



## Accredited testing-laboratory

**DAR registration number: DAT-P-176/94-D1**

**Federal Motor Transport Authority (KBA)  
DAR registration number: KBA-P 00070-97**

**Recognized by the Federal Communications Commission**

**Anechoic chamber registration no.: 90462 (FCC)**

**Anechoic chamber registration no.: 3463A-1 (IC)**

**Certification ID: DE 0001**

**Accreditation ID: DE 0002**

**Accredited Bluetooth® Test Facility (BQTF)**

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**Test report no. : 1-1065-06-04/09**  
**Type identification : AAD-3880016-BV**  
**Applicant : Sony Ericsson Mobile Communications AB**  
**FCC ID : PY7A3880016**  
**IC Certification No : 4170B-A3880016**  
**Test standards : 47 CFR Part 15**  
**RSS - 210 Issue 7**

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## 1 General information

### 1.1 Notes

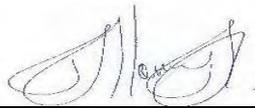
The test results of this test report relate exclusively to the test item specified in 3.1.1. The CETECOM ICT Services GmbH does not assume responsibility for any conclusions and generalisations drawn from the test results with regard to other specimens or samples of the type of the equipment represented by the test item. The test report may only be reproduced or published in full. Reproduction or publication of extracts from the report requires the prior written approval of the CETECOM ICT Services GmbH.

#### Test laboratory manager:

**2009-01-28**      **Daniel Muyunga**

Date

Name



Signature

**2009-01-28**      **Joerg Warken**

Date

Name



Signature

#### Technical responsibility for area of testing:

**2009-01-28**      **Michael Berg**

Date

Name



Signature

## 1.2 Testing laboratory

CETECOM ICT Services GmbH

Untertürkheimer Straße 6 - 10

66117 Saarbrücken

Germany

Phone: + 49 681 5 98 - 0

Fax: + 49 681 5 98 - 9075

e-mail: info@ICT.cetecom.de

Internet: http://www.cetecom-ict.de

**State of accreditation:** The test laboratory (area of testing) is accredited according to  
**DIN EN ISO/IEC 17025**  
**DAR registration number: DAT-P-176/94-D1**

**Accredited by:** Federal Motor Transport Authority (KBA)  
**DAR registration number: KBA-P 00070-97**

**Testing location, if different from CETECOM ICT Services GmbH:**

**Name :**  
**Street :**  
**Town :**  
**Country :**  
**Phone :**  
**Fax :**

## 1.3 Details of applicant

<b>Name:</b>	Sony Ericsson Mobile Communications AB
<b>Street:</b>	Mobilvägen 10
<b>Town:</b>	22188 Lund
<b>Country:</b>	Sweden
<b>Telephone:</b>	+46-46-19-3000
<b>Fax:</b>	+46-10-800-2441
<b>Contact:</b>	Peter Lindeborg
<b>E-mail:</b>	peter.lindeborg@sonyericsson.com
<b>Telephone:</b>	+46-10-802-43 68

## 1.4 Application details

<b>Date of receipt of order:</b>	2009-01-22
<b>Date of receipt of test item:</b>	2009-01-21
<b>Date of start test:</b>	2009-01-21
<b>Date of end test:</b>	2009-01-28
<b>Persons(s) who have been present during the test:</b>	-/-

## 2 Test standard/s:

47 CFR Part 15	2008-07	Title 47 of the Code of Federal Regulations; Chapter I- Federal Communications Commission subchapter A - general, Part 15-Radio frequency devices
RSS - 210 Issue 7	2007-06	Spectrum Management and Telecommunications - Radio Standards Specification Low-power Licence-exempt Radiocommunication Devices (All Frequency Bands): Category I Equipment

### 3 Technical tests

#### 3.1 Details of manufacturer

Name:	Sony Ericsson Mobile Communications AB
Street:	Mobilvägen 10
Town:	22188 Lund
Country:	Sweden

##### 3.1.1 Test item

Kind of test item	:	GSM Mobile 850/900/1800/1900; EDGE; MS10, UMTS 1, BTEDR
Type identification	:	AAD-3880016-BV
S/N serial number	:	Conduced Sample: BX900GKJ24 Radiated Sample: BX900GKJ26
HW hardware status	:	A
SW software status	:	tbd
Frequency Band [MHz]	:	ISM 2.400 - 2.483,5
Type of Modulation	:	FHSS
Number of channels	:	79
Antenna	:	Internal antenna
Power Supply	:	3.70 V DC by Li-Ion Battery (BST-39) and Power supply
Temperature Range	:	-20 °C to 60 °C

Max. power radiated: 0.73 dBm EIRP (GFSK modulation)

Max. power conducted: 5.00 dBm (GFSK modulation)

FCC ID: PY7A3880016

IC: 4170B-A3880016

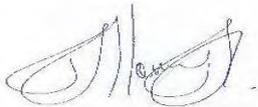
**3.1.2 Additional EUT information For IC Canada (appendix 2)**

IC Registration Number:	<b>4170B-A3880016</b>
Model Name:	<b>AAD-3880016-BV</b>
Manufacturer (complete Address):	<b>Sony Ericsson Mobile Communications AB Mobilvägen 10 22188 Lund Sweden</b>
Tested to Radio Standards Specification (RSS) No.:	<b>RSS-210 Issue 7</b>
Open Area Test Site Industry Canada Number:	<b>IC 3463A-1</b>
Frequency Range (or fixed frequency) [MHz]:	<b>2400 – 2483.5 MHz</b>
RF: Power [W] (max):	<b>Rad. EIRP: 1.18 mW (GFSK) Conducted : 3.16mW (GFSK)</b>
Antenna Type:	<b>Integrated antenna</b>
Field Strength [dB $\mu$ V/m in 3m]:	<b>96 (GFSK)</b>
Occupied Bandwidth (99% BW) [kHz]:	<b>1335 (Pi/4DQPSK)</b>
Type of Modulation:	<b>GFSK, Pi/4 DQPSK, 8 DPSK</b>
Emission Designator (TRC-43):	<b>IM00FXD / 79M0GXD (FHSS) bei EDR</b>
Transmitter Spurious (worst case) [dB $\mu$ V/m in 10m]:	<b>22.7</b>
Receiver Spurious (worst case) [dB $\mu$ V/m in 10m]:	<b>22.5</b>

ATTESTATION:

I attest that the testing was performed or supervised by me; that the test measurements were made in accordance with the above-mentioned departmental standard(s), and that the radio equipment identified in this application has been subject to all applicable test conditions specified in the departmental standards and all of the requirements of the standards have been met.

Signature:



Test engineer: Daniel Muyunga

Date: 2009-01-28

### 3.1.3 EUT operating modes

EUT operating mode no. *)	Description of operating modes	Additional information
Op. 0	Normal mode	Normal temperature and power source conditions
Op. 1		low temperature, low power source conditions
Op. 2		low temperature, high power source conditions
Op. 3		high temperature, low power source conditions
Op. 4		high temperature, high power source conditions

\*) EUT operating mode no. is used to simplify the test plan

### 3.1.4 Extreme conditions testing values

Description	Shortcut	Unit	Value
Nominal Temperature	T <sub>nom</sub>	°C	<b>20</b>
Nominal Humidity	H <sub>nom</sub>	%	<b>53</b>
Nominal Power Source	V <sub>nom</sub>	V	<b>3.70</b>

Type of power source: **V DC by Li-Ion Battery (BST-39) and Power supply**

Deviations from these values are reported in chapter 2

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#### 4 Summary of Measurement Results and list of all performed test cases

- No deviations from the technical specifications were ascertained
- There were deviations from the technical specifications ascertained

TC identifier	Description	verdict	date	Remark
RF-Testing	FCC Part 15 §15.247 - CANADA RSS-210	PASS	2009-01-28	-/-

Test Specification Clause	Test Case	Modulation	Pass	Fail	N/A	Not performed
None	Antenna Gain	GFSK	Yes			
§15.247(a1)	Carrier frequency separation	GFSK	Yes			
§15.247(a1)	Number of hopping channels	GFSK	Yes			
§15.247(a)(1)(iii)	Time of occupancy (dwell time)	--	Yes			
§15.247(e)	Power Spectral density (Hybrid system in Inquiry mode/Page scan)	--			Yes	
§15.247(a)(1)	Spectrum Bandwidth of a FHSS System / 20dB Bandwith	GFSK Pi/4 DQPSK 8 DPSK	Yes Yes Yes			
§ 15.247 (b)(1)	Maximum output power (conducted)	GFSK Pi/4 DQPSK 8 DPSK	Yes Yes Yes			
§ 15.247 (b)(1)	Max. peak output power (radiated)	GFSK	Yes			
§ 15.247 (d)	Band-edge compliance of conducted emissions	GFSK Pi/4 DQPSK 8 DPSK	Yes Yes Yes			
§ 15.205	Band-edge compliance of radiated emissions	Widest modulation	Yes			
§ 15.247 (d)	Spurious Emission - conducted (Transmitter)	GFSK	Yes			
§ 15.247 (d)	Spurious Emission - radiated (Transmitter) >30 MHz	GFSK	Yes			
§ 15.109	Spurious Emissions - radiated (Receiver)	GFSK	Yes			
§ 15.209	Spurious Emissions - radiated (Transmitter) <30 MHz	GFSK	Yes			
§ 15.107/207	Conducted Emissions <30 MHz	GFSK	Yes			

## 5 RF measurement testing

### 5.1 Description of test set-up

#### 5.1.1 Radiated measurements

The radiated measurements are performed in vertical and horizontal plane in the frequency range from 9 kHz to 25 GHz in semi-anechoic chambers. The EUT is positioned on a non-conductive support with a height of 0.80 m above a conductive ground plane that covers the whole chamber. The receiving antennas are confirmed with specifications ANSI C63.2-1996 clause 15 and ANSI C63.4-2003 clause 4.1.5. These antennas can be moved over the height range between 1.0 m and 4.0 m in order to search for maximum field strength emitted from EUT. The measurement distances between EUT and receiving antennas are indicated in the test setups for the various frequency ranges. For each measurement, the EUT is rotated in all three axes until the maximum field strength is received. The wanted and unwanted emissions are received by spectrum analysers where the detector modes and resolution bandwidths over various frequency ranges are set according to requirement ANSI C63-4-2003 clause 4.2. Antennas are confirmed with ANSI C63.2-1996 item 15.

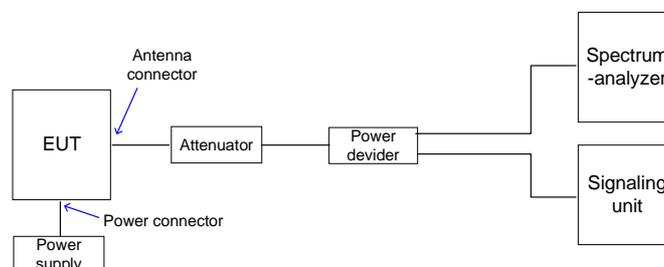
- 9 kHz - 150 kHz: Quasi Peak measurement, 200 Hz Bandwidth, passive loop antenna.
- 150 kHz - 30 MHz: Quasi Peak measurement, 9 kHz Bandwidth, passive loop antenna.
- 30 MHz - 200 MHz: Quasi Peak measurement, 120 kHz Bandwidth, bi-conical antenna
- 200MHz - 1GHz: Quasi Peak measurement, 120 kHz Bandwidth, log periodic antenna
- >1GHz: Average, RBW 1MHz, VBW 10 Hz, waveguide horn

All measurements are done in accordance with the Filing and Measurement Guidelines for Frequency Hopping Spread Spectrum Systems DA 00-705 and Appendix A “BLUETOOTH APPROVALS”

The EUT is powered by an external power supply with nominal voltage. The signalling is performed from outside the chamber with a signalling unit (CMU200 or other) by air link using signalling antenna.

#### 5.1.2 Conducted measurements

The EUT’s RF signal is coupled out by the antenna connector which is supplied by the manufacturer. The signal is first 10dB attenuated before it is power divided (~6dB loss per branch). One of the signal paths is connected to the communication base Station (CMU200 or other), the other one is connected to the spectrum analyzer. The specific losses for both signal paths are first checked within a calibration. The measurement readings on the signalling unit/spectrum analyzer are corrected by the specific test set-up loss. The attenuator, power divider, signalling unit and the spectrum analyzer are impedance matched on 50 Ohm.



## 5.2 Referenced documents

None

## 5.3 Additional comments

None

## 5.4 Antenna gain

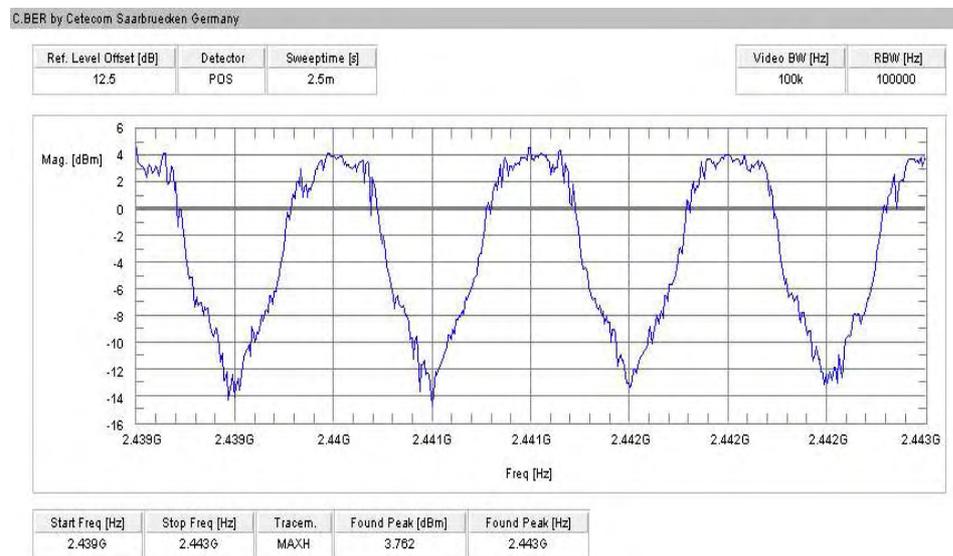
The antenna gain of the complete system is calculated by the difference of radiated power in EIRP and the conducted power of the module.

	low channel 2402 MHz	mid channel 2441 MHz	high channel 2480 MHz
Conducted power [dBm] Measured, GFSK modulation	4.687	5.005	4.938
Radiated power [dBm] Measured, GFSK modulation	0.730	0.550	0.680
Gain [dBi] Calculated	-3.957	-4.455	-4.258

### 5.5 Carrier frequency separation §15.247(a)(1)

Modulation: GFSK

Plot 1 of 1:



Result: Channel separation is: ~ 1 MHz

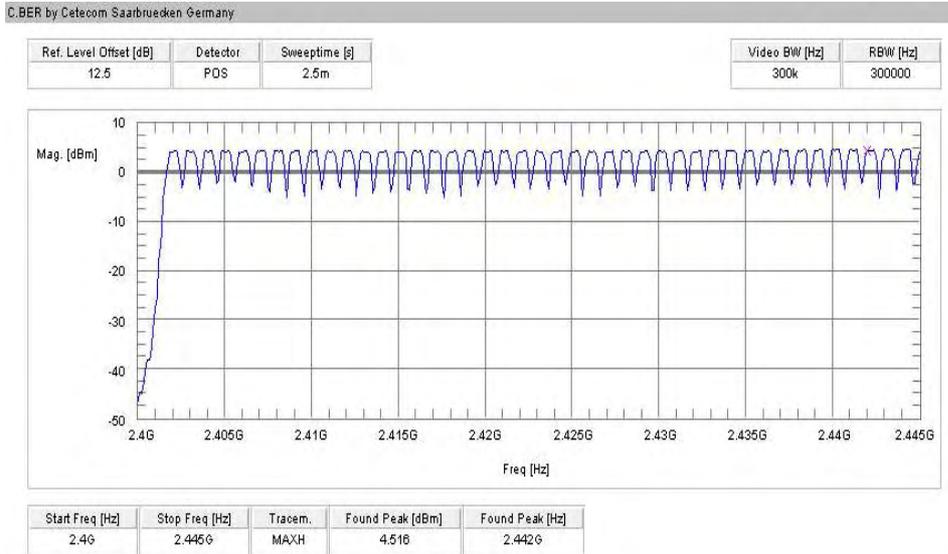
Limits:

Under normal test conditions only	Minimum 25 kHz or 20 dB Bandwidth of the hopping system
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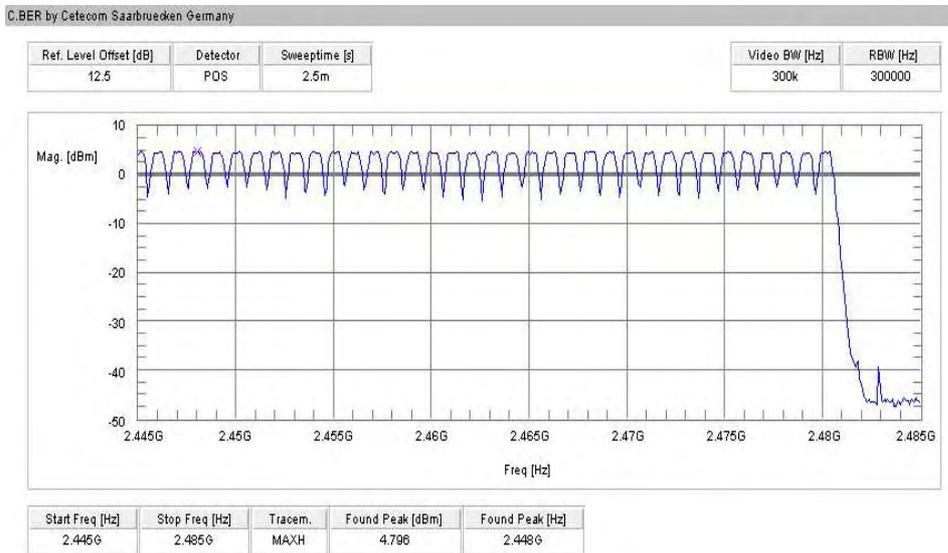
**5.6 Number of hopping channels §15.247(a)(1)**

Modulation: GFSK

Plot 1 of 2:



Plot 2 of 2:



Result: The number of hopping channels is: 79

Limits:

Under normal test conditions only	at least 15 non-overlapping channels
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## 5.7 Time of occupancy (dwell time) §15.247(a)(1)(iii)

### For Bluetooth devices:

The dwell time of 0.4 s within a 31.6 second period in data mode is independent from the packet type (packet length). The calculation for a 31.6 second period is as follows:

Dwell time = time slot length \* hop rate / number of hopping channels \* 31.6 s

Example for a DH1 packet (with a maximum length of one time slot)

Dwell time =  $625 \mu\text{s} * 1600 \text{ 1/s} / 79 * 31.6 \text{ s} = 0.4 \text{ s}$  (in a 31.6 s period)

For multi-slot packet the hopping is reduced according to the length of the packet.

Example for a DH5 packet (with a maximum length of five time slots)

Dwell time =  $5 * 625 \mu\text{s} * 1600 * 1/5 * 1/s / 79 * 31.6 \text{ s} = 0.4 \text{ s}$  (in a 31.6 s period)

This is according to the Bluetooth Core Specification V 1.1 & V 1.2 & V2.0 (+ critical errata) for all Bluetooth devices.

Therefore, all Bluetooth devices comply with the FCC dwell time requirement in the data mode.

This was checked during the Bluetooth Qualification tests.

