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)

Test report no.	**:**	**1-1100-01-04/09**
Type identification	**:**	**PAN1x55 (BlueMod+P2x/G2)**
Applicant	**:**	**Panasonic Electronic Devices Europe GmbH**
FCC ID	**:**	**T7V-BC06**
IC Certification No	**:**	**216Q-BC06**
Test standards	**:**	**47 CFR Part 15**
		RSS - 210 Issue 7

Table of contents

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:

2009-03-11	**Joerg Warken**	
Date	Name	Signature

2009-03-11	**Marco Bertolino**	
Date	Name	Signature

Technical responsibility for area of testing:

2009-03-11	**Michael Berg**	
Date	Name	Signature

1.2 Testing laboratory

CETECOM ICT Services GmbH

Untertürkheimer Straße 6 - 10
66117 Saarbrücken
Germany
Phone: + 49 681 5 98 - 0
Fax: + 49 681 5 98 - 9075
e-mail: info@ICT.cetecom.de
Internet: http://www.cetecom-ict.de

State of accreditation:	**The test laboratory (area of testing) is accredited according to DIN EN ISO/IEC 17025 DAR registration number: DAT-P-176/94-D1**
Accredited by:	**Federal Motor Transport Authority (KBA) DAR registration number: KBA-P 00070-97**

Testing location, if different from CETECOM ICT Services GmbH:

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

1.3 Details of applicant

Name:	**Panasonic Electronic Devices Europe GmbH**
Street:	**Zeppelinstrasse 19**
Town:	**21337 Lüneburg**
Country:	**Germany**
Telephone:	**+49-4131-899-0**
Fax:	**+49-4131-899-262**
Contact:	**Herr Jens Jensen**
E-mail:	**JJ@stollmann.de**
Telephone:	**+49-40-89088-498**

1.4 Application details

Date of receipt of order:	**2009-02-04**
Date of receipt of test item:	**2009-03-03**
Date of start test:	**2009-03-04**
Date of end test:	**2009-03-06**
Persons(s) who have been present during the test:	**Mr. Jens Jensen**

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:	**Panasonic Electronic Devices Europe GmbH**
Street:	**Zeppelinstrasse 19**
Town:	**21337 Lüneburg**
Country:	**Germany**

3.1.1 Test item

Kind of test item :	**Bluetooth Module**
Type identification general :	**PAN1x55 (BlueMod+P2x/G2)**
Type identification in detail : *)	**PAN1455 internal antenna alias BlueMod+P24/G2** **PAN1555 external antenna alias BlueMod+P25/G2**
S/N serial number :	**0080250000CC hex (conducted sample)** **0080250000C9 hex (radiated sample) internal antenna** **0080250000C5 hex (radiated sample) external antenna**
HW hardware status :	**V1.0**
SW software status :	**CVS checkpoint label: P_PG_I_PM_V_1_00**
Frequency Band [MHz] :	**ISM 2.400 - 2.483,5**
Type of Modulation :	**FHSS**
Number of channels :	**79**
Antenna :	**Internal ceramic antenna and external rod. antenna**
Power Supply :	**3.3 V DC**
Temperature Range :	**-40 °C to +85 °C**

***) the difference is described in detail in the Annex of the testreport**
Conducted measurements are valid for both types

Max. power radiated: 4.5 dBm EIRP (GFSK) internal antenna

Max. power radiated: 7.9 dBm EIRP (GFSK) external antenna

Max. power conducted: 4.9 dBm (GFSK)

FCC ID: T7V-BC06
IC: 216Q-BC06

3.1.2 Additional EUT information For IC Canada (appendix 2)

IC Registration Number:	**216Q-BC06**
Model Name general:	**PAN1x55 (BlueMod+P2x/G2)**
Model Name in detail :	**PAN1455 internal antenna alias BlueMod+P24/G2** **PAN1555 external antenna alias BlueMod+P25/G2**
Manufacturer (complete Address):	**Panasonic Electronic Devices Europe GmbH** **Zeppelinstrasse 19** **21337 Lüneburg** **Germany**
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]:	**2402 – 2480 MHz**
RF: Power [W] (max):	**Conducted : 3.15 mW** **Internal antenna:** **Rad. EIRP: 2.82 mW** **External antenna:** **Rad. EIRP: 6.17 mW**
Antenna Type:	**Internal ceramic antenna and external rod. antenna**
Occupied Bandwidth (99% BW)	**GFSK: 920 kHz** **Pi/4 DQPSK: 1317 kHz** **8 DPSK: 1317 kHz**
Type of Modulation:	**GFSK, Pi/4 DQPSK, 8 DPSK**
Emission Designator (TRC-43):	**920KFXD** **1M32GXD** **1M32GXD**
Transmitter Spurious (worst case) [µV/m in 3m]:	**43.09**
Receiver Spurious (worst case) [µV/m in 3m]:	**42.99**

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: 2009-03-11

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:	**216Q**
2. MODEL NUMBER:	**PAN1455 internal antenna alias BlueMod+P24/G2** **PAN1555 external antenna alias BlueMod+P25/G2**
3. MANUFACTURER:	**Panasonic Electronic Devices Europe GmbH**
4. TYPE OF EVALUATION:	**(c) RF Evaluation**

- Evaluated against exposure limits: General Public Use ☒ Controlled Use ☐
- Duty cycle used in evaluation: 99 %
- Standard used for evaluation: RSS-102 Issue 2 (2005-11)
- Measurement distance: 0.20 m
- RF value: 0.0123 V/m □ A/m □ W/m^2 ☒

Measured ☐ Computed ☐ Calculated ☒

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) Joerg Warken
Title: Senior engineer
Company: Cetecom ICT Services GmbH

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}	%	**52**
Nominal Power Source	V_{nom}	V	**3.3**

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

Deviations from these values are reported in chapter 2

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	2009-03-11	-/-

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

5 RF measurement testing

5.1 Description of test set-up

5.1.1 Radiated measurements

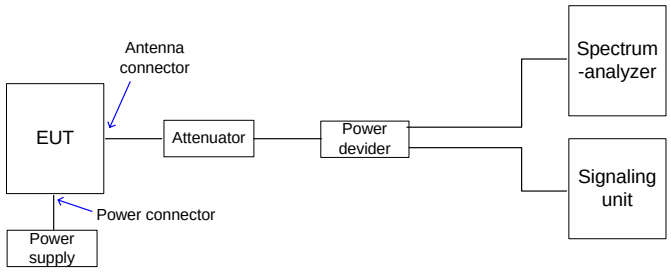
The radiated measurements are performed in vertical and horizontal plane in the frequency range from 9 kHz to 25 GHz in semi-anechoic chambers. The EUT is positioned on a non-conductive support with a height of 0.80 m above a conductive ground plane that covers the whole chamber. The receiving antennas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

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

All measurements are done in accordance with the Filing and Measurement Guidelines for Frequency Hopping Spread Spectrum Systems DA 00-705 and Appendix A “BLUETOOTH APPROVALS”
The EUT is powered by an external power supply with nominal voltage. The signalling is performed from outside the chamber with a signalling unit (CMU200 or other) by air link using signalling antenna.

5.1.2 Conducted measurements

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



5.2 Referenced documents

None

5.3 Additional comments

None

5.4 Antenna gain

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

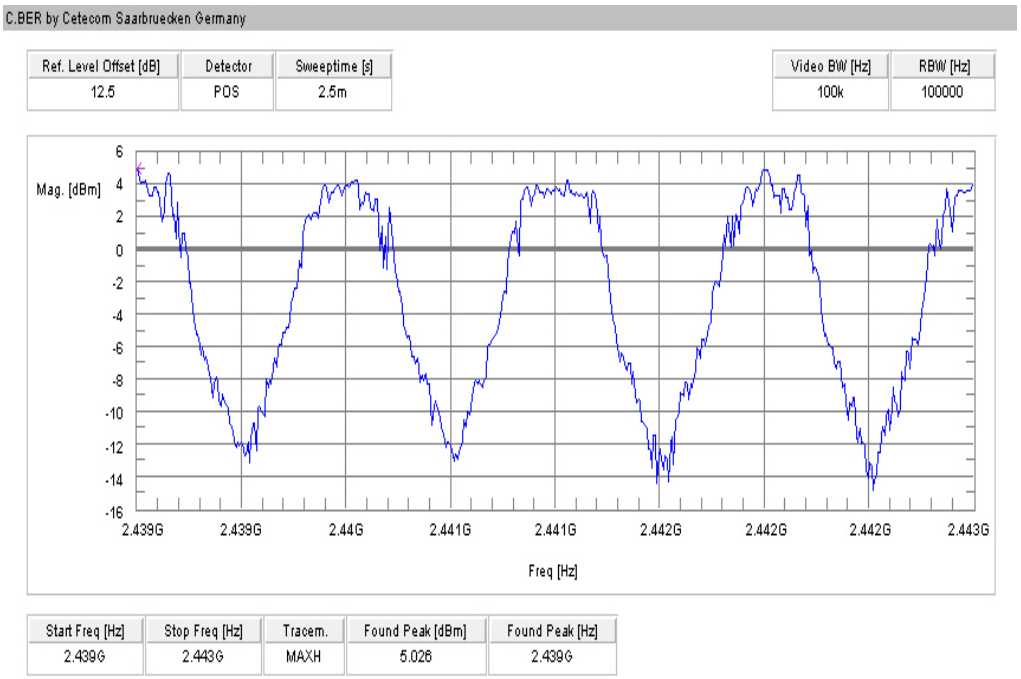
Internal antenna	low channel 2402 MHz	mid channel 2441 MHz	high channel 2480 MHz
Conducted power [dBm] Measured, GFSK modulation	**4.9**	4.8	4.7
Radiated power [dBm] Measured, GFSK modulation	3.4	**4.5**	4.3
Gain [dBi] Calculated	-1.5	**-0.3**	-0.4

External antenna	low channel 2402 MHz	mid channel 2441 MHz	high channel 2480 MHz
Conducted power [dBm] Measured, GFSK modulation	**4.9**	4.8	4.7
Radiated power [dBm] Measured, GFSK modulation	7.2	7.8	**7.9**
Gain [dBi] Calculated	2.3	3.0	**3.2**

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

Modulation: GFSK

Plot 1 of 1:



Result: Channel separation is: ~ 1 MHz

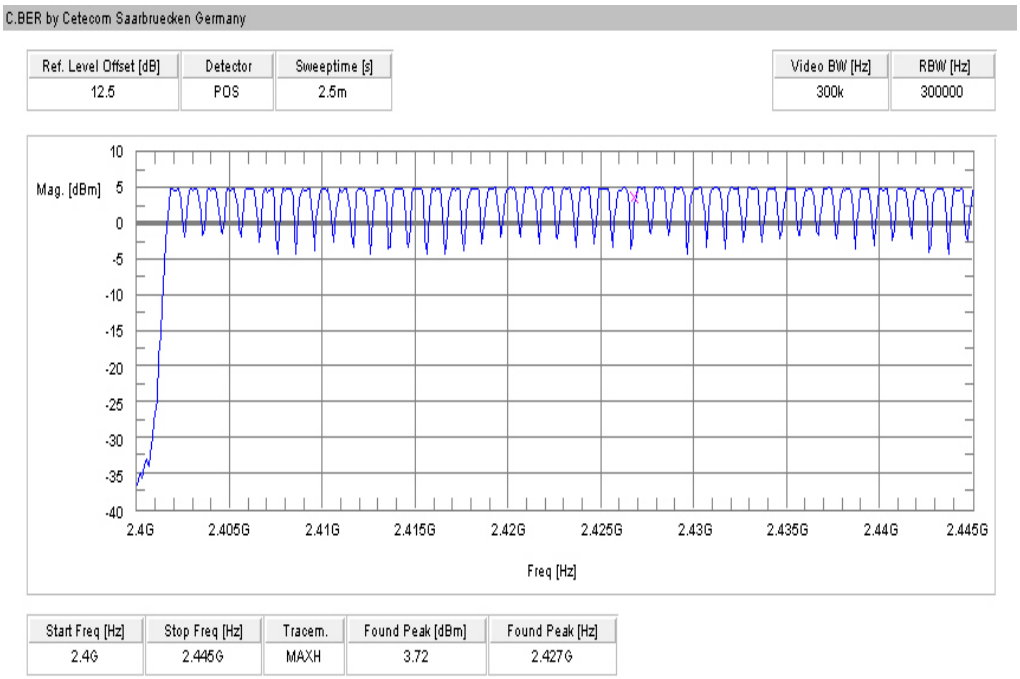
Limits:

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

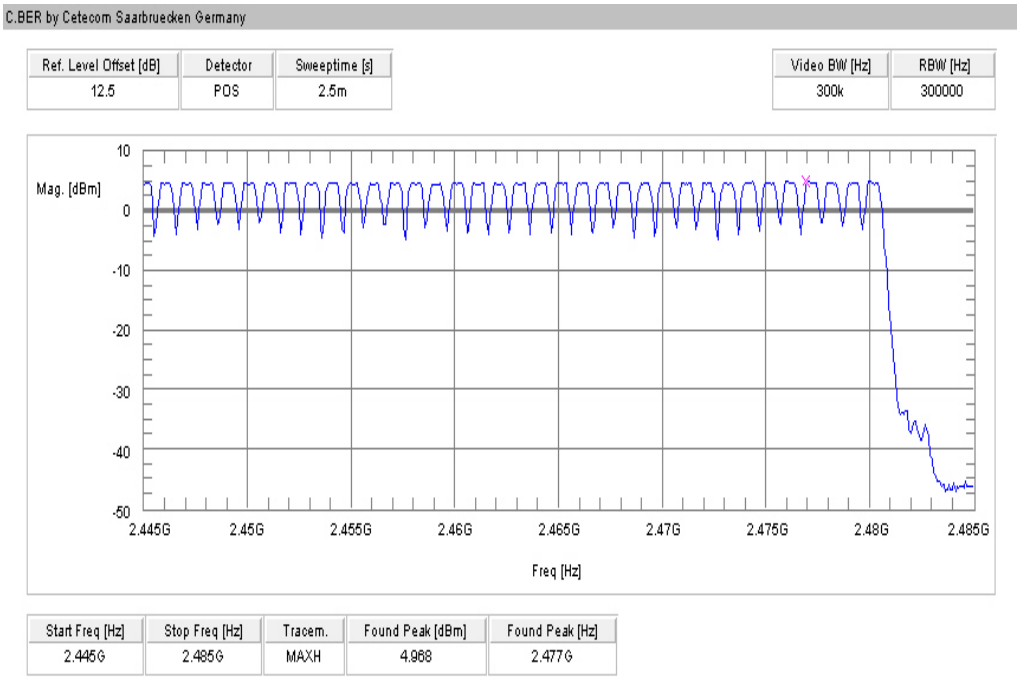
5.6 Number of hopping channels §15.247(a)(1)

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

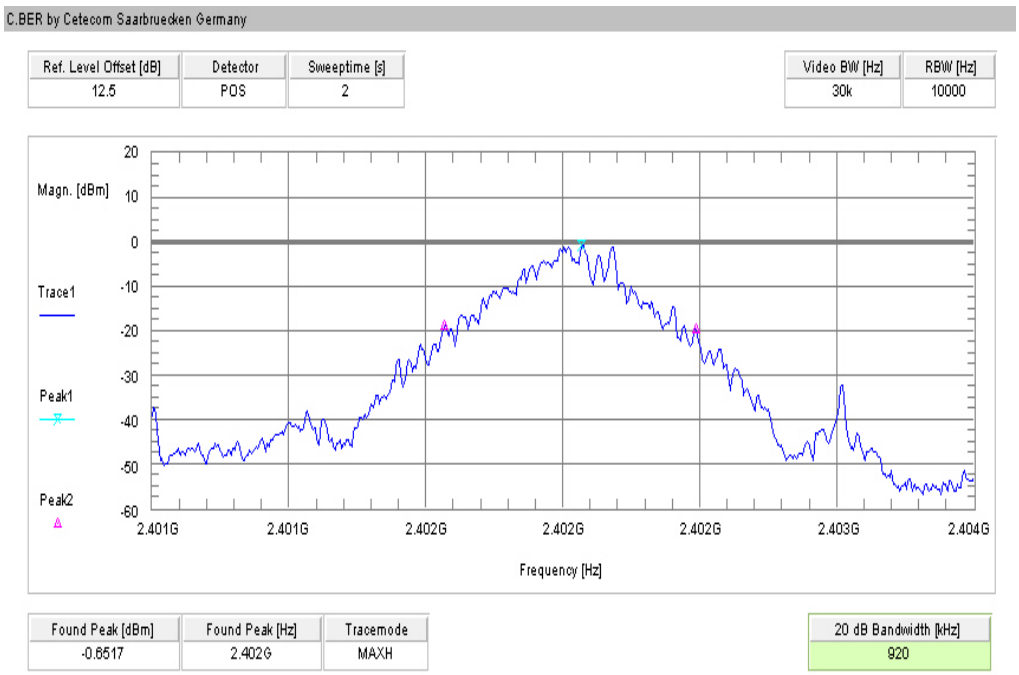
Result: Power density: - dBm/Hz = - dBm / 3 kHz
Correction factor from dBm/Hz to dBm / 3 kHz is +34.8 dB

Limits:

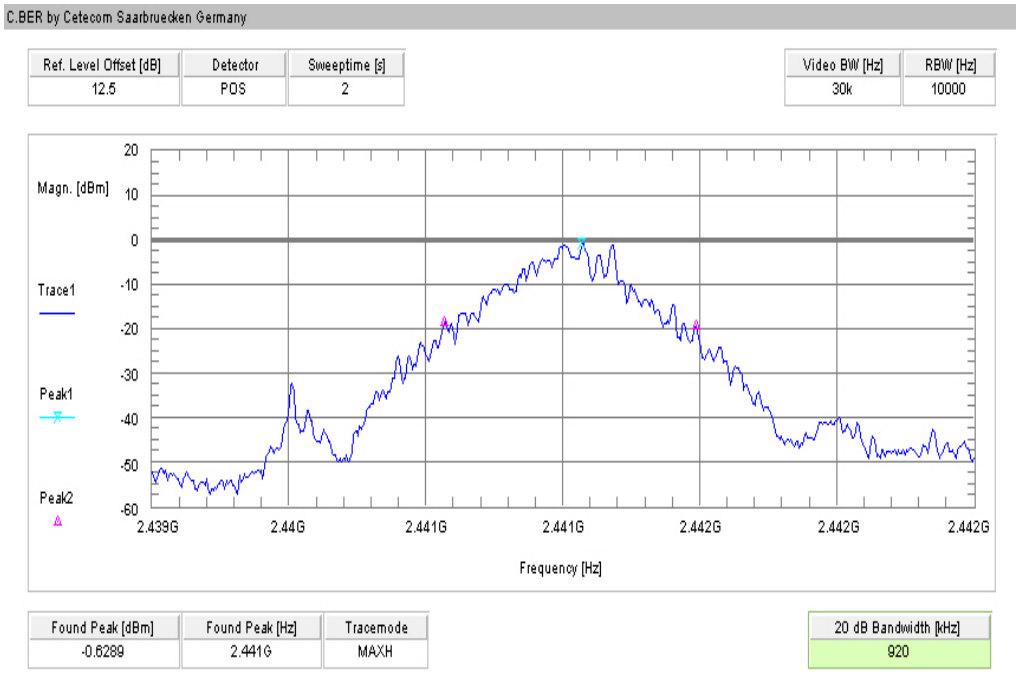
Under normal test conditions only	For digitally modulated systems, the peak power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission

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

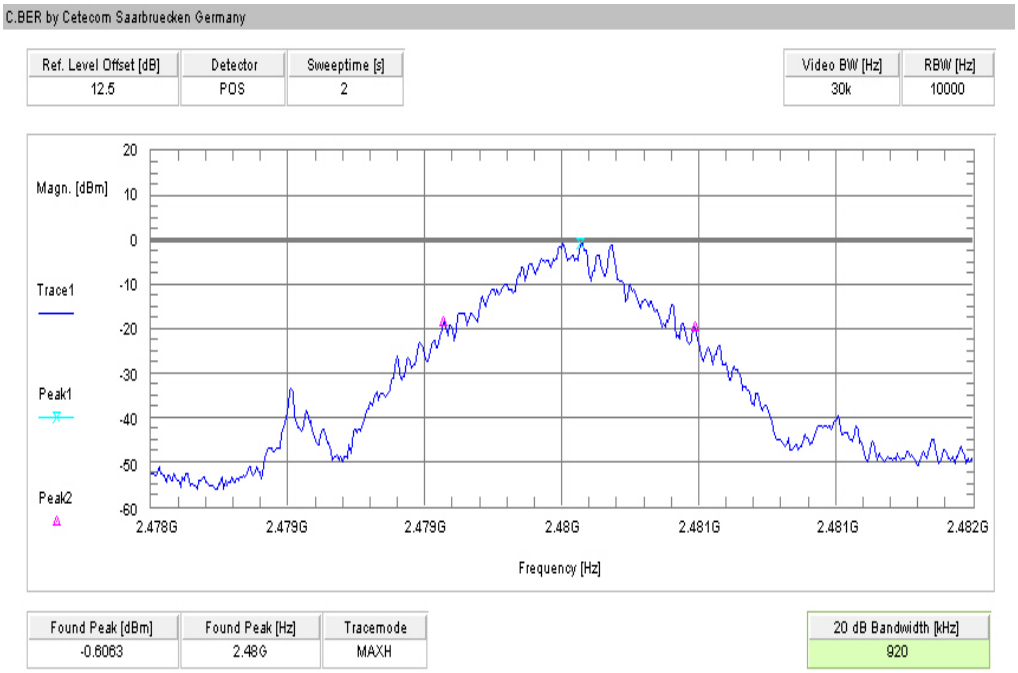
Plot 1: GFSK



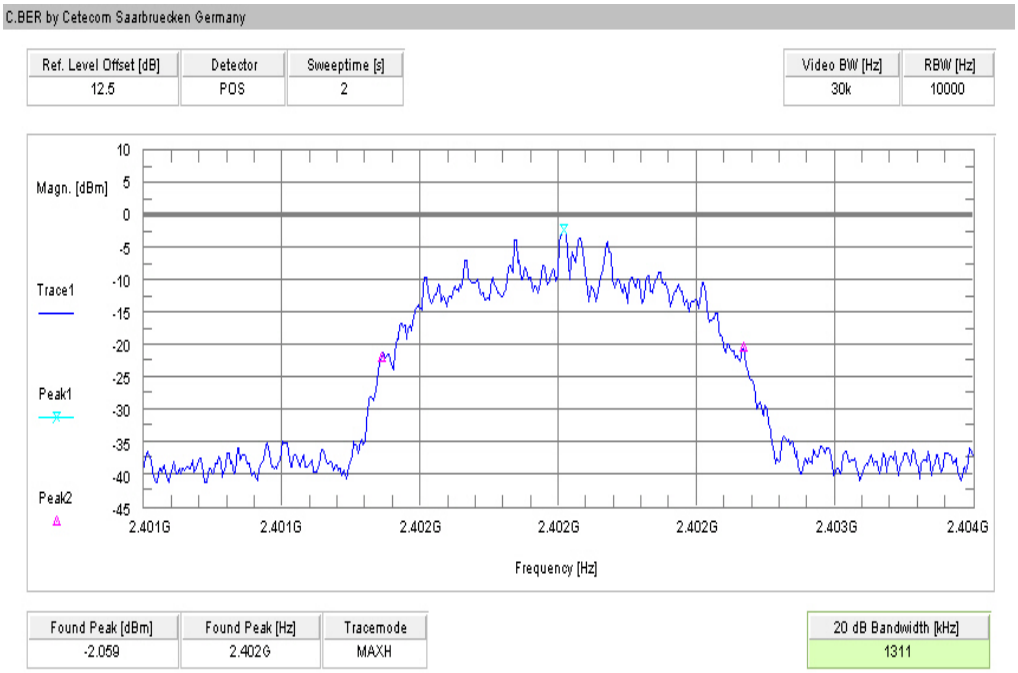
Plot 2: GFSK



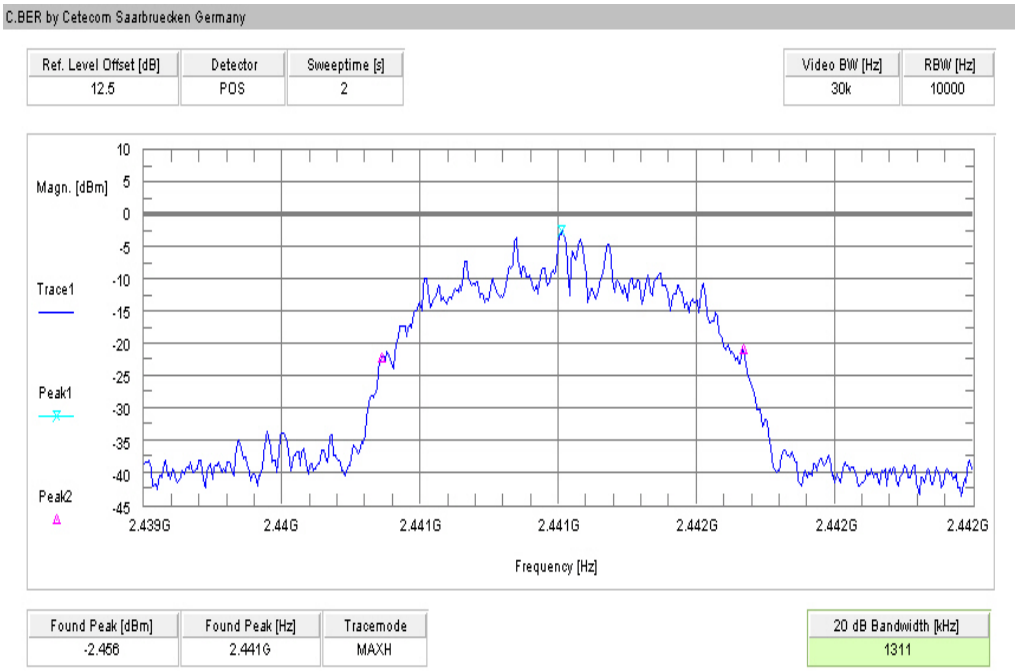
Plot 3: GFSK



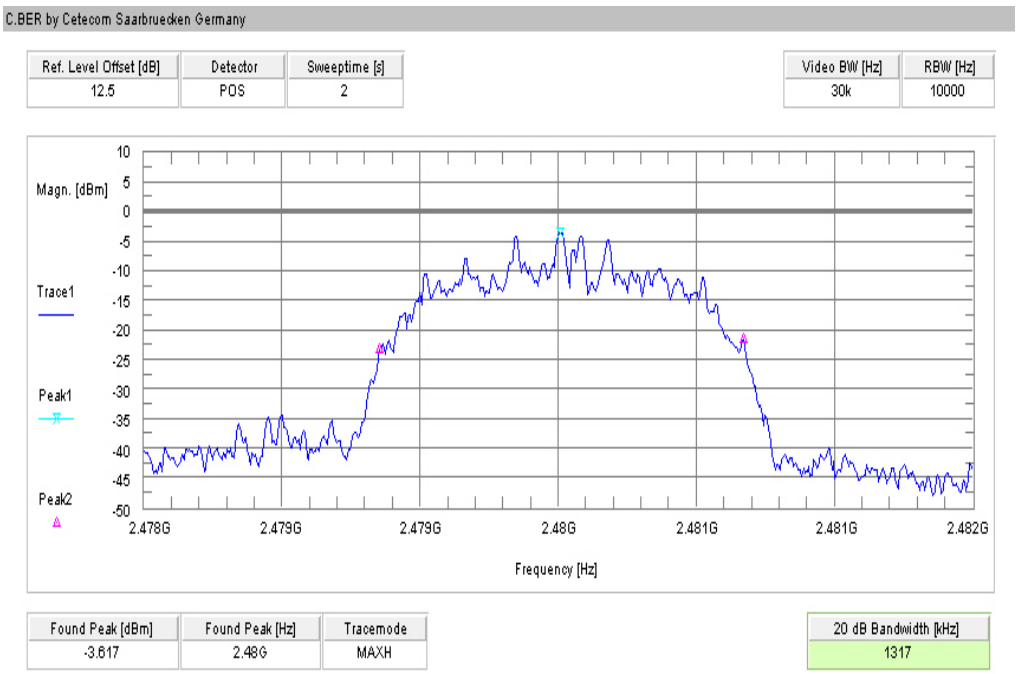
Plot 4: Pi/4 DQPSK



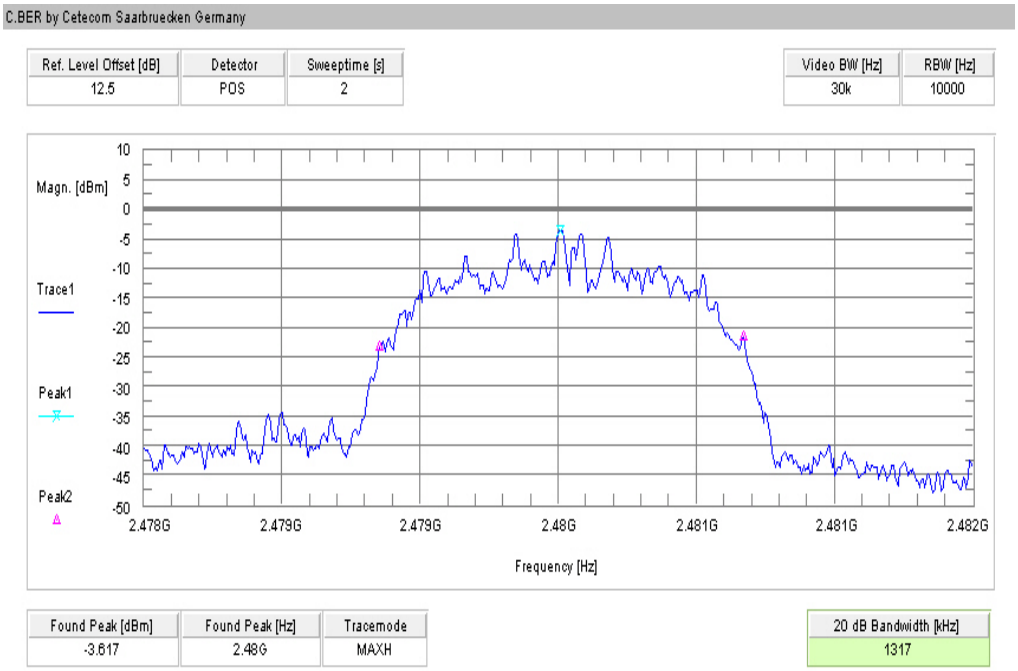
Plot 5: Pi/4 DQPSK



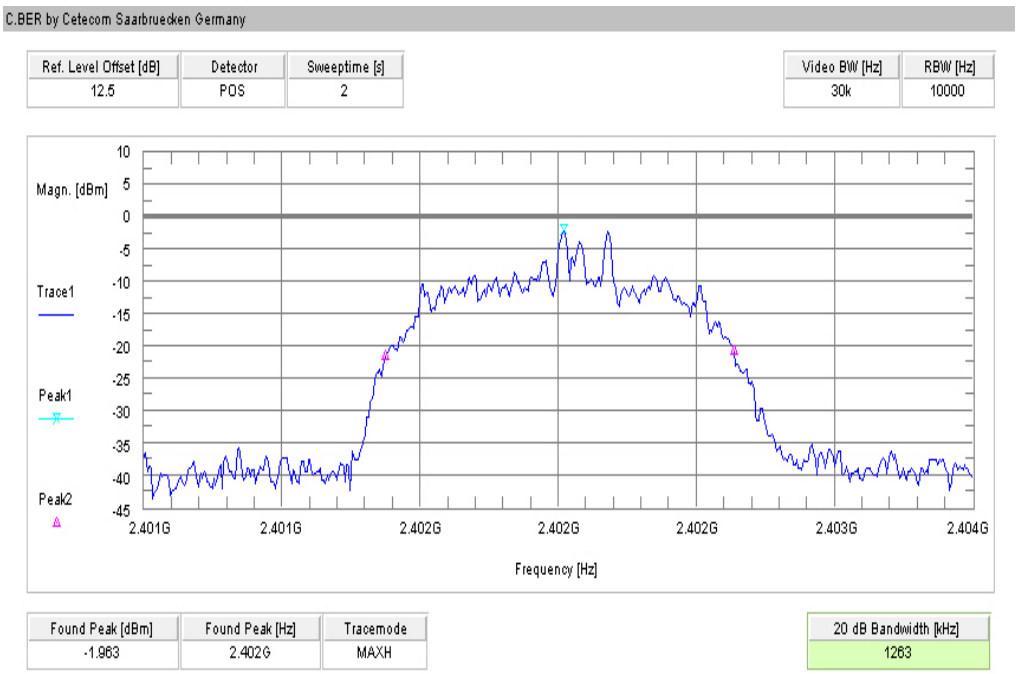
Plot 6: Pi/4 DQPSK



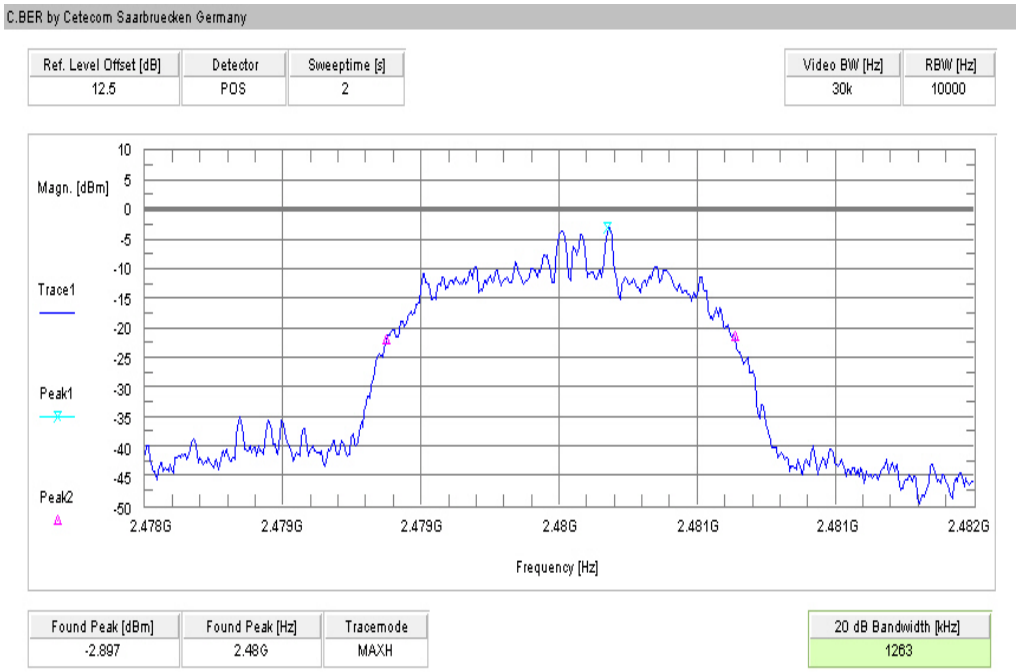
Plot 7: 8DPSK



Plot 8: 8DPSK



Plot 9: 8DPSK



Result:

Modulation	**20 dB BANDWIDTH [kHz]**		
Frequency [MHz]	2402	2441	2480
GFSK	**920**	**920**	**920**
Pi/4 DQPSK	1311	1311	**1317**
8DPSK	**1317**	1263	1263
Measurement uncertainty	± 10 kHz		

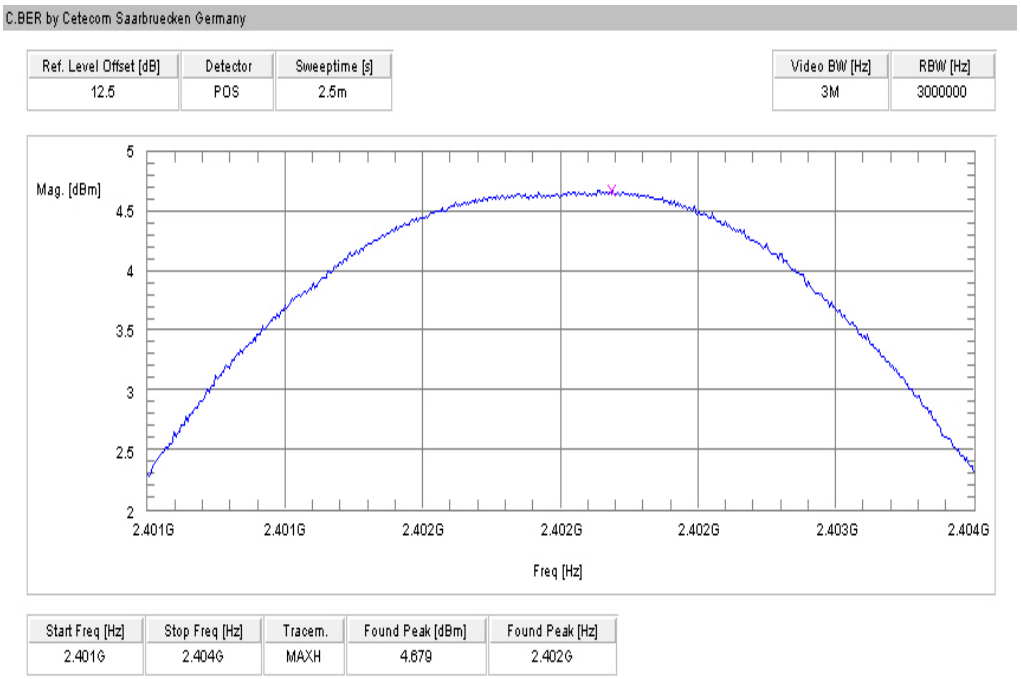
RBW / VBW as provided in the „Measurement Guidelines“ (DA 00-705, March 30, 2000)
RBW: 10 kHz / VBW 10 kHz

Limits:

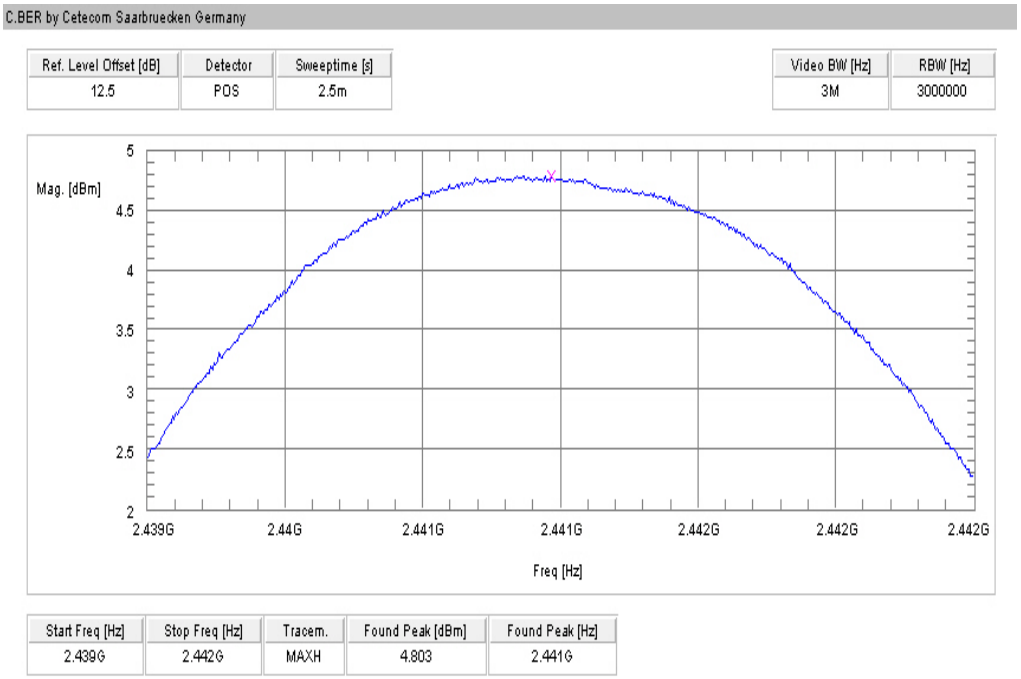
Under normal test conditions only	GFSK < 1000 kHz Pi/4 DQPSK < 1500 kHz 8DPSK < 1500 kHz

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

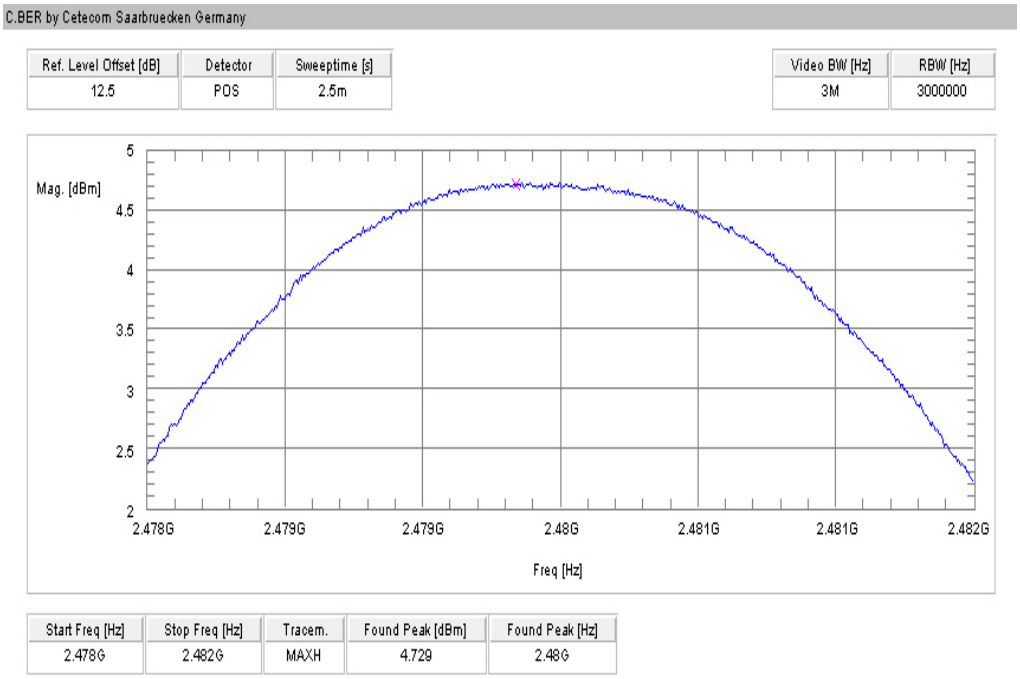
Plot 1: GFSK



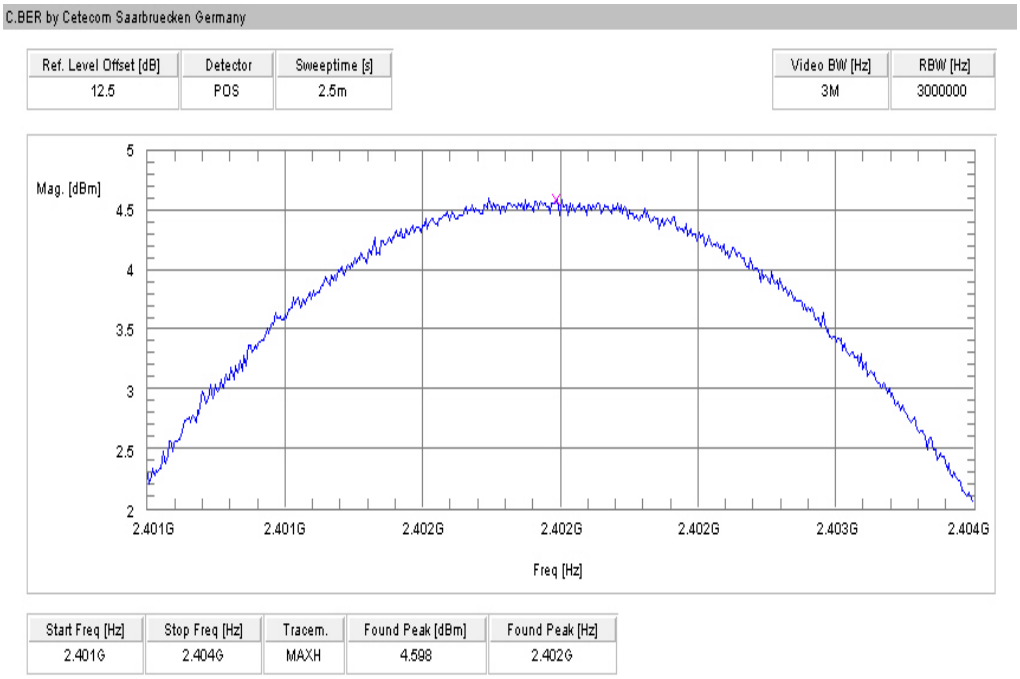
Plot 2: GFSK



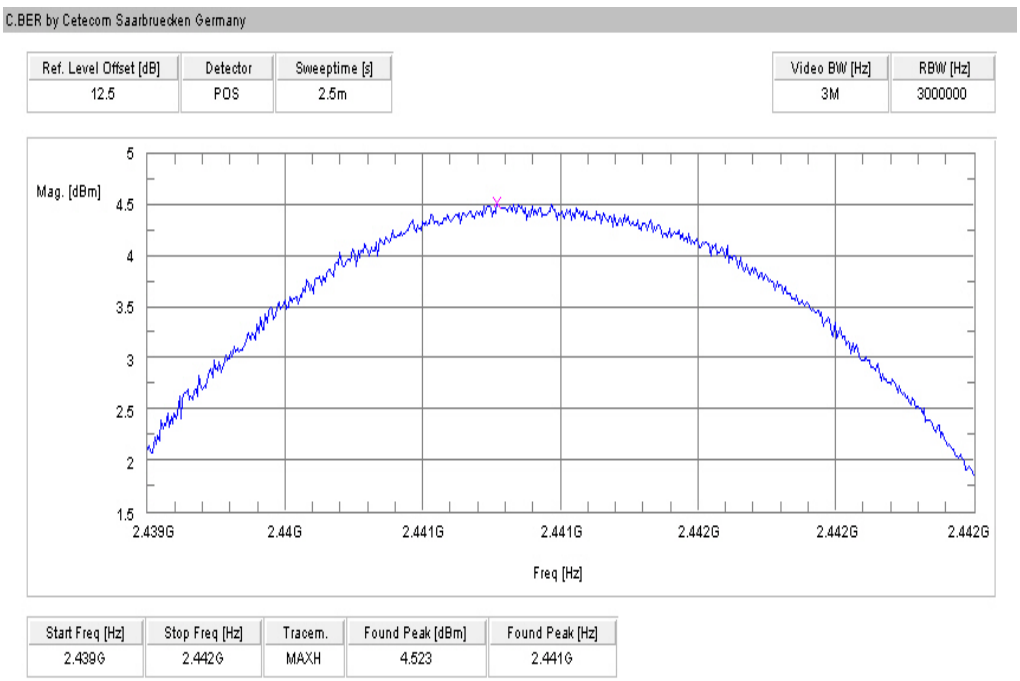
Plot 3: GFSK


C.BER by Cetecom Saarbruecken Germany
Ref. Level Offset [dB]
12.5
Detector
POS
Sweeptime [s]
2.5m
Video BW [Hz]
3M
RBW [Hz]
3000000
Mag. [dBm]
5
4.5
4
3.5
3
2.5
2
2.478G
2.479G
2.479G
2.48G
2.481G
2.481G
2.482G
Freq [Hz]
Start Freq [Hz]
2.478G
Stop Freq [Hz]
2.482G
Tracem.
MAXH
Found Peak [dBm]
4.729
Found Peak [Hz]
2.48G

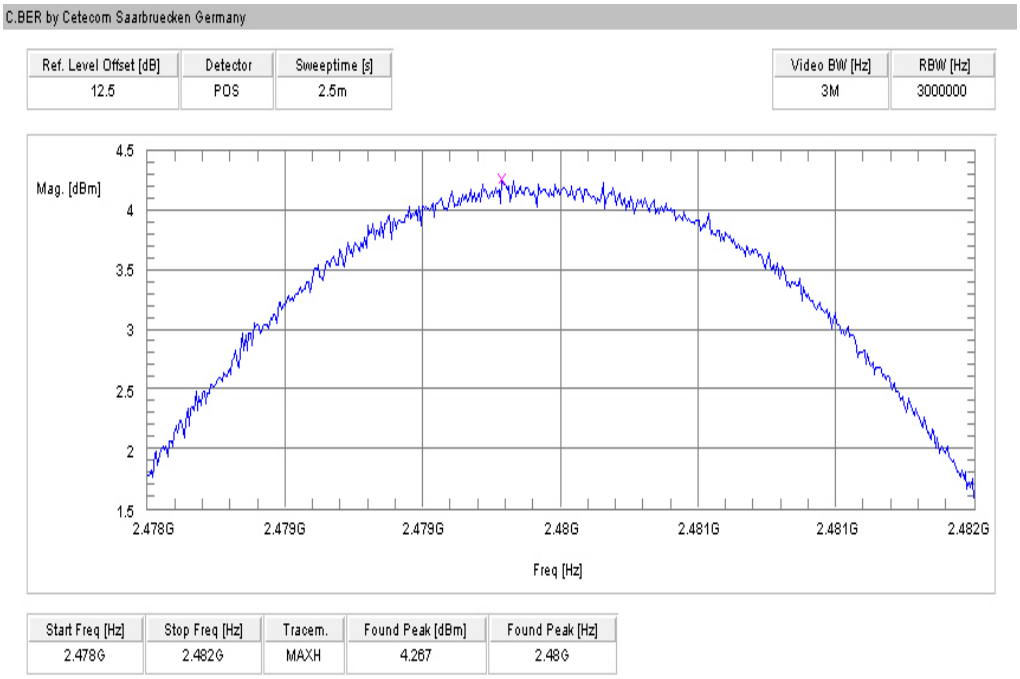
Plot 4: Pi/4 DQPSK



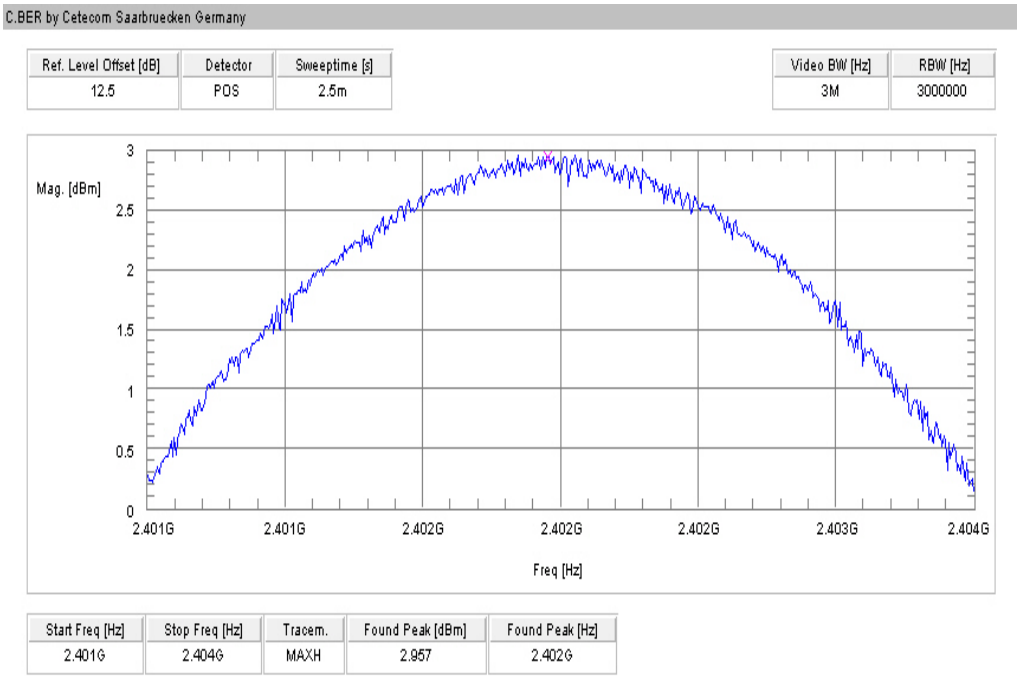
Plot 5: Pi/4 DQPSK



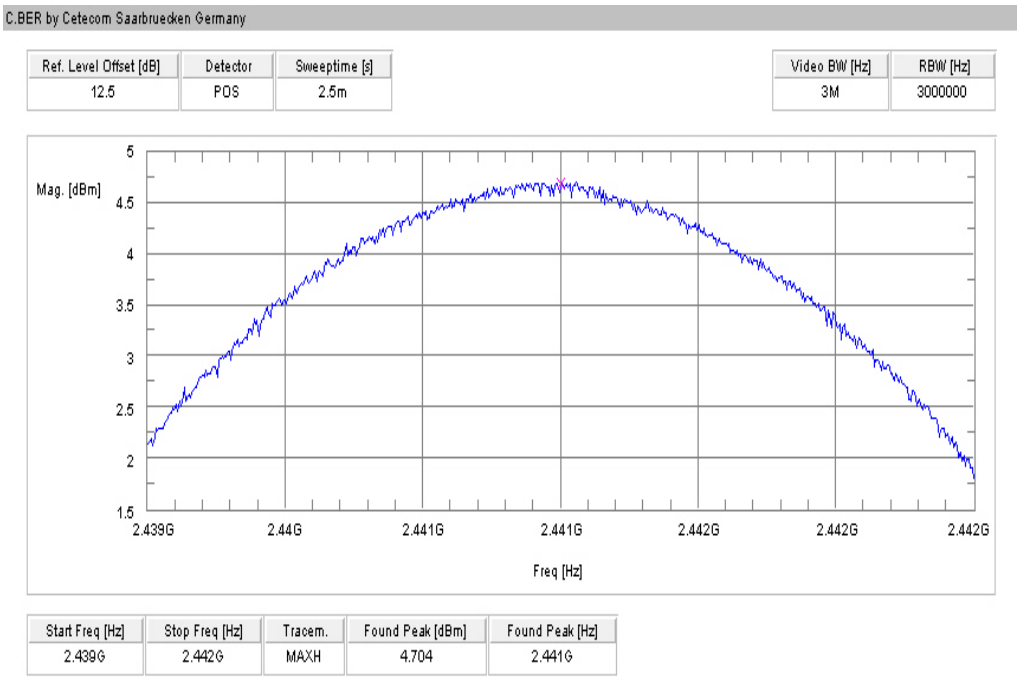
Plot 6: Pi/4 DQPSK



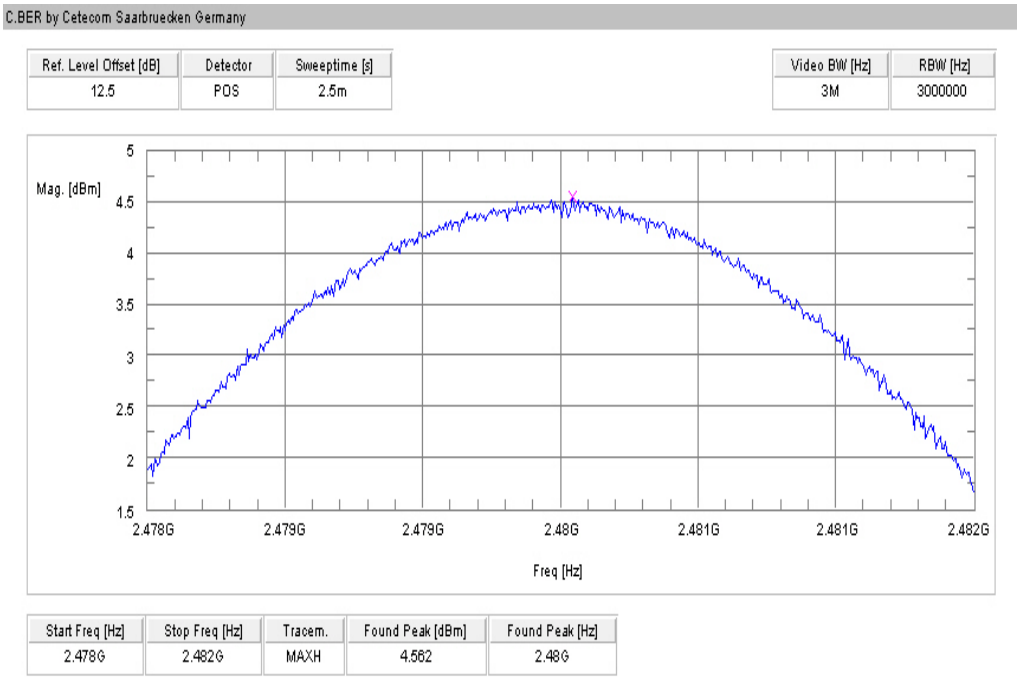
Plot 7: 8DPSK



Plot 8: 8DPSK



Plot 9: 8DPSK



Results:

Modulation	**Max. peak output power [dBm]**		
Frequency [MHz]	2402	2441	2480
GFSK	**4.979**	4.803	4.729
Pi/4 DQPSK	**4.598**	4.523	4.267
8DPSK	2.957	**4.704**	4.562
Measurement uncertainty	± 2 dB		

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 integrated antenna

Results:

Test conditions		Max. peak output power EIRP [dBm]		
Frequency [MHz]		2402	2442	2480
T_{nom}	V_{nom}	3.4	**4.5**	4.3
Measurement uncertainty		±3dB		

Modulation: Pi/4DQPSK integrated antenna

Results:

Test conditions		Max. peak output power EIRP [dBm]		
Frequency [MHz]		2402	2442	2480
T_{nom}	V_{nom}	3.1	**4.2**	3.9
Measurement uncertainty		±3dB		

Modulation: 8DPSK integrated antenna

Results:

Test conditions		Max. peak output power EIRP [dBm]		
Frequency [MHz]		2402	2442	2480
T_{nom}	V_{nom}	1.5	**4.4**	4.2
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

Modulation: GFSK external antenna

Results:

Test conditions		Max. peak output power EIRP [dBm]		
Frequency [MHz]		2402	2442	2480
T_{nom}	V_{nom}	7.2	7.8	**7.9**
Measurement uncertainty		±3dB		

Modulation: Pi/4DQPSK external antenna

Results:

Test conditions		Max. peak output power EIRP [dBm]		
Frequency [MHz]		2402	2442	2480
T_{nom}	V_{nom}	6.9	**7.5**	**7.5**
Measurement uncertainty		±3dB		

Modulation: 8DPSK external antenna

Results:

Test conditions		Max. peak output power EIRP [dBm]		
Frequency [MHz]		2402	2442	2480
T_{nom}	V_{nom}	5.3	7.7	**7.8**
Measurement uncertainty		±3dB		

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

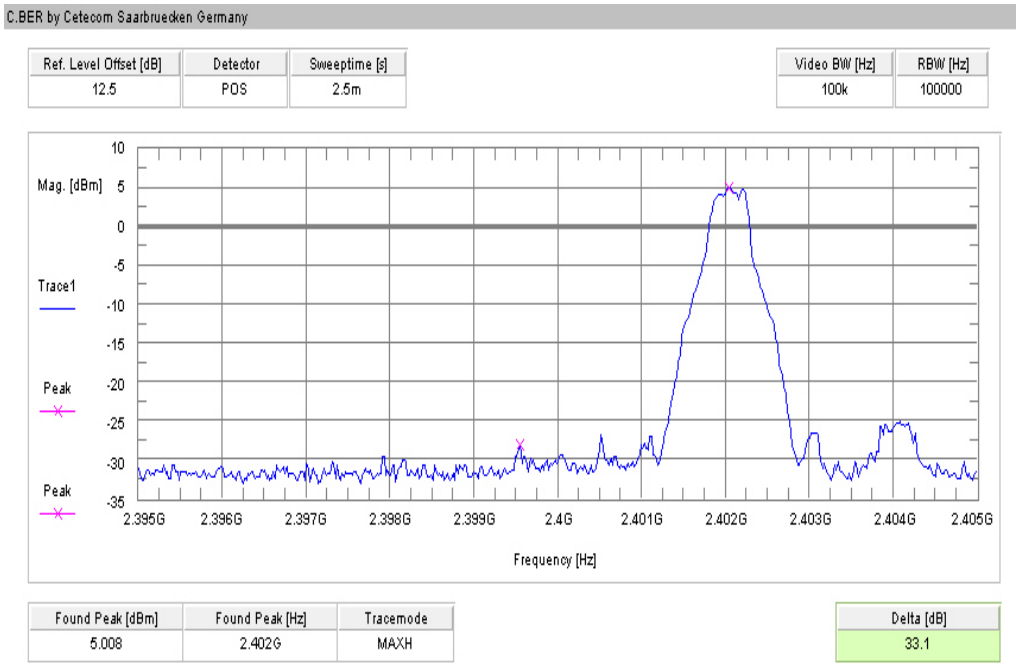
Limits:

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

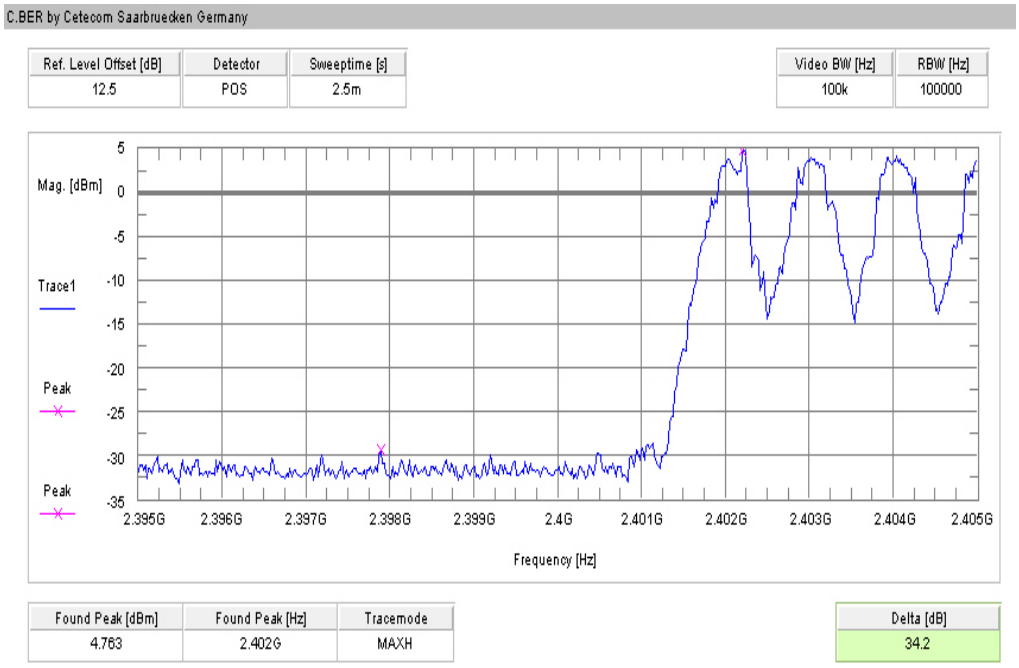
5.12 Band-edge compliance of conducted emissions §15.247 (d)

Modulation: GFSK

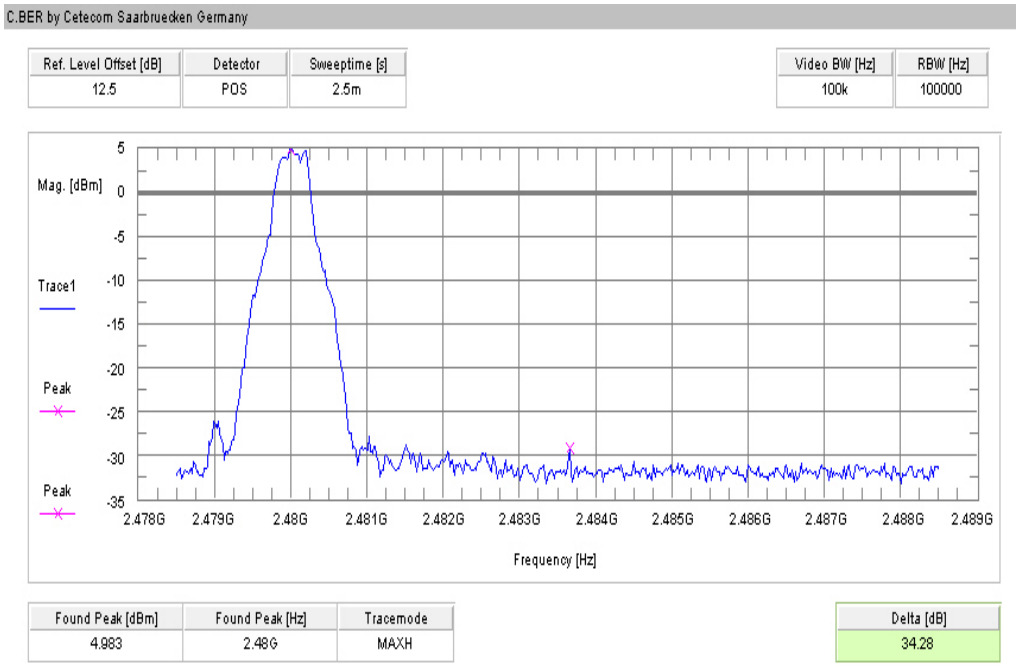
Plot 1 of 4 (hopping off, lowest frequency):



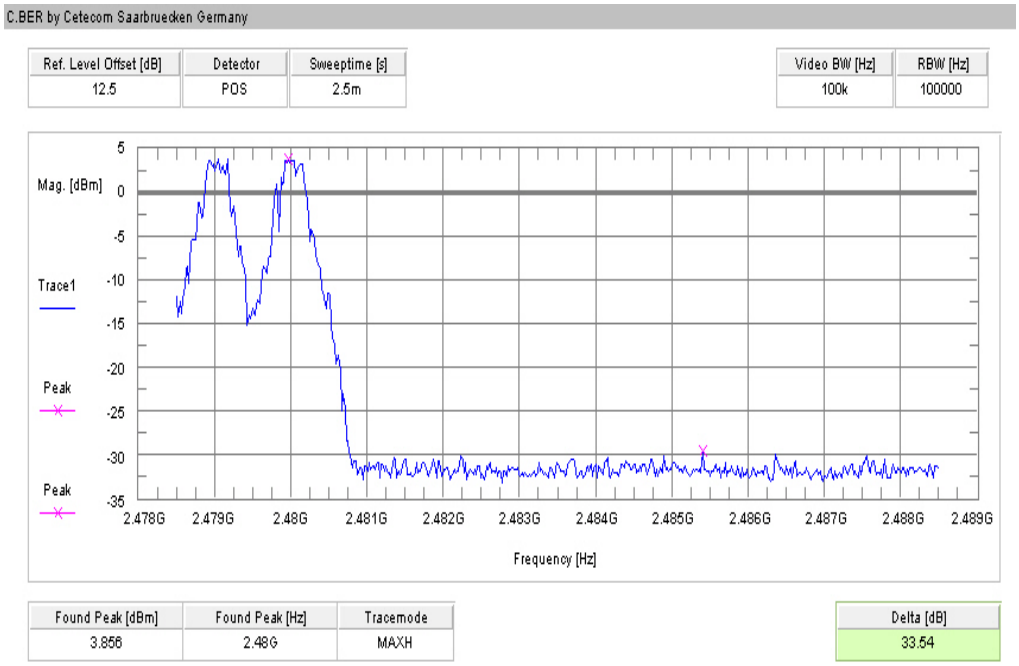
Plot 2 of 4 (hopping on, lowest frequency):



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



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

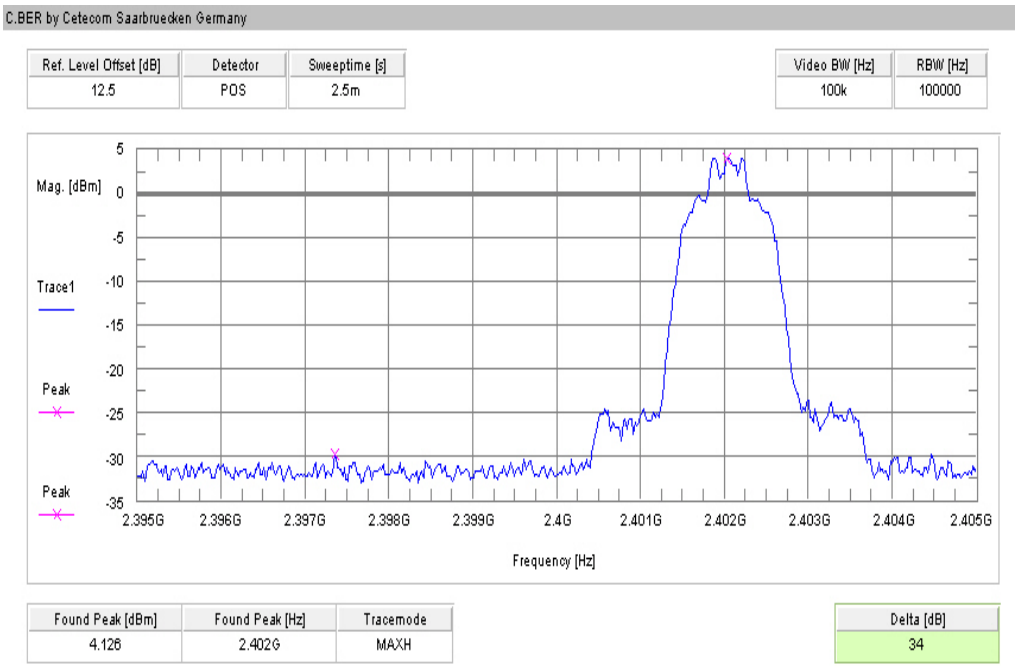


Results:

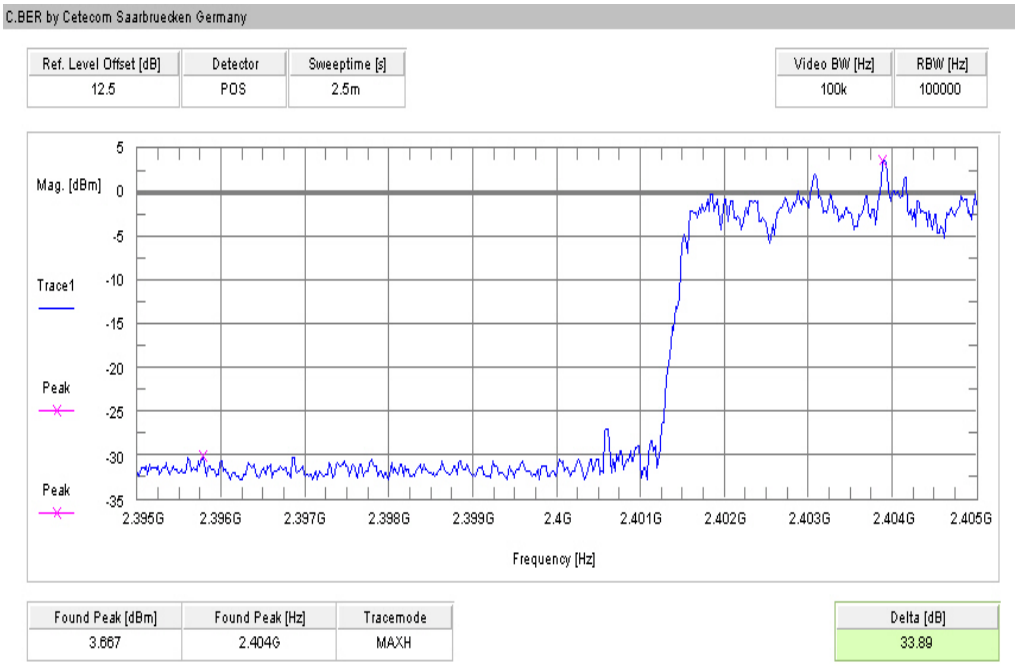
SZENARIO	DELTA VALUE [DB]
hopping off, lowest frequency	> 20 dB
hopping on, lowest frequency	> 20 dB
hopping off, highest frequency	> 20 dB
hopping on, highest frequency	> 20 dB
Measurement uncertainty	±1,5dB

Modulation: Pi/4 DQPSK

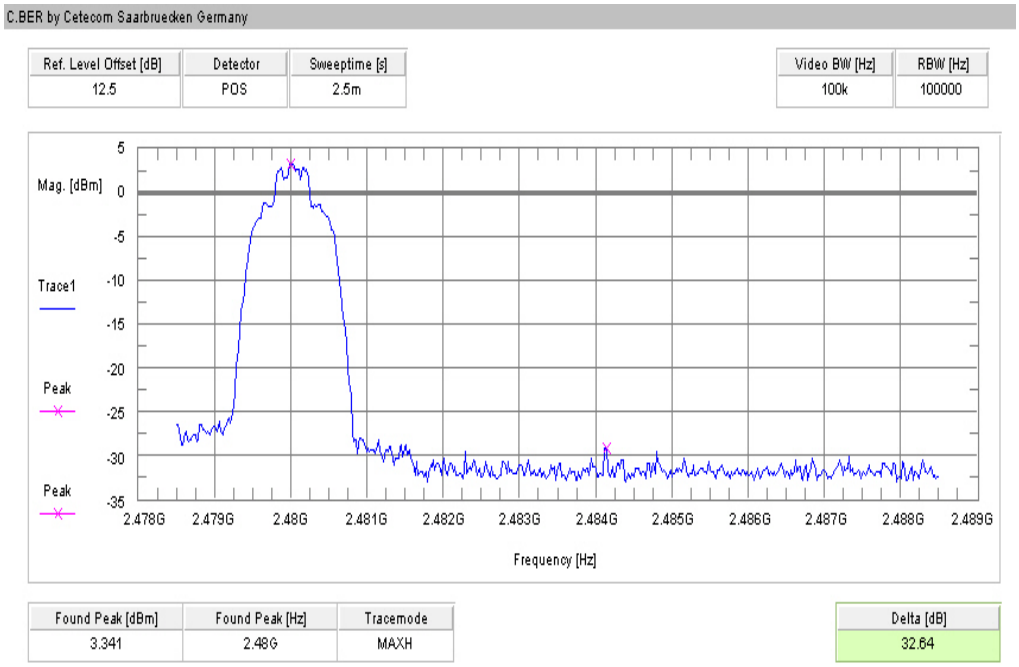
Plot 1 of 4 (hopping off, lowest frequency):



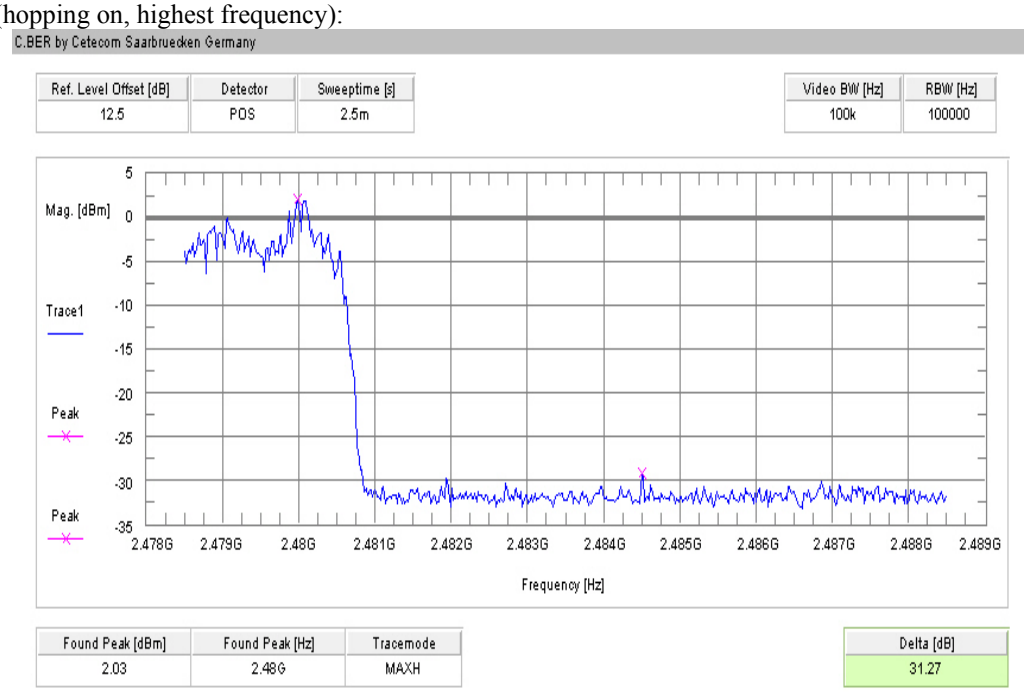
Plot 2 of 4 (hopping on, lowest frequency):



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



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

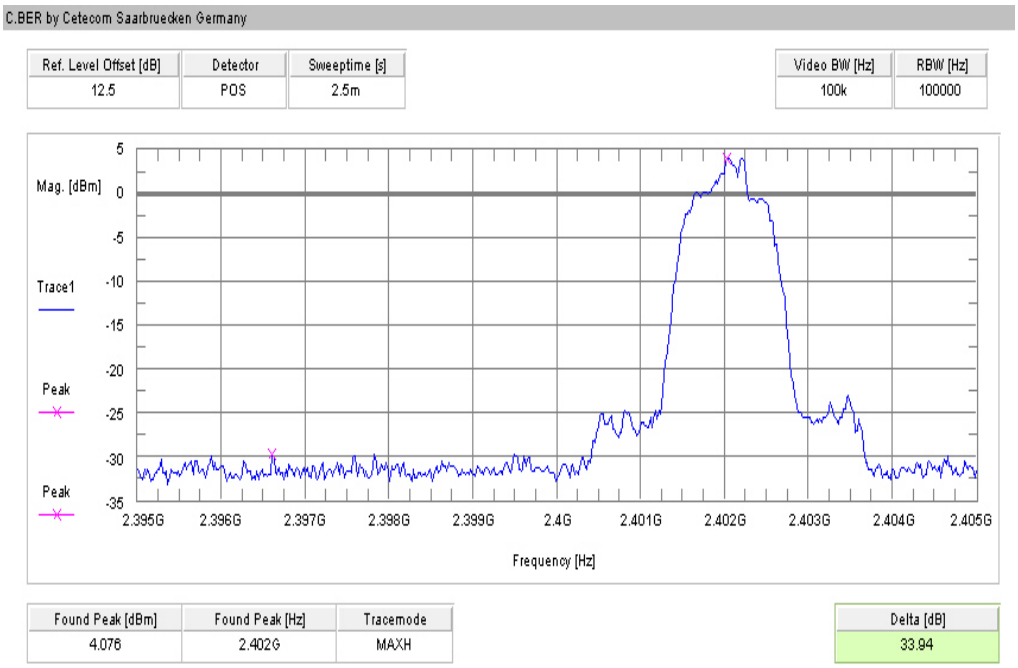


Results:

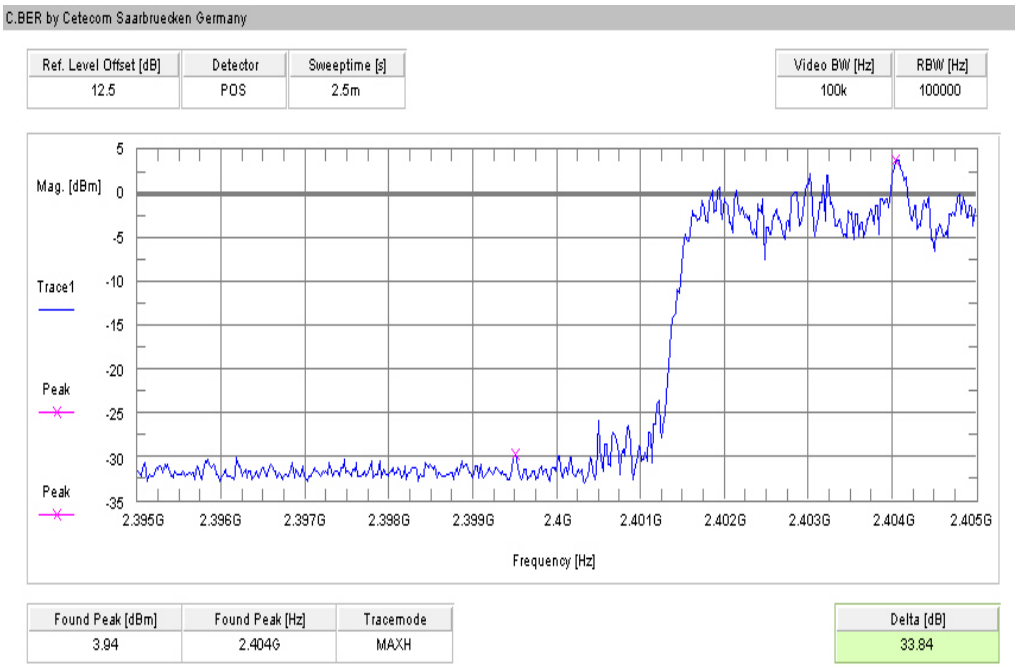
SZENARIO	DELTA VALUE [DB]
hopping off, lowest frequency	> 20 dB
hopping on, lowest frequency	> 20 dB
hopping off, highest frequency	> 20 dB
hopping on, highest frequency	> 20 dB
Measurement uncertainty	±1,5dB

Modulation: 8 DPSK

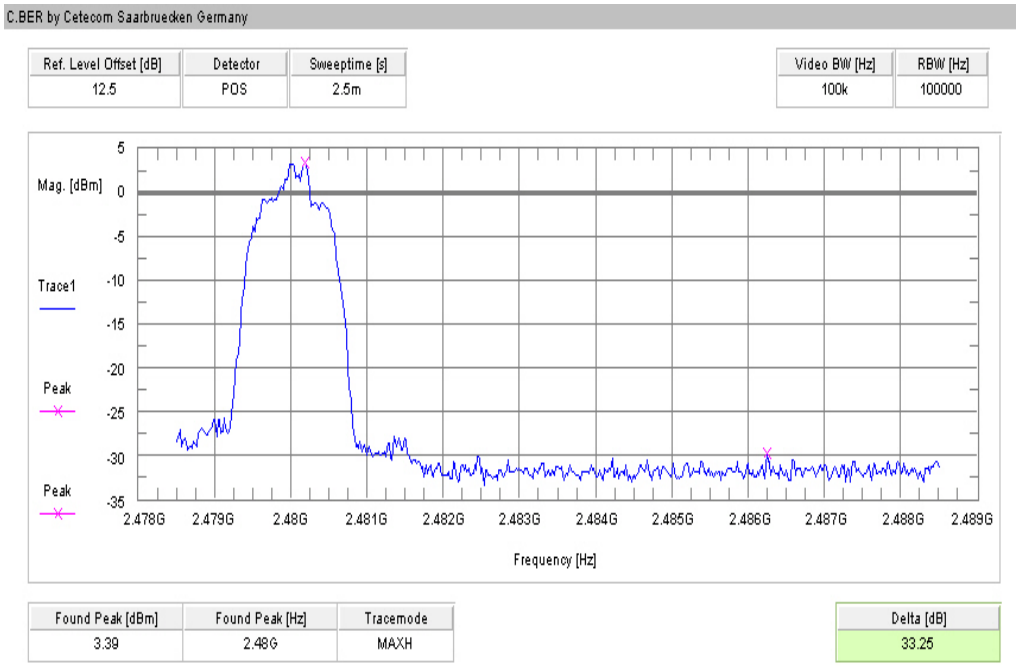
Plot 1 of 4 (hopping off, lowest frequency):



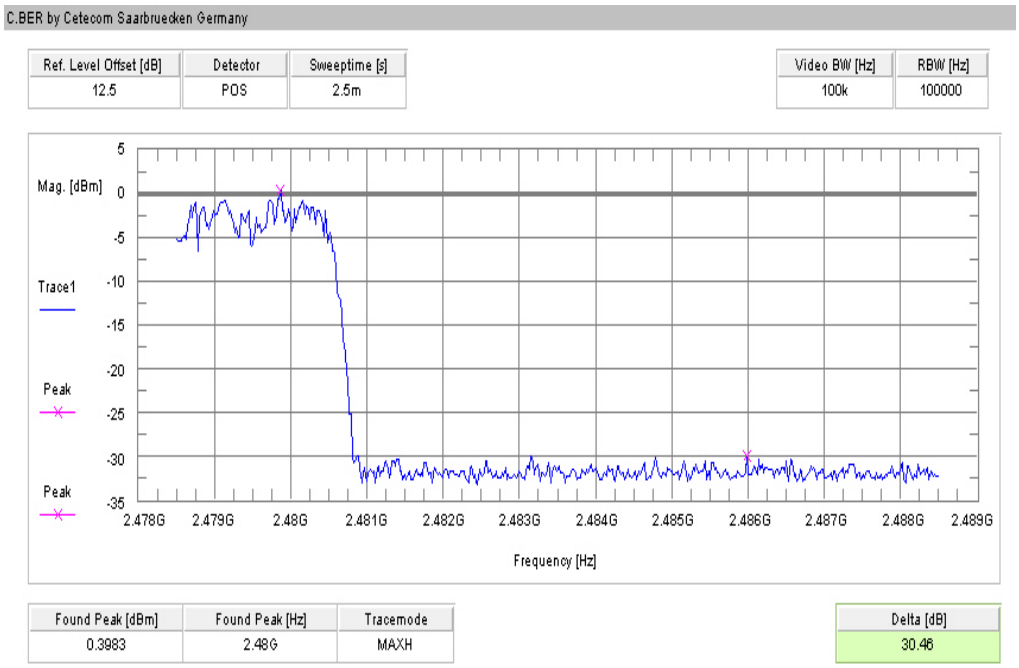
Plot 2 of 4 (hopping on, lowest frequency):



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

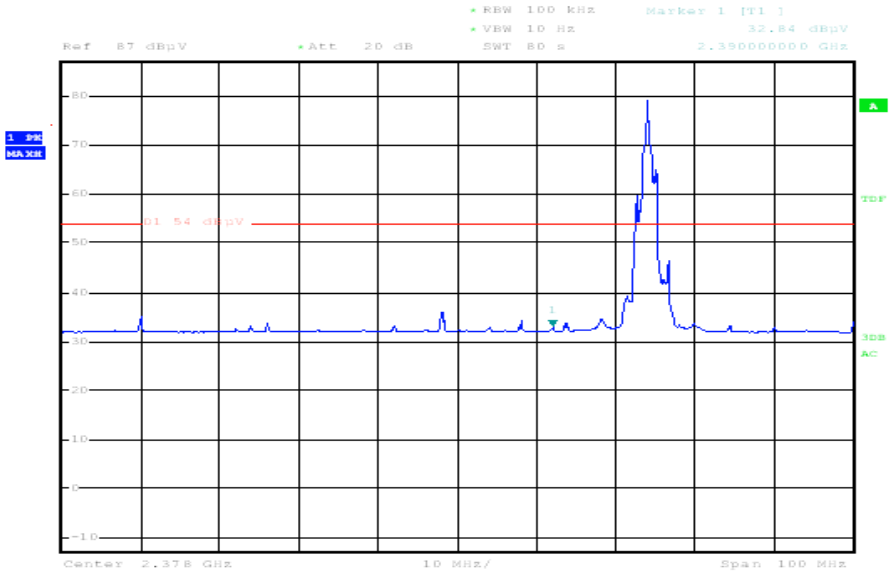
Limits:

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)).

