

Recognized by the
Federal Communications Commission
Anechoic chamber registration no.: 90462 (FCC)
Anechoic chamber registration no.: IC 3463A-1
TCB ID: DE 0001



Accredited by the
German Accreditation Council
DAR-Registration Number
DAT-P-176/94-D1



Accredited Bluetooth® Test Facility (BQTF)

Test report no.: 4-3052-01-11/08

FCC Part 15.247

FCC ID: SEKXABGW200

IC: 5264A-XABGW200

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1. Administrative data

1.1. Administrative data of the test facility

1.1.1 Identification of the testing laboratory

Company name:	Cetecom ICT Services GmbH
Address:	Untertürkheimerstr. 6-10 D-66117 Saarbruecken Germany
Laboratory accreditation:	DAR-Registration No. DAT-P-176/94-D1 Bluetooth Qualification Test Facility (BQTF)
Responsible for testing laboratory:	Nicolas Stamber, Karsten Gerald Phone: +49 681 598 0 Fax: +49 681 598 9075 email: info@ict.cetecom.de

N. Stamber, Gerald Karsten

..... /

Responsible for testing laboratory
(Nicolas Stamber, Karsten Gerald)

1.1.2 Organizational items

Reference No.:	
Order No.:	
Responsible for test report and project leader:	Nicolas Stamber, Karsten Gerald
Receipt of EUT:	2008-05-26
Date(s) of test:	2008-05-28 to 2008-05-30, 2008-10-22 to 2008-10-23 2008-12-15 to 2008-12-16, 2009-01-16
Date of report:	2009-01-16
Number of report pages:	97
Number of diagram pages (annex):	-/-

Version of template:	1.6

N. Stamber, Gerald Karsten

..... /

Responsible for test report
(Nicolas Stamber, Karsten Gerald)

Note:

The test results of this test report relate exclusively to the item tested as specified in this report. The CETECOM ICT Services GmbH does not assume responsibility for any conclusions and generalizations drawn from the test results with regard to other specimens or samples of the type of the equipment represented by the test item.

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During the test no hardware and software changes are allowed to be performed at the EUT.

1.1.3 Applicant's details

Applicant's name:	Atos Worldline SA/NV
Address:	Chaussee de Haecht 1442 1130 Bruxelles Belgium
Contact person:	Mr. Denis Verheyden Tel: +32 (0) 2 727 71 41 Fax: +32 (0) 2 726 89 26

1.2 Administrative data of manufacturer / member

Manufacturer's name:	same as applicant
Address:	

1.3 Description of the Equipment under test (EUT)

1.3.1 EUT: Type, S/N etc.

Product name	Product ID	Description	S/N serial number	HW hardware status	SW software status
XENTA WLAN	-/-	Payment Terminal	AIJ2365 (rad) AKW4533 (rad + cond)	-/-	-/-
Frequency Band [MHz]	Type of Modulation	Number of channels	Antenna	Power Supply	Temperature Range
ISM 2.412 - 2.462	DSSS	11	integrated	External power supply	-20°C - +55°C

1.3.2 If RF component testing only, description of additional used HW/SW

	Product name	Product ID	Description	S/N serial number	HW hardware status	SW software status
1	-/-					
2						

1.3.3 Test report cover sheet

Type of equipment	:	Payment terminal
Model name	:	XENTA WLAN
Manufacturer	:	Atos Worldline SA/NV
Address	:	Chaussee de Haecht 1442
City	:	1130 Bruxelles
Country	:	Belgium
Tested to Radio Standards Specification(RSS) No.	:	210 Issue 7
Open Area Test Site Industry Canada Number	:	IC 3463A-1
Frequency Range (or fixed frequency)	:	2.412 - 2.462 GHz
R F: Power in Watts	:	0.069 (18.4 dBm)
Field Strength (at what distance)	:	-/-
Occupied Bandwidth (99% BW)	:	17.6 MHz
Type of Modulation	:	G1D (DSSS)
Emission Designator	:	17M6G1D
Antenna Information	:	Integrated antenna
Transmitter Spurious (worst case)	:	44.5 dBµV/m in 3m
Receiver Spurious (worst case)	:	44.6 dBµV/m in 3m
IC no.	:	5264A-XABGW200
FCC ID	:	SEKXABGW200

ATTESTATION:

DECLARATION OF COMPLIANCE: I declare that the testing was performed or supervised by me; that the test measurements were made in accordance with the above-mentioned Industry Canada standard(s); and that the equipment identified in this application has been subjected to all the applicable test conditions specified in the Industry Canada standards and all of the requirements of the standard have been met.

Signature:



Date: 2009-01-16

Test engineer: Nicolas Stamber

1.3.4 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. 3		low temperature, high power source conditions
Op. 4		high temperature, low power source conditions
Op. 5		high temperature, high power source conditions

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

1.3.5 Extreme conditions testing values

Description	Shortcut	Unit	Value
Nominal Temperature / humidity	T _{nom}	°C / %	22°C / 33%
Low Temperature	T _{low}	°C	-20°C
High Temperature	T _{high}	°C	55°C
Nominal Power Source	V _{nom}	V AC	115
Low Power Source	V _{low}	V AC	100
High Power Source	V _{high}	V AC	240

2 Test standard & summary list of all performed test cases

TC identifier	Description	verdict	date	Remark
RF-Testing	FCC Part 15 §15.247	pass	2009-01-16	

Test Specification Clause	Test Case	Pass	Fail	Not applicable	Not performed
None	Antenna Gain	Yes			
§15.247 (d)	Peak power spectral density	Yes			
§15.247(a2)	Spectrum Bandwidth of a DSSS /OFDMSystem 6dB BW	Yes			
§ 15.247 (b) (3)	Maximum output power (conducted)	Yes			
§ 15.247 (b) (3)	Max. peak output power (radiated)	Yes			
§15.247 (c)	Band-edge compliance of conducted emissions	Yes			
§15.205	Band-edge compliance of radiated emissions	Yes			
§15.247 (c)	Spurious Emission - conducted (Transmitter)	Yes			
§ 15.209	Spurious Emission - radiated (Transmitter)	Yes			
§ 15.247 (c)	Spurious Emissions - radiated (Receiver)	Yes			
§ 15.109	Spurious Emissions - radiated <30 MHz	Yes			
§ 15.107/207	Conducted Emissions <30 MHz	Yes			

3 RF measurement testing

3.1 Description of test set-up

3.1.1 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 conform 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 conform with ANSI C63.2-1996 item 15.

150 kHz - 30 MHz: Quasi Peak measurement, 9kHz Bandwidth, passive loop antenna.

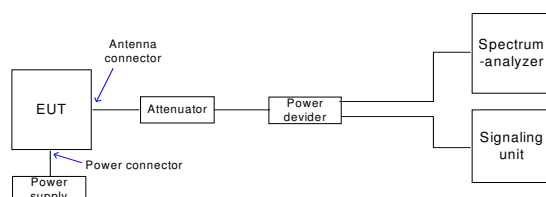
30 MHz - 200 MHz: Quasi Peak measurement, 120KHz Bandwidth, biconical antenna

200MHz - 1GHz: Quasi Peak measurement, 120KHz Bandwidth, log periodic antenna

>1GHz: Average, RBW 1MHz, VBW 10 MHz, waveguide horn with lownoise preamp

3.1.2 Conducted measurements

The EUT's RF signal is coupled out by the antenna connector which is supplied by the manufacturer. The signal is connected to the spectrum analyzer. The specific losses for signal path is first checked within a calibration. The measurement readings on the spectrum analyzer is corrected by the specific test set-up loss. The attenuator, power divider, signalling unit and the spectrum analyzer are impedance matched on 50 Ohm.



3.1.3 AC-conducted measurements

-/-

3.2 Referenced Documents

none

3.3 Additional comments

none

Antenna gain: (calculated)

Test conditions	Calculated Antenna Gain		
Frequency [MHz]	2412	2437	2462
1 Mbit	-0.73	-0.22	-0.30
11 Mbit	-0.50	0.17	0.12
Measurement uncertainty	±3dB		

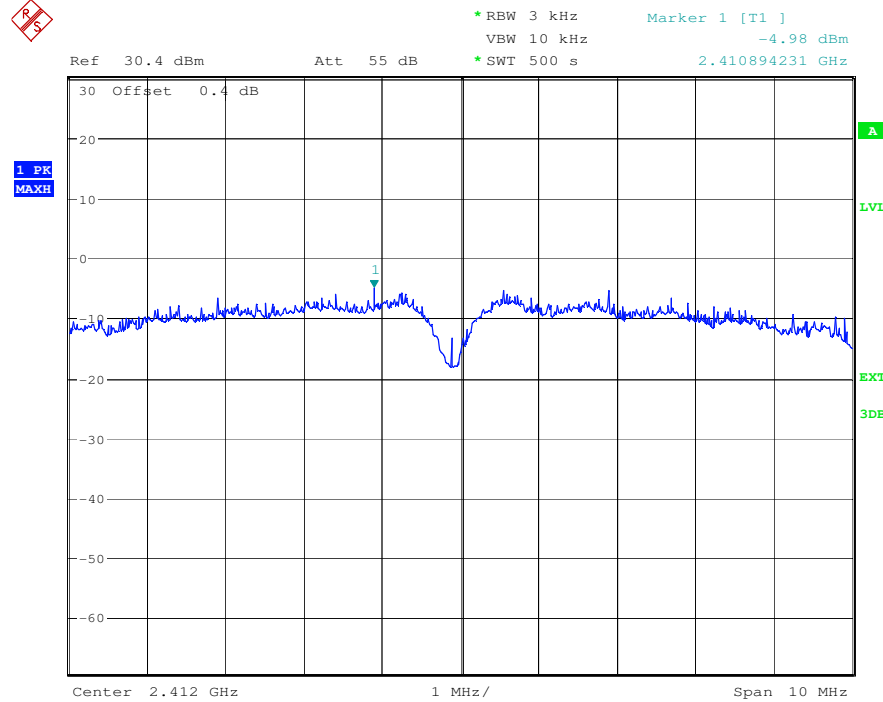
Remark:

The radiated and conducted tests were performed with different test samples.

3.5 Peak Power Spectral density (DSSS)

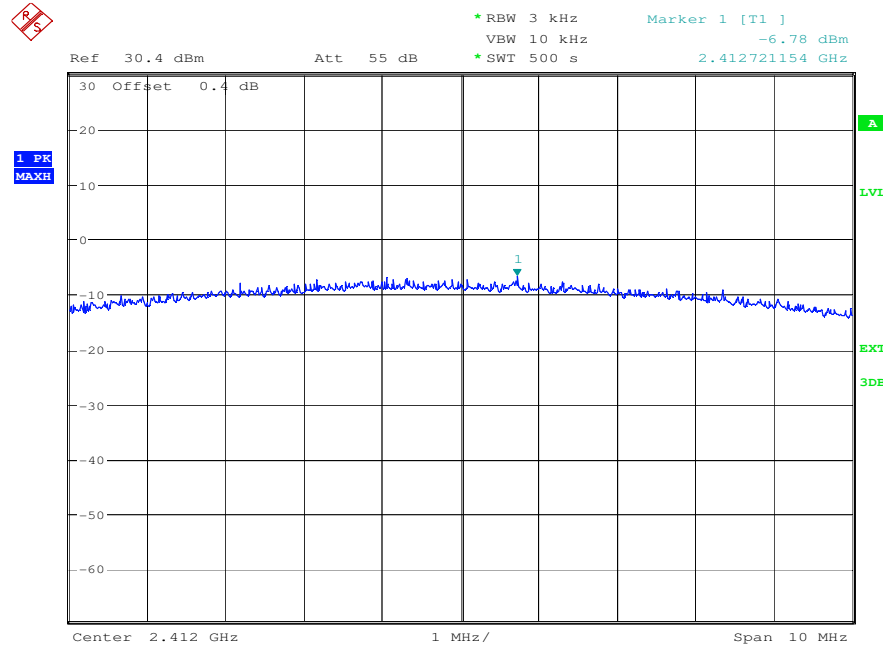
§15.247(d)

Plot 1: Channel 1 – 1 Mbit



Date: 16.DEC.2008 09:35:06

Plot 2: Channel 1 – 11 Mbit



Date: 16.DEC.2008 09:48:11

SRD-Testreport

CETECOM ICT Services GmbH Saarbruecken, Germany

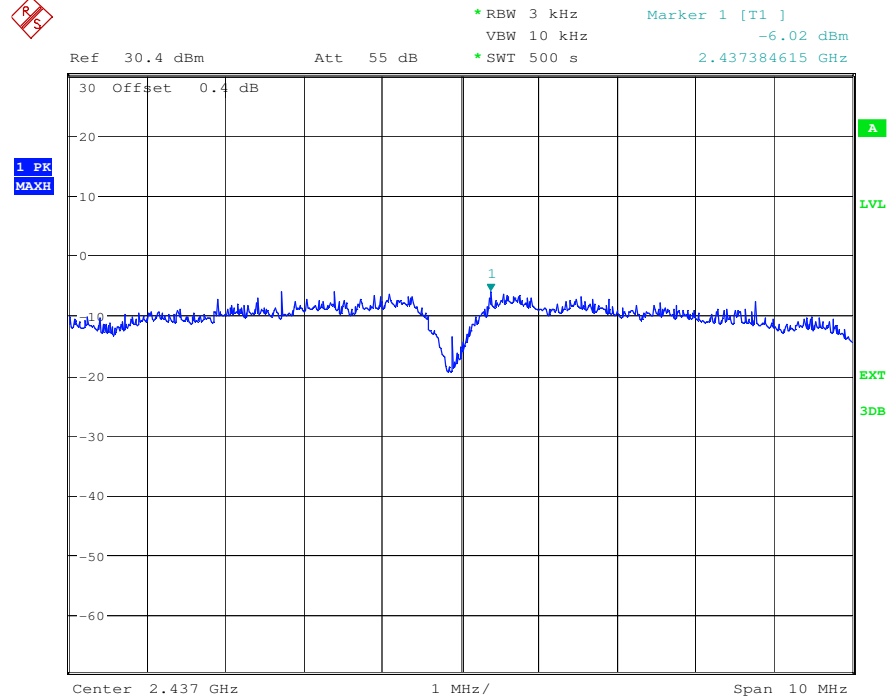


Test report No.: 4-3052-01-11/08

Date: 2009-01-16

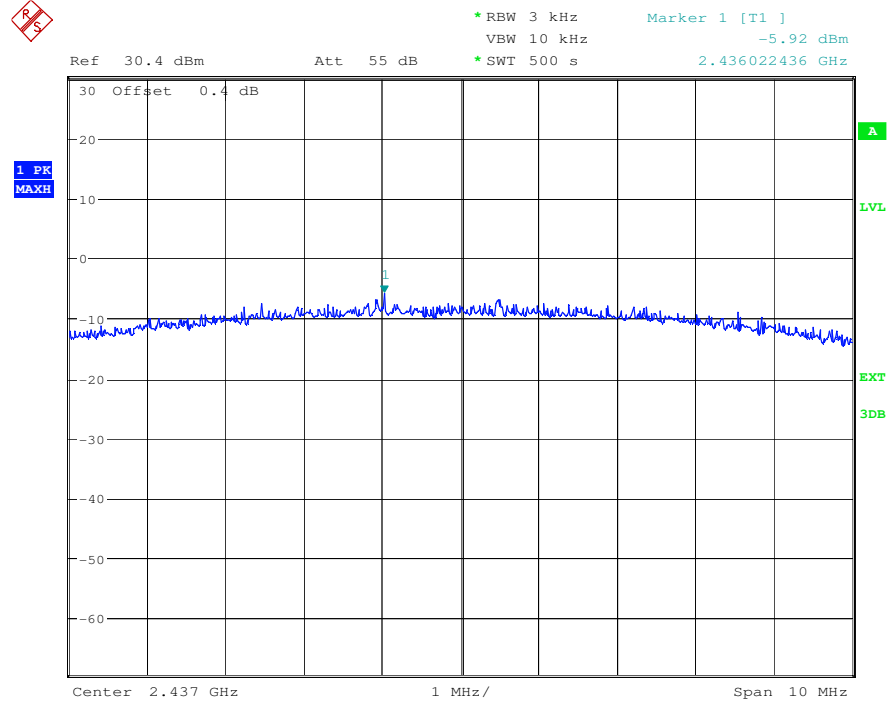
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Plot 3: Channel 6 – 1 Mbit



Date: 16.DEC.2008 09:58:20

Plot 4: Channel 6 – 11 Mbit



Date: 16.DEC.2008 10:07:06

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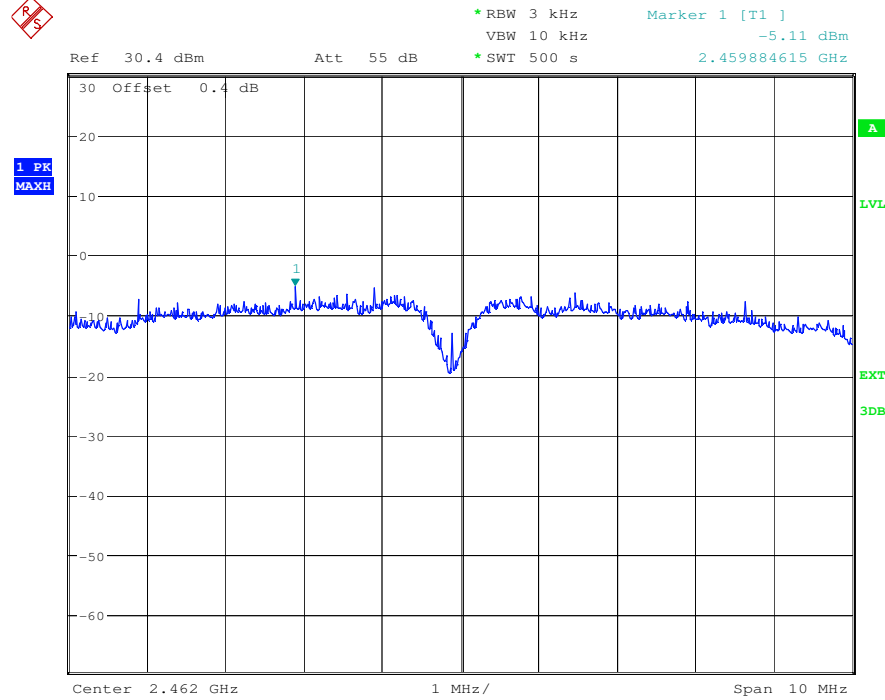


Test report No.: 4-3052-01-11/08

Date: 2009-01-16

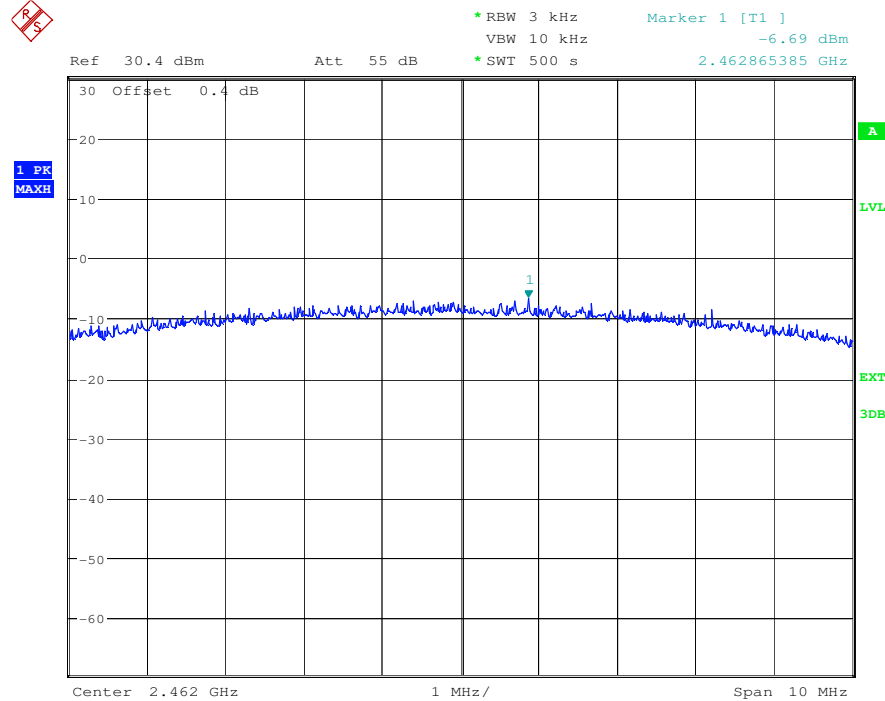
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Plot 5: Channel 11 – 1 Mbit



Date: 16.DEC.2008 10:19:03

Plot 6: Channel 11 – 11 Mbit



Date: 16.DEC.2008 10:27:58

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Test report No.: 4-3052-01-11/08

Date:2009-01-16

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Results:

Plot 1:	Channel 1; 1 Mbit/s:	Power density : - 4,98 dBm / 3 KHz
Plot 2:	Channel 1; 11 Mbit/s:	Power density : - 6.78 dBm / 3 KHz
Plot 3:	Channel 6; 1 Mbit/s:	Power density : - 6.02 dBm / 3 KHz
Plot 4:	Channel 6; 11 Mbit/s:	Power density : - 5.92 dBm / 3 KHz
Plot 5:	Channel 11; 1 Mbit/s:	Power density : - 5.11 dBm / 3 KHz
Plot 6:	Channel 11; 11 Mbit/s:	Power density : - 6.69 dBm / 3 KHz

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

3.5 Peak Power Spectral density (OFDM)

§15.247(d)

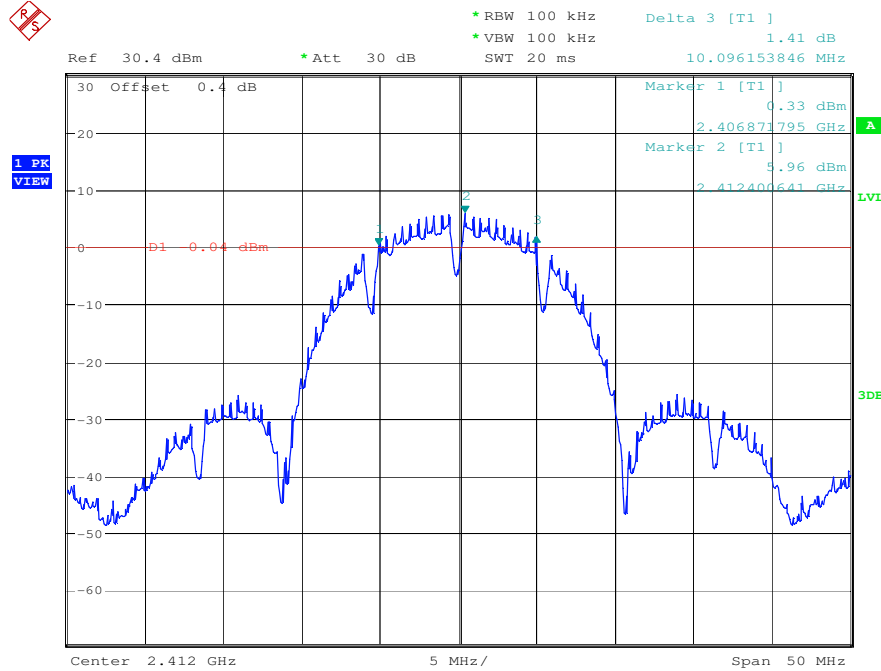
Not performed

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

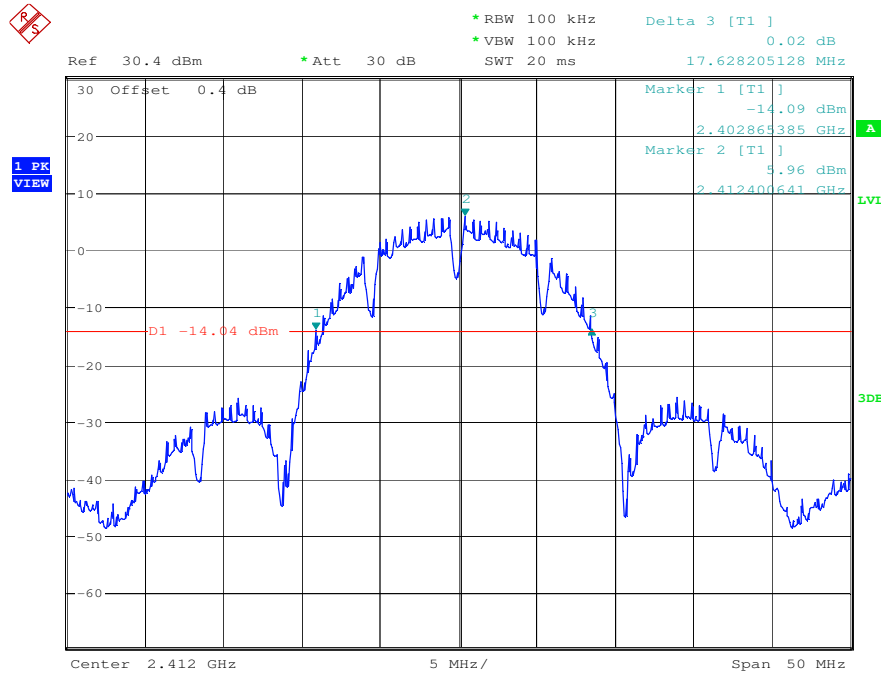
3.6 Spectrum Bandwidth of a DSSS System / 6 dB / 20 dB Bandwith §15.247(a2)