The Dwell time in hybrid mode is approximately 2.6 ms (in a 12.8s period)

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**5.8 Power Spectral density (Hybrid system in Inquiry mode/Page scan)  
§15.247(e)**

Plot 1 of 1:

**Not applicable**

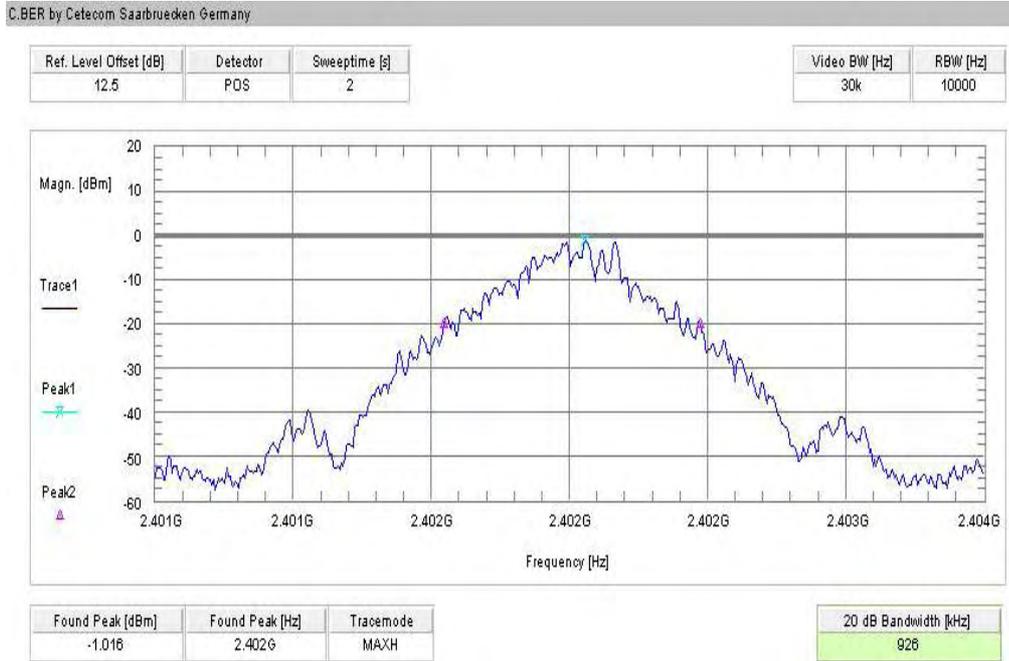
Result: Power density: - dBm/Hz = - dBm / 3 kHz  
Correction factor from dBm/Hz to dBm / 3 kHz is +34,8 dB

Limits:

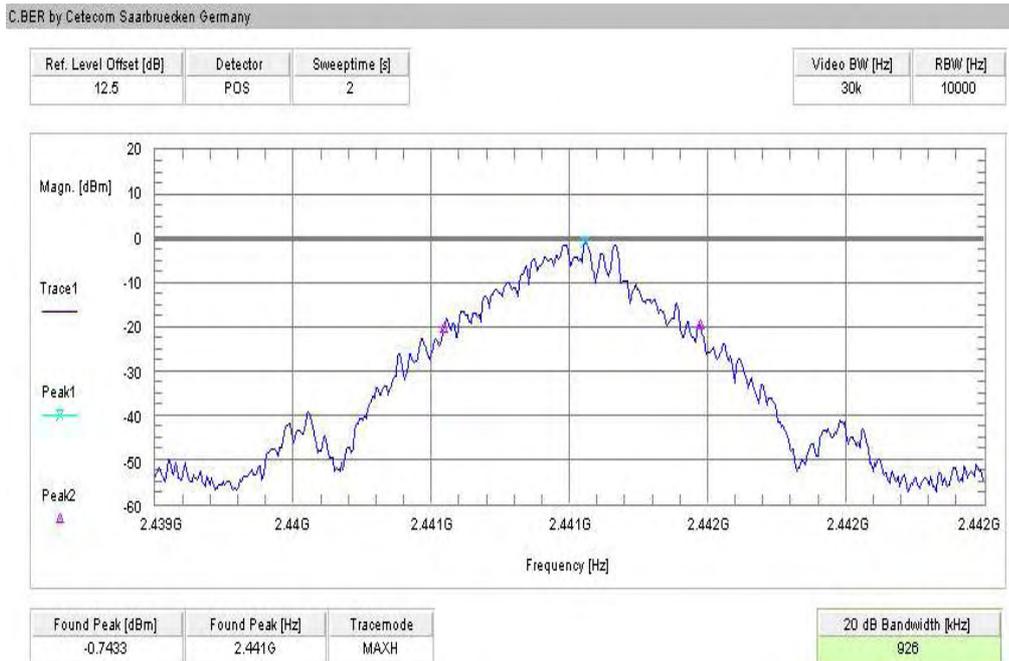
Under normal test conditions only	For digitally modulated systems, the peak power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission
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**5.9 Spectrum Bandwidth of a FHSS System / 20dB Bandwidth §15.247(a)(1)**

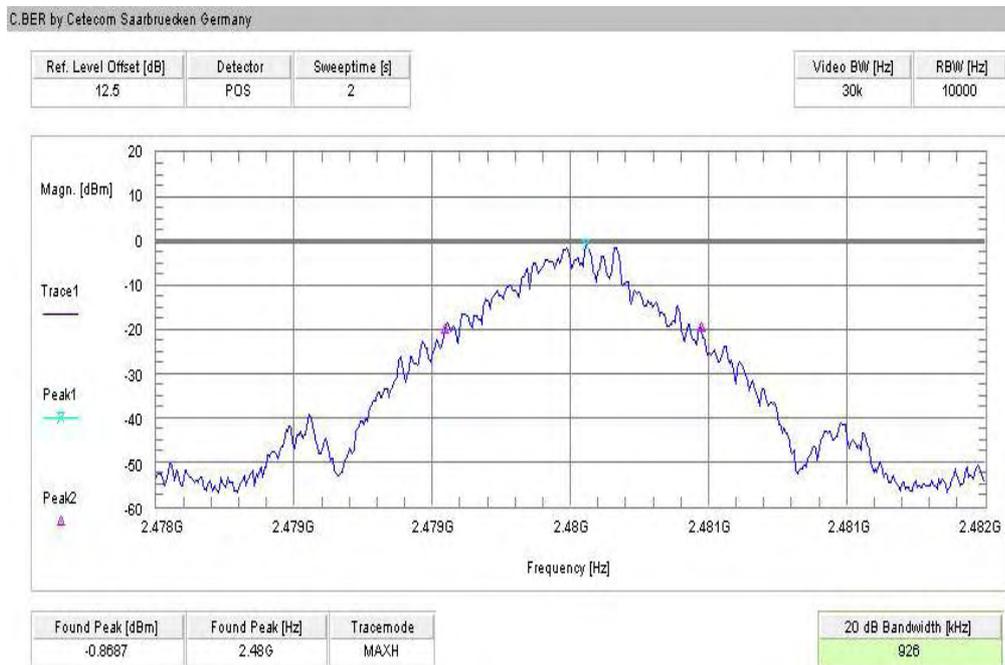
Plot 1: GFSK



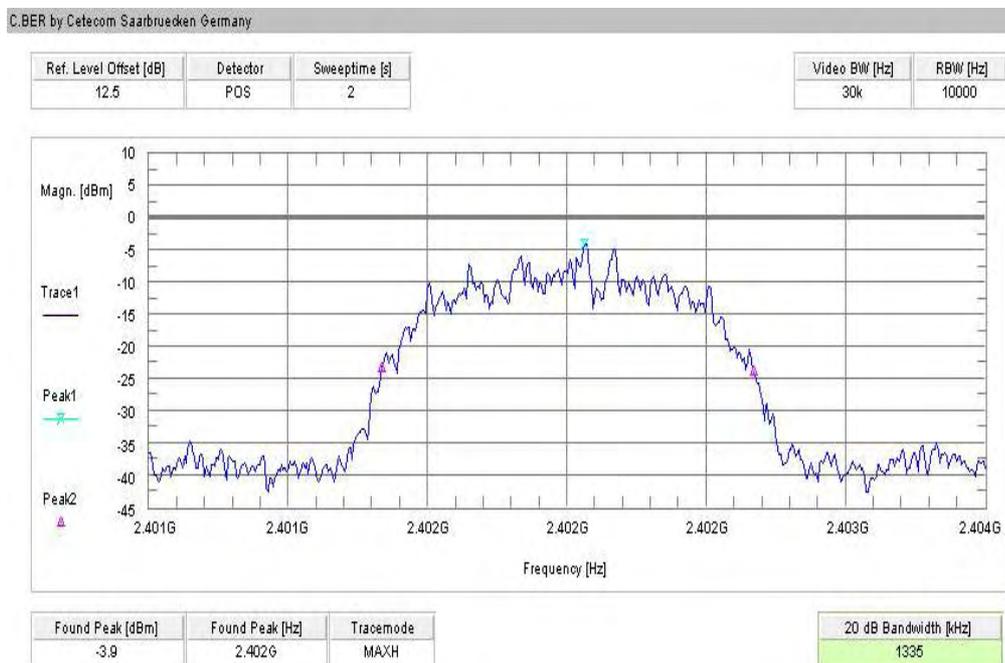
Plot 2: GFSK



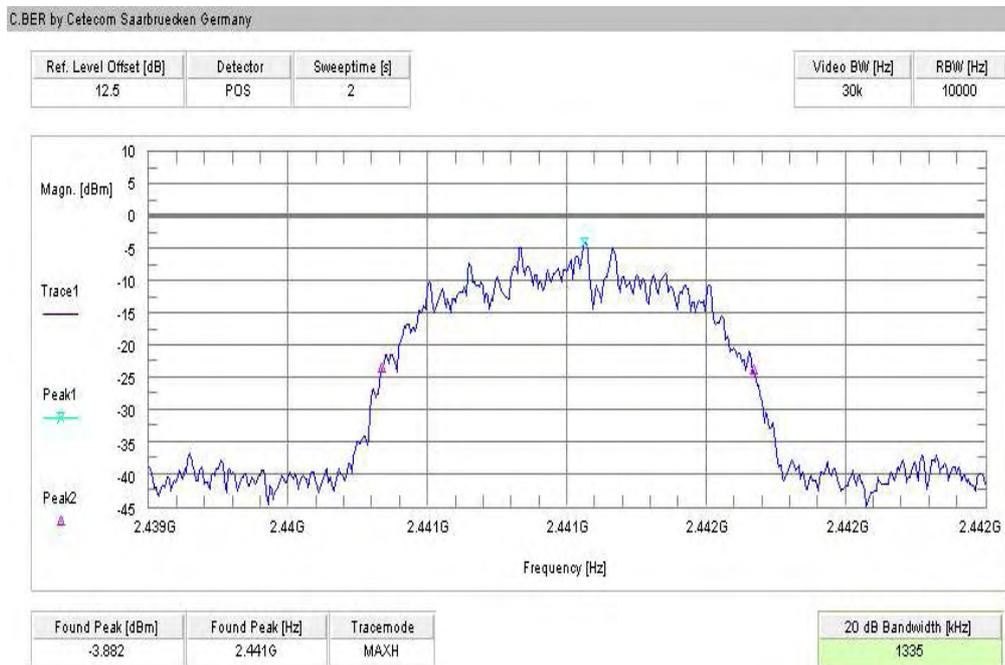
Plot 3: GFSK



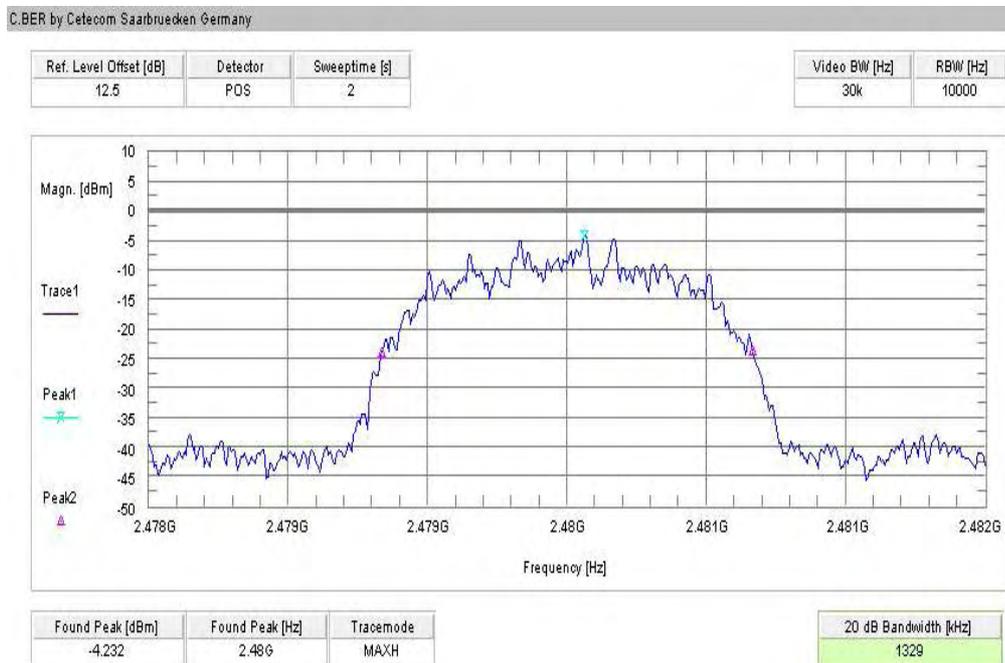
Plot 4: Pi/4 DQPSK



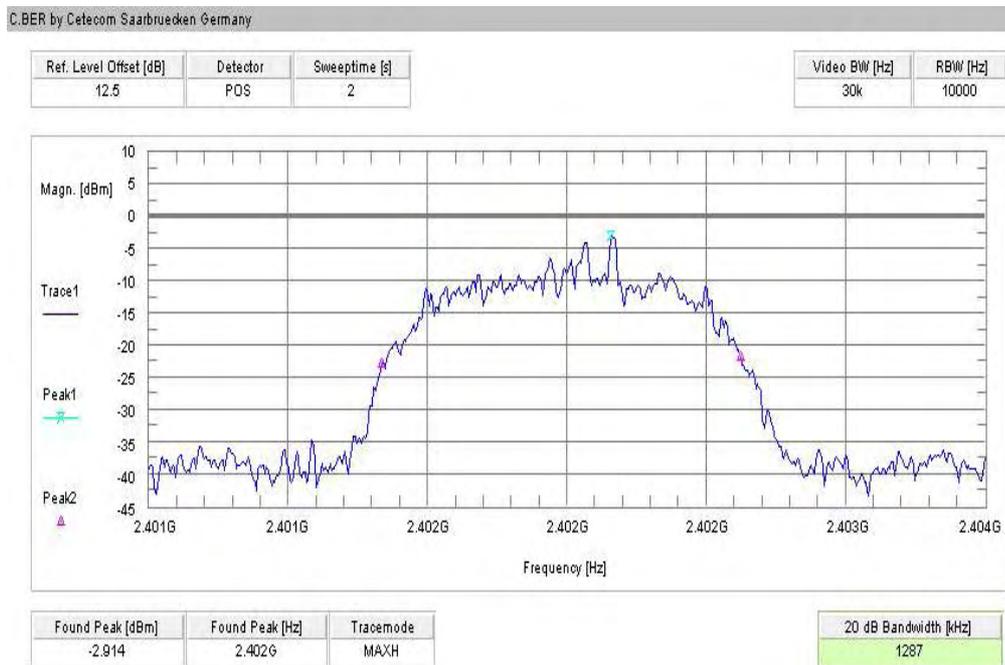
Plot 5: Pi/4 DQPSK



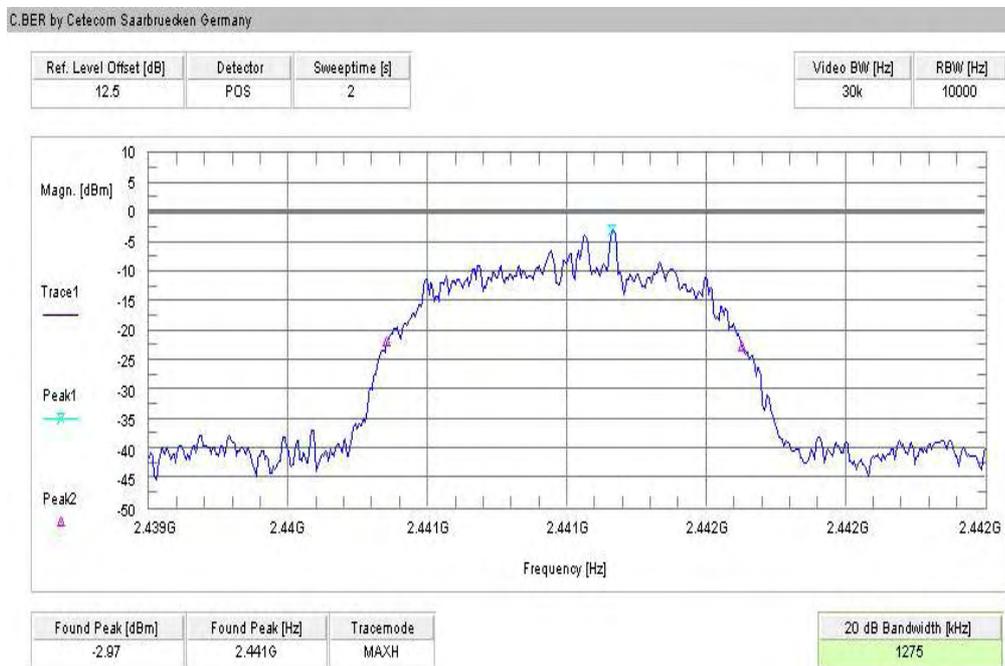
Plot 6: Pi/4 DQPSK



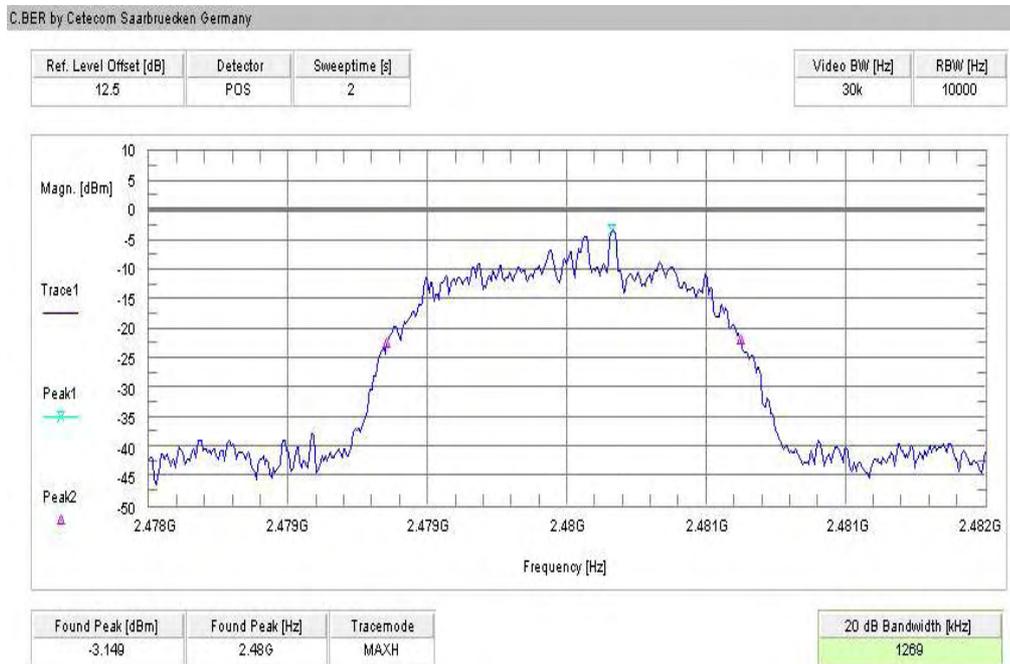
Plot 7: 8DPSK



Plot 8: 8DPSK



Plot 9: 8DPSK



Result:

Modulation	20 dB BANDWIDTH [kHz]		
	2402	2441	2480
Frequency [MHz]			
<i>GFSK</i>	926	926	926
<i>Pi/4 DQPSK</i>	1335	1335	1329
<i>8DPSK</i>	1287	1275	1269
Measurement uncertainty	±1kHz		

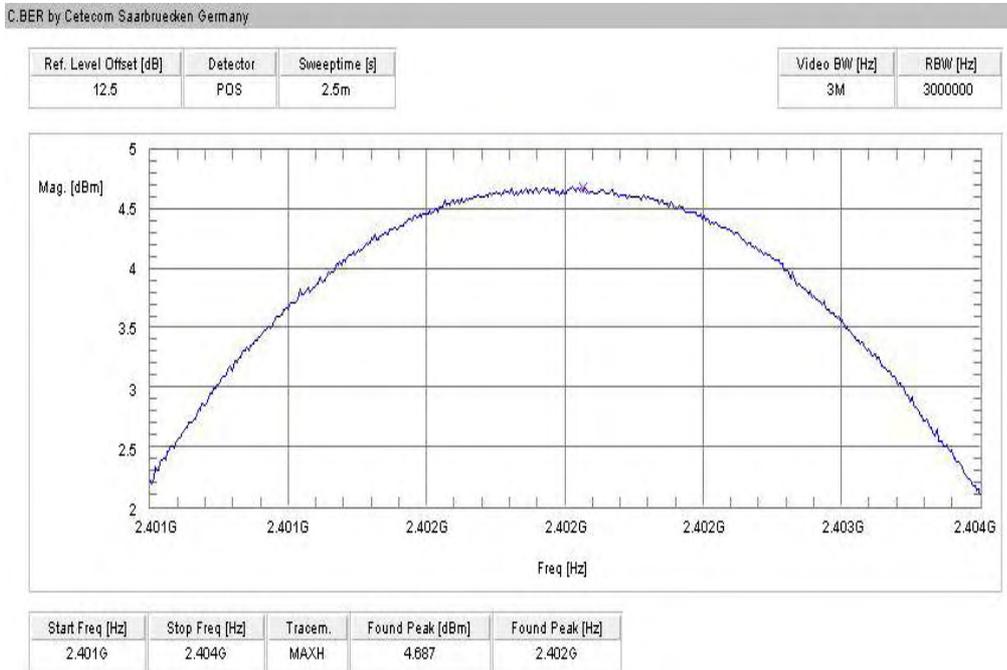
RBW / VBW as provided in the „Measurement Guidelines“ (DA 00-705, March 30, 2000)  
 RBW: 10 kHz / VBW 10 kHz

Limits:

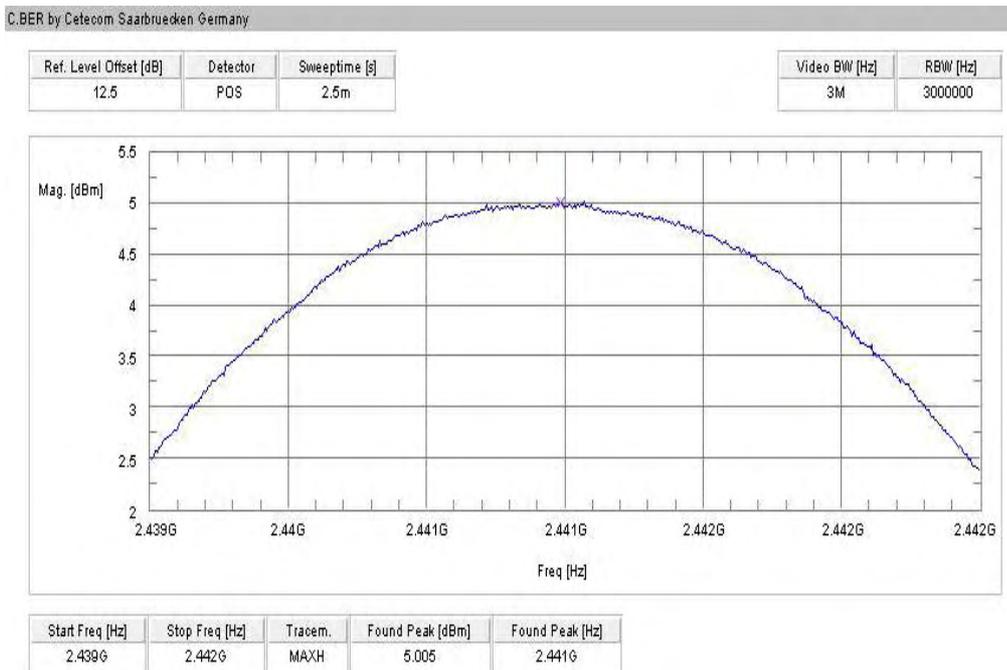
Under normal test conditions only	GFSK < 1000 kHz Pi/4 DQPSK < 1500 8DPSK < 1500
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**5.10 Maximum output power (conducted) § 15.247 (b)(1)**

