FCC ID: VEB-NKRDCMA82

EMI – TEST REPORT

- FCC Part 15.247 -

Deutsche Akkreditierungsstelle D-PL-12030-01-01

Test Report No. :	**T34715-00-02AA**	11. April 2011 Date of issue

Type / Model Name : 1 796 616 7 WLAN-Karte #MPCI-DCMA-82-MMCX

Product Description : Option REC5 IP5K Basis prog.

Applicant : SEW-Eurodrive GmbH & Co KG

Address : Ernst-Blickle-Str. 42

76646 Bruchsal

Manufacturer : SEW-Eurodrive GmbH & Co KG

Address : Ernst-Blickle-Str. 42

76646 Bruchsal

Licence holder : SEW-Eurodrive GmbH & Co KG

Address : Ernst-Blickle-Str. 42

76646 Bruchsal

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

mikes-testingpartners gmbh
Ohmstrasse 2-4 · 94342 STRASSKIRCHEN · GERMANY
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FCC ID: VEB-NKRDCMA82

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1 TEST STANDARDS

The tests were performed according to following standards:

FCC Rules and Regulations Part 15, Subpart A - General (October, 2009)

Part 15, Subpart A, Section 15.31	Measurement standards
Part 15, Subpart A, Section 15.33	Frequency range of radiated measurements
Part 15, Subpart A, Section 15.35	Measurement detector functions and bandwidths

FCC Rules and Regulations Part 15, Subpart C - Intentional Radiators (October, 2009)

Part 15, Subpart C, Section 15.203	Antenna requirement
Part 15, Subpart C, Section 15.204	External radio frequency power amplifiers and antenna modifications
Part 15, Subpart C, Section 15.205	Restricted bands of operation
Part 15, Subpart C, Section 15.207	Conducted limits
Part 15, Subpart C, Section 15.209	Radiated emission limits, general requirements
Part 15, Subpart C, Section 15.247	Operation within the bands 902 - 928 MHz, 2400 - 2483.5 MHz and 5725 - 5850 MHz

FCC Rules and Regulations Part 1, Subpart I - Procedures Implementing the National Environmental Policy Act of 1969

Part 1, Subpart I, Section 1.1310	Radiofrequency radiation exposure limits
Part 1, Subpart 2, Section 2.1093	Radiofrequency radiation exposure evaluation: portable device

OET Bulletin 65, 65A, 65B, 65C Edition 97-01, August 1997 – Evaluating Compliance with FCC Guidelines for Human Exposure to Radio Frequency Electromagnetic Fields.

ANSI C63.4: 2003	American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz.
ANSI C95.1:1999	IEEE Standard for Safety Levels with respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz
CISPR 16-4-2: 2003	Uncertainty in EMC measurement
CISPR 22: 2005 EN 55022: 2006	Information technology equipment

2 SUMMARY

GENERAL REMARKS:

The EuT consists of 2 identical WLAN Modules mounted on a dedicated Host PCB.

Available Features:

The WLAN client module is compatible with 802.11a/h, 802.11b and 802.11g technology. It is able to operate in the 2.4 GHz and 5 GHz frequency band.

- 802.11a Mode 5.15 GHz – 5.25 GHz and 5.725 GHz – 5.850 GHz
- 802.11b/g Mode 2400 – 2483.5 MHz
- 802.11h Mode 5.25 GHz – 5.35 GHz and 5.47 GHz – 5.725 GHz

The module uses DSSS or OFDM modulation and is capable to provide following data rates:

- 802.11b Mode 11, 5.5, 2, 1 Mbps, auto-fallback
- 802.11g Mode 54, 48, 36, 24, 18, 12, 9, 6 Mbps, auto-fallback
- 802.11a/h 54, 48, 36, 24, 18, 12, 9, 6 Mbps, auto-fallback

The tests have been carried out in the following frequency bands:
2400 to 2483.5 MHz and
5725 to 5850 MHz

Pre-scan has been performed to determine the worst-case mode from all possible combinations between available modulations and data rates. The maximum output power depends on used data rate.

As worst case the following data rates are used:

- **802.11b: 11 Mbps**
- **802.11g: 6 Mbps**
- **802.11g turbo: 12 Mbps**
- **802.11a: 6Mbps**

The EuT has been adjusted to transmit data during the tests with a duty cycle (X) of about X=1.

Following antennas are supported:

Number	Part number	Certification name	Connection	Frequency	Gain
1	13003356	Nahfeldkoppler	R-SMA	2.4 GHz	2.7
2	18231942	Nahfeldkoppler	R-SMA	5 GHz	3.7
3	18235840	Koppler	R-SMA	5 GHz	0.0
4	---	TW-145	RP-TNC	2.4 / 5 GHz	2.0 / 2.0

Eleven channels are provided to this EuT in 802.11b/g mode:

Channel	Frequency
1	2412 MHz
2	2417 MHz
3	2422 MHz
4	2427 MHz
5	2432 MHz
6	2437 MHz
7	2442 MHz
8	2447 MHz
9	2452 MHz
10	2457 MHz
11	2462 MHz

802.11g turbo mode:

Channel	Frequency
6	2437 MHz

Five channels are supported to this EuT in 802.11a mode:

802.11a mode:

Channel	Frequency
149	5745 MHz
153	5765 MHz
157	5785 MHz
161	5805 MHz
165	5825 MHz

Following channels were selected for the final test as listed below:

Technology	Available Channel	Tested Channel	Modulation	Modulation Type	Data Rate (Mbps)
802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	11
802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6
802.11g (turbo)	6	6	OFDM	BPSK	12
802.11a	149 to 165	149, 157, 165	OFDM	BPSK	6

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FINAL ASSESSMENT:

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

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

Testing commenced on : 25 October 2010

Testing concluded on : 16 November 2010

Checked by:

Klaus Gegenfurtner
I confirm the correctness and integrity of this document
2011.04.14 09:48:32 +02'00'

Klaus Gegenfurtner
Dipl. Ing.(FH)
Manager: Radio Group

Tested by:

Anton Altmann
I`m the author of this document
2011.04.11 10:52:45 +02'00'

Anton Altmann
Dipl. Ing.(FH)

3 EQUIPMENT UNDER TEST

3.1 Photo documentation of the EuT – Detailed photos see attachment A

3.2 Power supply system utilised

Power supply voltage Host PCB : 24 VDC
Power supply voltage WLAN Module : 3.3 VDC

3.3 Short description of the equipment under test (EuT)

The EuT is an Ethernet converter. It connects the WLAN to the Ethernet.

Number of tested samples: 2
Serial number: Prototype

EuT operation mode:

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

- Continuous transmitting (99 % Duty Cycle)

EuT configuration:

(The CDF filled by the applicant can be viewed at the test laboratory.)

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

- 24 VDC Power supply Model : UWU 52A
- _____ Model : _____
- _____ Model : _____
- _____ Model : _____
- _____ Model : _____
- _____ Model : _____

4 TEST ENVIRONMENT

4.1 Address of the test laboratory

mikes-testingpartners gmbh
Ohmstrasse 2-4
94342 STRASSKIRCHEN
GERMANY

4.2 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

4.3 Statement of the measurement uncertainty

The data and results referenced in this document are true and accurate. The reader may notice that tolerances within the calibration of the equipment and facilities may cause additional uncertainty. The measurement uncertainty is calculated for all measurements listed in this test report acc. to CISPR 16-4-2 „Uncertainties, statistics and limit modelling – Uncertainty in EMC measurement“ and documented in the mikes-testingpartners gmbh quality system acc. to DIN EN ISO/IEC 17025. For all measurements shown in this report, the measurement uncertainty of the test laboratory, mikes-testingpartners gmbh, is below the measurement uncertainty as defined by CISPR. Therefore, no special measures must be taken into consideration with regard to the limits according to CISPR. Furthermore, component diversity and modifications in production process of devices may result in additional deviation. If necessary, refer to the test lab for the actual measurement uncertainty for the specific test. The manufacturer has the sole responsibility of continued compliance of the EuT.

4.4 Measurement protocol for FCC, VCCI and AUSTEL

4.4.1 GENERAL INFORMATION

4.4.1.1 Test methodology

Conducted and radiated disturbance testing is performed according to the procedures set out by the International Special Committee on Radio Interference (CISPR) Publication 22, European Standard EN 55022 as shown under section 1 of this report.

4.4.1.2 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 using the appropriate impedance characteristic or left unterminated. Where appropriate, cables are manually manipulated with respect to each other thus obtaining maximum disturbances from the unit.

4.4.1.3 Details of test procedures

The test methods used comply with CISPR Publication 22, EN 55022 - " Information technology equipment - Radio disturbance characteristics - Limits and methods of measurement" and with ANSI C63.4 - "Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz". In compliance with 47 CFR Part 15 Subpart A, Section 15.38 testing for FCC compliance may be achieved by following the procedures set out in ANSI C63.4 and applying the CISPR 22 limits.

4.4.1.4 Conducted emission

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 FCC limit or to the CISPR limit.

To convert between dBµV and µV, the following conversion formula apply:

dBµV = 20*log(µV);
µV = 10^(dBµV/20);

Conducted emissions 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 limit margin of a peak mode measurement appears to be less than 20 dB, the emissions are remeasured using a tuned receiver with quasi-peak and average detection and recorded on the data sheets.

4.4.1.5 Radiated emission (electrical field 30 MHz - 1 GHz)

Spurious emissions from the EuT are measured in the frequency range of 30 MHz to 1000 MHz using a tuned receiver and appropriate broadband linearly polarised antennas. Measurements between 30 MHz and 1000 MHz are made with 120 kHz/6 dB bandwidth and quasi-peak detection. Table top equipment is placed on a 1.0 X 1.5 m non-conducting table 80 centimetres above the ground plane. Floor standing equipment is placed directly on the turntable/ground plane. The setup of the equipment under test is established in accordance with ANSI C63.4.The interface cables that are closer than 40 cm to the ground plane are bundled in the center in a serpentine fashion so that they are at least 40 cm from the ground plane. Cables to simulators/testers (if used in this test) are routed through the center of the table and to a screened room located outside the test area. The antenna is positioned 3, 10 or 30 m horizontally from the EuT and is repeated vertically. To locate maximum emissions from the test sample the antenna is varied in height from 1 to 4 m and the EuT is rotated 360 degrees.
The final level in dBµV/m is calculated by add on the reading value from the EMI receiver (level dBµV) the correction factor. The FCC or CISPR limit is subtracted from this result in order to provide the limit margin listed in the measurement protocol.

The resolution bandwidth setting:
30 MHz – 1000 MHz: RBW: 120 kHz

Example:

Frequency (MHz)	Level (dBµV)	+	Factor (dB)	=	Level (dBµV/m)	-	CISPR Limit (dBµV/m)	=	Delta (dB)
719.0	75.0	+	32.6	=	107.6	-	110.0	=	-2.4

4.4.1.6 Radiated emission (electrical field 1 GHz - 40 GHz)

Radiated emissions from the EuT are measured in the frequency range 1 GHz up to the maximum frequency as specified in 47 CFR Part 15, Subpart A, Section 15.33, using a spectrum analyser and appropriate linearly polarized antennas. Table top equipment is placed on a 1.0 X 1.5 metre non-conducting table 80 centimetres above the ground plane. Floor standing equipment is placed directly on the turntable/ground plane. The setup of the equipment under test is following set out in ANSI C63.4. The 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 screened room located outside the test area. Measurements are made in both the horizontal and vertical polarization planes in a fully anechoic room using a spectrum analyser set to max peak detector function and a resolution 1 MHz and video bandwidth 3 MHz for peak and 10 Hz for average measurement. The conditions determined as worst case will then be used for the final measurements. When the EuT is larger than the beam width of the measuring antenna it will be moved over the surface for the four sides of the equipment. Where appropriate, the test distance may be reduced in order to detect emissions under better uncertainty and are calculated at the specified test distance.

4.5 Determination of worst case measurement conditions

Measurements have been made in all three orthogonal axes and the settings of the EuT were changed to locate at which position and at what setting of the EuT produce the maximum of the emissions. For the further measurement the EuT is set in X position with the following settings:

5 TEST CONDITIONS AND RESULTS

5.1 Conducted emissions

For test instruments and accessories used see section 6 Part **A 4**.

5.1.1 Description of the test location

Test location: Shielded Room S2

5.1.2 Photo documentation of the test set-up

5.1.3 Applicable standard

According to FCC Part 15C, Section 15.207(a):
Except as shown in paragraphs (b) and (c) of this Section, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table.

Frequency of Emission (MHz)	Conducted Limit (dBµV)	
	Quasi-peak	Average
0.15-0.5	66 to 56 *	56 to 46 *
0.5-5	56	46
5-30	60	50

* Decreases with the logarithm of the frequency

5.1.4 Description of Measurement

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 limit 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.

To convert between dBµV and µV, the following conversions apply:

dBµV = 20 log µV

µV = 10^(dBµV/20)

5.1.5 Test result

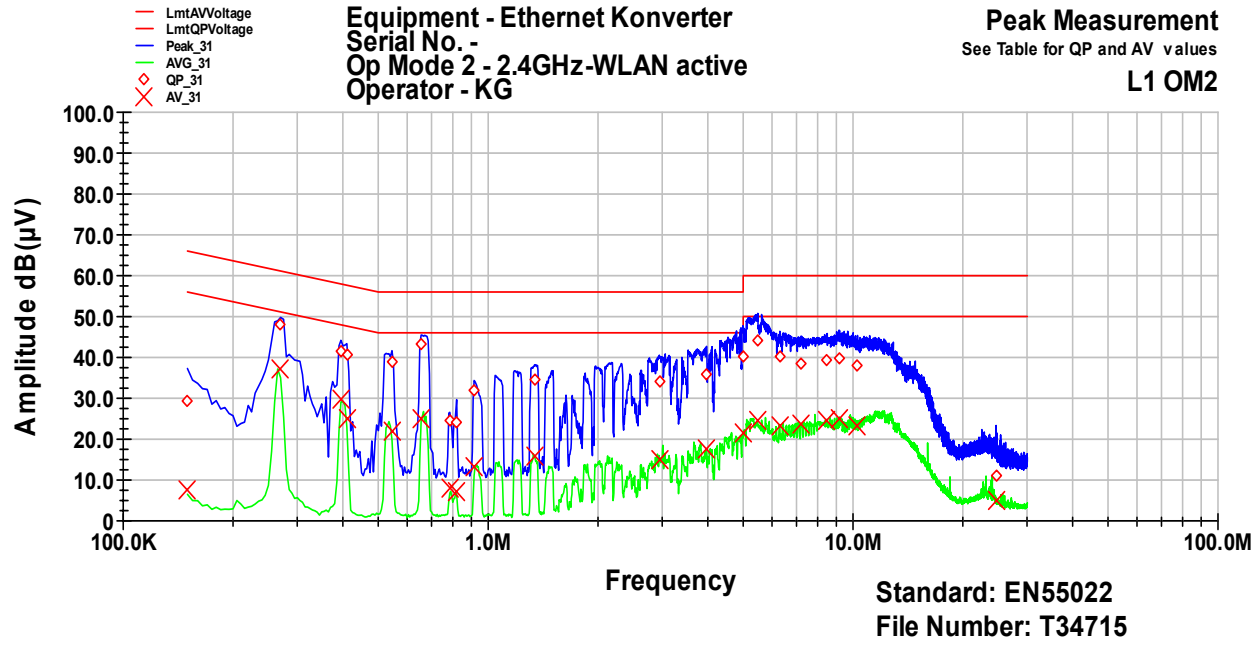
Frequency range: 0.15 MHz - 30 MHz

Min. limit margin 12.8 dB at 0.655 MHz

The requirements are **FULFILLED.**

Remarks: For detailed test result please refer to following test protocols

5.1.6 Test protocol



Frequency	QP Level	QP Margin	QP Limit	AV Level	AV Margin	AV Limit
MHz	dB(µV)	dB	dB	dB(µV)	dB	dB
0.15	29.5	-36.5	66.0	7.5	-48.5	56.0
0.27	48.0	-13.1	61.1	37.0	-14.2	51.1
0.395	41.6	-16.4	58.0	29.6	-18.4	48.0
0.41	40.6	-17.0	57.6	24.8	-22.8	47.6
0.545	38.7	-17.3	56.0	21.8	-24.2	46.0
0.655	43.2	-12.8	56.0	25.2	-20.8	46.0
0.785	24.6	-31.4	56.0	8.0	-38.0	46.0
0.82	24.1	-31.9	56.0	7.1	-38.9	46.0
0.915	32.0	-24.0	56.0	13.1	-32.9	46.0
1.35	34.8	-21.2	56.0	15.9	-30.1	46.0
2.945	34.2	-21.8	56.0	15.1	-30.9	46.0
3.965	35.7	-20.3	56.0	17.4	-28.6	46.0
4.99	40.2	-15.8	56.0	21.3	-24.7	46.0
5.48	43.9	-16.1	60.0	24.6	-25.4	50.0
6.3	40.3	-19.7	60.0	23.4	-26.6	50.0
7.225	38.6	-21.4	60.0	23.7	-26.3	50.0
8.495	39.5	-20.5	60.0	24.7	-25.3	50.0
9.145	39.6	-20.4	60.0	24.9	-25.1	50.0
10.28	38.0	-22.0	60.0	23.4	-26.6	50.0
24.65	11.0	-49.0	60.0	4.8	-45.2	50.0

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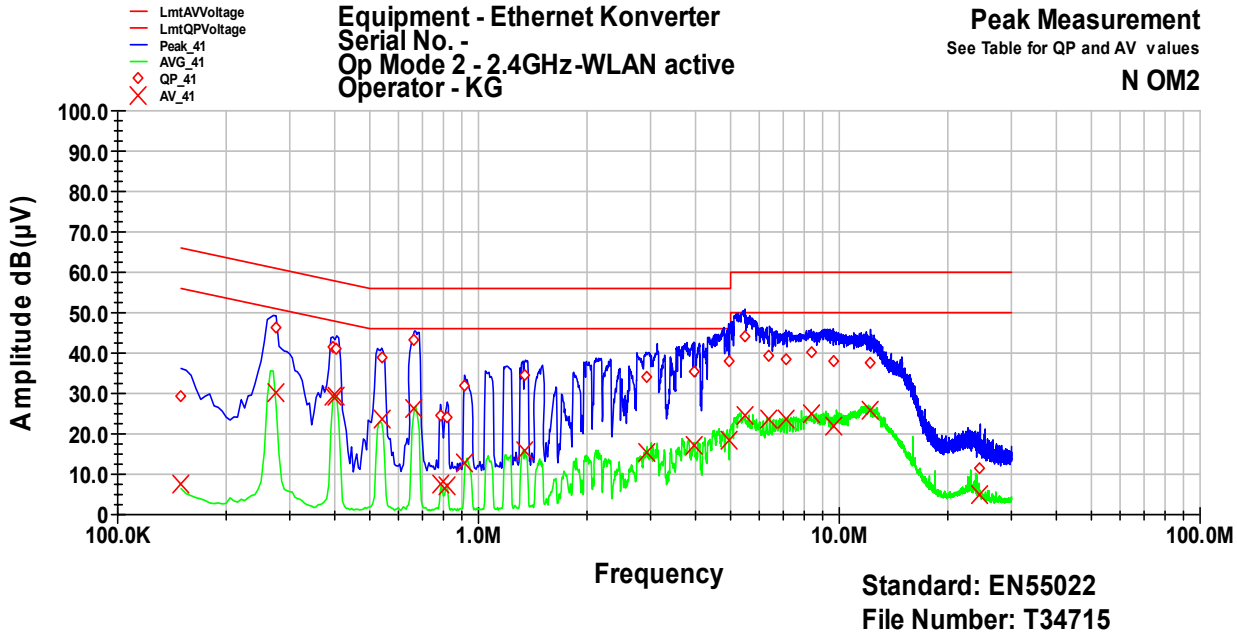


