



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.: 3462C-1 (IC)

Certification ID: DE 0001

Accreditation ID: DE 0002

Accredited Bluetooth® Test Facility (BQTF)

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Test report no. : 1-1041-19-04/09
Type identification : NX 700
Applicant : Clarion Co., Ltd.
FCC ID : AX2QY5014
IC Certification No : 419C-QY5014
Test standards : 47 CFR Part 15
RSS - 210 Issue 7

Table of contents

1	General information	3
1.1	Notes	3
1.2	Testing laboratory	4
1.3	Details of applicant	4
1.4	Application details	4
2	Test standard/s	5
3	Technical tests	6
3.1	Details of manufacturer	6
3.1.1	Test item	6
3.1.2	Additional EUT information For IC Canada (appendix 2)	7
3.1.3	RF Technical Brief Cover Sheet acc. To RSS-102	8
3.1.4	EUT operating modes	9
3.1.5	Extreme conditions testing values	9
4	Summary of Measurement Results and list of all performed test cases	10
5	RF measurement testing	11
5.1	Description of test set-up	11
5.1.1	Radiated measurements	11
5.1.2	Conducted measurements	11
5.2	Referenced documents	12
5.3	Additional comments	12
5.4	Antenna gain	12
5.5	Carrier frequency separation §15.247(a)(1)	13
5.6	Number of hopping channels §15.247(a)(1)	16
5.7	Time of occupancy (dwell time) §15.247(a)(1)(iii)	19
5.8	Power Spectral density (Hybrid system in Inquiry mode/Page scan) §15.247(e)	20
5.9	Spectrum Bandwidth of a FHSS System / 20dB Bandwidth §15.247(a)(1)	21
5.10	Maximum output power (conducted) § 15.247 (b)(1)	26
5.11	Max. peak output power (radiated) § 15.247 (b)(1)	31
5.12	Band-edge compliance of conducted emissions §15.247 (d)	33
5.13	Band-edge compliance of radiated emissions §15.205	40
5.14	Spurious Emissions - conducted (Transmitter) § 15.247 (c)(1)	43
5.15	Spurious Emissions > 30 MHz- radiated (Transmitter) § 15.247 (c)(1)	49
5.16	Spurious Emissions - radiated (Receiver) § 15.109	60
5.17	Spurious Emissions < 30 MHz - Transmitter radiated § 15.209	64
5.18	Conducted Emissions <30 MHz § 15.107/207	66
6	Test equipment and ancillaries used for tests	67
7	Photographs of the Test Set-up	69
8	Photographs of the EUT	70

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:

2009-11-12 **Marco Bertolino**
Date Name

M. Bertolino
Signature

2009-11-12 **Andreas Keller**
Date Name

Andreas Keller
Signature

Technical responsibility for area of testing:

2009-11-12 **Stefan Bös**
Date Name

Stefan Bös
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

Name:	Clarion Co., Ltd.
Street:	7-2 Shintoshin, Chuo-ku, Saitama-shi
Town:	Saitama 330-0081
Country:	JAPAN
Telephone:	
Fax:	+ 81 48 601- 3802
Contact:	Masahiko Shibata
E-mail:	Masa_Shibata@clarion.co.jp
Telephone:	+ 81 48 601-4121

1.4 Application details

Date of receipt of order:	2009-10-23
Date of receipt of test item:	2009-11-06
Date of start test:	2009-11-06
Date of end test	2009-11-11
Persons(s) who have been present during the test:	-/-

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:	Clarion Co., Ltd.
Street:	7-2 Shintoshin, Chuo-ku, Saitama-shi
Town:	Saitama 330-0081
Country:	JAPAN

3.1.1 Test item

Kind of test item	:	Car Navigation System
Type identification	:	NX 700
S/N serial number	:	Sample for radiated measurement: 311X Sample for conducted measurement: 312X
HW hardware status	:	000
SW software status	:	000
Frequency Band [MHz]	:	ISM band 2400 MHz – 2483.5 MHz 2402 MHz (channel 00) – 2480 MHz (channel 78)
Type of Modulation	:	GFSK, Pi/4 DQPSK, 8 DPSK
Number of channels	:	79
Antenna	:	Integrated antenna
Power Supply	:	14.4 V DC by Power supply
Temperature Range	:	-20°C to +70°C

Max. power radiated: 0.46dBm (8DPSK; calculated from conducted value + antenna gain)
 Max. power conducted: -0.04dBm (8DPSK)

FCC ID: AX2QY5014
 IC: 419C-QY5014

3.1.2 Additional EUT information For IC Canada (appendix 2)

IC Registration Number:	419C-QY5014
Model Name:	NX 700
Manufacturer (complete Address):	Clarion Co., Ltd. 7-2 Shintoshin, Chuo-ku, Saitama-shi Saitama 330-0081 JAPAN
Tested to Radio Standards Specification (RSS) No.:	RSS-210 Issue 7
Open Area Test Site Industry Canada Number:	IC 3462C-1
Frequency Range (or fixed frequency) [MHz]:	ISM band 2400 MHz – 2483.5 MHz 2402 MHz (channel 00) – 2480 MHz (channel 78)
RF: Power [W] (max):	QPSK modulation: Rad. EIRP: 0.9mW Conducted : 0.8mW Pi/4 DQPSK modulation: Rad. EIRP: 1.1mW Conducted : 0.9mW 8 DPSK modulation: Rad. EIRP: 1.1mW Conducted : 1.0mW
Antenna Type:	Integrated antenna
Occupied Bandwidth (99% BW) [kHz]:	GFSK modulation: 932 Pi/4 DQPSK modulation: 1317 8 DPSK modulation: 1269
Type of Modulation:	GFSK, Pi/4 DQPSK, 8 DPSK
Emission Designator (TRC-43):	GFSK modulation: 932KFXD Pi/4 DQPSK modulation: 1M32GXD 8 DPSK modulation: 1M27GXD
Transmitter Spurious (worst case) [dBµV/m in 3m]:	50 (noise floor)
Receiver Spurious (worst case) [dBµV/m in 3m]:	50 (noise floor)

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: Marco Bertolino Date: 2009-11-12

3.1.3 RF Technical Brief Cover Sheet acc. To RSS-102

All Fields must be completed with the requested information or the following codes: N/A for Not Applicable, N/P for Not Performed or N/V for Not Available. Where applicable, check appropriate box.

1. COMPANY NUMBER: **419C**
2. MODEL NUMBER: **NX 700**
3. MANUFACTURER: **Clarion Co., Ltd.**
4. TYPE OF EVALUATION: **N/A**

Declaration of RF Exposure Compliance

ATTESTATION:

I attest that the information provided in this test report are correct; that a Technical Brief was prepared and the information it contains is correct; that the device evaluation was performed or supervised by me; that applicable measurement methods and evaluation methodologies have been followed and that the device meets the SAR and/or RF exposure limits of RSS-102.

Name: Dipl.-Ing. (FH) Marco Bertolino
Title: Engineer
Company: Cetecom ICT Services GmbH

Signature:



Date: 2009-11-12

3.1.4 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

3.1.5 Extreme conditions testing values

Description	Shortcut	Unit	Value
Nominal Temperature	T _{nom}	°C	20
Nominal Humidity	H _{nom}	%	47
Nominal Power Source	V _{nom}	V	14.4 V

Type of power source: **DC by Power supply**

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	Passed	2009-11-12	-/-

Test Specification Clause	Test Case	Modulation	Pass	Fail	N/A	Not performed
None	Antenna Gain	GFSK	Yes			
§15.247(a1)	Carrier frequency separation	GFSK Pi/4 DQPSK 8 DPSK	Yes Yes Yes			
§15.247(a1)	Number of hopping channels	GFSK Pi/4 DQPSK 8 DPSK	Yes Yes 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)	--			X	
§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 Pi/4 DQPSK 8 DPSK	Yes Yes 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	GFSK Pi/4 DQPSK 8 DPSK	Yes Yes Yes			
§ 15.247 (d)	Spurious Emission - conducted (Transmitter)	GFSK Pi/4 DQPSK 8 DPSK	Yes Yes Yes			
§ 15.247 (d)	Spurious Emission - radiated (Transmitter) >30 MHz	8 DPSK	Yes			
§ 15.109	Spurious Emissions - radiated (Receiver)	-/-	Yes			
§ 15.209	Spurious Emissions - radiated (Transmitter) <30 MHz	8 DPSK	Yes			
§ 15.107/207	Conducted Emissions <30 MHz	8 DPSK	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.

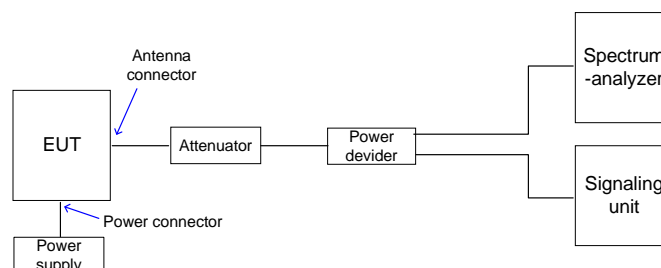
- 9 kHz - 150 kHz: Quasi Peak measurement, 200 Hz Bandwidth, passive loop antenna.
- 150 kHz - 30 MHz: Quasi Peak measurement, 9 kHz Bandwidth, passive loop antenna.
- 30 MHz - 200 MHz: Quasi Peak measurement, 120 kHz Bandwidth, bi-conical antenna
- 200MHz - 1GHz: Quasi Peak measurement, 120 kHz Bandwidth, 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

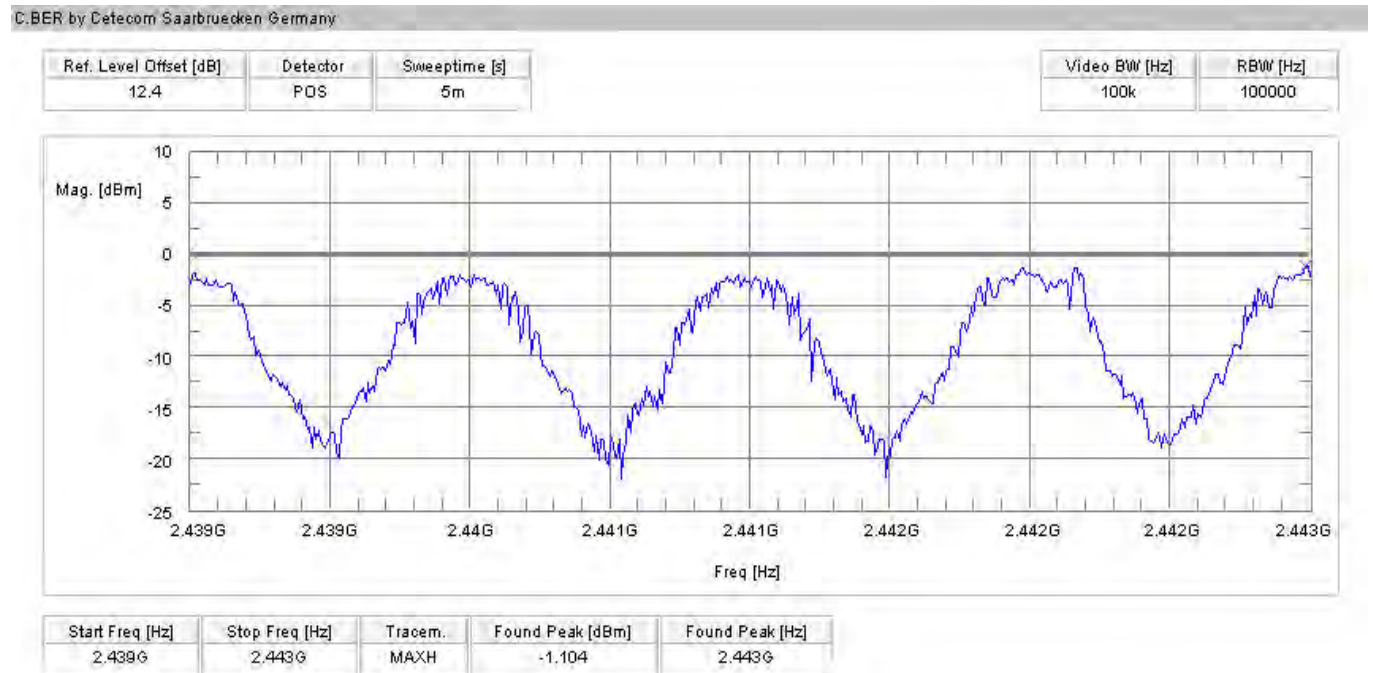
The antenna gain of the complete system is calculated by the difference of radiated power in EIRP and the conducted power of the module.

	low channel 2402 MHz	mid channel 2441 MHz	high channel 2480 MHz
Conducted power [dBm] Measured, GFSK modulation	-0.81	-0.92	-2.02
Radiated power [dBm] Measured, GFSK modulation	0.3	-3.6	-1.4
Gain [dBi] Calculated	0.5	-2.7	0.6

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

Modulation: GFSK

Plot 1 of 1:



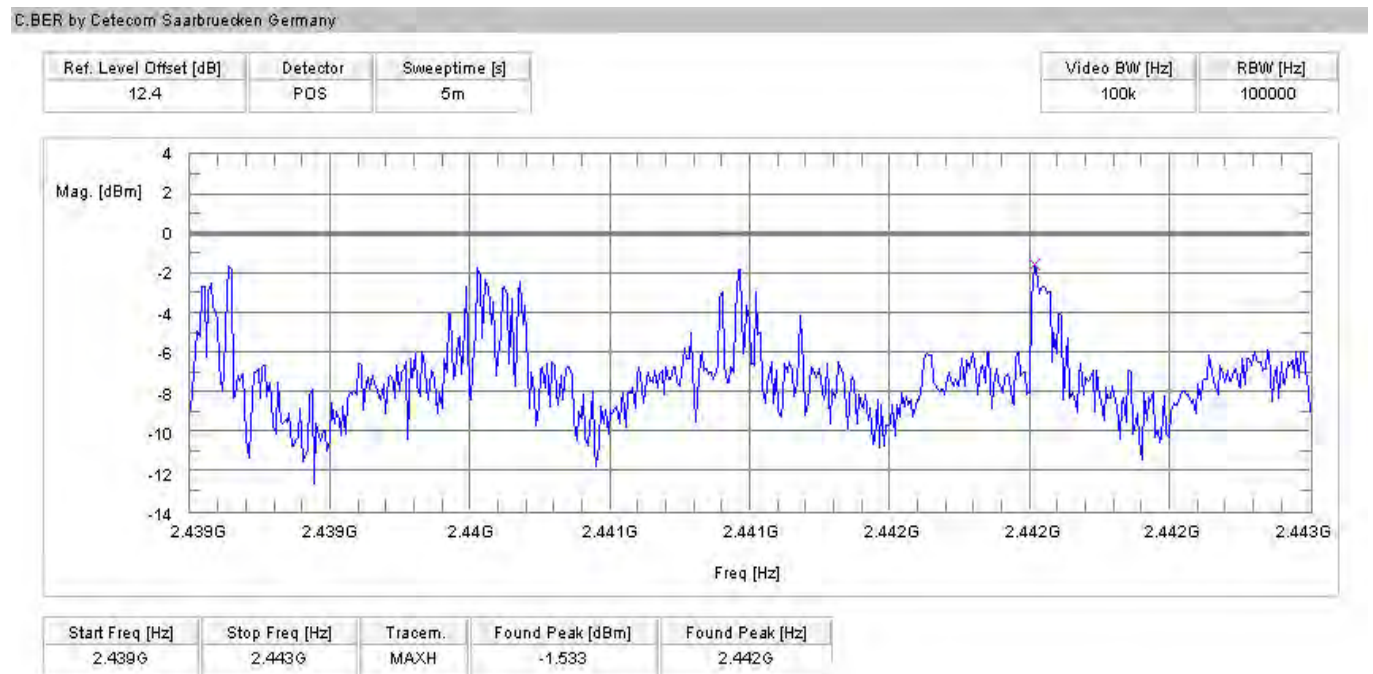
Result: Channel separation is: ~ 1 MHz

Limits:

Under normal test conditions only	Minimum 25 kHz or 20 dB Bandwidth of the hopping system
-----------------------------------	---

Modulation: Pi/4 DQPSK

Plot 1 of 1:



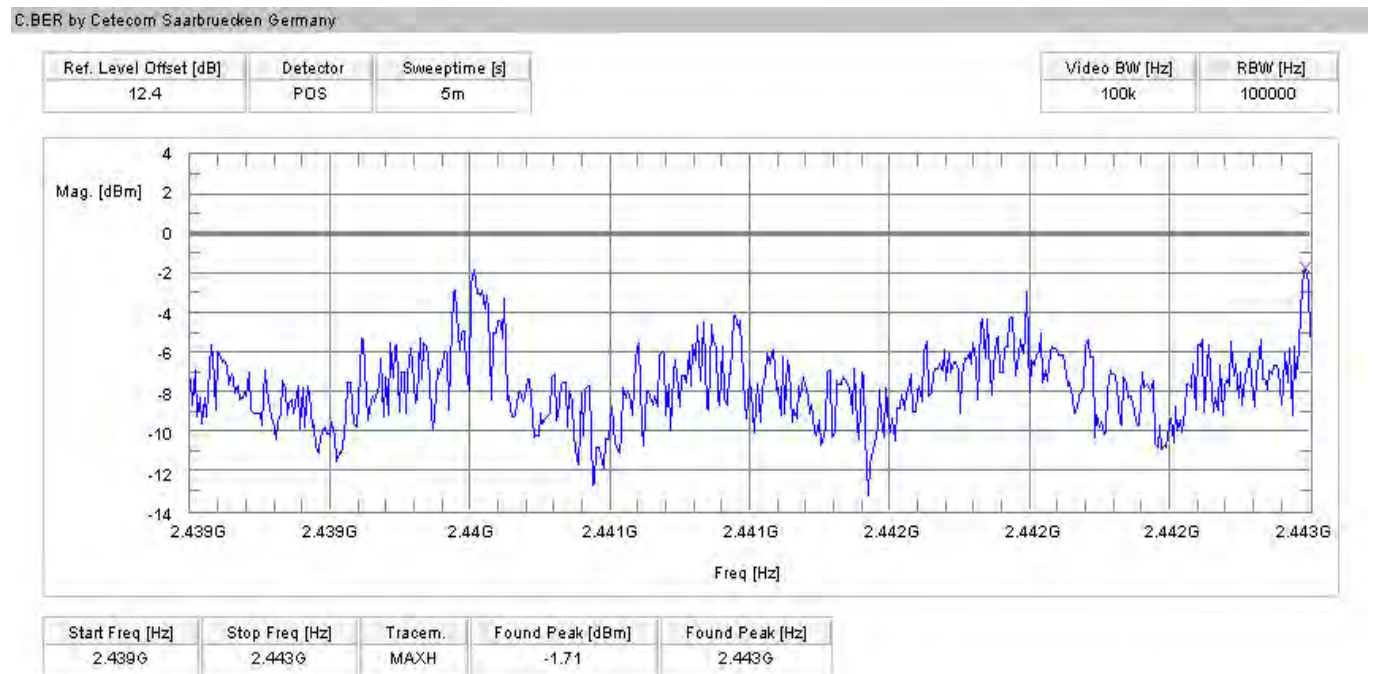
Result: Channel separation is: ~ 1 MHz

Limits:

Under normal test conditions only	Minimum 25 kHz or 20 dB Bandwidth of the hopping system
-----------------------------------	---

Modulation: 8 DPSK

Plot 1 of 1:



Result: Channel separation is: ~ 1 MHz

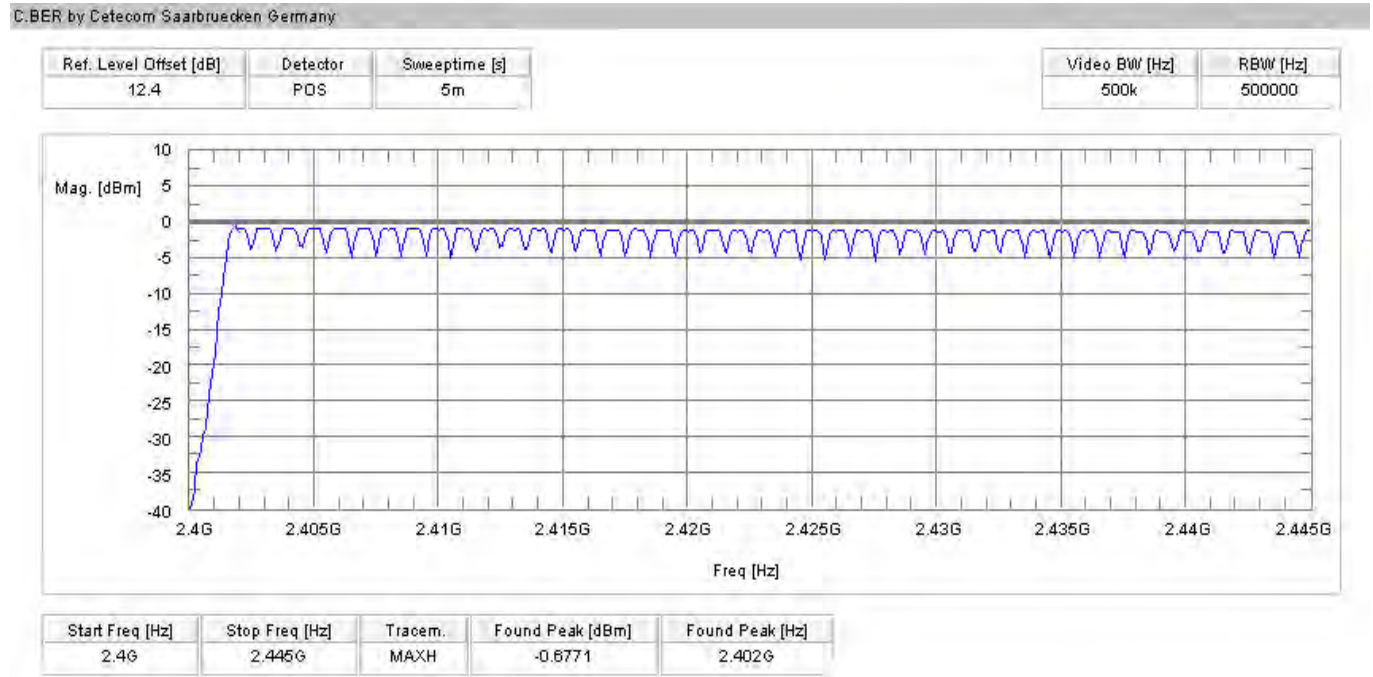
Limits:

Under normal test conditions only	Minimum 25 kHz or 20 dB Bandwidth of the hopping system
-----------------------------------	---

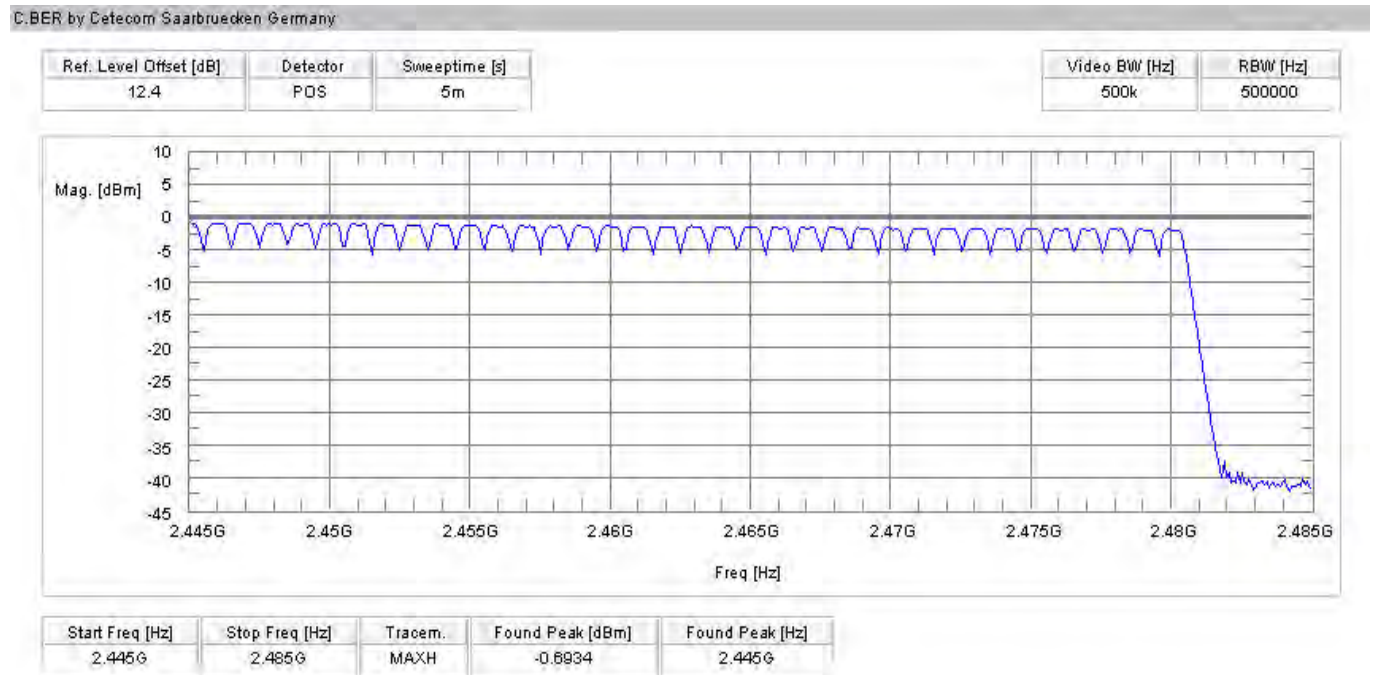
5.6 Number of hopping channels §15.247(a)(1)

Modulation: GFSK

Plot 1 of 2:



Plot 2 of 2:



