Deutscher Akkreditierungs Rat

Accredited testing-laboratory

DAR registration number: DGA-PL-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.	**:**	**1-1954-22-04/10**
Type identification	**:**	**AAD-3880072-BV**
Applicant	**:**	**Sony Ericsson Mobile Communications AB**
FCC ID	**:**	**PY7A3880072**
IC Certification No	**:**	**4170B-A3880072**
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:

2010-04-30	**Joerg Warken**	
Date	Name	Signature
2010-04-30	**Andreas Keller**	
Date	Name	Signature

Technical responsibility for area of testing:

2010-04-30	**Stefan Bös**	
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: DGA-PL-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:	**Sony Ericsson Mobile Communications AB**
Street:	**Nya Vattentornet**
Town:	**22188 Lund**
Country:	**Sweden**
Telephone:	**+46 (0) 46 19 30 00**
Fax:	**+46 (0) 46 19 32 95**
Contact:	**Johan Wedin**
E-mail:	**johan.wedin@sonyericsson.com**
Telephone:	**+46 (0) 707 19 57 36**

1.4 Application details

Date of receipt of order:	**2010-04-19**
Date of receipt of test item:	**2010-04-26**
Date of start test:	**2010-04-26**
Date of end test	**2010-04-30**
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:	**Sony Ericsson Mobile Communications AB**
Street:	**Nya Vattentornet**
Town:	**22188 Lund**
Country:	**Sweden**

3.1.1 Test item

Kind of test item	:	**GSM Mobile Phone 850/900/1800/1900 UMTS FDD1/FDD8, HSUPA/HSDPA, BT2.0+EDR, A-GPS, FM Rx, WLAN**
Type identification	:	**AAD-3880072-BV**
S/N serial number	:	**CB511H8BNA (conducted sample)** **CB511H8BNP (radiated sample)**
HW hardware status	:	**AP1.1**
SW software status	:	**1.0.A.1.27**
Frequency Band [MHz]	:	**2.402MHz - 2.480MHz**
Type of Modulation	:	**GFSK, Pi/4 DQPSK, 8 DPSK (FHSS)**
Number of channels	:	**79**
Antenna	:	**integral**
Power Supply	:	**4.0 V DC by power supply / battery + charger**
Temperature Range	:	**-20 °C to +55 °C**

Max. power radiated: 11.9 dBm EIRP (middle channel, 8DPSK)
Max. power conducted: 9.2 dBm (middle channel, 8DPSK)

FCC ID: **PY7A3880072**
IC: **4170B-A3880072**

3.1.2 Additional EUT information For IC Canada (appendix 2)

IC Registration Number:	**4170B-A3880072**
Model Name:	**AAD-3880072-BV**
Manufacturer (complete Address):	**Sony Ericsson Mobile Communications AB Nya Vattentornet 22188 Lund Sweden**
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]:	**2.402MHz - 2.480MHz**
RF: Power [W] (max):	**GFSK modulation: Rad. EIRP: 10.0mW Conducted : 5.3mW Pi/4 DQPSK modulation: Rad. EIRP: 13.2mW Conducted : 7.2mW 8 DPSK modulation: Rad. EIRP: 15.5mW Conducted : 8.3mW**
Antenna Type:	**Printed antenna**
Field Strength [dBµV/m in 3m]:	**109**
Occupied Bandwidth (99% BW) [kHz]:	**GFSK: 926kHz Pi/4 DQPSK: 1317kHz 8 DPSK: 1293kHz**
Type of Modulation:	**GFSK, Pi/4 DQPSK, 8 DPSK**
Emission Designator (TRC-43):	**926KFXD GFSK 1M32GXD Pi/4 DQPSK 1M29GXD 8 DPSK**
Transmitter Spurious (worst case) [µV/m in 3m]:	**49.7**
Receiver Spurious (worst case) [µV/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: Joerg Warken Date: 2010-04-30

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_{nom}	°C	**20**
Nominal Humidity	H_{nom}	%	**41**
Nominal Power Source	V_{nom}	V	**4.0**

Type of power source: **DC by power supply / battery + charger**

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	2010-04-30	-/-

Test Specification Clause	Test Case	Modulation	Pass	Fail	N/A	Not performed
None	Antenna Gain	8DPSK	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)	8DPSK	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 Pi/4 DQPSK 8 DPSK	Yes Yes Yes			
§ 15.247 (d)	Spurious Emission - radiated (Transmitter) >30 MHz	8DPSK	Yes			
§ 15.109	Spurious Emissions - radiated (Receiver)	8DPSK	Yes			
§ 15.209	Spurious Emissions - radiated (Transmitter) <30 MHz	8DPSK	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

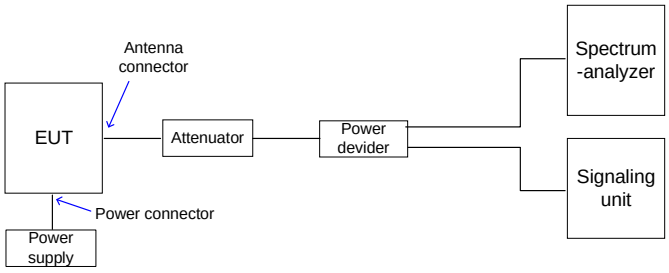
The radiated measurements are performed in vertical and horizontal plane in the frequency range from 9 kHz to 25 GHz in semi-anechoic chambers. The EUT is positioned on a non-conductive support with a height of 0.80 m above a conductive ground plane that covers the whole chamber. The receiving antennas 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, active loop antenna.
150 kHz - 30 MHz: Quasi Peak measurement, 9 kHz Bandwidth, active loop antenna.
30 MHz - 1GHz: Quasi Peak measurement, 120 kHz Bandwidth, Trilog 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

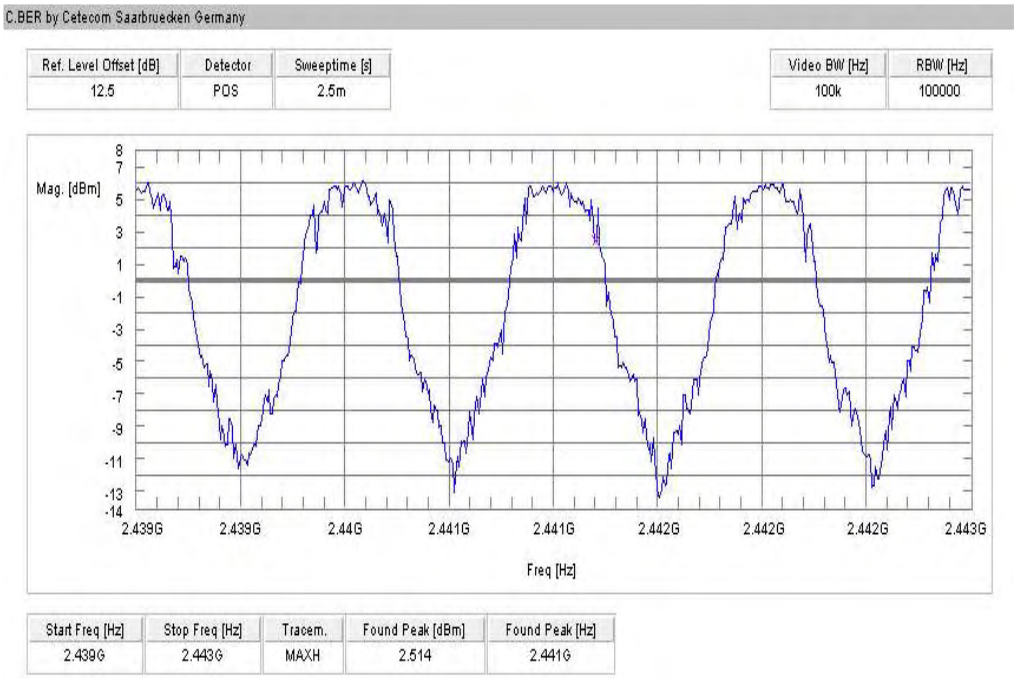
The antenna gain of the complete system is calculated by the difference of radiated power in EIRP and the conducted power of the module.

	low channel 2402 MHz	mid channel 2441 MHz	high channel 2480 MHz
Conducted power [dBm] Measured, 8DPSK modulation	8.98	9.07	8.92
Radiated power [dBm] Measured, 8DPSK modulation	10.49	11.90	10.80
Gain [dBi] Calculated	1.51	2.83	1.88

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

Modulation: GFSK

Plot 1 of 1:



Result: Channel separation is: ~ 1 MHz

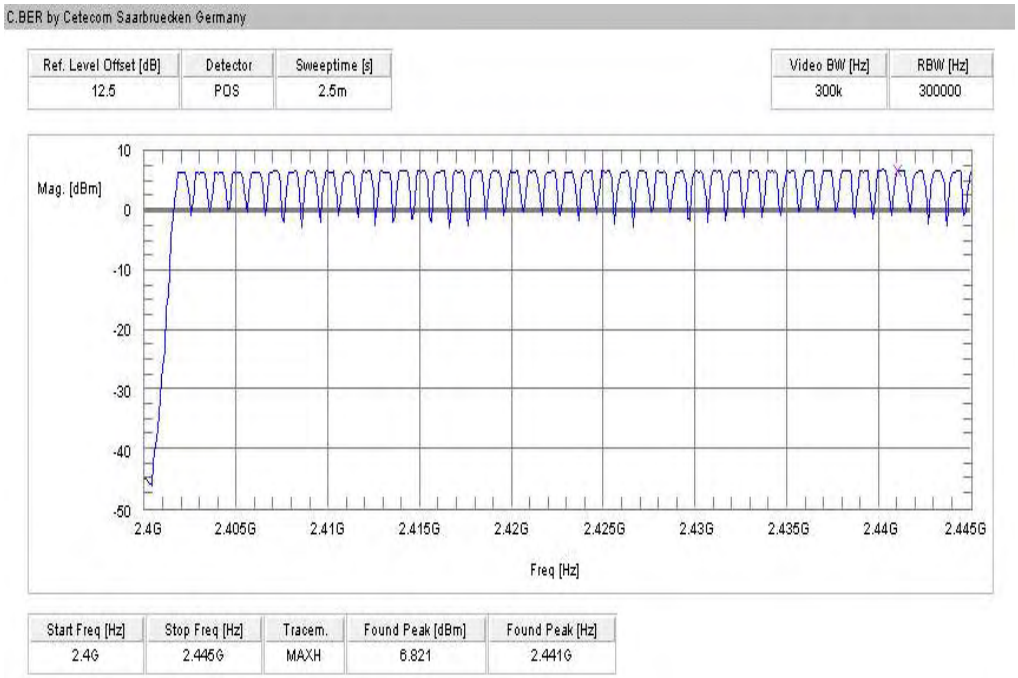
Limits:

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

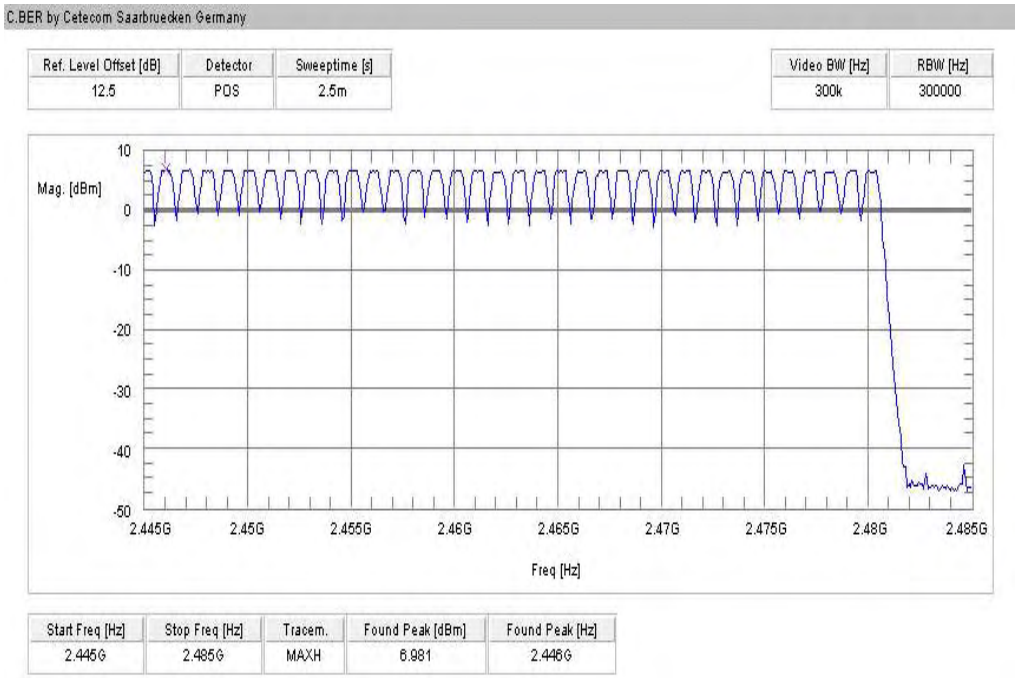
5.6 Number of hopping channels §15.247(a)(1)

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

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 a 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 µs * 1600 1/s / 79 * 31.6 s = 0.4 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 µs * 1600 * 1/5 *1/s / 79 * 31.6 s = 0.4 s (in a 31.6 s period)

This is according 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

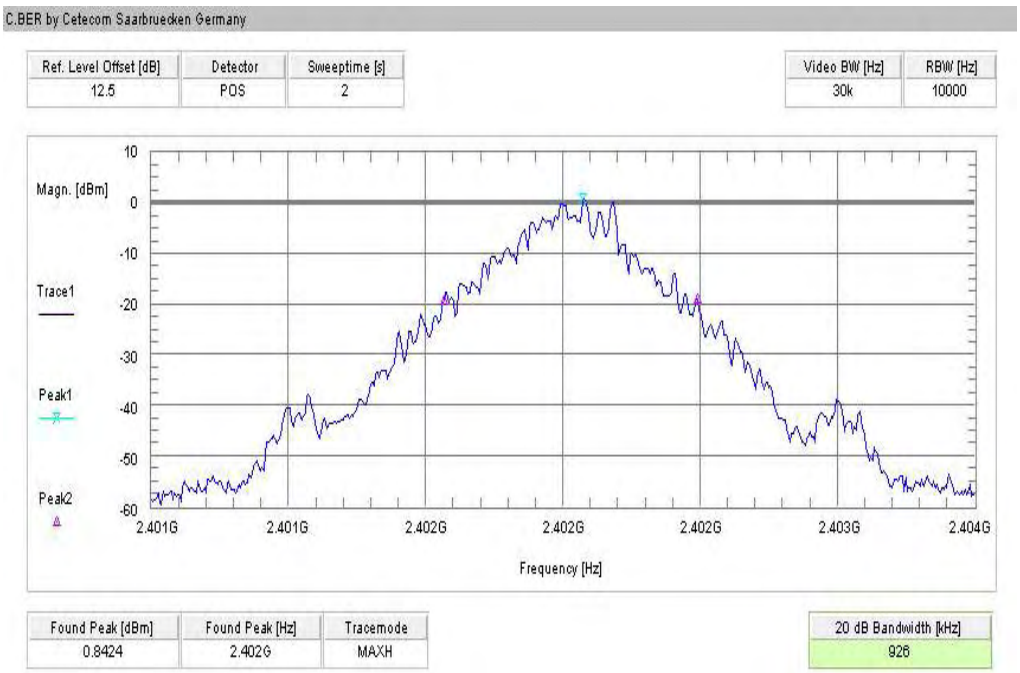
Result: Power density: - dBm/Hz = - dBm / 3 kHz
Correction factor from dBm/Hz to dBm / 3 kHz is +34,8 dB

Limits:

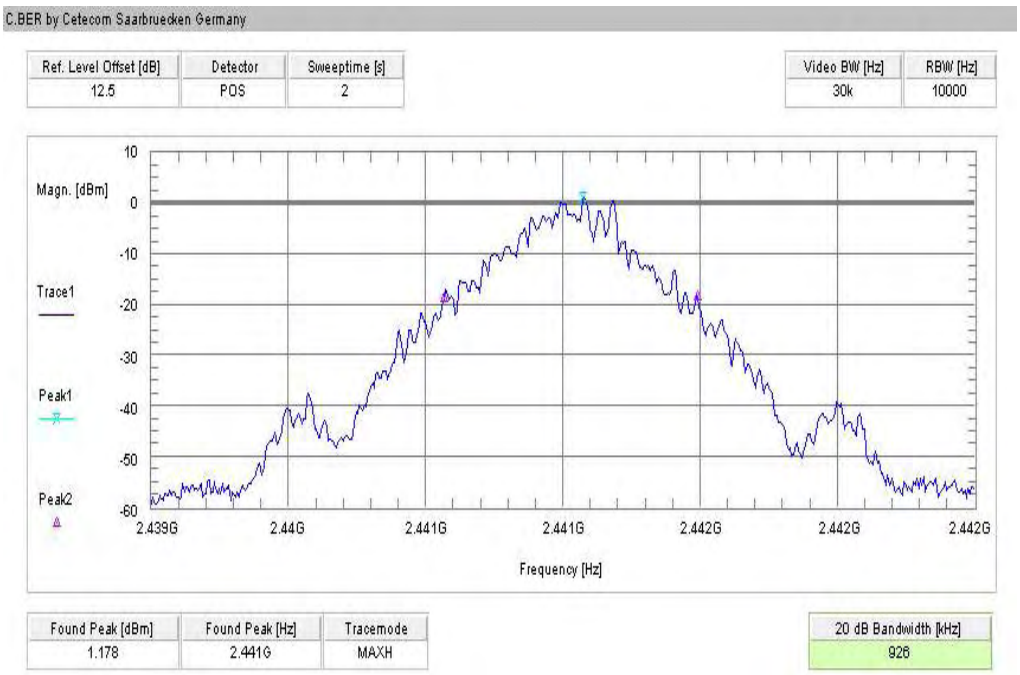
Under normal test conditions only	For digitally modulated systems, the peak power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission

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

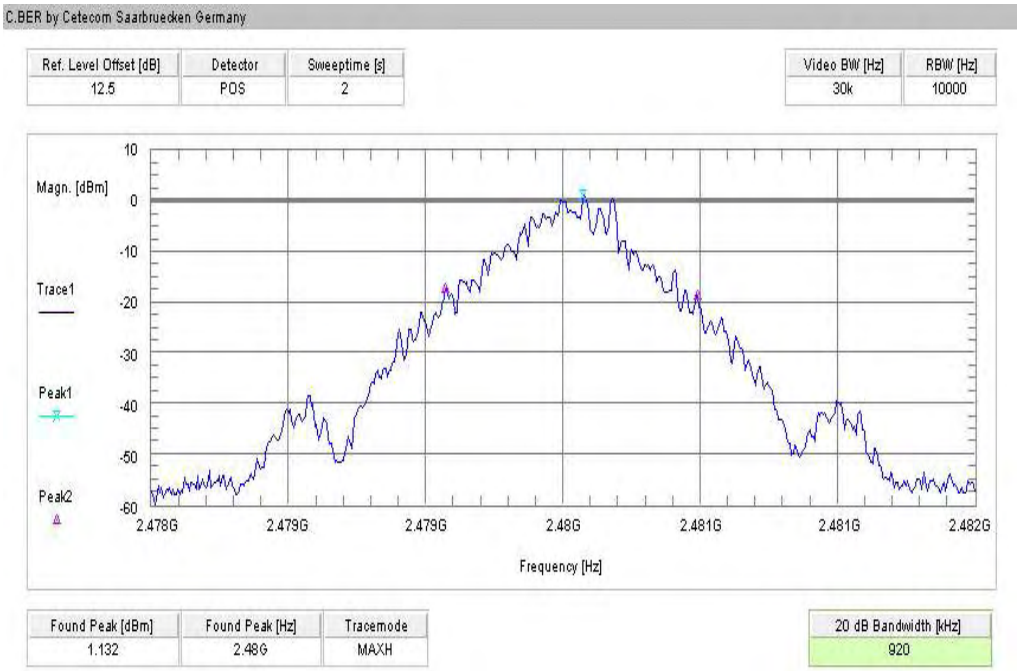
Plot 1: GFSK



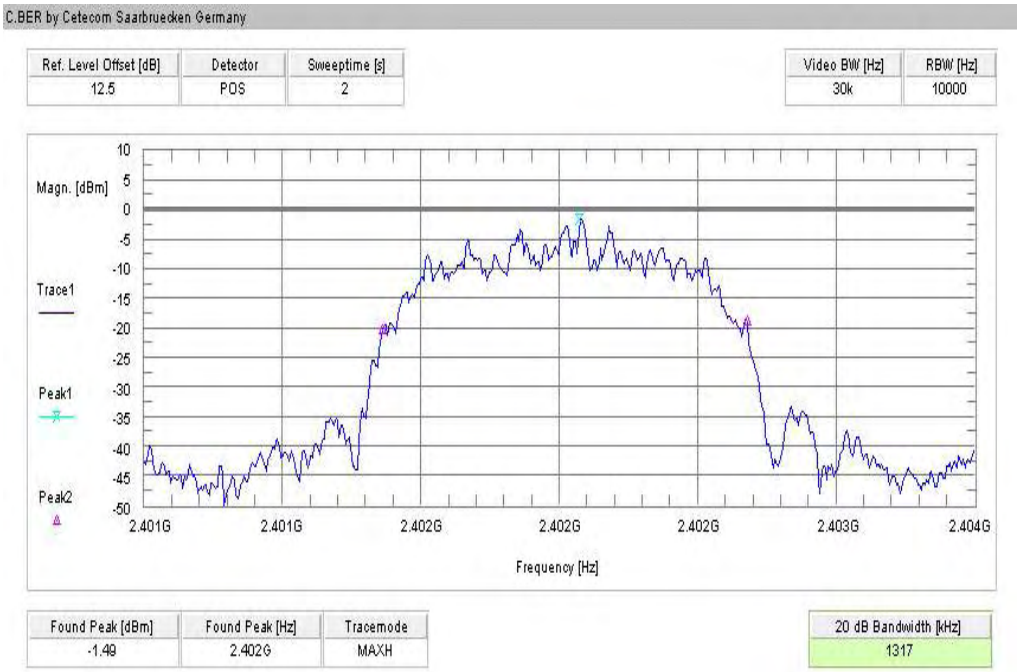
Plot 2: GFSK



Plot 3: GFSK



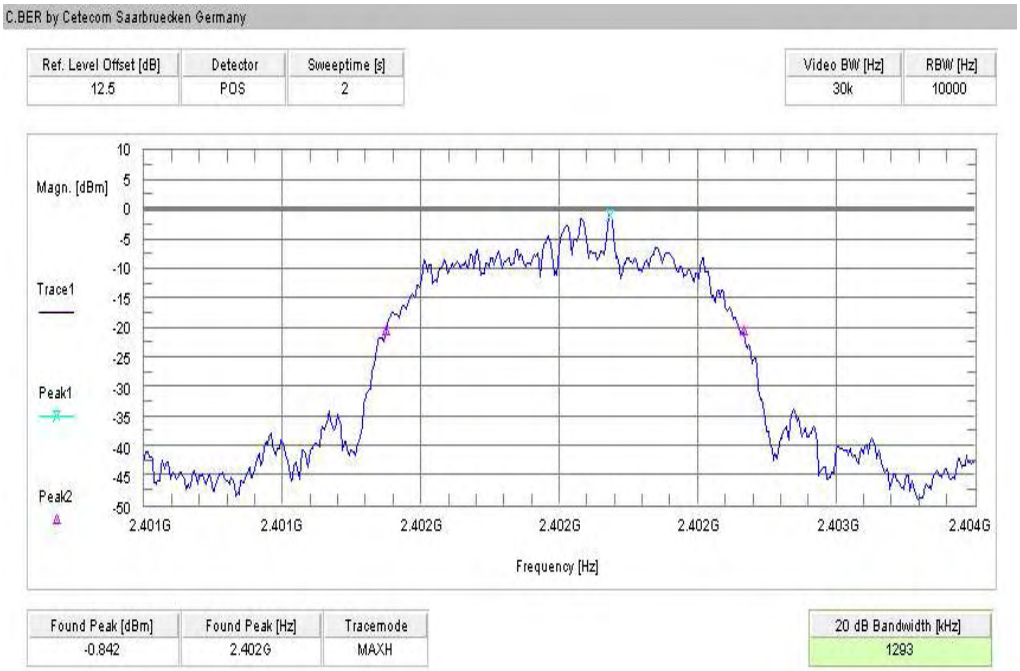
Plot 4: Pi/4 DQPSK



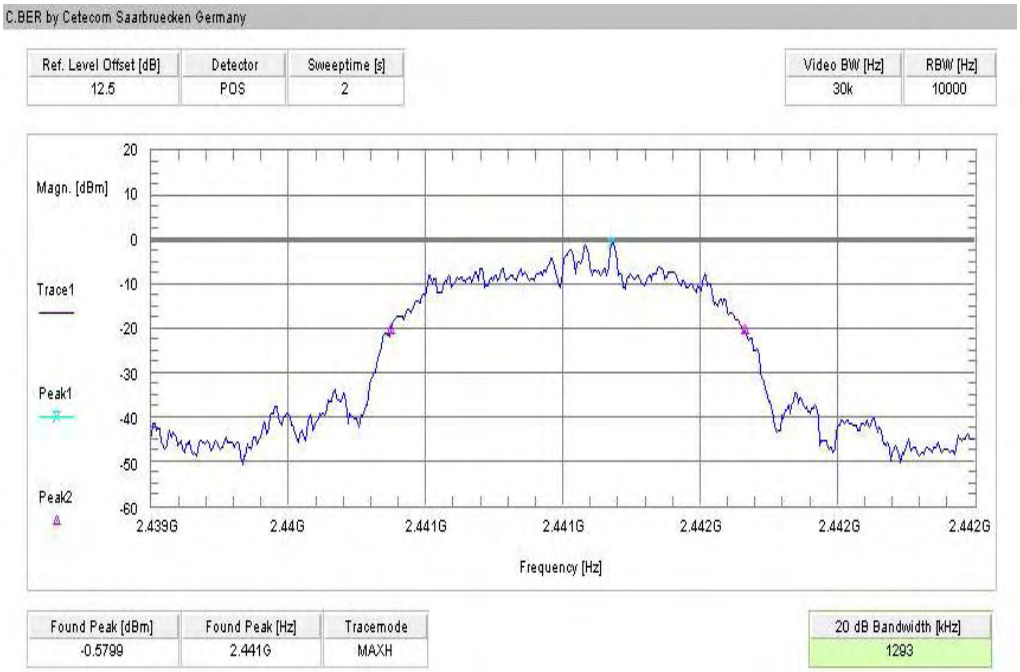
Plot 5: Pi/4 DQPSK

Plot 6: Pi/4 DQPSK

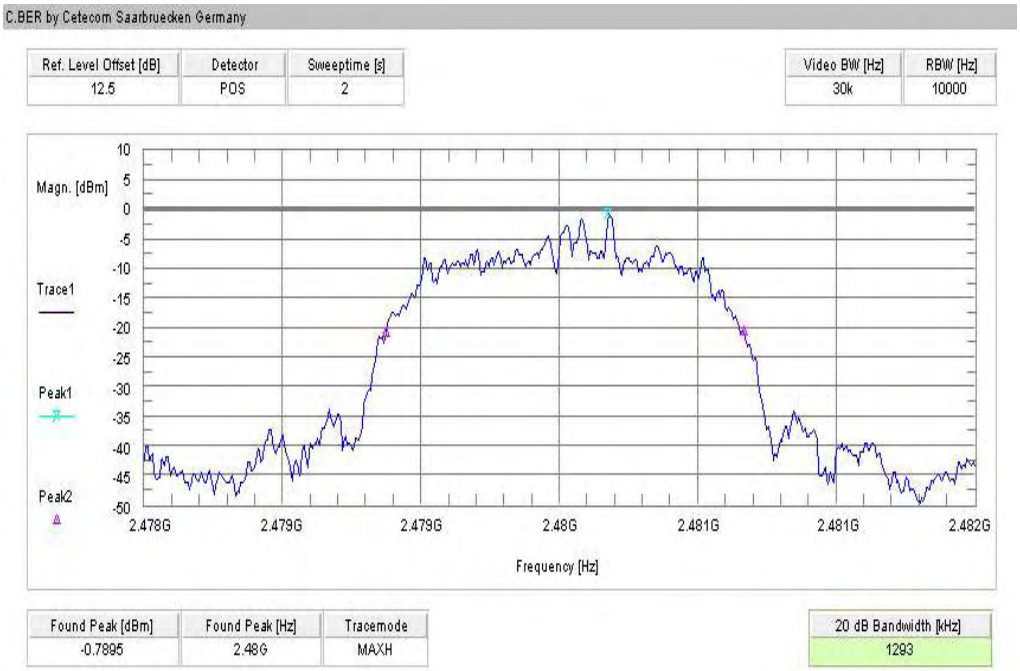
Plot 7: 8DPSK



Plot 8: 8DPSK



Plot 9: 8DPSK



Result:

Modulation	**20 dB BANDWIDTH [kHz]**		
Frequency [MHz]	2402	2441	2480
GFSK	926	926	920
Pi/4 DQPSK	1317	1317	1317
8DPSK	1293	1293	1293
Measurement uncertainty	±1kHz		

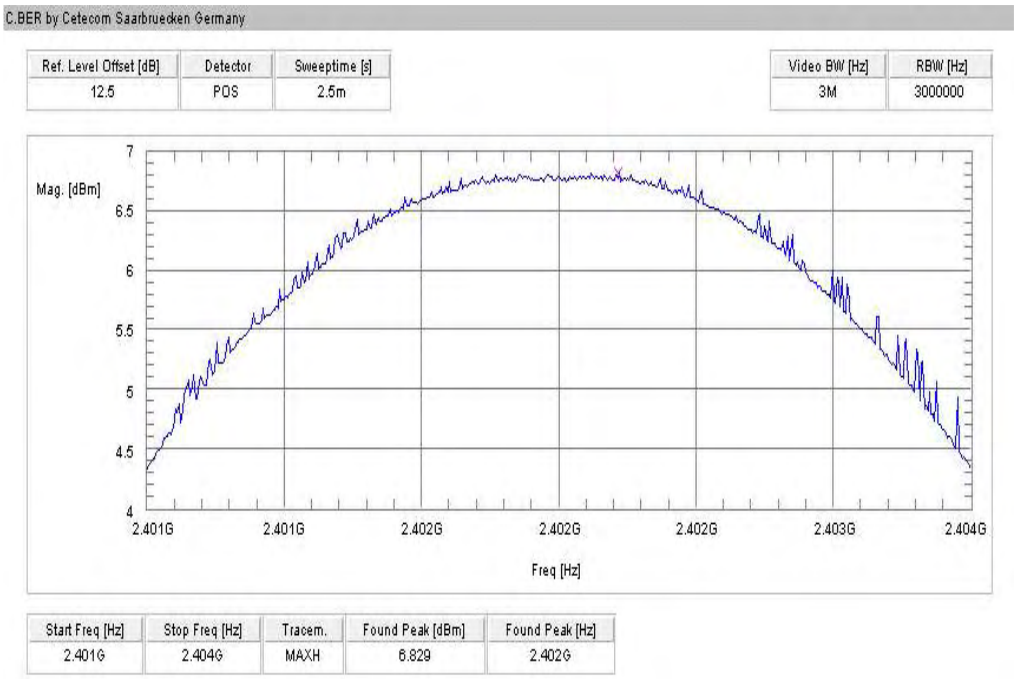
RBW / VBW as provided in the „Measurement Guidelines“ (DA 00-705, March 30, 2000)
RBW: 10 kHz / VBW 10 kHz

Limits:

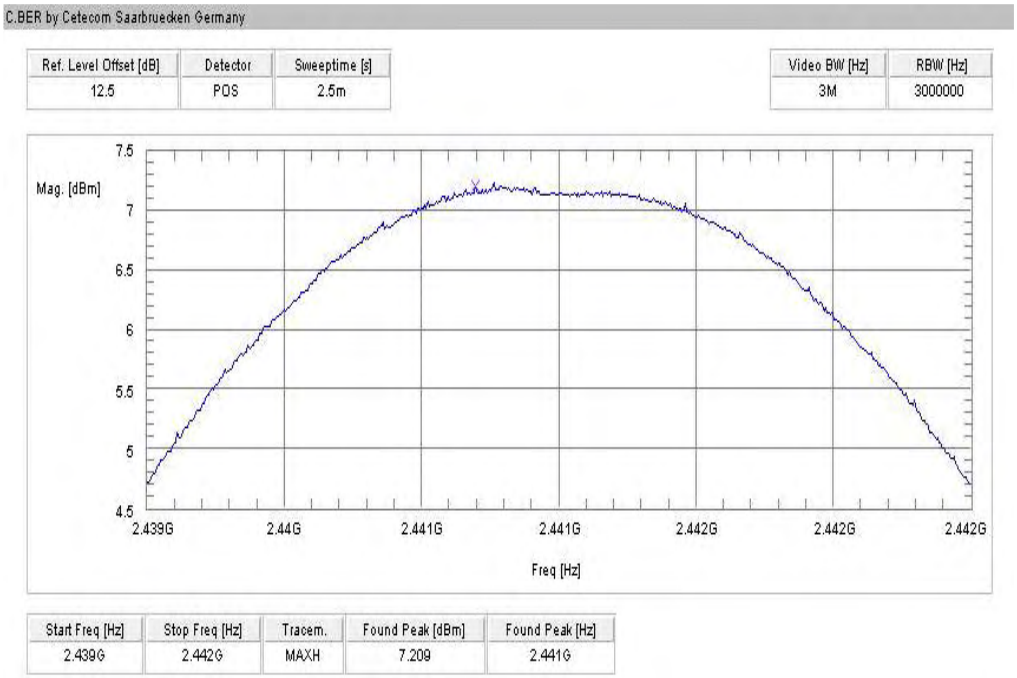
Under normal test conditions only	GFSK < 1000 kHz Pi/4 DQPSK < 1500 8DPSK < 1500