Frequency	QP Level	QP Margin	QP Limit	AV Level	AV Margin	AV Limit
MHz	dB(µV)	dB	dB	dB(µV)	dB	dB
0.15	29.2	-36.8	66.0	7.4	-48.6	56.0
0.275	46.2	-14.7	61.0	30.0	-20.9	51.0
0.395	41.6	-16.4	58.0	29.5	-18.4	48.0
0.405	41.3	-16.5	57.8	29.3	-18.4	47.8
0.54	38.9	-17.1	56.0	23.7	-22.3	46.0
0.665	43.1	-12.9	56.0	26.5	-19.5	46.0
0.785	24.4	-31.6	56.0	7.7	-38.3	46.0
0.82	24.2	-31.8	56.0	7.2	-38.8	46.0
0.915	32.0	-24.0	56.0	12.9	-33.1	46.0
1.35	34.7	-21.3	56.0	15.9	-30.1	46.0
2.915	33.9	-22.1	56.0	15.6	-30.4	46.0
3.95	35.6	-20.4	56.0	17.0	-29.0	46.0
4.935	38.1	-17.9	56.0	18.4	-27.6	46.0
5.48	44.1	-15.9	60.0	24.7	-25.3	50.0
6.405	39.3	-20.7	60.0	23.7	-26.3	50.0
7.11	38.7	-21.3	60.0	23.5	-26.5	50.0
8.36	40.2	-19.8	60.0	24.8	-25.2	50.0
9.61	37.9	-22.1	60.0	22.0	-28.0	50.0
12.2	37.4	-22.6	60.0	25.8	-24.2	50.0
24.58	11.5	-48.5	60.0	5.1	-44.9	50.0

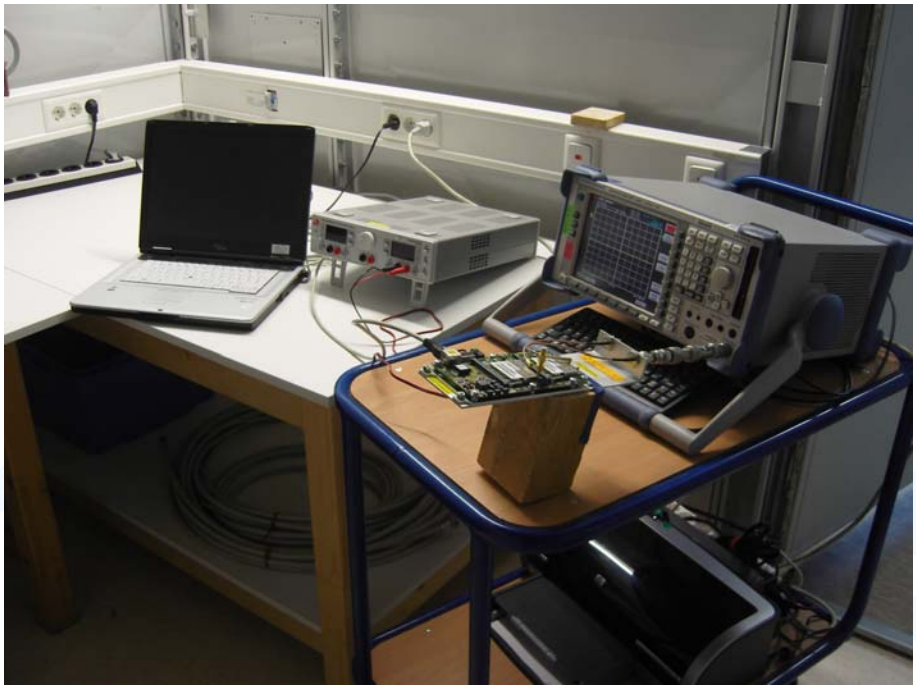
5.2 Emission bandwidth

For test instruments and accessories used see section 6 Part **MB**.

5.2.1 Description of the test location

Test location: AREA 4

5.2.2 Photo documentation of the test set-up



5.2.3 Applicable standard

According to FCC Part 15, Section 15.247(a)(2):
Systems using digital modulation techniques may operate in the 902 - 928 MHz, 2400 – 2483.5 MHz and 5725 – 5850 MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz.

5.2.4 Description of Measurement

The bandwidth was measured at an amplitude level reduced from the reference level of a modulated channel by a ratio of -6 dB. The reference level is the level of the highest signal amplitude observed at the transmitter at either the fundamental frequency or the first order modulation products in all typical modes of operation, including the unmodulated carrier, even if atypical. An alternative is to use the bandwidth measurement of the analyser.

Spectrum analyser settings:

RBW	100 kHz
VBW	300 kHz
Detector	Peak

5.2.5 Test result

WLAN Standard 802.11b

Channel number	Fundamental frequency (MHz)	6 dB Bandwidth (MHz)	Minimum limit (MHz)
1	2412	11.9	0.5
6	2437	11.7	0.5
11	2462	11.7	0.5

WLAN Standard 802.11g

Channel number	Fundamental frequency (MHz)	6 dB Bandwidth (MHz)	Minimum limit (MHz)
1	2412	16.4	0.5
6	2437	16.4	0.5
11	2462	16.5	0.5

WLAN Standard 802.11g turbo

Channel number	Fundamental frequency (MHz)	6 dB Bandwidth (MHz)	Minimum limit (MHz)
6	2437	32.6	0.5

WLAN Standard 802.11a

Channel number	Fundamental frequency (MHz)	6 dB Bandwidth (MHz)	Minimum limit (MHz)
149	5745	16.5	0.5
157	5785	16.5	0.5
165	5825	16.4	0.5

The requirements are **FULFILLED.**

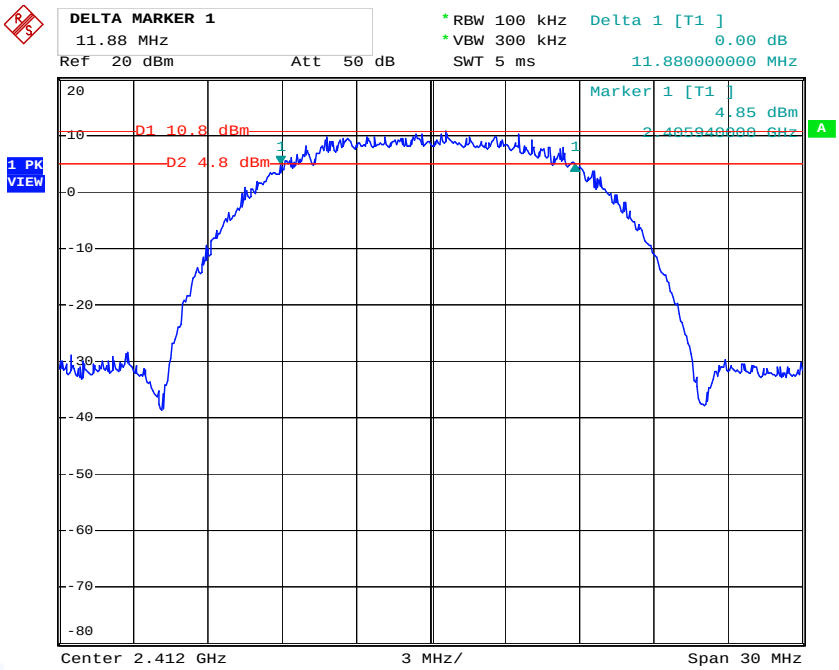
Remarks: The EBW of the EuT was measured and compared to the original filing.

Addition of new antennas would not change previous results.

For detailed test results please refer to following test protocols.

5.2.6 Test protocols

802.11b, Channel 1 (2412 MHz)



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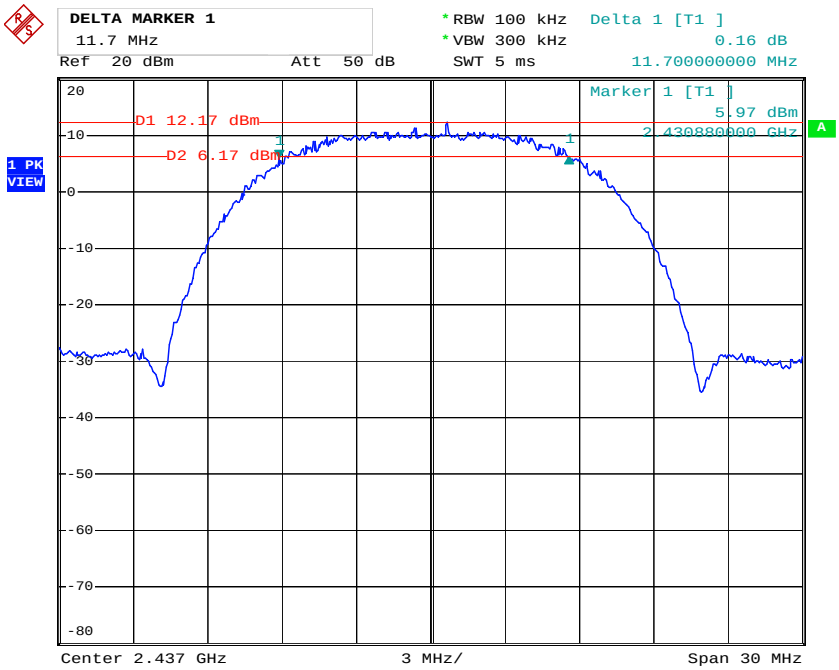
802.11b, Channel 6 (2437 MHz)



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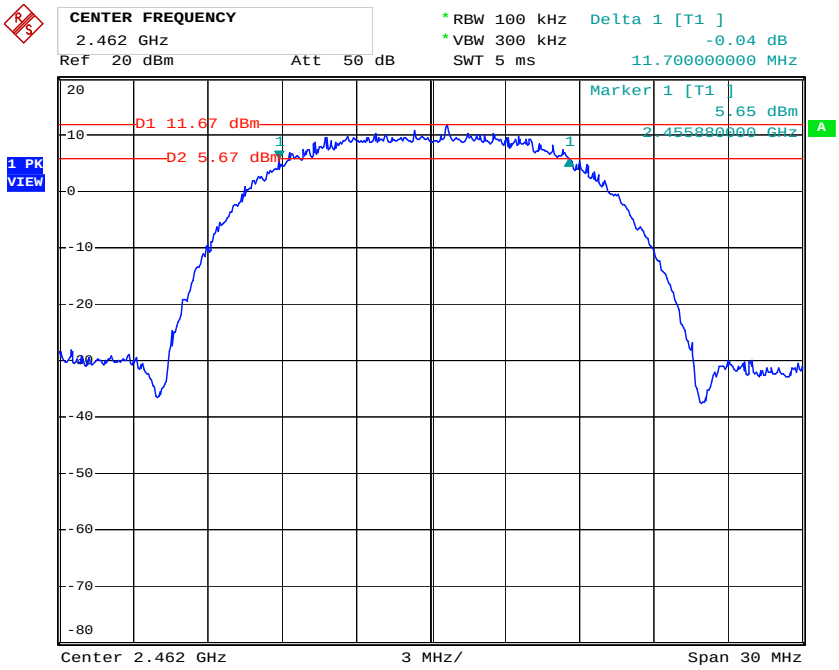
802.11b, Channel 11 (2462 MHz)



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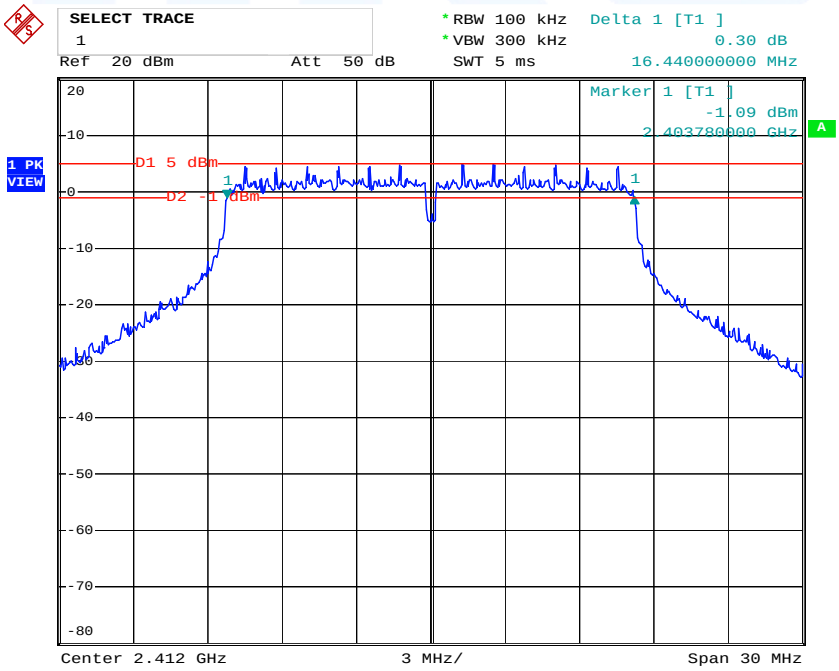
802.11g, Channel 1 (2412 MHz)



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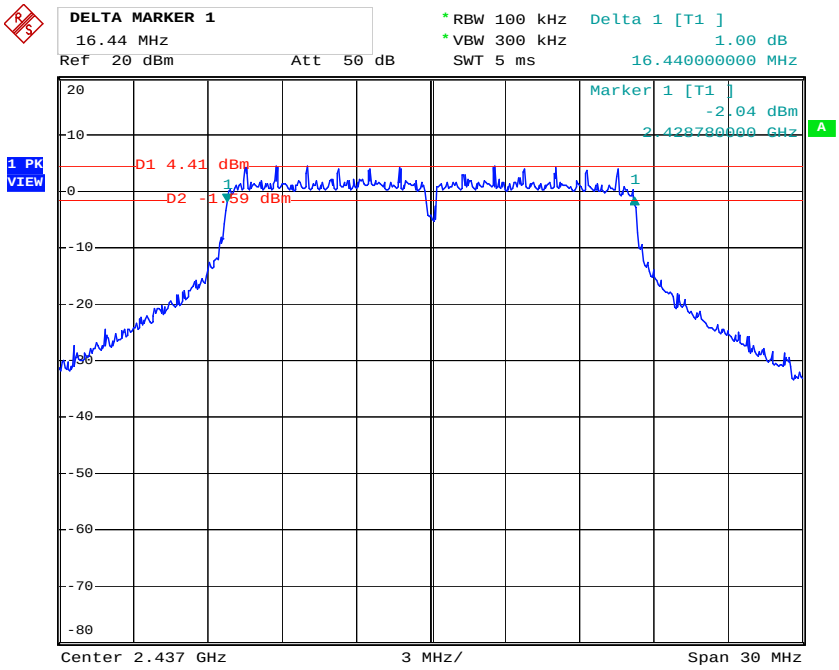
802.11g, Channel 6 (2437 MHz)



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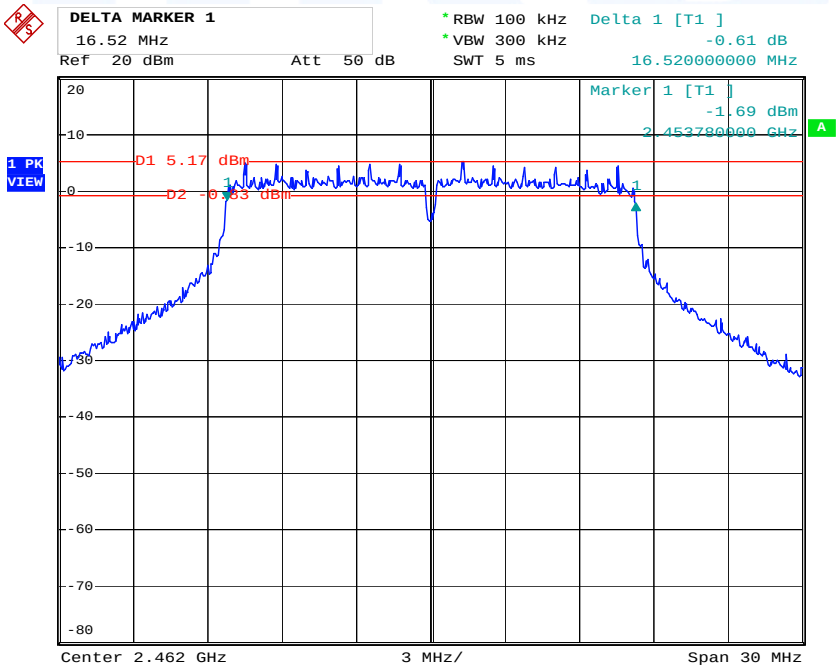
802.11g, Channel 11 (2462 MHz)



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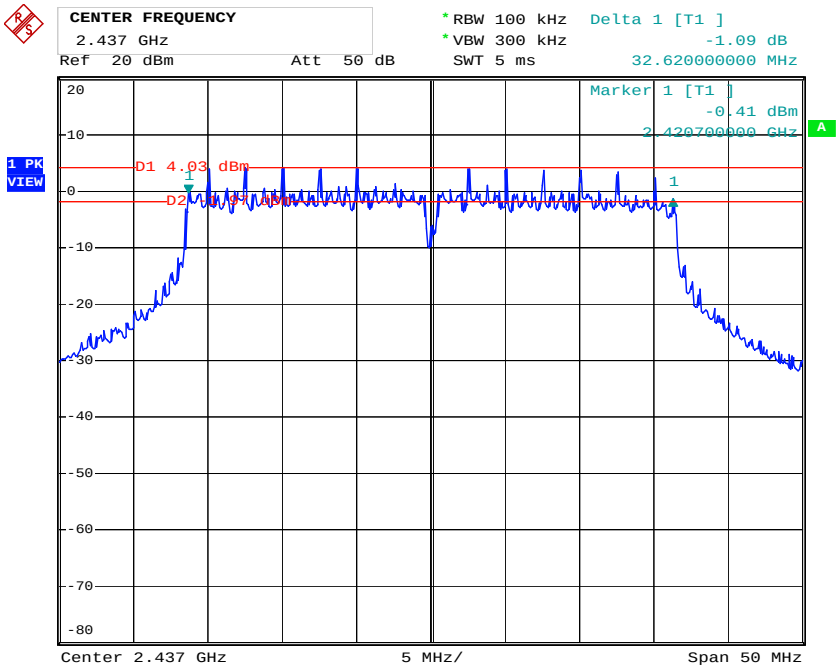
802.11g, Channel 6 turbo (2437 MHz)



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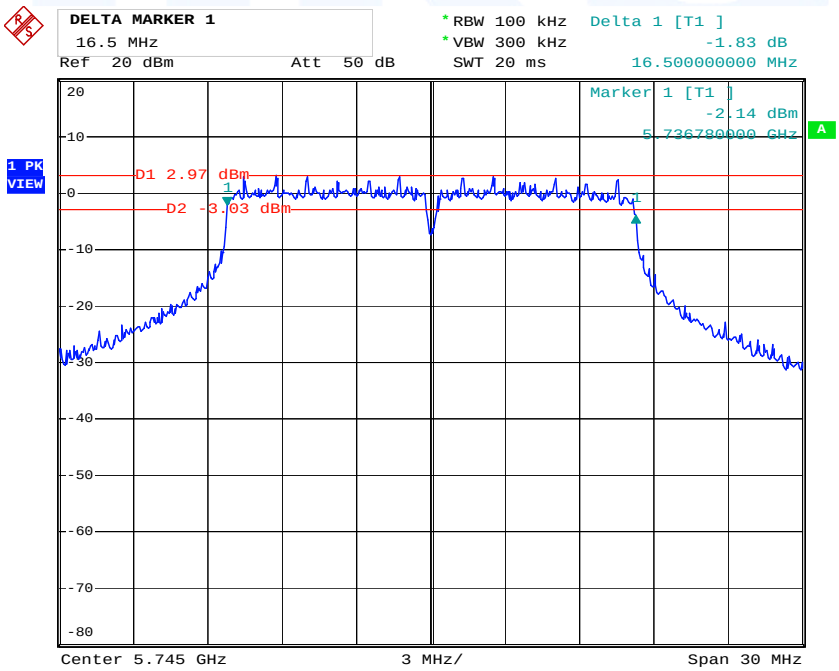
802.11a, Channel 149 (5745 MHz)