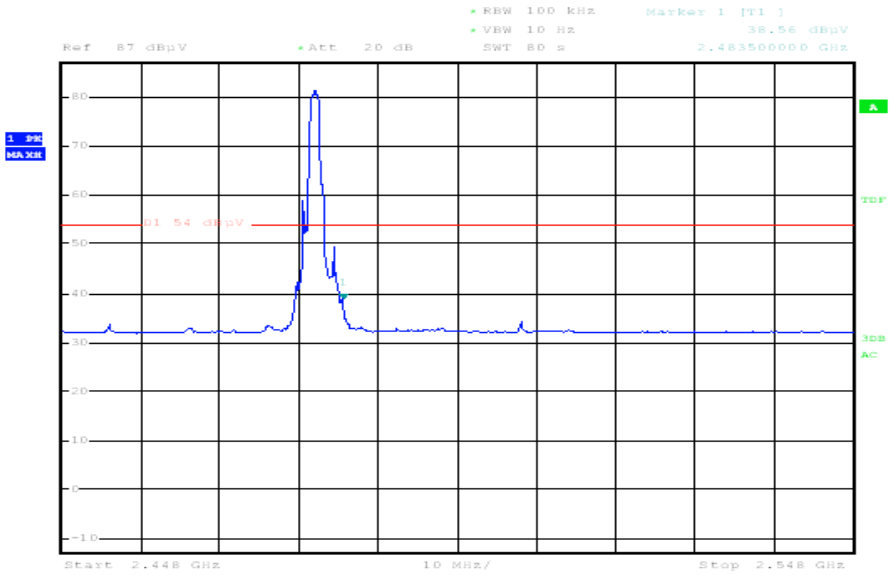
5.13 Band-edge compliance of radiated emissions §15.205

Modulation: GFSK internal antenna

Plot 1: Restricted Bands low

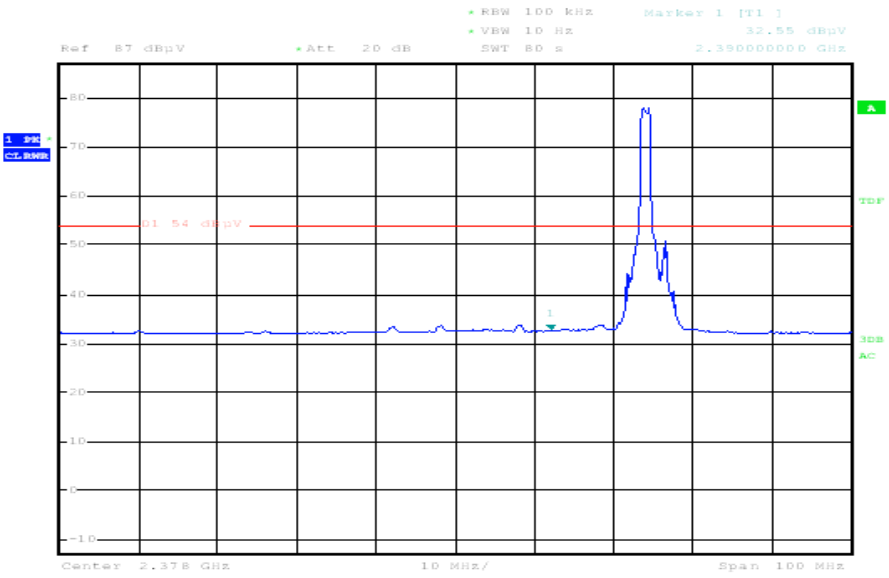


Plot 2: Restricted Bands high

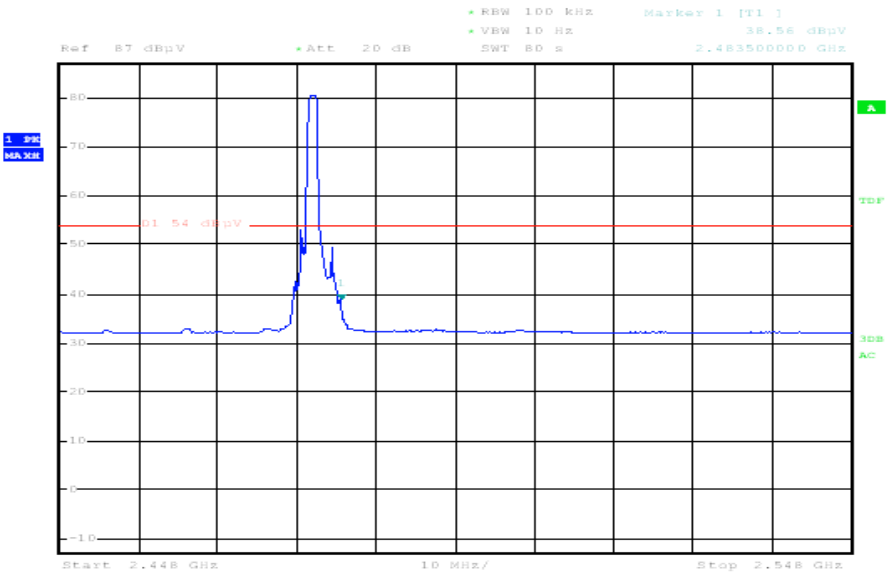


Modulation: Pi/4 DQPSK internal antenna

Plot 1: Restricted Bands low

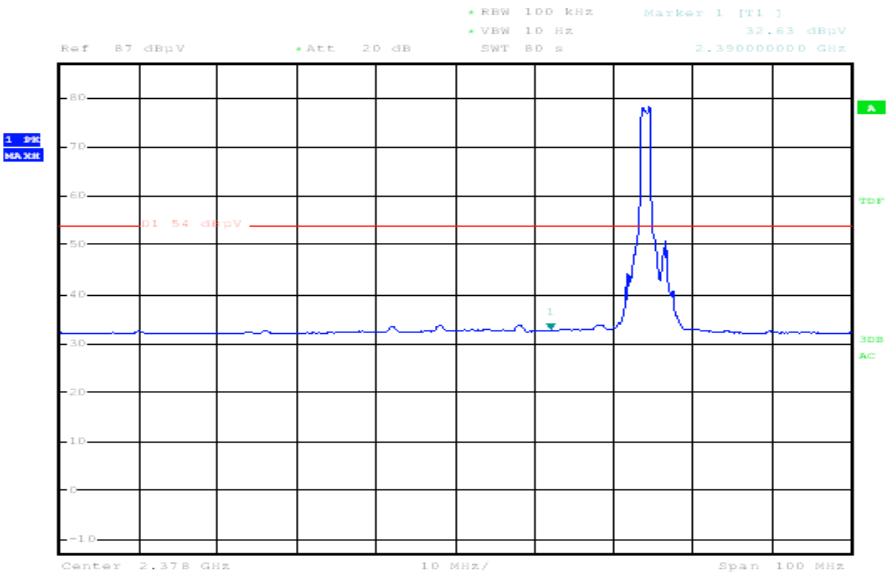


Plot 2: Restricted Bands high



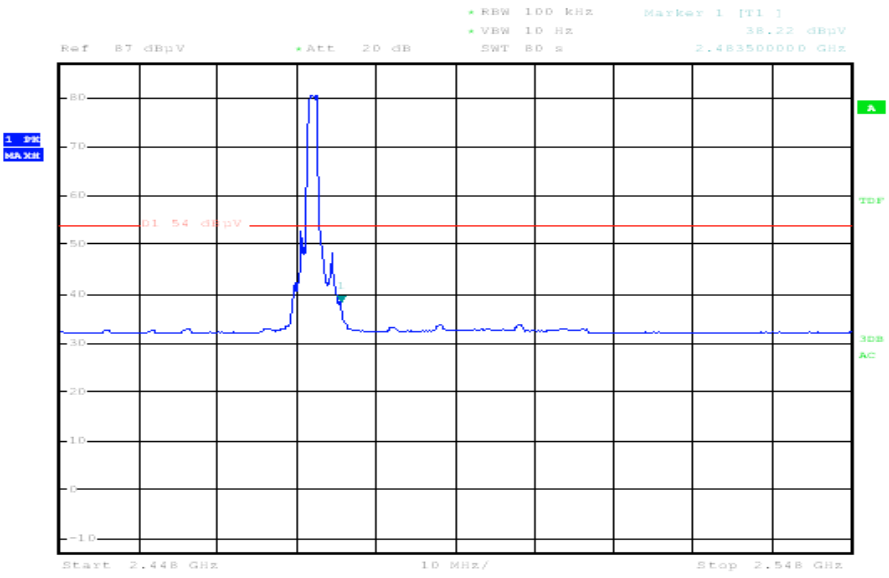
Modulation: 8 DPSK internal antenna

Plot 1: Restricted Bands low



Date: 3.MAR.2009 21:32:29

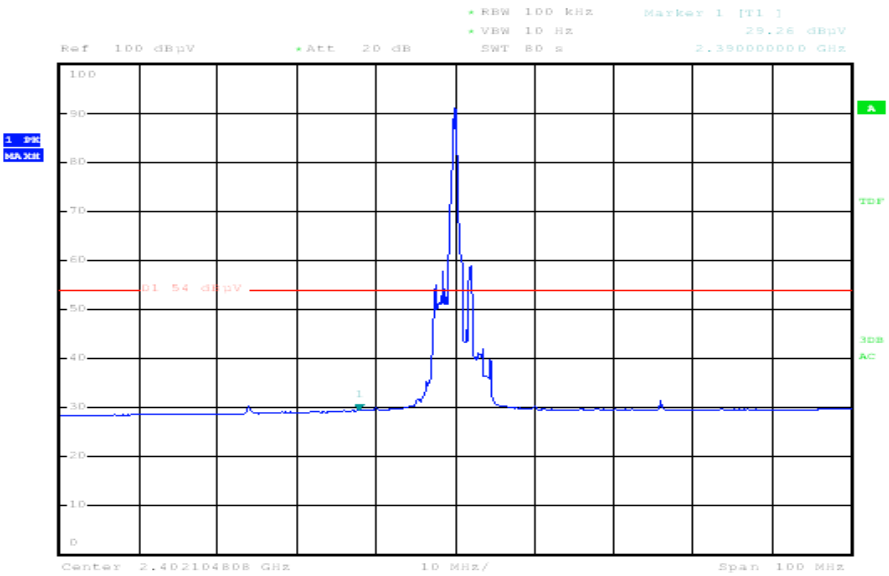
Plot 2: Restricted Bands high



Date: 3.MAR.2009 21:36:10

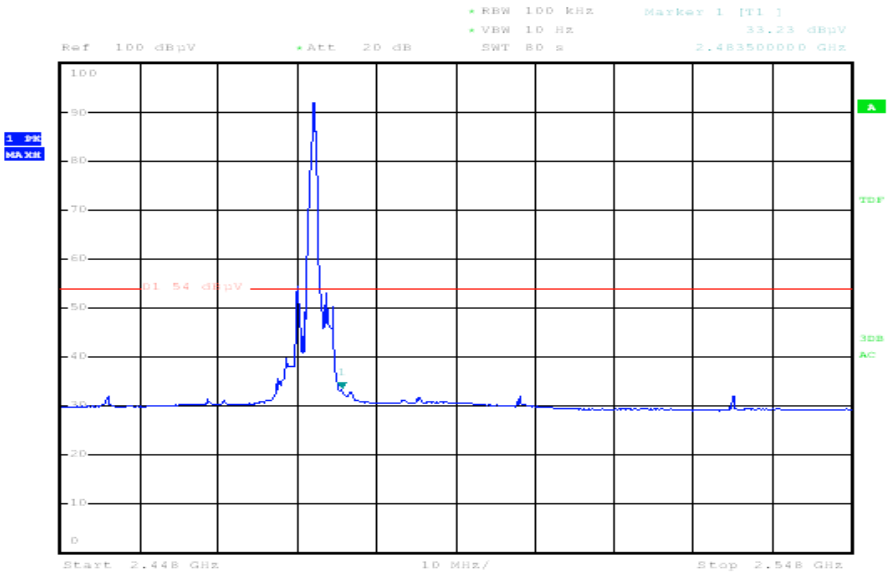
Modulation: GFSK external antenna

Plot 1: Restricted Bands low



Date: 4.MAR.2009 19:35:31

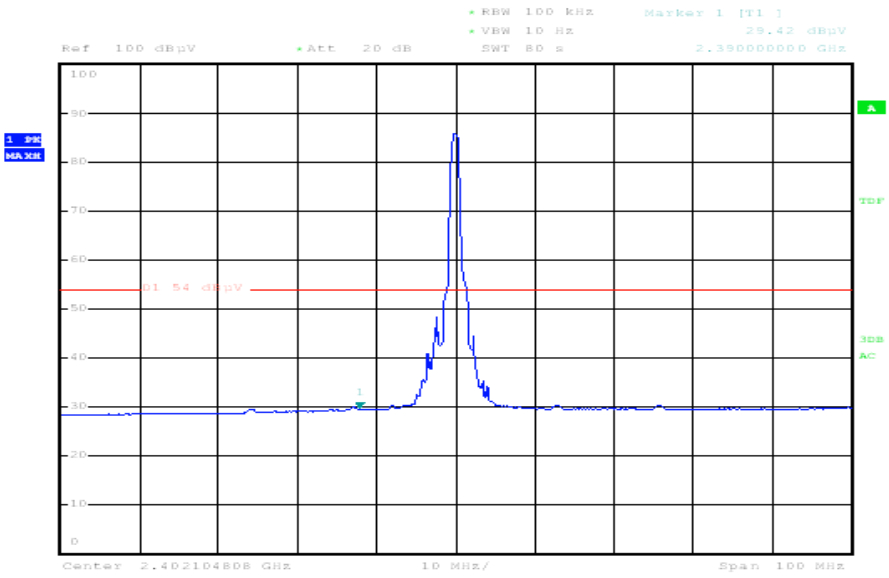
Plot 2: Restricted Bands high



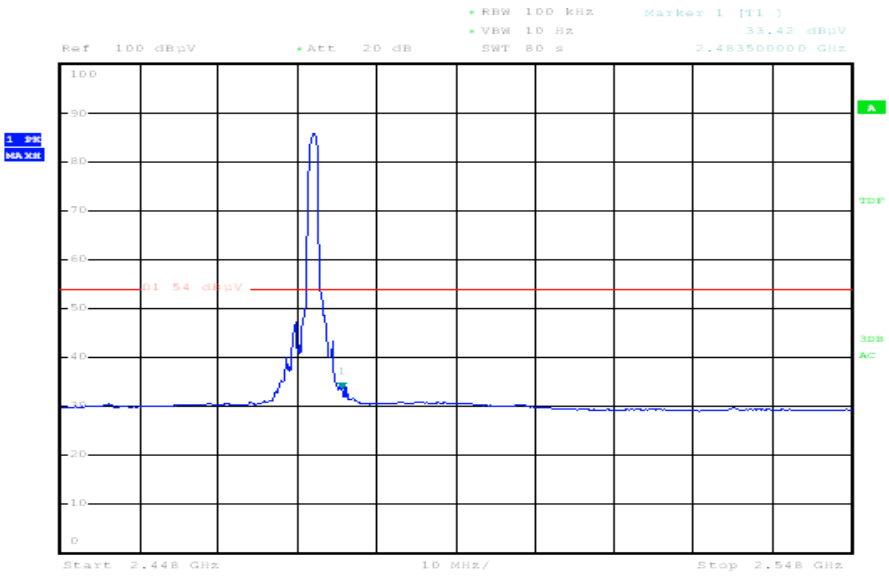
Date: 4.MAR.2009 19:51:43

Modulation: Pi/4 DQPSK external antenna

Plot 1: Restricted Bands low

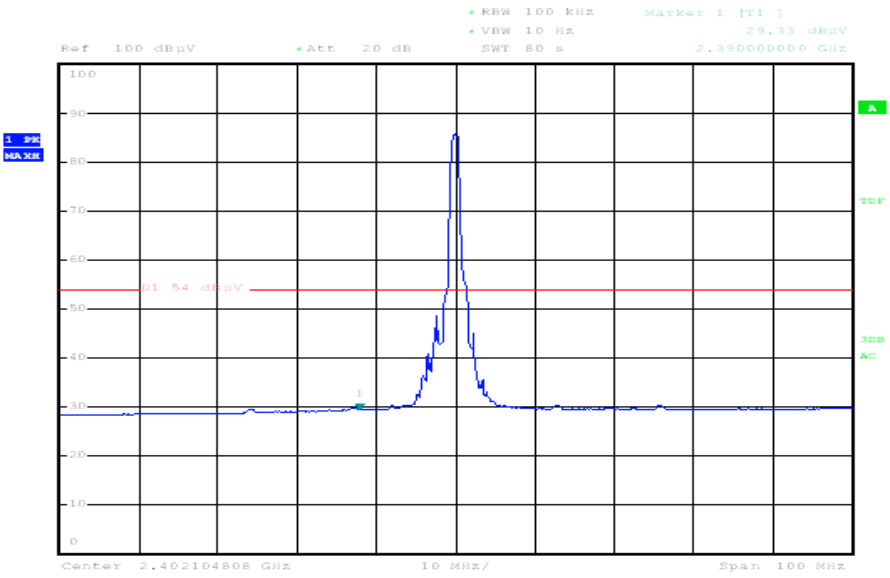


Plot 2: Restricted Bands high

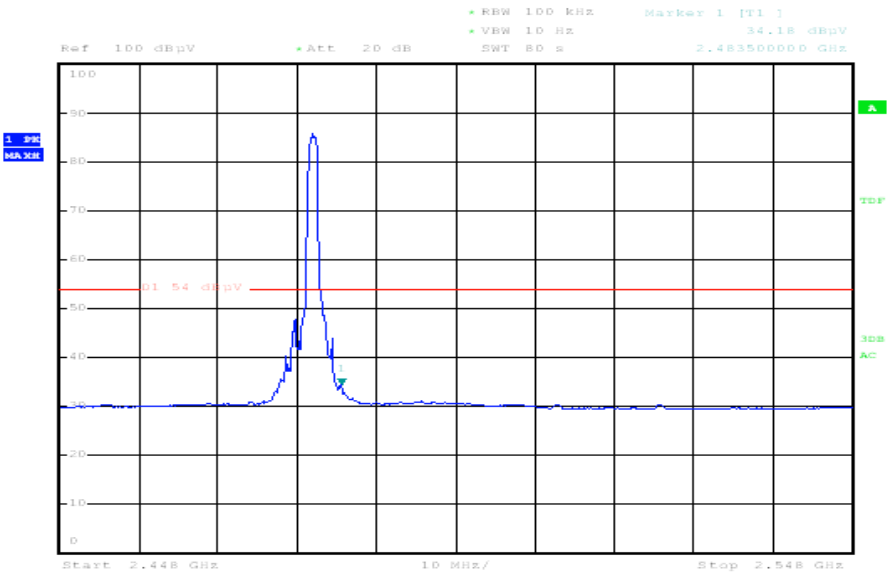


Modulation: 8 DPSK external antenna

Plot 1: Restricted Bands low



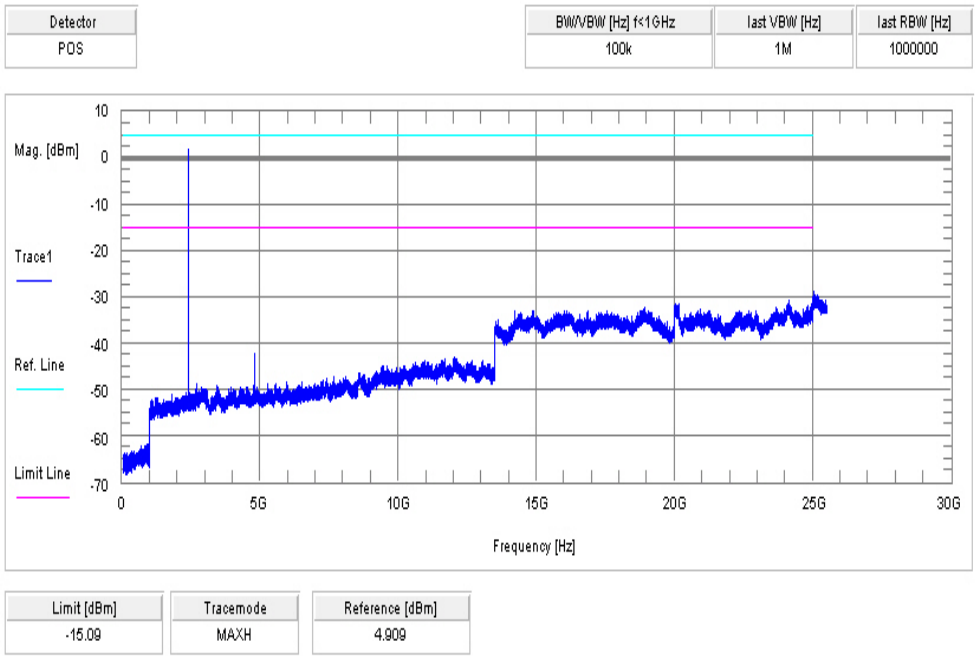
Plot 2: Restricted Bands high



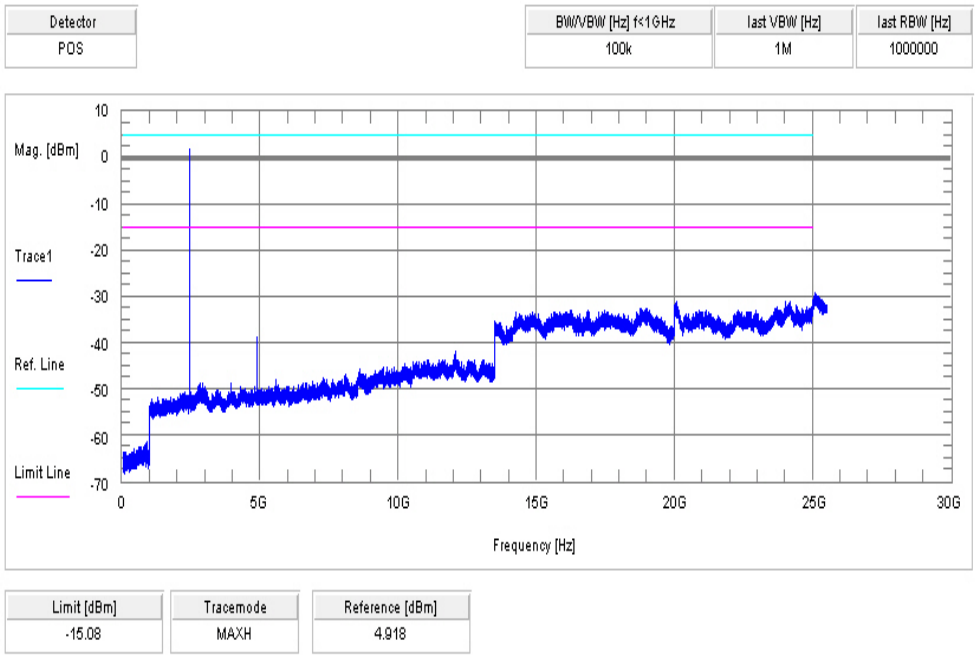
5.14 Spurious Emissions - conducted (Transmitter) § 15.247 (c)(1)

Modulation: GFSK

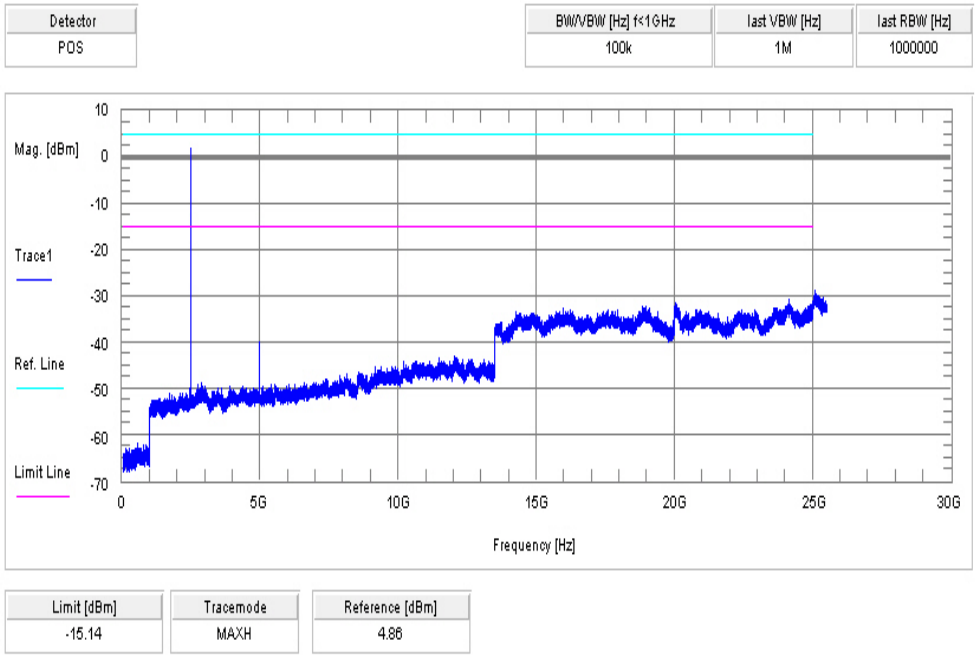
Plot 1 of 3: lowest channel



Plot 2 of 3: middle channel



Plot 3 of 3: highest channel



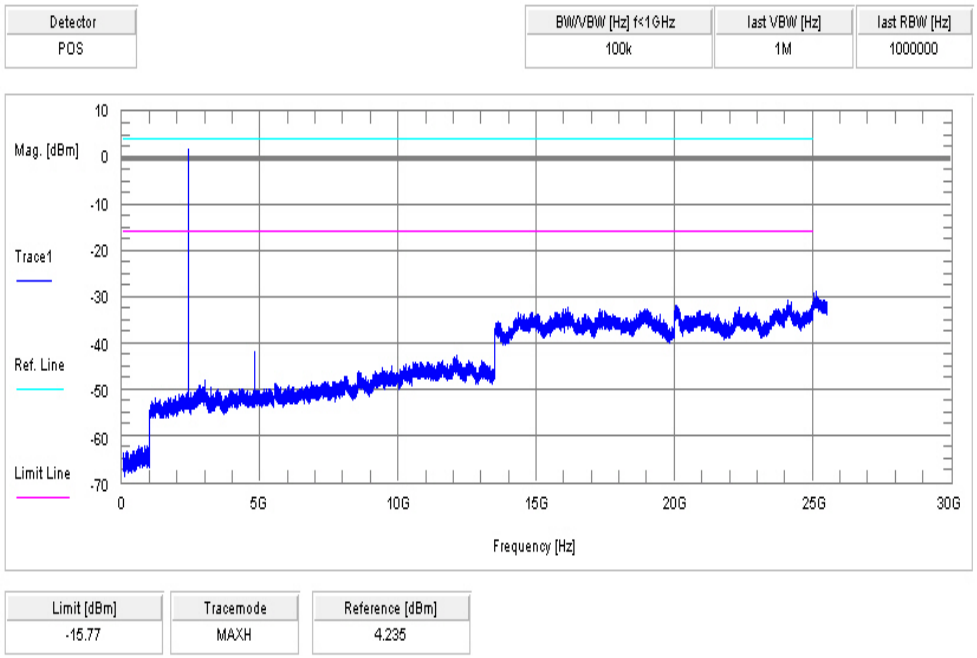
Result & Limits:

Emission Limitation					
f [MHz]		amplitude of emission [dBm]	limit max. allowed emission power	actual attenuation below frequency of operation [dB]	results
2402		4.909	30 dBm		Operating frequency
No critical peaks detected.			-20 dBc	No critical peaks	complies
2441		4.918	30 dBm		Operating frequency
No critical peaks detected.			-20 dBc	No critical peaks	complies
2480		4.860	30 dBm		Operating frequency
No critical peaks detected.			-20 dBc	No critical peaks	complies
Measurement uncertainty			± 3dB		

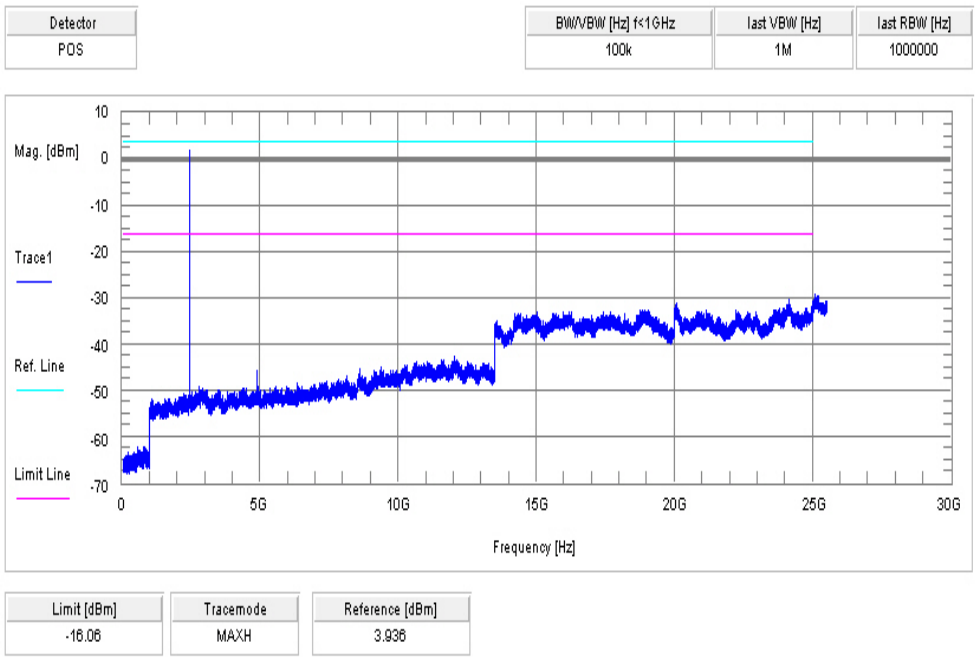
F < 1 GHz: RBW: 100 kHz VBW: 100 kHz
F > 1 GHz: RBW: 1 MHz VBW: 1 MHz

Modulation: Pi/4 DQPSK

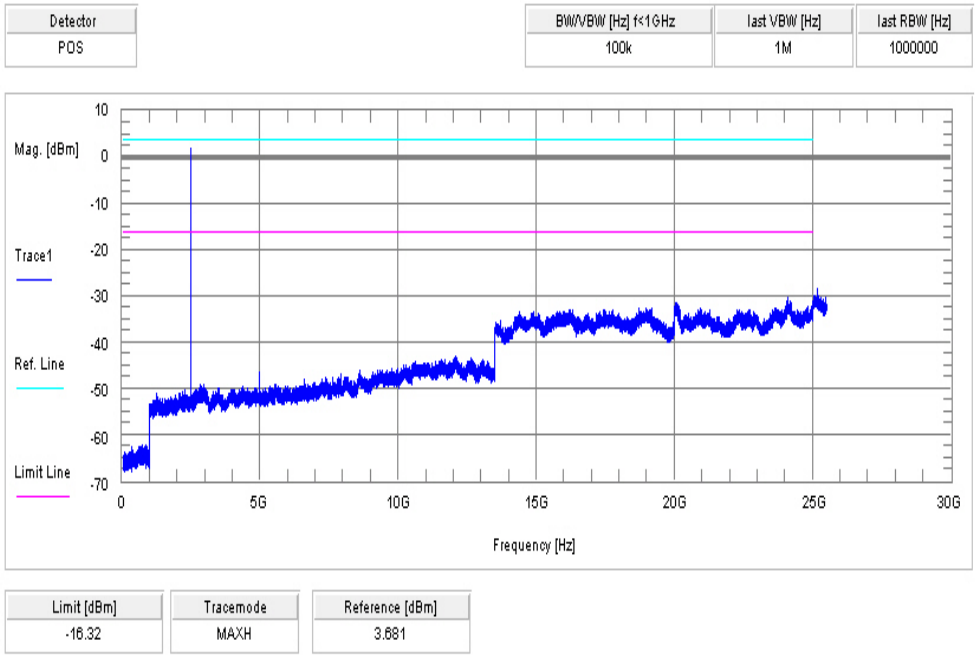
Plot 1 of 3: lowest channel



Plot 2 of 3: middle channel



Plot 3 of 3: highest channel



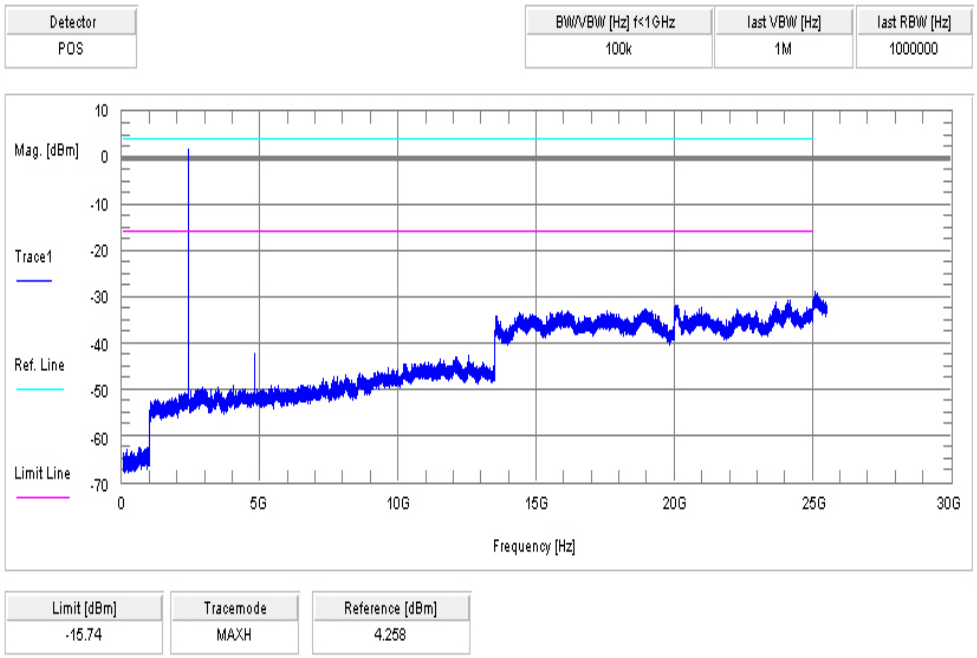
Result & Limits:

Emission Limitation					
f [MHz]		amplitude of emission [dBm]	limit max. allowed emission power	actual attenuation below frequency of operation [dB]	results
2402		4.235	30 dBm		Operating frequency
No critical peaks detected.			-20 dBc	No critical peaks	complies
2441		3.936	30 dBm		Operating frequency
No critical peaks detected.			-20 dBc	No critical peaks	complies
2480		3.681	30 dBm		Operating frequency
No critical peaks detected.			-20 dBc	No critical peaks	complies
Measurement uncertainty			± 3dB		

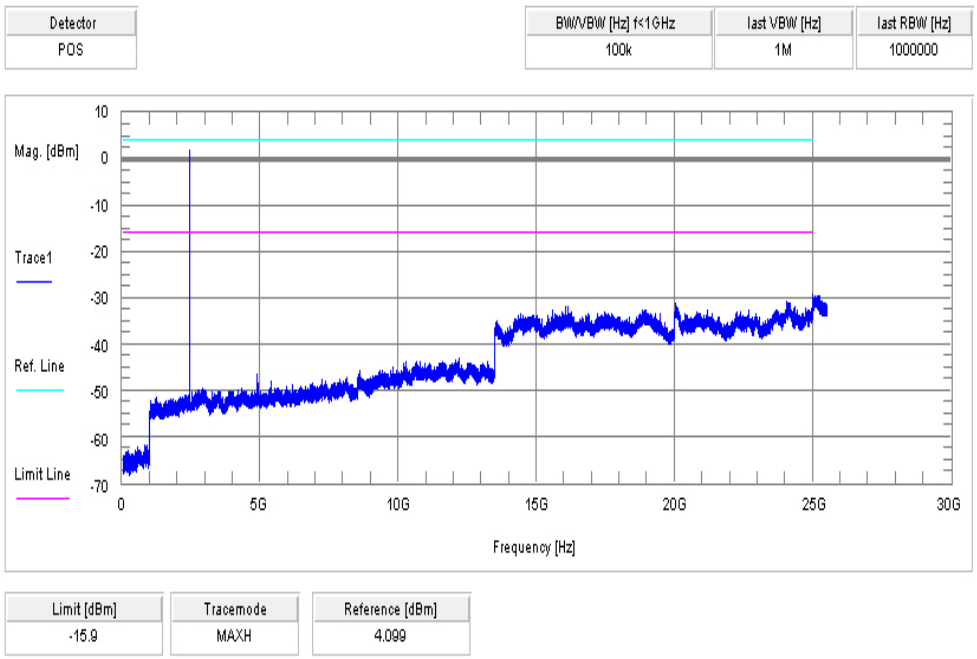
F < 1 GHz: RBW: 100 kHz VBW: 100 kHz
F > 1 GHz: RBW: 1 MHz VBW: 1 MHz

Modulation: 8 DPSK

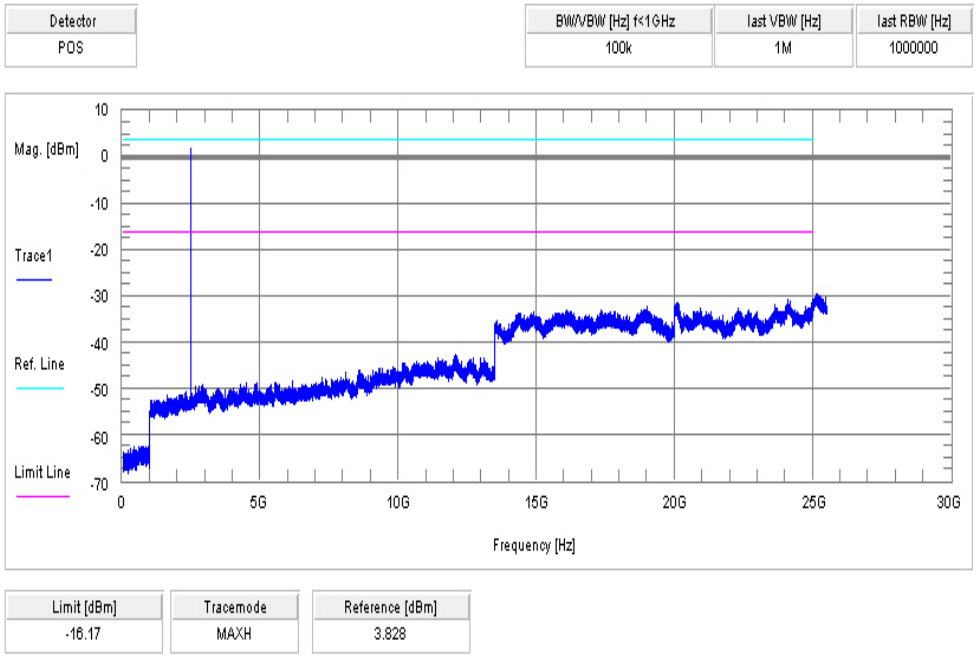
Plot 1 of 3: lowest channel



Plot 2 of 3: middle channel



Plot 3 of 3: highest channel



Result & Limits:

Emission Limitation					
f [MHz]		amplitude of emission [dBm]	limit max. allowed emission power	actual attenuation below frequency of operation [dB]	results
2402		4.258	30 dBm		Operating frequency
No critical peaks detected.			-20 dBc	No critical peaks	complies
2441		4.099	30 dBm		Operating frequency
No critical peaks detected.			-20 dBc	No critical peaks	complies
2480		3.828	30 dBm		Operating frequency
No critical peaks detected.			-20 dBc	No critical peaks	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)

Internal antenna:

Modulation: GFSK

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

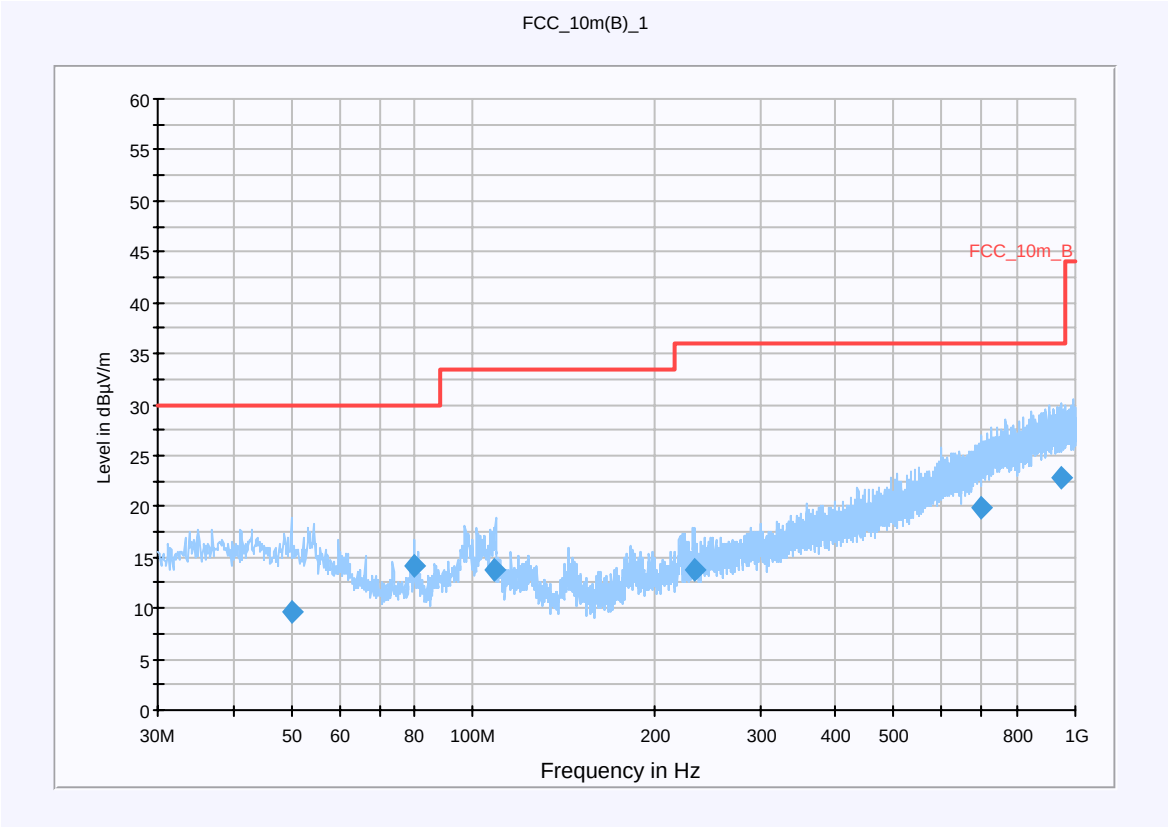
Common Information

EUT:	Blue Mode + P2x/G2 ; PAN1x55
Serial Number:	FCC ID: T7V-BC06; Reg Nr. IC: 216Q-BC06
Test Description:	FCC part 15 B
Operating Conditions:	BT Tx Mode Ch: 0
Operator Name:	LNG
Comment:	Modulation DH5

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 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
50.105400	9.5	15000.000	120.000	200.0	H	143.0	13.5	20.5	30.0	
79.979950	14.3	15000.000	120.000	200.0	V	207.0	9.4	15.7	30.0	
108.977000	13.7	15000.000	120.000	143.0	V	221.0	11.5	19.8	33.5	
233.165350	13.7	15000.000	120.000	200.0	V	50.0	13.1	22.3	36.0	
698.516800	19.9	15000.000	120.000	281.0	V	323.0	23.0	16.1	36.0	
945.373000	22.8	15000.000	120.000	200.0	H	239.0	25.8	13.2	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 (0109)
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

Plot 2: 1 - 12 GHz horizontal (lowest channel)

CETECOM ICT Services GmbH

Projekt- Nr.:1-1100-01-04_09

EUT:	PAN 1x55	Polarisation:	Horizontal
Manufacturer:	Panasonic	Battery:	DC Power Supply
IMEI:		HW:	
Operator:	BTL	SW:	
Start of Test :	04.03.2009 17:36:30	Vmin:	
Standard:	FCC_15_407_2400	Vnom:	
Signalling Unit:	CMU200	Vmax:	
Transducer-File:	C:\Spurious_neu\Messparameter\FCC_15_407_2400\Transducer_FCC_15_407_2400.xls		
Start Freq. [MHz]:	1000	Stop Freq. [MHz]	12000

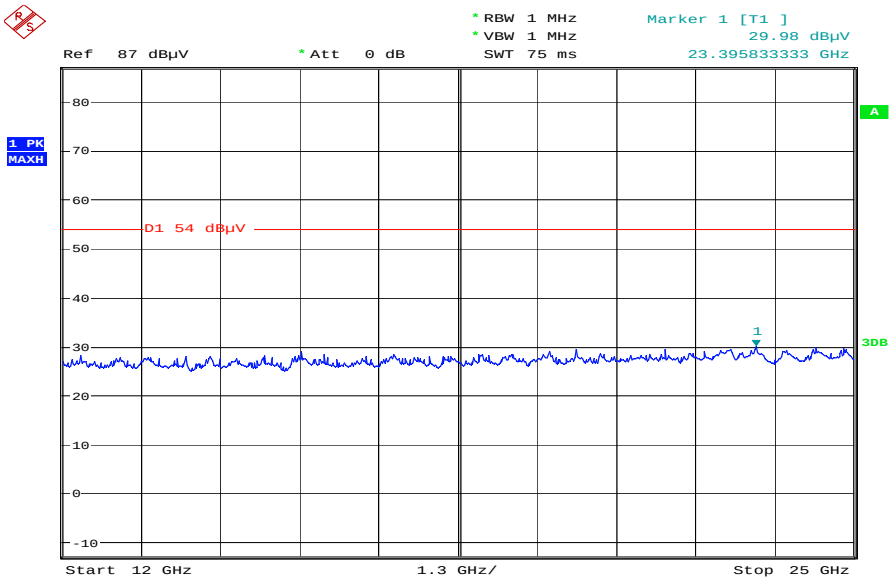
Plot 3: 1 - 12 GHz vertical (lowest channel)

CETECOM ICT Services GmbH

Projekt- Nr.:1-1100-01-04_09

EUT:	PAN 1x55	Polarisation:	Vertikal
Manufacturer:	Panasonic	Battery:	DC Power Supply
IMEI:		HW:	
Operator:	BTL	SW:	
Start of Test :	04.03.2009 18:18:14	Vmin:	
Standard:	FCC_15_407_2400	Vnom:	
Signalling Unit:	CMU200	Vmax:	
Transducer-File:	C:\Spurious_neu\Messparameter\FCC_15_407_2400\Transducer_FCC_15_407_2400.xls		
Start Freq. [MHz]:	1000	Stop Freq. [MHz]	12000

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



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

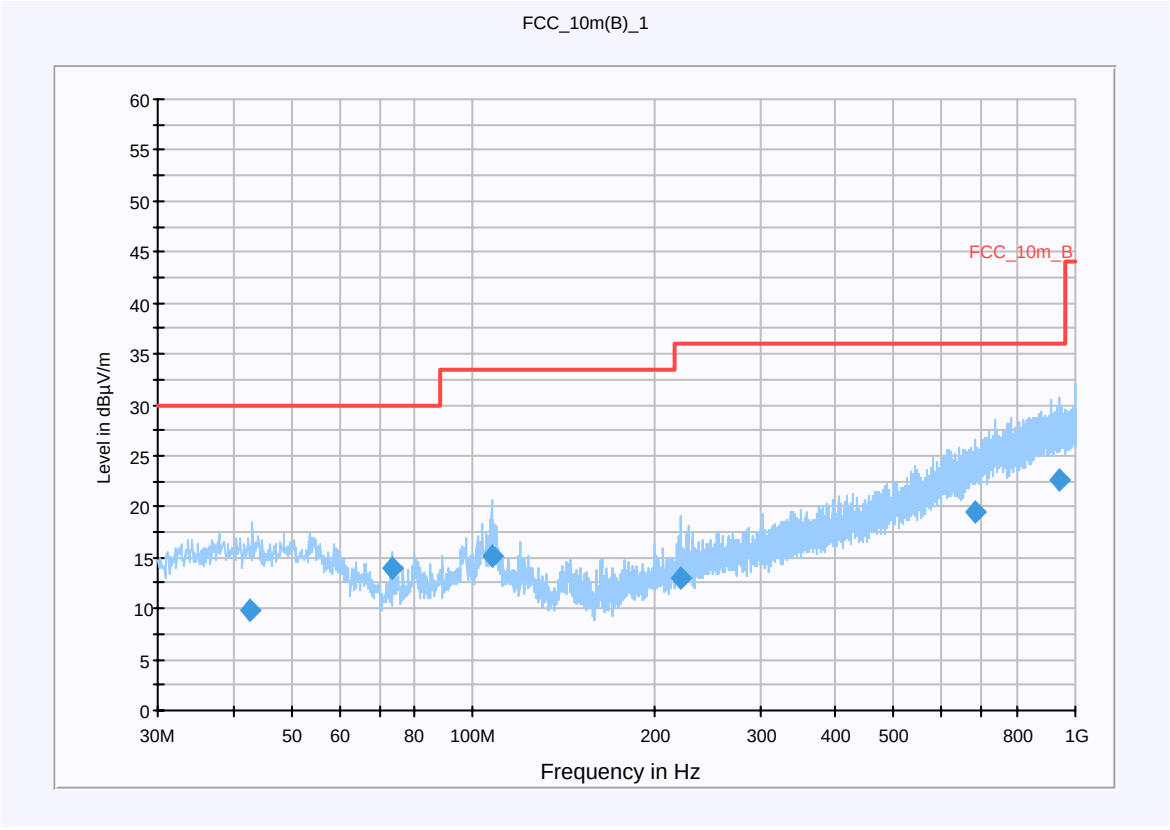
Common Information

EUT:	Blue Mode + P2x/G2 ; PAN1x55
Serial Number:	FCC ID: T7V-BC06; Reg Nr. IC: 216Q-BC06
Test Description:	FCC part 15 B
Operating Conditions:	BT Tx Mode Ch: 39
Operator Name:	LNG
Comment:	Modulation DH5

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 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
42.663350	9.9	15000.000	120.000	300.0	V	90.0	13.5	20.1	30.0	
73.736700	13.9	15000.000	120.000	200.0	V	117.0	9.5	16.1	30.0	
108.132500	15.1	15000.000	120.000	200.0	V	254.0	11.5	18.4	33.5	
220.612050	13.1	15000.000	120.000	100.0	V	110.0	12.7	22.9	36.0	
681.441200	19.4	15000.000	120.000	106.0	V	307.0	22.5	16.6	36.0	
940.510100	22.6	15000.000	120.000	140.0	V	195.0	25.8	13.4	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 (0109)
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

Plot 6: 1 - 12 GHz horizontal (middle channel)

CETECOM ICT Services GmbH

Projekt- Nr.:1-1100-01-04_09

EUT:	PAN 1x55	Polarisation:	Horizontal
Manufacturer:	Panasonic	Battery:	DC Power Supply
IMEI:		HW:	
Operator:	BTL	SW:	
Start of Test :	04.03.2009 18:02:43	Vmin:	
Standard:	FCC_15_407_2400	Vnom:	
Signalling Unit:	CMU200	Vmax:	
Transducer-File:	C:\Spurious_neu\Messparameter\FCC_15_407_2400\Transducer_FCC_15_407_2400.xls		
Start Freq. [MHz]:	1000	Stop Freq. [MHz]	12000

Plot 7: 1 - 12 GHz vertical (middle channel)

CETECOM ICT Services GmbH

Projekt- Nr.:1-1100-01-04_09

EUT:	PAN 1x55	Polarisation:	Vertikal
Manufacturer:	Panasonic	Battery:	DC Power Supply
IMEI:		HW:	
Operator:	BTL	SW:	
Start of Test :	04.03.2009 18:23:31	Vmin:	
Standard:	FCC_15_407_2400	Vnom:	
Signalling Unit:	CMU200	Vmax:	
Transducer-File:	C:\Spurious_neu\Messparameter\FCC_15_407_2400\Transducer_FCC_15_407_2400.xls		
Start Freq. [MHz]:	1000	Stop Freq. [MHz]	12000

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

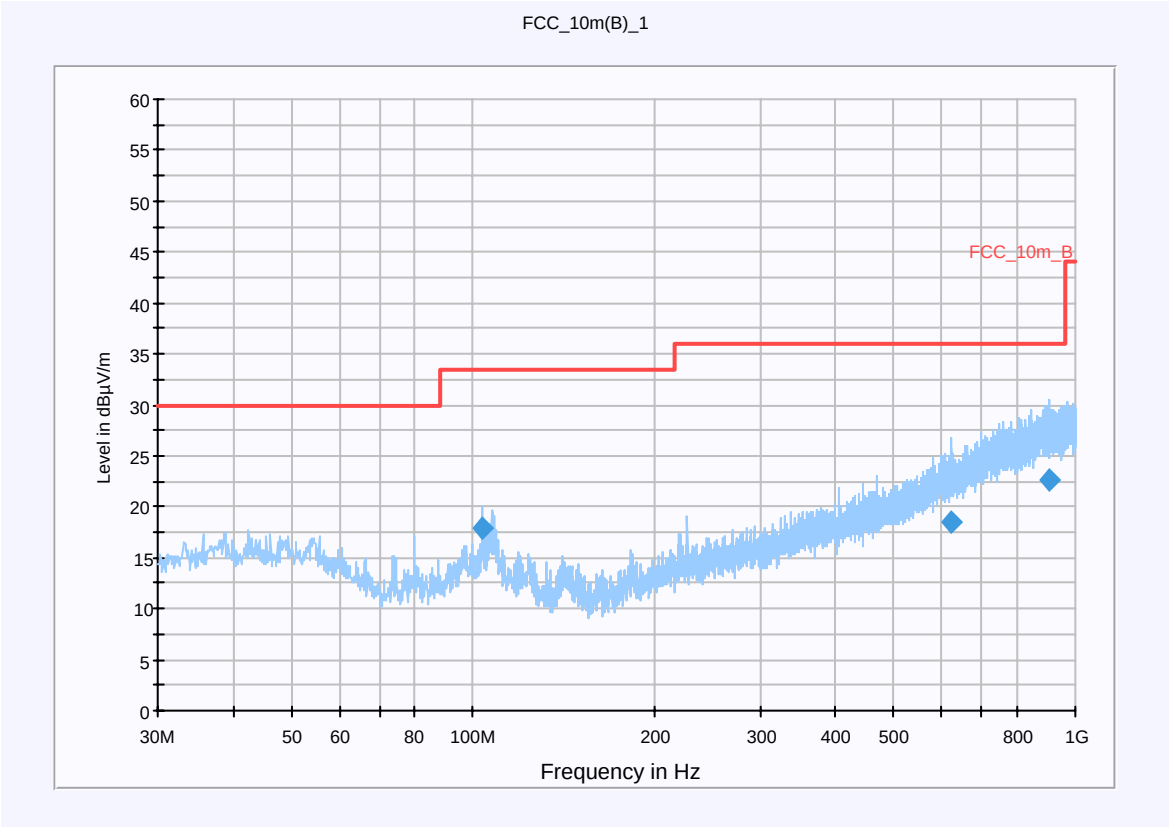
Common Information

EUT:	Blue Mode + P2x/G2 ; PAN1x55
Serial Number:	FCC ID: T7V-BC06; Reg Nr. IC: 216Q-BC06
Test Description:	FCC part 15 B
Operating Conditions:	BT Tx Mode Ch: 78
Operator Name:	LNG
Comment:	Modulation DH5

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 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
103.720450	17.8	15000.000	120.000	200.0	V	184.0	11.9	15.7	33.5	
622.213150	18.5	15000.000	120.000	400.0	H	232.0	21.5	17.5	36.0	
902.167650	22.6	15000.000	120.000	400.0	V	-4.0	25.7	13.4	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 (0109)
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

Plot 9: 1 - 12 GHz horizontal (highest channel)

CETECOM ICT Services GmbH

Projekt- Nr.:1-1100-01-04_09

EUT:	PAN 1x55	Polarisation:	Horizontal
Manufacturer:	Panasonic	Battery:	DC Power Supply
IMEI:		HW:	
Operator:	BTL	SW:	
Start of Test :	04.03.2009 18:09:41	Vmin:	
Standard:	FCC_15_407_2400	Vnom:	
Signalling Unit:	CMU200	Vmax:	
Transducer-File:	C:\Spurious_neu\Messparameter\FCC_15_407_2400\Transducer_FCC_15_407_2400.xls		
Start Freq. [MHz]:	1000	Stop Freq. [MHz]	12000

Plot 10: 1 - 12 GHz vertical (highest channel)

CETECOM ICT Services GmbH

Projekt- Nr.:1-1100-01-04_09

EUT:	PAN 1x55	Polarisation:	Vertikal
Manufacturer:	Panasonic	Battery:	DC Power Supply
IMEI:		HW:	
Operator:	BTL	SW:	
Start of Test :	04.03.2009 18:28:46	Vmin:	
Standard:	FCC_15_407_2400	Vnom:	
Signalling Unit:	CMU200	Vmax:	
Transducer-File:	C:\Spurious_neu\Messparameter\FCC_15_407_2400\Transducer_FCC_15_407_2400.xls		
Start Freq. [MHz]:	1000	Stop Freq. [MHz]	12000

Results: internal antenna

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]
1. harmonic	AV	59.27 @ 1m 49.77 @ 3m	1. harmonic	AV	58.86 @ 1m 49.36 @ 3m	1. harmonic	AV	58.37 @ 1m 48.87 @ 3m
2. harmonic	AV	46.34 @ 1m 36.84 @ 3m	2. harmonic	AV	45.74 @ 1m 36.24 @ 3m	2. harmonic	AV	45.92 @ 1m 36.42 @ 3m
Measurement uncertainty			±3 dB					

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

All detected emissions are manual remeasured. The plots show only the emission - not the correct power value. For the remeasured values please take a look at the table.

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

Internal antenna:

Modulation: GFSK

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

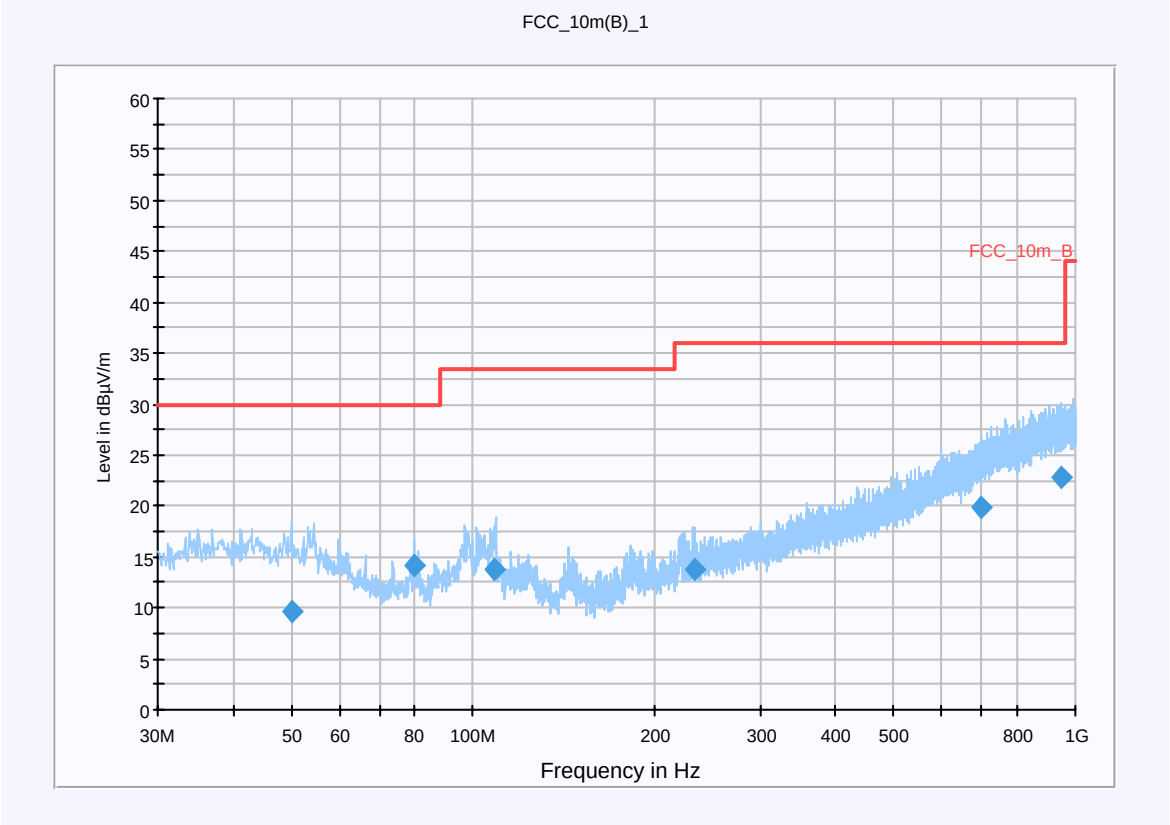
Common Information

EUT:	Blue Mode + P2x/G2 ; PAN1x55
Serial Number:	FCC ID: T7V-BC06; Reg Nr. IC: 216Q-BC06
Test Description:	FCC part 15 B
Operating Conditions:	BT Tx Mode Ch: 0
Operator Name:	LNG
Comment:	Modulation DH5

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 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
50.105400	9.5	15000.000	120.000	200.0	H	143.0	13.5	20.5	30.0	
79.979950	14.3	15000.000	120.000	200.0	V	207.0	9.4	15.7	30.0	
108.977000	13.7	15000.000	120.000	143.0	V	221.0	11.5	19.8	33.5	
233.165350	13.7	15000.000	120.000	200.0	V	50.0	13.1	22.3	36.0	
698.516800	19.9	15000.000	120.000	281.0	V	323.0	23.0	16.1	36.0	
945.373000	22.8	15000.000	120.000	200.0	H	239.0	25.8	13.2	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 (0109)
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

Plot 2: 1 - 12 GHz horizontal (lowest channel)

CETECOM ICT Services GmbH

Projekt- Nr.:1-1100-01-04_09-2

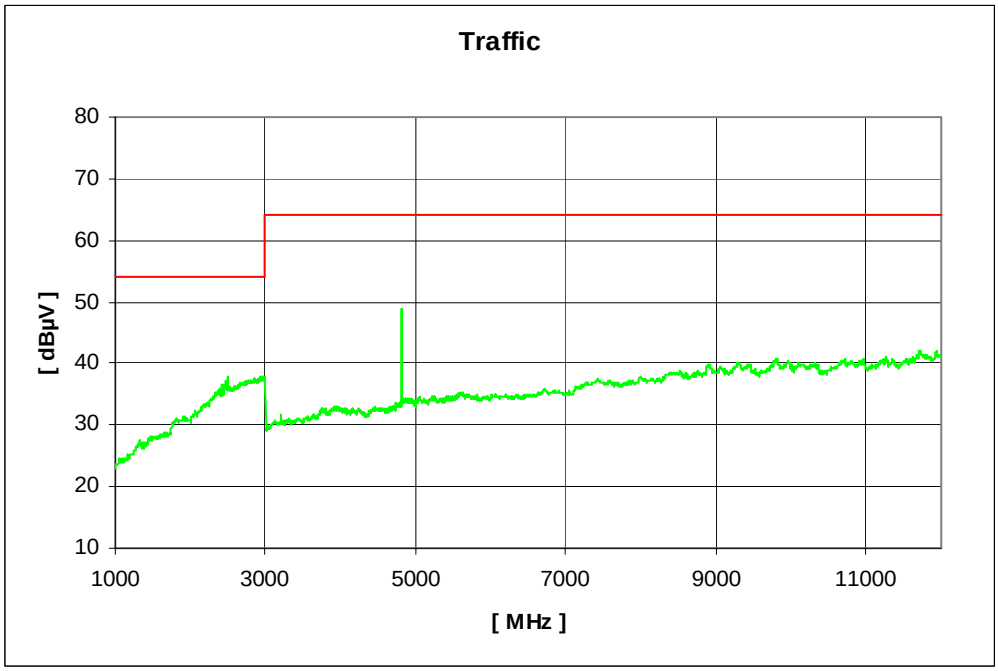
EUT:	PAN 1x55	Polarisation:	Horizontal
Manufacturer:	Panasonic	Battery:	Real Battery
IMEI:		HW:	
Operator:	BTL	SW:	
Start of Test :	05.03.2009 15:39:28	Vmin:	
Standard:	FCC_15_407_2400	Vnom:	
Signalling Unit:	CMU200	Vmax:	
Transducer-File:	C:\Spurious_neu\Messparameter\FCC_15_407_2400\Transducer_FCC_15_407_2400.xls		
Start Freq. [MHz]:	1000	Stop Freq. [MHz]	12000