Plot 7: Channel 1 – 1 Mbit – 6 dB



Date: 16.DEC.2008 11:13:19

Plot 8: Channel 1 – 1 Mbit – 20 dB



Date: 16.DEC.2008 11:14:35

SRD-Testreport

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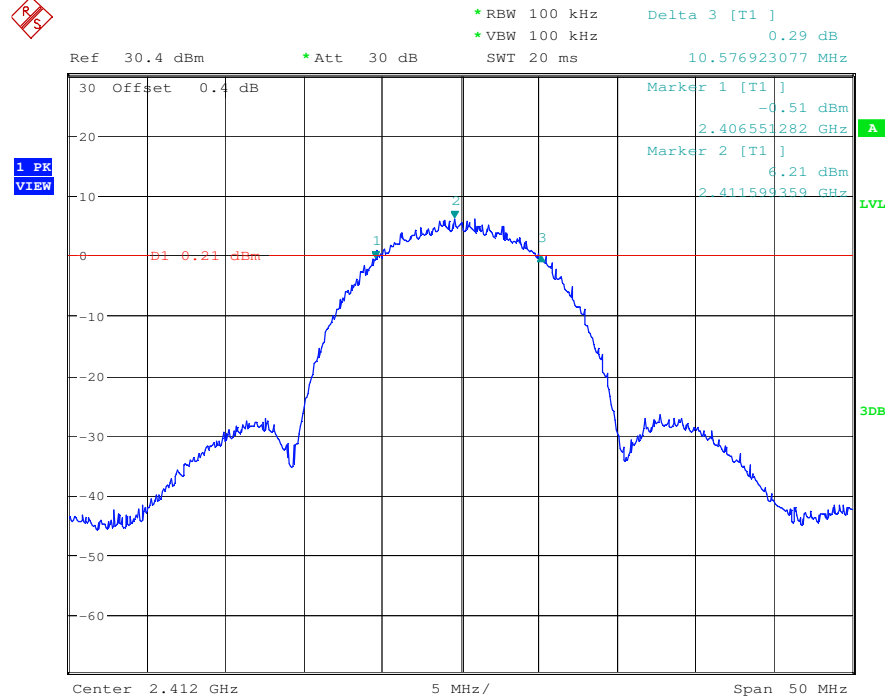


Test report No.: 4-3052-01-11/08

Date: 2009-01-16

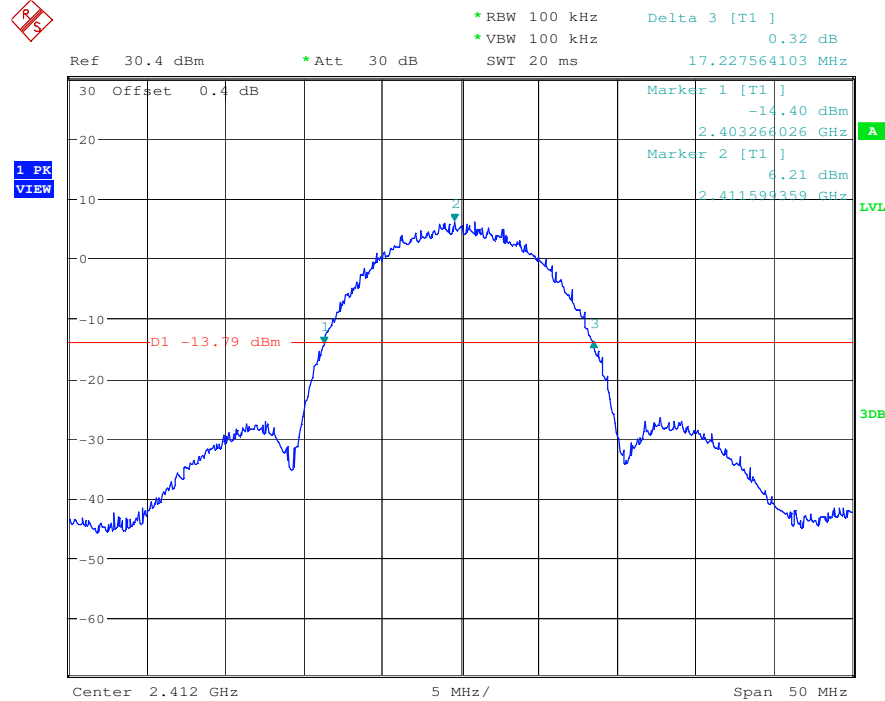
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Plot 9: Channel 1 – 11 Mbit – 6 dB



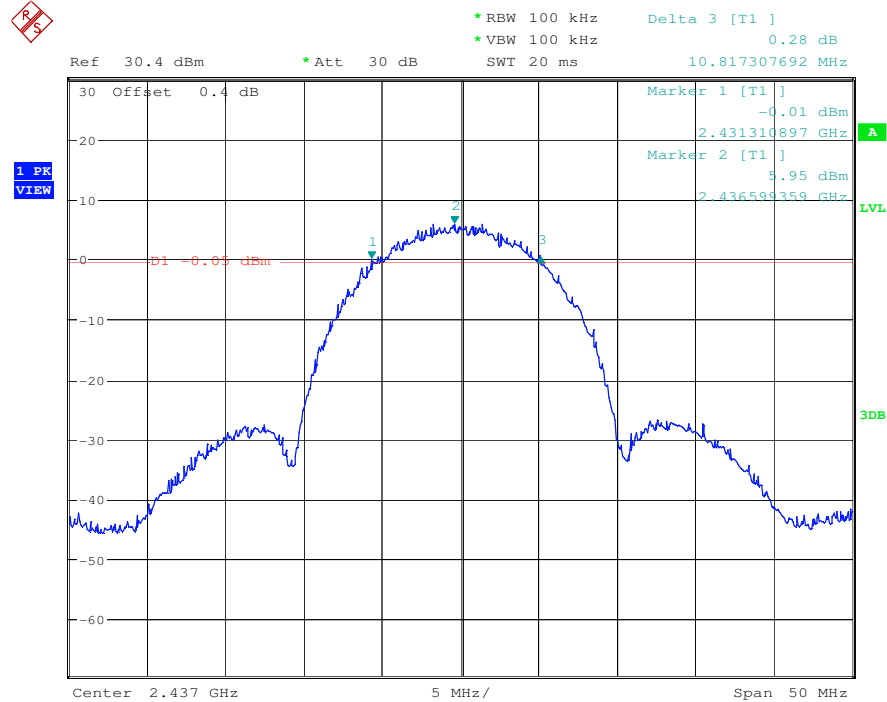
Date: 16.DEC.2008 11:17:03

Plot 10: Channel 1 – 11 Mbit – 20 dB



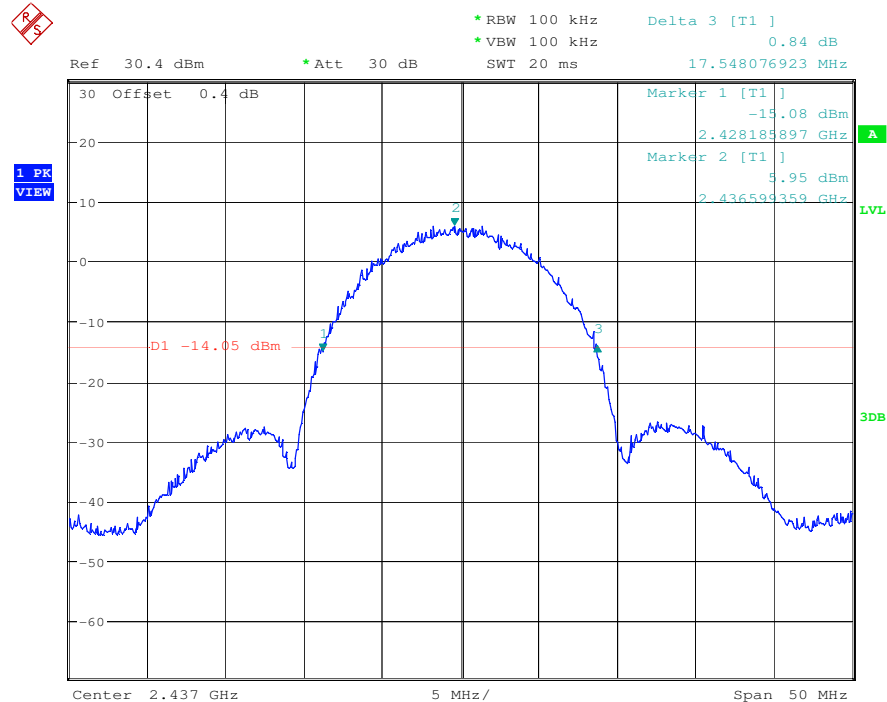
Date: 16.DEC.2008 11:18:18

Plot 13: Channel 6 – 11 Mbit – 6 dB



Date: 16.DEC.2008 11:36:50

Plot 14: Channel 6 – 11 Mbit – 20 dB



Date: 16.DEC.2008 11:37:54

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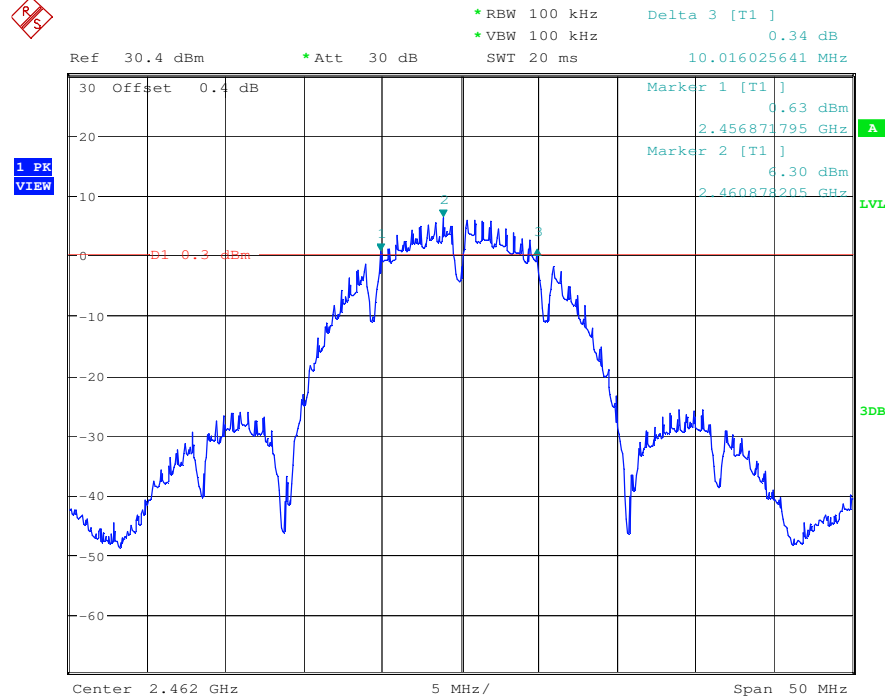


Test report No.: 4-3052-01-11/08

Date:2009-01-16

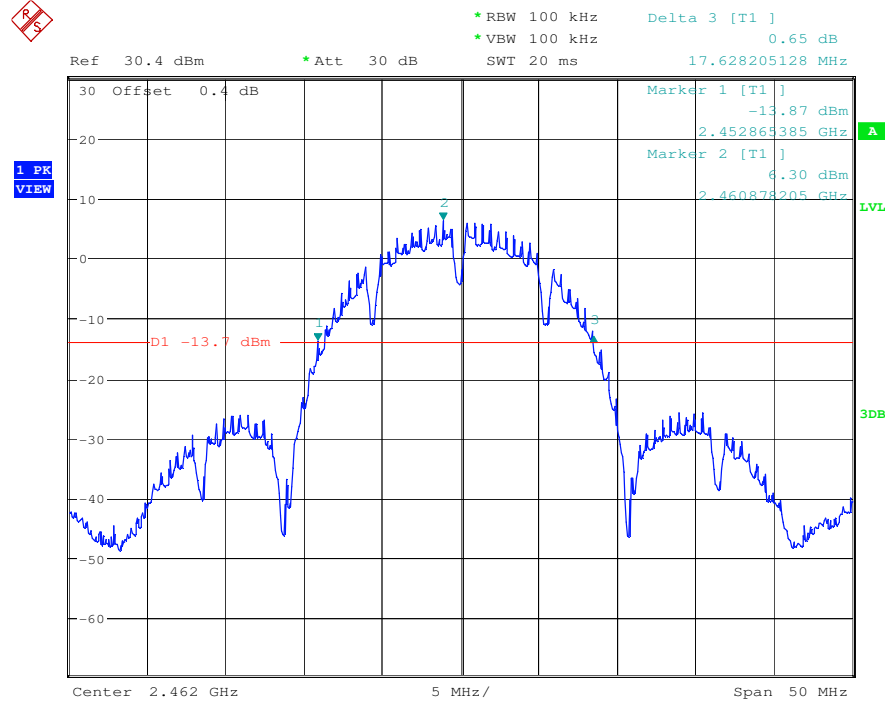
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Plot 15: Channel 11 – 1 Mbit – 6 dB



Date: 16.DEC.2008 11:41:18

Plot 16: Channel 11 – 1 Mbit – 20 dB



Date: 16.DEC.2008 11:42:44

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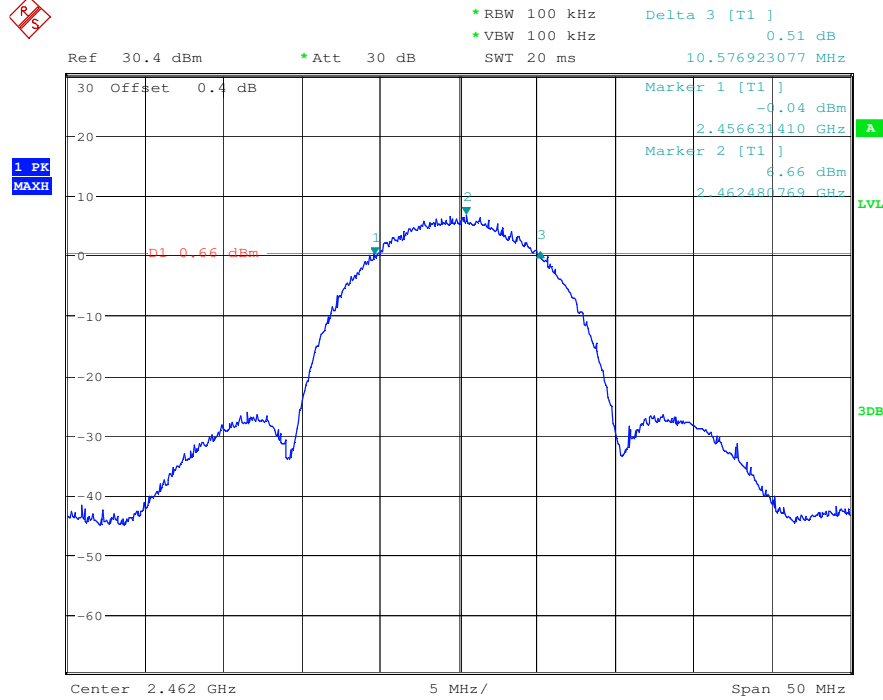


Test report No.: 4-3052-01-11/08

Date:2009-01-16

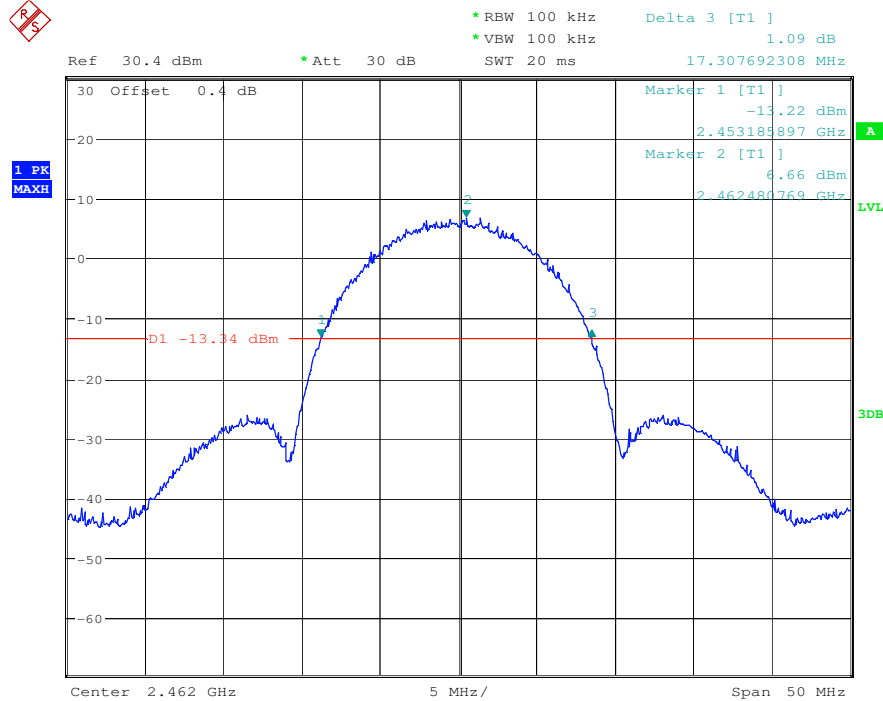
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Plot 17: Channel 11 – 11 Mbit – 6 dB



Date: 16.DEC.2008 11:44:33

Plot 18: Channel 11 – 11 Mbit – 20 dB



Date: 16.DEC.2008 11:45:32

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Results:

Test conditions		BANDWIDTH [MHz]		
Frequency [MHz]		2412	2437	2462
1 Mbit/s	6 dB	10.096	10.096	10.016
1 Mbit/s	20 dB	17.628	17.628	17.628
11 Mbit/s	6 dB	10.577	10.817	11.577
11 Mbit/s	20 dB	17.228	17.548	17.308
Measurement uncertainty		±1kHz		

RBW: 100 kHz / VBW 100 kHz

Limits :

Under normal test conditions only	> 500 KHz
-----------------------------------	-----------

3.6 Spectrum Bandwidth of a OFDM System / 6 dB Bandwith §15.247(a2)

Not performed

Results:

Test conditions		6 dB BANDWIDTH [MHz]		
Frequency [MHz]		2412	2437	2462
	6 dB			
	20 dB			
Measurement uncertainty		±1kHz		

RBW: 100 kHz / VBW 100 kHz

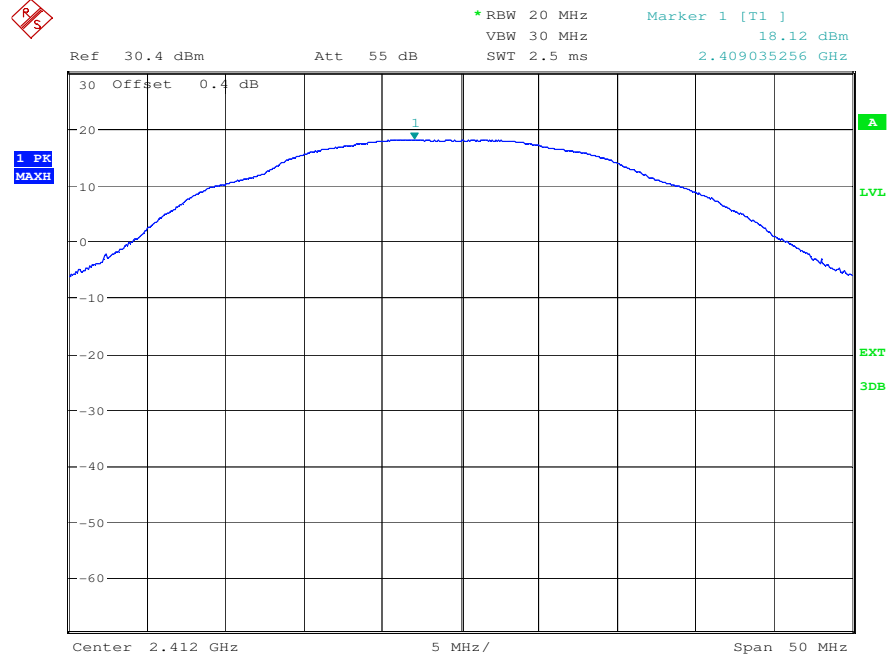
Limits :

Under normal test conditions only	> 500 KHz
-----------------------------------	-----------

3.7 Maximum output power (conducted) (DSSS)

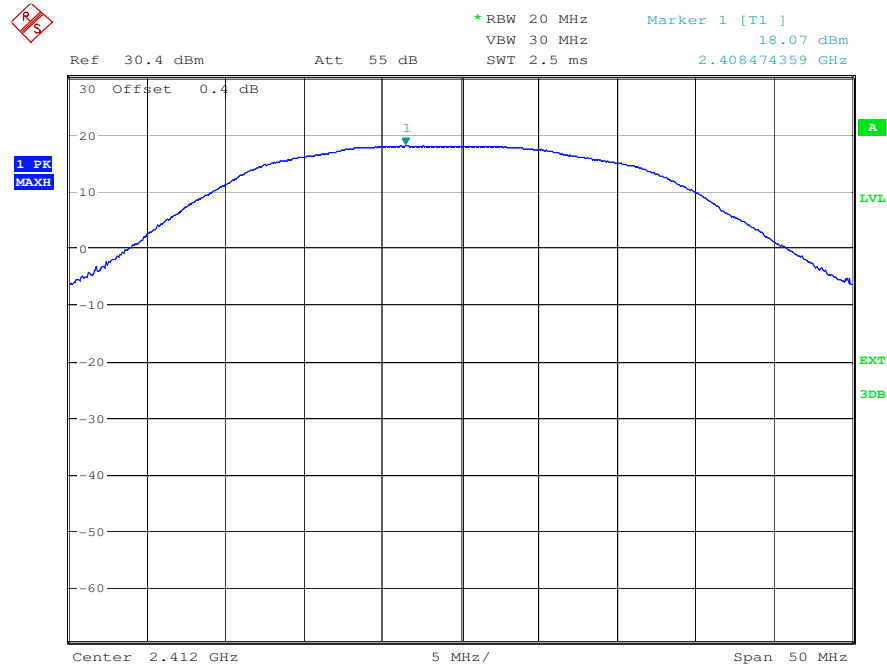
§15.247(b)(1)

Plot 19: Channel 1 – 1 Mbit



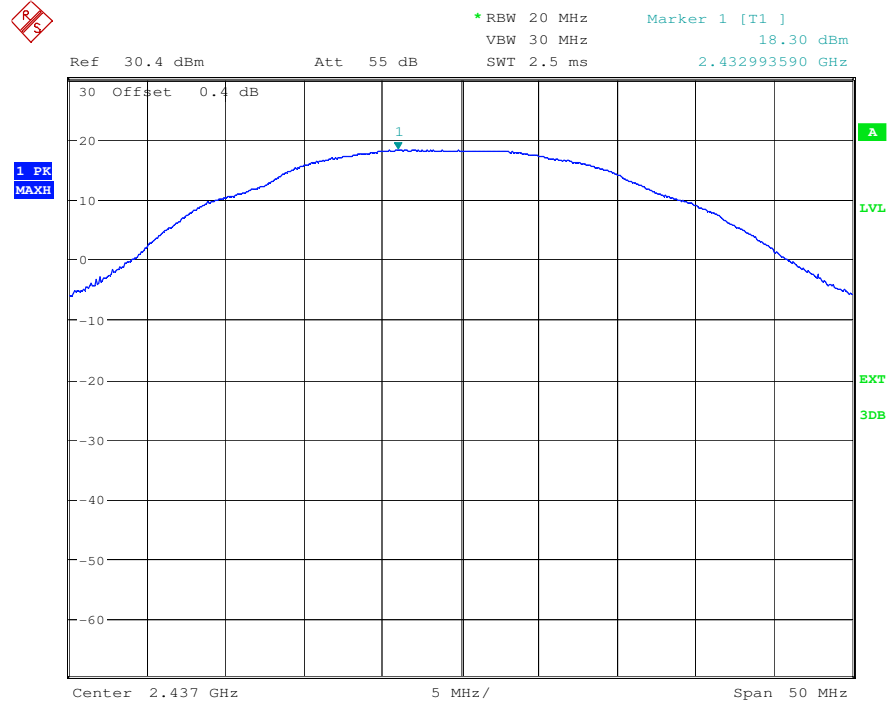
Date: 15.DEC.2008 14:48:34

Plot 20: Channel 1 – 11 Mbit



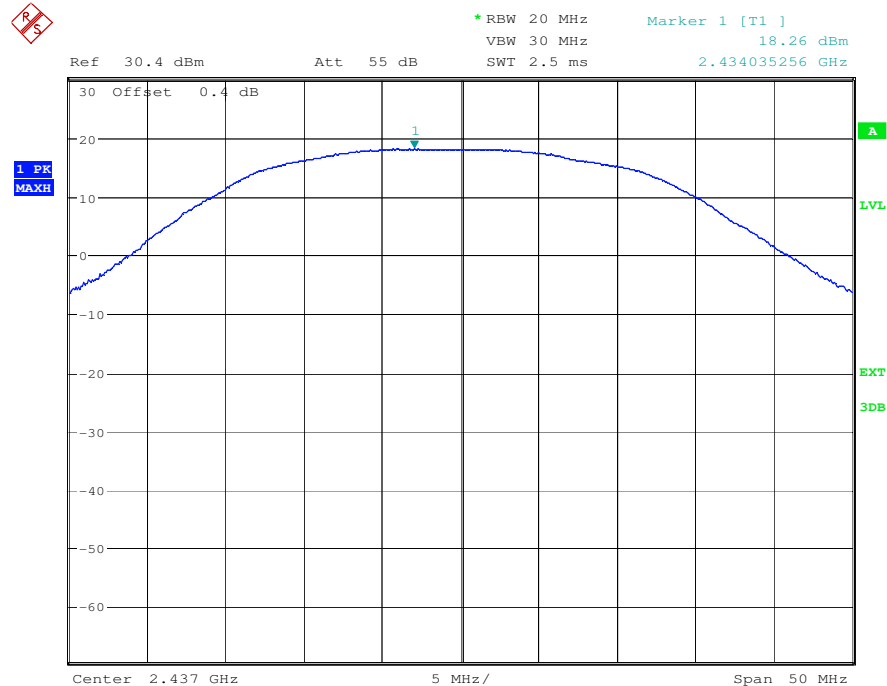
Date: 15.DEC.2008 14:49:18

Plot 21: Channel 6 – 1 Mbit



Date: 15.DEC.2008 14:35:00

Plot 22: Channel 6– 11 Mbit



Date: 15.DEC.2008 14:36:01

SRD-Testreport

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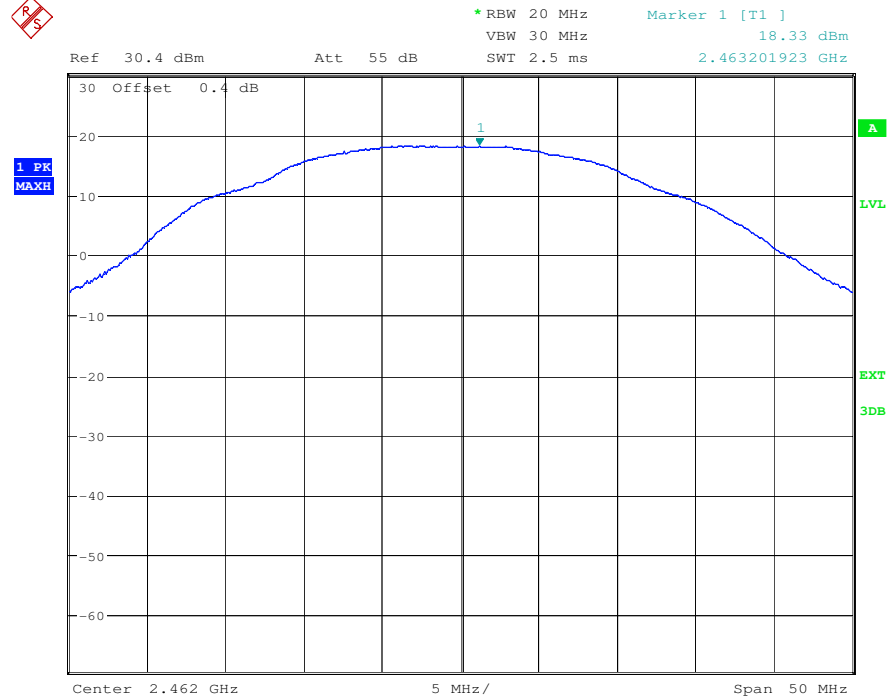


