Test Report

T-0301-4431-04 JP

Type / Model Name:	**TEC0480**
FCC ID:	**YM6-TEC0480**
Product Description:	**Operating panel**
Applicant:	**MSC Vertriebs GmbH**

EMC -- TEST REPORT

Test Report No. : T-0301-4431-04 JP	2013-05-06 Date of issue

Type / Model Name : TEC0480

FCC ID: YM6-TEC0480

Product Description : Operating panel

Applicant : MSC Vertriebs GmbH

Address : August-Wessels-Str. 17

86156 Augsburg

GERMANY

Manufacturer : MSC Freiburg GmbH

Address : Munzinger Strasse 3

79111 Freiburg i. Br.

GERMANY

Test Result according to the standards listed in clause 1 test standards:	**POSITIVE**

Deutsche Akkreditierungsstelle D-PL-12141-01-01

Contents

1 TEST STANDARDS

The tests were performed according to following standards:

FCC Part 15 Subpart A September 2012	Code of Regulations Part 15 (Radio Frequency Devices), Subpart A (General) of the Federal Communications Commision (FCC)
FCC Part 15 Subpart C September 2012	Code of Regulations Part 15 (Radio Frequency Devices), Subpart B (Unintentional Radiators) of the Federal Communications Commision (FCC) Applied Paragraphs: §15.207, §15.209, §15.247
ANSI C63.4-2009	American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9kHz – 40 GHz
KDB 558074 D01 April 9, 2013	DTS Meas Guidance v03r01

2 OVERVIEW TEST RESULT

Performed test(s)	Result		
	Passed	Failed	Not performed
Radiated disturbance (magnetic field)	X		
Conducted disturbance	X		
Radiated disturbance (30MHz – 1000MHz)	X		
Radiated disturbance (1GHz – 25GHz)	X		
Bandedges	X		
6dB bandwidth	X		
Maximum peak conducted output power	X		
Power spectral density	X		
Conducted spurious emissions	X		
Conducted spurious emissions in restricted bands	X		

3 SUMMARY

GENERAL REMARKS:

The TEC0480 Family consists out of three models: Minimal Small (with hotswap), Minimal Small (without hotswap) and Minimal Big. Radiated emission prescans in the frequency range 30MHz to 25GHz were made to determine the worst case model. The prescans showed no significant differences between the models. As worst case model the Minimal Small (with hotswap) model was defined. All results shown in this report are based on results of testing Minimal Small (with hotswap) model.

FINAL ASSESSMENT:

The equipment under test **fulfills** the EMC requirements cited in clause 1 test standards.

Date of receipt of test sample : acc. to storage records

Testing commenced on : 2013-01-28

Testing concluded on : 2013-05-03

Checked by:

Wolfgang Straubinger 2013.05.06 15:56:54 +02'00'

Wolfgang Straubinger

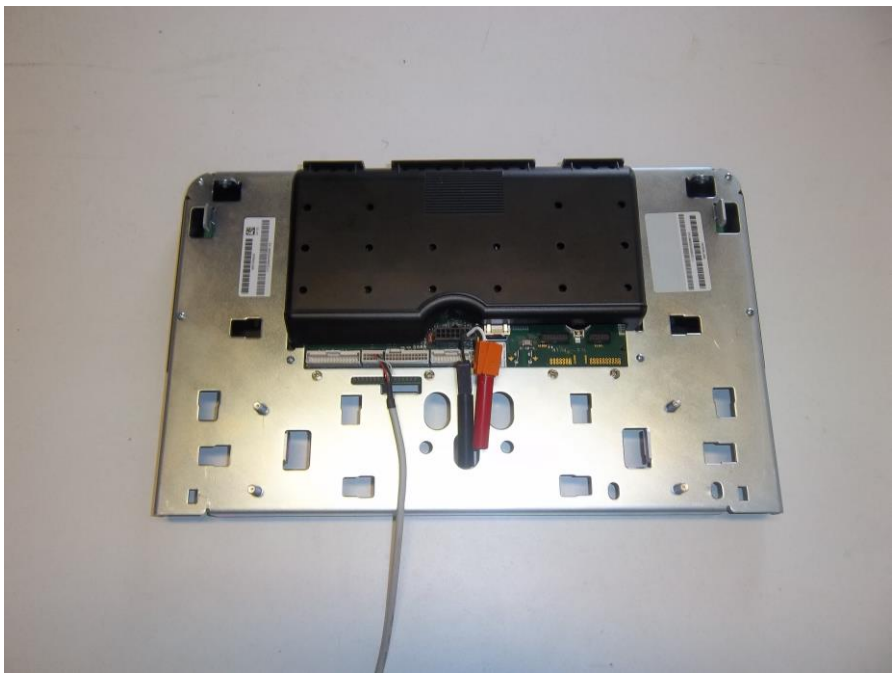
Tested by:

Jürgen Pessinger 2013.05.06 15:54:03 +02'00'

Jürgen Pessinger

4 EQUIPMENT UNDER TEST

4.1 Photo documentation of the EuT



4.2 Power supply system

Power supply voltage: 12V DC

4.3 Short description of the Equipment under Test (EuT)

The EuT is a display module with integrated WLAN feature. The unit will be used in fitness equipment.

Number of tested samples: 2
Serial number: none

Dimensions: L: 46cm W: 5,5cm H: 34,5cm

Radio equipment characteristics

Frequency band(s):	2400 – 2483,5 MHz
Operating frequency:	2412 – 2462 MHz
Channel spacing:	5MHz
Number of RF-channels:	11
Transmit power conducted:	22dBm
Type of antenna:	SMD antenna
Maximum antenna gain:	3dBi
Size / length of antenna:	9,5 mm
Duty cycle:	Up to 100%
Comments:	None

EuT operation mode:

The equipment under test was operated during the measurement under the following conditions:

- continous transmitt mode (duty cycle = 99%), maximum RF power adjusted

Transmission mode IEEE 802.11b (Datatransfer rate 11Mbps) and IEEE 802.11g (Datatransfer rate 54Mbps) were tested in following channels:

- CH01 2412MHz
- CH06 2437MHz
- CH11 2462MHz

EuT configuration:

The following interface cables and peripheral devices were connected during the measurements:

Interface cables:

Interface cable	Length [m]	Type	Line		Line termination
			shielded	unshielded	
DC power line	2,0	2-wires	☐	☒	12V battery or power supply
USB Port	2,0	4-wires	☒	☐	USB Keyboard

Peripheral devices:

Kind of equipment		Model and/or Manufacturer
power supply		EA-PS 3032-10B, emitel ID 01-05/50-11-009
USB-Keyboard		Wired Keyboard 600, Microsoft

5 TEST ENVIRONMENT

5.1 Address of the test laboratory

emitel GmbH
Ohmstrasse 1
94342 STRASSKIRCHEN
DEUTSCHLAND

Laboratory registration numbers:

DAkkS Registration number:	D-PL-12141-01-01
KBA Registration number:	KBA-P 00057-01
SNCH Registration number:	SNCH 001/2005
FCC Registration number:	765810
IC Registration number:	IC 5066A-1

5.2 Statement regarding the usage of logos at test reports

The logos of accreditation- and notification bodies displayed at this test reports are only valid for standards listed at the accreditation- or notification scope of emitel GmbH.

5.3 Environmental conditions

During the measurement the environmental conditions were within the listed ranges:

Temperature:	15-35 ° C
Humidity:	30-60 %
Atmospheric pressure:	86-106 kPa

All atmospheric pressure values refer to our Laboratory altitude of 324m.

5.4 Statement of the measurement uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. to CISPR 16-4-2 /11.2003 „Uncertainties, statistics and limit modelling – Uncertainty in EMC measurements“ and is documented in the quality system acc. to DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer does have the sole responsibility for the continued compliance of the device.

5.5 Measurement Protocol for FCC, VCCI and AUSTEL

5.5.1 GENERAL INFORMATION

5.5.1.1 Test Methodology

Conducted and radiated disturbance testing is performed according to the procedures in International Special Committee on Radio Interference (CISPR) Publication 22 (1997+A1:2000+A2:2002), European Standard EN 55022 (1998+A1:2000+A2:2003)and Australian Standard AS 3548 (which are based on CISPR 22).

The Japanese standard, "Voluntary Control Council for Interference (VCCI) by Data Processing Equipment and Electronic Office Machines, Technical Requirements" is technically equivalent to CISPR 22 (1997+A1:2000 +A2:2002). For official compliance, a conformance report must be sent to and accepted by the VCCI.

In compliance with FCC Docket 92-152, "Harmonization of Rules for Digital Devices Incorporate International Standards", testing for FCC compliance may be done following the ANSI C63.4-2003 procedures and using the CISPR 22 Limits.

5.5.1.2 Measurement Error

The data and results referenced in this document are true and accurate. The reader is cautioned that there is some measurement variability due to the tolerances of the test equipment that can contribute to a nominal product measurement uncertainty. The measurement uncertainty was calculated for all measurements listed in this test report according to NIS 81/5.1994 “The treatment of uncertainty in EMC measurements” and is documented in the emitel AG quality system according to DIN EN ISO/IEC 17025. Furthermore, component differences and manufacturing process variability of production units similar to that tested may result in additional product uncertainty. If necessary, refer to the test lab for the actual measurement uncertainty for specific tests. The manufacturer has the sole responsibility of continued compliance of the device.

5.5.1.3 Justification

The Equipment Under Test (EUT) is configured in a typical user arrangement in accordance with the manufacturer's instructions. A cable is connected to each available port and either terminated with a peripheral into it’s characteristic impedance or left unterminated. When appropriate, the cables are manually manipulated with respect to each other to obtain maximum disturbances from the unit.

5.5.2 CONDUCTED DISTURBANCE

The final level, expressed in dBμV, is arrived at by taking the reading directly from the EMI receiver. This level is compared directly to the CISPR limit, which is equivalent to the Australian AS 3548 limit.

To convert between dBμV and μV, the following conversions apply:
dBμV = 20(log μV)
μV = Inverse log(dBμV/20)

5.5.3 RADIATED DISTURBANCE

The final level, expressed in dBµV/m, is arrived at by taking the reading from the EMI receiver (Level dBµV) and adding the antenna correction factor and cable loss factor (Factor dB) to it. This is done automatically in the EMI receiver, where the correction factor are stored. This result then has the CISPR limit subtracted from it to provide the Delta which gives the tabular data as shown in the data sheets in section 5.2. The CISPR 22 limit is equivalent to the Australian AS 3548 limit.

Example: CISPR B Delta

Frequency (MHz)	Level (dBµV)	+	Factor (dB)	=	Final (dBµV/m)	-	Limit (dBµV/m)	=	CISPR B (dB)
37.19	10.2	+	12.0	=	22.2	-	40.0	=	-17.8

5.5.4 DETAILS OF TEST PROCEDURES

5.5.4.1 General Standard Information

The test methods used comply with CISPR Publication 22 (1997+A1:2000+A2:2002), EN 55022 (1998+A1:2000+ A2:2003) and AS 3548 (1992) - "Limits and Methods of Measurement of Radio Interference Characteristics of Information Technology Equipment" and with ANSI C63.4-2003 - "Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz."

5.5.4.2 Conducted disturbance

Conducted disturbance on the 50 Hz and/or 60 Hz power interface of the EUT are measured in the frequency range of 150 kHz to 30 MHz. The measurements are performed using a receiver, which has CISPR characteristic bandwidth and quasi peak detection, and a Line Impedance Stabilization Network (LISN), with 50Ω/50 µH (CISPR 16) characteristics. Table top equipment is placed on a non-conducting table 80 centimetres above the floor and is positioned 40 centimetres from the vertical ground plane (wall) of the screen room. If the minimum passing margin appears to be less than 20 dB with a peak mode measurement, the emissions are remeasured using a tuned receiver with quasi peak and average detection and recorded on the data sheets.

5.5.4.3 Radiated disturbance

Radiated disturbance from the EUT are measured in the frequency range of 30 to 1000 MHz using a tuned receiver and appropriate broadband linearly polarized antennas. Measurements between 30 MHz and 1000 MHz are made with 120 kHz/6 dB bandwidth and quasi peak detection and measurements above 1000 MHz are made with a 1 MHz/6 dB bandwidth and average detection. Table top equipment is placed on a 1.0 X 1.5 meter non-conducting table 80 centimetres above the ground plane. Floor standing equipment is placed directly on the turntable/ground plane. Interface cables that are closer than 40 centimetres to the ground plane are bundled in the center in a serpentine fashion so they are at least 40 centimetres from the ground plane. Cables to simulators/testers (if used in this test) are routed through the center of the table and to a screen room located outside the test area. The antenna was positioned 3, 10 or 30 meters horizontally from the EUT. To locate maximum emissions from the test sample the antenna is varied in height from 1 to 4 meters, measurement scans are made with both horizontal and vertical antenna polarizations and the EUT are rotated 360 degrees.

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6 TEST CONDITIONS AND RESULTS

6.1 Radiated disturbance (magnetic field)

For test instruments and accessories used see section 7 Part **SER 1**.

6.1.1 Description of the test location

Test location: OATS 3

Test distance: 3 metres

6.1.2 Photo documentation of the test set-up

6.1.3 Test specification

Environmental conditions: Temperature: 19 ° C Humidity: 44 % Atmospheric pressure: 97 kPa

Frequency range: 0,009 MHz - 30 MHz

The test was carried out in the following operation mode(s):
- continous transmitt mode (duty cycle = 99%), maximum RF power adjusted

6.1.4 Test result

The requirements are **FULFILLED.**

Remarks: Sample 1 with SMD antenna was used for testing

6.1.5 Test protocol

Operation mode:	continous transmitt mode (duty cycle = 99%), maximum RF power adjusted	Result: PASS
Remarks:	sample #1	
Date:	2013-02-06	
Tested by:	Pessinger Jürgen	

Minimum margin to limit: -- dB

Frequency [MHz]	Reading [dBµV] QP	Reading [dBµV] AV	Correction [dB]	Values [dBµV/m] QP	Values [dBµV/m] AV	Limit [dBµV/m] QP	Limit [dBµV/m] AV	Margin [dB] QP	Margin [dB] AV
--	--								

No emission (peak detector) exceeds the AV/QP limit of section 15.209 in the frequency range 0,009MHz to 30MHz.

6.2 Conducted disturbance

For test instruments and accessories used see section 7 Part **A 4**.

6.2.1 Description of the test location

Test location: Shielded Room SK5

6.2.2 Photo documentation of the test set-up

6.2.3 Test specification

Environmental conditions: Temperature: 21 ° C Humidity: 40 % Atmospheric pressure: 97 kPa

Frequency range: 0.15 MHz - 30 MHz

The test was carried out in the following operation mode(s):
- continous transmitt mode (duty cycle = 99%), maximum RF power adjusted

6.2.4 Test result

Minimal margin to limit 11,4 dB at 8,945 MHz

The requirements are **FULFILLED.**

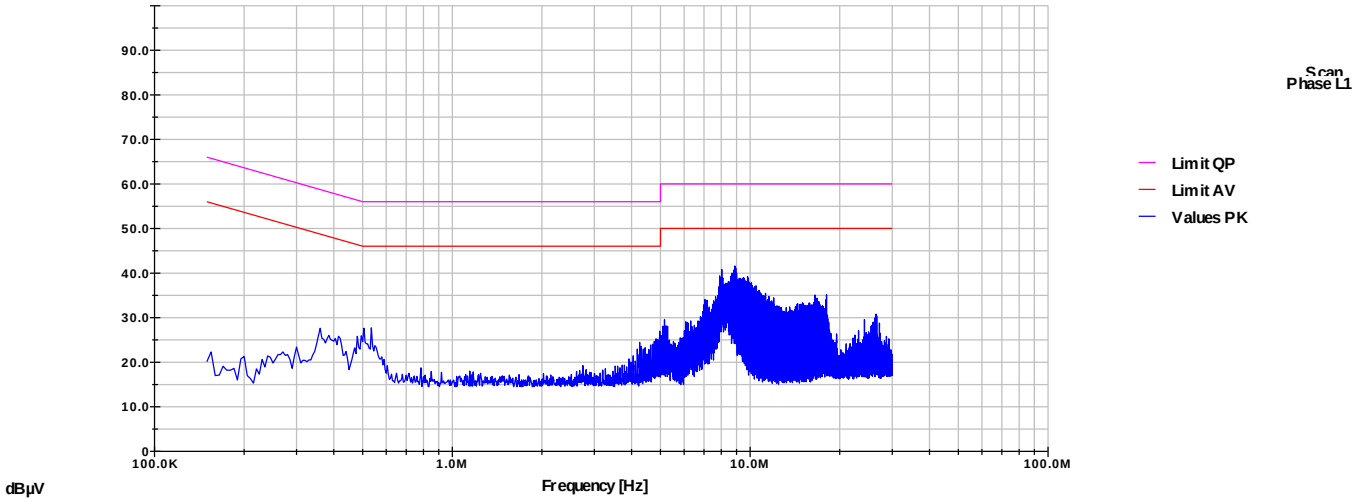
Remarks: Sample 1 with SMD antenna was used for testing

The measurement was made at AC input port of power supply.

6.2.5 Test protocol

Test point	L1	Result: SCAN
Operation mode:	continous transmitt mode (duty cycle = 99%), maximum RF power adjusted	
Remarks:	sample #1, IEEE 802.11b (11Mbps) CH06 (2437MHz) adjusted	
Date:	2012-12-16	
Tested by:	Pessinger Jürgen	

Start frequency [MHZ]	Stop frequency [MHZ]	Resolution bandwidth	step size	Measurement time	Detector
0.15	30	10 kHz	5 kHz	10 ms	Peak



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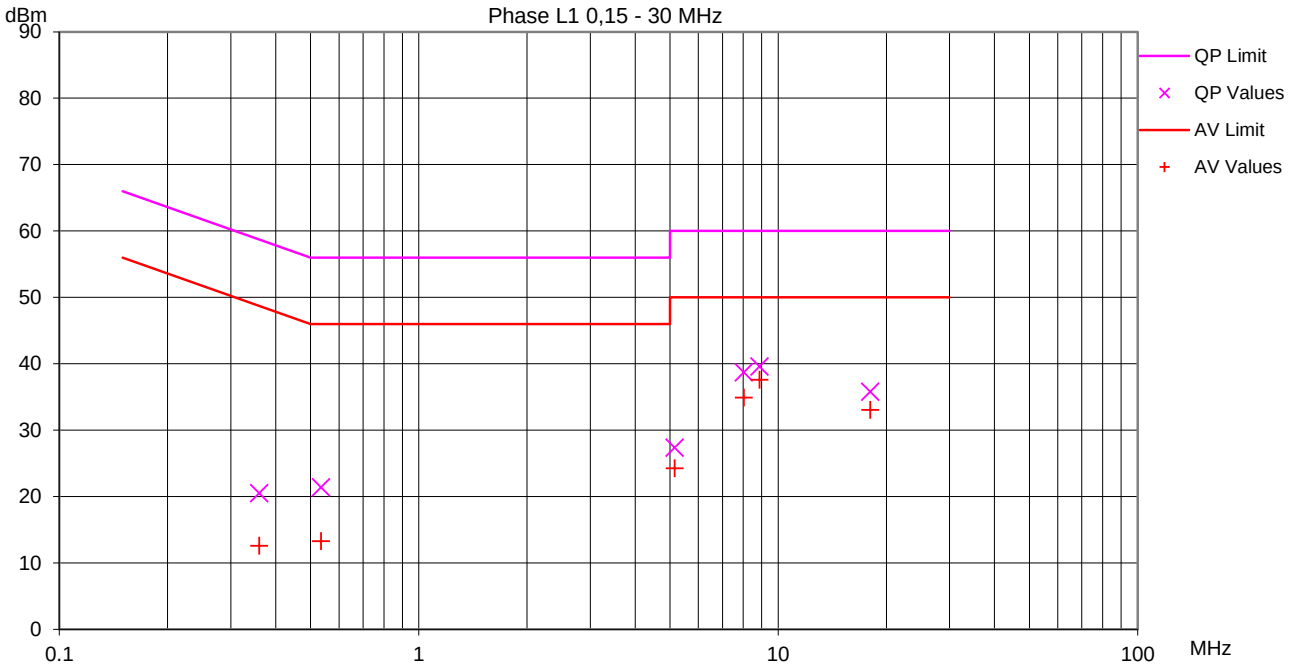
Test point	L1	Result: PASS
Operation mode:	continous transmitt mode (duty cycle = 99%), maximum RF power adjusted	
Remarks:	sample #1, IEEE 802.11b (11Mbps) CH06 (2437MHz) adjusted	
Date:	2012-12-16	
Tested by:	Pessinger Jürgen	

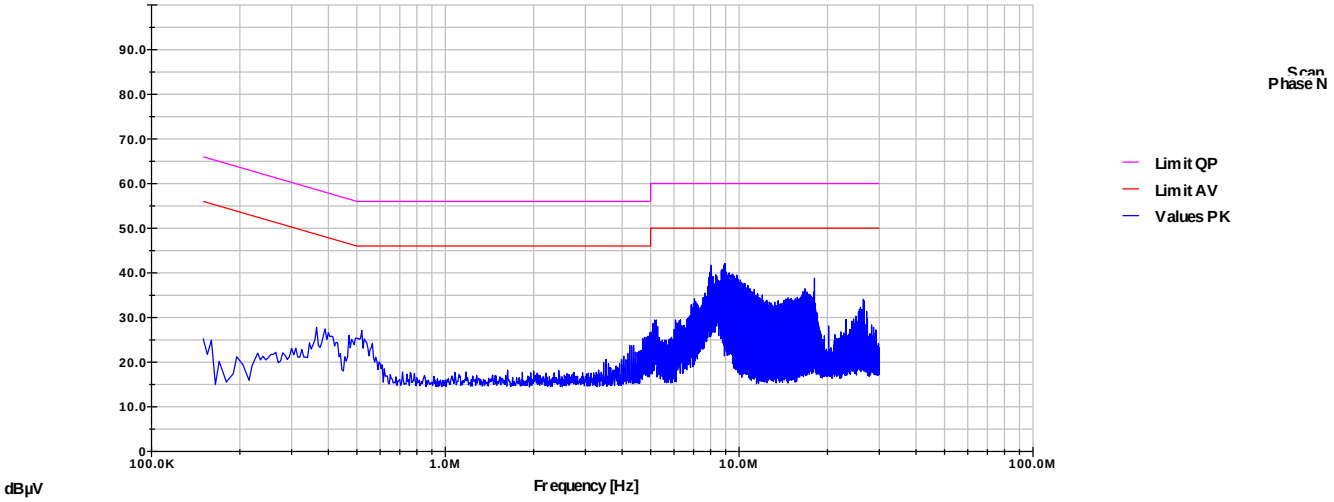


Minimum margin to limit: 12.4 dB

Frequency	Reading [dBµV]		Correction	Values [dBm]		Limit [dBm]		Margin [dB]	
[MHz]	QP	AV	[dB]	QP	AV	QP	AV	QP	AV
0.360	20.3	12.4	0.2	20.5	12.6	58.7	48.7	38.2	36.1
0.535	21.2	13.1	0.2	21.4	13.3	56.0	46.0	34.6	32.7
5.160	27.1	24.0	0.2	27.3	24.2	60.0	50.0	32.7	25.8
8.030	38.4	34.6	0.3	38.7	34.9	60.0	50.0	21.3	15.1
8.885	39.3	37.3	0.3	39.6	37.6	60.0	50.0	20.4	12.4
18.045	35.3	32.6	0.5	35.8	33.1	60.0	50.0	24.2	16.9

Test point:	N	Result: SCAN
Operation mode:	continous transmitt mode (duty cycle = 99%), maximum RF power adjusted	
Remarks:	sample #1, IEEE 802.11b (11Mbps) CH06 (2437MHz) adjusted	
Date:	2012-12-16	
Tested by:	Pessinger Jürgen	

Start frequency [MHZ]	Stop frequency [MHZ]	Resolution bandwidth	step size	Measurement time	Detector
0.15	30	10 kHz	5 kHz	10 ms	Peak



