



FCC PART 15C TEST REPORT No. 2012TAR192

for

Sony Mobile Communications AB

**GSM 850/900/1800/1900 quad bands and UMTS FDD 1/8 mobile
phone**

Type: PM-0090-BV

With

FCC ID: PY7PM-0090

IC No: 4170B-PM-0090

Hardware Version: A

Software Version: s_atp_lotus_0_0_98

Issued Date: 2012-05-04



No. DGA-PL-114/01-02

DAR accreditation (DIN EN ISO/IEC 17025): No. DGA-PL-114/01-02

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

Shouxiang Science Building, No 51, Xueyuan Road, Haidian District, Beijing, P.R.China 100191

Tel:+86(0)10-62304633-2678, Fax:+86(0)10-62304793 Email:welcome@emcite.com. www.emcite.com

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1. Test Laboratory

1.1. Testing Location

Company Name: TMC Beijing, Telecommunication Metrology Center of MIIT
Address: Shouxiang Science Building, No 51, Xueyuan Road, Haidian District,
Beijing, P.R.China
Postal Code: 100191
Telephone: 00861062304633
Fax: 00861062304793

1.2. Testing Environment

Normal Temperature: 15-35℃
Extreme Temperature: -20/+55℃
Relative Humidity: 30-60%
Air Pressure 990hPa-1040hPa

Note: The climatic requirements above are general exclude the special requirements for dedicated test environments listed in section 5 and some specific test cases in other parts of this report.

1.3. Project data

Project Leader: Zi Xiaogang
Testing Start Date: 2012-03-31
Testing End Date: 2012-05-04

1.4. Signature



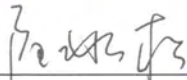
Zi Xiaogang

(Prepared this test report)



Song Chongwen

(Reviewed this test report)



Lu Bingsong

Deputy Director of the laboratory

(Approved this test report)

2. Client Information

2.1. Applicant Information

Company Name: Sony Mobile Communications (China) Co. Ltd
Address /Post: Sony Mobile R&D Center, No. 16, Guangshun South Street,
Chaoyang District
City: Beijing
Postal Code: 100102
Country: China
Contact: Ma, Gang
Telephone: +86-10-58656312
Fax: +86-10-58659049

2.2. Manufacturer Information

Company Name: Sony Mobile Communications AB
Address /Post: Nya Vattentorget, 22188 Lund, Sweden
City: Lund
Postal Code: 22188
Country: Sweden
Contact: Nordlof, Anders
Telephone: +46-10-802 3919
Fax: +46-10-800 2441

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

3.1. About EUT

Description	GSM 850/900/1800/1900 quad bands and UMTS FDD 1/8 mobile phone
Type	PM-0090-BV
FCC ID	PY7PM-0090
IC No	4170B-PM-0090
Frequency Range	ISM 2400MHz~2483.5MHz
Type of Modulation	GFSK/ π /4 DQPSK/8DPSK
Number of Channels	79
Cellular Frequency Band	GSM 850/900/1800/1900 and UMTS FDD 1/8
Support Functions	MP3, Camera, FM radio, USB memory, GPS receiver, Bluetooth (EDR), WLAN (802.11 b/g/n) and Wi-Fi hotspot
Antenna	Integral Antenna
MAX Radiated Power	10.43dBm EIRP(GFSK)
MAX Conducted Power	7.68dBm(GFSK)
Power Supply	3.7V DC by Battery

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

3.2. Internal Identification of EUT used during the test

EUT ID*	S/N	IMEI	HW Version	SW Version
#22007	CB5A1JZ6SP	004402144647355	A	s_atp_lotus_0_0_98

*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	SN	Revision
#20254	USB Cable	105012DB041877C	1

#20254

Commercial Name	EC450
Manufacturer	Sony
Length of cable	99cm

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

3.4. General Description

Equipment Under Test (EUT) is a model of GSM 850/900/1800/1900 quad bands and UMTS FDD 1/8 mobile phone with integrated antenna. It has MP3, Camera, FM radio, USB memory, GPS receiver, Bluetooth (EDR), WLAN (802.11 b/g/n) and Wi-Fi hotspot functions. It also supports GPRS function with multi-slots class 33 and EGPRS function with multi-slots class 33 too.

The HSDPA and HSUPA features are also supported.

It has MP3, Camera, FM radio, USB memory, GPS receiver, Bluetooth (EDR), WLAN (802.11 b/g/n) and Wi-Fi hotspot functions.

It consists of normal option: USB cable.

consists of normal options: Lithium Battery and Travel 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.	Oct,10 2009 Edition
ANSI C63.4	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
RSS - Gen Issue 3	Spectrum Management and Telecommunications - Radio Standards Specification General Requirements and Information for the Certification of Radiocommunication Equipment	2010-12
RSS -210 Issue8	Licence-exempt Radio Apparatus (All Frequency Bands): Category I Equipment	2010-12

5. LABORATORY ENVIRONMENT

Semi-anechoic chamber (23 meters×17meters×10meters) did not exceed following limits along the EMC testing:

Temperature	Min. = 15 °C, Max. = 30 °C
Relative humidity	Min. = 30 %, Max. = 60 %
Shielding effectiveness	> 110 dB
Electrical insulation	> 2 MΩ
Ground system resistance	< 0.5 Ω
Normalised site attenuation (NSA)	< ±3.2 dB, 10 m distance, from 30 to 1000 MHz
Uniformity of field strength	Between 0 and 6 dB, from 80 to 2000 MHz

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 chamber1 (6.8 meters×3.08 meters×3.53 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	< 0.5 Ω
Uniformity of field strength	Between 0 and 6 dB, from 80 to 3000 MHz

Fully-anechoic chamber2 (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
Uniformity of field strength	Between 0 and 6 dB, from 80 to 4000 MHz

Fully-anechoic chamber3 (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
Site voltage standing-wave ratio (S_{VSWR})	Between 0 and 6 dB, from 1GHz to 18GHz

Additional Humidity Requirements for Electrostatic Discharge Test: Min. = 30%, Max. = 60%.

6. SUMMARY OF TEST RESULTS

6.1. Summary of Test Results

SUMMARY OF MEASUREMENT RESULTS	Modulation	Sub-clause of Part15C	Sub-clause of IC	Verdict
Peak Output Power (Conducted)	GFSK/	15.247 (b)(1)	RSS-210 A8.4 (2)	P
	$\pi/4$ DQPSK			P
	8DPSK			P
Peak Output Power(Radiated)	GFSK	15.247 (b)(1)	RSS-210 A8.4 (2)	P
Antenna Gain	GFSK/	None	None	P
Frequency Band Edges	GFSK	15.247 (d)	RSS-210 A8.5	P
	$\pi/4$ DQPSK			P
	8DPSK			P
Conducted Emission	GFSK	15.247 (d)	RSS-210 A8.5	P
	$\pi/4$ DQPSK			P
	8DPSK			P
Radiated Emission	GFSK	15.247(d),15.205,15.209,15.109	RSS-210 A8.5	P
	$\pi/4$ DQPSK			P
	8DPSK			P
Time of Occupancy (Dwell Time)	GFSK	15.247 (a) (1)(iii)	RSS-210 A8.1 (4)	P
	$\pi/4$ DQPSK			P
	8DPSK			P
20dB Bandwidth	GFSK	15.247 (a)(1)	RSS-210 A8.1 (1)	P
	$\pi/4$ DQPSK			P
	8DPSK			P
Carrier Frequency Separation	GFSK	15.247 (a)(1)	RSS-210 A8.1 (2)	P
	$\pi/4$ DQPSK			P
	8DPSK			P
Number of hopping channels	GFSK	15.247 (a)(1)(iii)	RSS-210 A8.1 (4)	P
	$\pi/4$ DQPSK			P
	8DPSK			P
AC Powerline Conducted Emission	GFSK	15.107, 15.207	RSS-Gen 7.2.2	P

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

The measurement is made according to Public notice DA 00-705 and ANSI C63.4.

Terms used in Verdict column

P	Pass, The EUT complies with the essential requirements in the standard.
NP	Not Perform, The test was not performed by TMC
NA	Not Applicable, The test was not applicable
F	Fail, The EUT does not comply with the essential requirements in the

	standard
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6.2. Statements

The test cases as listed in section 6.1 of this report for the EUT specified in section 3 was performed by TMC and according to the standards or reference documents listed in section 4.2 The EUT met all requirements of the standards or reference documents.

6.3. Test Conditions

T nom	Normal Temperature
T min	Low Temperature
T max	High Temperature
V nom	Normal Voltage
V min	Low Voltage
V max	High Voltage
H nom	Norm Humidity
A nom	Norm Air Pressure

For this report, all the test case listed above are tested under Normal Temperature and Normal Voltage, and also under norm humidity, the specific conditions as following:

Temperature	T nom	26°C
Voltage	V nom	3.7V(By battery)
Humidity	H nom	44%
Air Pressure	A nom	1010hPa

7. Test Equipments Utilized

Conducted test system

No.	Equipment	Model	Serial Number	Manufacturer	Calibration Due date
1	Vector Signal Analyzer	FSU26	200030	Rohde & Schwarz	2012-09-25
2	Bluetooth Tester	CBT32	100649	Rohde & Schwarz	2012-08-17

Radiated emission test system

No.	Equipment	Model	Serial Number	Manufacturer	Calibration Due date
1	Test Receiver	ESI40	831564/002	Rohde & Schwarz	2012-09-25
2	EMI Antenna	VULB 9163	9163 301	Schwarzbeck	2012-09-25
3	EMI Antenna	3117	00034610	EMCO	2012-06-19
4	Dual-Ridge Waveguide Horn Antenna	3116	2663	EMCO	2012-08-27
5	Dual-Ridge Waveguide Horn Antenna	3116	2661	EMCO	2012-08-27
6	Universal Radio Communication Tester	CMU200	105948	Rohde & Schwarz	2012-08-17
7	LISN	ESH2-Z5	829991/012	Rohde & Schwarz	2013-06-08
8	Pre-amplifier(18GHz)	/	1005277	Rohde & Schwarz	/
9	Pre-amplifier(26.5GHz)	/	1005277	Rohde & Schwarz	/

Anechoic chamber

Fully anechoic chamber by Frankonia German.

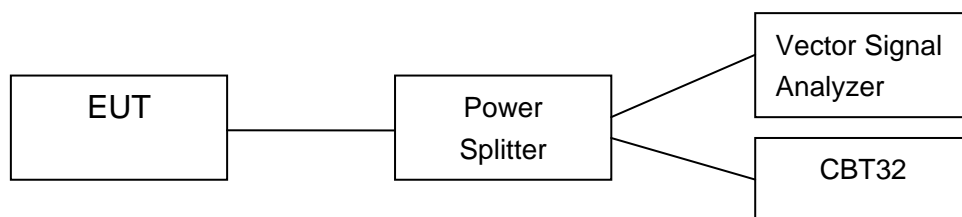
ANNEX A: MEASUREMENT RESULTS

A.1. Measurement Method

A.1.1. Conducted Measurements

The measurement is made according to Public notice DA 00-705 and ANSI C63.4.

- 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

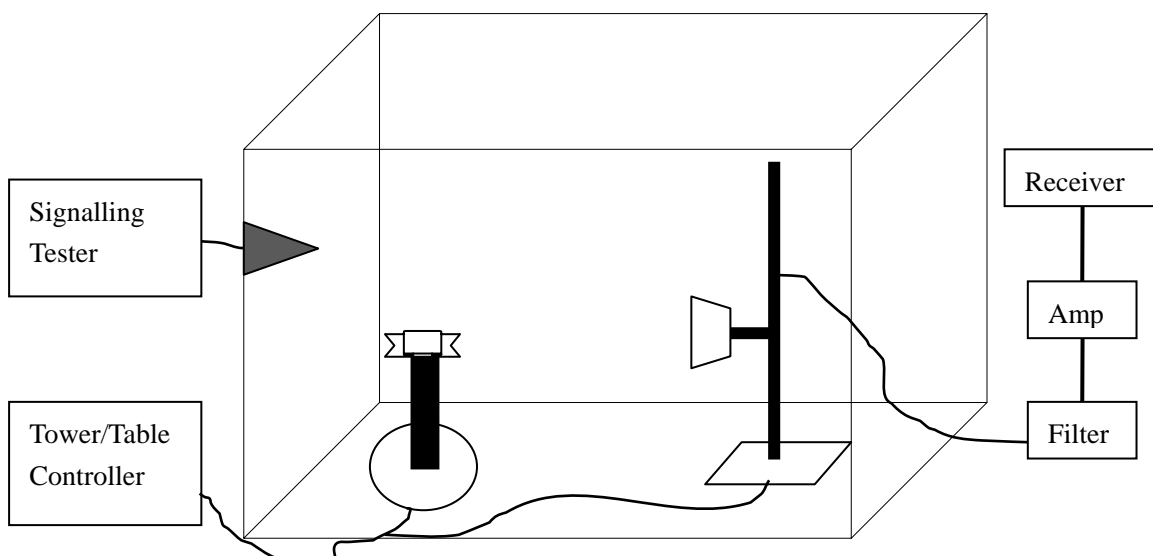
The measurement is made according to Public notice DA 00-705 and ANSI C63.4

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

Measurement Limit:

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

The measurement is made according to Public notice DA 00-705 and ANSI C63.4.

Measurement Results:

A.2.1 Antenna gain

The antenna gain of the complete system is calculated by the difference of radiated power in EIRP and the conducted power of the EUT.

Channel	Ch 0 2402 MHz	Ch 39 2441 MHz	Ch 78 2480 MHz
GFSK (Conducted)	6.77	7.36	7.68
GFSK (Radiated)	9.08	10.43	9.37
Gain(dBi)	2.31	3.07	1.69

Conclusion: PASS

A.2.2 Conducted Output Power

EUT ID: #22007

Peak(RBW=VBW=1MHz; SPAN=5MHz; Detector: Peak)

Channel	Ch 0 2402 MHz	Ch 39 2441 MHz	Ch 78 2480 MHz	Conclusion
GFSK (dBm)	6.77	7.36	7.68	P
$\pi/4$ DQPSK (dBm)	4.43	5.23	5.25	P
8DPSK (dBm)	5.00	5.75	5.81	P

Average(RBW=VBW=1MHz; SPAN=5MHz; Detector: RMS)

Channel	Ch 0 2402 MHz	Ch 39 2441 MHz	Ch 78 2480 MHz	Conclusion
GFSK (dBm)	6.72	7.30	7.59	P
$\pi/4$ DQPSK (dBm)	2.69	3.73	3.50	P
8DPSK (dBm)	2.72	3.62	3.59	P

Measurement Uncertainty: ± 1.17 dB

Conclusion: PASS

A.2.4 Radiated Output Power

EUT ID: #22007

Peak(RBW=VBW=1MHz; SPAN=5MHz; Detector: Peak)

Channel	Ch 0 2402 MHz	Ch 39 2441 MHz	Ch 78 2480 MHz	Conclusion
GFSK (dBm)	9.08	10.43	9.37	P

Average

Channel	Ch 0 2402 MHz	Ch 39 2441 MHz	Ch 78 2480 MHz	Conclusion
GFSK * (dBm)	9.03	10.37	9.28	P

Note:* These values are calculated with the antenna gain

Measurement Uncertainty: $\pm 1.98\text{dB}$

Conclusion: PASS

A.3. Frequency Band Edges

Measurement Limit:

Standard	Limit (dBc)
FCC 47 CFR Part 15.247 (d)/ RSS-210 A8.5	<-20 Note: The measurement results are calculated as power measured in any 100KHz bandwidth outside the frequency band in dBm minus power measured in the 100 kHz bandwidth within the band that contains the highest level of the desired power.

The measurement is made according to Public notice DA 00-705 and ANSI C63.4.

Measurement Condition:

RBW=VBW=100KHz; SPAN=10MHz; Detector: peak

Measurement Result:

EUT ID: #22007

For GFSK

Channel	Hopping	Band Edge Power (dBc)		Conclusion
0	Hopping OFF	Fig.1	-56.82	P
	Hopping ON	Fig.2	-56.86	P
78	Hopping OFF	Fig.3	-58.70	P
	Hopping ON	Fig.4	-56.59	P

For $\pi/4$ DQPSK

Channel	Hopping	Band Edge Power (dBc)		Conclusion
0	Hopping OFF	Fig.5	-56.36	P
	Hopping ON	Fig.6	-55.31	P
78	Hopping OFF	Fig.7	-59.62	P
	Hopping ON	Fig.8	-53.54	P

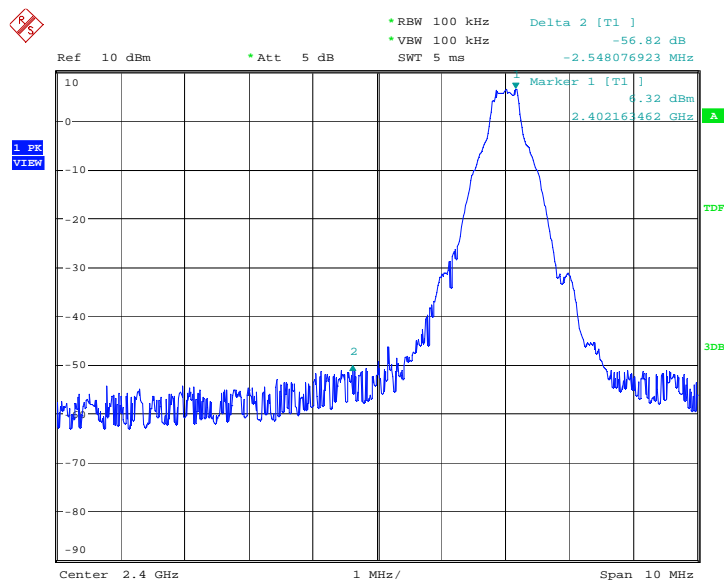
For 8DPSK

Channel	Hopping	Band Edge Power (dBc)		Conclusion
0	Hopping OFF	Fig.9	-56.72	P
	Hopping ON	Fig.10	-56.87	P
78	Hopping OFF	Fig.11	-57.52	P
	Hopping ON	Fig.12	-55.33	P

Measurement Uncertainty: $\pm 1.37\text{dB}$

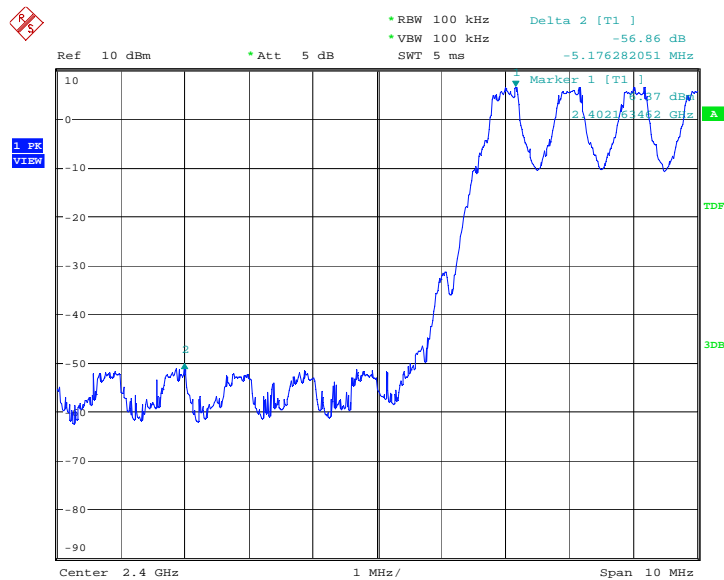
Conclusion: PASS

Test graphs as below



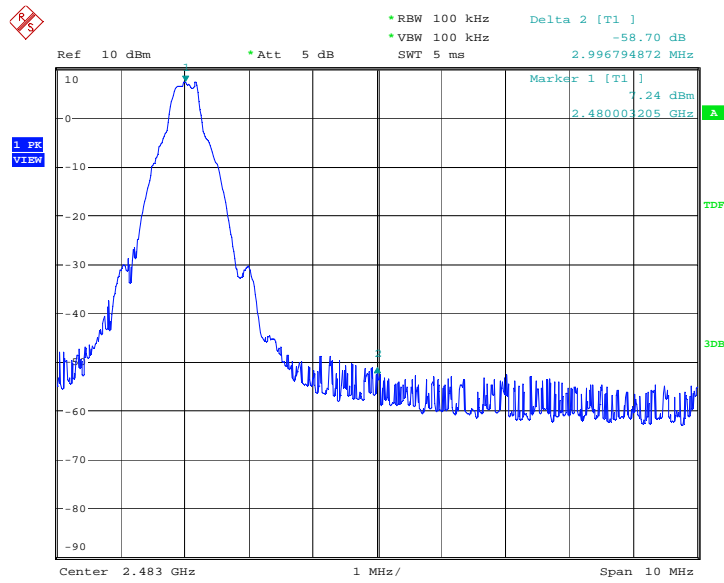
Date: 31.MAR.2012 10:09:49

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



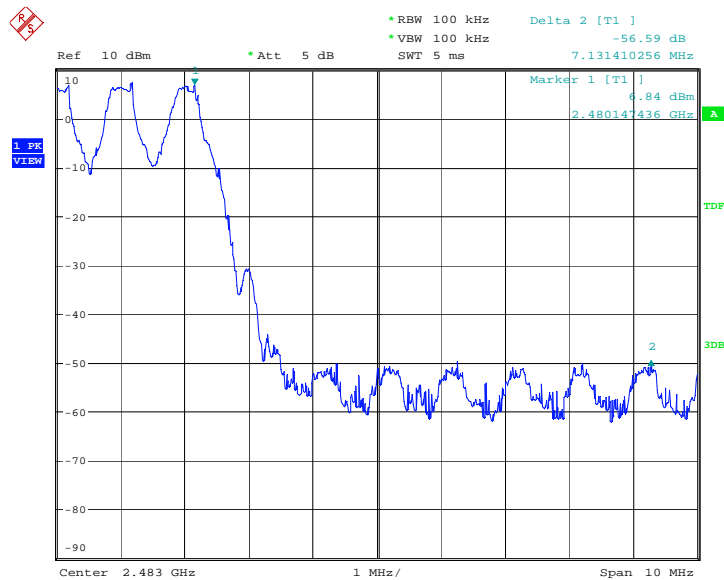
Date: 31.MAR.2012 10:12:08

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



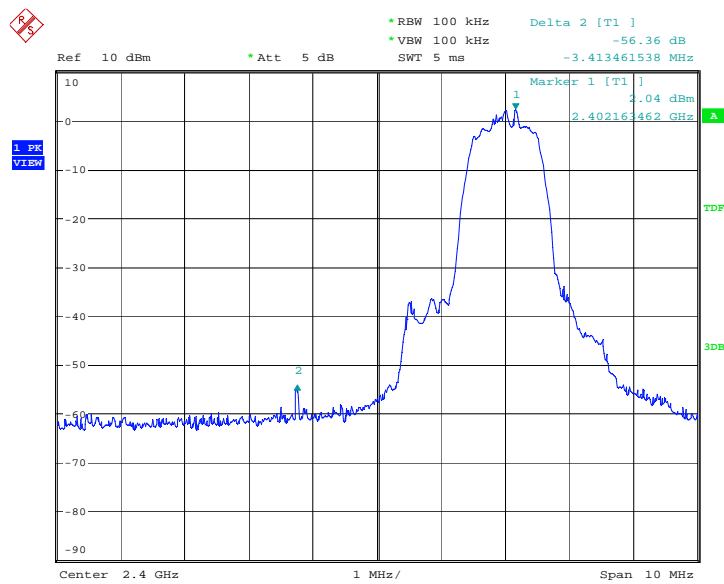
Date: 31.MAR.2012 10:10:06

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



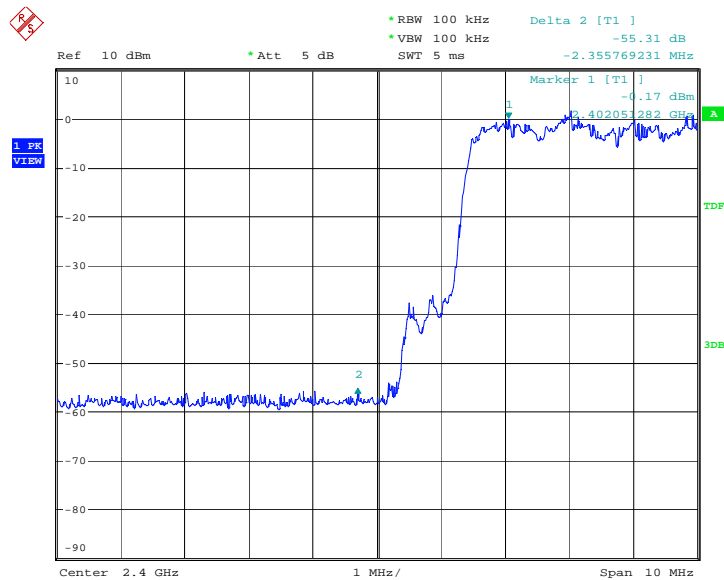
Date: 31.MAR.2012 10:14:11

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



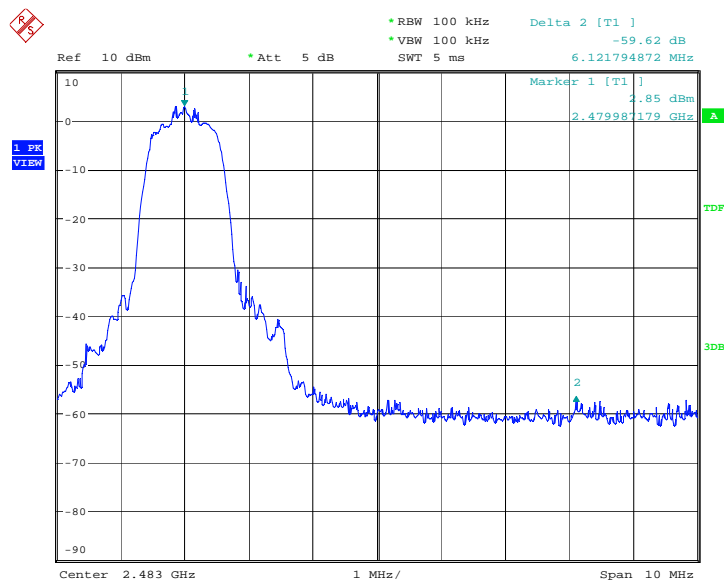
Date: 31.MAR.2012 10:31:56

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



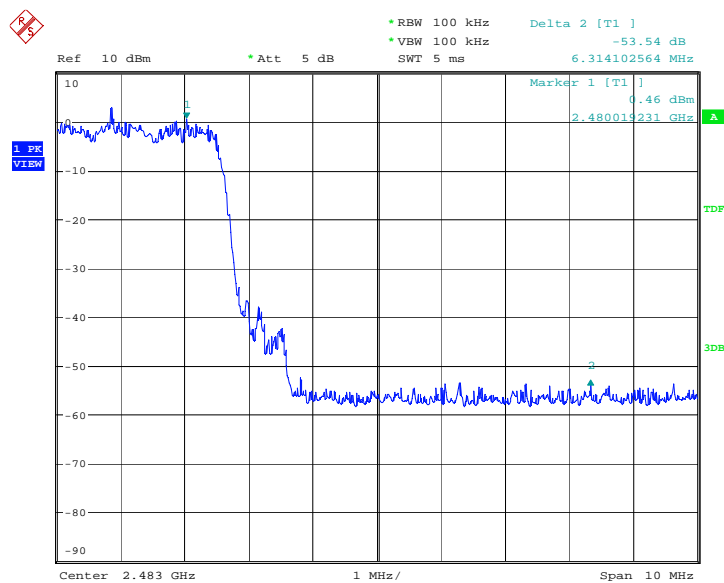
Date: 31.MAR.2012 10:34:16

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



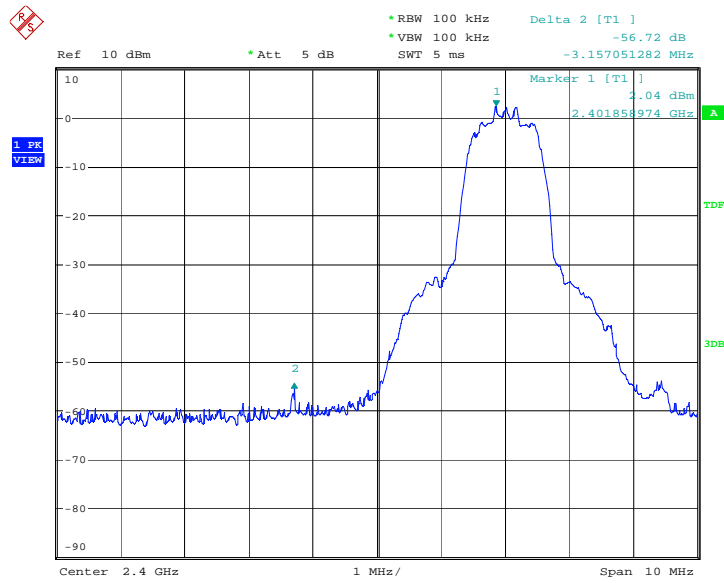
Date: 31.MAR.2012 10:32:14

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



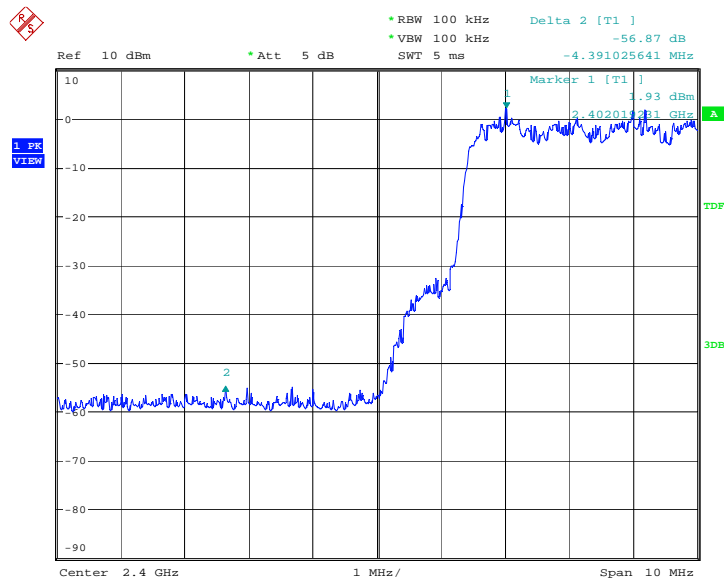
Date: 31.MAR.2012 10:36:19

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



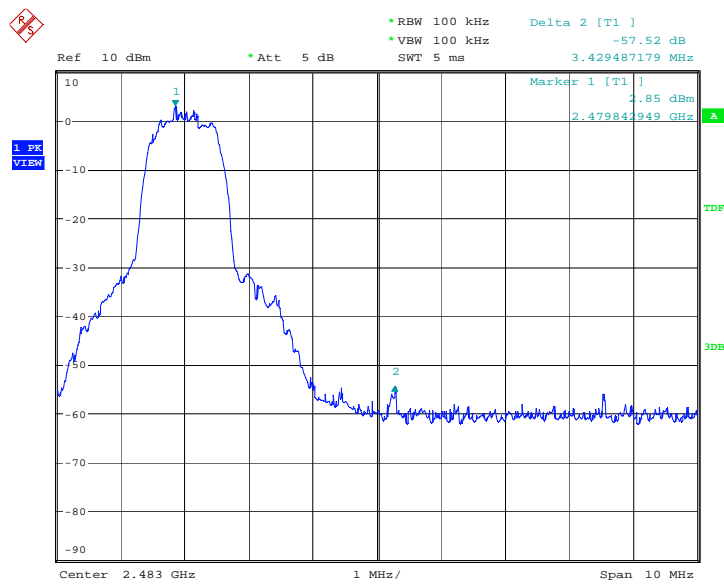
Date: 31.MAR.2012 10:54:02

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



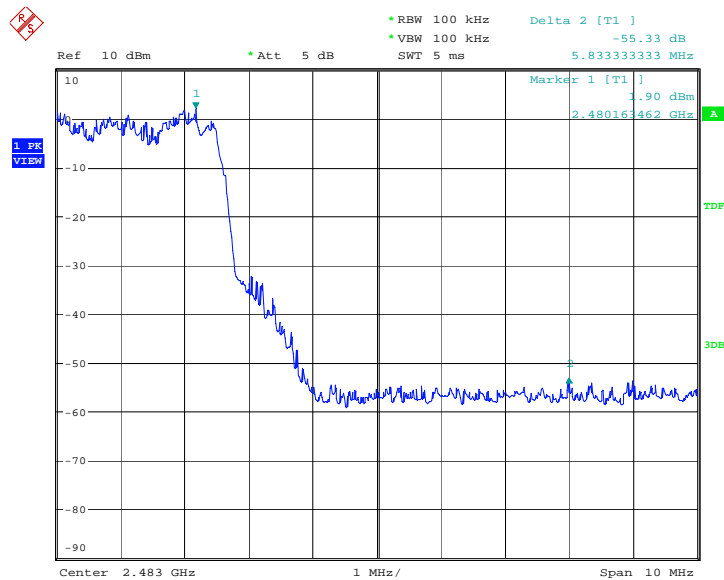
Date: 31.MAR.2012 10:56:22

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



Date: 31.MAR.2012 10:54:20

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



Date: 31.MAR.2012 10:58:23

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 Public notice DA 00-705 and ANSI C63.4