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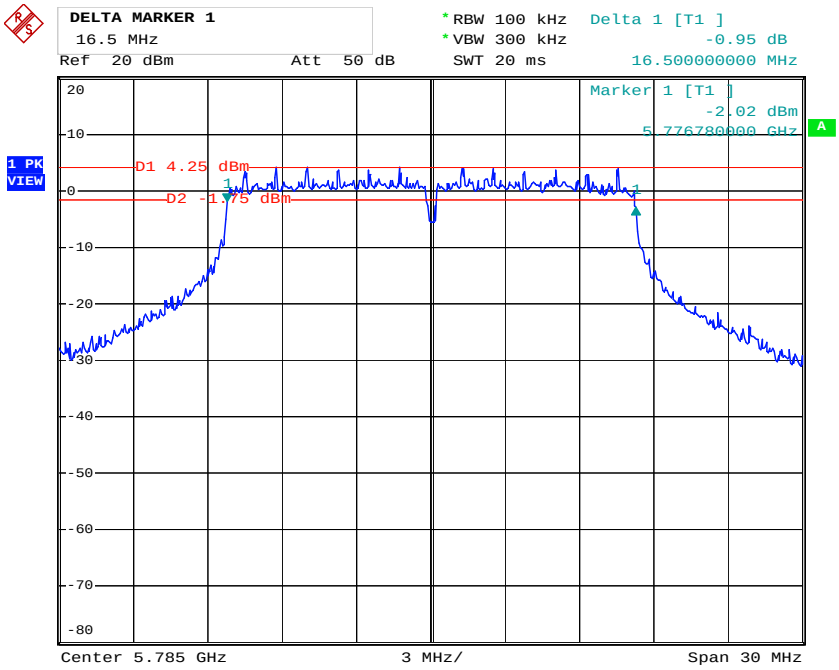
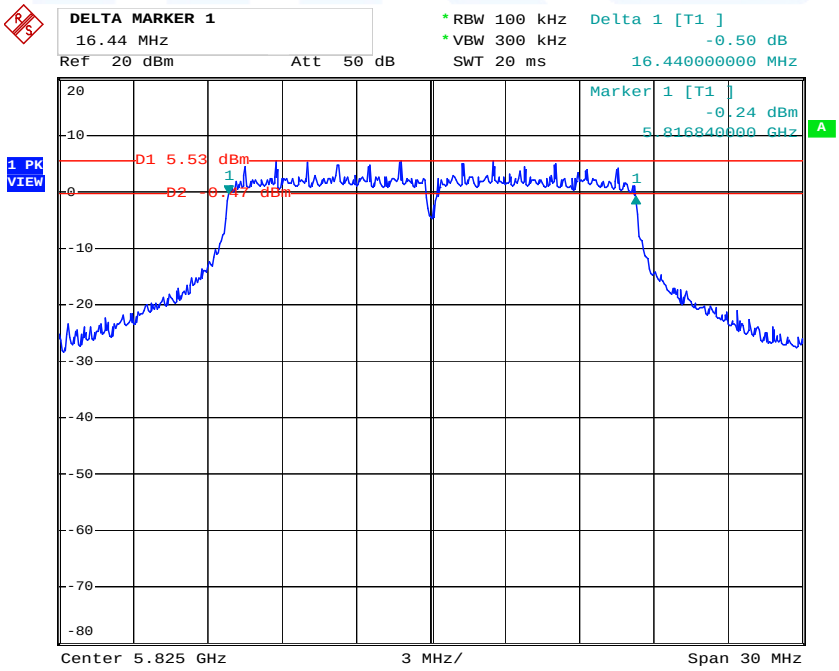
802.11a, Channel 157 (5785 MHz)



Date: 4.NOV.2010 08:47:13

802.11a, Channel 165 (5825 MHz)



Date: 4.NOV.2010 08:49:11

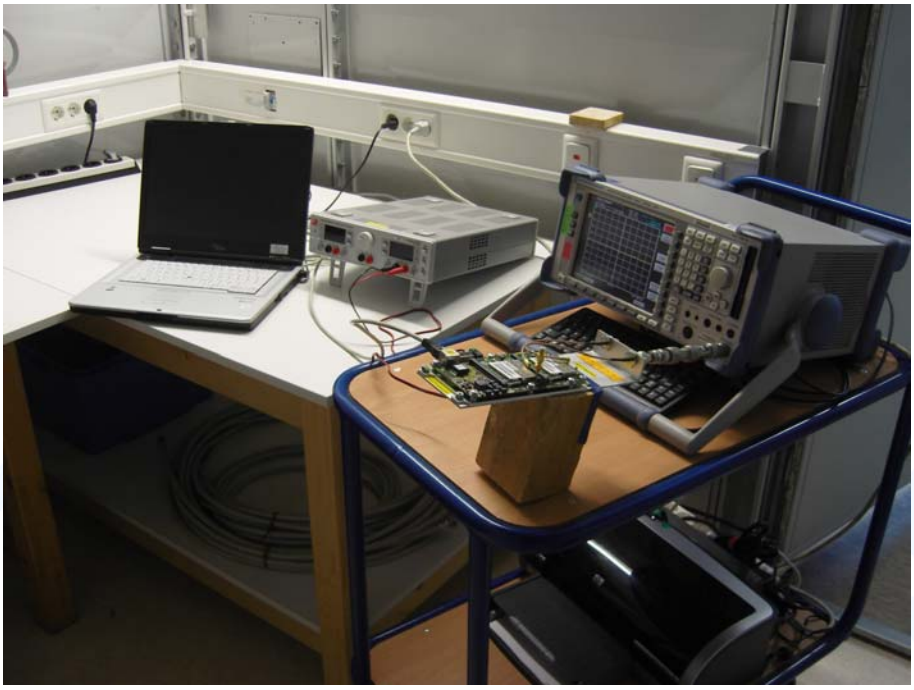
5.3 Maximum peak conducted output power

For test instruments and accessories used see section 6 Part **CPC 3**.

5.3.1 Description of the test location

Test location: AREA 4

5.3.2 Photo documentation of the test set-up



5.3.3 Applicable standard

According to FCC Part 15, Section 15.247(b)(3):
For systems using digital modulation in the 2400-2483.5 MHz and 5725 – 5850 MHz bands, the maximum peak output power of the transmitter shall not exceed 1 Watt. The limit is based on transmitting antennas of directional gain that do not exceed 6 dBi.

5.3.4 Description of Measurement

The transmitter antenna output was connected to the spectrum analyser. The center frequency of the spectrum analyser is set to the fundamental frequency. The span of the spectrum analyser should be larger than the emission bandwidth (EBW). To get the total power of the occupied bandwidth the function “Channel Power Measurement” of the analyser has been used. The channel bandwidth has been set to EBW. With peak detector and power mode “Max Hold” the result is the summed maximum output power of the EBW. To determine the max. output power the worst case power setting is used dependent of the antenna gain. The cable loss or other external attenuation was taken into account and expressed in a correction factor. The absolute maximum peak output power is calculated by adding the reading of the analyser plus correction and compared with the limit.

Spectrum analyser settings:

RBW	1 MHz
VBW	300 kHz
Channel bandwidth:	20 MHz, 40 MHz for turbo channels

5.3.5 Test result

WLAN Technology 802.11b

Channel	Frequency (MHz)	ART-Power settings (dBm)	Measured power (dBm)	Cable loss correction (dB)	Corrected power (dBm)	Output power limit (dBm)	Delta (dB)
1	2412	22	21.1	0.1	21.2	30	-8.8
6	2437	22	21.3	0.1	21.4	30	-8.6
11	2462	22	21.5	0.1	21.6	30	-8.4

Cable loss correction: 0.1 dB

WLAN Technology 802.11g

Channel	Frequency (MHz)	ART-Power settings (dBm)	Measured power (dBm)	Cable loss correction (dB)	Corrected power (dBm)	Output power limit (dBm)	Delta (dB)
1	2412	18	17.3	0.1	17.4	30	-12.6
6	2437	18	16.9	0.1	17.0	30	-13.0
11	2462	18	17.4	0.1	17.5	30	-12.5
6 (turbo)	2437	18	16.4	0.1	16.5	30	-14.5

Cable loss correction: 0.1 dB

WLAN Technology 802.11a

Channel	Frequency (MHz)	ART-Power settings (dBm)	Measured power (dBm)	Cable loss correction (dB)	Corrected power (dBm)	Output power limit (dBm)	Delta (dB)
149	5745	18	17.2	0.3	17.5	30	-12.5
157	5785	18	18.1	0.3	18.4	30	-11.6
165	5825	18	18.5	0.3	18.8	30	-11.2

Cable loss correction: 0.3 dB

Peak Power Limit according to FCC Part 15, Section 15.247(b)(3):

Frequency (MHz)	Peak Power Limit	
	(dBm)	(Watt)
902-928	30	1.0
2400-2483.5	**30**	**1.0**
5725-5850	**30**	**1.0**

The requirements are **FULFILLED.**

Remarks: The output power of the EuT was measured and compared to the original filing.

Addition of new antennas would not change previous results.

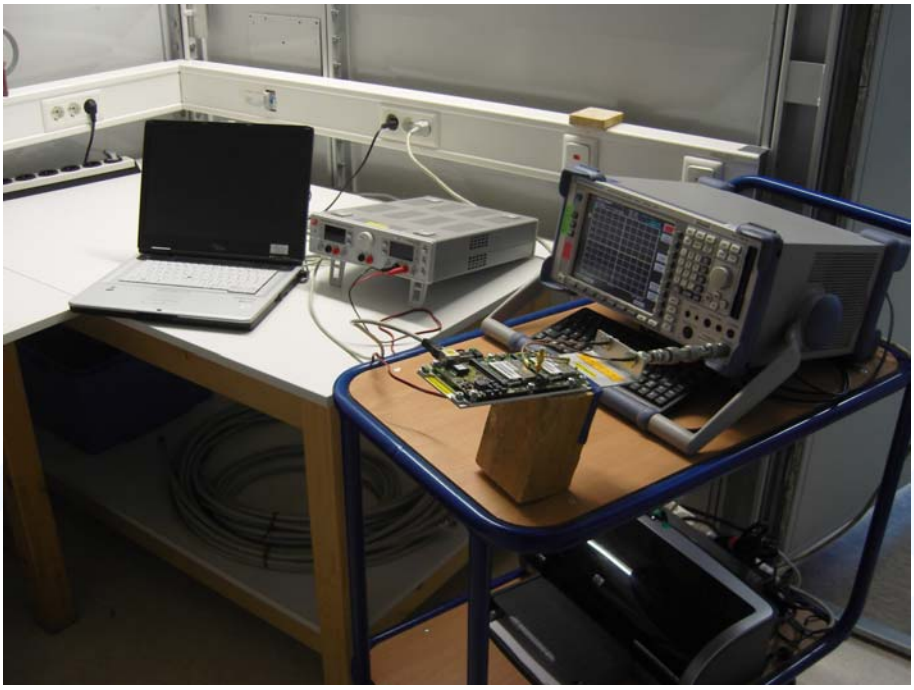
5.4 Power spectral density

For test instruments and accessories used see section 6 Part **CPC 3**.

5.4.1 Description of the test location

Test location: AREA 4

5.4.2 Photo documentation of the test set-up



5.4.3 Applicable standard

According to FCC Part 15, Section 15.247(e):
For digitally modulated systems, the 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. This power spectral density shall be determined in accordance with the provisions of paragraph (b) of this section. The same method of determining the conducted output power shall be used to determine the power spectral density.

5.4.4 Description of Measurement

The EuT was connected to the spectrum analyser. The bandwidth of the fundamental frequency was measured with the spectrum analyser, set sweep time equal to span/3 kHz. The power spectral density was measured using the analyser function “Channel Power” in dBm/Hz. The result is calculated by adding 35 dB (10 log 3000 Hz/Hz) as bandwidth correction factor to the analyser reading.

Spectrum analyser settings:

RBW	3 kHz
VBW	30 kHz

5.4.5 Test result

WLAN Standard 802.11b

Channel	Frequency (MHz)	Reading (dBm/Hz)	Correction to 3 kHz (dB)	PSD (dBm)	Limit (dBm)
1	2412	-53.3	35	-18.3	8
6	2437	-53.3	35	-18.3	8
11	2462	-53.1	35	-18.1	8

WLAN Standard 802.11g

Channel	Frequency (MHz)	Reading (dBm/Hz)	Correction to 3 kHz (dB)	PSD (dBm)	Limit (dBm)
1	2412	-57.4	35	-22.4	8
6	2437	-57.7	35	-22.7	8
11	2462	-57.0	35	-22.0	8

WLAN Standard 802.11g turbo

Channel	Frequency (MHz)	Reading (dBm/Hz)	Correction to 3 kHz (dB)	PSD (dBm)	Limit (dBm)
6	2437	-61.0	35	-26.0	8

WLAN Standard 802.11a

Channel	Frequency (MHz)	Reading (dBm/Hz)	Correction to 3 kHz (dB)	PSD (dBm)	Limit (dBm)
149	5745	-58.9	35	-23.9	8
157	5785	-58.0	35	-23.0	8
165	5825	-56.9	35	-21.9	8

Power spectral density limit according to FCC Part 15, Section 15.247(e):

Frequency (MHz)	Power spectral density limit (dBm/3kHz)
2400 - 2483.5	8

The requirements are **FULFILLED.**

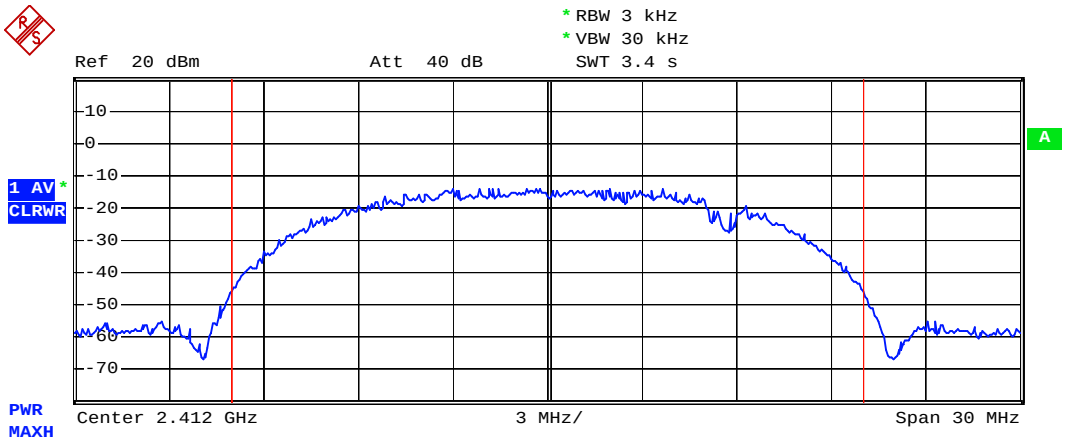
Remarks: The PSD of the EuT was measured and compared to the original filing.

Addition of new antennas would not change previous results.

FCC ID: VEB-NKRDCMA82

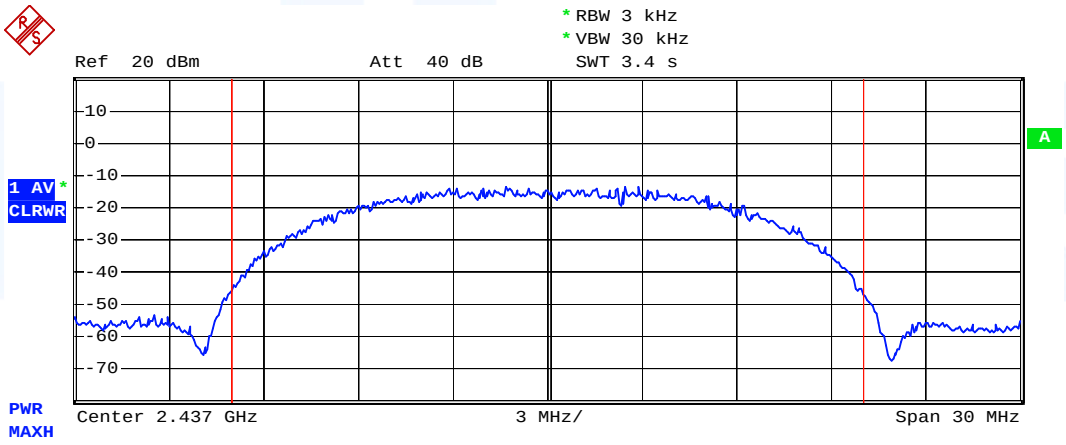
Power spectral density plots

802.11b Channel 1 (2412 MHz)



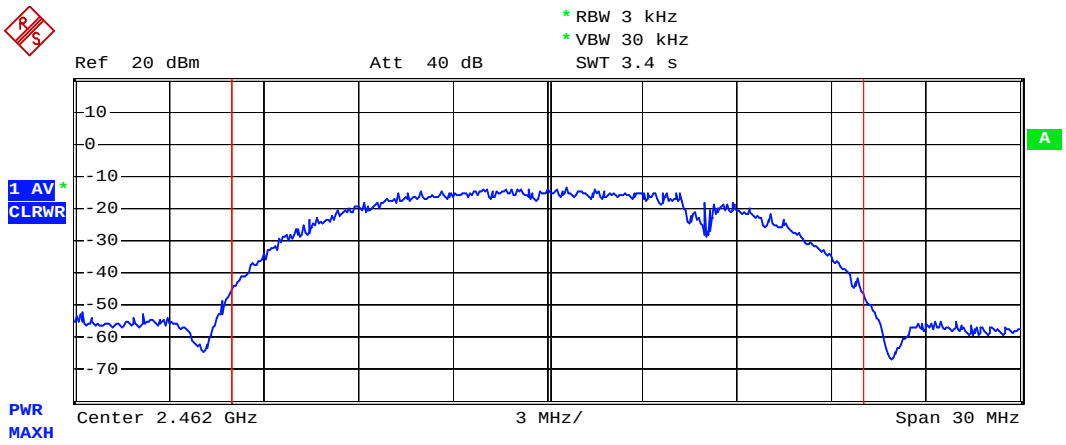
Tx Channel
Bandwidth 20 MHz Power -53.26 dBm/Hz

802.11b Channel 6 (2437 MHz)



Tx Channel
Bandwidth 20 MHz Power -53.28 dBm/Hz

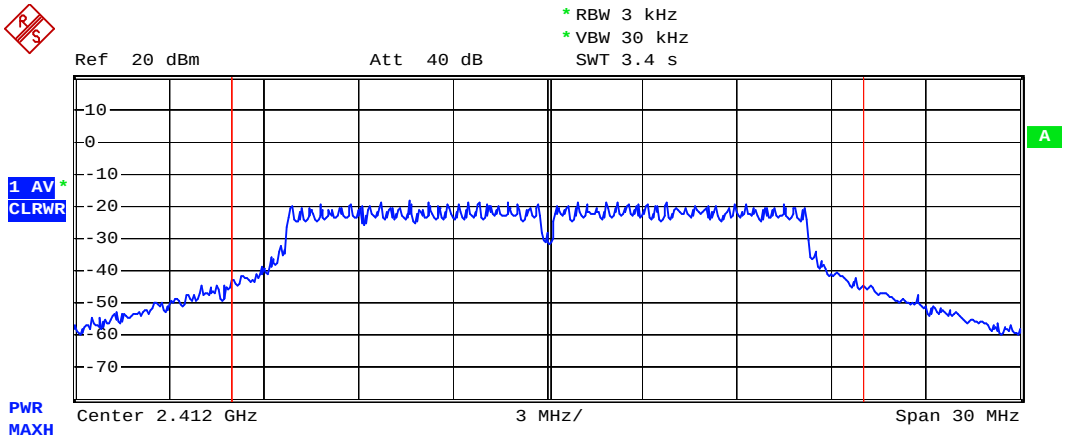
802.11b Channel 11 (2462 MHz)