Test report No.: 4-3052-01-11/08

Date:2009-01-16

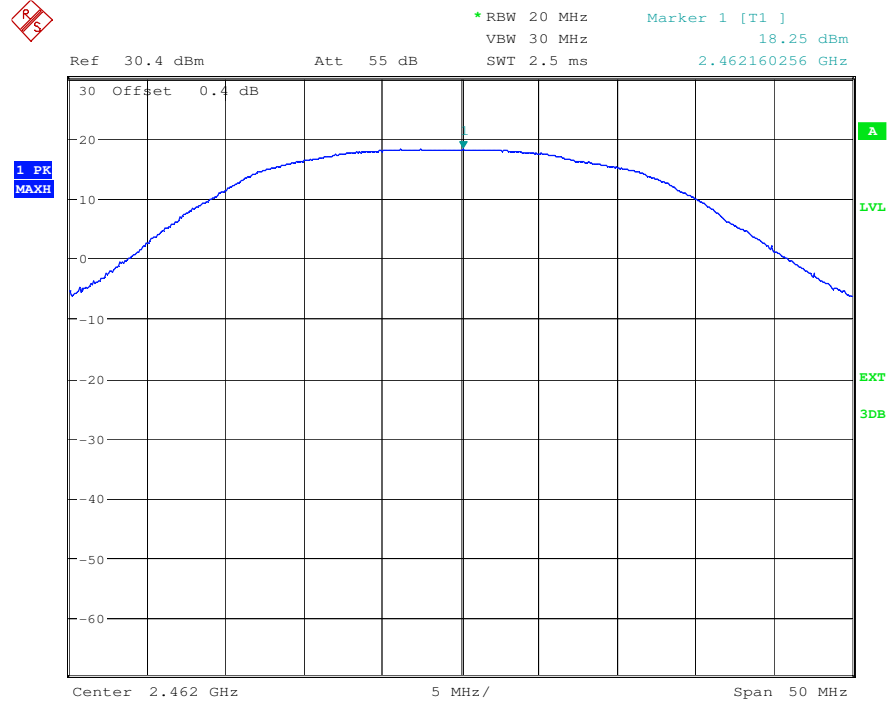
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Plot 23: Channel 11 – 1 Mbit



Date: 15.DEC.2008 14:37:04

Plot 24: Channel 11 – 11 Mbit



Date: 15.DEC.2008 14:37:44

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Results:

Test conditions	Max. peak output power [dBm]		
Frequency [MHz]	2412	2437	2462
1 Mbit/s	18.12	18.30	18.33
11 Mbit/s	18.07	18.26	18.25
Measurement uncertainty	±3dB		

Limits:

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

3.7 Maximum output power (conducted) (OFDM)

§15.247(b)(1)

Not performed

Results: with correction factor $10 * \log(6\text{dB BW} / \text{used BW})$, here xx **dB**

Test conditions		Max. peak output power [dBm]			
Frequency [MHz]		2412		2437	2462
T _{nom}	V _{nom}	PK			
		PK corrected			
Average					
Measurement uncertainty		±3dB			

Remark:

The correction factor is calculated by $10 \times \log(\text{measured BW} / \text{used BW})$ [dB]

Limits:

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

MPE calculation

These equations are generally accurate in the far field of an antenna but will over predict power density in the near field, where they could be used for making a “worst case” prediction.

$$S = PG/4\pi R^2$$

where S = power density (in appropriate units, e.g. mW/cm²)
P = power input to the antenna (in appropriate units e.g. mW)
G = power gain of the antenna in the direction of interest relative to the isotropic radiator
R = distance to the center of radiation of the antenna (appropriate units e.g. cm)

Or

$$S = EIRP/4\pi R^2$$

where EIRP = equivalent isotropically radiated power

Calculation:

(Calculated for max. EIRP)

EIRP 18.43 dBm = 69.7 mW
calculated at distance of 20 cm:

power density = 0.014 mW/ cm²

Limit:

1mW/ cm ² is the reference level for general public exposure according to the OET Bulletin 65, Edition 97-01 Table 1.

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

Results:

Test conditions		Max. peak output power EIRP [dBm]		
Data Rate 1 Mbit/s				
Frequency [MHz]		2412	2437	2462
T _{nom}	V _{nom}	17.39	18.08	18.03
DSSS				
T _{nom}	V _{nom}	-/-	-/-	-/-
OFDM				
Measurement uncertainty		±3dB		

RBW: 20 MHz / VBW: 30 MHz

Test conditions		Max. peak output power EIRP [dBm]		
Data Rate 11 Mbit/s				
Frequency [MHz]		2412	2437	2462
T _{nom}	V _{nom}	17.57	18.43	18.37
DSSS				
T _{nom}	V _{nom}	-/-	-/-	-/-
OFDM				
Measurement uncertainty		±3dB		

Limits:

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

SRD-Testreport

CETECOM ICT Services GmbH Saarbruecken, Germany

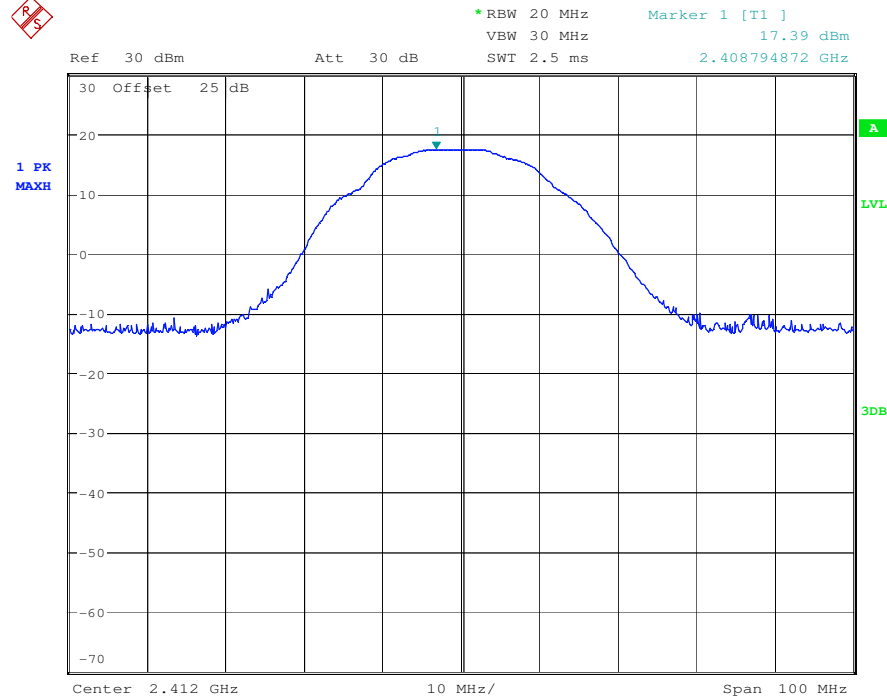


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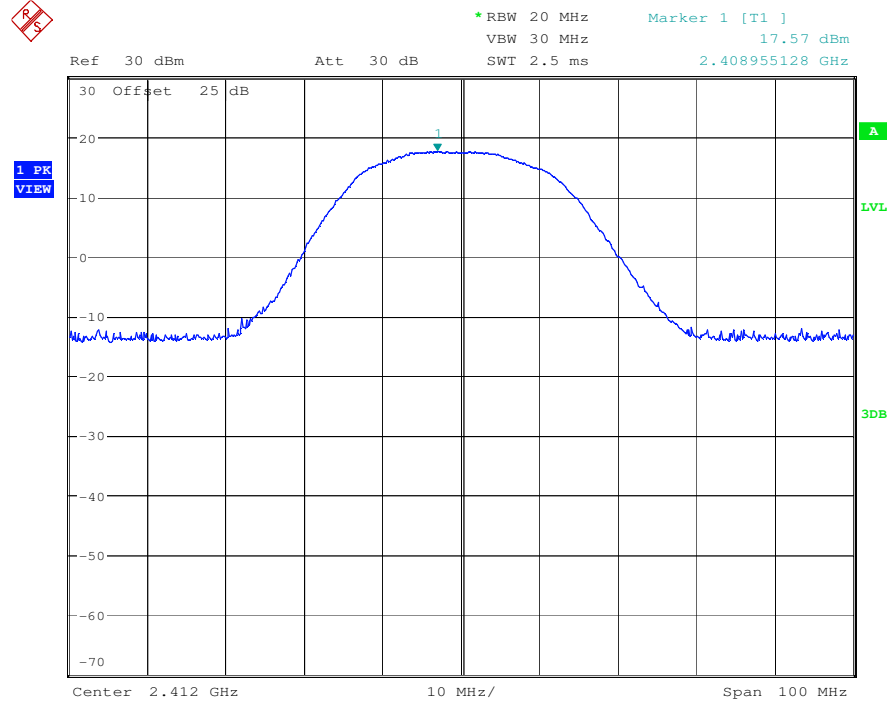
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Plot 25: Channel 1 – 1 Mbit



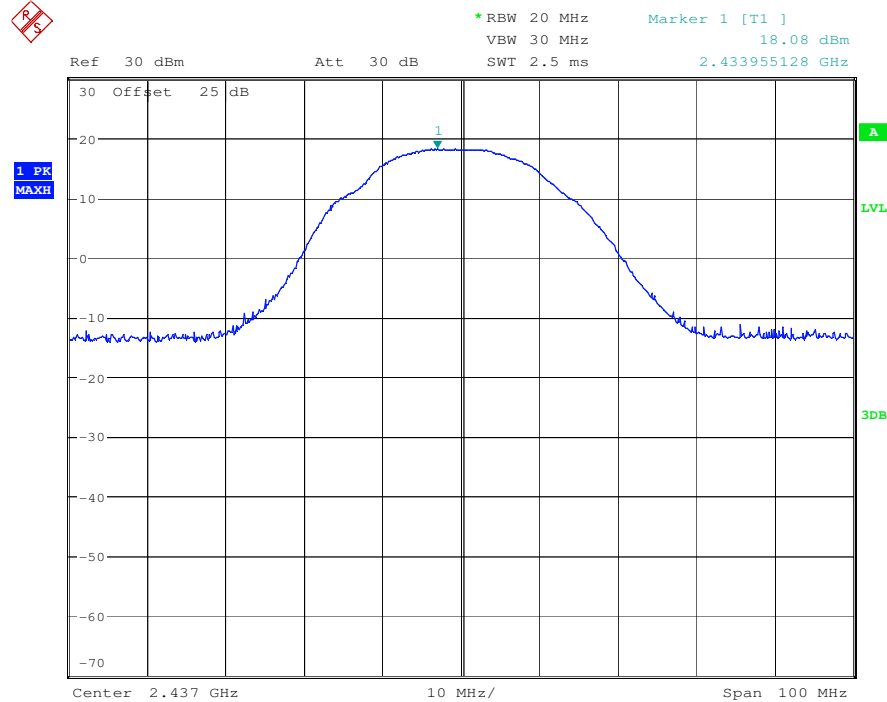
Date: 16.JAN.2009 15:34:41

Plot 26: Channel 1 – 11 Mbit/s



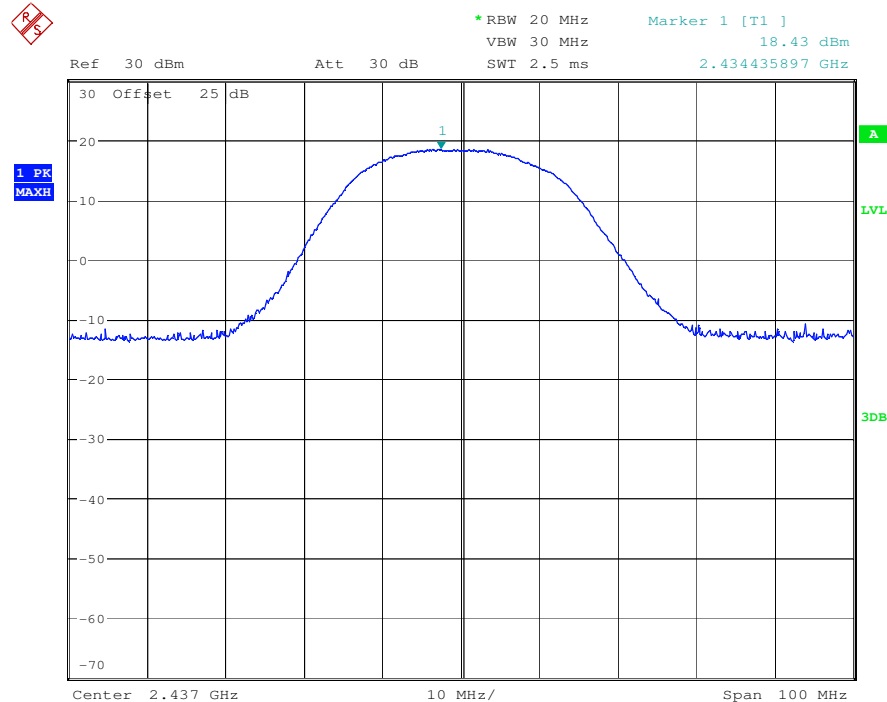
Date: 16.JAN.2009 15:38:23

Plot 27: Channel 6 – 1 Mbit



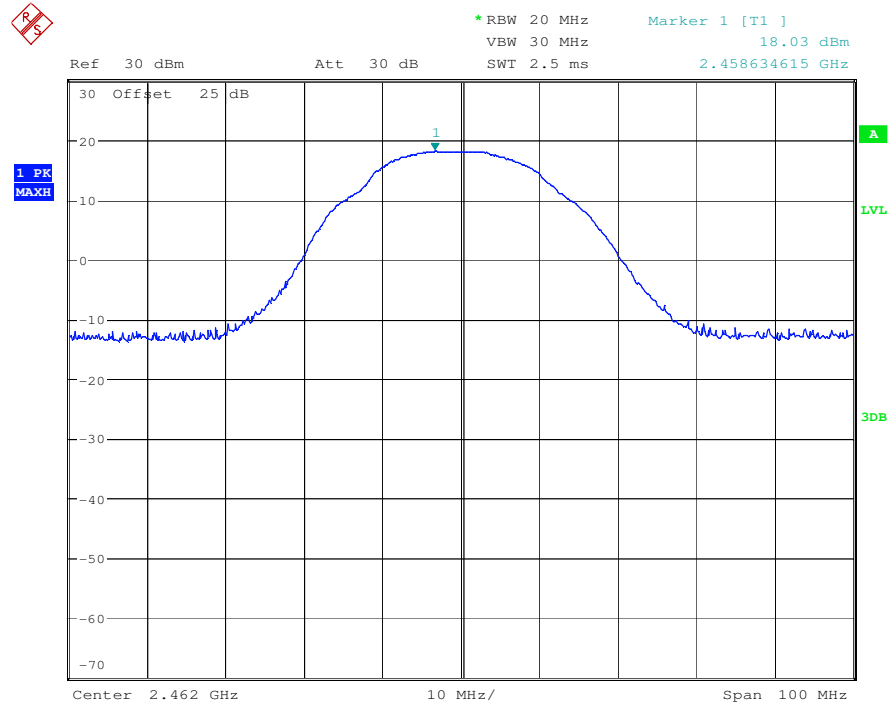
Date: 16.JAN.2009 15:39:10

Plot 28: Channel 6 – 11 Mbit/s



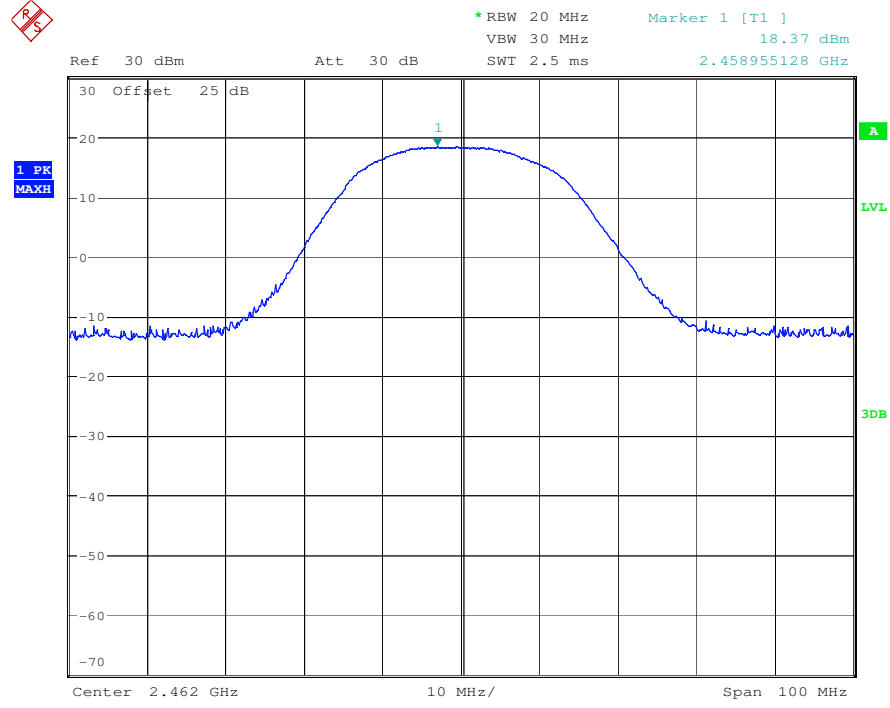
Date: 16.JAN.2009 15:41:13

Plot 29: Channel 11 – 1 Mbit



Date: 16.JAN.2009 15:42:34

Plot 30: Channel 11 – 11 Mbit/s



Date: 16.JAN.2009 15:44:02

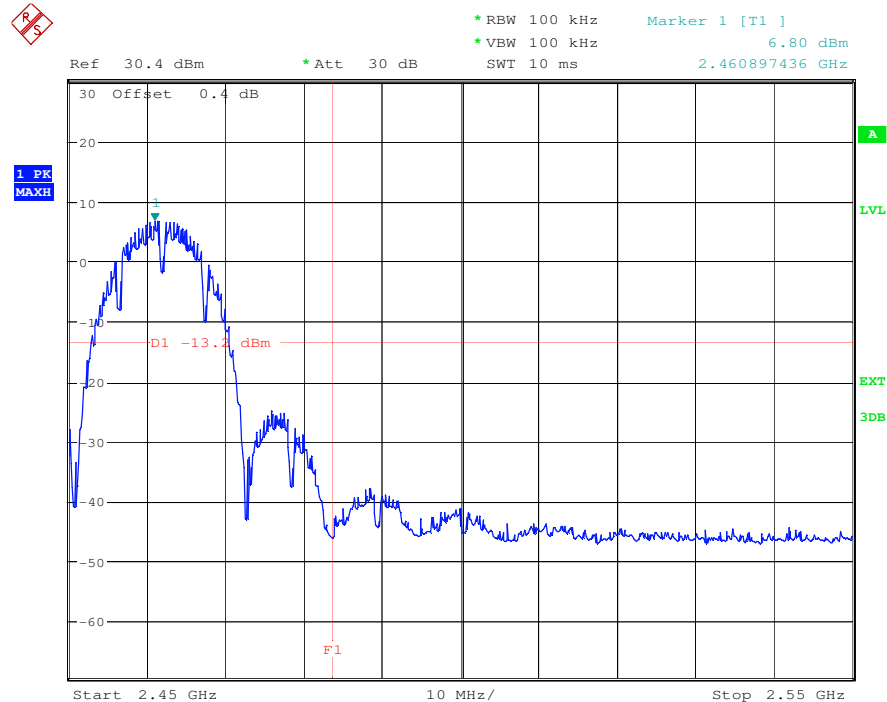
3.9 Band-edge compliance of conducted emissions §15.247 (c)

Plot 31: Channel 1 – 1 Mbit



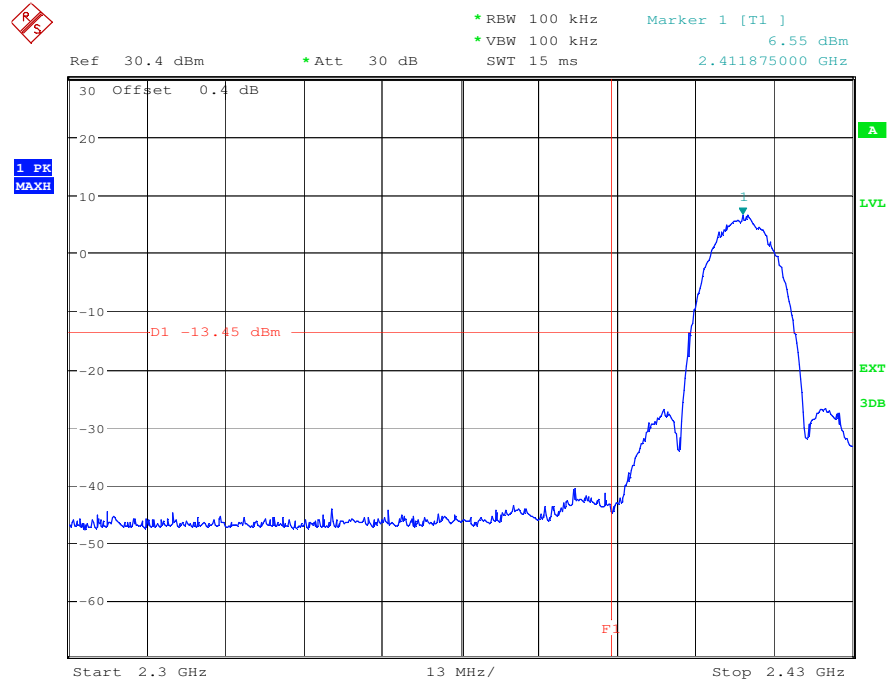
Date: 15.DEC.2008 15:04:35

Plot 32: Channel 11 – 1 Mbit



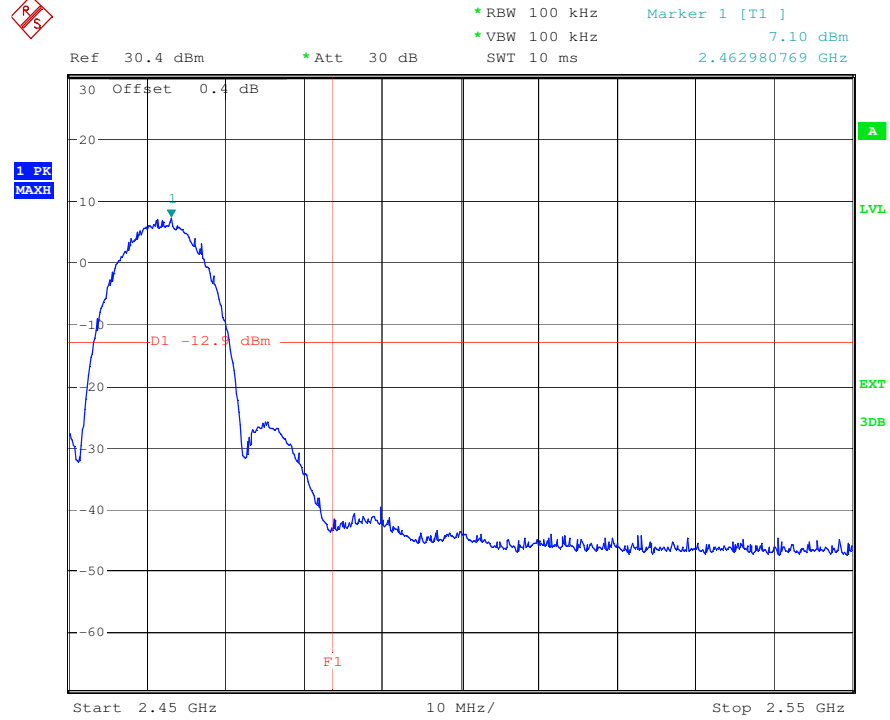
Date: 15.DEC.2008 15:09:33

Plot 33: Channel 1 – 11 Mbit



Date: 15.DEC.2008 15:06:04

Plot 34: Channel 11 – 11 Mbit



Date: 15.DEC.2008 15:11:37

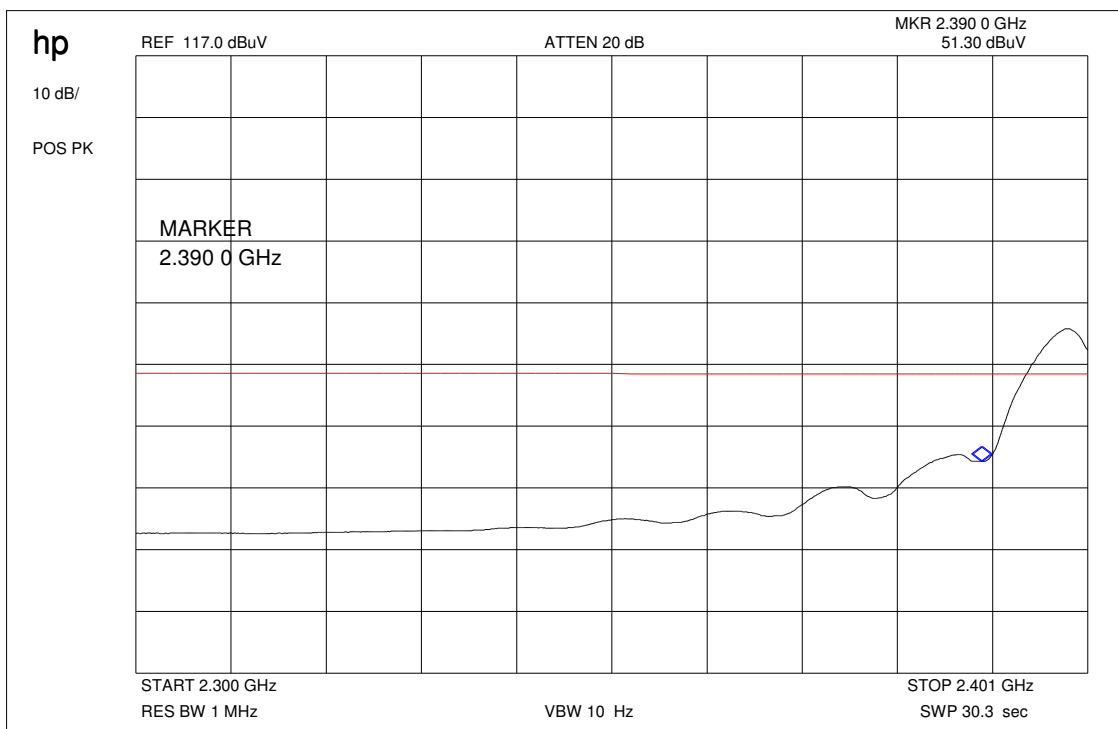
Limits:

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)).
-----------------------------------	--

3.10 Band-edge compliance of radiated emissions (DSSS)

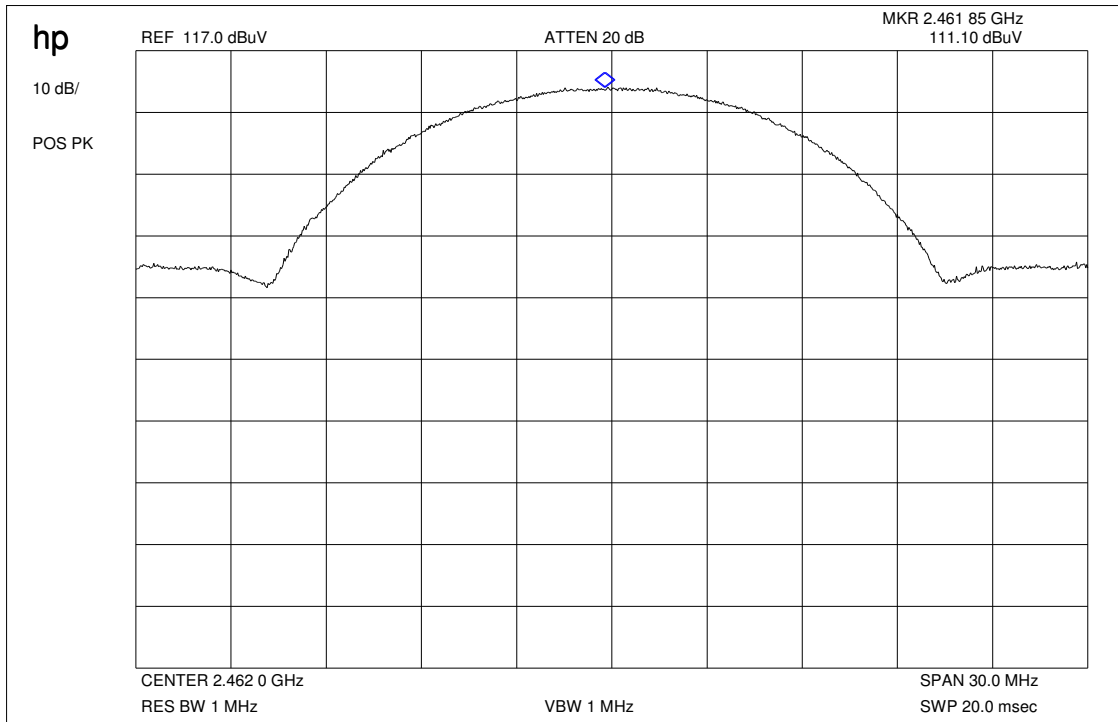
§15.205

Plot 35: Low channel 2412 MHz



The plot shows the lower restricted band from 2300 MHz to 2401 MHz.
Limit: 54 dB μ V/m at 3 m distance

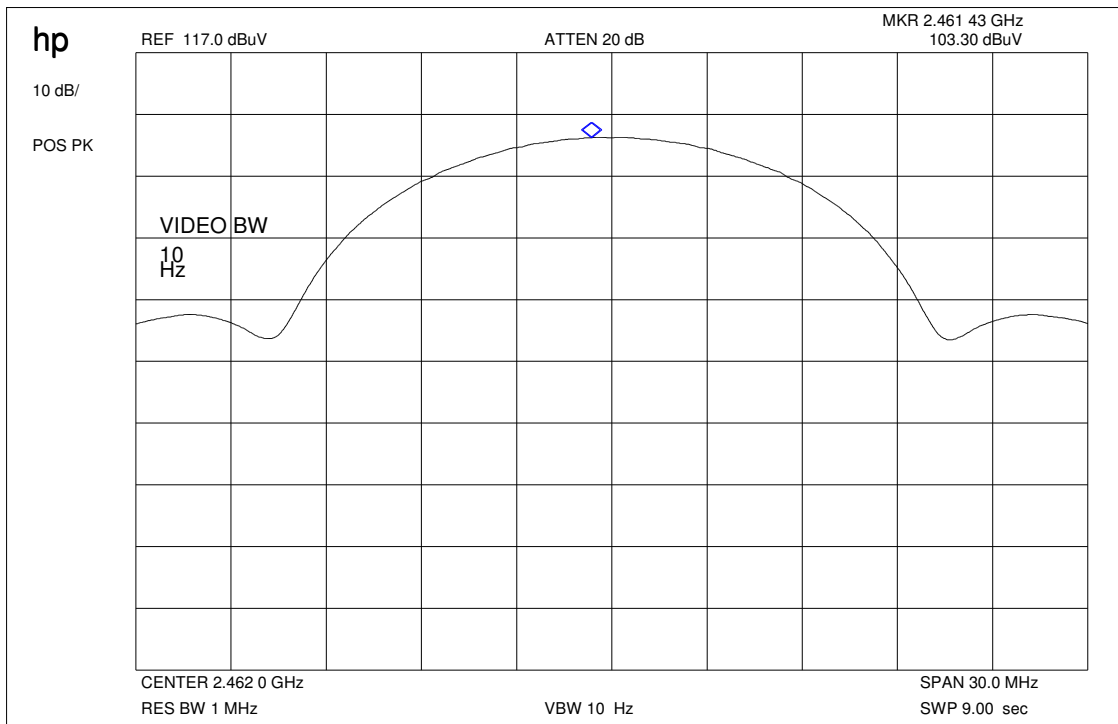
Plot 36: Max field strength in 3m distance (single frequency) peak



Result:

Frequency	Analyzer Value	Correction factor	Calculated Value
2462 MHz	111.10 dB μ V/m	-6.3	104.8 dB μ V/m

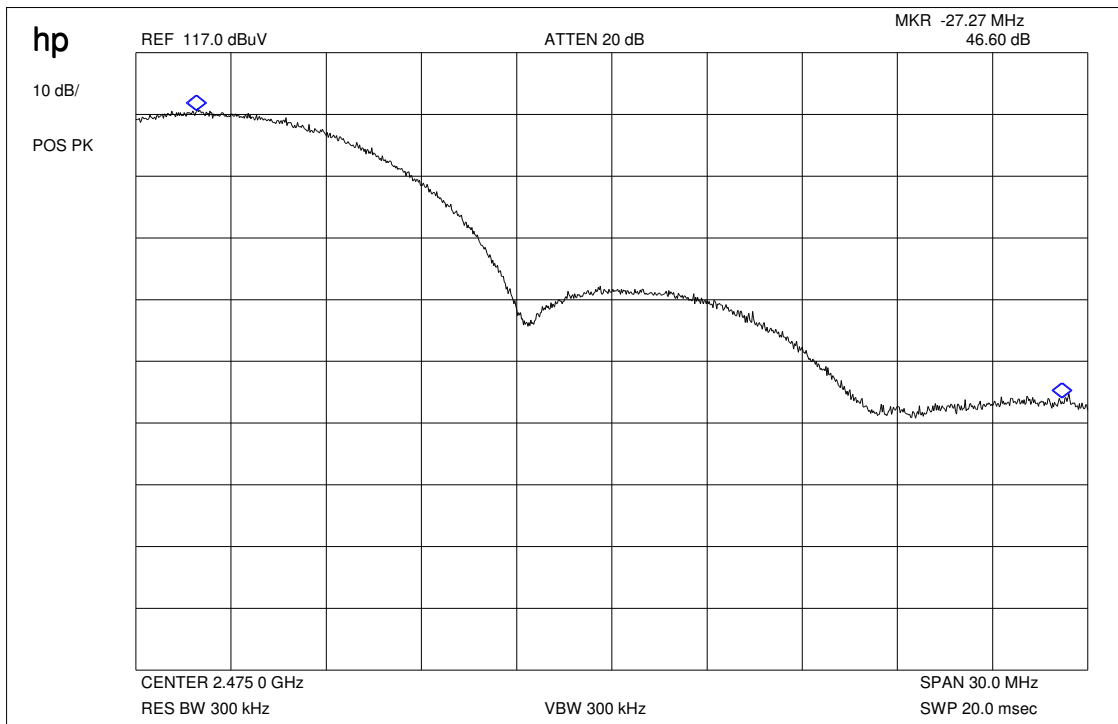
Plot 37: Max field strength in 3m distance (single frequency) average



Result:

Frequency	Analyzer Value	Correction factor	Calculated Value
2462 MHz	103.30 dB μ V/m	-6.3	97.0 dB μ V/m

Plot 38: Marker-Delta Method RBW/VBW = 1% of span



Result:

Marker-Delta-Value : 46.6 dB

This measurement was made to show that the behavior of the system is conform to FCC 15.205 (restricted bands)

SRD-Testreport

CETECOM ICT Services GmbH Saarbruecken, Germany

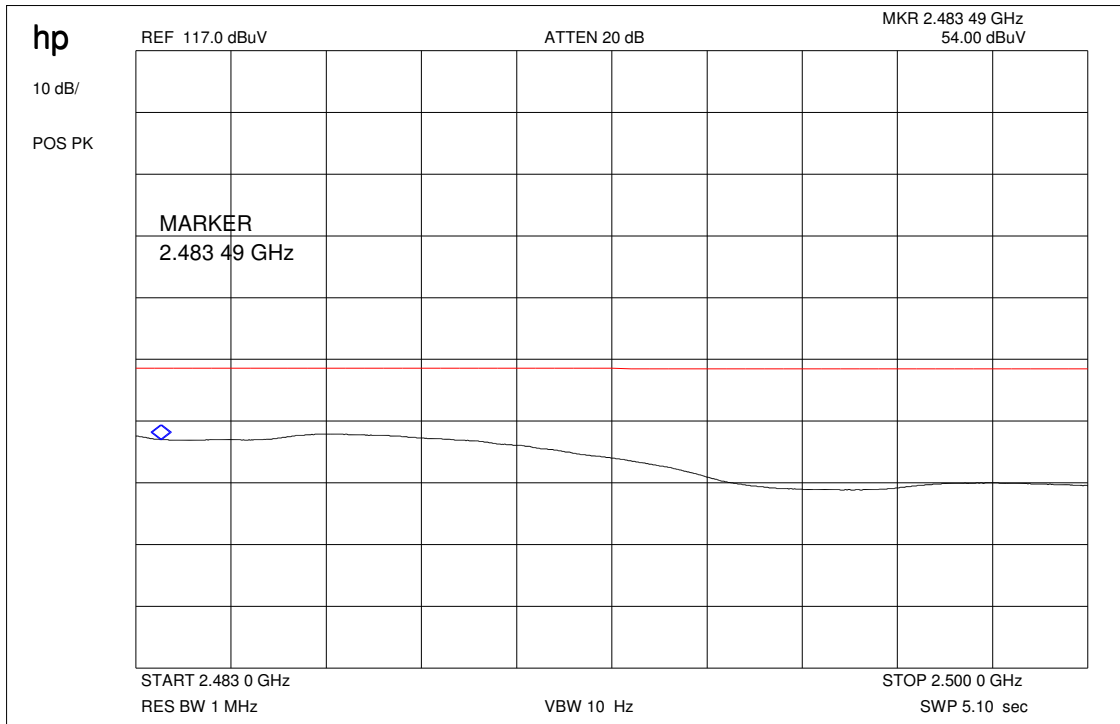


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Plot 39: upper restricted band



Results & Limits:

Radiated field strength

The field strength was measured with an EMI measuring receiver and 1 MHz RBW / VBW for peak and with 1MHz RBW / 10Hz VBW for average at a distance of 3m.

high channel	setup	value (3m)
Max. peak value	1 MHz RBW 1 MHz VBW	104.8 dB μ V/m
Max. average value	1 MHz RBW 10 Hz VBW	97.0 dB μ V/m
Delta value	Peak 300 kHz RBW/VBW	46.6 dB
Value at band edge	limit 54 dB μ V/m	50.4 dB μ V/m
Statement:		Complies

3.11 Band-edge compliance of radiated emissions (OFDM)

§15.205

Not performed

Result:

Frequency	Cable loss	Antenna factor	Results

Results & Limits:

Radiated field strength

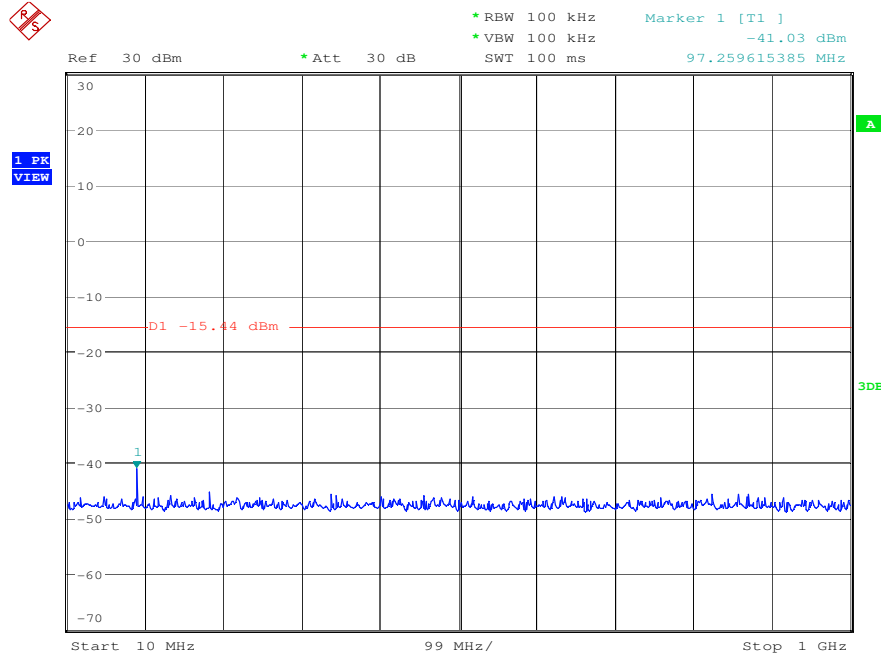
The field strength was measured with an EMI measuring receiver and 1 MHz RBW / VBW for peak and with 1 MHz RBW / 10Hz VBW for average at a distance of 3m.

high channel	setup	measured value (3m)	correction factor (3m)	calculated value (3m)
Max. peak value	1 MHz RBW 1 MHz VBW			
Max. average value	1 MHz RBW 10 Hz VBW			
Delta value	Peak 300 kHz RBW/VBW			
Value at band edge	limit 54 dB μ V/m			
Statement:				

3.12 Spurious Emissions - conducted (Transmitter)

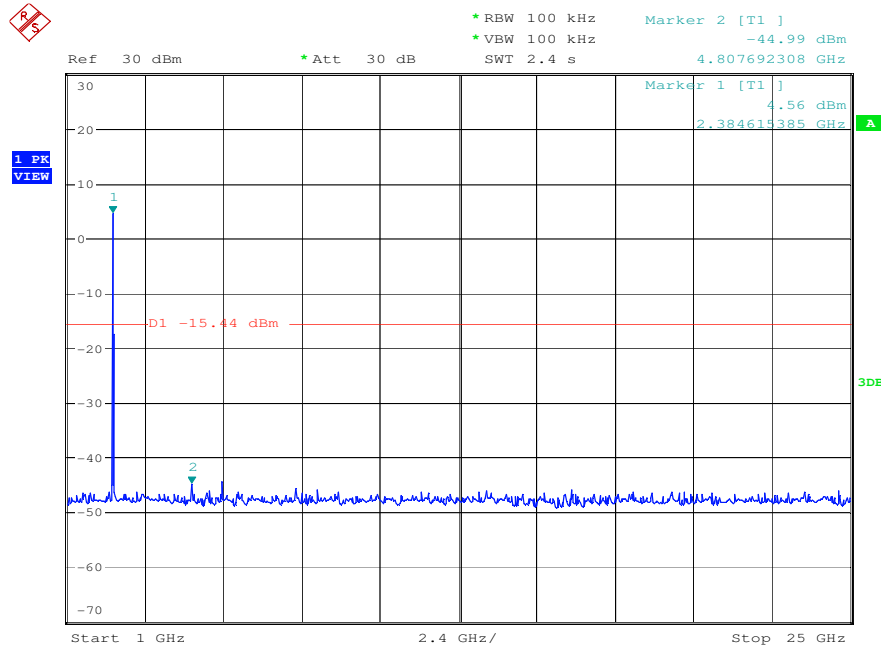
§15.247 (c)

Plot 40: Channel 1 – 1 Mbit



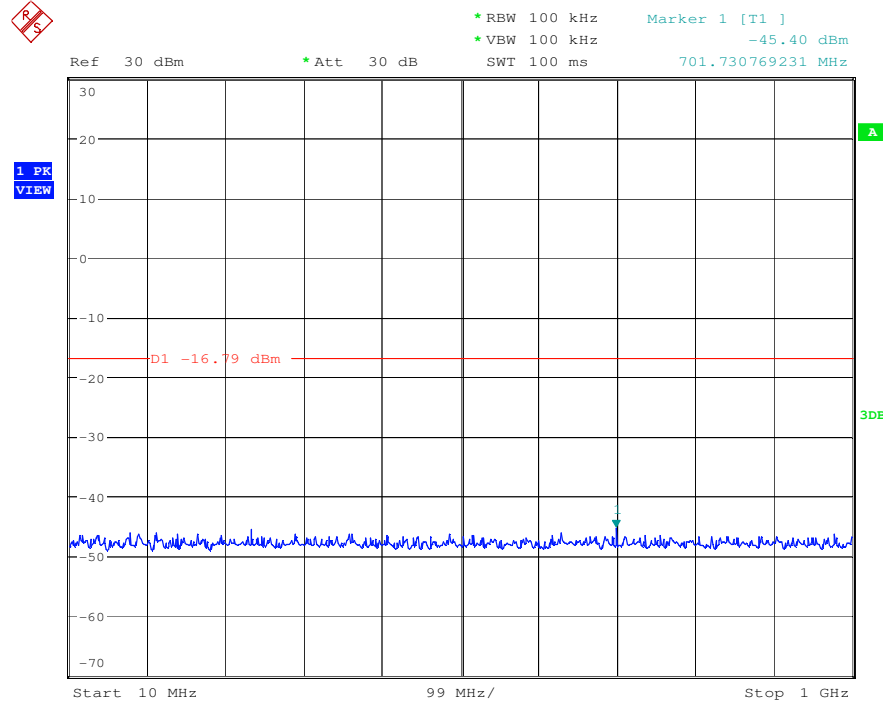
Date: 16.DEC.2008 12:51:15

Plot 41: Channel 1 – 1 Mbit



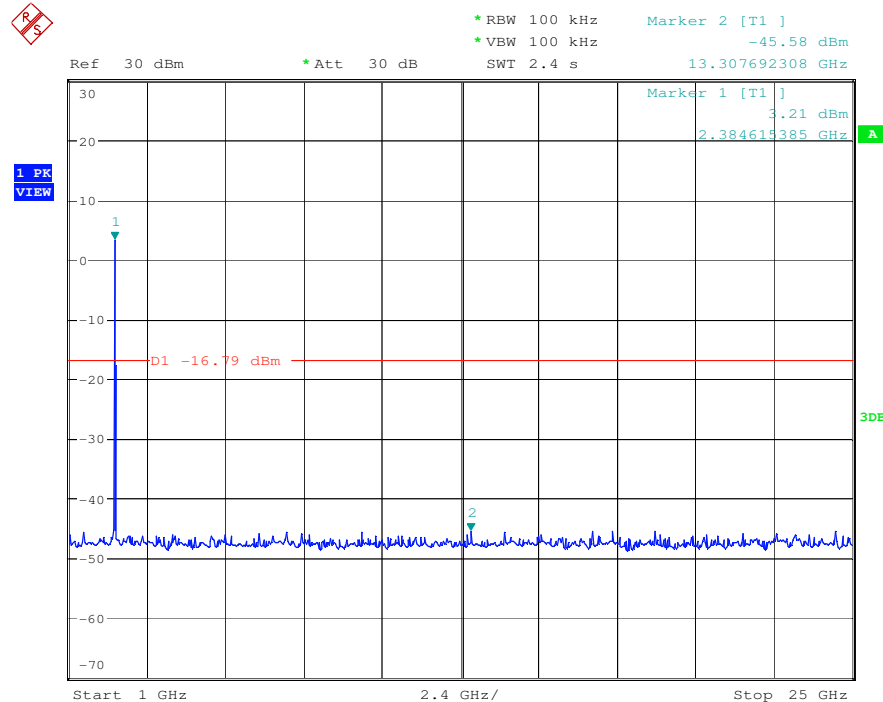
Date: 16.DEC.2008 12:50:31

Plot 42: Channel 1 – 11 Mbit



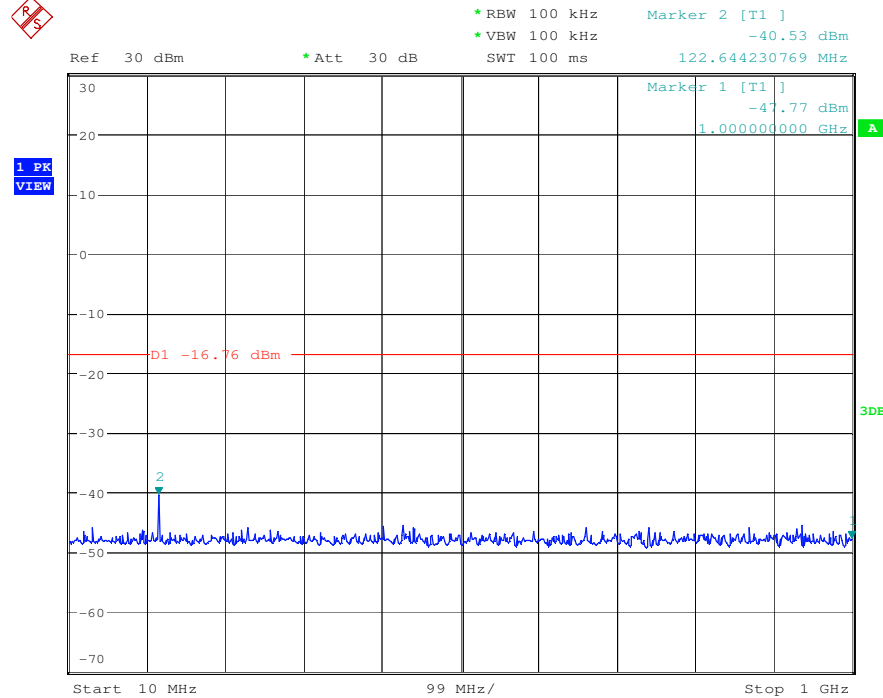
Date: 16.DEC.2008 12:54:09

Plot 43: Channel 1 – 11 Mbit



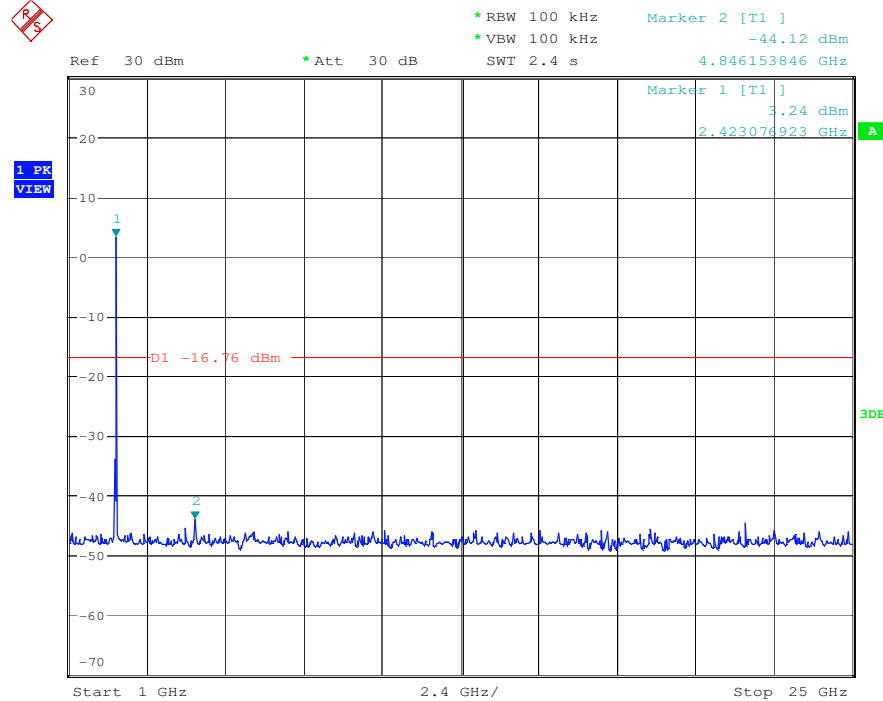
Date: 16.DEC.2008 12:53:18

Plot 44: Channel 6 – 1 Mbit



Date: 16.DEC.2008 13:12:10

Plot 45: Channel 6 – 1 Mbit



Date: 16.DEC.2008 13:11:31

SRD-Testreport

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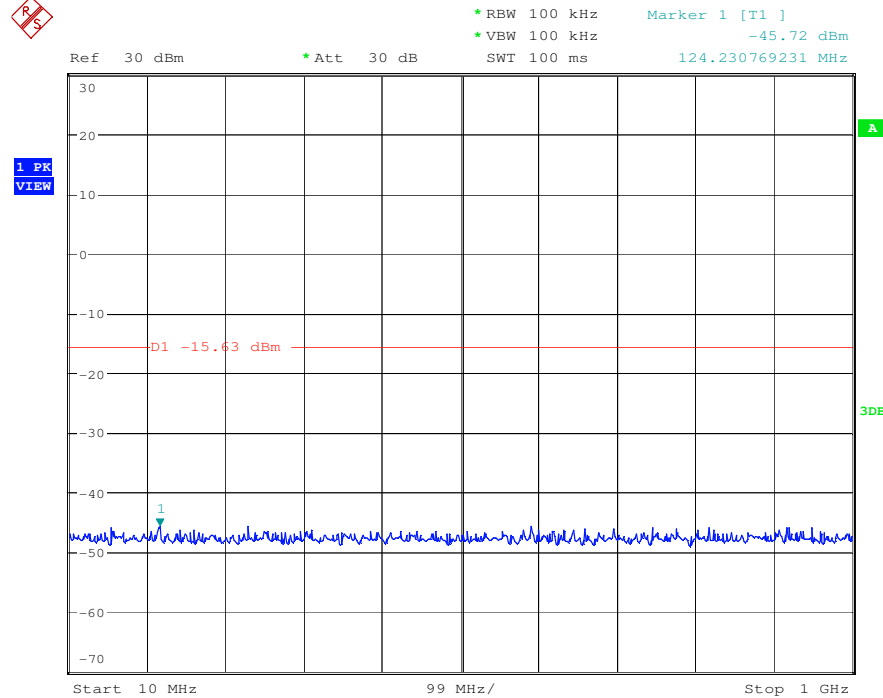