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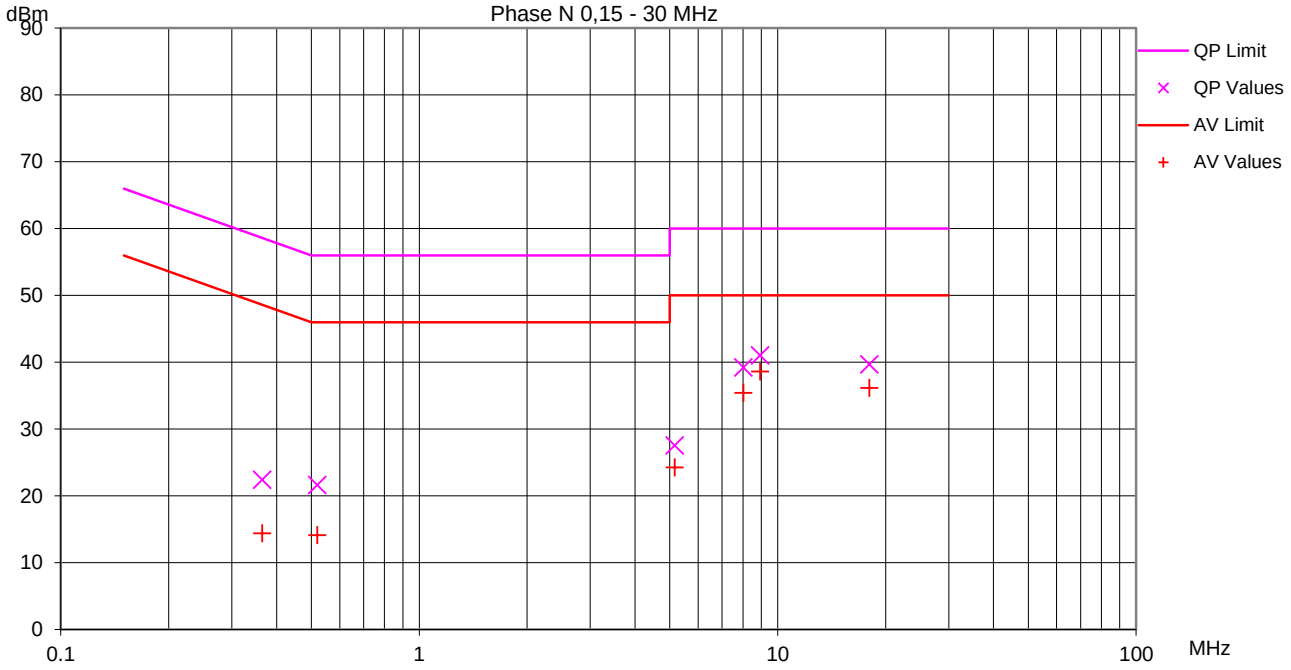
Test point:	N	Result: PASS
Operation mode:	continous transmitt mode (duty cycle = 99%), maximum RF power adjusted	
Remarks:	sample #1, IEEE 802.11b (11Mbps) CH06 (2437MHz) adjusted	
Date:	2012-12-16	
Tested by:	Pessinger Jürgen	



Minimum margin to limit: 11.4 dB

Frequency	Reading [dBµV]		Correction	Values [dBm]		Limit [dBm]		Margin [dB]	
[MHz]	QP	AV	[dB]	QP	AV	QP	AV	QP	AV
0.365	22.2	14.2	0.2	22.4	14.4	58.6	48.6	36.2	34.2
0.520	21.4	13.9	0.2	21.6	14.1	56.0	46.0	34.4	31.9
5.160	27.3	24.0	0.2	27.5	24.2	60.0	50.0	32.5	25.8
8.030	38.9	35.1	0.3	39.2	35.4	60.0	50.0	20.8	14.6
8.945	40.7	38.3	0.3	41.0	38.6	60.0	50.0	19.0	11.4
18.045	39.2	35.7	0.5	39.7	36.2	60.0	50.0	20.3	13.8

6.3 Radiated disturbance (30MHz – 1000MHz)

For test instruments and accessories used see section 7 Part **SER 2**.

6.3.1 Description of the test location

Test location: OATS 3

Test distance: 3 metres

6.3.2 Photo documentation of the test set-up

6.3.3 Test specification

Environmental conditions: Temperature: 19 ° C Humidity: 44 % Atmospheric pressure: 97 kPa

Frequency range: 30 MHz - 1000 MHz

The test was carried out in the following operation mode(s):
- continous transmitt mode (duty cycle = 99%), maximum RF power adjusted

6.3.4 Test result

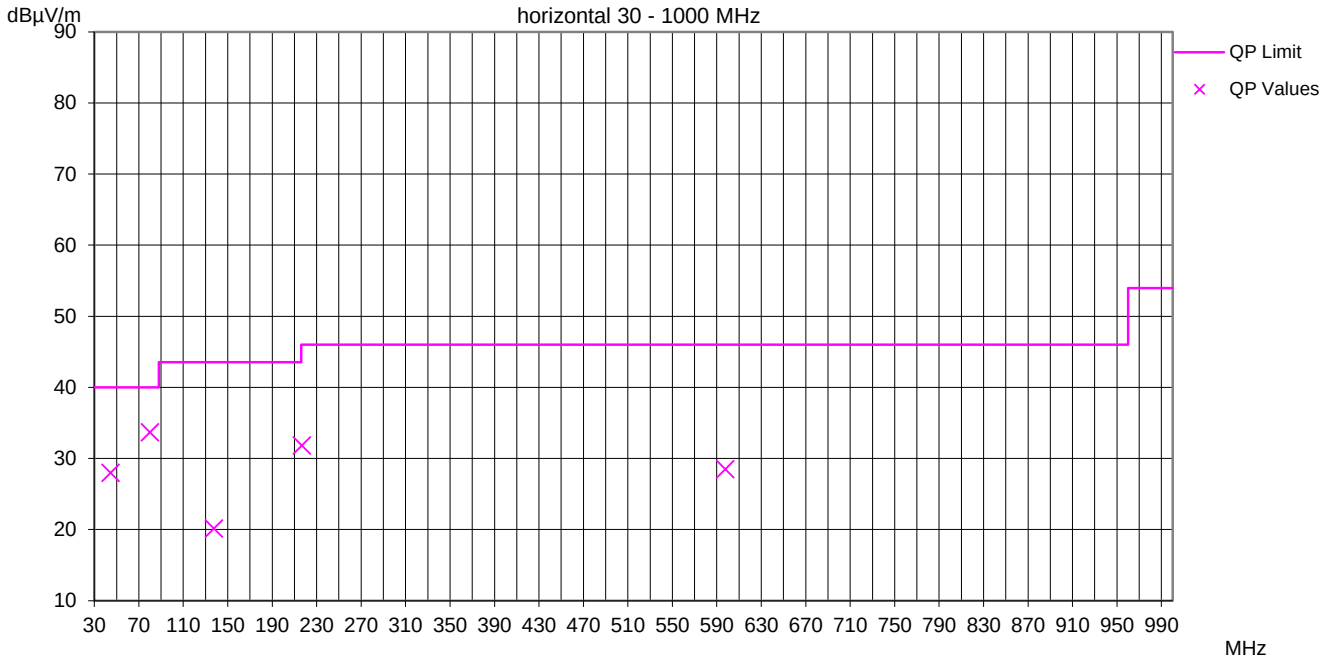
Minimal margin to limit 3,6 dB at 80,147 MHz

The requirements are **FULFILLED.**

Remarks: Sample 1 with SMD antenna was used for testing

6.3.5 Test protocol

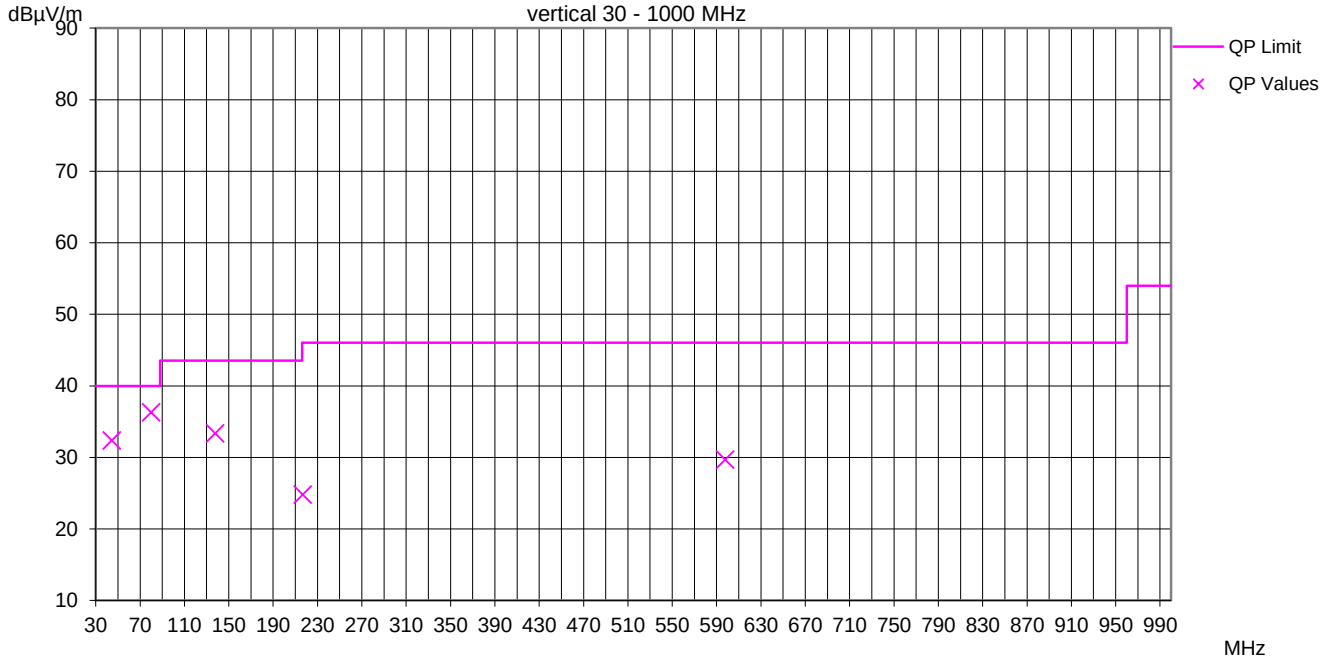
Operation mode:	continous transmitt mode (duty cycle = 99%), maximum RF power adjusted	Result: PASS
Remarks:	sample #1, IEEE 802.11b (11Mbps) CH01 (2412MHz) adjusted	
Date:	2013-02-06	
Tested by:	Pessinger Jürgen	



Minimum margin to limit: 6.3 dB

Frequency [MHz]	Reading [dBµV] QP	Correction [dB]	Values [dBµV/m] QP	Limit [dBµV/m] QP	Margin [dB] QP
44.700	12.9	15.0	27.9	40.0	12.1
80.145	22.7	11.0	33.7	40.0	6.3
137.705	9.5	10.6	20.1	43.5	23.4
216.775	18.0	13.8	31.8	46.0	14.2
597.750	5.5	23.0	28.5	46.0	17.5

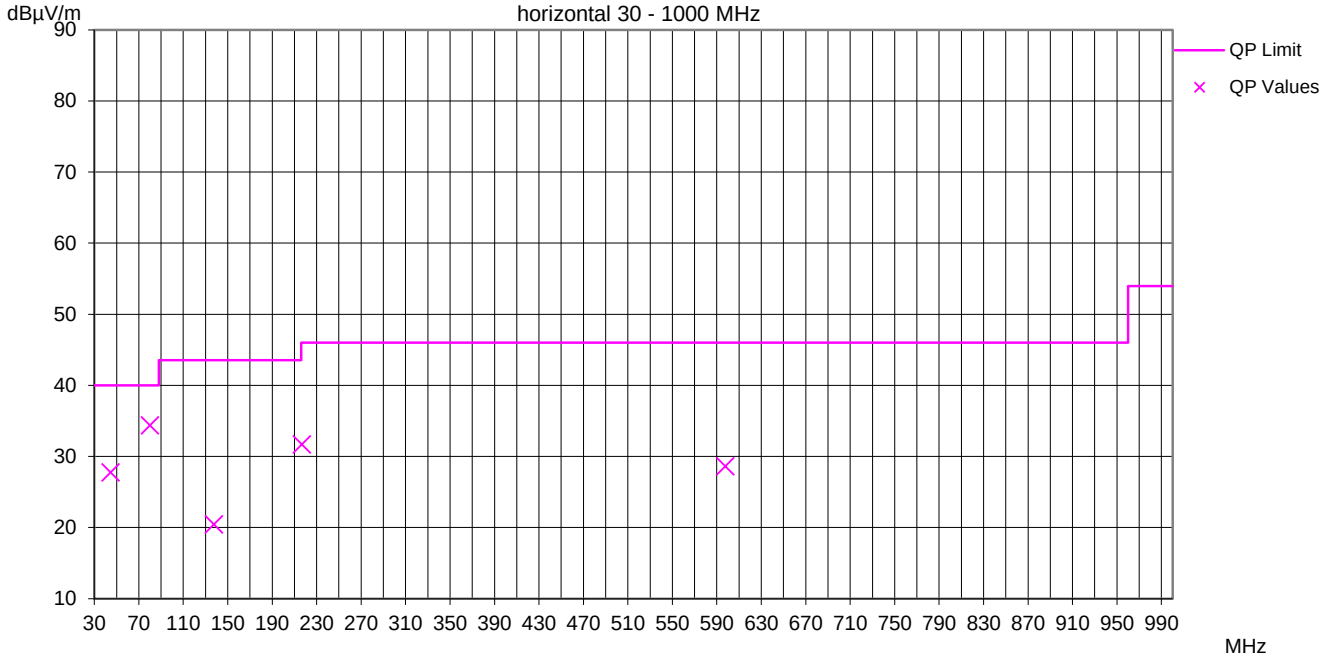
Operation mode:	continous transmitt mode (duty cycle = 99%), maximum RF power adjusted	Result: PASS
Remarks:	sample #1, IEEE 802.11b (11Mbps) CH01 (2412MHz) adjusted	
Date:	2013-02-06	
Tested by:	Pessinger Jürgen	



Minimum margin to limit: 3.7 dB

Frequency [MHz]	Reading [dBµV] QP	Correction [dB]	Values [dBµV/m] QP	Limit [dBµV/m] QP	Margin [dB] QP
44.700	17.3	15.0	32.3	40.0	7.7
80.145	25.3	11.0	36.3	40.0	3.7
137.705	22.7	10.6	33.3	43.5	10.2
216.775	9.5	15.3	24.8	46.0	21.2
597.750	6.7	23.0	29.7	46.0	16.3

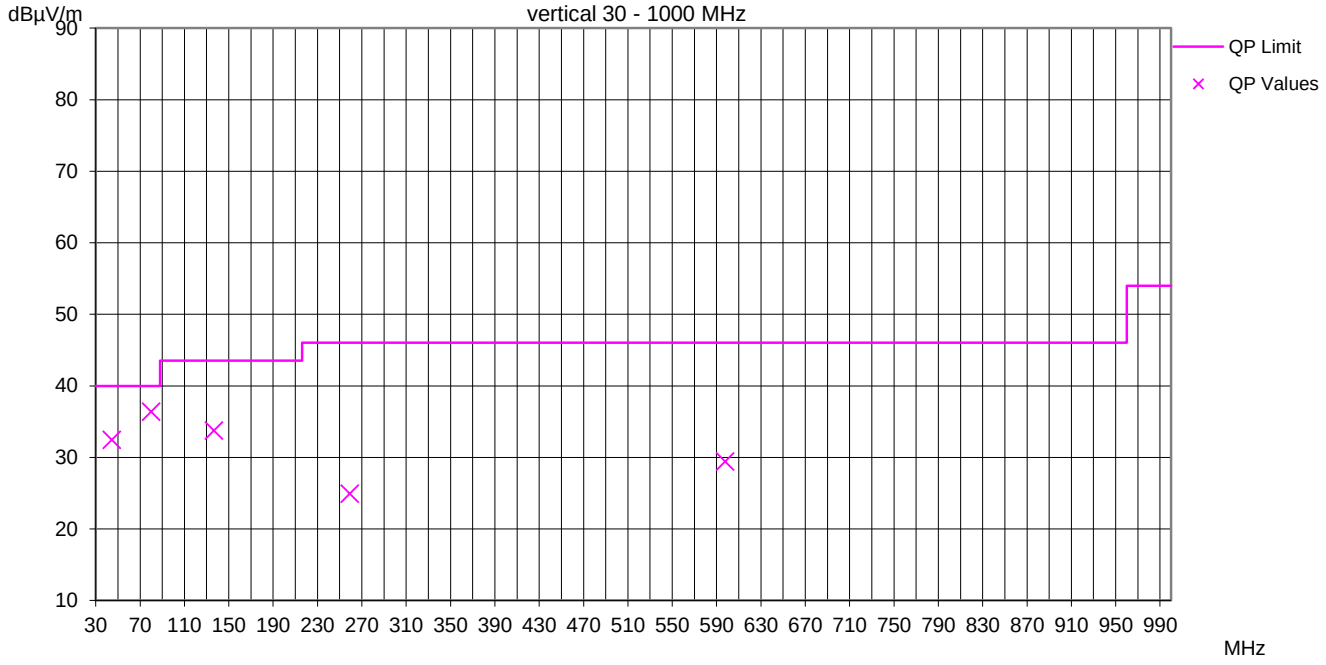
Operation mode:	continous transmitt mode (duty cycle = 99%), maximum RF power adjusted	Result: PASS
Remarks:	sample #1, IEEE 802.11b (11Mbps) CH06 (2437MHz) adjusted	
Date:	2013-02-06	
Tested by:	Pessinger Jürgen	



Minimum margin to limit: 5.6 dB

Frequency [MHz]	Reading [dBµV] QP	Correction [dB]	Values [dBµV/m] QP	Limit [dBµV/m] QP	Margin [dB] QP
44.700	12.7	15.0	27.7	40.0	12.3
80.146	23.4	11.0	34.4	40.0	5.6
137.705	9.8	10.6	20.4	43.5	23.1
216.775	17.9	13.8	31.7	46.0	14.3
597.754	5.6	23.0	28.6	46.0	17.4

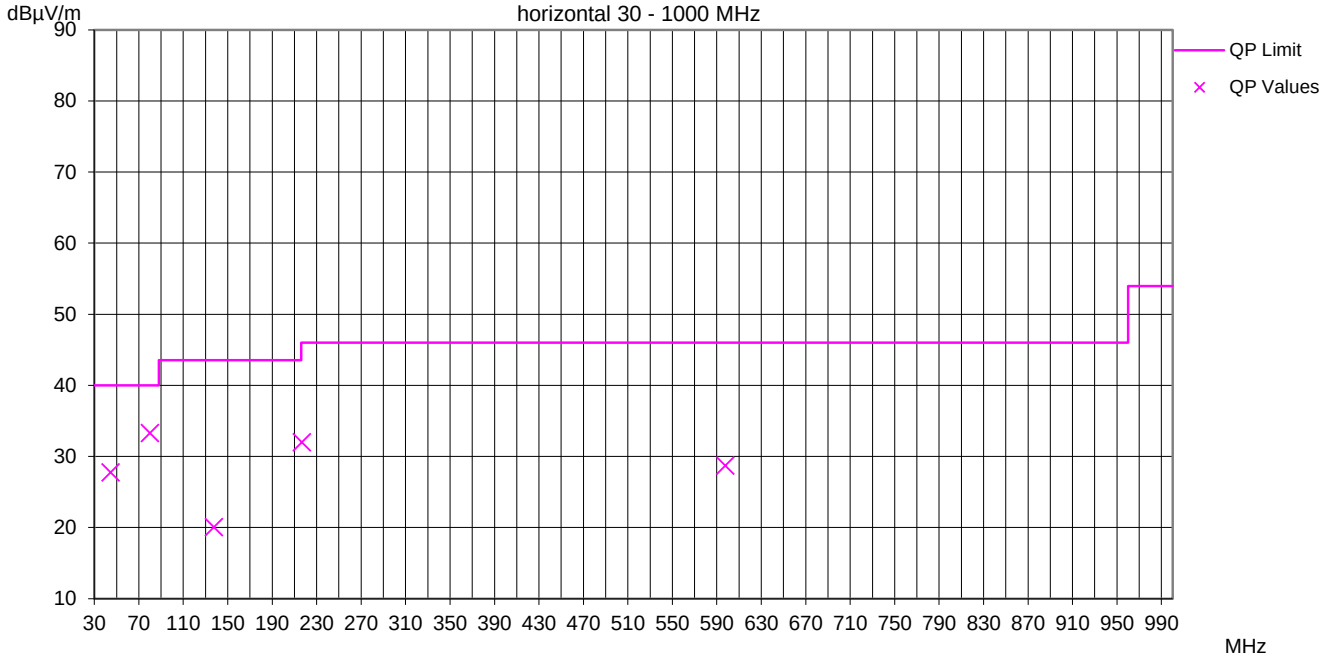
Operation mode:	continous transmitt mode (duty cycle = 99%), maximum RF power adjusted	Result: PASS
Remarks:	sample #1, IEEE 802.11b (11Mbps) CH06 (2437MHz) adjusted	
Date:	2013-02-06	
Tested by:	Pessinger Jürgen	



Minimum margin to limit: 3.6 dB

Frequency [MHz]	Reading [dBµV] QP	Correction [dB]	Values [dBµV/m] QP	Limit [dBµV/m] QP	Margin [dB] QP
44.700	17.4	15.0	32.4	40.0	7.6
80.147	25.4	11.0	36.4	40.0	3.6
136.828	23.1	10.6	33.7	43.5	9.8
259.248	9.6	15.3	24.9	46.0	21.1
597.754	6.4	23.0	29.4	46.0	16.6

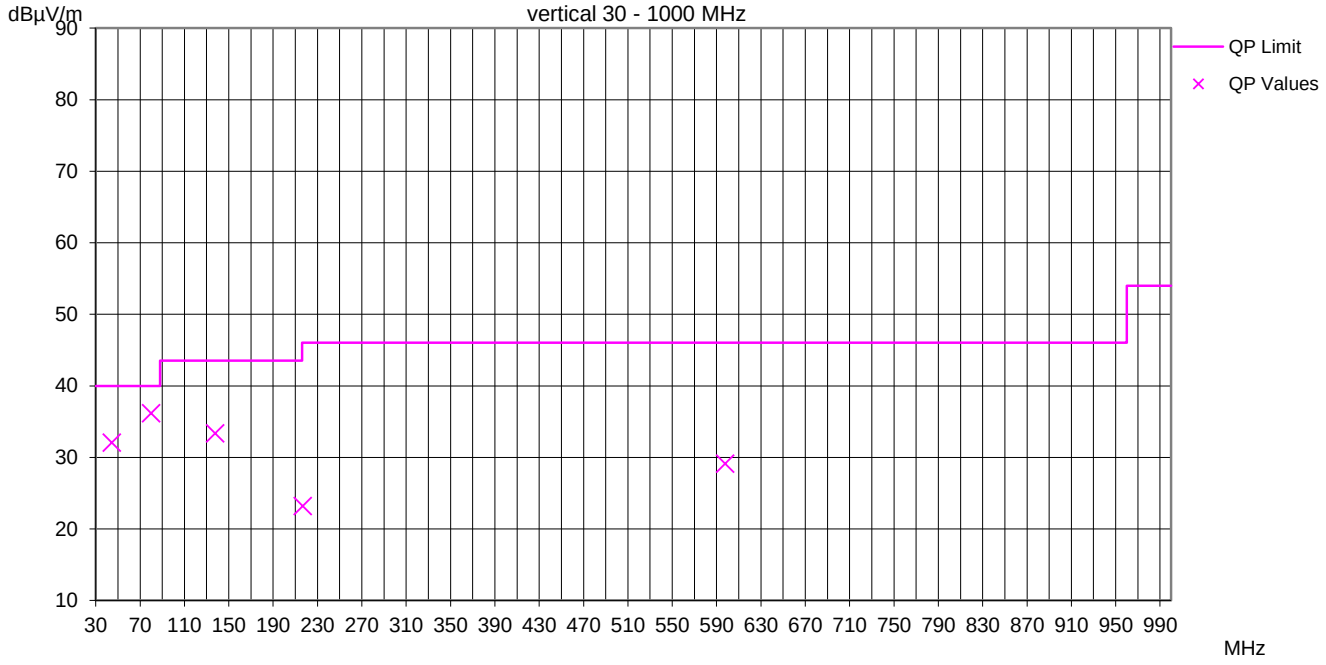
Operation mode:	continous transmitt mode (duty cycle = 99%), maximum RF power adjusted	Result: PASS
Remarks:	sample #1, IEEE 802.11b (11Mbps) CH11 (2462MHz) adjusted	
Date:	2013-02-06	
Tested by:	Pessinger Jürgen	