Tx Channel
Bandwidth 20 MHz Power -53.11 dBm/Hz

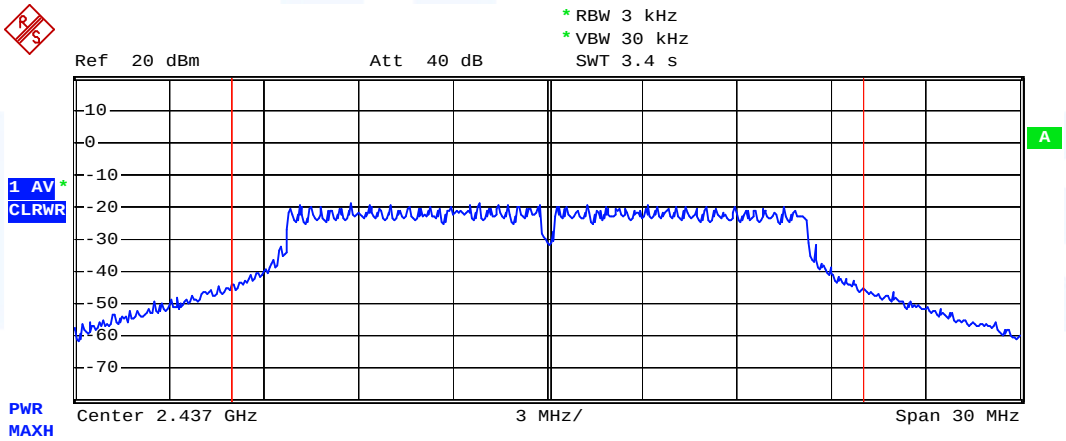
FCC ID: VEB-NKRDCMA82

802.11g Channel 1 (2412 MHz)



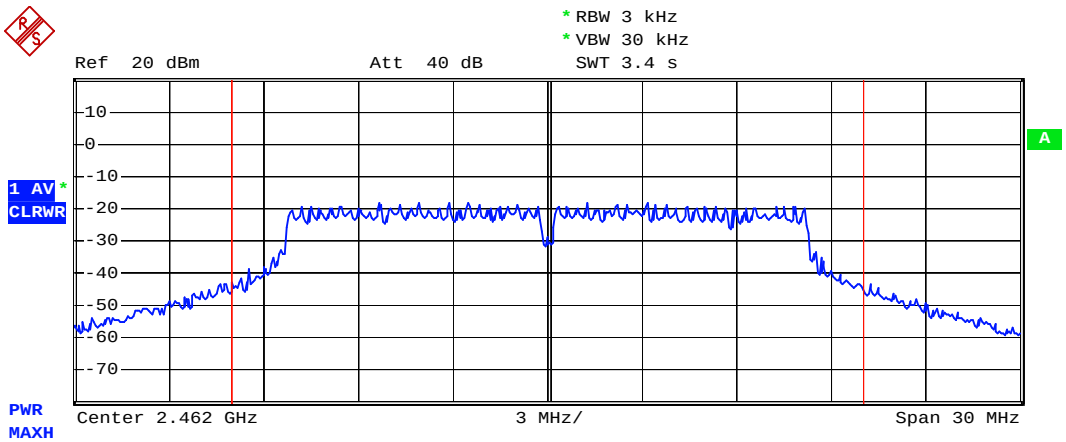
Tx Channel
Bandwidth 20 MHz Power -57.36 dBm/Hz

802.11g Channel 6 (2437 MHz)



Tx Channel
Bandwidth 20 MHz Power -57.68 dBm/Hz

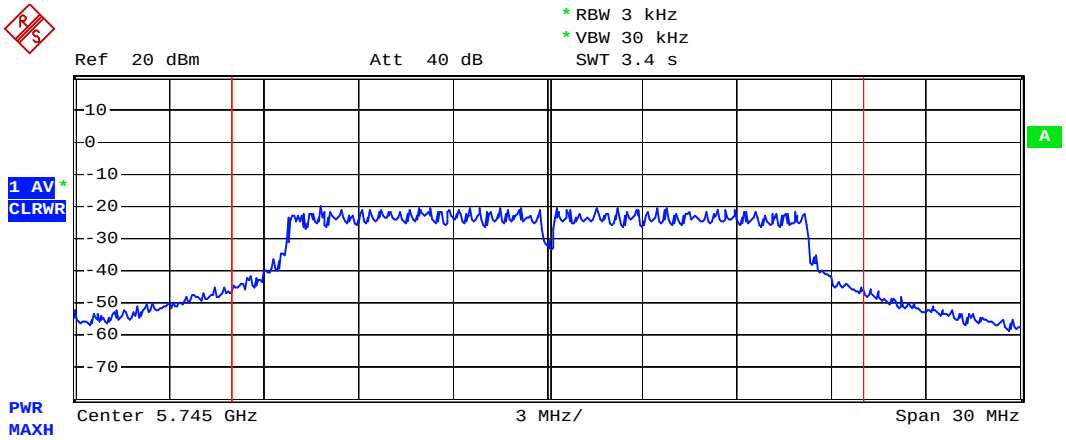
802.11g Channel 11 (2462 MHz)



Tx Channel
Bandwidth 20 MHz Power -57.04 dBm/Hz

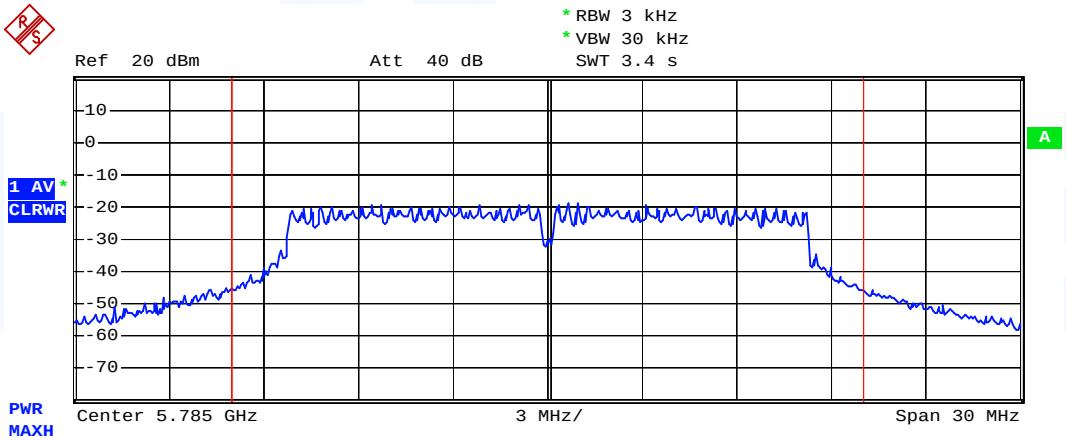
FCC ID: VEB-NKRDCMA82

802.11a Channel 149 (5745 MHz)



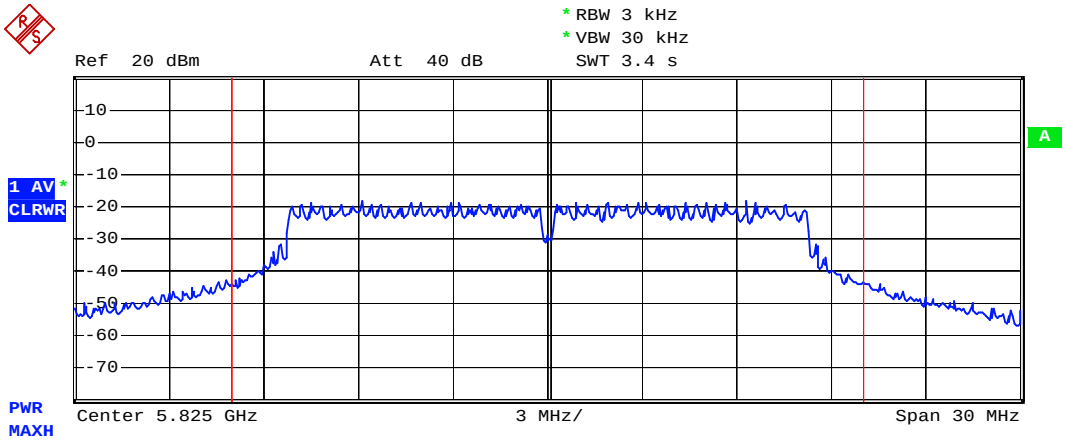
Tx Channel
Bandwidth 20 MHz Power -58.93 dBm/Hz

802.11a Channel 157 (5785 MHz)



Tx Channel
Bandwidth 20 MHz Power -58.00 dBm/Hz

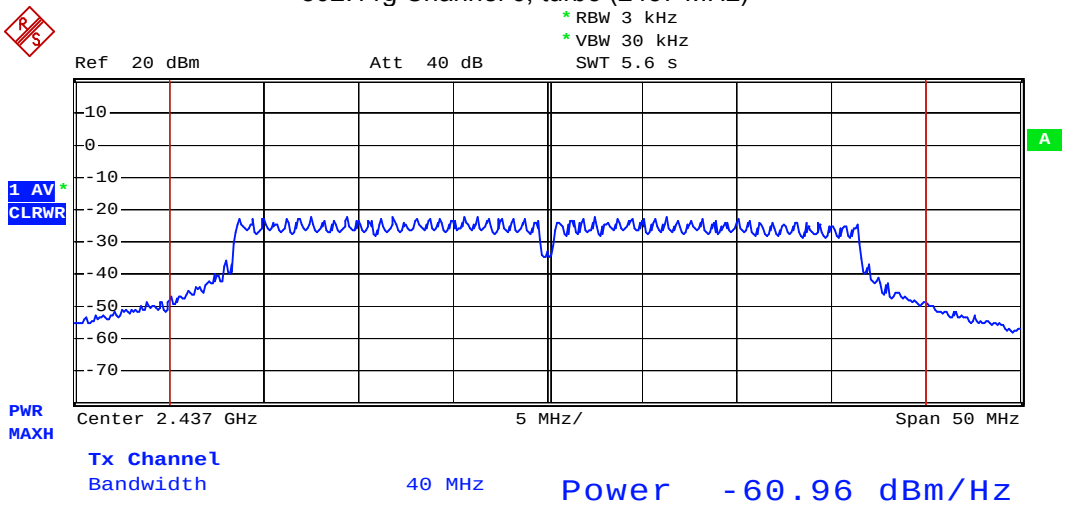
802.11a Channel 165 (5825 MHz)



Tx Channel
Bandwidth 20 MHz Power -56.93 dBm/Hz

FCC ID: VEB-NKRDCMA82

802.11g Channel 6, turbo (2437 MHz)



5.5 Maximum permissible exposure (MPE)

For test instruments and accessories used see section 6 Part **CPC 3**.

5.5.1 Description of the test location

Test location: AREA 4

5.5.2 Applicable standard

According to FCC Part 15, Section 15.247(i):
Systems operating under the provisions of this section shall be operated in a manner that the public is not exposed to radio frequency energy levels in excess of the Commission's guidelines.
The test methods used comply with ANSI/IEEE C95.1, "IEEE Standard for Safety Levels with respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz".
This test report shows the compliance with the limits for Maximum Permissible Exposure (MPE) specified in FCC Part 1, Section 1.1310 and the criteria to evaluate the environmental impact of human exposure to radio frequency (RF) radiation as specified in FCC Part 1, Section 1.1307(b).

5.5.3 Description of Measurement

The maximum total power input to the antenna has been measured conducted as described in clause 5.3 of this document. Through the Friis transmission formula, the known maximum gain of the antenna and the maximum power, can be calculated the MPE in a defined distance away from the product.

Friis transmission formula: $P_d = \frac{P_{out} * G}{4 * \Pi * r^2}$

where

P_d =power density (mW/cm^2)
P_{out} = output power to antenna (mW)
G = gain of antenna (linear scale)
r = distance between antenna and observation point (cm)

According to FCC Rules 47CFR 2.1093(b) the EuT is not a portable device. The EuT is designed to be used that radiating structures are 20 cm outside of the body of the user.

FCC ID: VEB-NKRDCMA82

5.5.4 Test result

WLAN Standard 802.11b

Worst case: Antenna Nahfeldkoppler with an antenna gain of 2.7 dBi, Power setting: 22

Channel No.	Frequency	Max power output to antenna		Antenna gain	Power density	Limit of power density
	(MHz)	(dBm)	(mW)	(dBi)	(mW/cm^2)	(mW/cm^2)
1	2412	21.2	131.8	2.7	0.049	1.0
6	2437	21.4	138.0	2.7	0.051	1.0
11	2462	21.6	144.5	2.7	0.054	1.0

WLAN Standard 802.11g

Worst case: Antenna Nahfeldkoppler with an antenna gain of 2.7 dBi, Power setting: 18

Channel No.	Frequency	Max power output to antenna		Antenna gain	Power density	Limit of power density
	(MHz)	(dBm)	(mW)	(dBi)	(mW/cm^2)	(mW/cm^2)
1	2412	17.4	55.0	2.7	0.020	1.0
6	2437	17.0	50.1	2.7	0.019	1.0
6 (turbo)	2437	16.5	44.7	2.7	0.017	1.0
11	2462	17.5	56.2	2.7	0.021	1.0

WLAN Standard 802.11a

Worst case: Antenna Nahfeldkoppler with an antenna gain of 3.0 dBi, Power setting: 18

Channel No.	Frequency	Max power output to antenna		Antenna gain	Power density	Limit of power density
	(MHz)	(dBm)	(mW)	(dBi)	(mW/cm^2)	(mW/cm^2)
149	5745	17.5	56.2	3.0	0.022	1.0
157	5785	18.4	69.2	3.0	0.027	1.0
165	5825	18.8	75.9	3.0	0.030	1.0

Limits for maximum permissible exposure (MPE):

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm^2)	Averaging time (minutes)
(B) Limits for General Population / Uncontrolled Exposure				
0.3 – 3.0	614	1.63	100	30
3.0 – 30	824/*f*	2.19/*f*	180/ f^2	30
30 - 300	27.5	0.073	0.2	30
300-1500	---	---	*f*/1500	30
1500-100000	**---**	**---**	**1.0**	**30**

f = Frequency in MHz

The requirements are **FULFILLED.**

Remarks: Addition of new antennas would not change previous results.

5.6 Co-location and Co-transmission

Applicable standard:
OET Bulletin 65, Edition 97-01, Section 2: Multiple-transmitter sites and Complex Environments

The FCC's MPE limits vary with frequency. Therefore, in mixed or broadband RF fields where several sources and frequencies are involved, the fraction of the recommended limit (in terms of power density or square of the electric or magnetic field strength) incurred within each frequency interval should be determined, and the sum of all fractional contributions should not exceed 1.0, or 100 % in terms of percentage.

1. WLAN Module 1 (2.4 GHz): P_d = 0.054 mW/cm^2
Limit: 1 mW/cm^2
Fraction of MPE: 5.4 %

2. WLAN Module 2 (5 GHz):: P_d = 0.030 mW/cm^2
Limit: 1 mW/cm^2
Fraction of MPE: 3 %

The requirements are **FULFILLED.**

Remarks: Addition of new antennas would not change previous results.

5.7 Spurious emissions in restricted bands

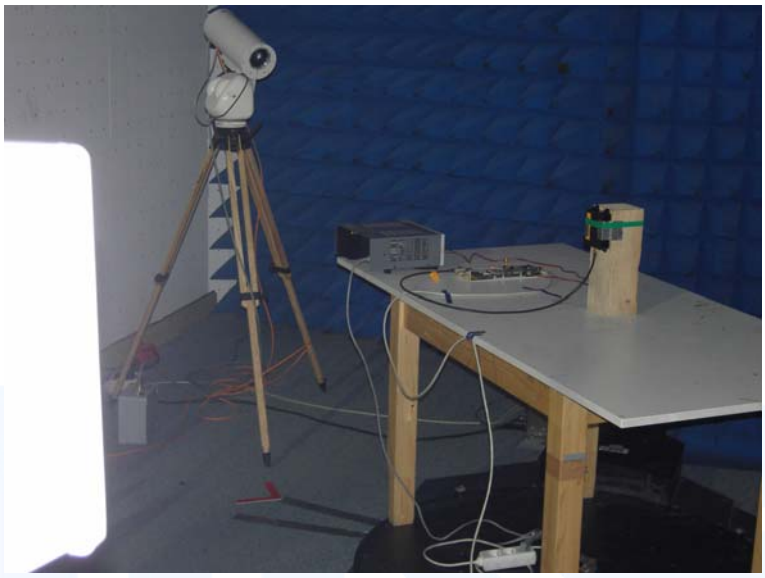
For test instruments and accessories used see section 6 Par SER 3.

5.7.1 Description of the test location

Test location: Anechoic Chamber A2

Test distance: 3 metres

5.7.2 Photo documentation of the test set-up



5.7.3 Applicable standard

According to FCC Part 15, Section 15.247(d):
In any 100 kHz bandwidth outside the frequency bands 2400 – 2483.50 MHz and 5725 – 5850 MHz, the digitally modulated 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 an 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 limit specified in Section 15.209(a) (see Section 15.205(c)).

5.7.4 Description of Measurement

The radiated power of the spurious emission from the EuT is measured in a test setup following the procedures set out in ANSI C63.4. If the emission level of the EuT in peak mode complies with the average limit, then testing will be stopped and peak values of the EuT will be reported, otherwise the emission will be measured in average mode again and reported.

Spectrum analyzer settings for peak values:
RBW: 1 MHz
VBW: 1 MHz
Spectrum analyzer settings for average values:
RBW: 1 MHz
VBW: 10 Hz

5.7.5 Test result

5.7.5.1 Standard 802.11b

Channel 1 (2412 MHz)
Nearest restricted bands: 2200-2300 MHz and 2310-2390 MHz

Antenna		Power	Frequency	Peak		Average	
Type	Gain (dBi)	Setting (dBm)	(MHz)	Value dB(µV/m)	Limit dB(µV/m)	Value dB(µV/m)	Limit dB(µV/m)
Nahfeldkoppler	2.7	22	2386	65.0	74	53.0	54
TW-145	2.0	22	2387	64.4	74	53.1	54
Nahfeldkoppler	2.7	22	4816	52.5	74	---	54
TW-145	2.0	22	4816	54.7	74	45.8	54

Channel 6 (2437 MHz)

Antenna		Power	Frequency	Peak		Average	
Type	Gain (dBi)	Setting (dBm)	(MHz)	Value dB(µV/m)	Limit dB(µV/m)	Value dB(µV/m)	Limit dB(µV/m)
Nahfeldkoppler	2.7	22	---	---	---	---	---
TW-145	2.0	22	---	---	---	---	---

Note: There are no radiated spurious emissions in restricted bands near band edges!

Channel 11 (2462 MHz)
Nearest restricted band: 2483.5-2500 MHz

Antenna		Power	Frequency	Peak		Average	
Type	Gain (dBi)	Setting (dBm)	(MHz)	Value dB(µV/m)	Limit dB(µV/m)	Value dB(µV/m)	Limit dB(µV/m)
Nahfeldkoppler	2.7	22	2488	65.9	74	53.3	54
TW-145	2.0	22	2486	62.0	74	48.2	54
TW-145	2.0	22	4928	50.5	74	---	54

5.7.5.2 Standard 802.11g

Channel 1 (2412 MHz)
Nearest restricted bands: 2200-2300 MHz and 2310-2390 MHz

Antenna		Power	Frequency	Peak		Average	
Type	Gain (dBi)	Setting (dBm)	(MHz)	Value dB(µV/m)	Limit dB(µV/m)	Value dB(µV/m)	Limit dB(µV/m)
Nahfeldkoppler	2.7	18	2389	73.2	74	53.6	54
TW-145	2.0	18	2389	69.7	74	52.5	54
Nahfeldkoppler	2.7	18	4816	48.6	74	---	54
TW-145	2.0	18	4816	49.4	74	---	54

Channel 6 (2437 MHz)

Antenna		Power	Frequency	Peak		Average	
Type	Gain (dBi)	Setting (dBm)	(MHz)	Value dB(µV/m)	Limit dB(µV/m)	Value dB(µV/m)	Limit dB(µV/m)
Nahfeldkoppler	2.7	18	---	---	---	---	---
TW-145	2.0	18	---	---	---	---	---

Note: There are no radiated spurious emissions in restricted bands near band edges!