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

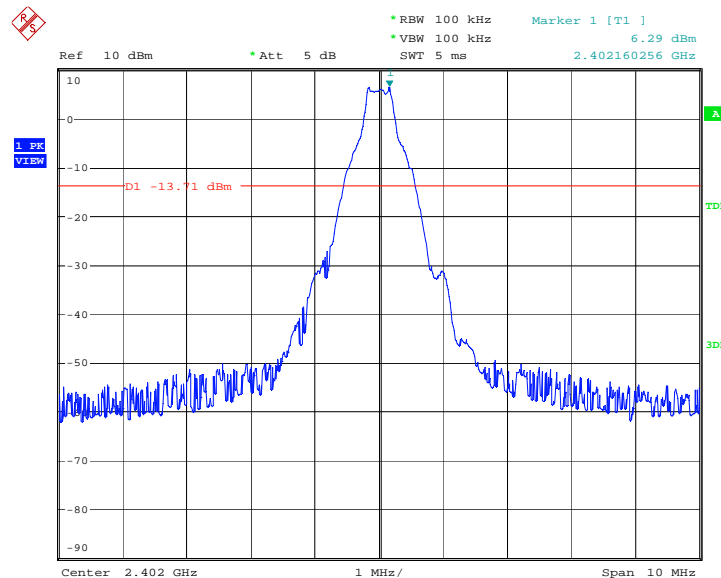
	3 GHz ~ 10 GHz	Fig.41	P
	10 GHz ~ 26 GHz	Fig.42	P