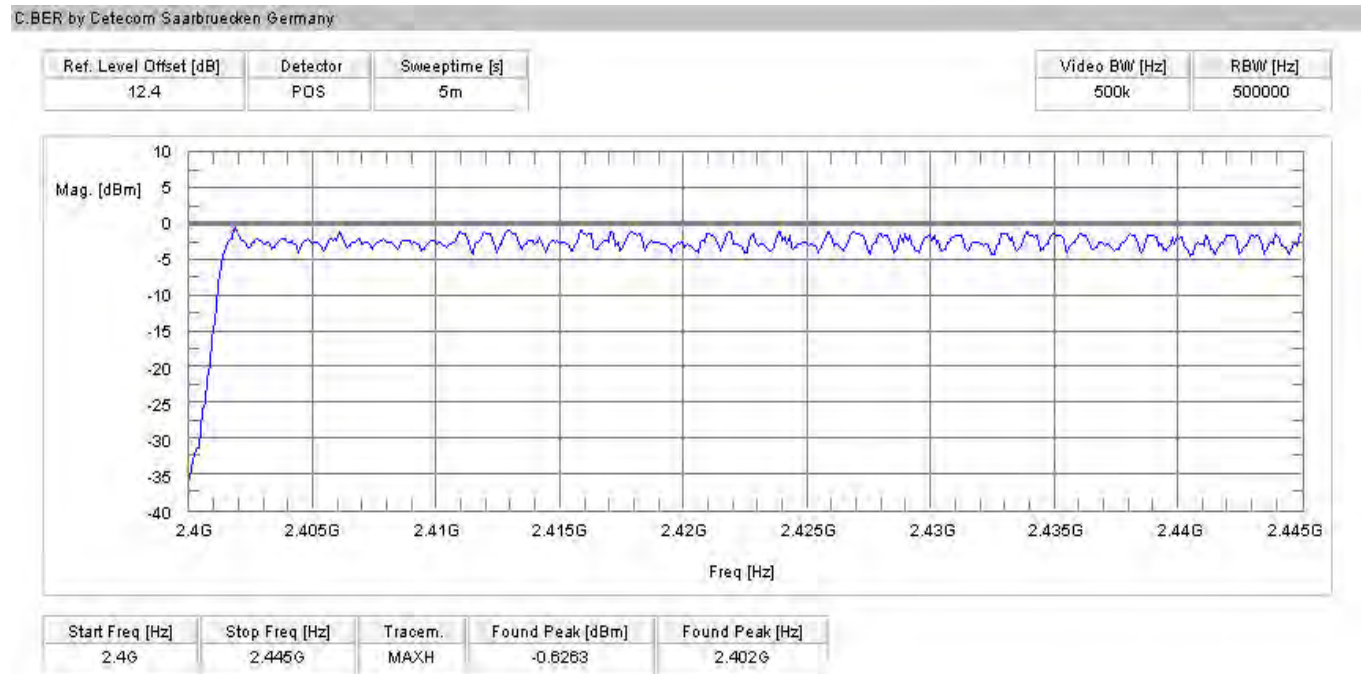
Result: The number of hopping channels is: 79

Limits:

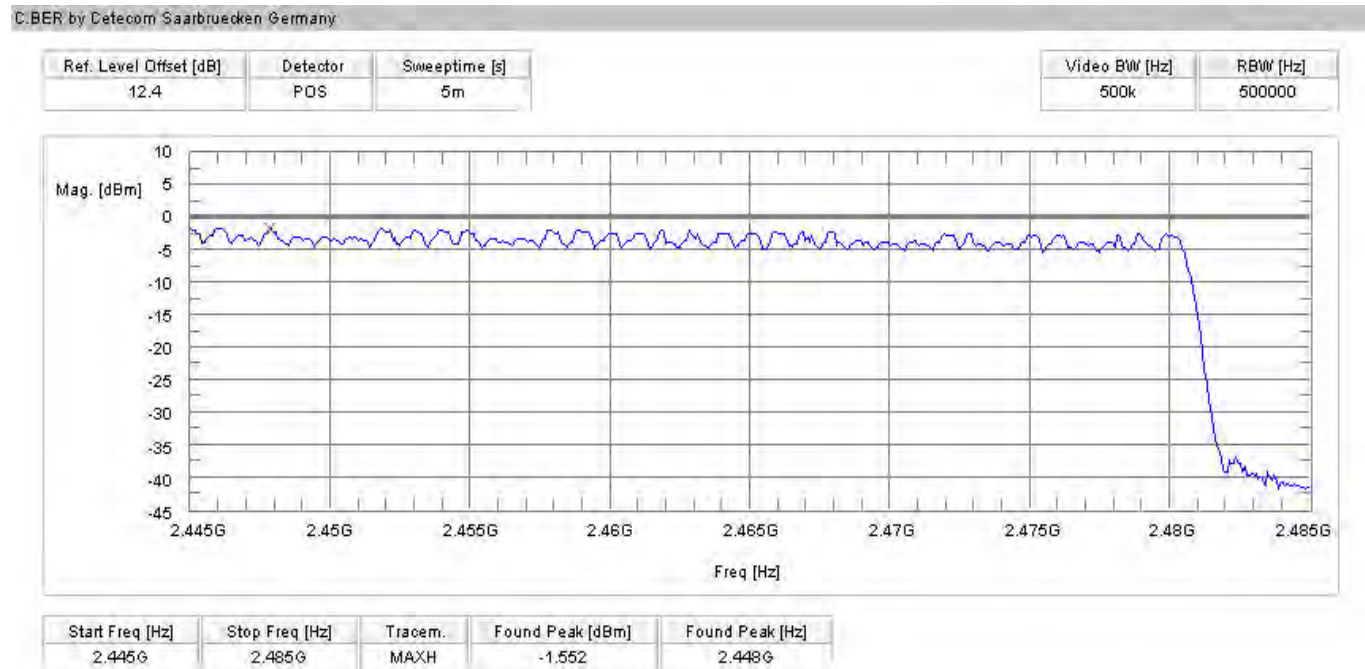
Under normal test conditions only	at least 15 non-overlapping channels
-----------------------------------	--------------------------------------

Modulation: Pi/4 DQPSK

Plot 1 of 2:



Plot 2 of 2:



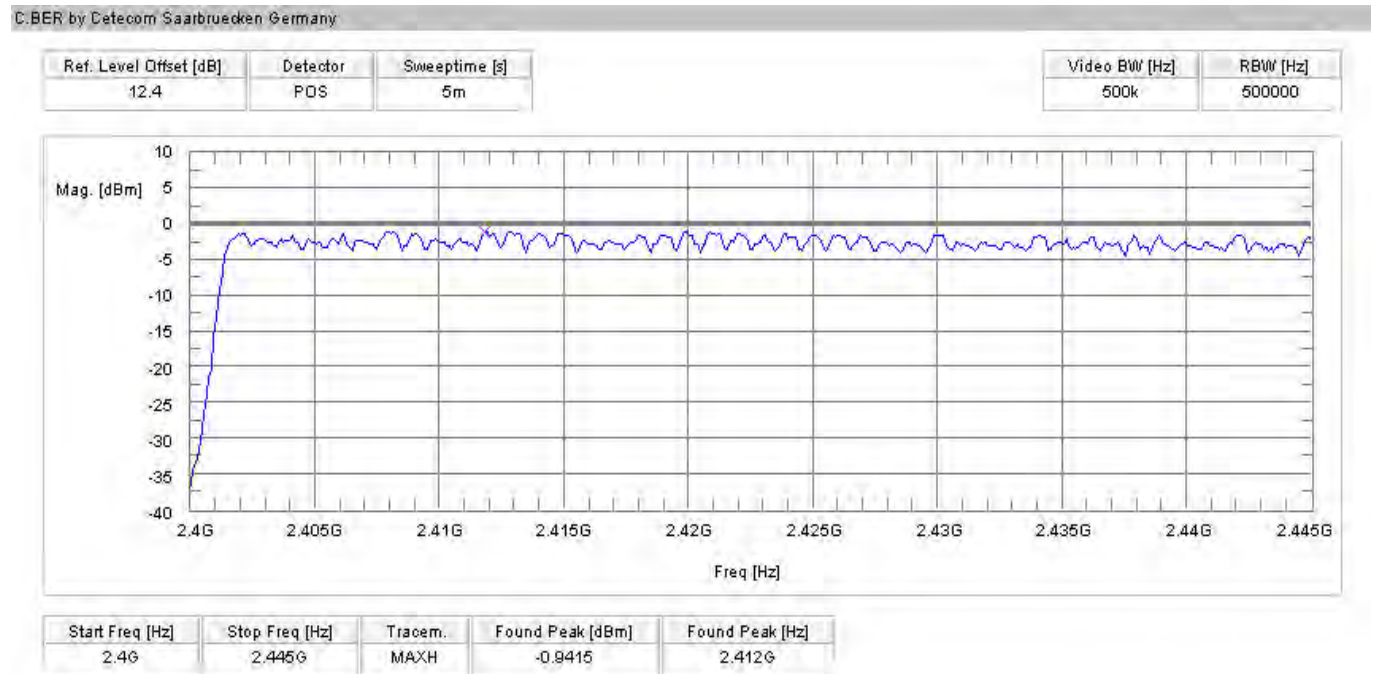
Result: The number of hopping channels is: 79

Limits:

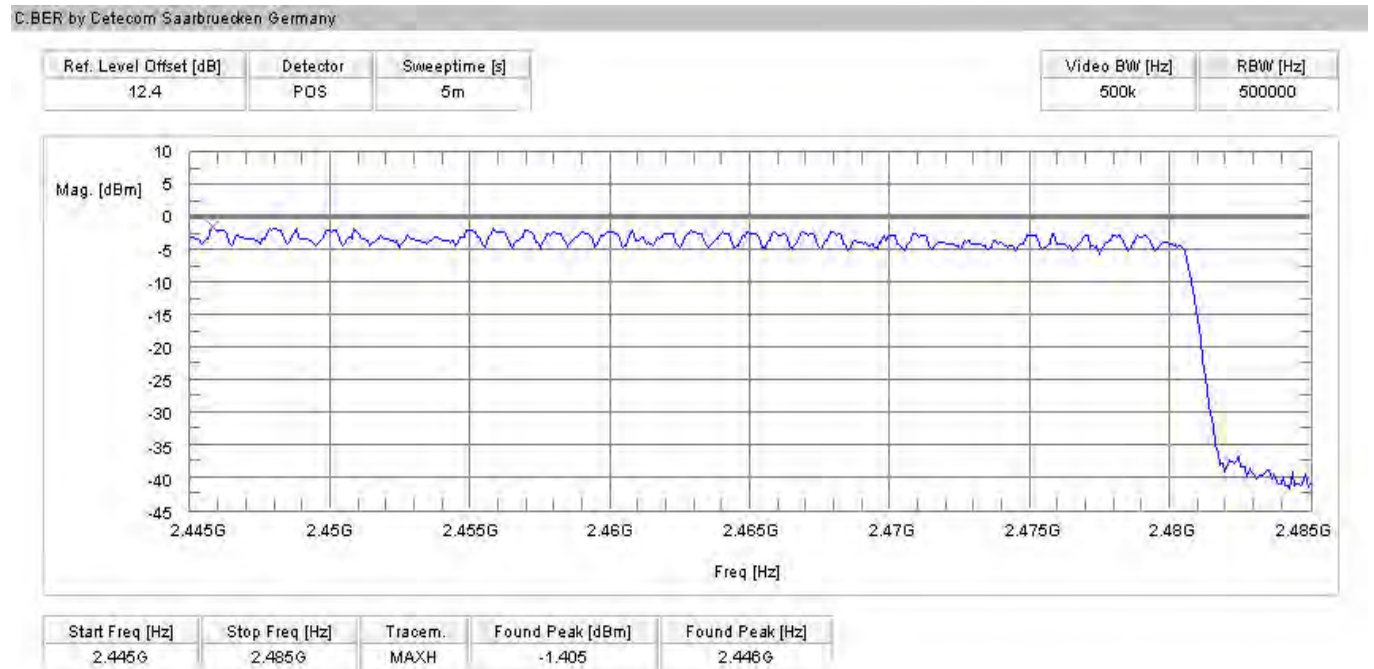
Under normal test conditions only	at least 15 non-overlapping channels
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Modulation: 8 DPSK

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
-----------------------------------	--------------------------------------

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)

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

Plot 1 of 1:

Not applicable

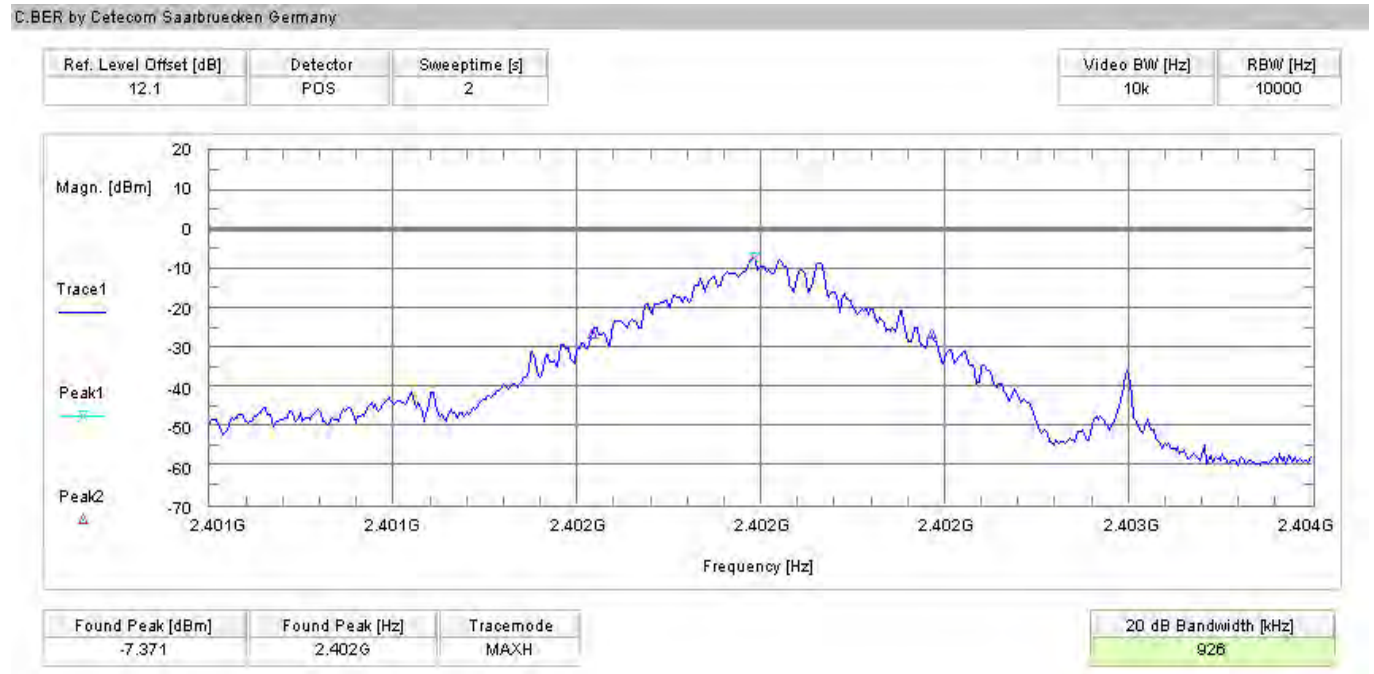
Result: Power density: - dBm/Hz = - dBm / 3 kHz
Correction factor from dBm/Hz to dBm / 3 kHz is +34,8 dB

Limits:

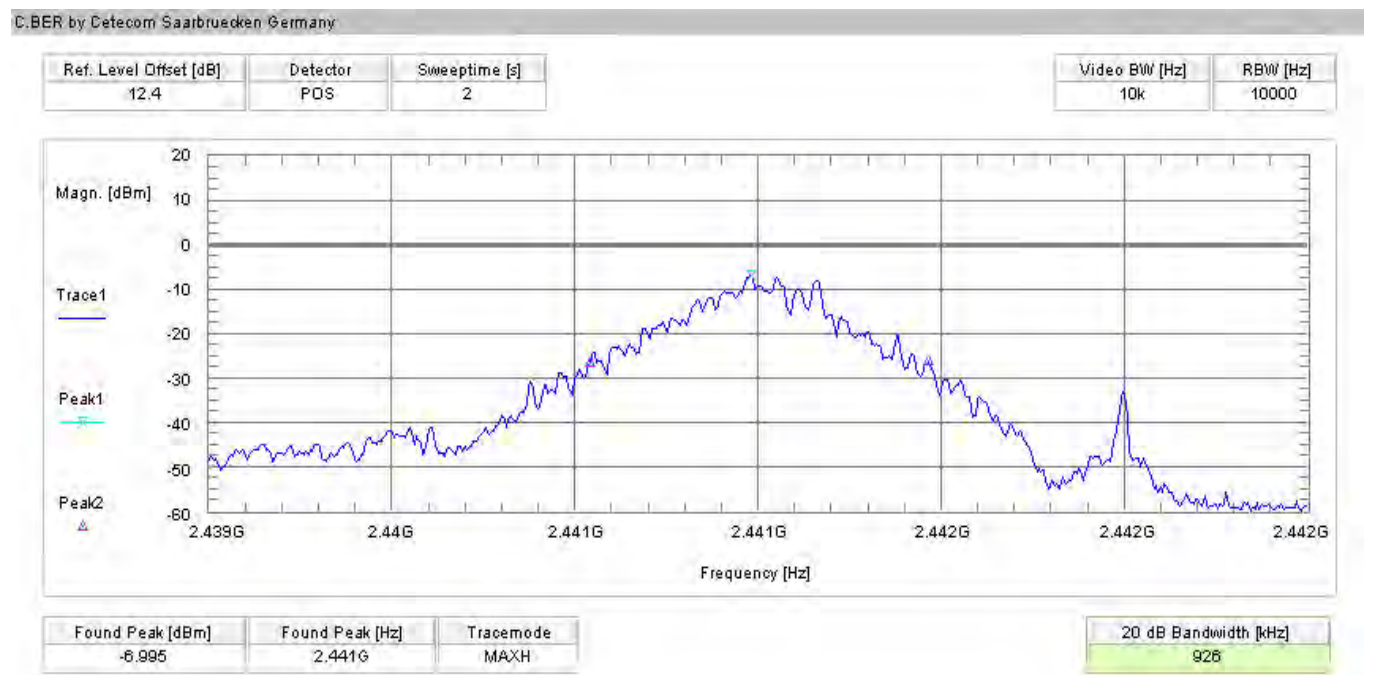
Under normal test conditions only	For digitally modulated systems, the peak power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission
-----------------------------------	---