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

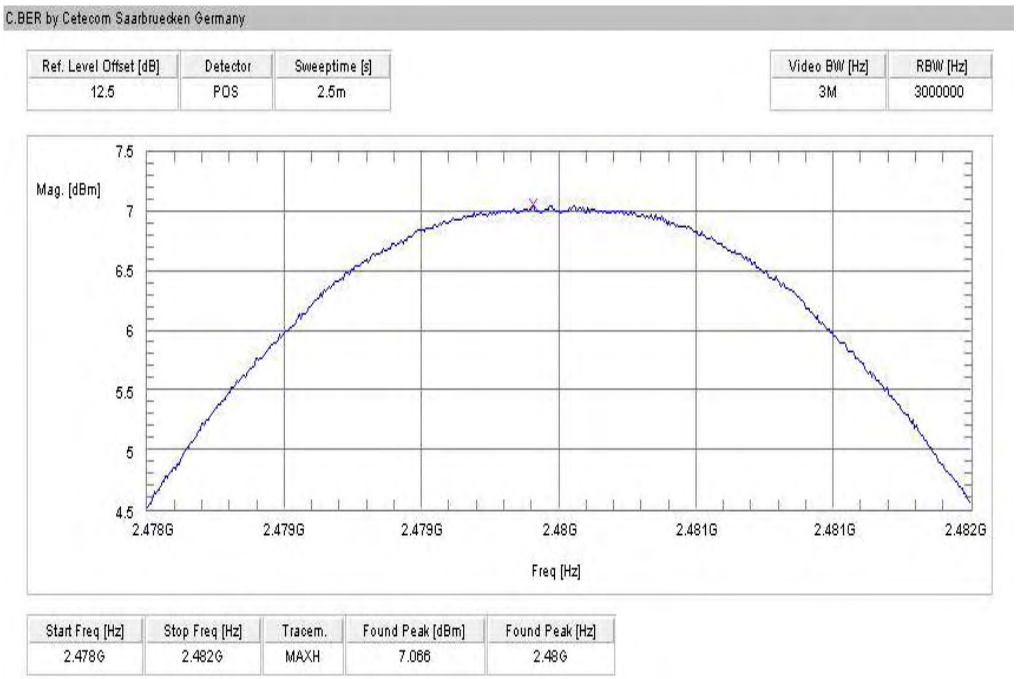
Plot 1: GFSK



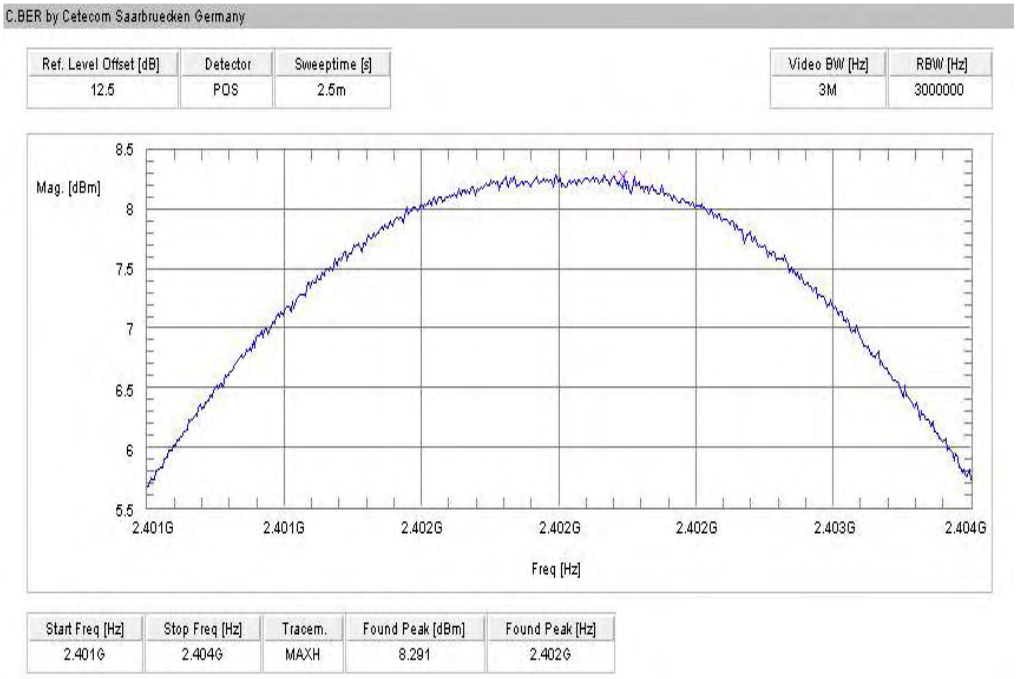
Plot 2: GFSK



Plot 3: GFSK

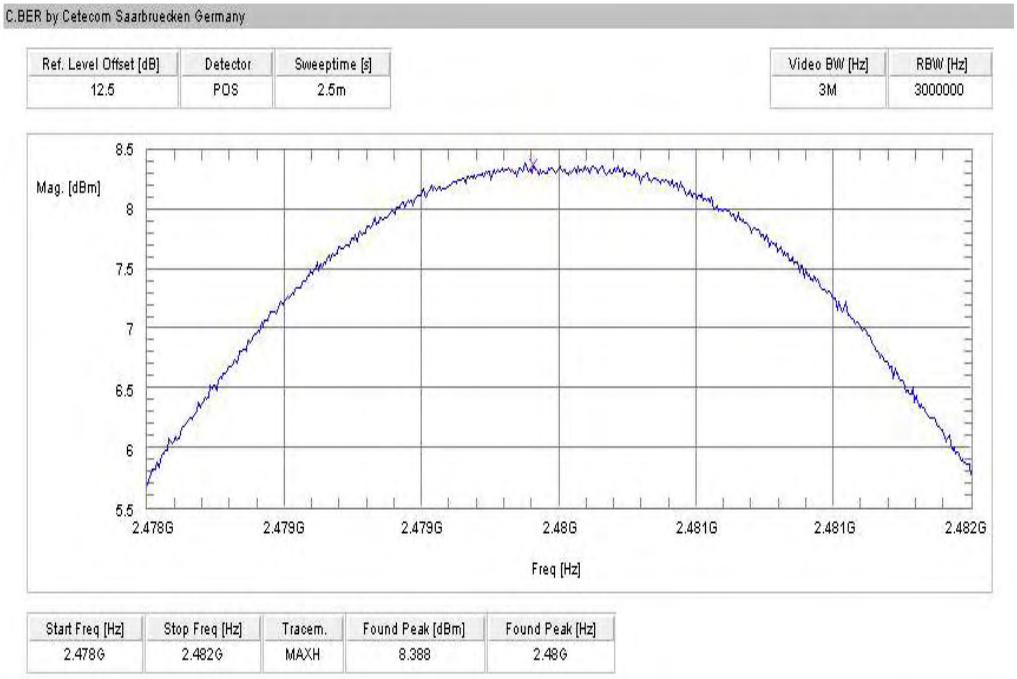


Plot 4: Pi/4 DQPSK

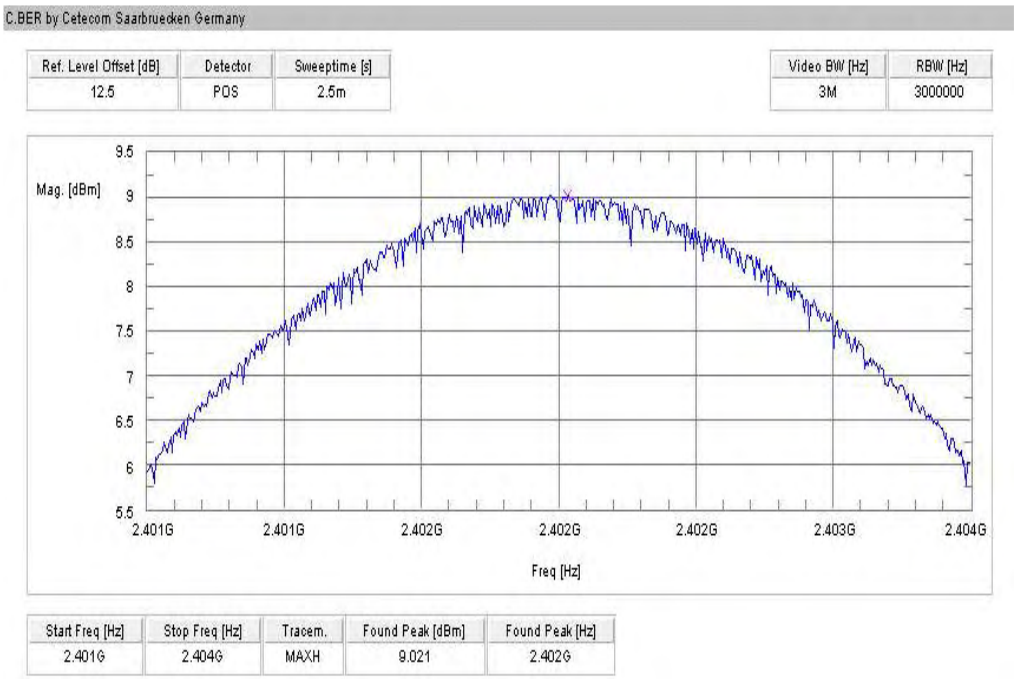


Plot 5: Pi/4 DQPSK

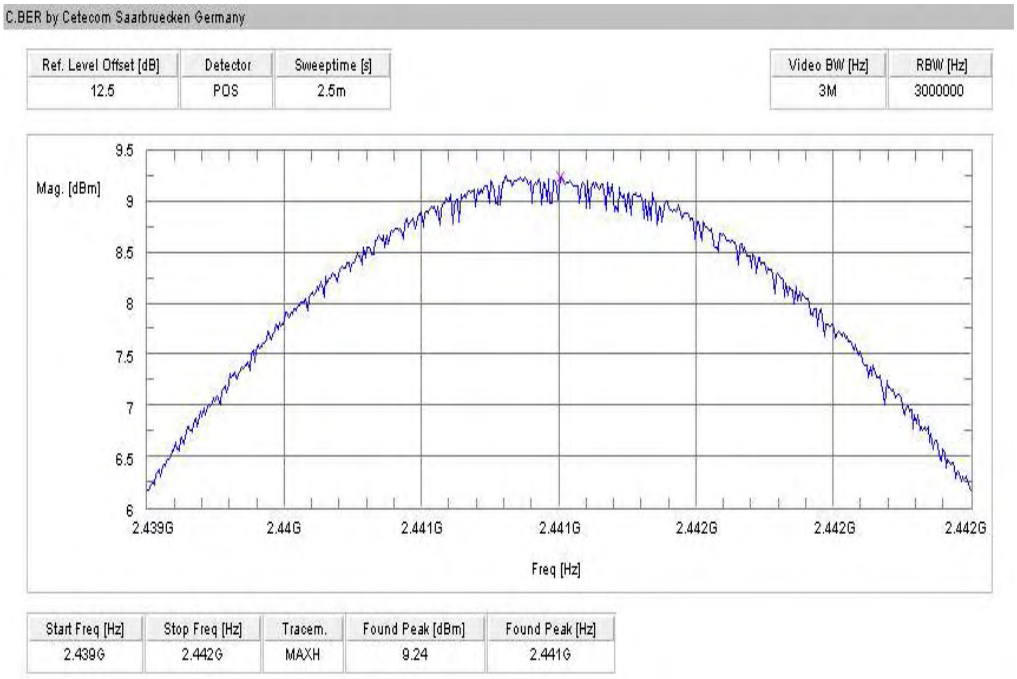
Plot 6: Pi/4 DQPSK



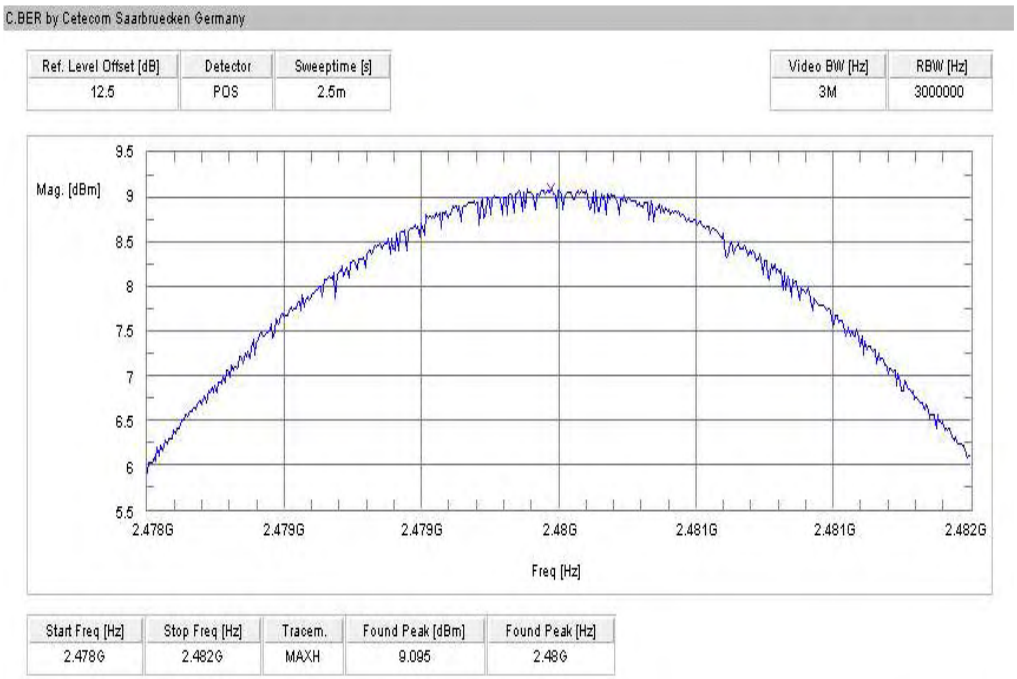
Plot 7: 8DPSK



Plot 8: 8DPSK



Plot 9: 8DPSK



Results:

Modulation	**Max. peak output power [dBm]**		
Frequency [MHz]	2402	2441	2480
GFSK	6.8	7.2	7.1
Pi/4 DQPSK	8.3	8.6	8.4
8DPSK	9.0	9.2	9.1
Measurement uncertainty	±2dB		

RBW / VBW: 3 MHz

Limits:

Under normal test conditions only, for frequency range 2400-2483.5 MHz	Max. 1.0 Watt (30dBm)

Conducted average power calculated

Modulation	Conducted Average power, duty cycle 0.792 **[dBm]**		
Frequency [MHz]	**2402**	**2441**	**2480**
Pi/4 DQPSK	5.72	6.06	5.90
8DPSK	6.72	6.80	6.73
GFSK	6.98	7.14	6.98

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}	8.40*	9.99*	8.89*
Measurement uncertainty		±3dB		

RBW / VBW: 3 MHz
Measured at a distance of 3m

* These values are calculated with the antenna gain (8DPSK modulation)

Limits:

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

Modulation: PI/4 DQPSK

Results:

Test conditions		Max. peak output power EIRP [dBm]		
Frequency [MHz]		2402	2442	2480
T_{nom}	V_{nom}	9.82*	11.20*	10.07*
Measurement uncertainty		±3dB		

RBW / VBW: 3 MHz
Measured at a distance of 3m

* These values are calculated with the antenna gain (8DPSK modulation)

Limits:

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

Modulation: 8DPSK

Results:

Test conditions		Max. peak output power EIRP [dBm]		
Frequency [MHz]		2402	2442	2480
T_{nom}	V_{nom}	10.49	11.90	10.80
Measurement uncertainty		±3dB		

RBW / VBW: 3 MHz
Measured at a distance of 3m

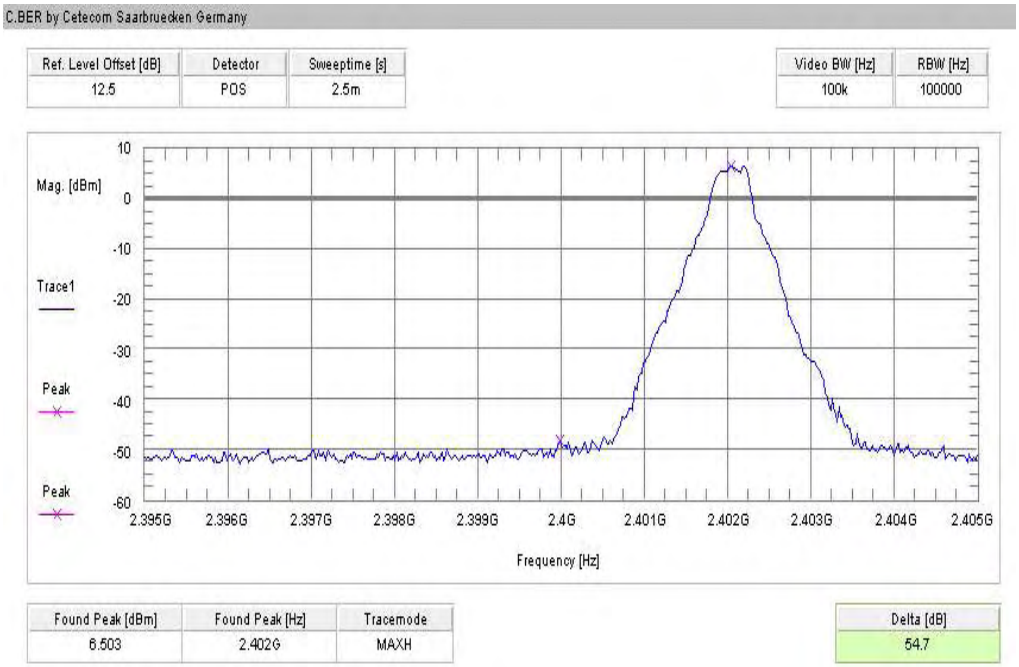
Limits:

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

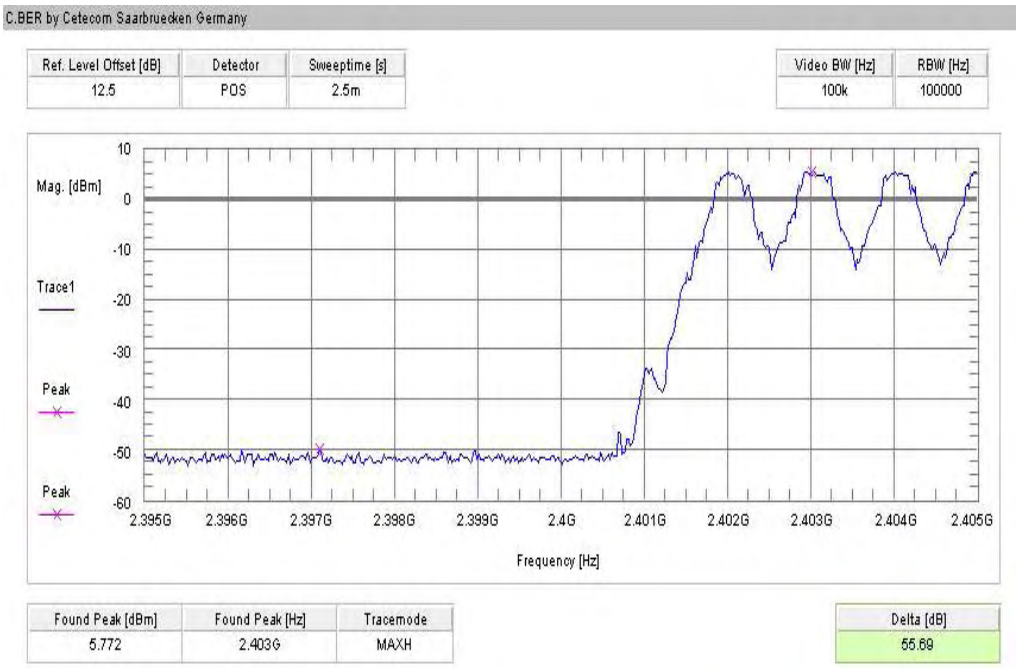
5.12 Band-edge compliance of conducted emissions §15.247 (d)

Modulation: GFSK

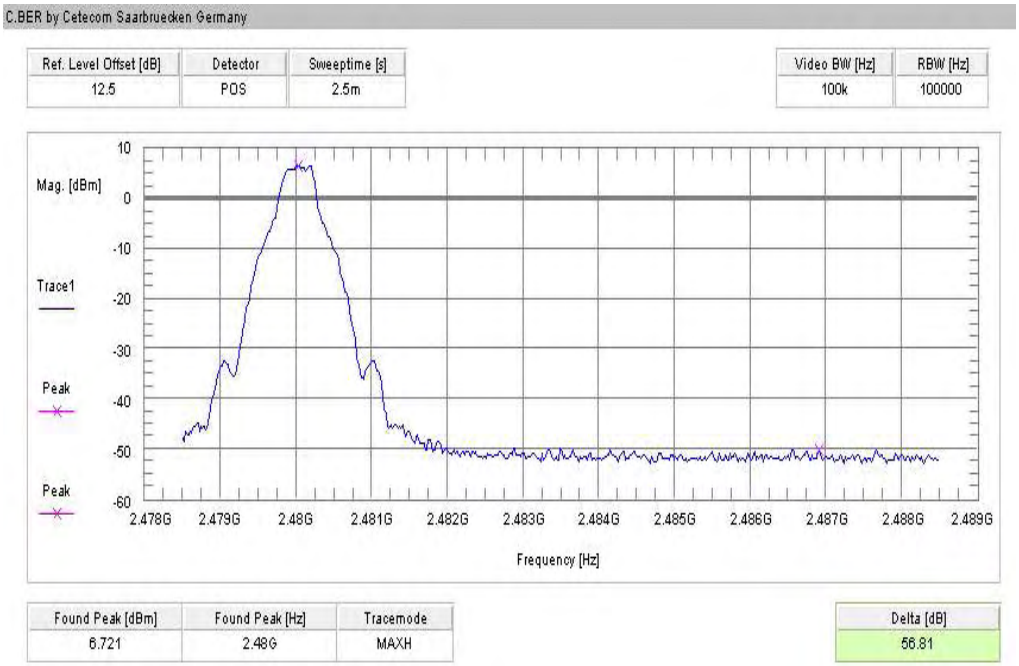
Plot 1 of 4 (hopping off, lowest frequency):



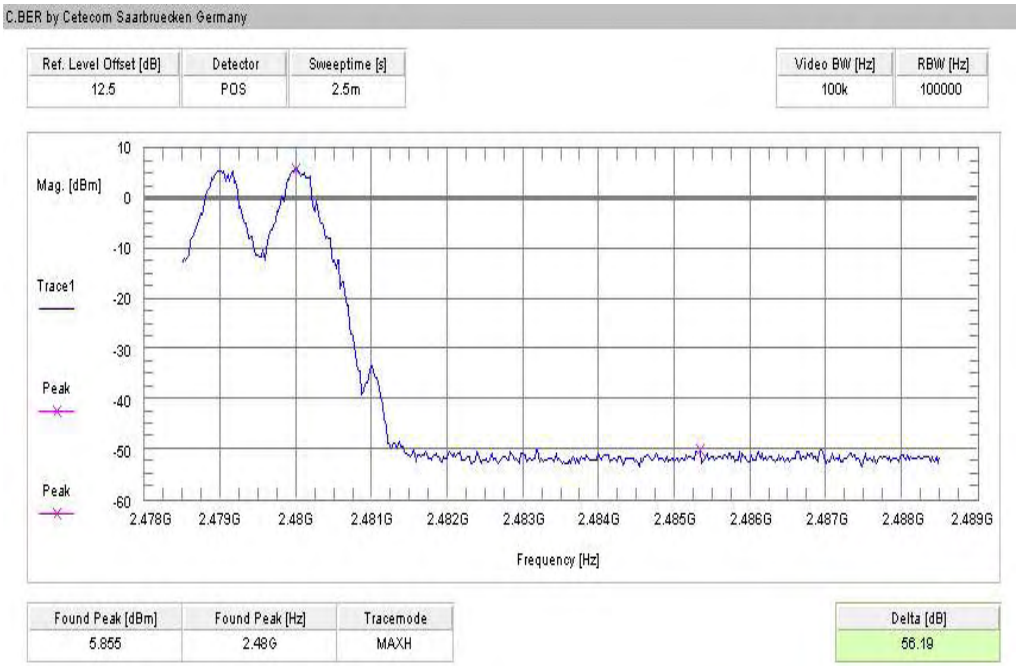
Plot 2 of 4 (hopping on, lowest frequency):



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



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

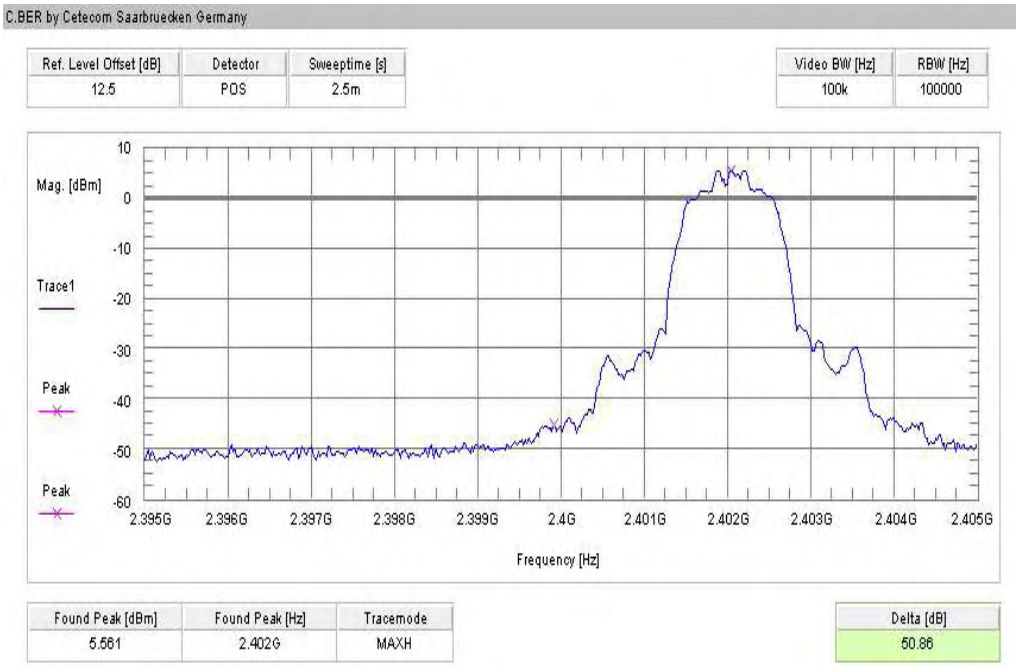


Results:

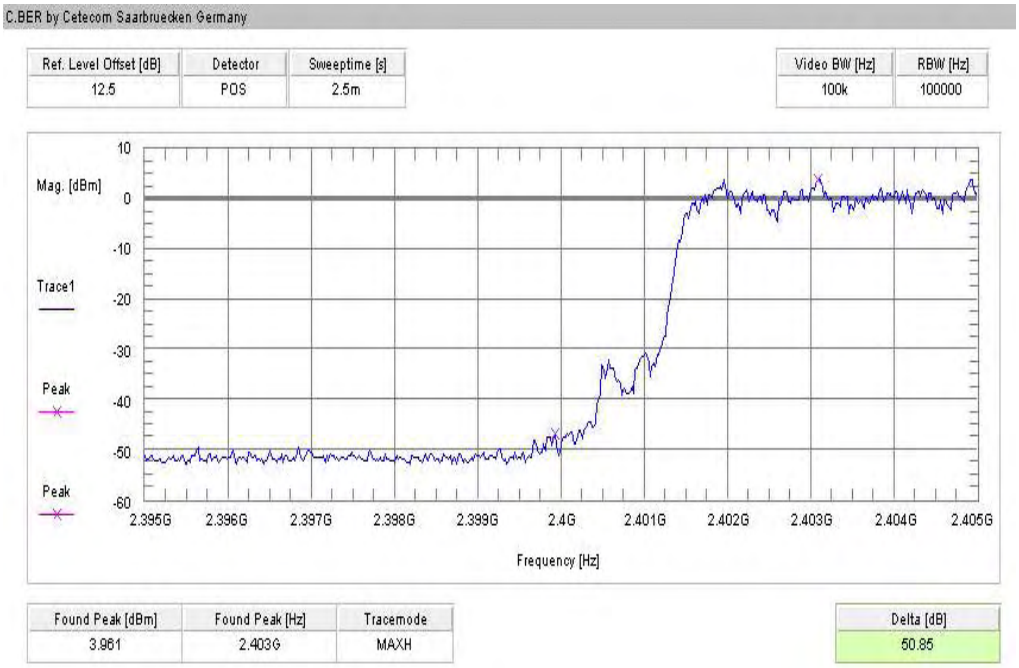
SZENARIO	DELTA VALUE [DB]
hopping off, lowest frequency	> 20 dB
hopping on, lowest frequency	> 20 dB
hopping off, highest frequency	> 20 dB
hopping on, highest frequency	> 20 dB
Measurement uncertainty	±1,5dB