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

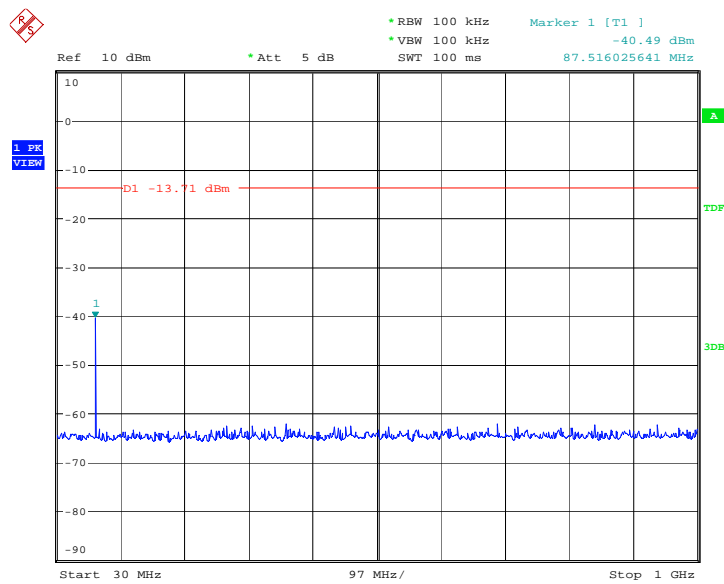
Conclusion: PASS

Test graphs as below



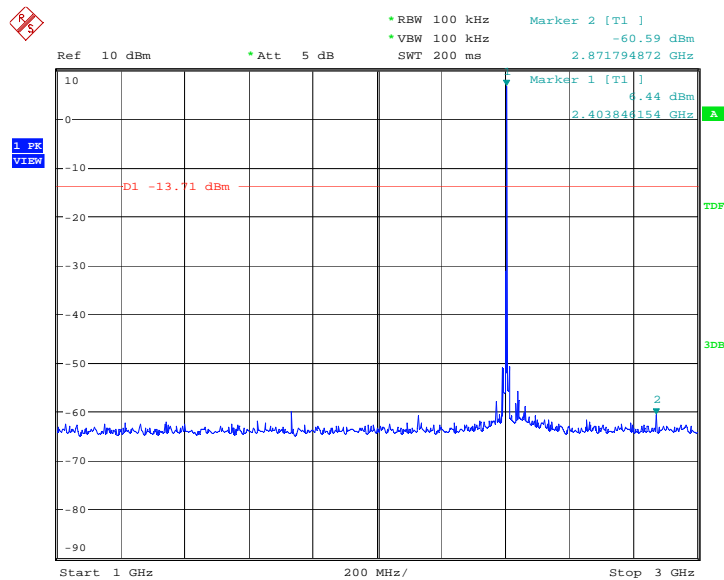
Date: 31.MAR.2012 10:14:30

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



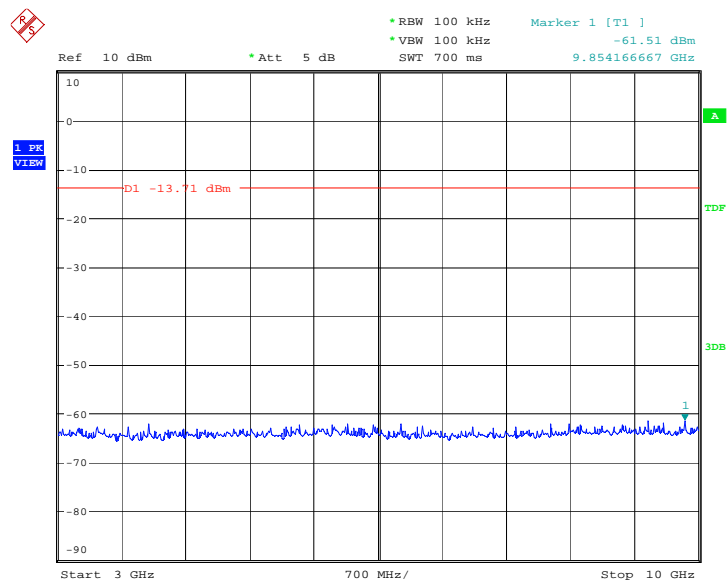
Date: 31.MAR.2012 10:14:46

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



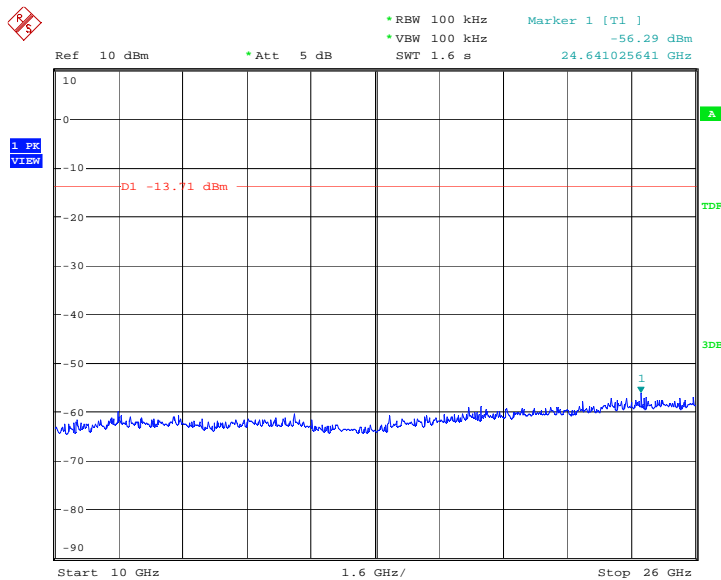
Date: 31.MAR.2012 10:15:18

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



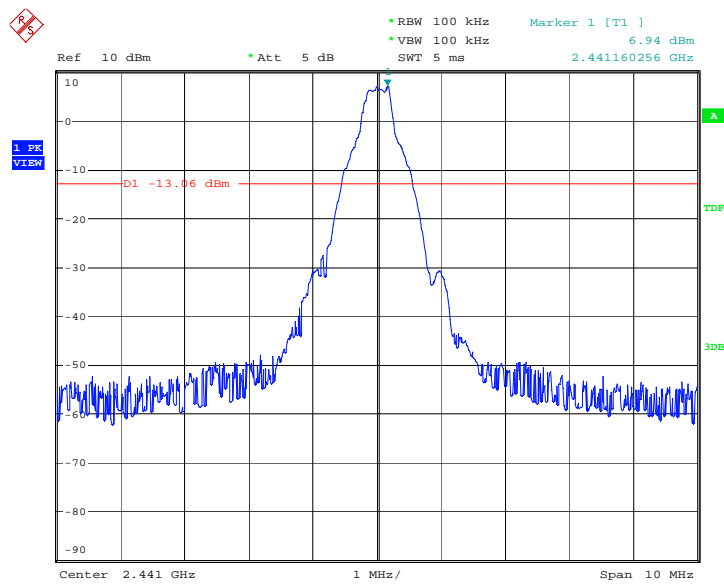
Date: 31.MAR.2012 10:15:35

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



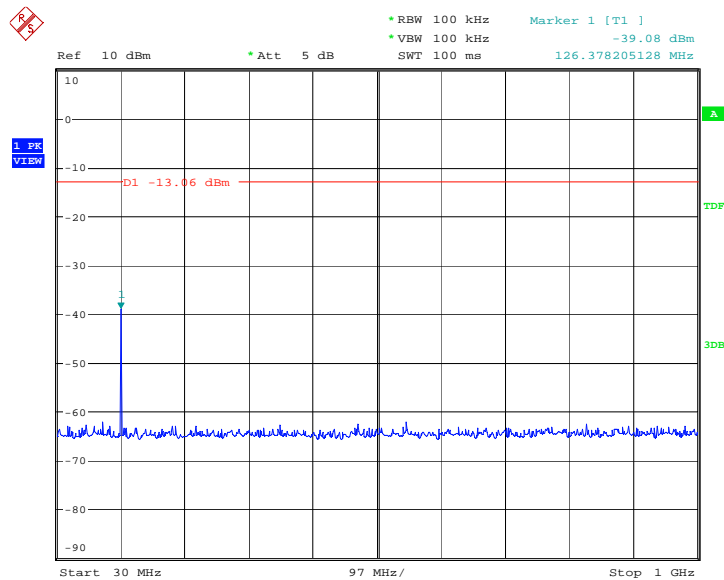
Date: 31.MAR.2012 10:15:51

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



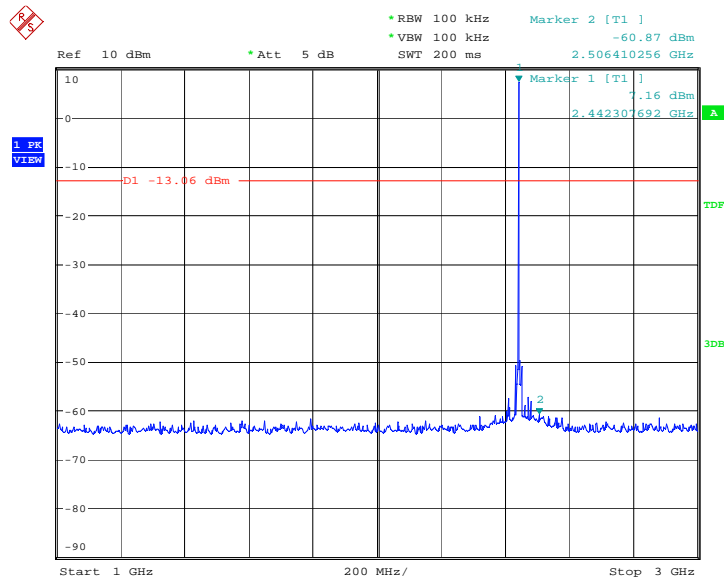
Date: 31.MAR.2012 10:16:08

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



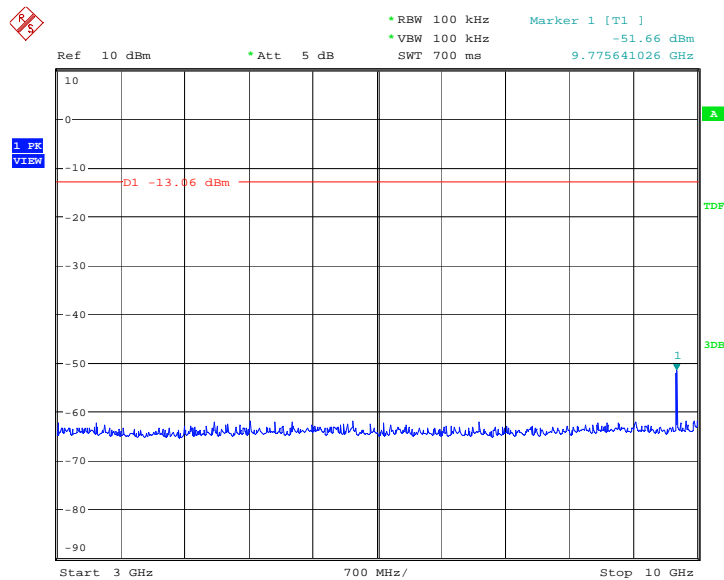
Date: 31.MAR.2012 10:16:25

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



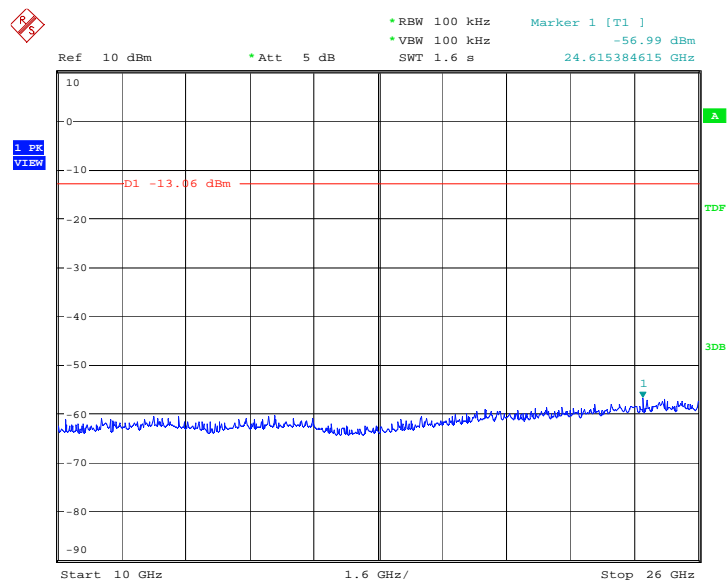
Date: 31.MAR.2012 10:16:56

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



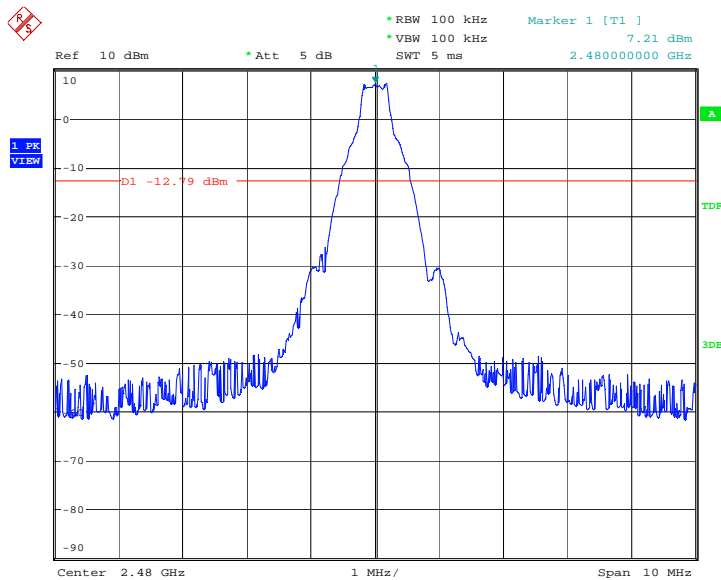
Date: 31.MAR.2012 10:17:13

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



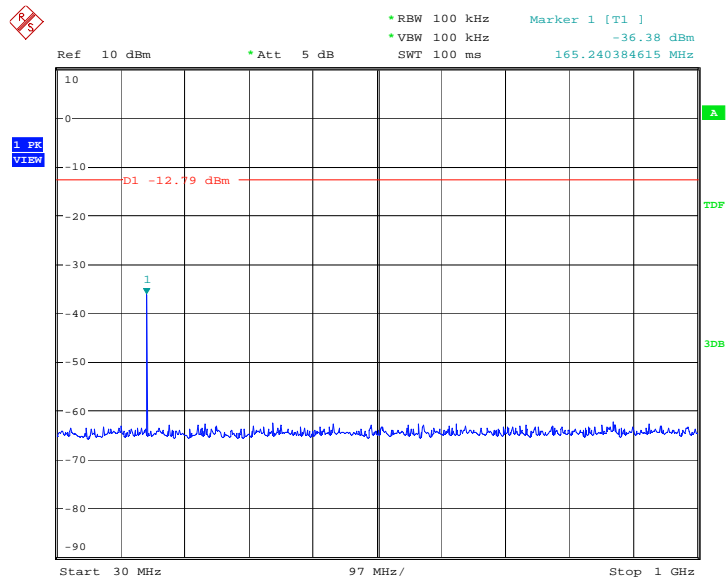
Date: 31.MAR.2012 10:17:29

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



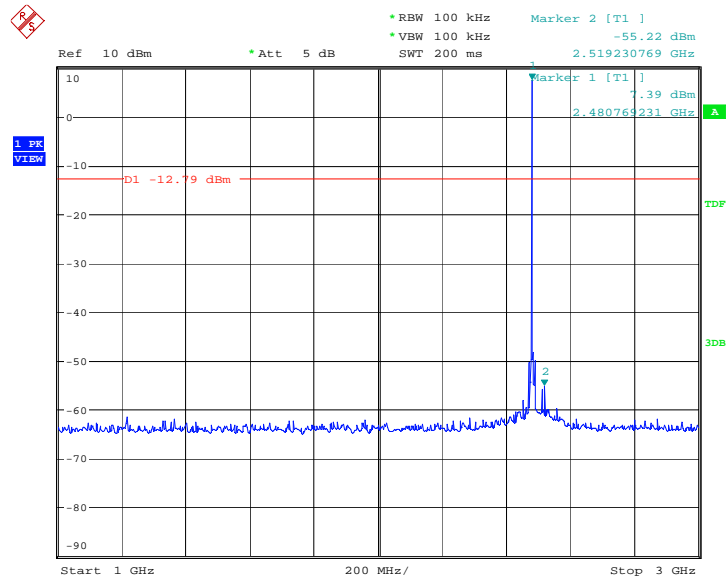
Date: 31.MAR.2012 10:17:46

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



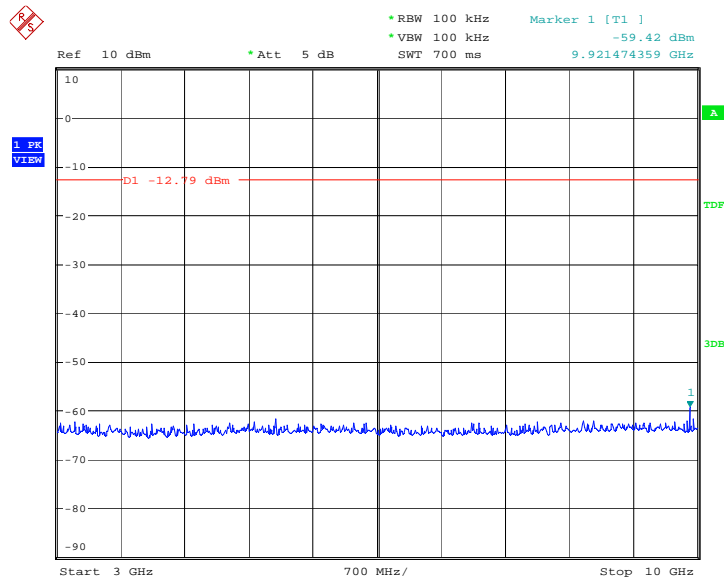
Date: 31.MAR.2012 10:18:03

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



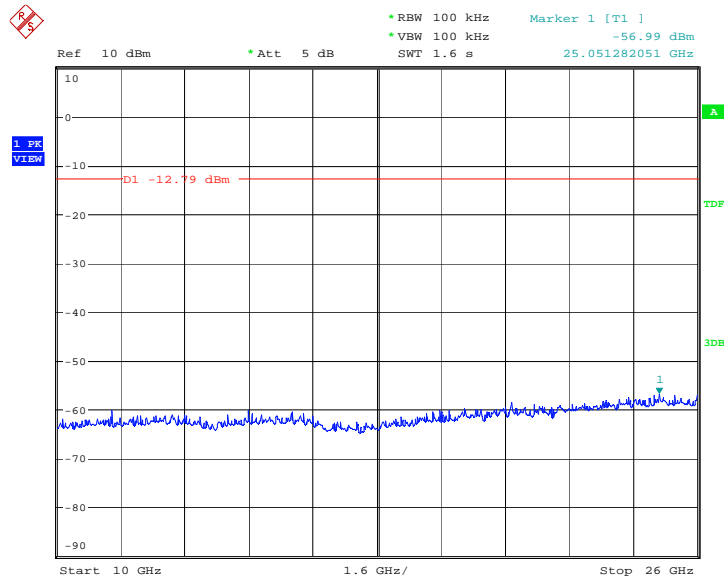
Date: 31.MAR.2012 10:18:34

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



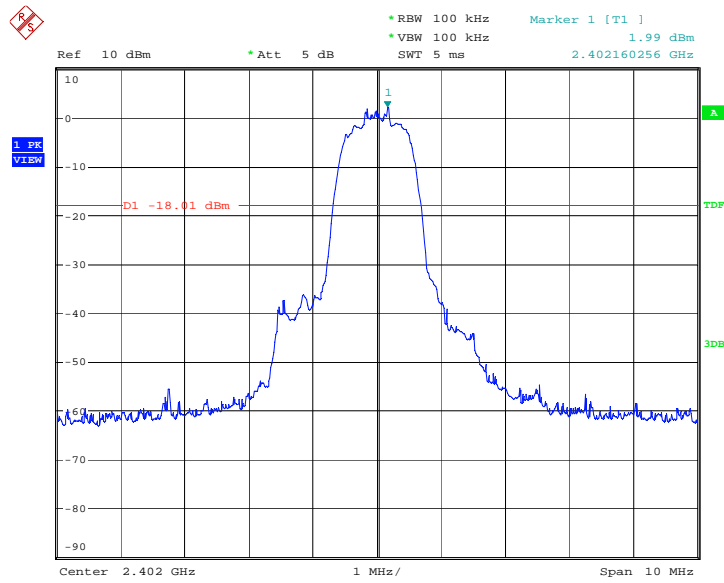
Date: 31.MAR.2012 10:18:51

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



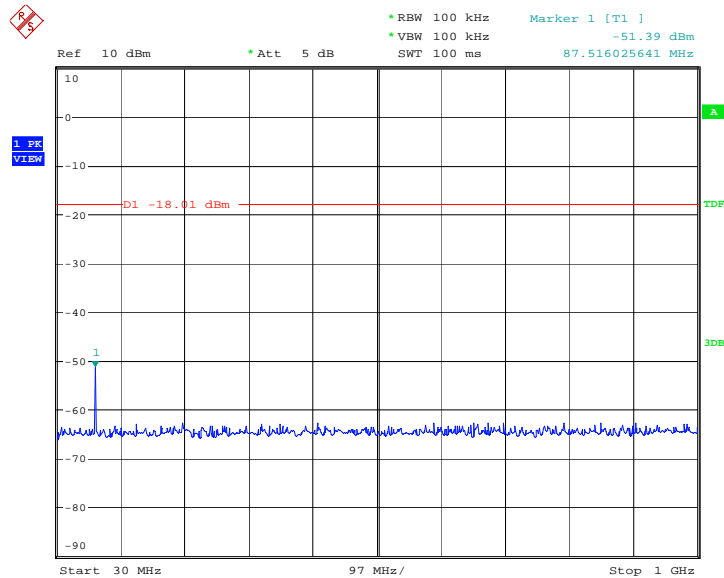
Date: 31.MAR.2012 10:19:07

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



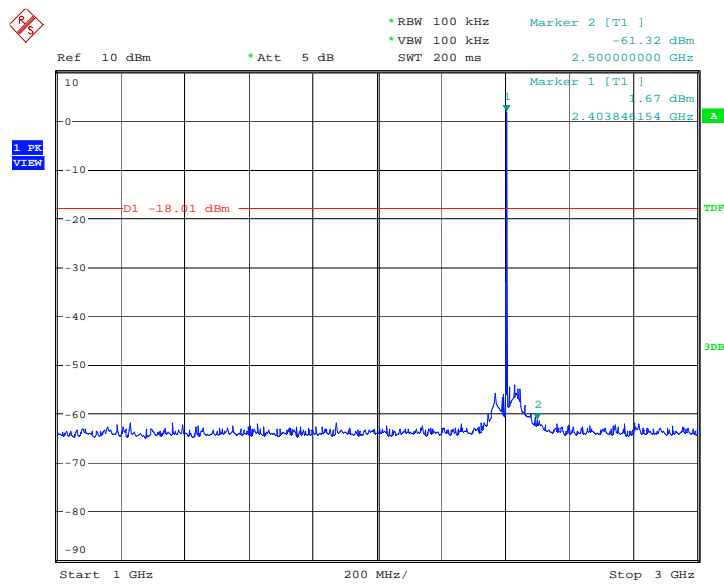
Date: 31.MAR.2012 10:36:38

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



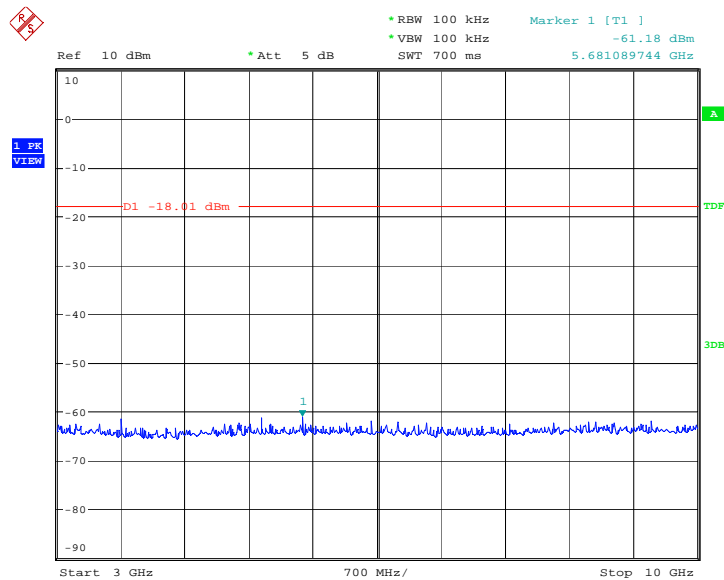
Date: 31.MAR.2012 10:36:55

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



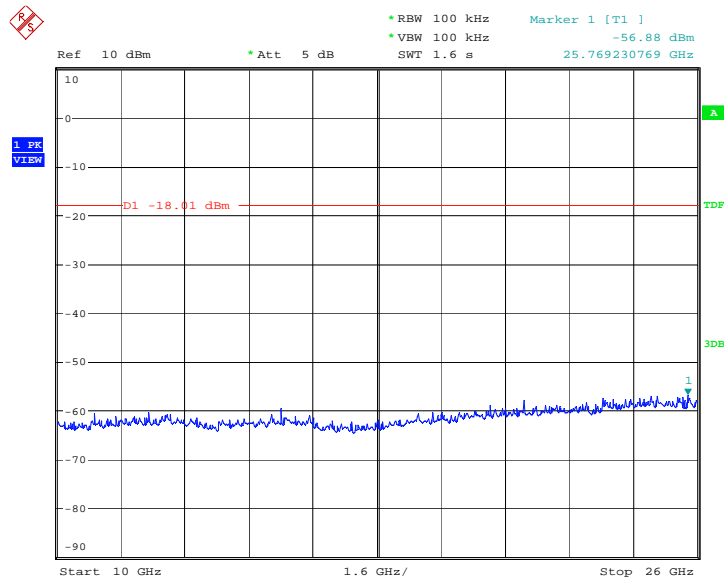
Date: 31.MAR.2012 10:37:26

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



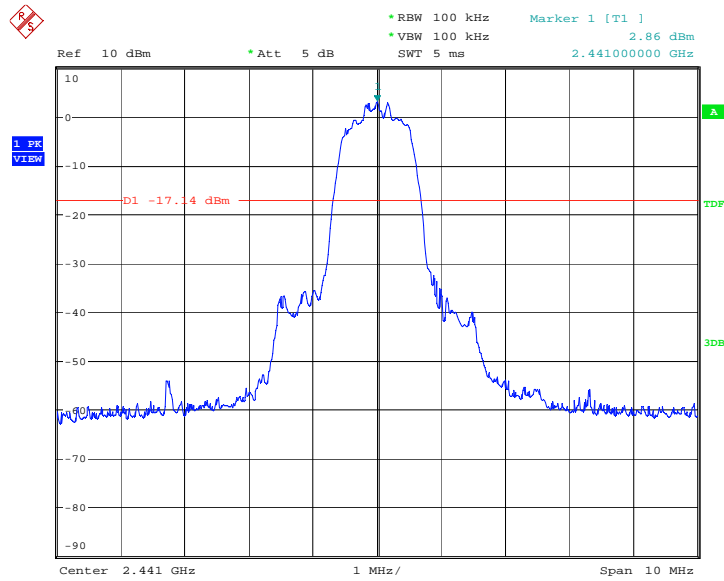
Date: 31.MAR.2012 10:37:43

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



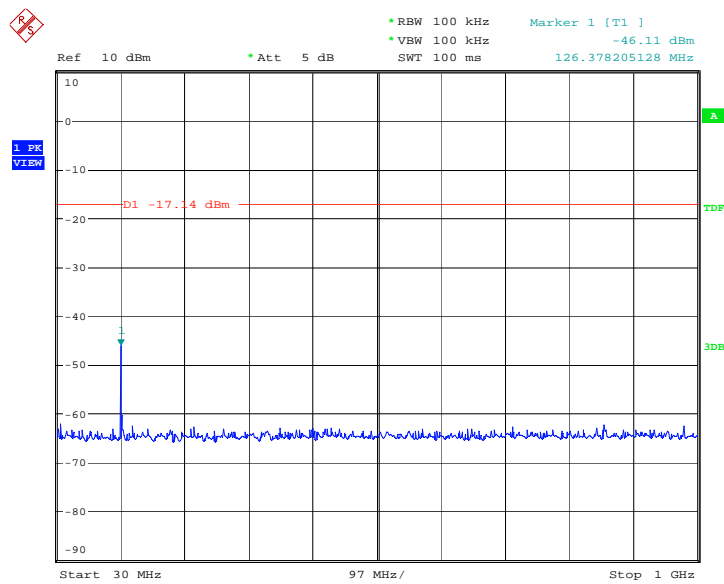
Date: 31.MAR.2012 10:37:59

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



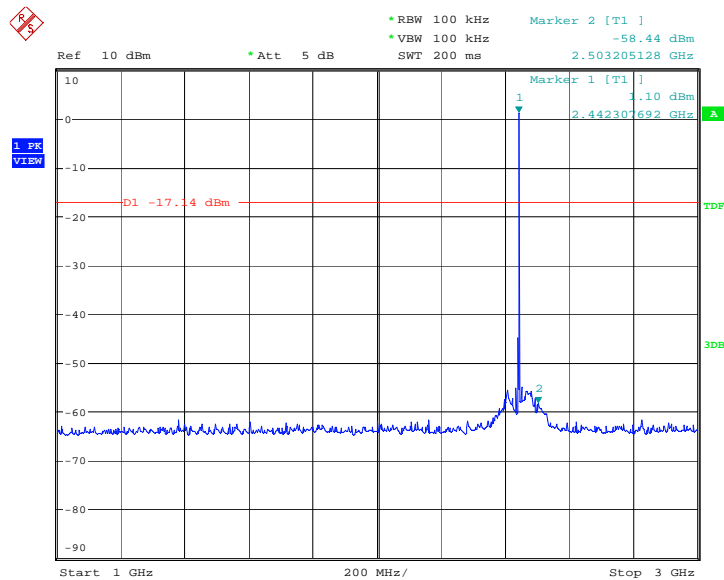
Date: 31.MAR.2012 10:38:16

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



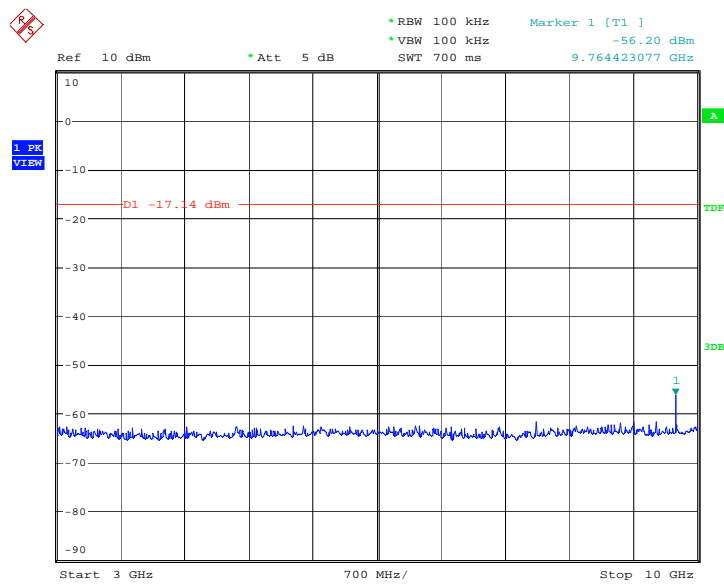
Date: 31.MAR.2012 10:38:33

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



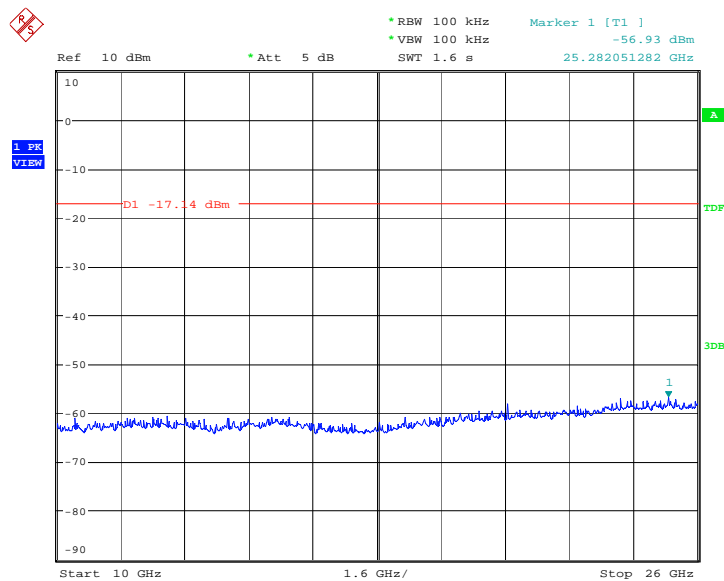
Date: 31.MAR.2012 10:39:04

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



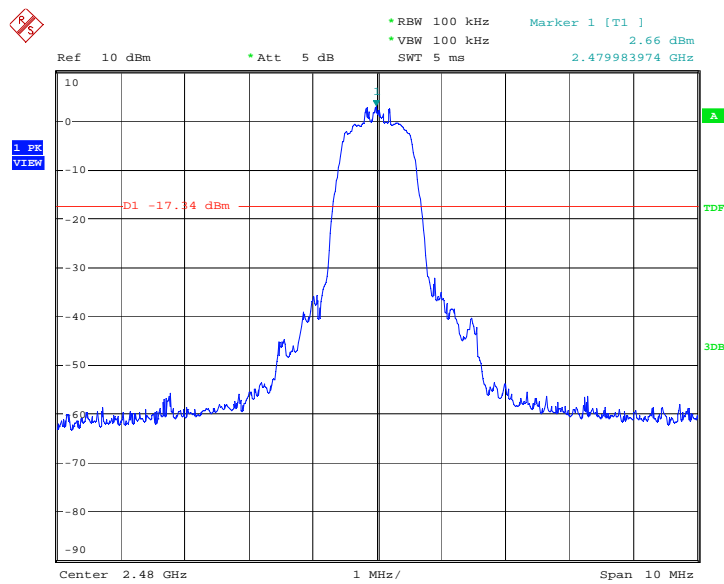
Date: 31.MAR.2012 10:39:21

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



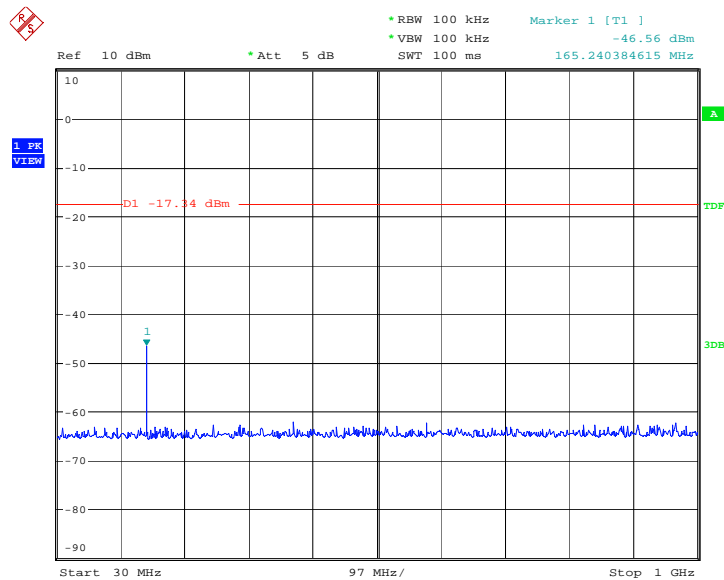
Date: 31.MAR.2012 10:39:38

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



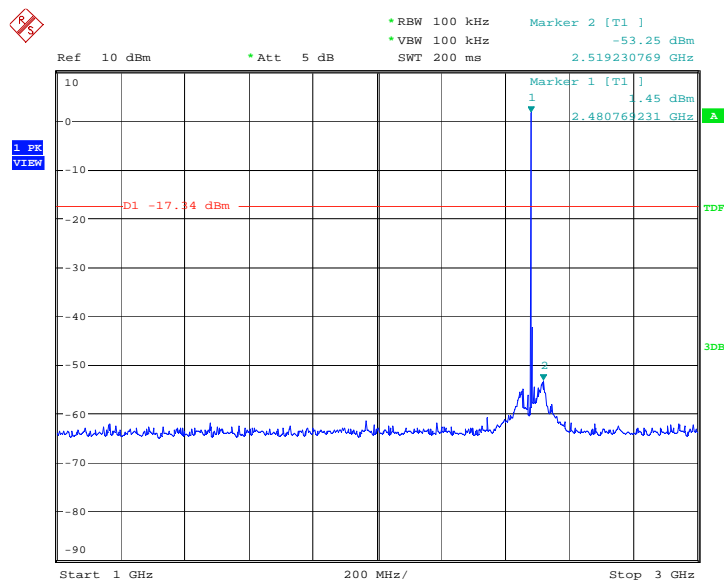
Date: 31.MAR.2012 10:39:54

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



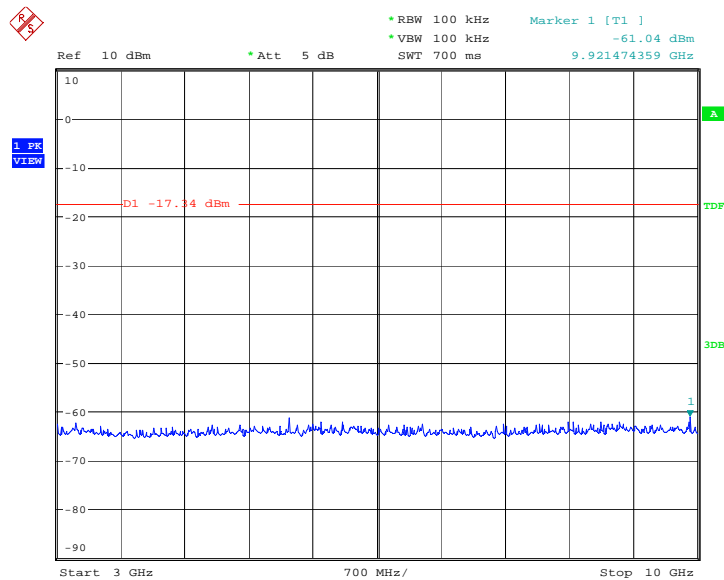
Date: 31.MAR.2012 10:40:11

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



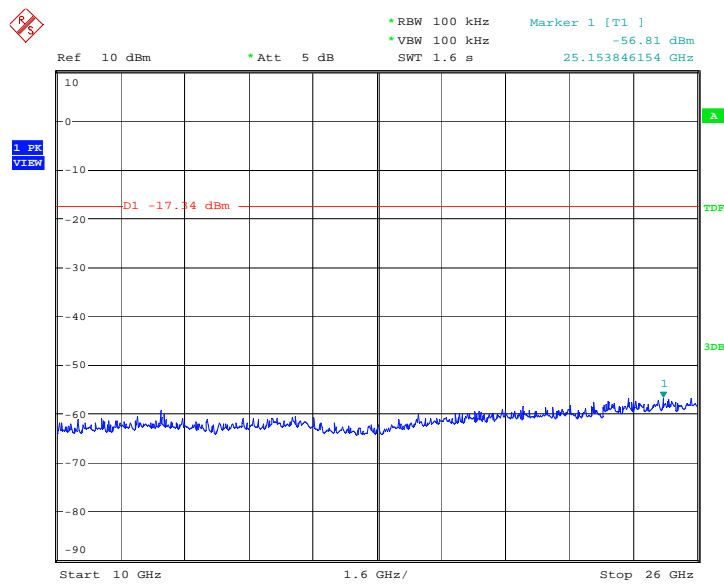
Date: 31.MAR.2012 10:40:42

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



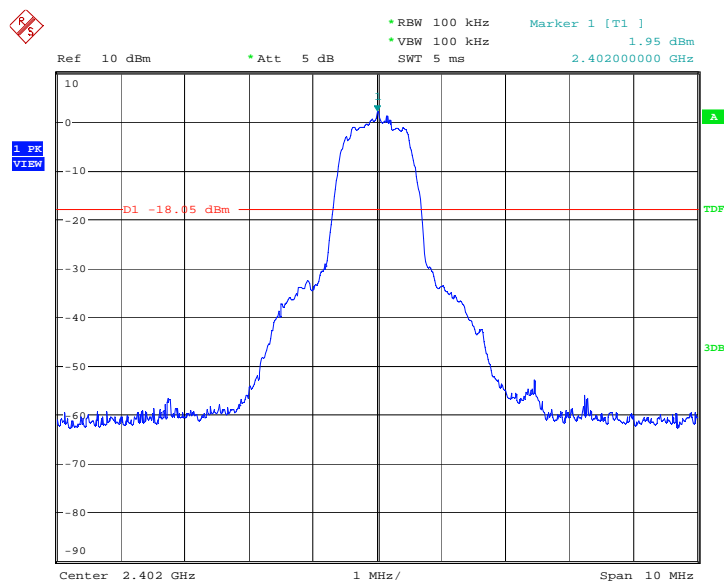
Date: 31.MAR.2012 10:40:59

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



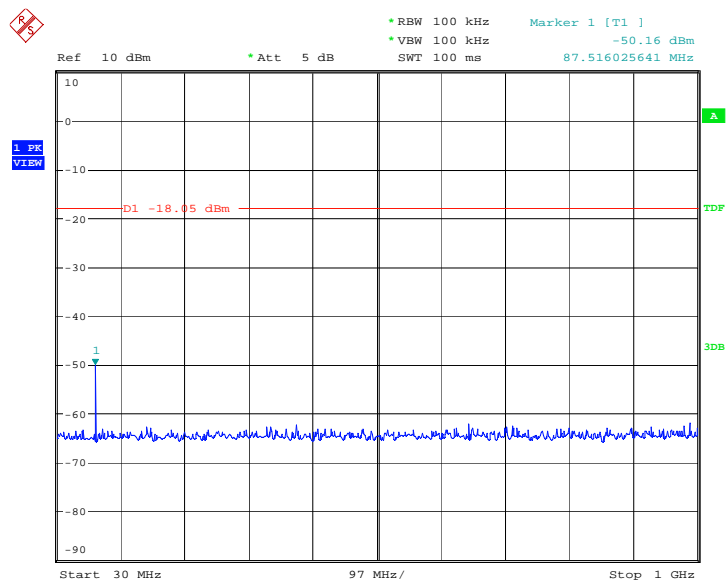
Date: 31.MAR.2012 10:41:16

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



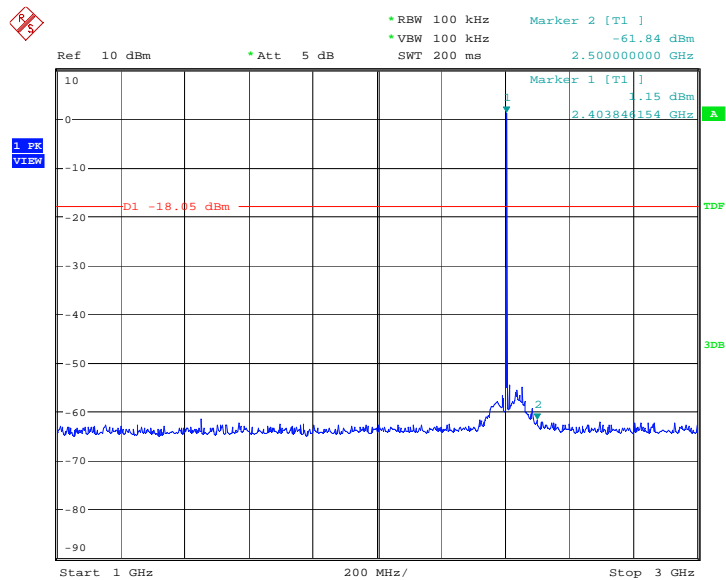
Date: 31.MAR.2012 10:58:42

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



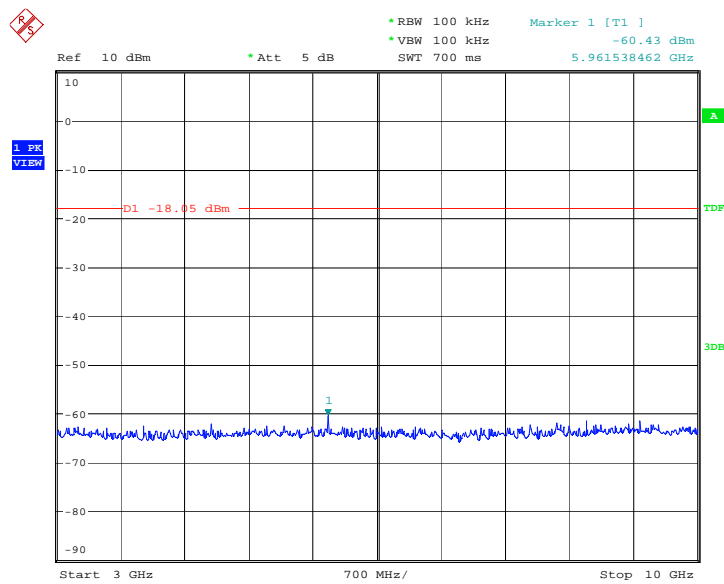
Date: 31.MAR.2012 10:58:59

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



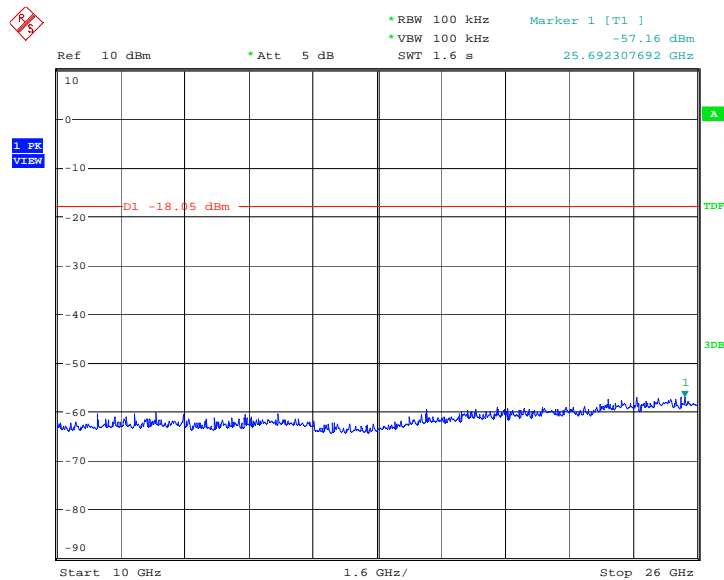
Date: 31.MAR.2012 10:59:30

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



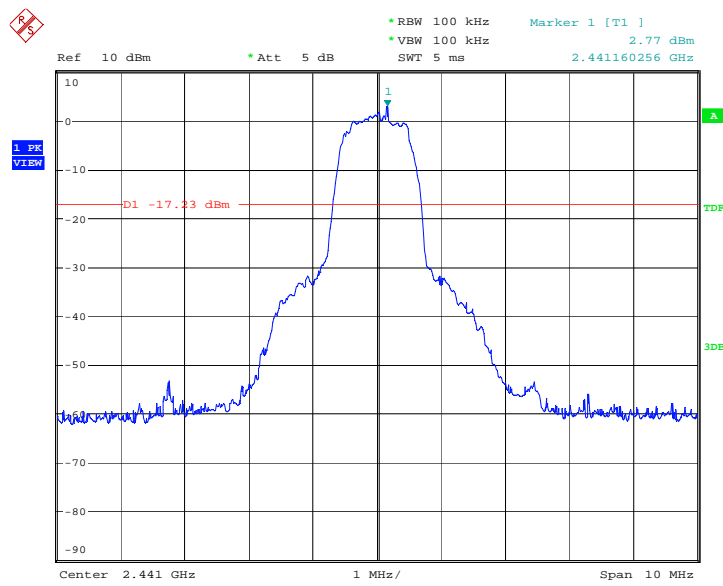
Date: 31.MAR.2012 10:59:47

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



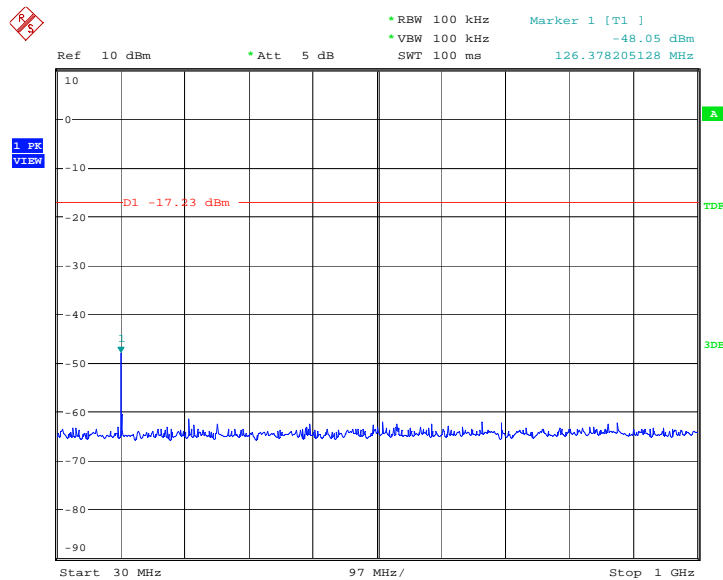
Date: 31.MAR.2012 11:00:03

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



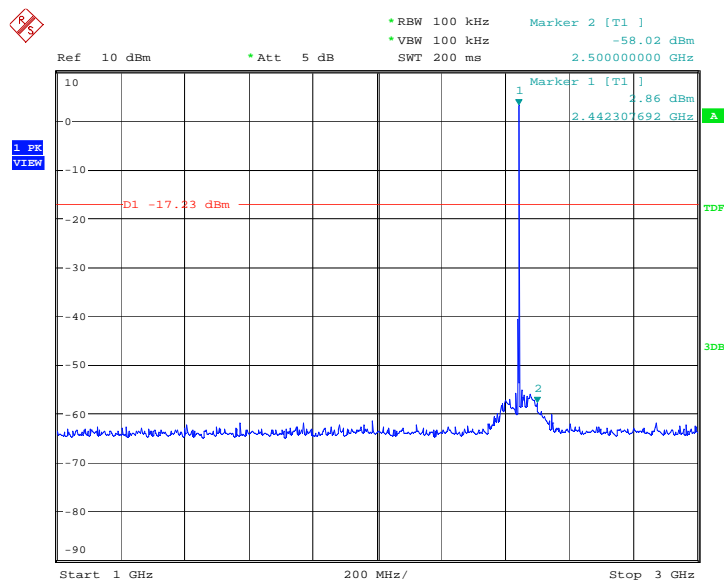
Date: 31.MAR.2012 11:00:20

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



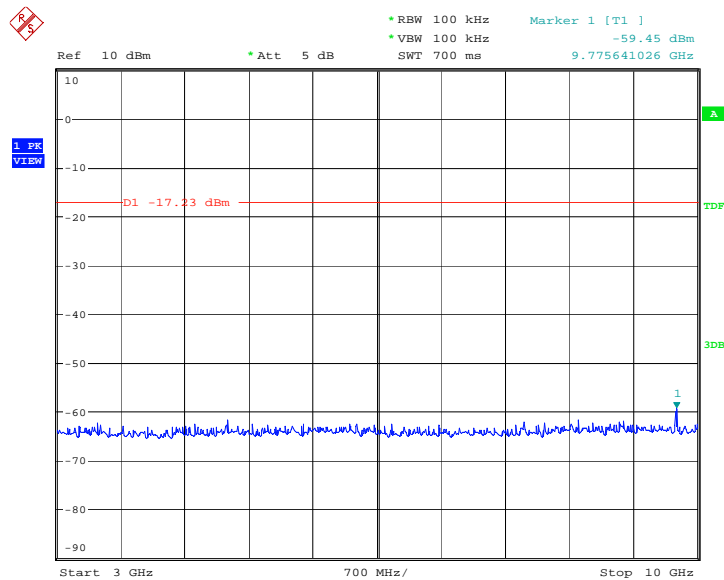
Date: 31.MAR.2012 11:00:37

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



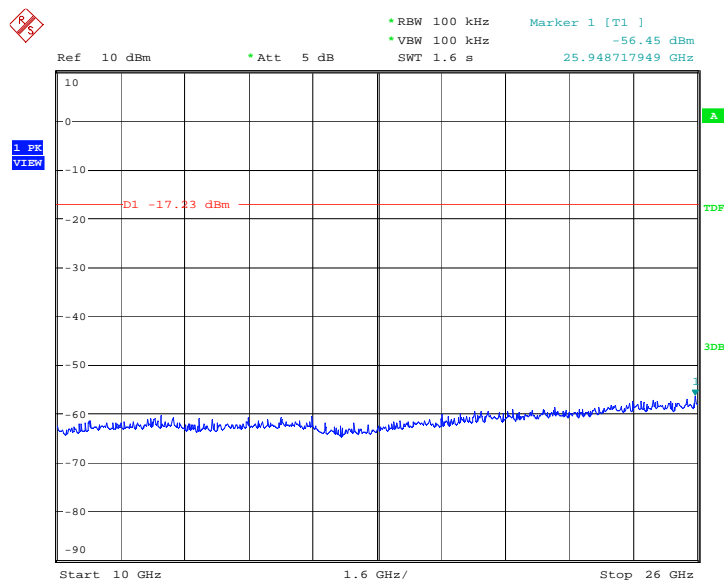
Date: 31.MAR.2012 11:01:08

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



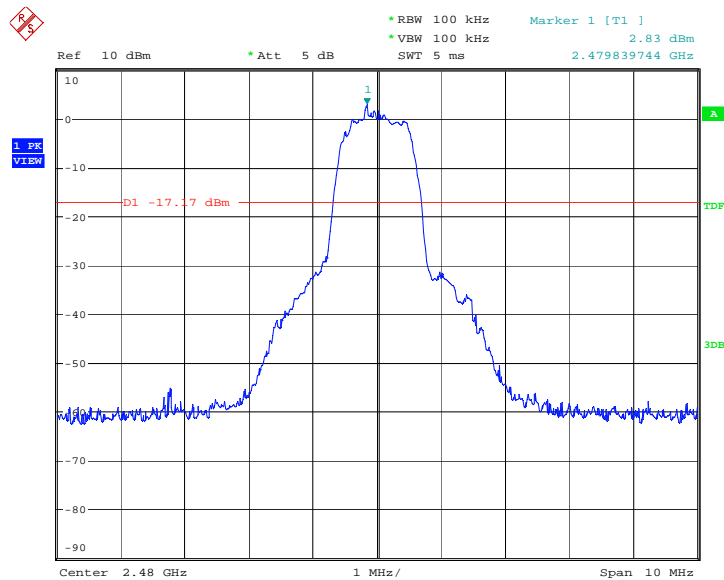
Date: 31.MAR.2012 11:01:25

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



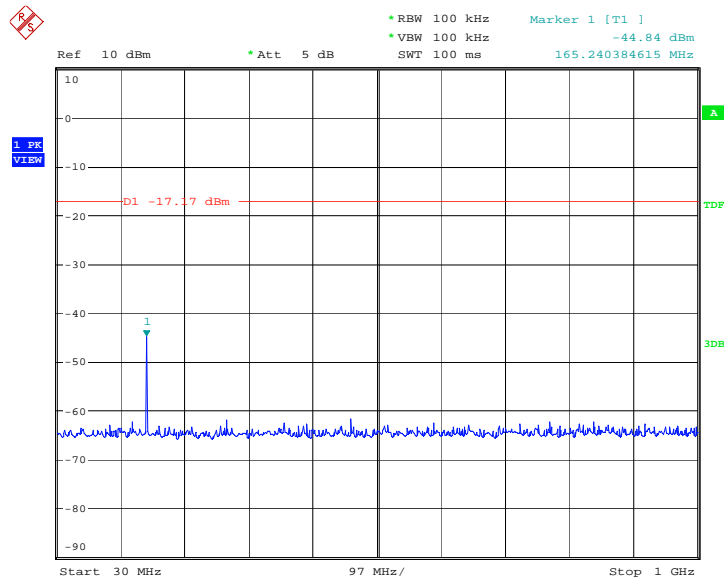
Date: 31.MAR.2012 11:01:41

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



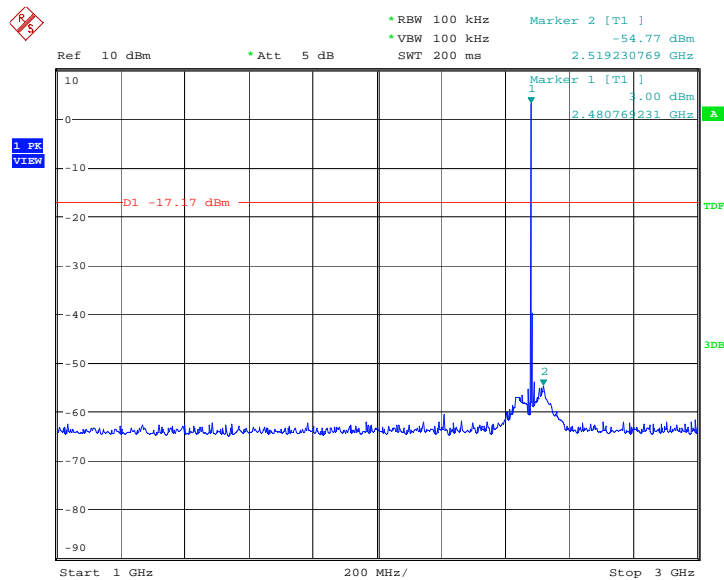
Date: 31.MAR.2012 11:01:58

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



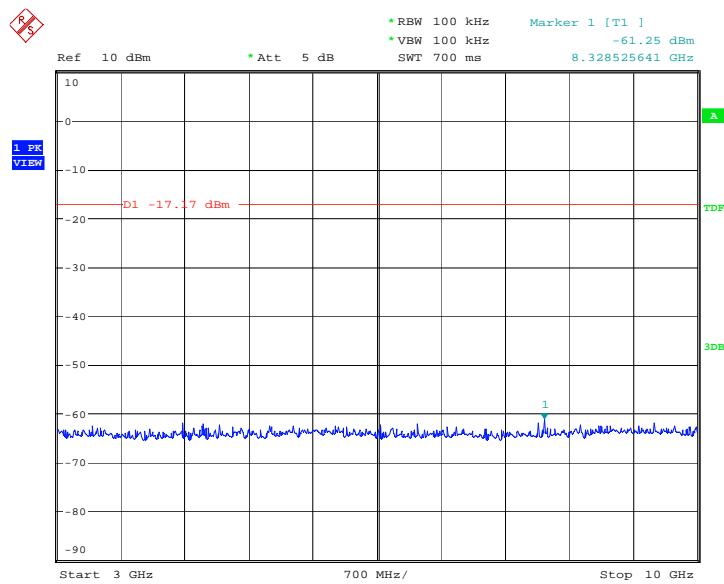
Date: 31.MAR.2012 11:02:15

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



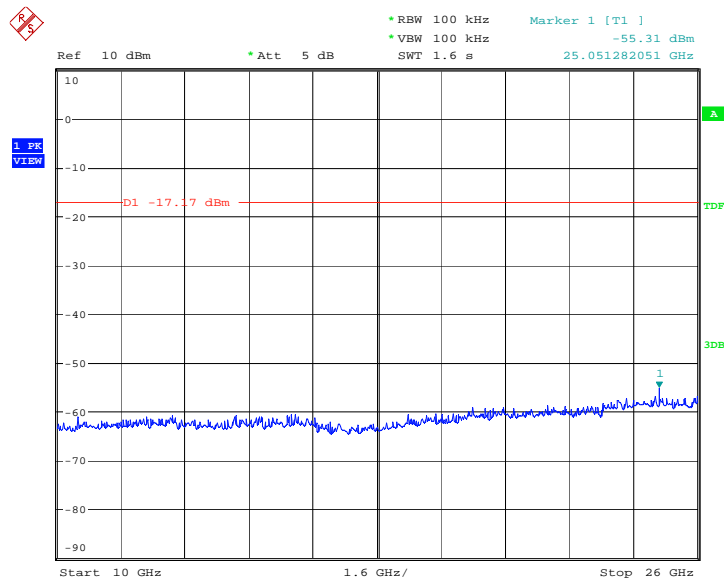
Date: 31.MAR.2012 11:02:46

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



Date: 31.MAR.2012 11:03:02

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



Date: 31.MAR.2012 11:03:18

Fig.57. Conducted spurious emission: 8DPSK, Channel 78, 1GHz - 26GHz

A.5. Radiated Emission

Measurement Limit:

Standard	Limit
FCC 47 CFR Part 15.247, 15.205, 15.209	Listed as follows
RSS-210 A8.5	

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

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 Public notice DA 00-705 and ANSI C63.4

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)
0.009-30	100KHz/300KHz	5
30-1000	100KHz/300KHz	5
1000-4000	1MHz/1MHz	15
4000-18000	1MHz/1MHz	40
18000-26500	1MHz/1MHz	20

Measurement Results:

A "reference path loss" is established and the A_{Rpl} is the attenuation of "reference path loss", and including the gain of receive antenna, the gain of the preamplifier, the cable los.