Plot 3: 1 - 12 GHz vertical (lowest channel)

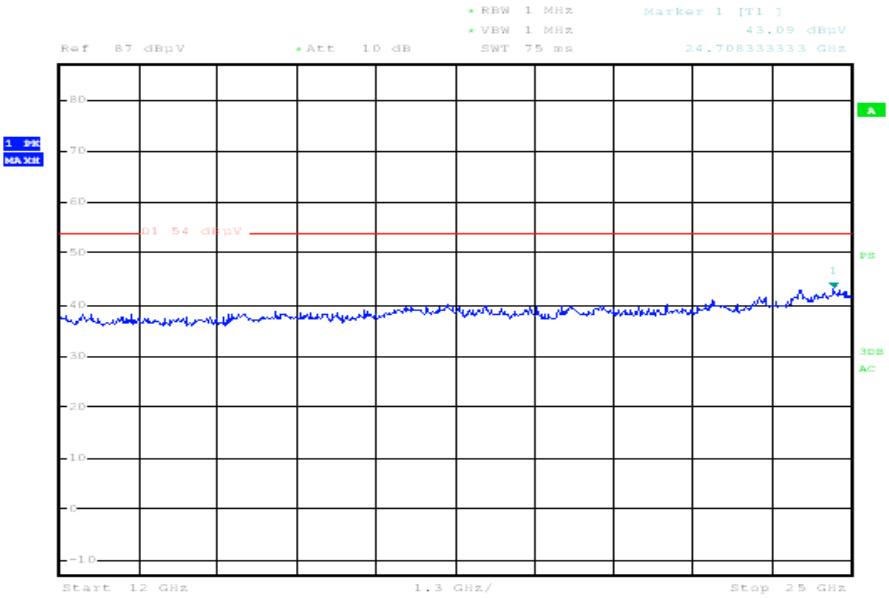
CETECOM ICT Services GmbH

Projekt- Nr.:1-1100-01-04_09-2

EUT:	PAN 1x55	Polarisation:	Vertikal
Manufacturer:	Panasonic	Battery:	Real Battery
IMEI:		HW:	
Operator:	BTL	SW:	
Start of Test :	05.03.2009 17:12:38	Vmin:	
Standard:	FCC_15_407_2400	Vnom:	
Signalling Unit:	CMU200	Vmax:	
Transducer-File:	C:\Spurious_neu\Messparameter\FCC_15_407_2400\Transducer_FCC_15_407_2400.xls		
Start Freq. [MHz]:	1000	Stop Freq. [MHz]	12000



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



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

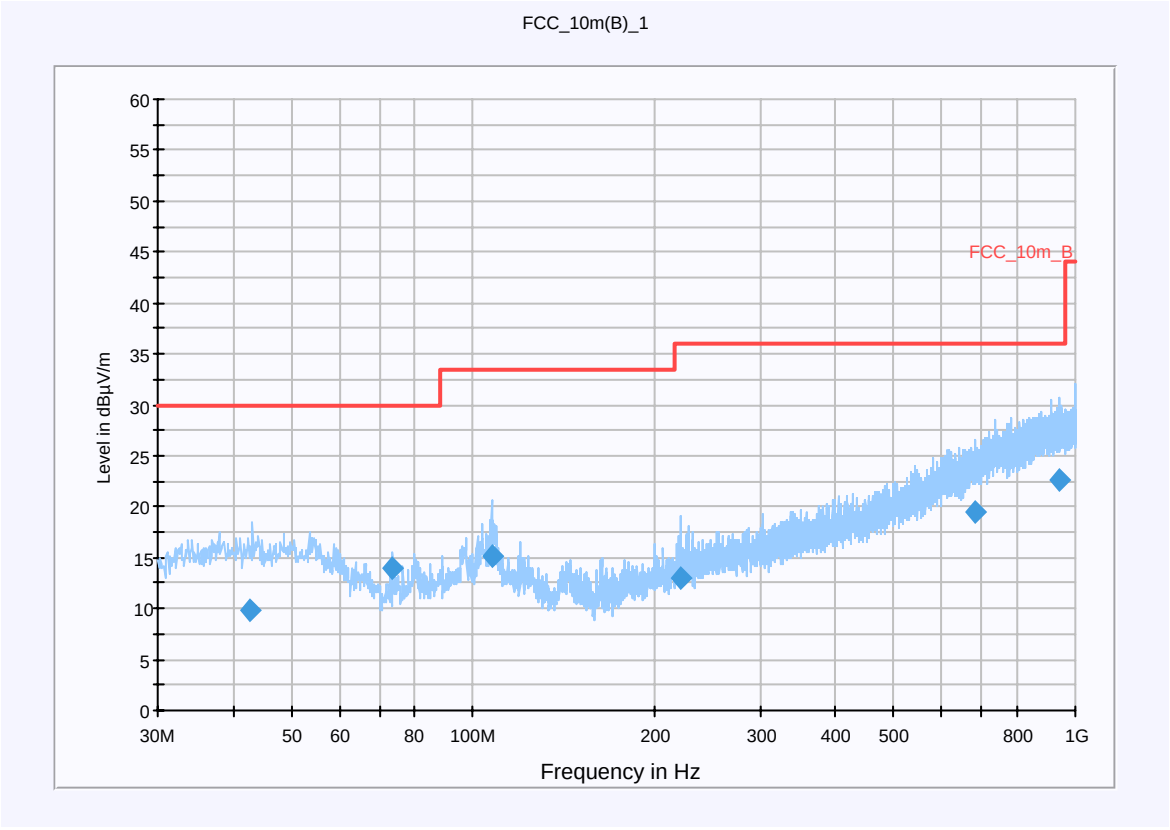
Common Information

EUT:	Blue Mode + P2x/G2 ; PAN1x55
Serial Number:	FCC ID: T7V-BC06; Reg Nr. IC: 216Q-BC06
Test Description:	FCC part 15 B
Operating Conditions:	BT Tx Mode Ch: 39
Operator Name:	LNG
Comment:	Modulation DH5

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 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
42.663350	9.9	15000.000	120.000	300.0	V	90.0	13.5	20.1	30.0	
73.736700	13.9	15000.000	120.000	200.0	V	117.0	9.5	16.1	30.0	
108.132500	15.1	15000.000	120.000	200.0	V	254.0	11.5	18.4	33.5	
220.612050	13.1	15000.000	120.000	100.0	V	110.0	12.7	22.9	36.0	
681.441200	19.4	15000.000	120.000	106.0	V	307.0	22.5	16.6	36.0	
940.510100	22.6	15000.000	120.000	140.0	V	195.0	25.8	13.4	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 (0109)
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

Plot 6: 1 - 12 GHz horizontal (middle channel)

CETECOM ICT Services GmbH

Projekt- Nr.:1-1100-01-04_09-2

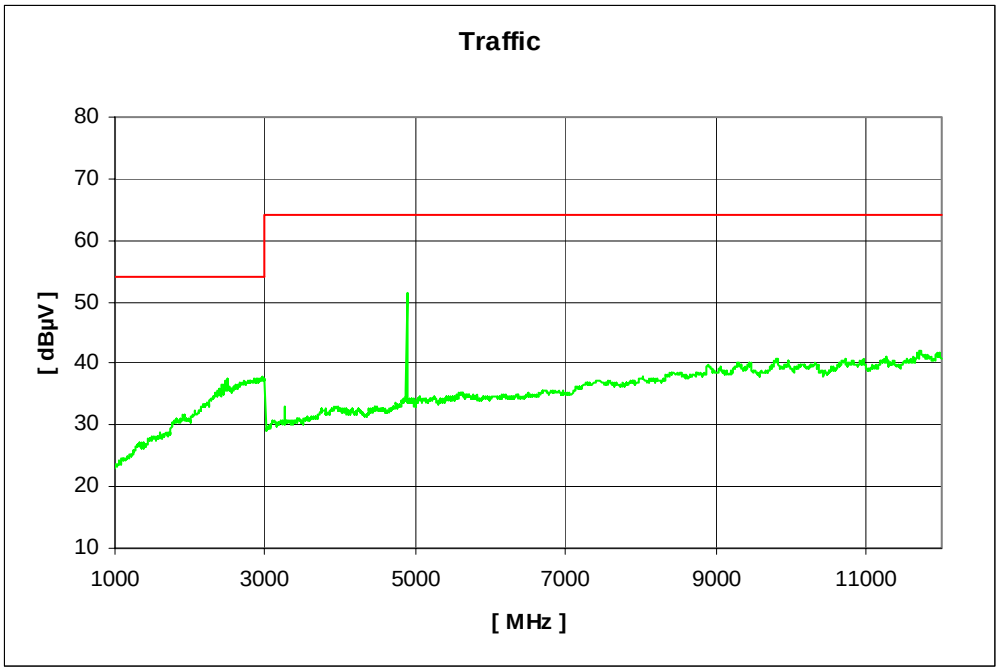
EUT:	PAN 1x55	Polarisation:	Horizontal
Manufacturer:	Panasonic	Battery:	Real Battery
IMEI:		HW:	
Operator:	BTL	SW:	
Start of Test :	05.03.2009 15:46:33	Vmin:	
Standard:	FCC_15_407_2400	Vnom:	
Signalling Unit:	CMU200	Vmax:	
Transducer-File:	C:\Spurious_neu\Messparameter\FCC_15_407_2400\Transducer_FCC_15_407_2400.xls		
Start Freq. [MHz]:	1000	Stop Freq. [MHz]	12000

Plot 7: 1 - 12 GHz vertical (middle channel)

CETECOM ICT Services GmbH

Projekt- Nr.:1-1100-01-04_09-2

EUT:	PAN 1x55	Polarisation:	Vertikal
Manufacturer:	Panasonic	Battery:	Real Battery
IMEI:		HW:	
Operator:	BTL	SW:	
Start of Test :	05.03.2009 17:00:20	Vmin:	
Standard:	FCC_15_407_2400	Vnom:	
Signalling Unit:	CMU200	Vmax:	
Transducer-File:	C:\Spurious_neu\Messparameter\FCC_15_407_2400\Transducer_FCC_15_407_2400.xls		
Start Freq. [MHz]:	1000	Stop Freq. [MHz]	12000



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

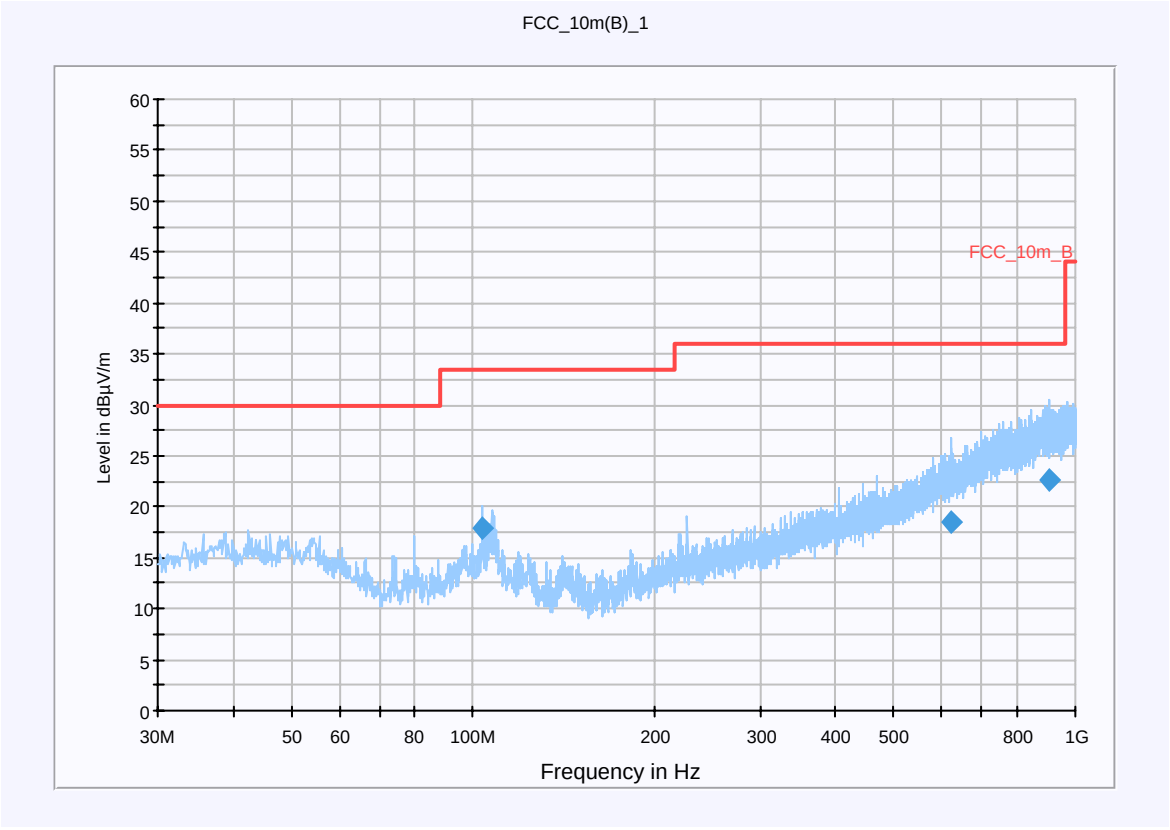
Common Information

EUT:	Blue Mode + P2x/G2 ; PAN1x55
Serial Number:	FCC ID: T7V-BC06; Reg Nr. IC: 216Q-BC06
Test Description:	FCC part 15 B
Operating Conditions:	BT Tx Mode Ch: 78
Operator Name:	LNG
Comment:	Modulation DH5

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 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
103.720450	17.8	15000.000	120.000	200.0	V	184.0	11.9	15.7	33.5	
622.213150	18.5	15000.000	120.000	400.0	H	232.0	21.5	17.5	36.0	
902.167650	22.6	15000.000	120.000	400.0	V	-4.0	25.7	13.4	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 (0109)
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

Plot 9: 1 - 12 GHz horizontal (highest channel)

CETECOM ICT Services GmbH

Projekt- Nr.:1-1100-01-04_09-2

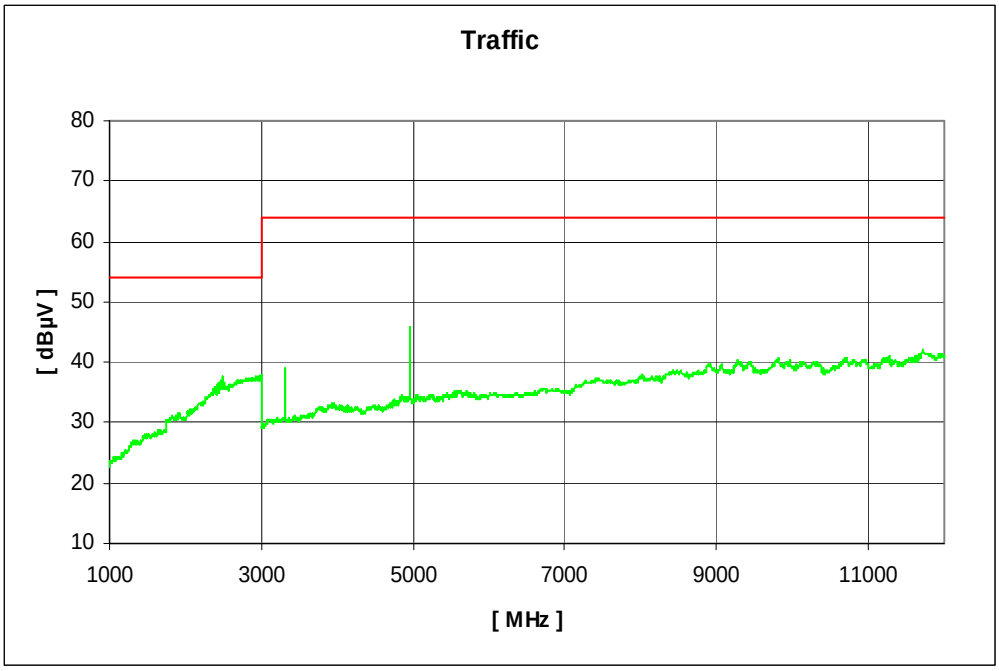
EUT:	PAN 1x55	Polarisation:	Horizontal
Manufacturer:	Panasonic	Battery:	Real Battery
IMEI:		HW:	
Operator:	BTL	SW:	
Start of Test :	05.03.2009 16:27:49	Vmin:	
Standard:	FCC_15_407_2400	Vnom:	
Signalling Unit:	CMU200	Vmax:	
Transducer-File:	C:\Spurious_neu\Messparameter\FCC_15_407_2400\Transducer_FCC_15_407_2400.xls		
Start Freq. [MHz]:	1000	Stop Freq. [MHz]	12000

Plot 10: 1 - 12 GHz vertical (highest channel)

CETECOM ICT Services GmbH

Projekt- Nr.:1-1100-01-04_09-2

EUT:	PAN 1x55	Polarisation:	Vertikal
Manufacturer:	Panasonic	Battery:	Real Battery
IMEI:		HW:	
Operator:	BTL	SW:	
Start of Test :	05.03.2009 16:50:15	Vmin:	
Standard:	FCC_15_407_2400	Vnom:	
Signalling Unit:	CMU200	Vmax:	
Transducer-File:	C:\Spurious_neu\Messparameter\FCC_15_407_2400\Transducer_FCC_15_407_2400.xls		
Start Freq. [MHz]:	1000	Stop Freq. [MHz]	12000



Results: external antenna

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]
1. harmonic	AV	51.05 @ 1m 41.55 @ 3m	1. harmonic	AV	55.35 @ 1m 45.85 @ 3m	1. harmonic	AV	49.26 @ 1m 39.76 @ 3m
Measurement uncertainty			±3 dB					

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

All detected emissions are manual remeasured. The plots show only the emission - not the correct power value. For the remeasured values please take a look at the table.

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

Modulation: GFSK

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

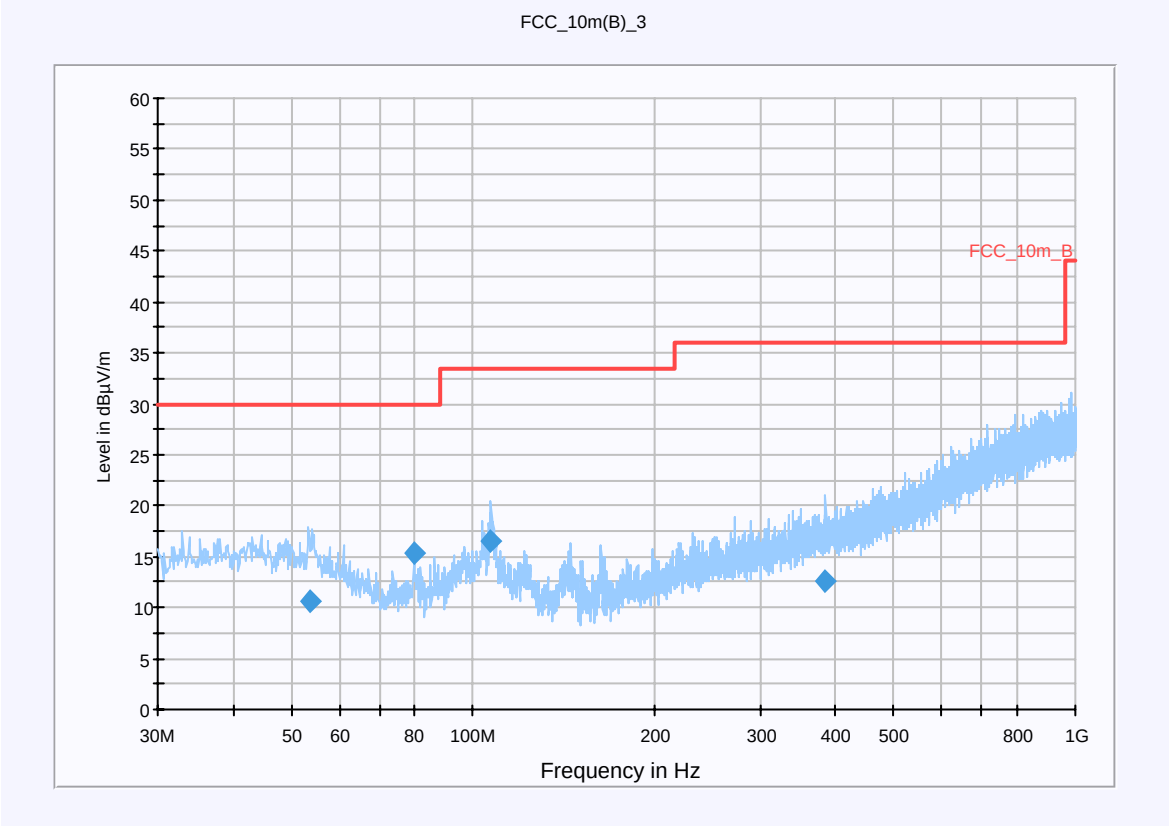
Common Information

EUT:	Blue Mode + P2x/G2 ; PAN1x55
Serial Number:	FCC ID: T7V-BC06; Reg Nr. IC: 216Q-BC06
Test Description:	FCC part 15 B
Operating Conditions:	BT RX Mode
Operator Name:	LNG
Comment:	

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 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
53.493950	10.7	15000.000	120.000	186.0	V	234.0	13.2	19.3	30.0	
79.993000	15.3	15000.000	120.000	220.0	V	230.0	9.4	14.7	30.0	
106.885250	16.6	15000.000	120.000	141.0	V	253.0	11.7	16.9	33.5	
385.271400	12.7	15000.000	120.000	220.0	V	29.0	17.1	23.3	36.0	

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

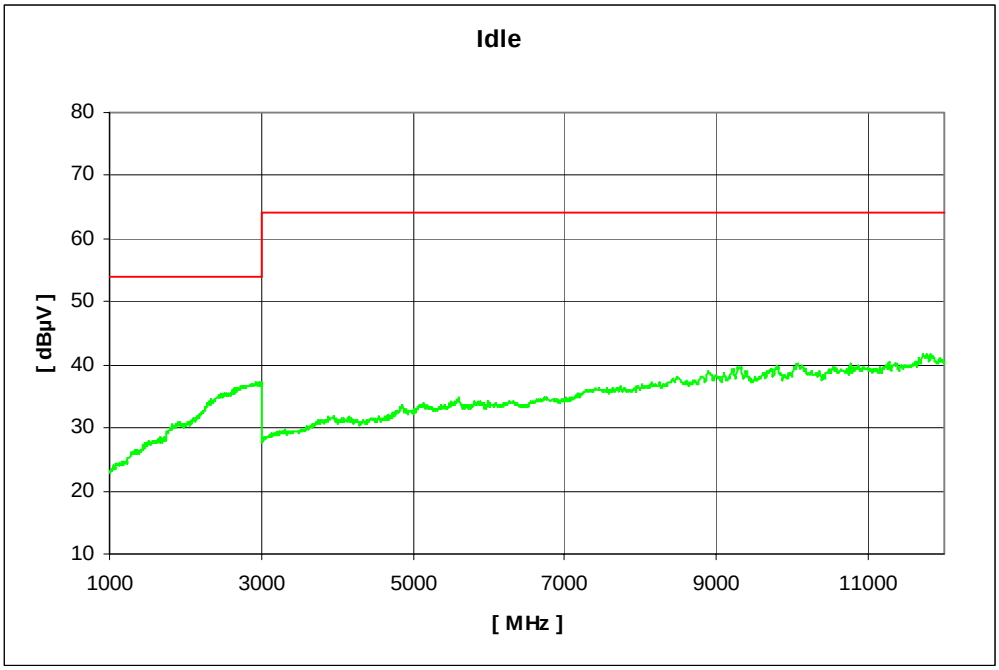
Subrange 1	
Frequency Range:	30 MHz - 2 GHz
Receiver:	Receiver [ESCI 3] @ GPIB0 (ADR 20), SN 100083/003, FW 4.32
Signal Path:	without Notch FW 1.0
Antenna:	VULB 9163 SN 9163-295, FW --- Correction Table (vertical): VULP6113 Correction Table (horizontal): VULP6113 Correction Table: Cable_EN_1GHz (0109)
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

Plot 2: 1 - 12 GHz horizontal (receiver)

CETECOM ICT Services GmbH

Projekt- Nr.:1-1100-01-04_09

EUT:	PAN 1x55	Polarisation:	Horizontal
Manufacturer:	Panasonic	Battery:	DC Power Supply
IMEI:		HW:	
Operator:	BTL	SW:	
Start of Test :	04.03.2009 18:39:48	Vmin:	
Standard:	FCC_15_407_2400	Vnom:	
Signalling Unit:	CMU200	Vmax:	
Transducer-File:	C:\Spurious_neu\Messparameter\FCC_15_407_2400\Transducer_FCC_15_407_2400.xls		
Start Freq. [MHz]:	1000	Stop Freq. [MHz]	12000

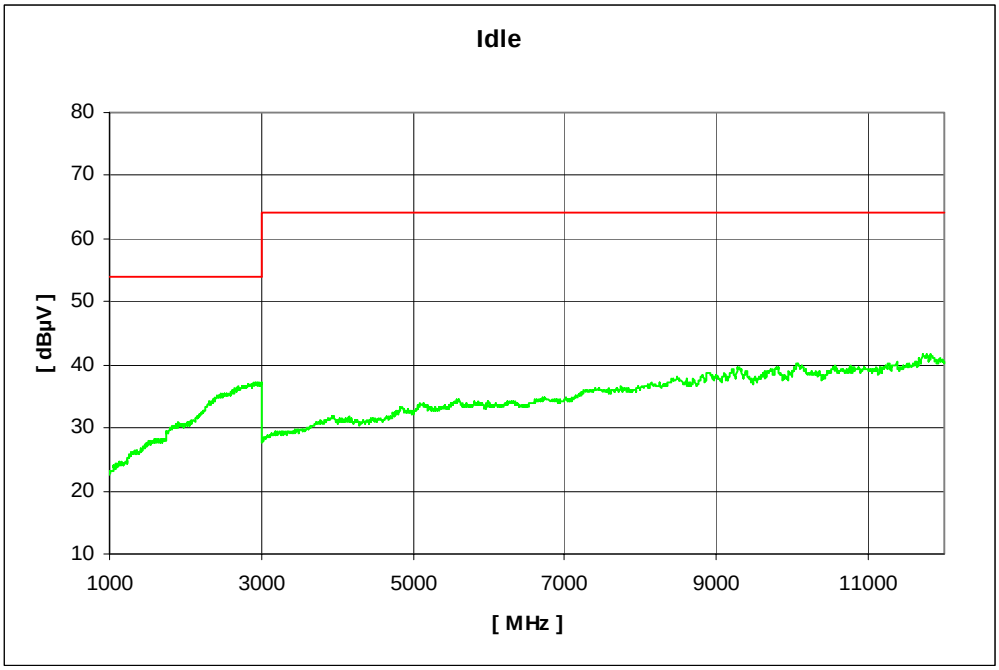


Plot 3: 1 - 12 GHz vertical (receiver)

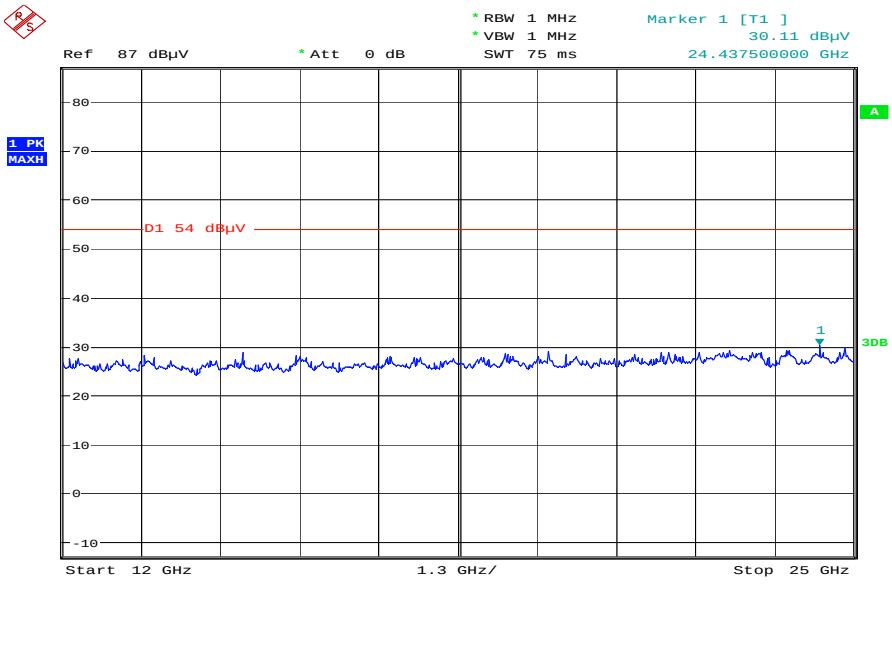
CETECOM ICT Services GmbH

Projekt- Nr.:1-1100-01-04_09

EUT:	PAN 1x55	Polarisation:	Vertikal
Manufacturer:	Panasonic	Battery:	DC Power Supply
IMEI:		HW:	
Operator:	BTL	SW:	
Start of Test :	04.03.2009 18:33:59	Vmin:	
Standard:	FCC_15_407_2400	Vnom:	
Signalling Unit:	CMU200	Vmax:	
Transducer-File:	C:\Spurious_neu\Messparameter\FCC_15_407_2400\Transducer_FCC_15_407_2400.xls		
Start Freq. [MHz]:	1000	Stop Freq. [MHz]	12000