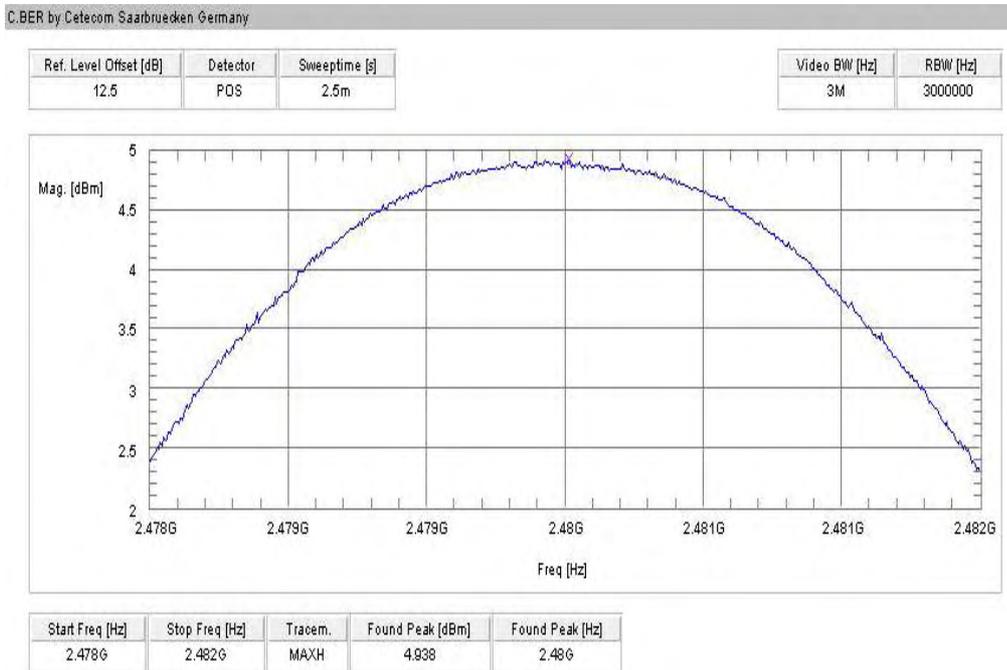
Plot 1: GFSK



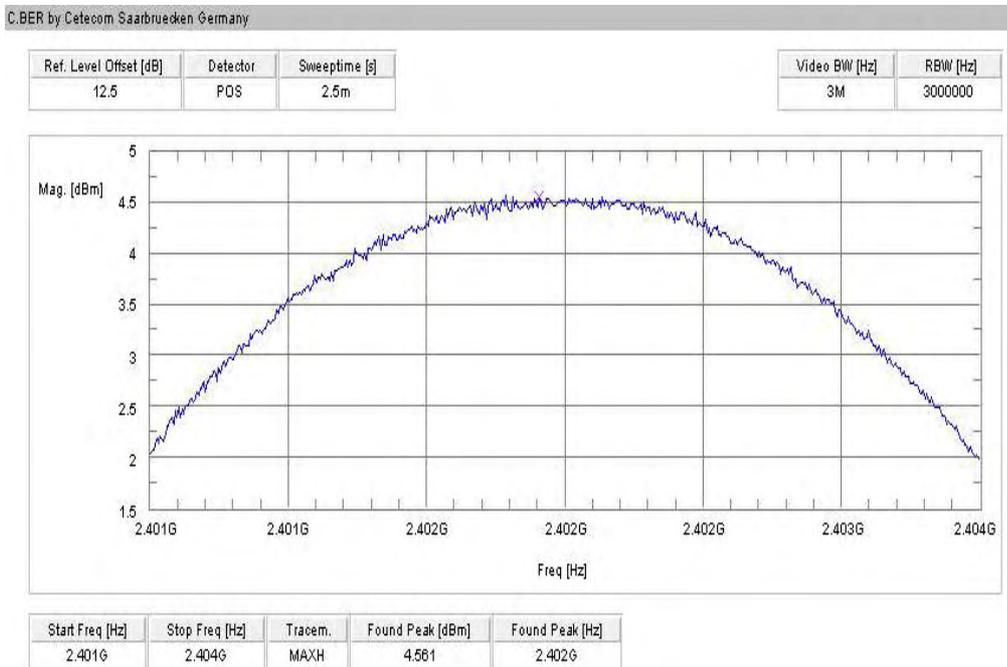
Plot 2: GFSK



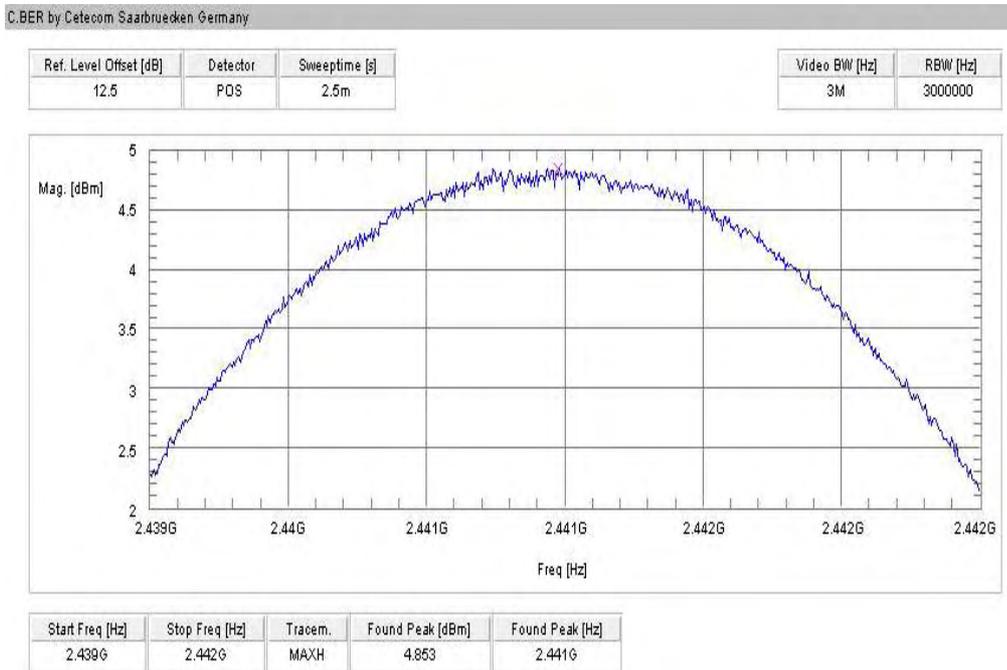
### Plot 3: GFSK



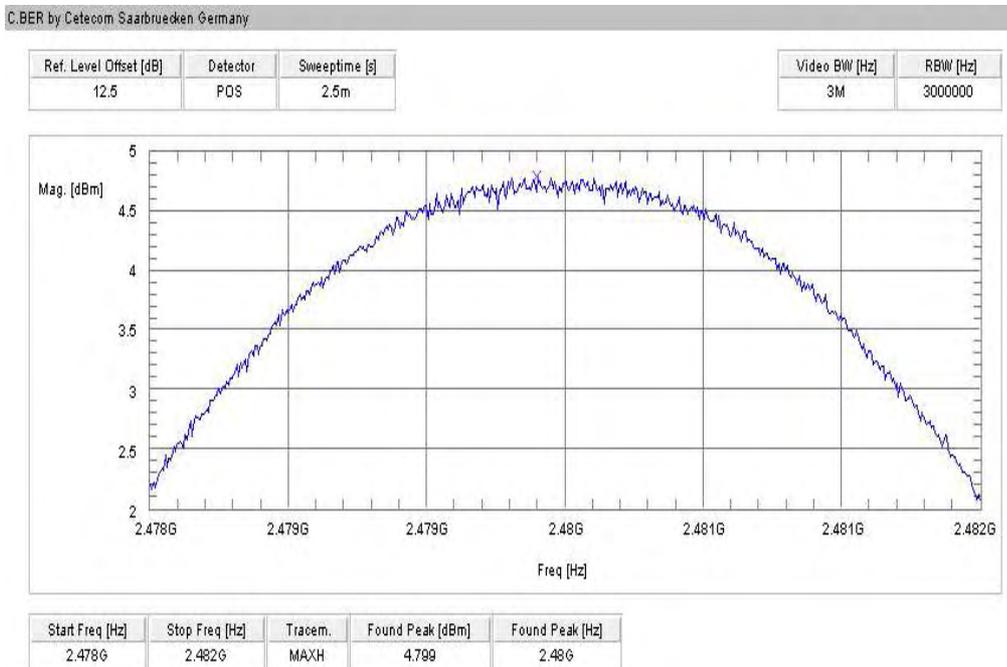
### Plot 4: Pi/4 DQPSK



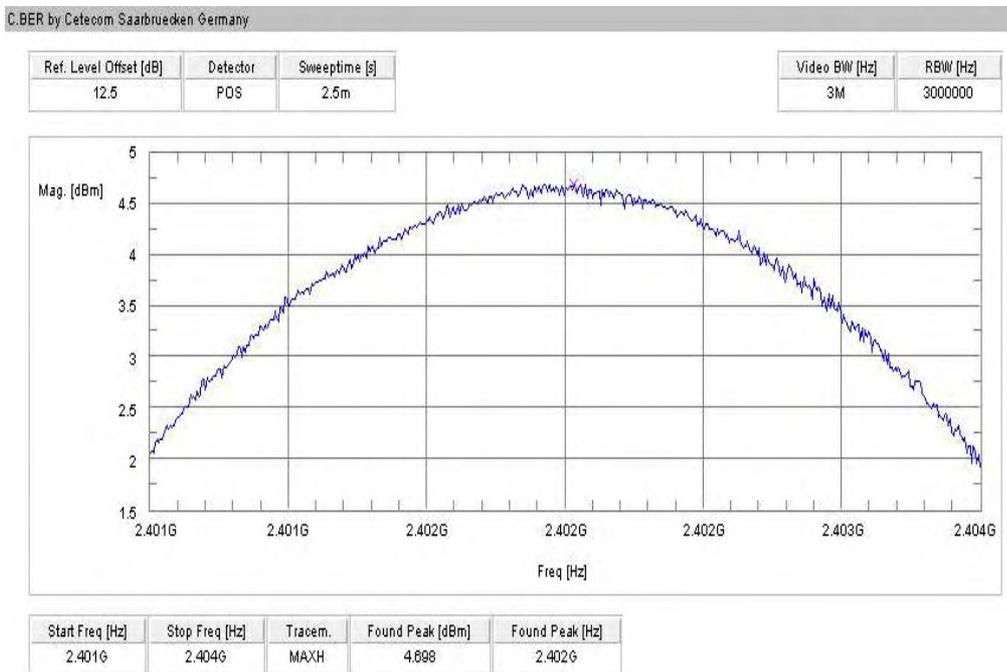
Plot 5: Pi/4 DQPSK



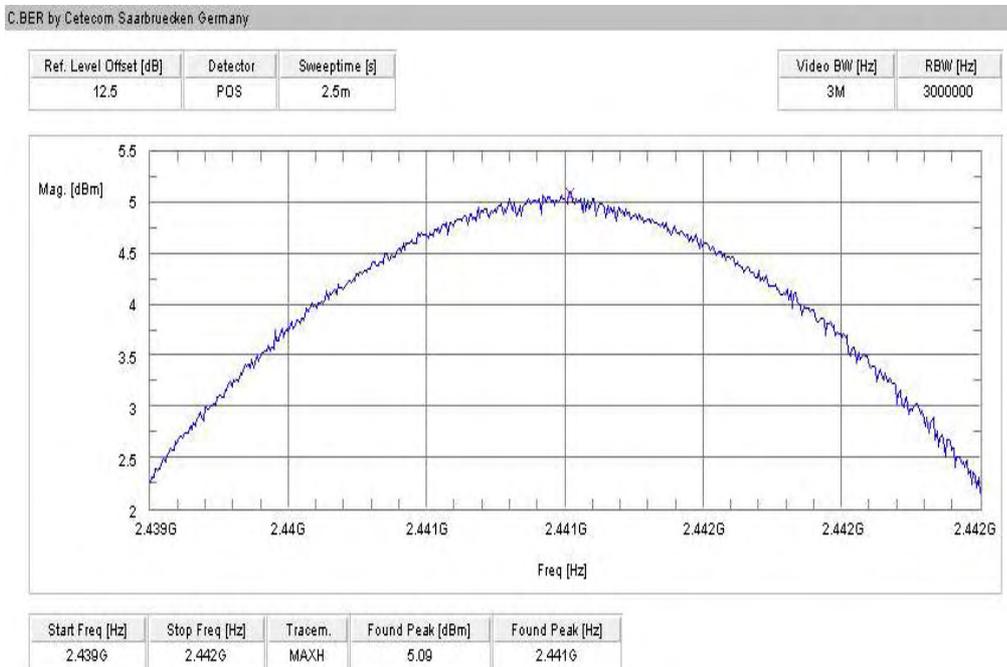
Plot 6: Pi/4 DQPSK



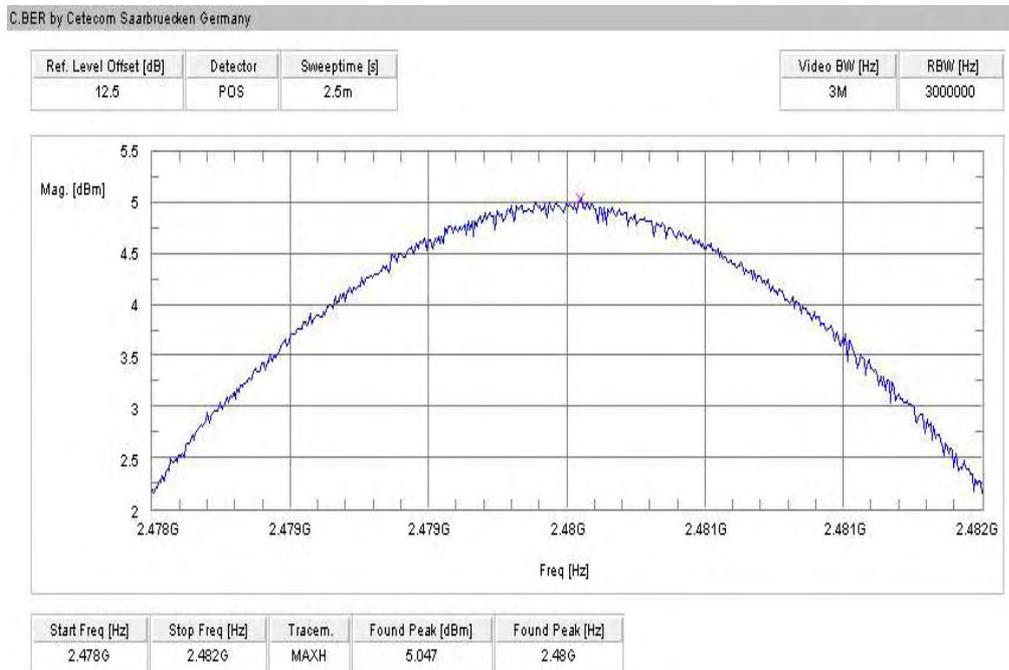
Plot 7: 8DPSK



Plot 8: 8DPSK



Plot 9: 8DPSK



Results:

Modulation	Max. peak output power [dBm]		
	2402	2441	2480
Frequency [MHz]			
<i>GFSK</i>	4.687	5.005	4.938
<i>Pi/4 DQPSK</i>	4.561	4.853	4.799
<i>8DPSK</i>	4.698	5.090	5.047
Measurement uncertainty	±2dB		

RBW / VBW: 3 MHz

Limits:

Under normal test conditions only, for frequency range 2400-2483.5 MHz	Max. 1.0 Watt
--	---------------

**5.11 Max. peak output power (radiated) § 15.247 (b)(1)**

Modulation: GFSK

Results:

Test conditions		Max. peak output power EIRP [dBm]		
Frequency [MHz]		2402	2442	2480
T <sub>nom</sub>	V <sub>nom</sub>	0.730	0.550	0.680
Measurement uncertainty		±3dB		

RBW / VBW: 3 MHz

Measured at a distance of 3m

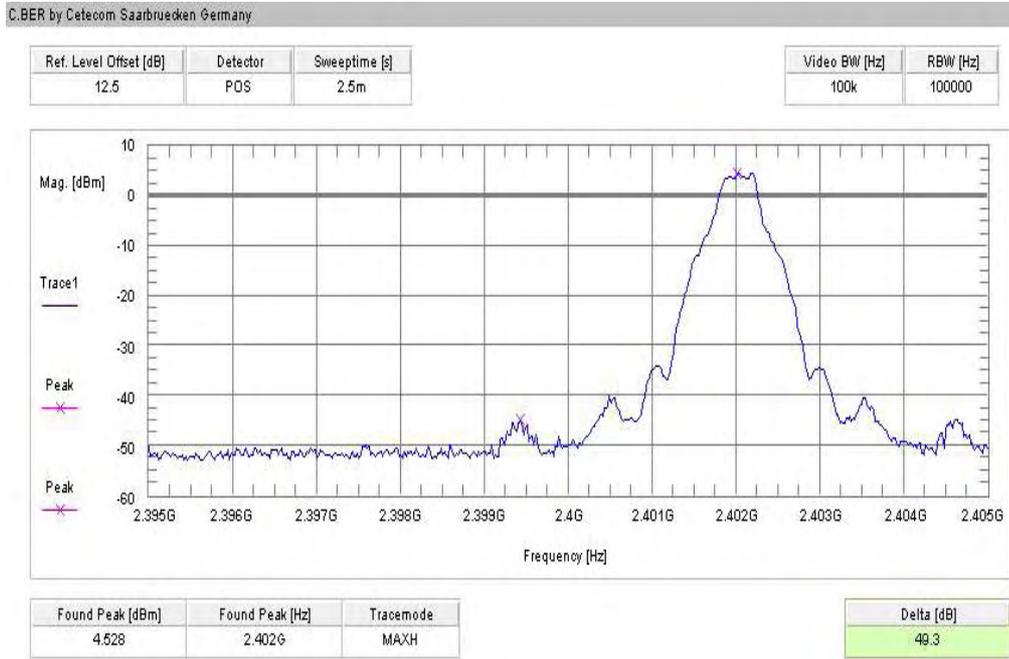
Limits:

Under normal test conditions only, for frequency range 2400-2483.5 MHz	Max. 1.0 Watt
--	---------------

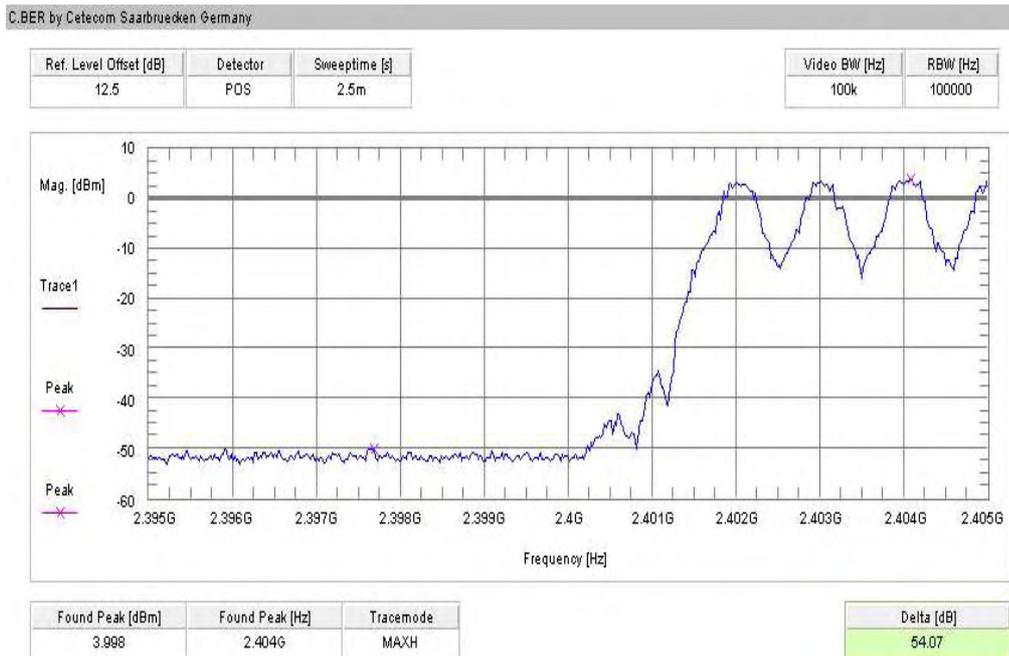
**5.12 Band-edge compliance of conducted emissions §15.247 (d)**