The measurement results are obtained as described below:

$$\text{Result} = P_{\text{Mea}} + A_{\text{Rpl}}$$

For GFSK

Channel	Frequency Range	Test Results	Conclusion
Ch 0 2402 MHz	9KHz~ 30MHz	Fig.58	P
	30 MHz ~ 1 GHz	Fig.59	P
	1 GHz ~ 4 GHz	Fig.60	P
	4 GHz ~ 18 GHz	Fig.61	P
Ch 39 2441 MHz	9KHz~ 30MHz	Fig.62	P
	30 MHz ~ 1 GHz	Fig.63	P
	1 GHz ~ 4 GHz	Fig.64	P
	4 GHz ~ 18 GHz	Fig.65	P
Ch 78 2480 MHz	9KHz~ 30MHz	Fig.66	P
	30 MHz ~ 1 GHz	Fig.67	P
	1 GHz ~ 4 GHz	Fig.68	P
	4 GHz ~ 18 GHz	Fig.69	P
Power	2.38GHz~2.4GHz---L	Fig.70	P
Power	2.45GHz~2.5GHz---H	Fig.71	P
For all channels	18 GHz ~ 26 GHz	Fig.72	P

For $\pi/4$ DQPSK

Channel	Frequency Range	Test Results	Conclusion
Ch 0 2402 MHz	9KHz~ 30MHz	Fig.73	P
	30 MHz ~ 1 GHz	Fig.74	P
	1 GHz ~ 4 GHz	Fig.75	P
	4 GHz ~ 18 GHz	Fig.76	P
Ch 39 2441 MHz	9KHz~ 30MHz	Fig.77	P
	30 MHz ~ 1 GHz	Fig.78	P
	1 GHz ~ 4 GHz	Fig.79	P
	4 GHz ~ 18 GHz	Fig.80	P
Ch 78 2480 MHz	9KHz~ 30MHz	Fig.81	P
	30 MHz ~ 1 GHz	Fig.82	P
	1 GHz ~ 4 GHz	Fig.83	P
	4 GHz ~ 18 GHz	Fig.84	P
Power	2.38GHz~2.4GHz---L	Fig.85	P
Power	2.45GHz~2.5GHz---H	Fig.86	P
For all channels	18 GHz ~ 26 GHz	Fig.87	P

For 8DPSK

Channel	Frequency Range	Test Results	Conclusion
Ch 0 2402 MHz	9KHz~ 30MHz	Fig.88	P
	30 MHz ~ 1 GHz	Fig.89	P
	1 GHz ~ 4 GHz	Fig.90	P
	4 GHz ~ 18 GHz	Fig.91	P
Ch 39 2441 MHz	9KHz~ 30MHz	Fig.92	P
	30 MHz ~ 1 GHz	Fig.93	P
	1 GHz ~ 4 GHz	Fig.94	P
	4 GHz ~ 18 GHz	Fig.95	P
Ch 78 2480 MHz	9KHz~ 30MHz	Fig.96	P
	30 MHz ~ 1 GHz	Fig.97	P
	1 GHz ~ 4 GHz	Fig.98	P
	4 GHz ~ 18 GHz	Fig.99	P
Power	2.38GHz~2.4GHz---L	Fig.100	P
Power	2.45GHz~2.5GHz---H	Fig.101	P
For all channels	18 GHz ~ 26 GHz	Fig.102	P

The correction factors have be taken into account in the above test results

Measurement Uncertainty: ±4.73dB

Conclusion: PASS

Test graphs as below:

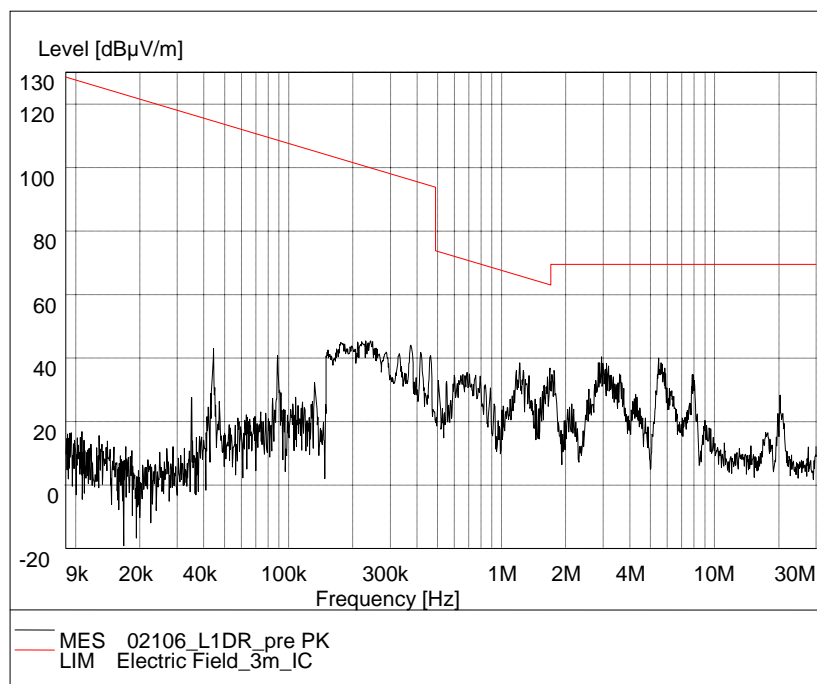


Fig.58. Radiated emission: GFSK, Channel 0, 9 KHz – 30MHz

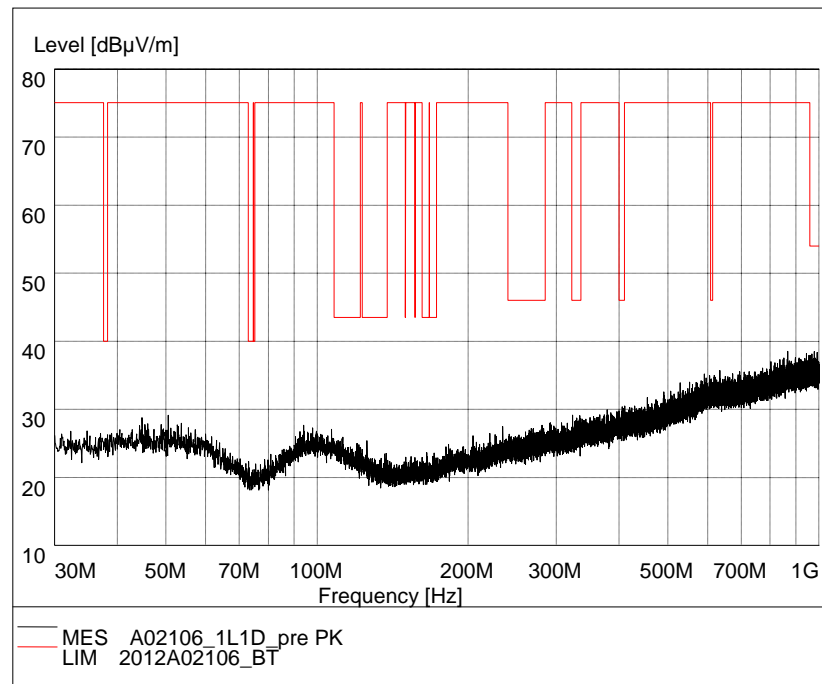


Fig.59. Radiated emission: GFSK, Channel 0, 30 MHz - 1 GHz

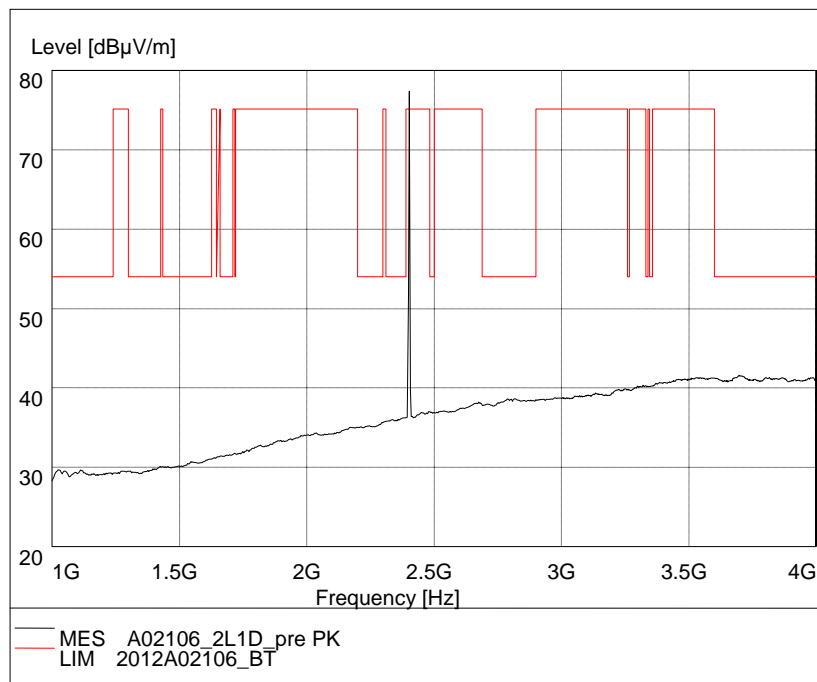


Fig.60. Radiated emission: GFSK, Channel 0, 1 GHz - 4 GHz

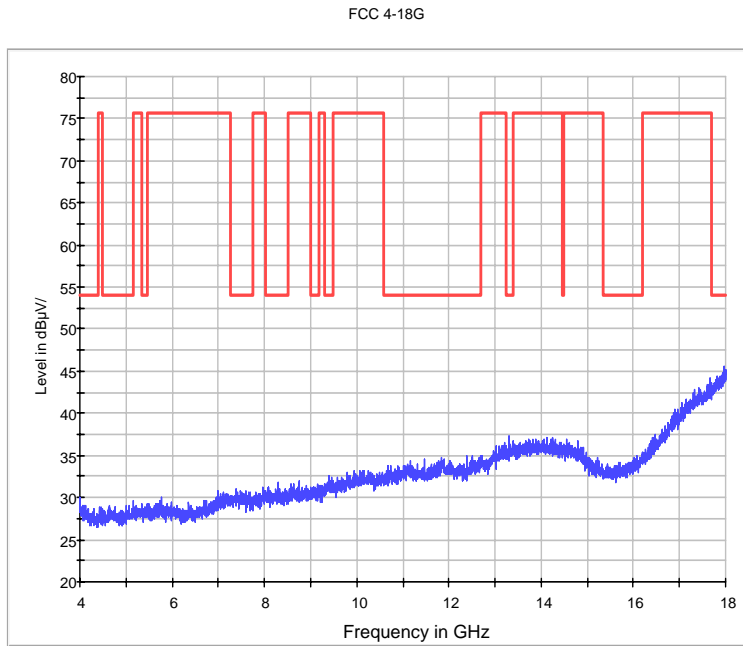


Fig.61. Radiated emission: GFSK, Channel 0, 4 GHz - 18 GHz

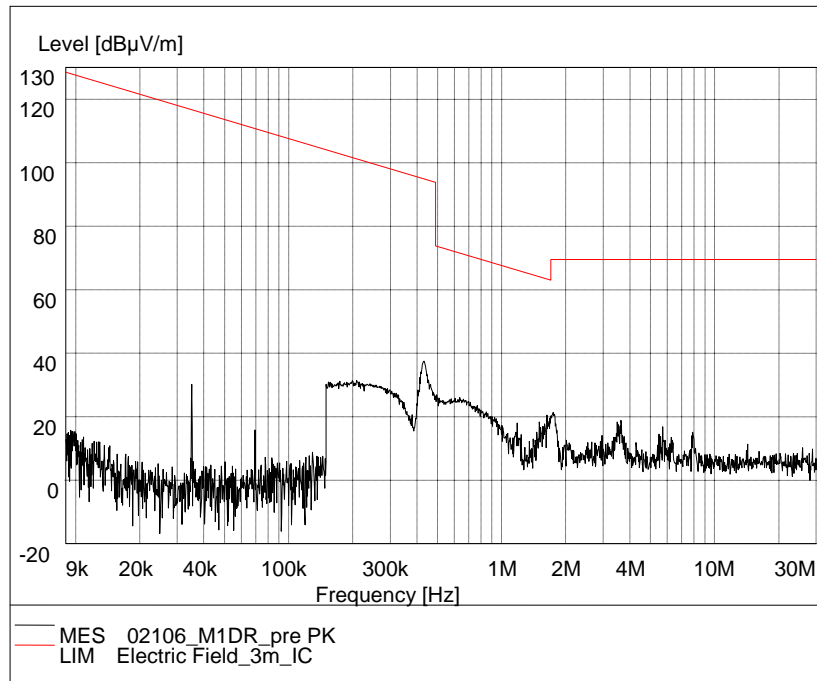


Fig.62. Radiated emission: GFSK, Channel 39, 9 KHz – 30MHz

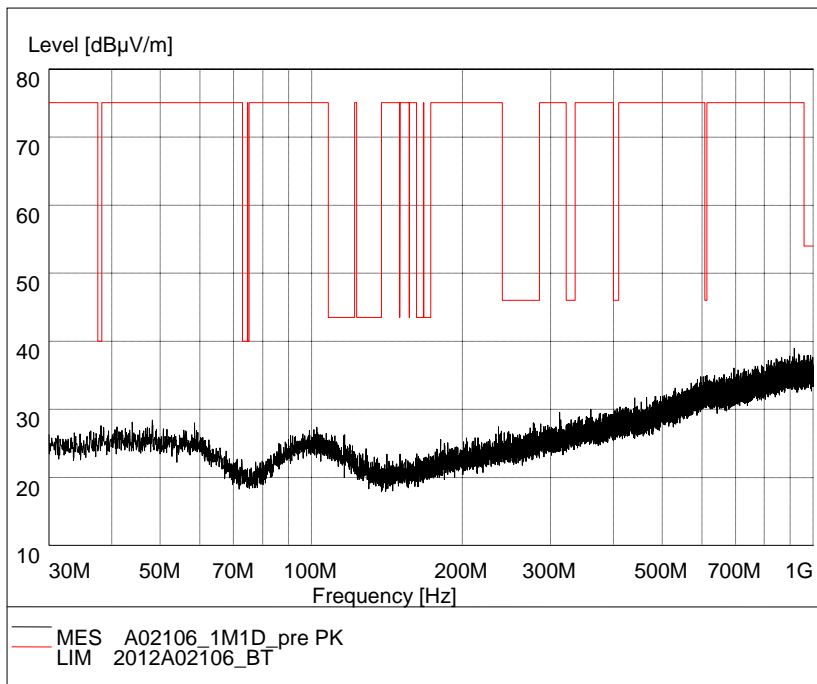


Fig.63. Radiated emission: GFSK, Channel 39, 30 MHz - 1 GHz

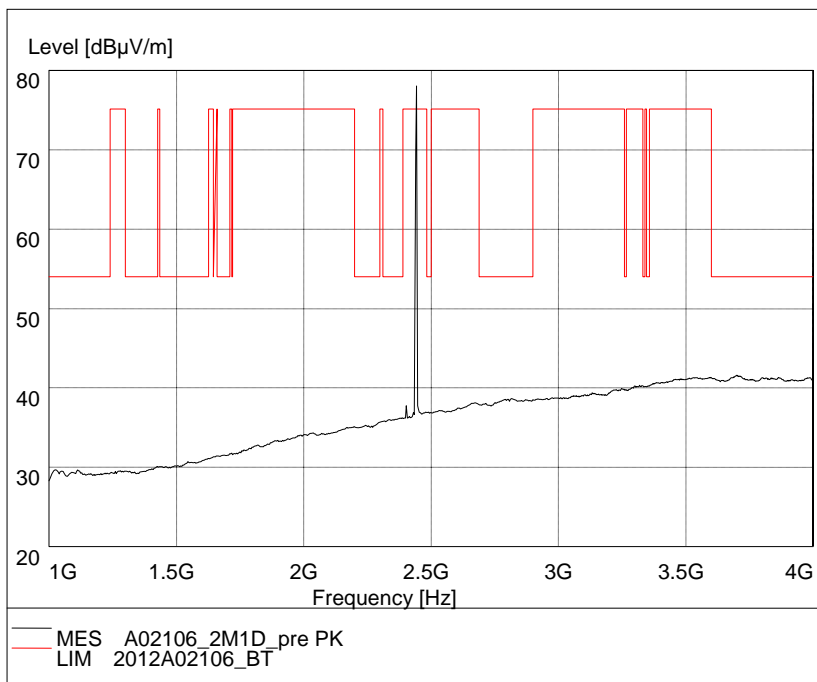


Fig.64. Radiated emission: GFSK, Channel 39, 1 GHz - 4 GHz

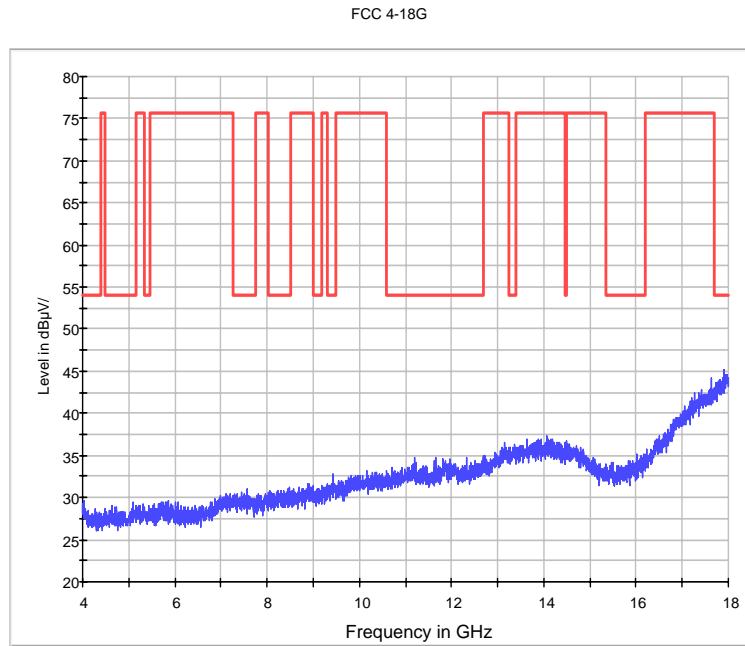


Fig.65. Radiated emission: GFSK, Channel 39, 4 GHz - 18 GHz

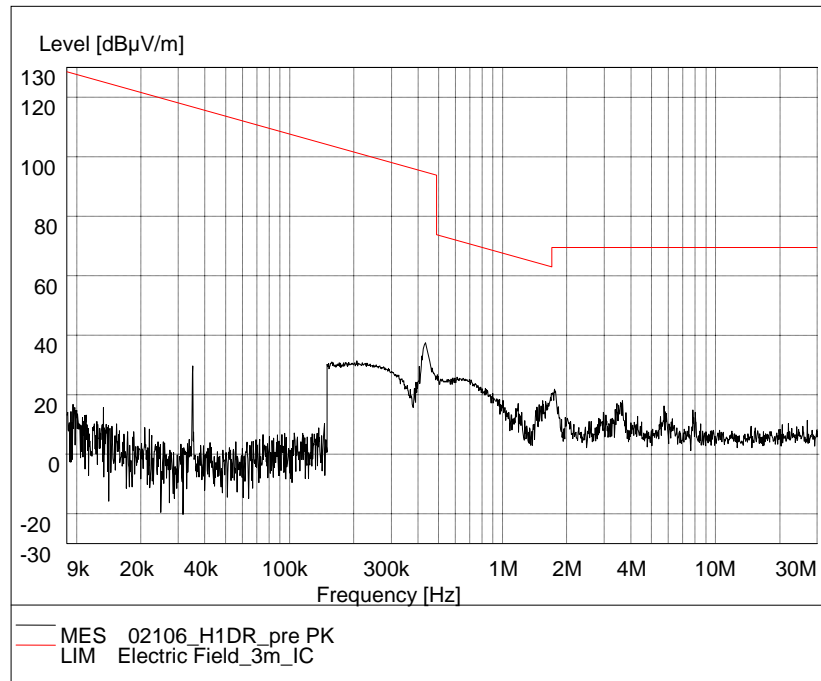


Fig.66. Radiated emission: GFSK, Channel 78, 9 KHz – 30MHz

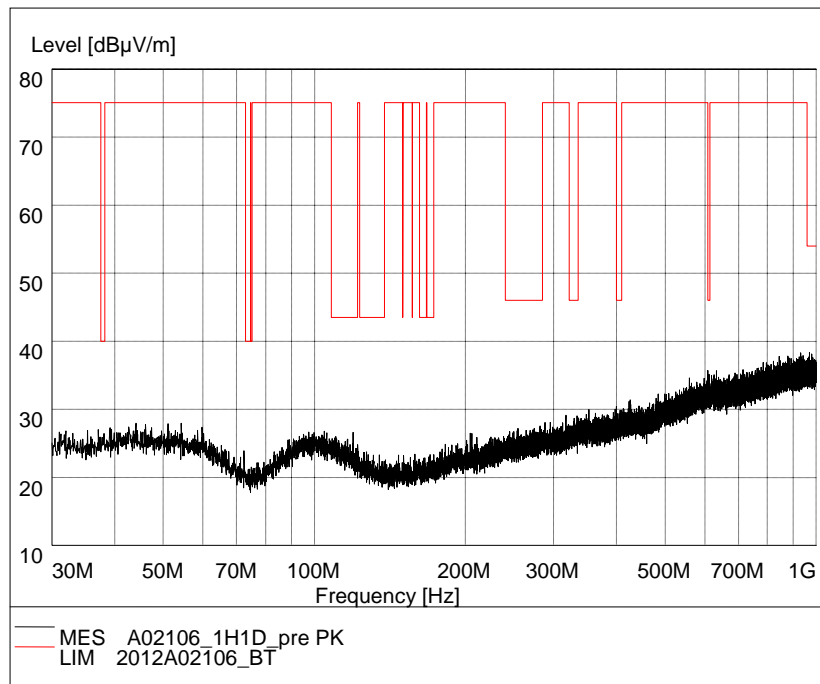


Fig.67. Radiated emission: GFSK, Channel 78, 30 MHz - 1 GHz

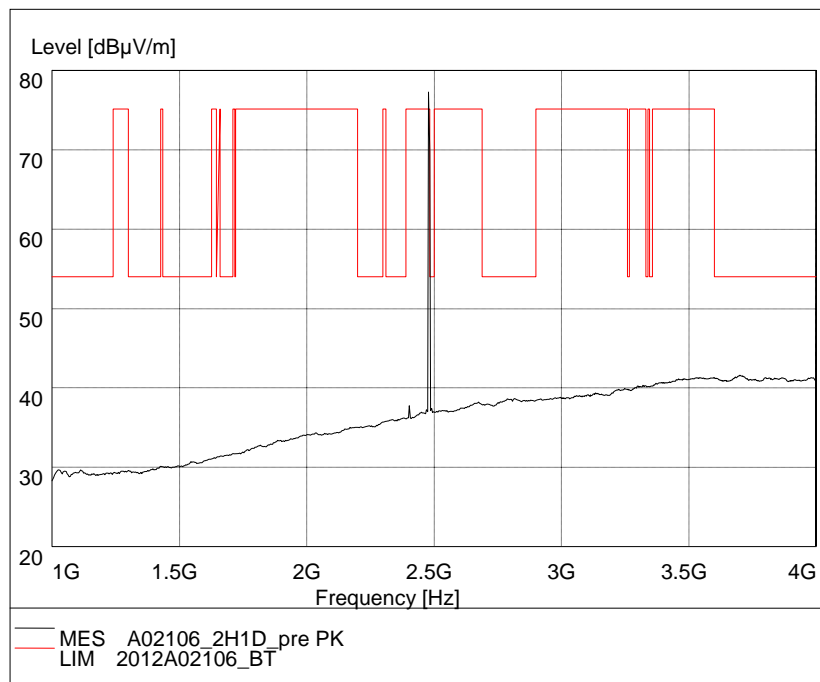


Fig.68. Fig.47 Radiated emission: GFSK, Channel 78, 1 GHz - 4 GHz

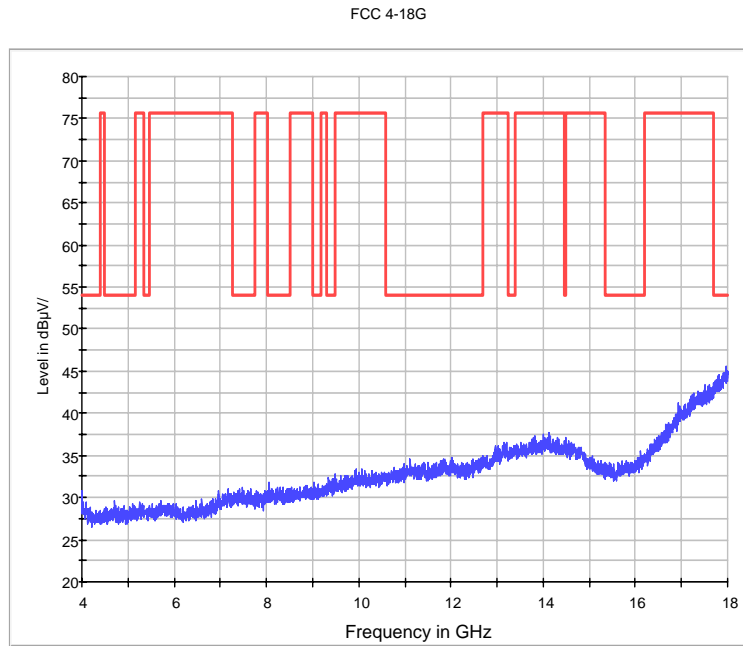


Fig.69. Radiated emission: GFSK, Channel 78, 4 GHz - 18 GHz

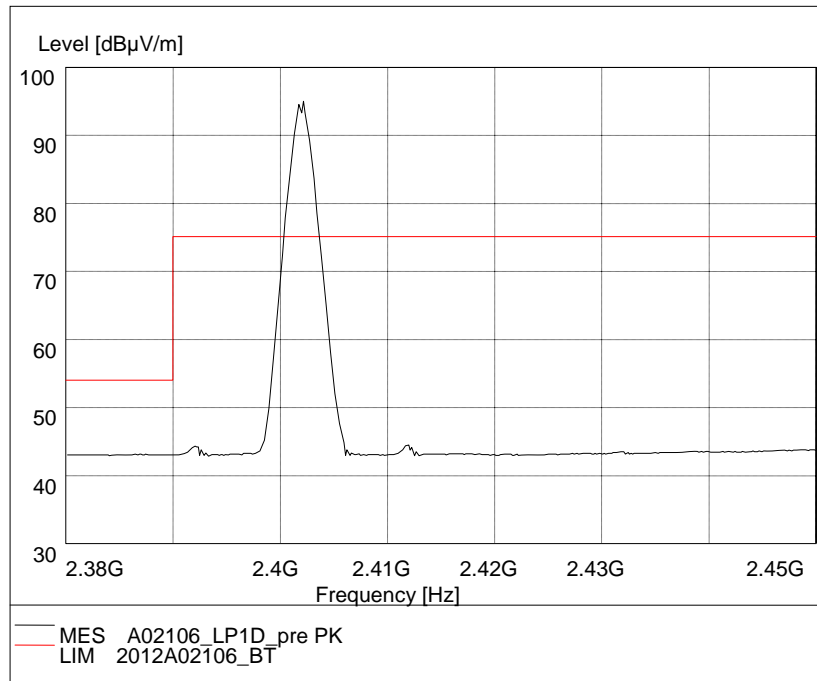


Fig.70. Radiated emission (Power): GFSK, low channel

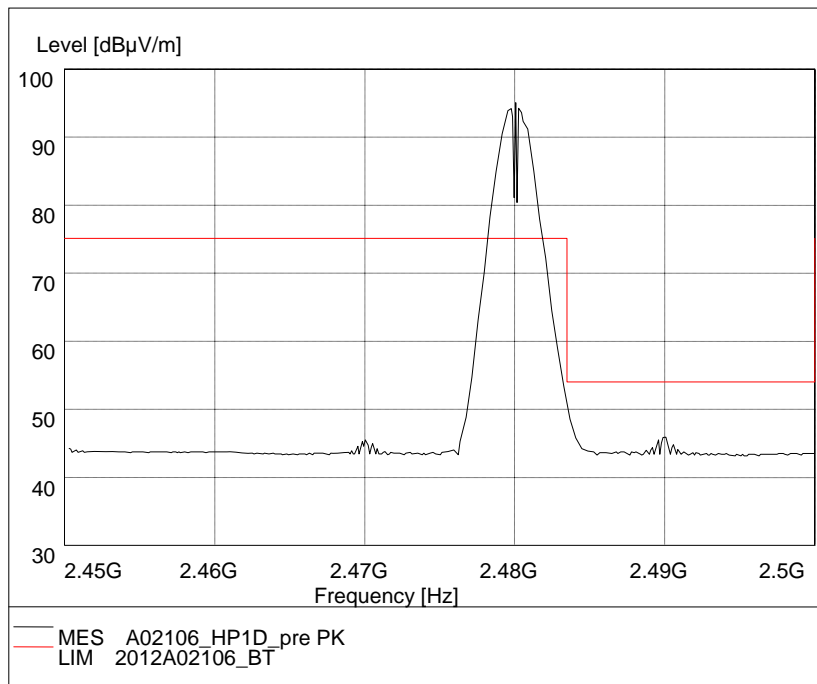


Fig.71. Radiated emission (Power) GFSK, high channel

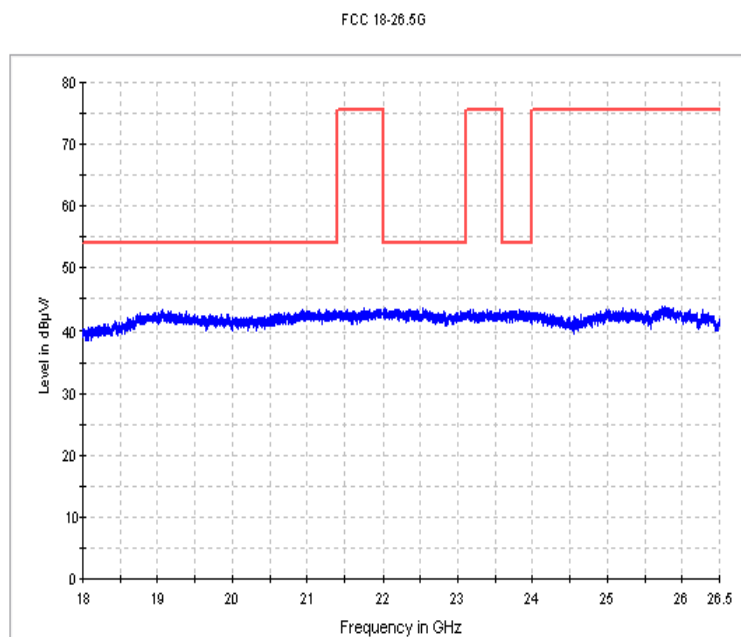


Fig.72. Radiated emission: GFSK, 18 GHz - 26 GHz

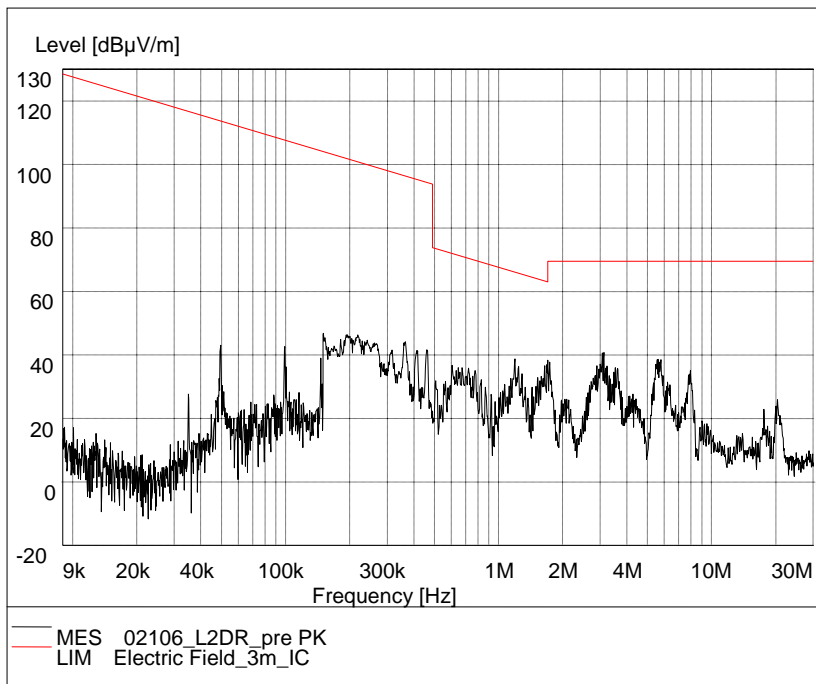


Fig.73. Radiated emission: $\pi/4$ DQPSK, Channel 0, 9 KHz – 30MHz

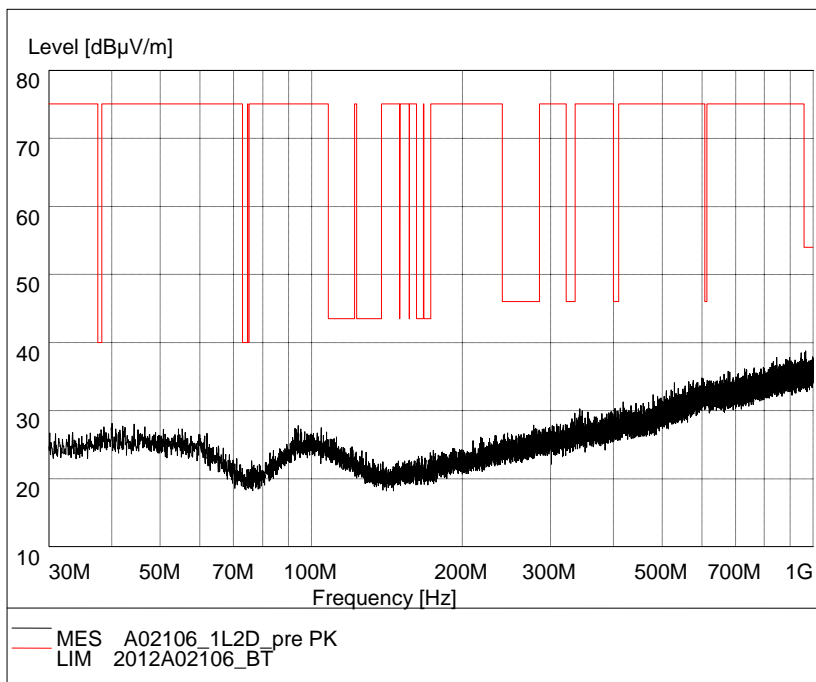


Fig.74. Radiated emission: $\pi/4$ DQPSK, Channel 0, 30 MHz - 1 GHz

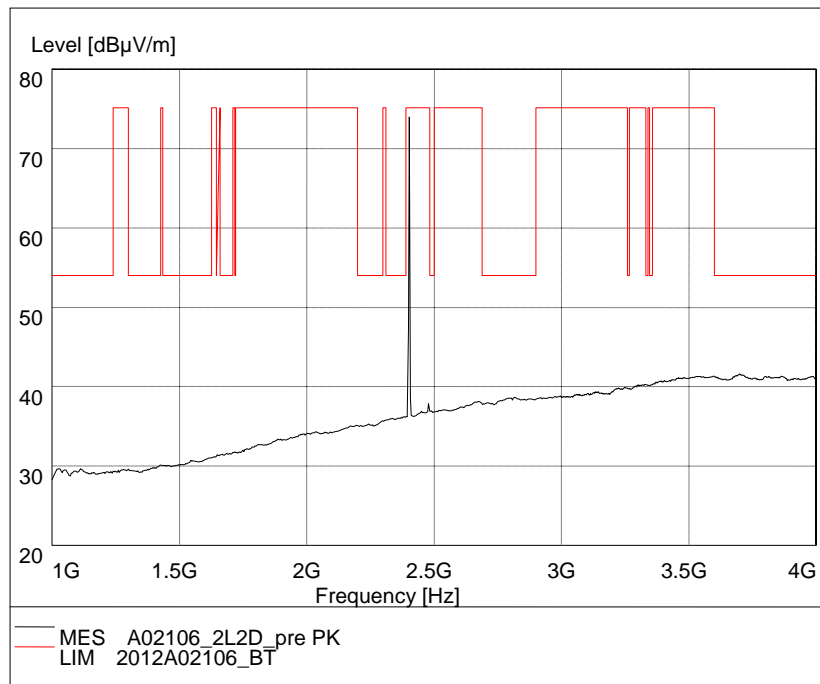


Fig.75. Radiated emission: $\pi/4$ DQPSK, Channel 0, 1 GHz - 4 GHz

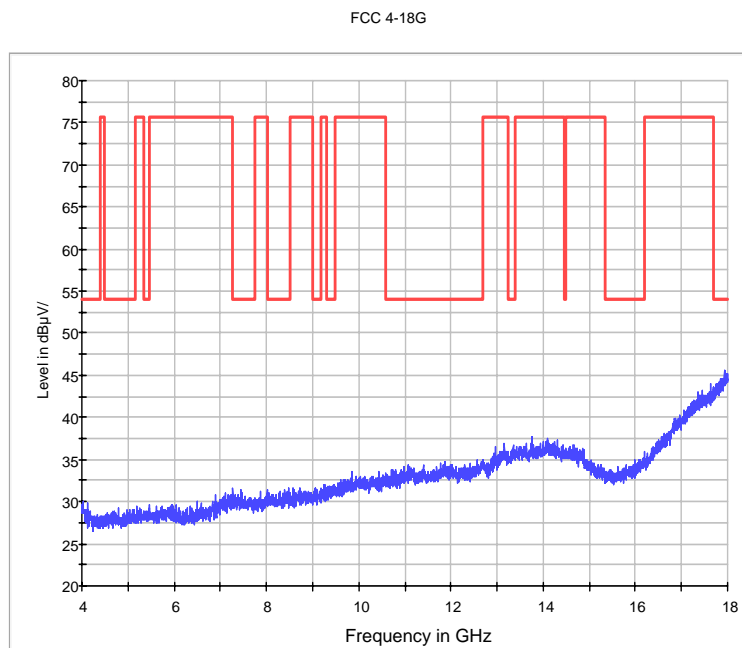


Fig.76. Radiated emission: $\pi/4$ DQPSK, Channel 0, 4 GHz - 18 GHz

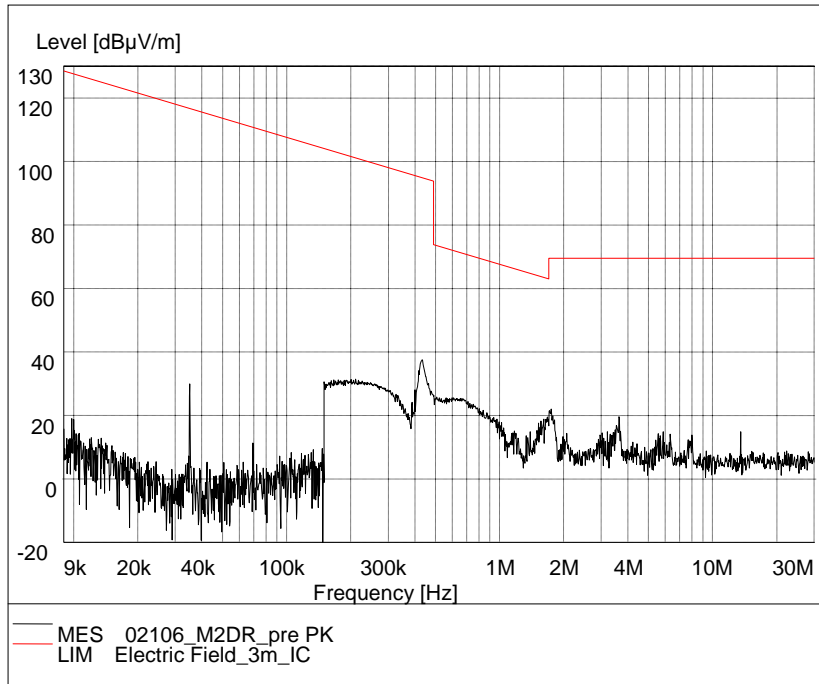


Fig.77. Radiated emission: $\pi/4$ DQPSK, Channel 39, 9 KHz – 30MHz

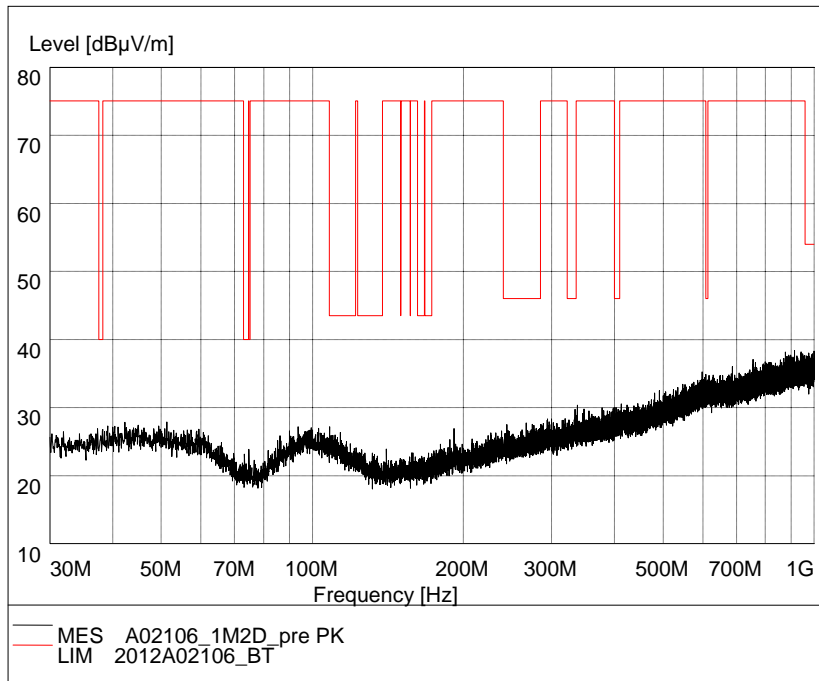


Fig.78. Radiated emission: $\pi/4$ DQPSK, Channel 39, 30 MHz - 1 GHz

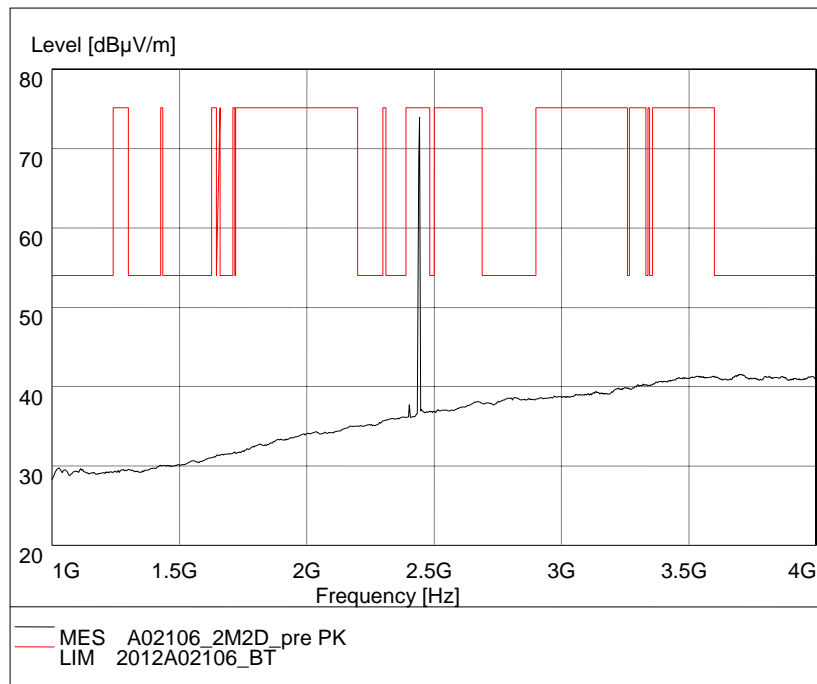


Fig.79. Radiated emission: $\pi/4$ DQPSK, Channel 39, 1 GHz - 4 GHz

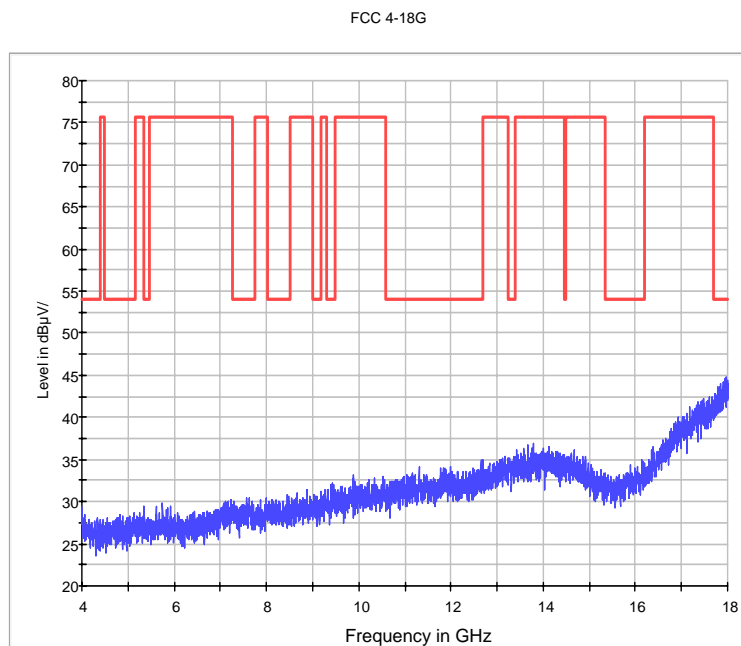


Fig.80. Radiated emission: $\pi/4$ DQPSK, Channel 39, 4 GHz - 18 GHz

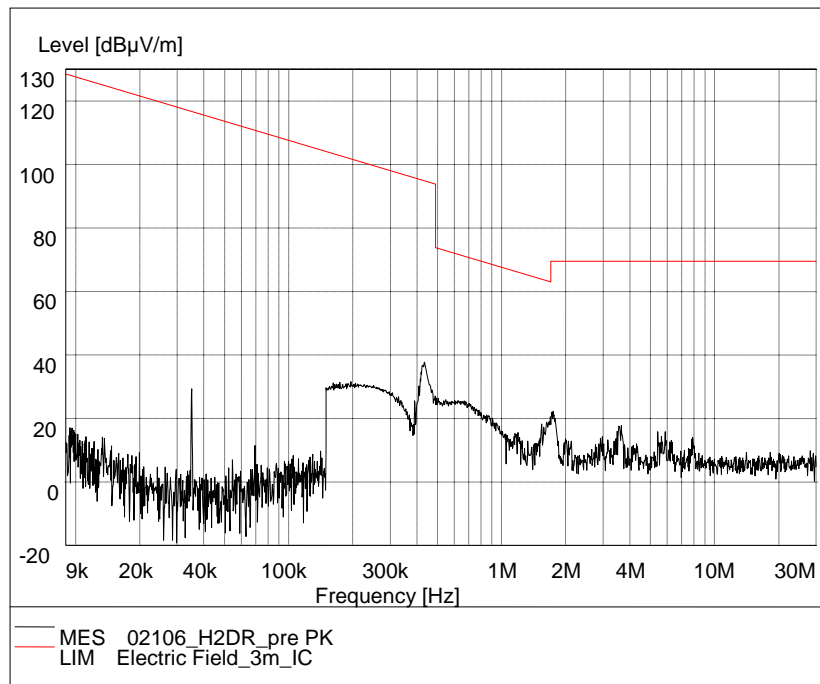


Fig.81. Radiated emission: $\pi/4$ DQPSK, Channel 78, 9 KHz – 30MHz

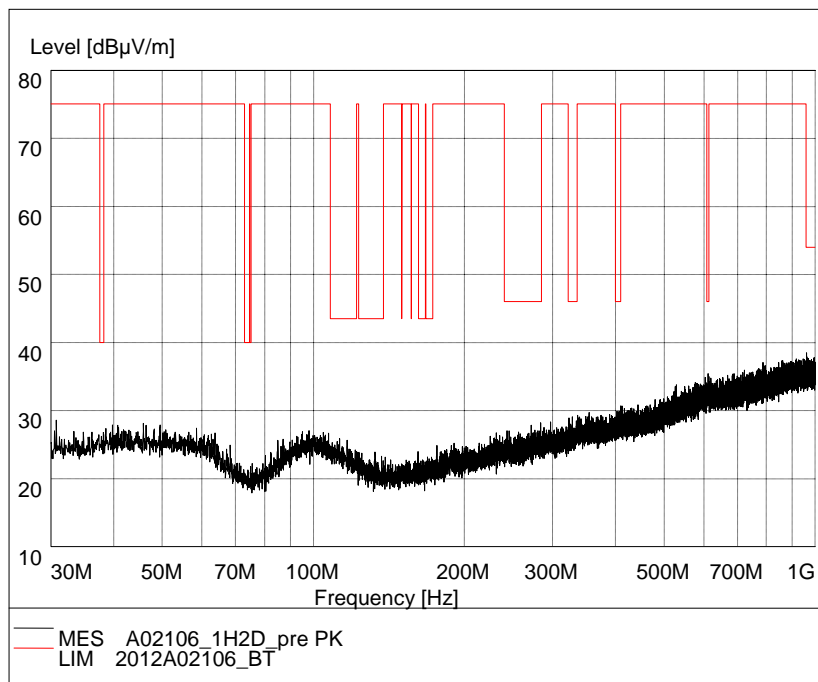


Fig.82. Radiated emission: $\pi/4$ DQPSK, Channel 78, 30 MHz - 1 GHz

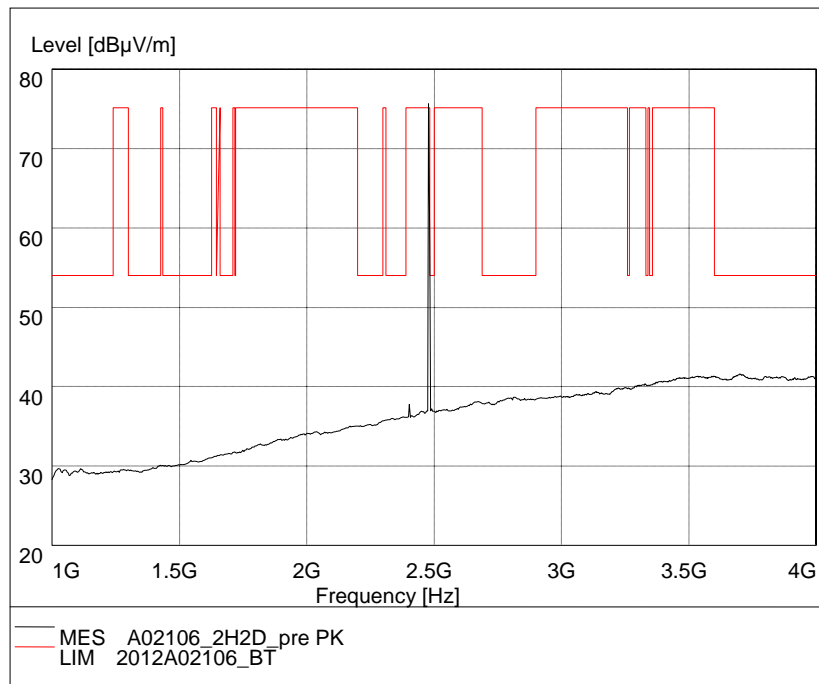


Fig.83. Radiated emission: $\pi/4$ DQPSK, Channel 78, 1 GHz - 4 GHz

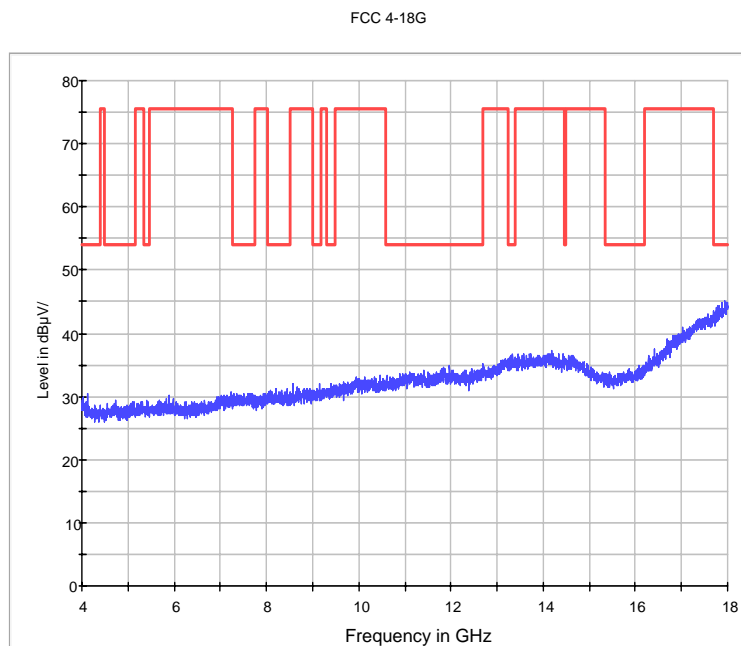