Minimum margin to limit: 6.7 dB

Frequency [MHz]	Reading [dBµV] QP	Correction [dB]	Values [dBµV/m] QP	Limit [dBµV/m] QP	Margin [dB] QP
44.700	12.7	15.0	27.7	40.0	12.3
80.145	22.3	11.0	33.3	40.0	6.7
137.705	9.4	10.6	20.0	43.5	23.5
216.775	18.2	13.8	32.0	46.0	14.0
597.755	5.7	23.0	28.7	46.0	17.3

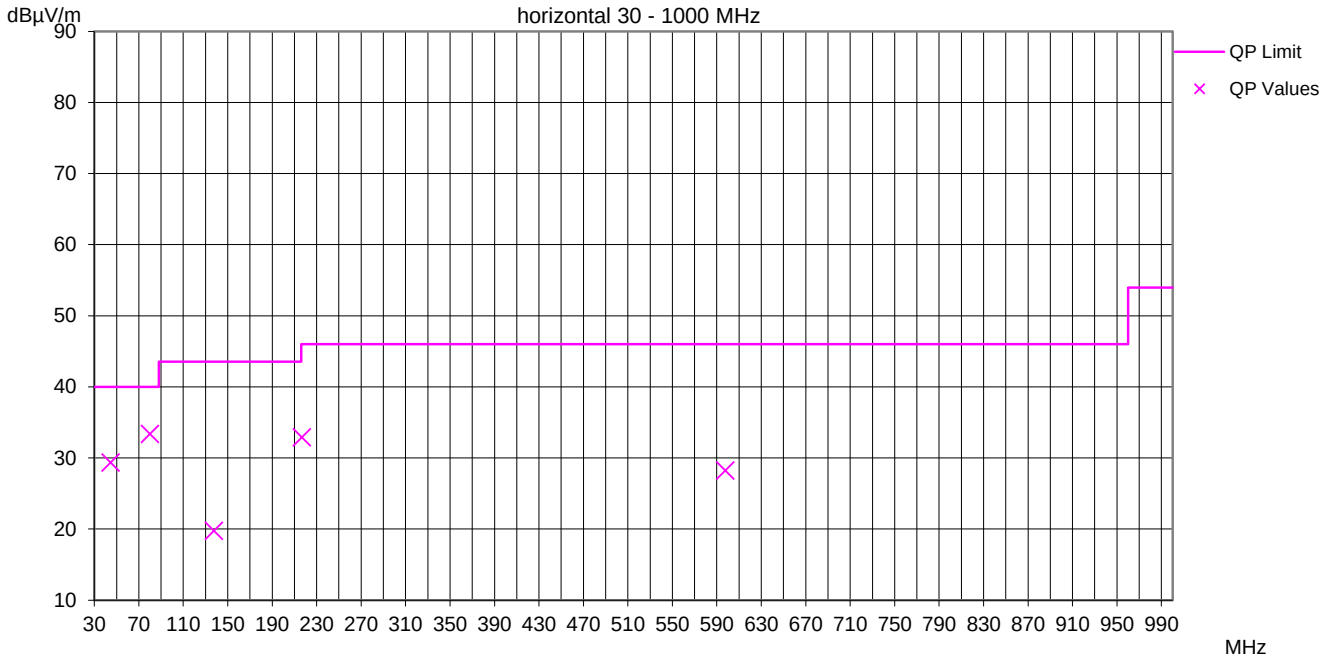
Operation mode:	continous transmitt mode (duty cycle = 99%), maximum RF power adjusted	Result: PASS
Remarks:	sample #1, IEEE 802.11b (11Mbps) CH11 (2462MHz) adjusted	
Date:	2013-02-06	
Tested by:	Pessinger Jürgen	



Minimum margin to limit: 3.8 dB

Frequency [MHz]	Reading [dBµV] QP	Correction [dB]	Values [dBµV/m] QP	Limit [dBµV/m] QP	Margin [dB] QP
44.700	17.0	15.0	32.0	40.0	8.0
80.147	25.2	11.0	36.2	40.0	3.8
137.705	22.7	10.6	33.3	43.5	10.2
216.774	9.4	13.8	23.2	46.0	22.8
597.755	6.1	23.0	29.1	46.0	16.9

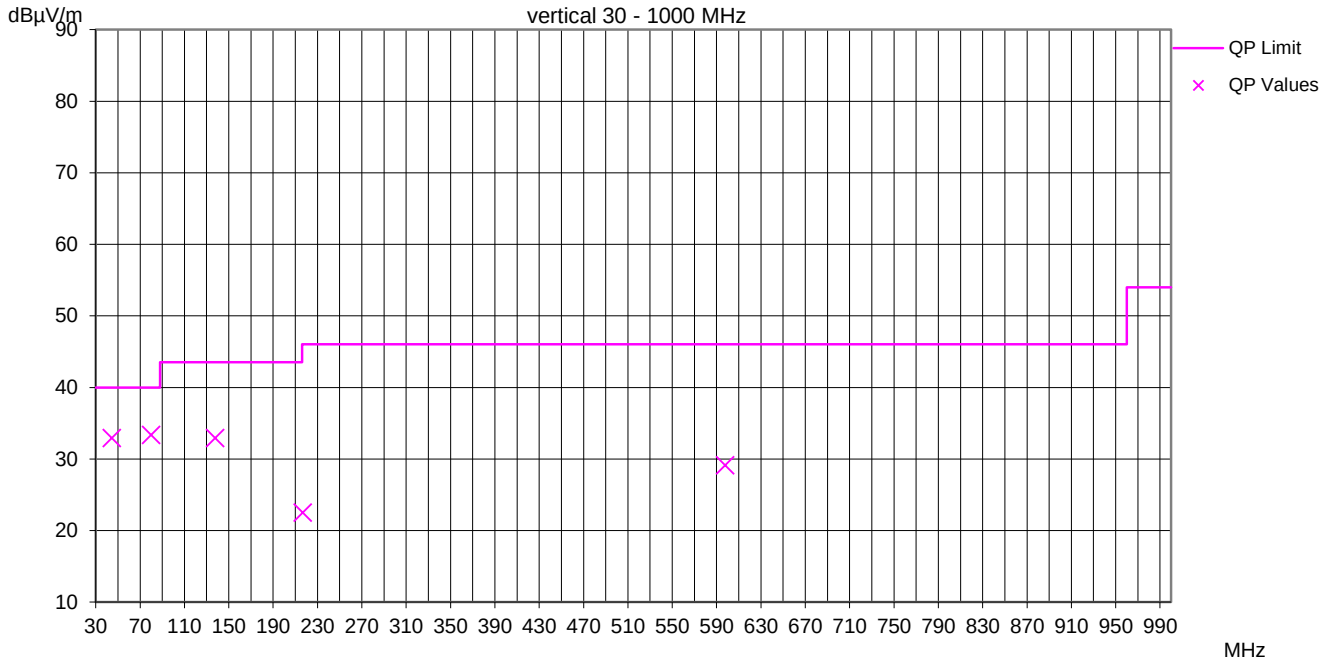
Operation mode:	continous transmitt mode (duty cycle = 99%), maximum RF power adjusted	Result: PASS
Remarks:	sample #1, IEEE 802.11g (54Mbps) CH01 (2412MHz) adjusted	
Date:	2013-02-06	
Tested by:	Pessinger Jürgen	



Minimum margin to limit: 6.6 dB

Frequency [MHz]	Reading [dBµV] QP	Correction [dB]	Values [dBµV/m] QP	Limit [dBµV/m] QP	Margin [dB] QP
44.700	14.3	15.0	29.3	40.0	10.7
80.145	22.4	11.0	33.4	40.0	6.6
137.705	9.1	10.6	19.7	43.5	23.8
216.776	19.1	13.8	32.9	46.0	13.1
597.751	5.2	23.0	28.2	46.0	17.8

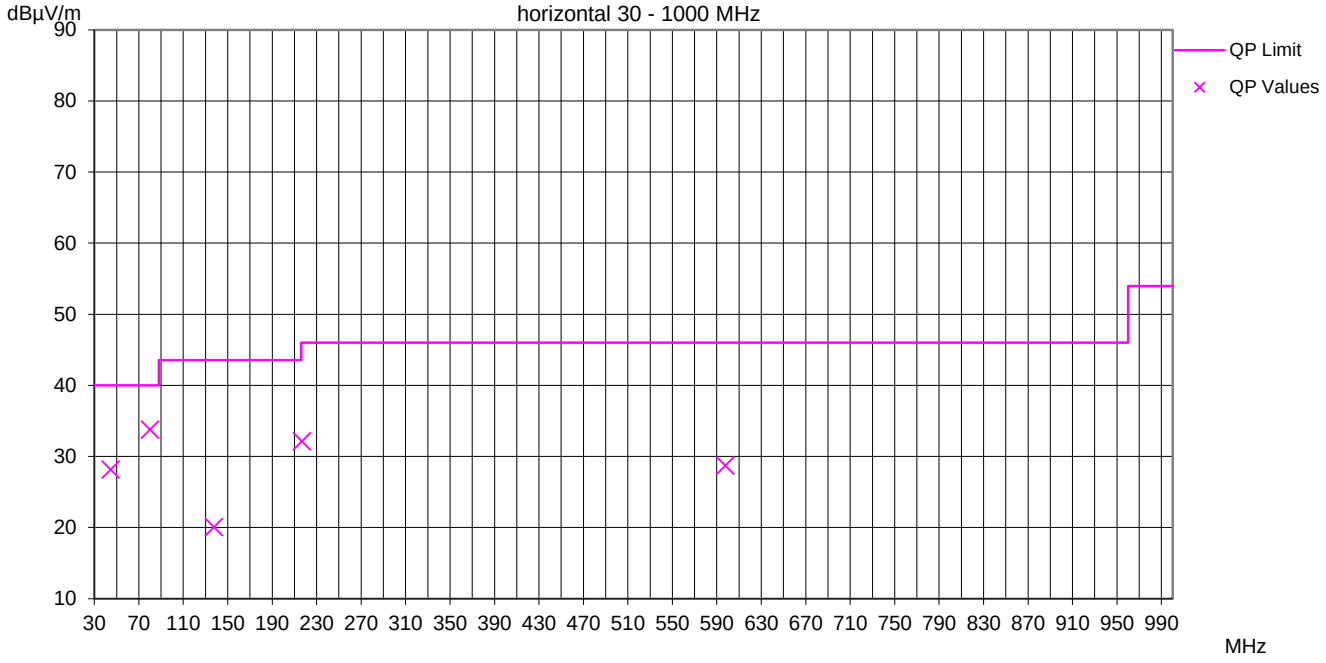
Operation mode: continous transmitt mode (duty cycle = 99%), maximum RF power adjusted Result: PASS
Remarks: sample #1, IEEE 802.11g (54Mbps) CH01 (2412MHz) adjusted
Date: 2013-02-06
Tested by: Pessinger Jürgen



Minimum margin to limit: 6.6 dB

Frequency [MHz]	Reading [dBµV] QP	Correction [dB]	Values [dBµV/m] QP	Limit [dBµV/m] QP	Margin [dB] QP
44.700	17.9	15.0	32.9	40.0	7.1
80.147	22.4	11.0	33.4	40.0	6.6
137.706	22.3	10.6	32.9	43.5	10.6
216.774	8.7	13.8	22.5	46.0	23.5
597.753	6.1	23.0	29.1	46.0	16.9

Operation mode:	continous transmitt mode (duty cycle = 99%), maximum RF power adjusted	Result: PASS
Remarks:	sample #1, IEEE 802.11g (54Mbps) CH06 (2437MHz) adjusted	
Date:	2013-02-06	
Tested by:	Pessinger Jürgen	



Minimum margin to limit: 6.2 dB

Frequency [MHz]	Reading [dBµV] QP	Correction [dB]	Values [dBµV/m] QP	Limit [dBµV/m] QP	Margin [dB] QP
44.700	13.1	15.0	28.1	40.0	11.9
80.145	22.8	11.0	33.8	40.0	6.2
137.705	9.4	10.6	20.0	43.5	23.5
216.776	18.3	13.8	32.1	46.0	13.9
597.751	5.7	23.0	28.7	46.0	17.3

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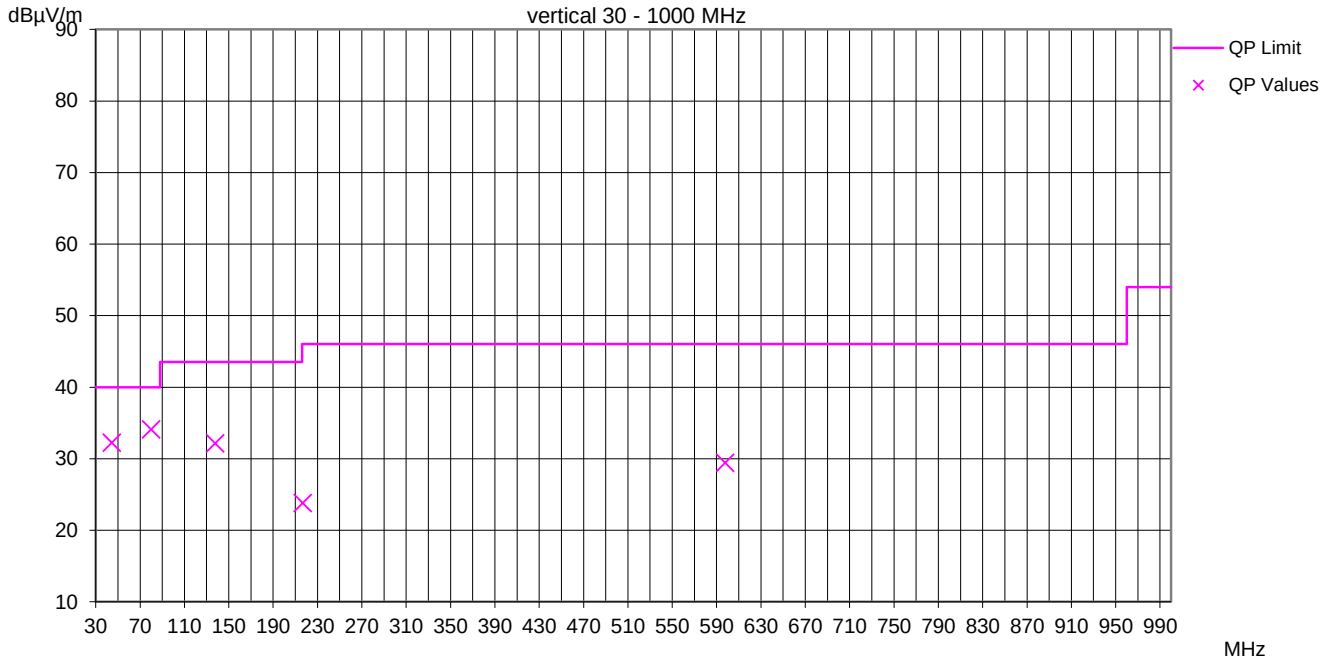
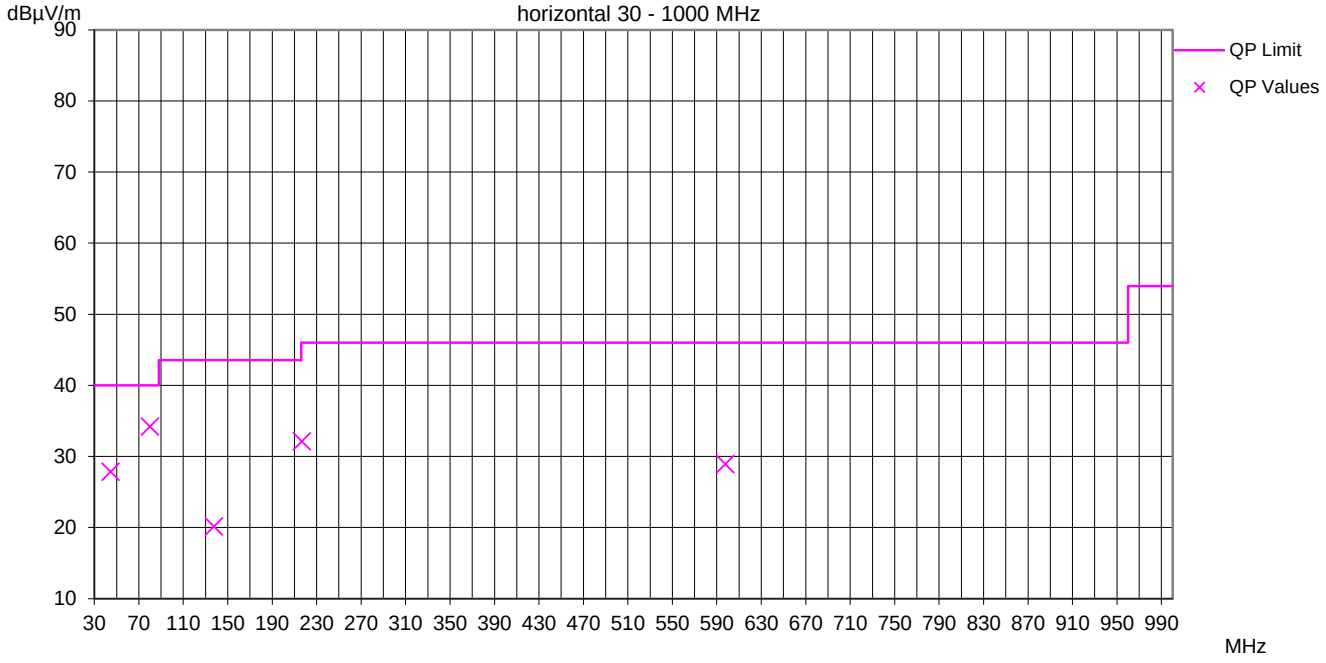
Operation mode:	continous transmitt mode (duty cycle = 99%), maximum RF power adjusted	Result: PASS
Remarks:	sample #1, IEEE 802.11g (54Mbps) CH06 (2437MHz) adjusted	
Date:	2013-02-06	
Tested by:	Pessinger Jürgen	



Minimum margin to limit: 5.9 dB

Frequency [MHz]	Reading [dBµV] QP	Correction [dB]	Values [dBµV/m] QP	Limit [dBµV/m] QP	Margin [dB] QP
44.700	17.2	15.0	32.2	40.0	7.8
80.147	23.1	11.0	34.1	40.0	5.9
137.706	21.5	10.6	32.1	43.5	11.4
216.774	10.0	13.8	23.8	46.0	22.2
597.753	6.4	23.0	29.4	46.0	16.6

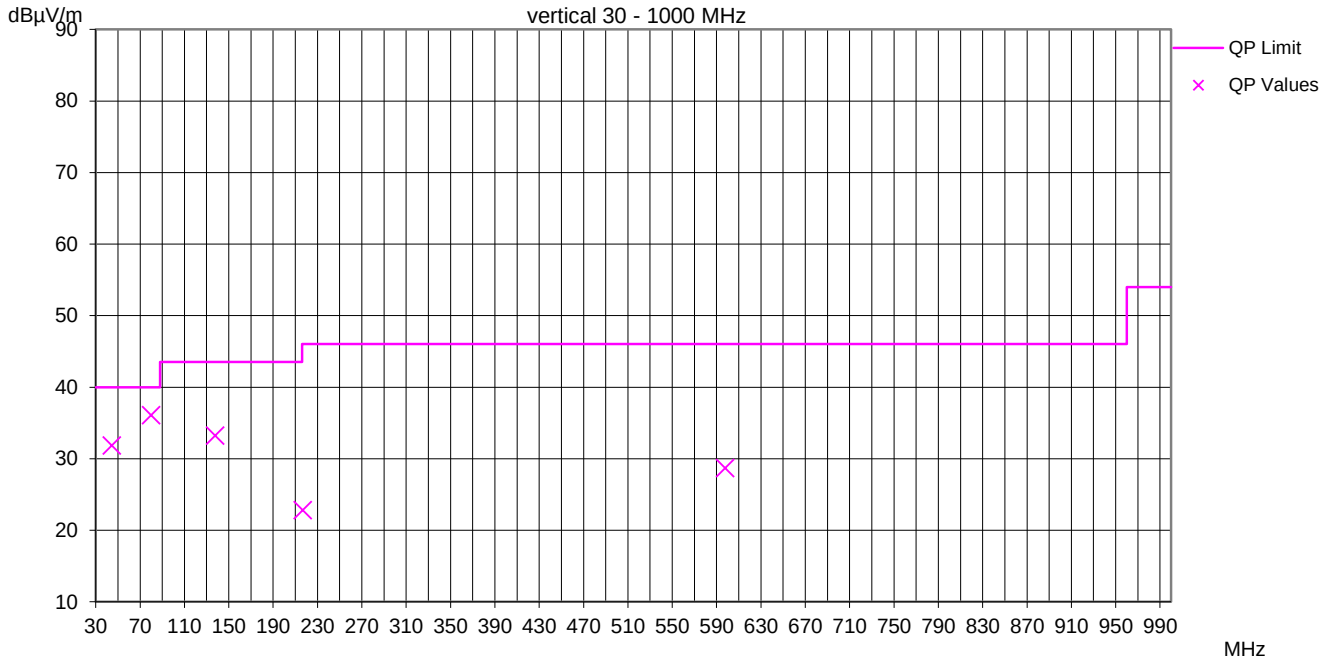
Operation mode:	continous transmitt mode (duty cycle = 99%), maximum RF power adjusted	Result: PASS
Remarks:	sample #1, IEEE 802.11g (54Mbps) CH11 (2462MHz) adjusted	
Date:	2013-02-06	
Tested by:	Pessinger Jürgen	



Minimum margin to limit: 5.8 dB

Frequency [MHz]	Reading [dBµV] QP	Correction [dB]	Values [dBµV/m] QP	Limit [dBµV/m] QP	Margin [dB] QP
44.700	12.8	15.0	27.8	40.0	12.2
80.145	23.2	11.0	34.2	40.0	5.8
137.705	9.5	10.6	20.1	43.5	23.4
216.775	18.3	13.8	32.1	46.0	13.9
597.755	5.9	23.0	28.9	46.0	17.1

Operation mode:	continous transmitt mode (duty cycle = 99%), maximum RF power adjusted	Result: PASS
Remarks:	sample #1, IEEE 802.11g (54Mbps) CH11 (2462MHz) adjusted	
Date:	2013-02-06	
Tested by:	Pessinger Jürgen	



Minimum margin to limit: 3.9 dB

Frequency [MHz]	Reading [dBµV] QP	Correction [dB]	Values [dBµV/m] QP	Limit [dBµV/m] QP	Margin [dB] QP
44.700	16.8	15.0	31.8	40.0	8.2
80.147	25.1	11.0	36.1	40.0	3.9
137.705	22.6	10.6	33.2	43.5	10.3
216.774	9.0	13.8	22.8	46.0	23.2
597.755	5.7	23.0	28.7	46.0	17.3

6.4 Radiated disturbance (1GHz – 25GHz)

For test instruments and accessories used see section 7 Part **SER 3**.