5.9 Spectrum Bandwidth of a FHSS System / 20dB Bandwidth §15.247(a)(1)

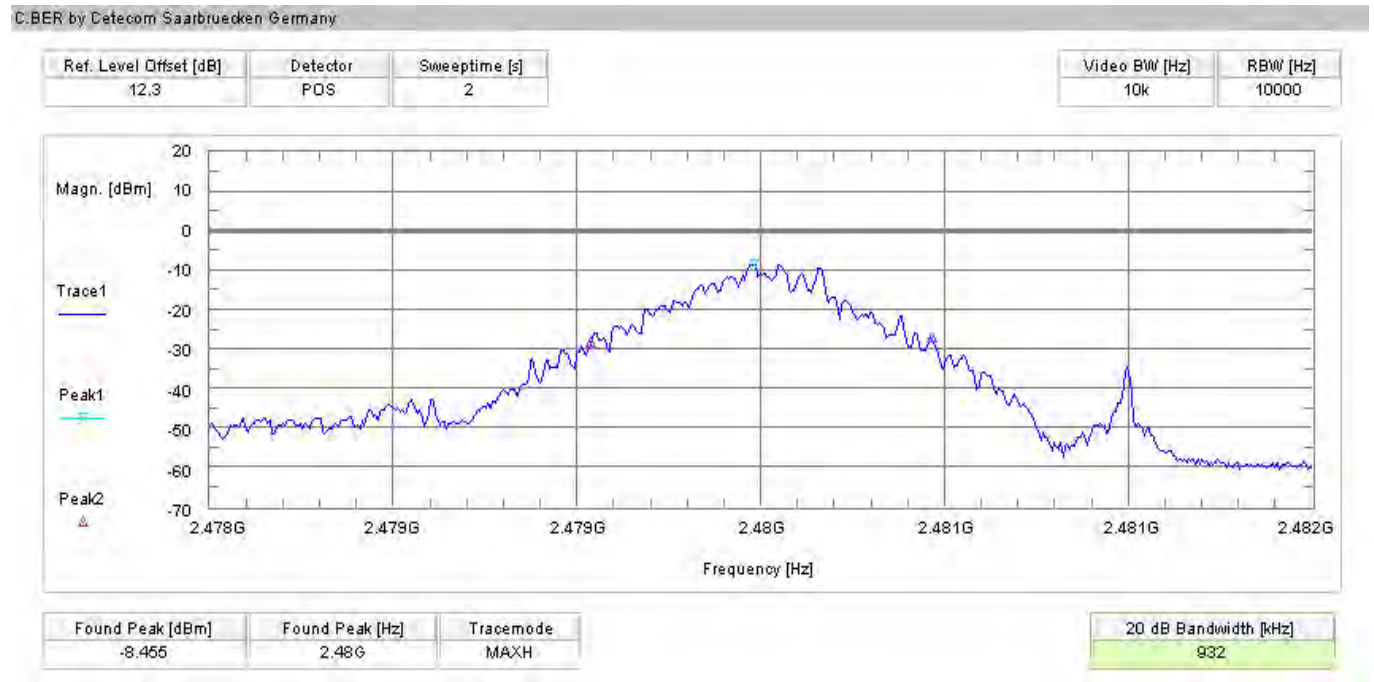
Plot 1: GFSK



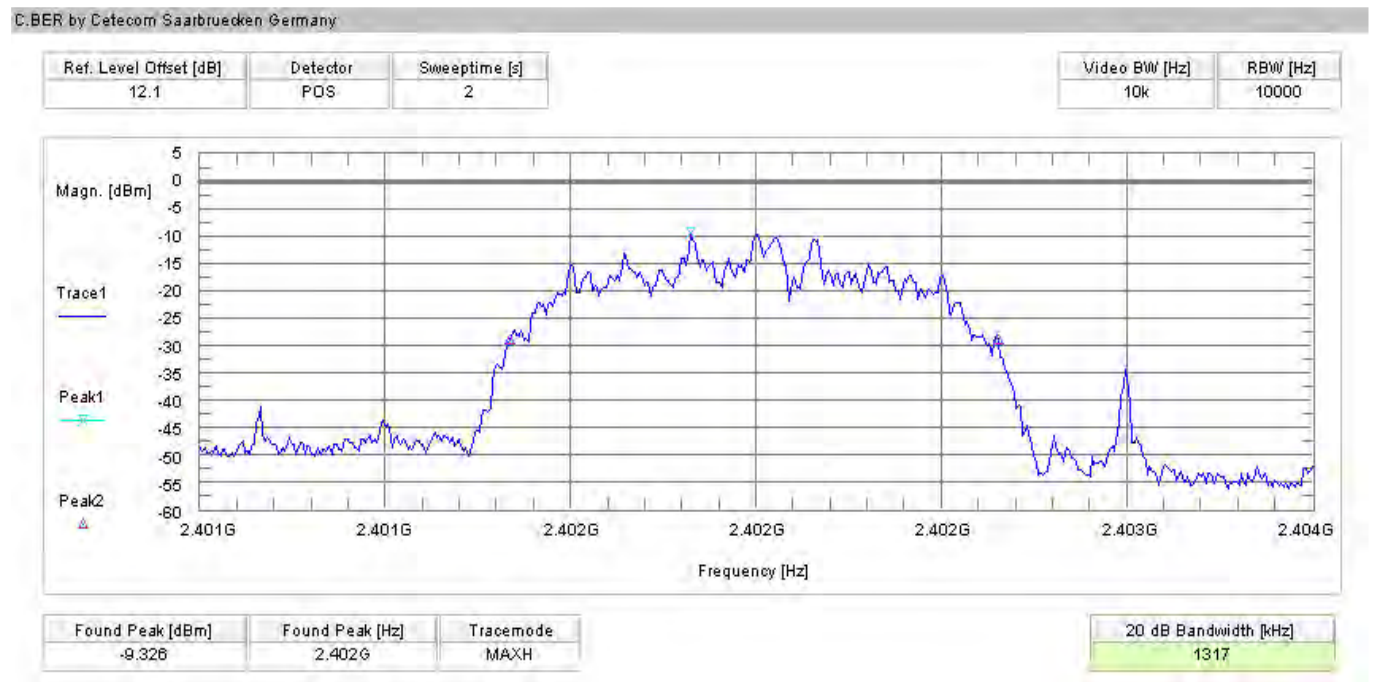
Plot 2: GFSK



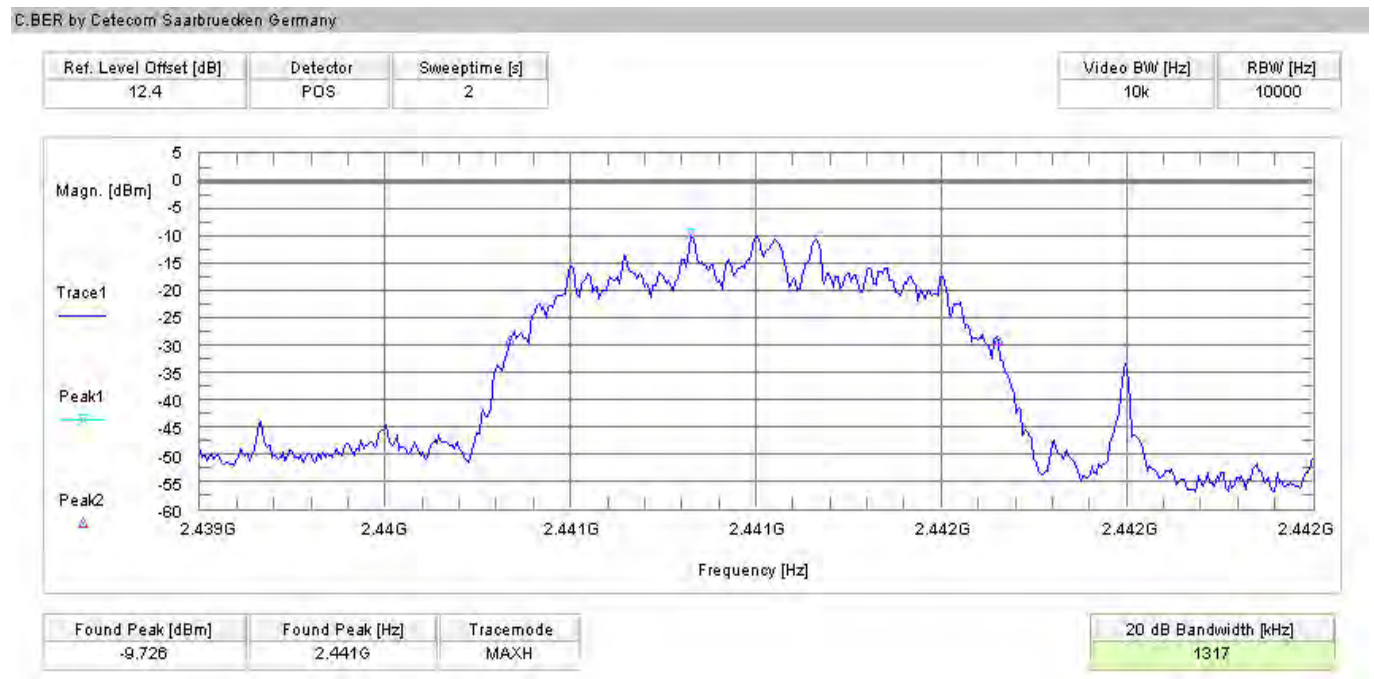
Plot 3: GFSK



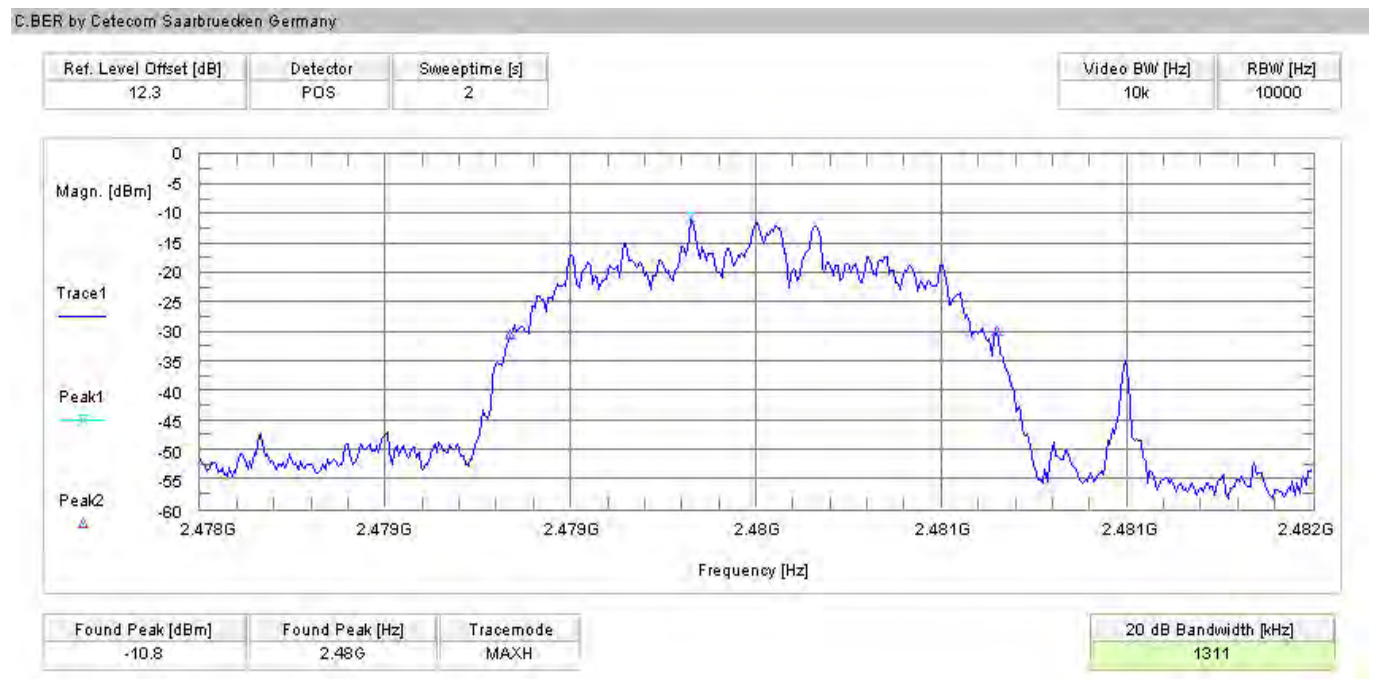
Plot 4: Pi/4 DQPSK



Plot 5: Pi/4 DQPSK

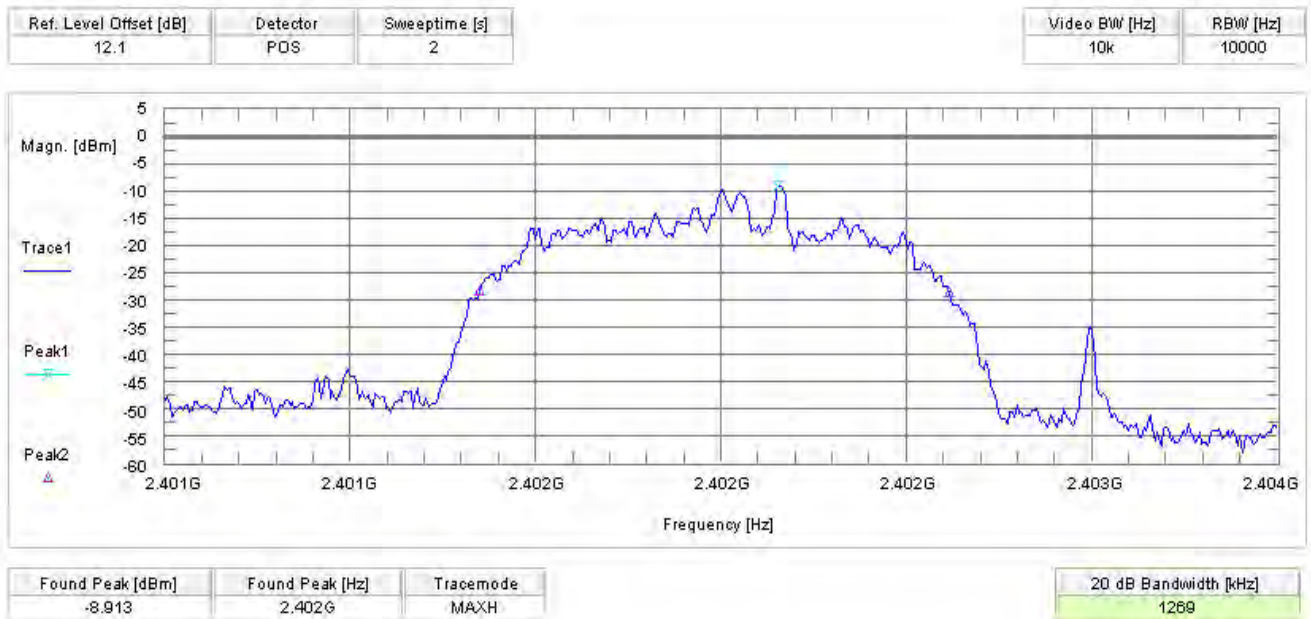


Plot 6: Pi/4 DQPSK



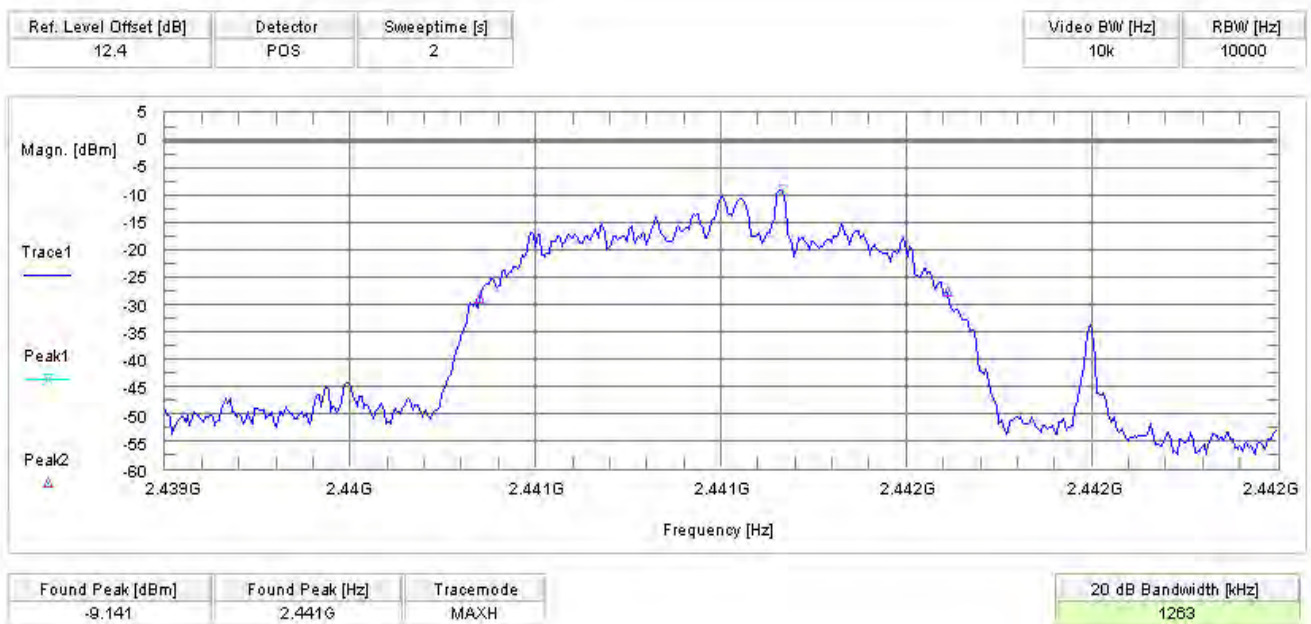
Plot 7: 8DPSK

C.BER by Cetecom Saarbruecken Germany

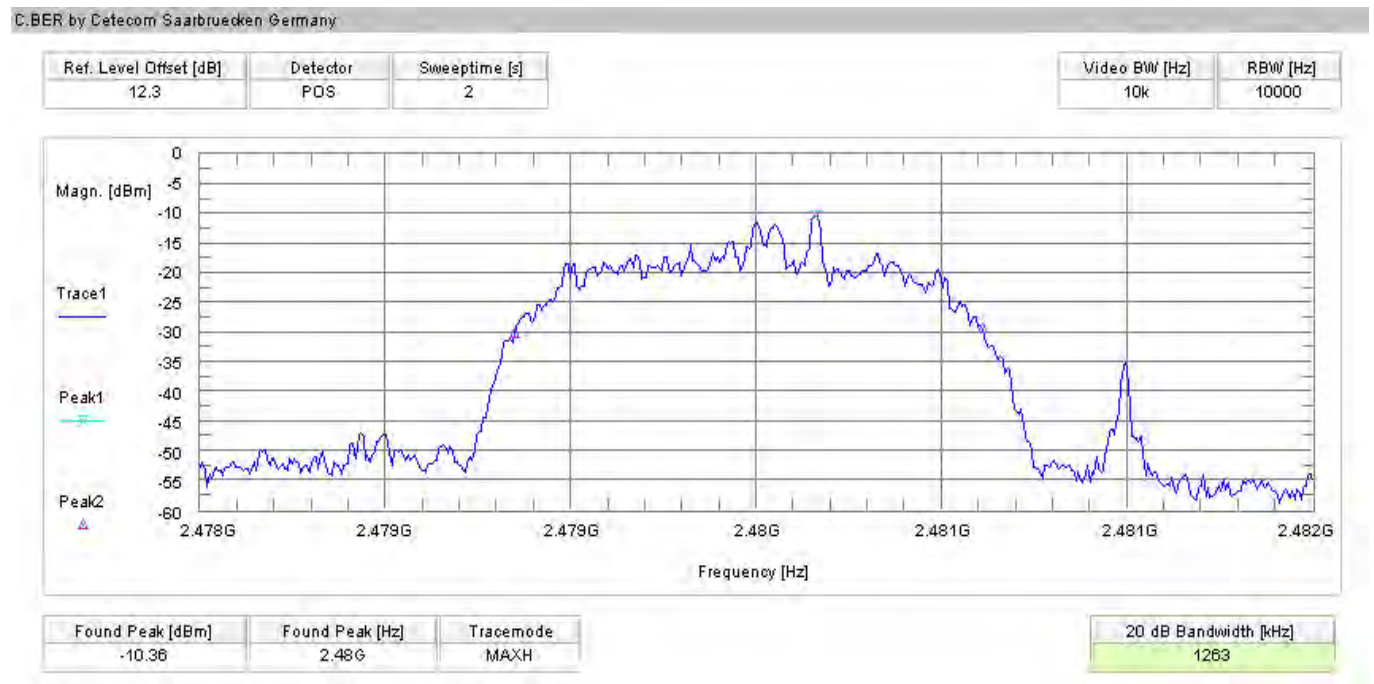


Plot 8: 8DPSK

C.BER by Cetecom Saarbruecken Germany



Plot 9: 8DPSK



Result:

Modulation	20 dB BANDWIDTH [kHz]		
	2402	2441	2480
Frequency [MHz]	2402	2441	2480
<i>GFSK</i>	926	926	932
<i>Pi/4 DQPSK</i>	1317	1317	1311
<i>8DPSK</i>	1269	1263	1263
Measurement uncertainty	±1kHz		

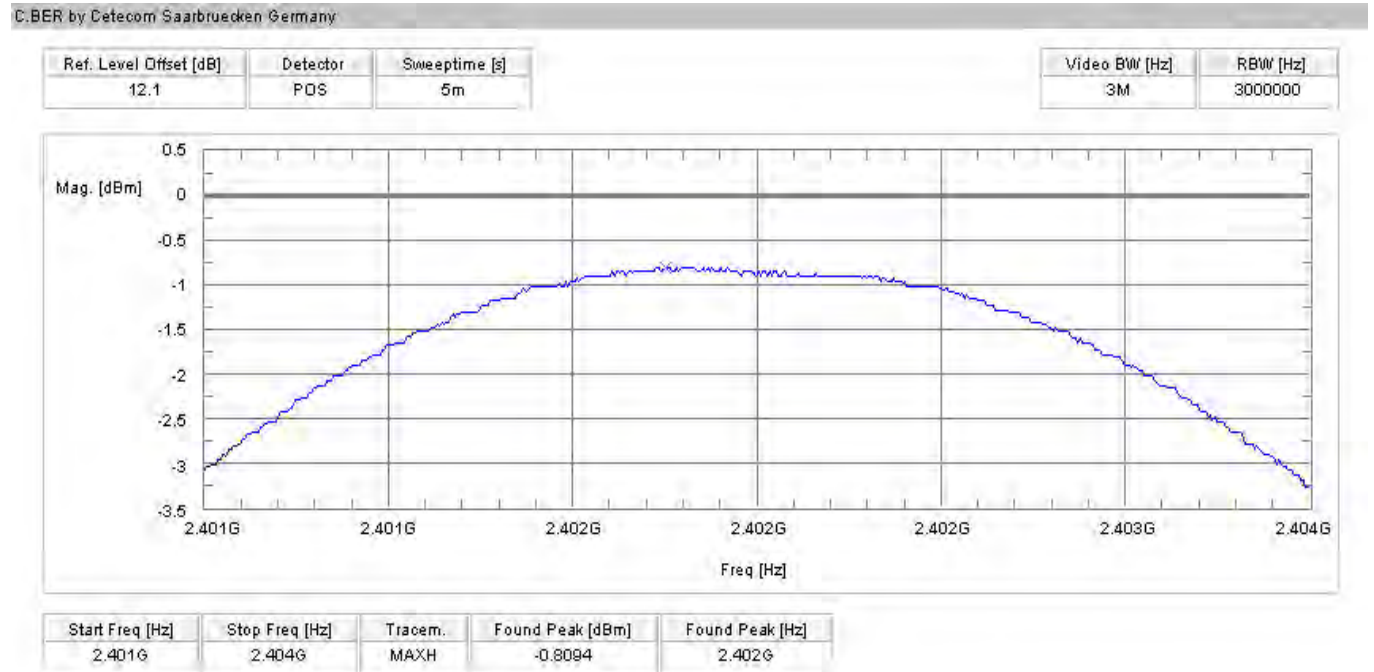
RBW / VBW as provided in the „Measurement Guidelines“ (DA 00-705, March 30, 2000)
 RBW: 10 kHz / VBW 10 kHz

Limits:

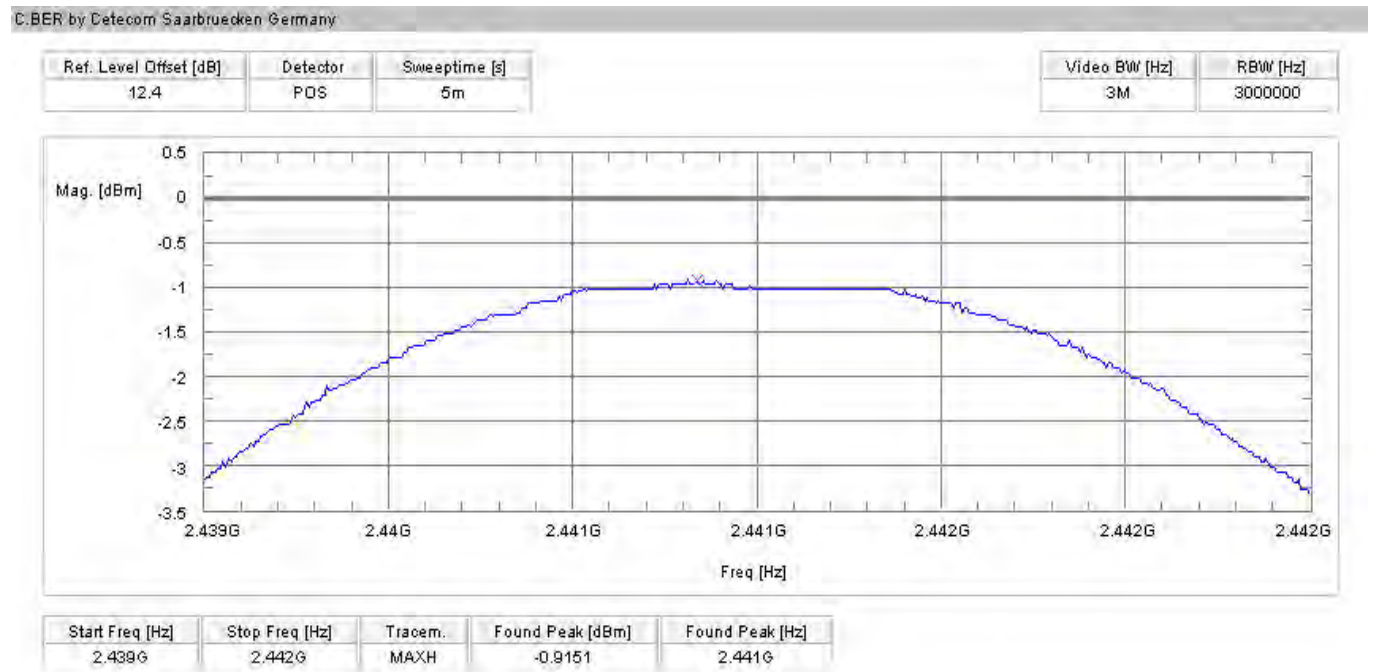
Under normal test conditions only	GFSK < 1000 kHz Pi/4 DQPSK < 1500 kHz 8DPSK < 1500 kHz
-----------------------------------	--

5.10 Maximum output power (conducted) § 15.247 (b)(1)

Plot 1: GFSK



Plot 2: GFSK

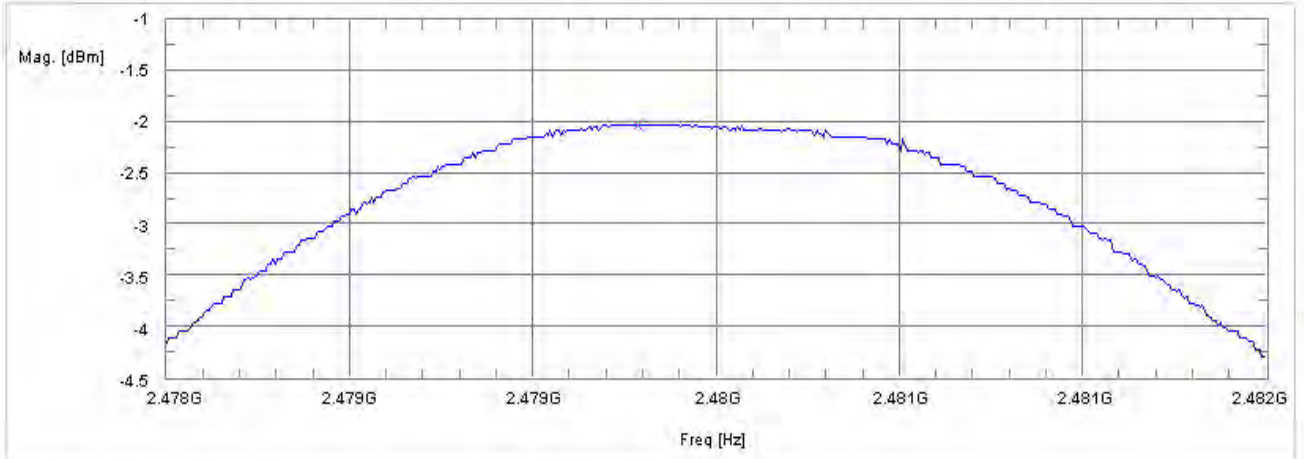


Plot 3: GFSK

C.BER by Detecon Saarbruecken Germany

Ref. Level Offset [dB]	Detector	Sweeptime [s]
12.3	PDS	5m

Video BW [Hz]	RBW [Hz]
3M	3000000



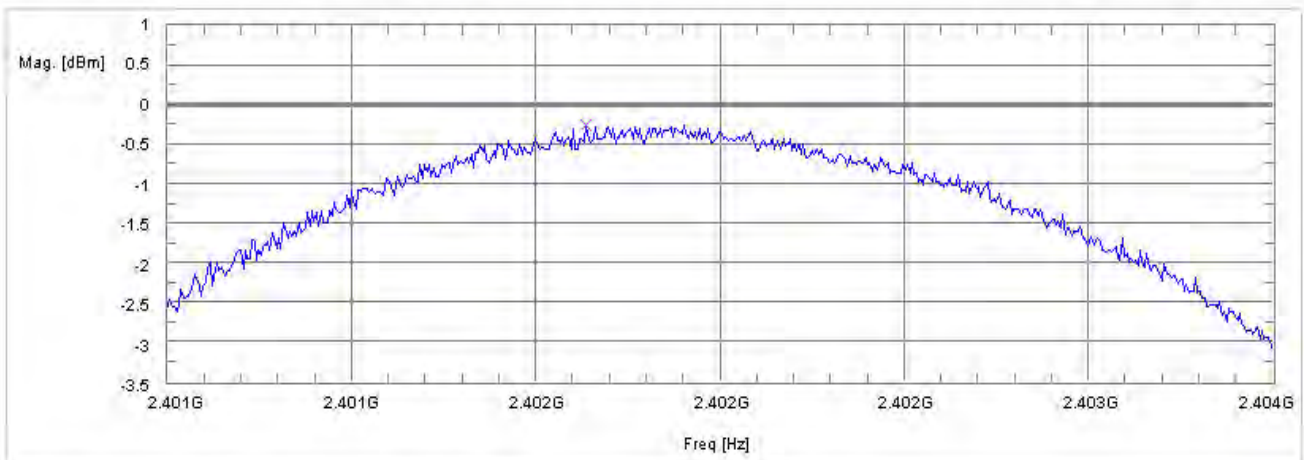
Start Freq [Hz]	Stop Freq [Hz]	TraceM.	Found Peak [dBm]	Found Peak [Hz]
2.478G	2.482G	MAXH	-2.019	2.480

Plot 4: Pi/4 DQPSK

C.BER by Detecon Saarbruecken Germany

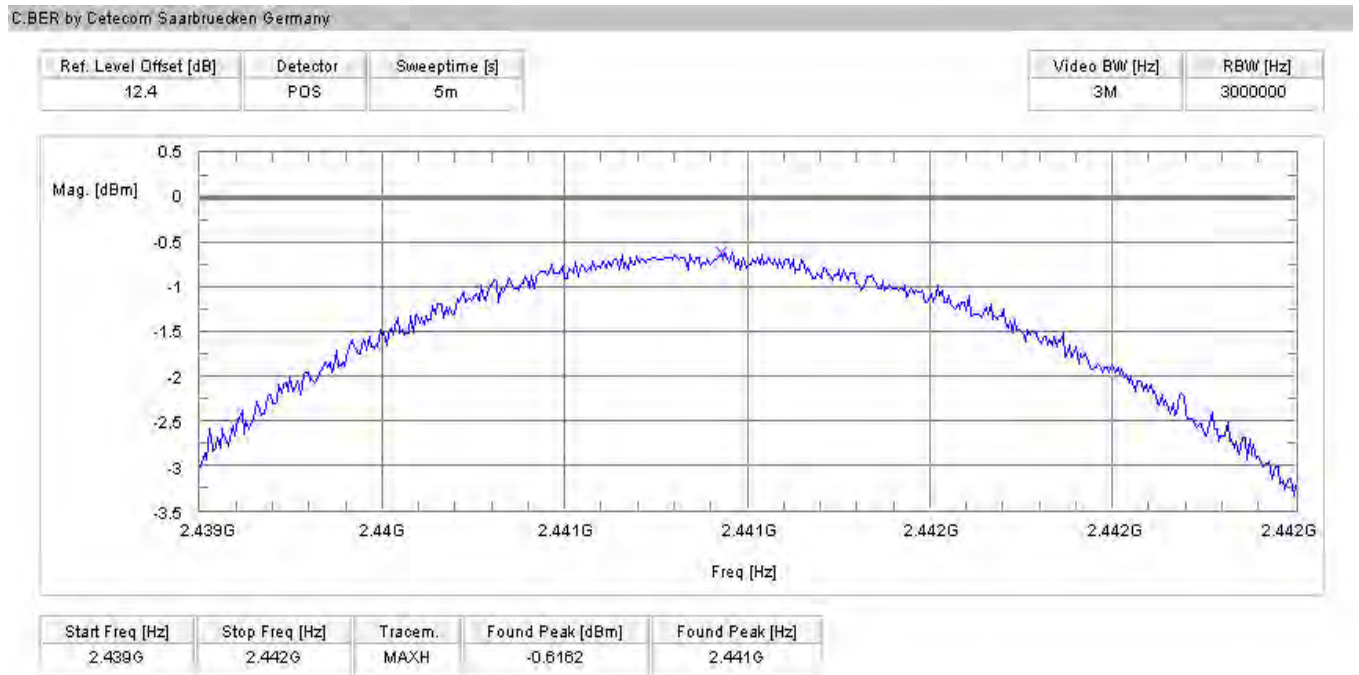
Ref. Level Offset [dB]	Detector	Sweeptime [s]
12.1	PDS	5m

Video BW [Hz]	RBW [Hz]
3M	3000000

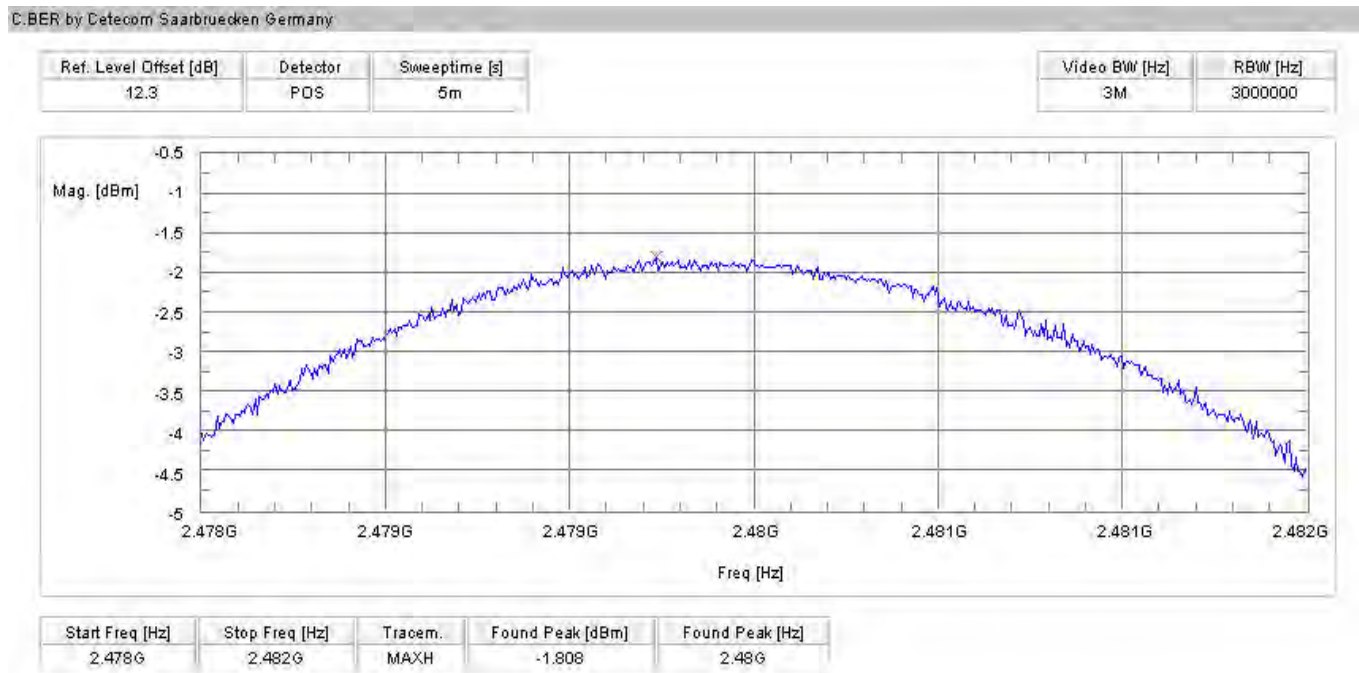


Start Freq [Hz]	Stop Freq [Hz]	TraceM.	Found Peak [dBm]	Found Peak [Hz]
2.401G	2.404G	MAXH	-0.2541	2.402G