Modulation: Pi/4 DQPSK

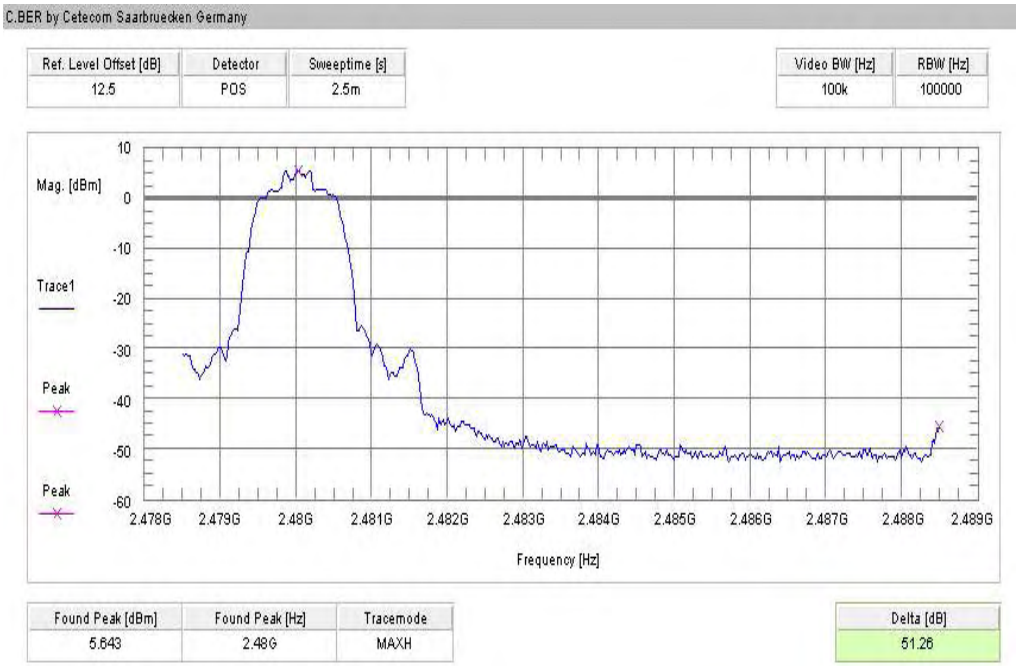
Plot 1 of 4 (hopping off, lowest frequency):



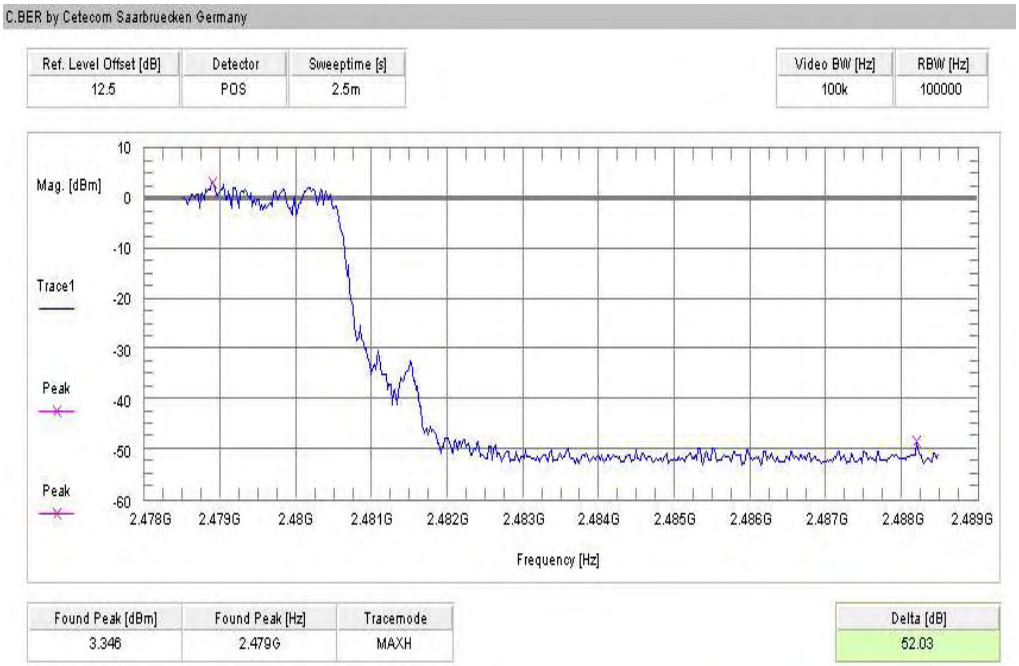
Plot 2 of 4 (hopping on, lowest frequency):



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



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

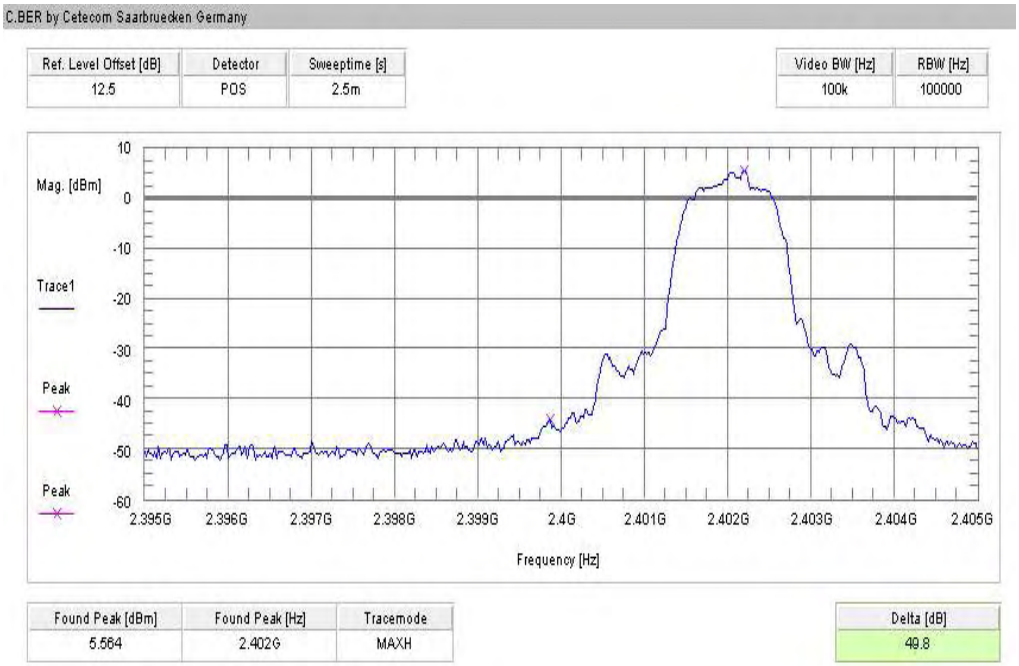


Results:

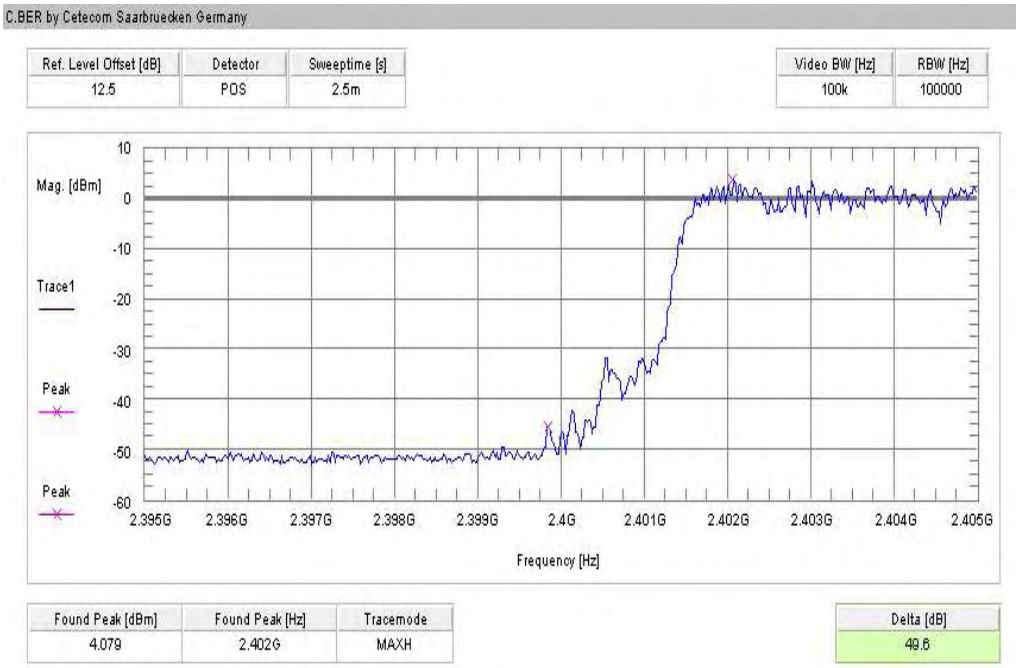
SZENARIO	DELTA VALUE [DB]
hopping off, lowest frequency	> 20 dB
hopping on, lowest frequency	> 20 dB
hopping off, highest frequency	> 20 dB
hopping on, highest frequency	> 20 dB
Measurement uncertainty	±1,5dB

Modulation: 8 DPSK

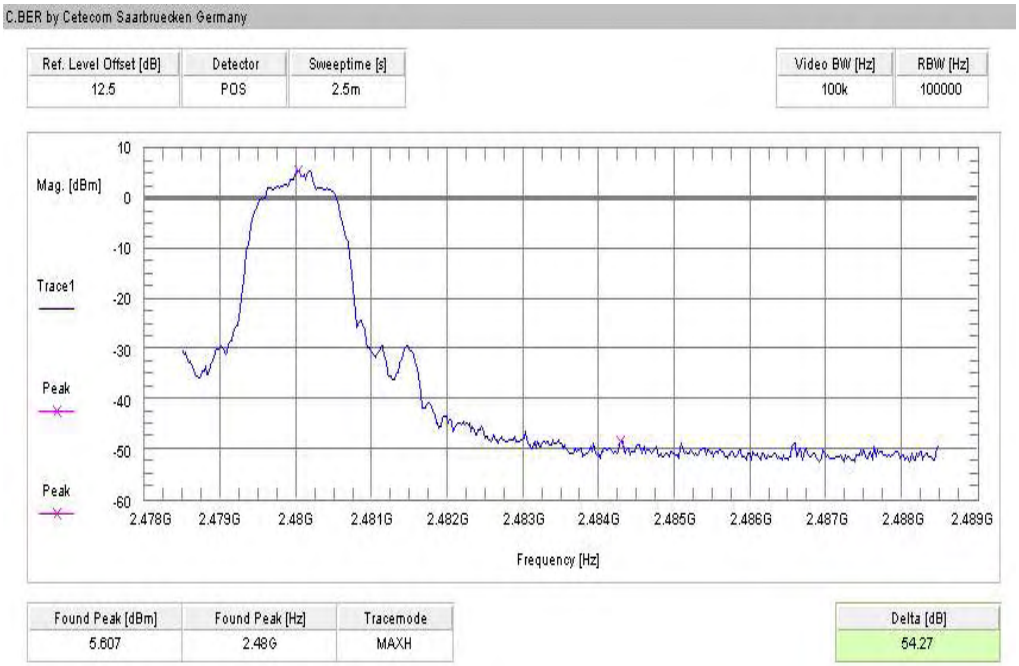
Plot 1 of 4 (hopping off, lowest frequency):



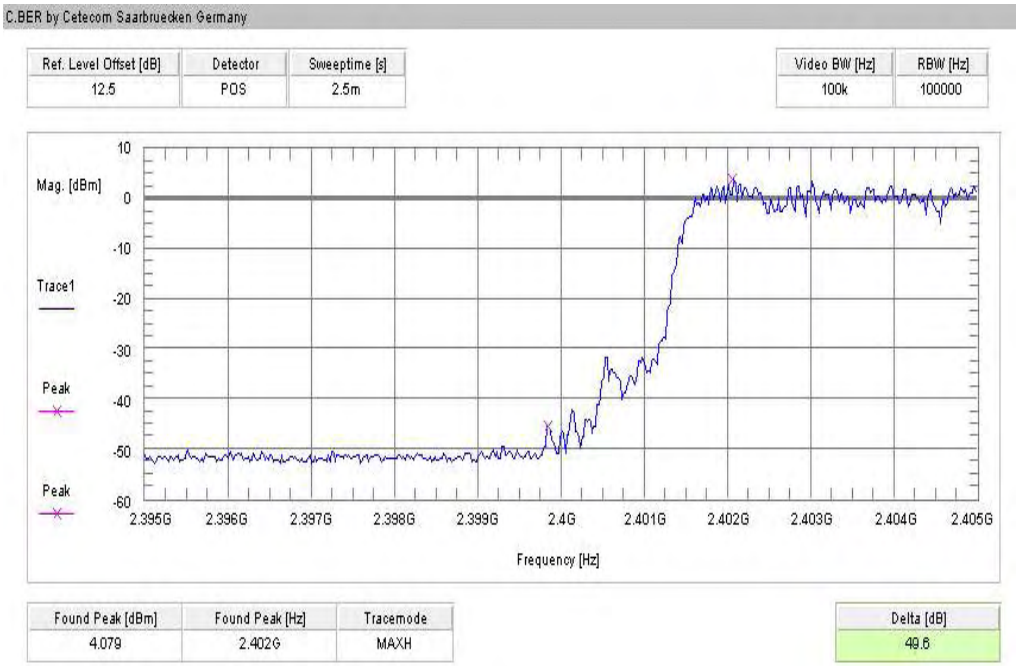
Plot 2 of 4 (hopping on, lowest frequency):



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

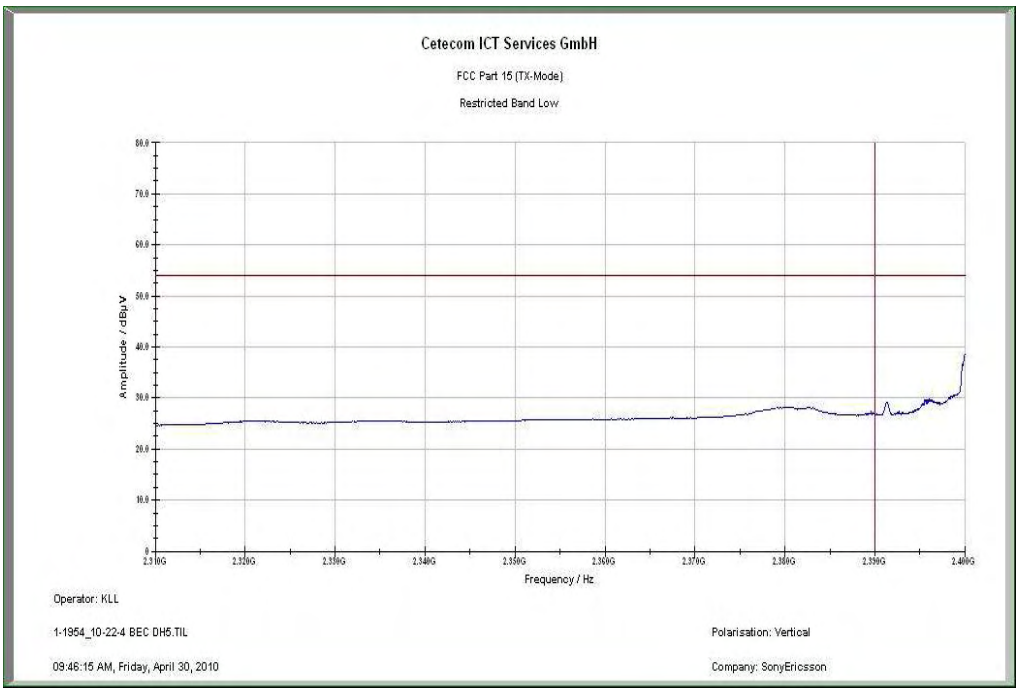
Limits:

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)).

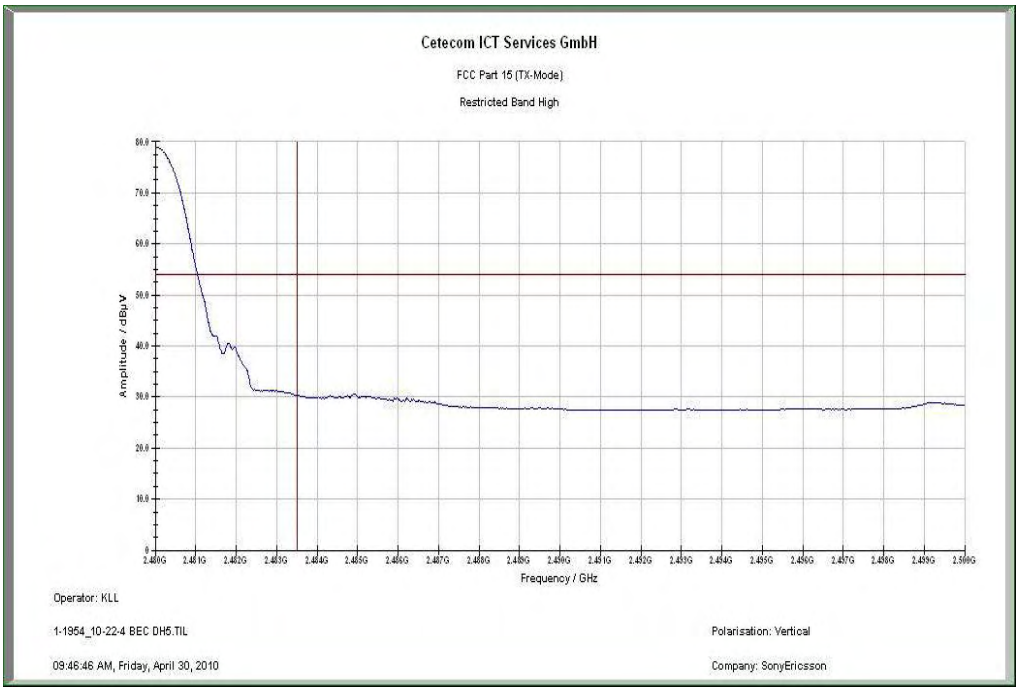
5.13 Band-edge compliance of radiated emissions §15.205