6.4.1 Description of the test location

Test location: Anechoic Chamber A4

Test distance: 3 metres

6.4.2 Photo documentation of the test set-up

6.4.3 Test specification

Environmental conditions: Temperature: 23 ° C Humidity: 36 % Atmospheric pressure: 97 kPa

Frequency range: 1000 MHz - 25000 MHz

The test was carried out in the following operation mode(s):
- continous transmitt mode (duty cycle = 99%), maximum RF power adjusted

6.4.4 Test result

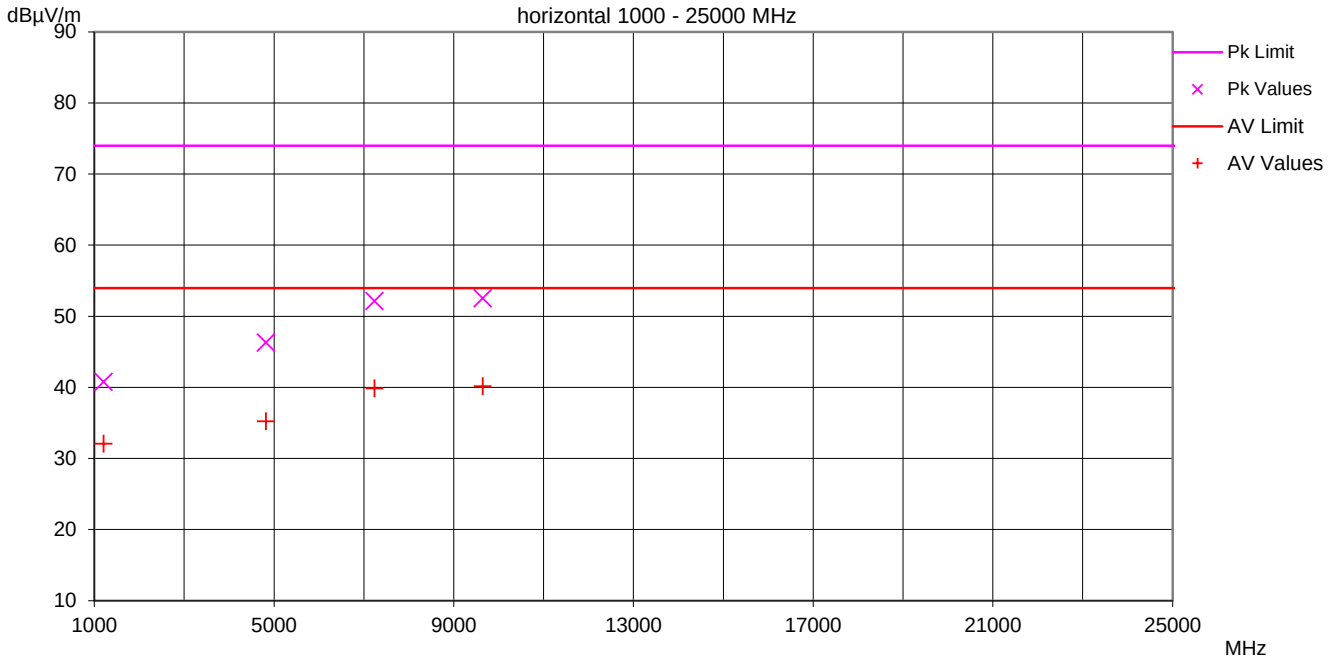
Minimal margin to limit 8,2 dB at 7386 MHz

The requirements are **FULFILLED.**

Remarks: Sample 1 with SMD antenna was used for testing

6.4.5 Test protocol

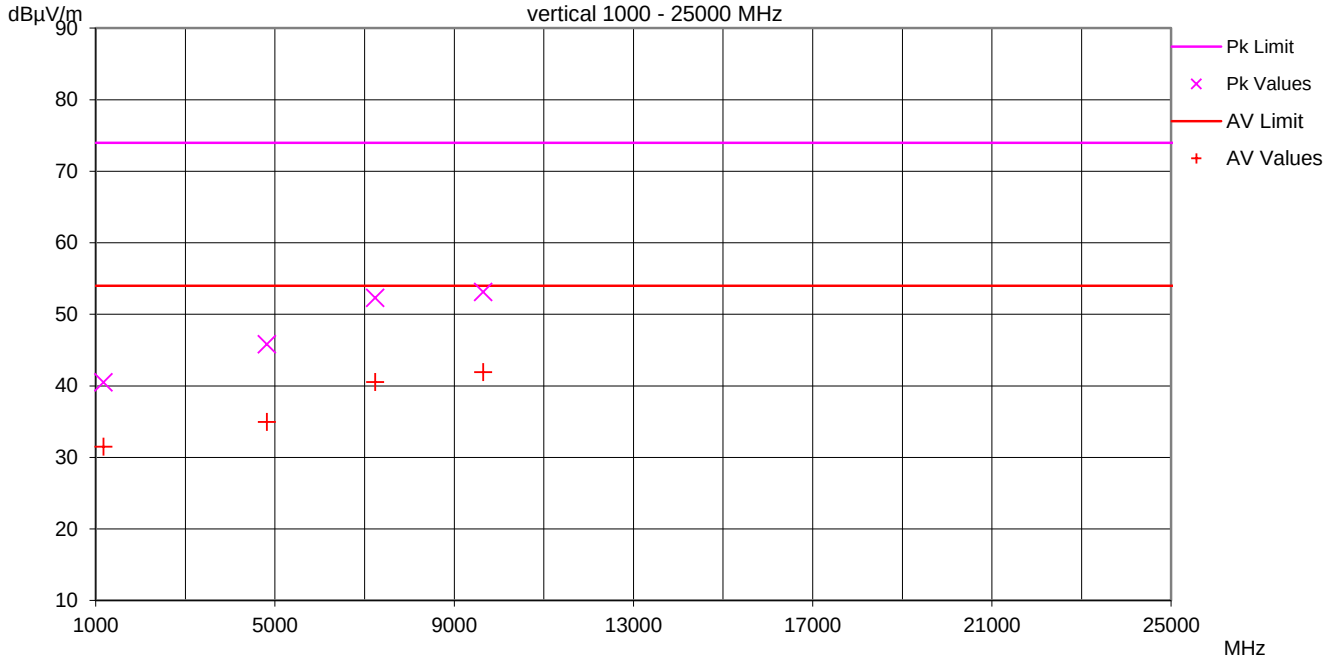
Operation mode:	continous transmitt mode (duty cycle = 99%), maximum RF power adjusted	Result: PASS
Remarks:	sample #1, IEEE 802.11b (11Mbps) CH01 (2412MHz) adjusted	
Date:	2013-02-12	
Tested by:	Pessinger Jürgen	



Minimum margin to limit: 13.8 dB

Frequency	Reading [dBµV]		Correction	Values [dBµV/m]		Limit [dBµV/m]		Margin [dB]	
[MHz]	Pk	AV	[dB]	Pk	AV	Pk	AV	Pk	AV
1208.000	36.3	27.6	4.4	40.8	32.1	74.0	54.0	33.2	21.9
4824.000	31.9	20.8	14.4	46.3	35.2	74.0	54.0	27.7	18.8
7238.000	33.2	20.9	18.9	52.1	39.8	74.0	54.0	21.9	14.1
9648.000	32.1	19.8	20.3	52.5	40.2	74.0	54.0	21.5	13.8

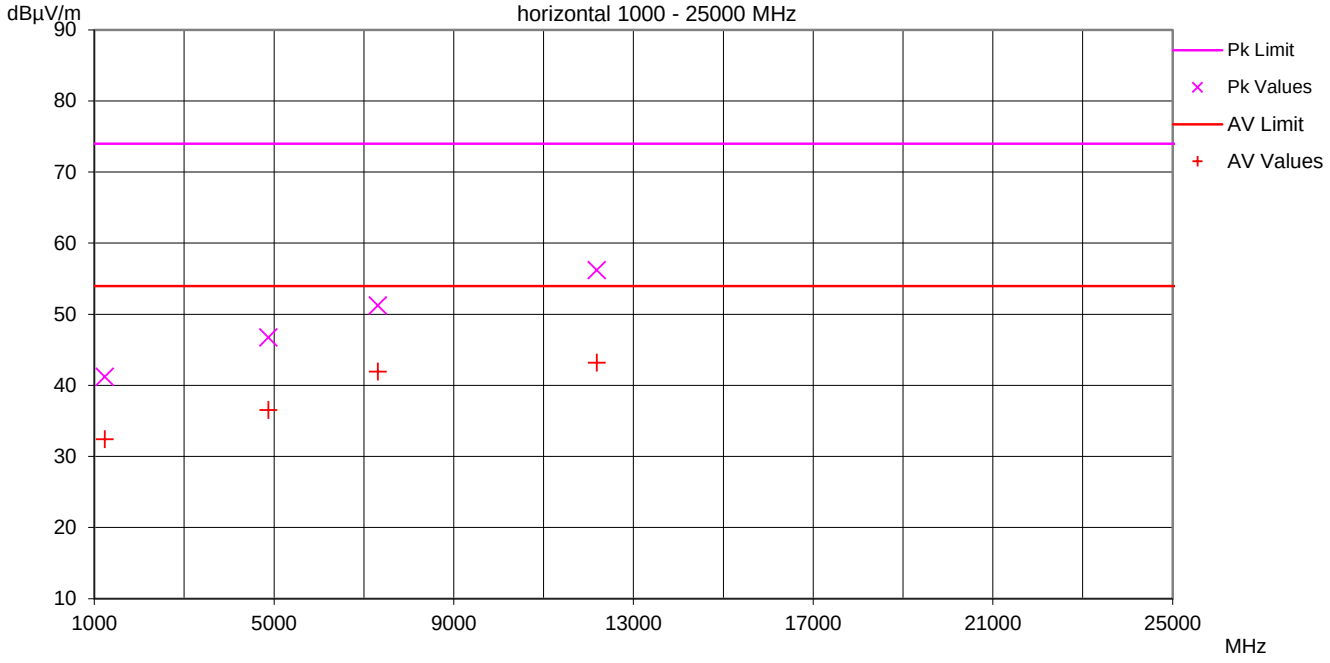
Operation mode:	continous transmitt mode (duty cycle = 99%), maximum RF power adjusted	Result: PASS
Remarks:	sample #1, IEEE 802.11b (11Mbps) CH01 (2412MHz) adjusted	
Date:	2013-02-12	
Tested by:	Pessinger Jürgen	



Minimum margin to limit: 12.1 dB

Frequency	Reading [dBµV]		Correction	Values [dBµV/m]		Limit [dBµV/m]		Margin [dB]	
[MHz]	Pk	AV	[dB]	Pk	AV	Pk	AV	Pk	AV
1172.000	36.2	27.2	4.3	40.5	31.5	74.0	54.0	33.5	22.5
4824.000	31.4	20.5	14.4	45.8	34.9	74.0	54.0	28.2	19.1
7236.000	33.4	21.6	18.9	52.3	40.5	74.0	54.0	21.7	13.4
9649.000	32.8	21.6	20.3	53.1	41.9	74.0	54.0	20.9	12.1

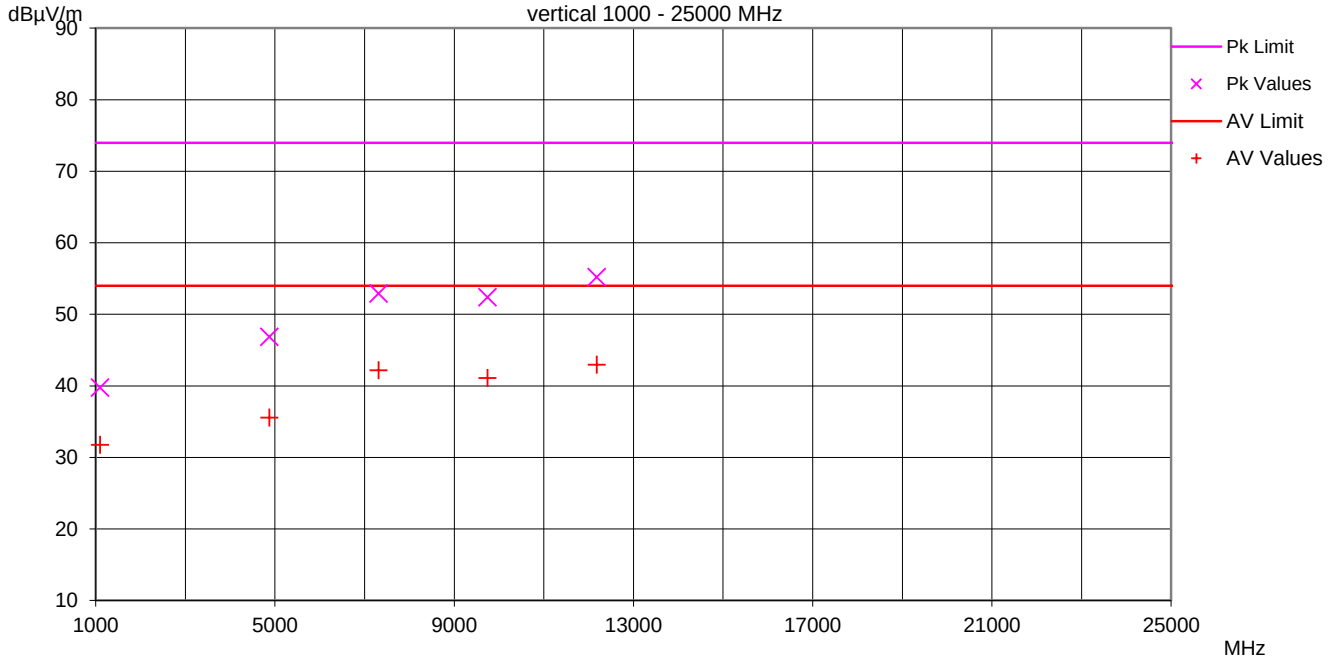
Operation mode:	continous transmitt mode (duty cycle = 99%), maximum RF power adjusted	Result: PASS
Remarks:	sample #1, IEEE 802.11b (11Mbps) CH06 (2437MHz) adjusted	
Date:	2013-02-12	
Tested by:	Pessinger Jürgen	



Minimum margin to limit: 10.8 dB

Frequency	Reading [dBµV]		Correction	Values [dBµV/m]		Limit [dBµV/m]		Margin [dB]	
[MHz]	Pk	AV	[dB]	Pk	AV	Pk	AV	Pk	AV
1236.000	36.7	27.9	4.5	41.2	32.4	74.0	54.0	32.8	21.6
4876.000	32.3	22.0	14.5	46.7	36.5	74.0	54.0	27.3	17.5
7312.000	32.1	22.8	19.2	51.2	41.9	74.0	54.0	22.8	12.1
12184.000	34.3	21.2	21.9	56.2	43.2	74.0	54.0	17.8	10.8

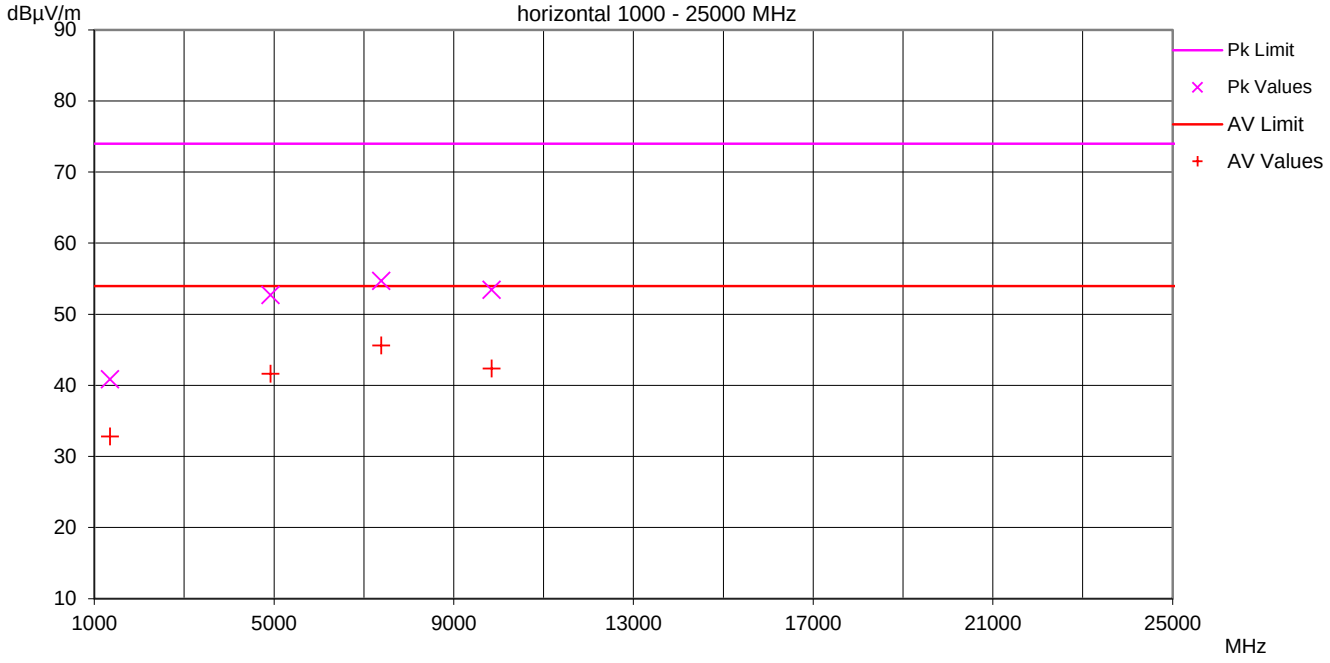
Operation mode:	continous transmitt mode (duty cycle = 99%), maximum RF power adjusted	Result: PASS
Remarks:	sample #1, IEEE 802.11b (11Mbps) CH06 (2437MHz) adjusted	
Date:	2013-02-12	
Tested by:	Pessinger Jürgen	



Minimum margin to limit: 11.0 dB

Frequency	Reading [dBµV]		Correction	Values [dBµV/m]		Limit [dBµV/m]		Margin [dB]	
[MHz]	Pk	AV	[dB]	Pk	AV	Pk	AV	Pk	AV
1100.000	35.7	27.7	4.1	39.7	31.7	74.0	54.0	34.3	22.2
4876.000	32.4	21.1	14.5	46.9	35.6	74.0	54.0	27.1	18.4
7312.000	33.7	23.0	19.2	52.9	42.2	74.0	54.0	21.1	11.8
9748.000	32.0	20.7	20.3	52.4	41.1	74.0	54.0	21.6	12.9
12184.000	33.5	21.2	21.7	55.2	43.0	74.0	54.0	18.8	11.0

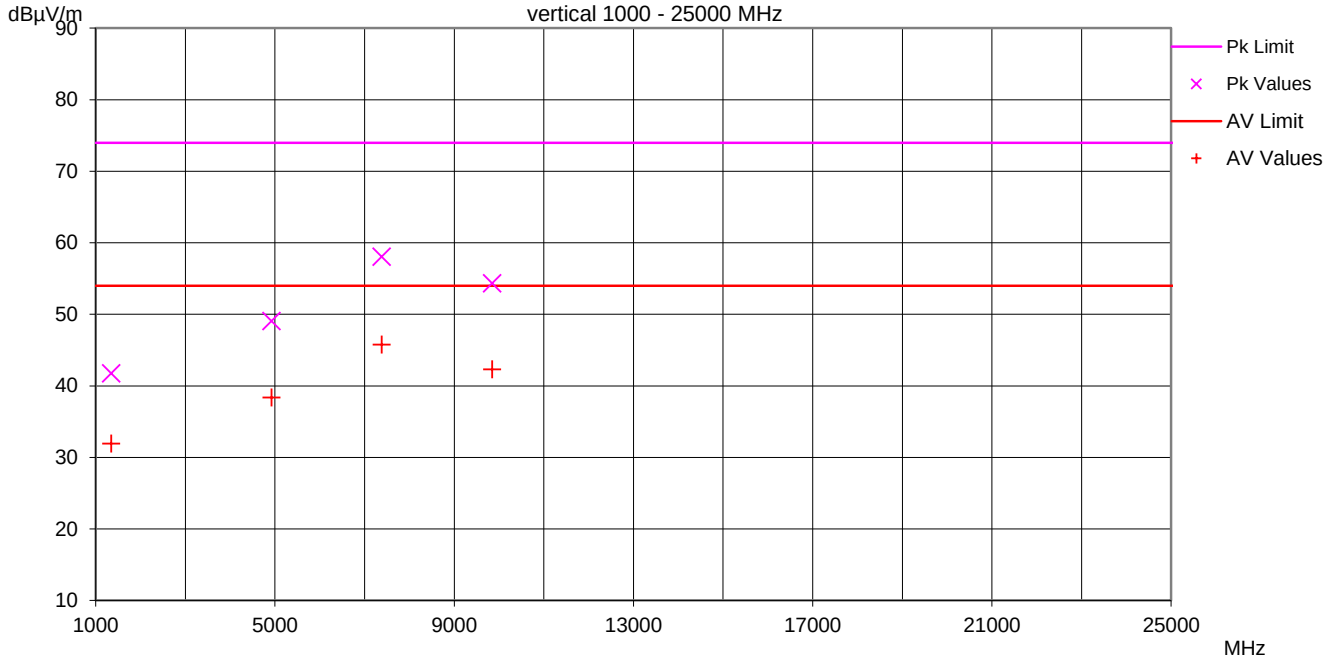
Operation mode:	continous transmitt mode (duty cycle = 99%), maximum RF power adjusted	Result: PASS
Remarks:	sample #1, IEEE 802.11b (11Mbps) CH11 (2462MHz) adjusted	
Date:	2013-02-12	
Tested by:	Pessinger Jürgen	



Minimum margin to limit: 8.4 dB

Frequency	Reading [dBµV]		Correction	Values [dBµV/m]		Limit [dBµV/m]		Margin [dB]	
[MHz]	Pk	AV	[dB]	Pk	AV	Pk	AV	Pk	AV
1348.000	36.1	28.1	4.7	40.8	32.8	74.0	54.0	33.2	21.2
4923.000	38.2	27.0	14.5	52.7	41.6	74.0	54.0	21.3	12.4
7386.000	35.5	26.4	19.2	54.7	45.6	74.0	54.0	19.3	8.4
9848.000	33.0	21.9	20.4	53.4	42.4	74.0	54.0	20.6	11.6

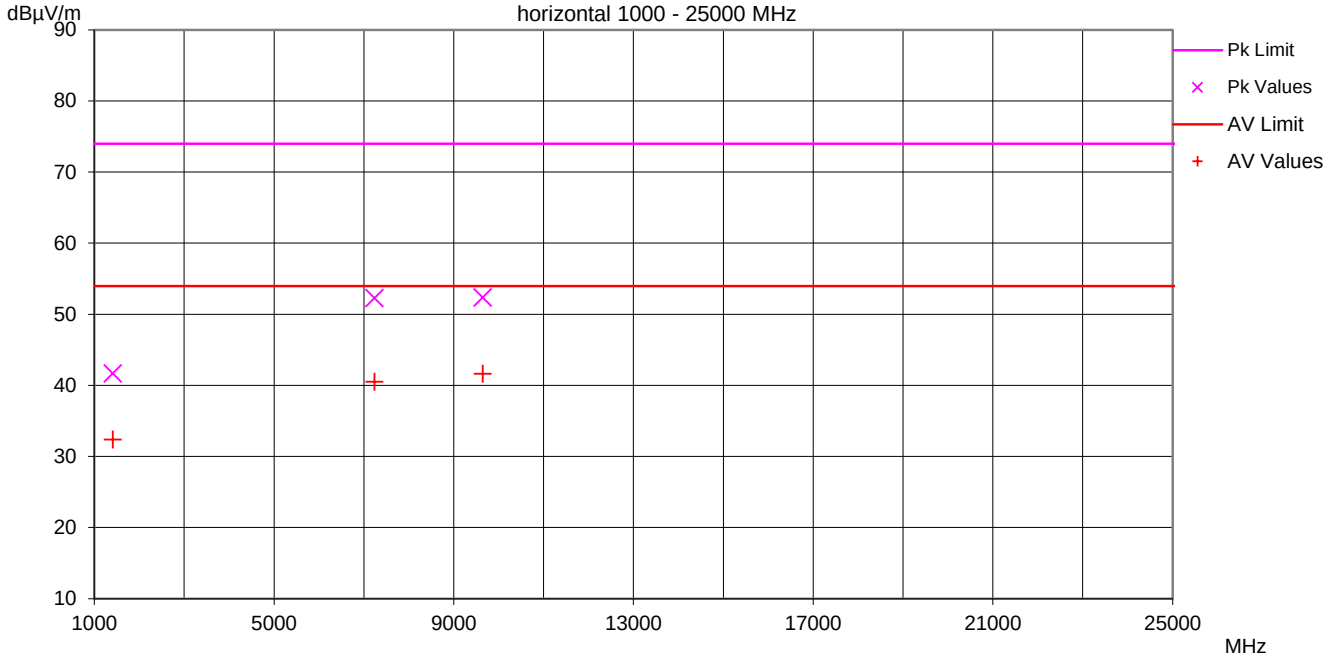
Operation mode:	continous transmitt mode (duty cycle = 99%), maximum RF power adjusted	Result: PASS
Remarks:	sample #1, IEEE 802.11b (11Mbps) CH11 (2462MHz) adjusted	
Date:	2013-02-12	
Tested by:	Pessinger Jürgen	