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



Results: Internal antenna

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

Modulation: GFSK

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

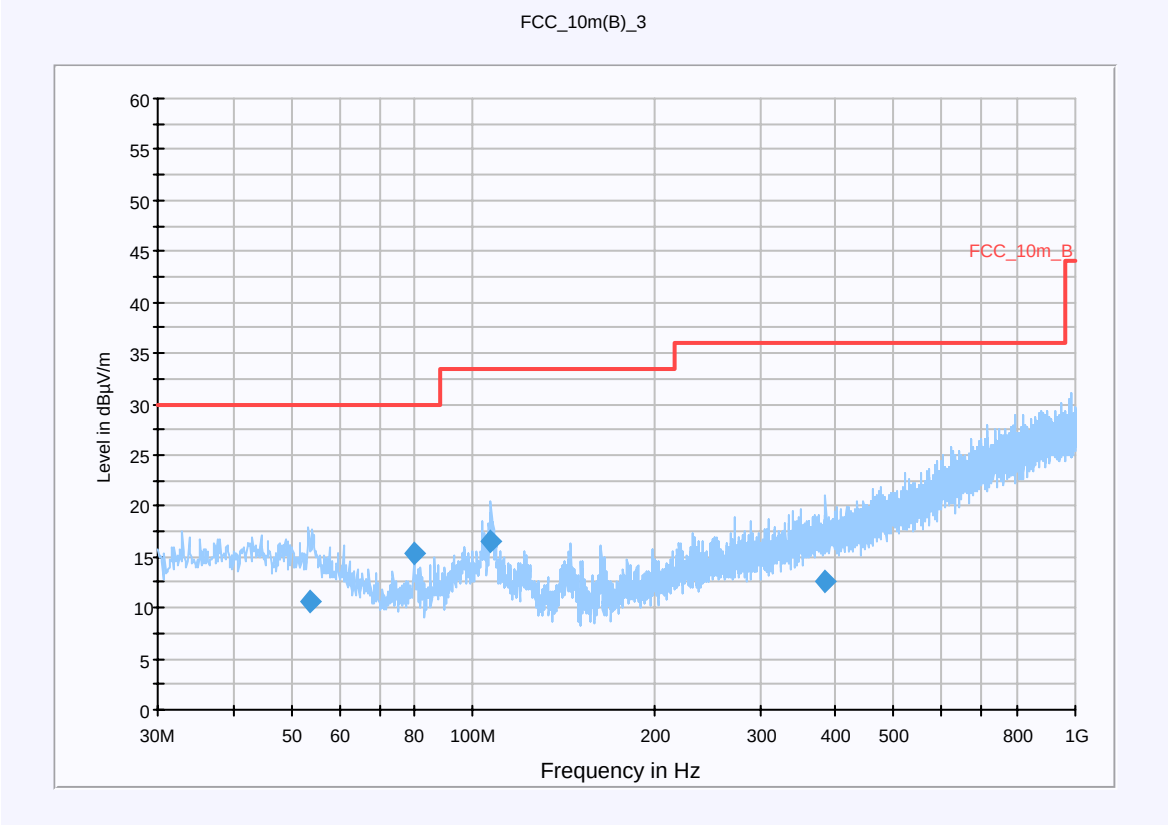
Common Information

EUT:	Blue Mode + P2x/G2 ; PAN1x55
Serial Number:	FCC ID: T7V-BC06; Reg Nr. IC: 216Q-BC06
Test Description:	FCC part 15 B
Operating Conditions:	BT RX Mode
Operator Name:	LNG
Comment:	

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 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
53.493950	10.7	15000.000	120.000	186.0	V	234.0	13.2	19.3	30.0	
79.993000	15.3	15000.000	120.000	220.0	V	230.0	9.4	14.7	30.0	
106.885250	16.6	15000.000	120.000	141.0	V	253.0	11.7	16.9	33.5	
385.271400	12.7	15000.000	120.000	220.0	V	29.0	17.1	23.3	36.0	

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

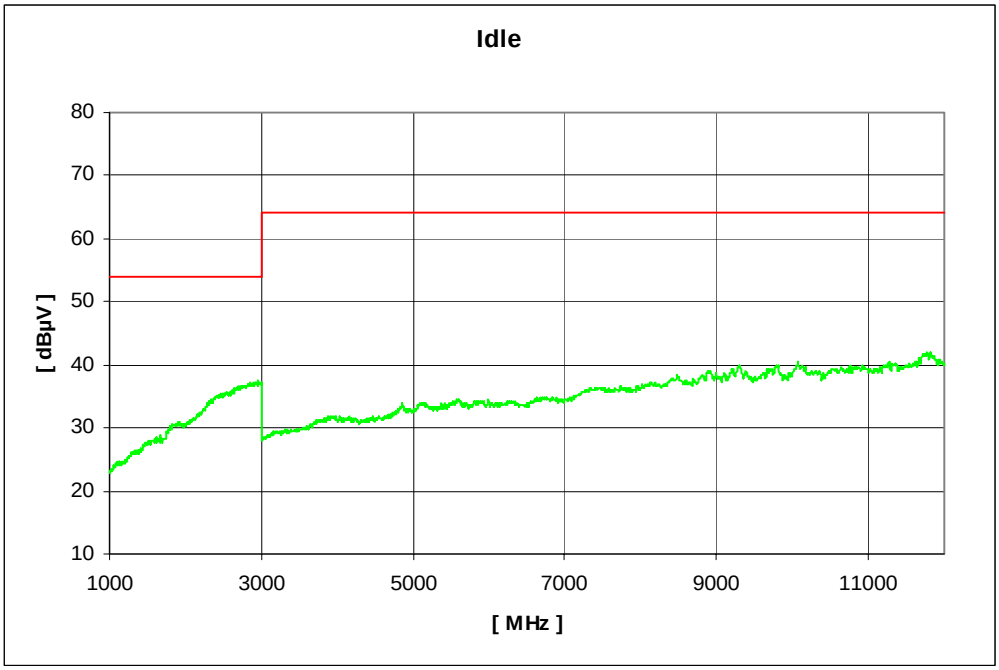
	Subrange 1
Frequency Range:	30 MHz - 2 GHz
Receiver:	Receiver [ESCI 3] @ GPIB0 (ADR 20), SN 100083/003, FW 4.32
Signal Path:	without Notch FW 1.0
Antenna:	VULB 9163 SN 9163-295, FW --- Correction Table (vertical): VULP6113 Correction Table (horizontal): VULP6113 Correction Table: Cable_EN_1GHz (0109)
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

Plot 2: 1 - 12 GHz horizontal (receiver)

CETECOM ICT Services GmbH

Projekt- Nr.:1-1100-01-04_09-2

EUT:	PAN 1x55	Polarisation:	Horizontal
Manufacturer:	Panasonic	Battery:	Real Battery
IMEI:		HW:	
Operator:	BTL	SW:	
Start of Test :	05.03.2009 17:44:13	Vmin:	
Standard:	FCC_15_407_2400	Vnom:	
Signalling Unit:	CMU200	Vmax:	
Transducer-File:	C:\Spurious_neu\Messparameter\FCC_15_407_2400\Transducer_FCC_15_407_2400.xls		
Start Freq. [MHz]:	1000	Stop Freq. [MHz]	12000

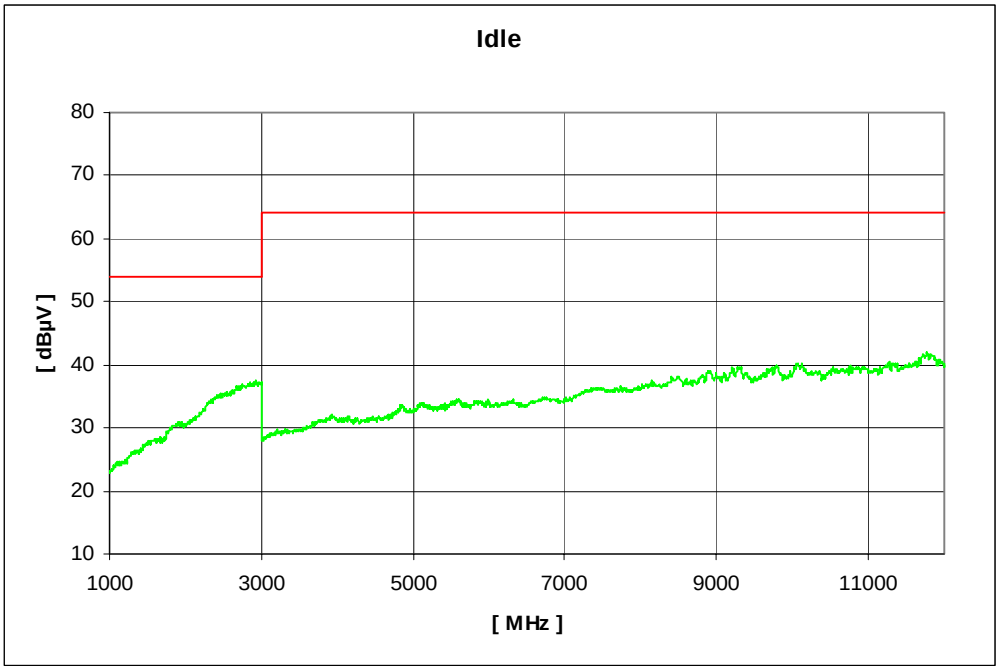


Plot 3: 1 - 12 GHz vertical (receiver)

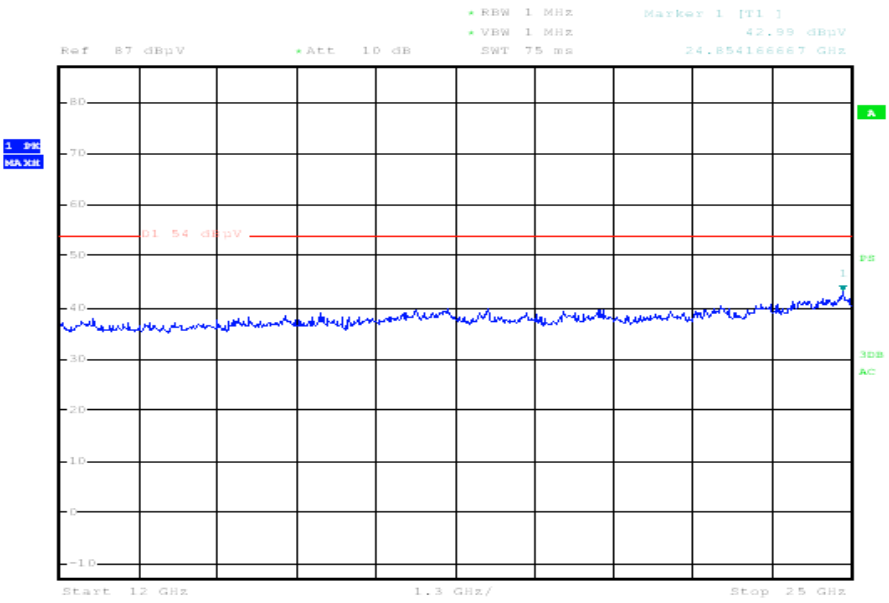
CETECOM ICT Services GmbH

Projekt- Nr.:1-1100-01-04_09-2

EUT:	PAN 1x55	Polarisation:	Vertikal
Manufacturer:	Panasonic	Battery:	Real Battery
IMEI:		HW:	
Operator:	BTL	SW:	
Start of Test :	05.03.2009 17:38:39	Vmin:	
Standard:	FCC_15_407_2400	Vnom:	
Signalling Unit:	CMU200	Vmax:	
Transducer-File:	C:\Spurious_neu\Messparameter\FCC_15_407_2400\Transducer_FCC_15_407_2400.xls		
Start Freq. [MHz]:	1000	Stop Freq. [MHz]	12000



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



Results: External antenna

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

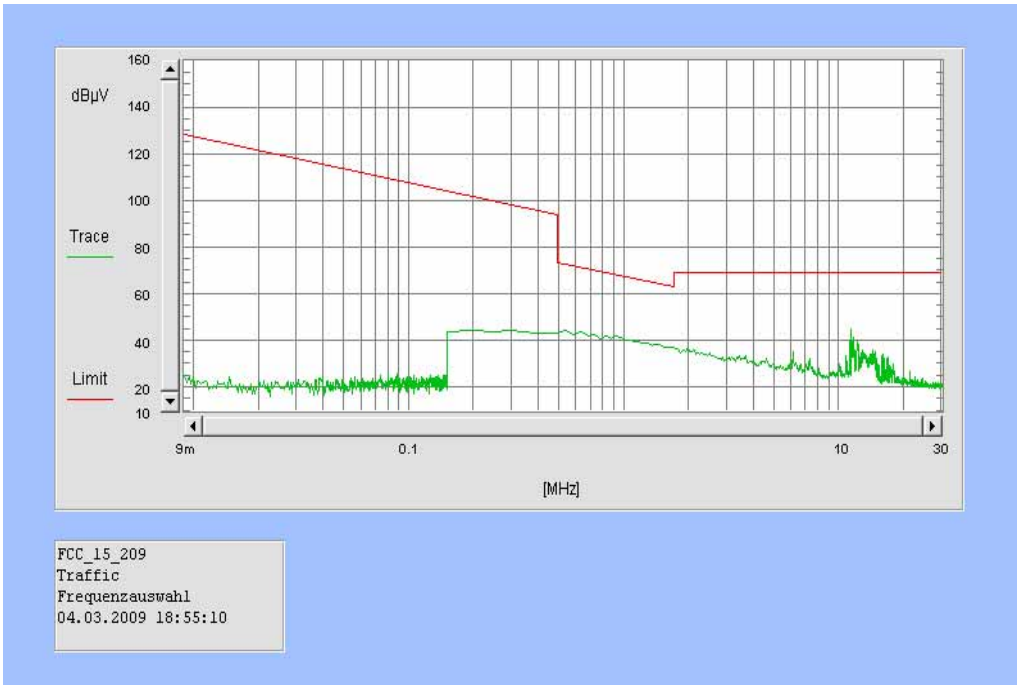
Frequency (MHz)	Field strength (µV/m)	Measurement distance (m)
30 - 88	100 (40 dBµV/m)	3
88 - 216	150 (43.5 dBµV/m)	3
216 - 960	200 (46 dBµV/m)	3
above 960	500 (54 dBµV/m)	3

5.17 Spurious Emissions < 30 MHz - Transmitter radiated § 15.209

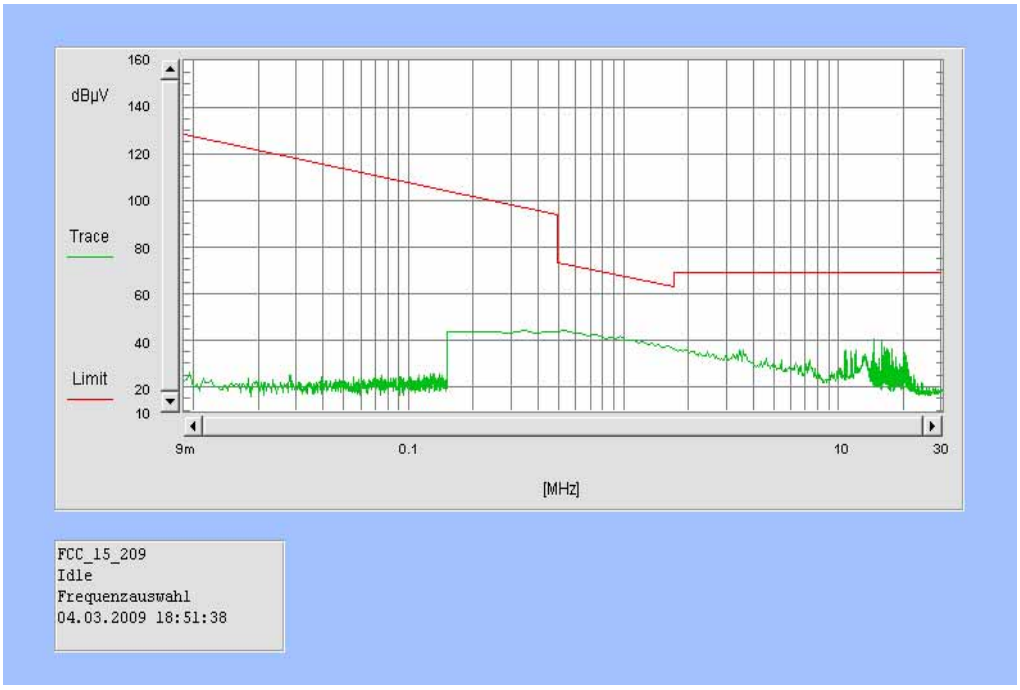
Modulation: GFSK

Measured at 10 m distance.
Values recalculated with 40 dB/decade according to FCC rules.

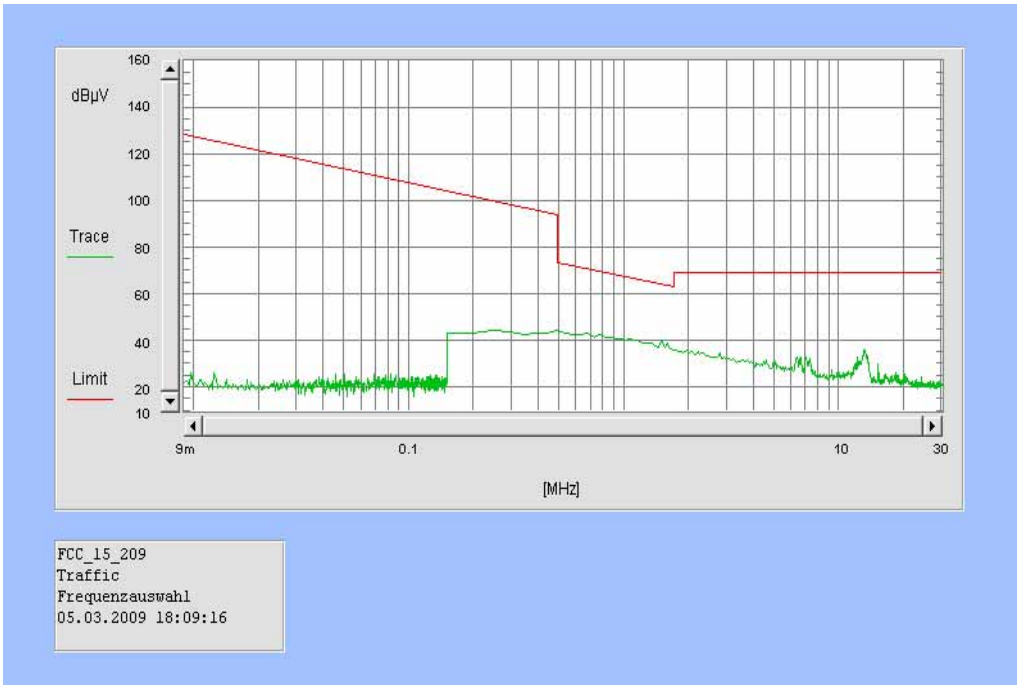
Plot 1: TX mode internal antenna



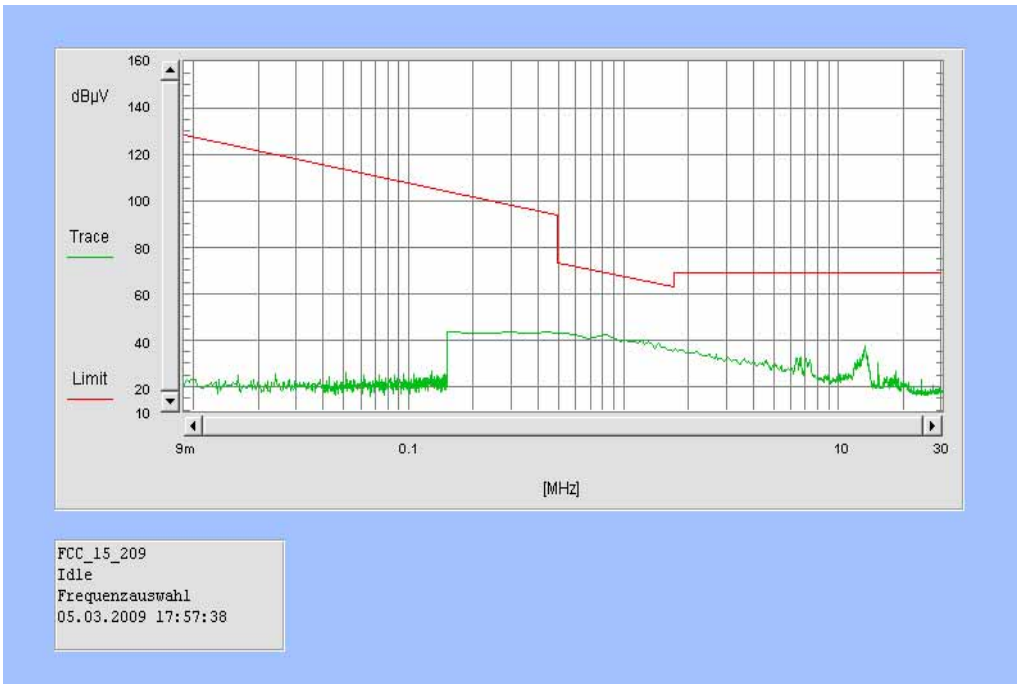
Plot 2: RX mode internal antenna



Plot 3: TX mode external antenna



Plot 4: RX mode external antenna



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 Performed!

Modulation: GFSK

Limits:

Under normal test conditions only	See plots

6 Test equipment and ancillaries used for tests

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

All reported calibration intervals are calibrations according to the EN/ISO/IEC 17025 standard. These calibrations were performed from an accredited external calibration laboratory.
Additional to these calibrations the laboratory performed comparison measurements with other calibrated systems and performed a weekly chamber inspection.
All used devices are connected with a 10 MHz external reference.
According to the manufacturers' instruction is it possible to establish a calibration interval for the FSP unit of 24 month, if the device has an external 10 MHz reference.

Anechoic chamber C:

No	Equipment/Type	Manuf.	Serial Nr.	Inv. No. Cetecom	Last Calibration	Frequency (months)	Next Calibration
1	Anechoic chamber	MWB	87400/02	300000996	Monthly verification		
2	System-Rack 85900	HP I.V.	*	300000222	n.a.		
3	Measurement System 1						
4	Spektrum Analyzer 8566B	HP	3138A07614	300001207	13.12.2007	24	13.12.2009
5	Spektrum Analyzer Display 85662A	HP	3144A28627	300001208	13.12.2007	24	13.12.2009
6	Quasi-Peak-Adapter 85650A	HP	2811A01204	300002308	13.12.2007	24	13.12.2009
7	RF-Preselector 85685A	HP	2837A00778	300002448	13.12.2007	24	13.12.2009
8	PC Vectra VL	HP		300001688	n.a.		
9	Software EMI	HP		300000983	n.a.		
10	Measurement System 2						
11	FSP 30	R&S	100886	300003575	25.08.2008	24	25.08.2010
12	PC	F+W			n.a.		
13	TILE	TILE			n.a.		
14	Biconical antenna	EMCO	S/N: 860 942/003		Monthly verification (System cal.)		
15	Log. Period. Antenna 3146	EMCO	2130	300001603	Monthly verification (System cal.)		
16	Double Ridged Antenna HP 3115P	EMCO	3088	300001032	Monthly verification (System cal.)		
17	Active Loop Antenna 6502	EMCO	2210	300001015	Monthly verification (System cal.)		
18	Power Supply 6032A	HP	2818A03450	300001040	12.05.2007	36	12.05.2010
19	Busisolator	Kontron		300001056	n.a.		
20	Leitungsteiler 11850C	HP		300000997	Monthly verification (System cal.)		
21	Power attenuator 8325	Byrd	1530	300001595	Monthly verification (System cal.)		
22	Band reject filter WRCG1855/1910	Wainwright	7	300003350	Monthly verification (System cal.)		
23	Band reject filter WRCG2400/2483	Wainwright	11	300003351	Monthly verification (System cal.)		

Anechoic chamber A:

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

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	HP	3041A00544	300002270	13.05.2007	36	13.05.2010
5	Signal Generator	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	12	04.06.2009
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

Climatic Box:

No	Equipment/Type	Manuf.	Serial Nr.	Inv. No. Cetecom	Last Calibration	Frequency (months)	Next Calibration
1	Climatic box VT 4002	Heraeus Vötsch	58566046820010	300003019	11.05.2007	24	11.05.2009
2	Climatic box CTS T-40/50	CTS	064023	300003540	03.01.2007	24	03.01.2009

SRD Laboratory Room 002:

No	Equipment/Type	Manuf.	Serial Nr.	Inv. No. Cetecom	Last Calibration	Frequency (months)	Next Calibration
1	System Controller PSM 12	R&S	835259/007	3000002681-00xx	n.a.		
2	Memory Extension PSM-K10	R&S	To 1	3000002681	n.a.		
3	Operating Software PSM-B2	R&S	To 1	3000002681	n.a.		
4	19'' Monitor		22759020-ED	3000002681	n.a.		
5	Mouse		LZE 0095/6639	3000002681	n.a.		
6	Keyboard		G00013834L461	3000002681	n.a.		
7	Spectrum Analyser FSIQ 26	R&S	835540/018	3000002681-0005	10.01.2008	24	10.01.2010
8	Tracking Generator FSIQ-B10	R&S	835107/015	3000002681	s.No.7		
10	RF-Generator SMIQ03 (B1 Signal)	R&S	835541/056	3000002681-0002	26.08.2008	36	26.08.2011
11	Modulation Coder SMIQ-B20	R&S	To 10	3000002681	s.No.10		
12	Data Generator SMIQ-B11	R&S	To 10	3000002681	s.No.10		
13	RF Rear Connection SMIQ-B19	R&S	To 10	3000002681	s.No.10		
14	Broadband horn antenna (1-18 GHz)	EMCO	9107-3696	300001604	16.04.2008	24	16.04.2010
15	Broadband horn antenna (1-18 GHz)	EMCO	9107-3697	300001605	21.08.2008	24	21.08.2010
16	Std gain horn antenna (18-26.5 GHz)	Narda	Model no. 638	3000000486	n.a.		
17	Std gain horn antenna (18-26.5 GHz)	Narda	Model no. 638	3000000487	n.a.		
18	Sleeve dipole antenna Model 3126-880	ETS-Lindgren	00040887	3000000	n.a.		
19	Fast CPU SM-B50	R&S	To 10	3000002681	s.No.10		
20	FM Modulator SM-B5	R&S	835676/033	3000002681	s.No.10		
21	RF-Generator SMIQ03 (B2 Signal)	R&S	835541/055	3000002681-0001	25.08.2008	36	25.08.2011
22	Modulation Coder SMIQ-B20	R&S	To 16	3000002681	s.No.16		
23	Data Generator SMIQ-B11	R&S	To 16	3000002681	s.No.16		
24	RF Rear Connection SMIQ-B19	R&S	To 16	3000002681	s.No.16		
25	Fast CPU SM-B50	R&S	To 16	3000002681	s.No.16		
26	FM Modulator SM-B5	R&S	836061/022	3000002681	s.No.16		
27	RF-Generator SMP03 (B3 Signal)	R&S	835133/011	3000002681-0003	26.08.2008	36	26.08.2011
28	Attenuator SMP-B15	R&S	835136/014	3000002681	S.No.22		
29	RF Rear Connection SMP-B19	R&S	834745/007	3000002681	S.No.22		
30	Power Meter NRVD	R&S	835430/044	3000002681-0004	26.08.2008	24	26.08.2010
31	Power Sensor NRVD-Z1	R&S	833894/012	3000002681-0013	26.08.2008	24	26.08.2010
32	Power Sensor NRVD-Z1	R&S	833894/011	3000002681-0010	26.08.2008	24	26.08.2010
33	Rubidium Standard RUB	R&S		3000002681-0009	27.08.2008	24	27.08.2010
34	Switching and Signal Conditioning Unit SSCU	R&S	338864/003	3000002681-0006	Verified with path compensation		
35	Laser Printer HP Deskjet 2100	HP	N/A	3000002681-0011	n.a.		
36	19'' Rack	R&S	11138363000004	3000002681	n.a.		
37	RF-cable set	R&S	N/A	3000002681	n.a.		
39	IEEE-cables	R&S	N/A	3000002681	n.a.		
40	Sampling System FSIQ-B70	R&S	835355/009	3000002681	s.No.7		
41	RSP programmable attenuator	R&S	834500/010	3000002681-0007	26.08.2008	24	26.08.2010
42	Signalling Unit	R&S	838312/011	3000002681	n.a.		
43	NGPE programmable Power Supply for EUT	R&S	192.033.41	3000002681			
44	Power Splitter 6005-3	Inmet Corp.	none	300002841	23.12.2006	24	23.12.2008
45	SMA Cables SPS-1151-985-SPS	Insulated Wire	different	different	n.a.		

46	CBT32 with EDR Signaling Unit	R&S					
47	Coupling unit	Narda	N/A	--	n.a.		
48	2xSwitch Matrix PSU	R&S	872584/021	300001329	n.a.		
49	RF-cable set	R&S	N/A	different	n.a.		
50	IEEE-cables	R&S	N/A	--	n.a.		