Modulation: GFSK

Plot 1: Restricted band low

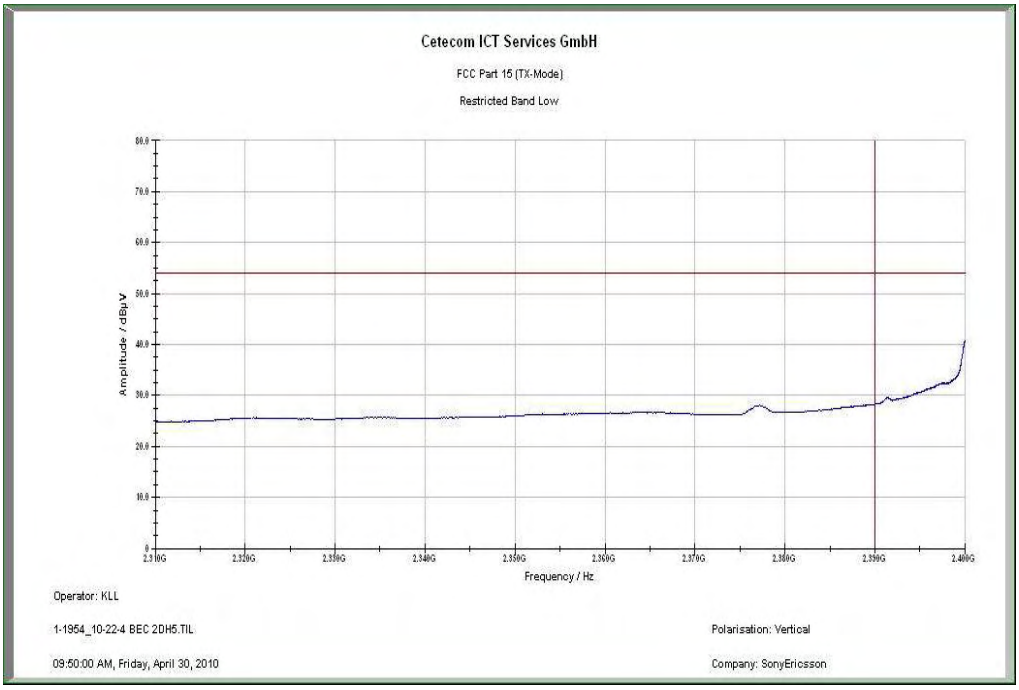


Plot 2: Restricted band high

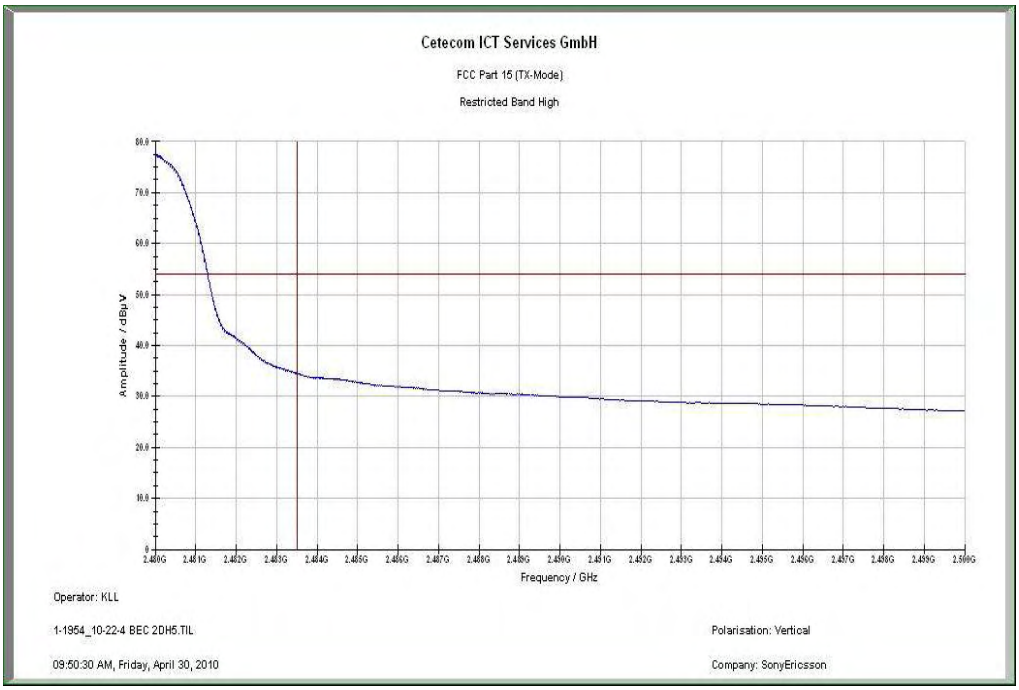


Modulation: PI/4 DQPSK

Plot 3: Restricted band low

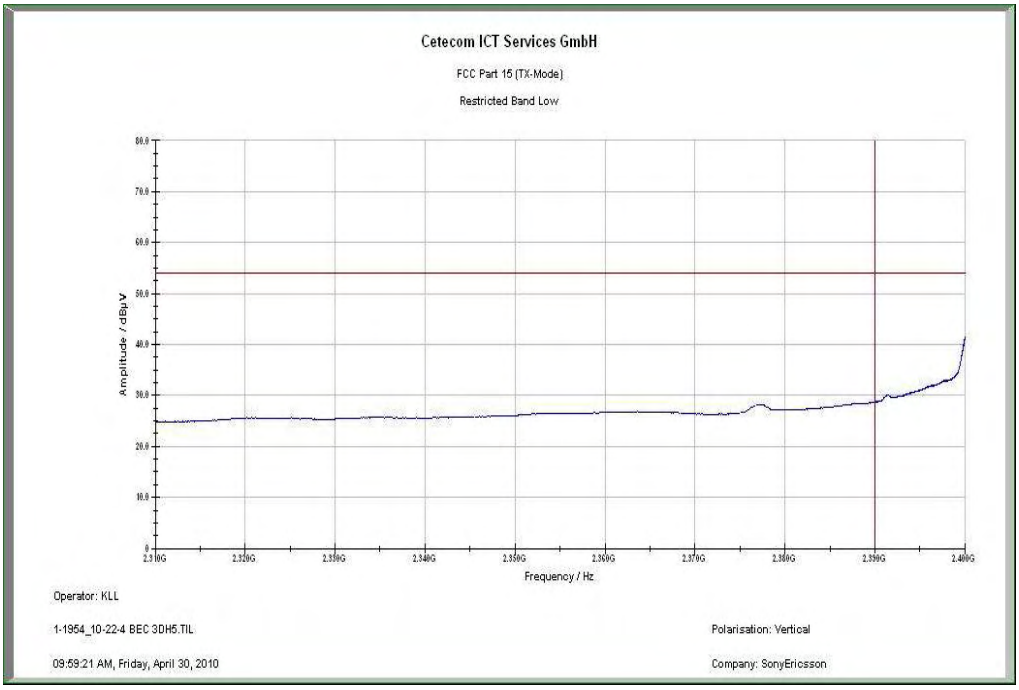


Plot 4: Restricted band high

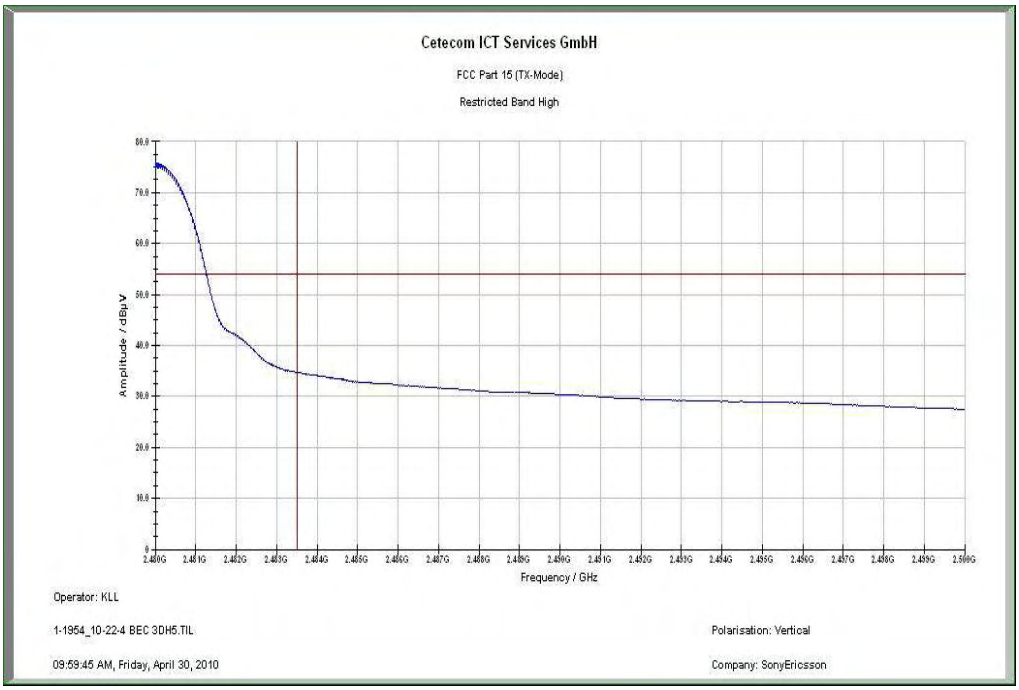


Modulation: 8DPSK

Plot 5: Restricted band low



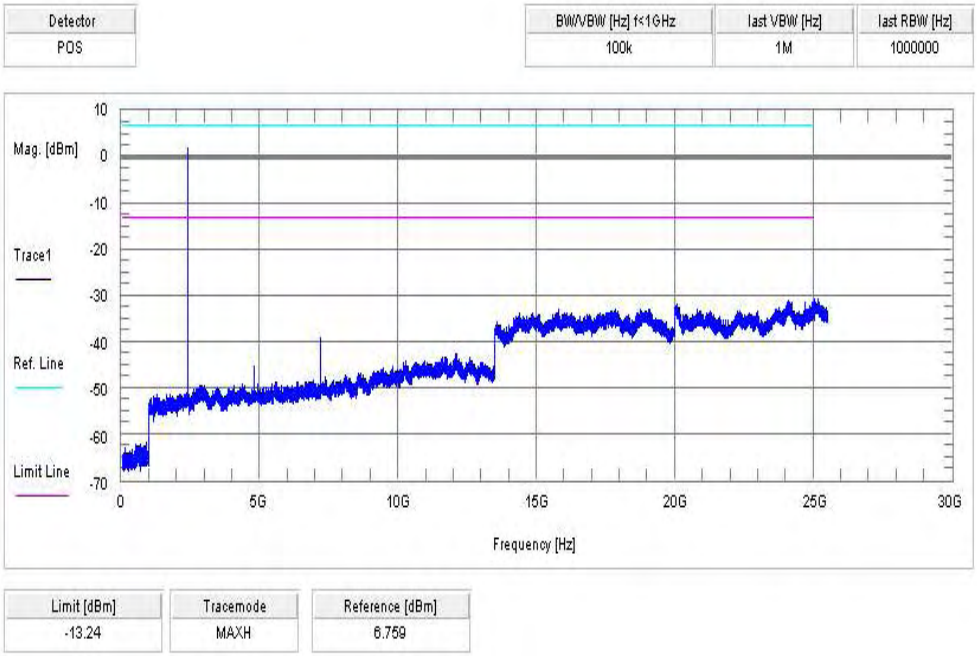
Plot 6: Restricted band high



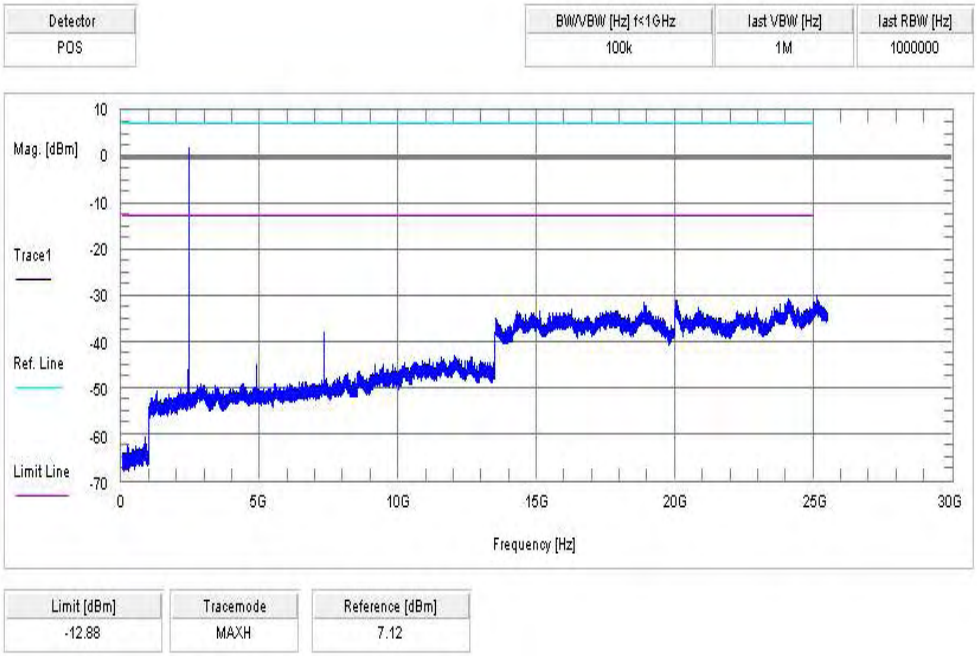
5.14 Spurious Emissions - conducted (Transmitter) § 15.247 (c)(1)

Modulation: GFSK

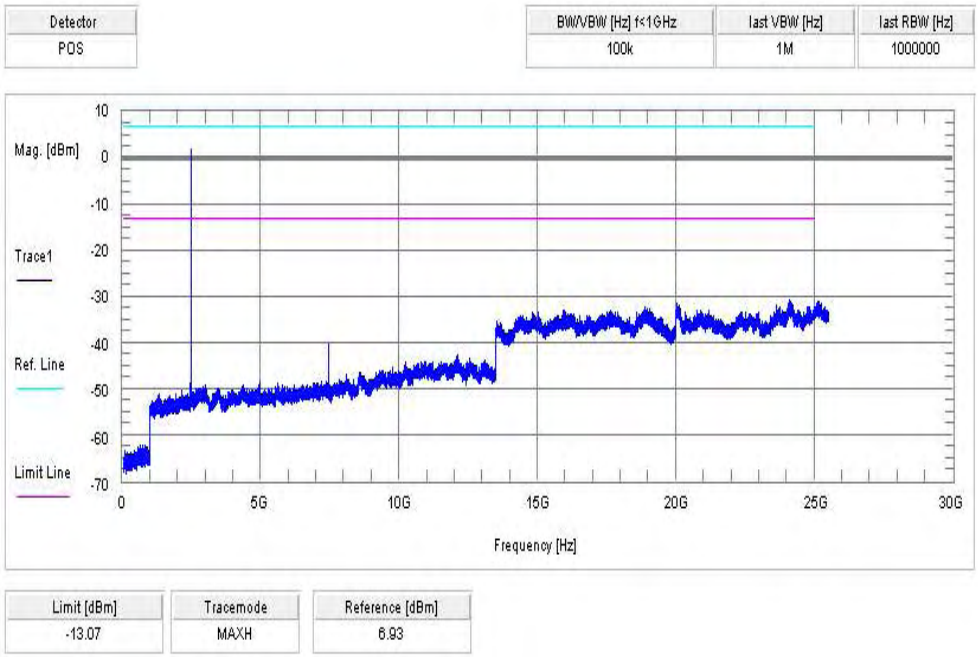
Plot 1 of 3: lowest channel



Plot 2 of 3: middle channel



Plot 3 of 3: highest channel



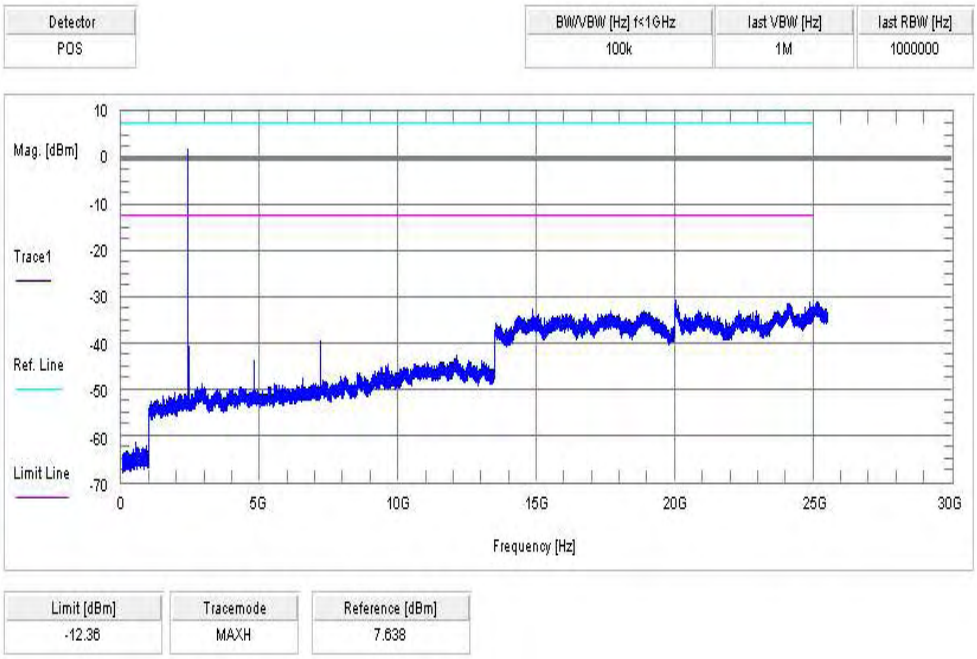
Result & Limits:

Emission Limitation					
f [MHz]		amplitude of emission [dBm]	limit max. allowed emission power	actual attenuation below frequency of operation [dB]	results
2402		6.76	30 dBm		Operating frequency
4804		-44.1	-20 dBc	50.86	complies
7206		-39.4		46.16	complies
2441		7.1	30 dBm		Operating frequency
4882		-45.1	-20 dBc	52.2	complies
7323		-38.2		45.3	complies
2480		6.9	30 dBm		Operating frequency
7440		-40	-20 dBc	46.9	complies
Measurement uncertainty		± 3dB			

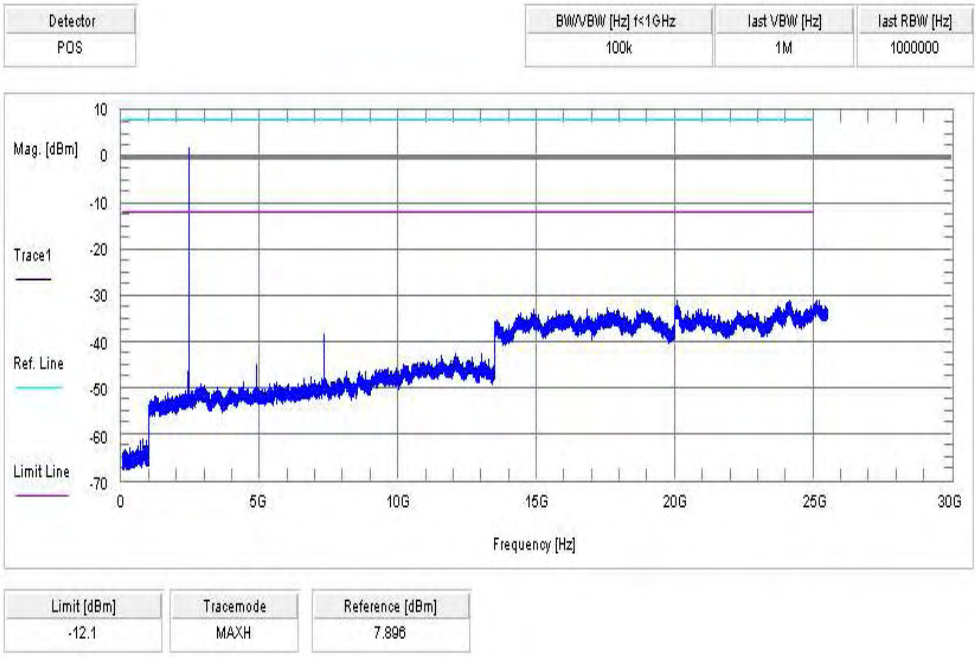
F < 1 GHz: RBW: 100 kHz VBW: 100 kHz
F > 1 GHz: RBW: 1 MHz VBW: 1 MHz

Modulation: Pi/4 DQPSK

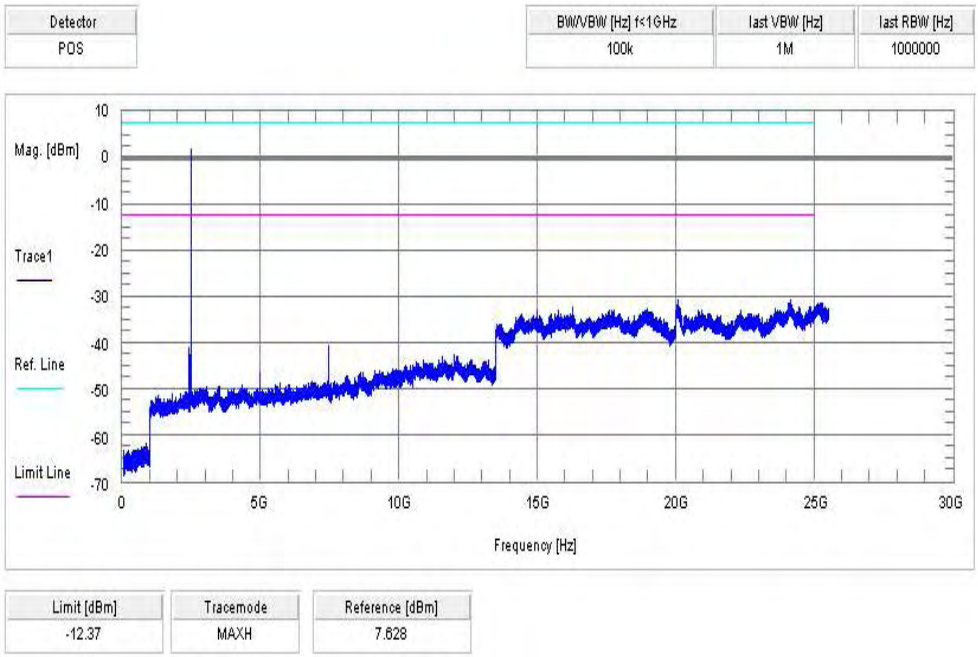
Plot 1 of 3: lowest channel



Plot 2 of 3: middle channel



Plot 3 of 3: highest channel



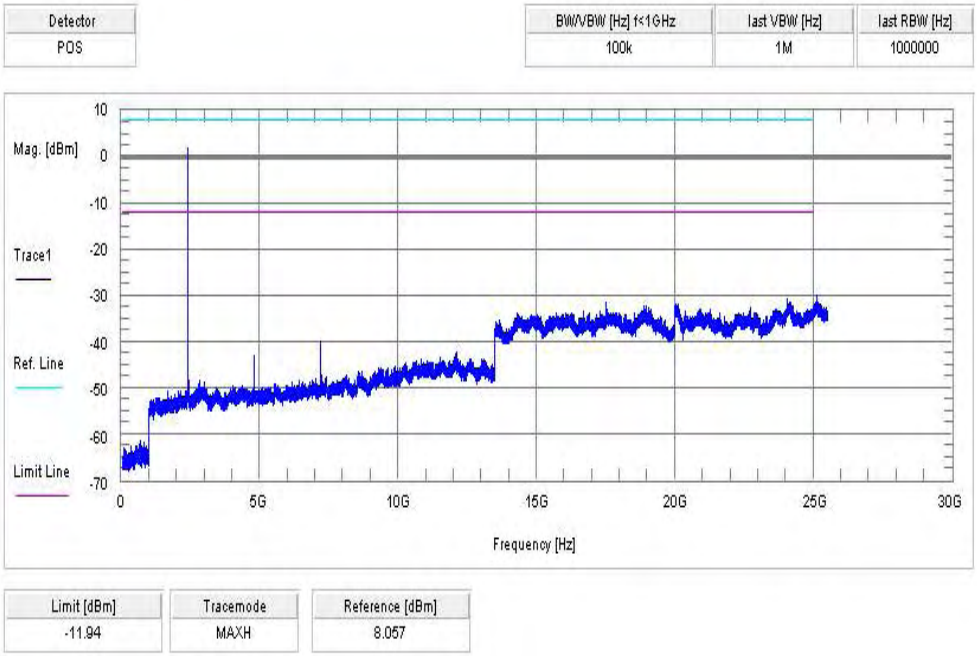
Result & Limits:

Emission Limitation					
f [MHz]		amplitude of emission [dBm]	limit max. allowed emission power	actual attenuation below frequency of operation [dB]	results
2402		7.64	30 dBm		Operating frequency
4804		-43.8	-20 dBc	51.44	complies
7206		-39.8		47.44	complies
2441		7.89	30 dBm		Operating frequency
4882		-46.2	-20 dBc	54.09	complies
7323		-38.0		45.89	complies
2480		7.63	30 dBm		Operating frequency
4960		-47.5	-20 dBc	55.13	complies
7440		-40.4		48.03	complies
Measurement uncertainty		± 3dB			