Minimum margin to limit: 8.2 dB

Frequency	Reading [dBµV]		Correction	Values [dBµV/m]		Limit [dBµV/m]		Margin [dB]	
[MHz]	Pk	AV	[dB]	Pk	AV	Pk	AV	Pk	AV
1348.000	37.0	27.2	4.7	41.7	31.9	74.0	54.0	32.3	22.0
4923.000	34.5	23.8	14.5	49.1	38.4	74.0	54.0	24.9	15.6
7386.000	38.8	26.5	19.2	58.0	45.7	74.0	54.0	16.0	8.2
9848.000	33.9	21.8	20.4	54.3	42.3	74.0	54.0	19.7	11.7

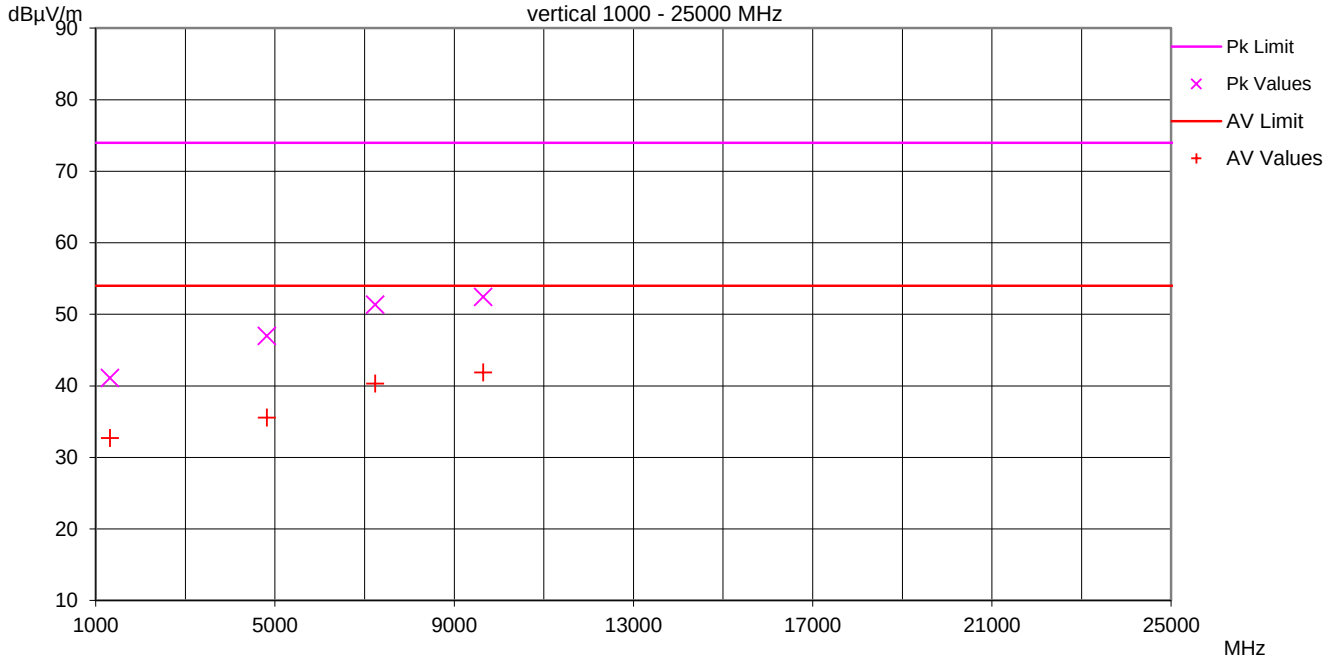
Operation mode:	continous transmitt mode (duty cycle = 99%), maximum RF power adjusted	Result: PASS
Remarks:	sample #1, IEEE 802.11g (54Mbps) CH01 (2412MHz) adjusted	
Date:	2013-02-12	
Tested by:	Pessinger Jürgen	



Minimum margin to limit: 12.4 dB

Frequency	Reading [dBµV]		Correction	Values [dBµV/m]		Limit [dBµV/m]		Margin [dB]	
[MHz]	Pk	AV	[dB]	Pk	AV	Pk	AV	Pk	AV
1412.000	36.9	27.6	4.8	41.7	32.3	74.0	54.0	32.3	21.6
7236.000	33.3	21.5	18.9	52.3	40.5	74.0	54.0	21.7	13.5
9648.000	32.0	21.3	20.3	52.3	41.6	74.0	54.0	21.6	12.4

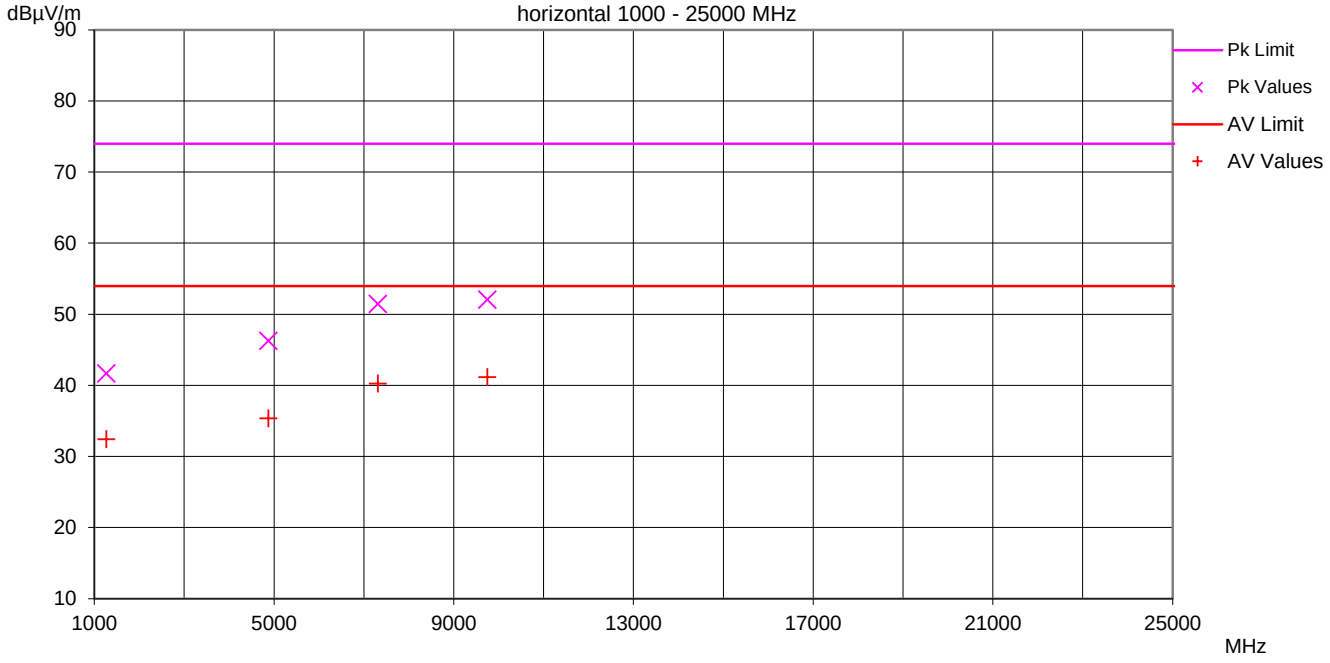
Operation mode:	continous transmitt mode (duty cycle = 99%), maximum RF power adjusted	Result: PASS
Remarks:	sample #1, IEEE 802.11g (54Mbps) CH01 (2412MHz) adjusted	
Date:	2013-02-12	
Tested by:	Pessinger Jürgen	



Minimum margin to limit: 12.1 dB

Frequency	Reading [dBµV]		Correction	Values [dBµV/m]		Limit [dBµV/m]		Margin [dB]	
[MHz]	Pk	AV	[dB]	Pk	AV	Pk	AV	Pk	AV
1316.000	36.4	28.0	4.7	41.1	32.7	74.0	54.0	32.9	21.3
4824.000	32.6	21.2	14.4	47.0	35.6	74.0	54.0	27.0	18.4
7235.000	32.4	21.4	18.9	51.3	40.3	74.0	54.0	22.6	13.7
9648.000	32.1	21.5	20.3	52.4	41.8	74.0	54.0	21.6	12.1

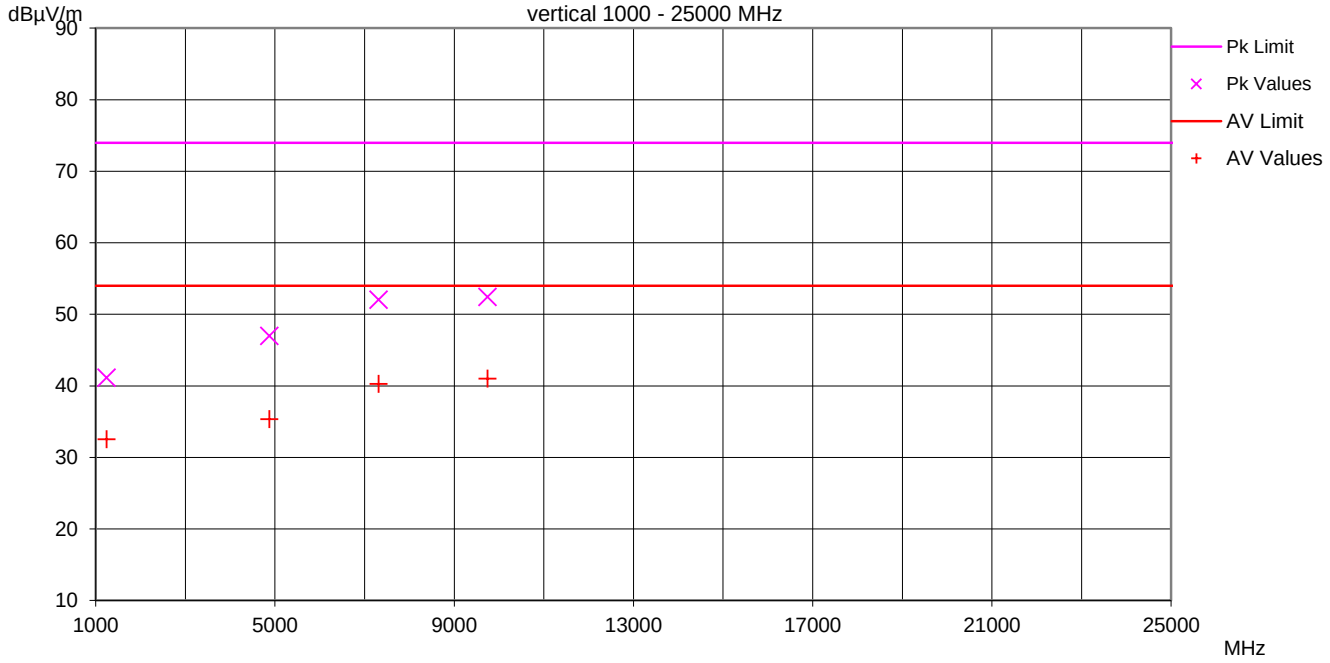
Operation mode:	continous transmitt mode (duty cycle = 99%), maximum RF power adjusted	Result: PASS
Remarks:	sample #1, IEEE 802.11g (54Mbps) CH06 (2437MHz) adjusted	
Date:	2013-02-12	
Tested by:	Pessinger Jürgen	



Minimum margin to limit: 12.8 dB

Frequency	Reading [dBµV]		Correction	Values [dBµV/m]		Limit [dBµV/m]		Margin [dB]	
[MHz]	Pk	AV	[dB]	Pk	AV	Pk	AV	Pk	AV
1268.000	37.0	27.8	4.6	41.6	32.4	74.0	54.0	32.3	21.6
4874.000	31.8	20.9	14.5	46.2	35.4	74.0	54.0	27.8	18.6
7312.000	32.3	21.1	19.2	51.4	40.2	74.0	54.0	22.5	13.8
9748.000	31.7	20.8	20.4	52.0	41.1	74.0	54.0	22.0	12.8

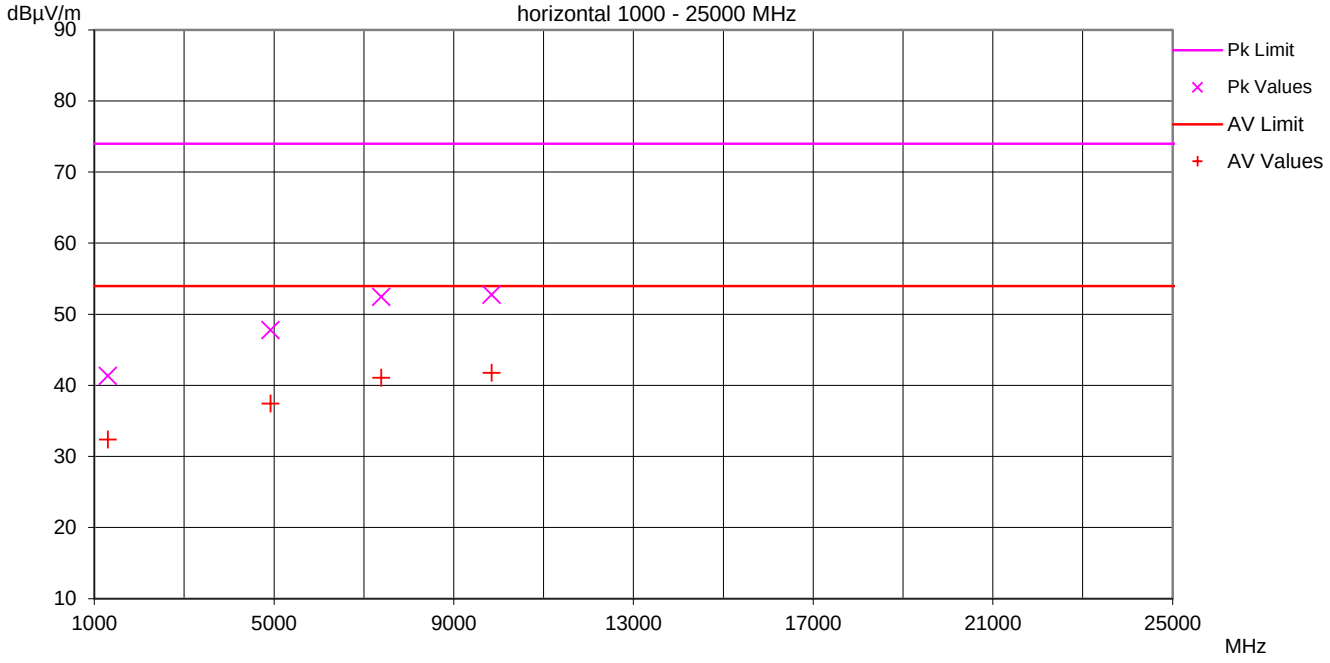
Operation mode:	continous transmitt mode (duty cycle = 99%), maximum RF power adjusted	Result: PASS
Remarks:	sample #1, IEEE 802.11g (54Mbps) CH06 (2437MHz) adjusted	
Date:	2013-02-12	
Tested by:	Pessinger Jürgen	



Minimum margin to limit: 13.0 dB

Frequency	Reading [dBµV]		Correction	Values [dBµV/m]		Limit [dBµV/m]		Margin [dB]	
[MHz]	Pk	AV	[dB]	Pk	AV	Pk	AV	Pk	AV
1240.000	36.6	28.0	4.5	41.1	32.5	74.0	54.0	32.8	21.4
4874.000	32.5	20.9	14.5	47.0	35.3	74.0	54.0	27.0	18.6
7312.000	32.9	21.1	19.2	52.0	40.2	74.0	54.0	22.0	13.7
9748.000	32.1	20.6	20.4	52.4	41.0	74.0	54.0	21.6	13.0

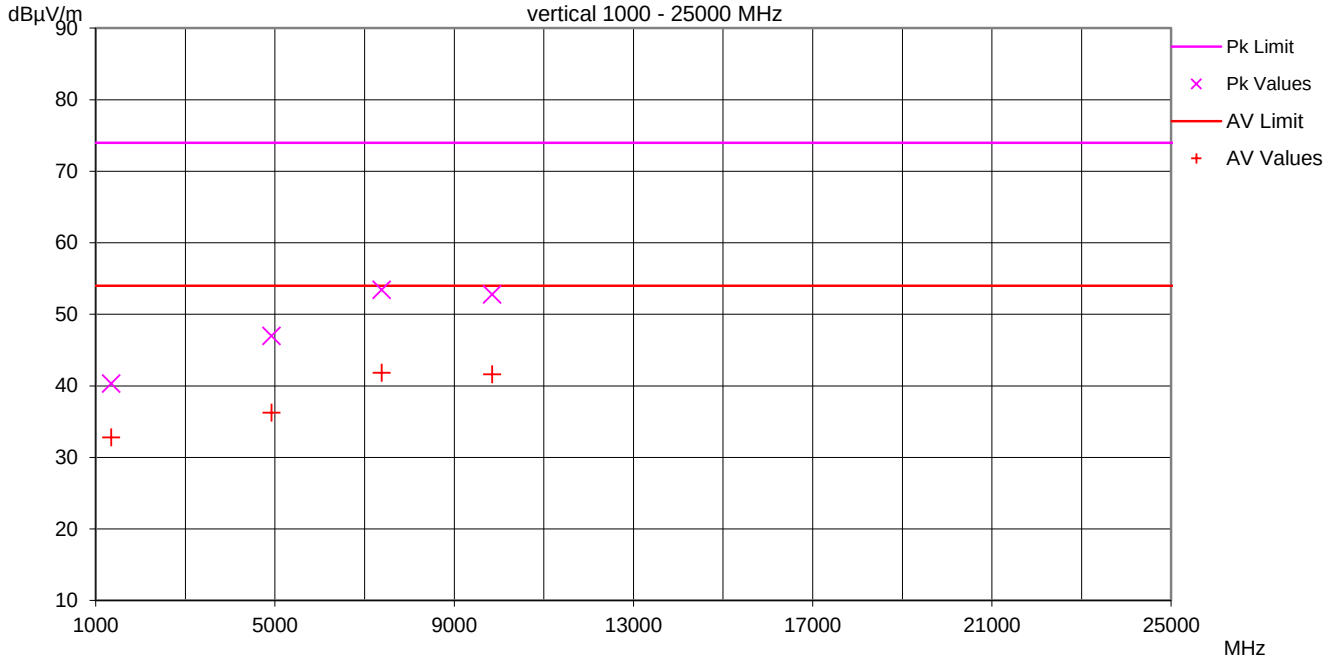
Operation mode:	continous transmitt mode (duty cycle = 99%), maximum RF power adjusted	Result: PASS
Remarks:	sample #1, IEEE 802.11g (54Mbps) CH11 (2462MHz) adjusted	
Date:	2013-02-12	
Tested by:	Pessinger Jürgen	



Minimum margin to limit: 12.3 dB

Frequency	Reading [dBµV]		Correction	Values [dBµV/m]		Limit [dBµV/m]		Margin [dB]	
[MHz]	Pk	AV	[dB]	Pk	AV	Pk	AV	Pk	AV
1300.000	36.6	27.7	4.7	41.3	32.3	74.0	54.0	32.7	21.6
4924.000	33.2	22.8	14.6	47.8	37.4	74.0	54.0	26.2	16.6
7385.000	33.2	21.8	19.2	52.4	41.0	74.0	54.0	21.5	12.9
9848.000	32.3	21.3	20.4	52.7	41.7	74.0	54.0	21.2	12.3

Operation mode:	continous transmitt mode (duty cycle = 99%), maximum RF power adjusted	Result: PASS
Remarks:	sample #1, IEEE 802.11g (54Mbps) CH11 (2462MHz) adjusted	
Date:	2013-02-12	
Tested by:	Pessinger Jürgen	



Minimum margin to limit: 12.2 dB

Frequency	Reading [dBµV]		Correction	Values [dBµV/m]		Limit [dBµV/m]		Margin [dB]	
[MHz]	Pk	AV	[dB]	Pk	AV	Pk	AV	Pk	AV
1348.000	35.6	28.1	4.7	40.3	32.8	74.0	54.0	33.7	21.2
4924.000	32.4	21.7	14.6	47.0	36.2	74.0	54.0	27.0	17.7
7385.000	34.2	22.6	19.2	53.4	41.8	74.0	54.0	20.6	12.2
9848.000	32.3	21.2	20.4	52.7	41.6	74.0	54.0	21.2	12.4

6.5 Bandedges

For test instruments and accessories used see section 7 Part **SER 3**.