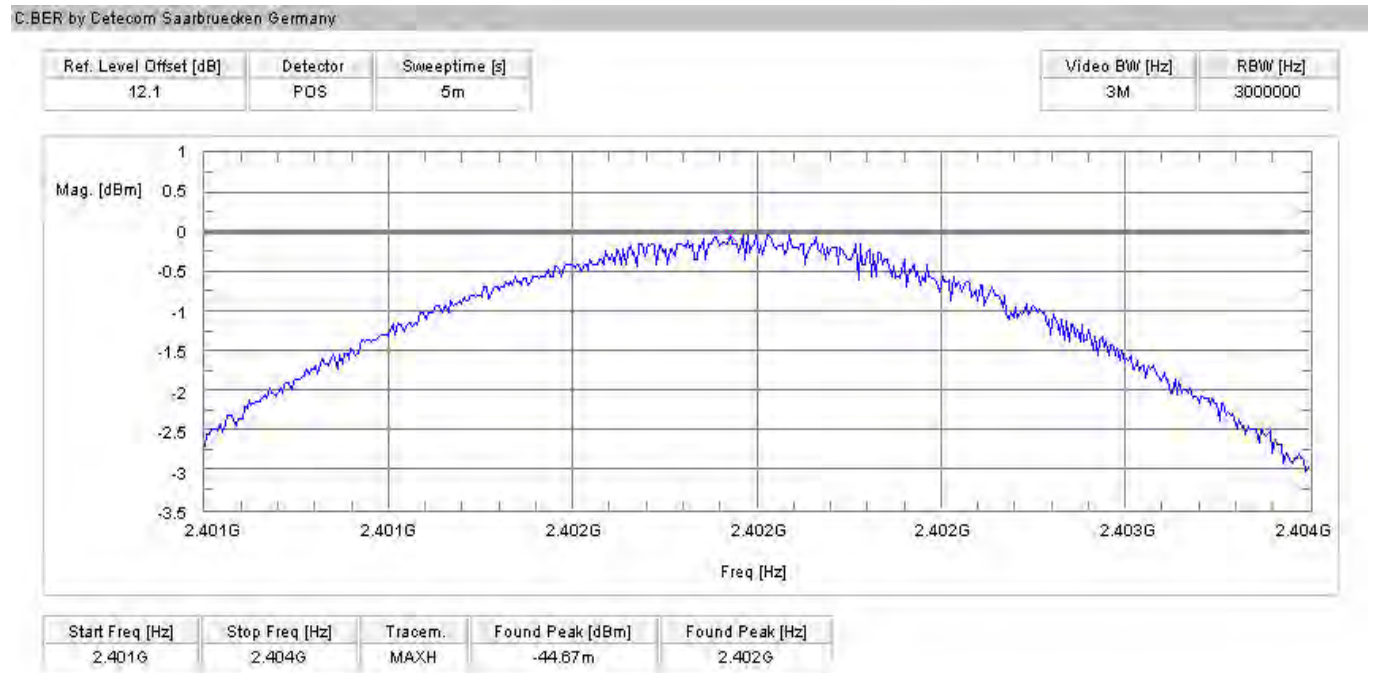
Plot 5: Pi/4 DQPSK



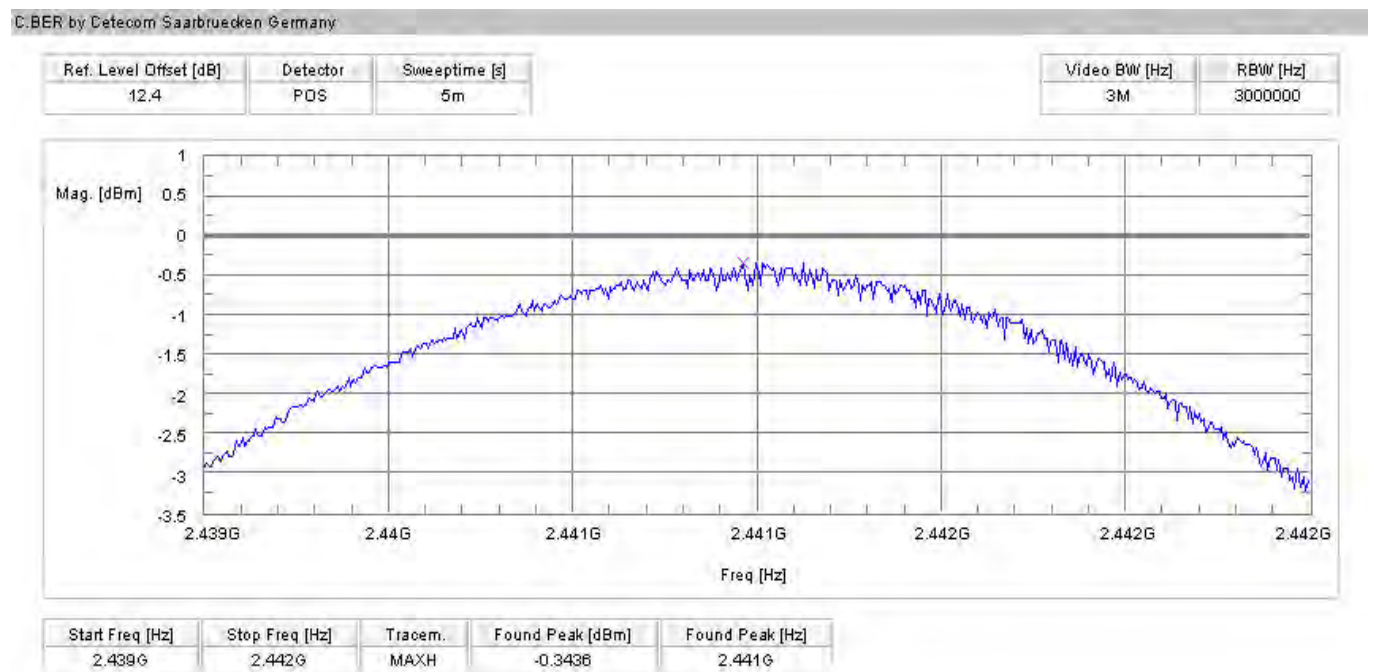
Plot 6: Pi/4 DQPSK



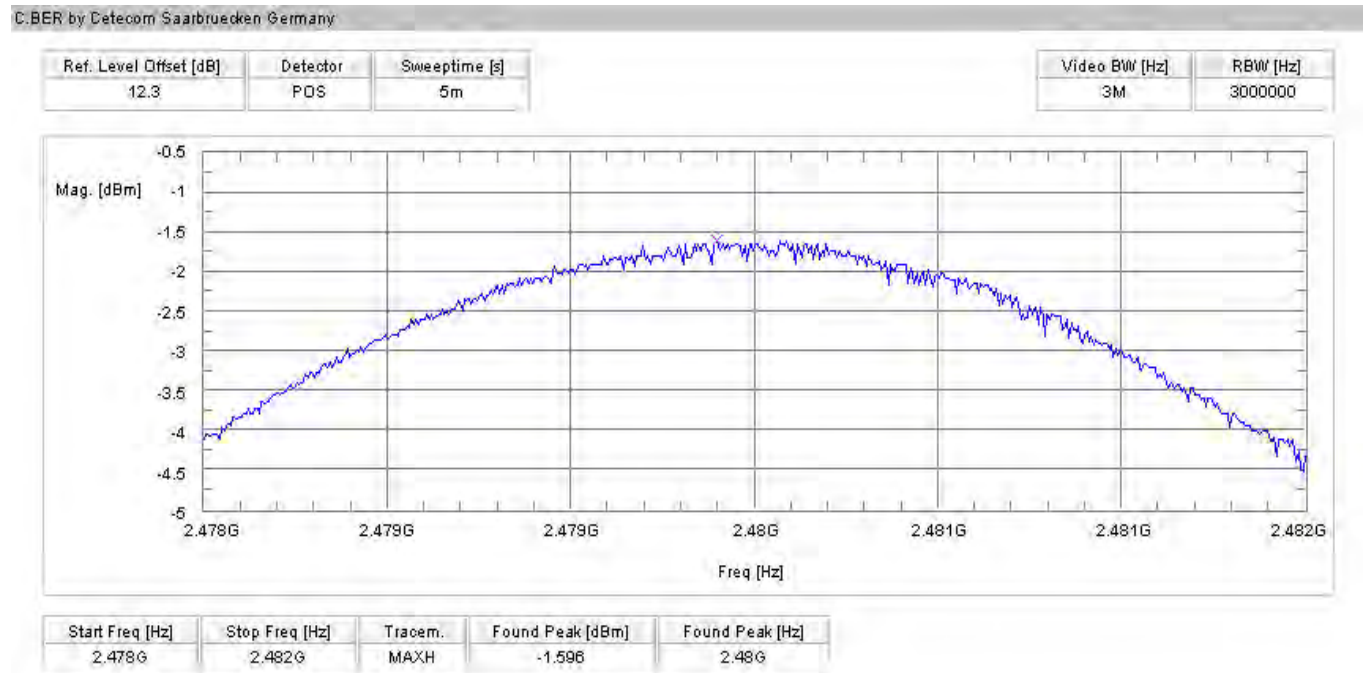
Plot 7: 8DPSK



Plot 8: 8DPSK



Plot 9: 8DPSK



Results:

Modulation Frequency [MHz]	Max. peak output power [dBm]		
	2402	2441	2480
<i>GFSK</i>	-0.81	-0.92	-2.02
<i>Pi/4 DQPSK</i>	-0.25	-0.62	-1.81
<i>8DPSK</i>	-0.04	-0.34	-1.60
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 _{nom}	V _{nom}	0.3	-3.6	-1.4
Measurement uncertainty		±3dB		

Modulation: Pi/4 DQPSK

Results:

Test conditions		Max. peak output power EIRP [dBm]		
Frequency [MHz]		2402	2442	2480
T _{nom}	V _{nom}	0.4	-3.5	-1.8
Measurement uncertainty		±3dB		

Modulation: 8 DPSK

Results:

Test conditions		Max. peak output power EIRP [dBm]		
Frequency [MHz]		2402	2442	2480
T _{nom}	V _{nom}	-0.1	-3.7	-1.2
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
--	---------------

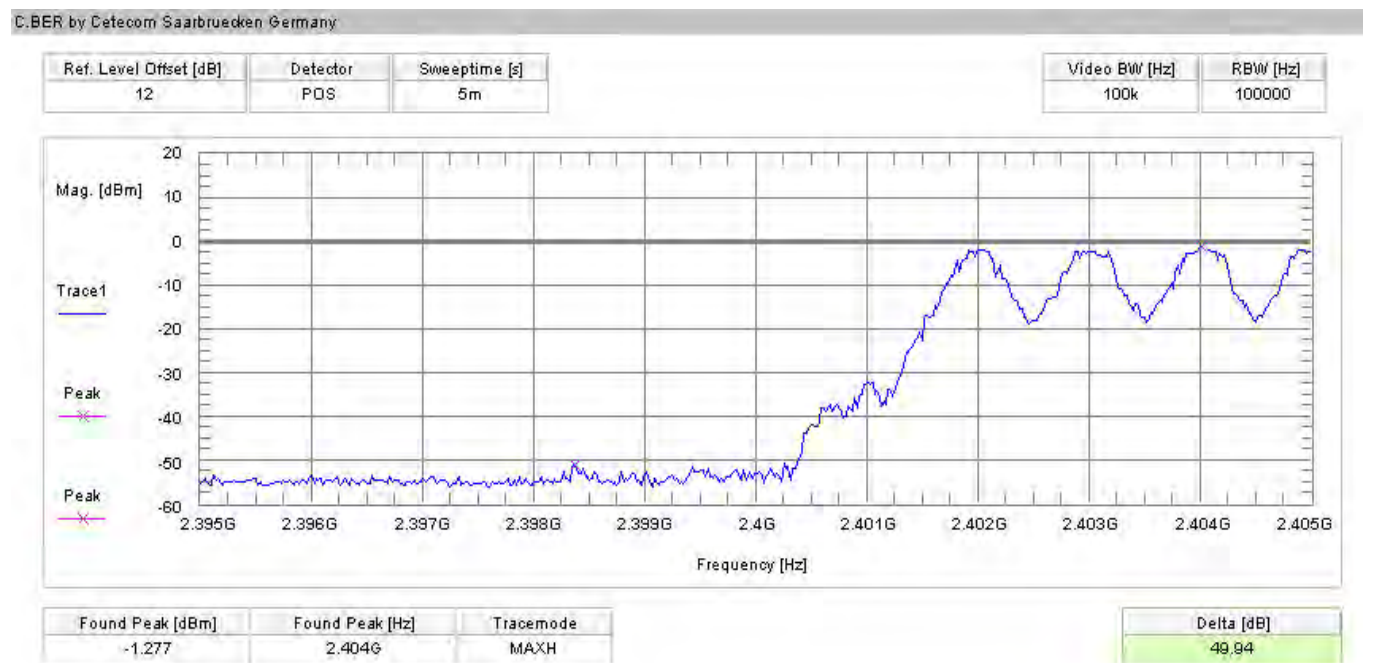
5.12 Band-edge compliance of conducted emissions §15.247 (d)

Modulation: GFSK

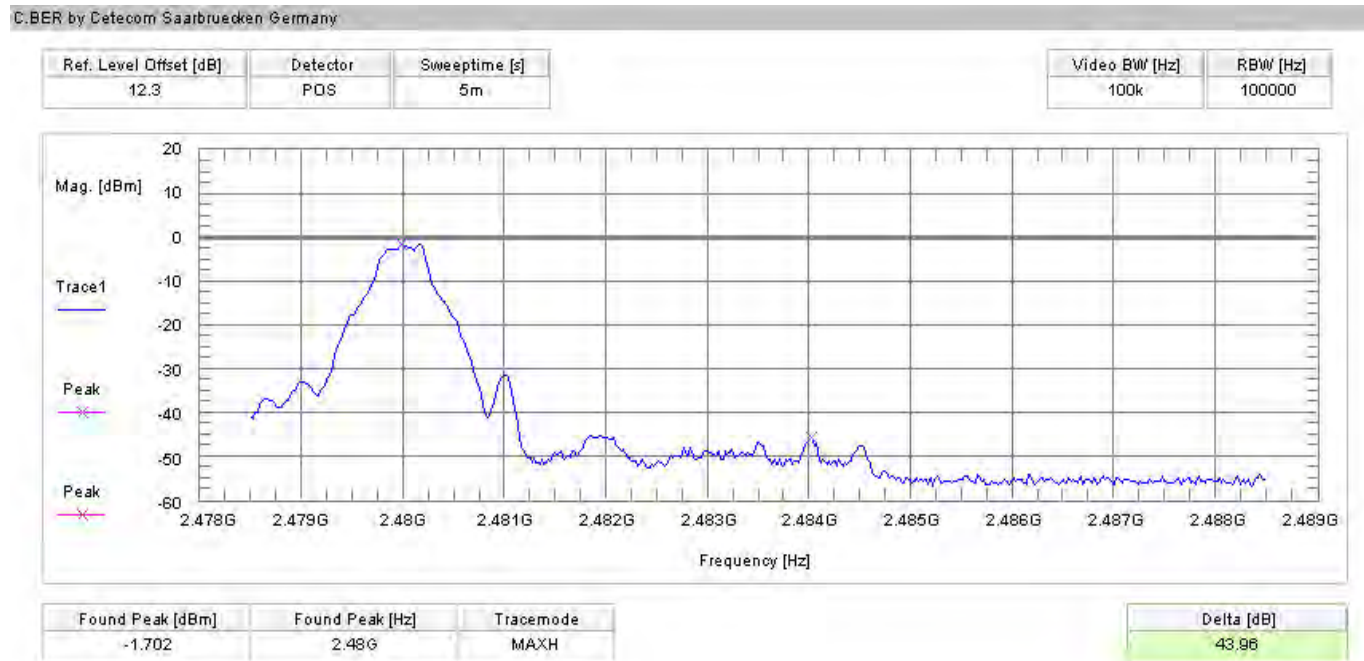
Plot 1 of 4 (hopping off, lowest frequency):



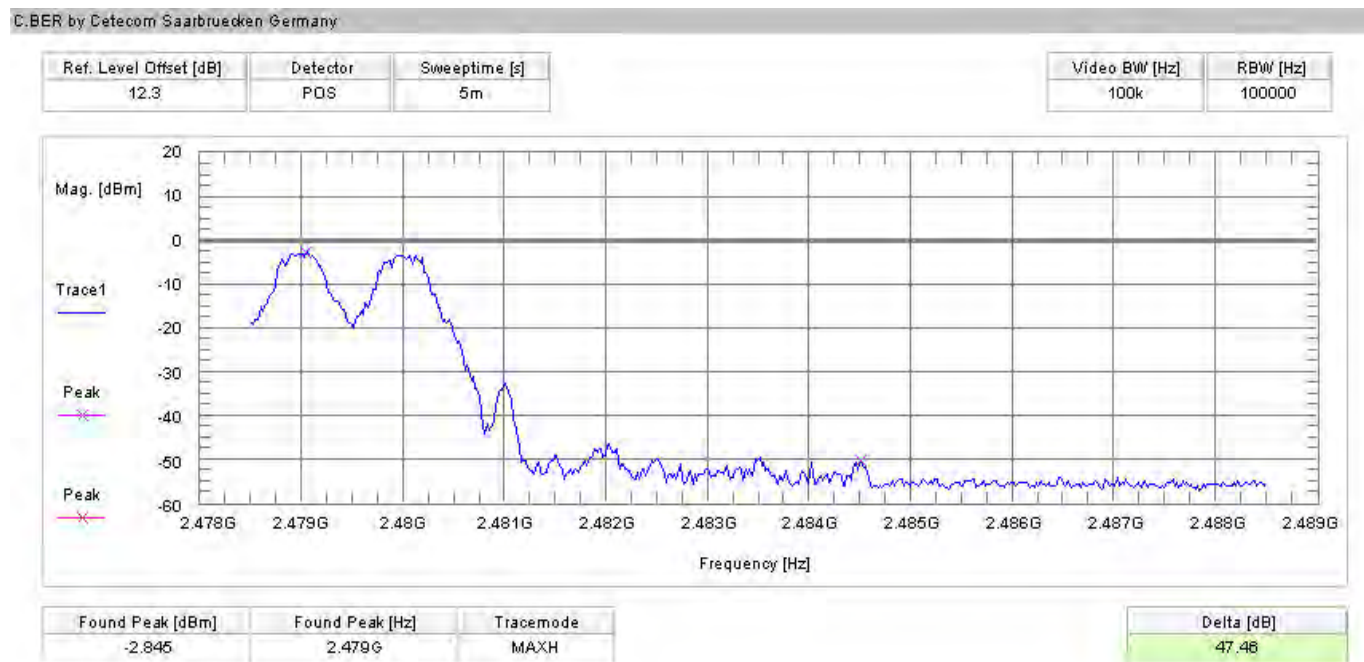
Plot 2 of 4 (hopping on, lowest frequency):



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



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

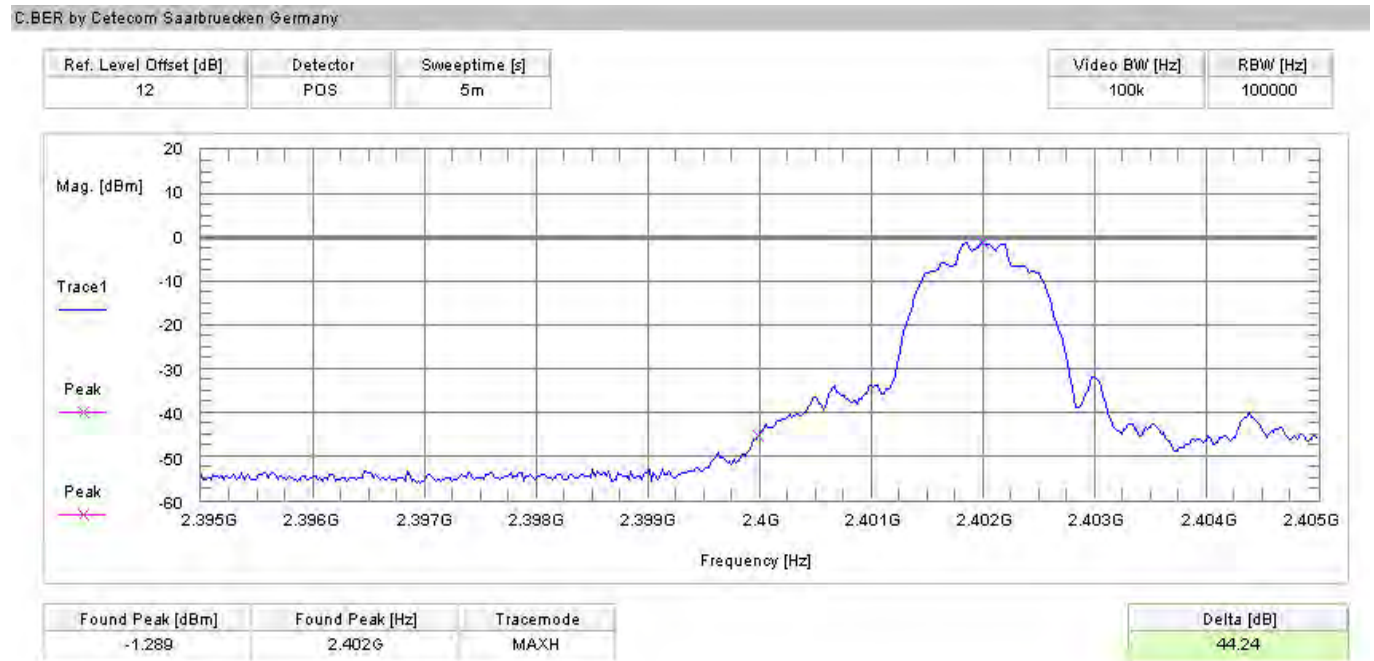


Results:

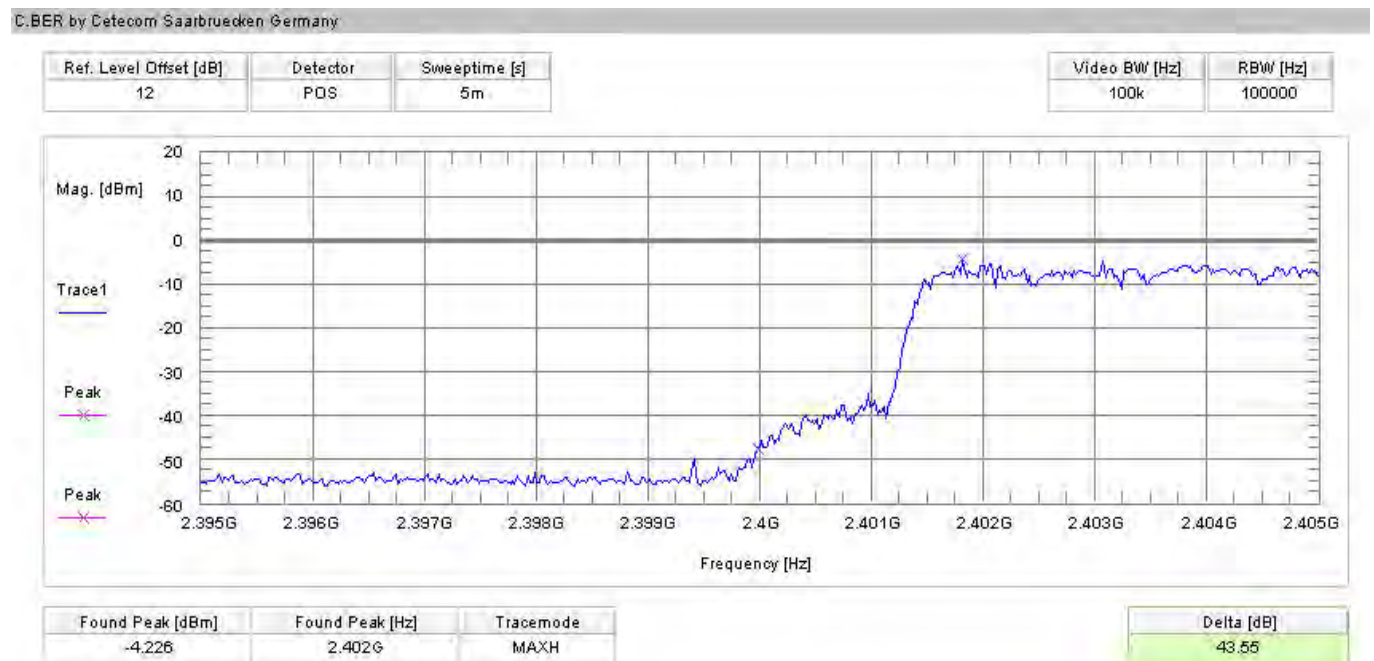
SZENARIO	DELTA VALUE [DB]
hopping off, lowest frequency	> 20 dB
hopping on, lowest frequency	> 20 dB
hopping off, highest frequency	> 20 dB
hopping on, highest frequency	> 20 dB
Measurement uncertainty	±1,5dB

Modulation: Pi/4 DQPSK

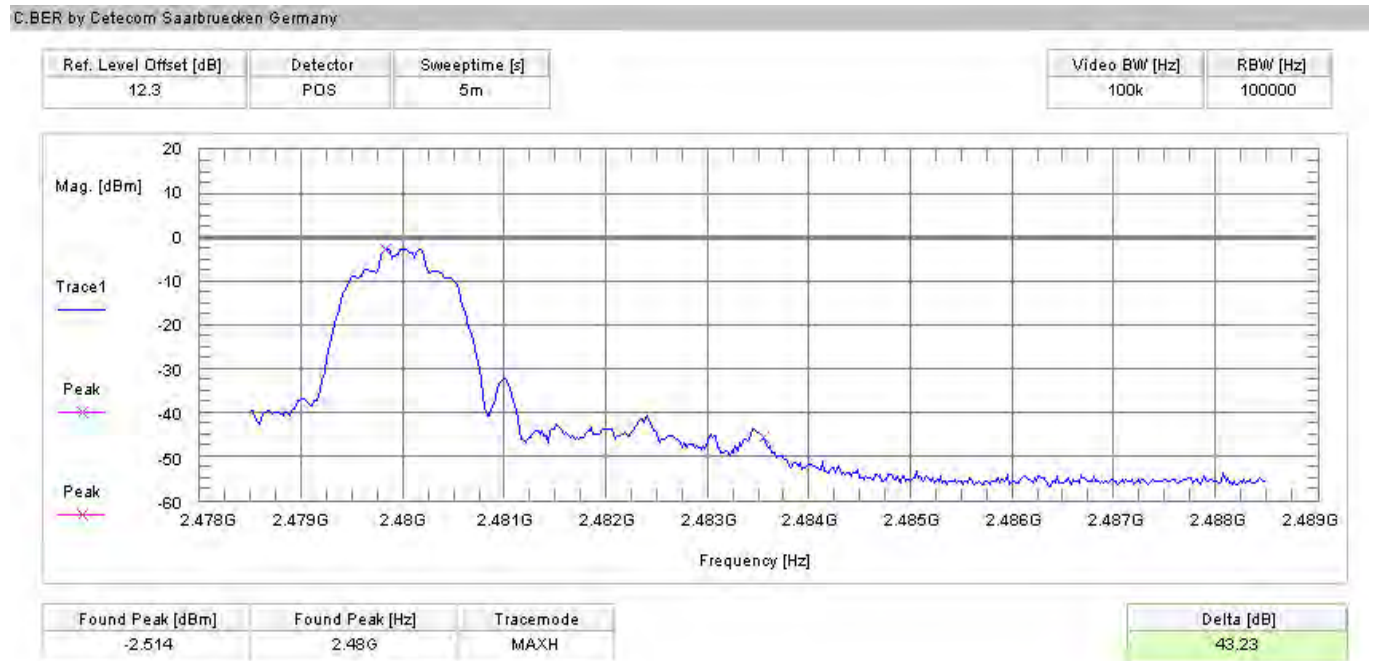
Plot 1 of 4 (hopping off, lowest frequency):