Channel 11 (2462 MHz)
Nearest restricted band: 2483.5-2500 MHz

Antenna		Power	Frequency	Peak		Average	
Type	Gain (dBi)	Setting (dBm)	(MHz)	Value dB(µV/m)	Limit dB(µV/m)	Value dB(µV/m)	Limit dB(µV/m)
Nahfeldkoppler	2.7	18	2484	70.4	74	52.2	54
TW-145	2.0	18	2484	69.0	74	52.1	54

Channel 6 turbo (2437 MHz)
Nearest restricted band: 2200-2300 MHz, 2310-2390 MHz and 2483.5-2500 MHz

Antenna		Power	Frequency	Peak		Average	
Type	Gain (dBi)	Setting (∆dB)	(MHz)	Value dB(µV/m)	Limit dB(µV/m)	Value dB(µV/m)	Limit dB(µV/m)
Nahfeldkoppler	2.7	18	2389	65.9	74	52.4	54
TW-145	2.0	18	2389	63.6	74	49.1	54
Nahfeldkoppler	2.7	18	2484	66.3	74	52.2	54
TW-145	2.0	18	2485	60.1	74	47.2	54

5.7.5.3 Standard 802.11a

Channel 149 (5745 MHz)
Nearest restricted band: 5350-5460 MHz

Antenna		Power	Frequency	Peak		Average	
Type	Gain (dBi)	Setting (dBm)	(MHz)	Value dB(µV/m)	Limit dB(µV/m)	Value dB(µV/m)	Limit dB(µV/m)
Nahfeldkoppler	3.0	18	5440	58.7	74	49.1	54
TW-145	2.0	18	5440	55.4	74	47.3	54
Koppler	0	18	5440	53.7	74	---	54
Nahfeldkoppler	3.0	18	11496	52.0	74	---	54
Nahfeldkoppler	3.0	18	17244	53.7	74	---	54
Koppler	0	18	11496	52.0	74	---	54

Channel 157 (5785 MHz)

Antenna		Power	Frequency	Peak		Average	
Type	Gain (dBi)	Setting (dBm)	(MHz)	Value dB(µV/m)	Limit dB(µV/m)	Value dB(µV/m)	Limit dB(µV/m)
Nahfeldkoppler	3.0	18	---	---	---	---	---
TW-145	2.0	18	---	---	---	---	---
Koppler	0	18	---	---	---	---	---

Note: There are no radiated spurious emissions in restricted bands near band edges!

Channel 165 (5825 MHz)
Nearest restricted bands: 4500-5150 MHz, 5350-5460 MHz and 7250-7750 MHz

Antenna		Power	Frequency	Peak		Average	
Type	Gain (dBi)	Setting (dBm)	(MHz)	Value dB(µV/m)	Limit dB(µV/m)	Value dB(µV/m)	Limit dB(µV/m)
Nahfeldkoppler	3.0	18	5441	58.9	74	50.4	54
TW-145	2.0	18	5441	53.4	74	--	54
Koppler	0	18	5403	52.6	74	--	54
Nahfeldkoppler	3.0	18	11656	53.6	74	---	54
Nahfeldkoppler	3.0	18	17482	59.2	74	43.1	54
Koppler	0	18	11651	59.4	74	43.8	54

Note: All other emissions falling in restricted bands are at least 10 dB below the appropriate limit (see table below). The power settings are controlled by firmware and are defined for each antenna type.

FCC ID: VEB-NKRDCMA82

Radiated limits according to FCC Part 15 Section 15.209(a):

Frequency	Field strength of spurious emissions		Measurement distance
(MHz)	(µV/m)	dB(µV/m)	(metres)
0.009-0.490	2400/F (kHz)		300
0.490-1.705	24000/F (kHz)		30
1.705-30	30	29.5	30
30-88	100	40	3
88-216	150	43.5	3
216-960	200	46	3
Above 960	500	54	3

Restricted bands of operation:

The field strength of emissions appearing within these frequency bands shall not exceed the limits shown in Section 15.209

MHz	MHz	MHz	GHz
0.090 – 0.110	16.42 – 16.423	399.9 – 410	4.5 – 5.15
0.495 – 0.505	16.69475 – 16.69525	608 – 614	5.35 – 5.46
2.1735 – 2.1905	16.80425 – 16.80475	960 – 1240	7.25 – 7.75
4.125 – 4.128	25.5 – 25.67	1300 – 1427	8.025 – 8.5
4.17725 – 4.17775	37.5 – 38.25	1435 – 1626.5	9.0 – 9.2
4.20725 – 4.20775	73 – 74.6	1645.5 – 1646.5	9.3 – 9.5
6.215 – 6.218	74.8 – 75.2	1660 – 1710	10.6 – 12.7
6.26775 – 6.26825	108 – 121.94	1718.8 – 1722.2	13.25 – 13.4
6.31175 – 6.31225	123 – 138	2200 – 2300	14.47 – 14.5
8.291 – 8.294	149.9 – 150.05	2310 – 2390	15.35 – 16.2
8.362 – 8.366	156.52475 – 156.52525	2483.5 – 2500	17.7 – 21.4
8.37625 – 8.38675	156.7 – 156.9	2690 – 2900	22.01 – 23.12
8.41425 – 8.41475	162.0125 – 167.17	3260 – 3267	23.6 – 24.0
12.29 – 12.293	167.72 – 173.2	3332 – 3339	31.2 – 31.8
12.51975 – 12.52025	240 – 285	3345.8 – 3358	36.43 – 36.5
12.57675 – 12.57725	322 – 335.4	3600 – 4400	Above 38.6

The requirements are **FULFILLED.**

Remarks: The measurement was performed up to the 10th harmonic.

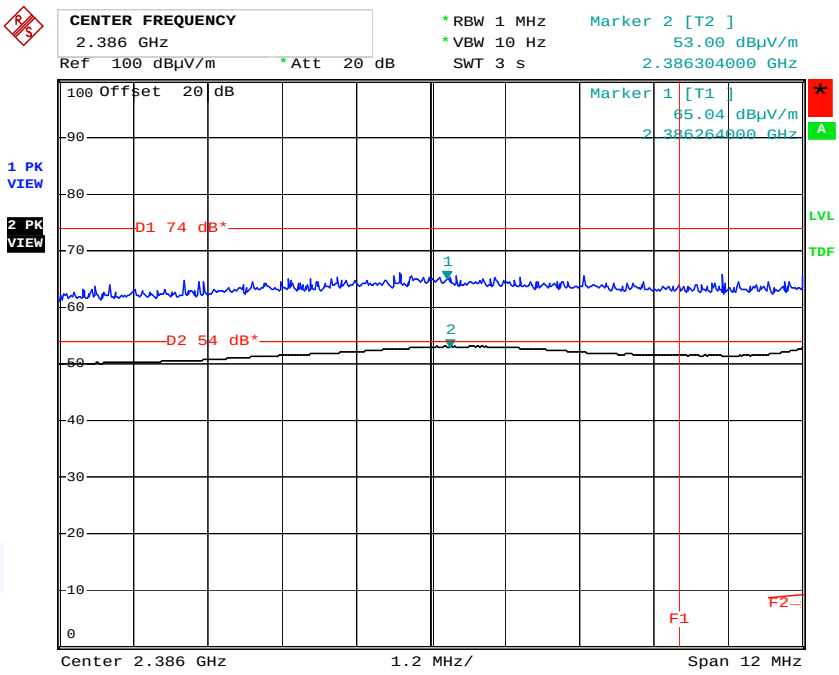
Conducted spurious emissions are not included in this permissive change.

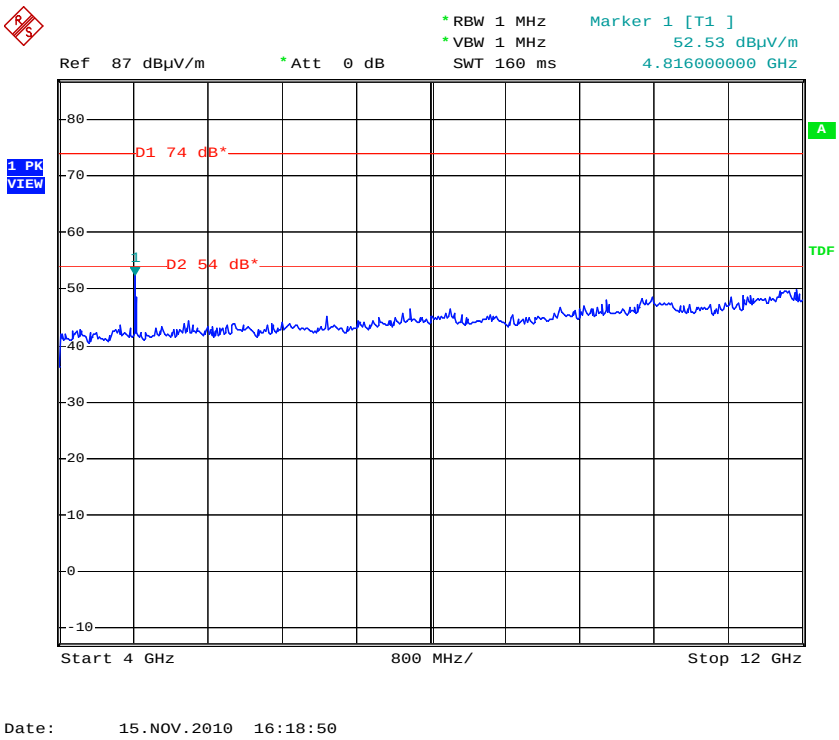
5.7.6 Test protocols

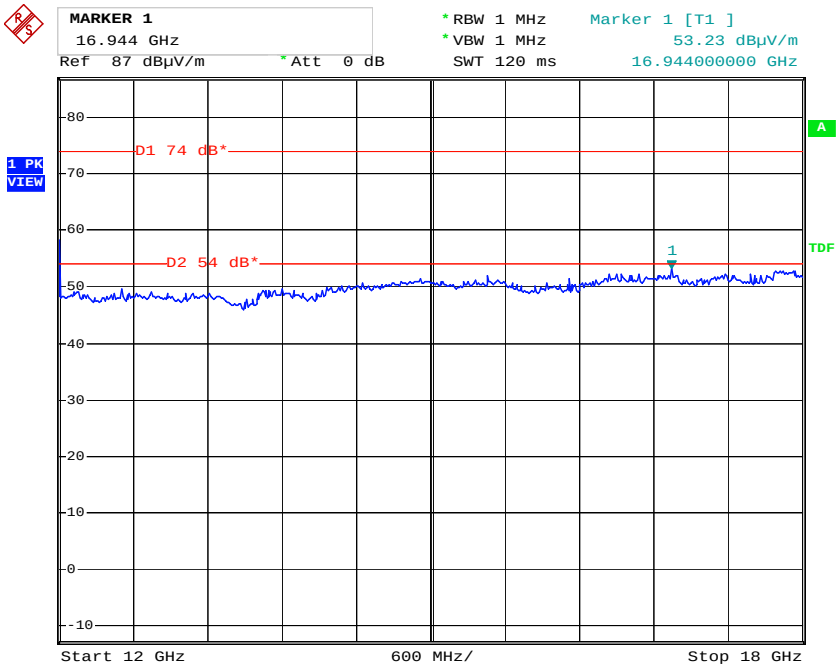
Radiated spurious emissions at lower and upper band edge in restricted bands and harmonics

5.7.6.1 Antenna: Nahfeldkoppler 2.4 GHz

802.11b, Ch 1 (2412 MHz)

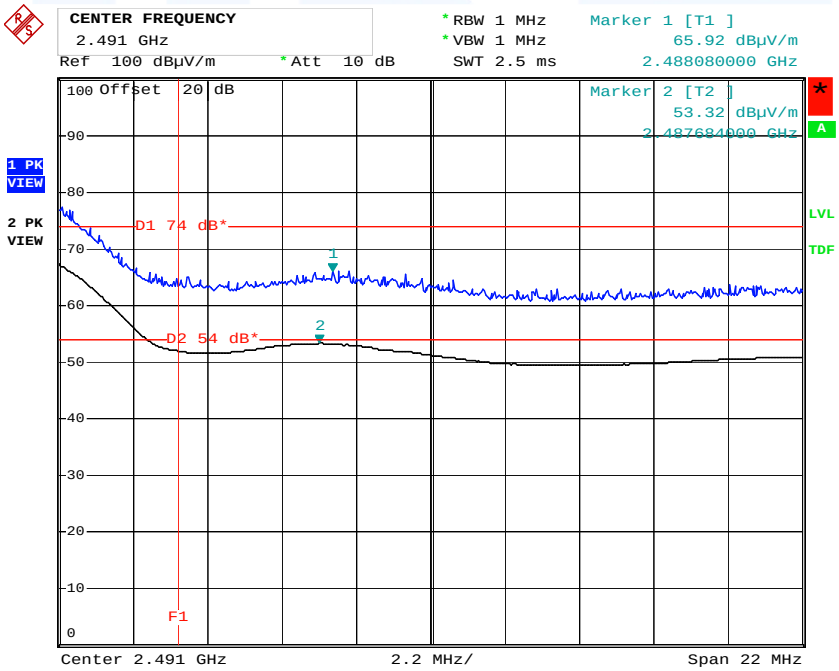






Date: 15.NOV.2010 16:08:23

802.11b, Ch 11 (2462 MHz)



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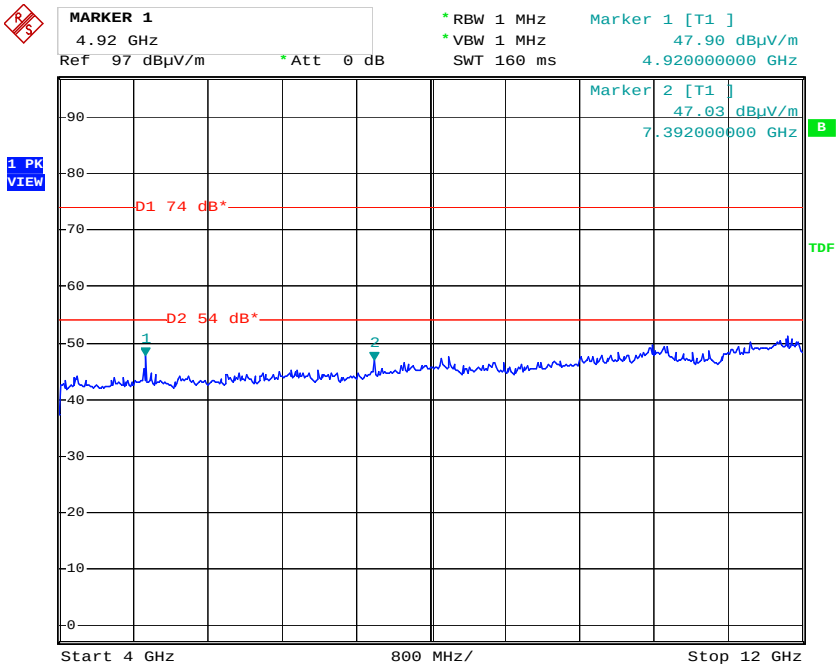

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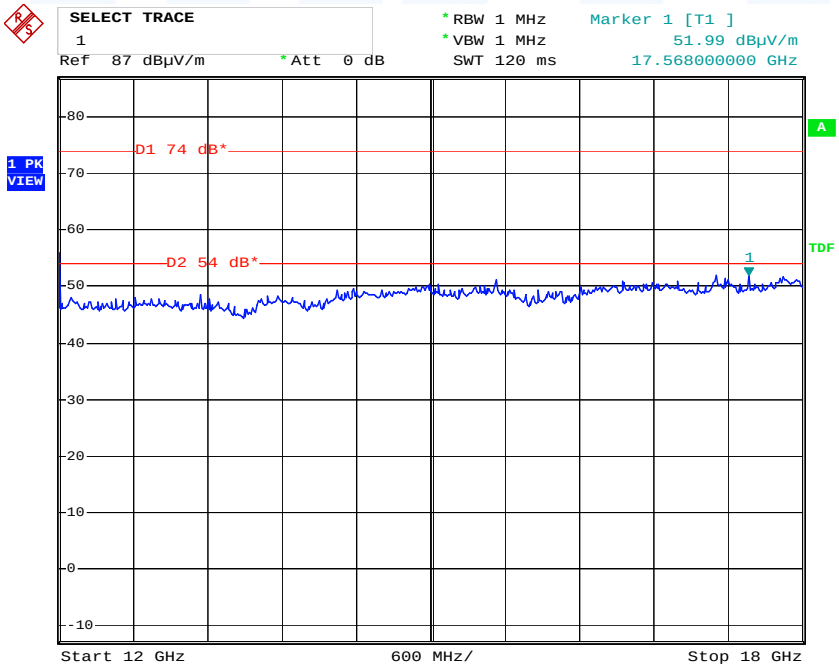
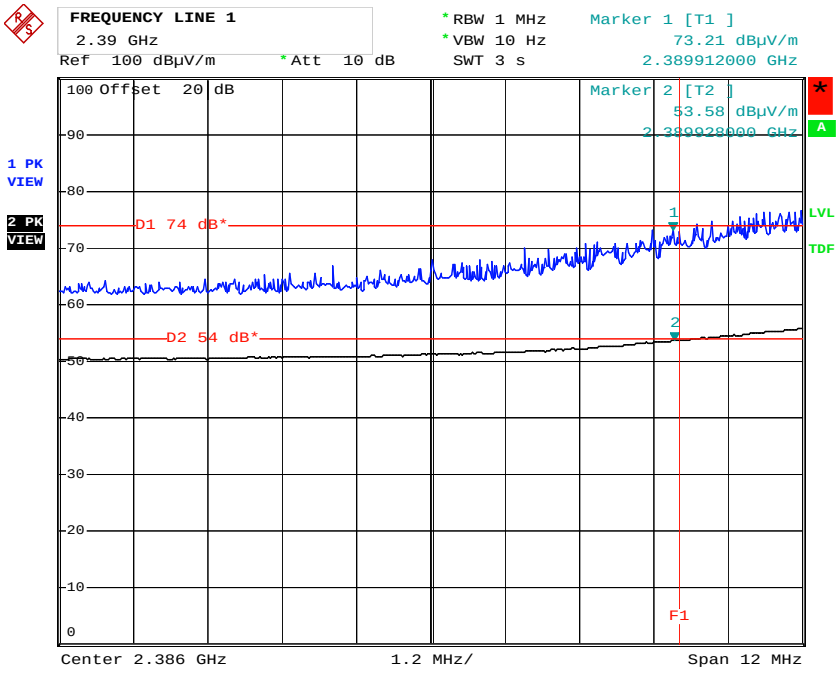


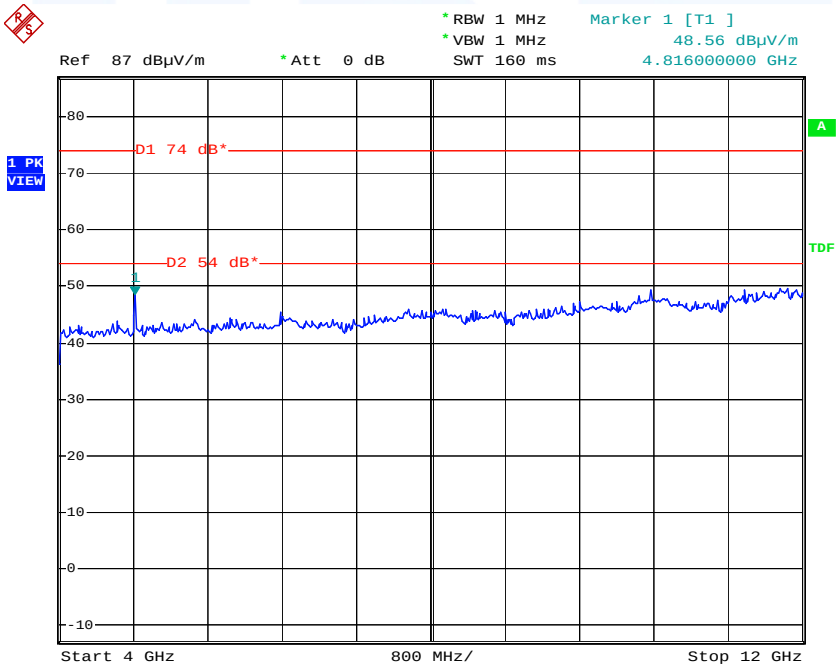
Date: 15.NOV.2010 16:11:06

FCC ID: VEB-NKRDCMA82

802.11g, Ch 1 (2412 MHz)