6.5.1 Description of the test location

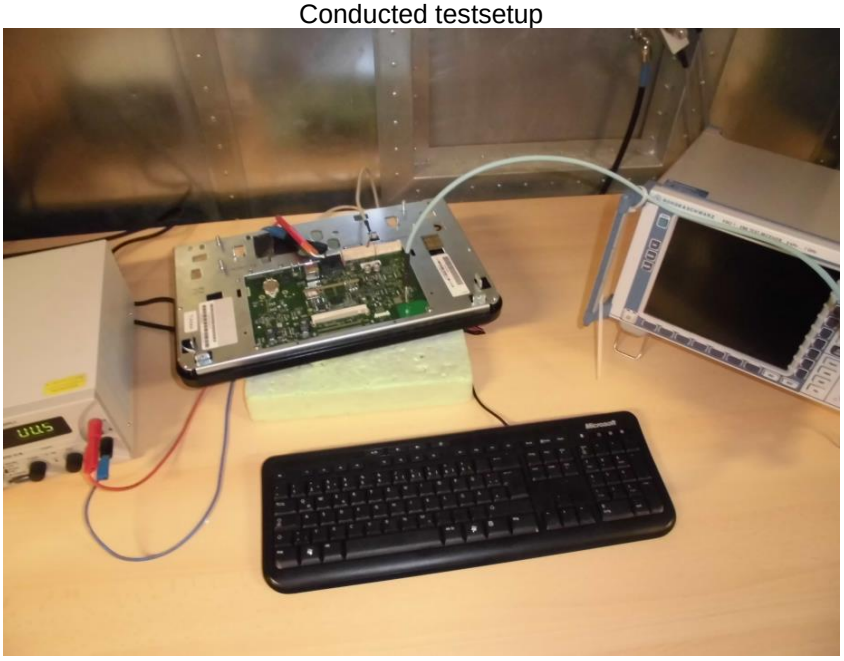
Test location: Anechoic Chamber A4 / AREA A4

Test distance: 3 metres / conducted

6.5.2 Photo documentation of the test set-up

radiated testsetup

Conducted testsetup



emitel GmbH, Ohmstrasse 1, 94342 STRASSKIRCHEN, DEUTSCHLAND Tel. */ Phone*: +49 (0) 94 24 94 82-0 Fax: +49 (0) 94 24 94 82-640

6.5.3 Test specification

Environmental conditions: Temperature: 24 ° C Humidity: 46 % Atmospheric pressure: 97 kPa

The test was carried out in the following operation mode(s):
- continous transmitt mode (duty cycle = 99%), maximum RF power adjusted

6.5.4 Test result

The requirements are **FULFILLED.**

Remarks: Sample 1 with SMD antenna was used for radiated testing, sample 2 with temprarry antenna connector was used for conducted testing

Marker-delta method according to KDB 558074 D01 subclause 13.2 used

6.5.5 Test protocol

Bandedge low

Operation mode: continous transmitt mode (duty cycle = 99%), maximum RF power adjusted — Result: PASS
Remarks: IEEE 802.11b (11Mbps) CH01 (2412MHz) adjusted
Date: 2013-05-02
Tested by: Pessinger Jürgen

Reference

Reading [dBµV]		Correction	Values [dBµV/m]	
Pk	AV	[dB]	Pk	AV
70.7	60.0	30.7	101.4	90.7

Calculated Emission at Bandedge

Reference [dBµV/m]		Delta	Values [dBµV/m]		Limit [dBµV/m]		Margin [dB]	
Pk	AV	[dB]	Pk	AV	Pk	AV	Pk	AV
101.4	90.7	-38,2	63.2	52.5	74.0	54.0	10.8	1.5

Operation mode: continous transmitt mode (duty cycle = 99%), maximum RF power adjusted — Result: PASS
Remarks: IEEE 802.11g (54Mbps) CH01 (2412MHz) adjusted
Date: 2013-05-02
Tested by: Pessinger Jürgen

Reference

Reading [dBµV]		Correction	Values [dBµV/m]	
Pk	AV	[dB]	Pk	AV
60.1	49.3	30.7	90.8	80.0

Calculated Emission at Bandedge

Reference [dBµV/m]		Delta	Values [dBµV/m]		Limit [dBµV/m]		Margin [dB]	
Pk	AV	[dB]	Pk	AV	Pk	AV	Pk	AV
90.8	80.0	-27.1	63.7	52.9	74.0	54.0	10.3	1.1

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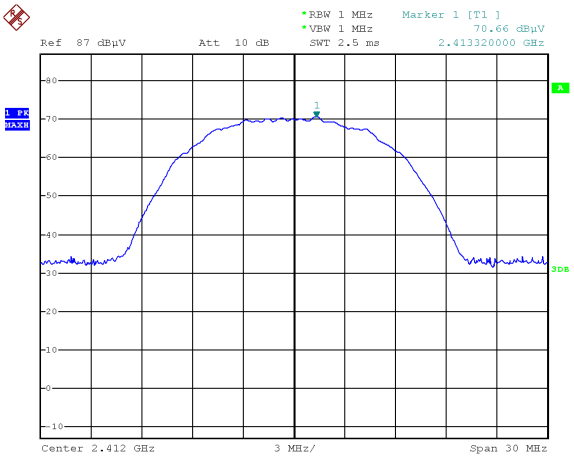
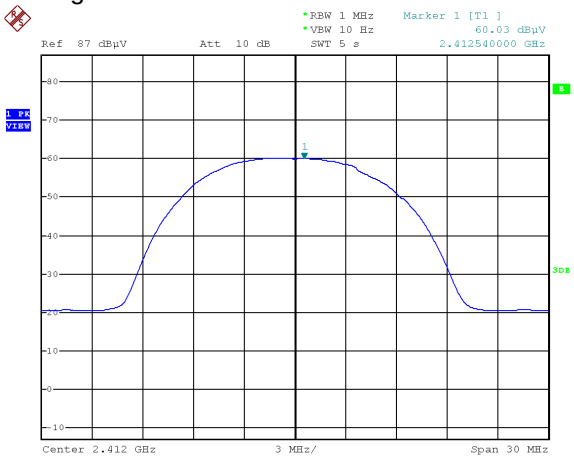
IEEE 802.11b (11Mbps) CH01 (2412MHz) adjusted

Reference
Peak:



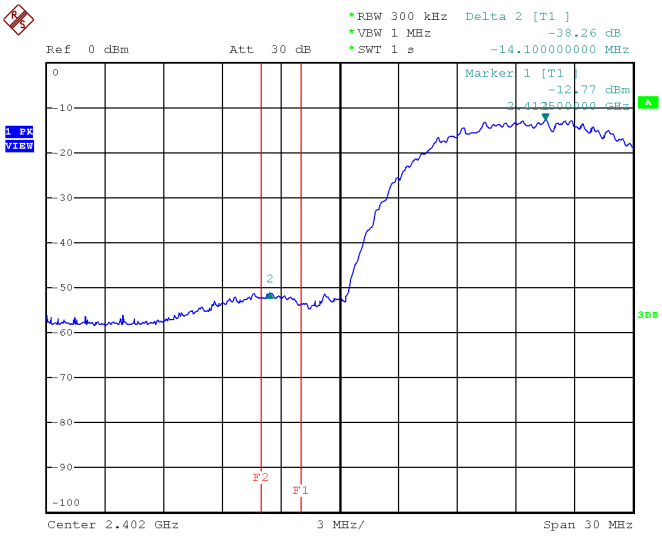
7
Date: 3.MAY.2013 09:29:09

Reference
Average:



7
Date: 3.MAY.2013 09:27:59

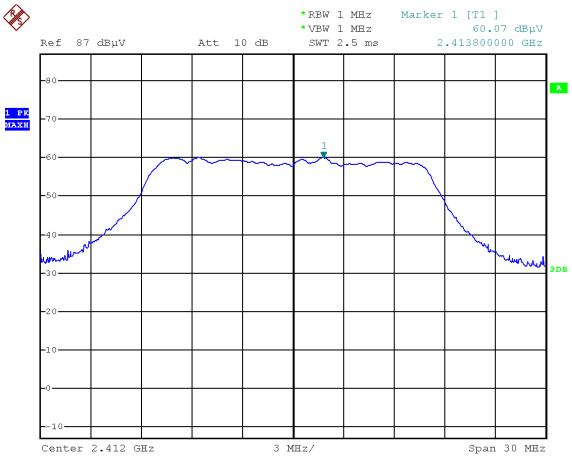
Delta measurement



7
Date: 29.APR.2013 15:35:05

IEEE 802.11g (54Mbps) CH01 (2412MHz) adjusted

Reference
Peak:



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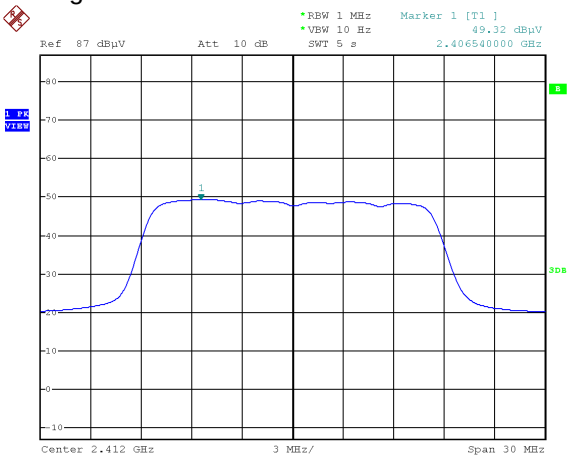
Date: 3.MAY.2013 09:32:47

Reference
Average:



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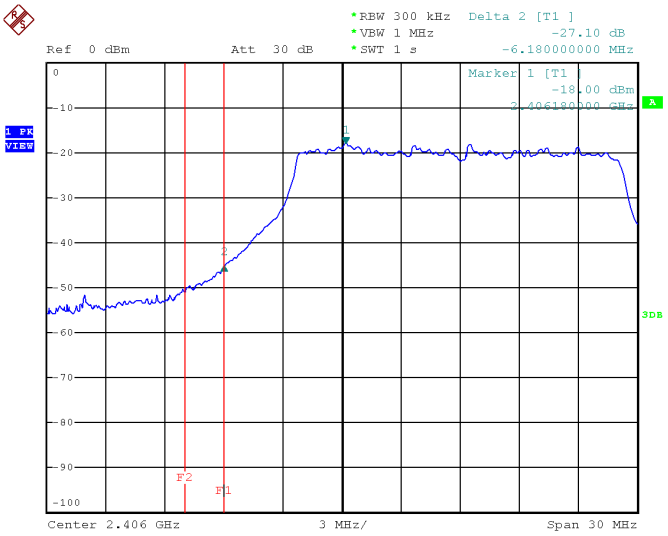
Date: 3.MAY.2013 09:31:59

Delta measurement



7
Date: 29.APR.2013 15:40:50

Bandedge high

Operation mode:	continous transmitt mode (duty cycle = 99%), maximum RF power adjusted	Result:	PASS
Remarks:	IEEE 802.11b (11Mbps) CH11 (2462MHz) adjusted		
Date:	2013-05-03		
Tested by:	Pessinger Jürgen		

Reference

Reading [dBµV]		Correction	Values [dBµV/m]	
Pk	AV	[dB]	Pk	AV
70.2	62.4	30.7	100.9	93.1

Calculated Emission at Bandedge

Reference [dBµV/m]		Delta	Values [dBµV/m]		Limit [dBµV/m]		Margin [dB]	
Pk	AV	[dB]	Pk	AV	Pk	AV	Pk	AV
100.9	93.1	-44,3	56.6	48.8	74.0	54.0	17.4	5.2

Operation mode:	continous transmitt mode (duty cycle = 99%), maximum RF power adjusted	Result:	PASS
Remarks:	IEEE 802.11g (54Mbps) CH11 (2462MHz) adjusted		
Date:	2013-05-03		
Tested by:	Pessinger Jürgen		

Reference

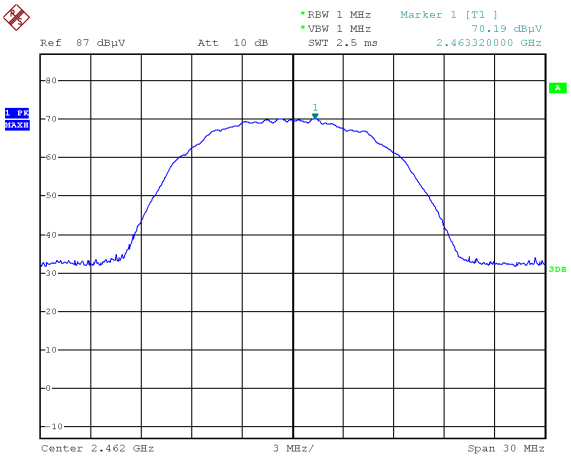
Reading [dBµV]		Correction	Values [dBµV/m]	
Pk	AV	[dB]	Pk	AV
62.4	51.6	30.7	93.1	82.3

Calculated Emission at Bandedge

Reference [dBµV/m]		Delta	Values [dBµV/m]		Limit [dBµV/m]		Margin [dB]	
Pk	AV	[dB]	Pk	AV	Pk	AV	Pk	AV
93.1	82.3	-36,7	56.4	45.6	74.0	54.0	17.6	8.4

IEEE 802.11b (11Mbps) CH11 (2462MHz) adjusted

Reference
Peak:



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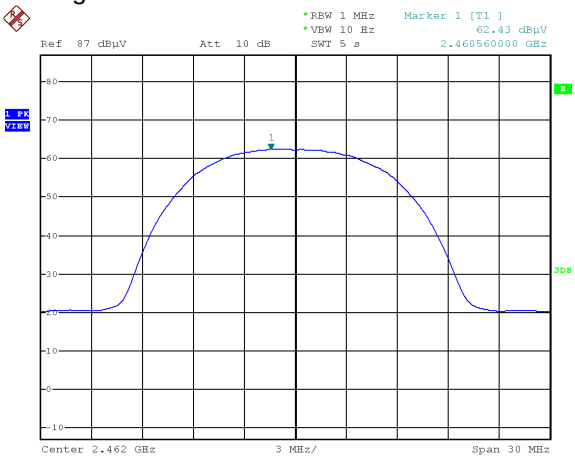
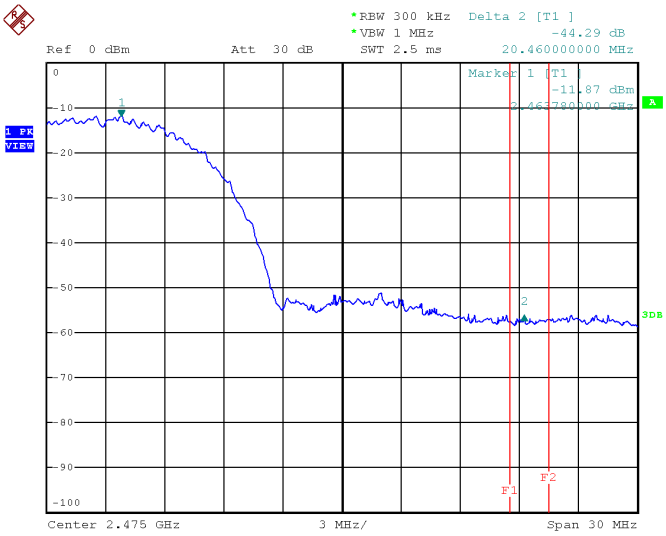
Reference
Average:



7
Date: 3.MAY.2013 09:38:46

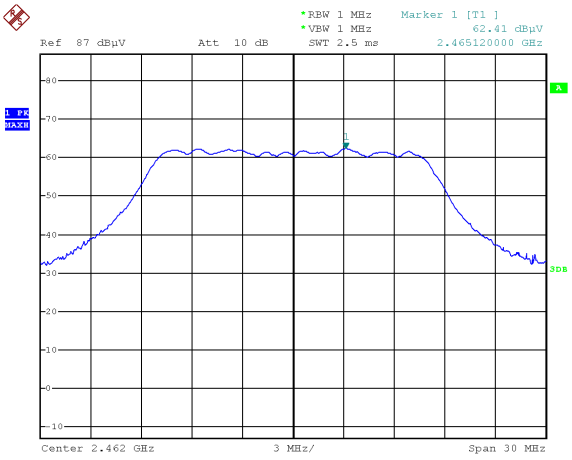
Delta measurement



7
Date: 29.APR.2013 16:29:26

IEEE 802.11g (54Mbps) CH11 (2462MHz) adjusted

Reference
Peak:



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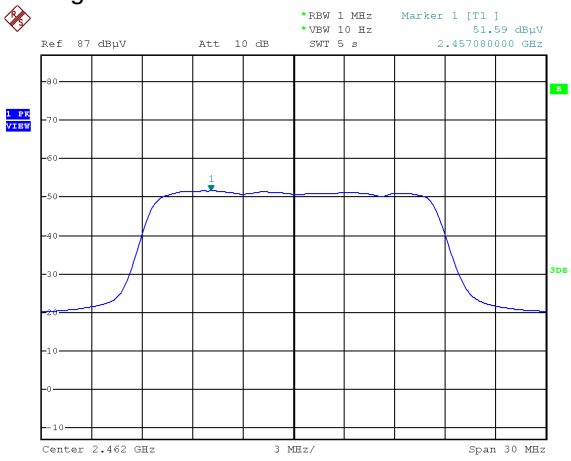
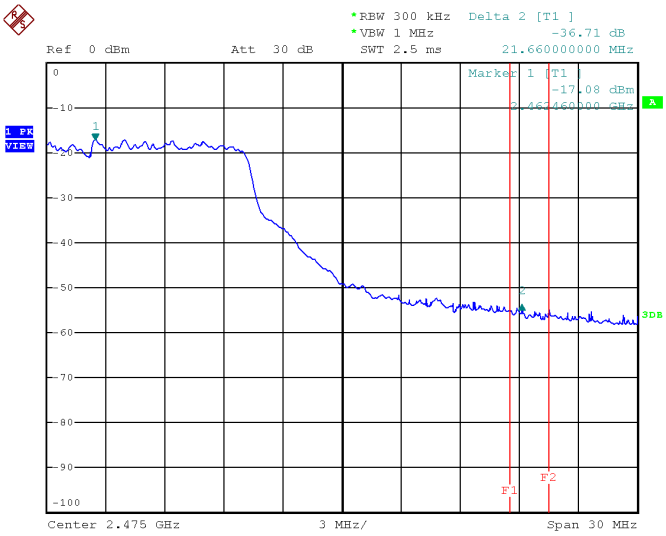
Date: 3.MAY.2013 09:36:37

Reference
Average:



7
Date: 3.MAY.2013 09:35:20

Delta measurement



7
Date: 29.APR.2013 16:27:06

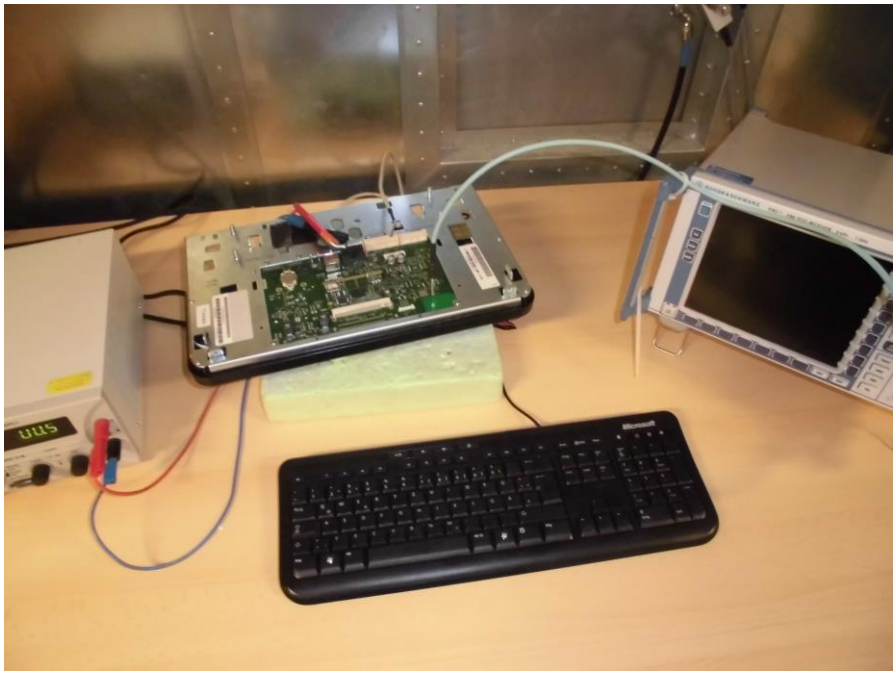
6.6 6dB Bandwidth

For test instruments and accessories used see section 7 Part **CPC 3**.

6.6.1 Description of the test location

Test location: AREA A4

6.6.2 Photo documentation of the test set-up



6.6.3 Test specification

Environmental conditions: Temperature: 22 ° C Humidity: 46 % Atmospheric pressure: 98 kPa

Frequency range: 2400 MHz – 2483,5 MHz

The test was carried out in the following operation mode(s):
- continous transmitt mode (duty cycle = 99%), maximum RF power adjusted

6.6.4 Test result

The requirements are **FULFILLED.**

Remarks: Sample 2 with temporary antenna connector was used for testing

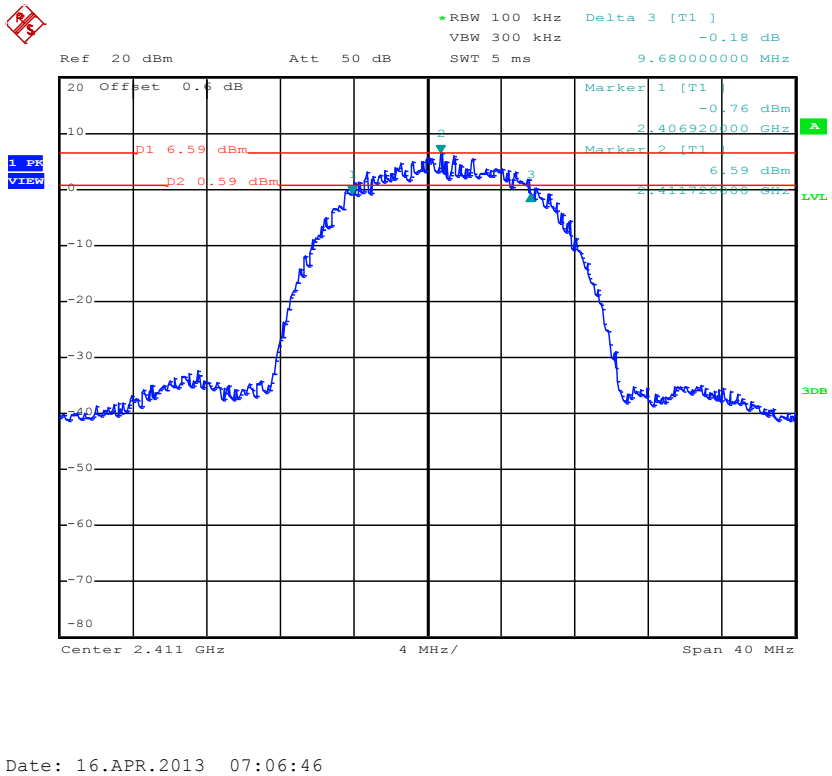
DTS bandwidth measurement according to KDB 558074 D01 subclause 8.1 option 1 used.