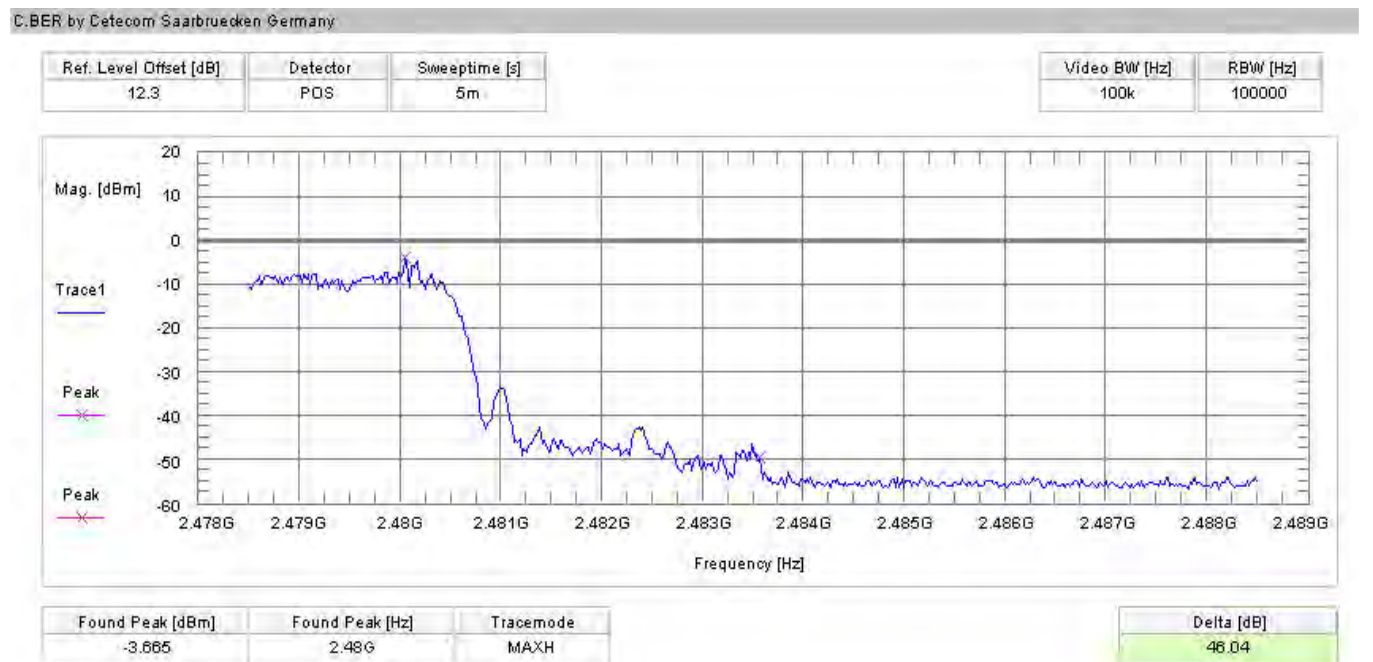
Plot 2 of 4 (hopping on, lowest frequency):



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



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

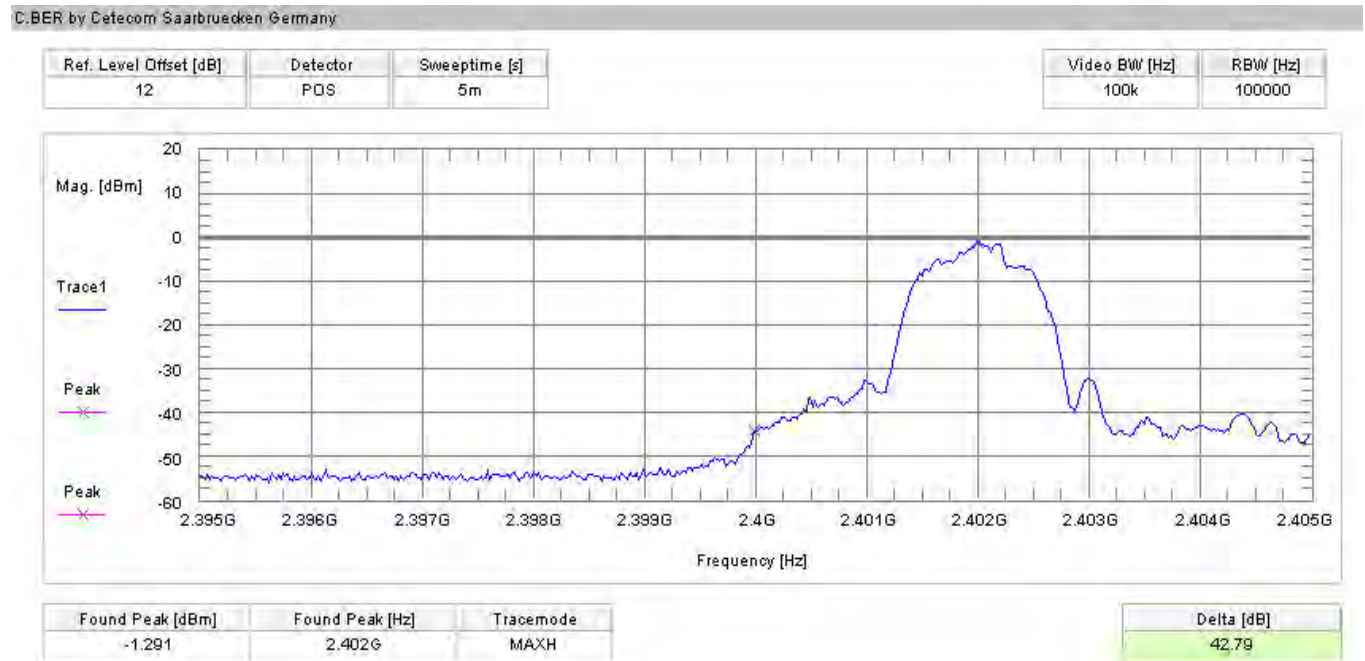


Results:

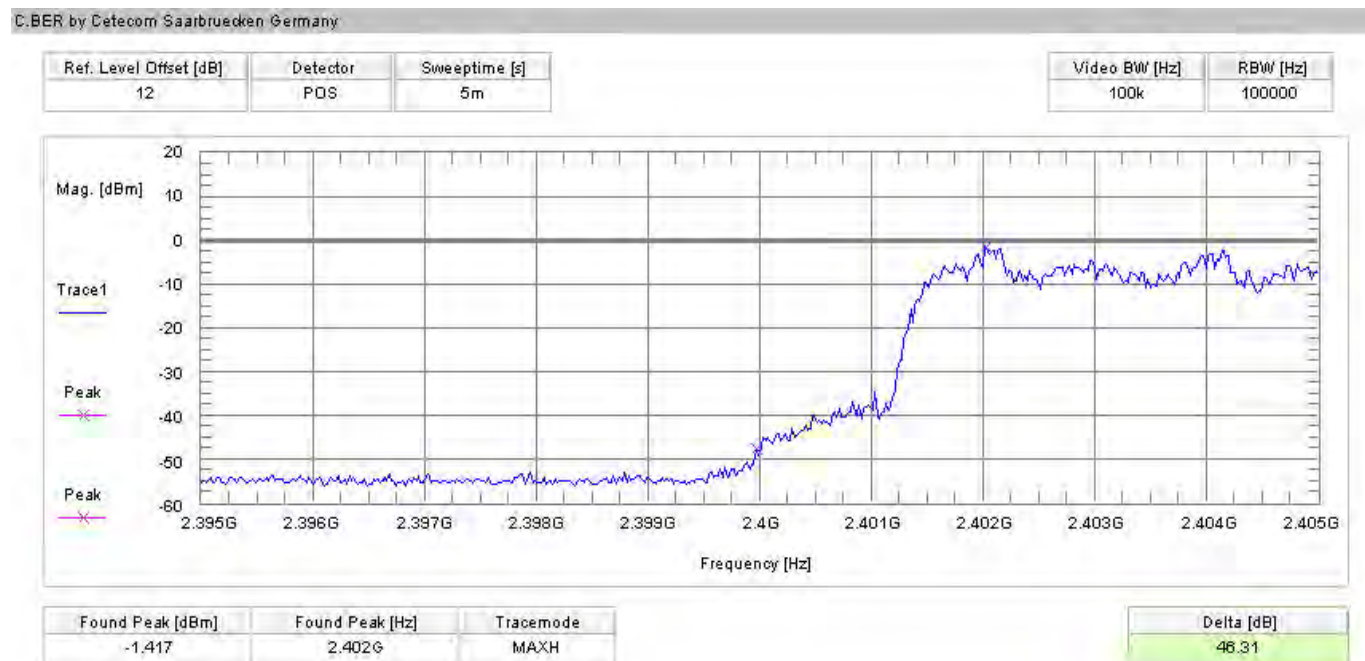
SZENARIO	DELTA VALUE [DB]
hopping off, lowest frequency	> 20 dB
hopping on, lowest frequency	> 20 dB
hopping off, highest frequency	> 20 dB
hopping on, highest frequency	> 20 dB
Measurement uncertainty	±1,5dB

Modulation: 8 DPSK

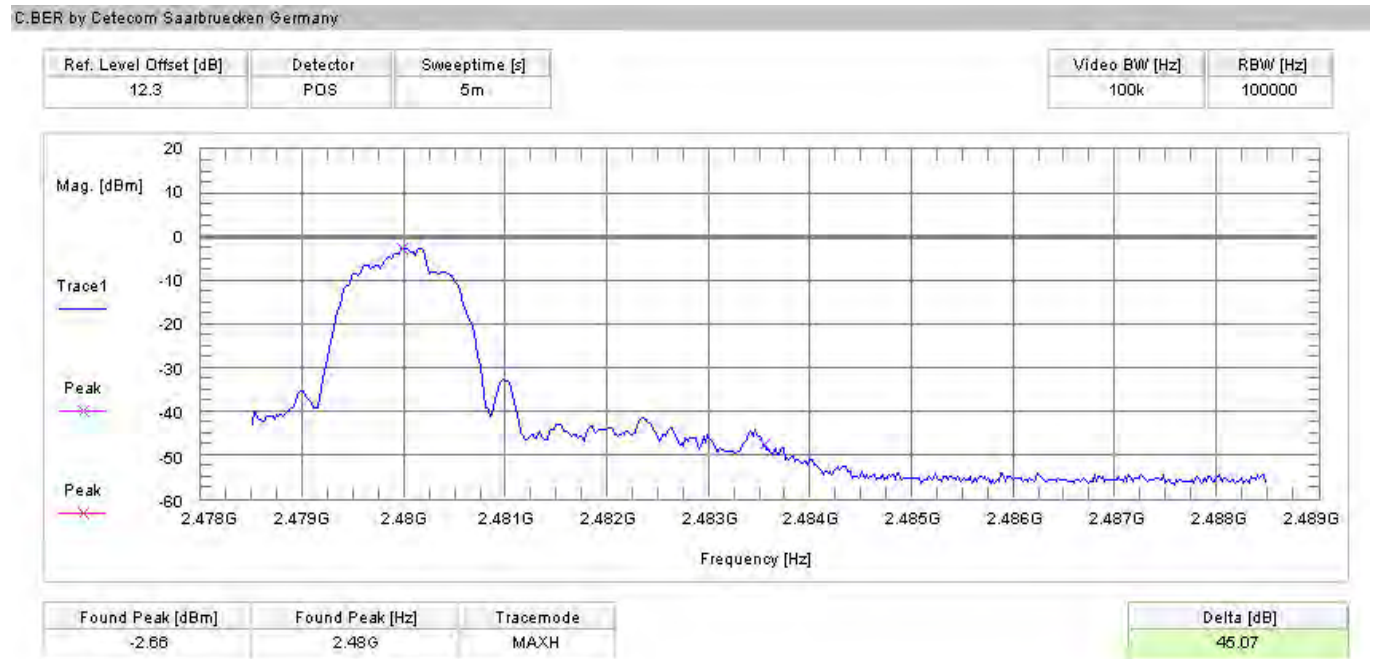
Plot 1 of 4 (hopping off, lowest frequency):



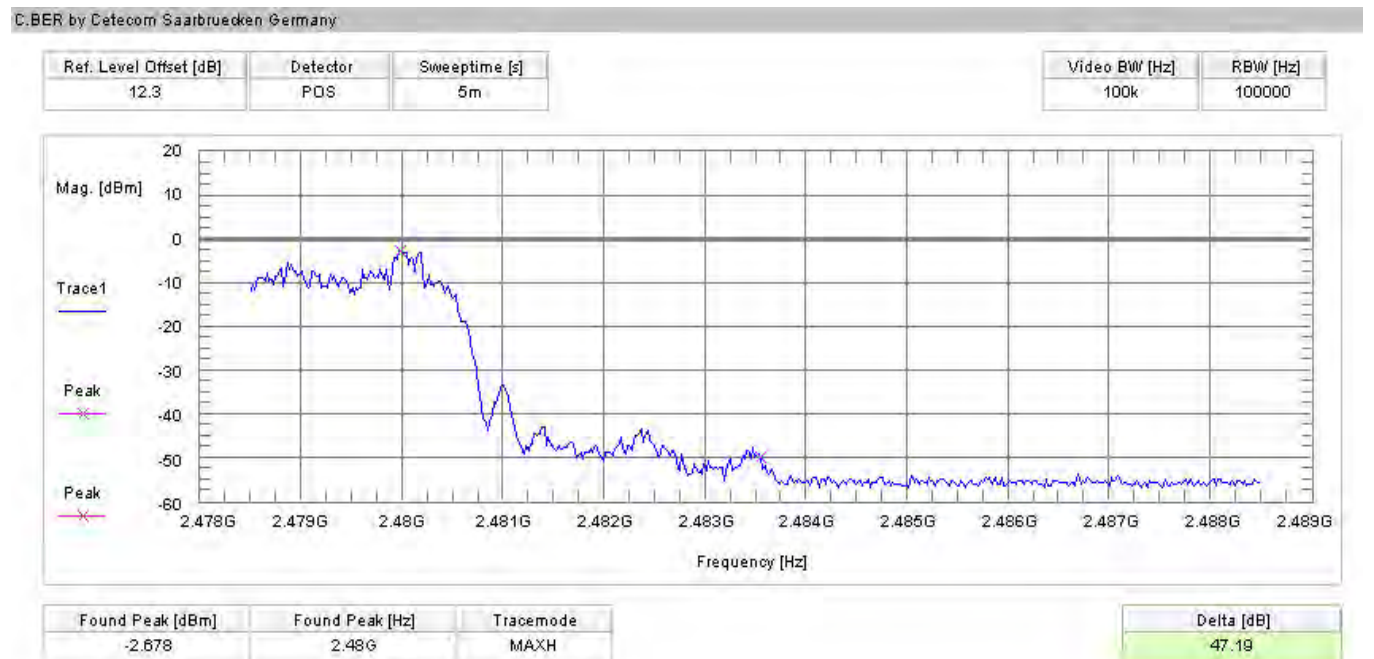
Plot 2 of 4 (hopping on, lowest frequency):



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

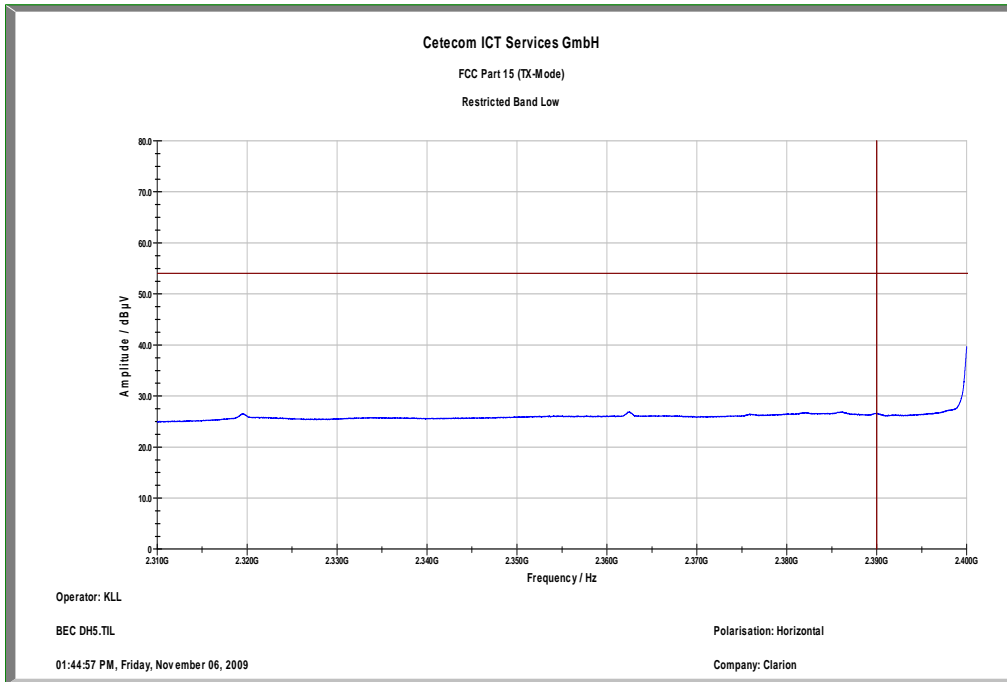
Limits:

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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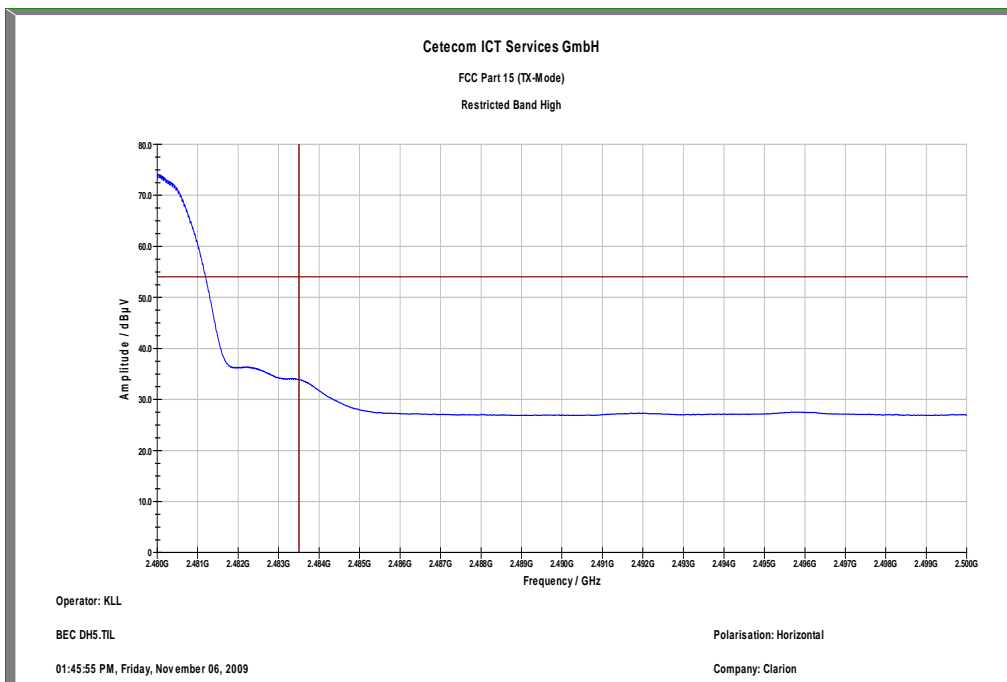
5.13 Band-edge compliance of radiated emissions §15.205

Modulation: GFSK

Plot 1: Restricted Bands low, DUT worst case position, vertical antenna polarization

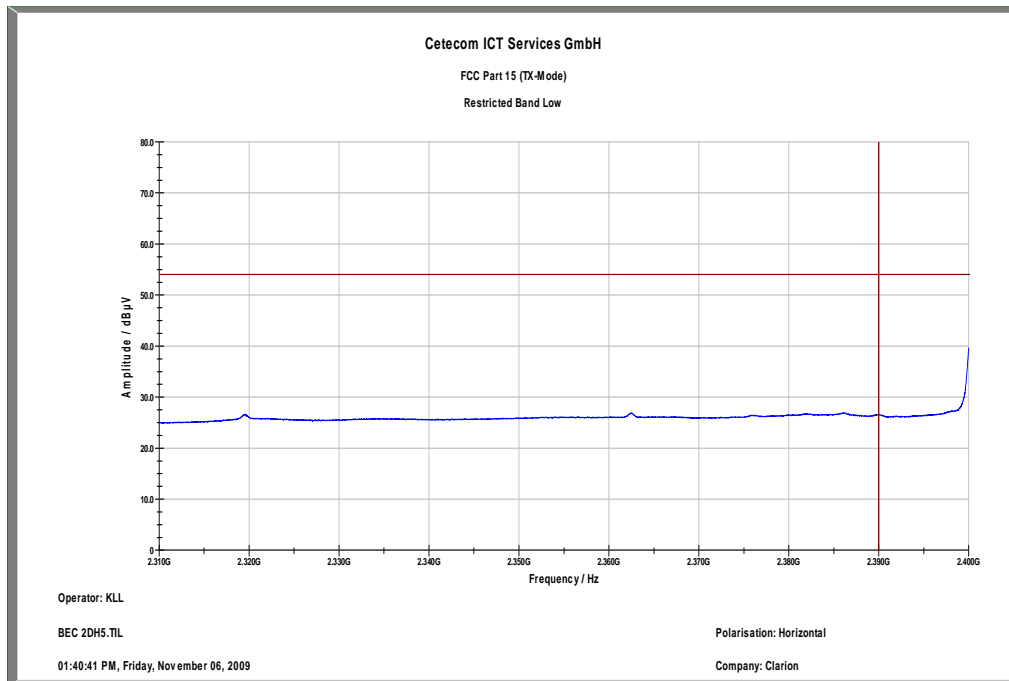


Plot 2: Restricted Bands high, DUT worst case position, vertical antenna polarization



Modulation: Pi/4 DQPSK

Plot 1: Restricted Bands low, DUT worst case position, vertical antenna polarization

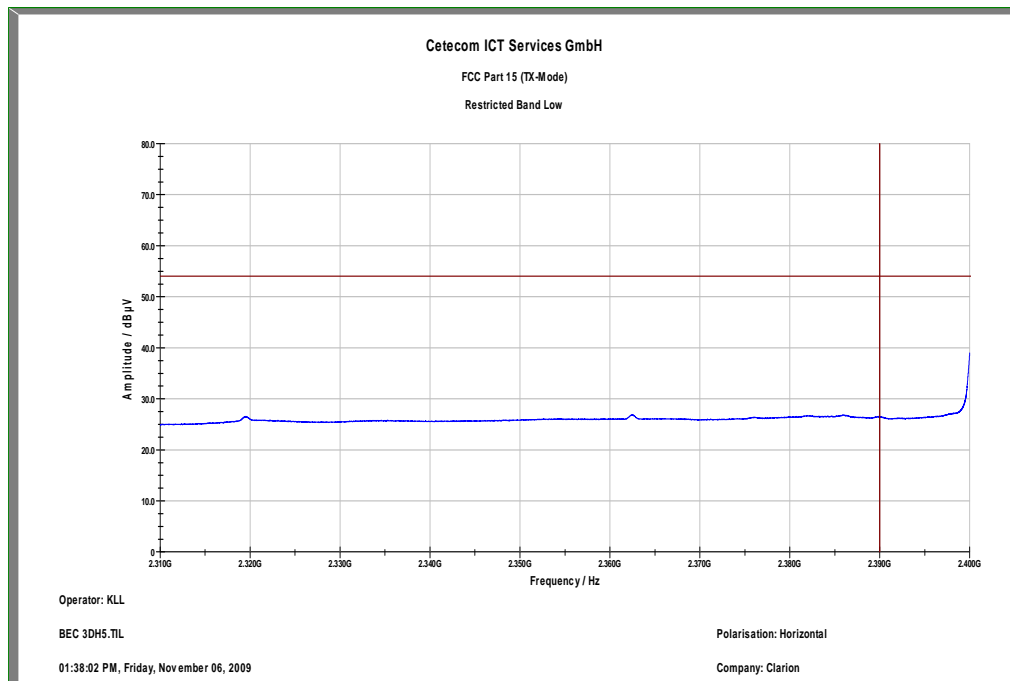


Plot 2: Restricted Bands high, DUT worst case position, vertical antenna polarization

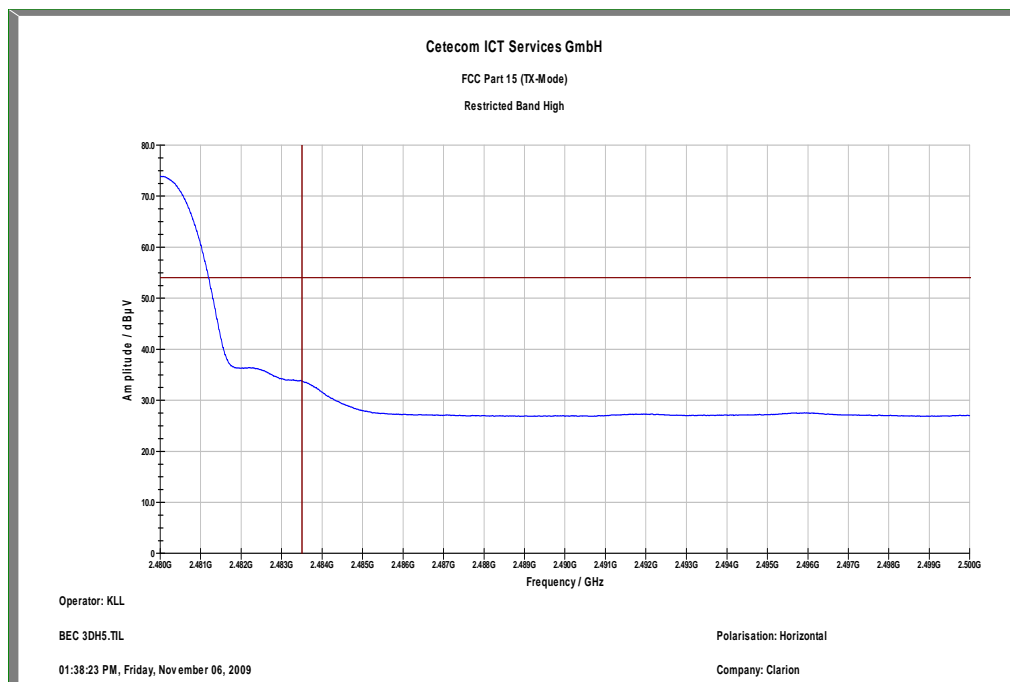


Modulation: 8 DPSK

Plot 1: Restricted Bands low, DUT worst case position, vertical antenna polarization