Fig.84. Radiated emission: $\pi/4$ DQPSK, Channel 78, 4 GHz - 18 GHz

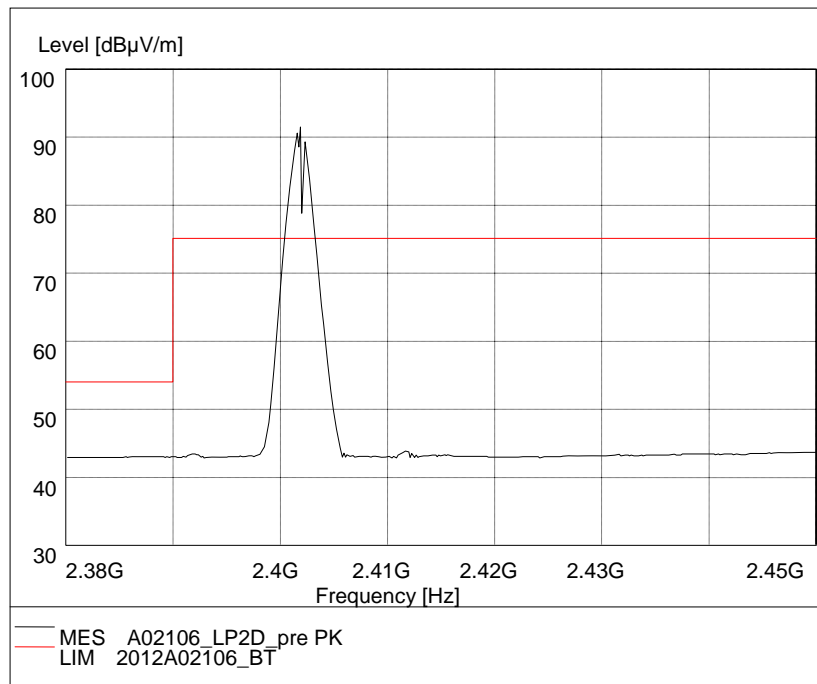


Fig.85. Radiated emission (Power): $\pi/4$ DQPSK, low channel

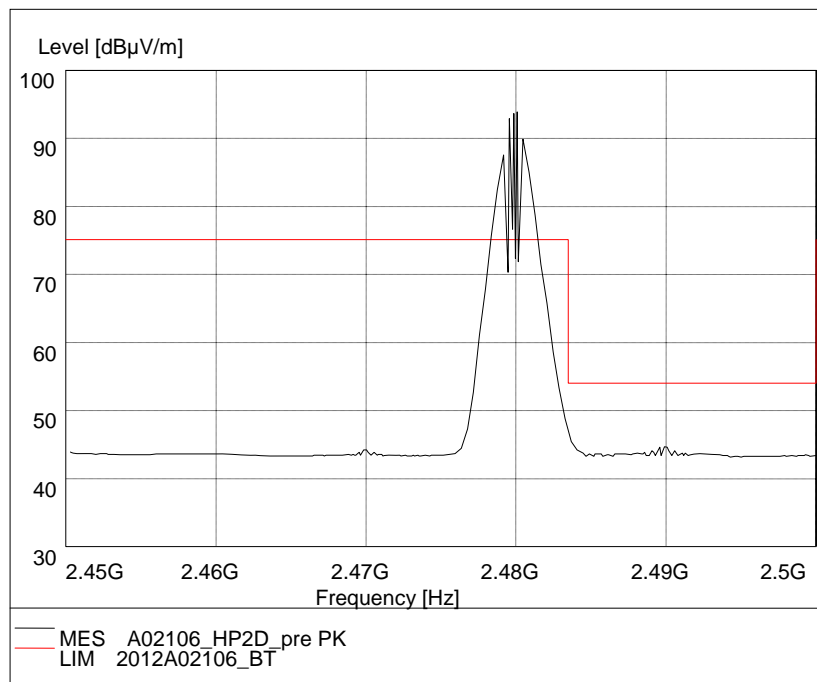


Fig.86. Radiated emission (Power): $\pi/4$ DQPSK, high channel

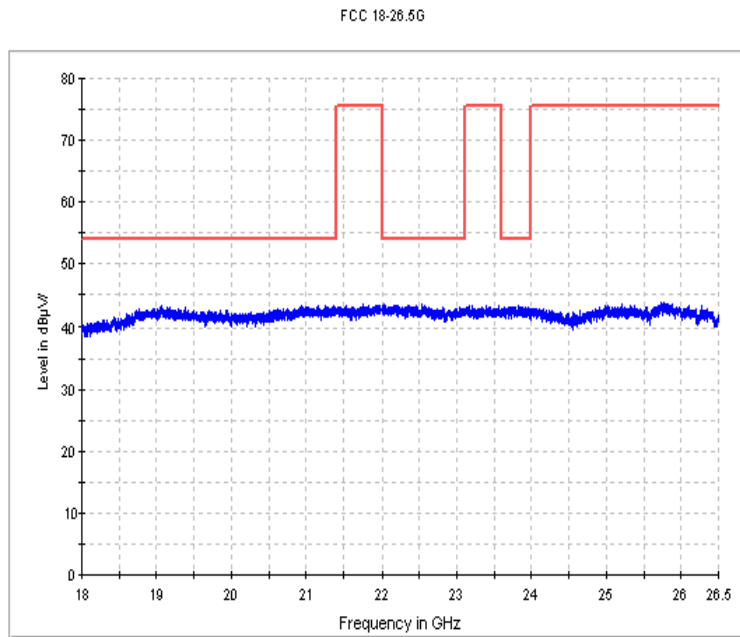


Fig.87. Radiated emission: $\pi/4$ DQPSK, 18 GHz - 26 GHz

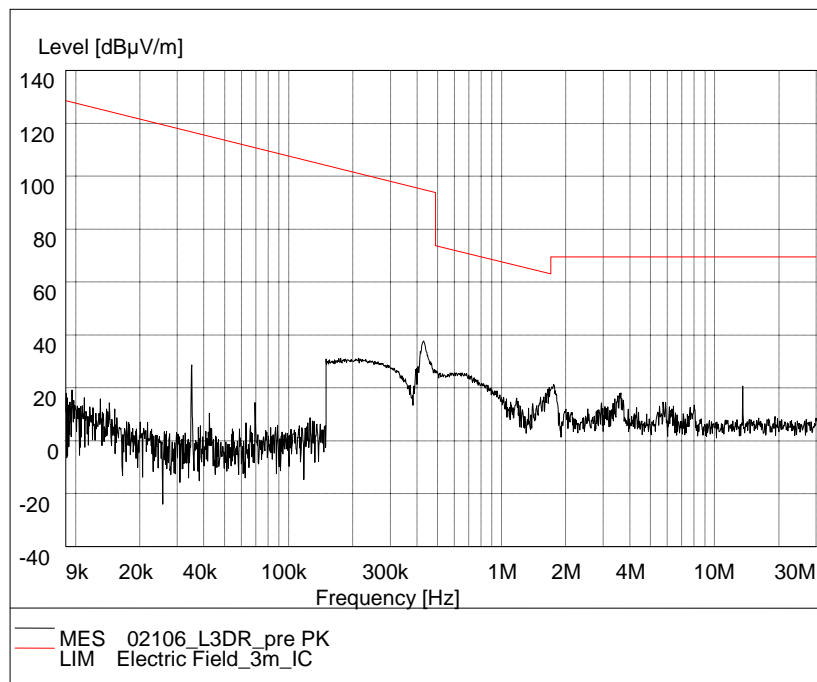


Fig.88. Radiated emission: 8DPSK, Channel 0, 9 KHz – 30MHz

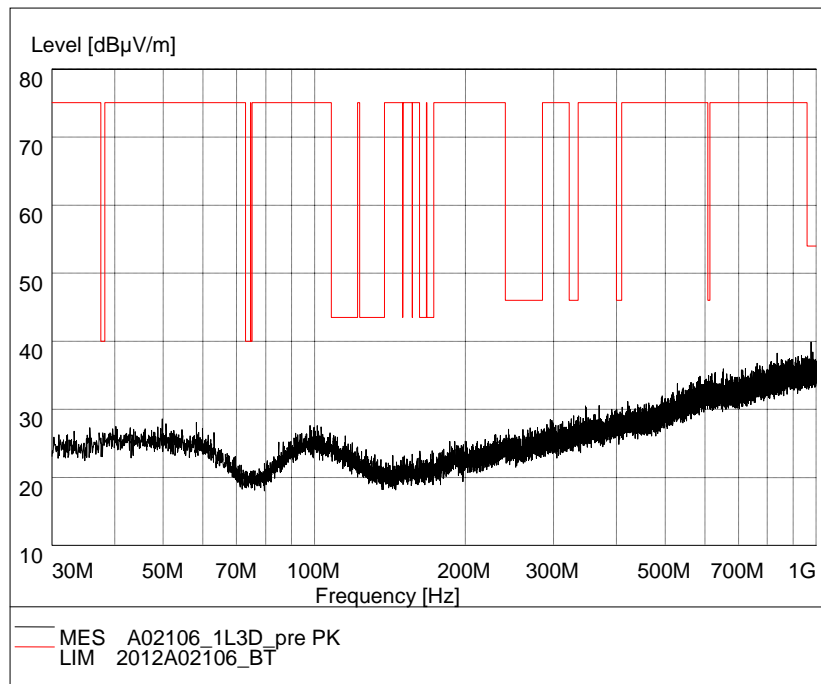


Fig.89. Radiated emission: 8DPSK, Channel 0, 30 MHz - 1 GHz

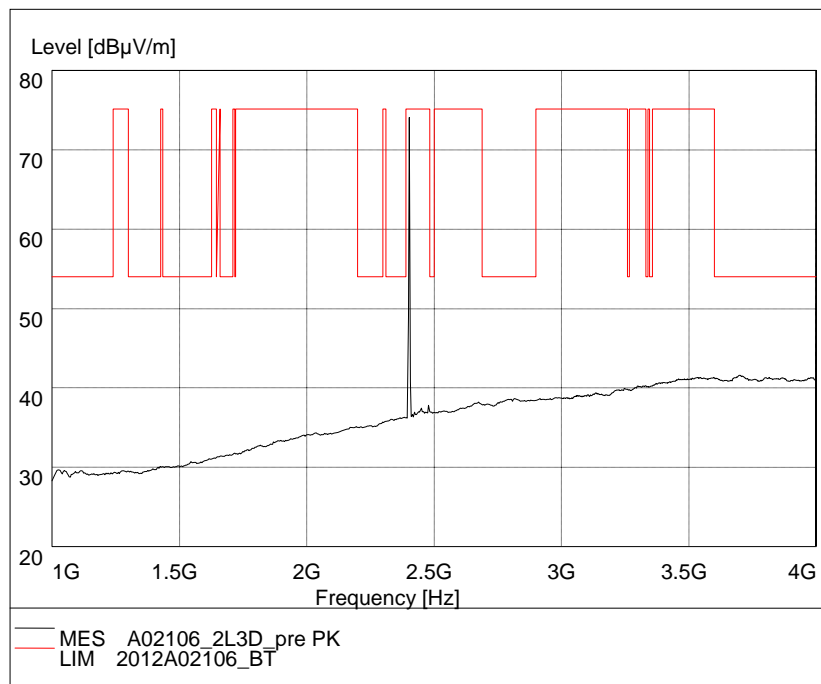


Fig.90. Radiated emission: 8DPSK, Channel 0, 1 GHz - 4 GHz

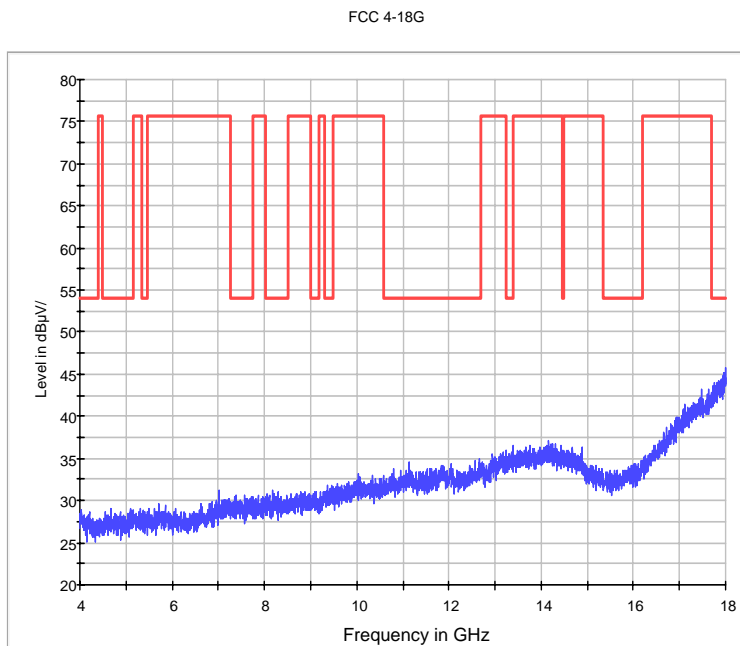


Fig.91. Radiated emission: 8DPSK, Channel 0, 4 GHz - 18 GHz

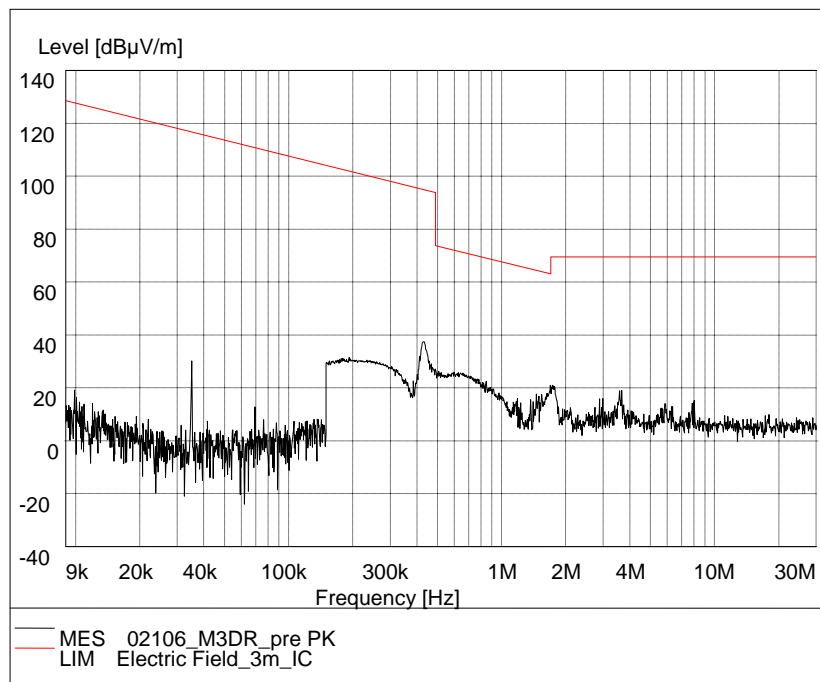


Fig.92. Radiated emission: 8DPSK, Channel 39, 9 KHz – 30MHz

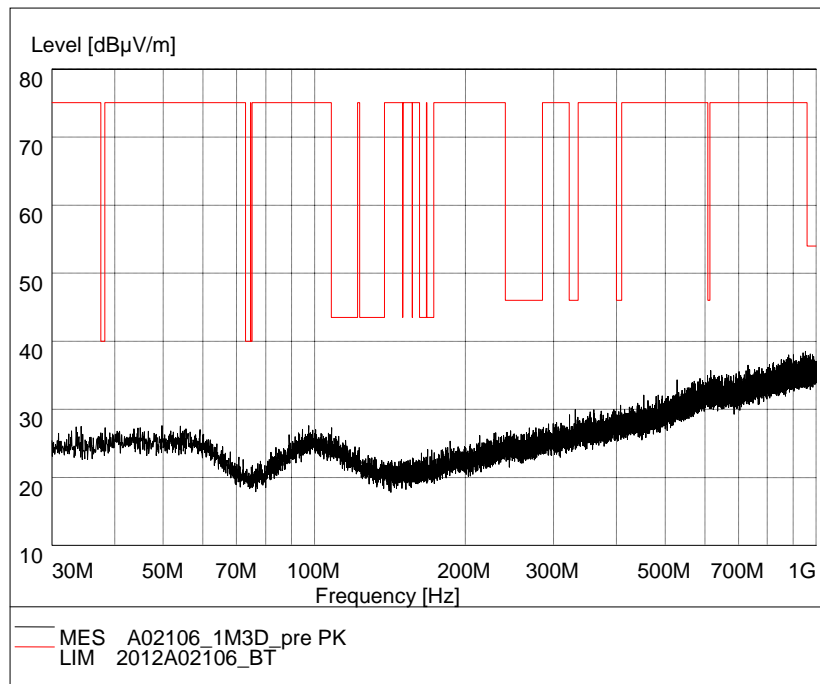


Fig.93. Radiated emission: 8DPSK, Channel 39, 30 MHz - 1 GHz

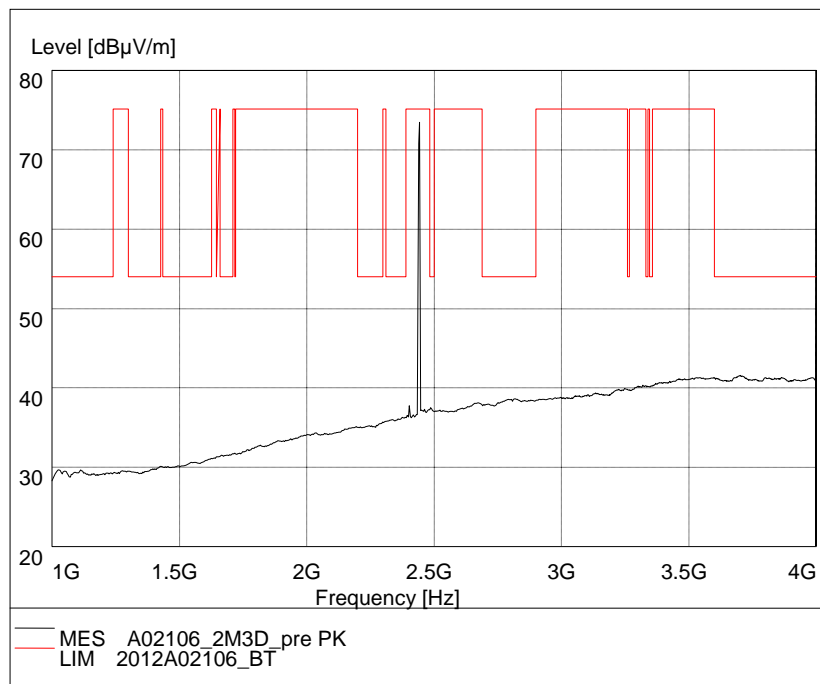


Fig.94. Radiated emission: 8DPSK, Channel 39, 1 GHz - 4 GHz

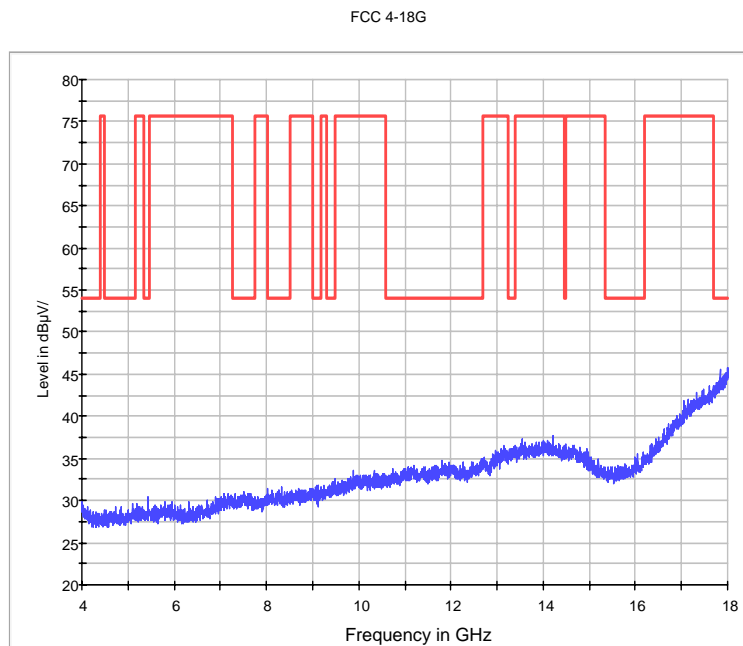


Fig.95. Radiated emission: 8DPSK, Channel 39, 4 GHz - 18 GHz

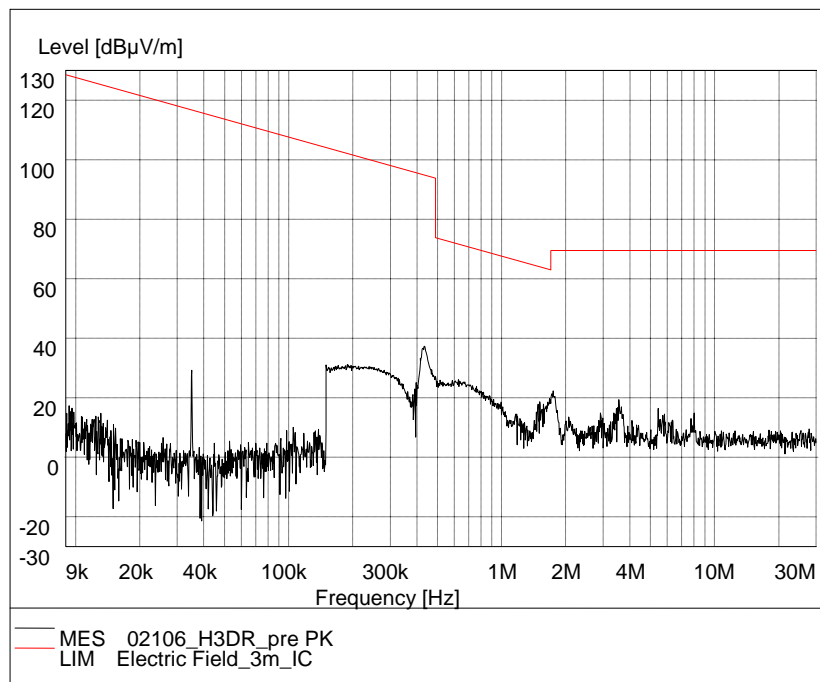


Fig.96. Radiated emission: 8DPSK, Channel 78, 9 KHz – 30MHz

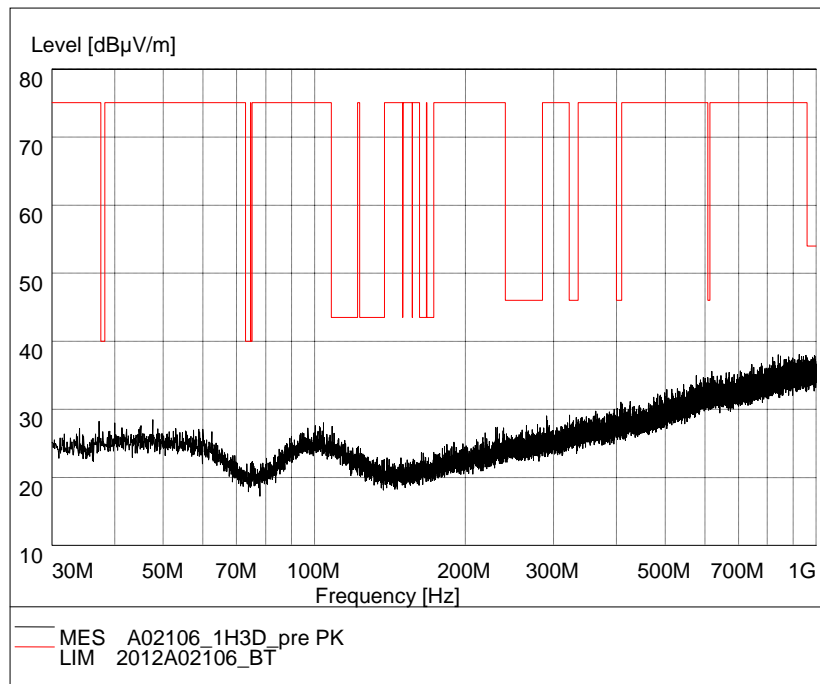


Fig.97. Radiated emission: 8DPSK, Channel 78, 30 MHz - 1 GHz

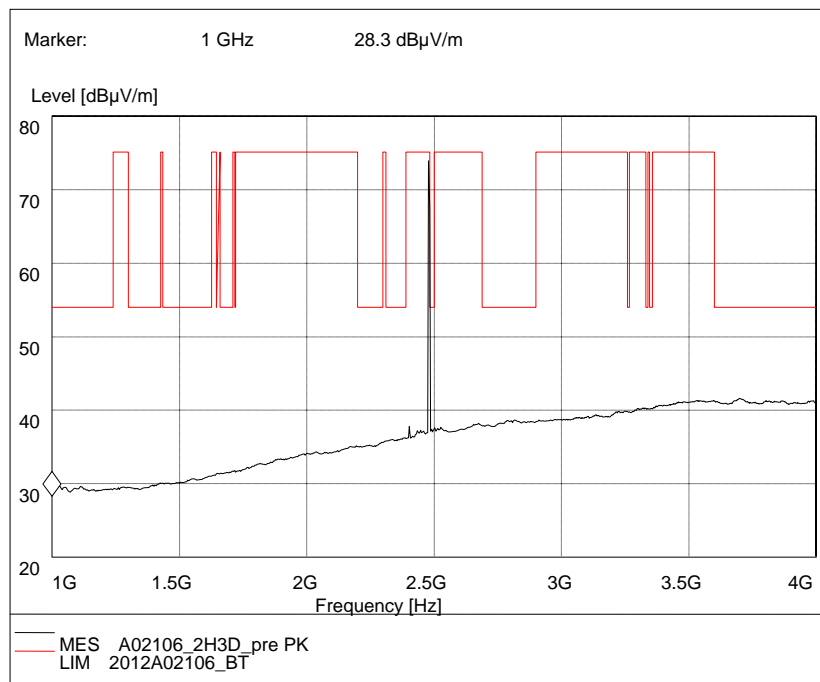


Fig.98. Radiated emission: 8DPSK, Channel 78, 1 GHz - 4 GHz

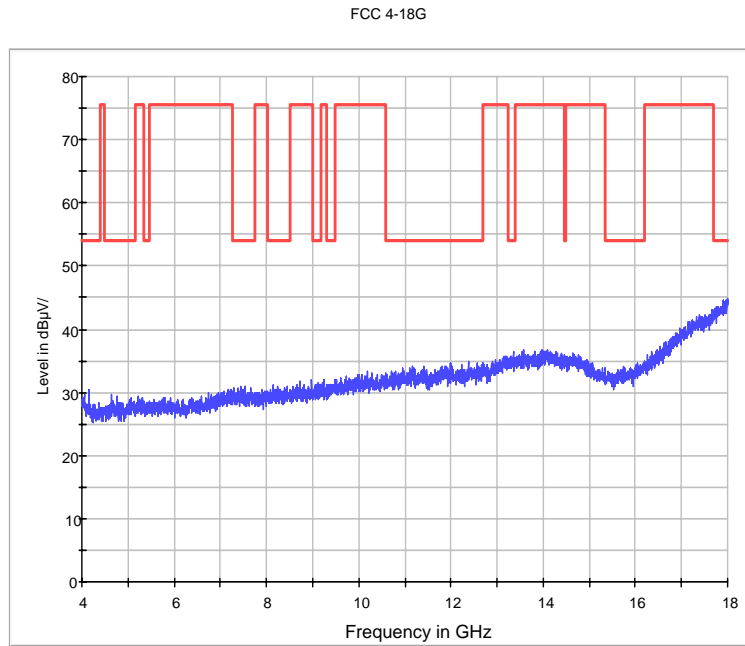


Fig.99. Radiated emission: 8DPSK, Channel 78, 4 GHz - 18 GHz

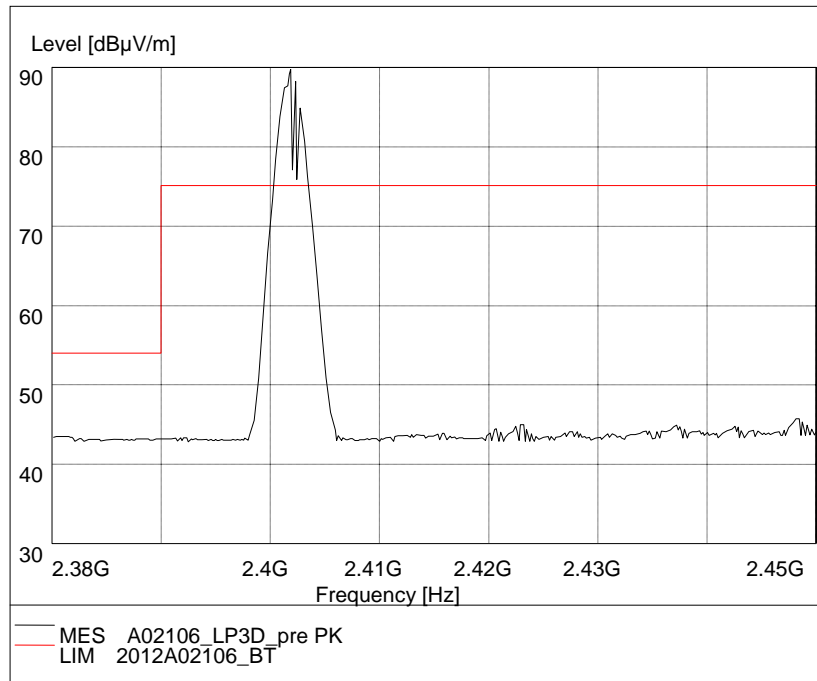


Fig.100. Radiated emission (Power): 8DPSK, low channel

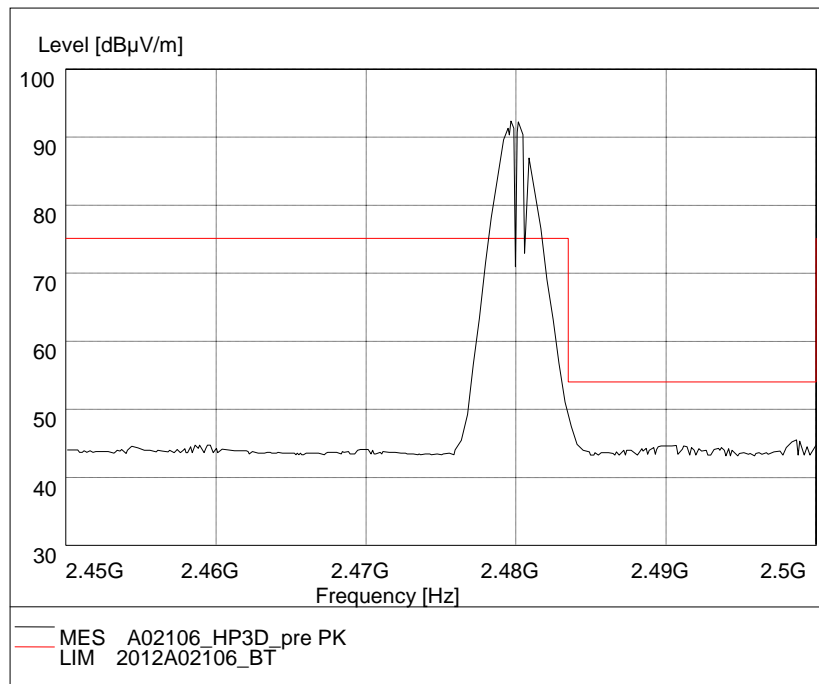


Fig.101. Radiated emission (Power): 8DPSK, high channel

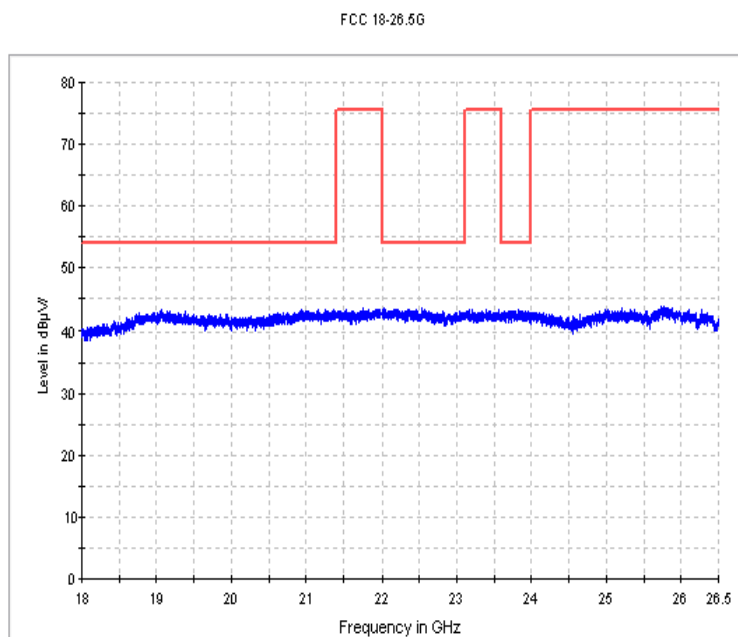


Fig.102. Radiated emission: 8DPSK, 18 GHz - 26 GHz

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 Public notice DA 00-705 and ANSI C63.4. The total time of occupancy is get by multiplying the measured number of transmissions occurred during 31.6 second period with the duration of one transmission.

Measurement Condition:

RBW=VBW=1MHz; SPAN=0; Detector: peak

Measurement Result:

EUT ID: #22007

For GFSK

Channel	Packet	Dwell Time (ms)		Conclusion
39	DH1	Fig.103.	110.26	P
		Fig.104.		
	DH3	Fig.105.	197.61	P
		Fig.106.		
	DH5	Fig.107.	207.27	P
		Fig.108.		

For $\pi/4$ DQPSK

Channel	Packet	Dwell Time (ms)		Conclusion
39	DH1	Fig.109.	110.93	P
		Fig.110.		
	DH3	Fig.111.	178.25	P
		Fig.112.		
	DH5	Fig.113.	175.15	P
		Fig.114.		

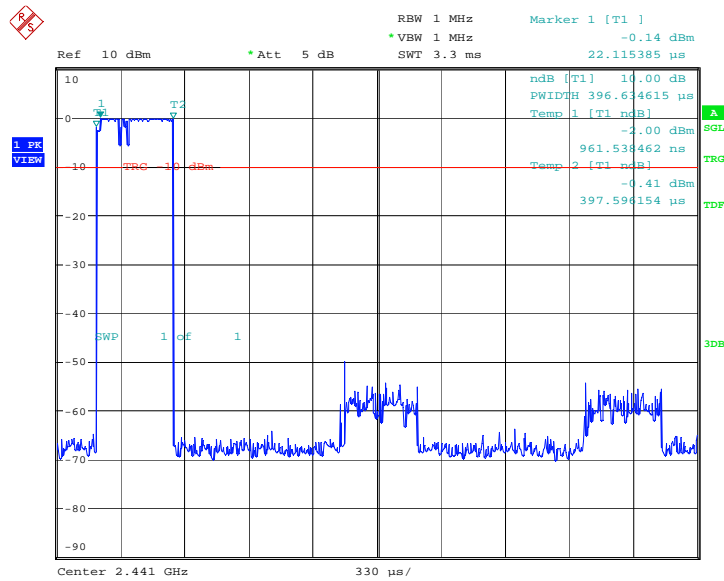
For 8DPSK

Channel	Packet	Dwell Time (ms)		Conclusion
39	DH1	Fig.115.	141.88	P
		Fig.116.		
	DH3	Fig.117.	189.91	P
		Fig.118.		
	DH5	Fig.119.	201.79	P
		Fig.120.		