6.6.5 Test protocol

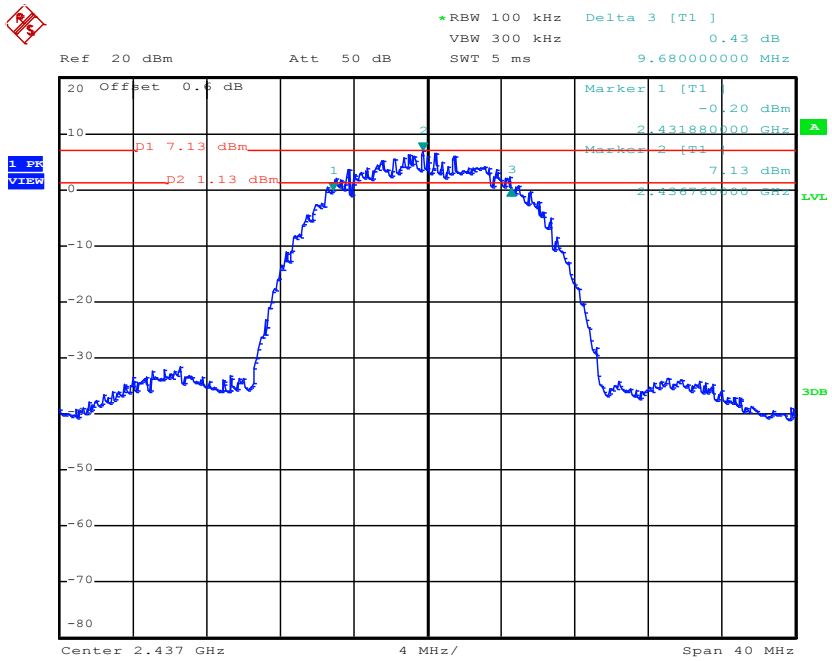
IEEE 802.11b

CH	frequency [MHz]	6dB Bandwidth [MHz]	minimum Limit [MHz]	Result
1	2412	9,68	0.5	Limit kept
6	2437	9.68	0.5	Limit kept
11	2462	9.68	0.5	Limit kept

IEEE 802.11b (11Mbps) CH01

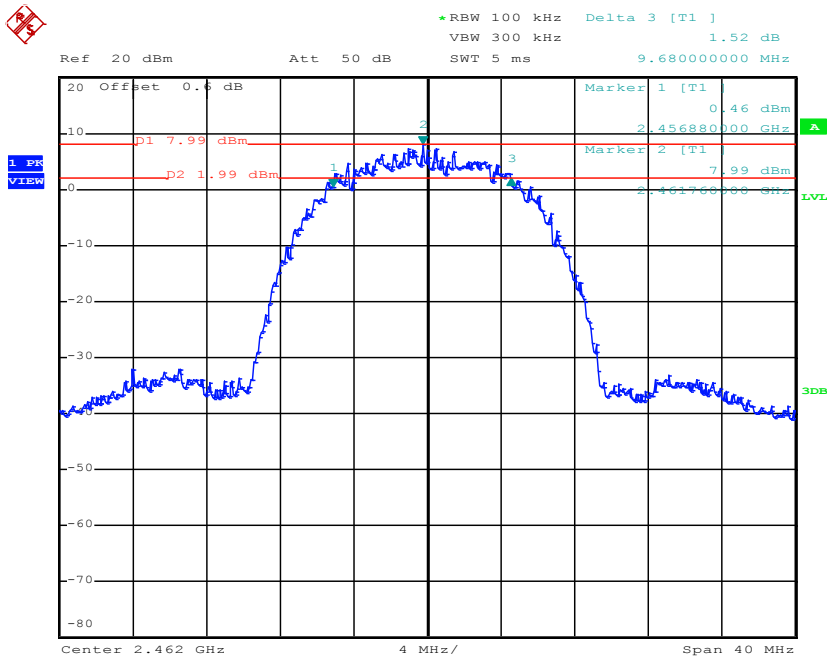


IEEE 802.11b (11Mbps) CH06



Date: 16.APR.2013 08:26:30

IEEE 802.11b (11Mbps) CH11

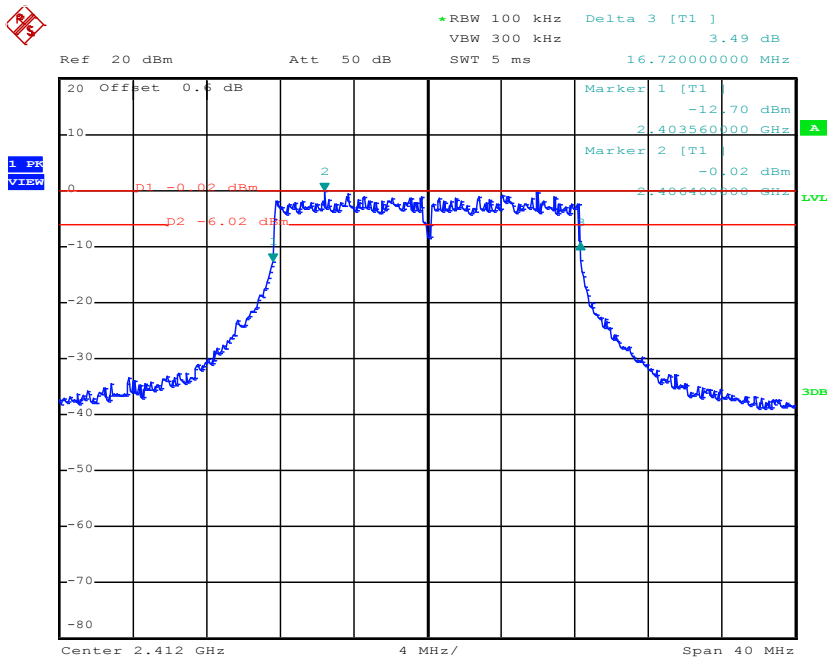


Date: 16.APR.2013 08:45:49

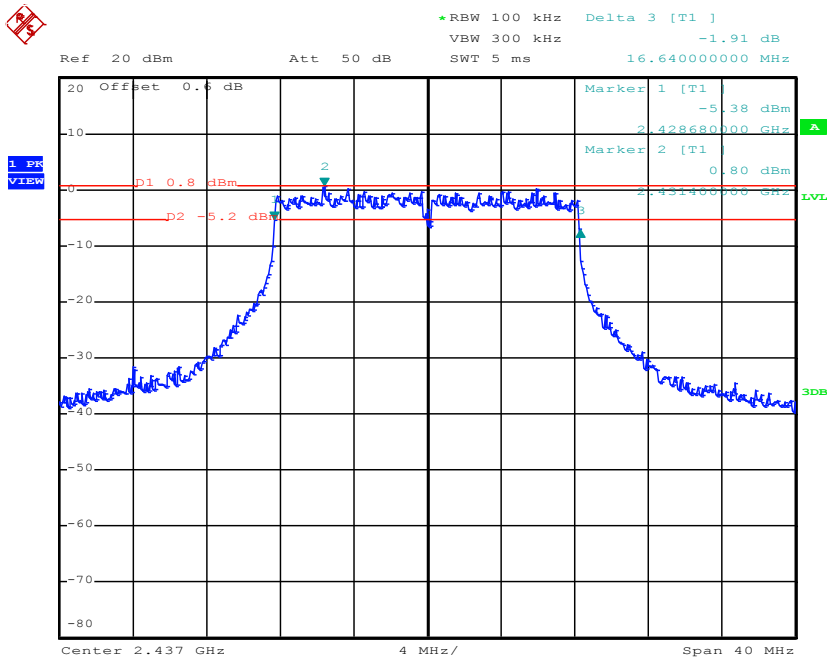
IEEE 802.11g

CH	frequency [MHz]	6dB Bandwidth [MHz]	minimum Limit [MHz]	Result
1	2412	16.72	0.5	Limit kept
6	2437	16.64	0.5	Limit kept
11	2462	16.68	0.5	Limit kept

IEEE 802.11g (Mbps) CH01

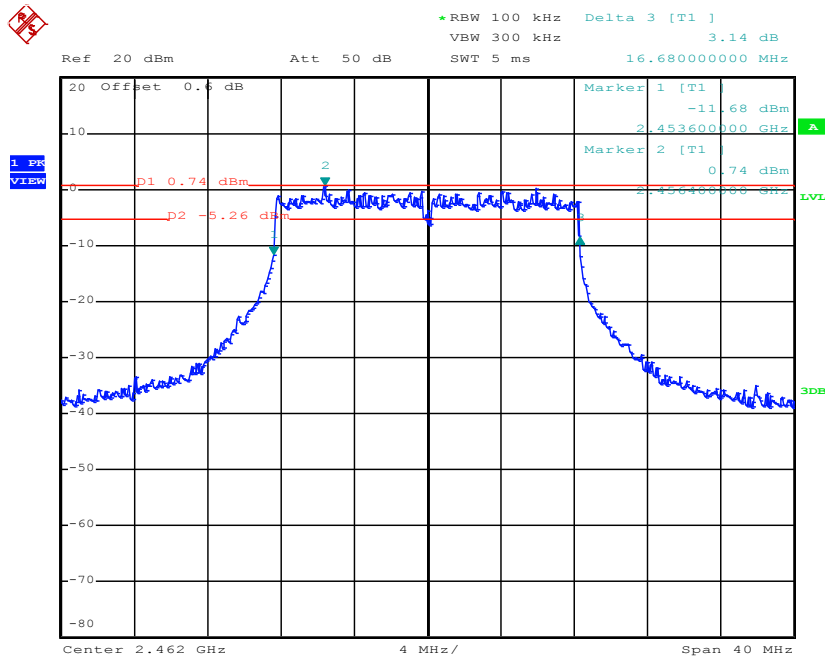


IEEE 802.11g (Mbps) CH06



Date: 16.APR.2013 10:32:32

IEEE 802.11g (Mbps) CH11



Date: 16.APR.2013 10:49:28

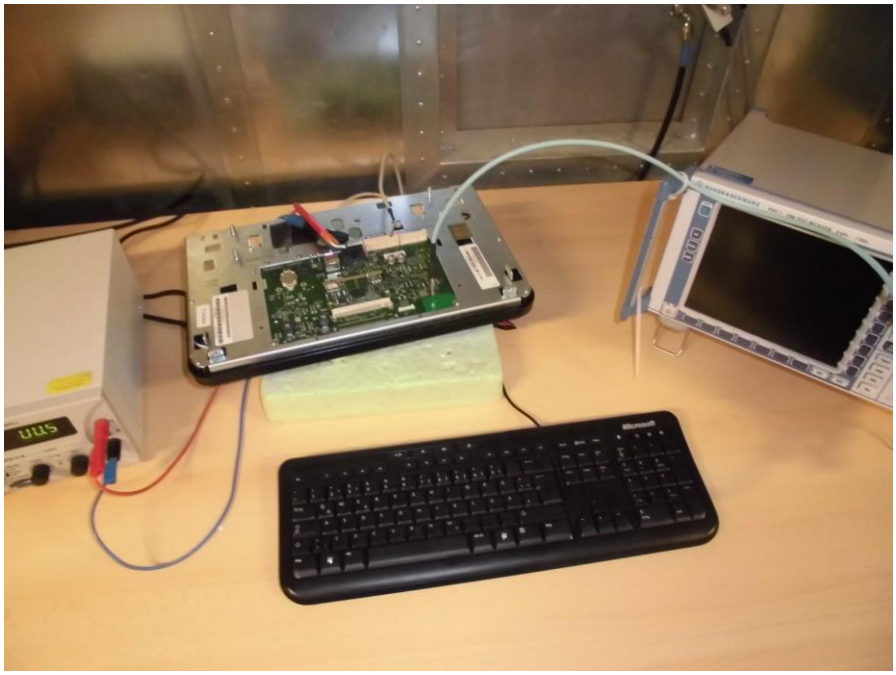
6.7 Maximum Peak Conducted Output Power

For test instruments and accessories used see section 7 Part **CPC 3**.

6.7.1 Description of the test location

Test location: AREA A4

6.7.2 Photo documentation of the test set-up



6.7.3 Test specification

Environmental conditions: Temperature: 22 ° C Humidity: 46 % Atmospheric pressure: 98 kPa

Frequency range: 2400 MHz – 2483,5 MHz

The test was carried out in the following operation mode(s):
- continous transmitt mode (duty cycle = 99%), maximum RF power adjusted

6.7.4 Test result

The requirements are **FULFILLED.**

Remarks: Sample 2 with temporary antenna connector was used for testing

Integrated band power method according to KDB 558074 D01 subclause 9.1.2 used.

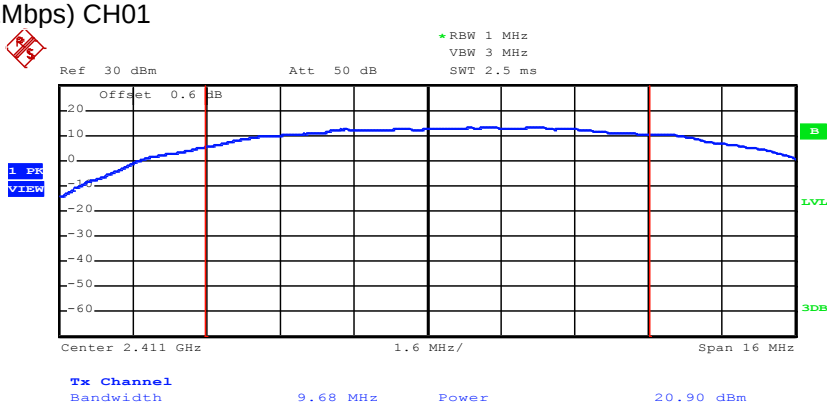
6.7.5 Test protocol

IEEE 802.11b

IEEE 802.11b (11Mbps)

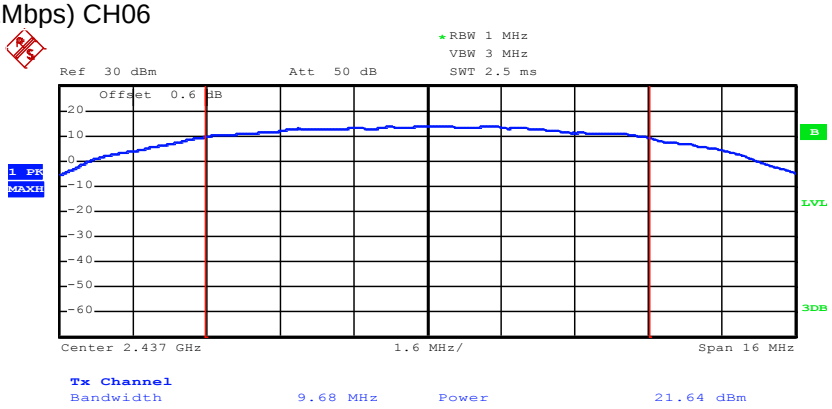
CH	frequency [MHz]	conducted output power [dBm]	Limit [dBm]	Result
1	2412	20.9	30	Limit kept
6	2437	21.6	30	Limit kept
11	2462	22.1	30	Limit kept

IEEE 802.11b (11Mbps) CH01



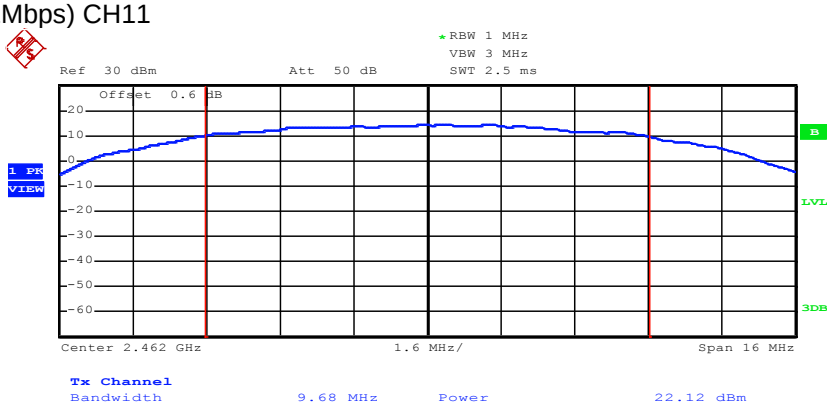
Date: 16.APR.2013 07:19:20

IEEE 802.11b (11Mbps) CH06



Date: 16.APR.2013 08:24:13

IEEE 802.11b (11Mbps) CH11



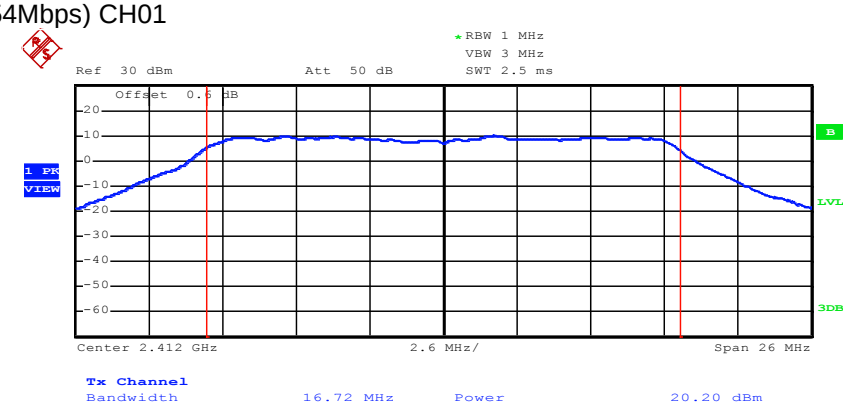
Date: 16.APR.2013 08:46:53

IEEE 802.11g

IEEE 802.11g (54Mbps)

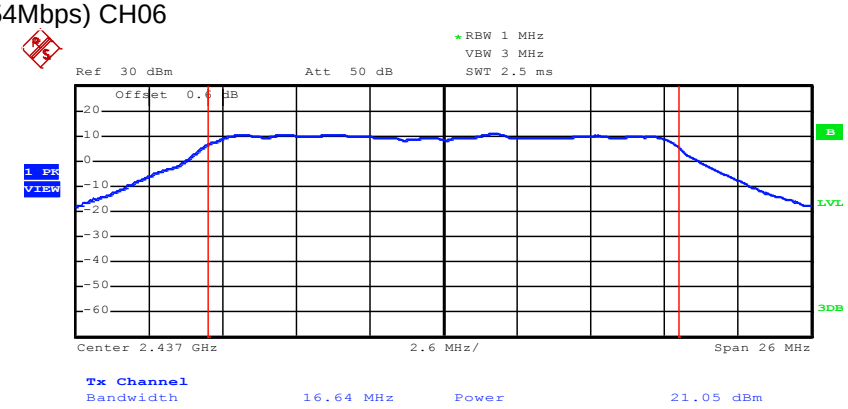
CH	frequency [MHz]	conducted output power [dBm]	Limit [dBm]	Result
1	2412	20.2	30	Limit kept
6	2437	21.1	30	Limit kept
11	2462	21.2	30	Limit kept

IEEE 802.11g (54Mbps) CH01



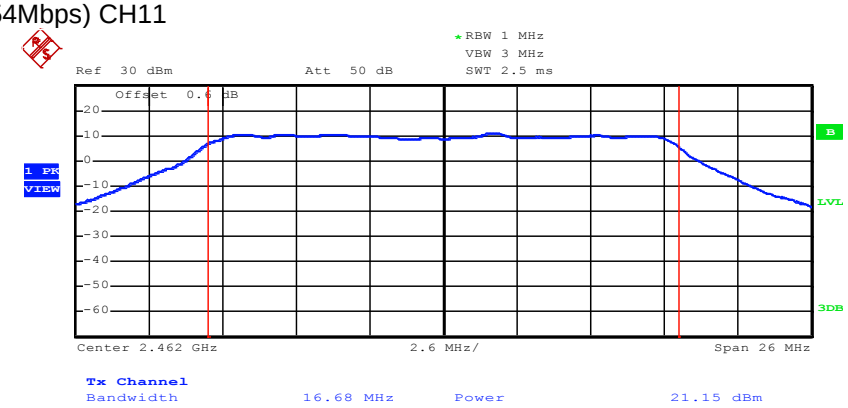
Date: 16.APR.2013 09:02:19

IEEE 802.11g (54Mbps) CH06



Date: 16.APR.2013 10:34:12

IEEE 802.11g (54Mbps) CH11



Date: 16.APR.2013 10:50:54

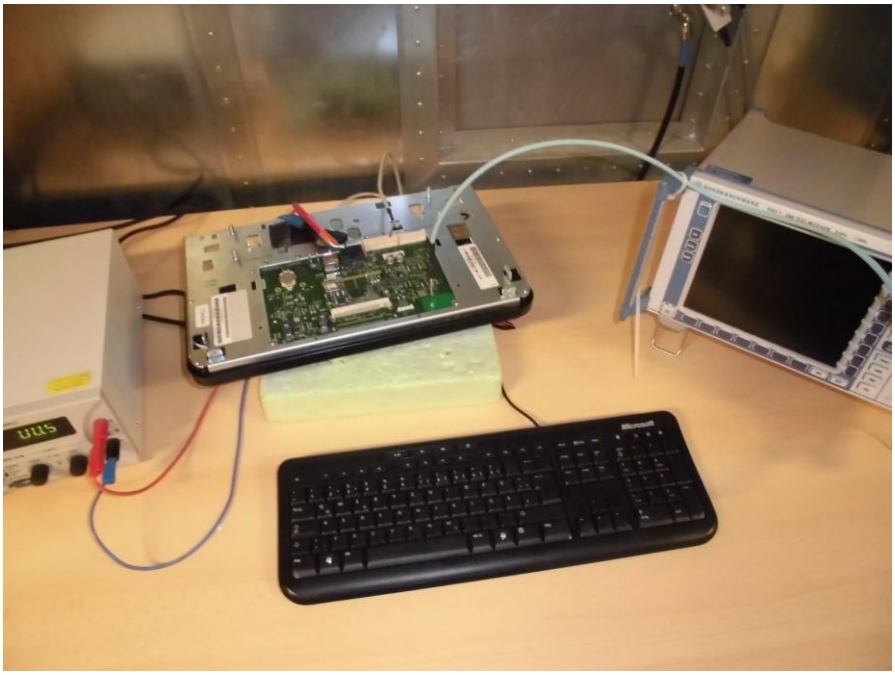
6.8 Power Spectral Density

For test instruments and accessories used see section 7 Part **CPC 3**.

6.8.1 Description of the test location

Test location: AREA A4

6.8.2 Photo documentation of the test set-up



6.8.3 Test specification

Environmental conditions: Temperature: 23 ° C Humidity: 41 % Atmospheric pressure: 97 kPa

Frequency range: 2400 MHz – 2483,5 MHz

The test was carried out in the following operation mode(s):
- continous transmitt mode (duty cycle = 99%), maximum RF power adjusted

6.8.4 Test result

The requirements are **FULFILLED.**

Remarks: Sample 2 with temporary antenna connector was used for testing

Method PKPSD according to KDB 558074 D01 subclause 10.2 used.

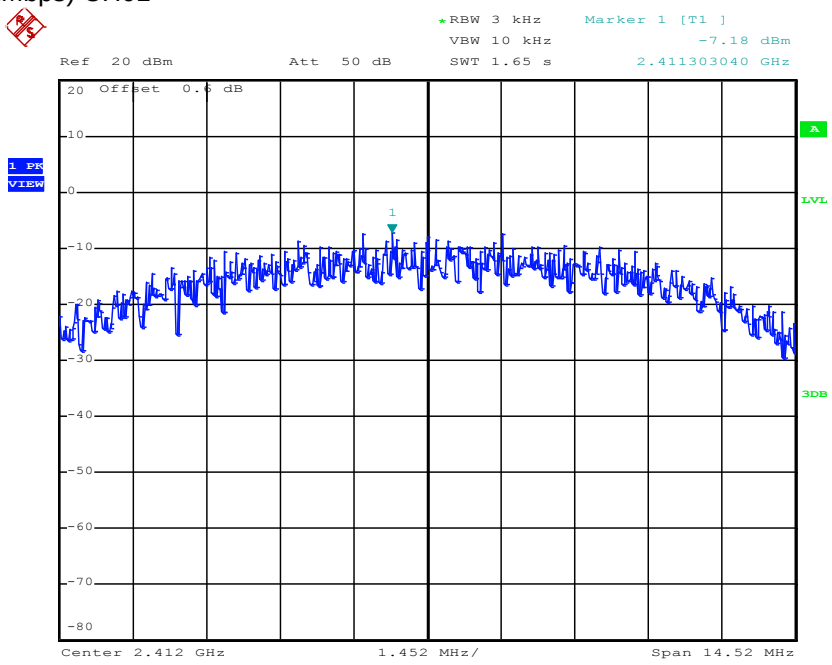
6.8.5 Test protocol

IEEE 802.11b

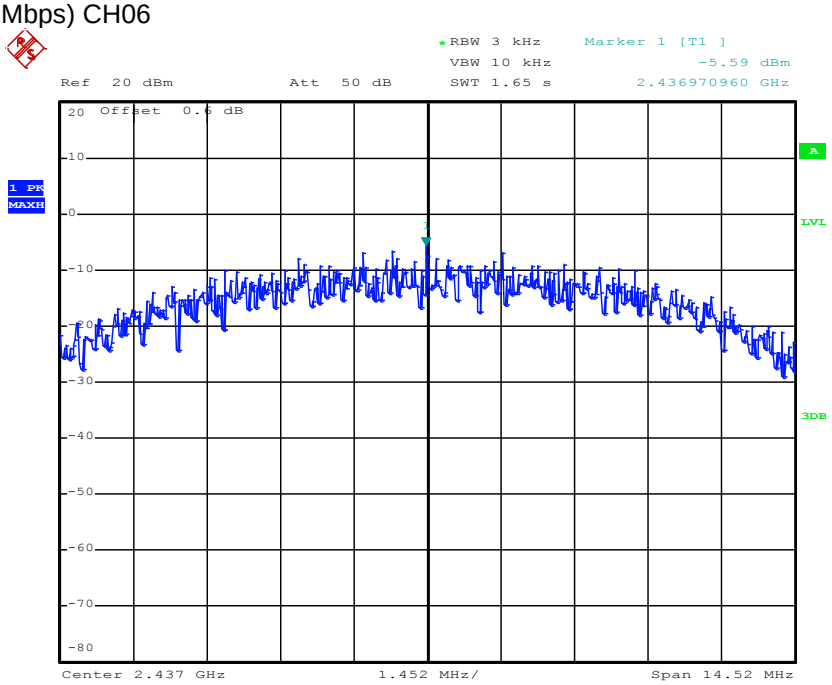
IEEE 802.11b (11Mbps)

CH	Nominal frequency [MHz]	Power Spectral Density [dBm]	Limit [dBm/3kHz]	Result
1	2412	-7.18	8	Limit kept
6	2437	-5.6	8	Limit kept
11	2462	-6.4	8	Limit kept