Modulation: GFSK

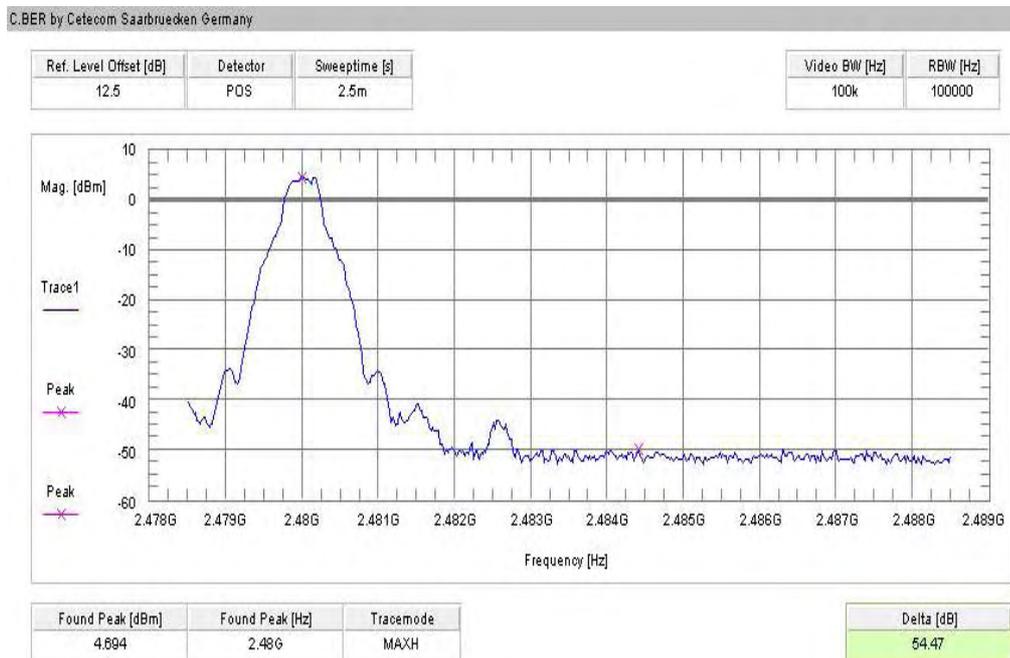
Plot 1 of 4 (hopping off, lowest frequency):



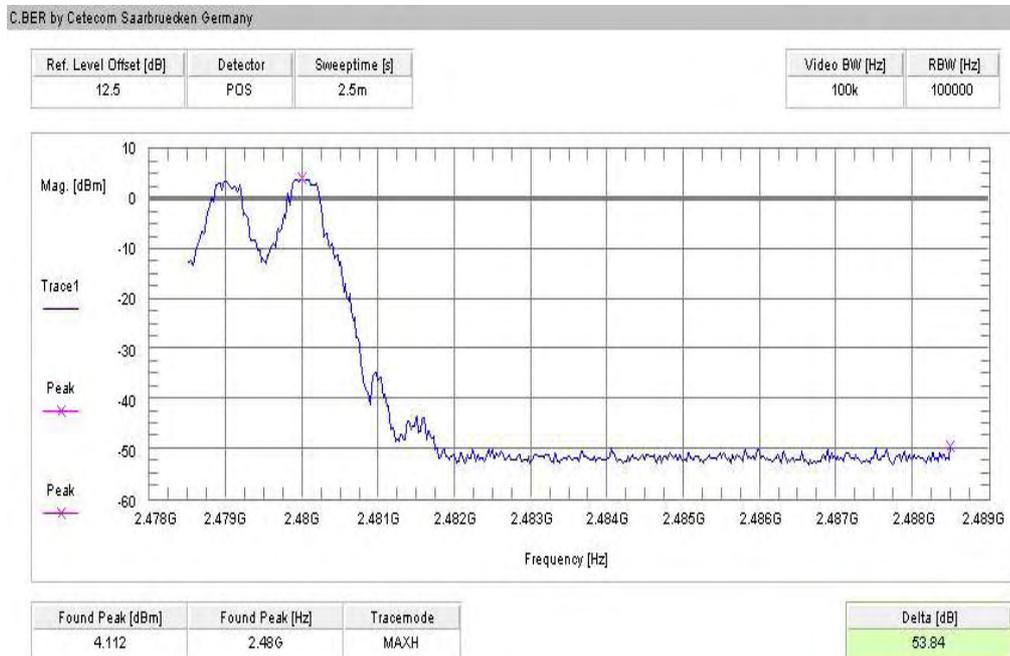
Plot 2 of 4 (hopping on, lowest frequency):



Plot 3 of 4 (hopping off, highest frequency):



Plot 4 of 4 (hopping on, highest frequency):

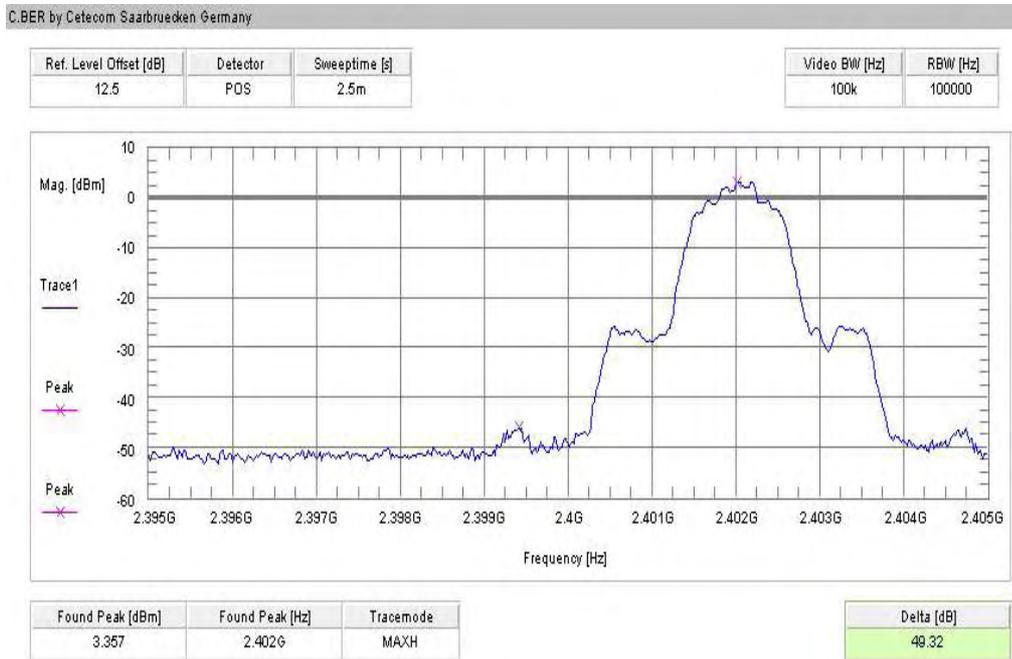


Results:

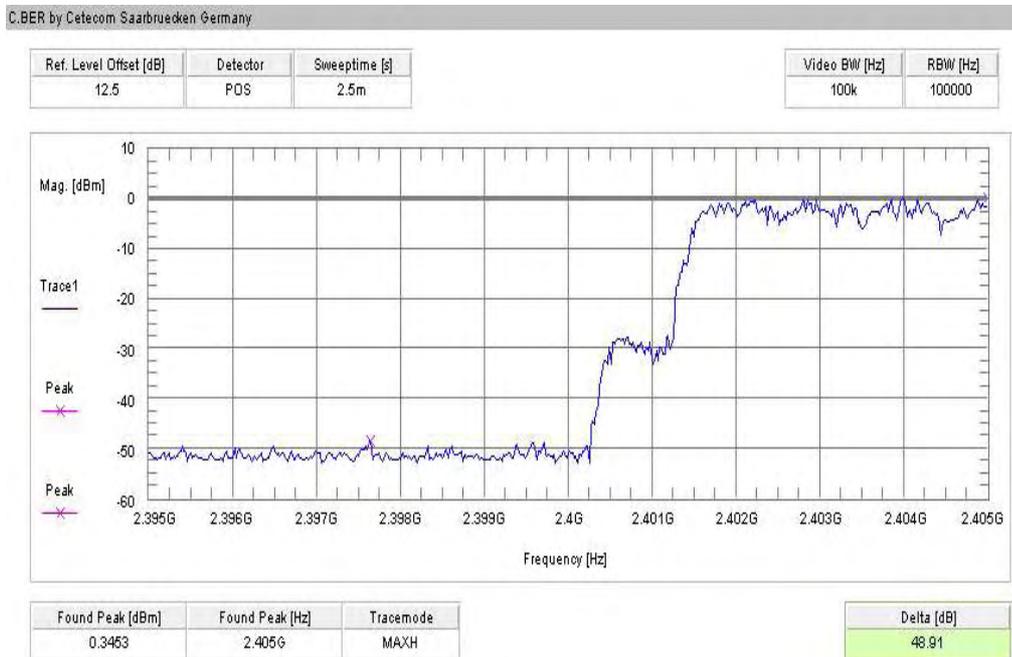
SZENARIO	DELTA VALUE [DB]
hopping off, lowest frequency	> 20 dB
hopping on, lowest frequency	> 20 dB
hopping off, highest frequency	> 20 dB
hopping on, highest frequency	> 20 dB
Measurement uncertainty	±1,5dB

Modulation: Pi/4 DQPSK

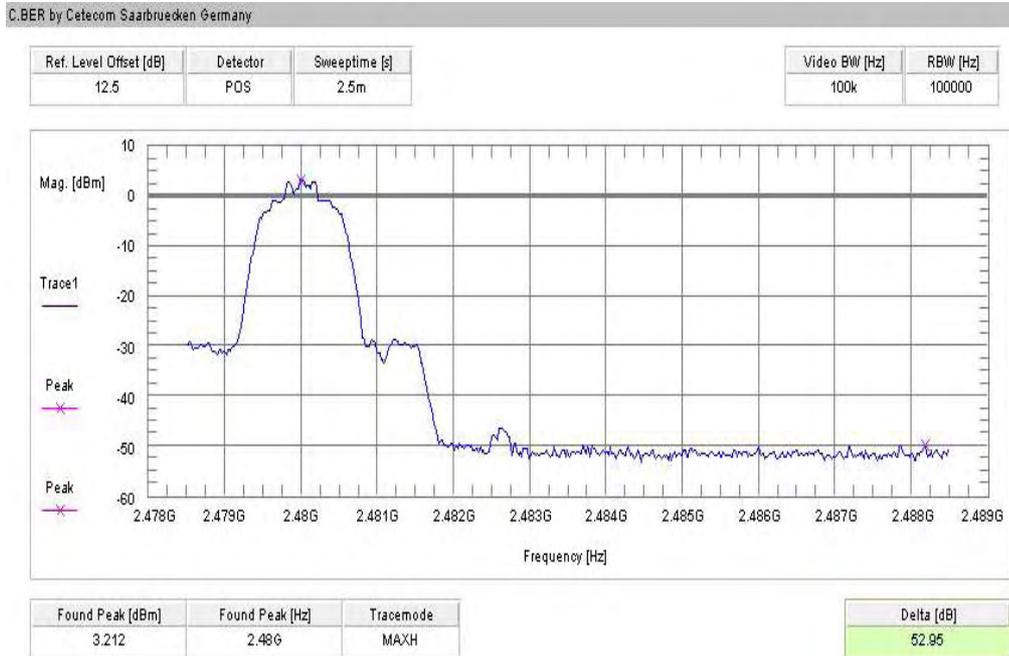
Plot 1 of 4 (hopping off, lowest frequency):



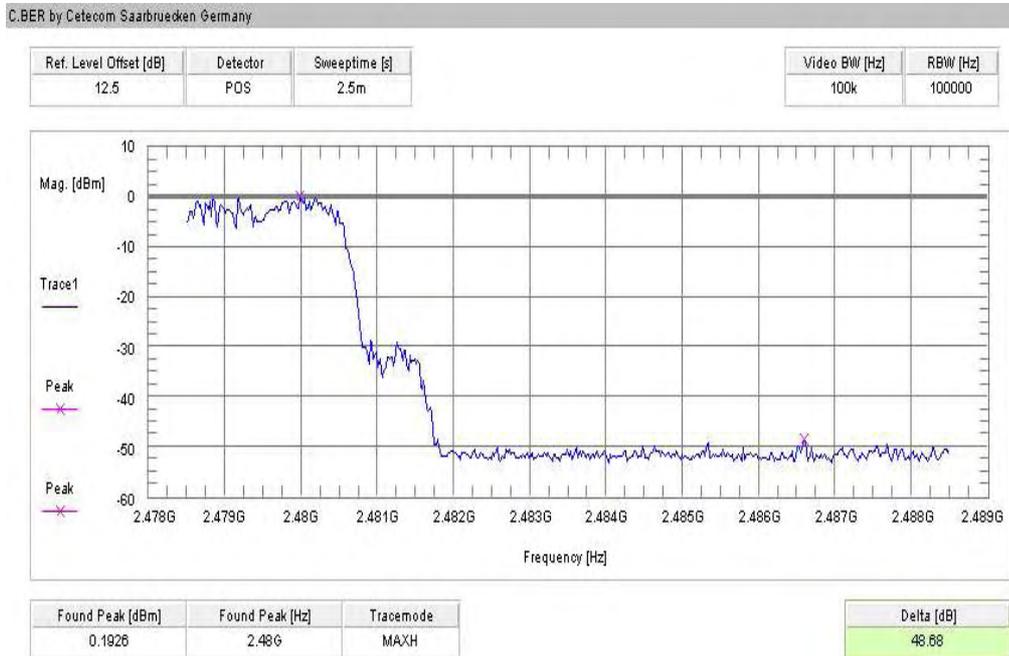
Plot 2 of 4 (hopping on, lowest frequency):



Plot 3 of 4 (hopping off, highest frequency):



Plot 4 of 4 (hopping on, highest frequency):

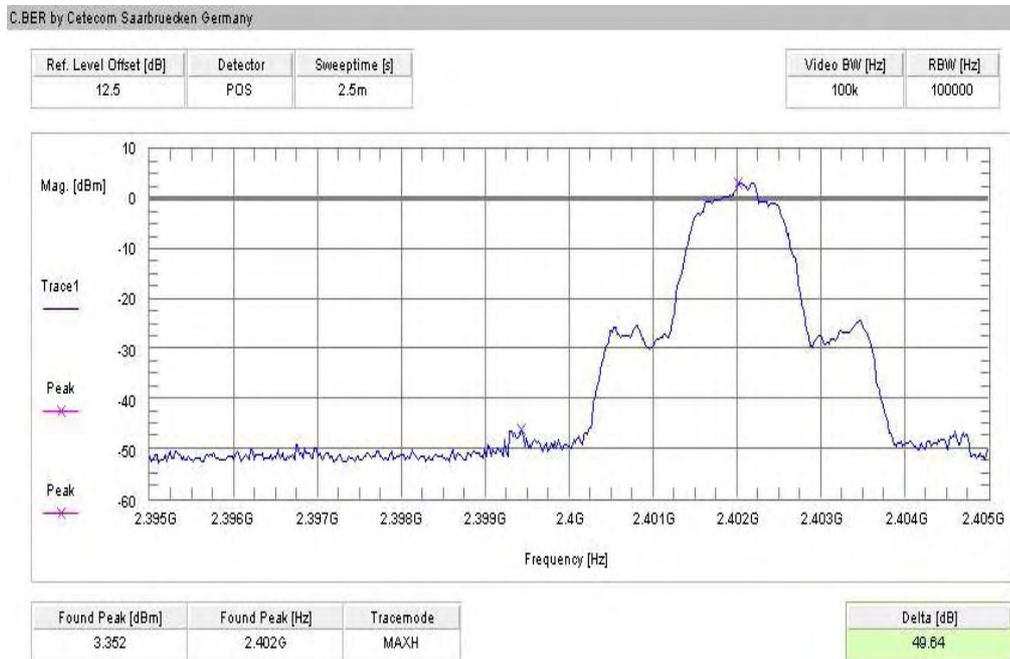


Results:

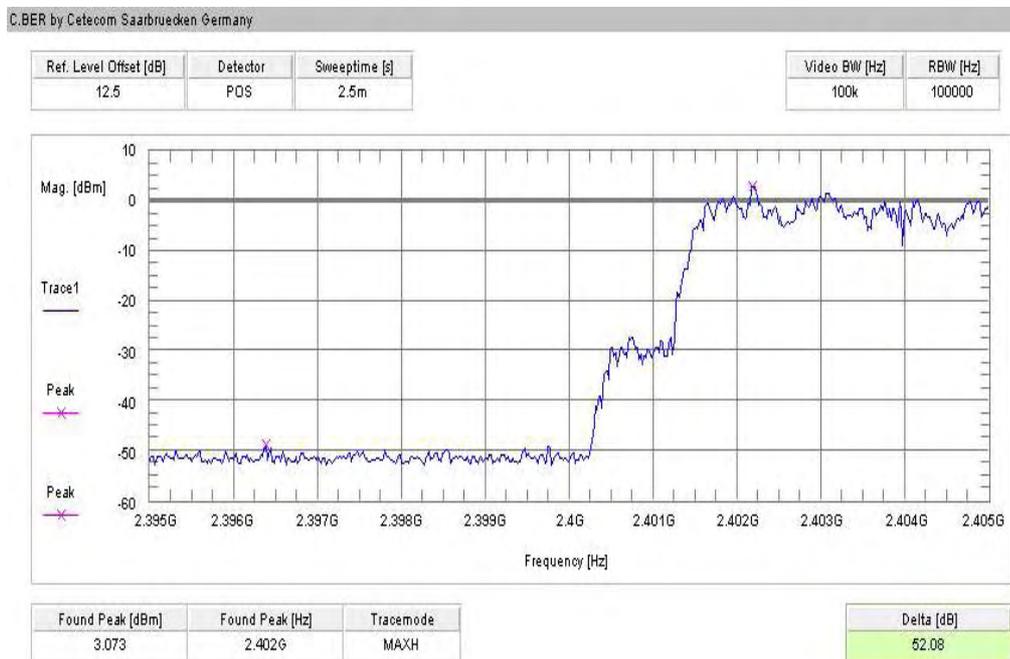
SZENARIO	DELTA VALUE [DB]
hopping off, lowest frequency	> 20 dB
hopping on, lowest frequency	> 20 dB
hopping off, highest frequency	> 20 dB
hopping on, highest frequency	> 20 dB
Measurement uncertainty	±1,5dB

Modulation: 8 DPSK

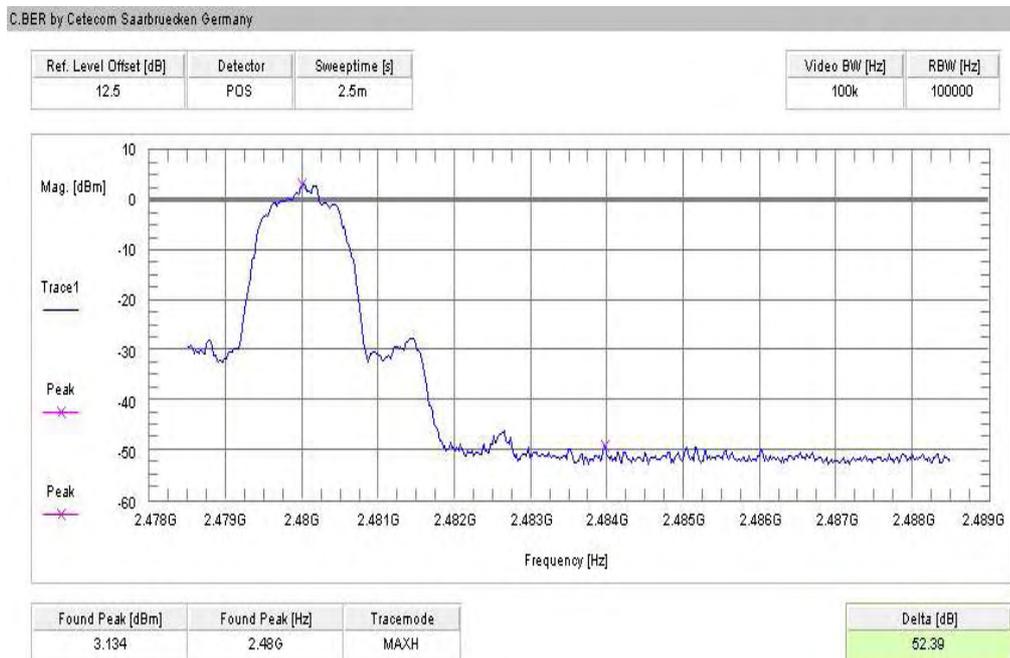
Plot 1 of 4 (hopping off, lowest frequency):



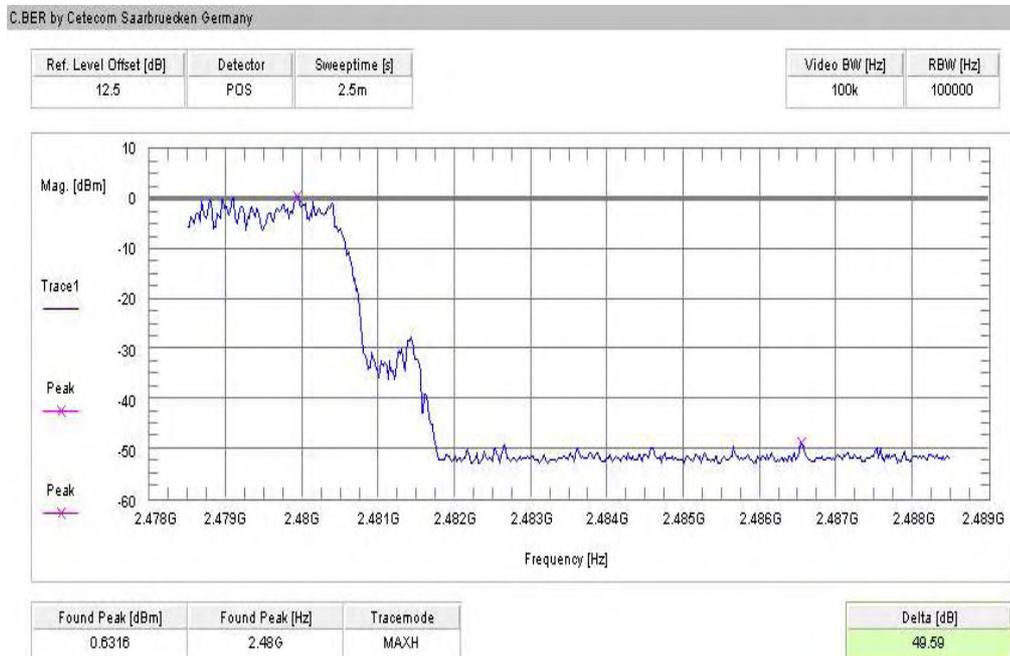
Plot 2 of 4 (hopping on, lowest frequency):