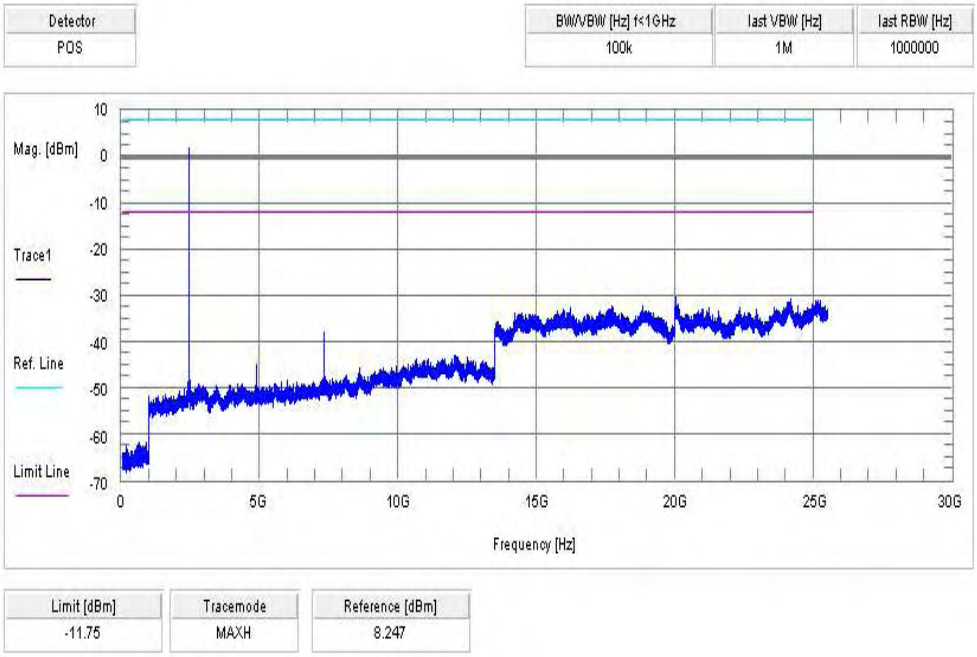
F < 1 GHz: RBW: 100 kHz VBW: 100 kHz
F > 1 GHz: RBW: 1 MHz VBW: 1 MHz

Modulation: 8 DPSK

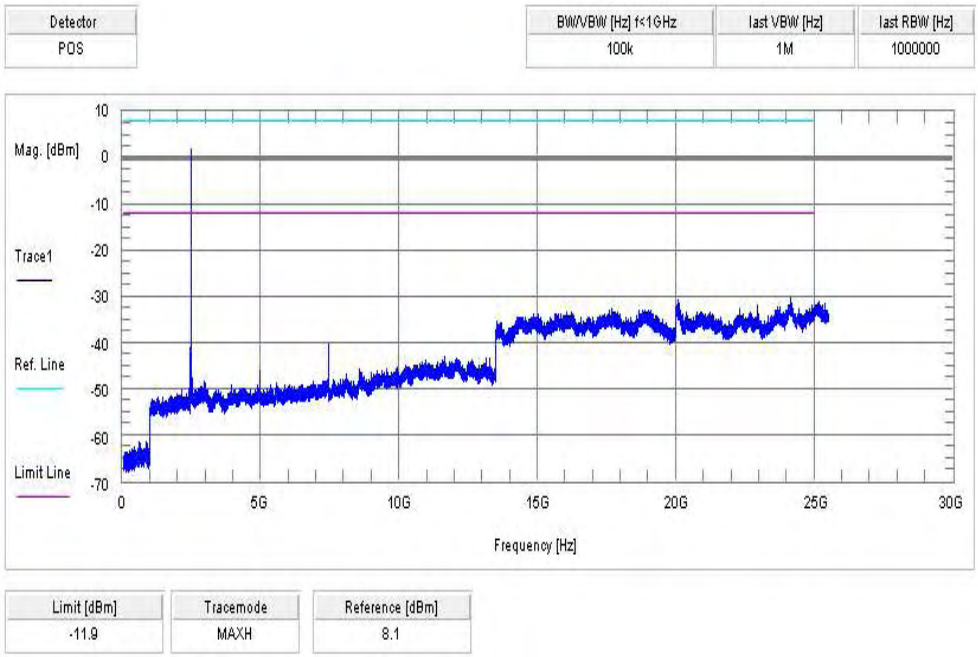
Plot 1 of 3: lowest channel



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		8.06	30 dBm		Operating frequency
4804		-43.3	-20 dBc	51.36	complies
7206		-40.0		48.06	complies
2441		8.24	30 dBm		Operating frequency
4882		-46.0	-20 dBc	54.24	complies
7323		-37.9		47.94	complies
2480		8.1	30 dBm		Operating frequency
4960		-46.1	-20 dBc	54.2	complies
7440		-40.0		48.1	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)).

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

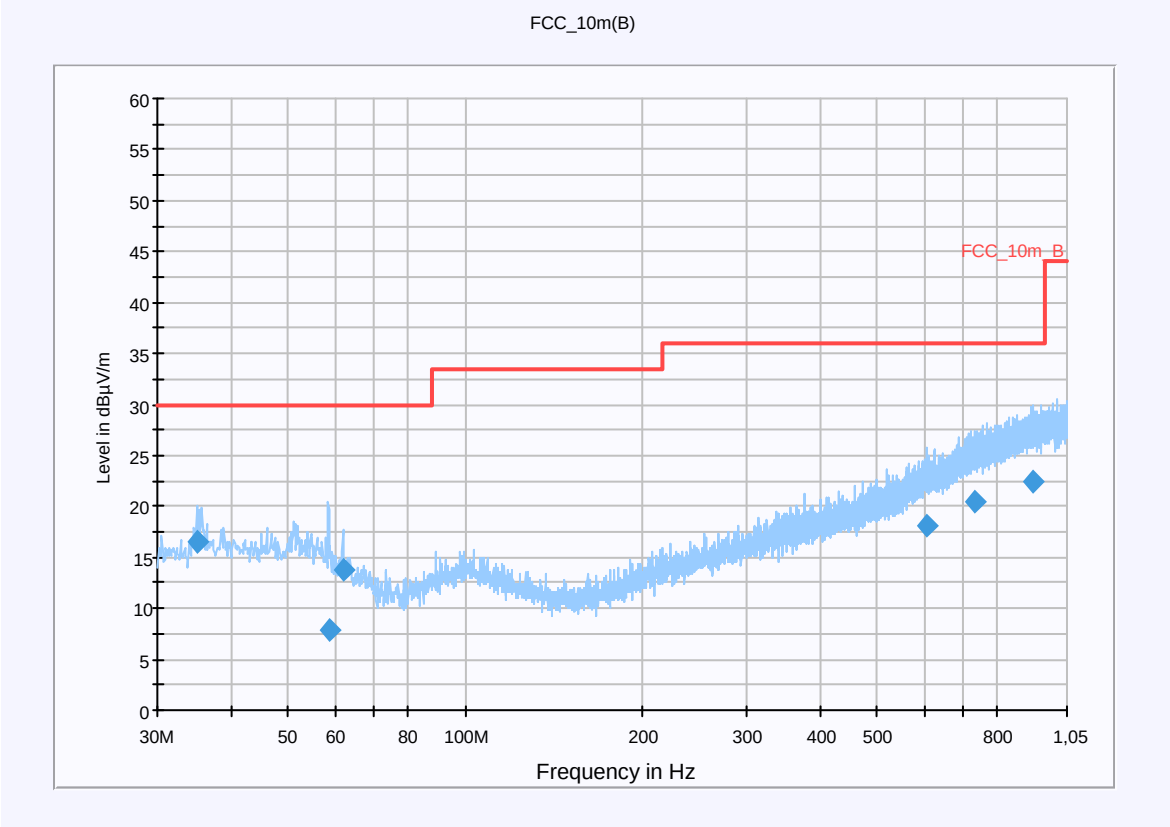
Plot 1: 0.03 - 1 GHz vertical (lowest channel)

EUT:	AAD-3880072-BV + CAA-0002016 (EP800)
Serial Number:	IMEI:00440214-048457-1
Test Description:	FCC part 15 C Class B @ 10 m
Operating Conditions:	BT-Testmode; Tx Ch: 0
Operator Name:	Lang
Comment:	AC: 115 V / 60 Hz

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
35.002350	16.4	15000.000	120.000	200.0	V	85.0	13.0	13.6	30.0	
58.666500	7.8	15000.000	120.000	400.0	H	211.0	11.9	22.2	30.0	
62.000550	13.8	15000.000	120.000	200.0	V	277.0	11.1	16.2	30.0	
608.384400	18.0	15000.000	120.000	368.0	V	104.0	20.8	18.0	36.0	
733.704600	20.4	15000.000	120.000	400.0	H	-6.0	23.2	15.6	36.0	
921.159450	22.4	15000.000	120.000	400.0	H	214.0	25.3	13.6	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

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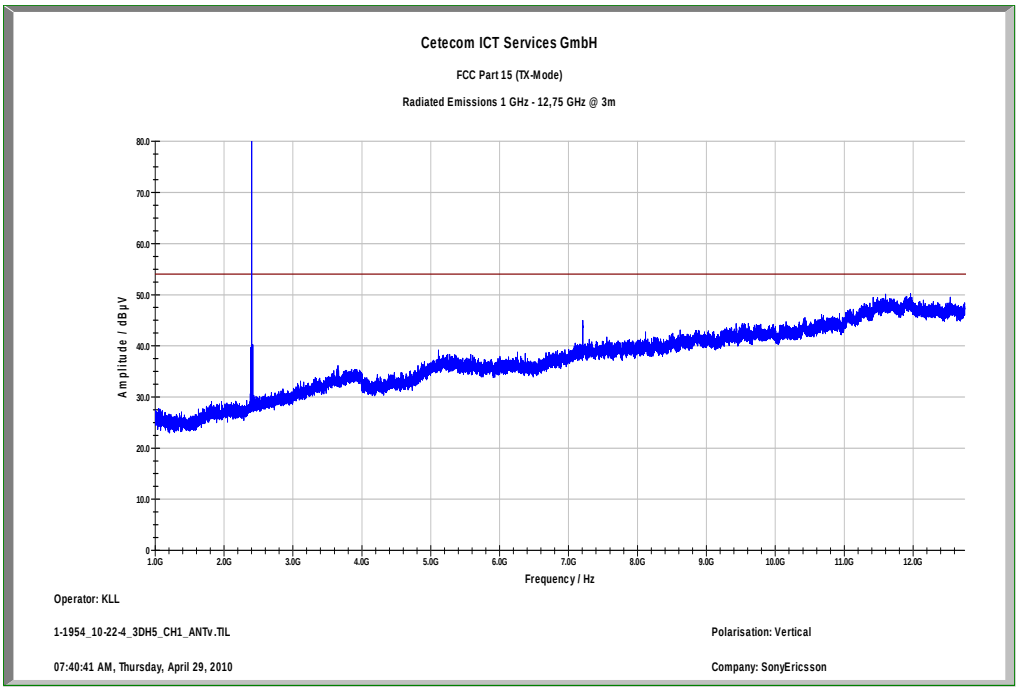
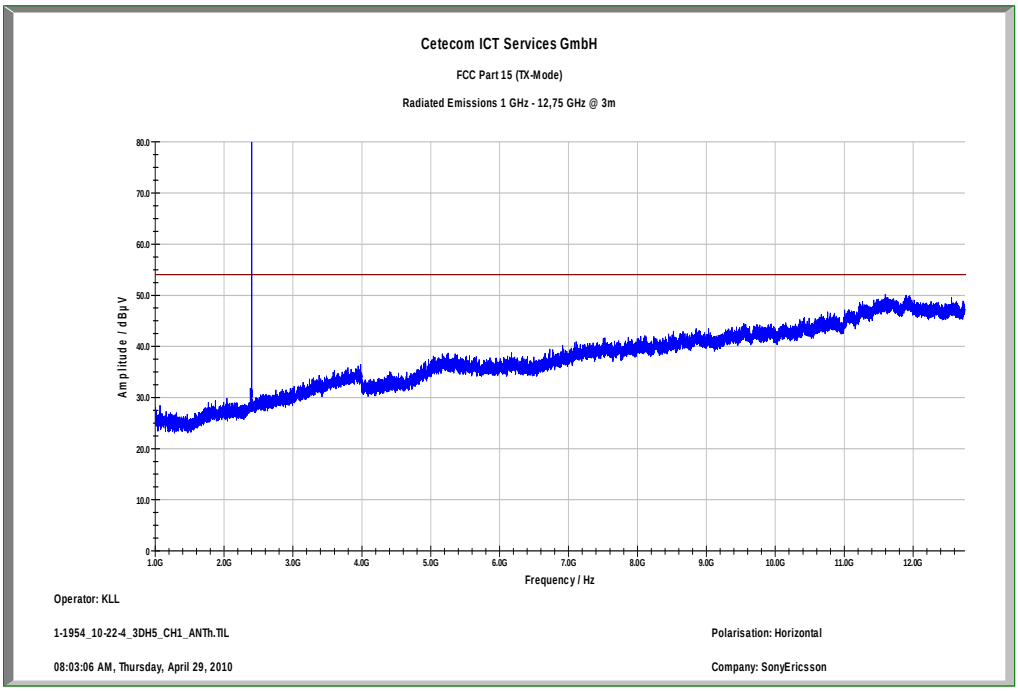
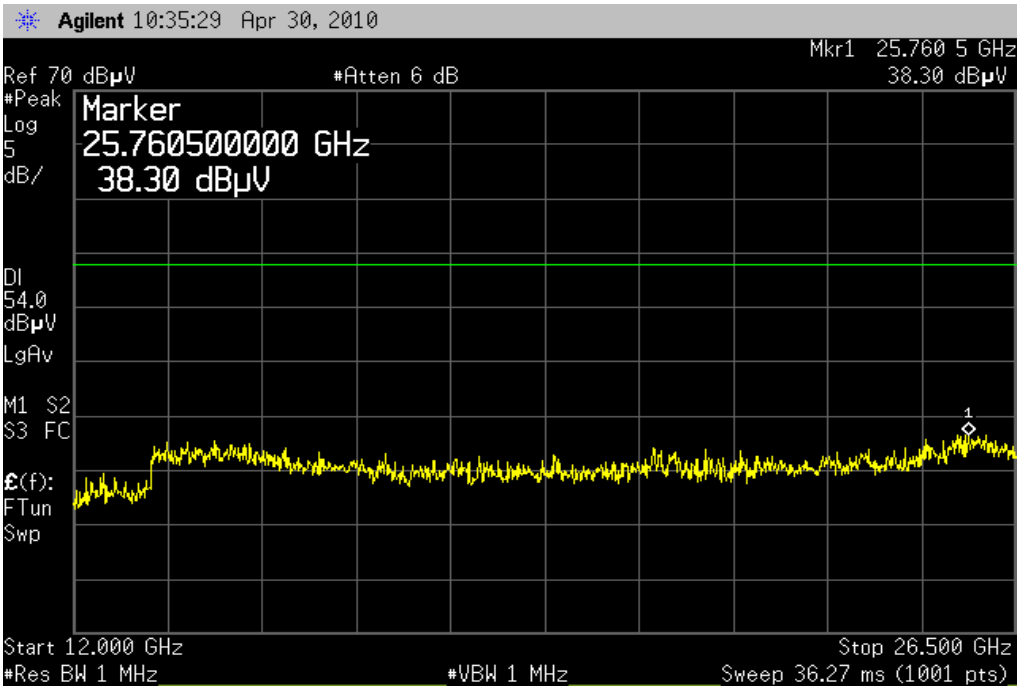
Plot 2: 1 – 12.75 GHz vertical (lowest channel)



Plot 3: 1 – 12.75 GHz horizontal (lowest channel)



Plot 4: 12 – 26.5 GHz vertical/horizontal max. hold (valid for all channels)



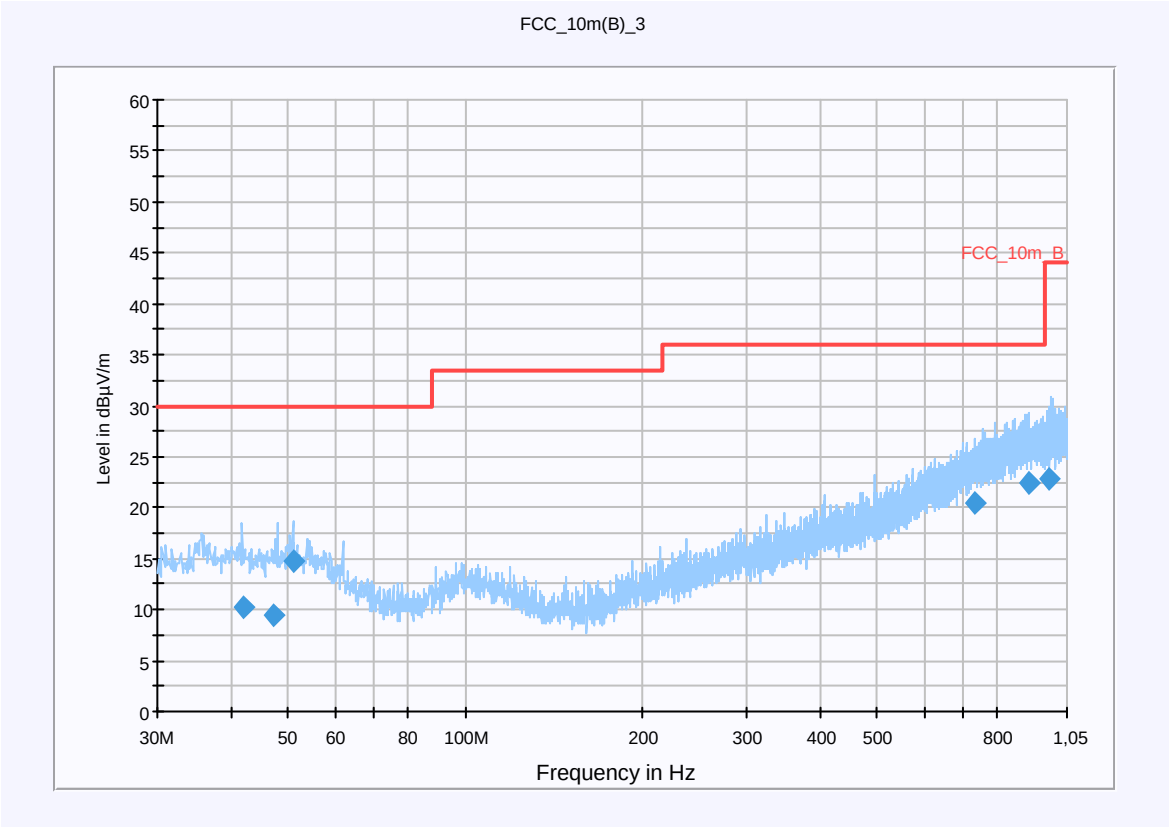
Plot 5: 0.03 - 1 GHz vertical (middle channel)

EUT:	AAD-3880072-BV + CAA-0002016 (EP800)
Serial Number:	IMEI:00440214-048457-1
Test Description:	FCC part 15 C Class B @ 10 m
Operating Conditions:	BT-Testmode; Tx Ch: 39
Operator Name:	Lang
Comment:	AC: 115 V / 60 Hz

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
42.018900	10.3	15000.000	120.000	159.0	V	250.0	13.4	19.7	30.0	
47.418150	9.4	15000.000	120.000	150.0	V	232.0	13.3	20.6	30.0	
50.991600	14.8	15000.000	120.000	150.0	V	156.0	13.3	15.2	30.0	
732.120450	20.4	15000.000	120.000	220.0	H	232.0	23.2	15.6	36.0	
903.407700	22.4	15000.000	120.000	98.0	H	300.0	25.2	13.6	36.0	
980.677800	22.9	15000.000	120.000	207.0	V	304.0	25.6	21.1	44.0	