Measurement Uncertainty: ± 0.088 ms

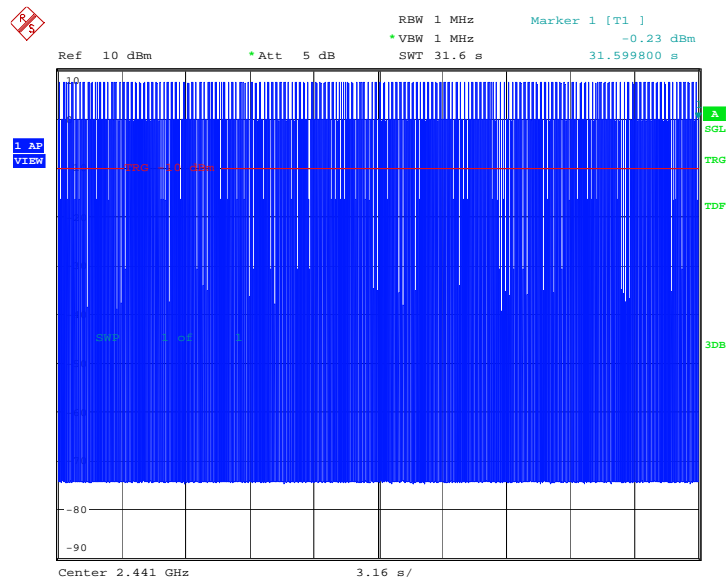
Conclusion: PASS

Test graphs as below:



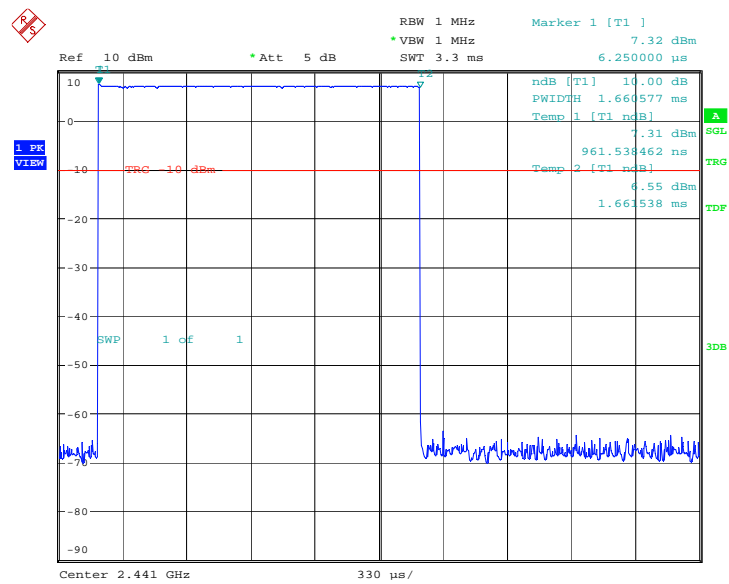
Date: 31.MAR.2012 10:20:33

Fig.103. Time of occupancy (Dwell Time): Channel 39, GFSK-DH1



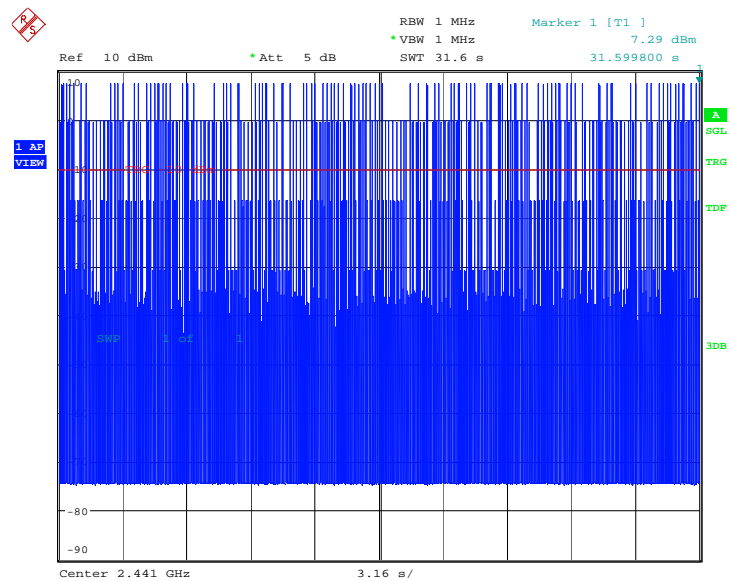
Date: 31.MAR.2012 10:20:21

Fig.104. Number of Transmissions Measurement: Channel 39, GFSK-DH1



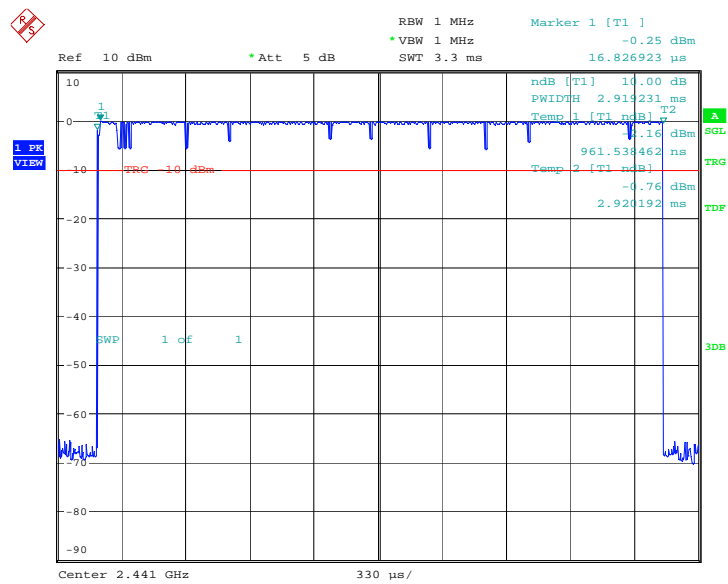
Date: 31.MAR.2012 10:21:54

Fig.105. Time of occupancy (Dwell Time): Channel 39, GFSK-DH3



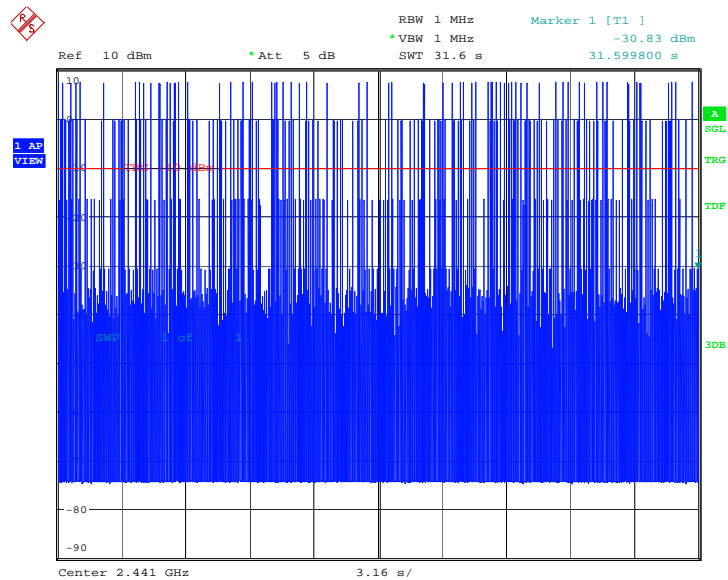
Date: 31.MAR.2012 10:21:43

Fig.106. Number of Transmissions Measurement: Channel 39, GFSK-DH3



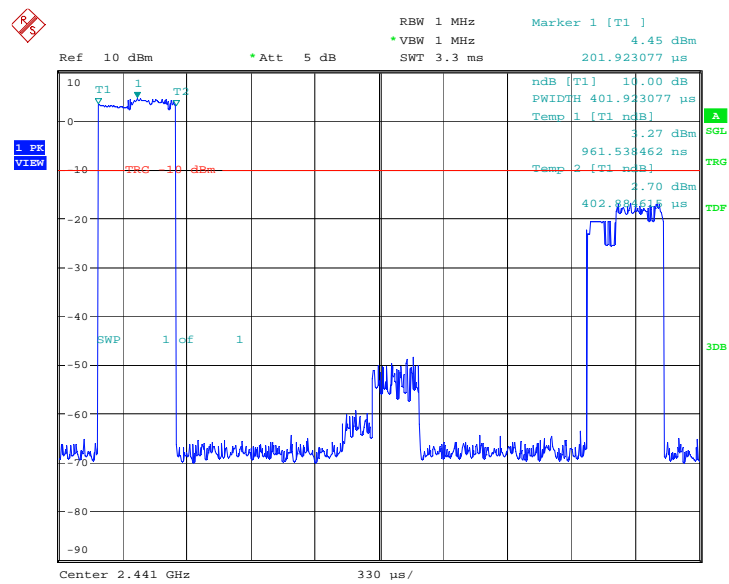
Date: 31.MAR.2012 10:23:12

Fig.107. Time of occupancy (Dwell Time): Channel 39, GFSK-DH5



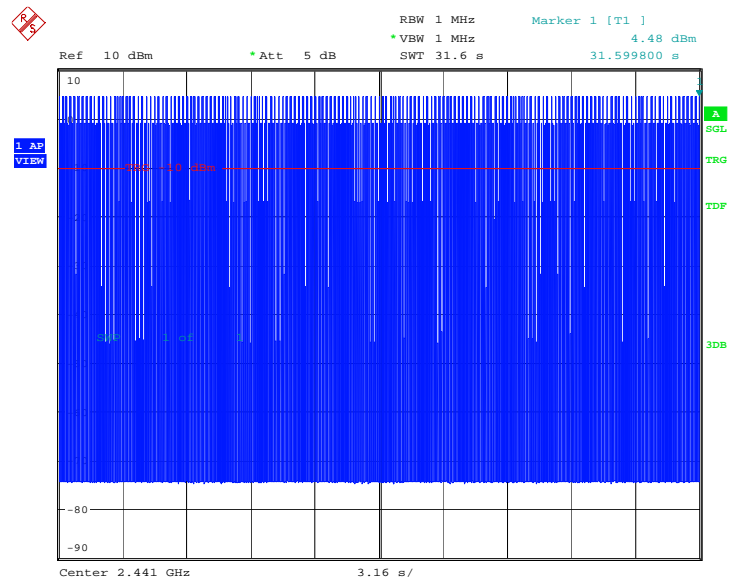
Date: 31.MAR.2012 10:23:00

Fig.108. Number of Transmissions Measurement: Channel 39, GFSK-DH5



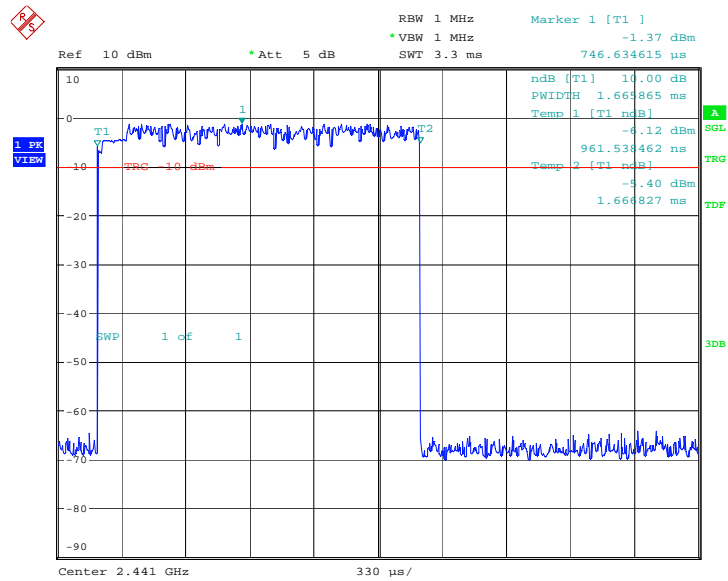
Date: 31.MAR.2012 10:42:42

Fig.109. Time of occupancy (Dwell Time): Channel 39, $\pi/4$ DQPSK -DH1



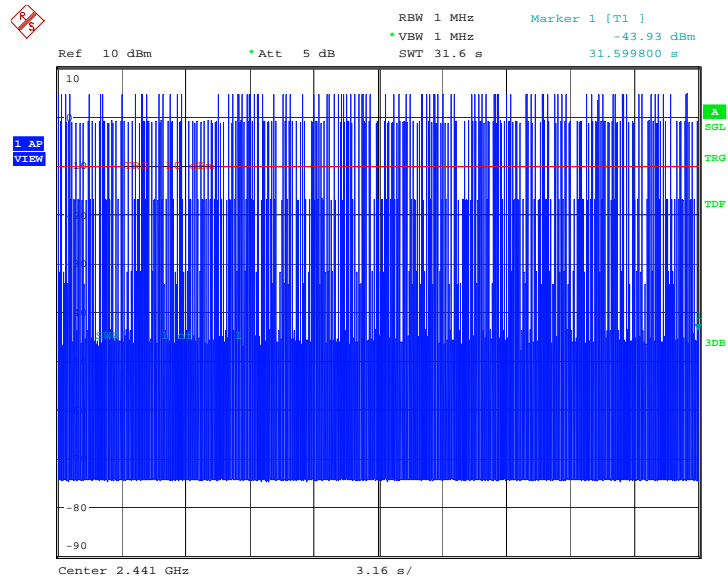
Date: 31.MAR.2012 10:42:30

Fig.110. Number of Transmissions Measurement: Channel 39, $\pi/4$ DQPSK -DH1



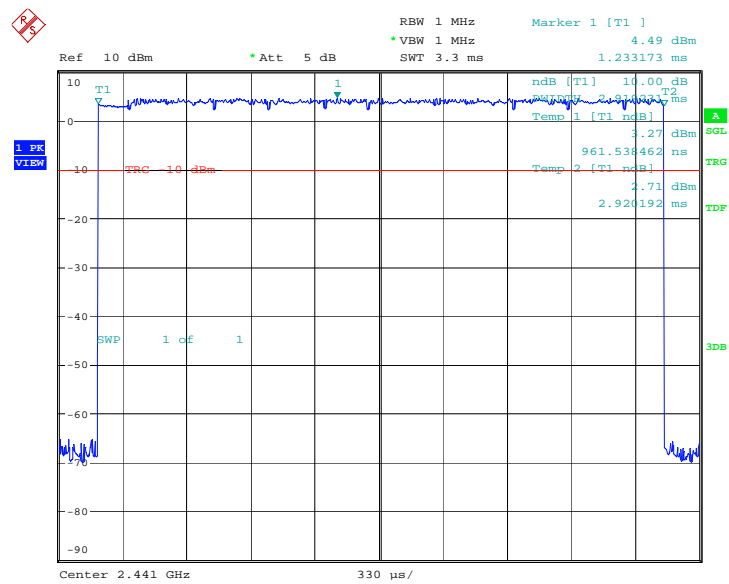
Date: 31.MAR.2012 10:44:00

Fig.111. Time of occupancy (Dwell Time): Channel 39, $\pi/4$ DQPSK -DH3



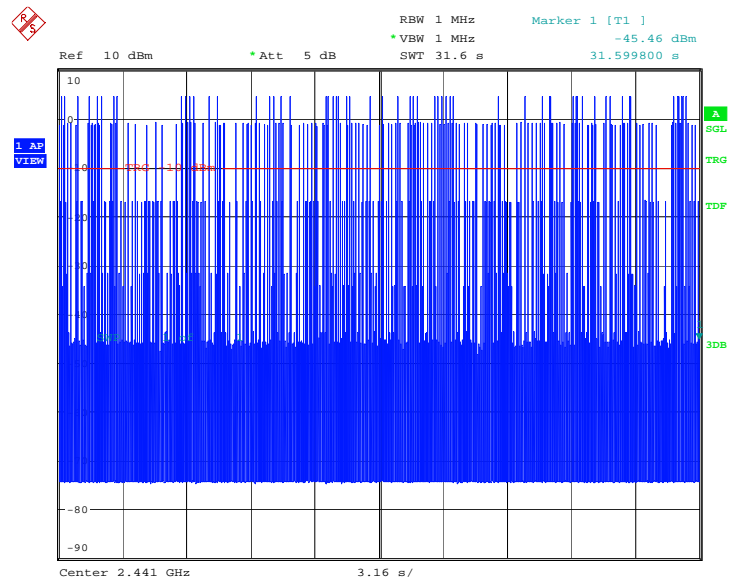
Date: 31.MAR.2012 10:43:48

Fig.112. Number of Transmissions Measurement: Channel 39, $\pi/4$ DQPSK -DH3



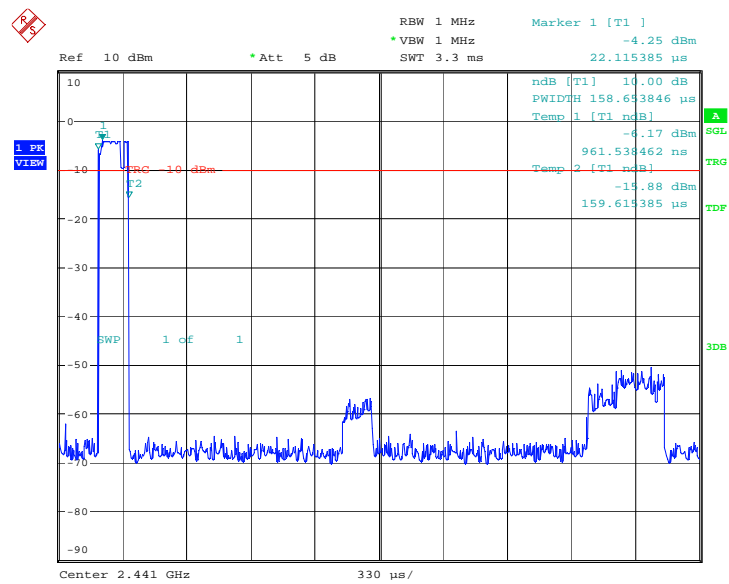
Date: 31.MAR.2012 10:45:17

Fig.113. Time of occupancy (Dwell Time): Channel 39, $\pi/4$ DQPSK -DH5



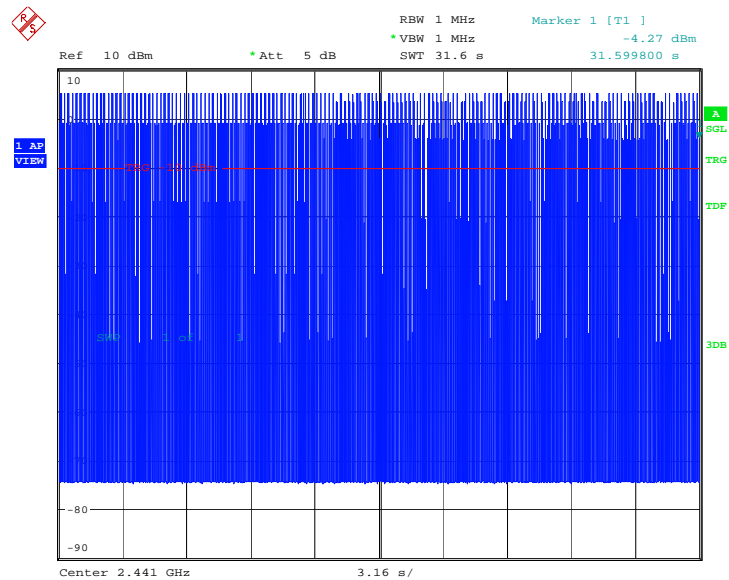
Date: 31.MAR.2012 10:45:05

Fig.114. Number of Transmissions Measurement: Channel 39, $\pi/4$ DQPSK -DH5



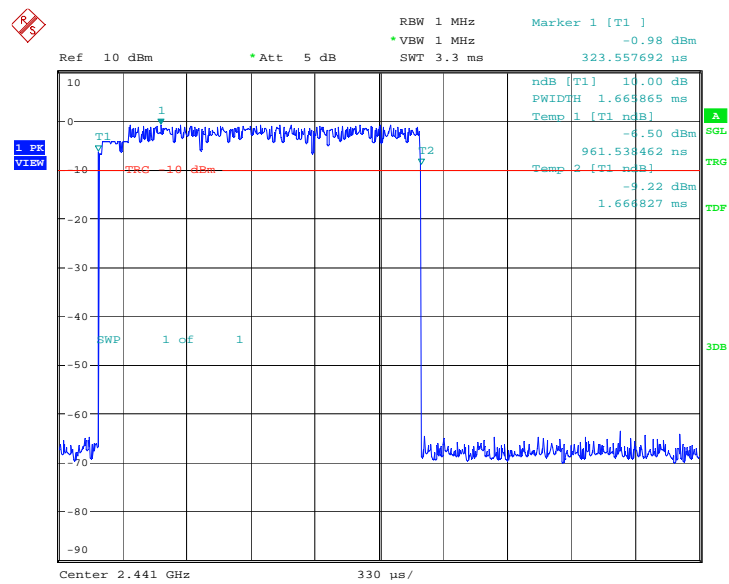
Date: 31.MAR.2012 11:04:44

Fig.115. Time of occupancy (Dwell Time): Channel 39, 8DPSK-DH1



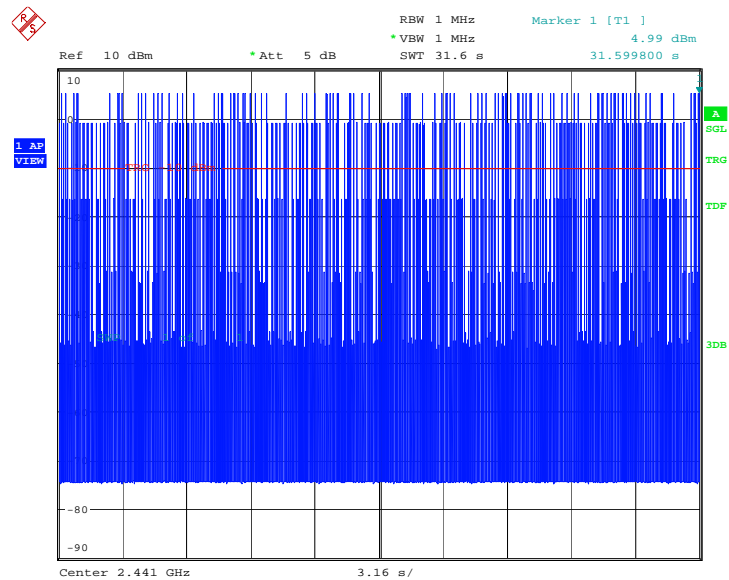
Date: 31.MAR.2012 11:04:32

Fig.116. Number of Transmissions Measurement: Channel 39, 8DPSK -DH1



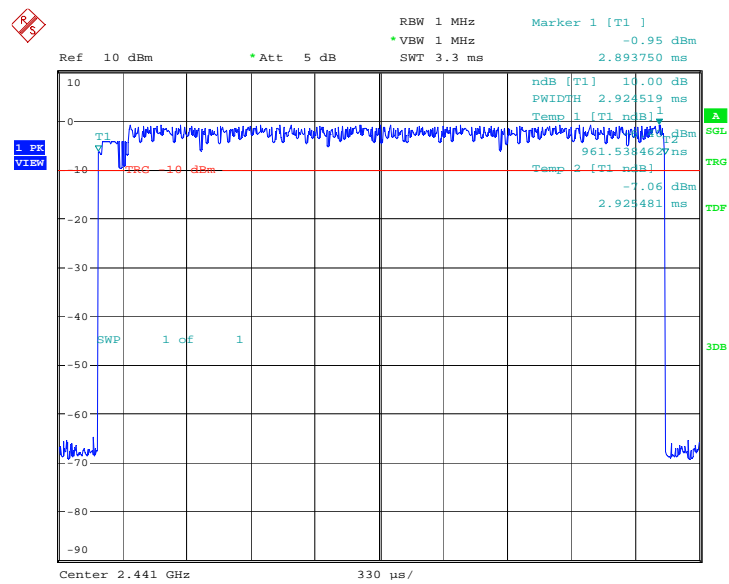
Date: 31.MAR.2012 11:06:02

Fig.117. Time of occupancy (Dwell Time): Channel 39, 8DPSK -DH3



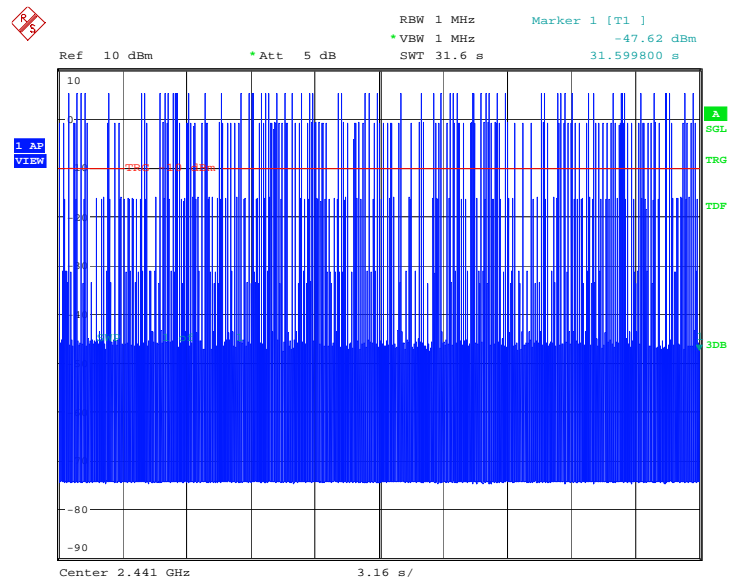
Date: 31.MAR.2012 11:05:50

Fig.118. Number of Transmissions Measurement: Channel 39, 8DPSK -DH3



Date: 31.MAR.2012 11:07:21

Fig.119. Time of occupancy (Dwell Time): Channel 39, 8DPSK -DH5



Date: 31.MAR.2012 11:07:09

Fig.120. Number of Transmissions Measurement: Channel 39, 8DPSK -DH5

A.7. 20dB Bandwidth

Measurement Limit:

Standard	Limit
FCC 47 CFR Part 15.247(a)(1) / RSS-210 A8.1 (1)	NA *

The measurement is made according to Public notice DA 00-705 and ANSI C63.

Measurement Condition:

RBW=20KHz; VBW=50KHz; SPAN=3MHz; Detector: peak

Measurement Results:

EUT ID: #22007

For GFSK

Channel	20dB Bandwidth (kHz)		Conclusion
0	Fig.121.	865.38	P
39	Fig.122.	870.19	P
78	Fig.123.	865.38	P

For $\pi/4$ DQPSK

Channel	20dB Bandwidth (kHz)		Conclusion
0	Fig.124.	1269.23	P
39	Fig.125.	1274.04	P
78	Fig.126.	1274.04	P

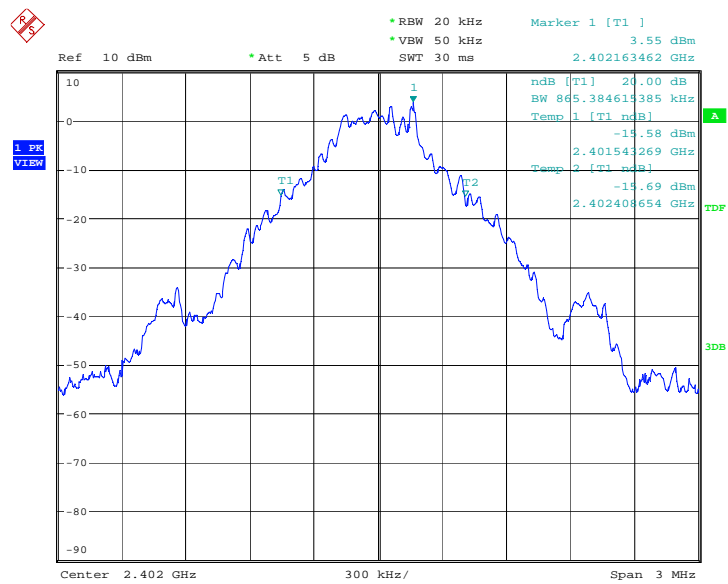
For 8DPSK

Channel	20dB Bandwidth (kHz)		Conclusion
0	Fig.127.	1274.04	P
39	Fig.128.	1274.04	P
78	Fig.129.	1269.23	P

Measurement Uncertainty: ± 1.1 KHz

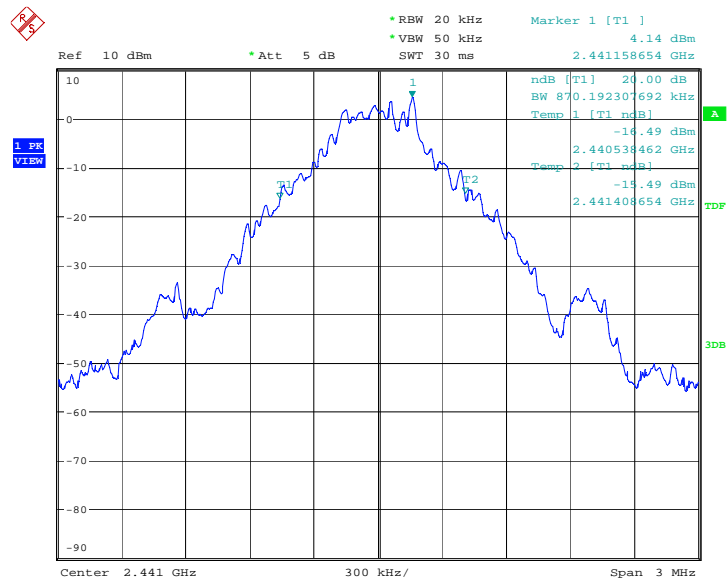
Conclusion: PASS

Test graphs as below:



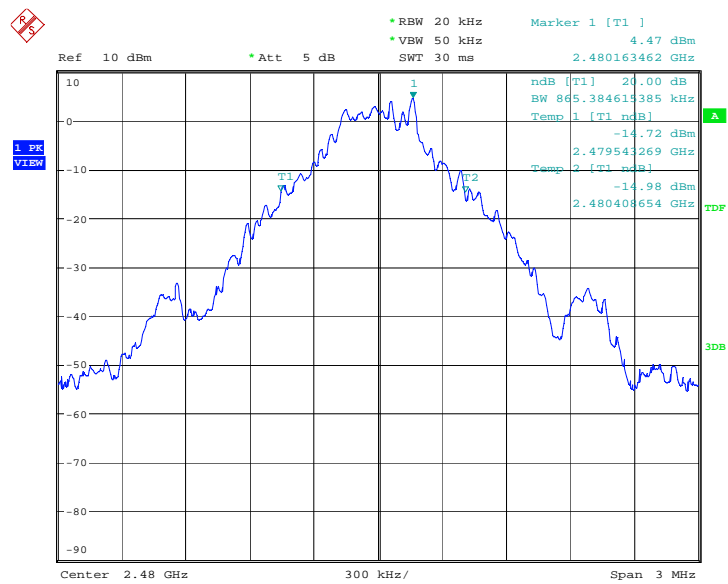
Date: 31.MAR.2012 10:23:45

Fig.121. 20dB Bandwidth: GFSK, Channel 0



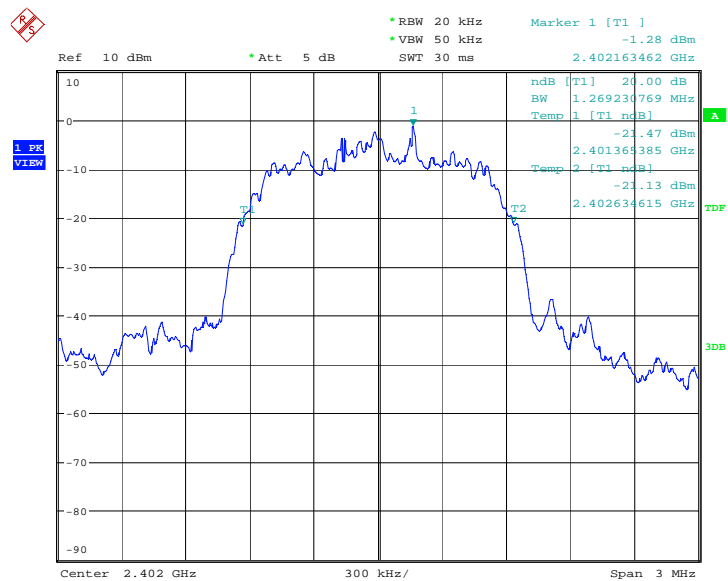
Date: 31.MAR.2012 10:24:17

Fig.122. 20dB Bandwidth: GFSK, Channel 39



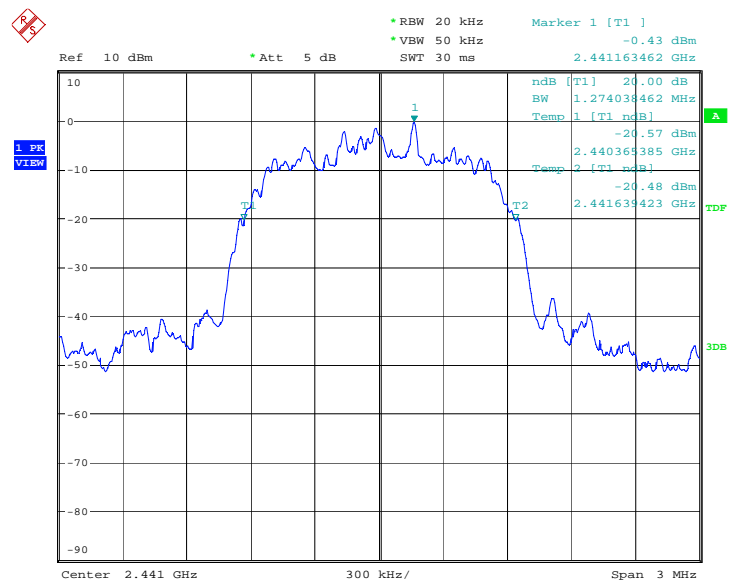
Date: 31.MAR.2012 10:24:49

Fig.123. 20dB Bandwidth: GFSK, Channel 78



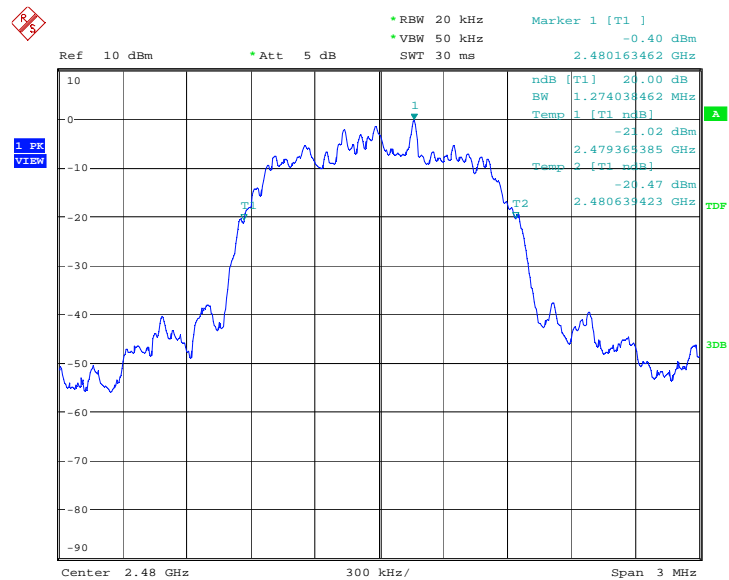
Date: 31.MAR.2012 10:45:51

Fig.124. 20dB Bandwidth: $\pi/4$ DQPSK, Channel 0



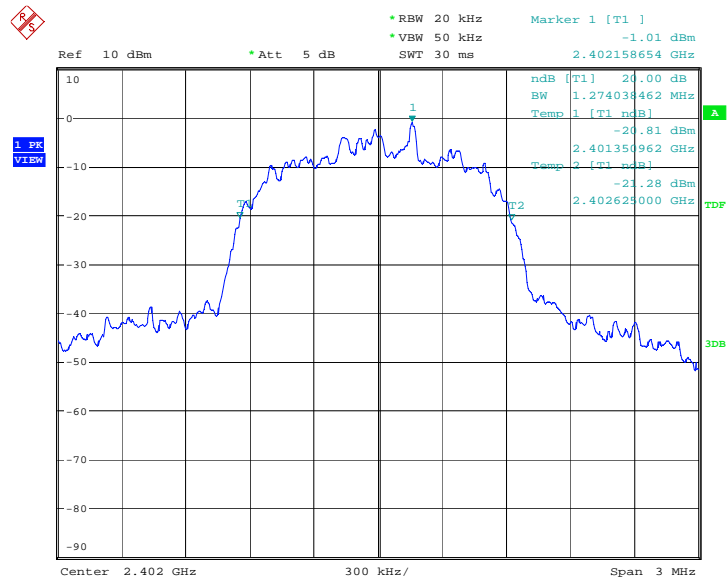
Date: 31.MAR.2012 10:46:23

Fig.125. 20dB Bandwidth: $\pi/4$ DQPSK, Channel 39



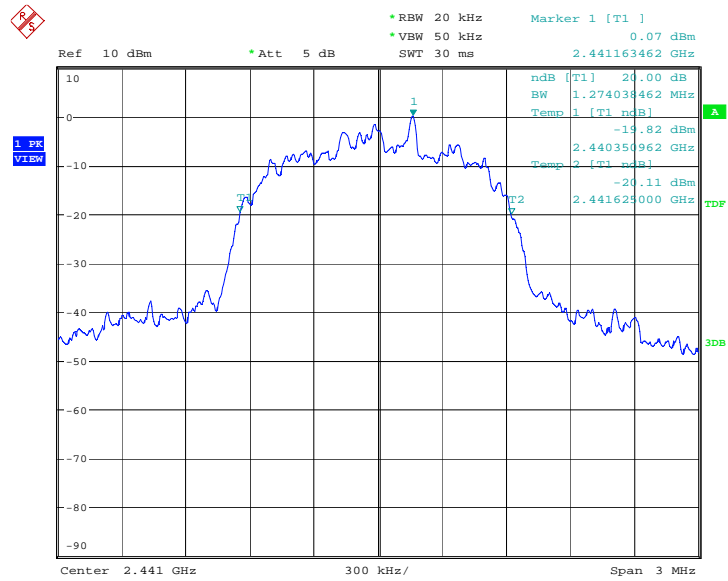
Date: 31.MAR.2012 10:46:55

Fig.126. 20dB Bandwidth: $\pi/4$ DQPSK, Channel 78



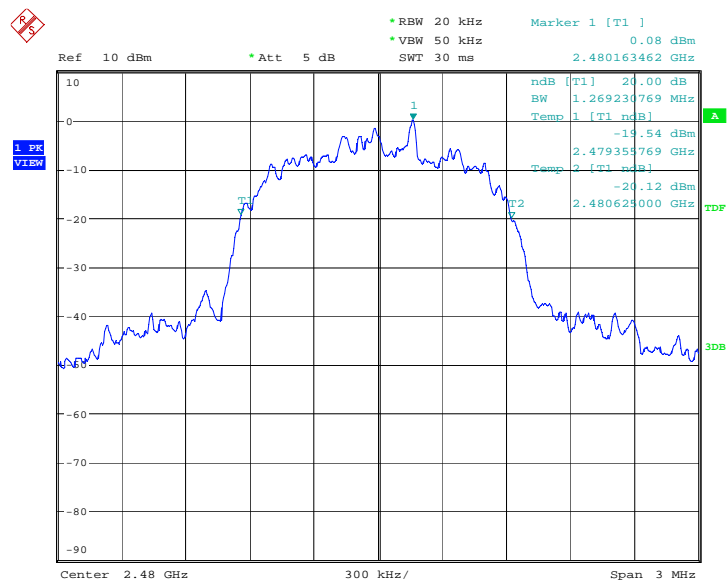
Date: 31.MAR.2012 11:07:54

Fig.127. 20dB Bandwidth: 8DPSK, Channel 0



Date: 31.MAR.2012 11:08:26

Fig.128. 20dB Bandwidth: 8DPSK, Channel 39



Date: 31.MAR.2012 11:08:58

Fig.129. 20dB Bandwidth: 8DPSK, Channel 78

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 Public notice DA 00-705 and ANSI C63.4