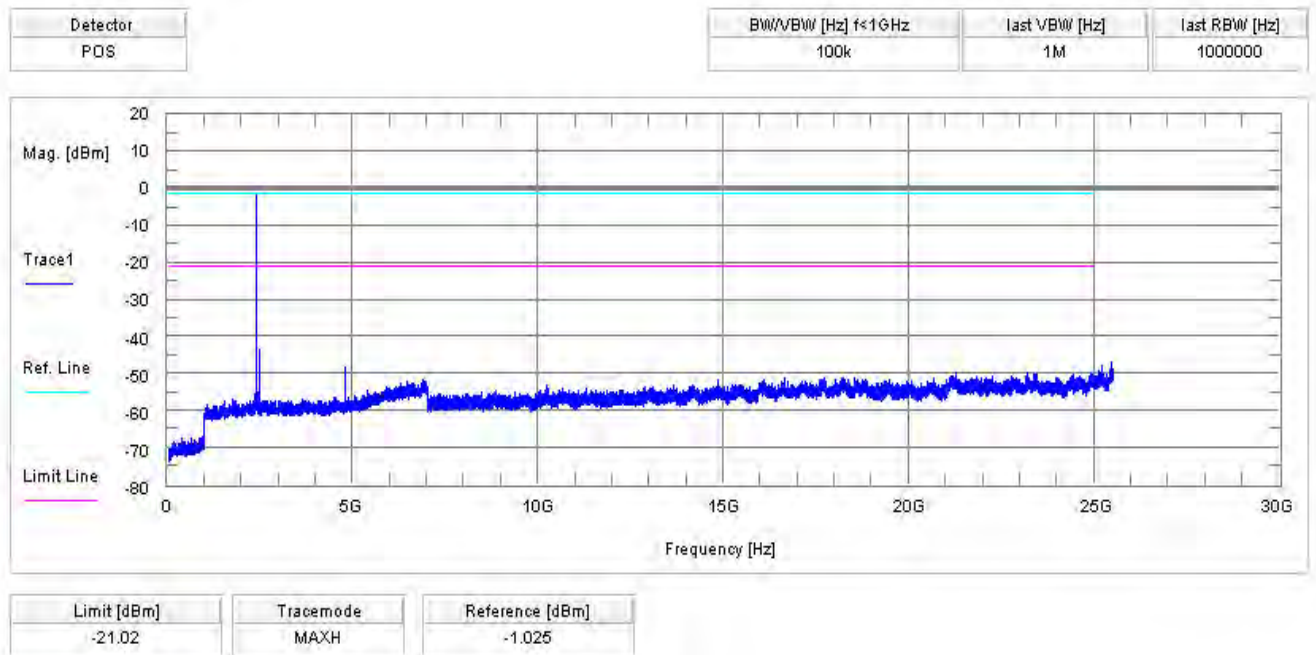
Plot 2: Restricted Bands high, DUT worst case position, vertical antenna polarization



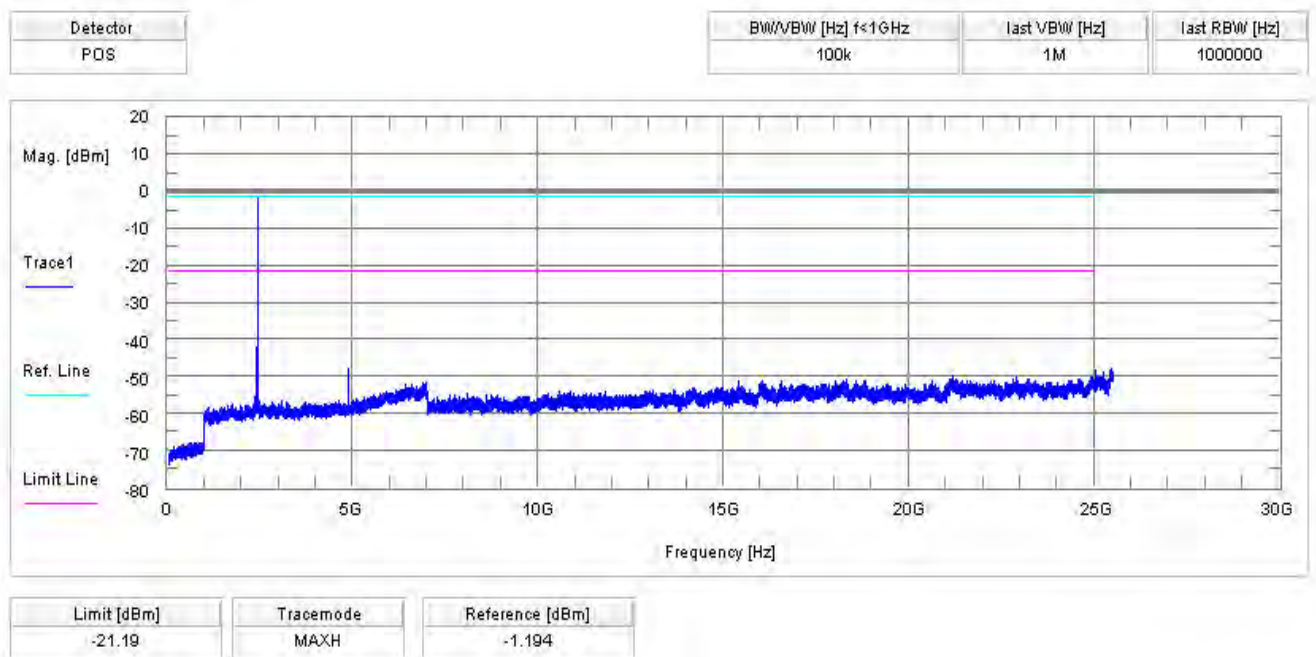
5.14 Spurious Emissions - conducted (Transmitter) § 15.247 (c)(1)

Modulation: GFSK

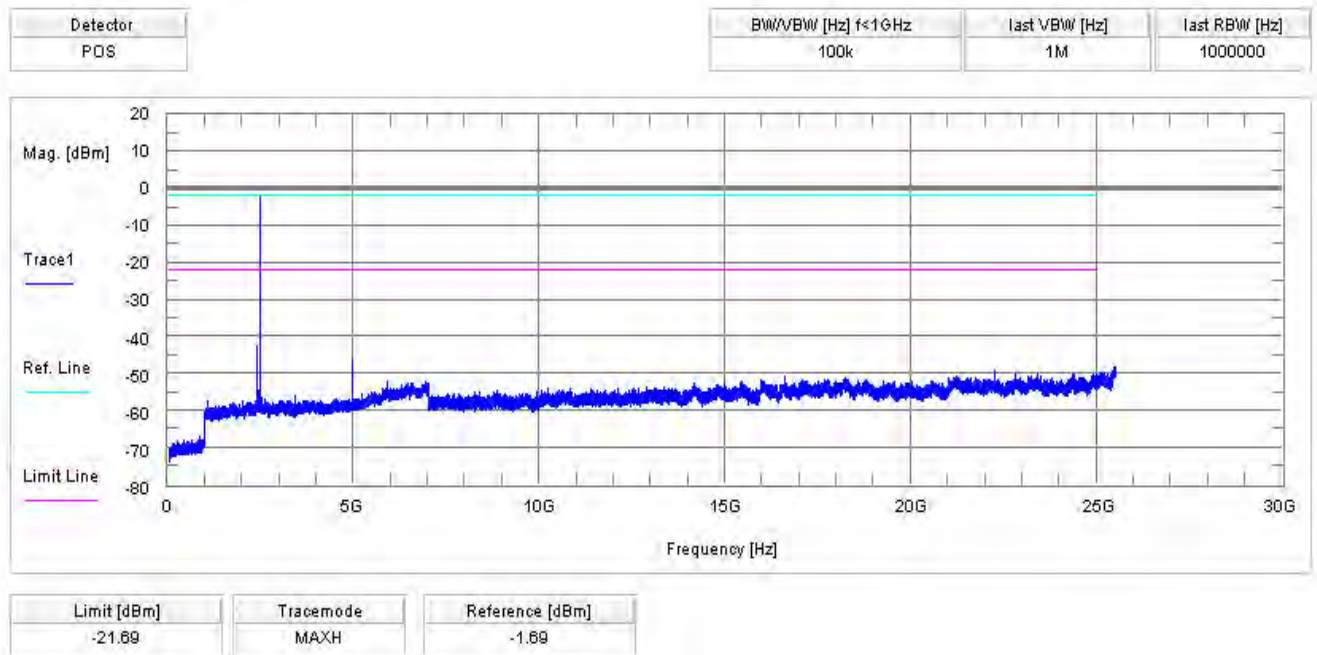
Plot 1 of 3: lowest channel



Plot 2 of 3: middle channel



Plot 3 of 3: highest channel



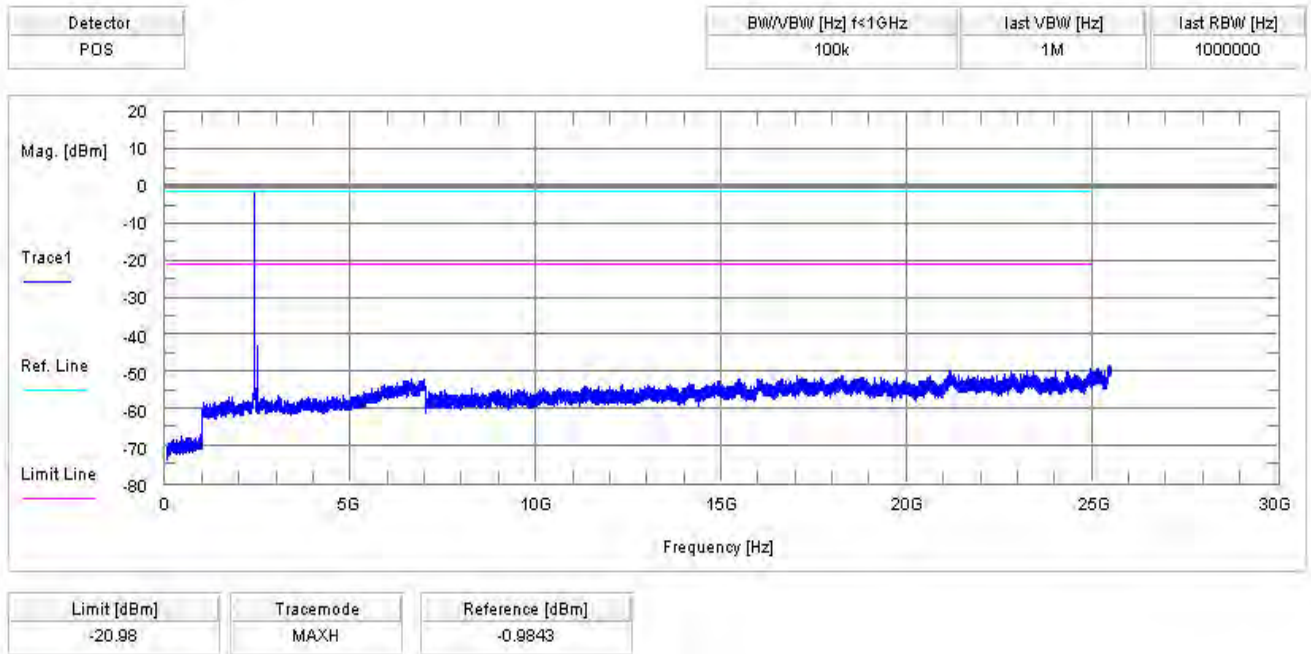
Result & Limits:

Emission Limitation					
f [MHz]		amplitude of emission [dBm]	limit max. allowed emission power	actual attenuation below frequency of operation [dB]	results
2402		-1.03	30 dBm		Operating frequency
No critical peaks detected. All detected emissions are below the -20 dBc criteria.			-20 dBc		complies
2441		-1.19	30 dBm		Operating frequency
No critical peaks detected. All detected emissions are below the -20 dBc criteria.			-20 dBc		complies
2480		-1.69	30 dBm		Operating frequency
No critical peaks detected. All detected emissions are below the -20 dBc criteria.			-20 dBc		complies
Measurement uncertainty			± 3dB		

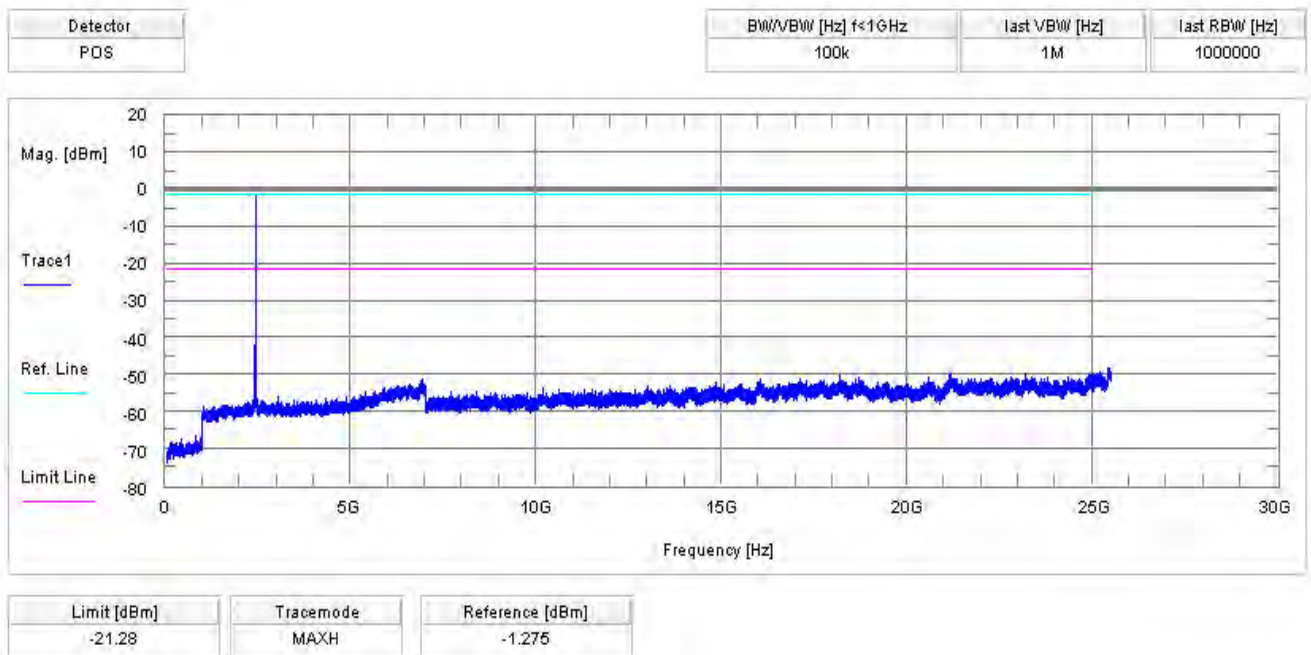
F < 1 GHz: RBW: 100 kHz VBW: 100 kHz
 F > 1 GHz: RBW: 1 MHz VBW: 1 MHz

Modulation: Pi/4 DQPSK

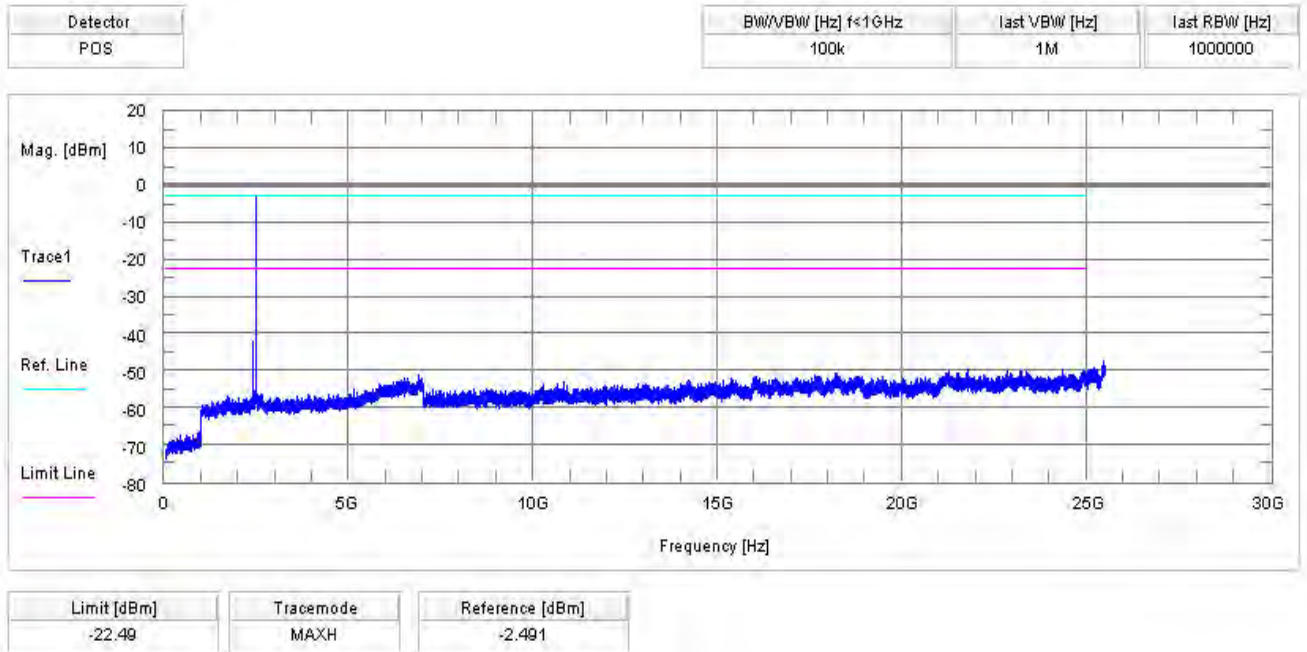
Plot 1 of 3: lowest channel



Plot 2 of 3: middle channel



Plot 3 of 3: highest channel



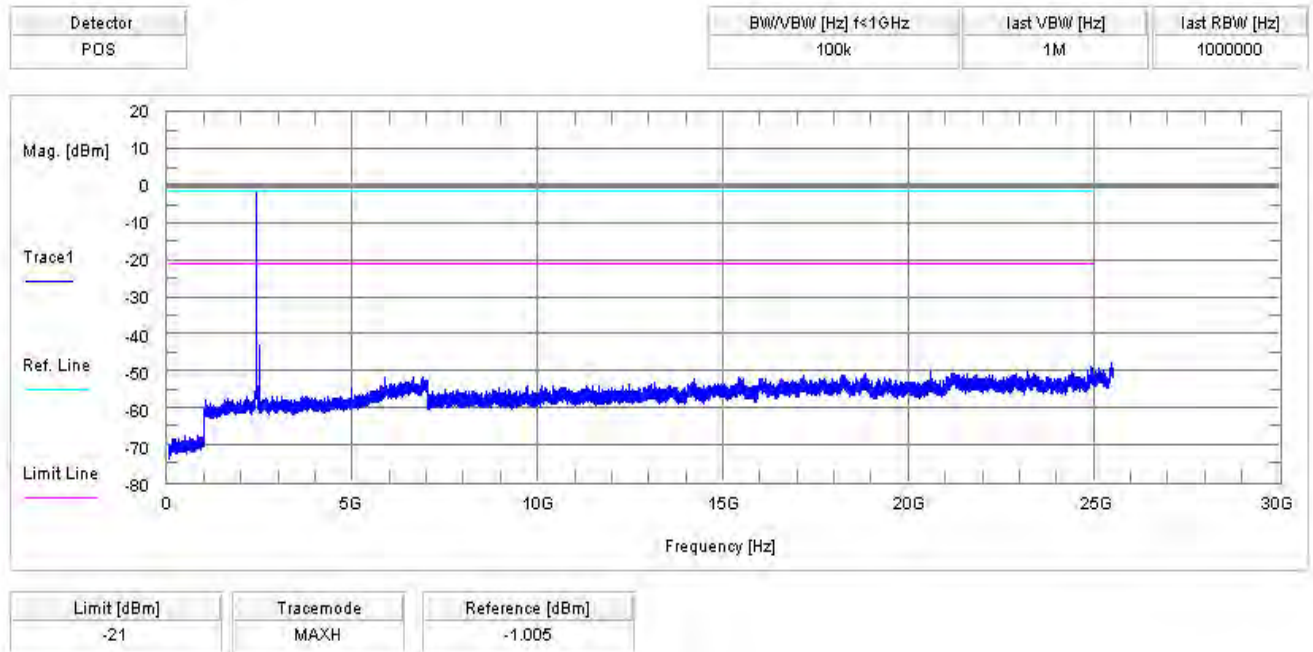
Result & Limits:

Emission Limitation					
f [MHz]		amplitude of emission [dBm]	limit max. allowed emission power	actual attenuation below frequency of operation [dB]	results
2402		-0.98	30 dBm		Operating frequency
No critical peaks detected. All detected emissions are below the -20 dBc criteria.			-20 dBc		complies
2441		-1.28	30 dBm		Operating frequency
No critical peaks detected. All detected emissions are below the -20 dBc criteria.			-20 dBc		complies
2480		-2.49	30 dBm		Operating frequency
No critical peaks detected. All detected emissions are below the -20 dBc criteria.			-20 dBc		complies
Measurement uncertainty			± 3dB		

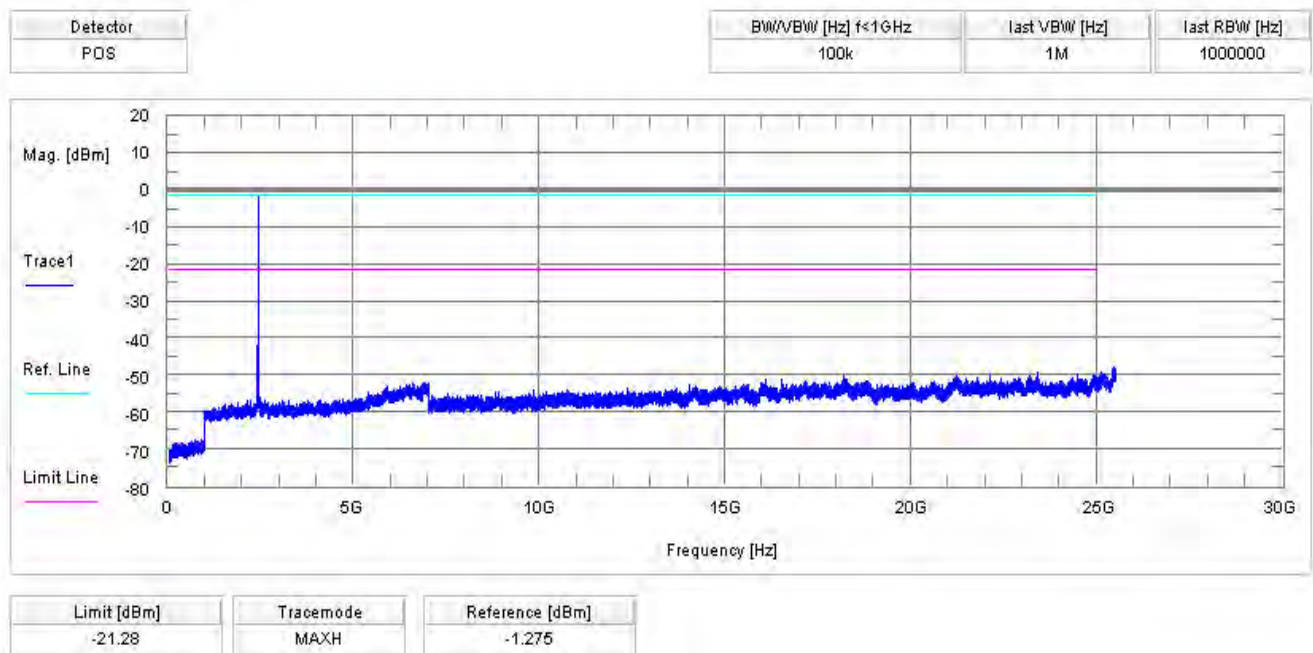
F < 1 GHz: RBW: 100 kHz VBW: 100 kHz
 F > 1 GHz: RBW: 1 MHz VBW: 1 MHz

Modulation: 8 DPSK

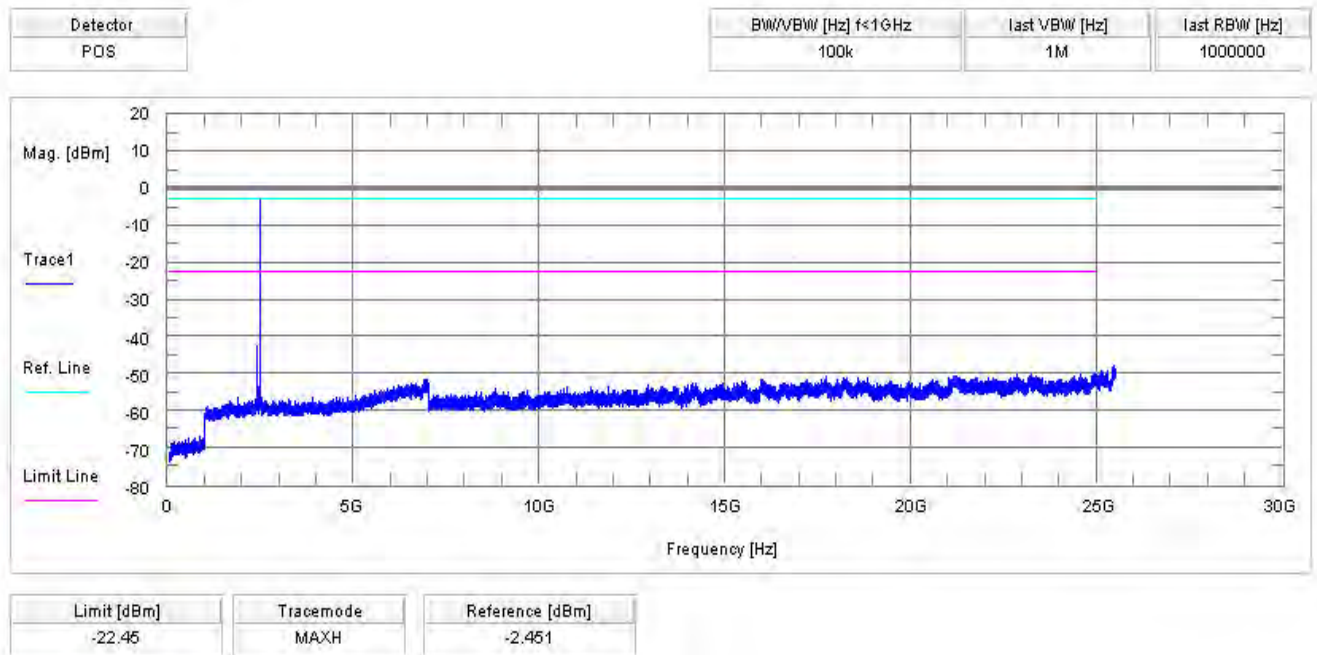
Plot 1 of 3: lowest channel



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		-1.01	30 dBm		Operating frequency
No critical peaks detected. All detected emissions are below the -20 dBc criteria.			-20 dBc		complies
2441		-1.28	30 dBm		Operating frequency
No critical peaks detected. All detected emissions are below the -20 dBc criteria.			-20 dBc		complies
2480		-2.45	30 dBm		Operating frequency
No critical peaks detected. All detected emissions are below the -20 dBc criteria.			-20 dBc		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)