Test report No.: 4-3052-01-11/08

Date: 2009-01-16

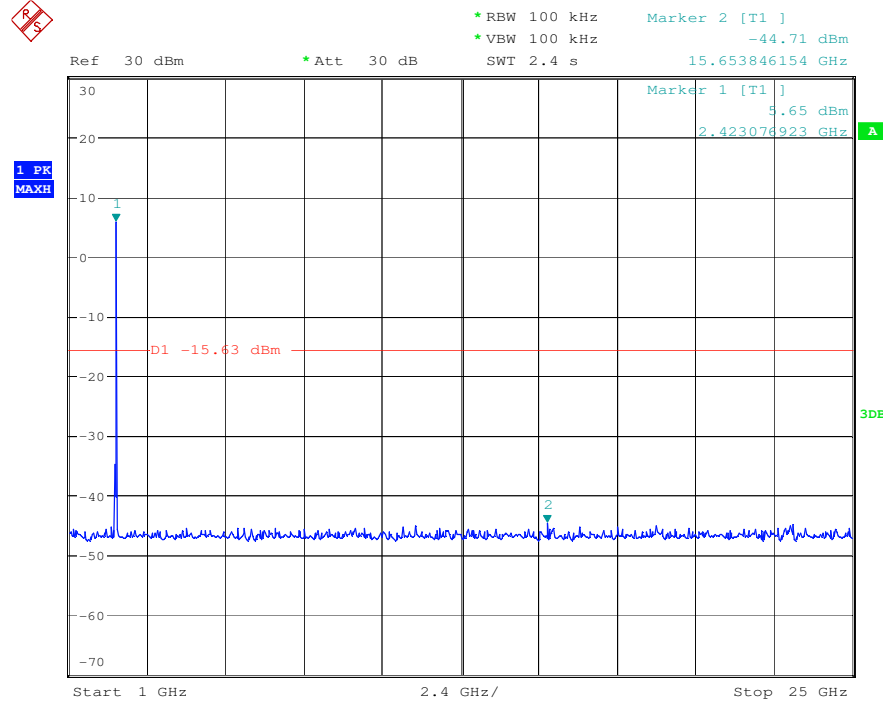
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Plot 46: Channel 6 – 11 Mbit



Date: 16.DEC.2008 13:01:15

Plot 47: Channel 6 – 11 Mbit



Date: 16.DEC.2008 13:00:04

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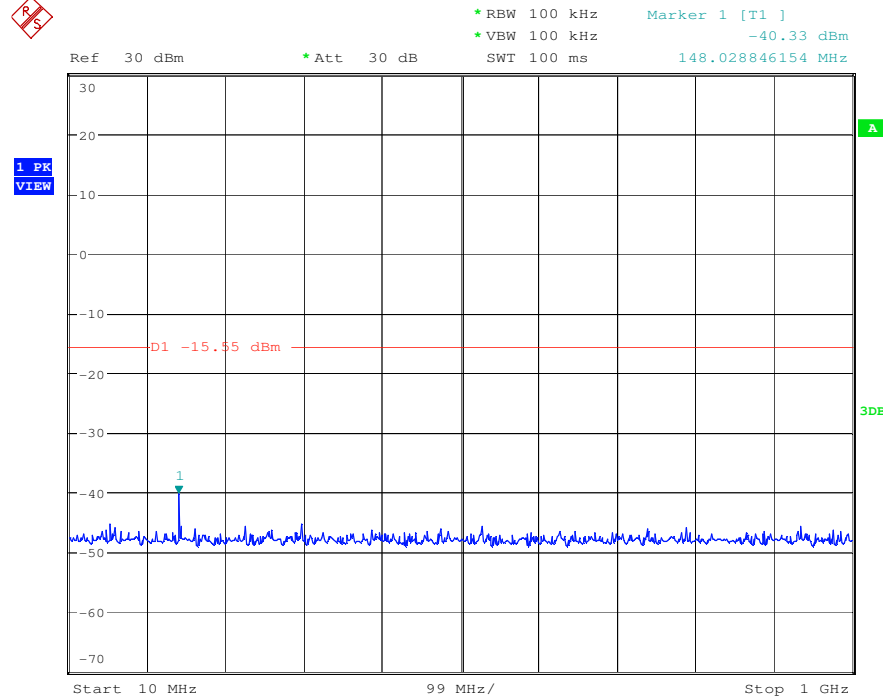


Test report No.: 4-3052-01-11/08

Date:2009-01-16

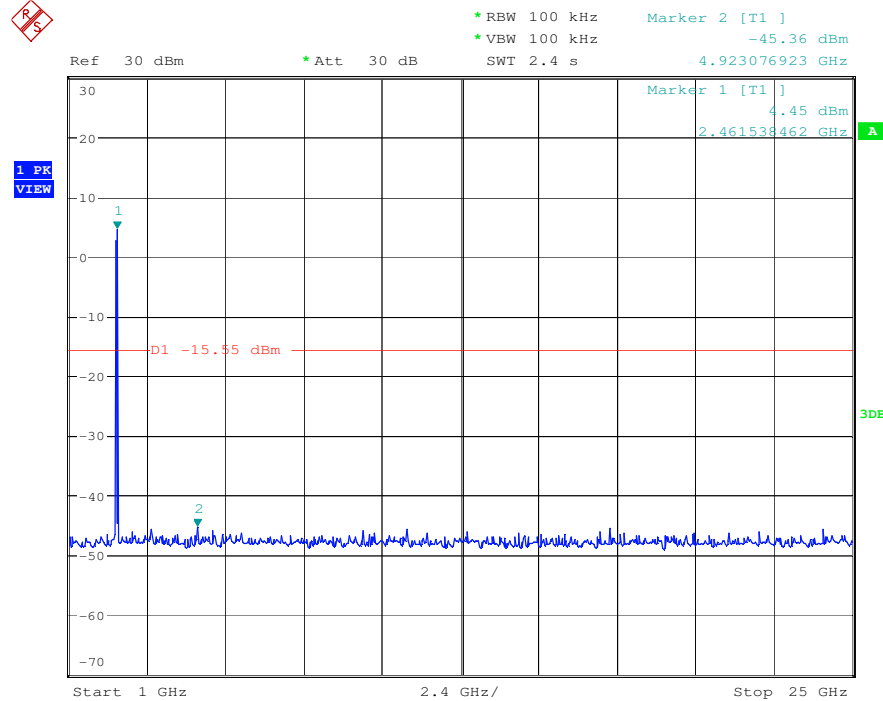
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Plot 48: Channel 11 – 1 Mbit



Date: 16.DEC.2008 13:14:50

Plot 49: Channel 11 – 1 Mbit



Date: 16.DEC.2008 13:14:04

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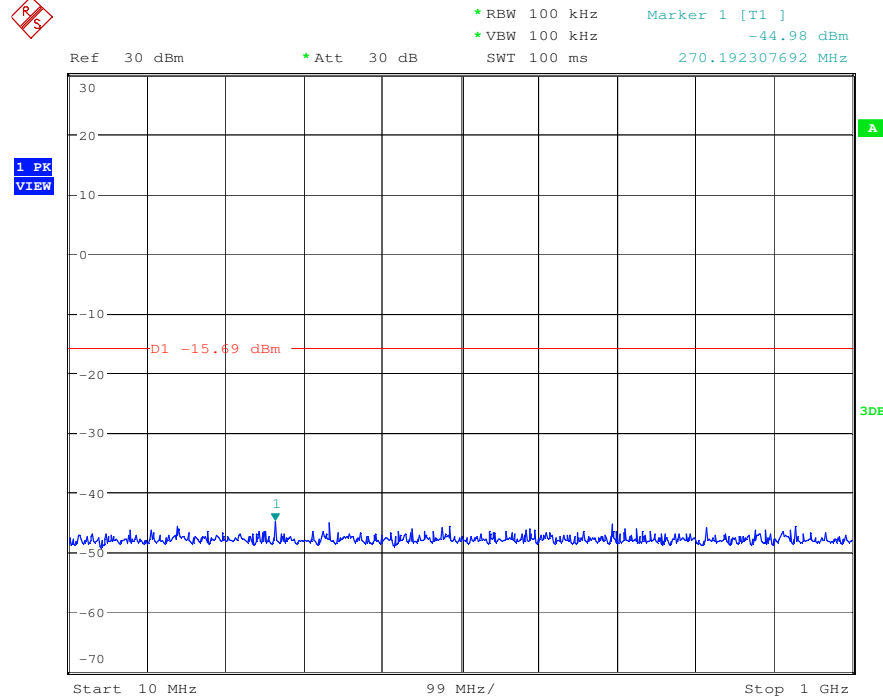


Test report No.: 4-3052-01-11/08

Date: 2009-01-16

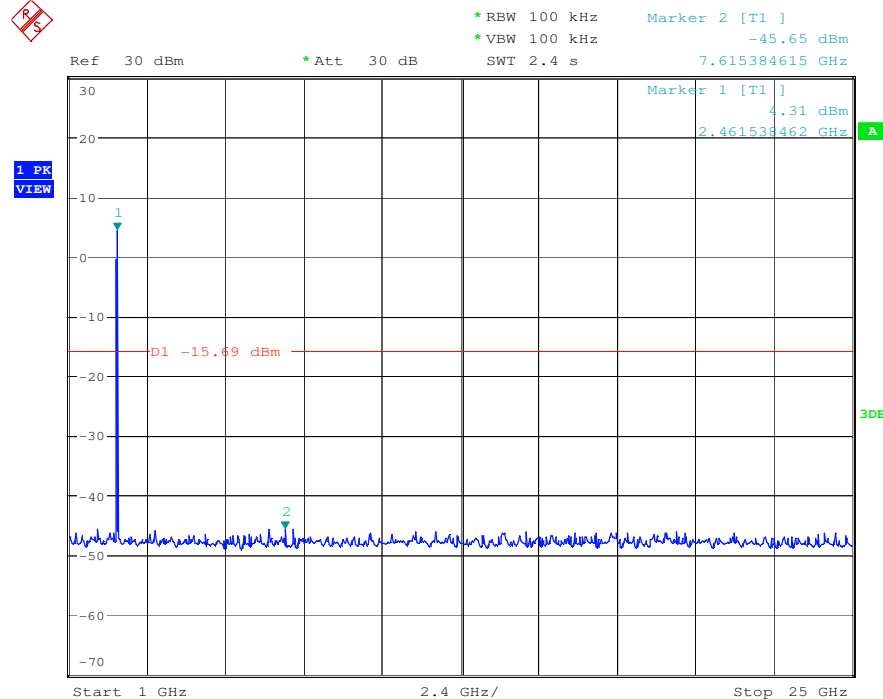
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Plot 50: Channel 11 – 11 Mbit



Date: 16.DEC.2008 13:17:59

Plot 51: Channel 11 – 11 Mbit



Date: 16.DEC.2008 13:17:02

Result & Limits

Emission Limitations					
f [MHz]		amplitude of emission [dBm]	limit max. allowed emission power	actual attenuation below frequency of operation [dB]	results
			2412		Operating frequency
			-20 dBc		
			2437		Operating frequency
			-20 dBc		
			2462		Operating frequency
			-20 dBc		
Measurement uncertainty		± 3dB			

RBW : 100 kHz VBW: 100 kHz

No critical peaks found

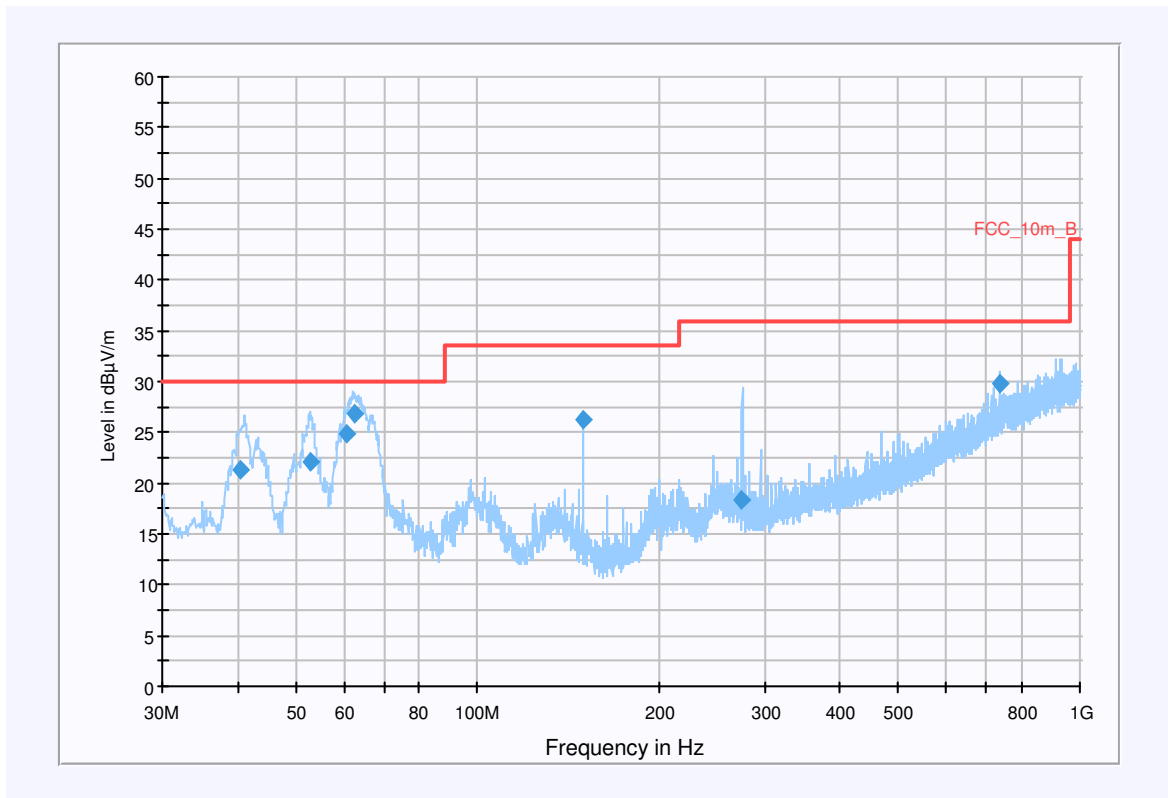
Under normal test conditions only	In any 100 kHz bandwidth outside the frequency band at least 20dB below the highest level of the desired power. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified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

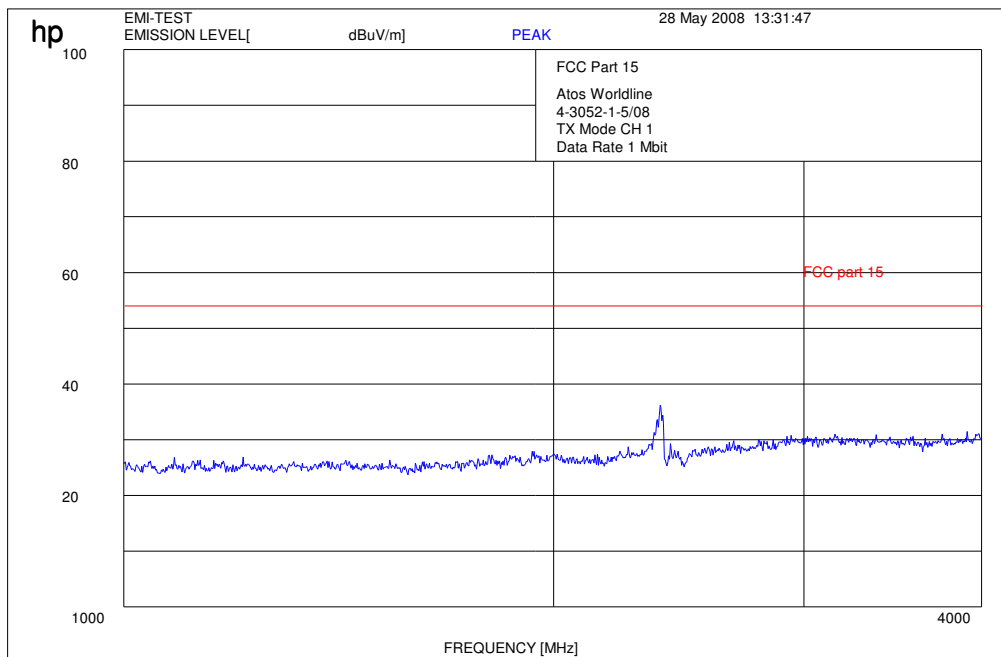
3.13 Spurious Emissions - radiated (Transmitter) DSSS §15.209

Data Rate 1 Mbit/s

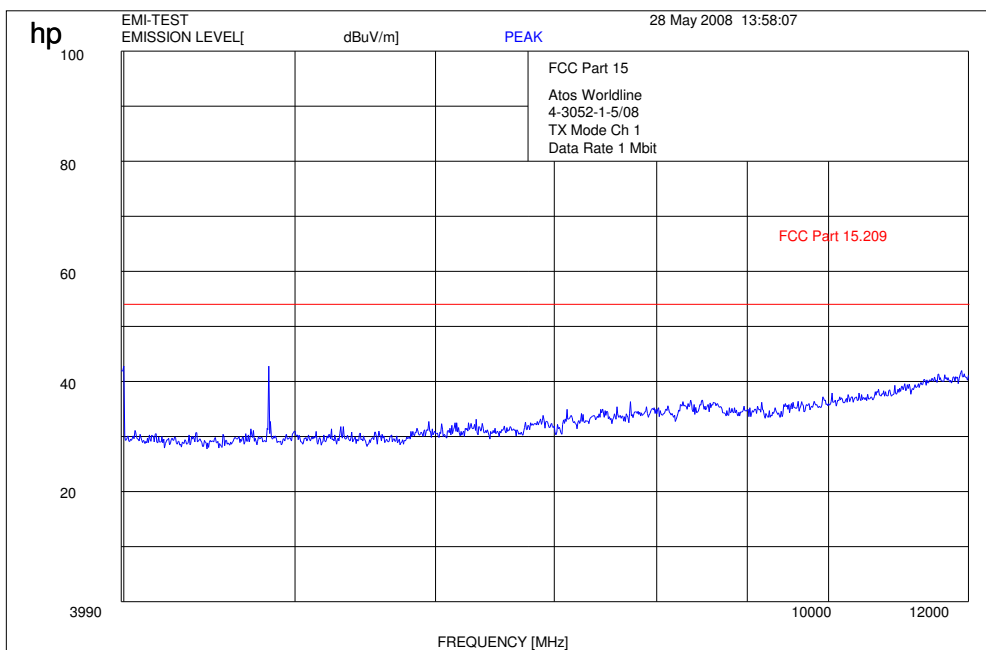
Plot 52: 0.03 - 1 GHz vertical / horizontal (Channel 1 – 1 Mbit/s)



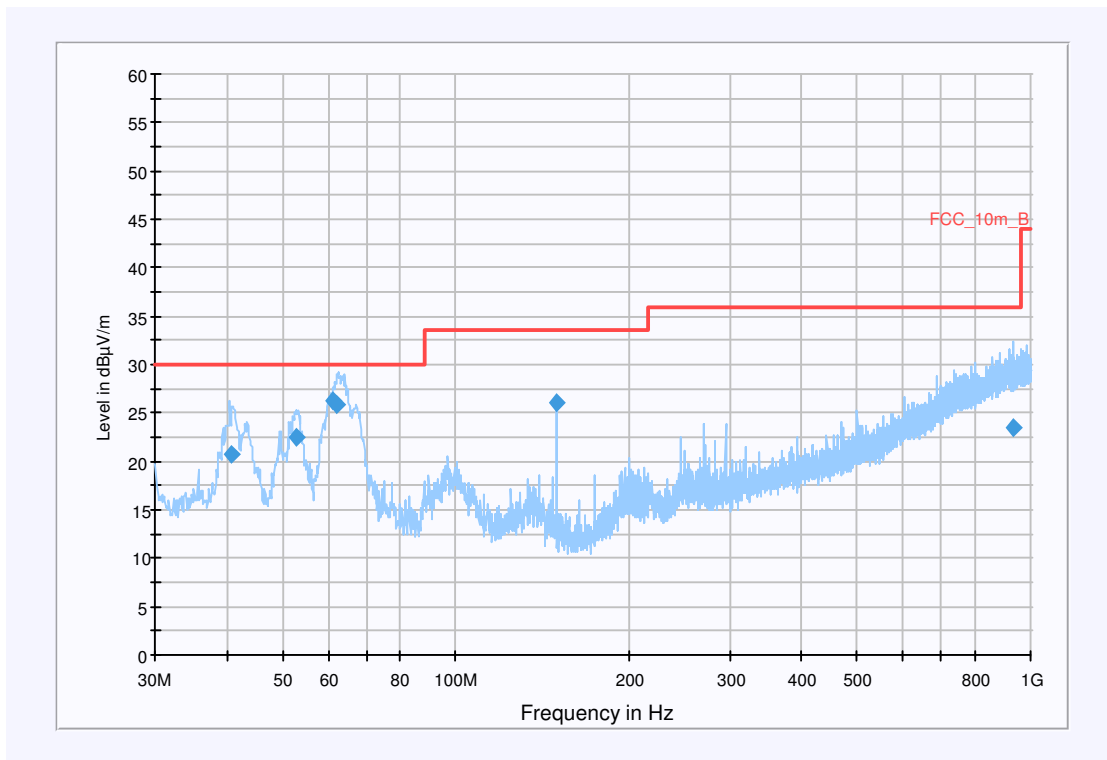
Plot 53: 1- 4 GHz (Channel 1 – 1 Mbit/s)



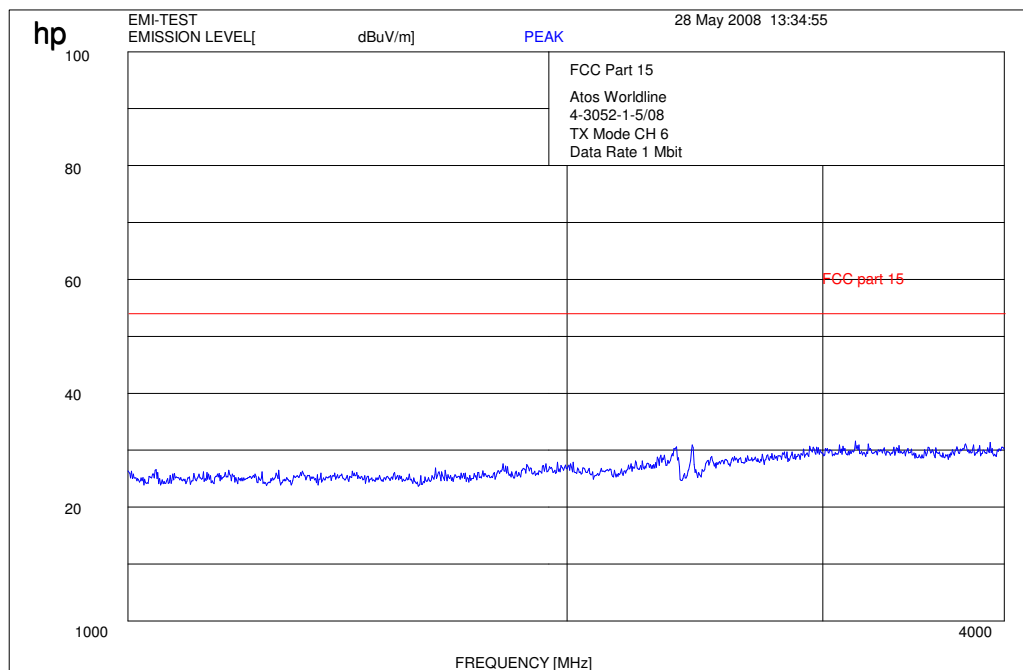
Plot 54: 4 - 12 GHz horizontal / vertical (Channel 1 – 1 Mbit/s)