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

Measurement Condition:

RBW=VBW=300KHz; SPAN=3MHz; Detector: peak

Measurement Result:

EUT ID: #22007

For GFSK

Channel	Carrier frequency separation (kHz)	Conclusion
39	Fig.130. 822.12	P

For $\pi/4$ DQPSK

Channel	Carrier frequency separation (kHz)	Conclusion
39	Fig.131. 1100.96	P

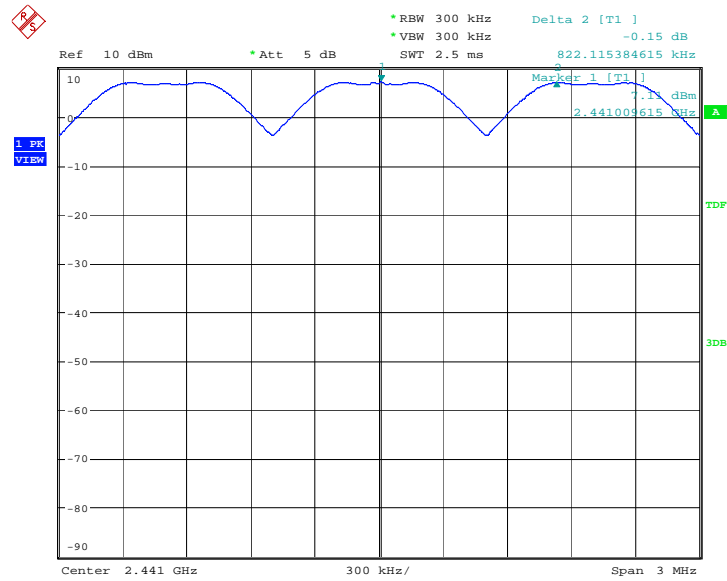
For 8DPSK

Channel	Carrier frequency separation (kHz)	Conclusion
39	Fig.132. 990.38	P

Measurement Uncertainty: $\pm 1.1\text{KHz}$

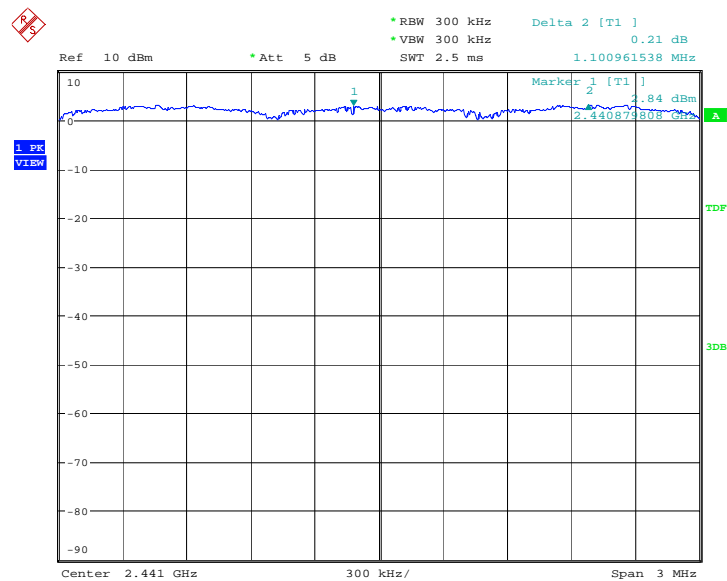
Conclusion: PASS

Test graphs as below:



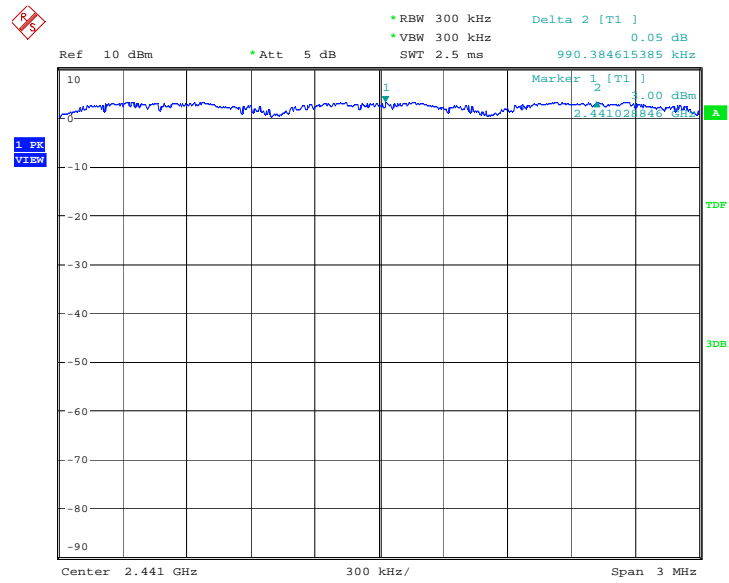
Date: 31.MAR.2012 10:26:53

Fig.130. Carrier frequency separation measurement: GFSK, Channel 39



Date: 31.MAR.2012 10:48:59

Fig.131. Carrier frequency separation measurement: $\pi/4$ DQPSK, Channel 39



Date: 31.MAR.2012 11:11:02

Fig.132. 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 Public notice DA 00-705 and ANSI C63.4

Measurement Condition:

RBW=VBW=500KHz; Detector: peak

Measurement Result:

EUT ID: #22007

For GFSK

Channel	Number of hopping channels	Conclusion
0~39	Fig.133.	79 P
40~78	Fig.134.	

For $\pi/4$ DQPSK

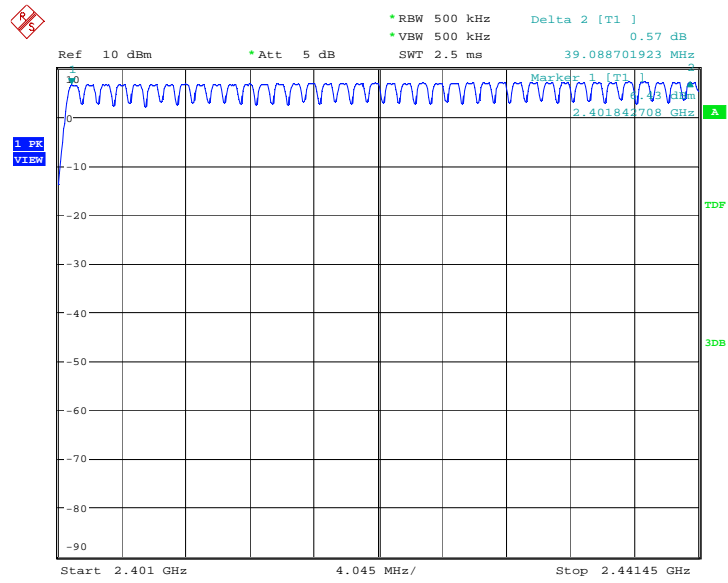
Channel	Number of hopping channels	Conclusion
0~39	Fig.135.	79 P
40~78	Fig.136.	

For 8DPSK

Channel	Number of hopping channels	Conclusion
0~39	Fig.137.	79 P
40~78	Fig.138.	

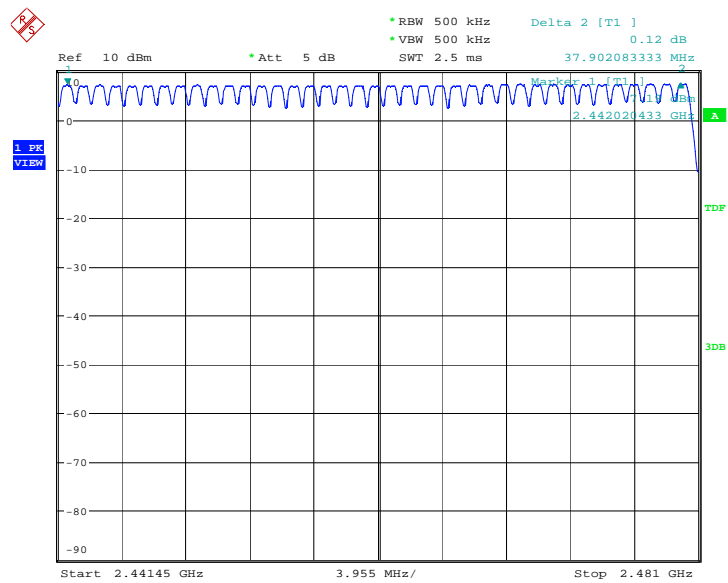
Conclusion: PASS

Test graphs as below:



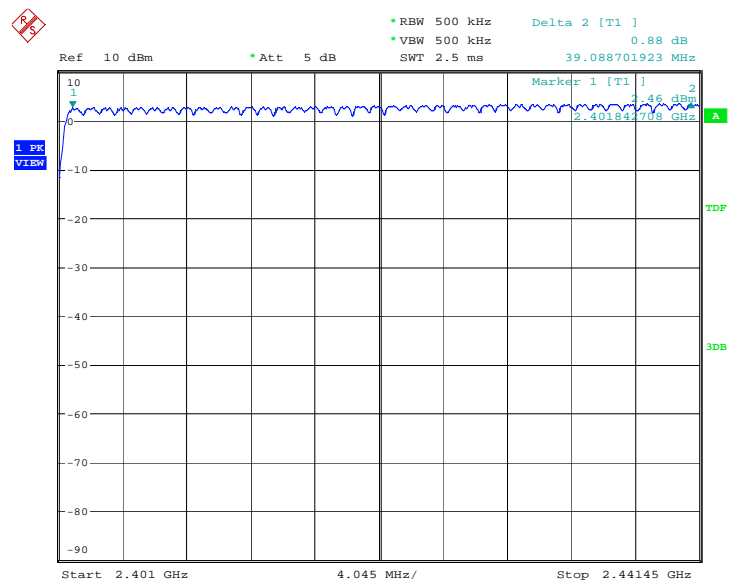
Date: 31.MAR.2012 10:28:57

Fig.133. Number of hopping frequencies: GFSK, Channel 0 - 39



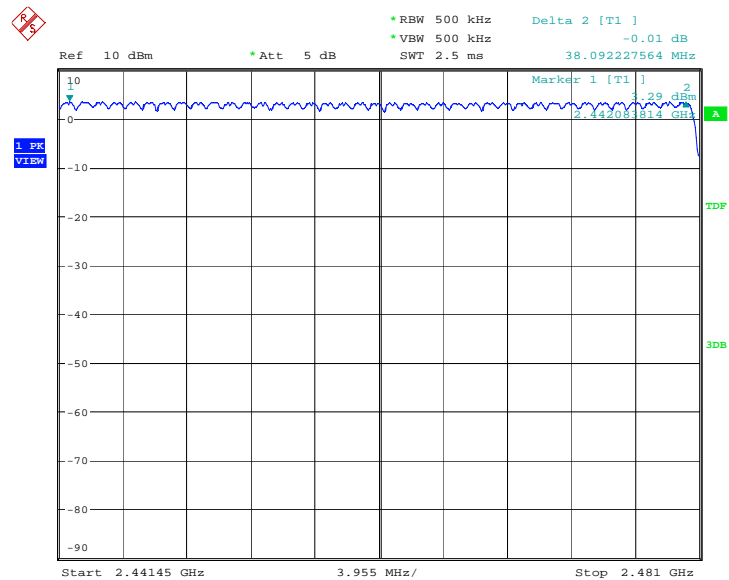
Date: 31.MAR.2012 10:31:00

Fig.134. Number of hopping frequencies: GFSK, Channel 40 - 78



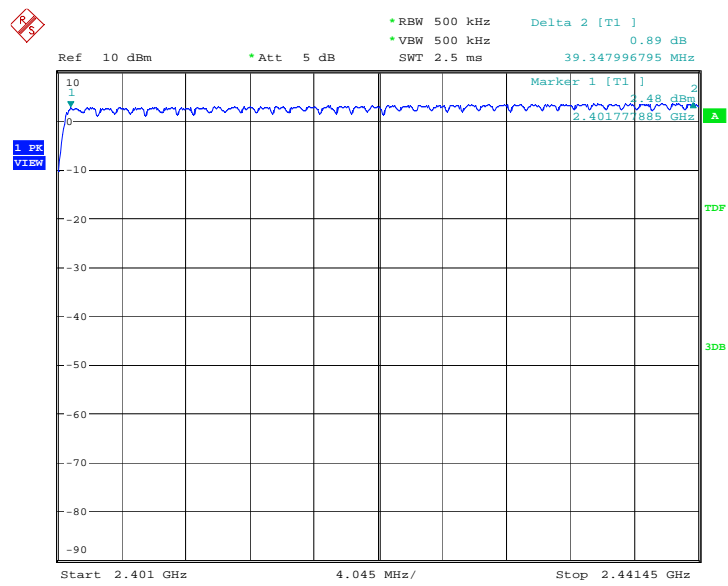
Date: 31.MAR.2012 10:51:03

Fig.135. Number of hopping frequencies: $\pi/4$ DQPSK, Channel 0 - 39



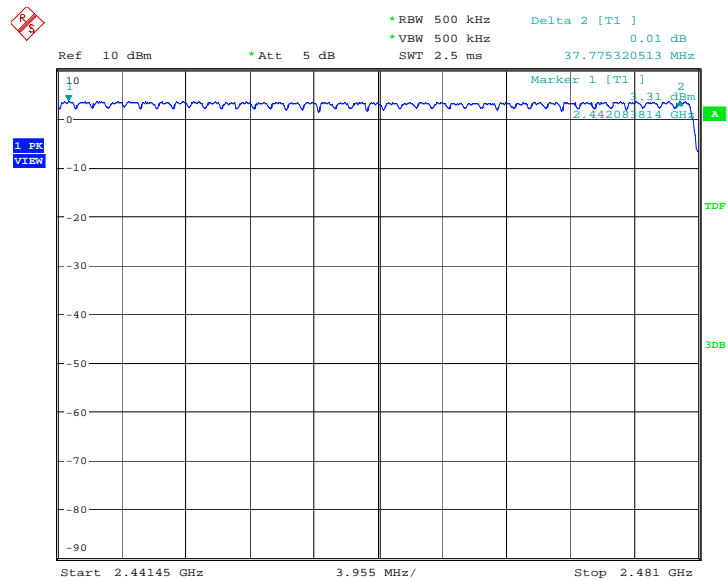
Date: 31.MAR.2012 10:53:06

Fig.136. Number of hopping frequencies: $\pi/4$ DQPSK, Channel 40 - 78



Date: 31.MAR.2012 11:13:06

Fig.137. Number of hopping frequencies: 8DPSK, Channel 0 - 39



Date: 31.MAR.2012 11:15:07

Fig.138. Number of hopping frequencies: 8DPSK, Channel 40 - 78

A.10. AC Powerline Conducted Emission

Standard
FCC 47 CFR Part 15.107, 15.207/ RSS-Gen 7.2.2

Test Condition

Voltage (V)	Frequency (Hz)
120	60

Measurement Result and limit:

EUT ID: #22007

Bluetooth (Quasi-peak Limit)

Frequency range (MHz)	Quasi-peak Limit (dB μ V)	Result (dB μ V)		Conclusion
		With Charger		
0.15 to 0.5	66 o 56	Fig.139. (TX Mode)	Fig.140. (Idle Mode)	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 (dB μ V)	Result (dB μ V)		Conclusion
		With Charger		
0.15 to 0.5	56 to 46	Fig.139 (TX Mode)	Fig.140 (Idle Mode)	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 C63.4.

Note: the graphic result above is the maximum of the measurements for both phase line and neutral line.

Conclusion: PASS

Test graphs as below:

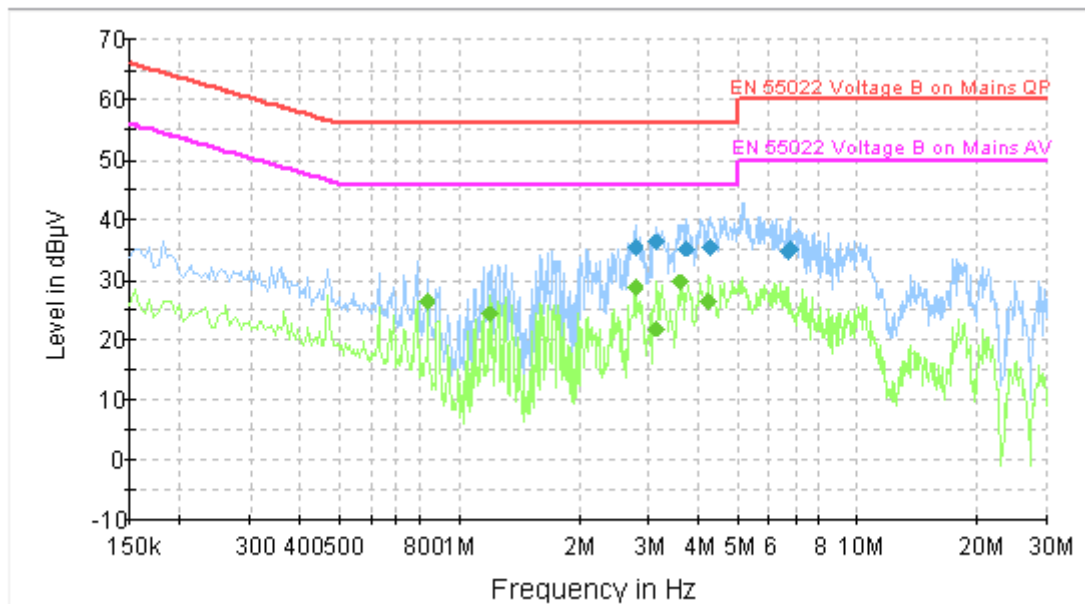


Fig.139 AC Powerline Conducted Emission with charger-TX Mode

Final Result 1

Frequency (MHz)	QuasiPeak (dB µV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dB µV)
2.765821	35.5	GND	N	9.8	20.5	56.0
3.133110	36.2	GND	N	9.8	19.8	56.0
3.730678	35.1	GND	N	9.8	20.9	56.0
4.289804	35.4	GND	N	9.8	20.6	56.0
6.686779	34.7	GND	N	9.7	25.3	60.0
6.821521	35.3	GND	N	9.7	24.7	60.0

Final Result 2

Frequency (MHz)	Average (dB µV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dB µV)
0.834000	26.3	GND	N	9.9	19.7	46.0
1.198500	24.3	GND	N	9.8	21.7	46.0
2.765821	28.8	GND	N	9.8	17.2	46.0
3.133110	22.0	GND	N	9.8	24.0	46.0
3.602677	29.6	GND	N	9.8	16.4	46.0
4.247226	26.3	GND	N	9.8	19.7	46.0

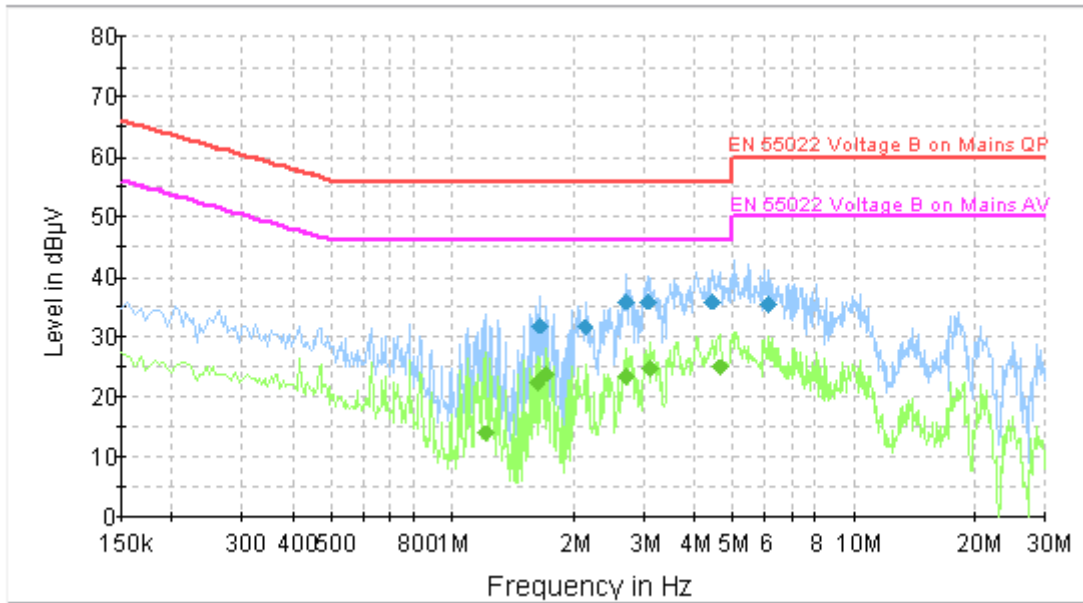


Fig.140 AC Powerline Conducted Emission with charger-Idle Mode

Final Result 1

Frequency (MHz)	QuasiPeak (dB µV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dB µV)
1.657500	31.8	GND	N	9.8	24.2	56.0
2.133973	31.6	GND	N	9.8	24.4	56.0
2.711189	35.9	GND	N	9.8	20.1	56.0
3.071223	35.8	GND	N	9.8	20.2	56.0
4.442218	35.8	GND	N	9.8	20.2	56.0
6.082215	35.4	GND	N	9.8	24.6	60.0

Final Result 2

Frequency (MHz)	Average (dB µV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dB µV)
1.207500	13.9	GND	L1	9.8	32.1	46.0
1.621500	22.1	GND	N	9.8	23.9	46.0
1.711500	23.9	GND	N	9.8	22.1	46.0
2.711189	23.4	GND	L1	9.8	22.6	46.0
3.133110	24.6	GND	N	9.8	21.4	46.0
4.623048	24.9	GND	N	9.8	21.1	46.0

A.11 RECEIVER RADIATION EMISSION

Reference

FCC: CFR Part 15.109, 2.1053

A.11.1 Method of Measurement

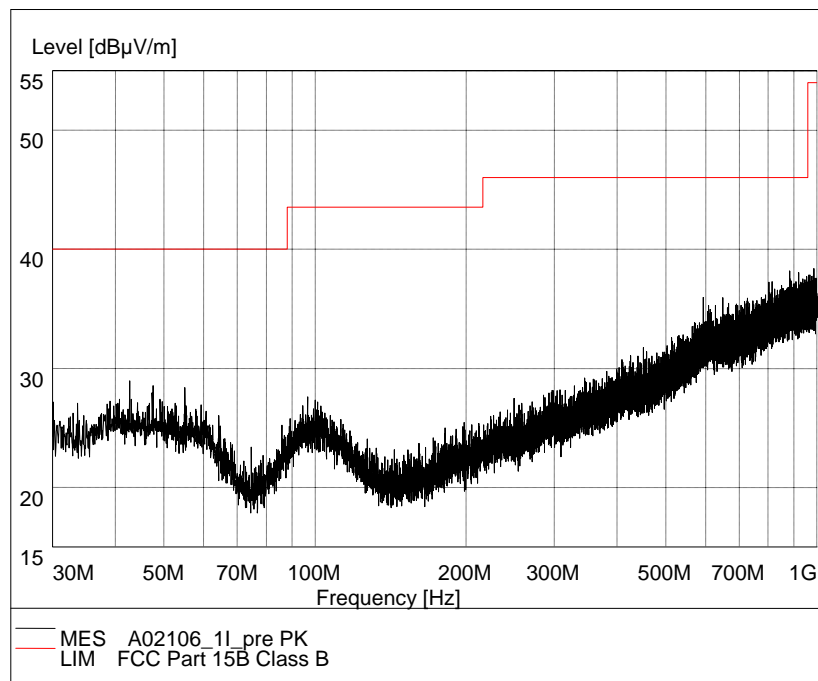
The measurement procedure in ANSI C64.4-2003 is used. The EUT is placed on a 80cm height non-conductive table locating on the center of turntable. From 30MHz-1GHz, the measurement distance is 10m. For frequency range above 1GHz, the measurement distance is 3m.

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

A.11.2 Method of Measurement

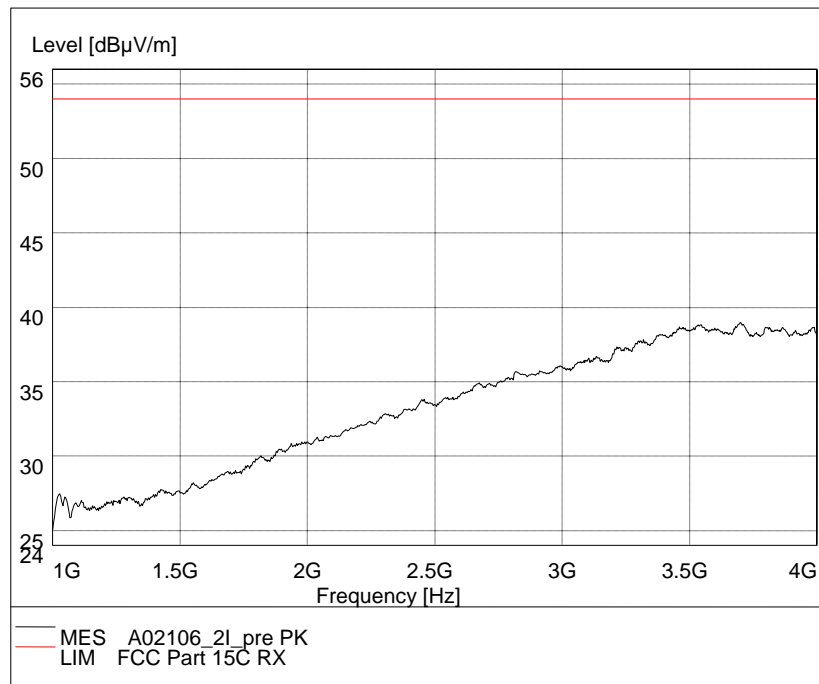
Frequency of Emission (MHz)	Limit (dB μ V/m)	Measurement Distance (m)
30-88	30	10
88-216	33.5	10
216-960	36	10
960-1000	44	10
>1000	54	3

A. 11.3 Measurement results



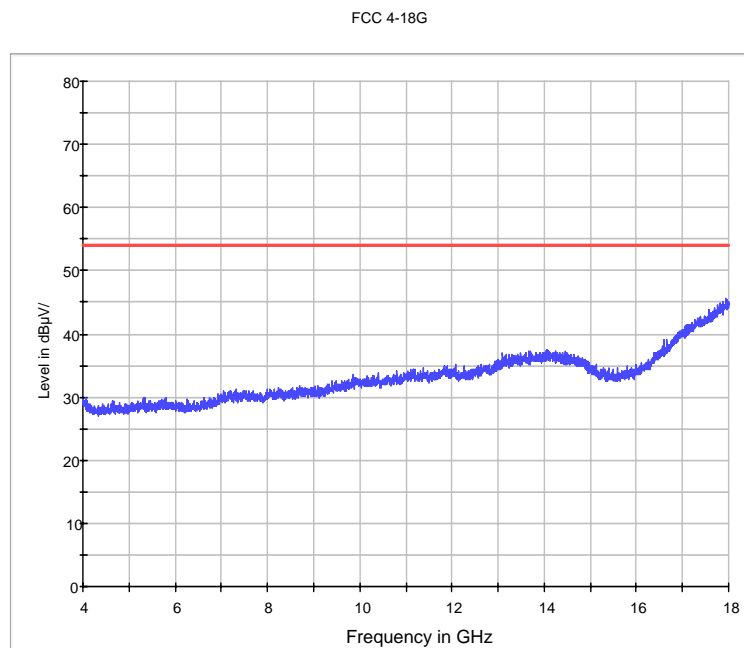
IF bandwidth: 120 kHz

Idle Mode: 30MHz-1GHz



RBW / VBW 1 MHz

Idle Mode: 1GHz-4GHz



RBW / VBW 1 MHz

Idle Mode: 4GHz-18GHz