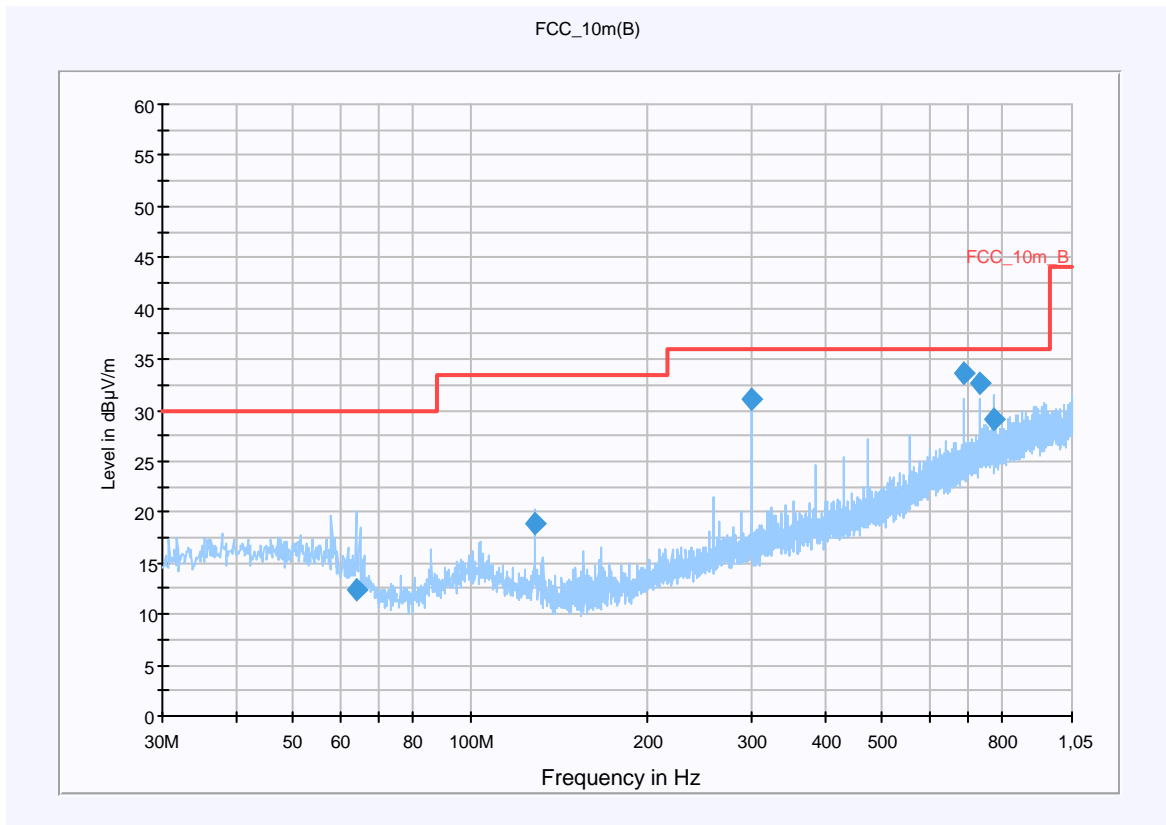
Modulation: 8DPSK

Plot 1: 0.03 - 1 GHz (lowest channel)

EUT: NX700E
 Serial Number: 311X
 Test Description: FCC part 15 class B @ 10 m
 Operating Conditions: BT TX Ch. 0
 Operator Name: Hennemann
 Comment: DC: 12 V; all cables connected or terminated

Scan Setup: STAN_Fin [EMI radiated]

Hardware Setup: Electric Field (NOS)
 Level Unit: dBµV/m
Subrange **Detectors** **IF Bandwidth** **Meas. Time** **Receiver**
 30 MHz - 1,05 GHz QuasiPeak 120 kHz 15 s 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)	Comment
63.951300	12.3	15000.000	120.000	100.0	V	235.0	10.9	17.7	30.0	
128.842650	18.9	15000.000	120.000	130.0	V	113.0	9.8	14.6	33.5	
300.681600	31.0	15000.000	120.000	263.0	H	106.0	14.8	5.0	36.0	
687.268650	33.7	15000.000	120.000	256.0	V	-4.0	22.7	2.3	36.0	
730.221300	32.6	15000.000	120.000	264.0	V	16.0	23.7	3.4	36.0	
773.147850	29.1	15000.000	120.000	346.0	H	208.0	24.2	6.9	36.0	

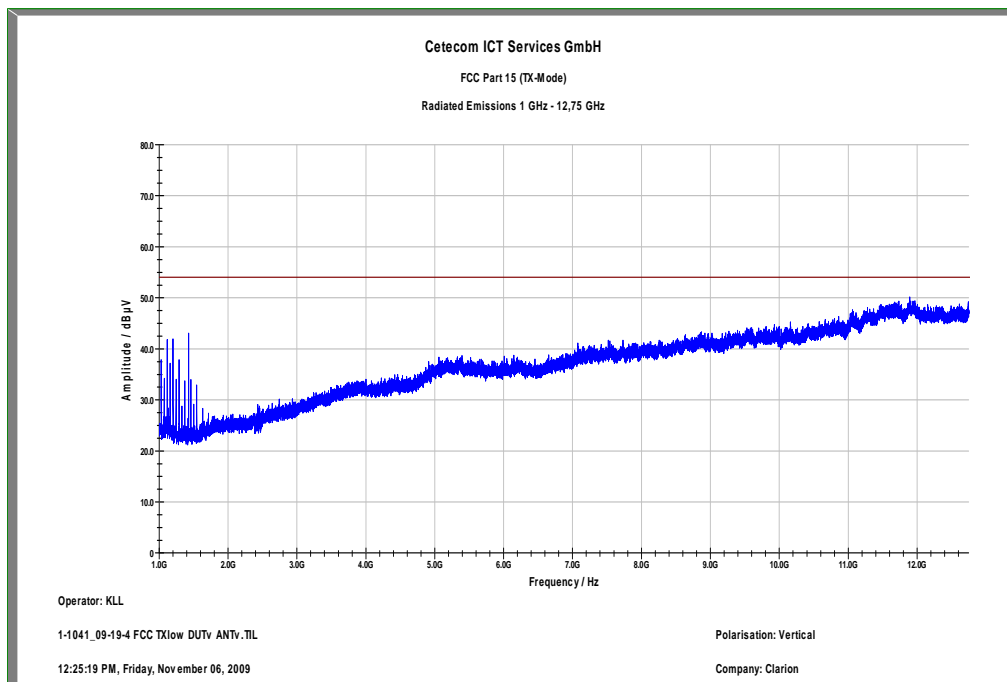
Hardware Setup: EMI radiated\Electric Field (NOS) - [EMI radiated]

Subrange 1

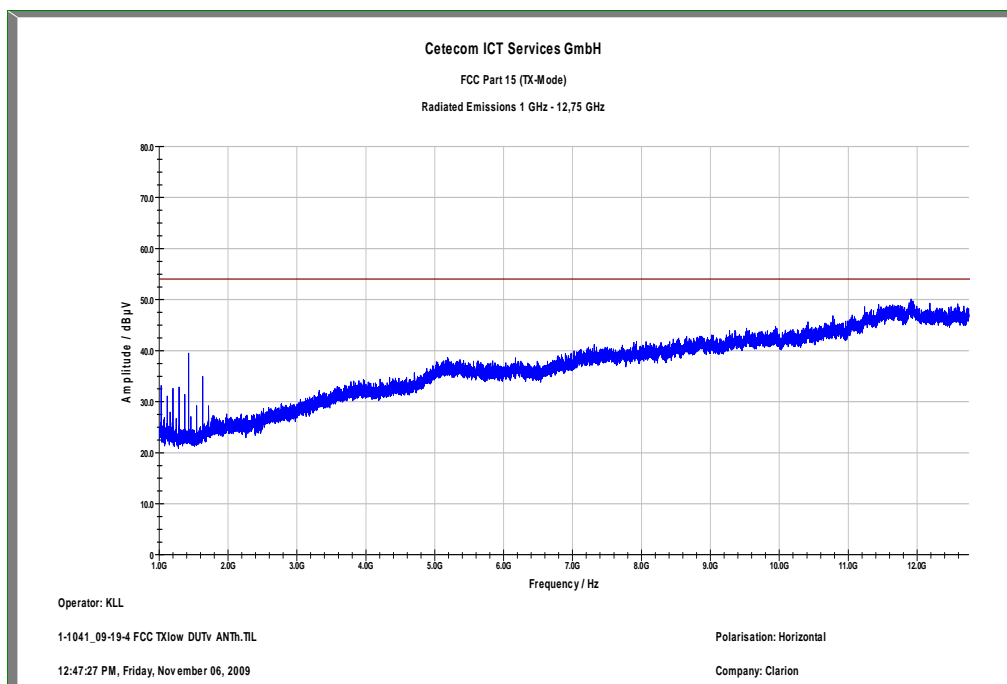
Frequency Range:	30 MHz - 2 GHz
Receiver:	Receiver [ESCI 3] @ GPIB0 (ADR 20), SN 100083/003, FW 4.32
Signal Path:	without Notch FW 1.0
Antenna:	VULB 9163 SN 9163-295, FW --- Correction Table (vertical): VULP6113 Correction Table (horizontal): VULP6113 Correction Table: Cable_EN_1GHz (0909)
Antenna Tower:	Tower [EMCO 2090 Antenna Tower] @ GPIB0 (ADR 8), FW REV 3.12
Turntable:	Turntable [EMCO Turntable] @ GPIB0 (ADR 9), FW REV 3.12

EMC 32 Version 8.10.00

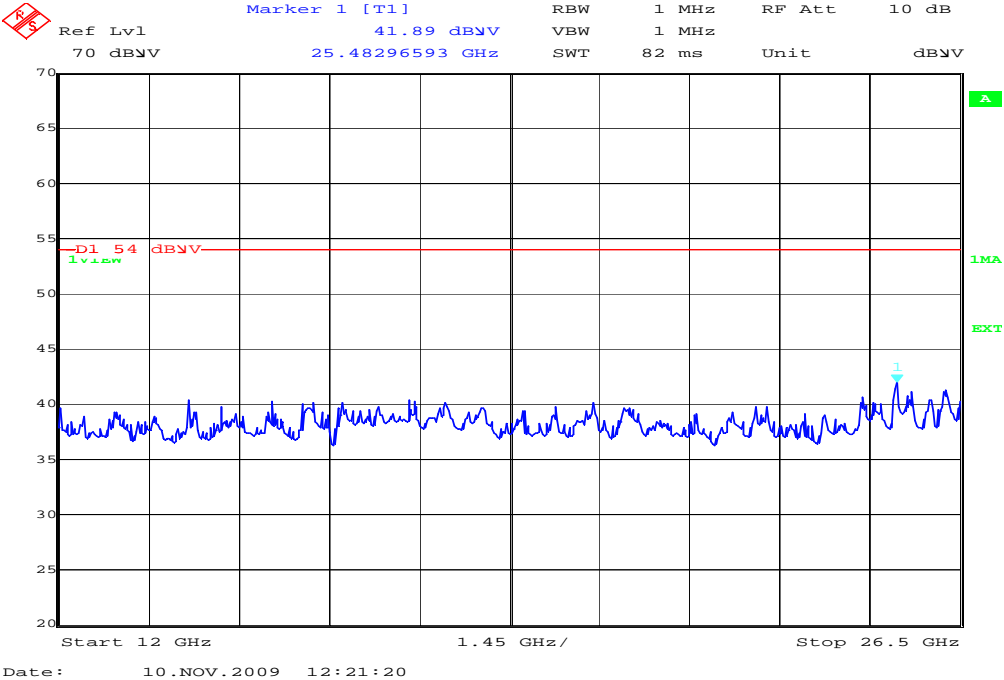
Plot 2: 1 - 13 GHz vertical (lowest channel)



Plot 3: 1 - 13 GHz horizontal (lowest channel)



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

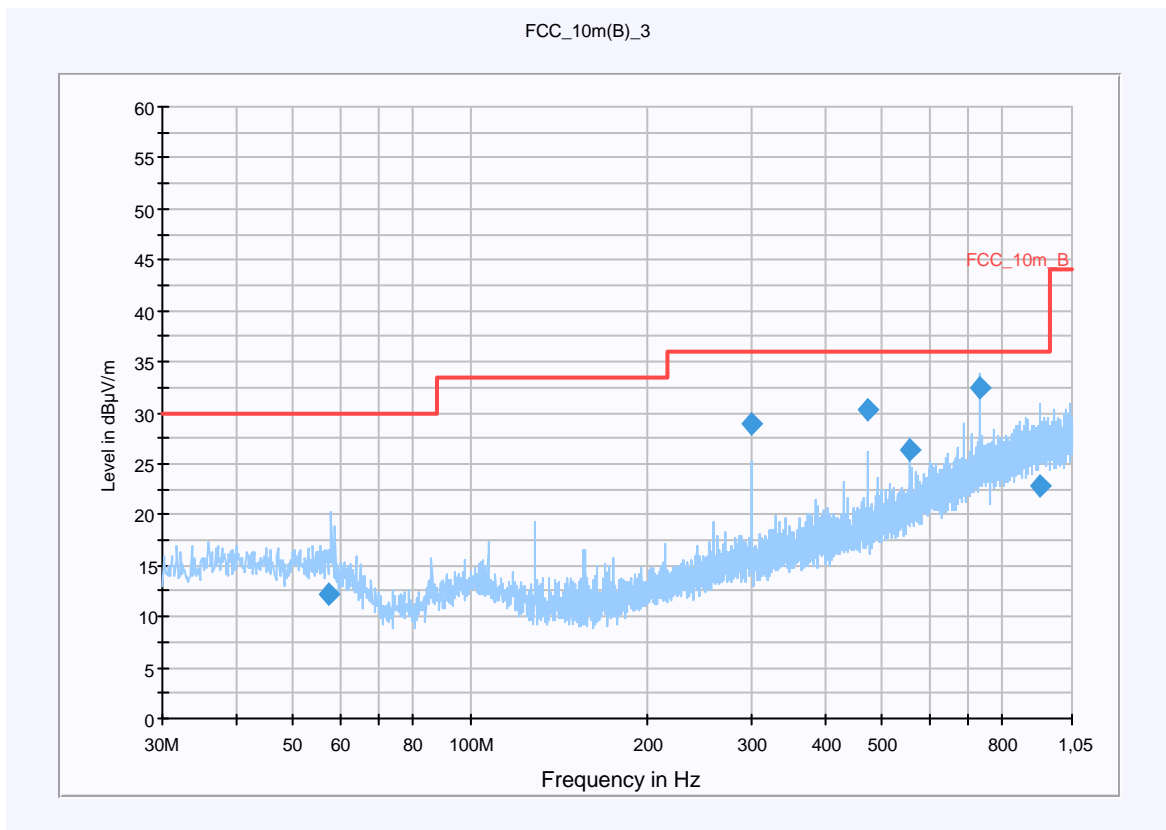


Plot 5: 0.03 - 1 GHz (middle channel)

EUT: NX700E
 Serial Number: 311X
 Test Description: FCC part 15 class B @ 10 m
 Operating Conditions: BT TX Ch. 39
 Operator Name: Hennemann
 Comment: DC: 12 V; all cables connected or terminated

Scan Setup: STAN_Fin [EMI radiated]

Hardware Setup: Electric Field (NOS)
 Level Unit: dB μ V/m
Subrange **Detectors** **IF Bandwidth** **Meas. Time** **Receiver**
 30 MHz - 1,05 GHz QuasiPeak 120 kHz 15 s Receiver



Final Result 1

Frequency (MHz)	QuasiPeak (dB μ V/m)	Meas. Time (ms)	Bandwidth (kHz)	Antenna height (cm)	Polarity	Turntable position (deg)	Corr. (dB)	Margin (dB)	Limit (dB μ V/m)	Comment
57.655650	12.3	15000.000	120.000	220.0	V	222.0	12.4	17.7	30.0	
300.645450	28.9	15000.000	120.000	220.0	H	90.0	14.8	7.1	36.0	
472.497450	30.3	15000.000	120.000	166.0	H	52.0	18.5	5.7	36.0	
558.420000	26.4	15000.000	120.000	166.0	H	185.0	20.1	9.6	36.0	
730.199250	32.4	15000.000	120.000	117.0	H	-2.0	23.7	3.6	36.0	
924.069750	22.9	15000.000	120.000	161.0	H	52.0	25.8	13.1	36.0	

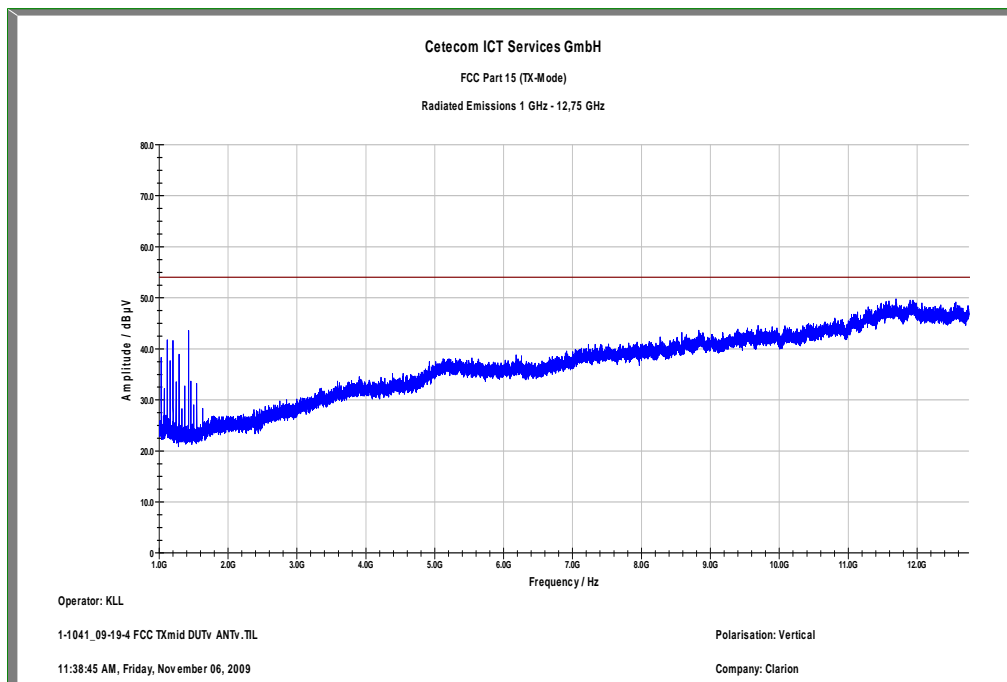
Hardware Setup: EMI radiated\Electric Field (NOS) - [EMI radiated]

Subrange 1

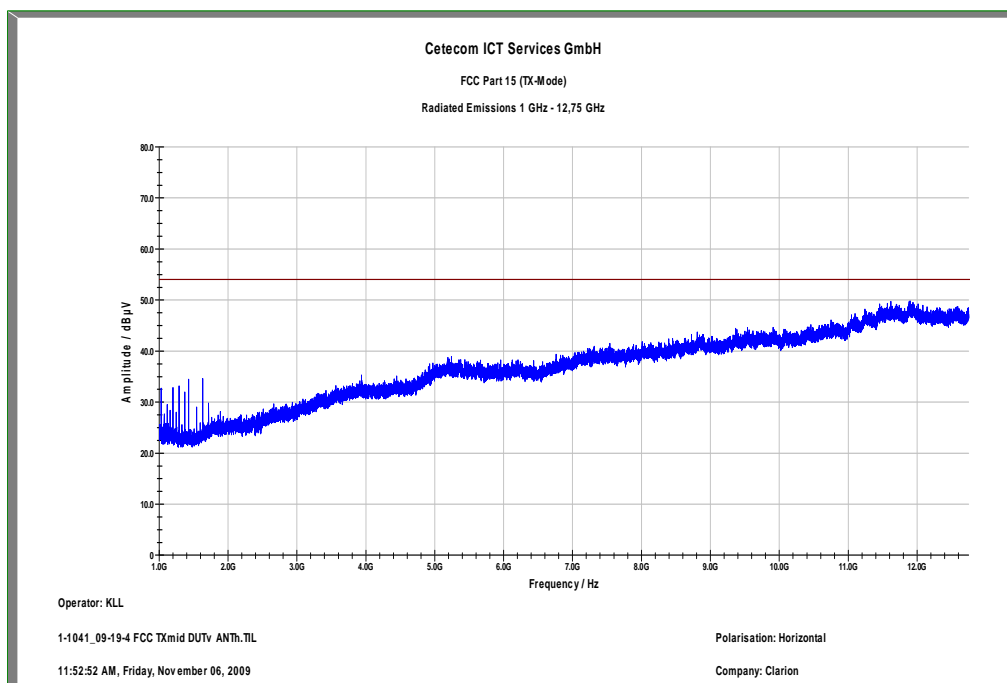
Frequency Range:	30 MHz - 2 GHz
Receiver:	Receiver [ESCI 3] @ GPIB0 (ADR 20), SN 100083/003, FW 4.32
Signal Path:	without Notch FW 1.0
Antenna:	VULB 9163 SN 9163-295, FW --- Correction Table (vertical): VULP6113 Correction Table (horizontal): VULP6113 Correction Table: Cable_EN_1GHz (0909)
Antenna Tower:	Tower [EMCO 2090 Antenna Tower] @ GPIB0 (ADR 8), FW REV 3.12
Turntable:	Turntable [EMCO Turntable] @ GPIB0 (ADR 9), FW REV 3.12

EMC 32 Version 8.10.00

Plot 6: 1 - 13 GHz vertical (middle channel)



Plot 7: 1 - 13 GHz horizontal (middle channel)

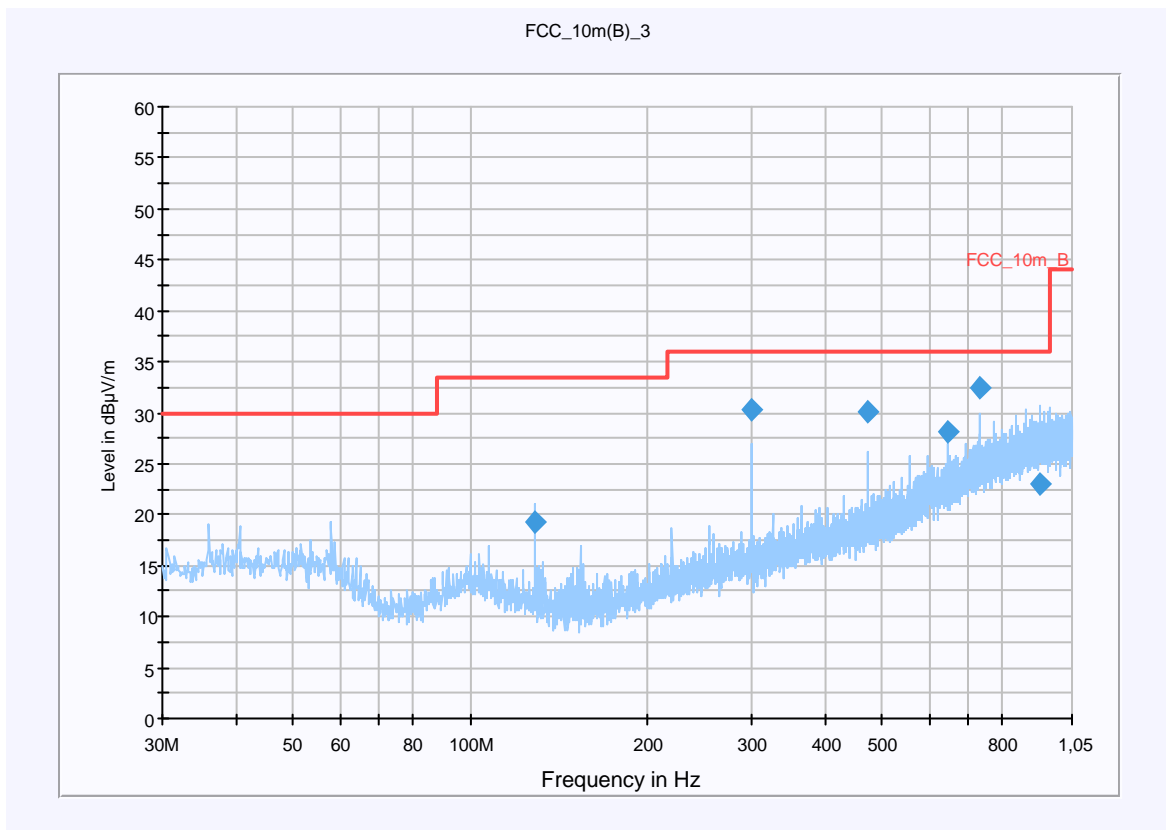


Plot 8: 0.03 - 1 GHz (highest channel)

EUT: NX700E
 Serial Number: 311X
 Test Description: FCC part 15 class B @ 10 m
 Operating Conditions: BT TX Ch. 78
 Operator Name: Hennemann
 Comment: DC: 12 V; all cables connected or terminated

Scan Setup: STAN_Fin [EMI radiated]

Hardware Setup: Electric Field (NOS)
 Level Unit: dB μ V/m
Subrange **Detectors** **IF Bandwidth** **Meas. Time** **Receiver**
 30 MHz - 1,05 GHz QuasiPeak 120 kHz 15 s Receiver



Final Result 1

Frequency (MHz)	QuasiPeak (dB μ V/m)	Meas. Time (ms)	Bandwidth (kHz)	Antenna height (cm)	Polarity	Turntable position (deg)	Corr. (dB)	Margin (dB)	Limit (dB μ V/m)	Comment
128.851350	19.2	15000.000	120.000	116.0	V	291.0	9.8	14.3	33.5	
300.678150	30.2	15000.000	120.000	210.0	H	96.0	14.8	5.8	36.0	
472.494000	30.1	15000.000	120.000	173.0	H	52.0	18.5	5.9	36.0	
644.322900	28.2	15000.000	120.000	166.0	H	15.0	21.6	7.8	36.0	
730.216650	32.5	15000.000	120.000	129.0	H	0.0	23.7	3.5	36.0	
925.193250	22.9	15000.000	120.000	148.0	H	165.0	25.8	13.1	36.0	