Note: 3000002681-00xx inventoried as a system

SRD Laboratory Room 005:

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

SRD Laboratory Room 011:

No	Equipment/Type	Manuf.	Serial Nr.	Inv. No. Cetecom	Last Calibration	Frequency (months)	Next Calibration
1	NRP Power Meter	R&S	100212	300003780	27.02.2008	24	27.02.2010

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	31.01.2007	24	31.01.2009
6	Turntable Controller - 1061 3M	EMCO	1218	300000661	-/-	-/-	-/-
7	Tower Controller 1051 Controller	EMCO	1262	300000625	-/-	-/-	-/-
8	Tower - 1051	EMCO	1262	300000625	-/-	-/-	-/-
10	Ultra Notch-Filter Rejected band Ch. 62	WRCD	9	-/-	-/-	-/-	-/-

C.BER Bluetooth Rack Room AC2:

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

7 Photographs of the Test Set-up

Photo documentation:

Photo 1:

Photo 2:

8 Photographs of the EUT

Photo documentation: internal antenna

Photo 1:

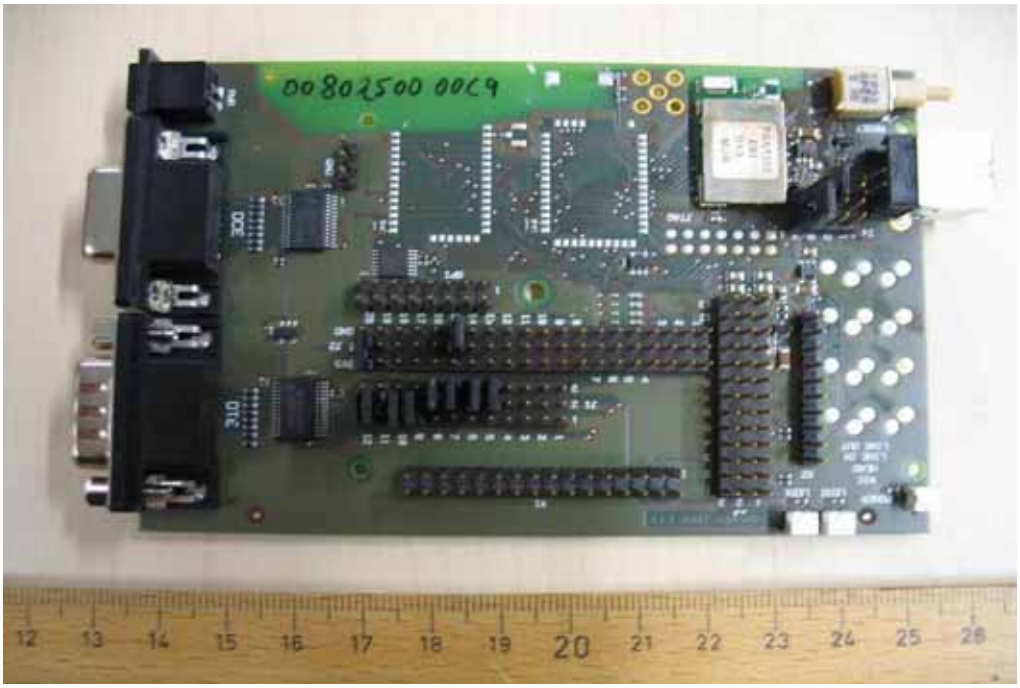


Photo 2:

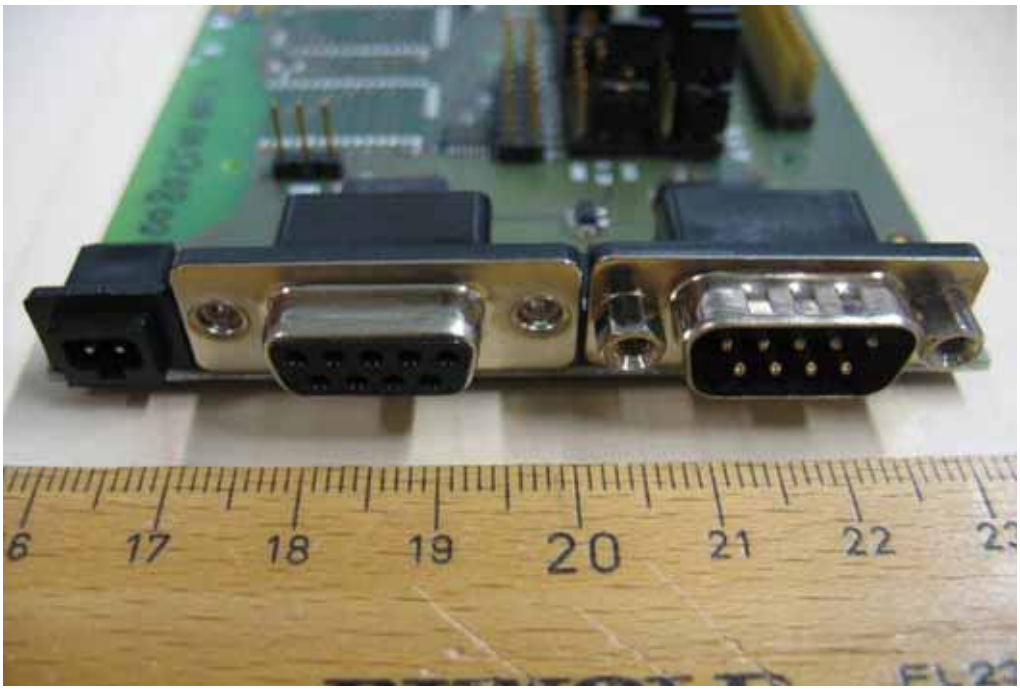


Photo 3:

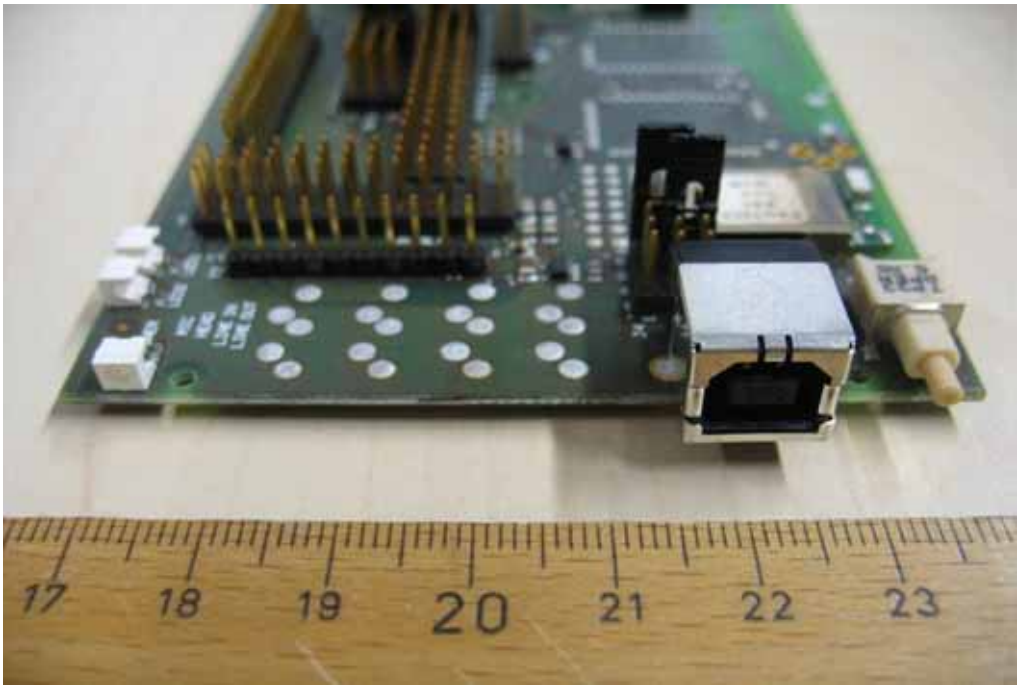


Photo 4:

Photo 5:

Photo 6:

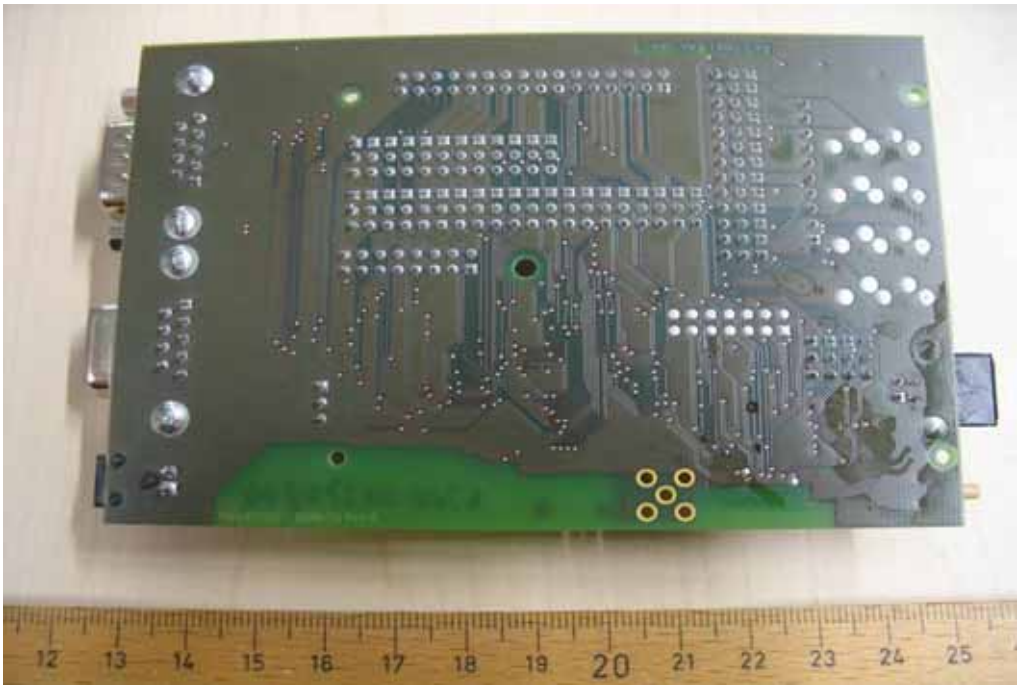


Photo 7:

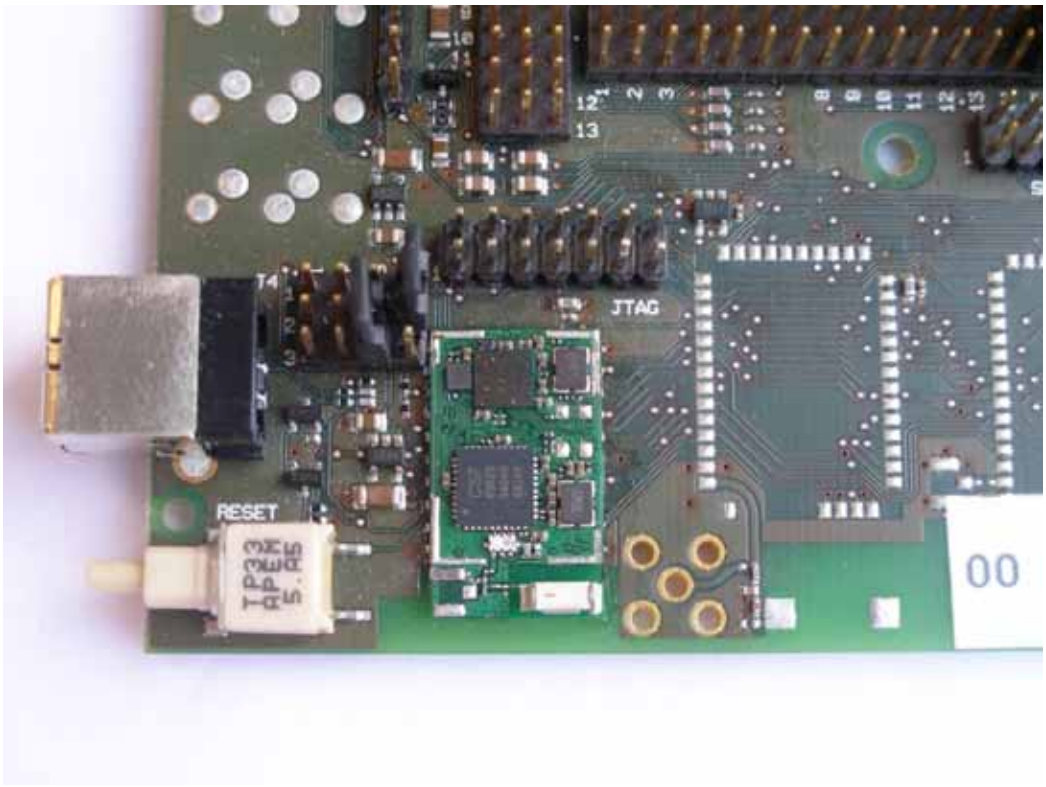


Photo documentation: external antenna

Photo 1:

Photo 2:

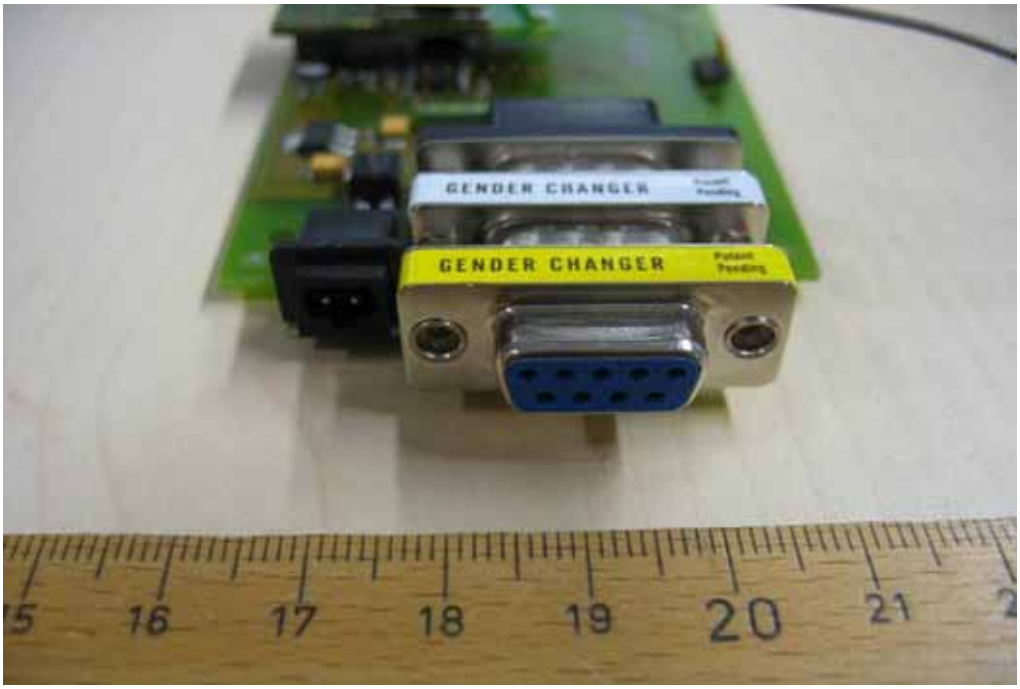


Photo 3:

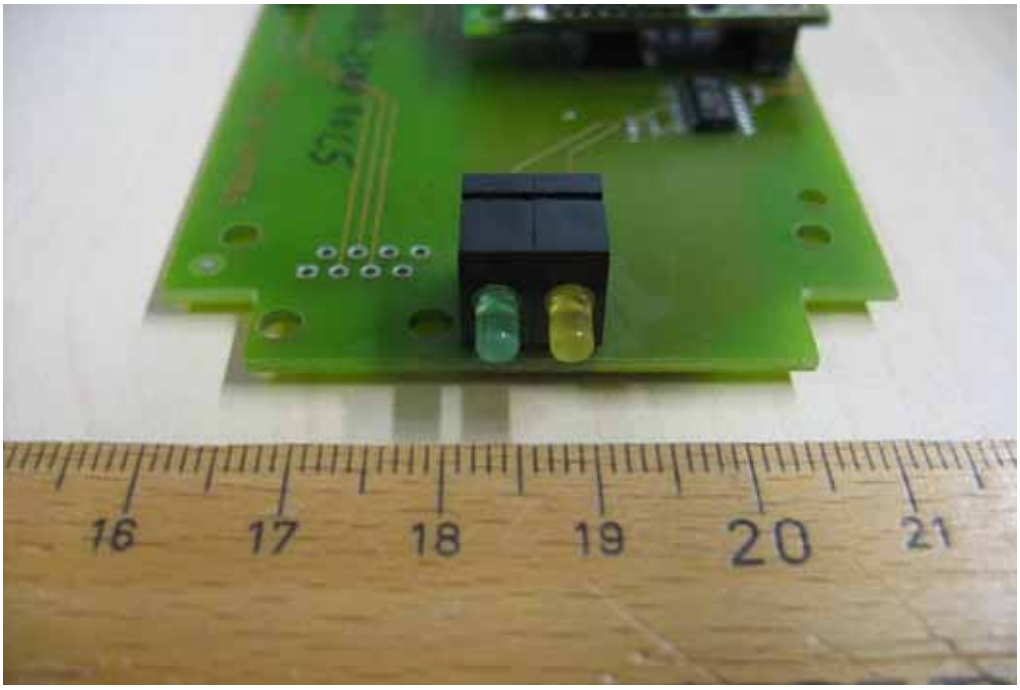


Photo 4:

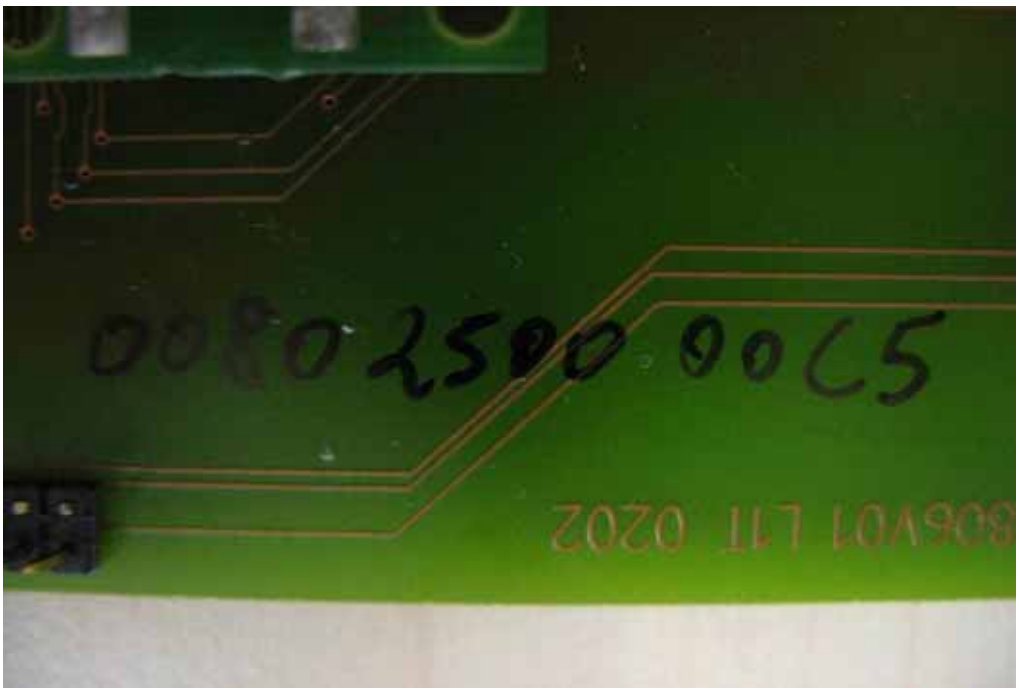


Photo 5:

Photo 6:

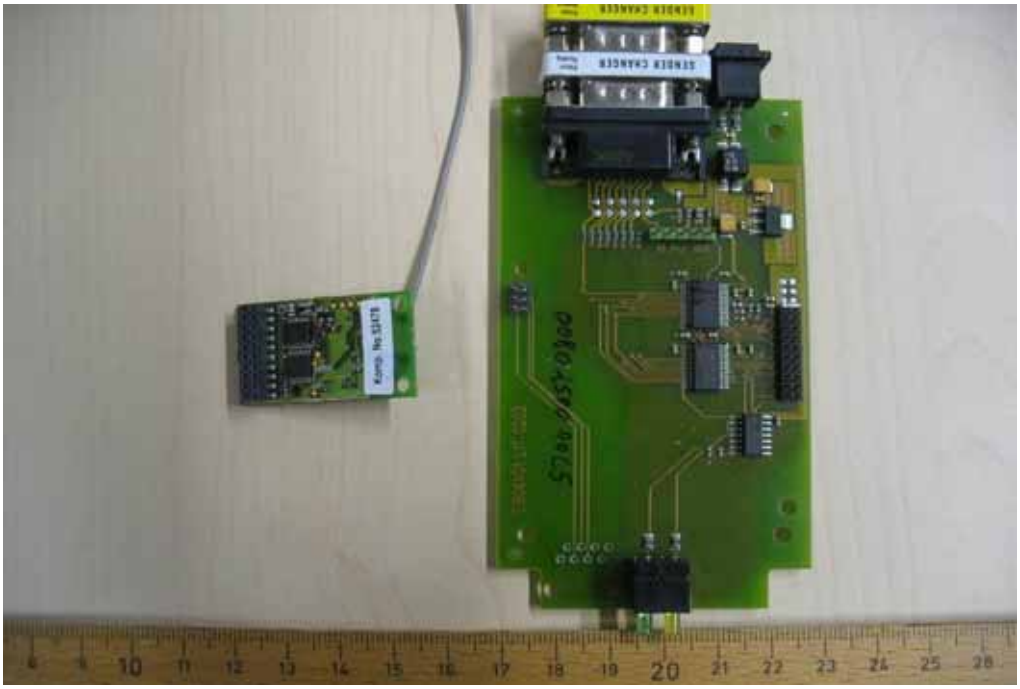


Photo 7:

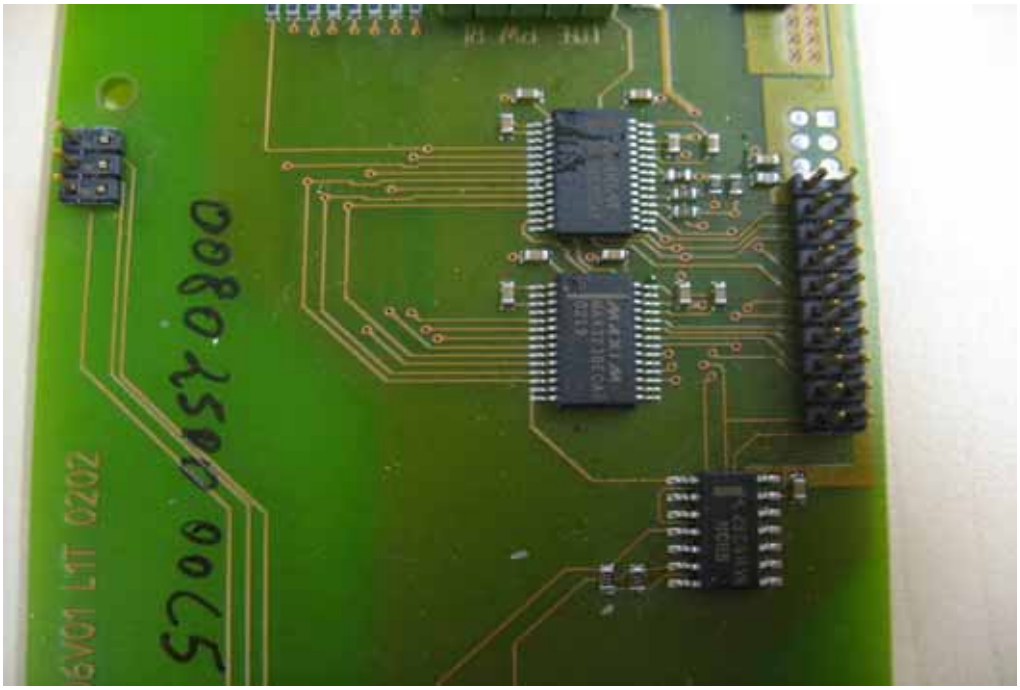
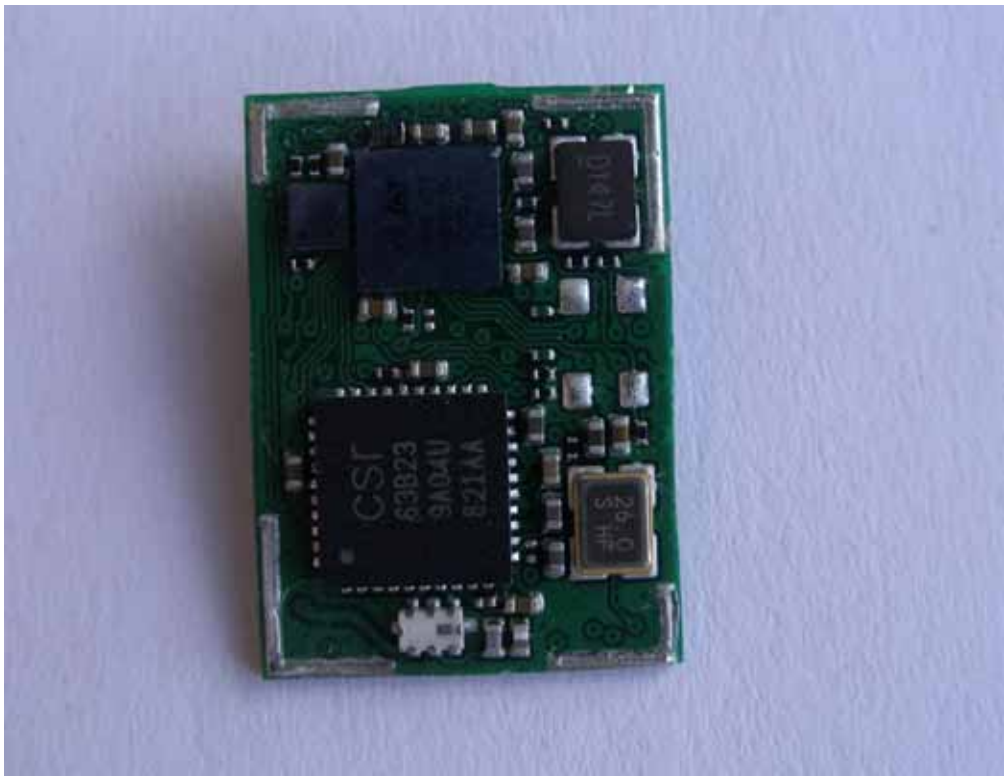


Photo 8:

Photo 9:



Stollmann E+V GmbH · Mendelssohnstraße 15D · D-22761 Hamburg

Cetecom ICT Services GmbH
Attn. Mr. Warken
Untertürkheimer Str. 6-10
66117 Saarbrücken

Hamburg, 09.04.2009

Ref.: Project 1-1100-0x PAN1x55
Here: PAN1455 and PAN1555 Documentation of Identity

Dear Mr. Schmidt,
this document should describe the identity and the differences of the Panasonic PAN1455 and PAN1555 Bluetooth Modules. Both modules are identical in hardware and software except for the antenna configuration.

PAN1455 routes the RF signal to a module pin, so that customers using metal housings can connect the external rod antenna.

PAN1555 utilizes an ceramic antenna for customers using plastic housings.

The Cetecom FCC test report "1-1100-01-04_09 Rev1.3.pdf" prooves that both configurations are conform to FCC and IC rules.

The identity and differences of the modules will be docemented by the following photos

PAN1555 Top View

PAN1455 Top View

Both modules are identical in artwork, except for the antenna region at the lower side.

PAN1555 picture shows the RF signal leaving the balun in direction below and passes through a matching network to the ceramic antenna. PAN1455 picture shows the RF signal leaving the balun in direction to the left and ending up at a via connecting the module pin at the bottom.

All other parts are placed and routed identically.

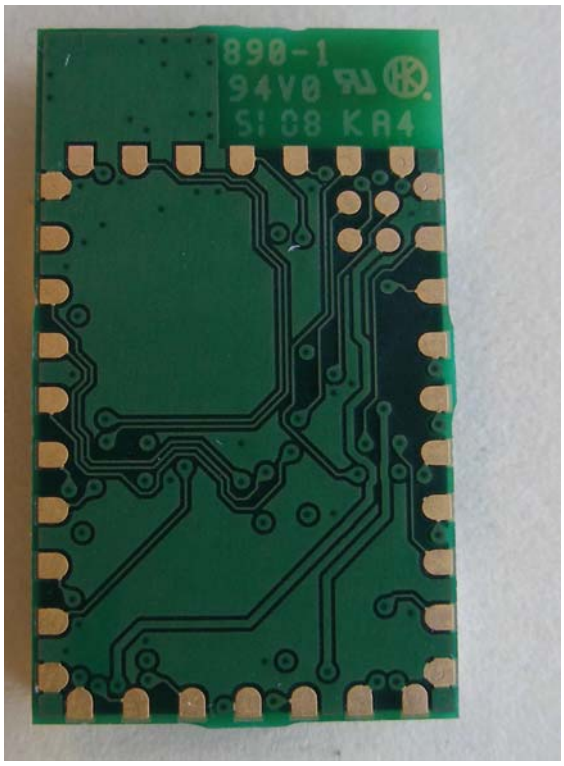
Note PAN1555 is soldered on an evaluation board.

Stollmann Entwicklungs-
und Vertriebs-GmbH
Mendelssohnstraße 15 D
22761 Hamburg, Germany

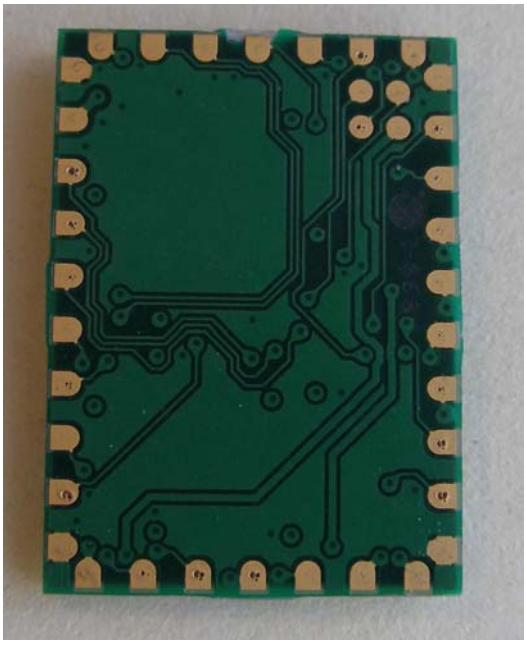
Phone: +49 (0)40 890 88-0
Fax: +49 (0)40 890 88-444
E-mail: info@stollmann.de
www.stollmann.de

General Manager
Peter Herrmann, Christian Lührs
HRB Hamburg 55634
VAT-ID : DE 811 675 541

Dresdner Bank AG, Hamburg
Bank Code 200 800 00
Account Number: 937 868 600
SWIFT Code: DRESDEFF 200
IBAN DE92 2008 0000 0937 8686 00



PAN1555 Bottom View



PAN1455 Bottom View

To be demonstrated here is that both modules consist of the same PCB routing except for the antenna region at the top of the pictures. PAN1455 has the RF signal at the left 2nd pin from the top. PAN1555 has this pin not connected, because the RF signal is connected to the ceramic antenna.

Therewith we declare the identity of PAN1455 and PAN1555 except for the differences depicted above.

Best Regards

i.A.

Stollmann E+V GmbH
Mendelssohnstr. 15d
22761 Hamburg
Germany