



FCC PART 15C/IC RSS-210 TEST REPORT No. 2010TAR182

for

Sony Ericsson Mobile Communications AB

GSM 850/900/1800/1900 quad bands and

UMTS FDD 1/8 mobile phone

Model Name: AAD-3880083-BV

Marketing Name: W20i

With

FCC ID: PY7A3880083

IC ID: 4170B-A3880083

Hardware Version: A

Software Version: R7BA084

Issued Date: 2010-05-28



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

FCC 2.948 Listed: No.733176

No. DGA-PL-114/01-02

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:

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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°C
Extreme Temperature: -20/+55°C
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: 2010-05-05
Testing End Date: 2010-05-28

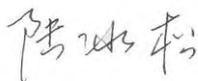
1.4. Signature



Zi Xiaogang
(Prepared this test report)



Sun Xiangqian
(Reviewed this test report)



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

2. Client Information

2.1. Applicant Information

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2.2. Manufacturer Information

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Address /Post: Nya Vattentorget, 22188 Lund, Sweden
City: Lund
Postal Code: 22188
Country: Sweden
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Email Anders.Nordlof@sonyericsson.com
Telephone: +46 46 193919
Fax: +46 46 193295

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

3.1. About EUT

Description	GSM850/900/1800/1900, GPRS, EDGE, UMTS FDD 1/8, BT EDR2.0, FM-receiver mobile phone
Model Name	AAD-3880083-BV
Marketing Name	W20i
FCC ID	PY7A3880083
IC ID	4170B-A3880083
Frequency Band	ISM 2400MHz~2483.5MHz
Type of Modulation	GFSK/ $\pi/4$ DQPSK/8DPSK
Number of Channels	79
Cellular Frequency Band	EGSM900/DCS1800/GSM850/PCS1900/FDD BAND I/VIII PowerClass:EGSM900:4/DCS1800:1/GSM850:4/PCS1900:1/FDD BAND I/VIII:3
Support Functions	Bluetooth, Camera, FM, MP3, USB Memory
Antenna	Integral Antenna
MAX Radiated Power	2.33dBm EIRP(GFSK)
MAX Conducted Power	6.68dBm(GFSK)
Power Supply	3.6V 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
N05	BX901EU3MP	00440107-988869-5	A	R7BA084
N07	BX901EU3B5	00440107-988908-1	A	R7BA084

*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	Type	SN
AE1	Battery	CBA-0002010	442010ISMENX
AE2	Travel Charger	CAA-0002020-BV	5810W11300040

*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 FDD1/8 mobile phone with integrated antenna. It has MP3, Camera, FM radio, USB memory and Bluetooth functions. It also supports GPRS function with multi-slots class 10 and EGPRS function

with multi-slots class 10 too. It 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, 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 2	Spectrum Management and Telecommunications - Radio Standards Specification General Requirements and Information for the Certification of Radiocommunication Equipment	2007-06
RSS - 210 Issue 7	Spectrum Management and Telecommunications - Radio Standards Specification Low-power Licence-exempt Radiocommunication Devices (All Frequency Bands): Category I Equipment	2007-06

5. LABORATORY ENVIRONMENT

Shielding Room1 (6.0 meters×3.0 meters×2.7 meters) did not exceed following limits along the conducted RF performance testing:

Temperature	Min. = 15 °C, Max. = 30 °C
Relative humidity	Min. = 30 %, Max. = 60 %
Shielding effectiveness	> 110 dB
Ground system resistance	< 0.5 Ω
Uniformity of field strength	Between 0 and 6 dB, from 80MHz to 3000 MHz

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

Temperature	Min. = 15 °C, Max. = 35 °C
Relative humidity	Min. =30 %, Max. = 60 %
Shielding effectiveness	> 110 dB
Electrical insulation	> 10 kΩ
Ground system resistance	< 0.5 Ω

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	> 10 kΩ
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

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

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	25°C
Voltage	V nom	3.6V(By battery)
Humidity	H nom	39%
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	2010-06-18
2	Bluetooth Tester	CBT32	100649	Rohde & Schwarz	2011-02-03

Radiated emission test system

No.	Equipment	Model	Serial Number	Manufacturer	Calibration Due date
1	Test Receiver	ESI40	831564/002	Rohde & Schwarz	2011-02-11
2	EMI Antenna	VULB 9163	9163 301	Schwarzbeck	2011-04-29
3	EMI Antenna	3117	00034610	EMCO	2010-07-01
4	Dual-Ridge Waveguide Horn Antenna	3116	2663	EMCO	2011-03-01
5	Dual-Ridge Waveguide Horn Antenna	3116	2661	EMCO	2011-03-01
6	Universal Radio Communication Tester	CMU200	105948	Rohde & Schwarz	2010-08-14
7	LISN	ESH2-Z5	829991/012	Rohde & Schwarz	2010-08-13
8	Pre-amplifier(18GHz)	/	1005277	Rohde & Schwarz	/
9	Pre-amplifier(26.5GHz)	/	1005277	Rohde & Schwarz	/

Anechoic chamber

Fully anechoic chamber by Frankonia German.

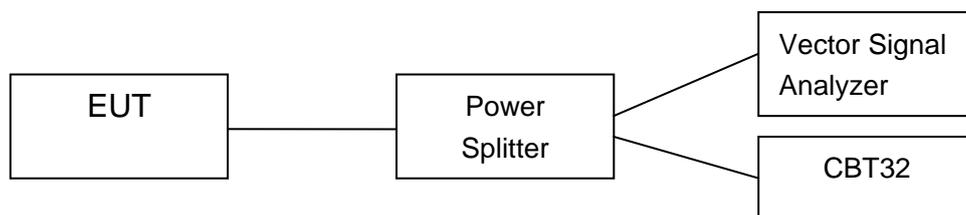
ANNEX A: MEASUREMENT RESULTS

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

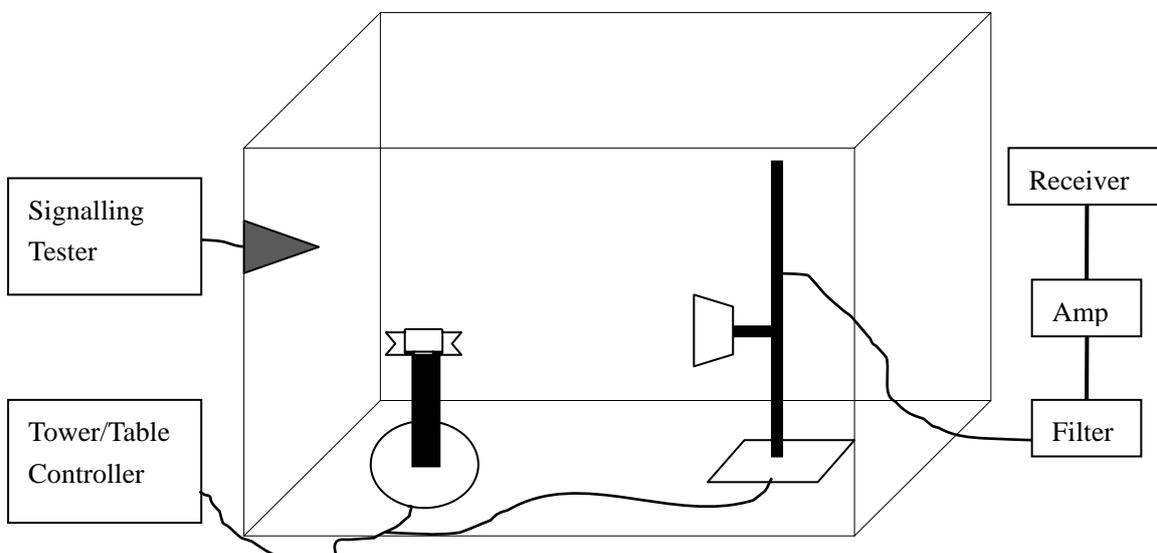
The measurement is made according to Public notice DA 00-705 and ANSI C63.4

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 Condition:

RBW=VBW=1MHz; SPAN=5MHz; Detector: peak

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 (dBi)	-1.81	-4.39	-6.39

Conclusion: PASS

A.2.2 Peak Output Power(Conducted)

EUT ID:N07

Channel	Ch 0 2402 MHz	Ch 39 2441 MHz	Ch 78 2480 MHz	Conclusion
GFSK (dBm)	4.14	6.68	6.26	P
$\pi/4$ DQPSK (dBm)	1.15	3.46	3.16	P
8DPSK (dBm)	1.11	3.40	3.10	P

Measurement Uncertainty: ± 1.17 dB

Conclusion: PASS

A.2.3 Peak Output Power(Radiated)

EUT ID:N05

Channel	Ch 0 2402 MHz	Ch 39 2441 MHz	Ch 78 2480 MHz	Conclusion
GFSK (dBm)	2.33	2.29	-0.13	P

Measurement Uncertainty: ± 1.98 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

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:N07

For GFSK

Channel	Hopping	Band Edge Power (dBc)		Conclusion
0	Hopping OFF	Fig.1	-48.98	P
	Hopping ON	Fig.2	-55.15	P
78	Hopping OFF	Fig.3	-56.14	P
	Hopping ON	Fig.4	-53.64	P

For $\pi/4$ DQPSK

Channel	Hopping	Band Edge Power (dBc)		Conclusion
0	Hopping OFF	Fig.5	-48.65	P
	Hopping ON	Fig.6	-47.24	P
78	Hopping OFF	Fig.7	-54.09	P
	Hopping ON	Fig.8	-53.20	P

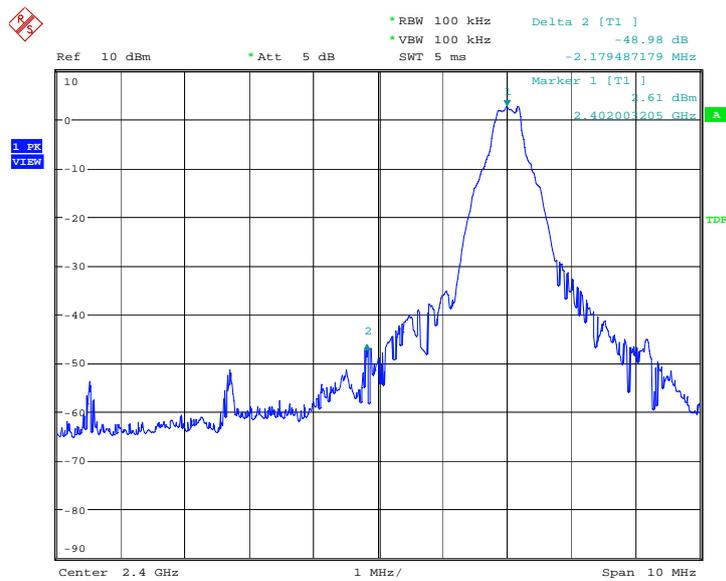
For 8DPSK

Channel	Hopping	Band Edge Power (dBc)		Conclusion
0	Hopping OFF	Fig.9	-48.38	P
	Hopping ON	Fig.10	-48.02	P
78	Hopping OFF	Fig.11	-53.32	P
	Hopping ON	Fig.12	-50.19	P

Measurement Uncertainty: ± 1.37 dB

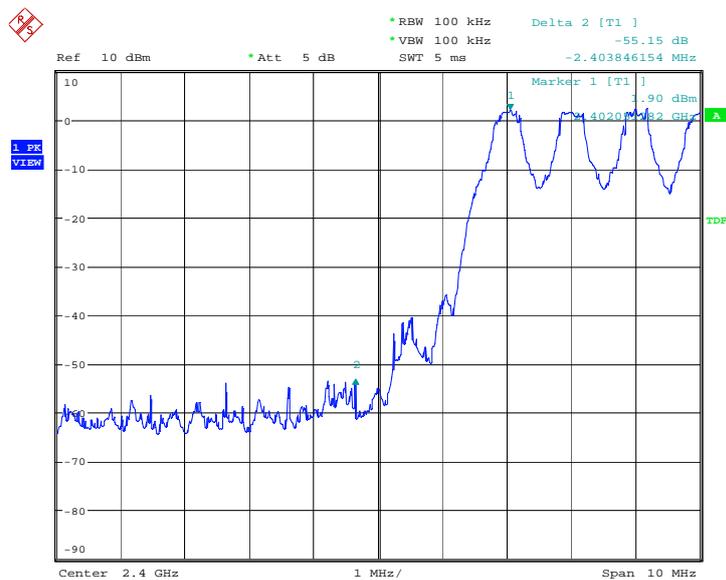
Conclusion: PASS

Test graphs as below:



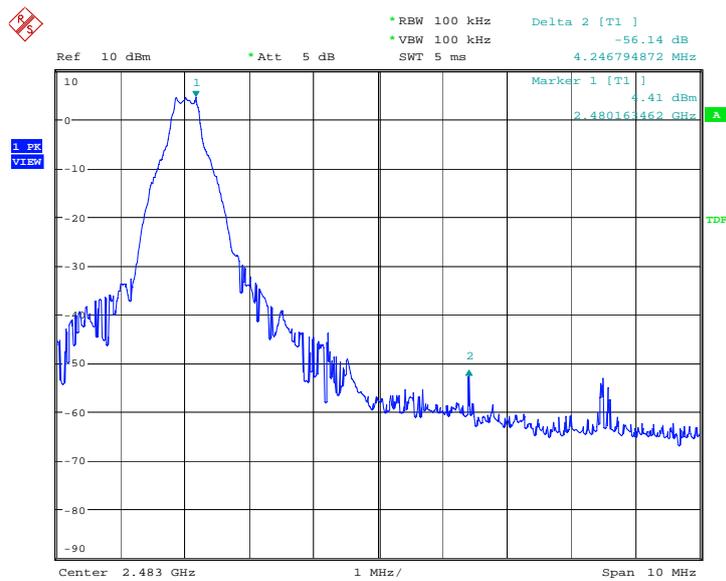
Date: 12.MAY.2010 09:08:47

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



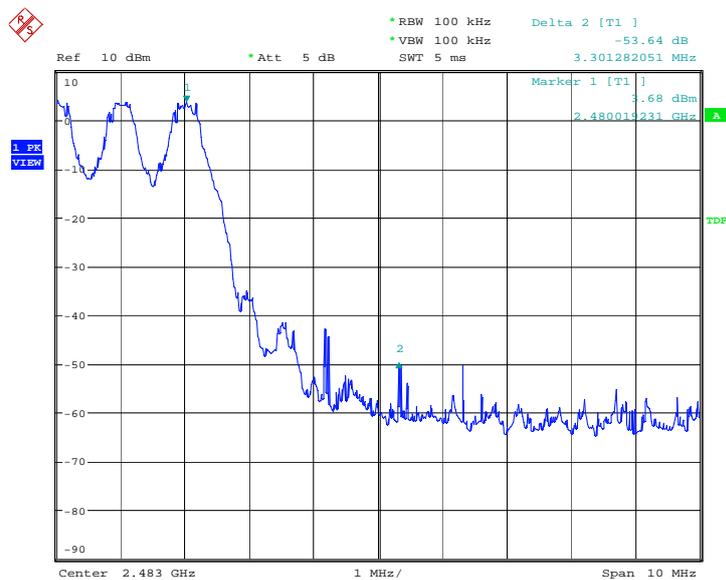
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Fig.2 Frequency Band Edges: GFSK, Channel 0, Hopping On



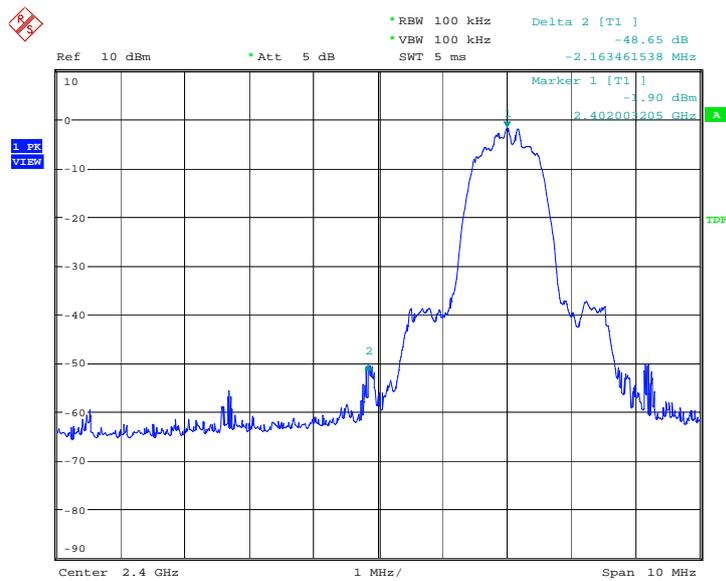
Date: 12.MAY.2010 09:09:05

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



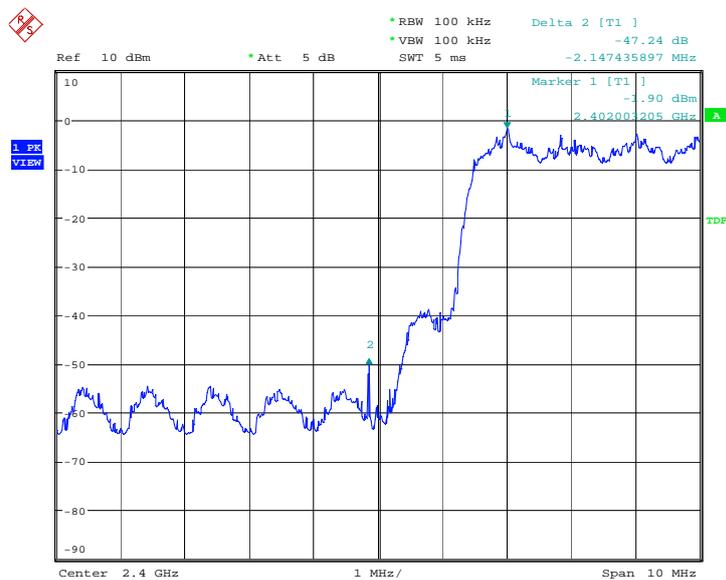
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Fig.4 Frequency Band Edges: GFSK, Channel 78, Hopping On



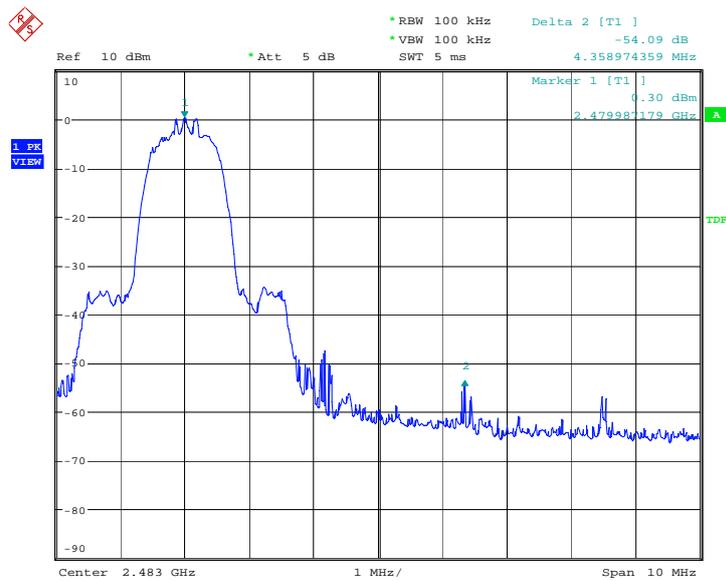
Date: 12.MAY.2010 09:34:22

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



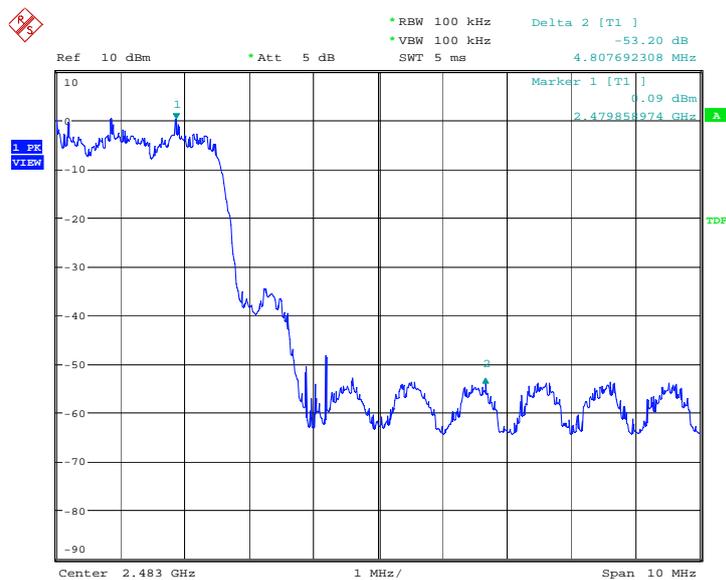
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Fig.6 Frequency Band Edges: $\pi/4$ DQPSK, Channel 0, Hopping On



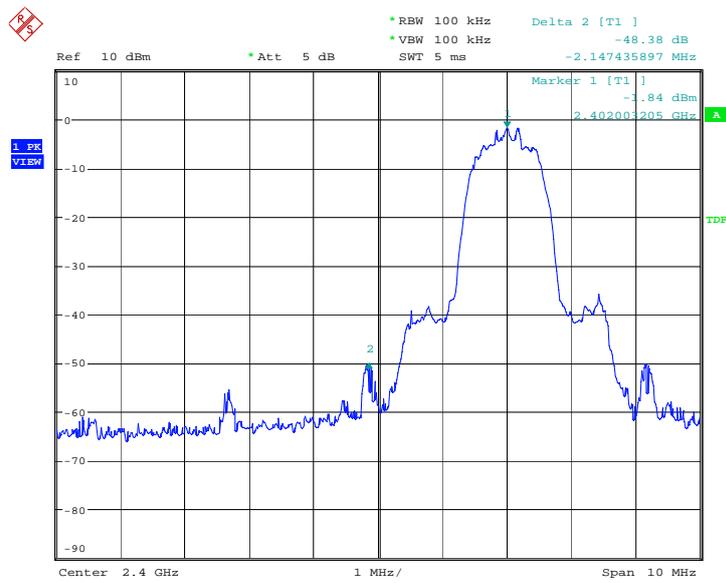
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Fig.7 Frequency Band Edges: $\pi/4$ DQPSK, Channel 78, Hopping Off



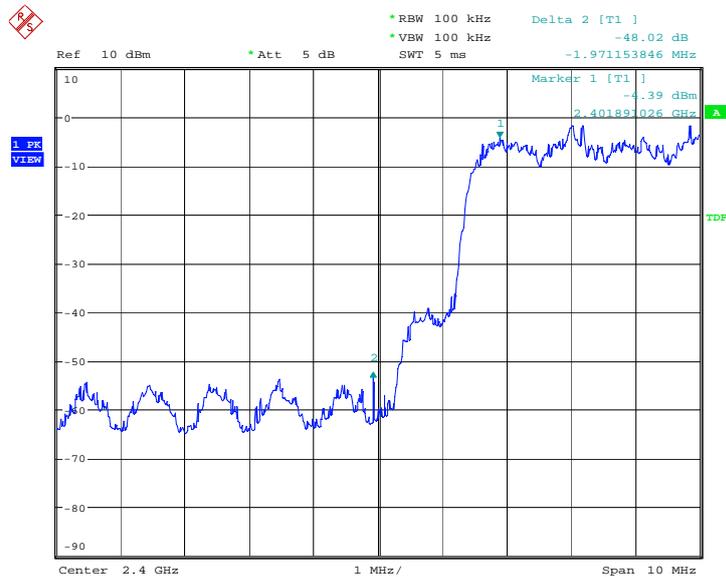
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Fig.8 Frequency Band Edges: $\pi/4$ DQPSK, Channel 78, Hopping On