Date: 16.NOV.2010 11:05:03



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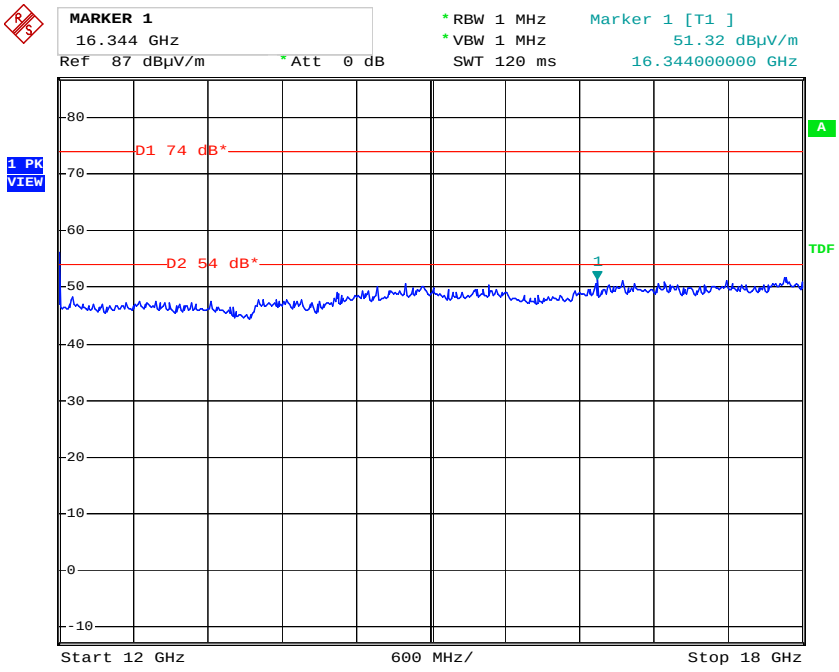
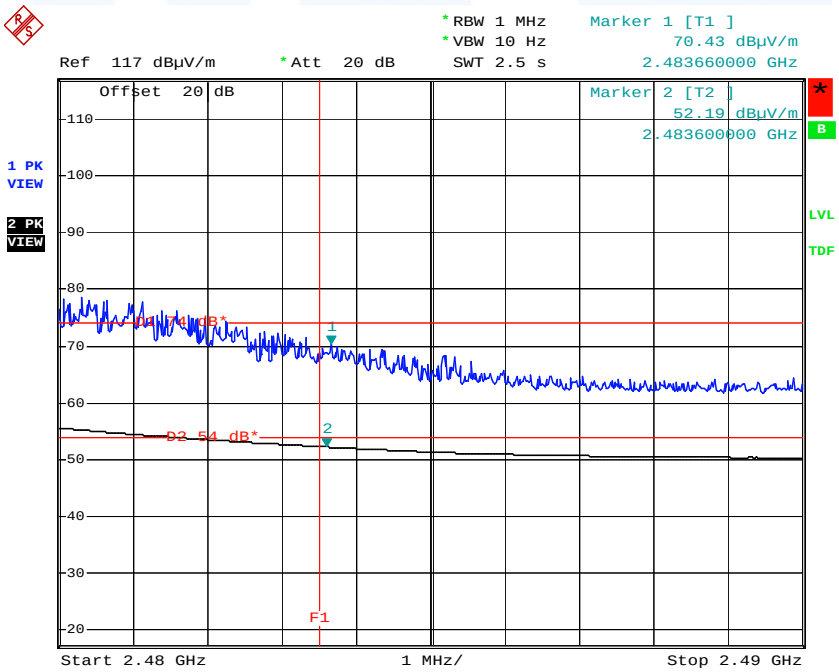
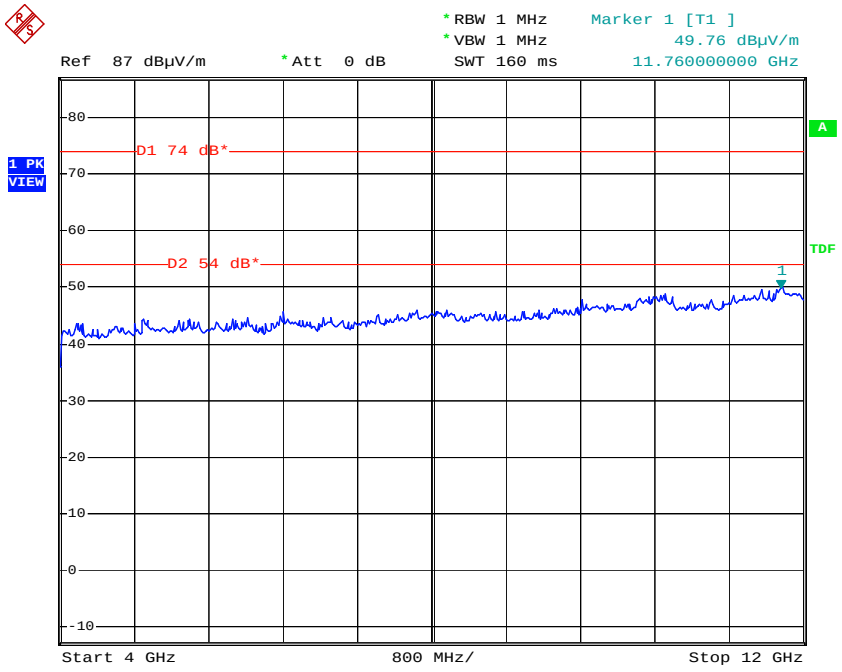


Date: 15.NOV.2010 16:12:18

802.11g, Ch 11 (2462 MHz)



Date: 26.OCT.2010 17:14:52



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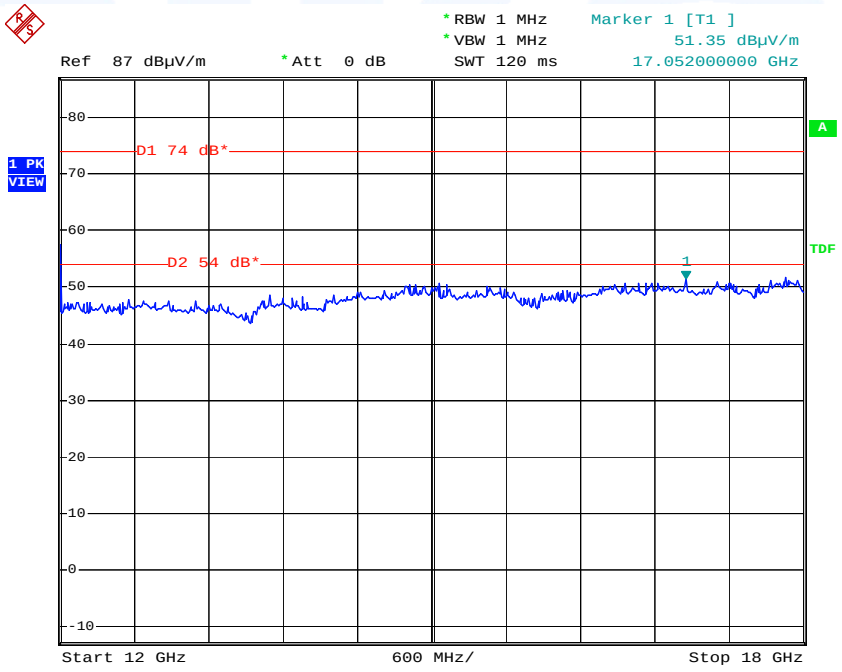
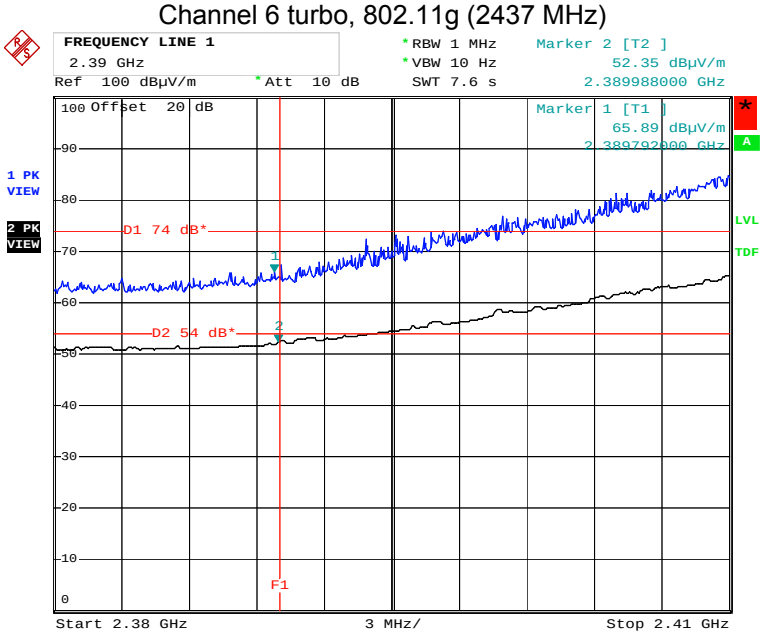


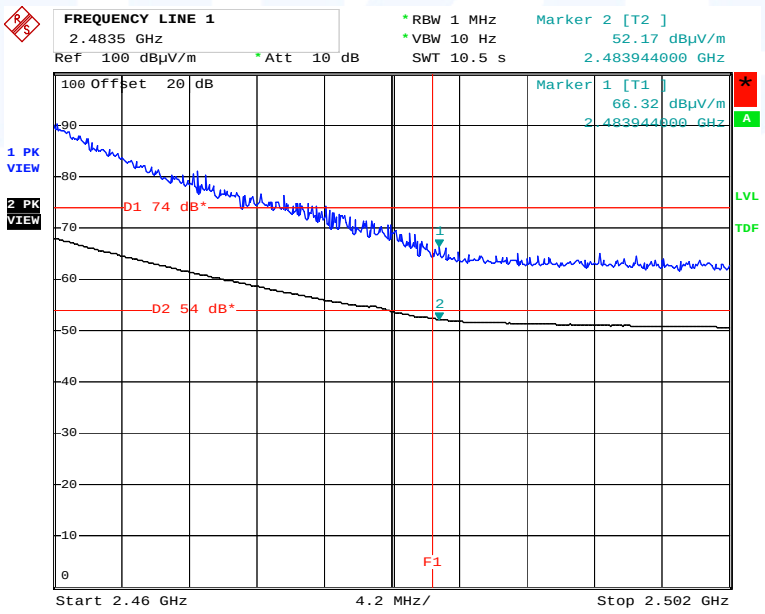
Date: 15.NOV.2010 16:14:24

FCC ID: VEB-NKRDCMA82

Channel 6 turbo, 802.11g (2437 MHz)



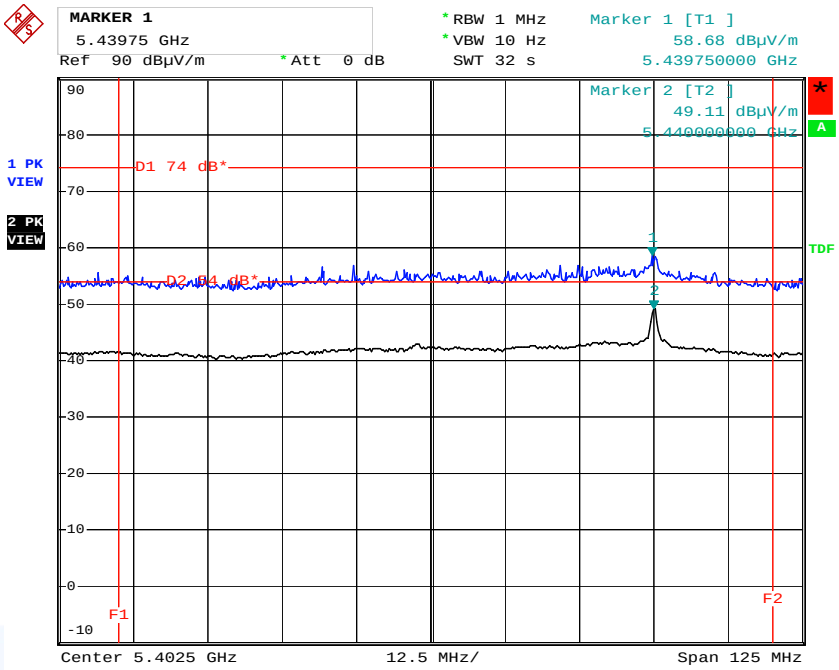
Date: 16.NOV.2010 11:08:55

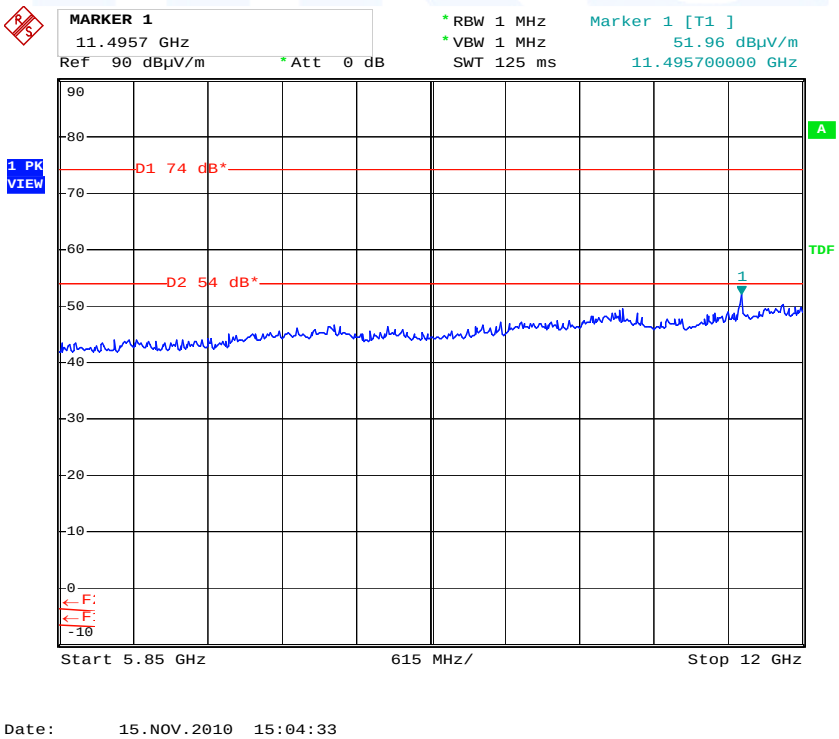


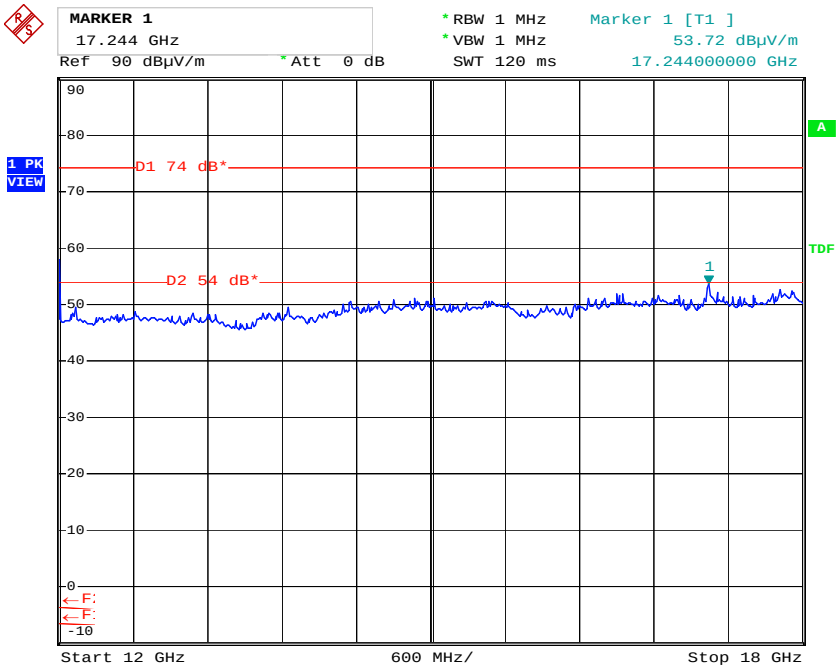
Date: 16.NOV.2010 11:14:02

5.7.6.2 Antenna: Nahfeldkoppler 5 GHz

802.11a, Ch 149 (5745 MHz)

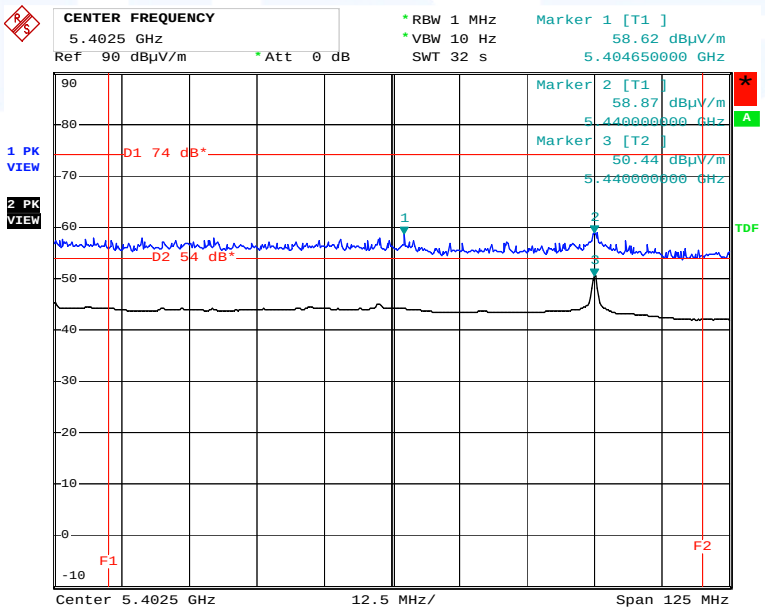






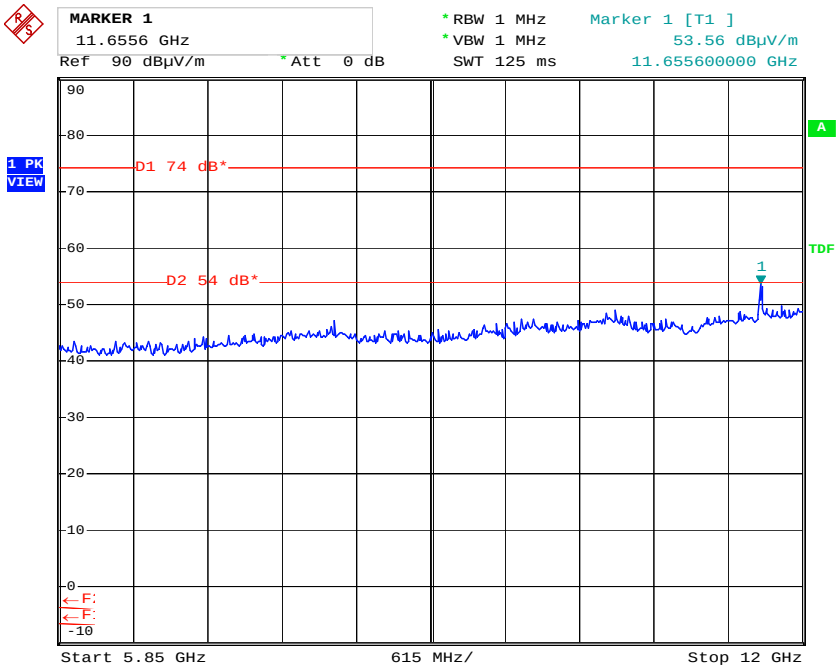
Date: 15.NOV.2010 15:03:01

802.11a, Ch 165 (5825 MHz)