Plot 3 of 4 (hopping off, highest frequency):



Plot 4 of 4 (hopping on, highest frequency):



Results:

SZENARIO	DELTA VALUE [DB]
hopping off, lowest frequency	> 20 dB
hopping on, lowest frequency	> 20 dB
hopping off, highest frequency	> 20 dB
hopping on, highest frequency	> 20 dB
Measurement uncertainty	±1,5dB

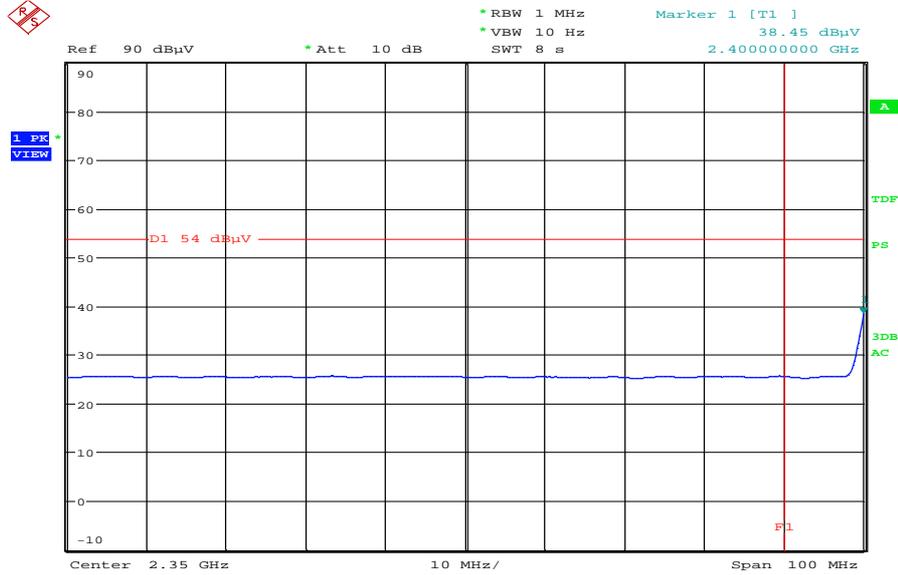
Limits:

Under normal test conditions only	In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 5.205(c)).
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### 5.13 Band-edge compliance of radiated emissions §15.205

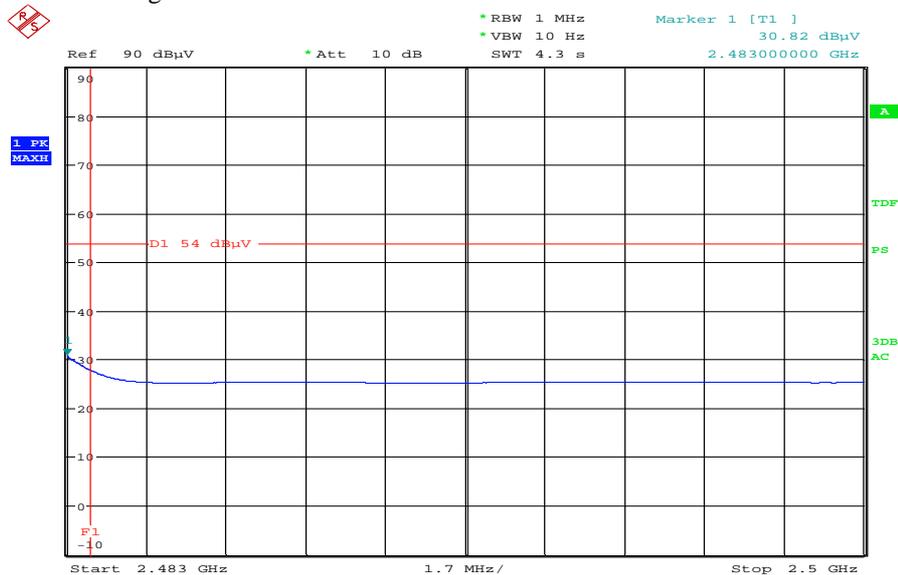
Restricted Bands, Modulation: GFSK

Plot 1: Restricted Band low



Date: 27.JAN.2009 18:13:00

Plot 2: Restricted Band high

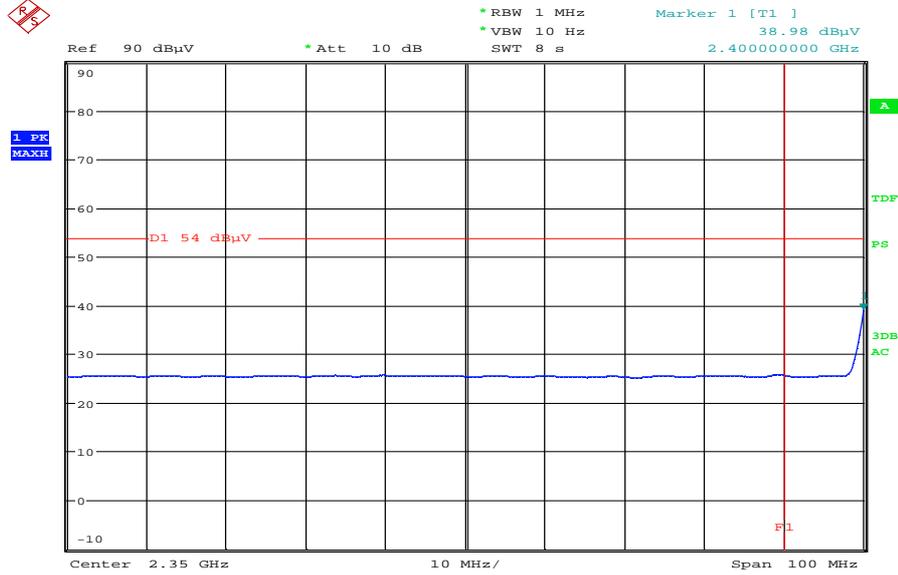


Date: 27.JAN.2009 18:18:37

Limit: 54 dB $\mu$ V/m			Verdict: Complies
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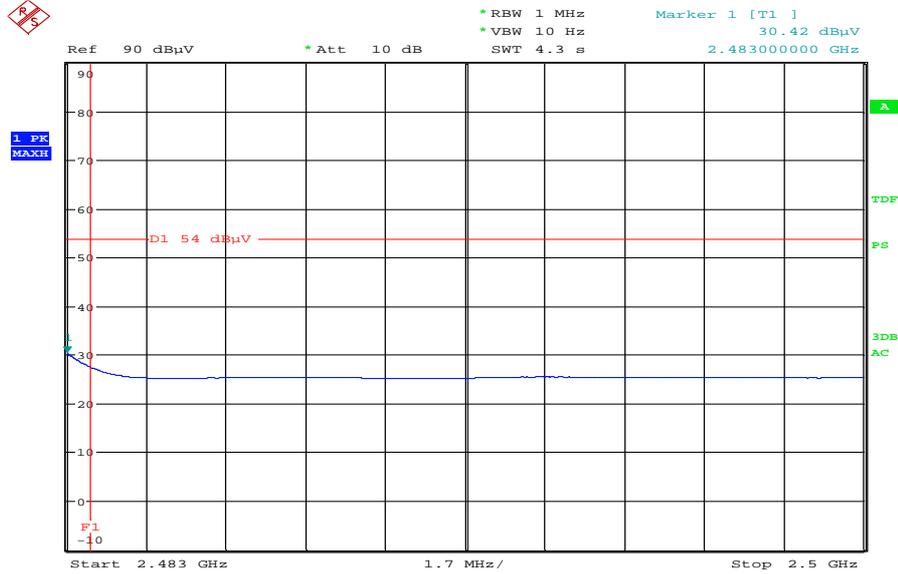
Restricted Bands, Modulation: Pi/4 DQPSK

Plot 3: Restricted Band low



Date: 27.JAN.2009 18:14:02

Plot 4: Restricted Band high

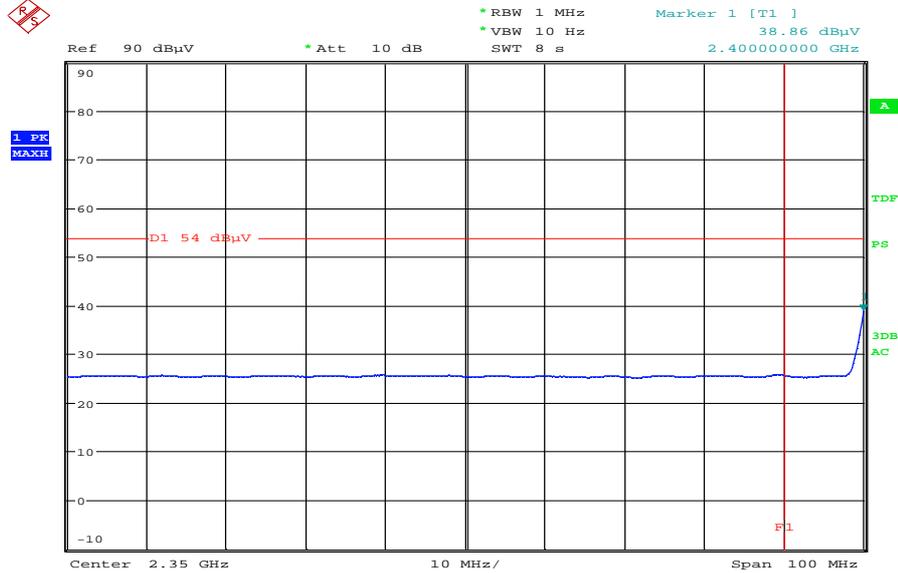


Date: 27.JAN.2009 18:18:08

Limit: 54 dBμV/m			Verdict: Complies
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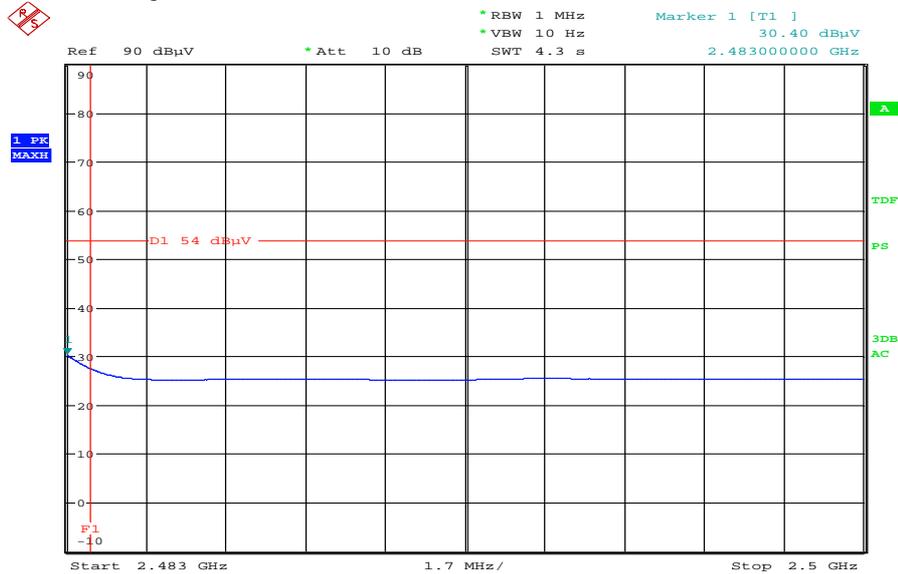
Restricted Bands, Modulation: 8DPSK

Plot 5: Restricted Band low



Date: 27.JAN.2009 18:14:46

Plot 6: Restricted Band high



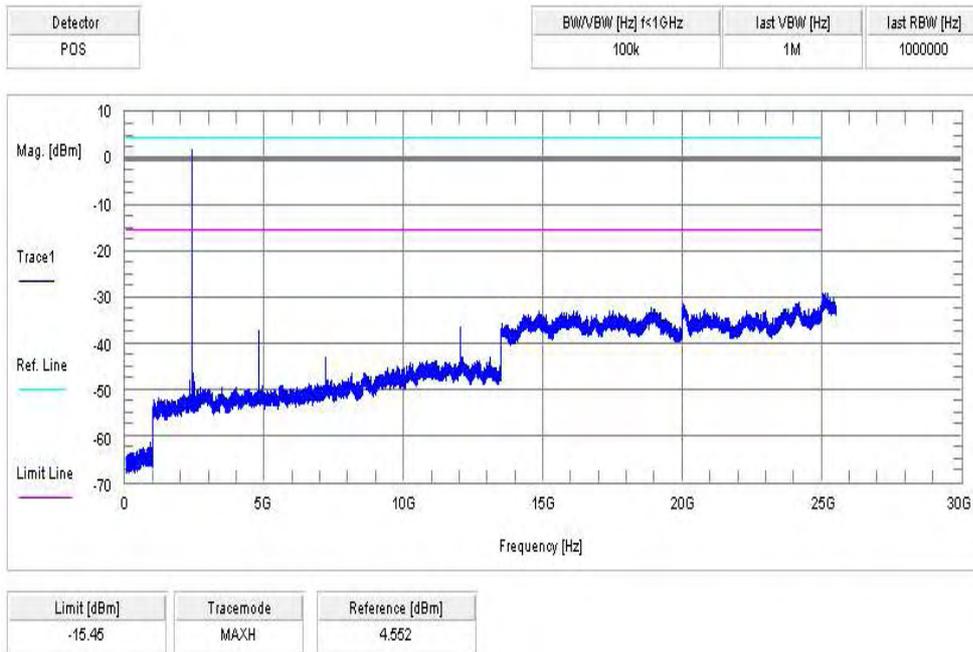
Date: 27.JAN.2009 18:17:38

Limit: 54 dBμV/m			Verdict: Complies
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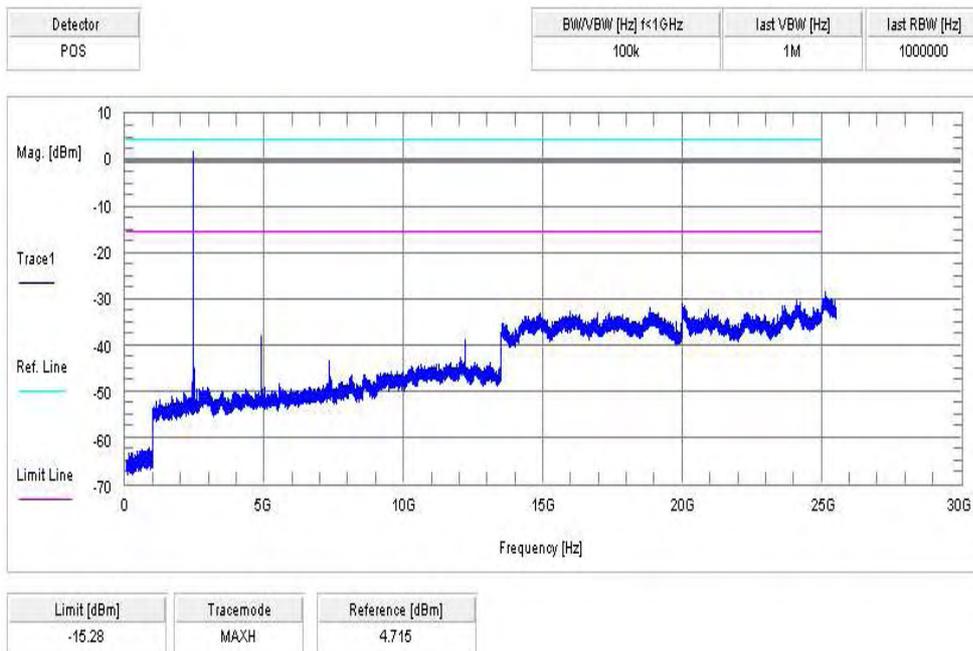
5.14 Spurious Emissions - conducted (Transmitter) § 15.247 (c)(1)

Modulation: GFSK

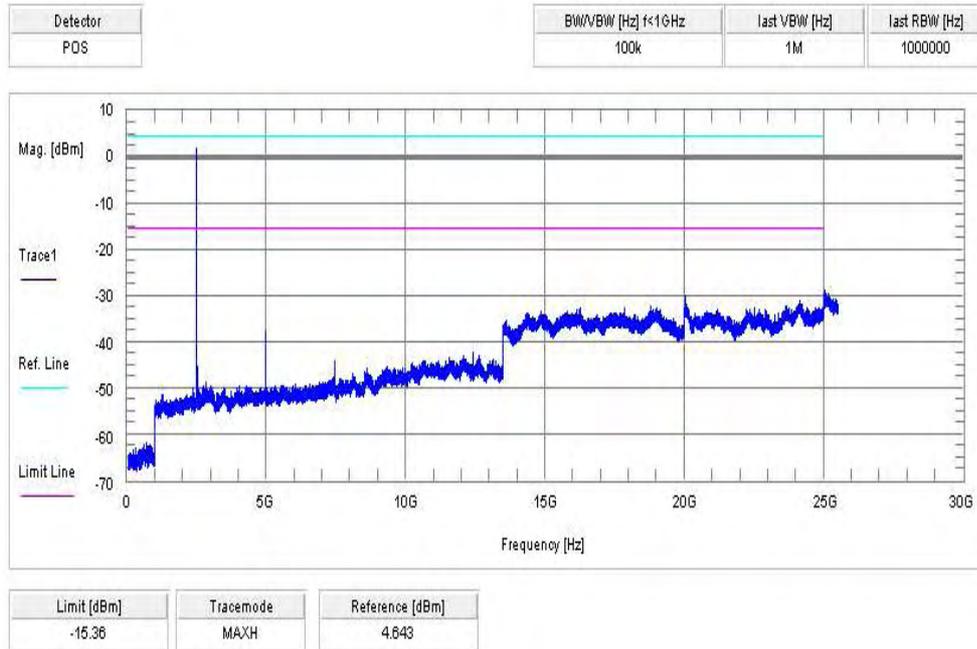
Plot 1 of 3: lowest channel



Plot 2 of 3: middle channel



Plot 3 of 3: highest channel



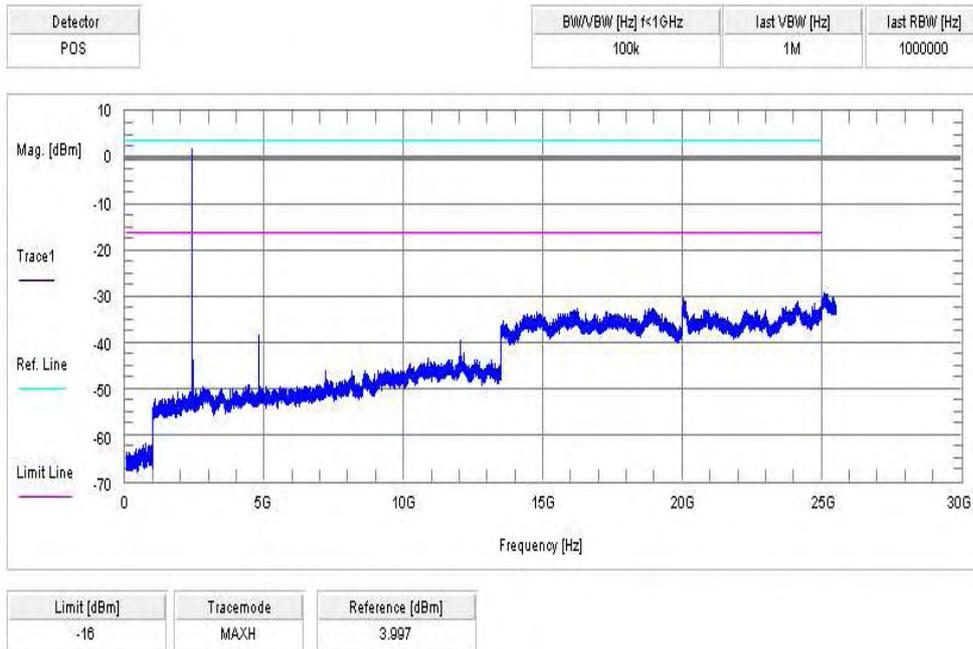
Result & Limits:

Emission Limitation					
f [MHz]		amplitude of emission [dBm]	limit max. allowed emission power	actual attenuation below frequency of operation [dB]	results
2402		4.552	30 dBm		Operating frequency
			-20 dBc	No critical peaks found (see Plots)	complies
				No critical peaks found (see Plots)	complies
2441		4.715	30 dBm		Operating frequency
			-20 dBc	No critical peaks found (see Plots)	complies
				No critical peaks found (see Plots)	complies
2480		4.643	30 dBm		Operating frequency
			-20 dBc	No critical peaks found (see Plots)	complies
				No critical peaks found (see Plots)	complies
Measurement uncertainty			± 3dB		

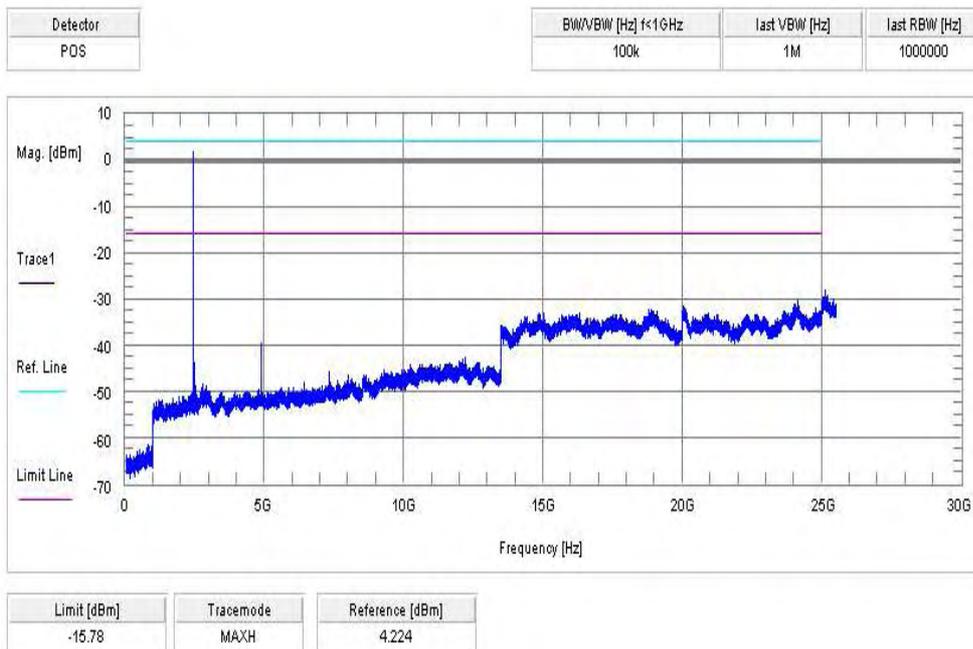
F < 1 GHz: RBW: 100 kHz VBW: 100 kHz  
 F > 1 GHz: RBW: 1 MHz VBW: 1 MHz