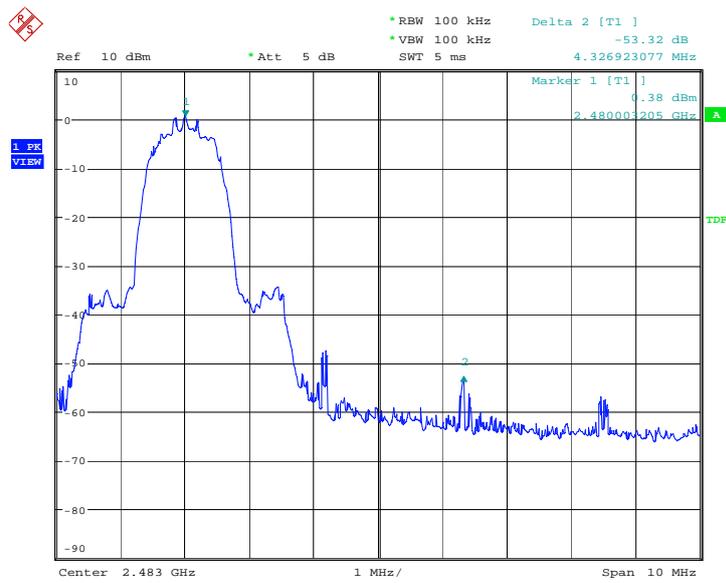
Date: 12.MAY.2010 09:59:57

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



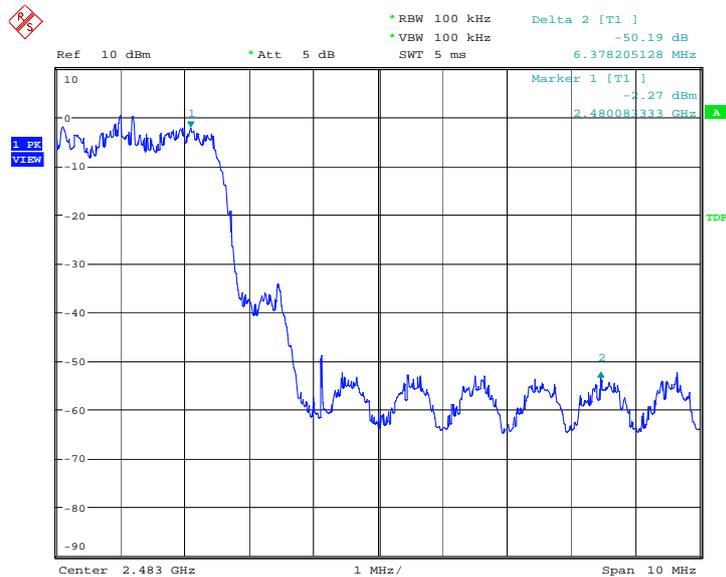
Date: 12.MAY.2010 10:02:17

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



Date: 12.MAY.2010 10:00:14

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



Date: 12.MAY.2010 10:04:19

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

A.4. Conducted Emission

Measurement Limit:

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

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

Measurement Condition:

RBW=VBW=100KHz; Detector: peak

Measurement Results:

EUT ID:N07

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 ~ 26 GHz	Fig.15	P
Ch 39 2441 MHz	Center Frequency	Fig.16	P
	30 MHz ~ 1 GHz	Fig.17	P
	1 GHz ~ 26 GHz	Fig.18	P
Ch 78 2480 MHz	Center Frequency	Fig.19	P
	30 MHz ~ 1 GHz	Fig.20	P
	1 GHz ~ 26 GHz	Fig.21	P

For $\pi/4$ DQPSK

Channel	Frequency Range	Test Results	Conclusion
Ch 0 2402 MHz	Center Frequency	Fig.22	P
	30 MHz ~ 1 GHz	Fig.23	P
	1 GHz ~ 26 GHz	Fig.24	P
Ch 39 2441 MHz	Center Frequency	Fig.25	P
	30 MHz ~ 1 GHz	Fig.26	P
	1 GHz ~ 26 GHz	Fig.27	P
Ch 78 2480 MHz	Center Frequency	Fig.28	P
	30 MHz ~ 1 GHz	Fig.29	P
	1 GHz ~ 26 GHz	Fig.30	P

For 8DPSK

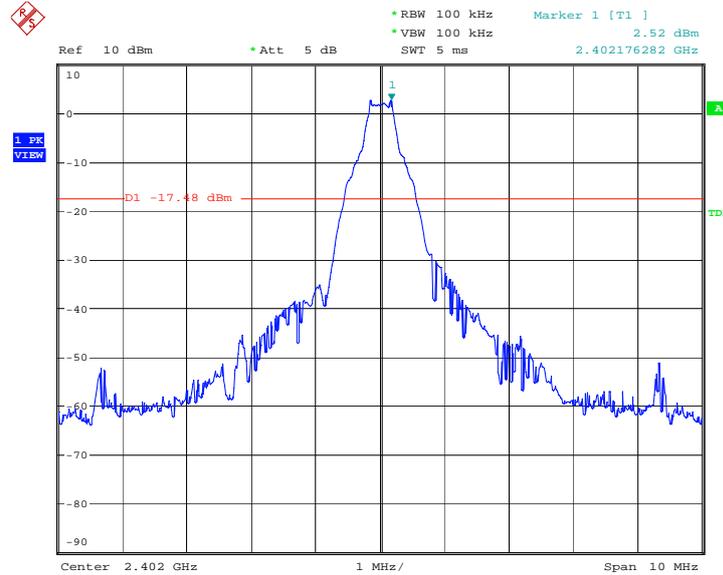
Channel	Frequency Range	Test Results	Conclusion
Ch 0 2402 MHz	Center Frequency	Fig.31	P
	30 MHz ~ 1 GHz	Fig.32	P
	1 GHz ~ 26 GHz	Fig.33	P
Ch 39 2441 MHz	Center Frequency	Fig.34	P
	30 MHz ~ 1 GHz	Fig.35	P
	1 GHz ~ 26 GHz	Fig.36	P

Ch 78 2480 MHz	Center Frequency	Fig.37	P
	30 MHz ~ 1 GHz	Fig.38	P
	1 GHz ~ 26 GHz	Fig.39	P

Measurement Uncertainty: $\pm 2.86\text{dB}$

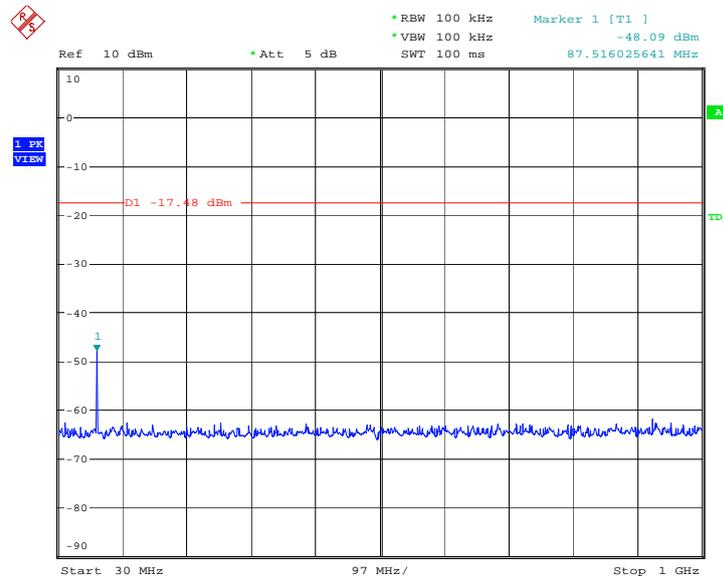
Conclusion: PASS

Test graphs as below:



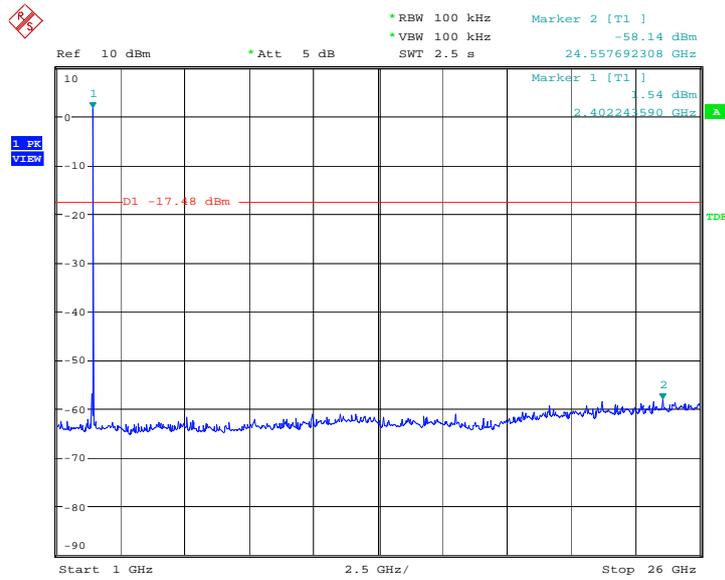
Date: 12.MAY.2010 09:13:27

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



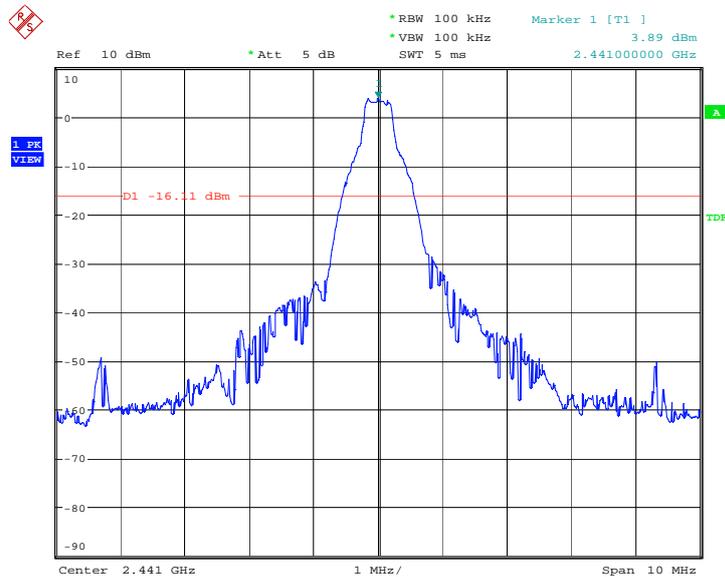
Date: 12.MAY.2010 09:13:44

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



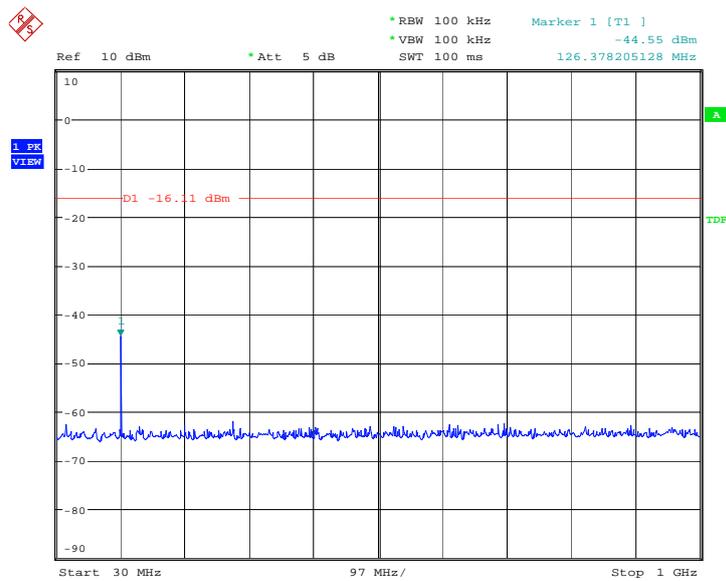
Date: 12.MAY.2010 09:14:15

Fig.15 Conducted spurious emission: GFSK, Channel 0,1GHz - 26GHz



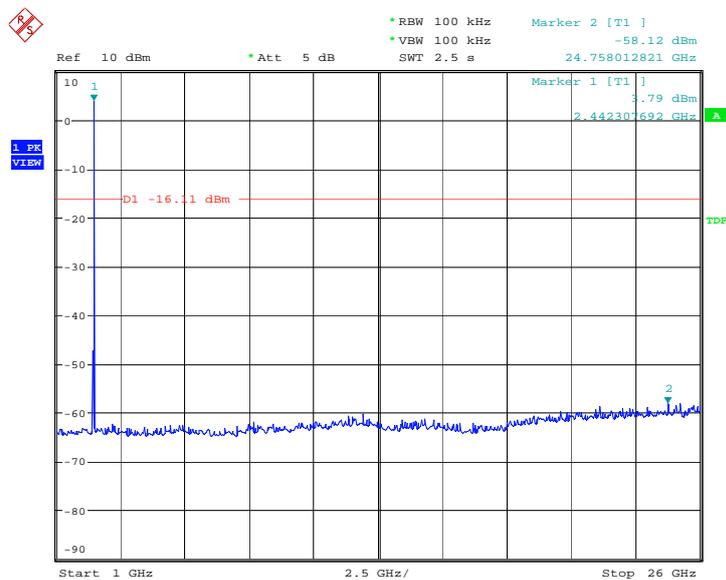
Date: 12.MAY.2010 09:14:32

Fig.16 Conducted spurious emission: GFSK, Channel 39, 2441MHz



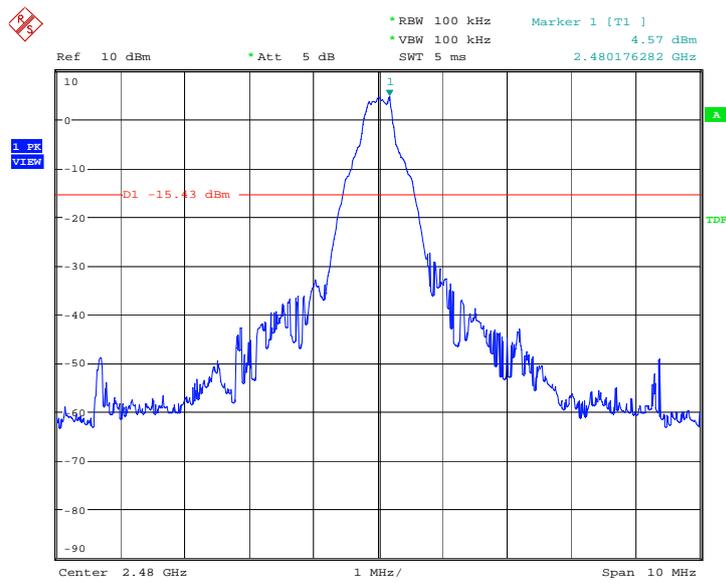
Date: 12.MAY.2010 09:14:49

Fig.17 Conducted spurious emission: GFSK, Channel 39, 30MHz - 1GHz



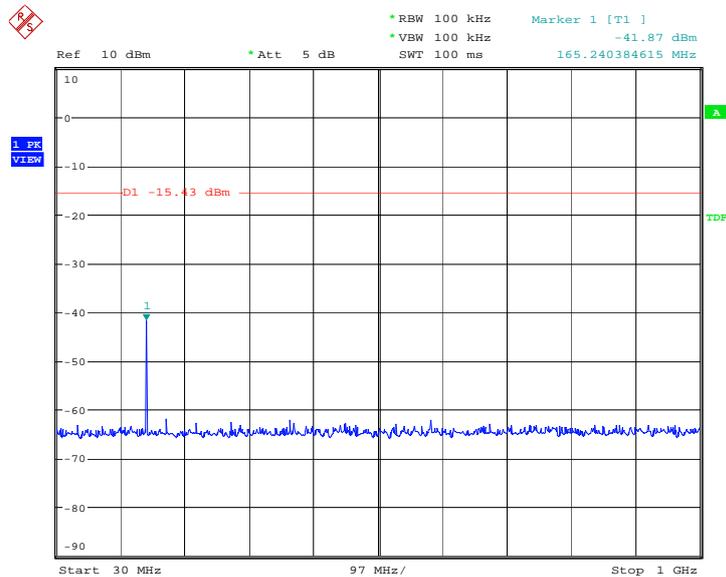
Date: 12.MAY.2010 09:15:20

Fig.18 Conducted spurious emission: GFSK, Channel 39, 1GHz - 26GHz



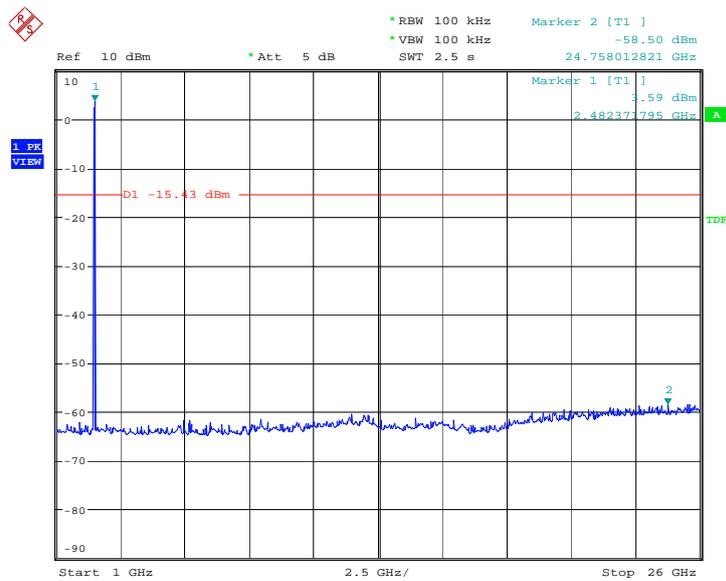
Date: 12.MAY.2010 09:15:37

Fig.19 Conducted spurious emission: GFSK, Channel 78, 2480MHz



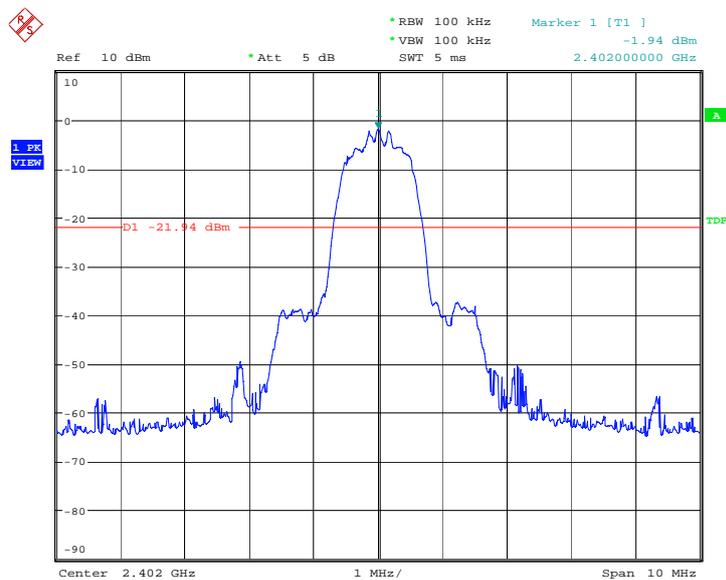
Date: 12.MAY.2010 09:15:53

Fig.20 Conducted spurious emission: GFSK, Channel 78, 30MHz - 1GHz



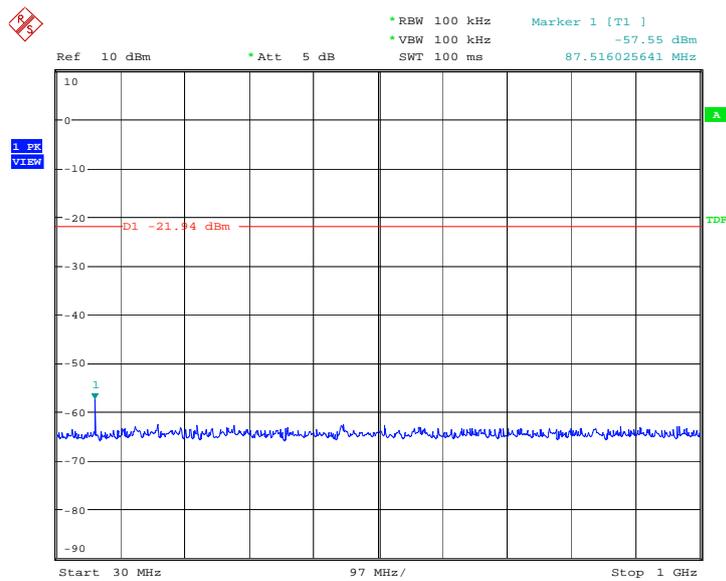
Date: 12.MAY.2010 09:16:25

Fig.21 Conducted spurious emission: GFSK, Channel 78, 1GHz - 26GHz



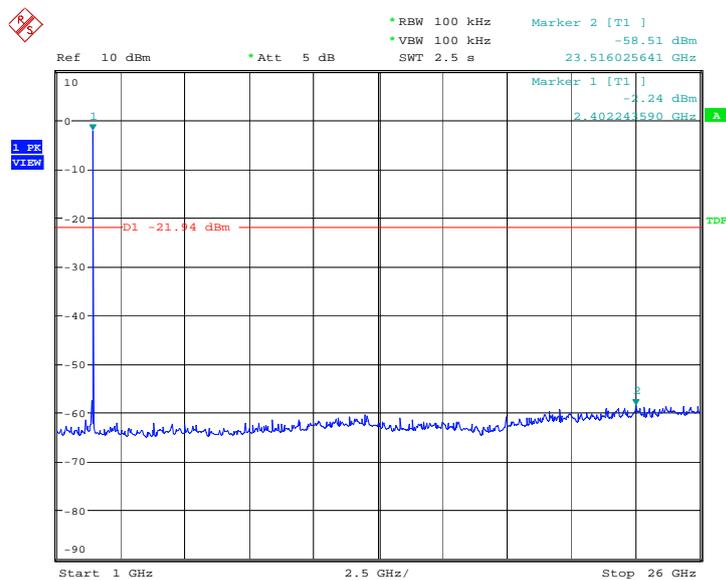
Date: 12.MAY.2010 09:39:02

Fig.22 Conducted spurious emission: $\pi/4$ DQPSK, Channel 0,2402MHz



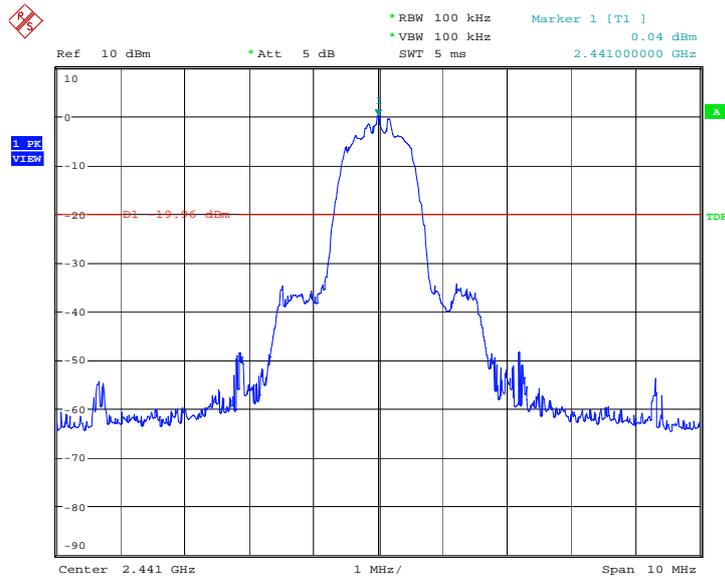
Date: 12.MAY.2010 09:39:19

Fig.23 Conducted spurious emission: $\pi/4$ DQPSK, Channel 0, 30MHz - 1GHz



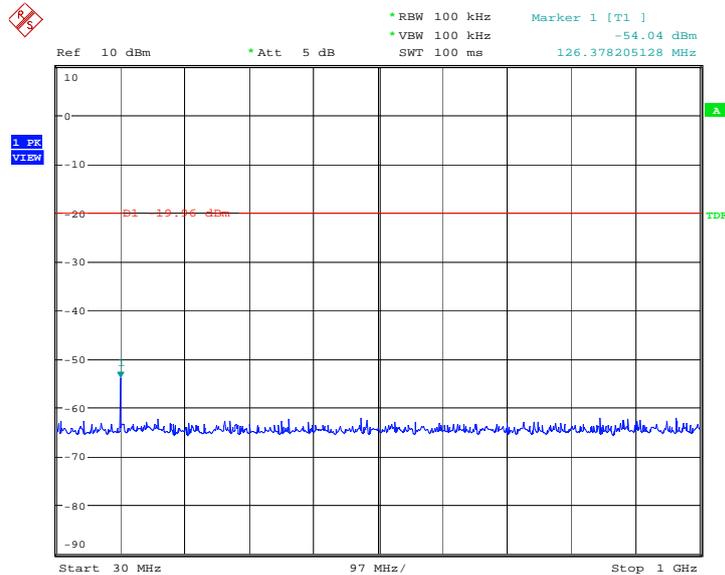
Date: 12.MAY.2010 09:39:50

Fig.24 Conducted spurious emission: $\pi/4$ DQPSK, Channel 0,1GHz - 26GHz



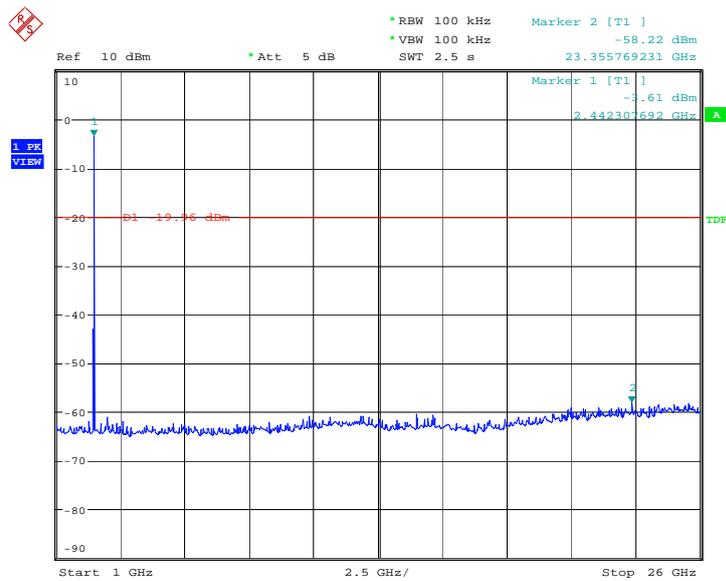
Date: 12.MAY.2010 09:40:07

Fig.25 Conducted spurious emission: $\pi/4$ DQPSK, Channel 39, 2441MHz



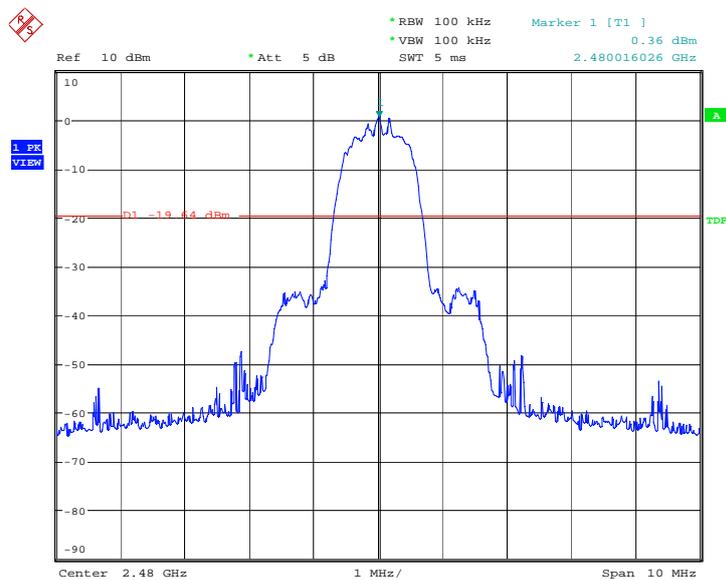
Date: 12.MAY.2010 09:40:23

Fig.26 Conducted spurious emission: $\pi/4$ DQPSK, Channel 39, 30MHz - 1GHz



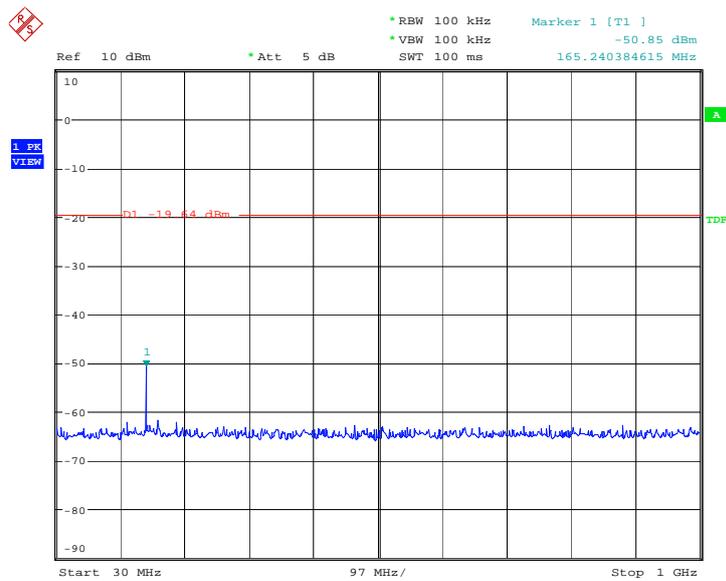
Date: 12.MAY.2010 09:40:55

Fig.27 Conducted spurious emission: $\pi/4$ DQPSK, Channel 39, 1GHz – 26GHz



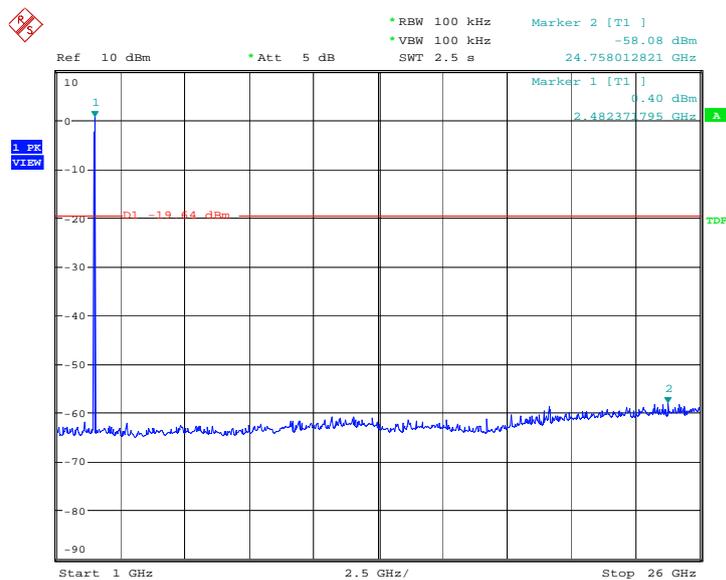
Date: 12.MAY.2010 09:41:11

Fig.28 Conducted spurious emission: $\pi/4$ DQPSK, Channel 78, 2480MHz



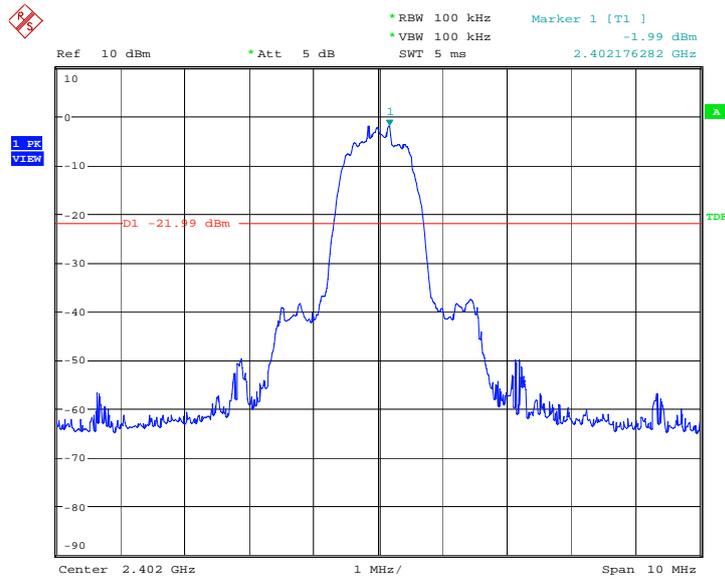
Date: 12.MAY.2010 09:41:28

Fig.29 Conducted spurious emission: $\pi/4$ DQPSK, Channel 78, 30MHz - 1GHz



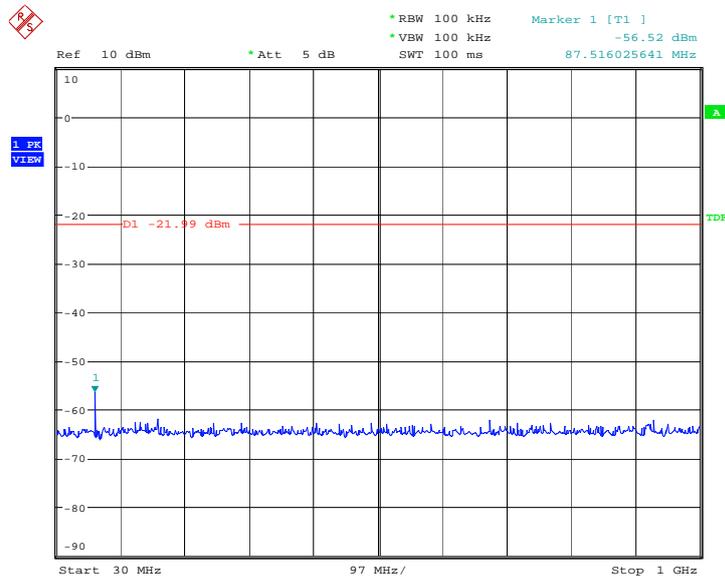
Date: 12.MAY.2010 09:41:59

Fig.30 Conducted spurious emission: $\pi/4$ DQPSK, Channel 78, 1GHz - 26GHz