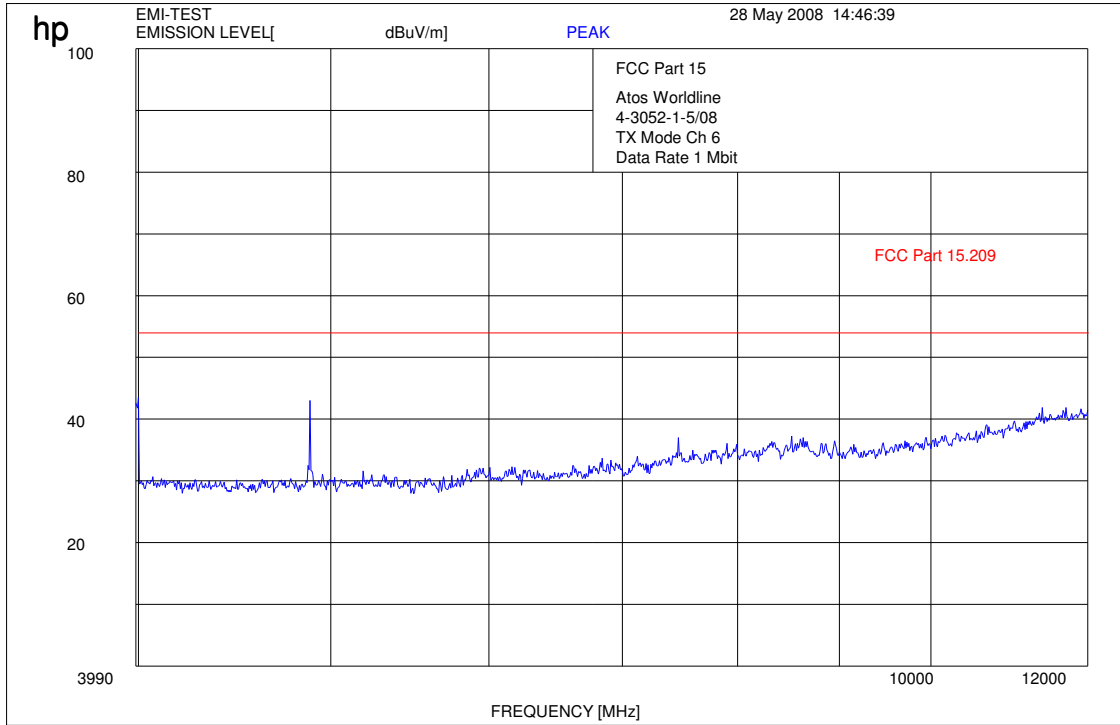
Plot 55: 0.03 – 1 GHz vertical / horizontal (Channel 6 – 1 Mbit/s)



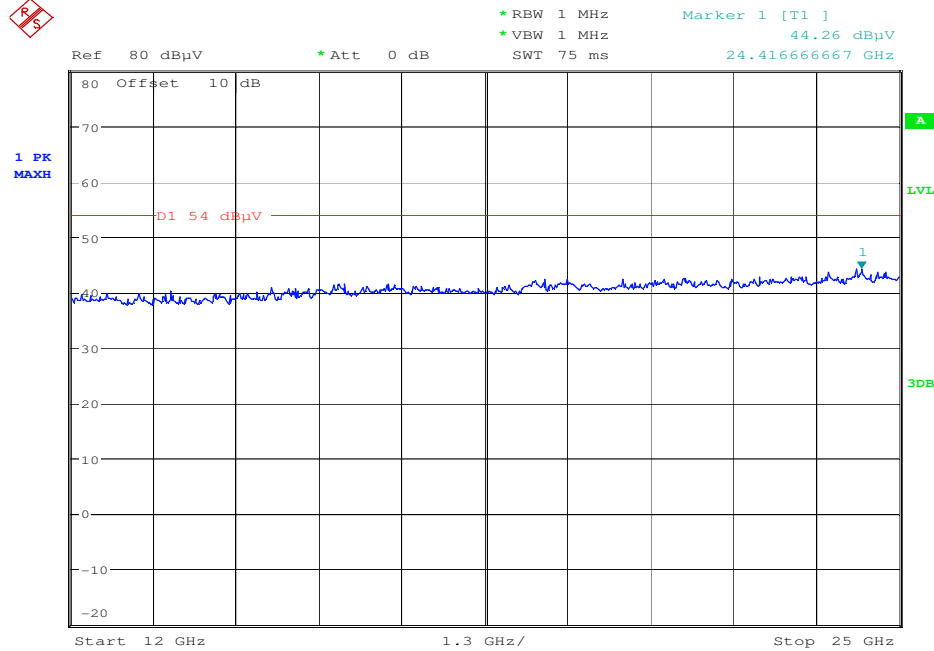
Plot 56: 1 – 4 GHz vertical / horizontal (Channel 6 – 1 Mbit/s)



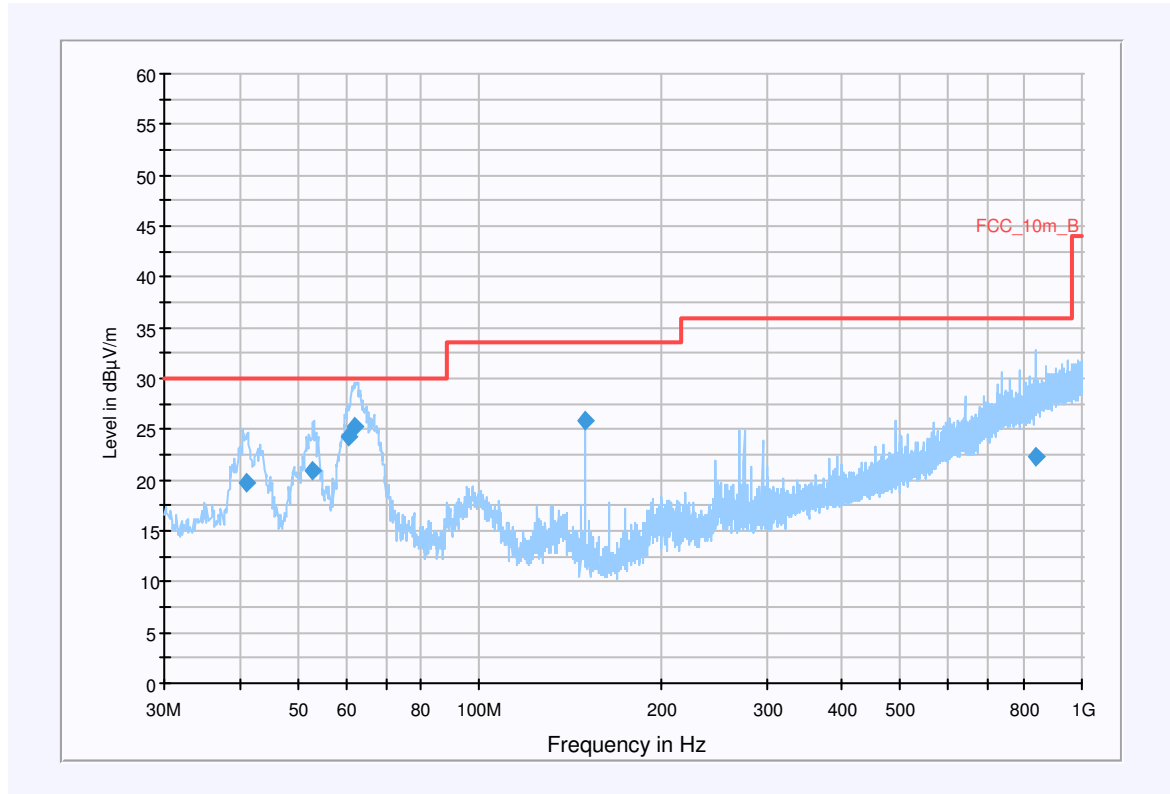
Plot 57: 4- 12 GHz vertical / horizontal (Channel 6 – 1 Mbit/s)



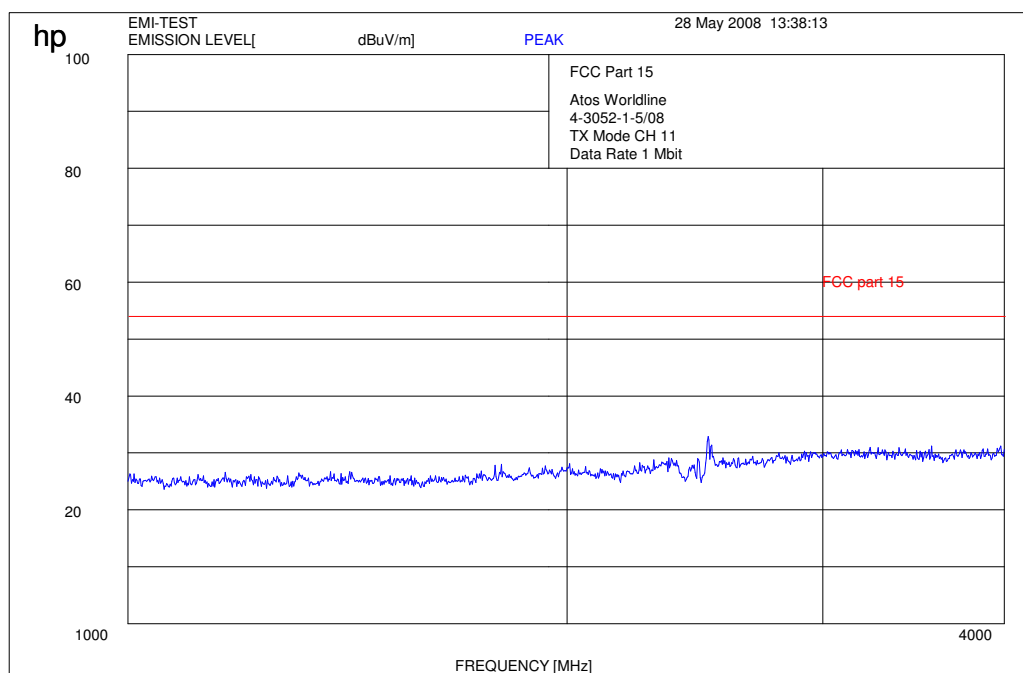
Plot 58: 12- 25 GHz vertical / horizontal (Channel 6 – 1 Mbit/s – valid for all three channels)



Plot 59: 0.03 - 4 GHz vertical / horizontal (Channel 11 – 1 Mbit/s)



Plot 60: 1 - 4 GHz vertical / horizontal (Channel 11 – 1 Mbit/s)



SRD-Testreport

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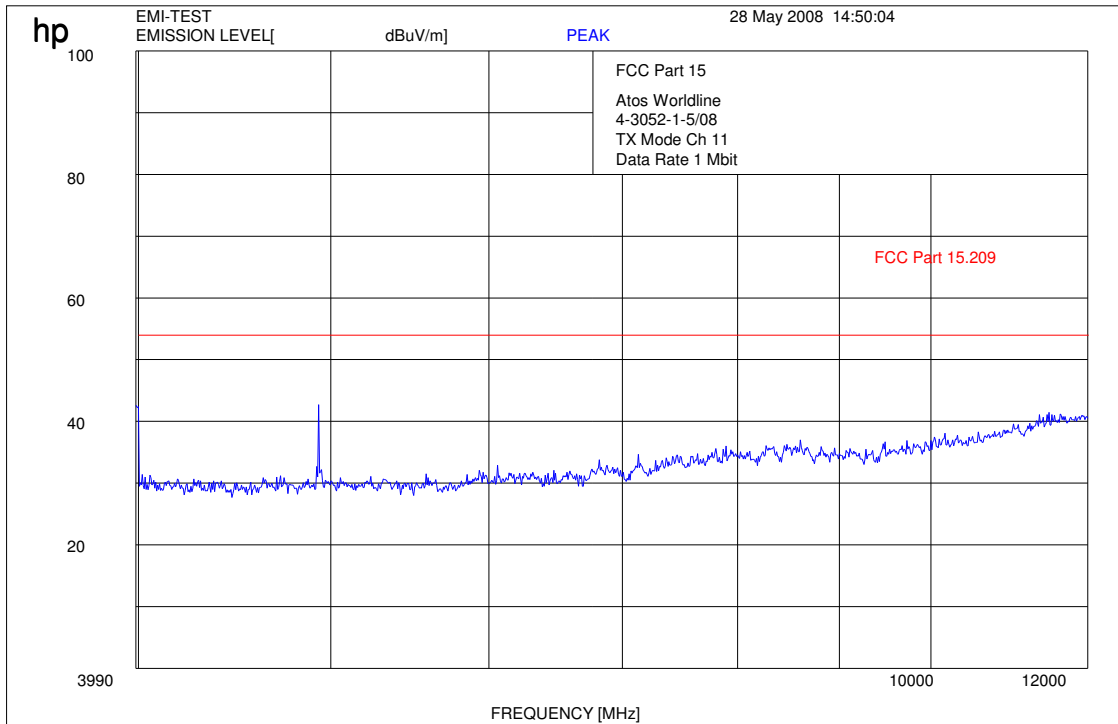


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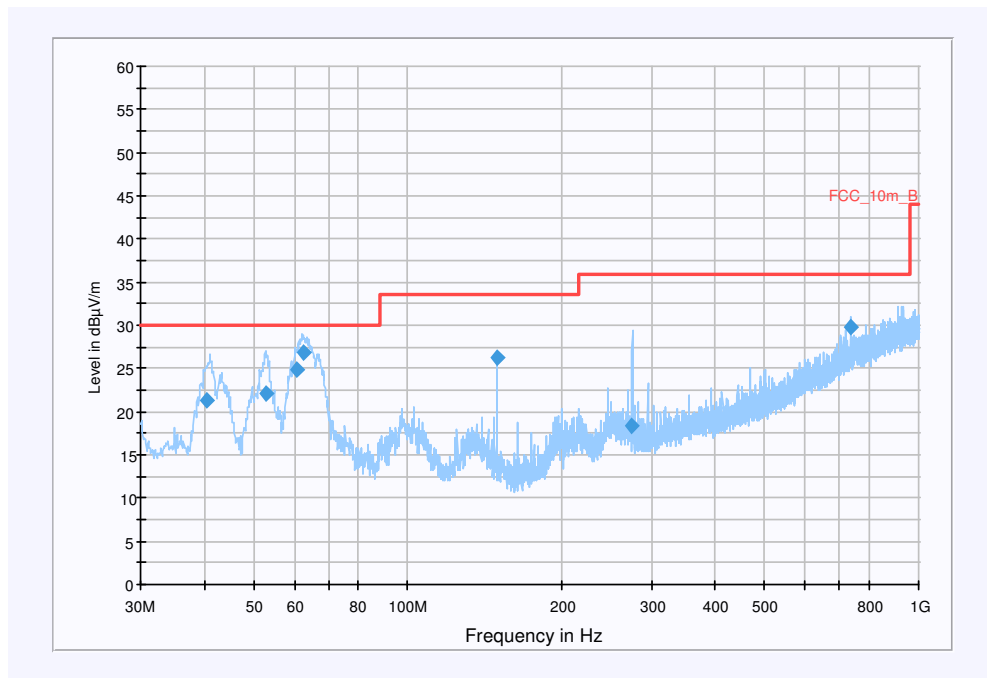
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Plot 61: 4- 12 GHz vertical / horizontal (Channel 11 – 1 Mbit/s)

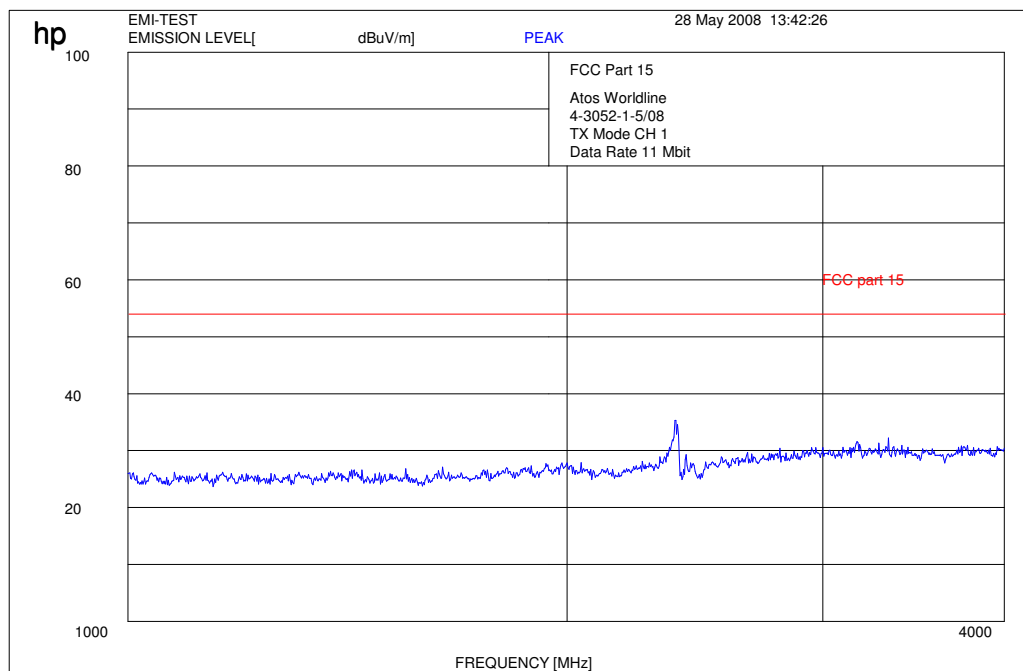


Data Rate 11 Mbit/s

Plot 62: 0.03 - 1 GHz vertical / horizontal (Channel 1 – 11 Mbit/s)



Plot 63: 1 - 4 GHz vertical / horizontal (Channel 1 – 11 Mbit/s)



SRD-Testreport

CETECOM ICT Services GmbH Saarbruecken, Germany

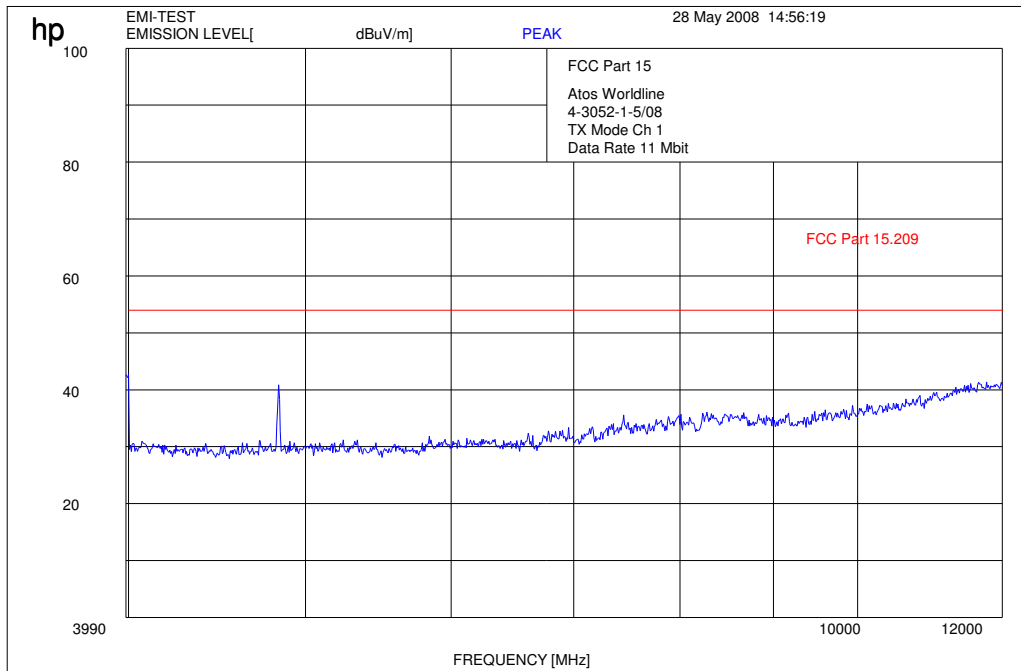


Test report No.: 4-3052-01-11/08

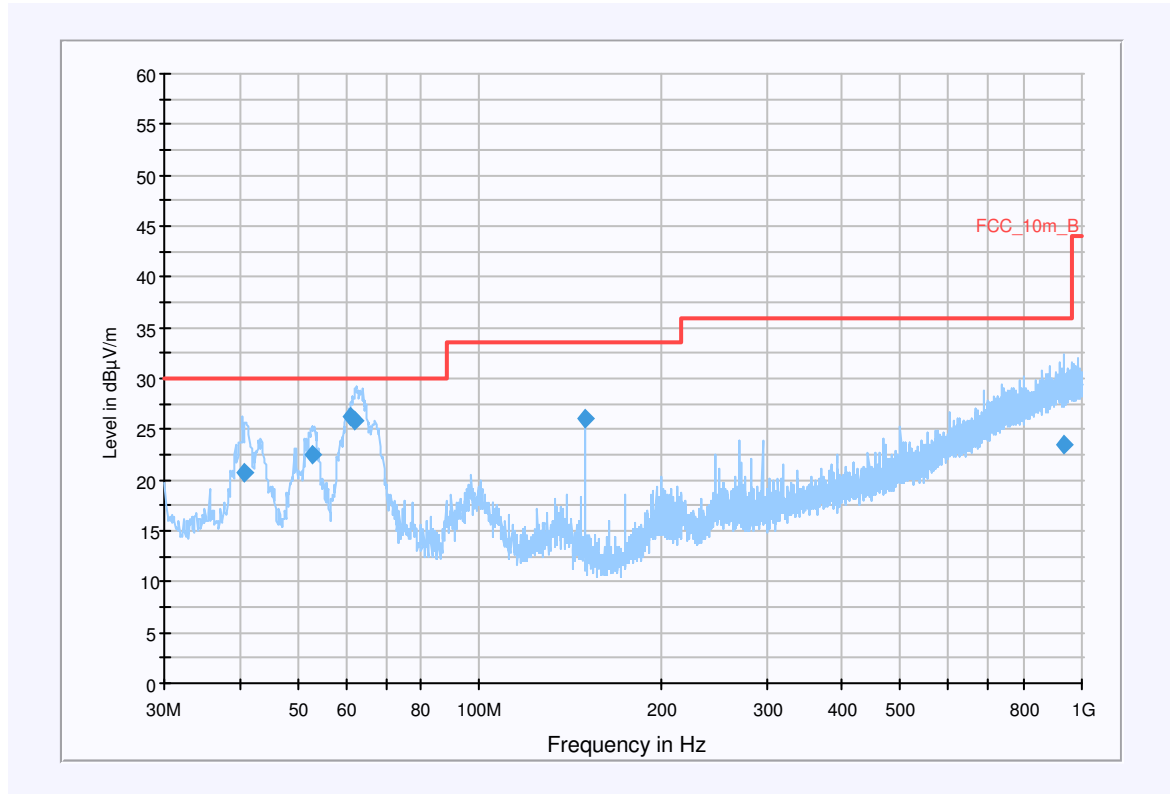
Date:2009-01-16

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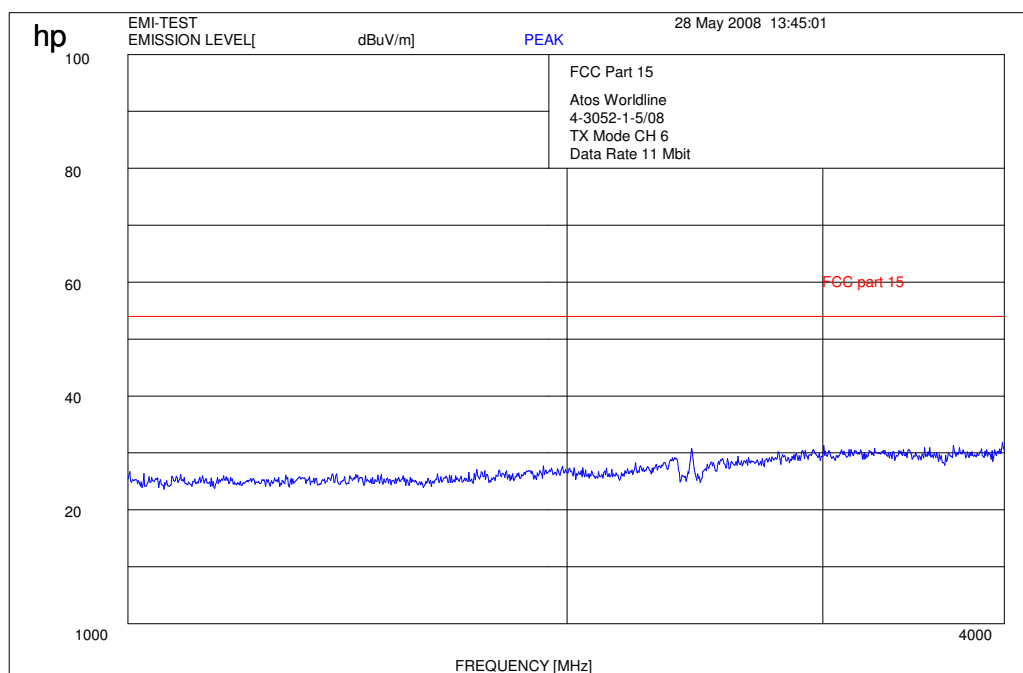
Plot 64: 4- 12 GHz vertical / horizontal (Channel 1 – 11 Mbit/s)