*Modulation: Pi/4 DQPSK*

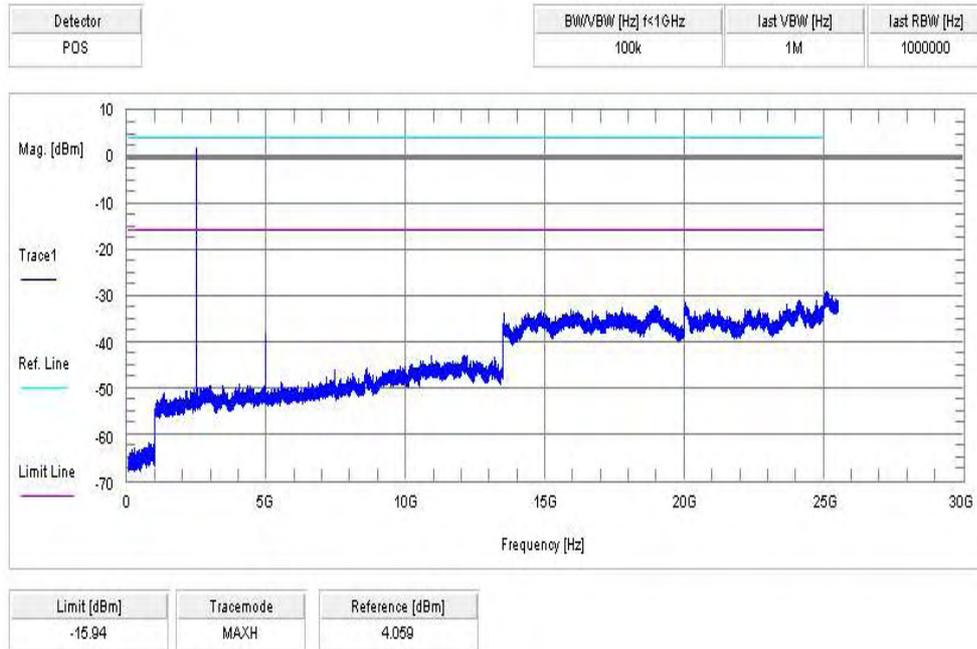
Plot 1 of 3: lowest channel



Plot 2 of 3: middle channel



Plot 3 of 3: highest channel



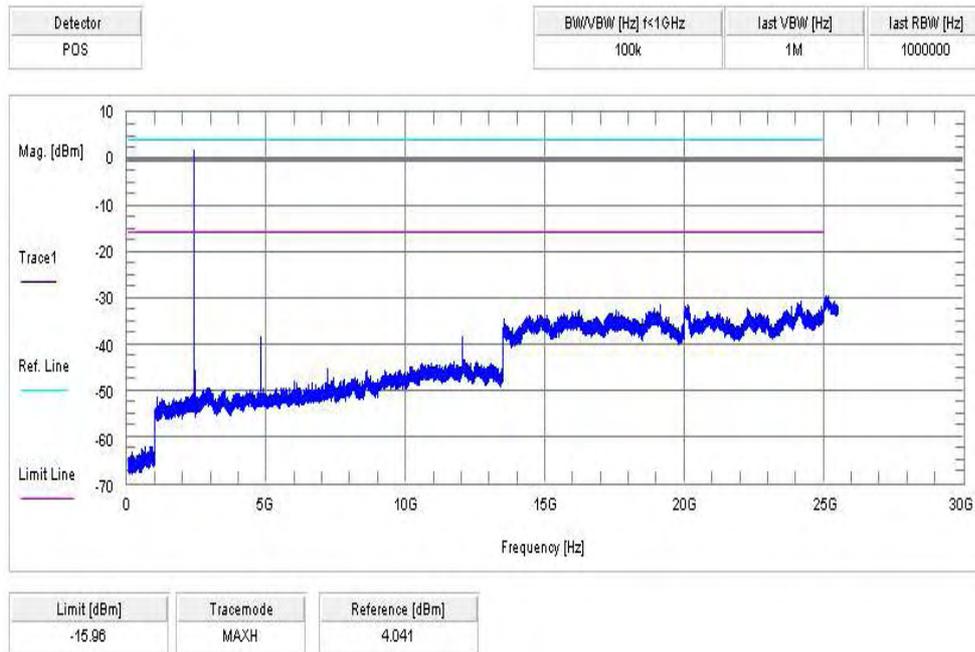
Result & Limits:

Emission Limitation					
f [MHz]		amplitude of emission [dBm]	limit max. allowed emission power	actual attenuation below frequency of operation [dB]	results
2402		3.997	30 dBm		Operating frequency
			-20 dBc	No critical peaks found (see Plots)	complies
				No critical peaks found (see Plots)	complies
2441		4.224	30 dBm		Operating frequency
			-20 dBc	No critical peaks found (see Plots)	complies
				No critical peaks found (see Plots)	complies
2480		4.059	30 dBm		Operating frequency
			-20 dBc	No critical peaks found (see Plots)	complies
				No critical peaks found (see Plots)	complies
Measurement uncertainty			± 3dB		

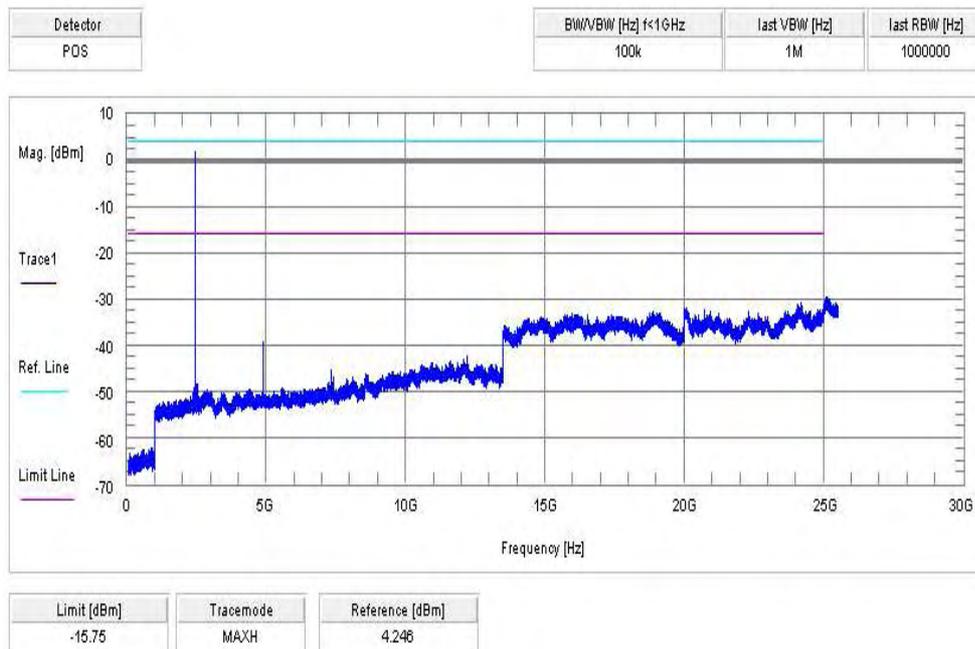
F < 1 GHz: RBW: 100 kHz VBW: 100 kHz  
 F > 1 GHz: RBW: 1 MHz VBW: 1 MHz

Modulation: 8 DPSK

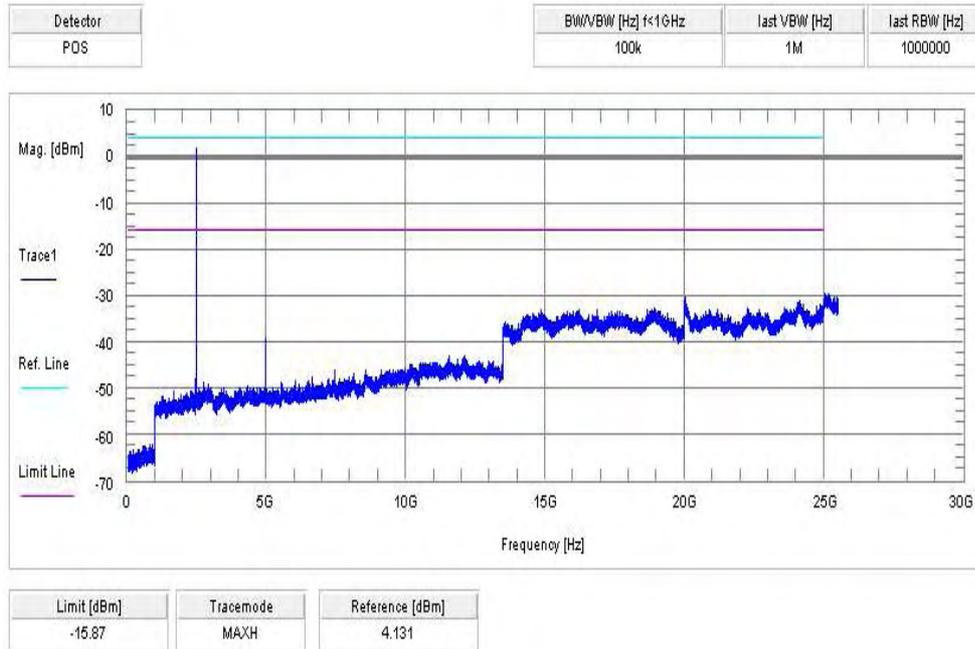
Plot 1 of 3: lowest channel



Plot 2 of 3: middle channel



Plot 3 of 3: highest channel



Result & Limits:

Emission Limitation					
f [MHz]		amplitude of emission [dBm]	limit max. allowed emission power	actual attenuation below frequency of operation [dB]	results
2402		4.061	30 dBm		Operating frequency
			-20 dBc	No critical peaks found (see Plots)	complies
				No critical peaks found (see Plots)	complies
2441		4.246	30 dBm		Operating frequency
			-20 dBc	No critical peaks found (see Plots)	complies
				No critical peaks found (see Plots)	complies
2480		4.131	30 dBm		Operating frequency
			-20 dBc	No critical peaks found (see Plots)	complies
				No critical peaks found (see Plots)	complies
Measurement uncertainty			± 3dB		

F < 1 GHz: RBW: 100 kHz VBW: 100 kHz  
 F > 1 GHz: RBW: 1 MHz VBW: 1 MHz

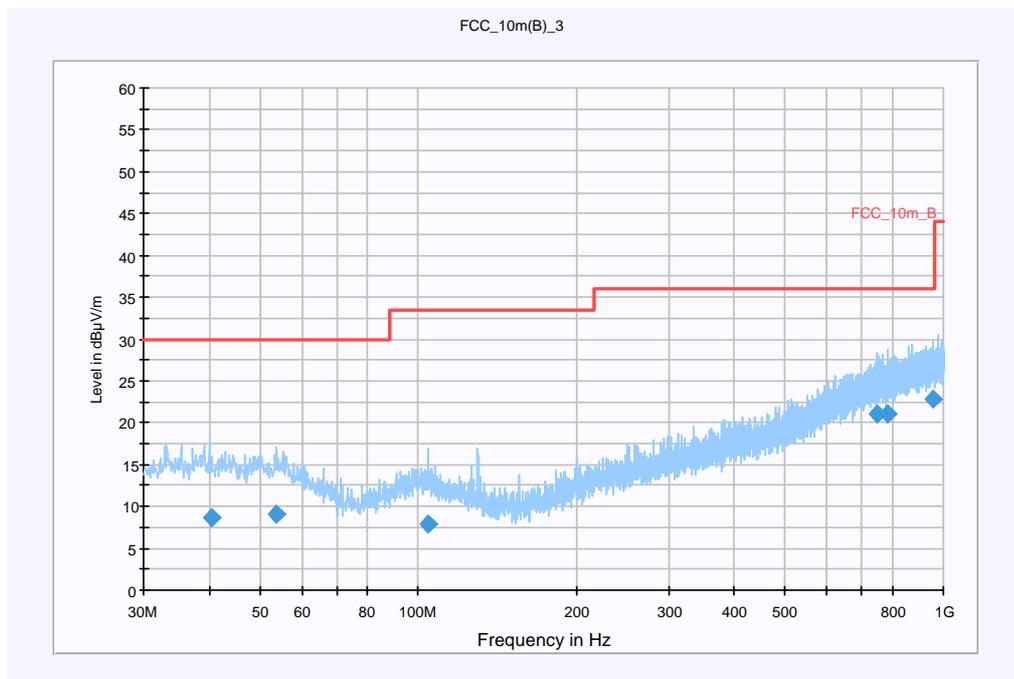
Under normal test conditions only	In any 100 kHz bandwidth outside the frequency band at least 20dB below the highest level of the desired power. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).
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Note: For emissions that fall into restricted bands you find the radiated emissions later in the report.

**5.15 Spurious Emissions > 30 MHz- radiated (Transmitter) § 15.247 (c)(1)**

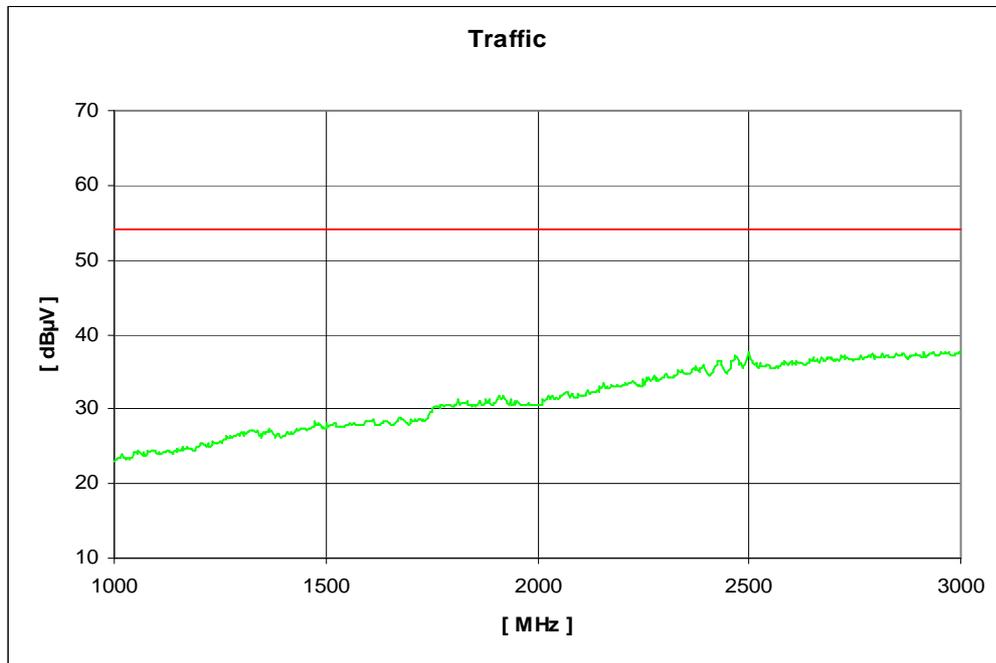
Modulation: GFSK

Plot 1: 0.03 - 1 GHz vertical/horizontal (lowest channel)



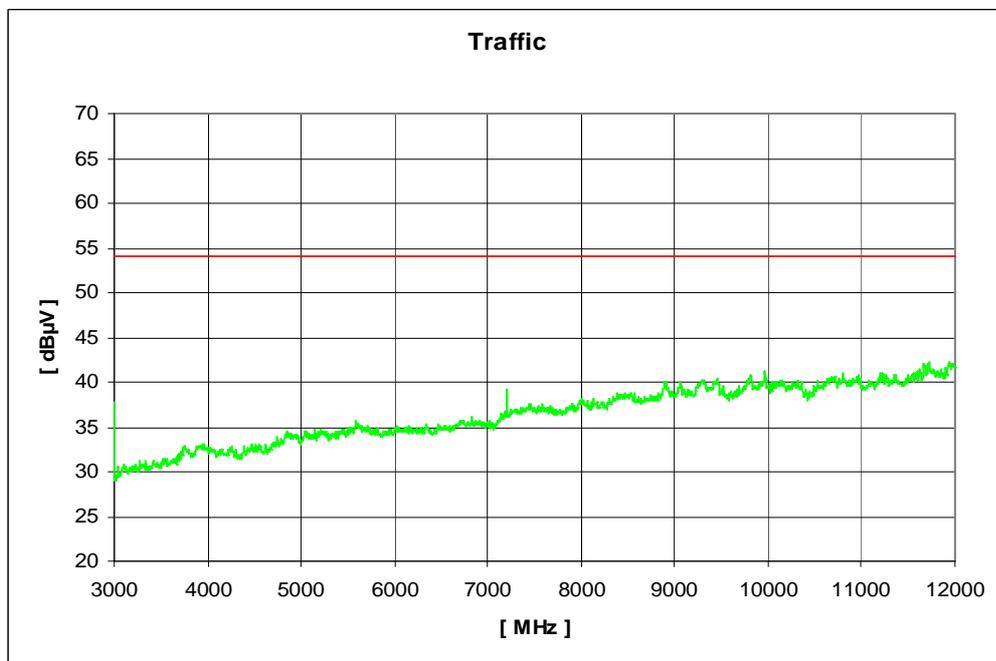
Frequency (MHz)	QuasiPeak (dBµ V/m)	Meas. Time (ms)	Bandwidth (kHz)	Antenna height (cm)	Polarity	Turntable position (deg)	Corr. (dB)	Margin (dB)	Limit (dBµ V/m)
37.775550	9.5	15000.000	120.000	220.0	H	204.0	13.4	20.5	30.0
103.648700	10.9	15000.000	120.000	118.0	V	249.0	12.0	22.6	33.5
130.010800	15.1	15000.000	120.000	119.0	V	21.0	9.7	18.4	33.5
692.428550	19.7	15000.000	120.000	150.0	V	126.0	22.8	16.3	36.0
788.521100	21.0	15000.000	120.000	163.0	V	176.0	24.3	15.0	36.0
904.087600	22.5	15000.000	120.000	220.0	V	13.0	25.7	13.5	36.0

Plot 2: 1 - 3 GHz vertical/horizontal (lowest channel)

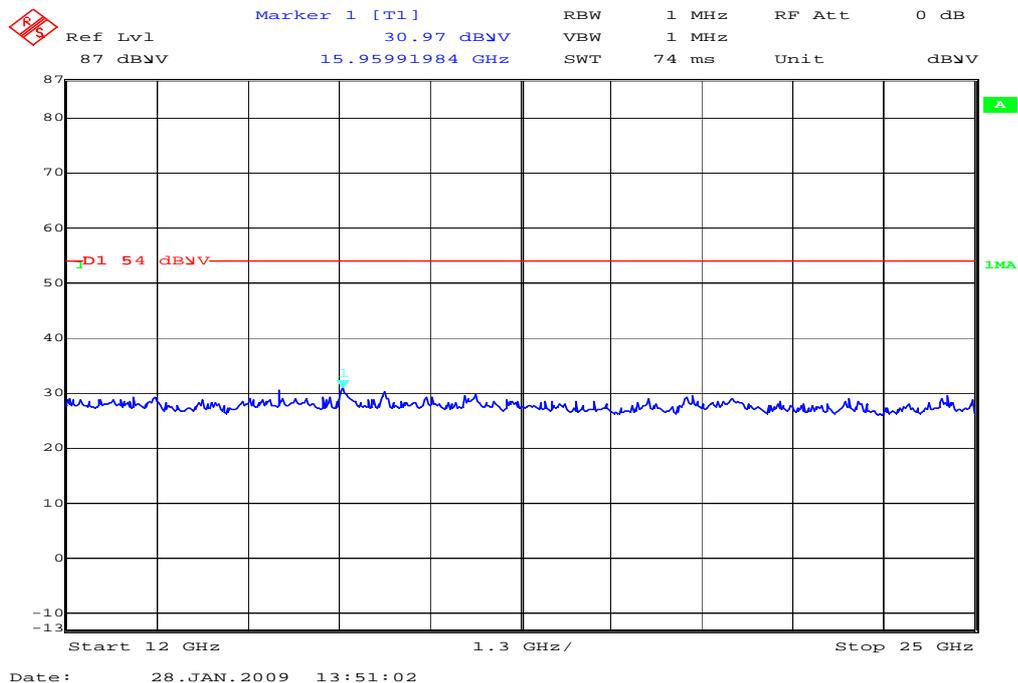


Signal suppressed with a 2.4 GHz band rejection filter

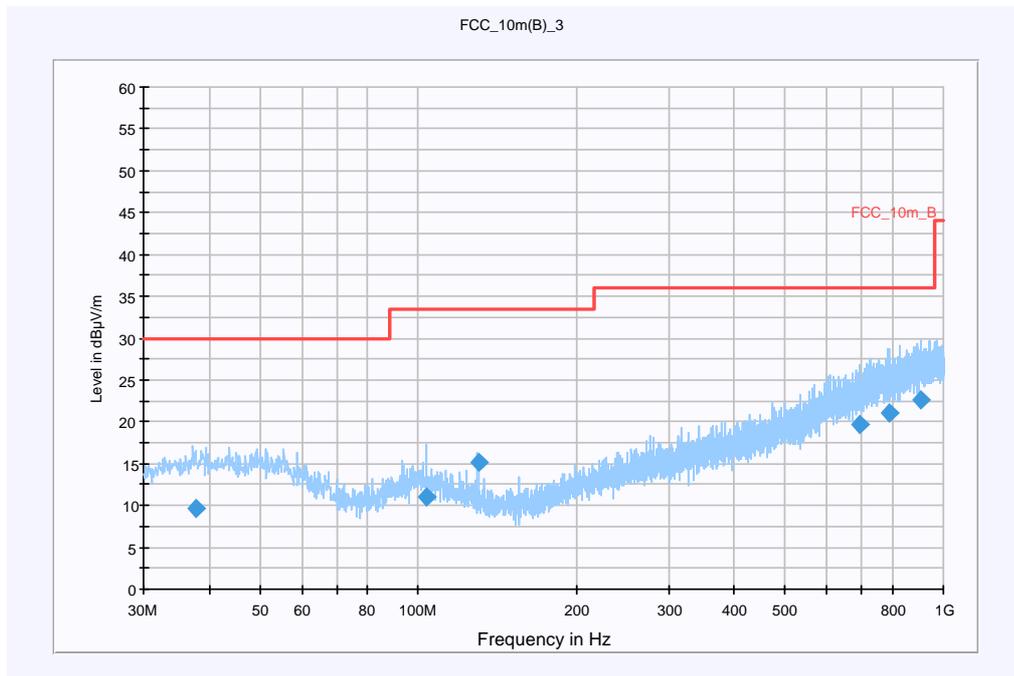
Plot 3: 3 - 12 GHz vertical/horizontal (lowest channel)