IEEE 802.11b (11Mbps) CH01

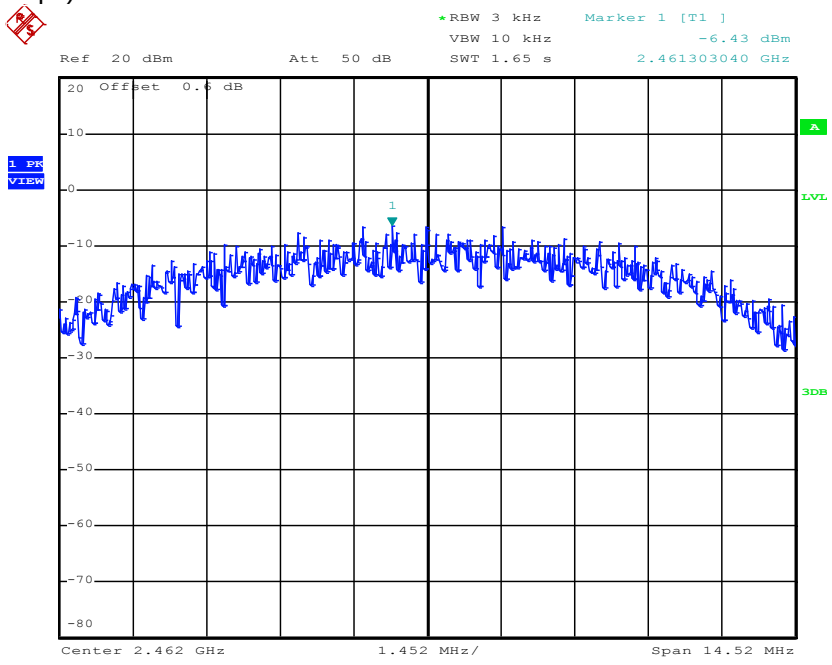


IEEE 802.11b (11Mbps) CH06



Date: 16.APR.2013 12:03:03

IEEE 802.11b (11Mbps) CH11



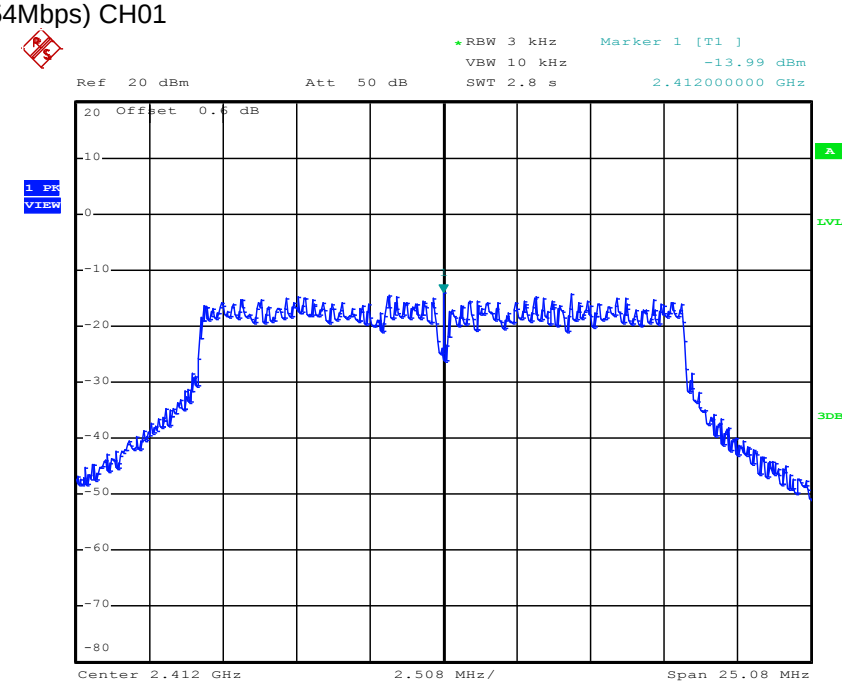
Date: 16.APR.2013 12:10:43

IEEE 802.11g

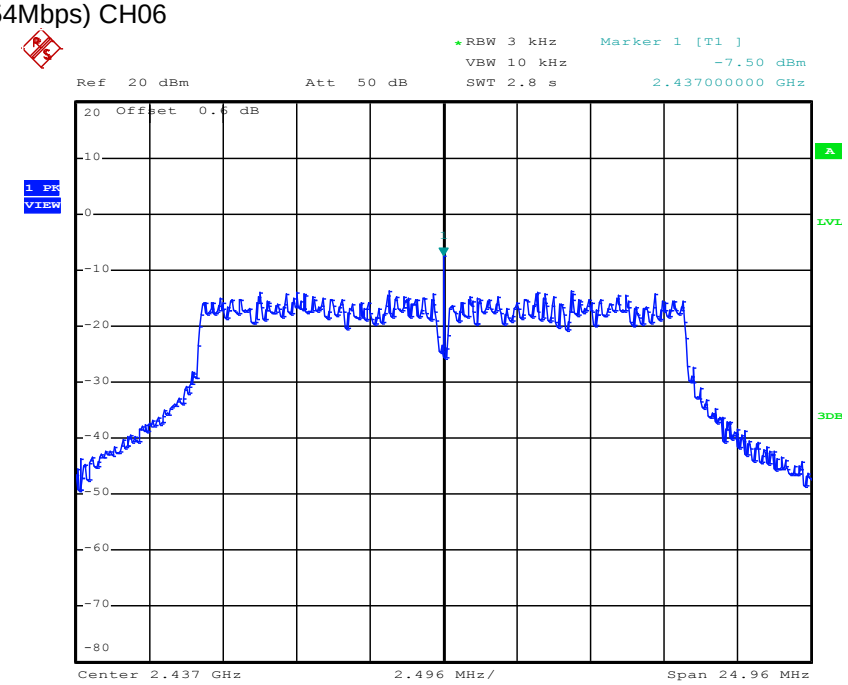
IEEE 802.11g (54Mbps)

CH	Nominal frequency [MHz]	Power Spectral Density [dBm]	Limit [dBm/3kHz]	Result
1	2412	-14.0	8	Limit kept
6	2437	-7.5	8	Limit kept
11	2462	-9.0	8	Limit kept

IEEE 802.11g (54Mbps) CH01

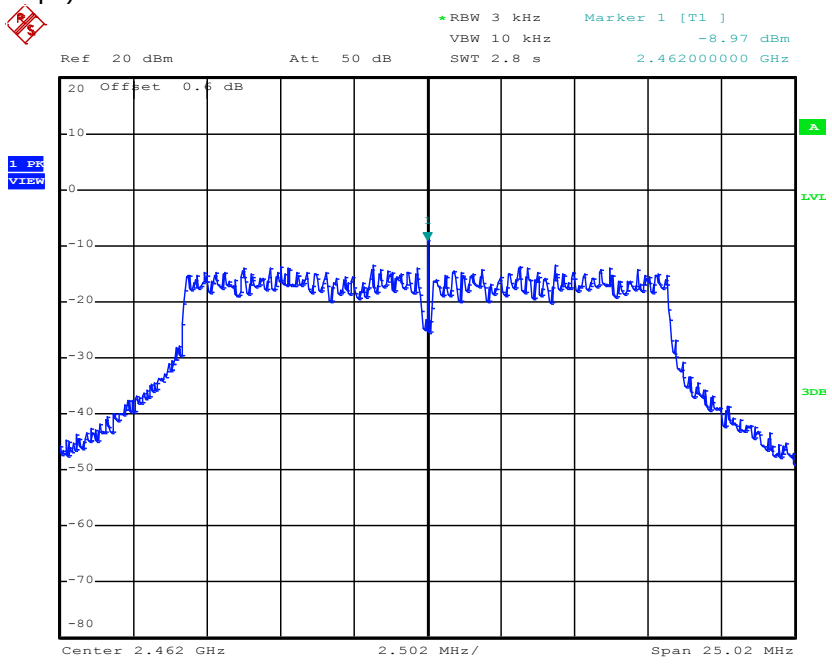


IEEE 802.11g (54Mbps) CH06



Date: 16.APR.2013 11:30:49

IEEE 802.11g (54Mbps) CH111



Date: 16.APR.2013 11:01:10

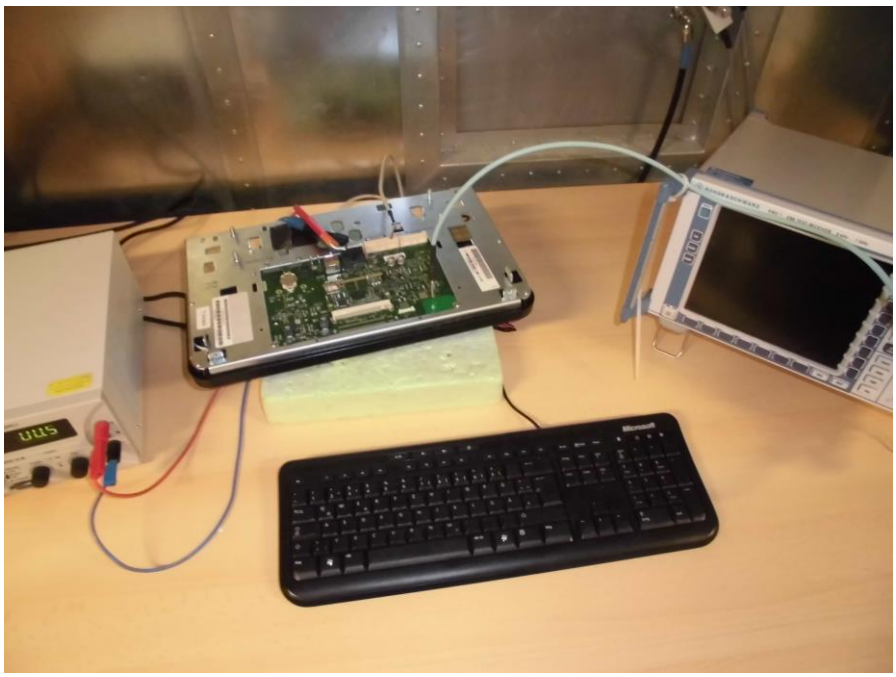
6.9 Conducted spurious emissions

For test instruments and accessories used see section 7 Part **SEC 1-3**.

6.9.1 Description of the test location

Test location: AREA A4

6.9.2 Photo documentation of the test set-up



6.9.3 Test specification

Environmental conditions: Temperature: 23 ° C Humidity: 43 % Atmospheric pressure: 98 kPa

Frequency range: 30 MHz – 25 GHz

The test was carried out in the following operation mode(s):
- continous transmitt mode (duty cycle = 99%), maximum RF power adjusted

6.9.4 Test result

The requirements are **FULFILLED.**

Remarks: Sample 2 with temporary antenna connector was used for testing

Emissions in non-restricted frequency bands measurement according to KDB 558074 D01

subclause 11.0 used.

6.9.5 Test protocol

Operation mode: continous transmitt mode (duty cycle = 99%), maximum RF power adjusted — Result: PASS
Remarks: IEEE 802.11b (11Mbps) CH01 (2412MHz) adjusted
Date: 2013-04-17
Tested by: Pessinger Jürgen

Reference level **7.3dBm**

Minimum margin to limit: 20.1 dB

Frequency [MHz]	Reading [dBm] Pk	Limit [dBm] Pk	Margin [dB] Pk
2398.575	-32.8	-12.7	20.1
6982.800	-35.2	-12.7	22,5
10342.100	-34.0	-12.7	21,3

Operation mode: continous transmitt mode (duty cycle = 99%), maximum RF power adjusted — Result: PASS
Remarks: IEEE 802.11b (11Mbps) CH06 (2437MHz) adjusted
Date: 2013-04-17
Tested by: Pessinger Jürgen

Reference level **7.3dBm**

Minimum margin to limit: 12.1 dB

Frequency [MHz]	Reading [dBm] Pk	Limit [dBm] Pk	Margin [dB] Pk
3019.083	-36.2	-12.7	23.5
5792.700	-35.3	-12.7	22.6
13730.350	-24.8	-12.7	12.1

Operation mode: continous transmitt mode (duty cycle = 99%), maximum RF power adjusted — Result: PASS
Remarks: IEEE 802.11b (11Mbps) CH11 (2462MHz) adjusted
Date: 2013-04-17
Tested by: Pessinger Jürgen

Reference level **7.3dBm**

Minimum margin to limit: 20.4 dB

Frequency [MHz]	Reading [dBm] Pk	Limit [dBm] Pk	Margin [dB] Pk
3085.628	-36.3	-12.7	23.6
9837.600	-34.1	-12.7	21.4
10430.624	-33.1	-12.7	20.4

Operation mode: continous transmitt mode (duty cycle = 99%), maximum RF power adjusted Result: PASS
Remarks: IEEE 802.11g (54Mbps) CH01 (2412MHz) adjusted
Date: 2013-04-17
Tested by: Pessinger Jürgen

Reference level **0.4dBm**

Minimum margin to limit: 34.1 dB

Frequency [MHz]	Reading [dBm] Pk	Limit [dBm] Pk	Margin [dB] Pk
672.853	-54.3	-19.6	34.7
4495.700	-54.5	-19.6	34.9
6924.900	-53.7	-19.6	34.1

Operation mode: continous transmitt mode (duty cycle = 99%), maximum RF power adjusted Result: PASS
Remarks: IEEE 802.11g (54Mbps) CH06 (2437MHz) adjusted
Date: 2013-04-17
Tested by: Pessinger Jürgen

Reference level **0.4dBm**

Minimum margin to limit: 15.5 dB

Frequency [MHz]	Reading [dBm] Pk	Limit [dBm] Pk	Margin [dB] Pk
3124.230	-36.1	-19.6	16.5
5794.400	-36.6	-19.6	17.0
9264.800	-35.1	-19.6	15.5

Operation mode: continous transmitt mode (duty cycle = 99%), maximum RF power adjusted Result: PASS
Remarks: IEEE 802.11g (54Mbps) CH11 (2462MHz) adjusted
Date: 2013-04-17
Tested by: Pessinger Jürgen

Reference level **0.4dBm**

Minimum margin to limit: 32.5 dB

Frequency [MHz]	Reading [dBm] Pk	Limit [dBm] Pk	Margin [dB] Pk
723.192	-54.8	-19.6	35.2
4407.300	-54.9	-19.6	35.3
10304.00	-52.1	-19.6	32.5

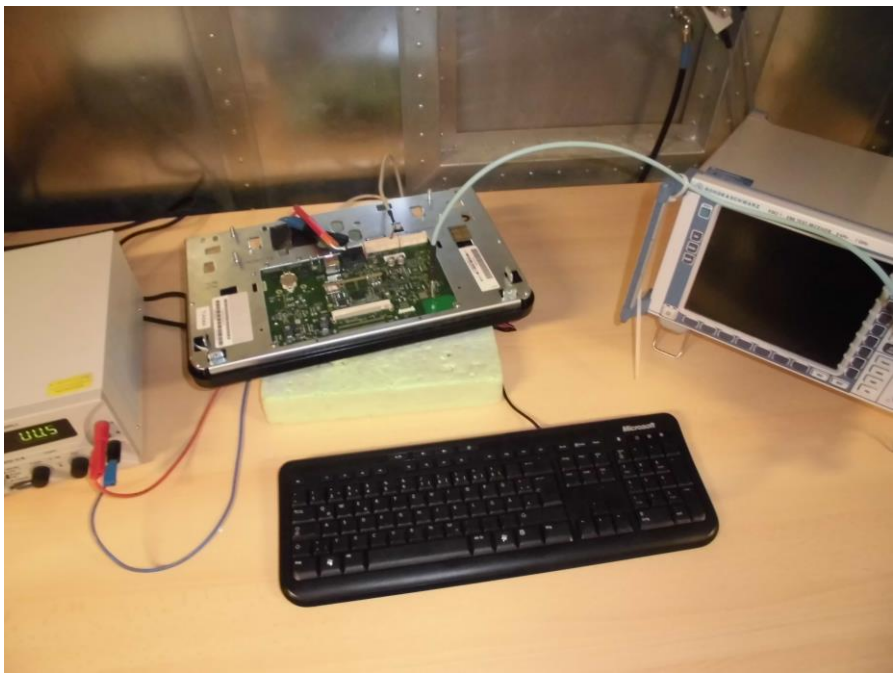
6.10 Conducted spurious emissions in restriced bands

For test instruments and accessories used see section 7 Part **SEC 1-3**.

6.10.1 Description of the test location

Test location: AREA A4

6.10.2 Photo documentation of the test set-up



6.10.3 Test specification

Environmental conditions: Temperature: 22 ° C Humidity: 46 % Atmospheric pressure: 98 kPa

Frequency range: 30 MHz – 25 GHz

The test was carried out in the following operation mode(s):
- continous transmitt mode (duty cycle = 99%), maximum RF power adjusted

According to the results in subclause 6.9 of this report it was decidec to measure the following restriected bands : 2310 – 2390 MHz, 2483.5 – 2500 MHz, 4.5 – 5.15 GHz, 7.25 – 7.75 GHz, 10.6 – 12.7 GHz and 14.47 – 14.5 GHz. For each channel and each transmission mode the three highest emissions are shown in the result tables

6.10.4 Test result

The requirements are **FULFILLED.**

Remarks: Sample 2 with temporary antenna connector was used for testing

Antenna-port conducted emission measurement according to KDB 558074 D01 subclause 12.2

used.

6.10.5 Test protocol

Following relationship is used for converting measured conducted peak power P to electrical field strength E:

E = P + G + RF – 20logD + 104.8dB

where

E	electrical filed strength in dBµV/m
P	measured conducted peak power in dBm
G	maximum antenna gain in dBi (3dBi)
RF	maximum ground reflection factor in dB (for f>1000MHz 0dB)
D	specified measurement distance in m (for f>1000MHz 3m)

Operation mode: continous transmitt mode (duty cycle = 99%), maximum RF power adjusted — Result: PASS
Remarks: IEEE 802.11b (11Mbps) CH01 (2412MHz) adjusted
Date: 2013-05-02
Tested by: Pessinger Jürgen

Minimum margin to limit: 38.1 dB

Frequency [MHz] f	Peak Reading [dBm] P	Antenna gain [dBi] G	reflection factor [dB] RF	Converted field strength [dBµV/m] E	Limit PK [dBµV/m]	Margin [dB]
2495.241	-64.7	3	0	33.5	74	40.5
4823.781	-62.3	3	0	35.9	74	38.1
12126.437	-63.8	3	0	34.4	74	39.6

NOTE: All Peak values are below the average limit (54 dBµV/m). No average measurement was performed.

Operation mode: continous transmitt mode (duty cycle = 99%), maximum RF power adjusted — Result: PASS
Remarks: IEEE 802.11b (11Mbps) CH06 (2437MHz) adjusted
Date: 2013-05-02
Tested by: Pessinger Jürgen

Minimum margin to limit: 35.7 dB

Frequency [MHz] f	Peak Reading [dBm] P	Antenna gain [dBi] G	reflection factor [dB] RF	Converted field strength [dBµV/m] E	Limit PK [dBµV/m]	Margin [dB]
2376.030	-60.4	3	0	37.8	74	36.2
4874.075	-61.9	3	0	36.3	74	37.7
7311.187	-59.9	3	0	38.3	74	35.7

NOTE: All Peak values are below the average limit (54 dBµV/m). No average measurement was performed.

Operation mode: continous transmitt mode (duty cycle = 99%), maximum RF power adjusted — Result: PASS
Remarks: IEEE 802.11b (11Mbps) CH11 (2462MHz) adjusted
Date: 2013-05-02
Tested by: Pessinger Jürgen

Minimum margin to limit: 29.8 dB

Frequency [MHz] f	Peak Reading [dBm] P	Antenna gain [dBi] G	reflection factor [dB] RF	Converted field strength [dBµV/m] E	Limit PK [dBµV/m]	Margin [dB]
2488.018	-54.1	3	0	44.2	74	29.8
4924.125	-62.2	3	0	36.1	74	37.9
7385.556	-61.2	3	0	37.1	74	36.9

NOTE: All Peak values are below the average limit (54 dBµV/m). No average measurement was performed.

Operation mode: continous transmitt mode (duty cycle = 99%), maximum RF power adjusted — Result: PASS
Remarks: IEEE 802.11g (53Mbps) CH01 (2412MHz) adjusted
Date: 2013-05-02
Tested by: Pessinger Jürgen

Minimum margin to limit: 24.1 dB

Frequency [MHz] f	Peak Reading [dBm] P	Antenna gain [dBi] G	reflection factor [dB] RF	Converted field strength [dBµV/m] E	Limit PK [dBµV/m]	Margin [dB]
2389.690	-48.4	3	0	49.9	74	24.1
4828.900	-67.7	3	0	30.6	74	43.4
12138.512	-64.1	3	0	34.2	74	39.8

NOTE: All Peak values are below the average limit (54 dBµV/m). No average measurement was performed.

Operation mode: continous transmitt mode (duty cycle = 99%), maximum RF power adjusted — Result: PASS
Remarks: IEEE 802.11g (53Mbps) CH06 (2437MHz) adjusted
Date: 2013-05-02
Tested by: Pessinger Jürgen

Minimum margin to limit: 35.6 dB

Frequency [MHz]	Peak Reading [dBm]	Antenna gain [dBi]	reflection factor [dB]	Converted field strength [dBµV/m]	Limit PK [dBµV/m]	Margin [dB]
f	P	G	RF	E		
2389.700	-59.9	3	0	38.4	74	35.6
4867.250	-65.1	3	0	33.2	74	40.8
7306.437	-65.4	3	0	32.9	74	41.1

NOTE: All Peak values are below the average limit (54 dBµV/m). No average measurement was performed.

Operation mode: continous transmitt mode (duty cycle = 99%), maximum RF power adjusted — Result: PASS
Remarks: IEEE 802.11g (53Mbps) CH11 (2462MHz) adjusted
Date: 2013-05-02
Tested by: Pessinger Jürgen

Minimum margin to limit: 35.6 dB

Frequency [MHz]	Peak Reading [dBm]	Antenna gain [dBi]	reflection factor [dB]	Converted field strength [dBµV/m]	Limit PK [dBµV/m]	Margin [dB]
f	P	G	RF	E		
2381.060	-59.9	3	0	38.4	74	35.6
4931.193	-66.2	3	0	32.1	74	41.9
7400.812	-63.2	3	0	35.1	74	38.9

NOTE: All Peak values are below the average limit (54 dBµV/m). No average measurement was performed.

7 USED TEST EQUIPMENT AND ACCESSORIES

All test instruments used, in addition to the test accessories, are calibrated and verified regularly.

Test ID	Model Type	Equipment No.	Next Calib.	Last Calib.	Next Verif.	Last Verif.
A 4	ESH 3	01-02/03-01-005	08/01/2014	08/01/2013		
	ESH2-Z5	01-02/20-01-001	26/01/2014	26/01/2011	01/03/2014	01/03/2013
	ESH 3 - Z 2	01-02/50-02-020	11/12/2013	11/12/2012		
	BNC-3000-N	01-02/50-07-008				
	N-5000-N	01-02/50-07-009				
	Tile Version 3.4K20	01-02/68-09-001				
	emitel ESW V31	01-02/68-09-002				
CPC 3	FSP 40	02-02/11-11-001	18/09/2013	18/09/2012		
SEC 1-3	Tile Version 3.4K20	01-02/68-09-001				
	FSP 40	02-02/11-11-001	18/09/2013	18/09/2012		
SER 1	ESH 3	01-02/03-01-005	08/01/2014	08/01/2013		
	FMZB 1516	01-02/24-01-018			14/02/2014	14/02/2013
	BNC-3000-N	01-02/50-07-008				
	N-5000-N	01-02/50-07-009				
	Tile Version 3.4K20	01-02/68-09-001				
SER 2	ESVP	01-02/03-01-002	18/03/2014	18/03/2013		
	HM 5012	01-02/11-01-001				
	VULB 9168	01-02/24-03-007	07/09/2015	07/09/2012		
	N-40000-N	01-02/50-05-043				
	N-30000-N	01-02/50-05-044				
	Tile Version 3.4K20	01-02/68-09-001				
	emitel ESW V31	01-02/68-09-002				
SER 3	AMF-40-005-180-24-10P	01-02/17-02-009			12/12/2013	12/12/2012
	HCC	01-02/50-01-021				
	FA210A0020000000	01-02/50-06-065				
	FA210A0050000000	01-02/50-10-005				
	Tile Version 3.4K20	01-02/68-09-001				
	emitel ESW V31	01-02/68-09-002				
	RST 070	01-05/60-02-003				
	FSP 40	02-02/11-11-001	18/09/2013	18/09/2012		
	3117	02-02/24-05-009	18/12/2013	18/12/2012		
	R1 _ 18 - 40 GHz	02-02/30-09-002			08/01/2014	08/01/2013