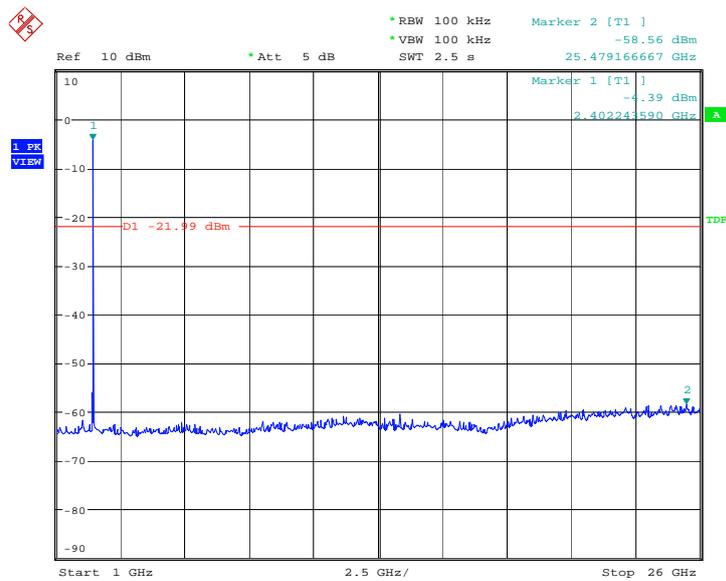
Date: 12.MAY.2010 10:04:37

Fig.31 Conducted spurious emission: 8DPSK, Channel 0,2402MHz



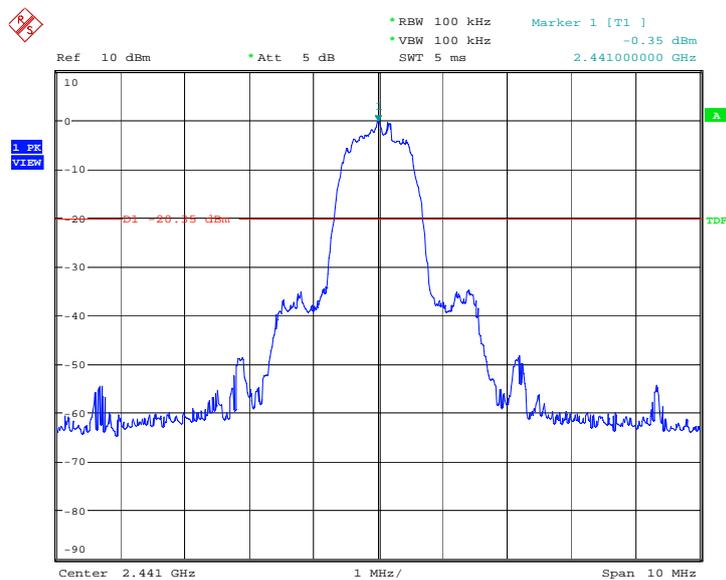
Date: 12.MAY.2010 10:04:53

Fig.32 Conducted spurious emission: 8DPSK, Channel 0, 30MHz - 1GHz



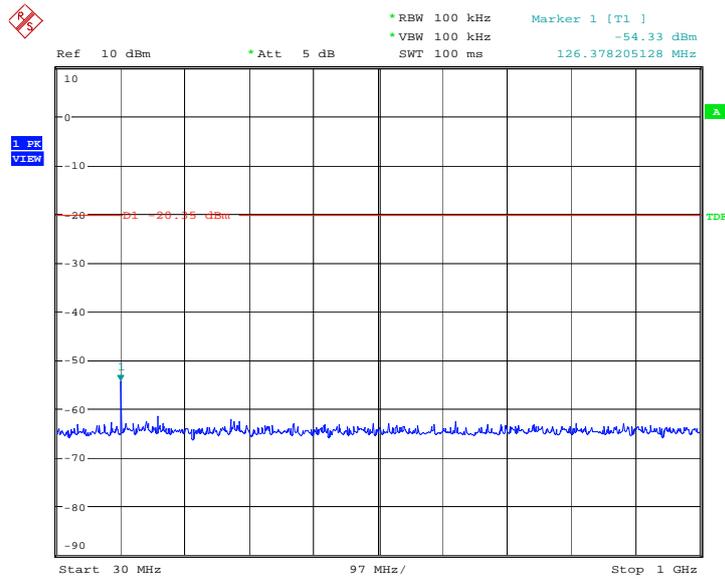
Date: 12.MAY.2010 10:05:25

Fig.33 Conducted spurious emission: 8DPSK, Channel 0,1GHz - 26GHz



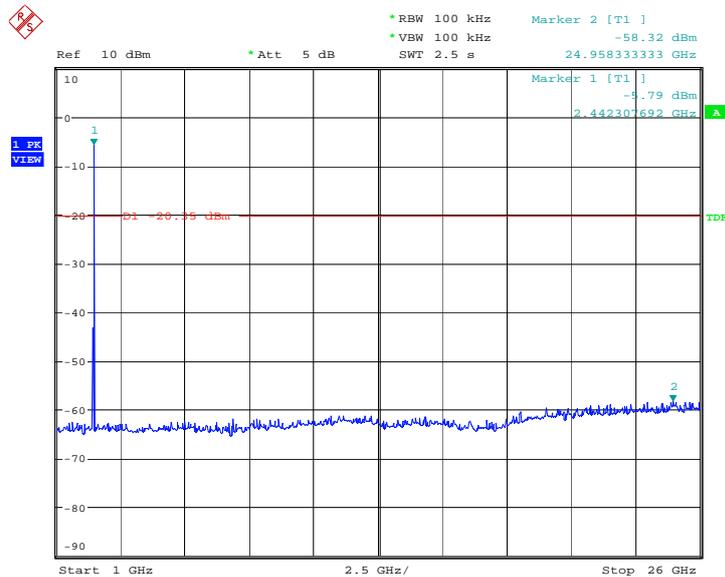
Date: 12.MAY.2010 10:05:41

Fig.34 Conducted spurious emission: 8DPSK, Channel 39, 2441MHz



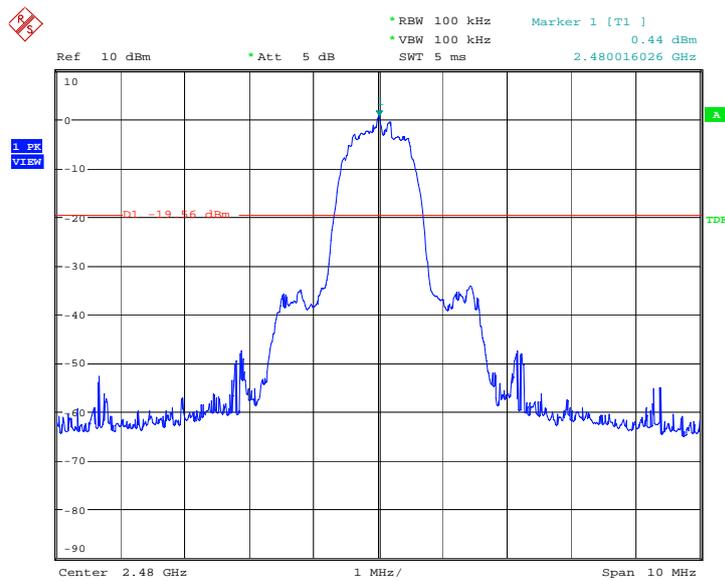
Date: 12.MAY.2010 10:05:58

Fig.35 Conducted spurious emission: 8DPSK, Channel 39, 30MHz - 1GHz



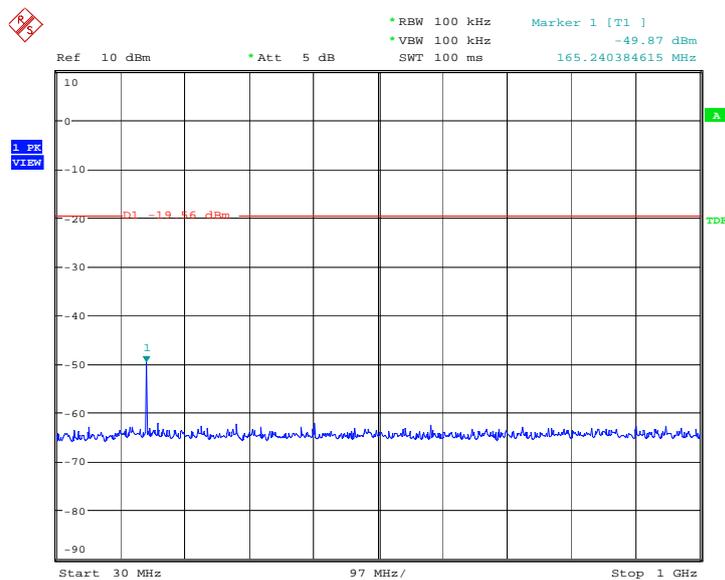
Date: 12.MAY.2010 10:06:29

Fig.36 Conducted spurious emission: 8DPSK, Channel 39, 1GHz - 26GHz



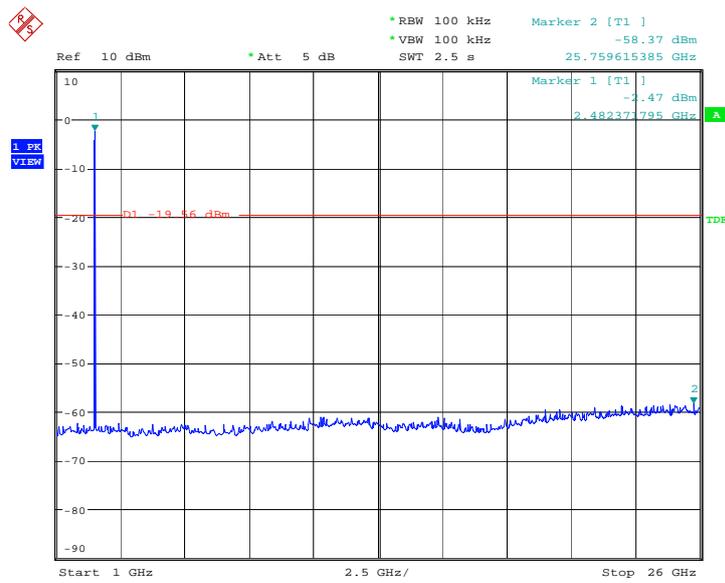
Date: 12.MAY.2010 10:06:46

Fig.37 Conducted spurious emission: 8DPSK, Channel 78, 2480MHz



Date: 12.MAY.2010 10:07:02

Fig.38 Conducted spurious emission: 8DPSK, Channel 78, 30MHz - 1GHz



Date: 12.MAY.2010 10:07:34

Fig.39 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, 15.109/ RSS-210 A8.5	20dB below peak output power

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

The measurement is made according to 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

Measurement Condition:

The measurement frequency range is from 30 MHz to 26 GHz. The measurement set-up is as follows:

Frequency range	Detector	Antenna Type	IF Bandwidth (RBW)	Video Bandwidth
30 MHz – 1 GHz	Peak	Bi-Log	100 kHz	300 kHz
1 GHz - 18 GHz	Peak	Waveguide Horn	1 MHz	1 MHz
18 GHz – 26 GHz	Peak	Waveguide Horn	1 MHz	1 MHz

Measurement Results:

EUT ID:N05

For GFSK

Channel	Frequency Range	Test Results	Conclusion
Ch 0 2402 MHz	30 MHz ~ 1 GHz	Fig.40	P
	1 GHz ~ 4 GHz	Fig.41	P
	4 GHz ~ 18 GHz	Fig.42	P
Ch 39 2441 MHz	30 MHz ~ 1 GHz	Fig.43	P
	1 GHz ~ 4 GHz	Fig.44	P
	4 GHz ~ 18 GHz	Fig.45	P
Ch 78 2480 MHz	30 MHz ~ 1 GHz	Fig.46	P
	1 GHz ~ 4 GHz	Fig.47	P
	4 GHz ~ 18 GHz	Fig.48	P
Power	2.45GHz~2.5GHz	Fig.49	P
For all channels	18 GHz ~ 26 GHz	Fig.50	P

Forπ/4 DQPSK

Channel	Frequency Range	Test Results	Conclusion
Ch 0	30 MHz ~ 1 GHz	Fig.51	P

2402 MHz	1 GHz ~ 4 GHz	Fig.52	P
	4 GHz ~ 18 GHz	Fig.53	P
Ch 39 2441 MHz	30 MHz ~ 1 GHz	Fig.54	P
	1 GHz ~ 4 GHz	Fig.55	P
	4 GHz ~ 18 GHz	Fig.56	P
Ch 78 2480 MHz	30 MHz ~ 1 GHz	Fig.57	P
	1 GHz ~ 4 GHz	Fig.58	P
	4 GHz ~ 18 GHz	Fig.59	P
Power	2.45GHz~2.5GHz	Fig.60	P
For all channels	18 GHz ~ 26 GHz	Fig.61	P