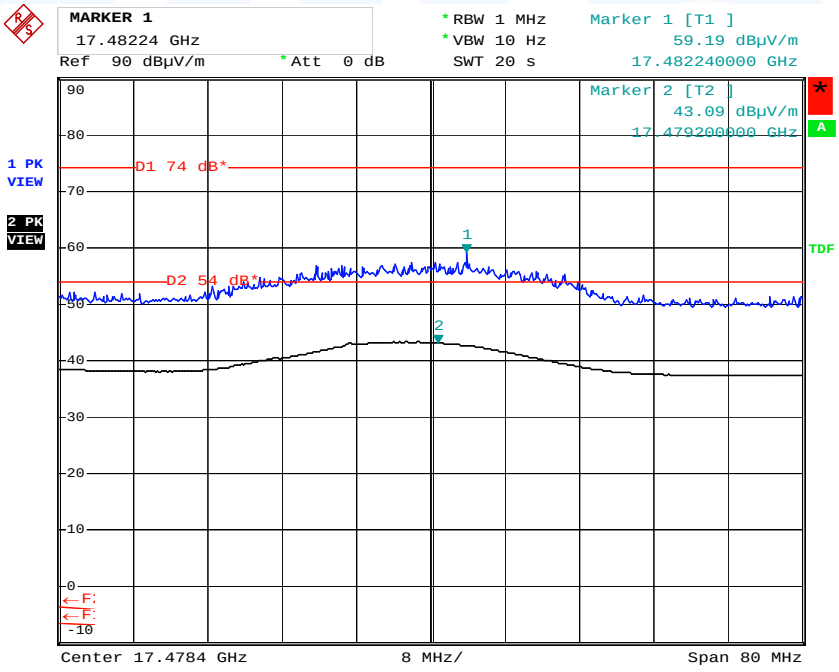


Date: 15.NOV.2010 15:34:36

FCC ID: VEB-NKRDCMA82



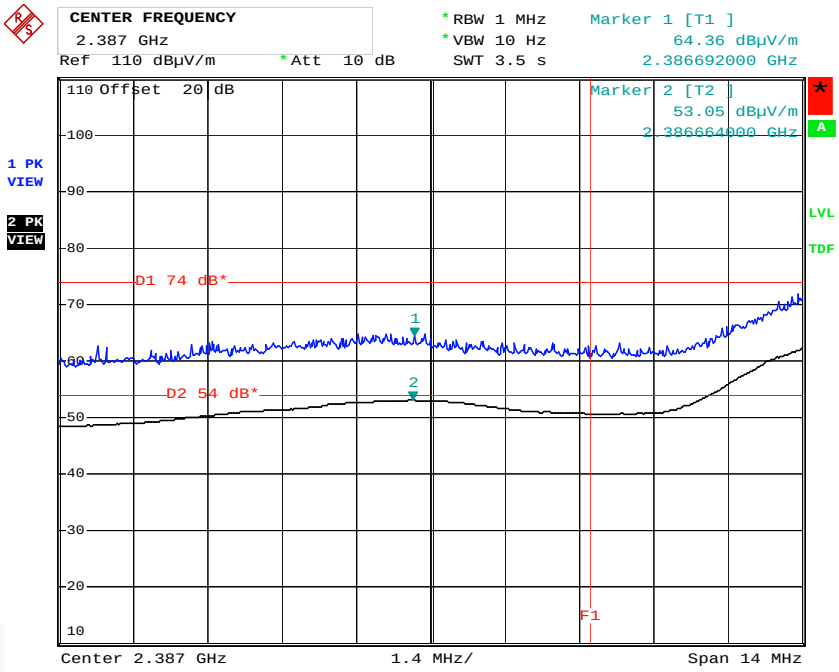
Date: 15.NOV.2010 15:06:01

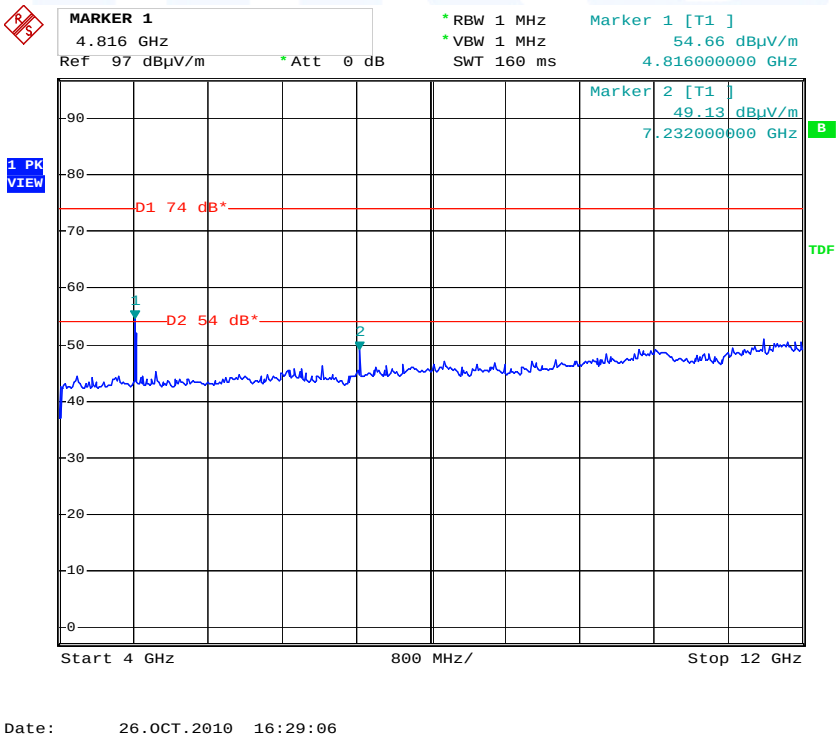


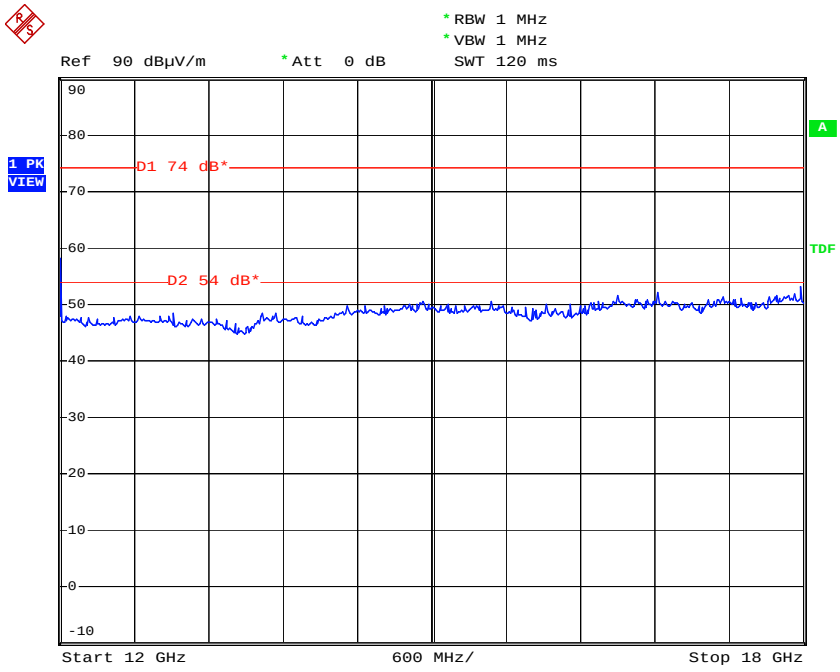
Date: 15.NOV.2010 15:23:30

5.7.6.3 Antenna: TW-145 2.4 GHz

802.11b, Ch 1 (2412 MHz)

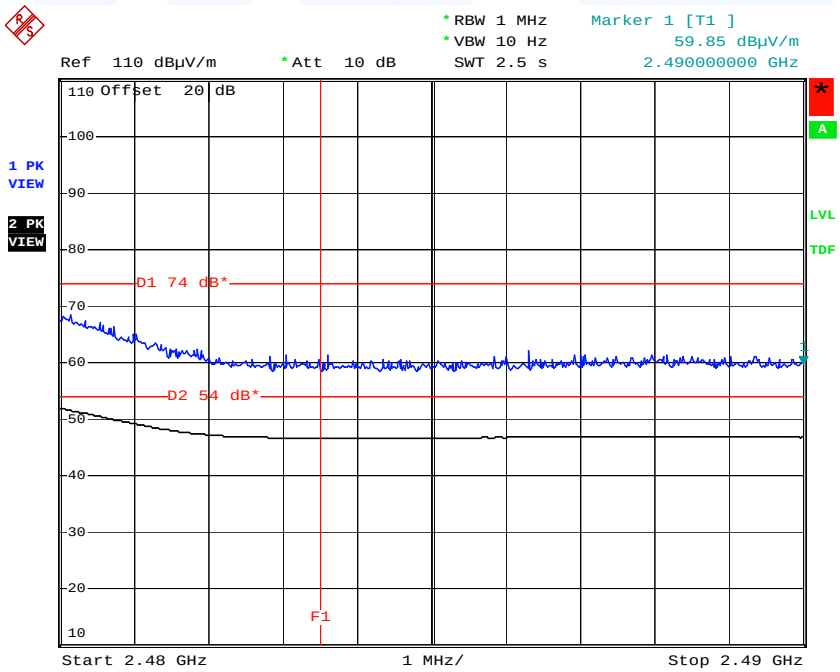




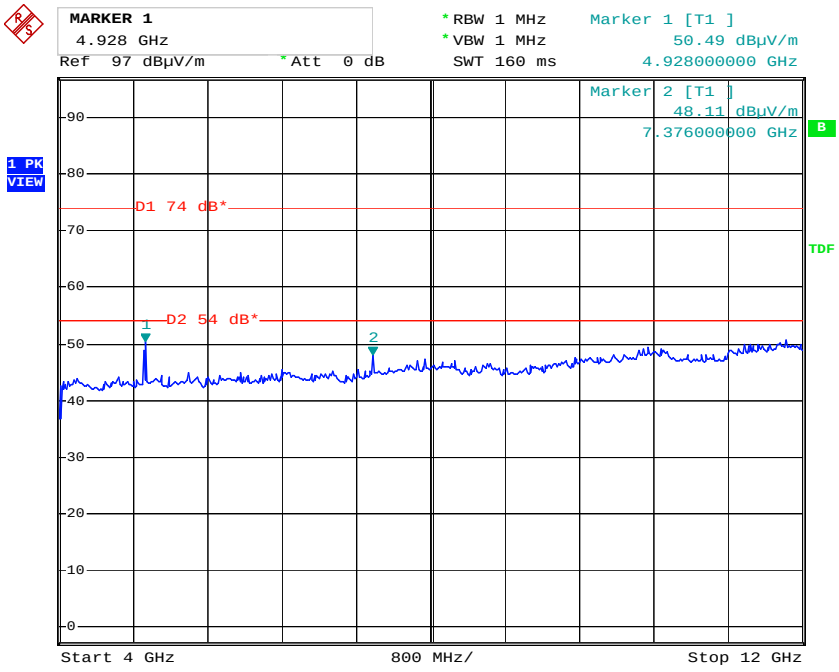


Date: 15.NOV.2010 11:59:40

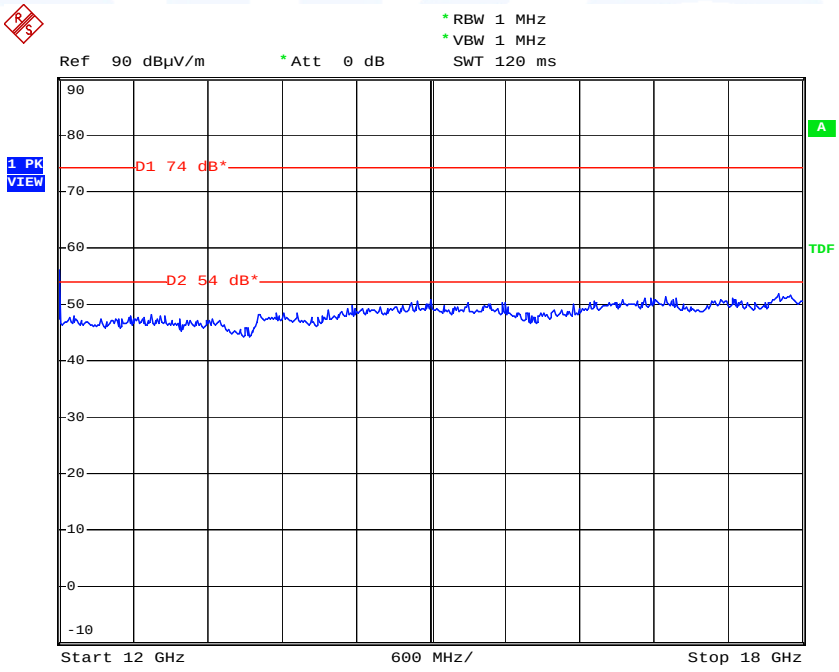
802.11b, Ch 11 (2462 MHz)



Date: 15.NOV.2010 12:55:53



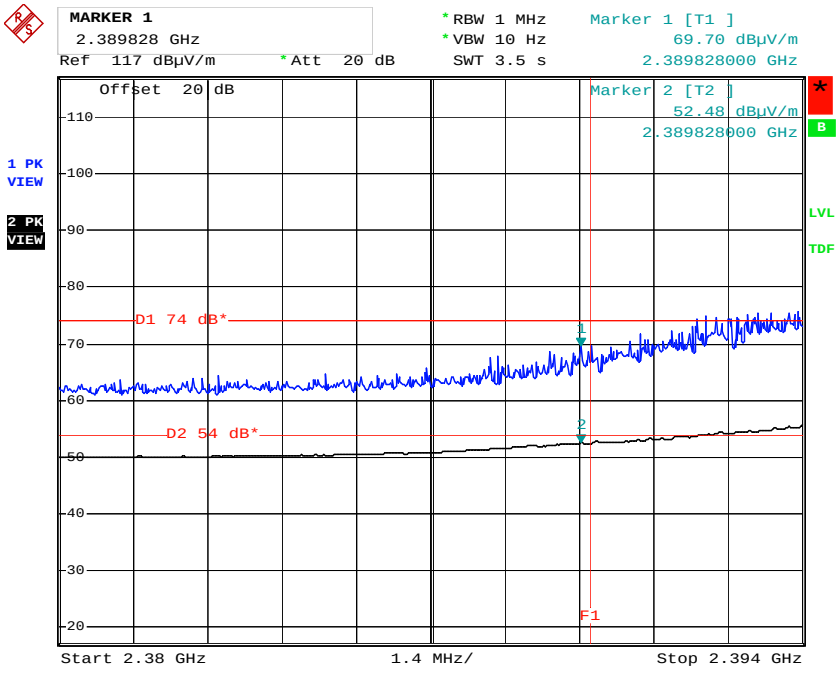
Date: 26.OCT.2010 16:26:13



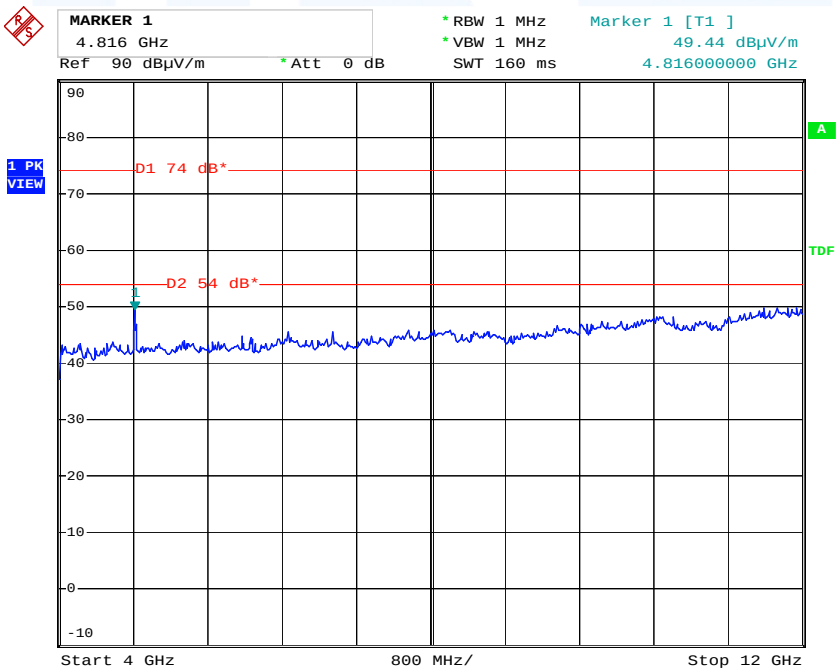
Date: 15.NOV.2010 12:01:46

FCC ID: VEB-NKRDCMA82

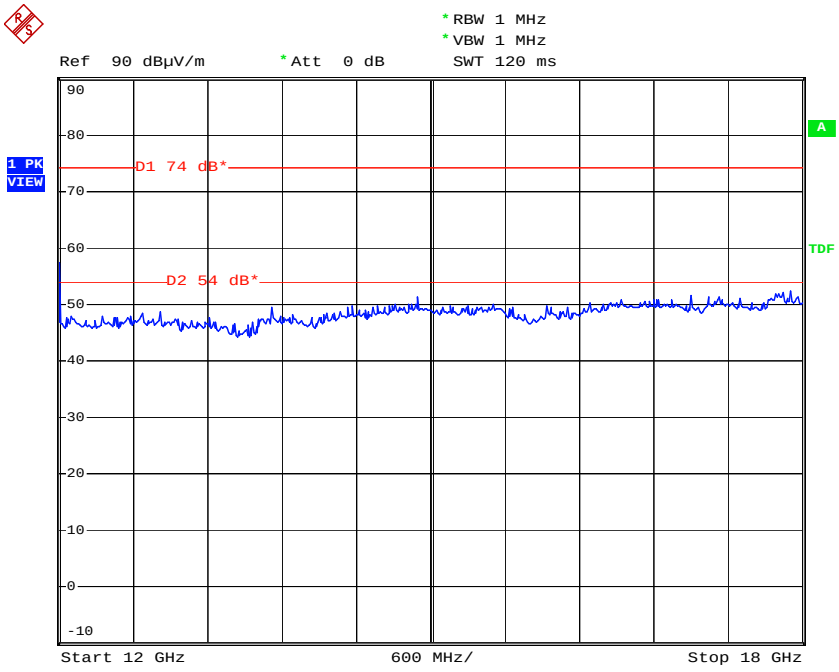
802.11g, Ch 1 (2412 MHz)



Date: 26.OCT.2010 17:25:58

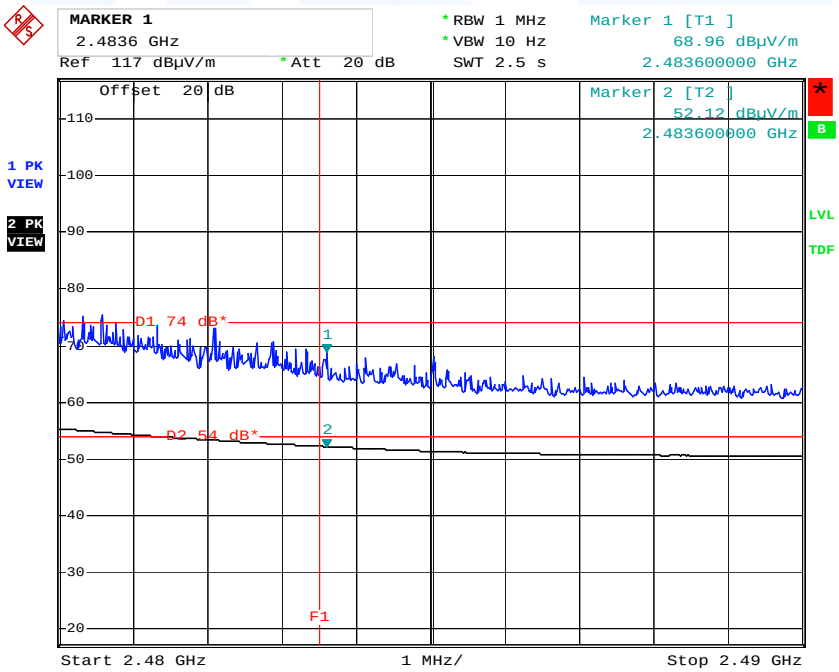


Date: 15.NOV.2010 12:10:18



Date: 15.NOV.2010 12:02:54

802.11g, Ch 11 (2462 MHz)