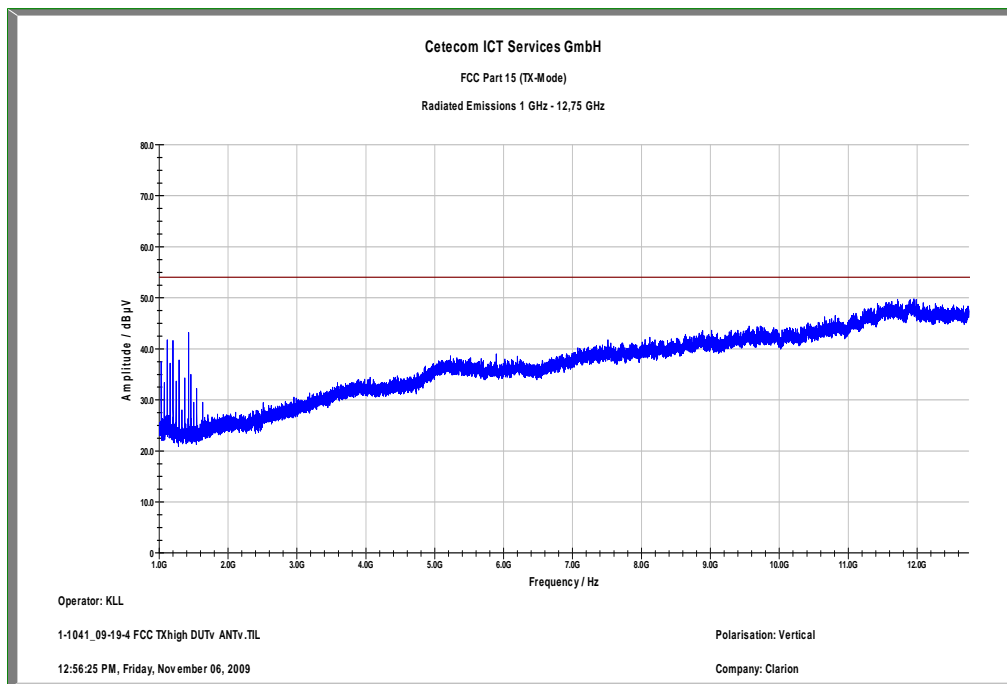
Hardware Setup: EMI radiated\Electric Field (NOS) - [EMI radiated]

Subrange 1

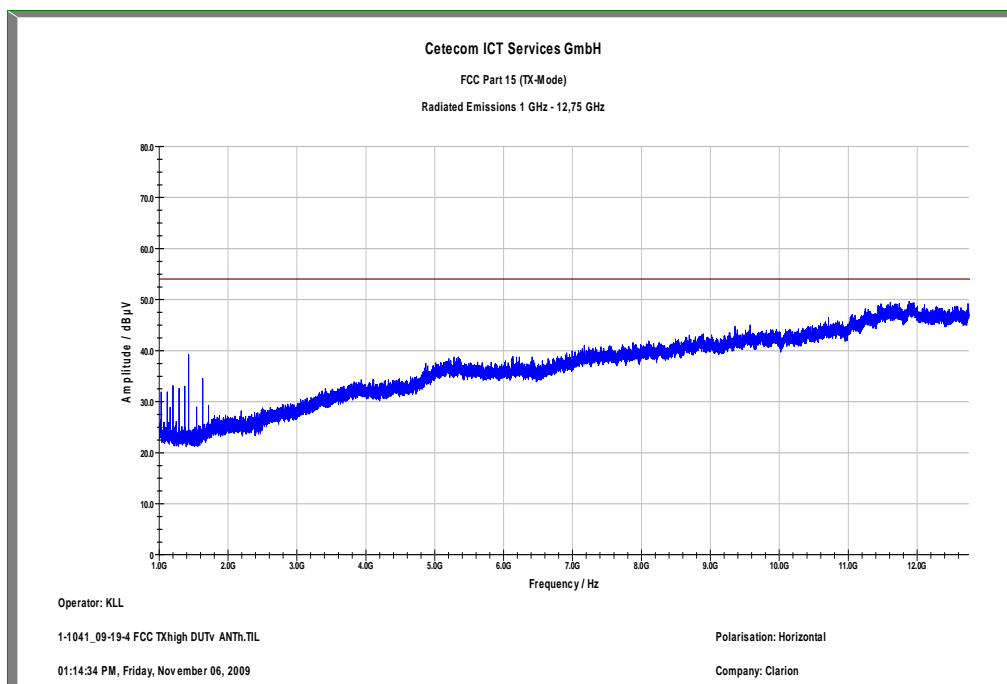
Frequency Range:	30 MHz - 2 GHz
Receiver:	Receiver [ESCI 3] @ GPIB0 (ADR 20), SN 100083/003, FW 4.32
Signal Path:	without Notch FW 1.0
Antenna:	VULB 9163 SN 9163-295, FW --- Correction Table (vertical): VULP6113 Correction Table (horizontal): VULP6113 Correction Table: Cable_EN_1GHz (0909)
Antenna Tower:	Tower [EMCO 2090 Antenna Tower] @ GPIB0 (ADR 8), FW REV 3.12
Turntable:	Turntable [EMCO Turntable] @ GPIB0 (ADR 9), FW REV 3.12

EMC 32 Version 8.10.00

Plot 9: 1 - 13 GHz vertical (highest channel)



Plot 10: 1 - 13 GHz horizontal (highest channel)



Results:

SPURIOUS EMISSIONS LEVEL (dB μ V/m)								
2402 MHz			2441 MHz			2480 MHz		
F [MHz]	Detector	Level [dB μ V/m]	F [MHz]	Detector	Level [dB μ V/m]	F [MHz]	Detector	Level [dB μ V/m]
1116.7	Pk	33.1	1116.7	Pk	33.3	1116.7	Pk	32.7
1205.7	Pk	33.7	1205.7	Pk	33.4	1205.7	Pk	33.7
1426.3	Pk	45.8				1426.4	Pk	45.8
Measurement uncertainty			±3 dB					

f < 1 GHz : RBW/VBW: 100 kHz

f ≥ 1GHz : RBW: 1 MHz VBW: 10 Hz

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 [μ V/m]	Measurement distance (m)
30 - 88	100 (40 dB μ V/m)	3
88 - 216	150 (43.5 dB μ V/m)	3
216 - 960	200 (46 dB μ V/m)	3
above 960	500 (54 dB μ V/m)	3

5.16 Spurious Emissions - radiated (Receiver) § 15.109

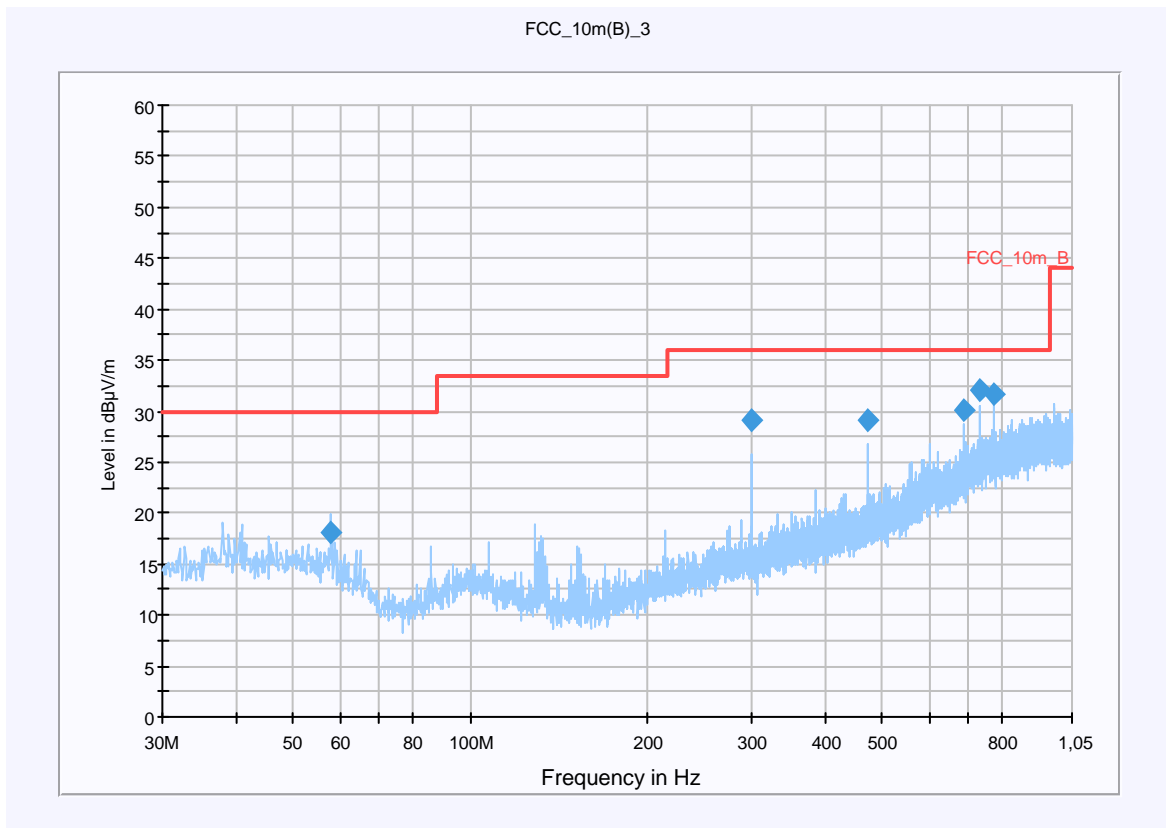
Modulation: GFSK

Plot 1: 0.03 - 1 GHz (receiver)

EUT: NX700E
 Serial Number: 311X
 Test Description: FCC part 15 class B @ 10 m
 Operating Conditions: BT RX
 Operator Name: Hennemann
 Comment: DC: 12 V; all cables connected or terminated

Scan Setup: STAN_Fin [EMI radiated]

Hardware Setup: Electric Field (NOS)
 Level Unit: dBµV/m
Subrange **Detectors** **IF Bandwidth** **Meas. Time** **Receiver**
 30 MHz - 1,05 GHz QuasiPeak 120 kHz 15 s 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)	Comment
57.983700	18.0	15000.000	120.000	220.0	V	6.0	12.3	12.0	30.0	
300.707850	29.1	15000.000	120.000	220.0	H	97.0	14.8	6.9	36.0	
472.465800	29.2	15000.000	120.000	169.0	H	87.0	18.5	6.8	36.0	
687.246150	30.1	15000.000	120.000	153.0	H	-1.0	22.7	5.9	36.0	
730.214400	32.2	15000.000	120.000	98.0	H	-3.0	23.7	3.8	36.0	
773.184300	31.8	15000.000	120.000	98.0	H	120.0	24.2	4.2	36.0	

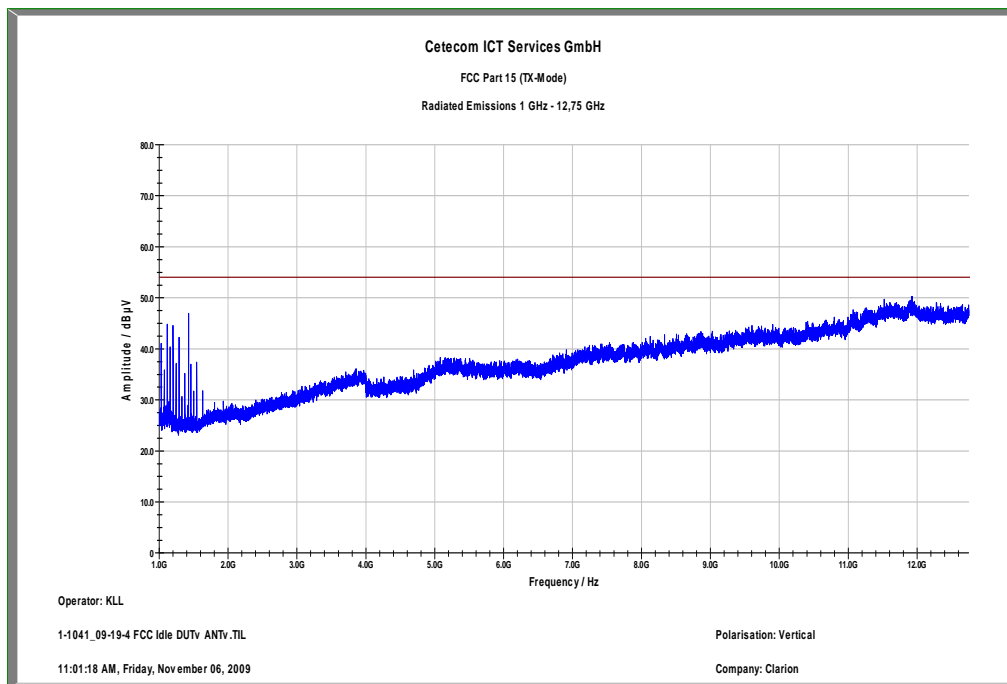
Hardware Setup: EMI radiated\Electric Field (NOS) - [EMI radiated]

Subrange 1

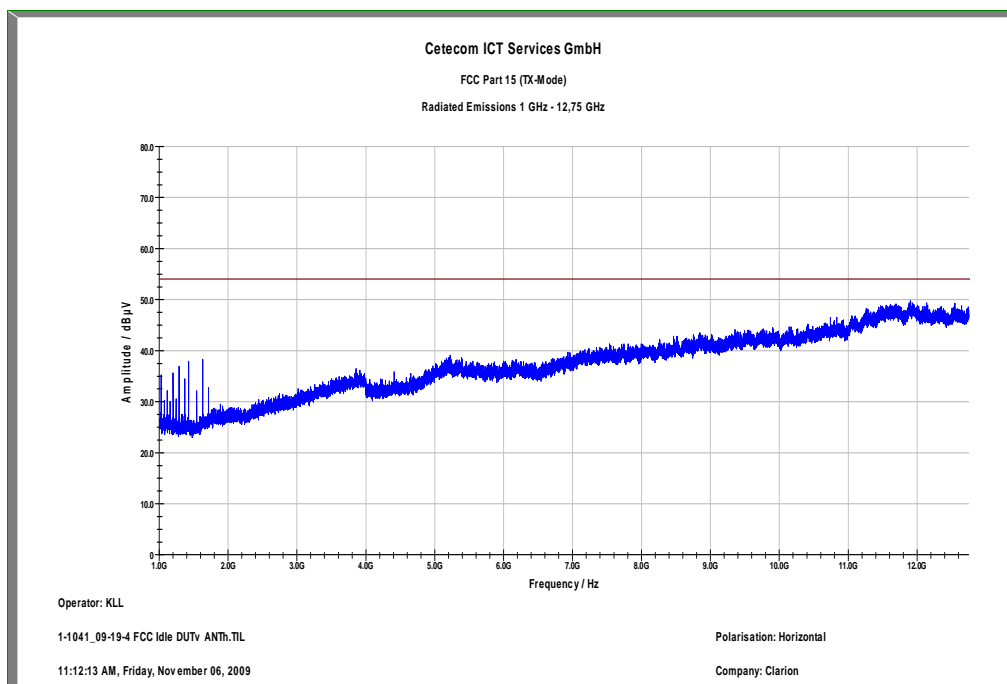
Frequency Range:	30 MHz - 2 GHz
Receiver:	Receiver [ESCI 3] @ GPIB0 (ADR 20), SN 100083/003, FW 4.32
Signal Path:	without Notch FW 1.0
Antenna:	VULB 9163 SN 9163-295, FW --- Correction Table (vertical): VULP6113 Correction Table (horizontal): VULP6113 Correction Table: Cable_EN_1GHz (0909)
Antenna Tower:	Tower [EMCO 2090 Antenna Tower] @ GPIB0 (ADR 8), FW REV 3.12
Turntable:	Turntable [EMCO Turntable] @ GPIB0 (ADR 9), FW REV 3.12

EMC 32 Version 8.10.00

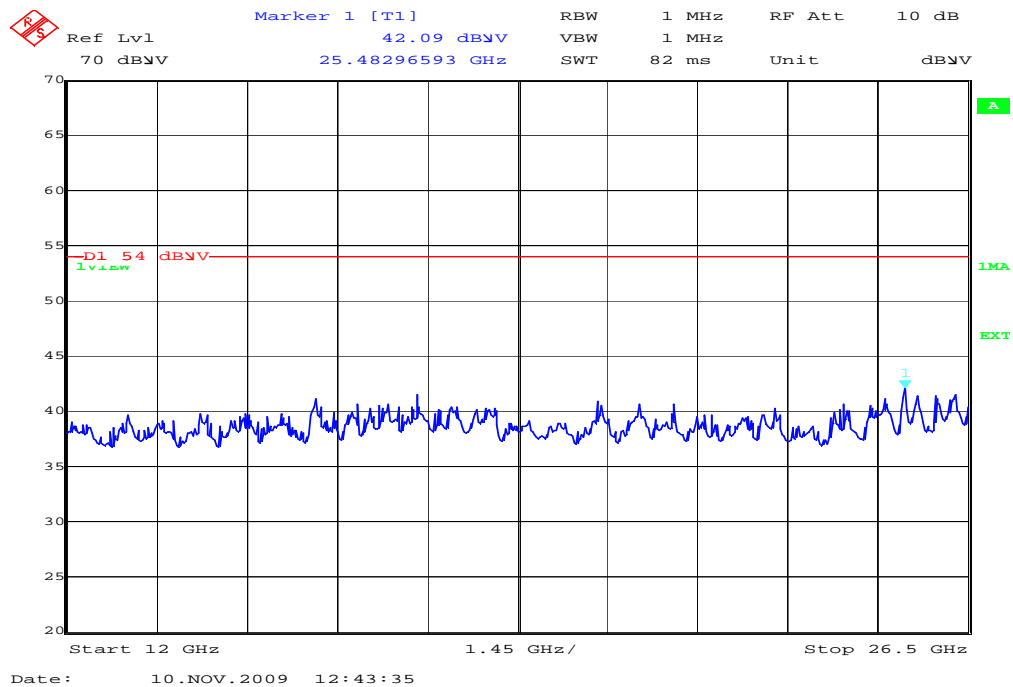
Plot 2: 1 - 13 GHz vertical (receiver)



Plot 3: 1 - 13 GHz horizontal (receiver)



Plot 4: 12 - 25 GHz vertical/horizontal (receiver)



Results:

Spurious Emissions level [dBµV/m]		
f[MHz]	Detector	Level [dBµV/m]
1116.5	Pk	33.1
1202.7	Pk	34.5
1426.4	Pk	46.5
Measurement uncertainty		±3 dB

f < 1 GHz: RBW/VBW: 100 kHz f ≥ 1GHz : RBW: 1 MHz VBW: 10 Hz
 See above plots

Measurement distance see table

Limits: § 15.109

Frequency (MHz)	Field strength (µV/m)	Measurement distance (m)
30 - 88	100 (40 dBµV/m)	3
88 - 216	150 (43.5 dBµV/m)	3
216 - 960	200 (46 dBµV/m)	3
above 960	500 (54 dBµV/m)	3

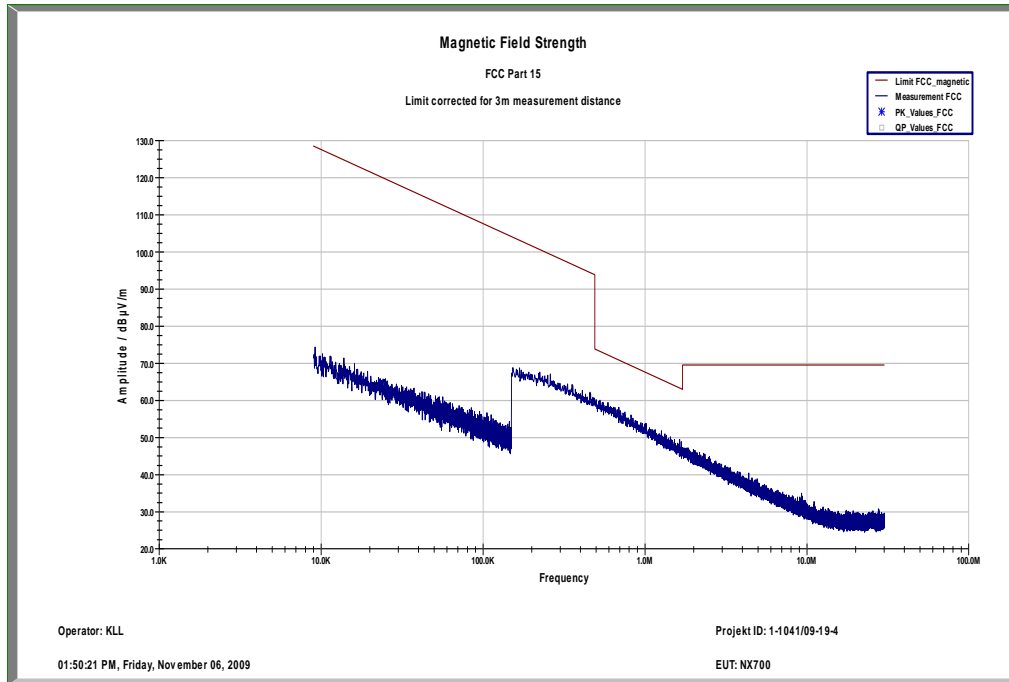
5.17 Spurious Emissions < 30 MHz - Transmitter radiated § 15.209

Modulation: 8DPSK

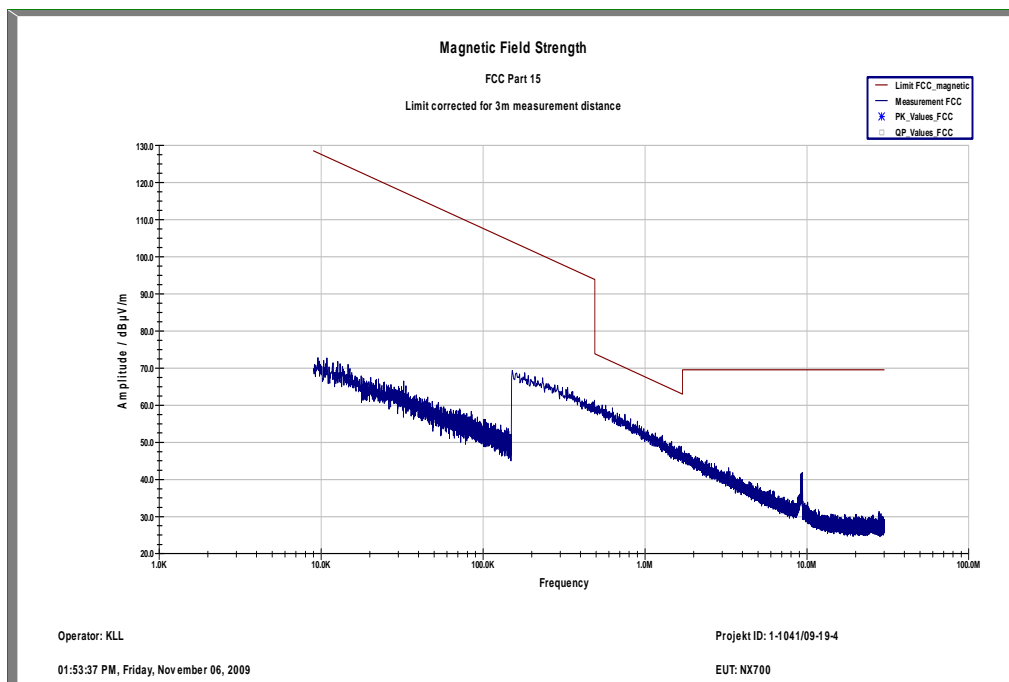
Measured at 10 m distance.

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

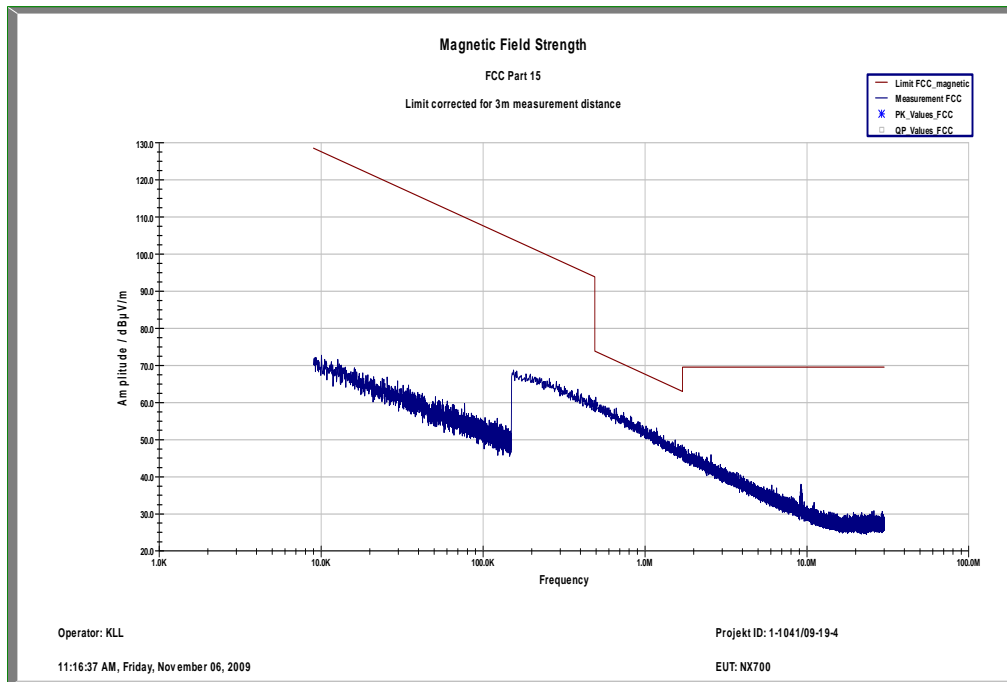
Plot 1: TX_on, antenna position 1



Plot 2: TX_on, antenna position 2



Plot 3: Stand-by



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

Not applicable

Modulation: GFSK

Plot 1:

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.

System Rack Room 005:

No	Equipment/Type	Manuf.	Serial Nr.	Inv. No. Cetecom	Last Calibration	Frequency (months)	Next Calibration
1	FSP 30	R&S	100886	300003575	25.08.2008	24	25.08.2010
2	CBT	R&S	100313	300003516	03.09.2008	24	03.09.2010
3	Switch Matrix	HP		300000929	n.a.		
4	Power Supply 6625A	HP	3041A00544	300002270	13.05.2007	36	13.05.2010
5	Signal Generator SMIQ03B	R&S	836206/0092	300002680	30.05.2007	36	30.05.2010

Signalling Units:

No	Equipment/Type	Manuf.	Serial Nr.	Inv. No. Cetecom	Last Calibration	Frequency (months)	Next Calibration
1	CBT	R&S	100313	300003516	03.09.2008	24	03.09.2010
2	CBT	R&S	100185	300003416	27.08.2008	24	27.08.2010
3	CMU-200	R&S	103992	300003231	04.06.2008	24	04.06.2010
4	CMU-200	R&S	106240	300003321	27.08.2008	24	27.08.2010
5	CMU-200	R&S	832221/0055	300002862	20.03.2008	24	20.03.2010

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 VULB 9163	Schwarzbeck	295	300003787	01.04.2008	24	01.04.2010
3	Amplifier - 0518C-138	Veritech Micro- wave Inc.	-/-	-/-	-/-	-/-	-/-
4	Switch - 3488A	HP		300000368	-/-	-/-	-/-
5	EMI Test receiver - ESCI	R&S	100083	300003312	01.06.2009	24	01.06.2011
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	-/-	-/-	-/-	-/-