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

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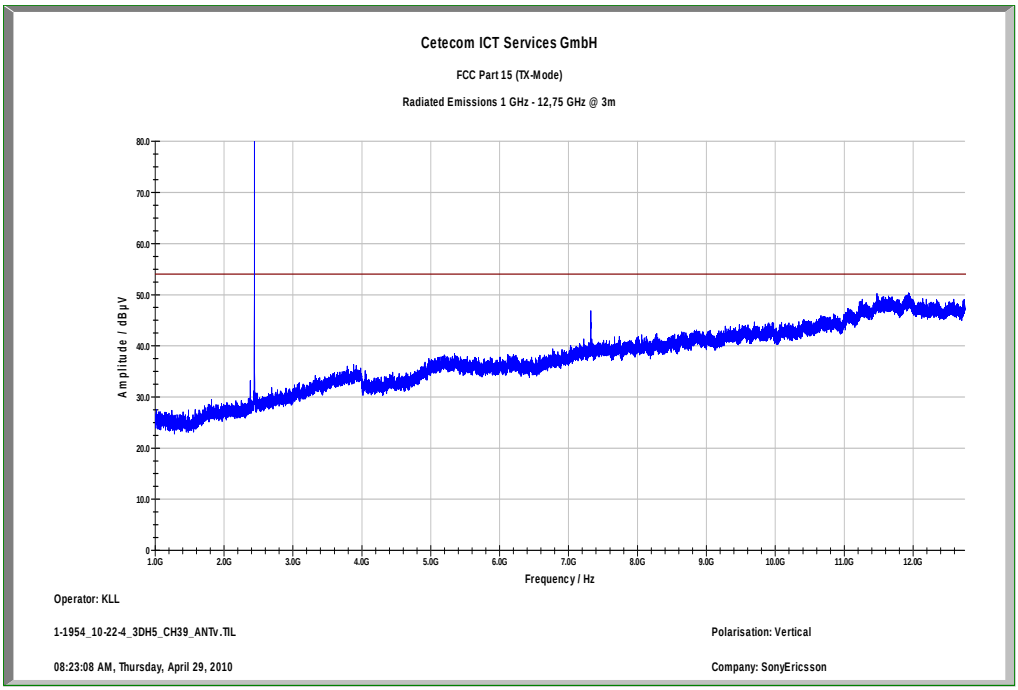
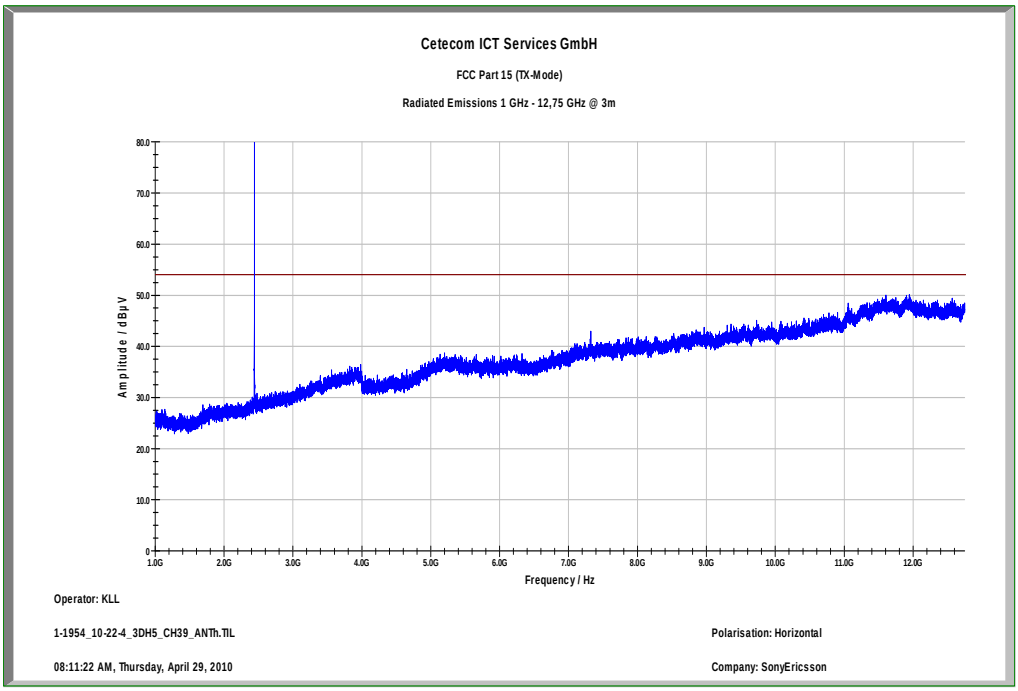
Plot 6: 1 – 12.75 GHz vertical (middle channel



Plot 7: 1 – 12.75 GHz horizontal (middle channel)



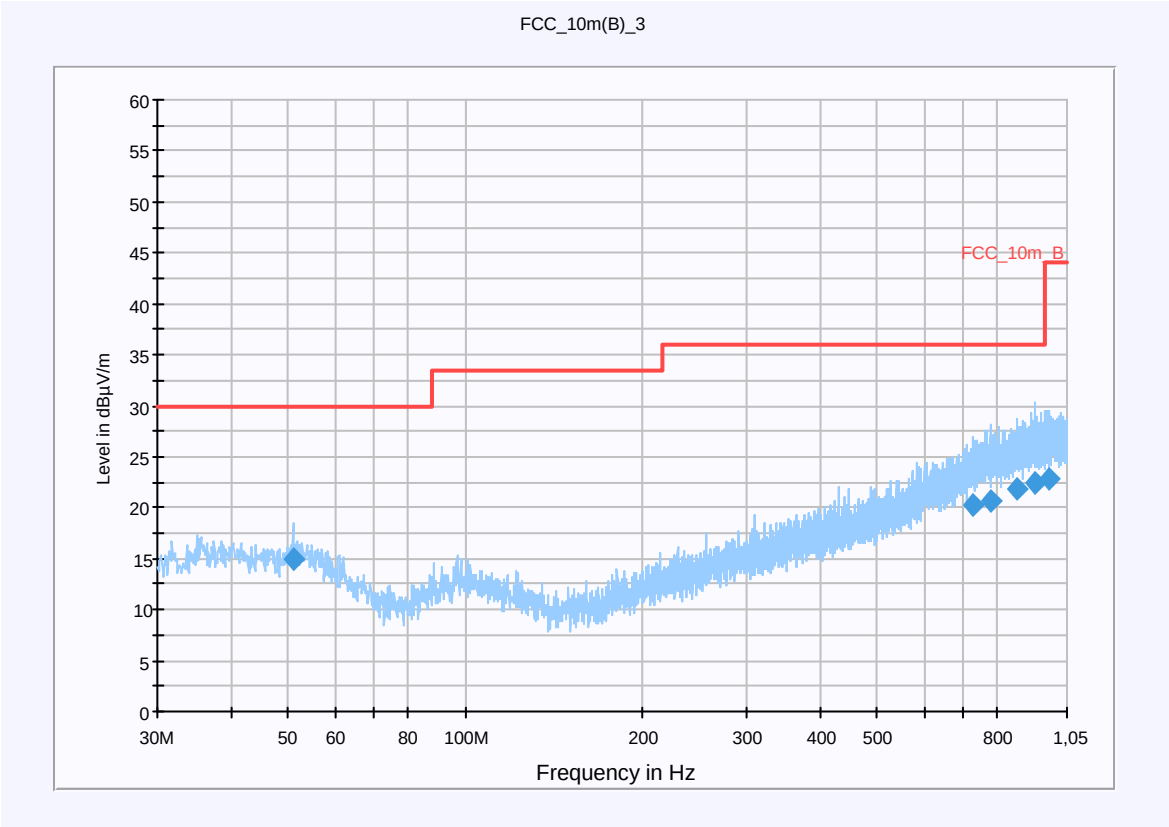
Plot 8: 0.03 - 1 GHz vertical (highest channel)

EUT:	AAD-3880072-BV + CAA-0002016 (EP800)
Serial Number:	IMEI:00440214-048457-1
Test Description:	FCC part 15 C Class B @ 10 m
Operating Conditions:	BT-Testmode; Tx Ch: 78
Operator Name:	Lang
Comment:	AC: 115 V / 60 Hz

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
50.973750	15.0	15000.000	120.000	106.0	V	80.0	13.3	15.0	30.0	
728.662950	20.2	15000.000	120.000	220.0	V	45.0	23.1	15.8	36.0	
778.327350	20.7	15000.000	120.000	220.0	V	102.0	23.7	15.3	36.0	
863.810550	21.9	15000.000	120.000	220.0	V	53.0	24.7	14.1	36.0	
927.477600	22.5	15000.000	120.000	220.0	H	251.0	25.3	13.5	36.0	
975.551550	22.8	15000.000	120.000	220.0	H	117.0	25.6	21.2	44.0	

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

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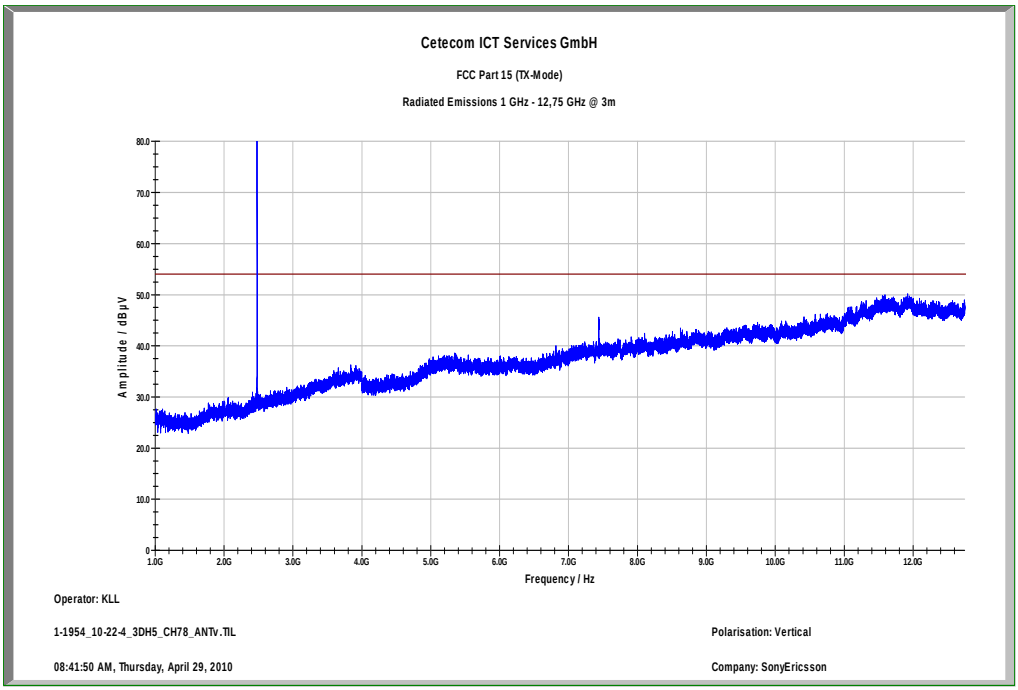
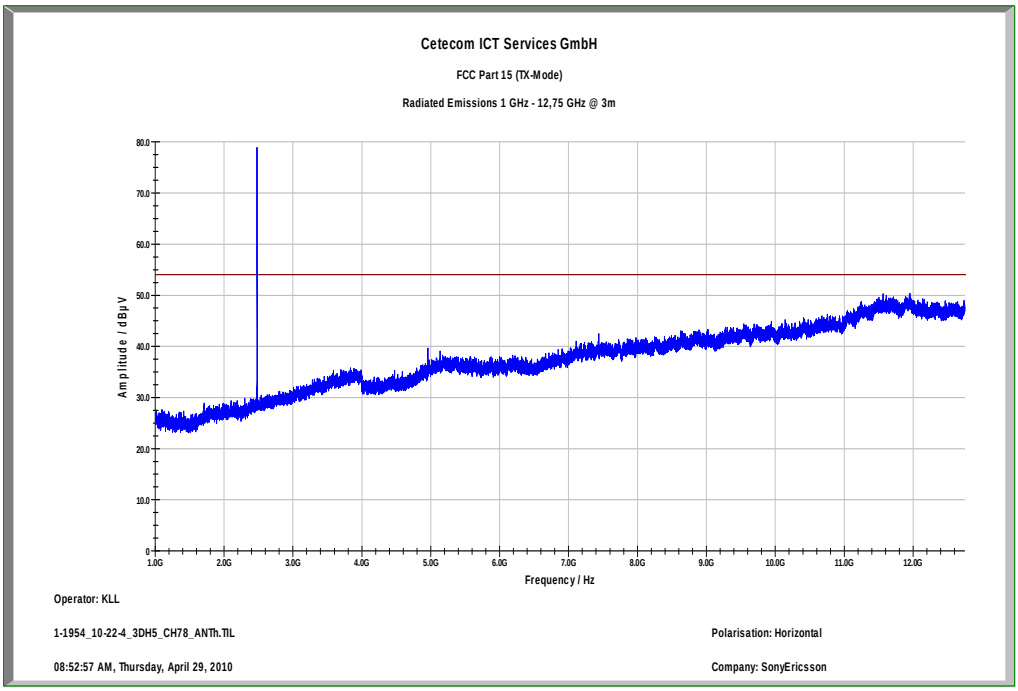
Plot 9: 1 – 12.75 GHz vertical (highest channel)



Plot 10: 1 – 12.75 GHz horizontal (highest channel)



Results:

SPURIOUS EMISSIONS LEVEL (dBµV/m)								
2402 MHz			2441 MHz			2480 MHz		
F [MHz]	Detector	Level [dBµV/m]	F [MHz]	Detector	Level [dBµV/m]	F [MHz]	Detector	Level [dBµV/m]
7206	PK	49.7 (v)	7323	Pk	46.1 (v)	4960	Pk	44.3 (h)
						7440	Pk	44.2
Measurement uncertainty			±3 dB					

f < 1 GHz : RBW/VBW: 100 kHz f ≥ 1GHz : RBW=1MHz/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 [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

5.16 Spurious Emissions - radiated (Receiver) § 15.109

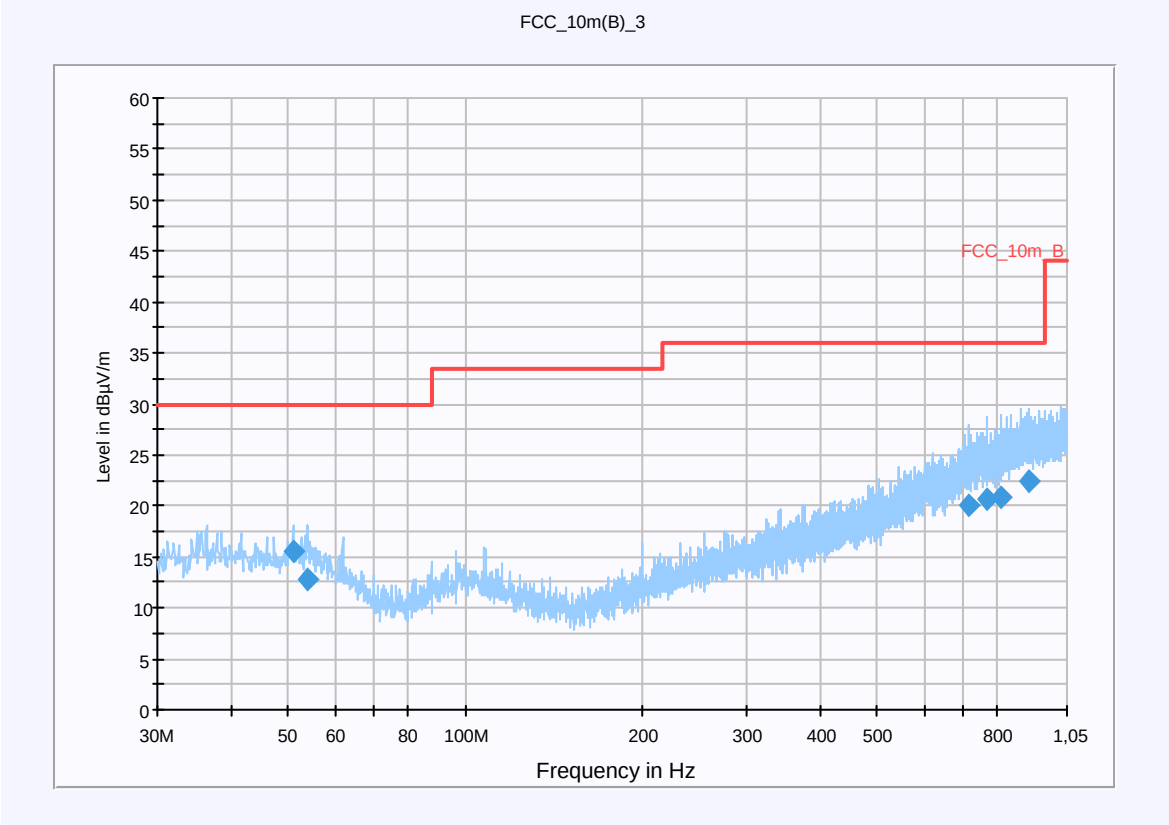
Plot 1: 0.03 - 1 GHz vertical/horizontal (receiver)

EUT:	AAD-3880072-BV + CAA-0002016 (EP800)
Serial Number:	IMEI:00440214-048457-1
Test Description:	FCC part 15 C Class B @ 10 m
Operating Conditions:	BT-Testmode; Rx- Mode
Operator Name:	Lang
Comment:	AC: 115 V / 60 Hz

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
51.003450	15.5	15000.000	120.000	98.0	V	146.0	13.3	14.5	30.0	
54.029550	12.7	15000.000	120.000	220.0	V	5.0	13.0	17.3	30.0	
718.011150	20.0	15000.000	120.000	220.0	V	255.0	22.8	16.0	36.0	
768.466350	20.7	15000.000	120.000	182.0	V	236.0	23.7	15.3	36.0	
809.779050	20.9	15000.000	120.000	220.0	H	170.0	24.0	15.1	36.0	
905.485800	22.4	15000.000	120.000	220.0	H	253.0	25.2	13.6	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

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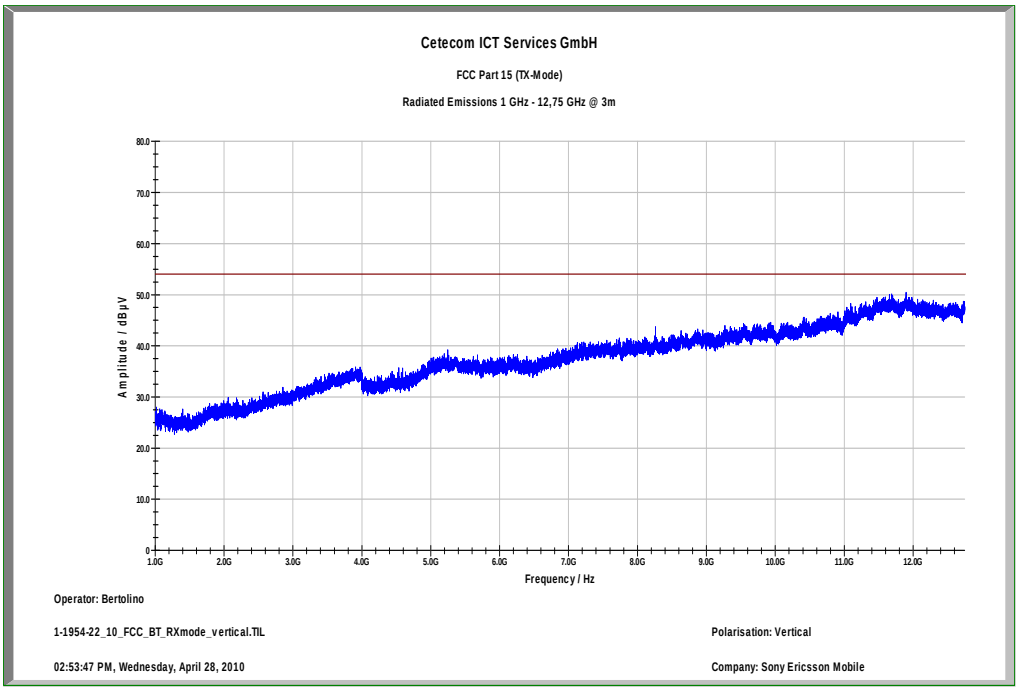
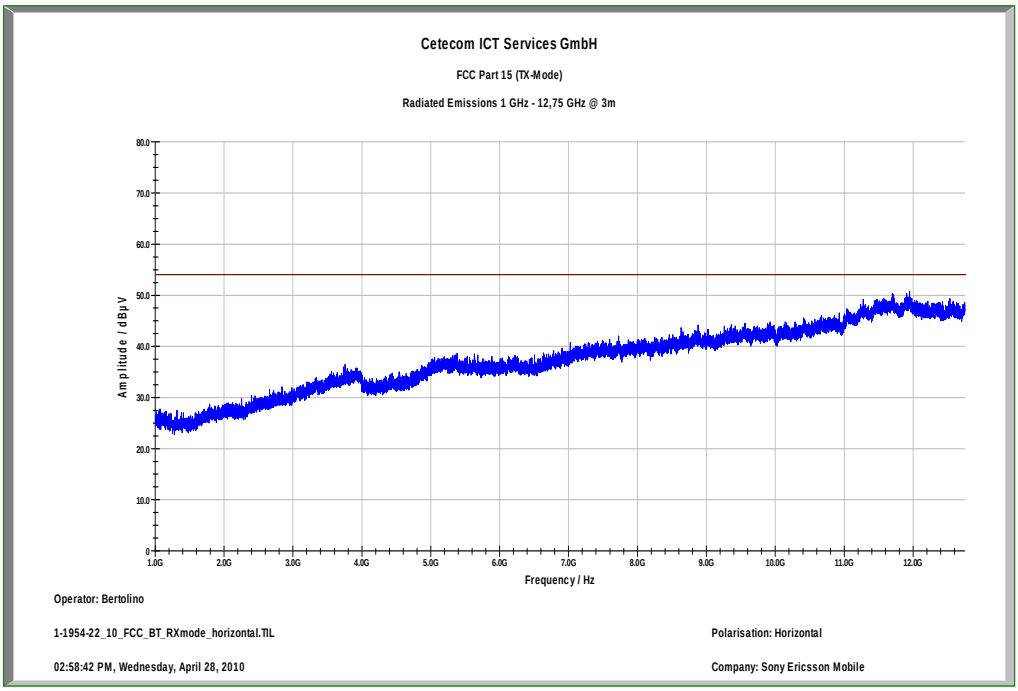
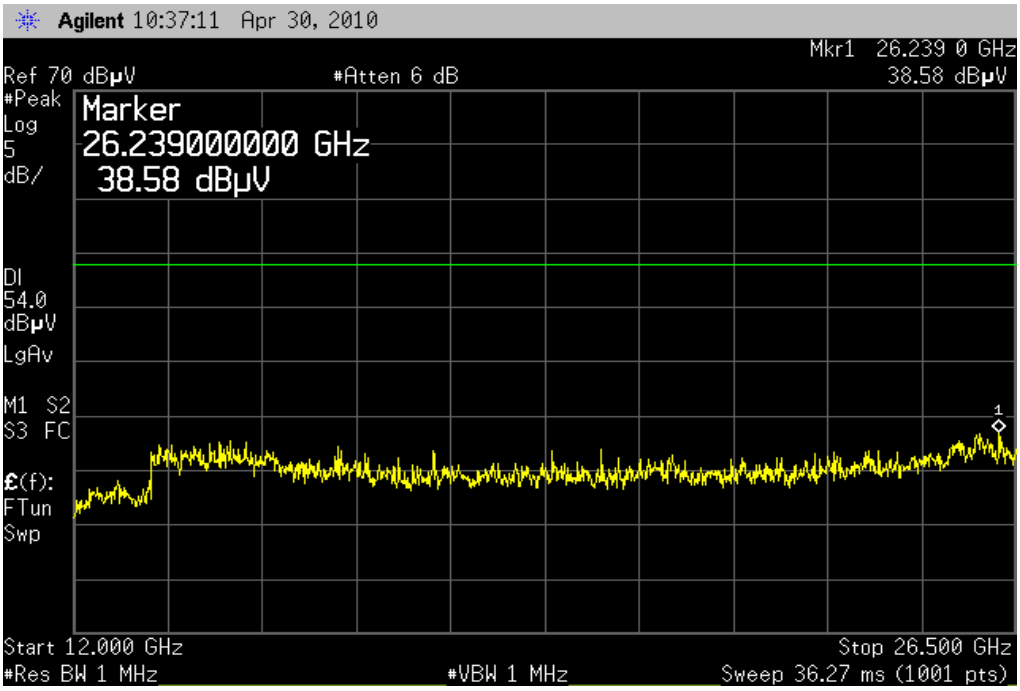
Plot 2: 1 – 12.75 GHz vertical (receiver)