Plot 4: 12 - 25 GHz vertical/horizontal (valid for all channels)



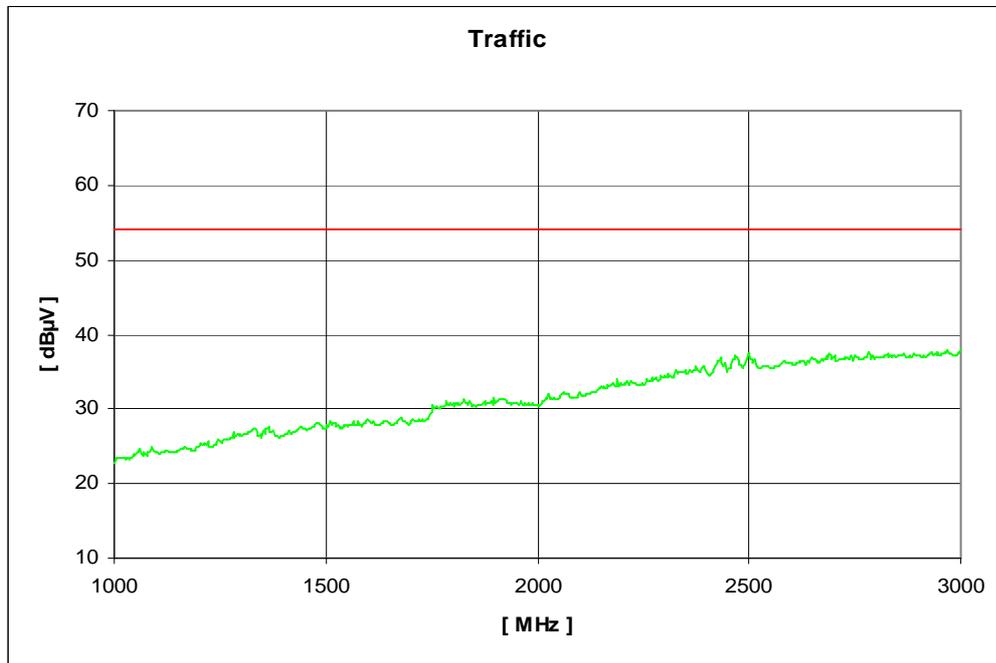
Plot 5: 0.03 - 1 GHz vertical/horizontal (middle channel)



**Final Result 1**

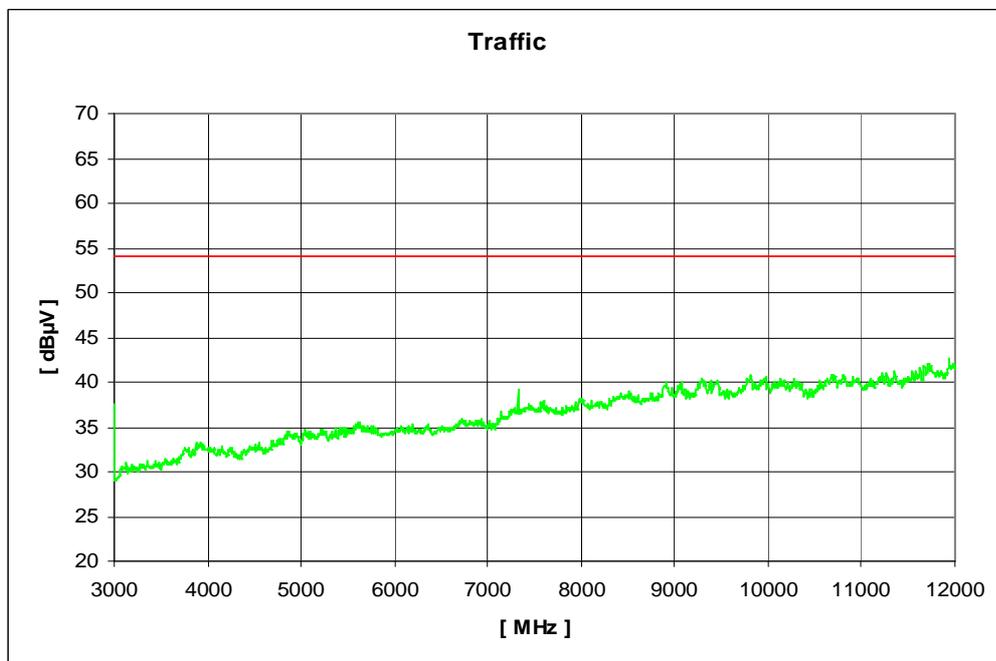
Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Antenna height (cm)	Polarity	Turntable position (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
37.775550	9.5	15000.000	120.000	220.0	H	204.0	13.4	20.5	30.0
103.648700	10.9	15000.000	120.000	118.0	V	249.0	12.0	22.6	33.5
130.010800	15.1	15000.000	120.000	119.0	V	21.0	9.7	18.4	33.5
692.428550	19.7	15000.000	120.000	150.0	V	126.0	22.8	16.3	36.0
788.521100	21.0	15000.000	120.000	163.0	V	176.0	24.3	15.0	36.0
904.087600	22.5	15000.000	120.000	220.0	V	13.0	25.7	13.5	36.0

Plot 6: 1 - 3 GHz vertical/horizontal (middle channel)

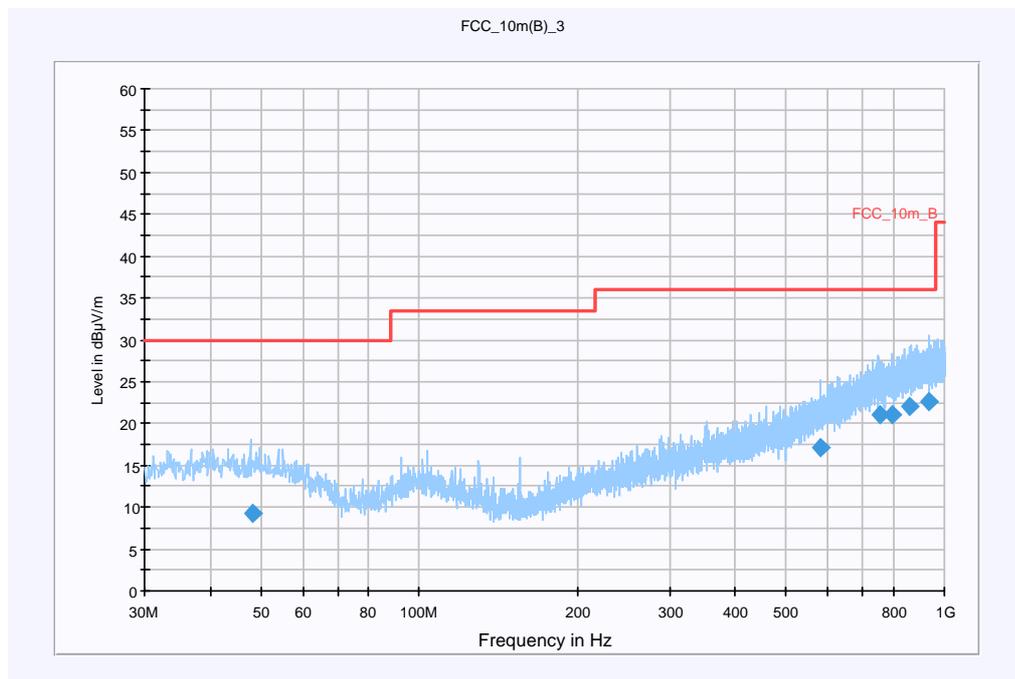


Signal suppressed with a 2.4 GHz band rejection filter

Plot 7: 3- 12 GHz vertical/horizontal (middle channel)



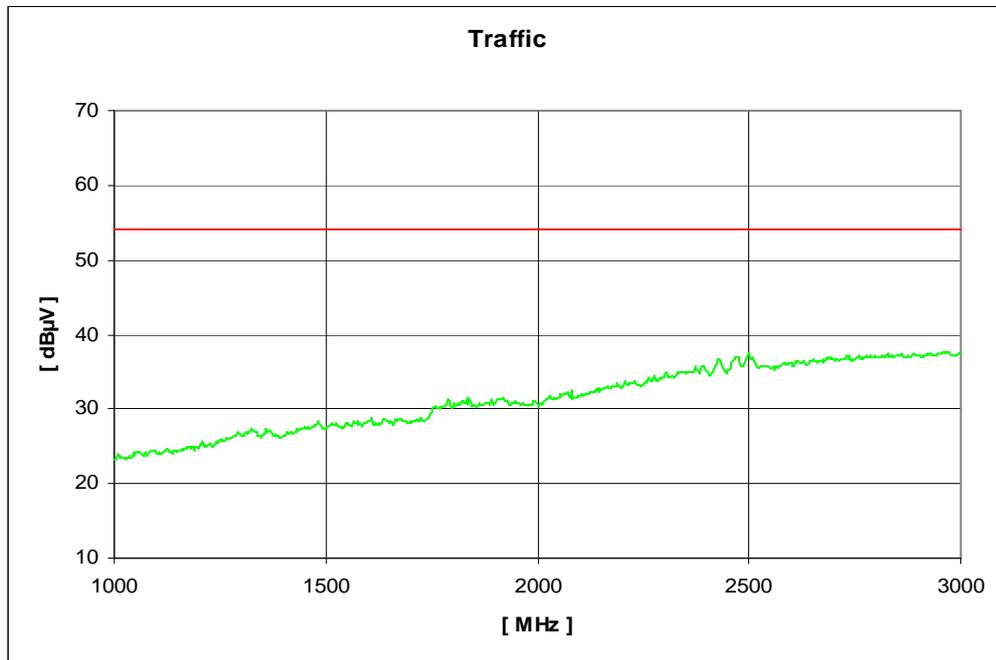
Plot 8: 0.03 - 1 GHz vertical/horizontal (highest channel)



**Final Result 1**

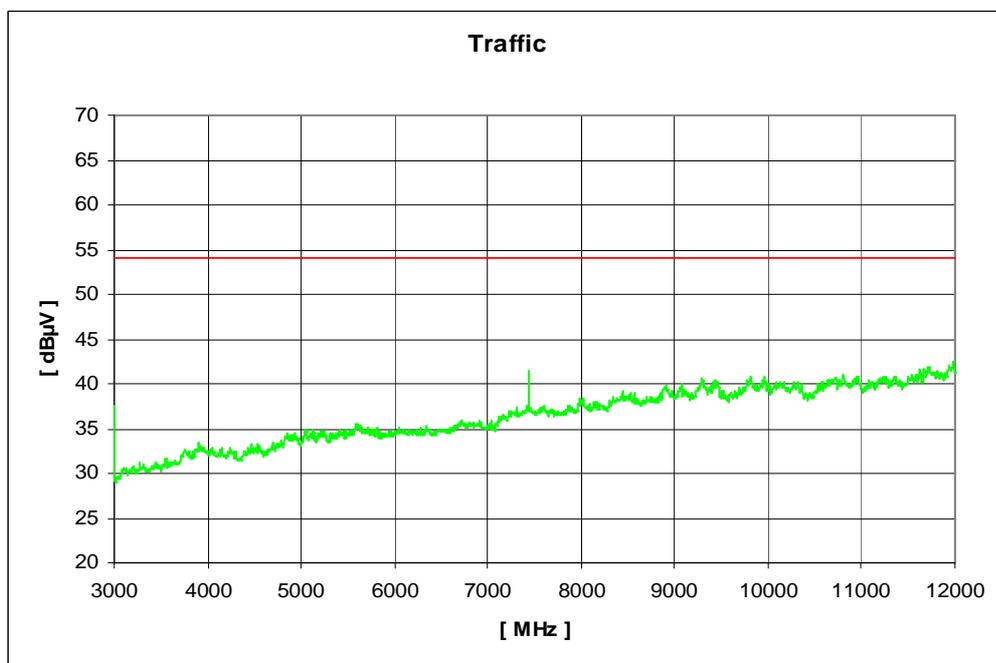
Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Antenna height (cm)	Polarity	Turntable position (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
48.283150	9.3	15000.000	120.000	143.0	H	141.0	13.5	20.7	30.0
581.869750	17.2	15000.000	120.000	115.0	H	210.0	20.9	18.8	36.0
750.435350	21.0	15000.000	120.000	220.0	H	235.0	24.2	15.0	36.0
795.774400	21.1	15000.000	120.000	138.0	H	102.0	24.3	14.9	36.0
857.583150	22.1	15000.000	120.000	100.0	H	129.0	25.2	13.9	36.0
931.615500	22.7	15000.000	120.000	148.0	H	203.0	25.8	13.3	36.0

Plot 9: 1 - 3 GHz vertical/horizontal (highest channel)



Signal suppressed with a 2.4 GHz band rejection filter

Plot 10: 3 - 12 GHz vertical/horizontal (highest channel)



Results:

SPURIOUS EMISSIONS LEVEL (dB $\mu$ V/m)								
2402 MHz			2441 MHz			2480 MHz		
F [MHz]	Detector	Level [dB $\mu$ V/m]	F [MHz]	Detector	Level [dB $\mu$ V/m]	F [MHz]	Detector	Level [dB $\mu$ V/m]
No critical peaks found								
Measurement uncertainty			±3 dB					

f < 1 GHz : RBW/VBW: 100 kHz

f ≥ 1GHz : RBW/VBW: 1 MHz

Limits: § 15.247 (c)

In any 100 kHz bandwidth outside the frequency band at least 20dB below the highest level of the desired 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)).

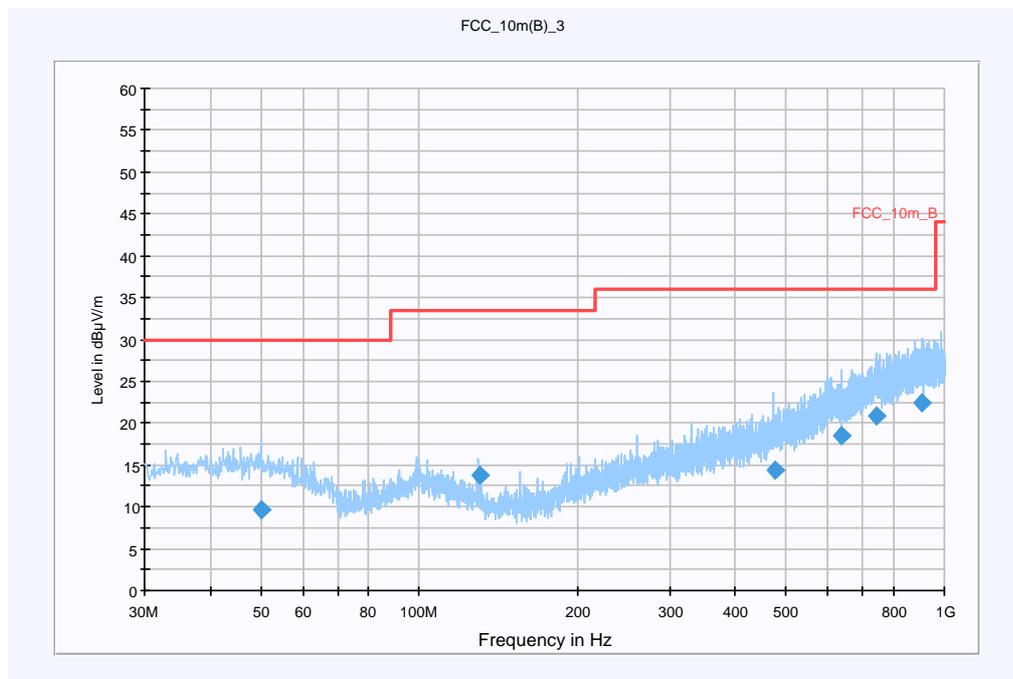
Limits: § 15.209

Frequency [MHz]	Field strength [ $\mu$ V/m]	Measurement distance (m)
30 - 88	100 (40 dB $\mu$ V/m)	3
88 - 216	150 (43.5 dB $\mu$ V/m)	3
216 - 960	200 (46 dB $\mu$ V/m)	3
above 960	500 (54 dB $\mu$ V/m)	3

### 5.16 Spurious Emissions - radiated (Receiver) § 15.109

Modulation: GFSK

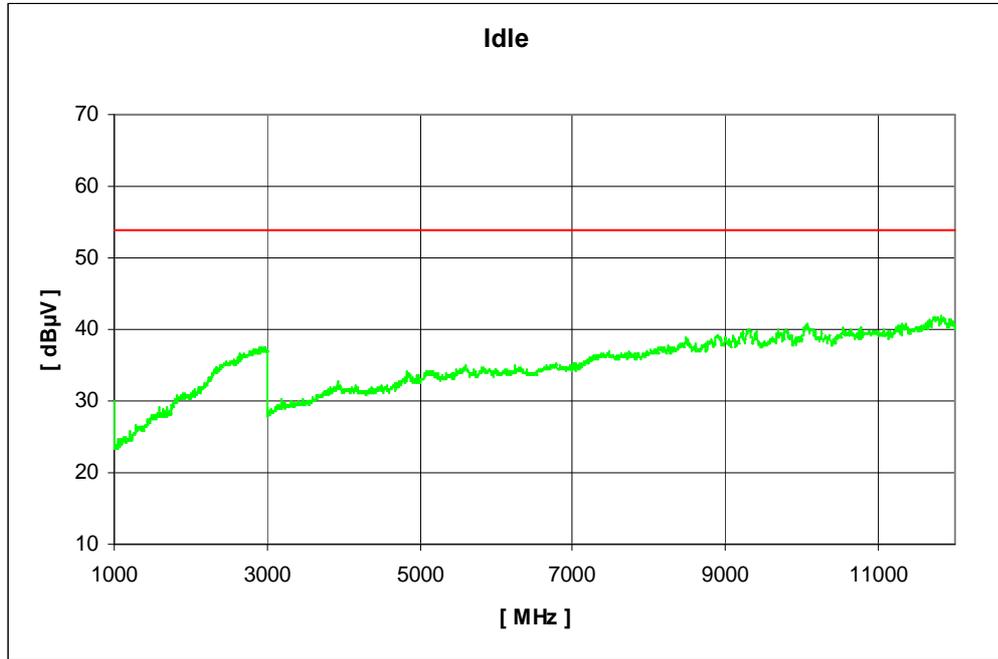
Plot 1: 0.03 - 1 GHz vertical/horizontal (receiver)



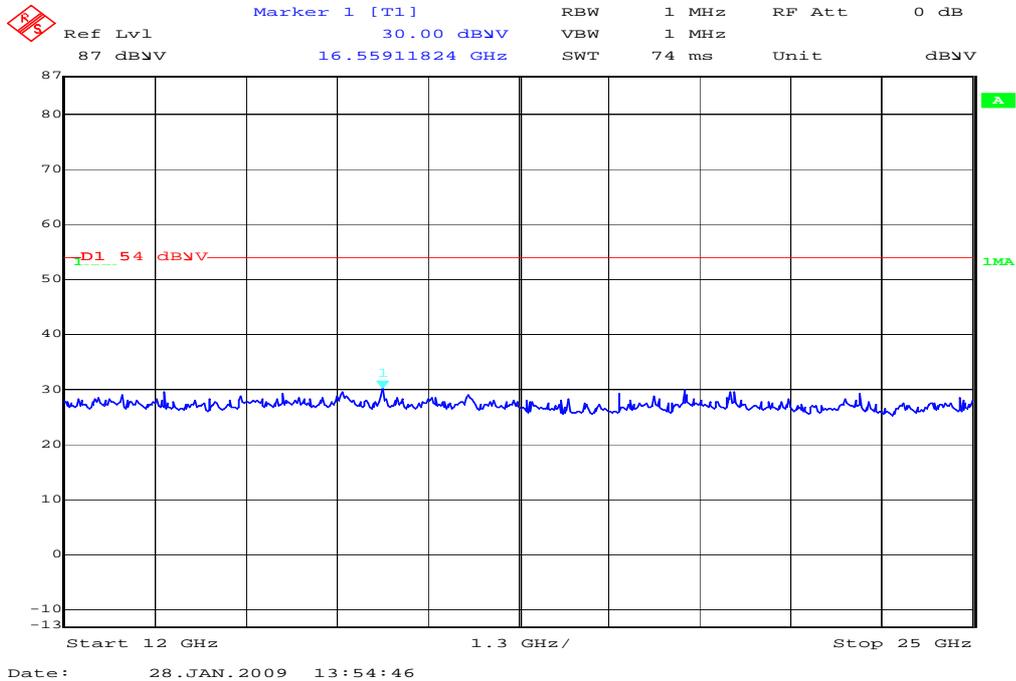
#### Final Result 1

Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Antenna height (cm)	Polarity	Turntable position (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
50.089950	9.6	15000.000	120.000	220.0	V	48.0	13.5	20.4	30.0
129.994150	13.8	15000.000	120.000	117.0	V	137.0	9.7	19.7	33.5
474.154600	14.4	15000.000	120.000	220.0	H	131.0	18.6	21.6	36.0
637.952350	18.4	15000.000	120.000	220.0	H	227.0	21.6	17.6	36.0
741.067800	20.8	15000.000	120.000	192.0	V	277.0	24.0	15.2	36.0
904.652500	22.5	15000.000	120.000	100.0	H	150.0	25.7	13.5	36.0