For 8DPSK

Channel	Frequency Range	Test Results	Conclusion
Ch 0 2402 MHz	30 MHz ~ 1 GHz	Fig.62	P
	1 GHz ~ 4 GHz	Fig.63	P
	4 GHz ~ 18 GHz	Fig.64	P
Ch 39 2441 MHz	30 MHz ~ 1 GHz	Fig.65	P
	1 GHz ~ 4 GHz	Fig.66	P
	4 GHz ~ 18 GHz	Fig.67	P
Ch 78 2480 MHz	30 MHz ~ 1 GHz	Fig.68	P
	1 GHz ~ 4 GHz	Fig.69	P
	4 GHz ~ 18 GHz	Fig.70	P
Power	2.45GHz~2.5GHz	Fig.71	P
For all channels	18 GHz ~ 26 GHz	Fig.72	P

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

Measurement Uncertainty: $\pm 4.73\text{dB}$

Conclusion: PASS

Test graphs as below:

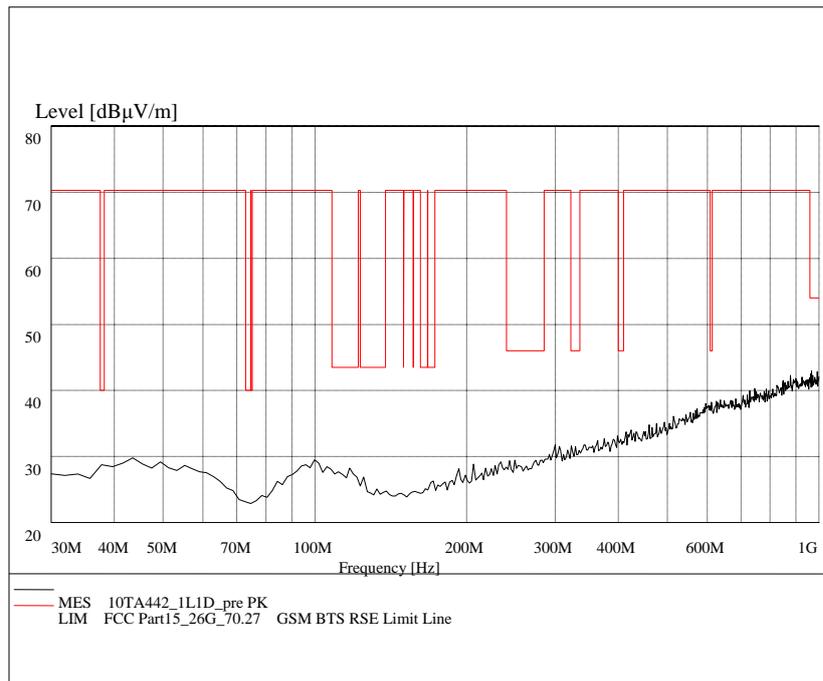


Fig.40 Radiated emission: GFSK, Channel 0, 30 MHz - 1 GHz

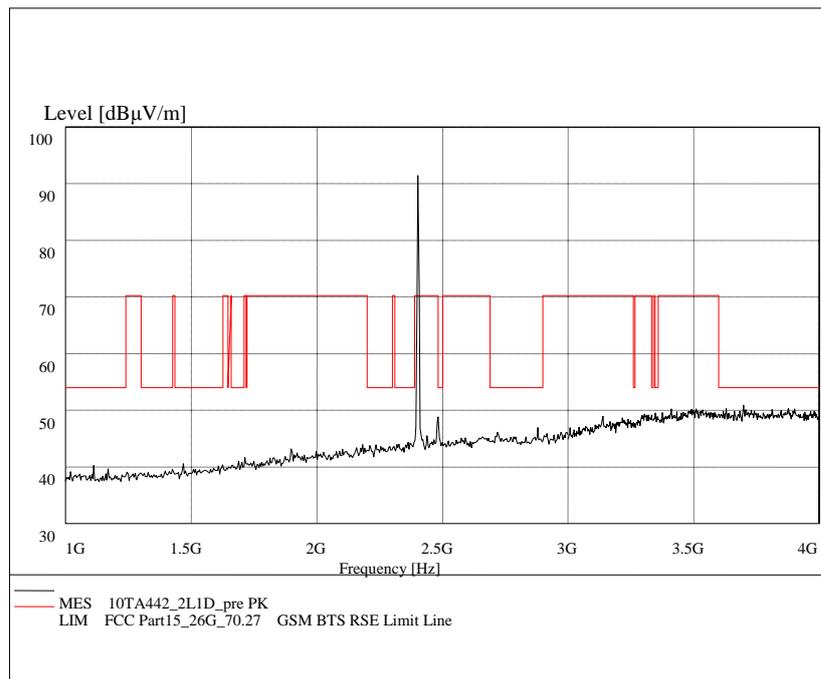


Fig.41 Radiated emission: GFSK, Channel 0, 1 GHz - 4 GHz

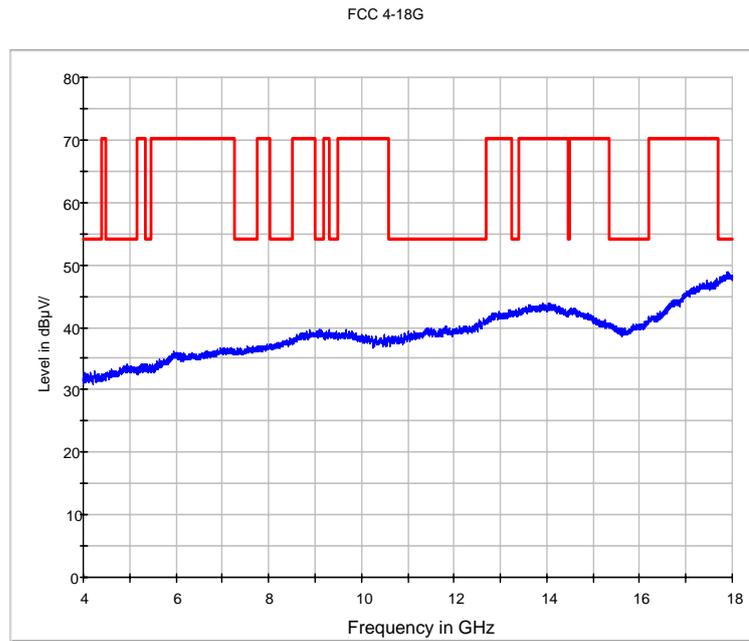


Fig.42 Radiated emission: GFSK, Channel 0, 4 GHz - 18 GHz

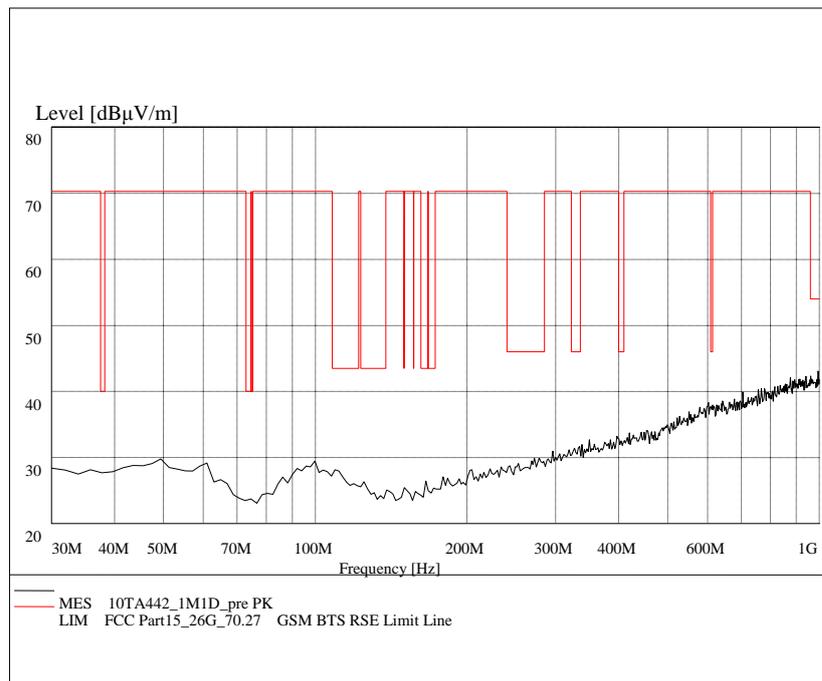


Fig.43 Radiated emission: GFSK, Channel 39, 30 MHz - 1 GHz

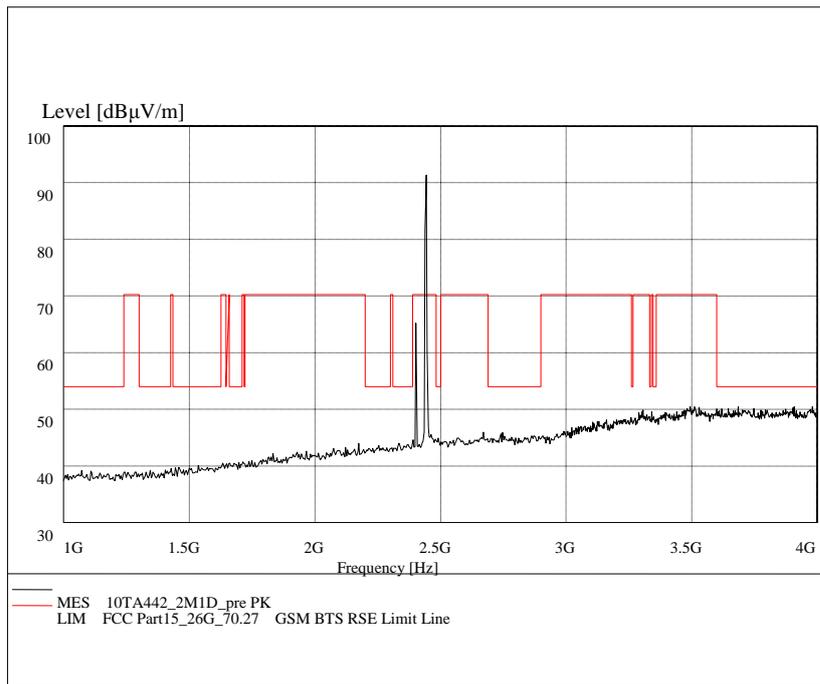


Fig.44 Radiated emission: GFSK, Channel 39, 1 GHz - 4 GHz

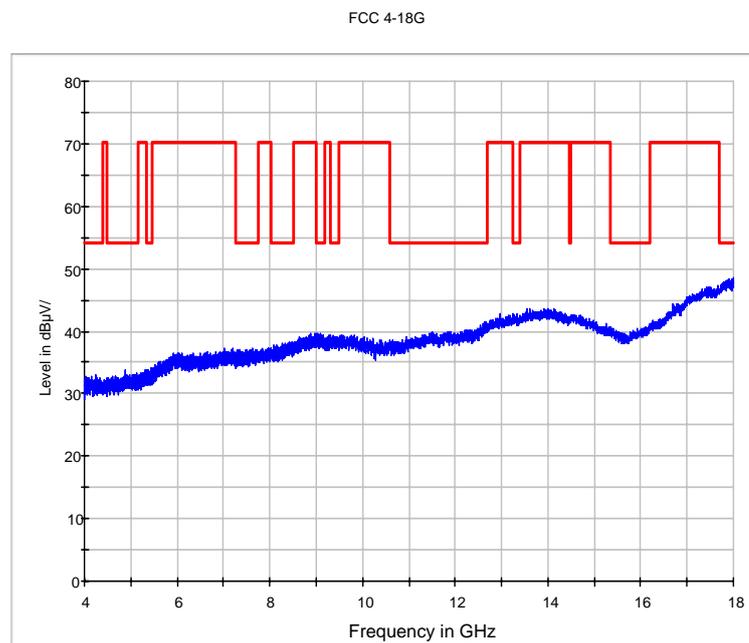


Fig.45 Radiated emission: GFSK, Channel 39, 4 GHz - 18 GHz

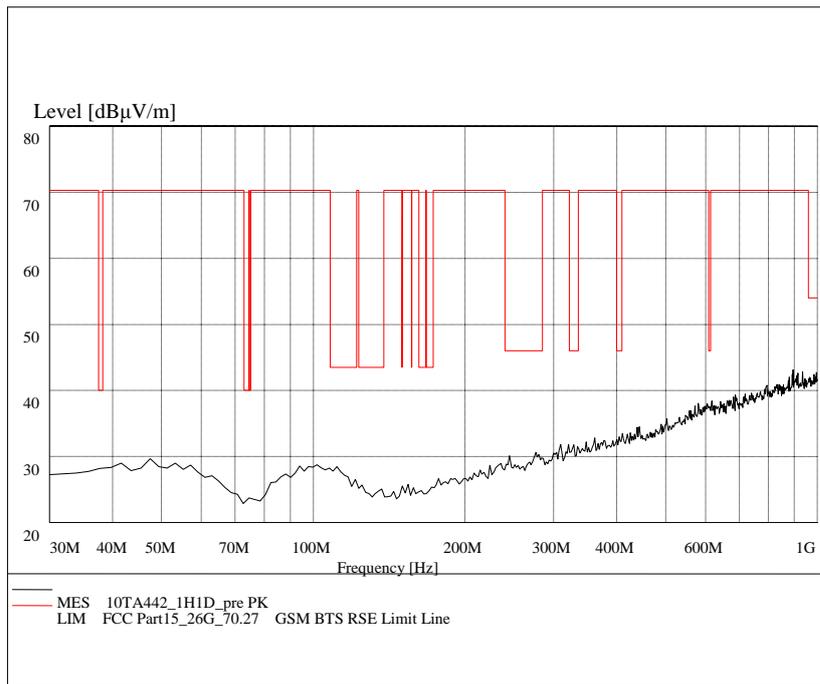


Fig.46 Radiated emission: GFSK, Channel 78, 30 MHz - 1 GHz

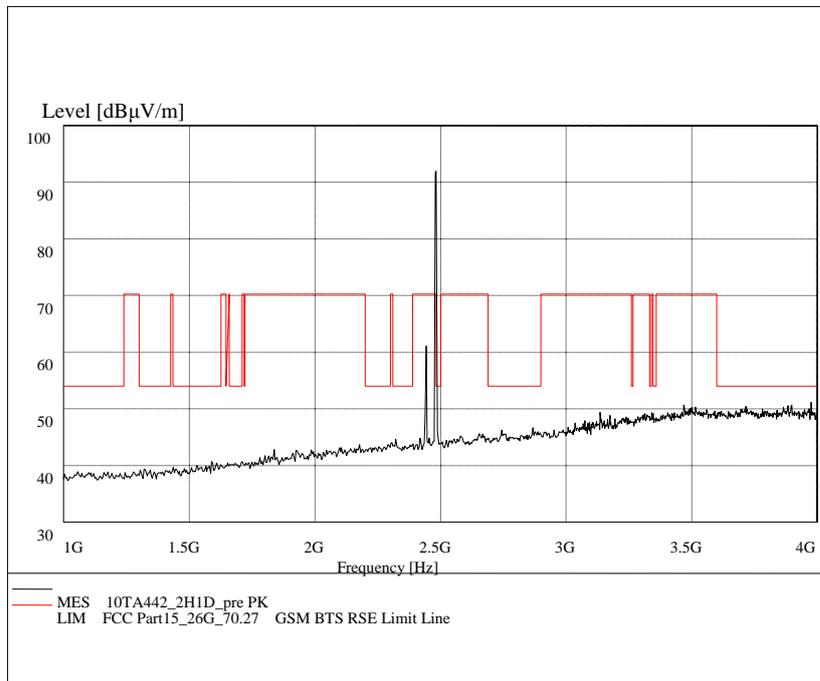


Fig.47 Radiated emission: GFSK, Channel 78, 1 GHz - 4 GHz

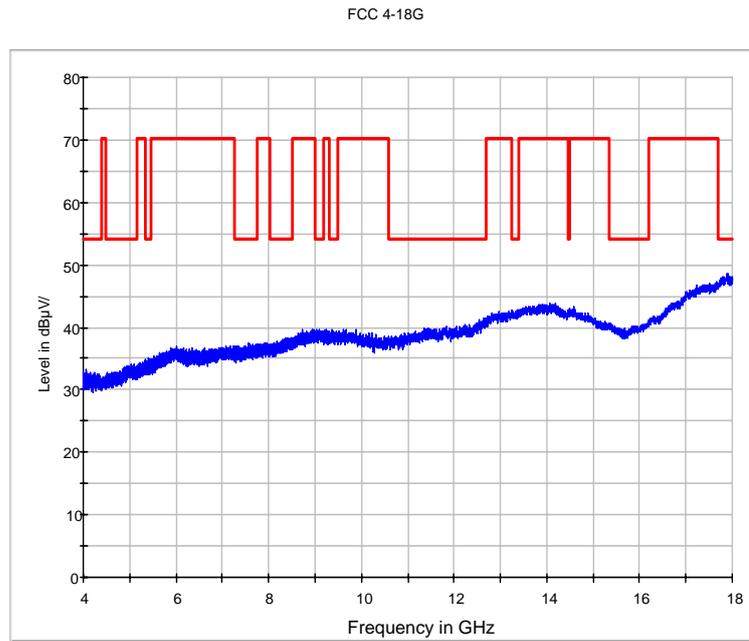


Fig.48 Radiated emission: GFSK, Channel 78, 4 GHz - 18 GHz

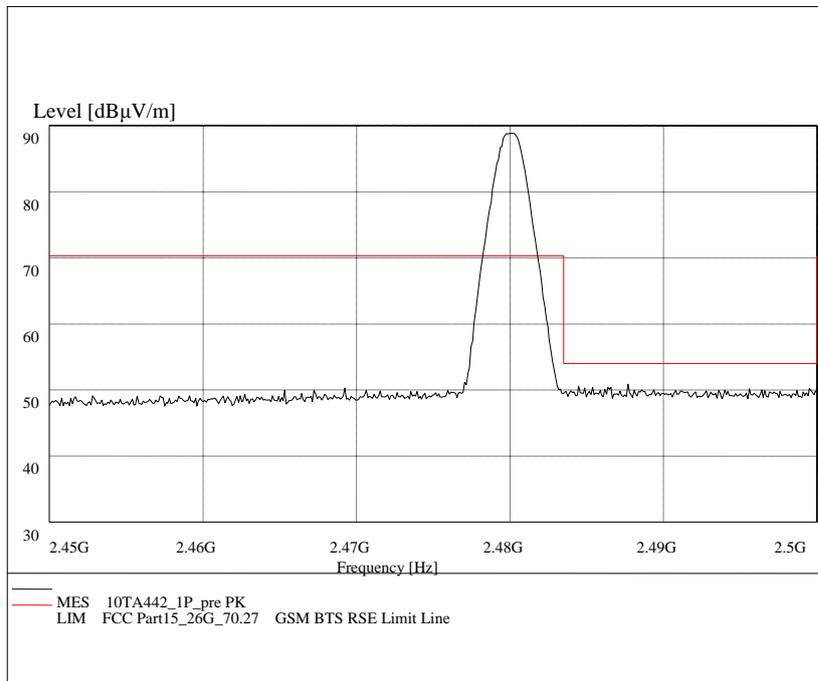


Fig.49 Radiated emission (Power): GFSK, 2.45GHz - 2.5GHz

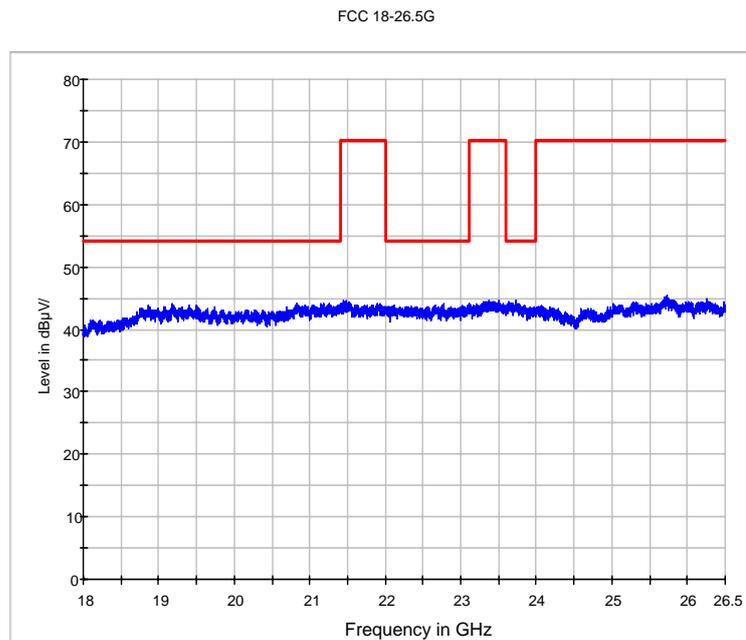


Fig.50 Radiated emission: GFSK, 18 GHz - 26 GHz

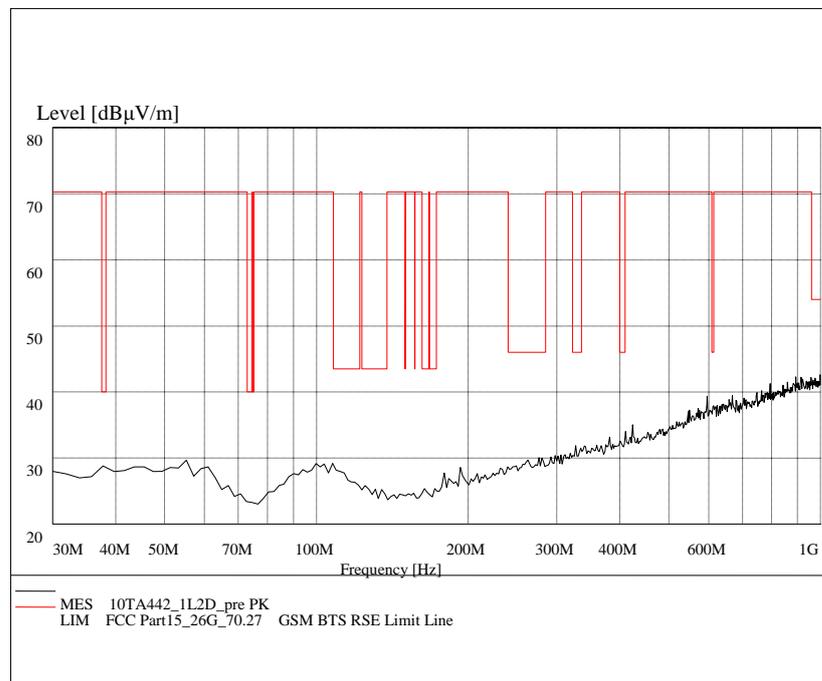


Fig.51 Radiated emission: $\pi/4$ DQPSK, Channel 0, 30 MHz - 1 GHz

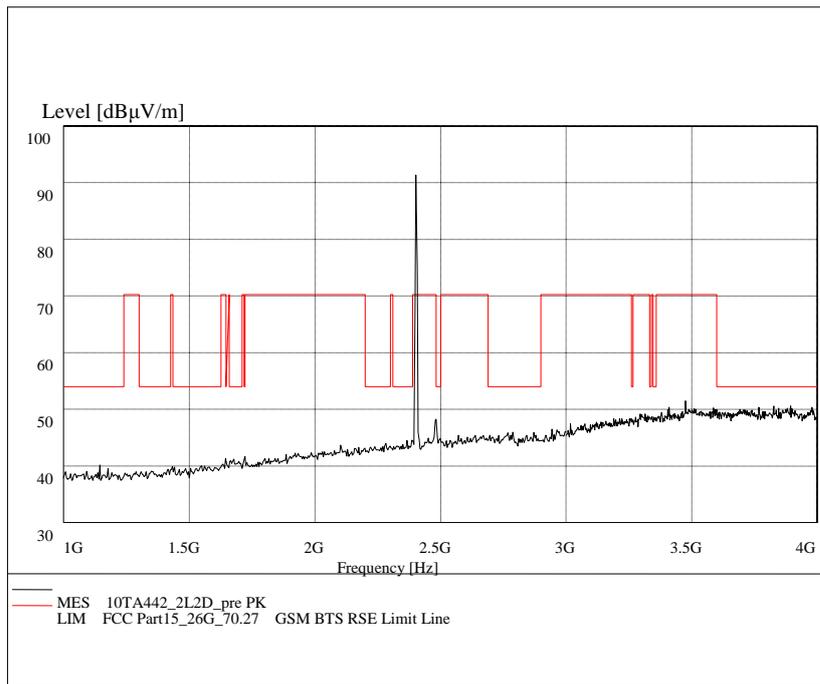


Fig.52 Radiated emission: $\pi/4$ DQPSK, Channel 0, 1 GHz - 4 GHz

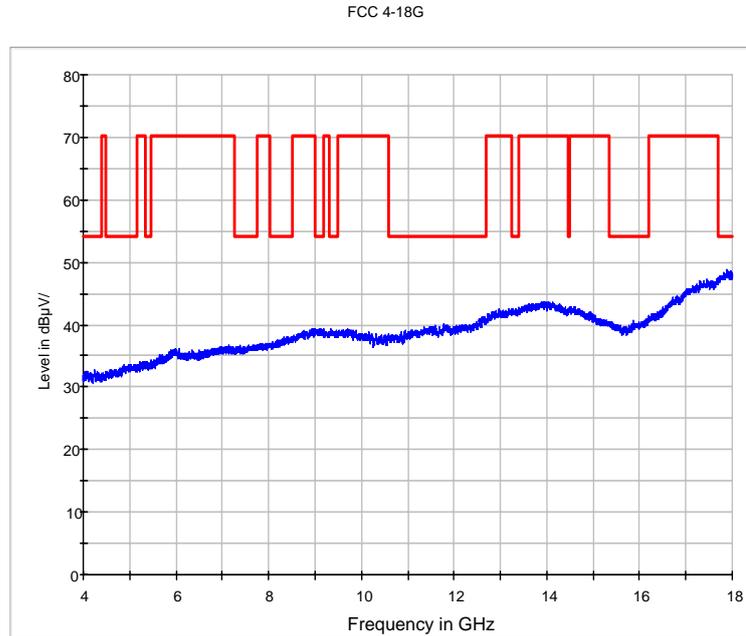


Fig.53 Radiated emission: $\pi/4$ DQPSK, Channel 0, 4 GHz - 18 GHz

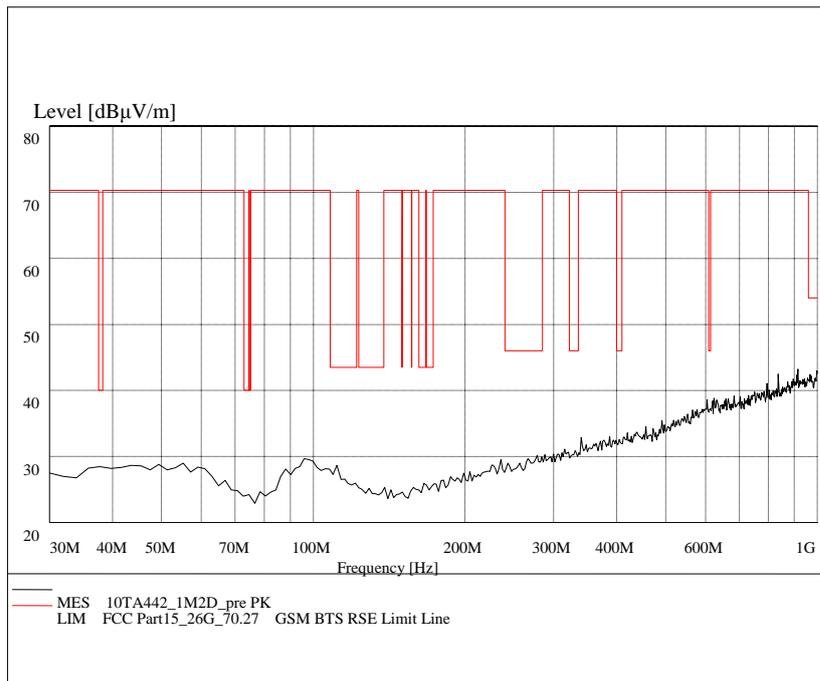


Fig.54 Radiated emission: $\pi/4$ DQPSK, Channel 39, 30 MHz - 1 GHz

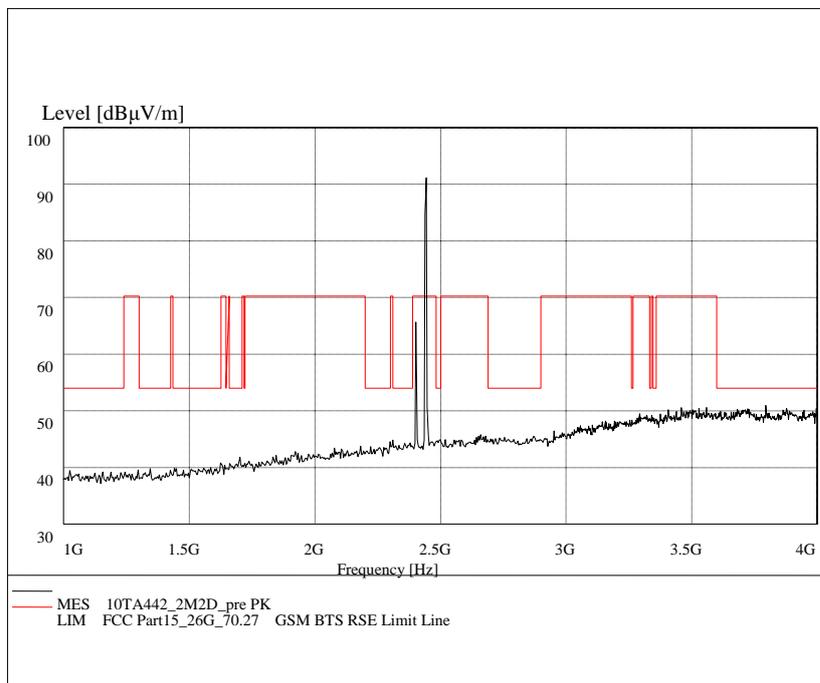


Fig.55 Radiated emission: $\pi/4$ DQPSK, Channel 39, 1 GHz - 4 GHz

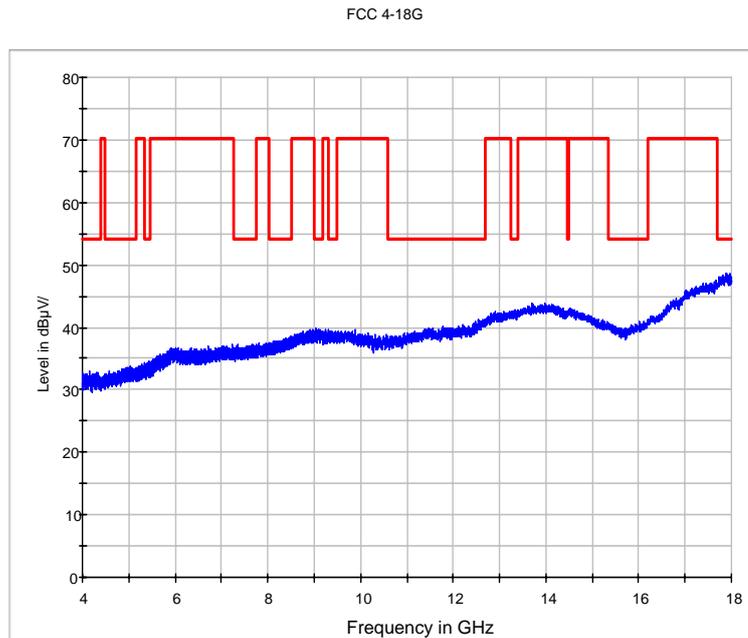