Plot 3: 1 – 12.75 GHz horizontal (receiver)



Plot 4: 12 – 26.5 GHz vertical/horizontal (receiver)



Results:

Spurious Emissions level [dBµV/m]		
f[MHz]	Detector	Level [dBµV/m]
No critical peaks detected		
Measurement uncertainty	±3 dB	

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

Measurement distance see table

Limits: § 15.109

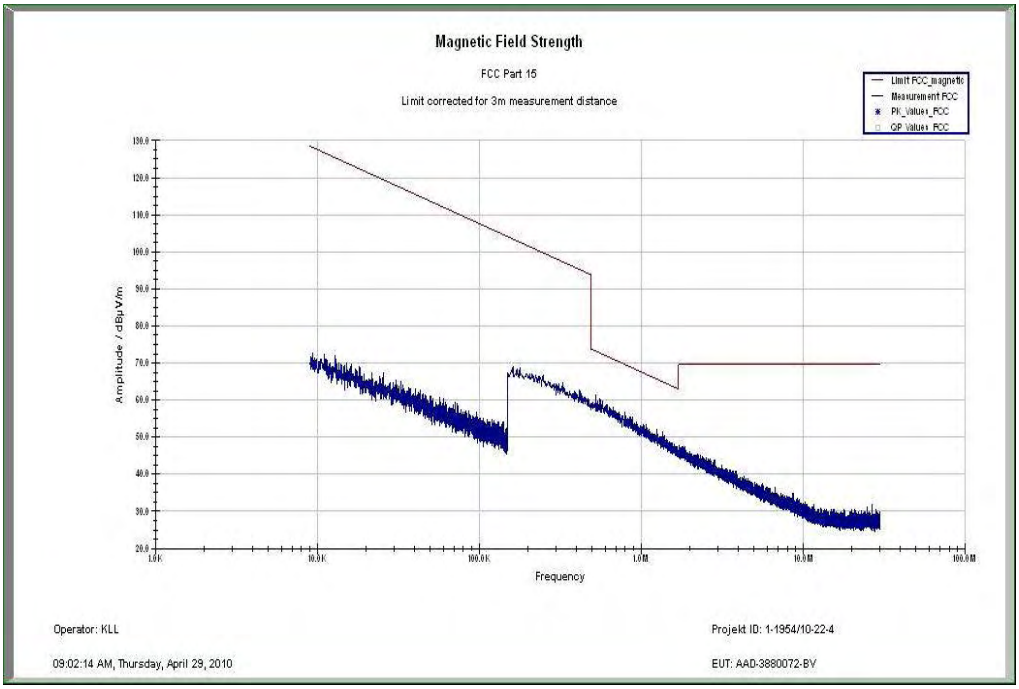
Frequency (MHz)	Field strength (µV/m)	Measurement distance (m)
30 - 88	100 (40 dBµV/m)	3
88 - 216	150 (43.5 dBµV/m)	3
216 - 960	200 (46 dBµV/m)	3
above 960	500 (54 dBµV/m)	3

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:



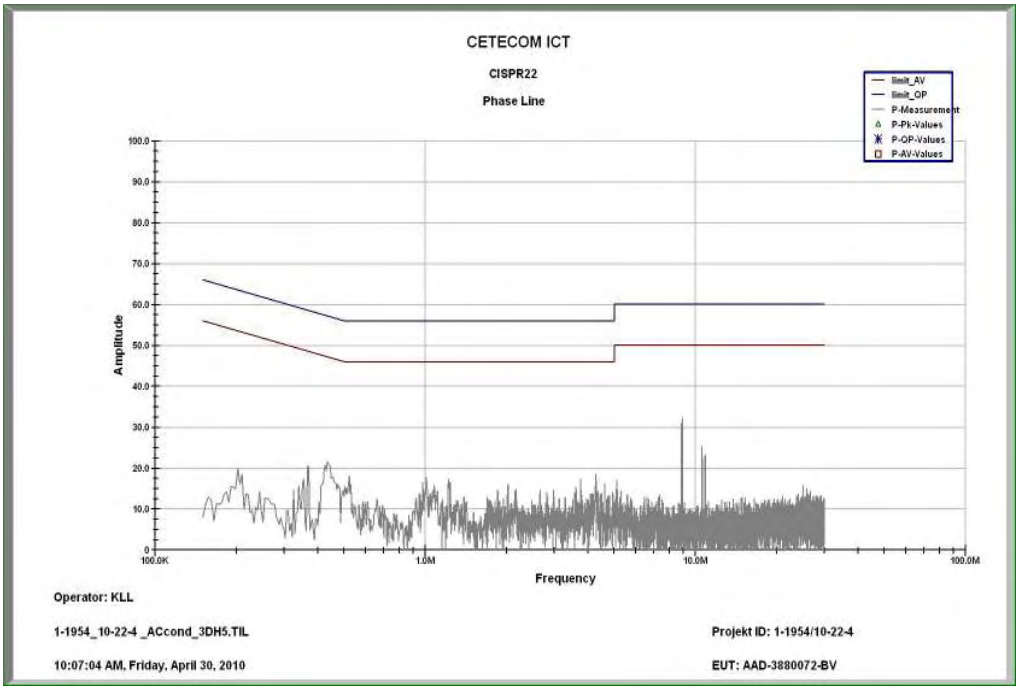
Limits:

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

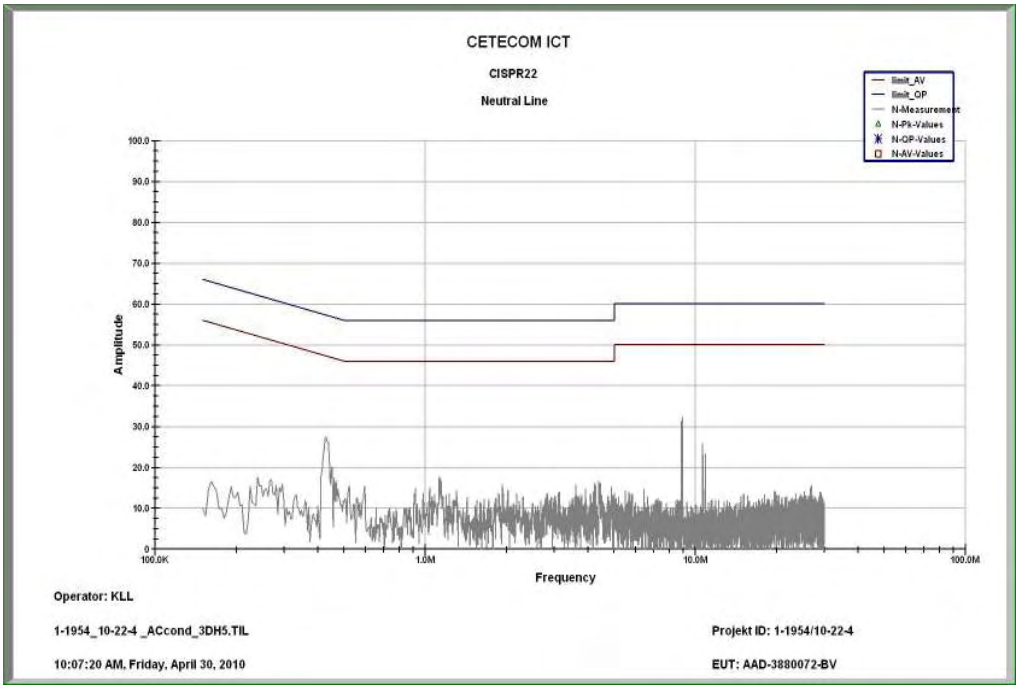
5.18 Conducted Emissions <30 MHz § 15.107/207

Transmitter operating: 8DPSK

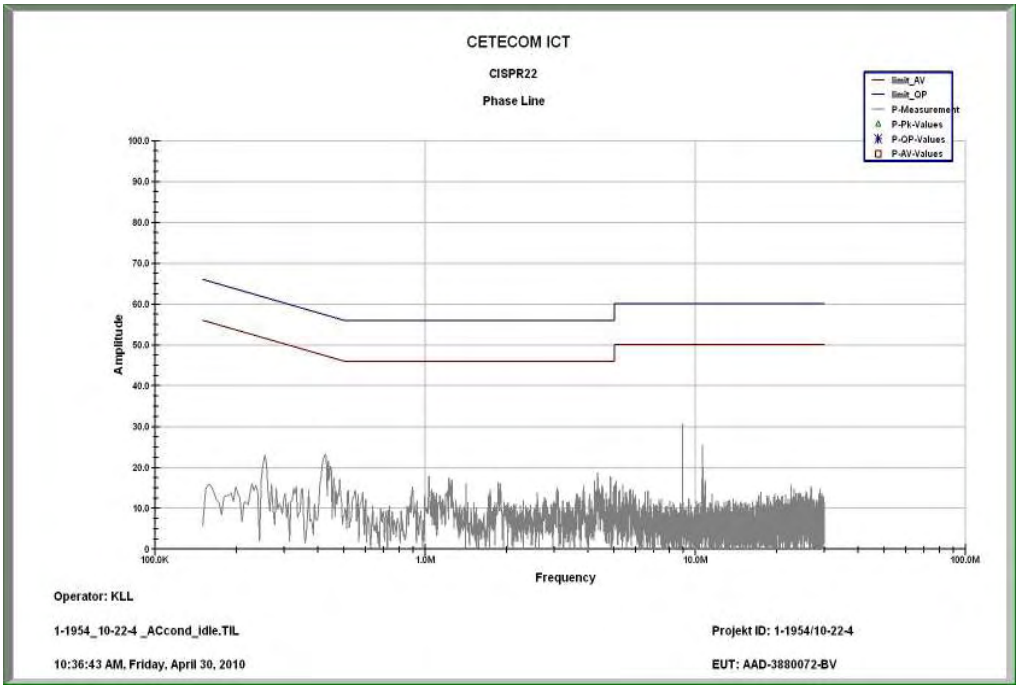
Plot 1: Transmitter operating: 8DPSK, phase line



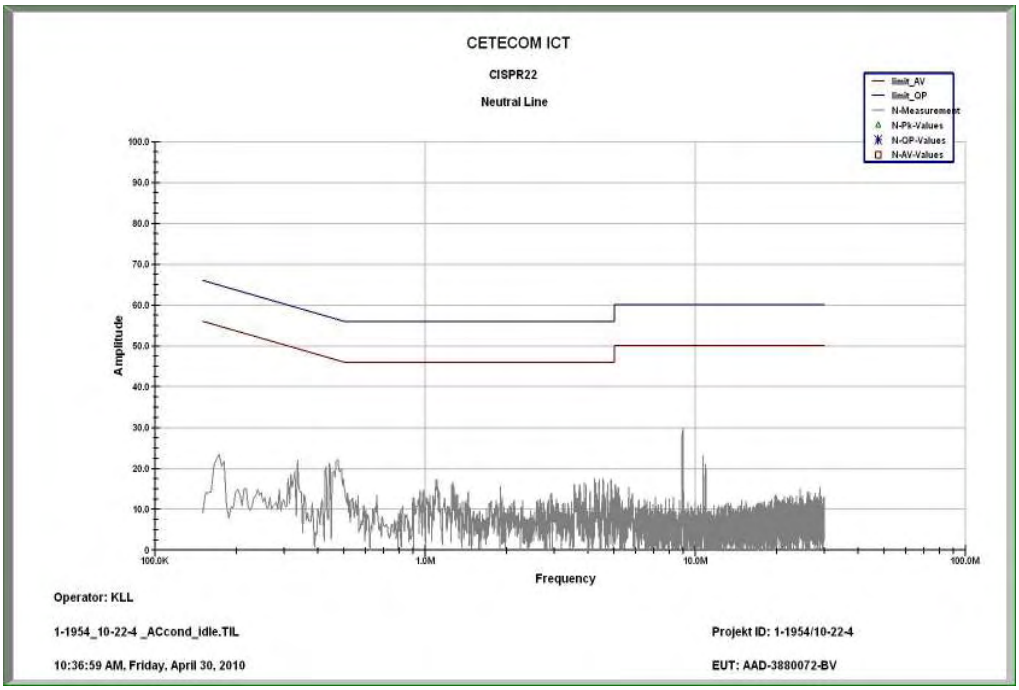
Plot 2: Transmitter operating: 8DPSK, neutral line



Plot 3: Idle mode, phase line



Plot 4: Idle mode, neutral line



Limits:

Under normal test conditions only	See plots

6 Test equipment and ancillaries used for tests

In order to simplify the identification of the equipment used at each specific test, each item of test equipment and ancillaries are provided with an identifier or number in the equipment list below.

Typically, the calibrations of the test apparatus are commissioned to and performed by an accredited calibration laboratory. The calibration intervals are determined in accordance with the DIN EN ISO/IEC 17025. In addition to the external calibrations, the laboratory executes comparison measurements with other calibrated test systems or effective verifications. Weekly chamber inspections and range calibrations are performed. Where possible, rf-generating and signalling equipment as well as measuring receivers and analyzers are connected to an external high-precision 10 MHz reference (GPS-based or rubidium frequency standard).

No.	Labor / Item	Equipment	Type	Manufact.	Serial No.	INV. No Cetecom	Kal. Art	Last Calib.	Next Calib.
1	45	Switch-Unit	3488A	HP Meßtechnik	2719A14505	300000368	ne		
2	50	Power Supply	6032A	HP Meßtechnik	2920A04466	300000580	k	06.01.2009	06.01.2011
4	n. a.	EMI-Messempfänger	ESCI 1166.5950.03	R&S	100083	300003312	k	08.01.2010	08.01.2012
5	n. a.	Analysator-Referenz-System (Harmonics u. Flicker)	ARS 16/1	SPS	A350907/00205	300003314	k	06.06.2007	06.06.2009
6	n. a.	Amplifier	JS42-00502650-28-5A	MITEQ	1084532	300003379	ev		
7	n. a.	Antennenmast	Model 2175	ETS-LINDGREN	64762	300003745	izw		
8	n. a.	Control unit	Model 2090	ETS-LINDGREN	64672	300003746	izw		
9	n. a.	Interface-Box	Model 105637	ETS-LINDGREN	44583	300003747	izw		
11	n. a.	Spectrum-Analyzer	FSU26	R&S	200809	300003874	k	08.01.2010	08.01.2012
12	n. a.	System Autoranging DC power supply, 60Vdc, 50A, 1200 W	6032A	HP Meßtechnik	2818A03450	300001040	Ve	08.01.2009	08.01.2012
13	n. a.	Power Attenuator	8325	Byrd	1530	300001595			
14	n. a.	Double-Ridged Waveguide Horn Antenna 1-26.5GHz	3115	EMCO	8812-3088	300001032	vlKI!	05.03.2009	05.03.2011
15	n. a.	Active Loop Antenna	6502	EMCO	2210	300001015	ne		
16	n. a.	Anechoic chamber		MWB	87400/02	300000996			
17	Spec.A. 2_2e	System rack for EMI measurement solution	85900	HP I.V.	*	300000222	ne		
18	9	Artificial Mains 9 kHz to 30 MHz, 4 x 25 Ampere	ESH3-Z5	R&S	828576/020	300001210	Ve	06.01.2010	06.01.2012
19	n. a.	Relais Matrix	3488A	HP Meßtechnik	2719A15013	300001156	ne		
20	n. a.	Relais Matrix	PSU	R&S	890167/024	300001168	ne		
21	n. a.	Isolating Transformer	RT5A	Grundig	9242	300001263	ne		
22	n. a.	Three-Way Power Splitter, 50 Ohm	11850C	HP Meßtechnik		300000997	ne		
23	n. a.	Switch / Control Unit	3488A	HP	2605e08770	300001443	ne		
24	n. a.	Band Reject filter	WRCG1855/1910-1835/1925-40/8SS	Wainwright	7	300003350	ev		

25	n. a.	Band Reject filter	WRCG2400/ 2483-2375/2505-50/10SS	Wainwright	11	300003351	ev		
26	n. a.	TILE-Software Emission	Quantum Change, Modell TILE-ICS/FULL	EMCO	none	300003451	ne		
27	n. a.	Highpass Filter	WHKX2.9/18G-12SS	Wainwright	1	300003492	ev		
28	n. a.	Highpass Filter	WHK1.1/15G-10SS	Wainwright	3	300003255	ev		
29	n. a.	Highpass Filter	WHKX7.0/18G-8SS	Wainwright	18	300003789	ne		
30	n. a.	PSA Spectrum Analyzer 3 Hz - 26.5 GHz	E4440A	Agilent	MY48250080	300003812	k	05.08.2008	05.08.2010
31	n. a.	MXG Microwave Analog Signal Generator	N5183A	Agilent	MY47420220	300003813	k	06.08.2008	06.08.2010
32	n. a.	RF Filter Section 9kHz - 1GHz	N9039A	Agilent	MY48260003	300003825	vlKI!	19.08.2008	19.08.2010
33	n. a.	TRILOG Super Antenna	VULB9163	Schwarz beck	371	300003854	vlKI!	17.12.2008	17.12.2010
34	n. a.	Switch / Control Unit	3488A	HP Meßtechnik		300001691	ne		
35	n. a.	Power Supply DC	NGPE 40/40	R&S	388	400000078	vlKI!	27.08.2008	27.08.2010
36	n. a.	Power Sensor 50 Ohms, 10 MHz - 18 GHz, 1 nW - 20 mW	NRV-Z1	R&S	833894/011	300002681-0010	k	26.08.2008	26.08.2010
38	n. a.	Vector Signal Generator, 300 kHz to 2.2 GHz	SMIQ03B	R&S	835541/055	300002681-0001	k	25.08.2008	25.08.2011
39	n. a.	Vector Signal Generator, 300 kHz to 2.2 GHz	SMIQ03B	R&S	835541/056	300002681-0002	k	26.08.2008	26.08.2011
40	n. a.	Signal Generator 0.01/2 - 20 GHz, Frequ. Resol. 0.1Hz	SMP02	R&S	835133/011	300002681-0003	k	26.08.2008	26.08.2011
41	n. a.	Dual Channel Power Meter	NRVD	R&S	835430/044	300002681-0004	k	26.08.2008	26.08.2010
42	n. a.	Switch / Control Unit	SSCU	R&S	338864/003	300002681-0006	ne		
43	n. a.	Precision Step Attenuator 50 Ohms, 0 - 2700MHz	RSP	R&S	834500/010	300002681-0007	k	26.08.2008	26.08.2010
44	n. a.	Frequency Standard (Rubidium Frequency Standard)	MFS (Rubidium)	R&S (Datum)	002	300002681-0009	Ve	27.08.2008	27.08.2010
45	n. a.	Power Sensor 50 Ohms, 10 MHz - 18 GHz, 1 nW - 20 mW	NRV-Z1	R&S	833894/012	300002681-0013	k	26.08.2008	26.08.2010
46	n. a.	Directional Coupler	101020010	Krytar	70215	300002840	ev		
47	n. a.	DC-Blocker	8143	Inmet Corp.	none	300002842	ne		
48	n. a.	Powersplitter	6005-3	Inmet Corp.		300002841	ev		
49	n. a.	Temperature Test Chamber	VT 4002	Heraeus Voetsch	58566046820010	300003019	Ve	28.05.2009	28.05.2011
50	n. a.	CBT (Bluetooth EDR Signalisierung)	CBT 1153.9000K35	R&S	100185	300003416	vlKI!	27.08.2008	27.08.2010
51	n. a.	Spectrum Analyzer 9kHz to 30GHz - 140..+30dBm	FSP30	R&S	100886	300003575	k	25.08.2008	25.08.2010
52	n. a.	CBT-K57 Software-Option for CBT/CBT32	CBT-K57	R&S	101051	300003910	ne		