Plot 2: 1 - 12 GHz vertical/horizontal (receiver)



Plot 3: 12 - 25 GHz vertical/horizontal (receiver)





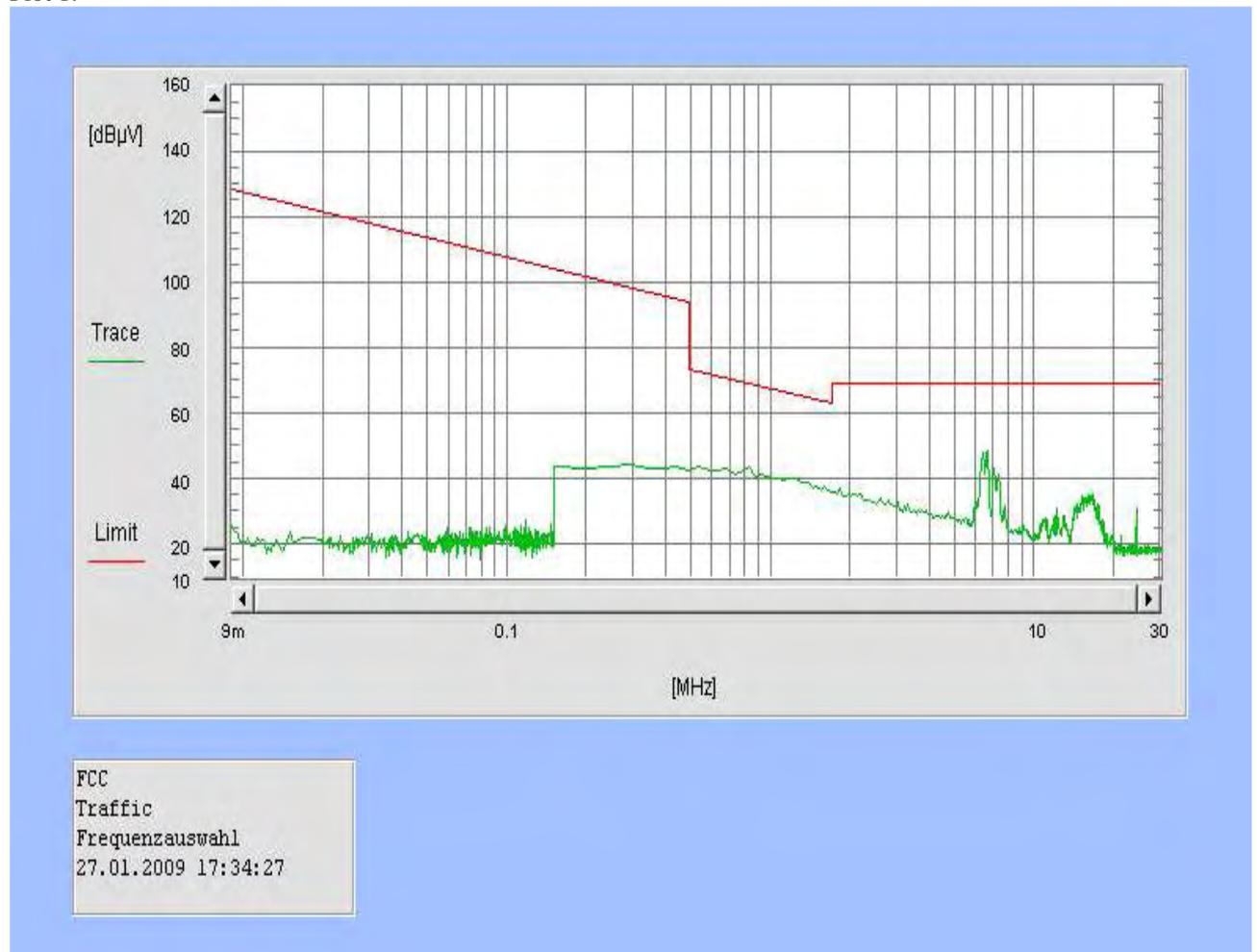
**5.17 Spurious Emissions < 30 MHz - Transmitter radiated § 15.209**

Modulation: GFSK

Measured at 3 m distance.

Values recalculated with 40 dB/decade according to FCC rules.

Plot 1:



Limits:

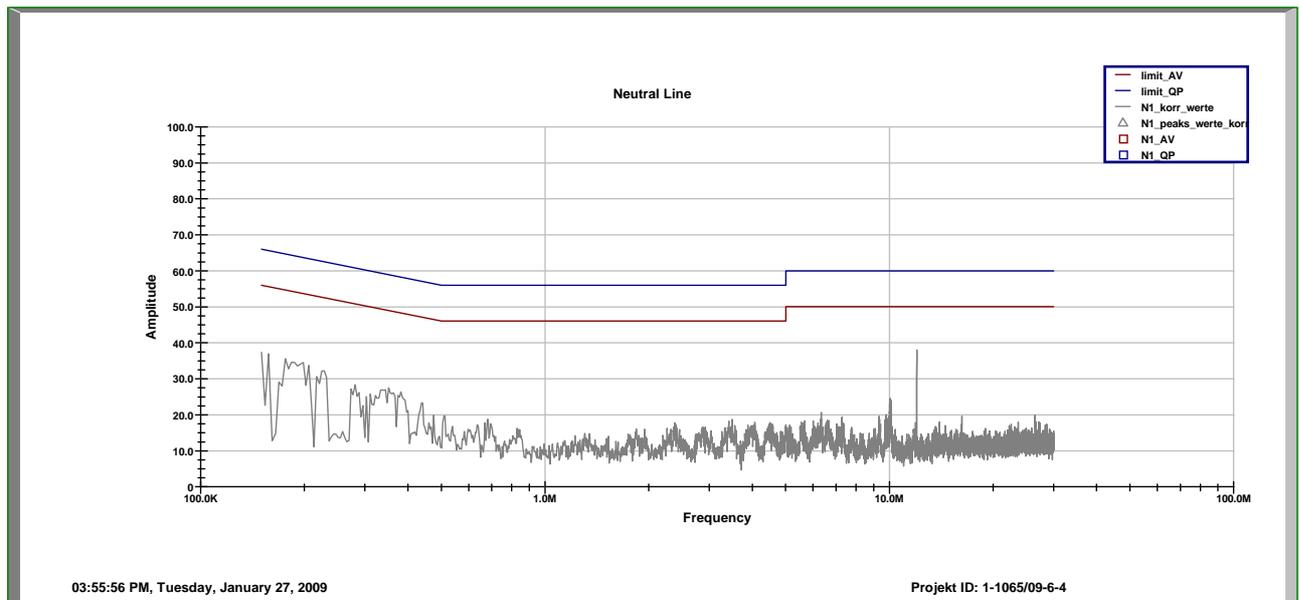
Frequency (MHz)	Field strength (µV/m)	Measurement distance (m)
0.009 – 0.490	2400/F(kHz)	300
0.490 – 1.705	24000/F(kHz)	30
1.705 – 30.0	30 / 29.5 dBµV/m	30

### 5.18 Conducted Emissions <30 MHz § 15.107/207

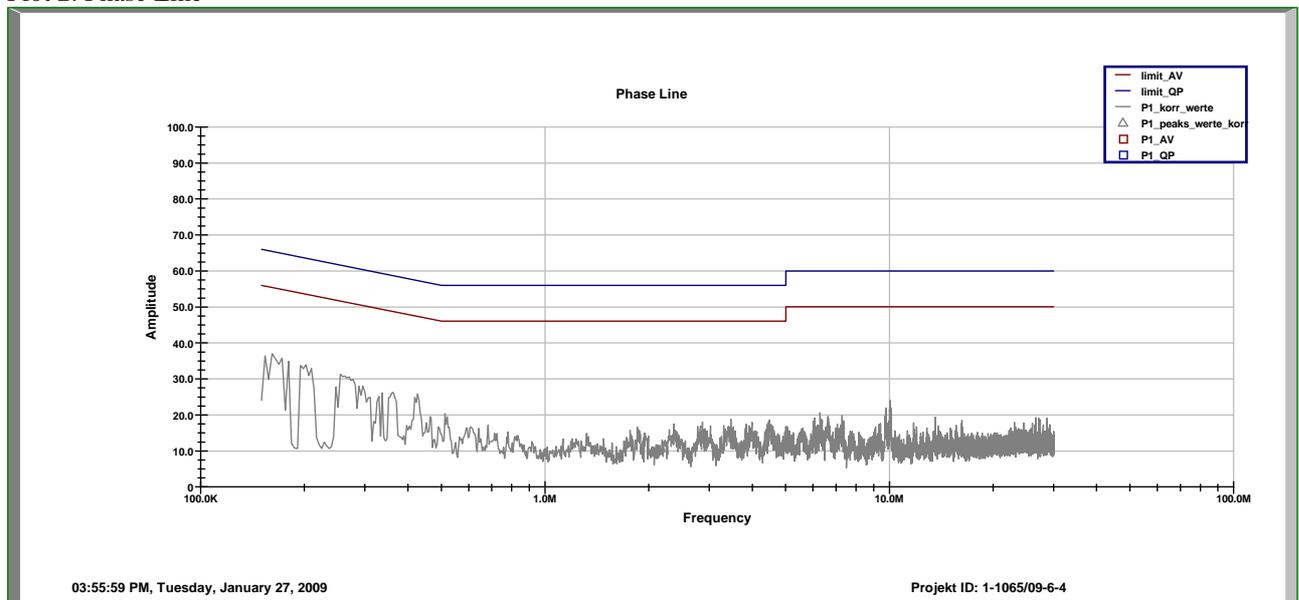
**Traffic Mode**

Modulation: GFSK

Plot 1: Neutral Line

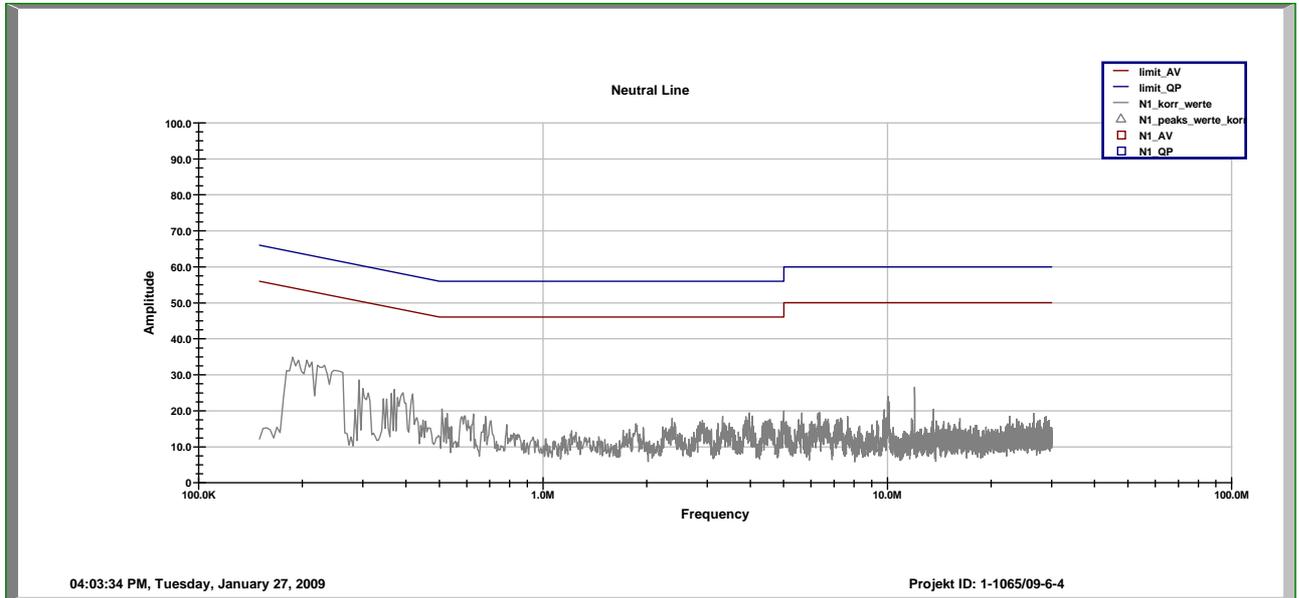


Plot 2: Phase Line

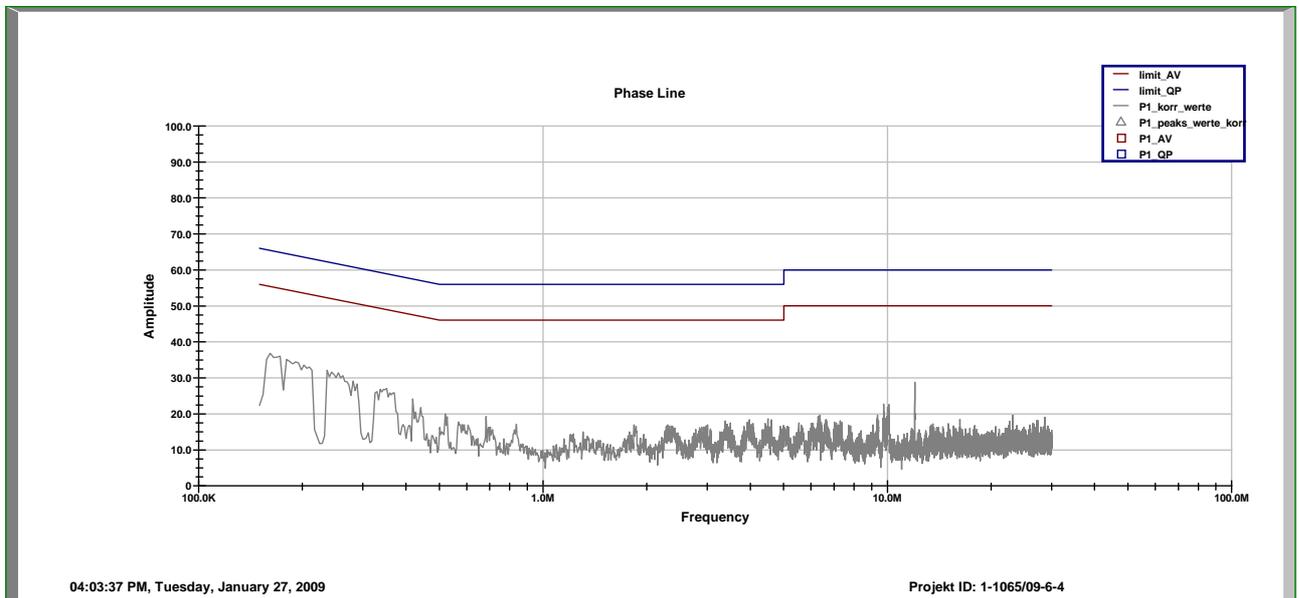


**Idle mode**

Plot3: Neutral Line



Plot4: Phase Line



Limits:

Under normal test conditions only	See plots
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## 6 Test equipment and ancillaries used for tests

To simplify the identification on each page of the test equipment used, on each page of the test report, each item of test equipment and ancillaries such as cables are identified (numbered) by the Test Laboratory, below.

All reported calibration intervals are calibrations according to the EN/ISO/IEC 17025 standard. These calibrations were performed from an accredited external calibration laboratory.

Additional to these calibrations the laboratory performed comparison measurements with other calibrated systems and performed a weekly chamber inspection.

All used devices are connected with a 10 MHz external reference.

According to the manufacturers' instruction is it possible to establish a calibration interval for the FSP unit of 24 month, if the device has an external 10 MHz reference.

### *Anechoic chamber A:*

No.	Instrument/Ancillary	Manufacturer	Type	Serial-No.	Internal identification
<b>Radiated emission in chamber A</b>					
A-1	Spectrum Analyzer	Rohde & Schwarz	ESU26	100037	300003555
A-2	Signal Generator	Rohde & Schwarz	SMR20B11	1104.0002.20	300003593
A-3	RF System Panel	Rohde & Schwarz	TS RSP	---	300003556
A-4	Relais Matrix	Rohde & Schwarz	PSN	860673/009	300001385
A-5	Horn Antenna	EMCO	3115	9709-5290	300000212
A-6	Bilog.-Log. Antenna	Schwarzbeck	VULB 9163	02/00	300003696
A-7	Notch Filter GSM 900	Wainwright	WRCD 901.9/903.1EE	9	---
A-8	Notch Filter GSM 1800	Wainwright	WRCD 1747/1748-5EE	1	---
A-9	Notch Filter GSM 1900	Wainwright	WRCD 1879.5/1880.5EE	9	---
A-10	Notch Filter GSM 850	Wainwright	WRCT 837-0.2/50-8EE	1	---
A-11	Notch Filter UMTS	Wainwright	WRCD 1800/2000-0.2/40-5EEK	2	---
A-12	Notch Filter ISM 2400	Wainwright	WRCD 2400/ 2483-2375/2505-50/10SS	26	---
A-13	High Pass Filter 1.1 GHz	Wainwright	WHK 1.1/15G-10SS	---	---
A-14	High Pass Filter 2.6 GHz	Wainwright	WHKX 2.6/18G-12SS	---	---
A-15	High Pass Filter 7 GHz	Wainwright	WHKX 7.0/18G-8SS	---	---
A-14	Amplifier	Miteq	AFS4-00201800-15-10P-6	US42-0050 2650-28-5A	300003204
A-16	Controller	Inn co	CO 2000	2020507	---
A-17	DC Power Supply	Hewlet Packard	HP6632A	---	300000924
A-18	Computer	F+W	---	---	300003303

### *SRD Laboratory Room 005:*

No	Equipment/Type	Manuf.	Serial Nr.	Inv. No. Cetecom	Last Calibration	Frequency (months)	Next Calibration
1	Spektrum Analyzer 8566B	HP	2747A05275	300000219	18.01.2008	24	18.01.2010
2	Spektrum Analyzer Display 85662A	HP	2816A16497	300001690	23.01.2008	24	23.01.2010
3	Quasi-Peak-Adapter 85650A	HP	2811A01135	300000216	23.01.2008	24	23.01.2010
4	Power Supply	Heiden	003202	300001187	12.05.2007	36	12.05.2010
5	Power Supply	Heiden	1701	300001392	12.05.2007	36	12.05.2010

*Anechoic chamber F:*

No	Equipment/Type	Manuf.	Serial Nr.	Inv. No. Cetecom	Last Calibration	Frequency (months)	Next Calibration
1	Control Computer	F+W	FW0502032	300003303	-/-	-/-	-/-
2	Trilog Antenna	9163-295	-/-	-/-	30.04.2008	24	30.04.2010
3	Amplifier - 0518C-138	Veritech Microwave Inc.	-/-	-/-	-/-	-/-	-/-
4	Switch - 3488A	HP		300000368	-/-	-/-	-/-
5	EMI Test receiver - ESCI	R&S	100083	300003312	31.01.2007	24	31.01.2009
6	Turntable Controller - 1061 3M	EMCO	1218	300000661	-/-	-/-	-/-
7	Tower Controller 1051 Controller	EMCO	1262	300000625	-/-	-/-	-/-
8	Tower - 1051	EMCO	1262	300000625	-/-	-/-	-/-
10	Ultra Notch-Filter Rejected band Ch. 62	WRCD	9	-/-	-/-	-/-	-/-

*C.BER Bluetooth Rack Room AC2:*

No	Equipment/Type	Manuf.	Inv. No. Cetecom	Last Calibration	Frequency (months)	Next Calibration
1	System Controller with XP Prof. & C.BER Control Software	F&W	300003580	na		
2	GPIO to USB Converter	Agilent	300003426	na		
3	Spectrum Analyser FSIQ26	R&S	300002681-005	10.01.2008	24	10.01.2010
	Sampling System FSIQ-B70	R&S	300002681-005	s.No.3		
	Tracking Generator FSIQ-B10 for FSIQ26	R&S	300002681-005	s.No.3		
4	RF-Generator SMIQ03 (Interferer Signal)	R&S	300002681-001	25.08.2008	36	25.08.2011
	Modulation Coder SMIQ-B20	R&S	300002681-001	s.No.4		
	Data Generator SMIQ-B11	R&S	300002681-001	s.No.4		
	RF Rear Connection SMIQ-B19	R&S	300002681-001	s.No.4		
	Fast CPU SM-B50	R&S	300002681-001	s.No.4		
	FM Modulator SM-B5	R&S	300002681-001	s.No.4		
5	Rubidium Standard RUB	R&S	300002681-009	27.08.2008	24	27.08.2010
6	Switching Unit 3488A including 2 44476A cards	HP	300000926	Verified with path compensation		
	44472A VHF switch	HP	300000926	Verified with path compensation		
7	Signalling Unit: CBT with EDR	R&S	300003416	27.08.2008	24	27.08.2010
8	RF-cable set	different	no	Verified with path compensation		
9	IEEE-cables	R&S	no	na		
10	NGPE programmable Power Supply for EUT	R&S	400000078	27.08.2008	24	27.08.2010
11	Coupling Unit 4324-2	Narda	no	Verified with path compensation		
12	Climatic Chamber VT4002	Voetch	300003019	11.05.2007	24	11.05.2009
13	6 dB Attenuator 1W	Narda	no	Verified with path compensation		
14	DCBlocker 30 MHz to 12.75 GHz 1W	Narda	no	Verified with path compensation		