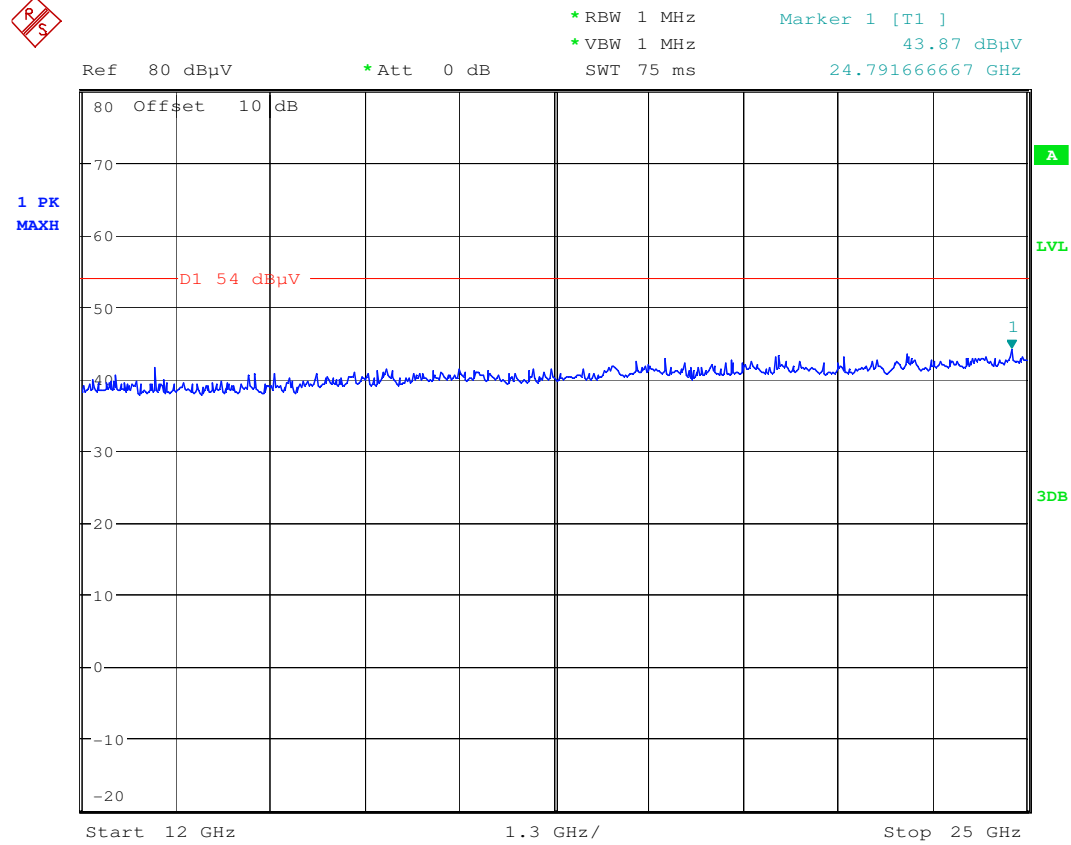
Plot 65: 0.03 - 1 GHz vertical / horizontal (Channel 6 – 11 Mbit/s)



Plot 66: 1 - 4 GHz vertical / horizontal (Channel 6 – 11 Mbit/s)

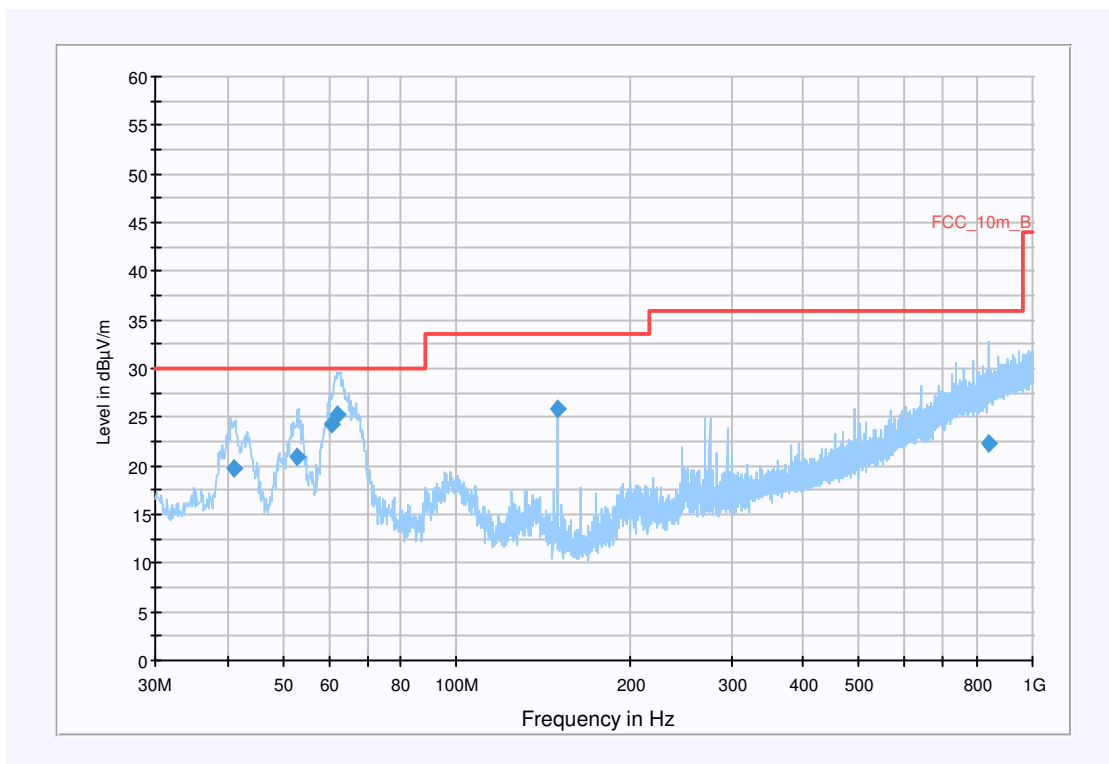


Plot 67: 12 - 25 GHz vertical / horizontal (Channel 6 – 11 Mbit/s – valid for all three channels)

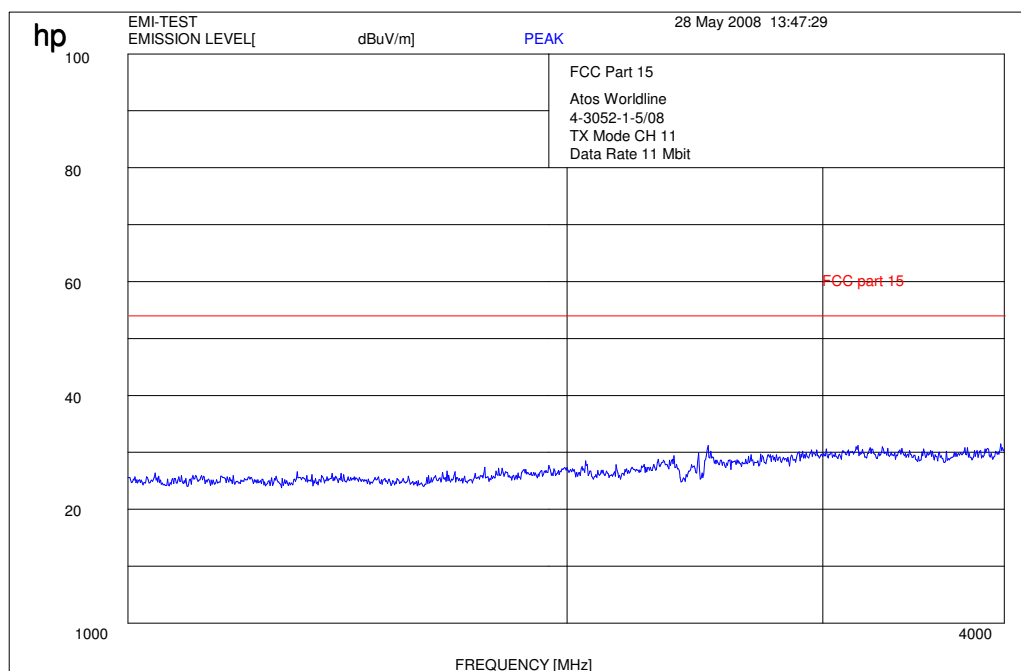


Date: 29.MAY.2008 10:04:03

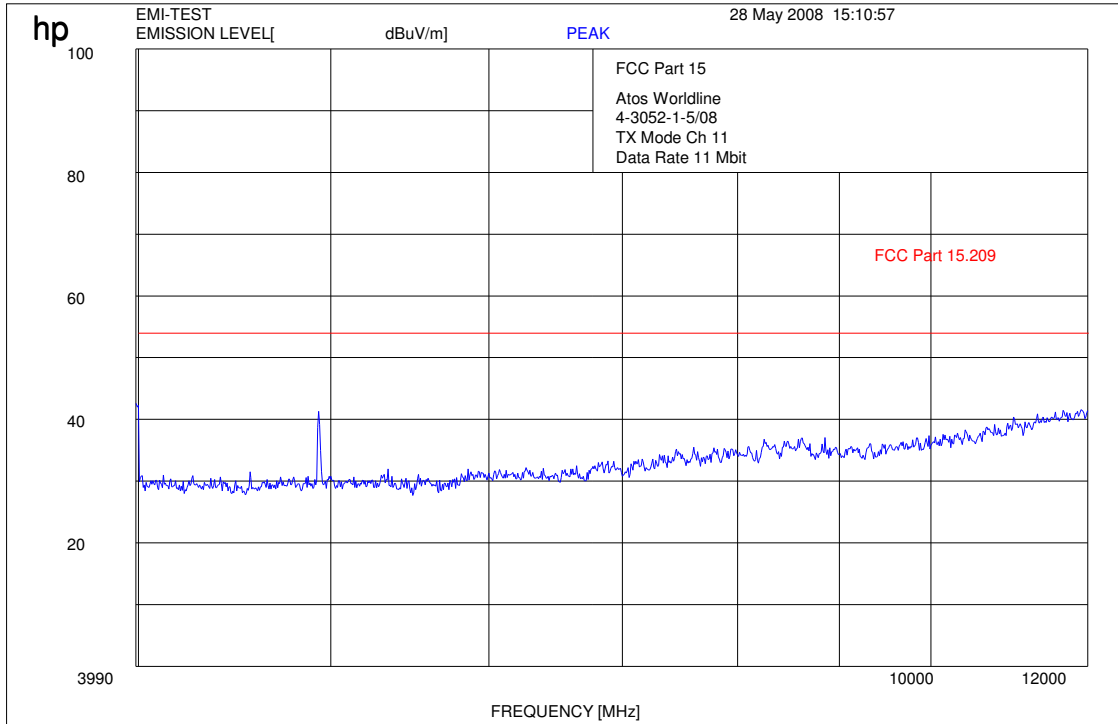
Plot 68: 0.03 - 1 GHz vertical / horizontal (Channel 11 – 11 Mbit/s)



Plot 69: 1 - 4 GHz vertical / horizontal (Channel 11 – 11 Mbit/s)



Plot 70: 4 - 12 GHz vertical / horizontal (Channel 11 – 11 Mbit/s)



Results:

SPURIOUS EMISSIONS LEVEL §15.209								
2412 MHz (Channel 1)			2437 MHz (Channel 6)			2462 MHz (Channel 11)		
F [MHz]	Detector	Level [dBµV/m]	F [MHz]	Detector	Level [dBµV/m]	F [MHz]	Detector	Level [dBµV/m]
Data Rate 1 Mbit/s								
4824	Peak	44.5	4874	Peak	43.5	4924	Peak	43.2
Data Rate 11 Mbit/s								
4824	Peak	40.9	4874	Peak	40.9	4924	Peak	41.3
Measurement uncertainty			±3 dB					

f < 1 GHz : RBW/VBW: 100 kHz

f ≥ 1GHz : RBW/VBW: 1 MHz

Limits: § 15.247 (c)

In any 100 kHz bandwidth outside the frequency band at least 20dB below the highest level of the desired power. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

Limits: § 15.209

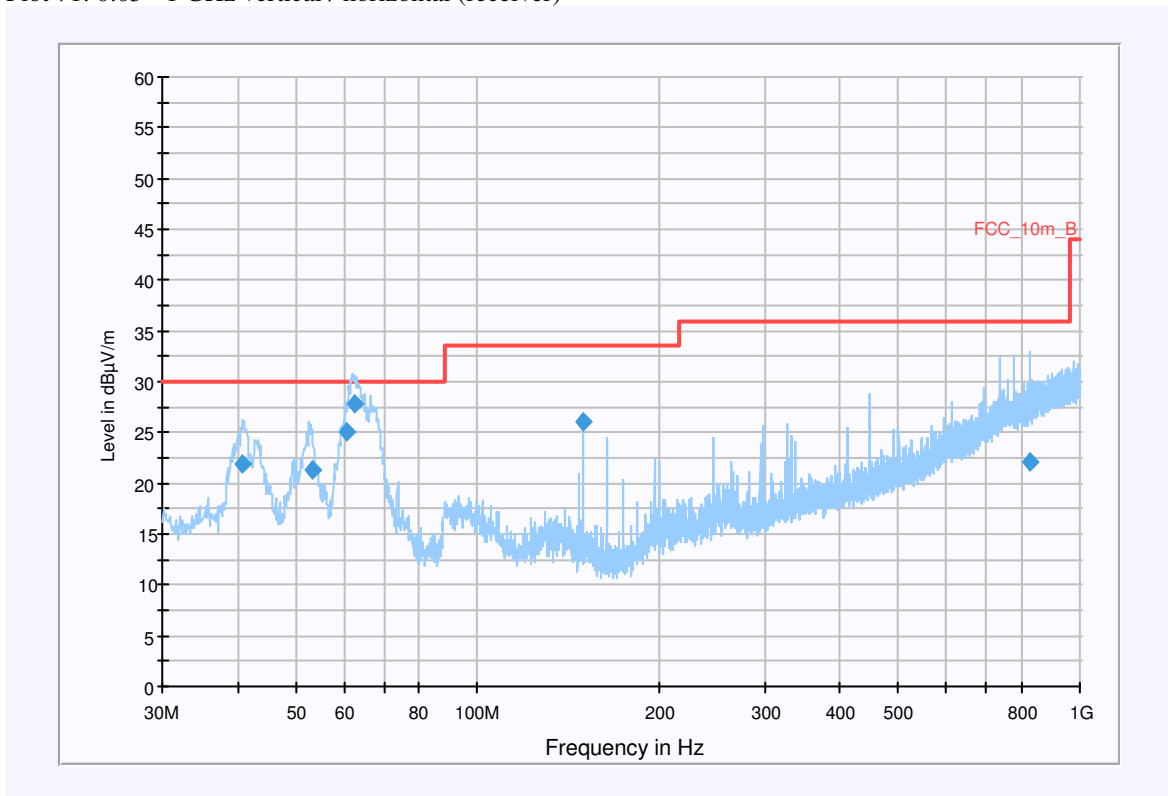
Frequency [MHz]	Field strength [µV/m]	Measurement distance (m)
30 - 88	100 (40 dBµV/m)	3
88 - 216	150 (43.5 dBµV/m)	3
216 - 960	200 (46 dBµV/m)	3
above 960	500 (54 dBµV/m)	3

3.14 Spurious Emissions - radiated Receiver

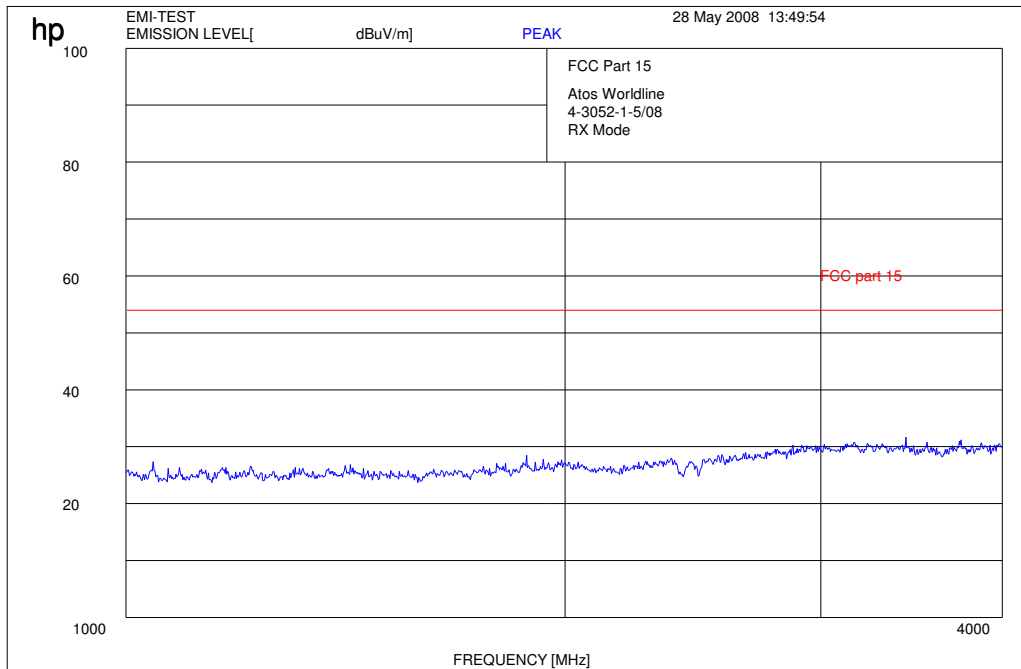
§15.109 / 209

DSSS

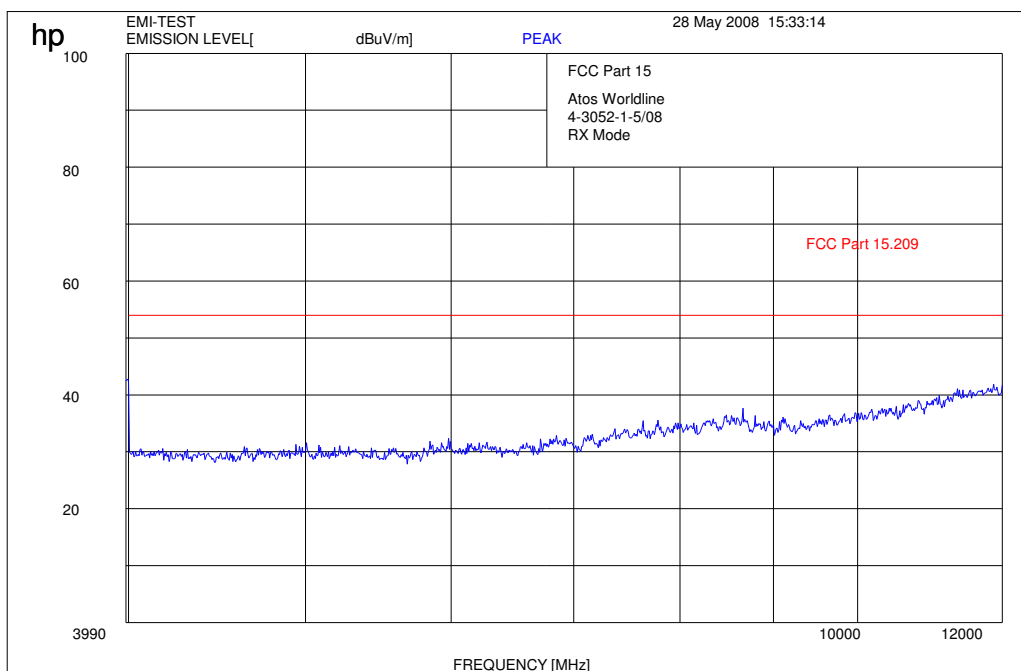
Plot 71: 0.03 - 1 GHz vertical / horizontal (receiver)



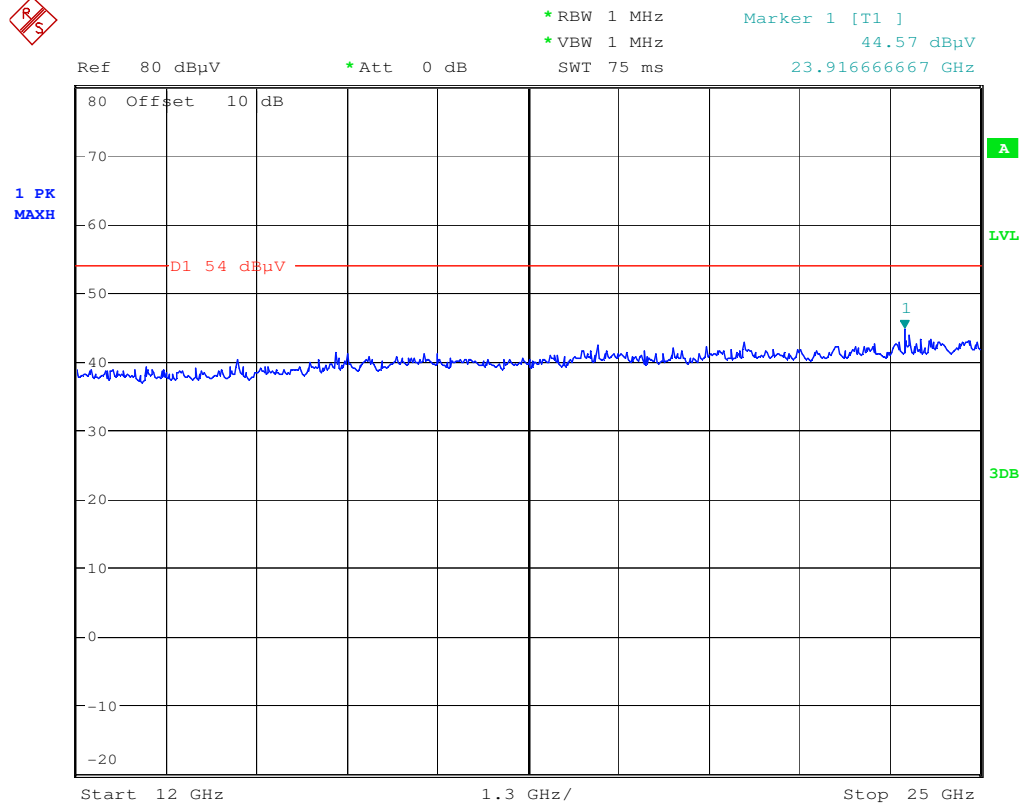
Plot 72: 1- 4 GHz vertical / horizontal (receiver)



Plot 73: 4- 12 GHz vertical / horizontal (receiver)



Plot 74: 12- 25 GHz vertical / horizontal (receiver)



Date: 29.MAY.2008 10:14:19

Results:

Spurious Emissions level [µV/m]								
CH 1 / 6 / 11								
f[MHz]	Detector	Level [µV/m]	f[MHz]	Detector	Level [µV/m]	f[MHz]	Detector	Level [µV/m]
< Limit (see Plots)								
Measurement uncertainty			±3 dB					

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

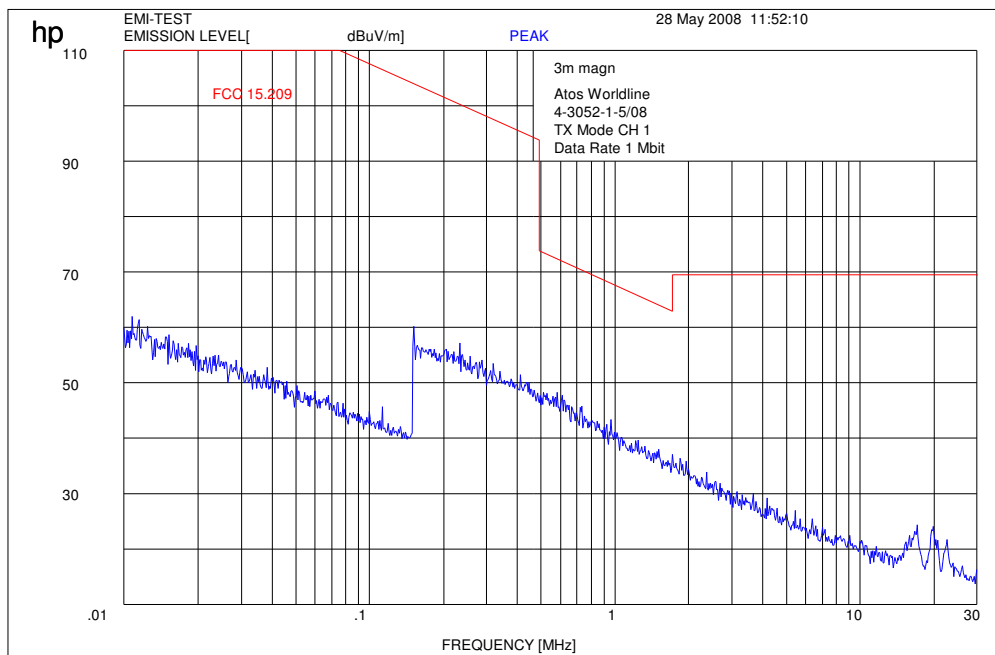
Limits : § 15.109 / 209

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

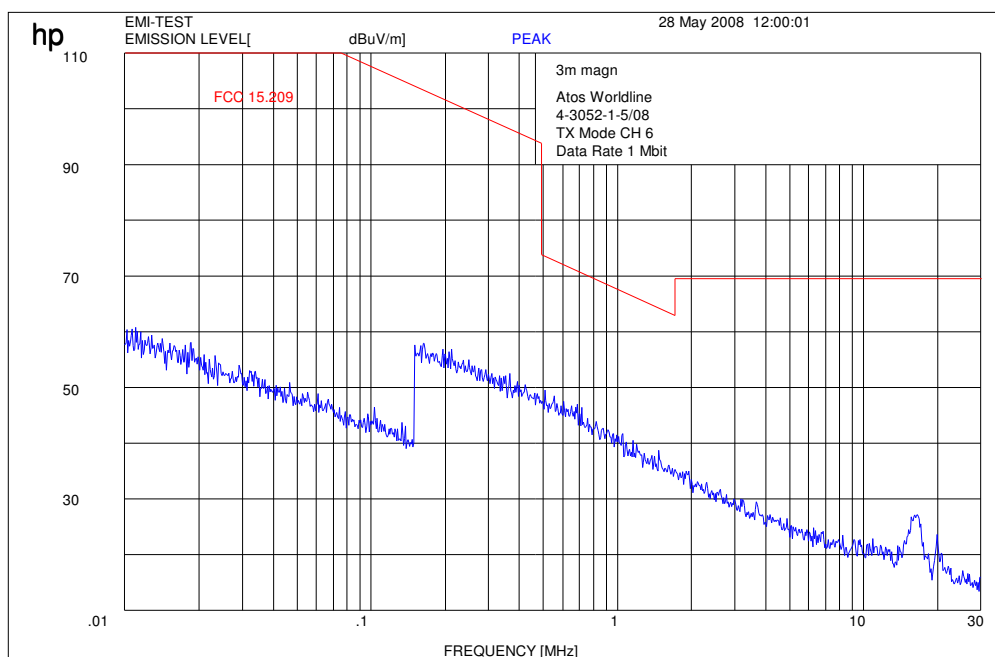
3.15 Spurious Emissions - radiated <30 MHz