Fig.56 Radiated emission: $\pi/4$ DQPSK, Channel 39, 4 GHz - 18 GHz

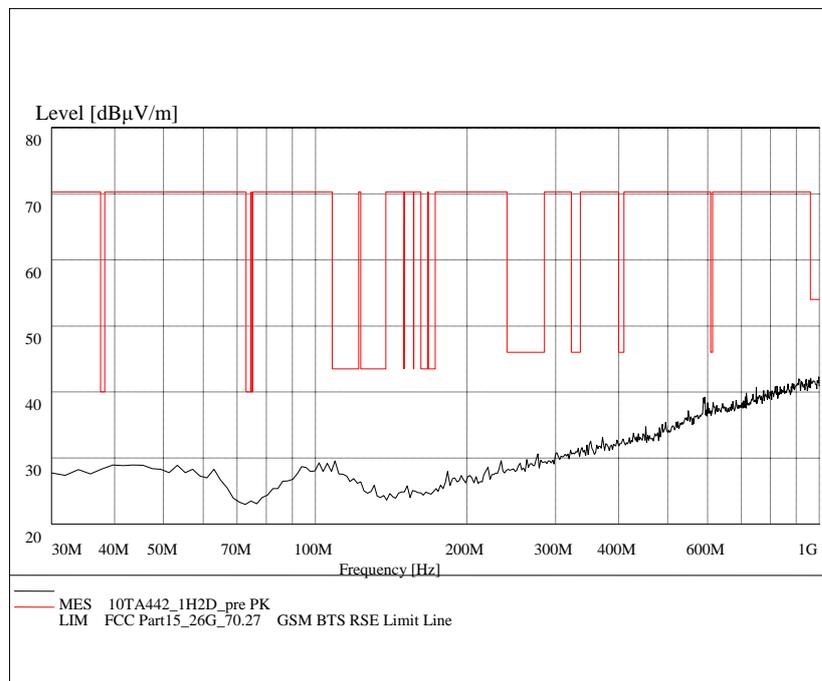


Fig.57 Radiated emission: $\pi/4$ DQPSK, Channel 78, 30 MHz - 1 GHz

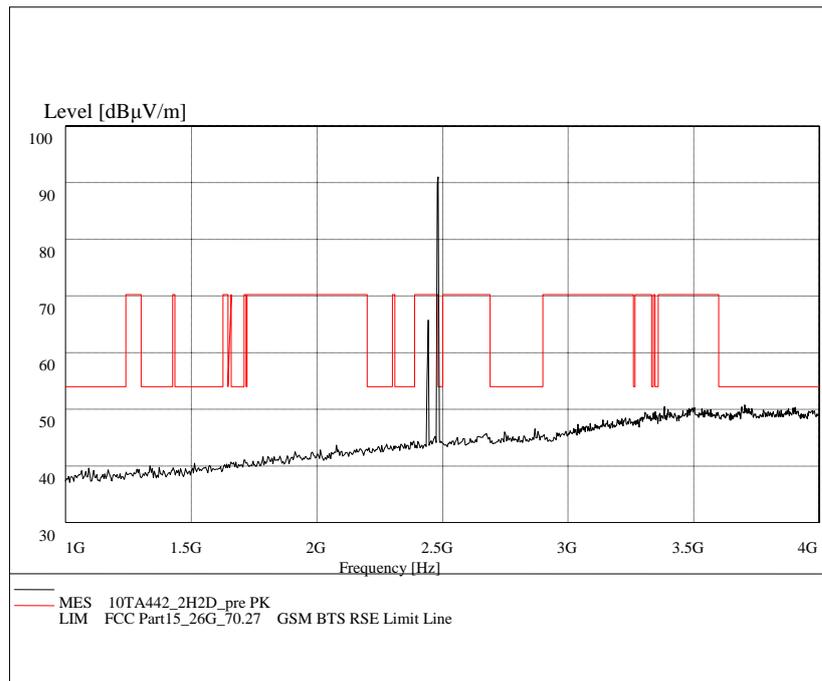


Fig.58 Radiated emission: $\pi/4$ DQPSK, Channel 78, 1 GHz - 4 GHz

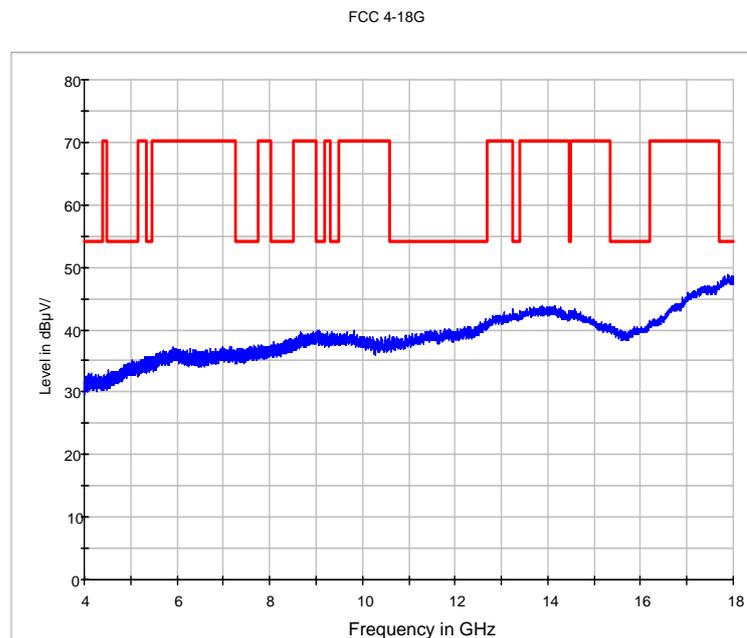


Fig.59 Radiated emission: $\pi/4$ DQPSK, Channel 78, 4 GHz - 18 GHz

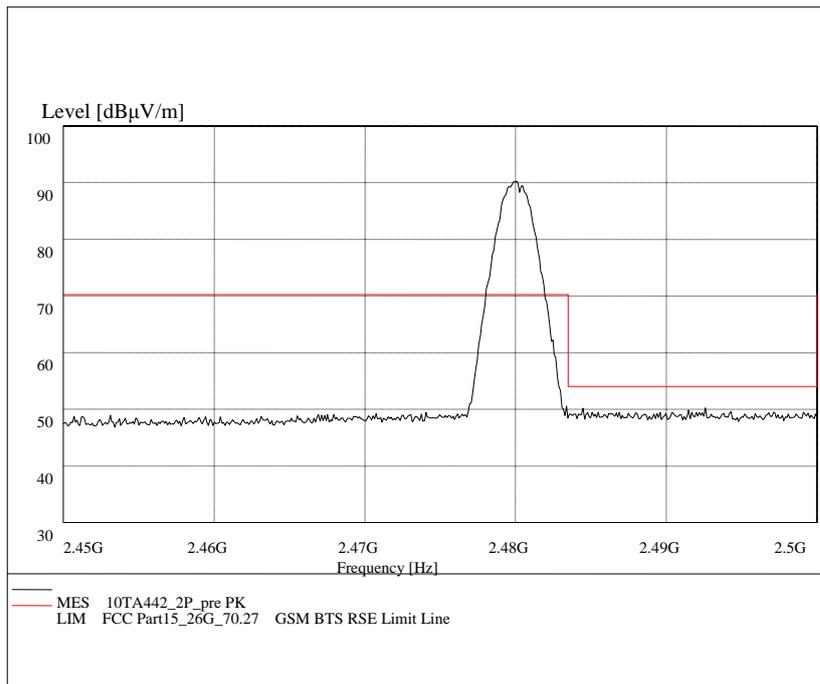


Fig.60 Radiated emission (Power): $\pi/4$ DQPSK, 2.45GHz - 2.5GHz

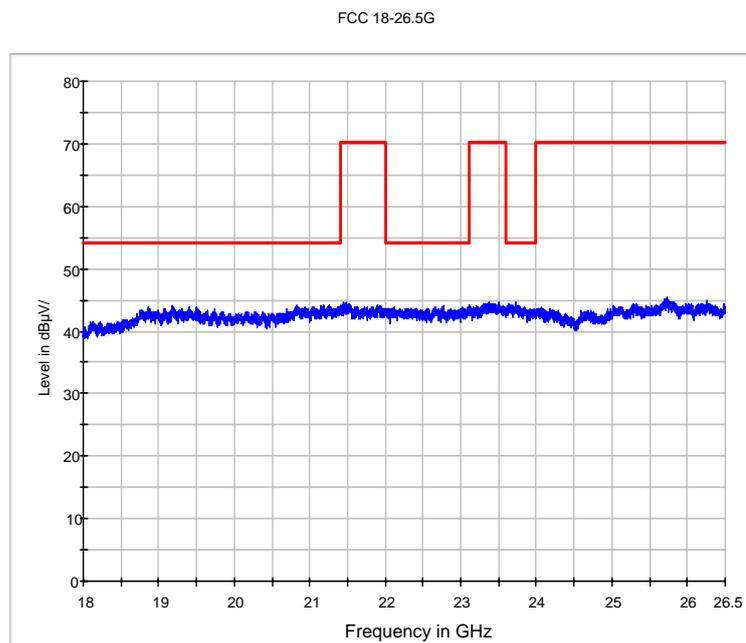


Fig.61 Radiated emission: $\pi/4$ DQPSK, 18 GHz - 26 GHz

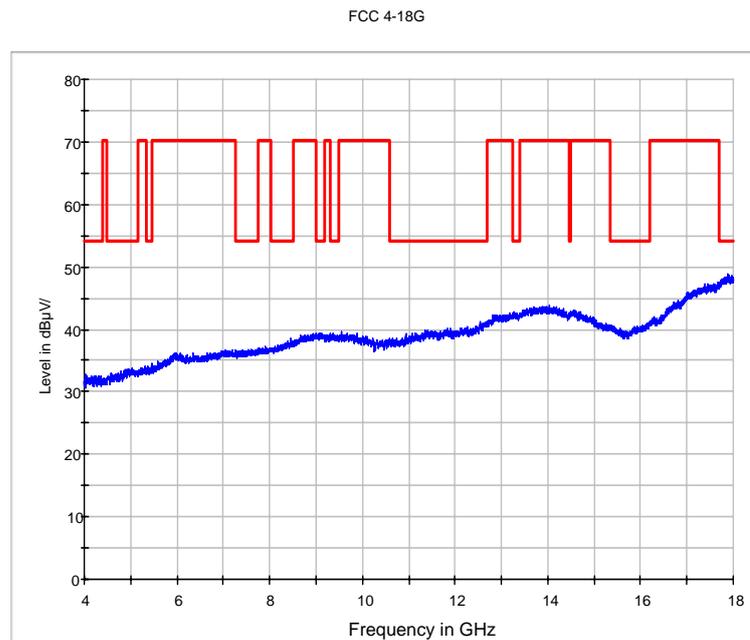


Fig.64 Radiated emission: 8DPSK, Channel 0, 4 GHz - 18 GHz

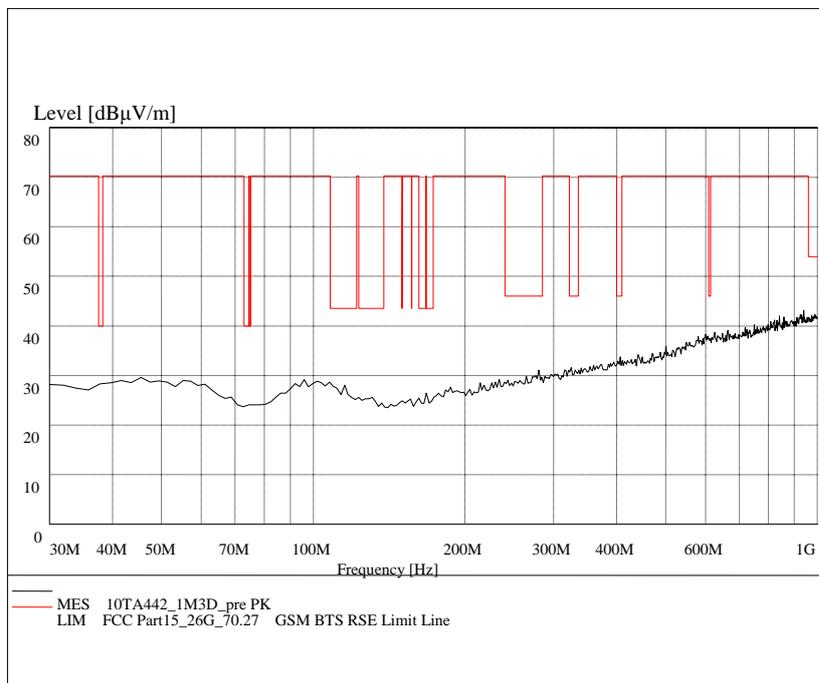


Fig.65 Radiated emission: 8DPSK, Channel 39, 30 MHz - 1 GHz

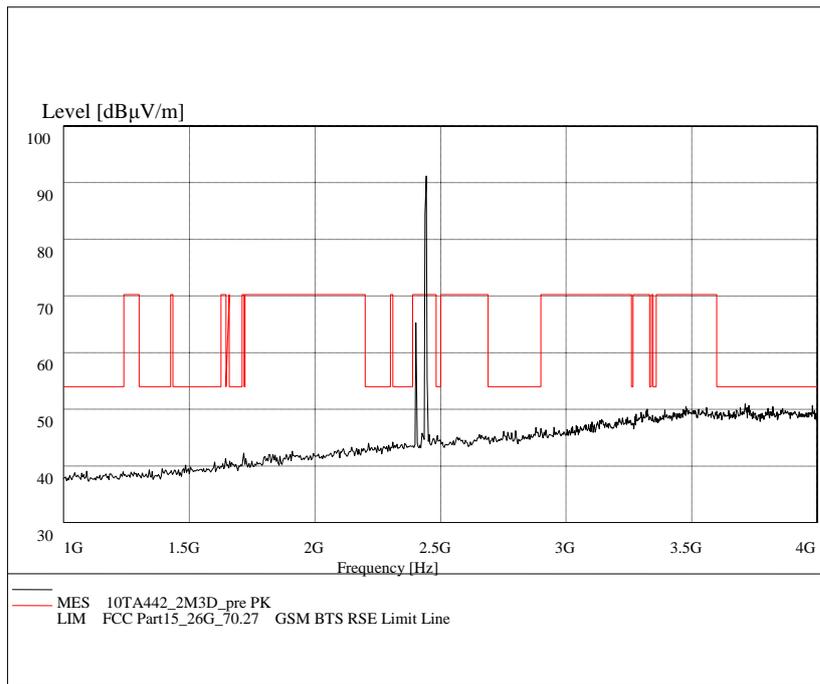


Fig.66 Radiated emission: 8DPSK, Channel 39, 1 GHz - 4 GHz

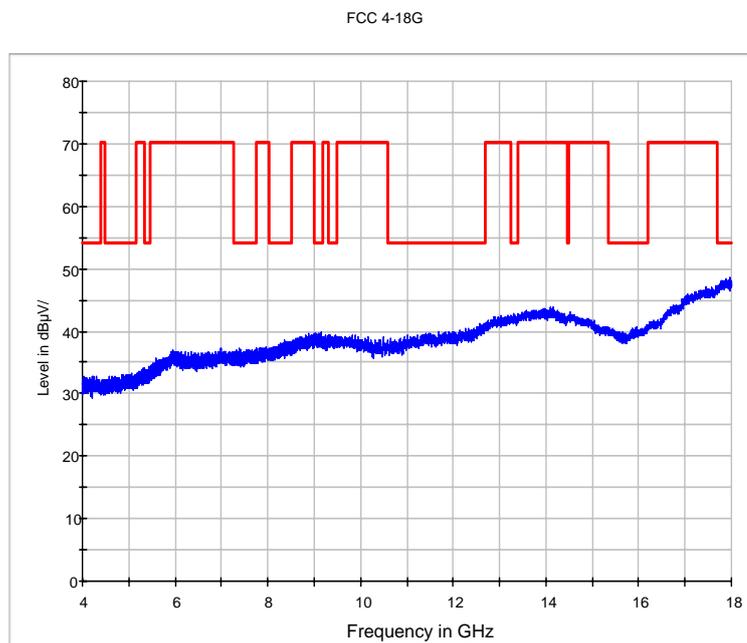


Fig.67 Radiated emission: 8DPSK, Channel 39, 4 GHz - 18 GHz

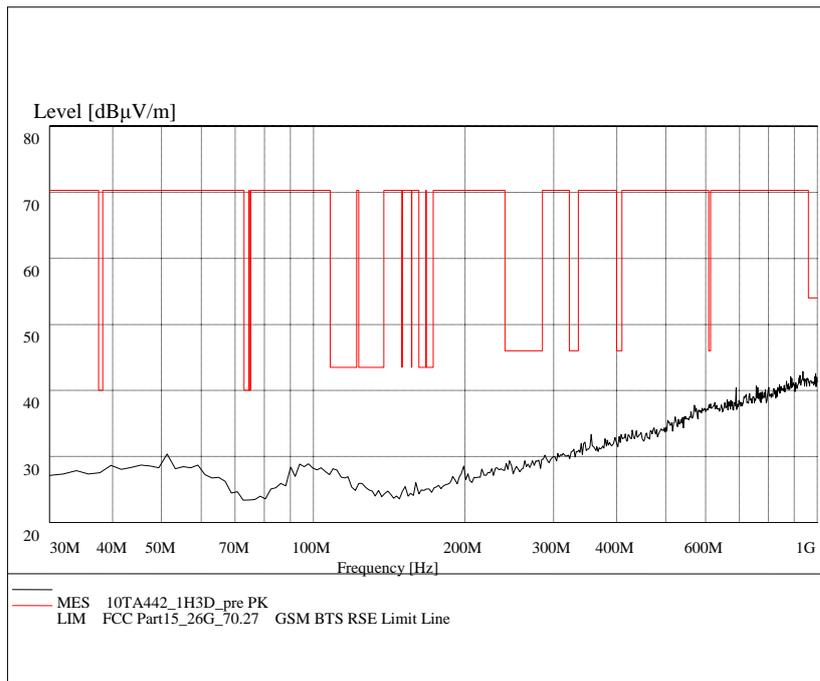


Fig.68 Radiated emission: 8DPSK, Channel 78, 30 MHz - 1 GHz

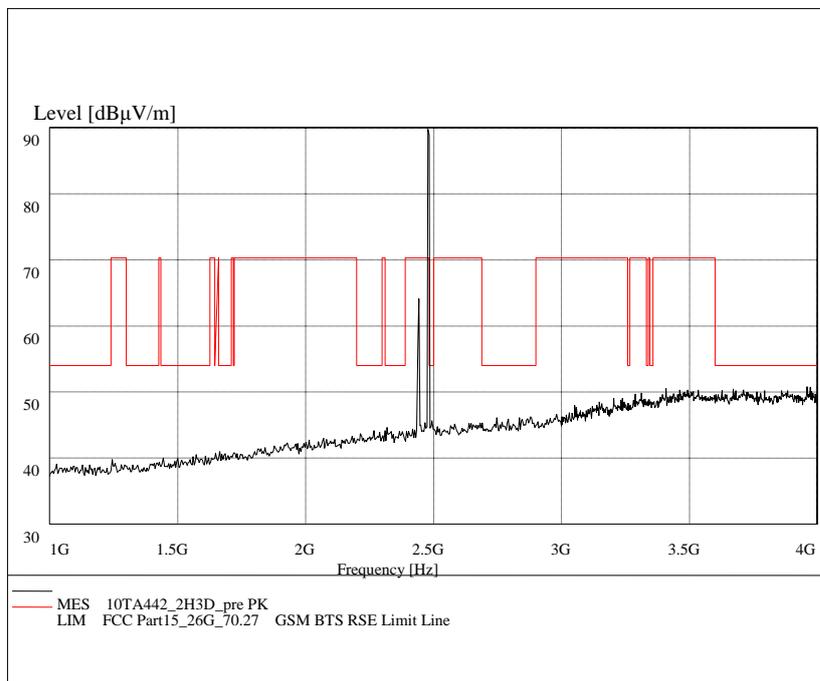


Fig.69 Radiated emission: 8DPSK, Channel 78, 1 GHz - 4 GHz

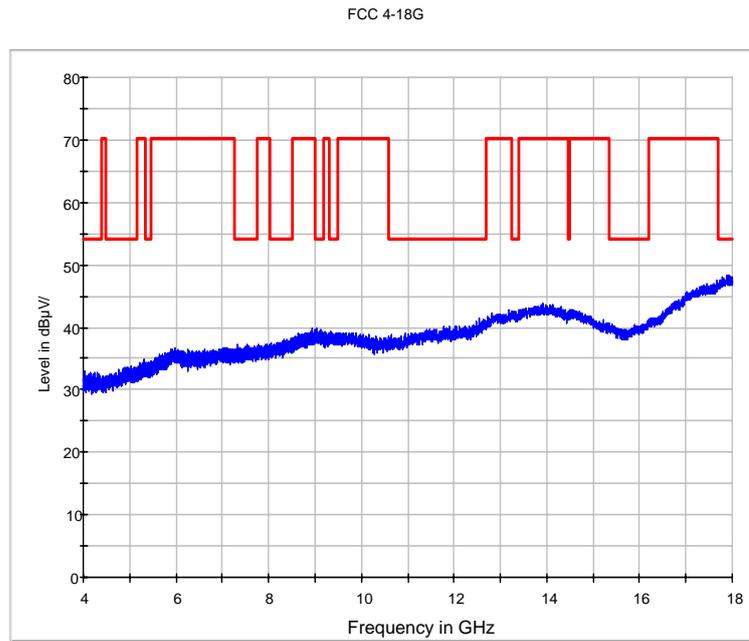


Fig.70 Radiated emission: 8DPSK, Channel 78, 4 GHz - 18 GHz

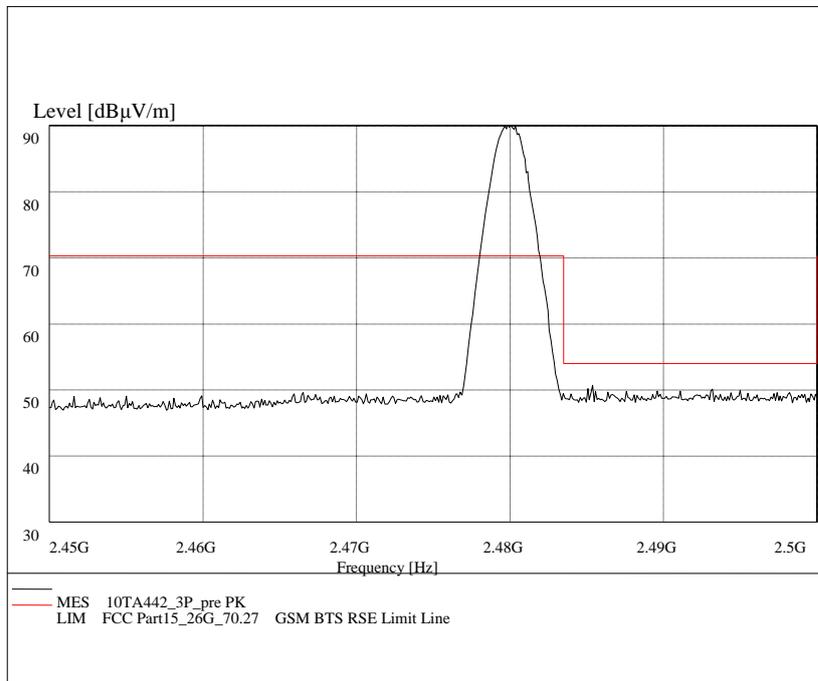


Fig.71 Radiated emission (Power): 8DPSK, 2.45GHz - 2.5GHz

FCC 18-26.5G

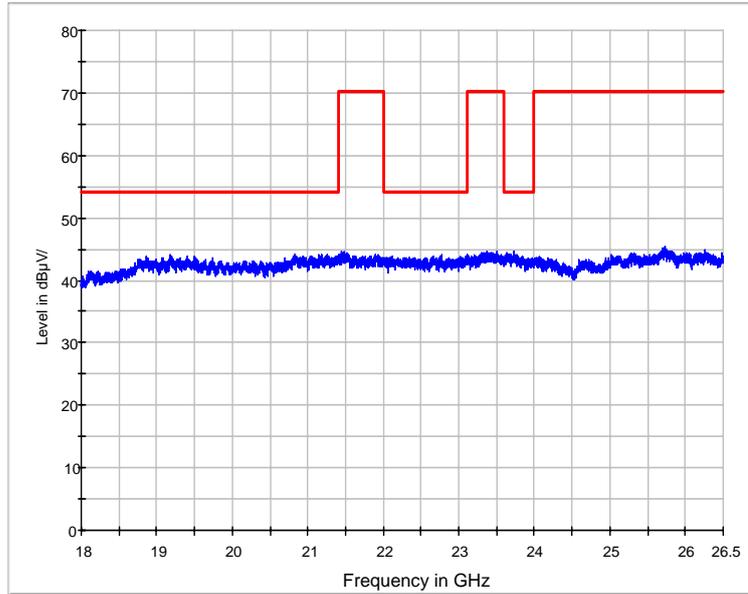


Fig.72 Radiated emission: 8DPSK, 18 GHz - 26 GHz

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:N07

For GFSK

Channel	Packet	Dwell Time (ms)		Conclusion
39	DH1	Fig.73	114.15	P
		Fig.74		
	DH3	Fig.75	166.59	P
		Fig.76		
	DH5	Fig.77	166.70	P
		Fig.78		

For $\pi/4$ DQPSK

Channel	Packet	Dwell Time (ms)		Conclusion
39	DH1	Fig.79	116.73	P
		Fig.80		
	DH3	Fig.81	173.25	P
		Fig.82		
	DH5	Fig.83	205.09	P
		Fig.84		

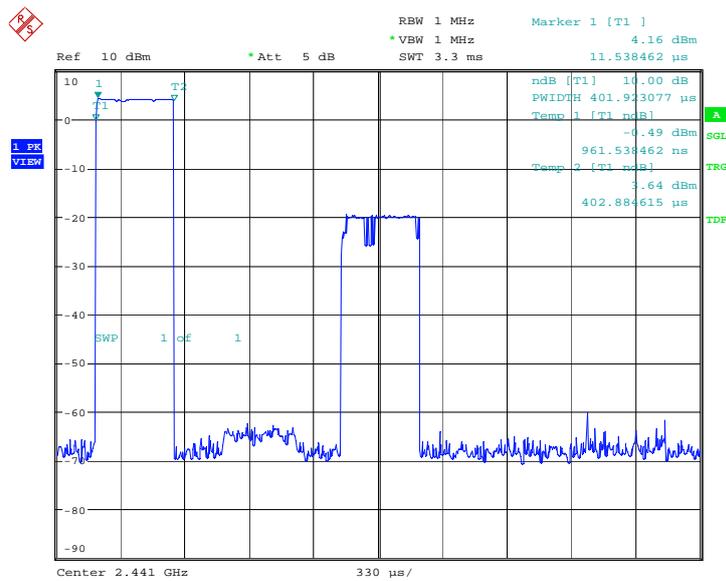
For 8DPSK

Channel	Packet	Dwell Time (ms)		Conclusion
39	DH1	Fig.85	112.80	P
		Fig.86		
	DH3	Fig.87	158.76	P
		Fig.88		
	DH5	Fig.89	208.02	P
		Fig.90		

Measurement Uncertainty: $\pm 0.088\text{ms}$

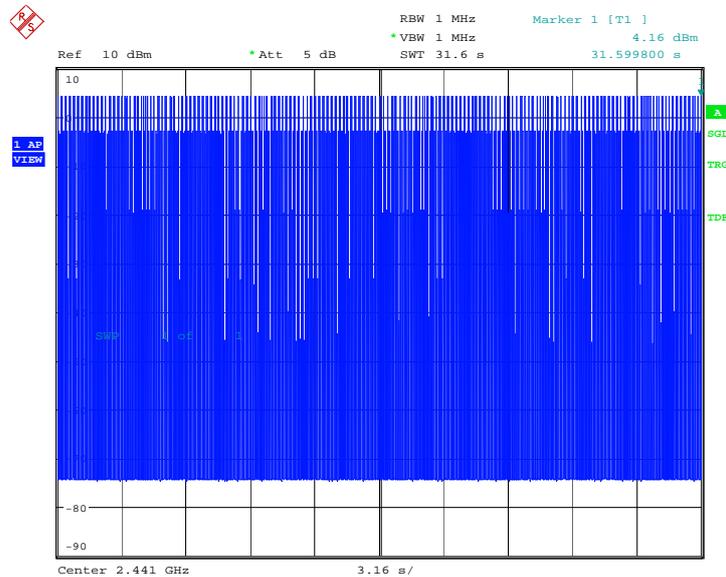
Conclusion: PASS

Test graphs as below:



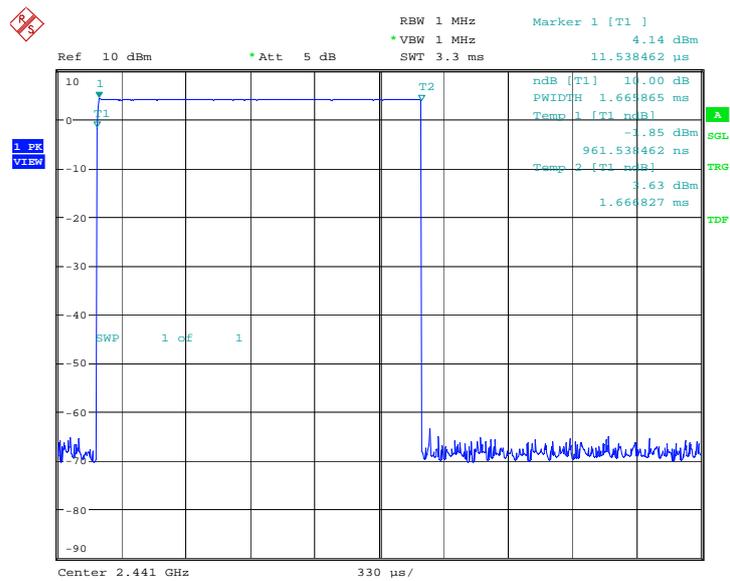
Date: 12.MAY.2010 09:17:48

Fig.73 Time of occupancy (Dwell Time): Channel 39, Packet DH1



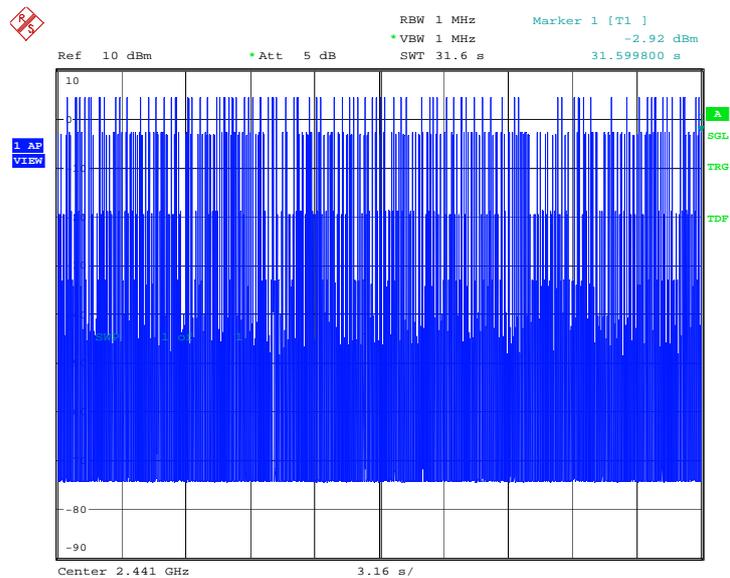
Date: 12.MAY.2010 09:17:37

Fig.74 Number of Transmissions Measurement:Channel 39,Packet DH1



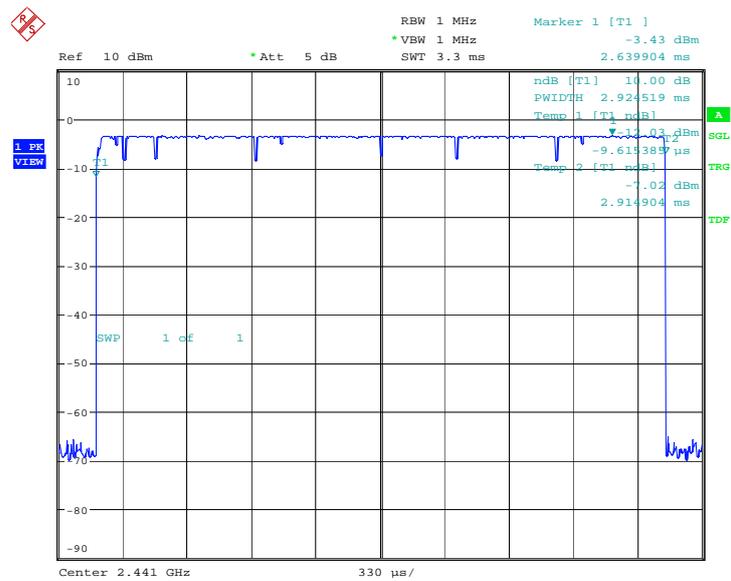
Date: 12.MAY.2010 09:19:08

Fig.75 Time of occupancy (Dwell Time): Channel 39, Packet DH3



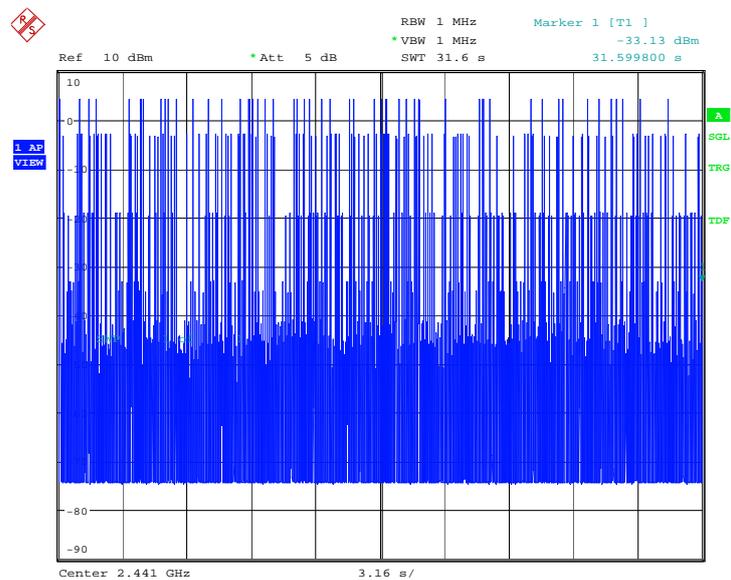
Date: 12.MAY.2010 09:18:56

Fig.76 Number of Transmissions Measurement:Channel 39,Packet DH3



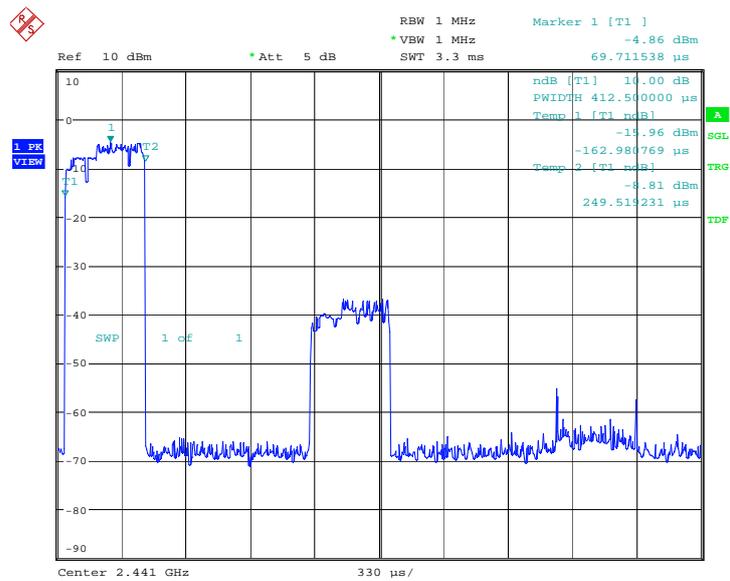
Date: 12.MAY.2010 09:20:25

Fig.77 Time of occupancy (Dwell Time): Channel 39, Packet DH5



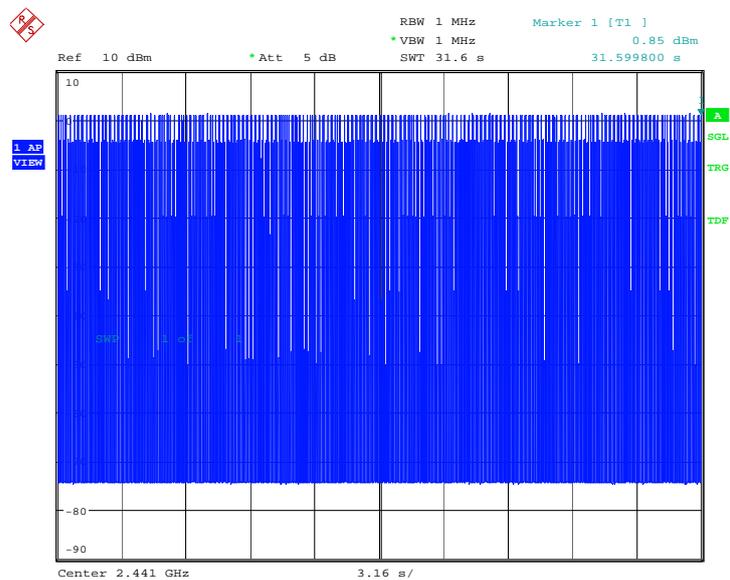
Date: 12.MAY.2010 09:20:13

Fig.78 Number of Transmissions Measurement:Channel 39,Packet DH5



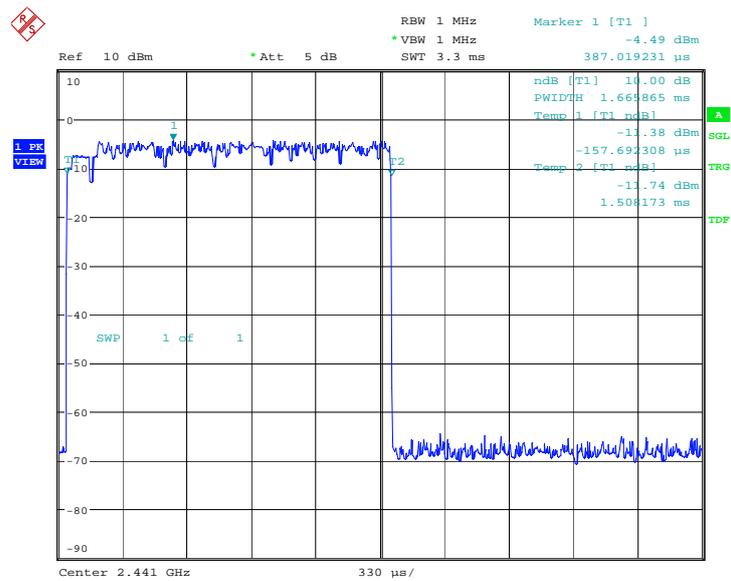
Date: 12.MAY.2010 09:43:23

Fig.79 Time of occupancy (Dwell Time): Channel 39, Packet 2-DH1



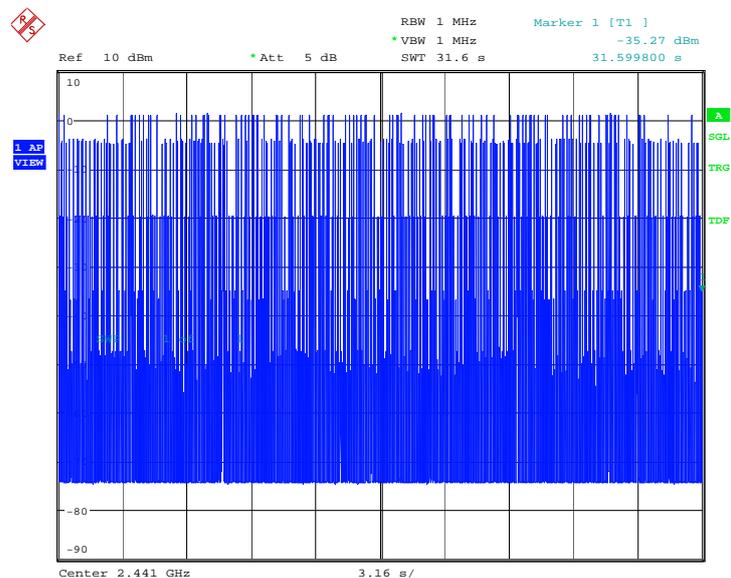
Date: 12.MAY.2010 09:43:11

Fig.80 Number of Transmissions Measurement:Channel 39,Packet 2-DH1



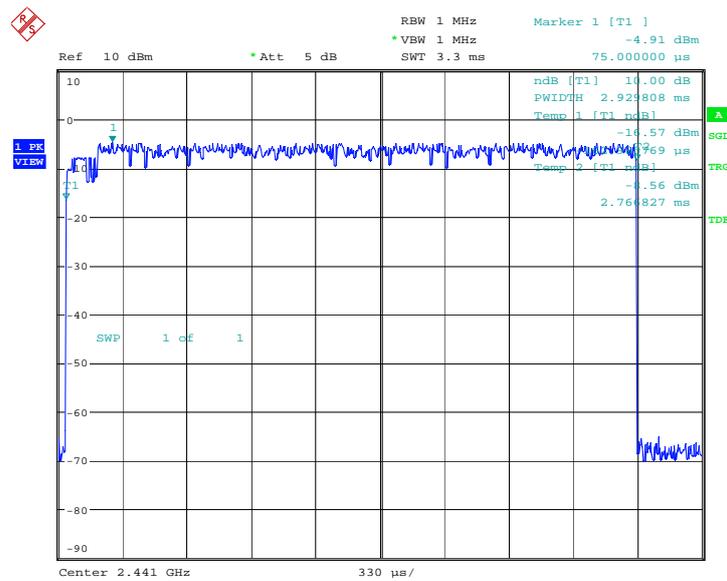
Date: 12.MAY.2010 09:44:41

Fig.81 Time of occupancy (Dwell Time): Channel 39, Packet 2-DH3



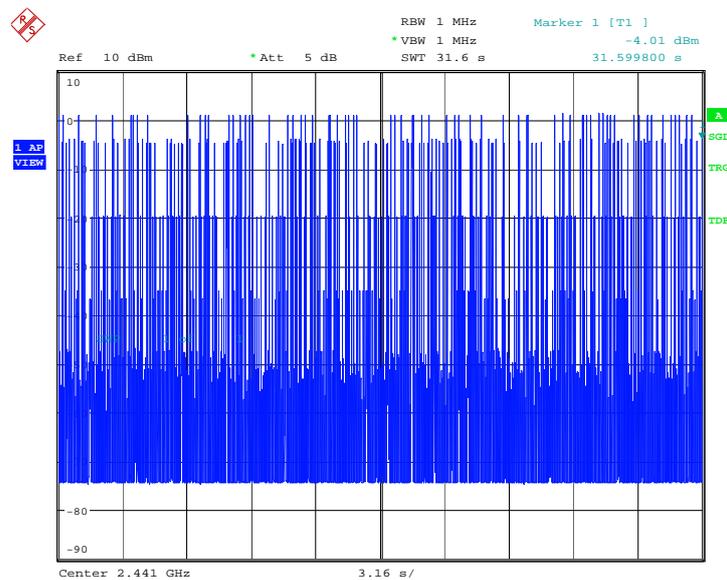
Date: 12.MAY.2010 09:44:30

Fig.82 Number of Transmissions Measurement:Channel 39,Packet 2-DH3



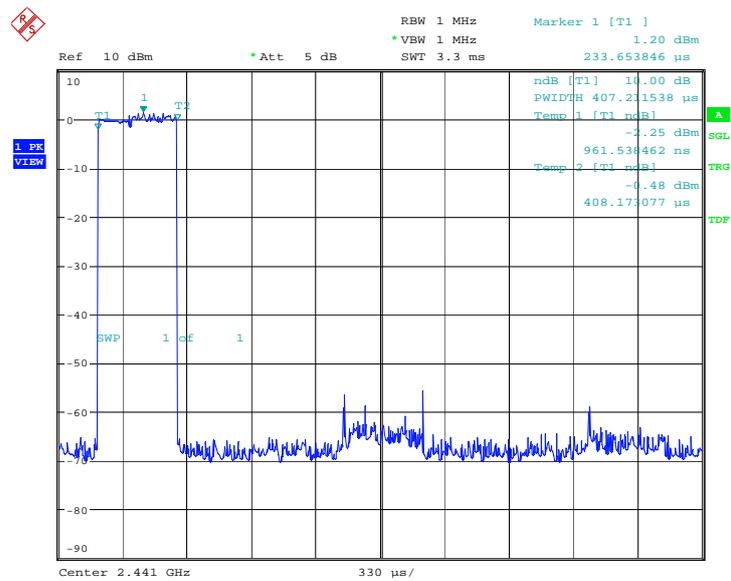
Date: 12.MAY.2010 09:45:59

Fig.83 Time of occupancy (Dwell Time): Channel 39, Packet 2-DH5



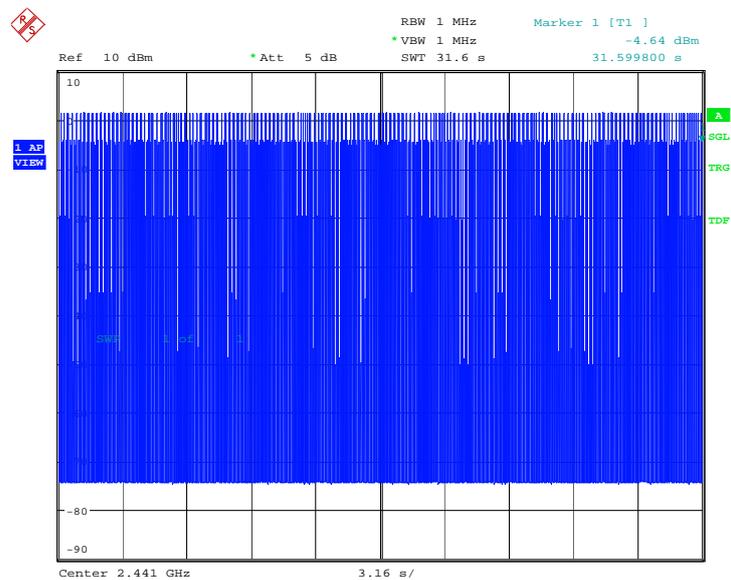
Date: 12.MAY.2010 09:45:47

Fig.84 Number of Transmissions Measurement:Channel 39,Packet 2-DH5



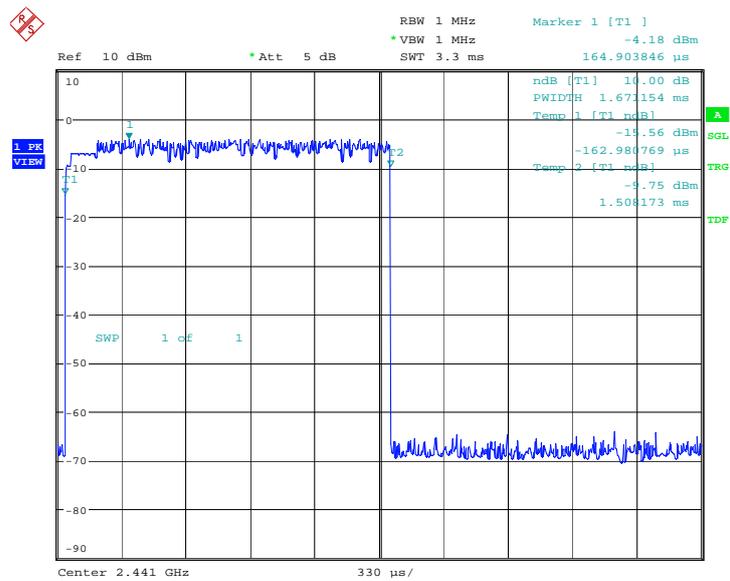
Date: 12.MAY.2010 10:08:57

Fig.85 Time of occupancy (Dwell Time): Channel 39, Packet 3-DH1



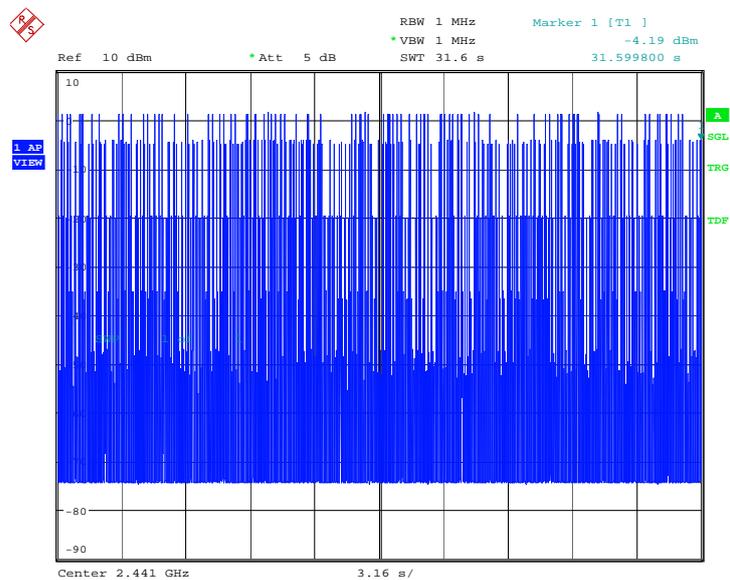
Date: 12.MAY.2010 10:08:45

Fig.86 Number of Transmissions Measurement:Channel 39,Packet 3-DH1



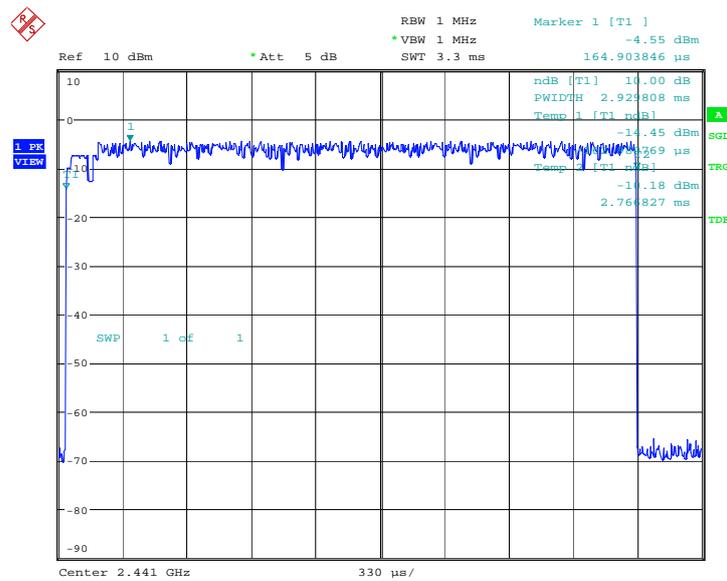
Date: 12.MAY.2010 10:10:15

Fig.87 Time of occupancy (Dwell Time): Channel 39, Packet 3-DH3



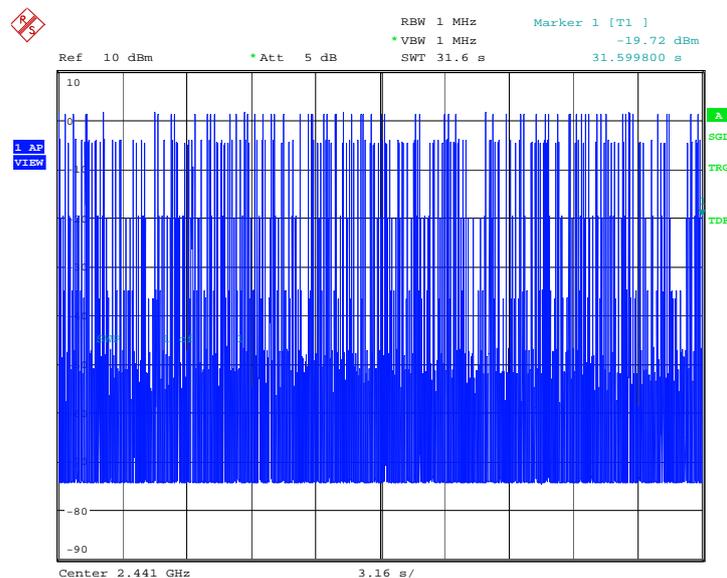
Date: 12.MAY.2010 10:10:03

Fig.88 Number of Transmissions Measurement:Channel 39,Packet 3-DH3



Date: 12.MAY.2010 10:11:30

Fig.89 Time of occupancy (Dwell Time): Channel 39, Packet 3-DH5



Date: 12.MAY.2010 10:11:19

Fig.90 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) / RSS-210 A8.1 (1)	NA *

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

Measurement Condition:

RBW=10KHz; VBW=30KHz; SPAN=2MHz; Detector: peak

Measurement Results:

EUT ID:N07

For GFSK

Channel	20dB Bandwidth (kHz)		Conclusion
0	Fig.91	759.62	P
39	Fig.92	766.03	P
78	Fig.93	762.82	P

For $\pi/4$ DQPSK

Channel	20dB Bandwidth (kHz)		Conclusion
0	Fig.94	1243.59	P
39	Fig.95	1246.79	P
78	Fig.96	1243.59	P

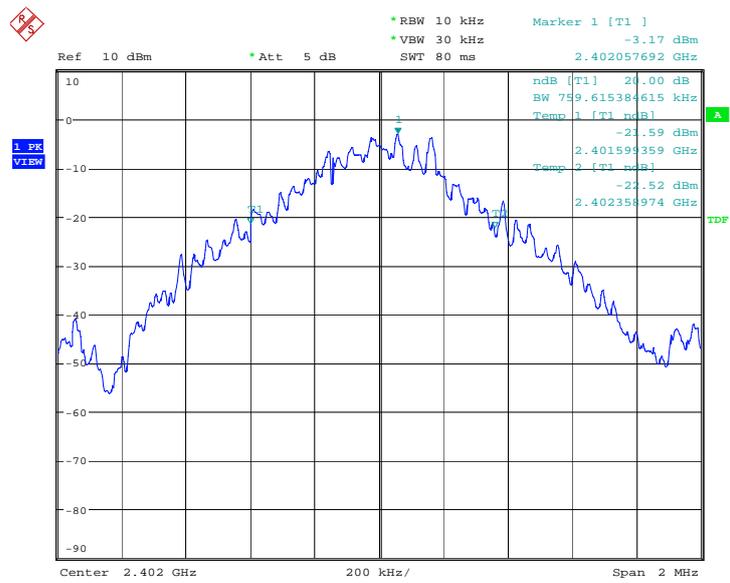
For 8DPSK

Channel	20dB Bandwidth (kHz)		Conclusion
0	Fig.97	1266.03	P
39	Fig.98	1269.23	P
78	Fig.99	1266.03	P

Measurement Uncertainty:±1.1KHz

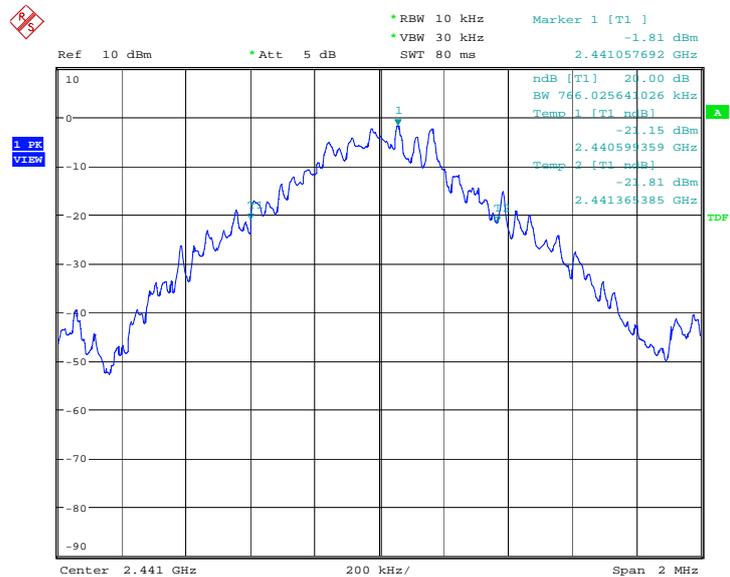
Conclusion:PASS

Test graphs as below:



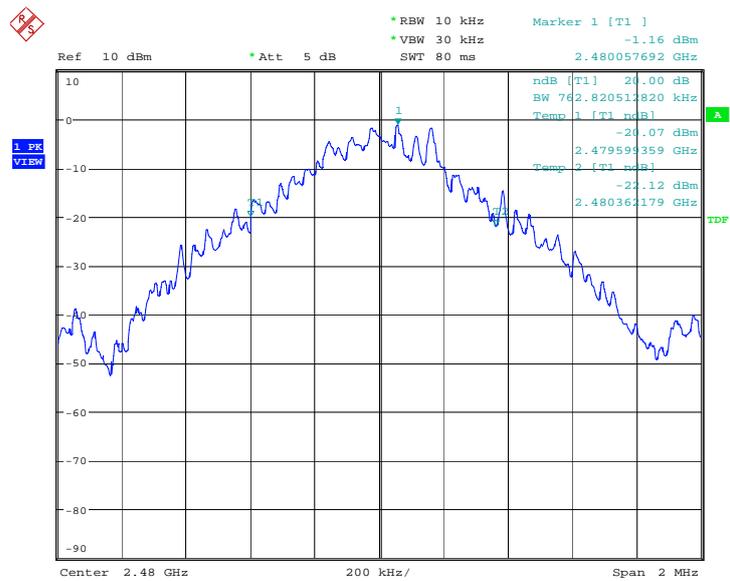
Date: 12.MAY.2010 09:20:58

Fig.91 20dB Bandwidth: GFSK, Channel 0



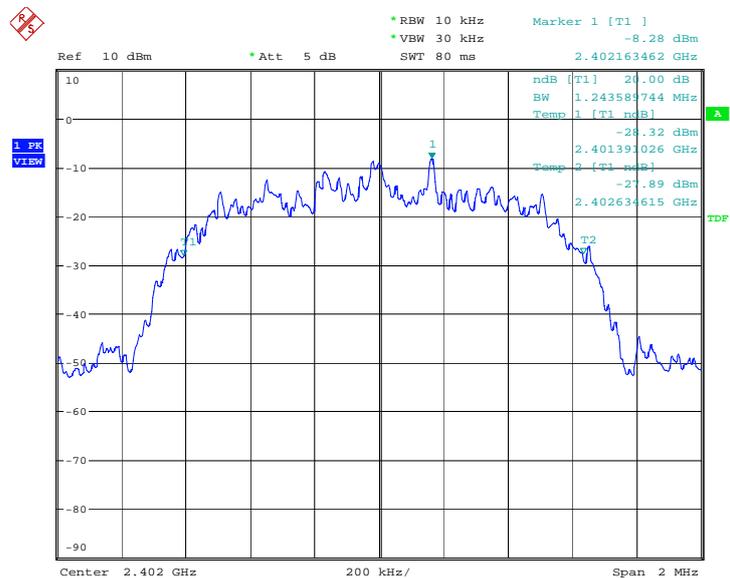
Date: 12.MAY.2010 09:21:30

Fig.92 20dB Bandwidth: GFSK, Channel 39



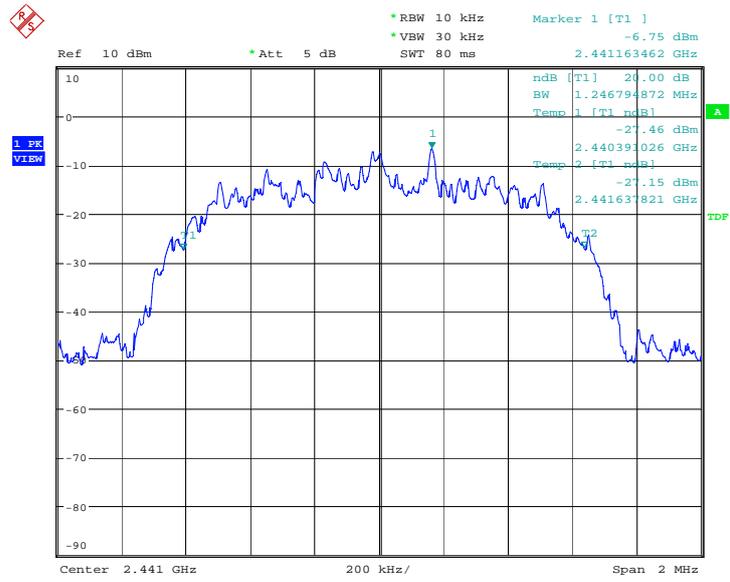
Date: 12.MAY.2010 09:22:02

Fig.93 20dB Bandwidth: GFSK, Channel 78



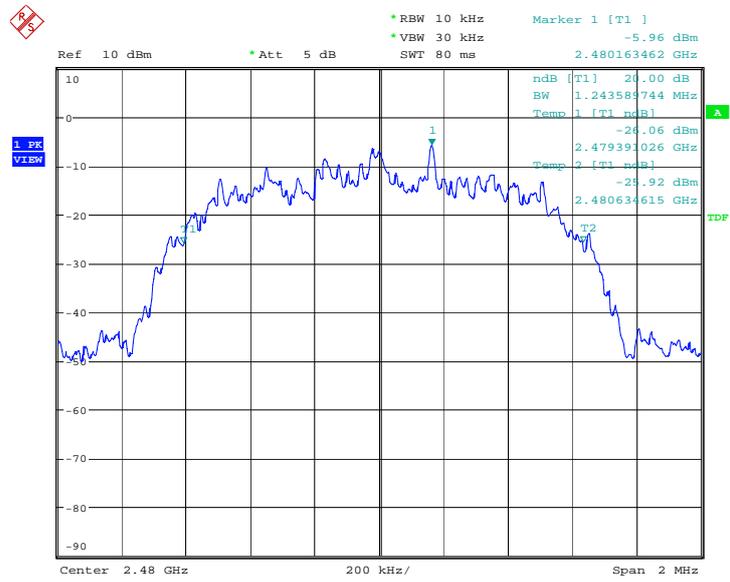
Date: 12.MAY.2010 09:46:32

Fig.94 20dB Bandwidth: $\pi/4$ DQPSK, Channel 0



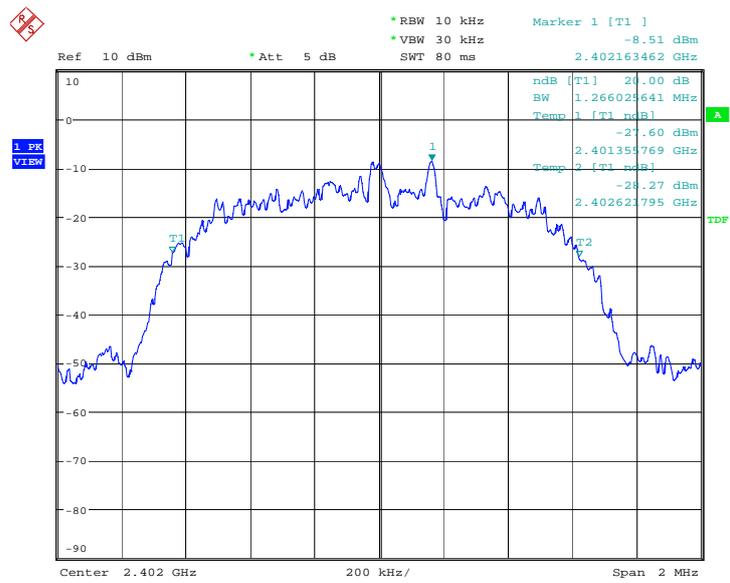
Date: 12.MAY.2010 09:47:04

Fig.95 20dB Bandwidth: $\pi/4$ DQPSK, Channel 39



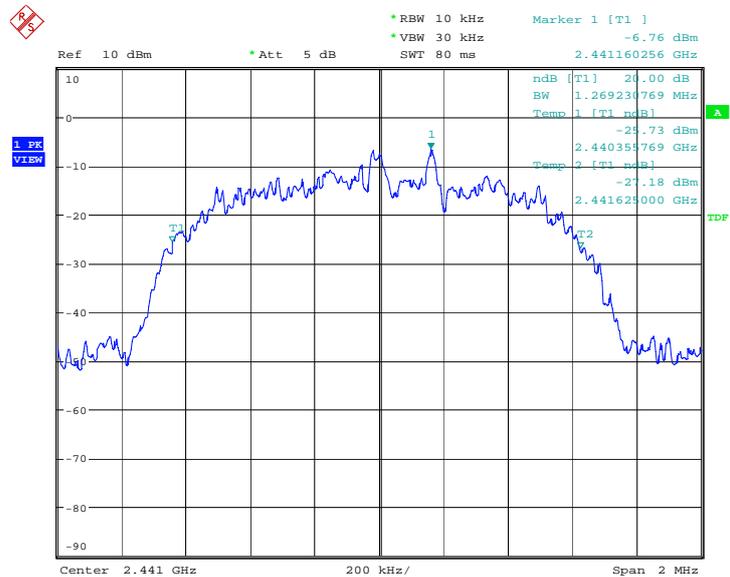
Date: 12.MAY.2010 09:47:36

Fig.96 20dB Bandwidth: $\pi/4$ DQPSK, Channel 78



Date: 12.MAY.2010 10:12:04

Fig.97 20dB Bandwidth: 8DPSK, Channel 0



Date: 12.MAY.2010 10:12:35

Fig.98 20dB Bandwidth: 8DPSK, Channel 39



Date: 12.MAY.2010 10:13:07

Fig.99 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:N07

For GFSK

Channel	Carrier frequency separation (kHz)	Conclusion
39	Fig.100 1000.00	P

For $\pi/4$ DQPSK

Channel	Carrier frequency separation (kHz)	Conclusion
39	Fig.101 879.81	P

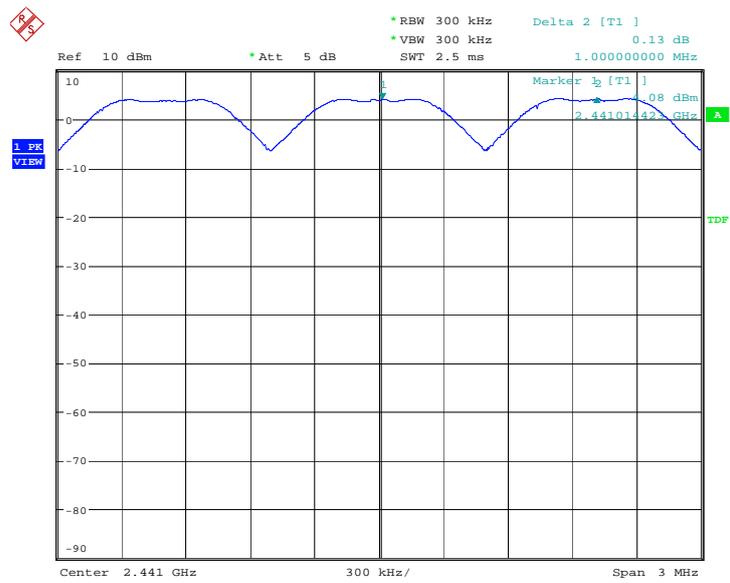
For 8DPSK

Channel	Carrier frequency separation (kHz)	Conclusion
39	Fig.102 1024.04	P

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

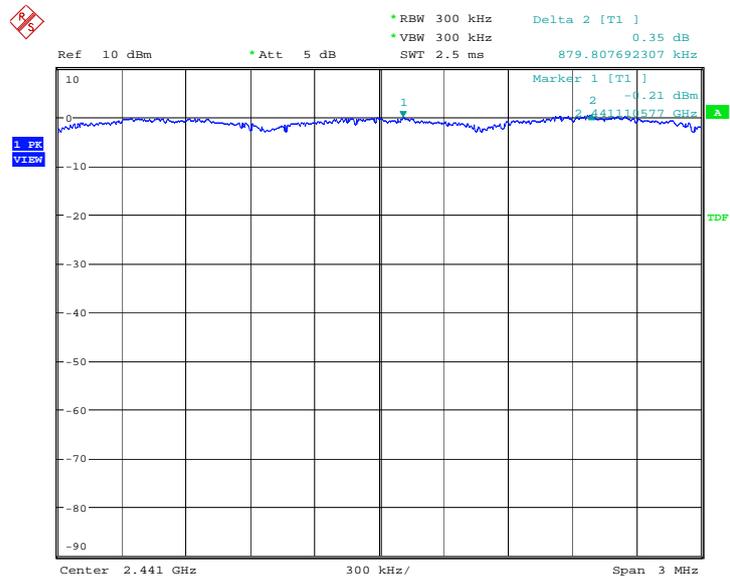
Conclusion: **PASS**

Test graphs as below:



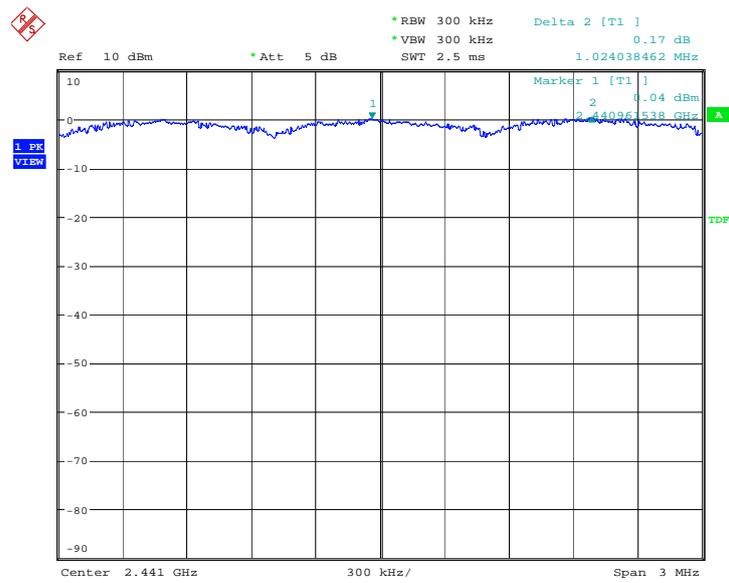
Date: 12.MAY.2010 09:24:06

Fig.100 Carrier frequency separation measurement: GFSK, Channel 39



Date: 12.MAY.2010 09:49:40

Fig.101 Carrier frequency separation measurement: $\pi/4$ DQPSK, Channel 39



Date: 12.MAY.2010 10:15:11

Fig.102 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:N07

For GFSK

Channel	Number of hopping channels	Conclusion
0~39	Fig.103	P
40~78	Fig.104	

For $\pi/4$ DQPSK

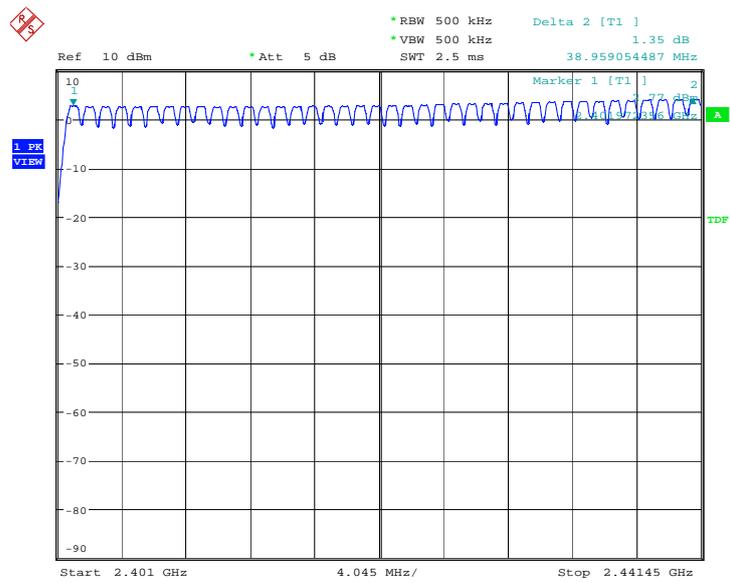
Channel	Number of hopping channels	Conclusion
0~39	Fig.105	P
40~78	Fig.106	

For 8DPSK

Channel	Number of hopping channels	Conclusion
0~39	Fig.107	P
40~78	Fig.108	

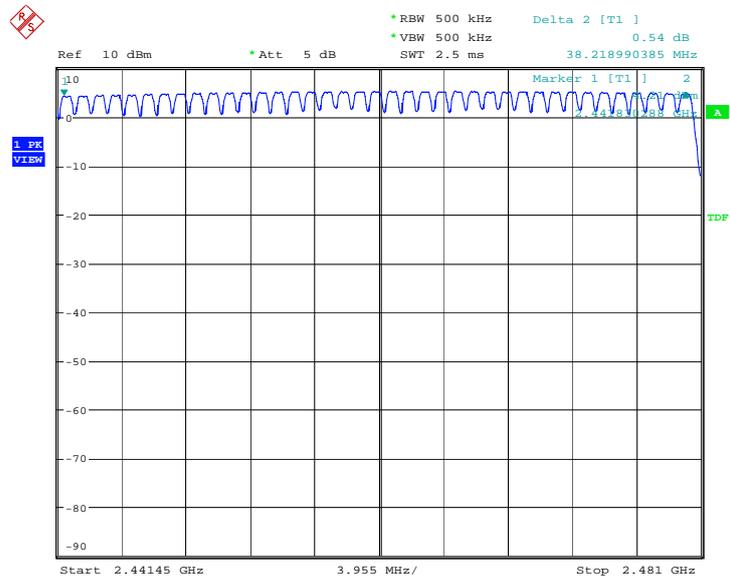
Conclusion: PASS

Test graphs as below:



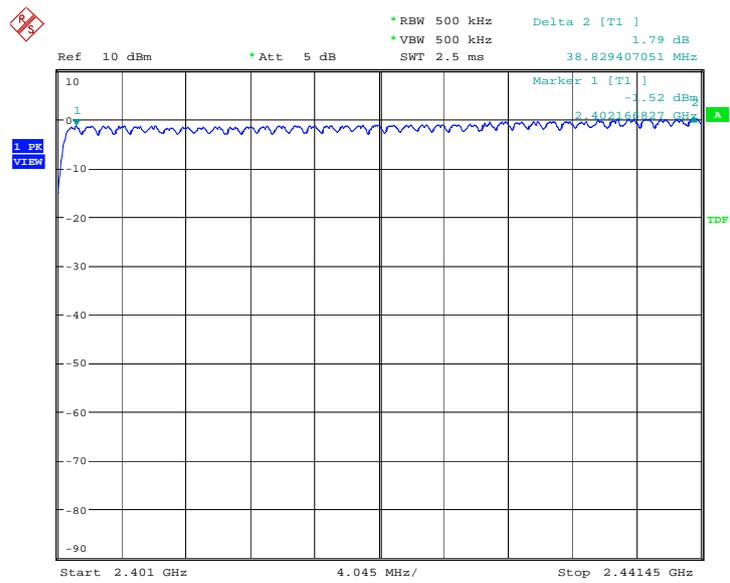
Date: 12.MAY.2010 09:26:09

Fig.103 Number of hopping frequencies: GFSK, Channel 0 - 39



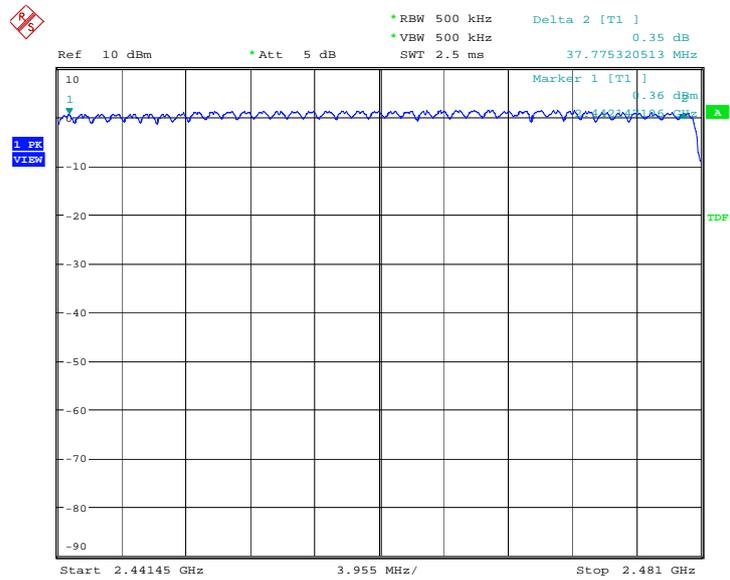
Date: 12.MAY.2010 09:28:11

Fig.104 Number of hopping frequencies: GFSK, Channel 40 - 78



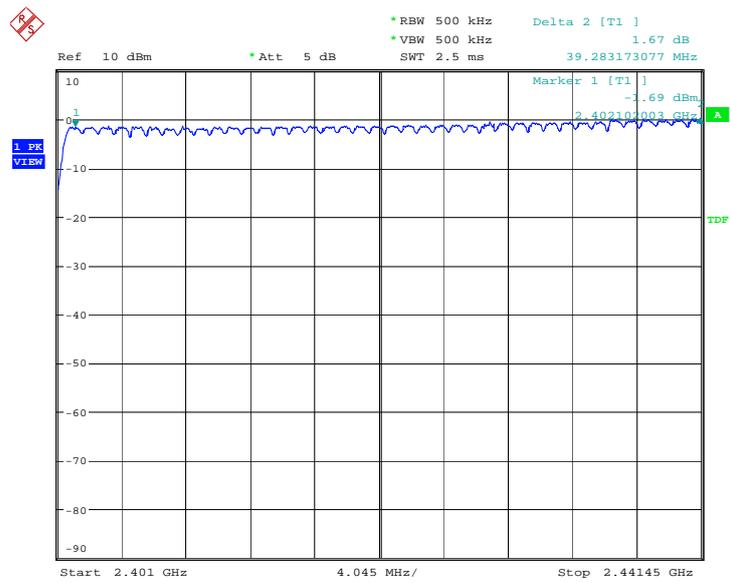
Date: 12.MAY.2010 09:51:44

Fig.105 Number of hopping frequencies: $\pi/4$ DQPSK, Channel 0 - 39



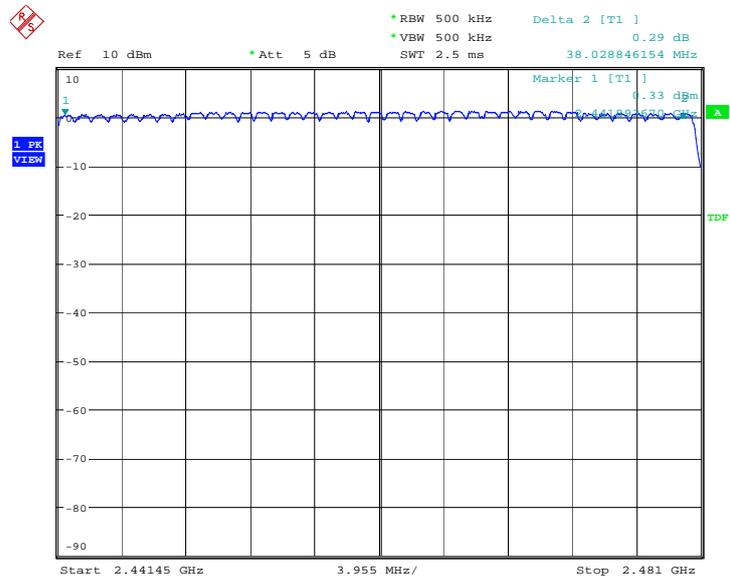
Date: 12.MAY.2010 09:53:46

Fig.106 Number of hopping frequencies: $\pi/4$ DQPSK, Channel 40 - 78



Date: 12.MAY.2010 10:17:15

Fig.107 Number of hopping frequencies: 8DPSK, Channel 0 - 39



Date: 12.MAY.2010 10:19:17

Fig.108 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)
110	60

Measurement Result and limit:

EUT ID:N05

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.109 (TX Mode)	Fig.110 (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.109 (TX Mode)	Fig.110 (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:

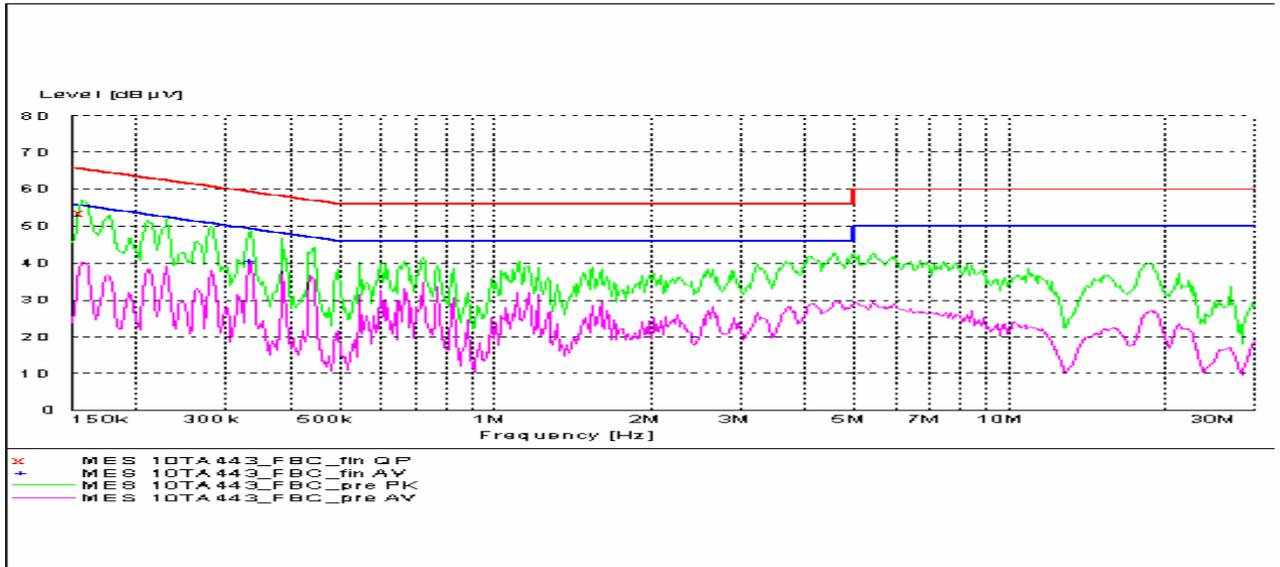


Fig.109 AC Powerline Conducted Emission with charger-TX Mode

MEASUREMENT RESULT: "10TA443_FBC_fin QP"

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Line	PE
0.157652	53.50	10.1	66	12.1	L1	GND

MEASUREMENT RESULT: "10TA443_FBC_fin AV"

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Line	PE
0.335832	40.30	10.1	49	9.0	L1	FLO

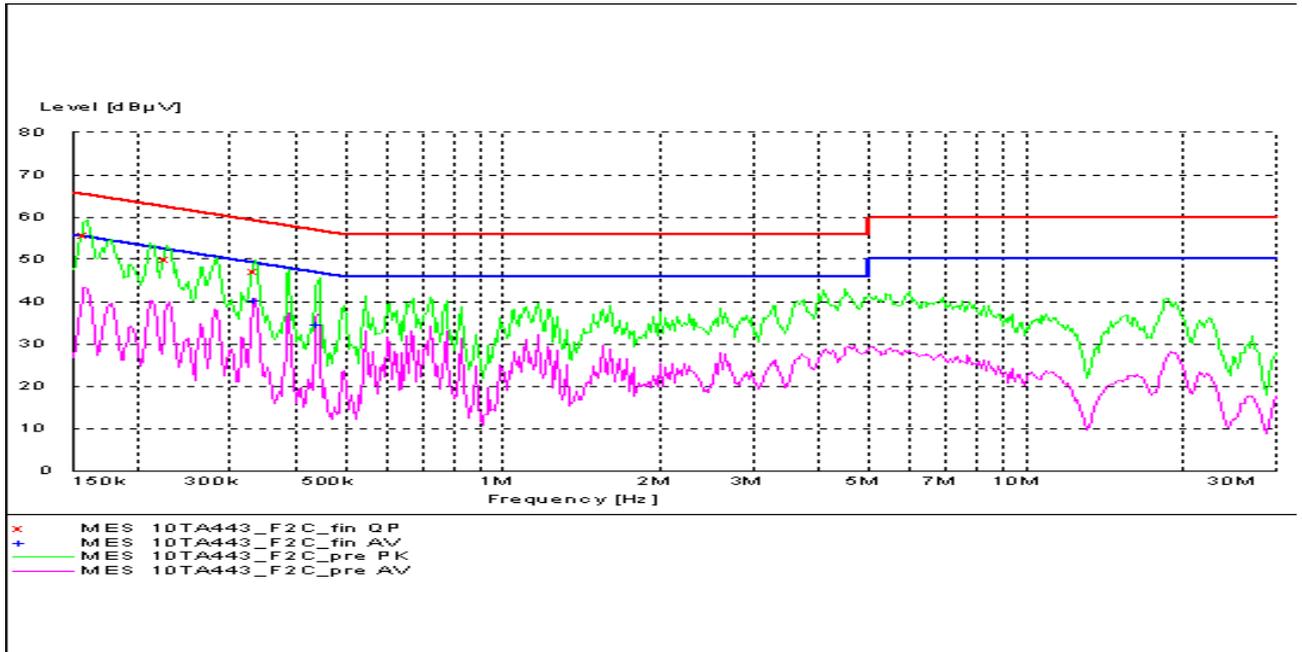


Fig.110 AC Powerline Conducted Emission with charger-Idle Mode

MEASUREMENT RESULT: "10TA443_F2C_fin QP"

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Line	PE
0.159228	55.80	10.1	66	9.7	L1	FLO
0.227818	49.90	10.1	63	12.7	L1	GND
0.335832	47.00	10.1	59	12.3	L1	GND

MEASUREMENT RESULT: "10TA443_F2C_fin AV"

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Line	PE
0.335832	40.10	10.1	49	9.2	L1	FLO
0.443732	34.70	10.1	47	12.3	L1	FLO