§15.109

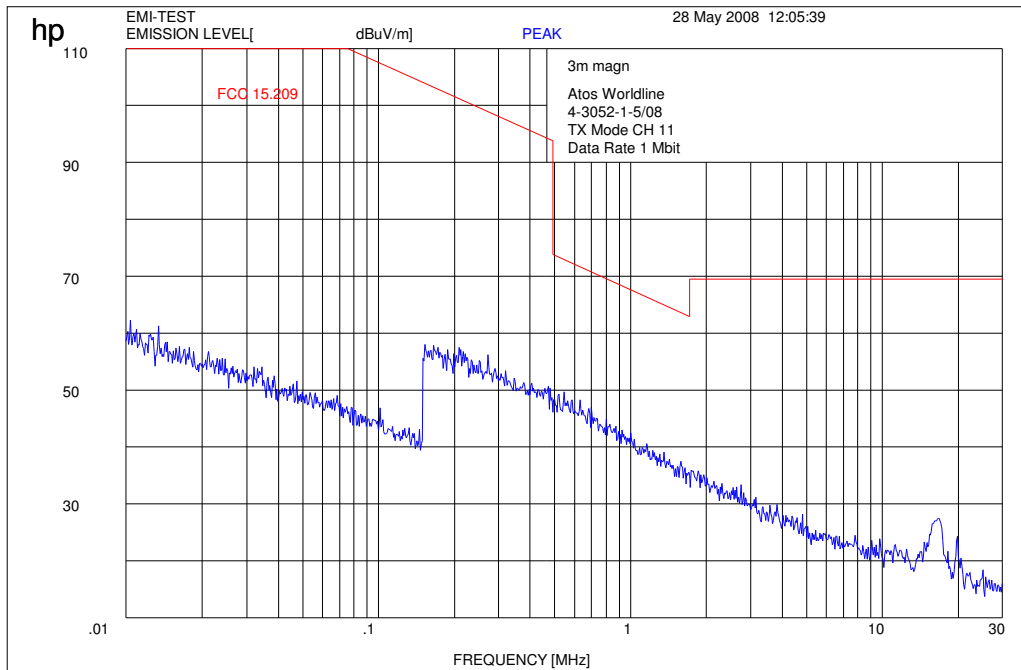
Plot 75: Channel 1 – 1 Mbit/s



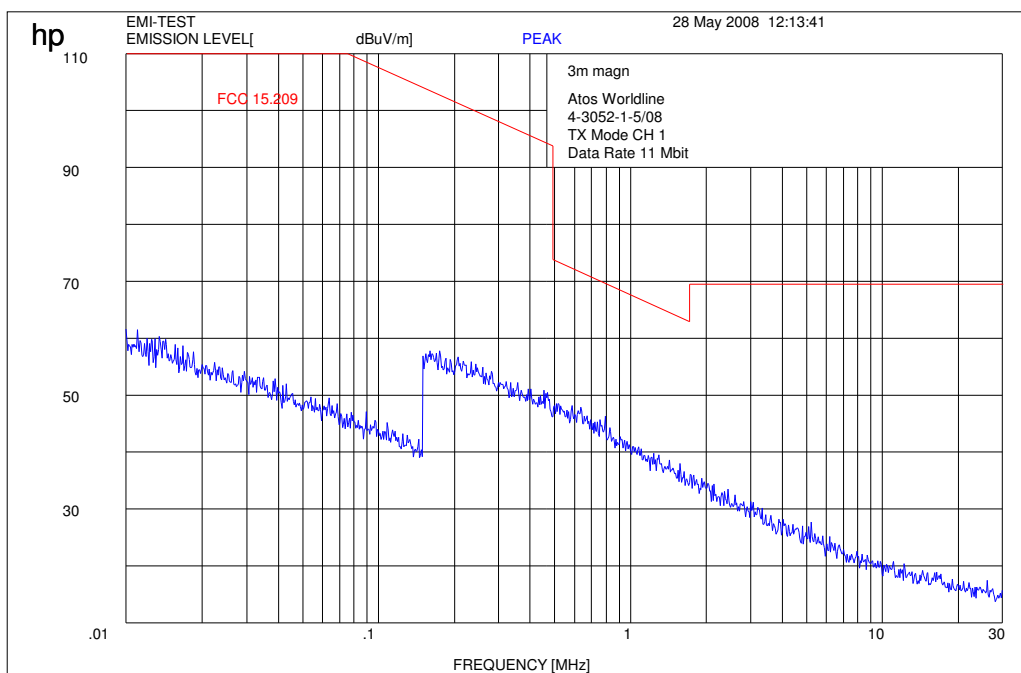
Plot 76: Channel 6 – 1 Mbit/s



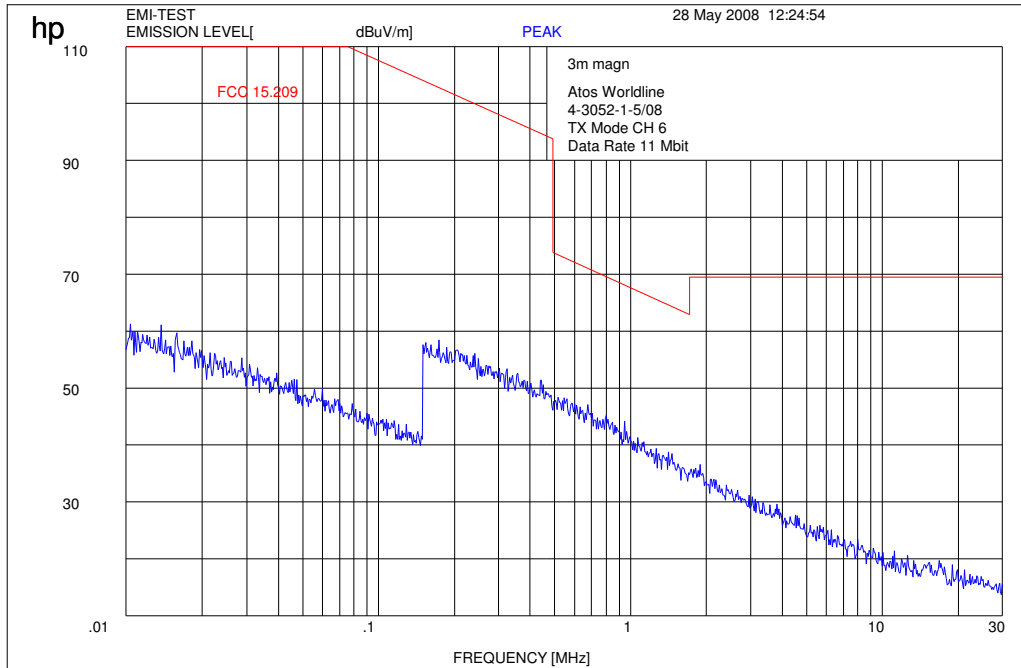
Plot 77: Channel 11 – 1 Mbit/s



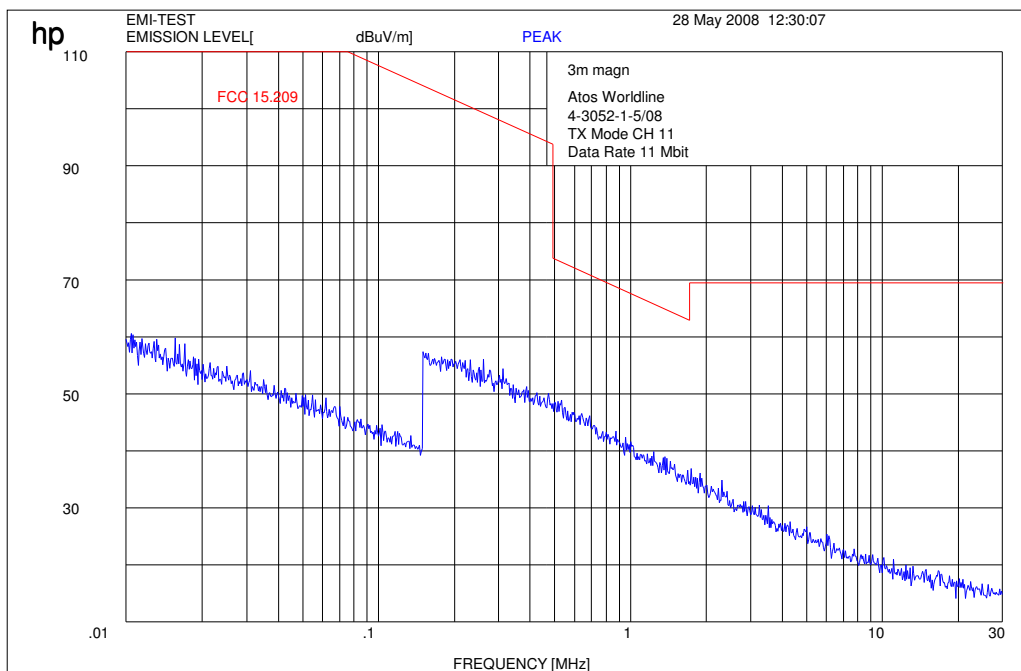
Plot 78: Channel 1 – 11 Mbit/s



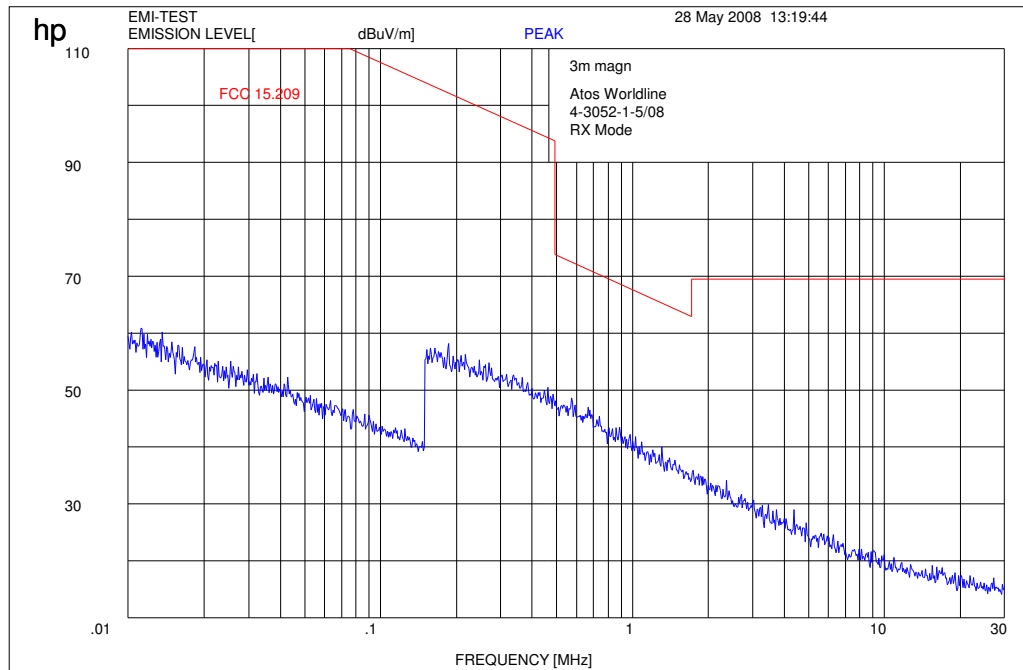
Plot 79: Channel 6 – 11 Mbit/s



Plot 80: Channel 11 – 11 Mbit/s



Plot 81: RX Mode



Limits:

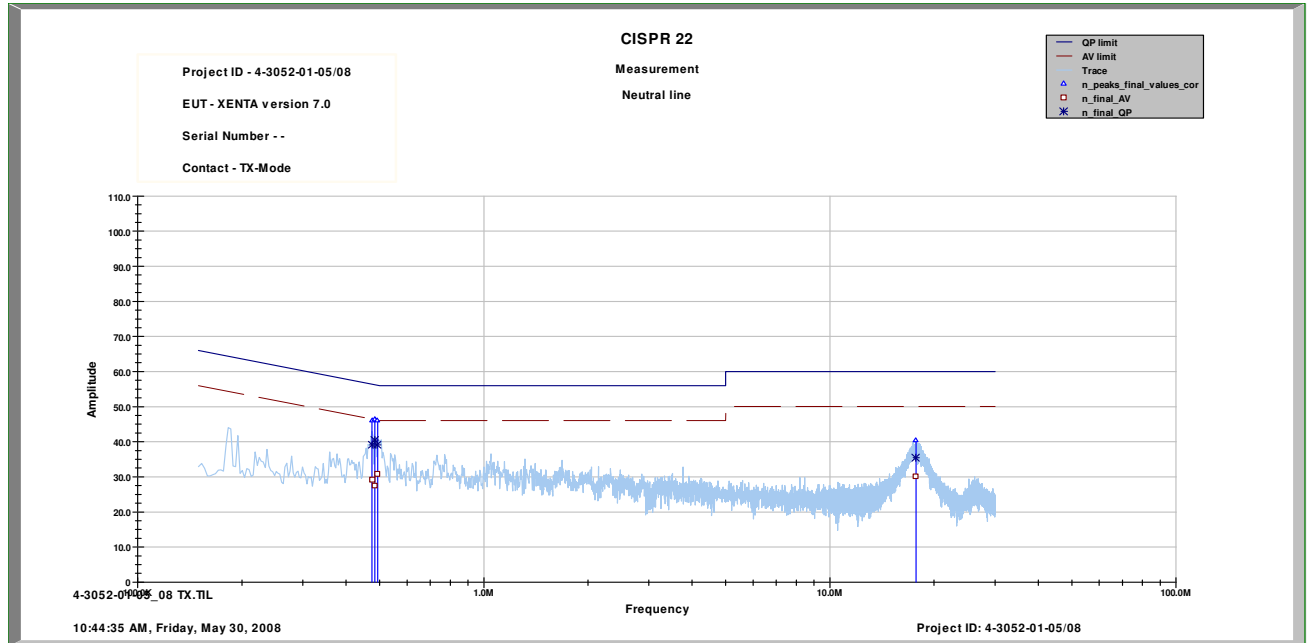
Frequency (MHz)	Field strength ($\mu\text{V/m}$)	Measurement distance (m)
0.009 – 0.490	2400/F(kHz)	300
0.490 – 1.705	24000/F(kHz)	30
1.705 – 30.0	30 / 29.5 dB $\mu\text{V/m}$	30
30 - 88	100 / 40 dB $\mu\text{V/m}$	3
88 - 216	150 / 43.5 dB $\mu\text{V/m}$	3
216 - 960	200 / 46 dB $\mu\text{V/m}$	3
above 960	54 dB $\mu\text{V/m}$	3

3.17 Conducted Emissions <30 MHz

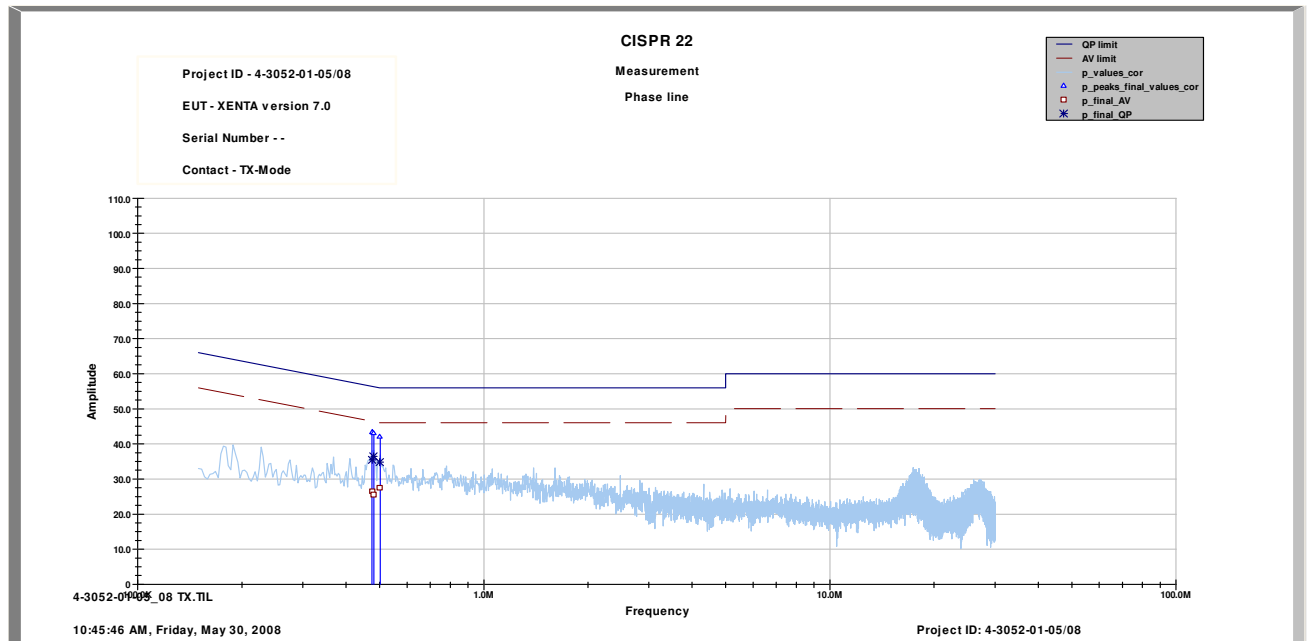
§15.107/207

We measured in TX and RX mode, L1 and N floating and grounded, max value was hold.

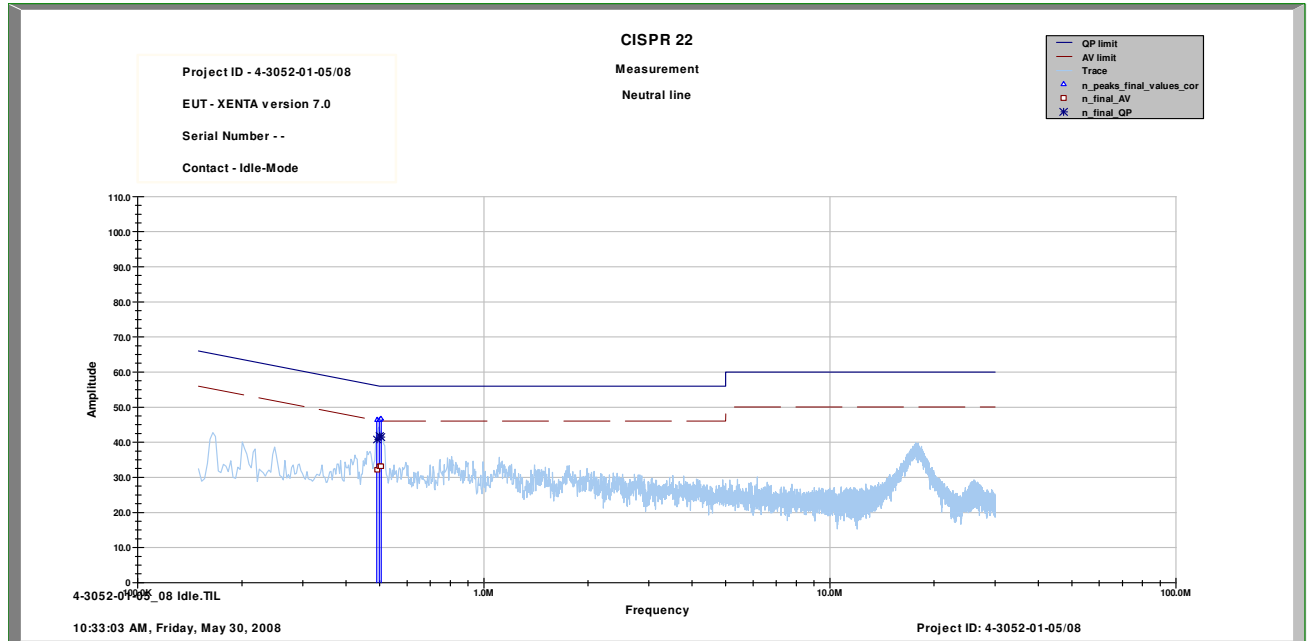
Plot 82: Neutral Line TX-Mode



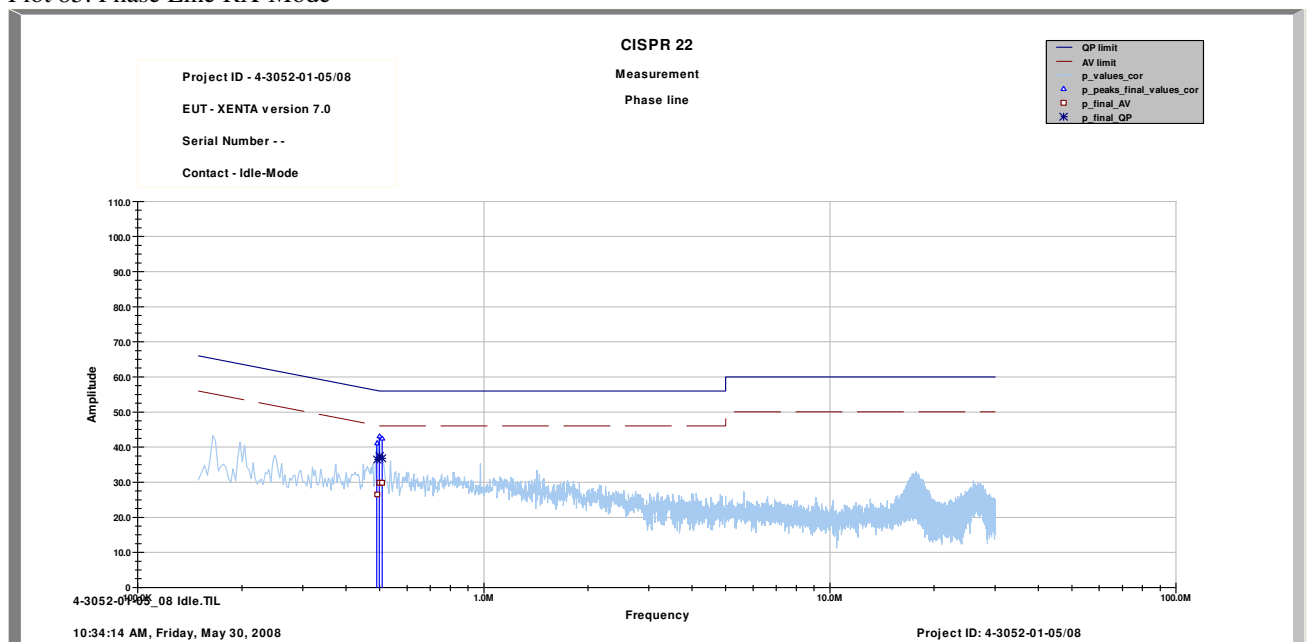
Plot 83: Phase Line TX-Mode



Plot 84: Neutral Line RX-Mode



Plot 85: Phase Line RX-Mode



Limits :

Under normal test conditions only	See plots
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3.16 Used Test equipment

Anechoic chamber C:

Device	Manufacturer	Type	S/N Number	Inv. No. Cetecom
Spektrum Analyser	HP	8566B	2747A05306	300001000
Spektrum Analyser Display	HP	85662A	2816A16541	300002297
Quasi-Peak-Adapter	HP	85650A	2811A01131	300000999
Power Supply	HP	6032A	2818A03450	300001040
Power Attenuator	Byrd	8325	1530	300001595
Biconical Antenna	EMCO	3104	3758	300001602
Log. Period. Antenna	EMCO	3146	2130	300001603
Double Ridged Antenna	EMCO	HP 3115P	3088	300001032
Active Loop Antenna	EMCO	6502	2210	300001015
Antenna VDE/FCC		HP11965B		300002298
SRM-Drive	HP	9144A	2823e46556	300001044
Software	HP	EMI		300000983
Busisolator	Kontron			300001056
Absorberhalle	MWB		87400/02	300000996
Salzsäule	Kontron			300001055
Antenna	R&S	HMO20	832211/003	300002243
Indukt.Tast Antenna	R&S	HFH 2 Z4	881468/026	300001464
System-Rack	HP I.V.	85900	*	300000222
Spectrum Analyzer	HP	8566B	2747A05275	300000219
Quasi-Peak-Adapter	HP	85650A	2811A01135	300000216
RF-Preselector	HP	85685A	2837A00779	300000218
Rahmen Antenne	R&S	HFH2-Z2	891847-35	300001169
Leitungsteiler	HP	11850C		300000997
Breitband-Hornantenne EMI	HP	35155P		300002300
PC	HP	Vectra VL		300001688
VHF Meßantenne	Schwarzbeck	VHA 9103		300001778
Spectrum Analyzer Display	HP	85662A	2816A16497	300001690
VHF Meßantenna	Schwarzbeck	VHA 9103		300001780
Biconical Antenna	EMCO	3104 C	9909-4868	300002590

SRD Laboratory:

Device	Manufacturer	Type	S/N Number	Inv. No. Cetecom
Spectrum Analyzer	HP	FSU 67	--	--