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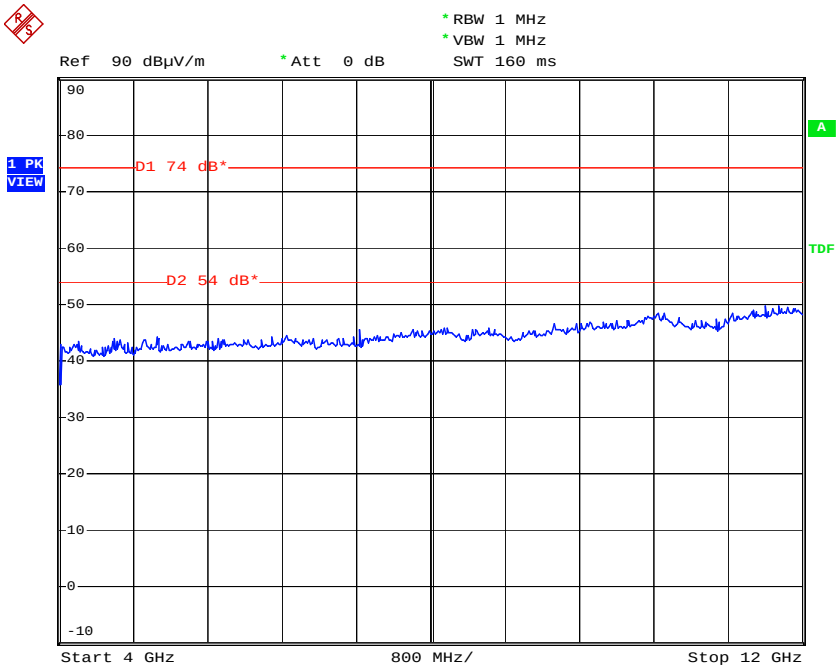

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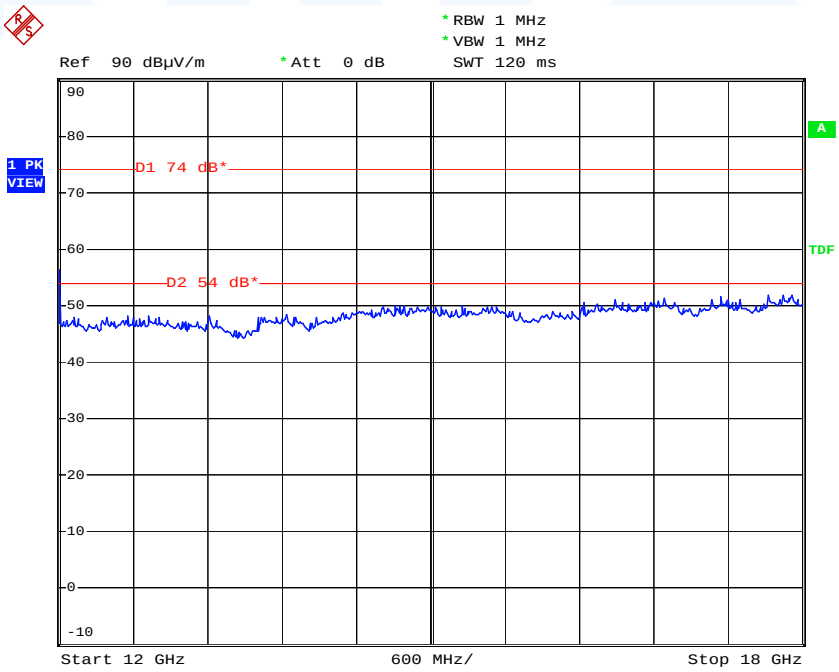
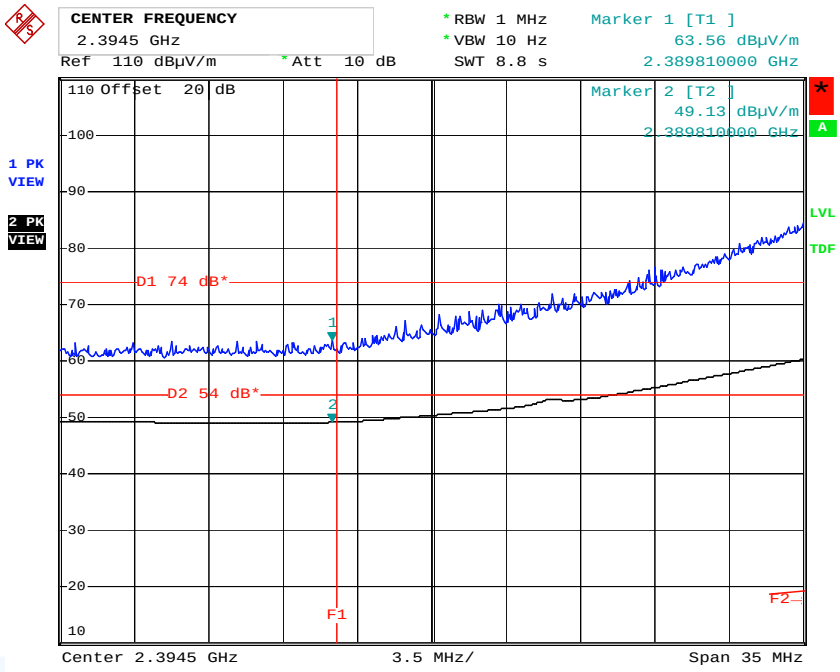


Date: 15.NOV.2010 12:04:28

FCC ID: VEB-NKRDCMA82

Channel 6 turbo, 802.11g (2437 MHz)



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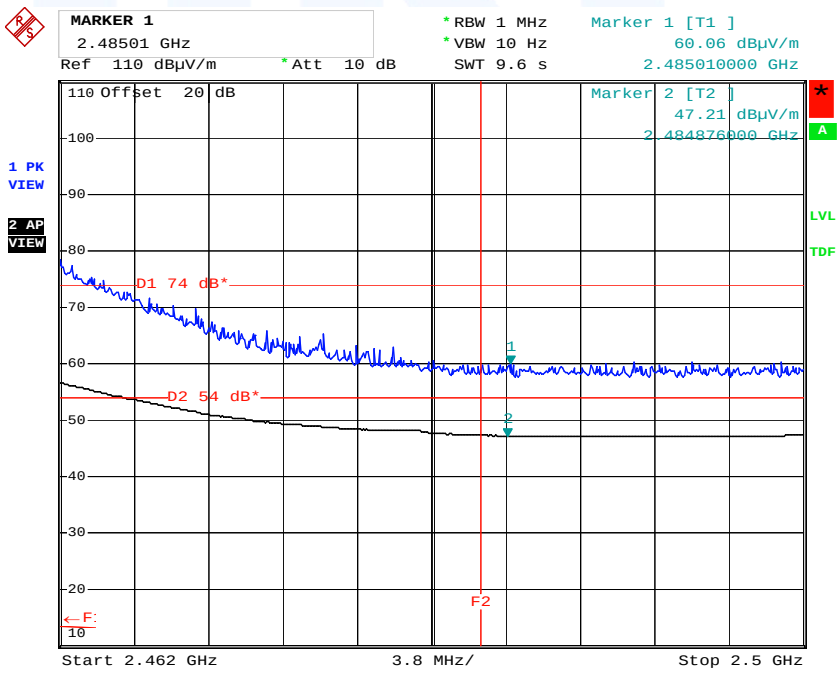

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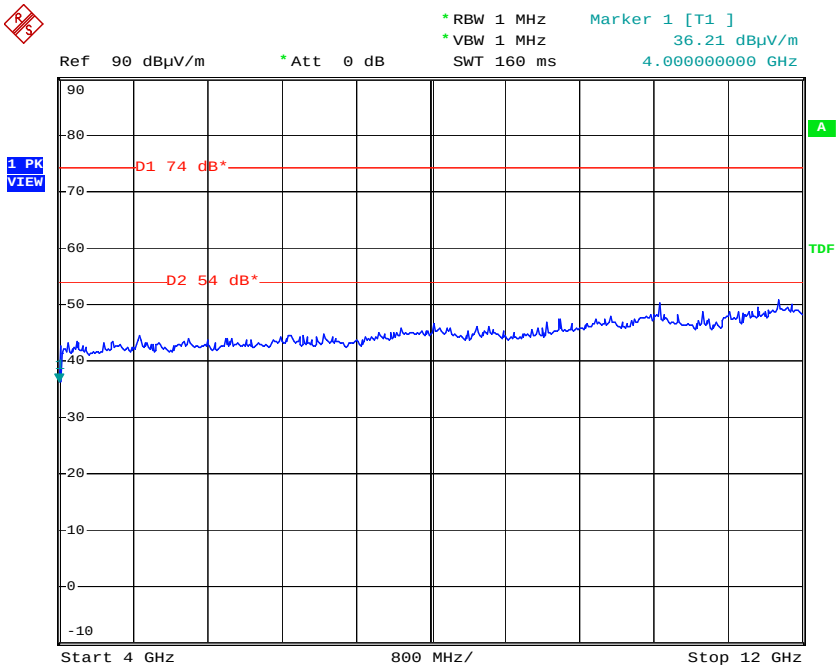
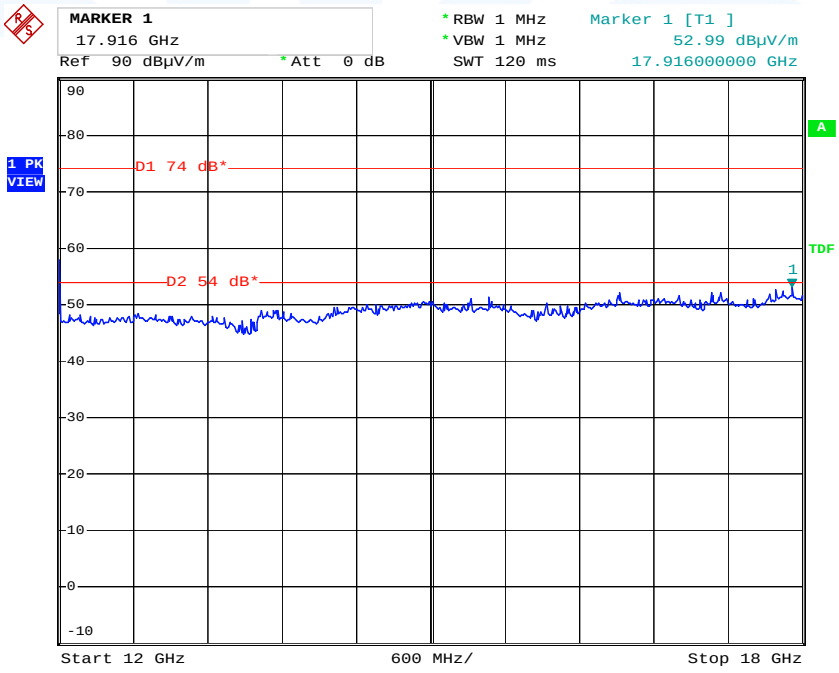
FCC ID: VEB-NKRDCMA82



Date: 15.NOV.2010 14:05:06

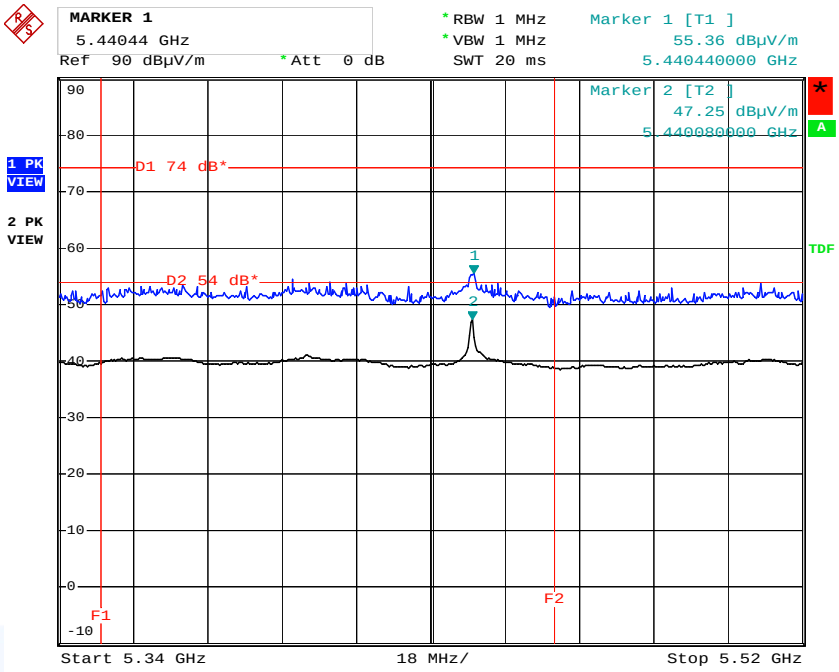


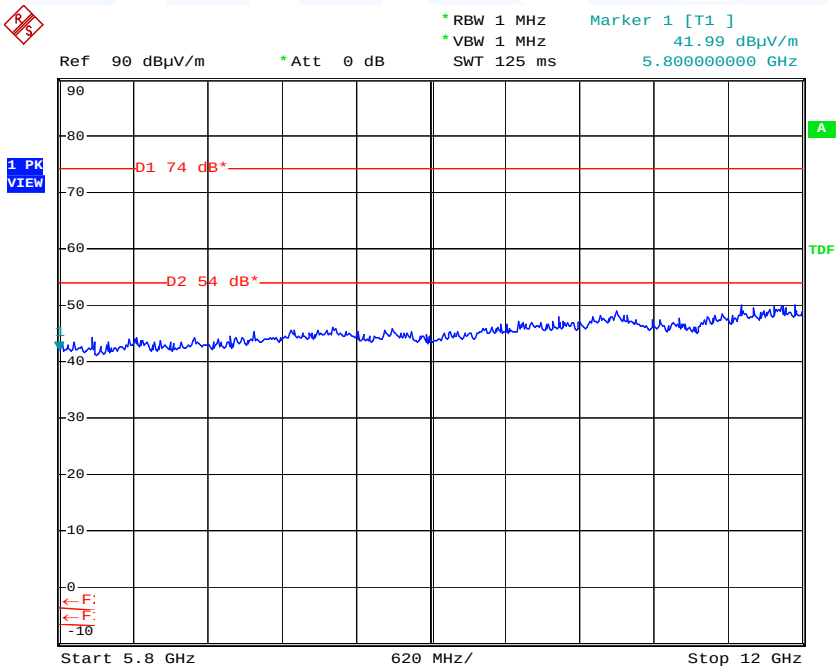
Date: 15.NOV.2010 14:06:33

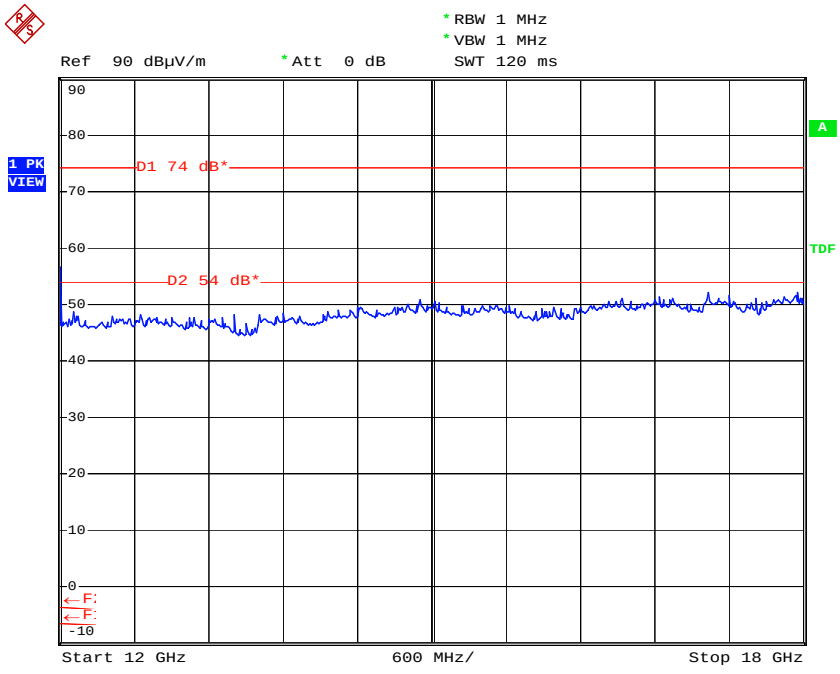
FCC ID: VEB-NKRDCMA82

5.7.6.4 Antenna: TW-145 5 GHz

802.11a, Ch 149 (5745 MHz)

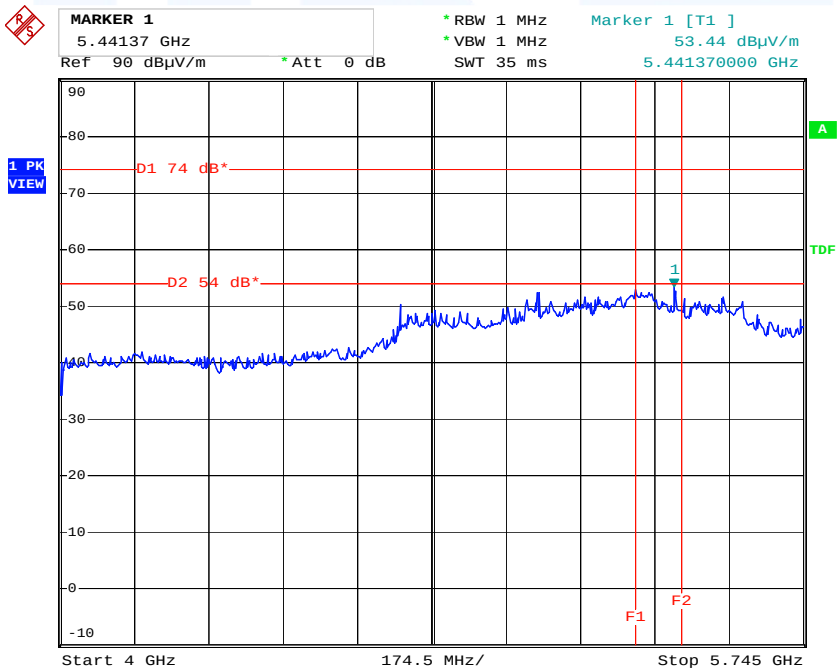






Date: 15.NOV.2010 14:24:24

802.11a, Ch 165 (5825 MHz)



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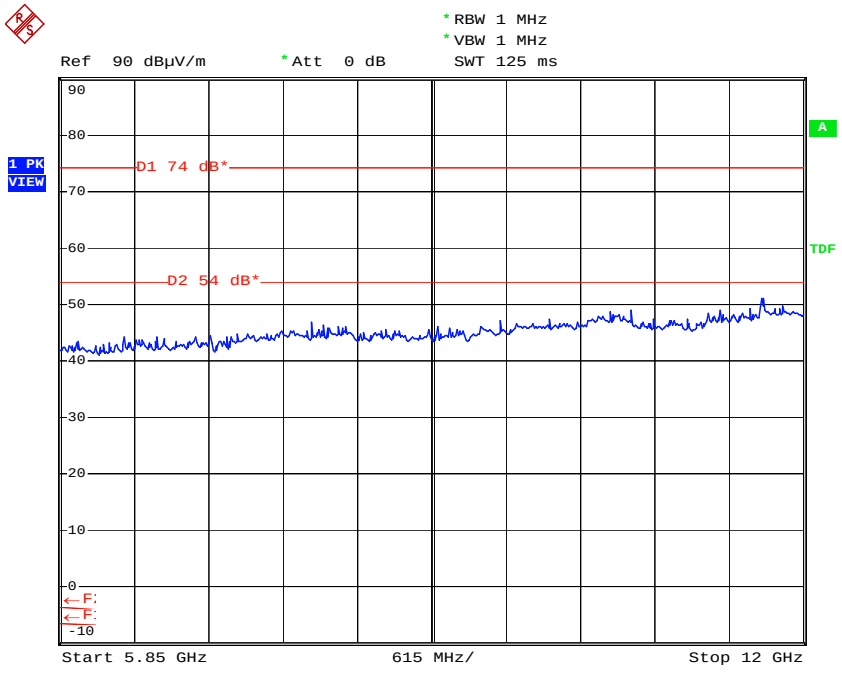

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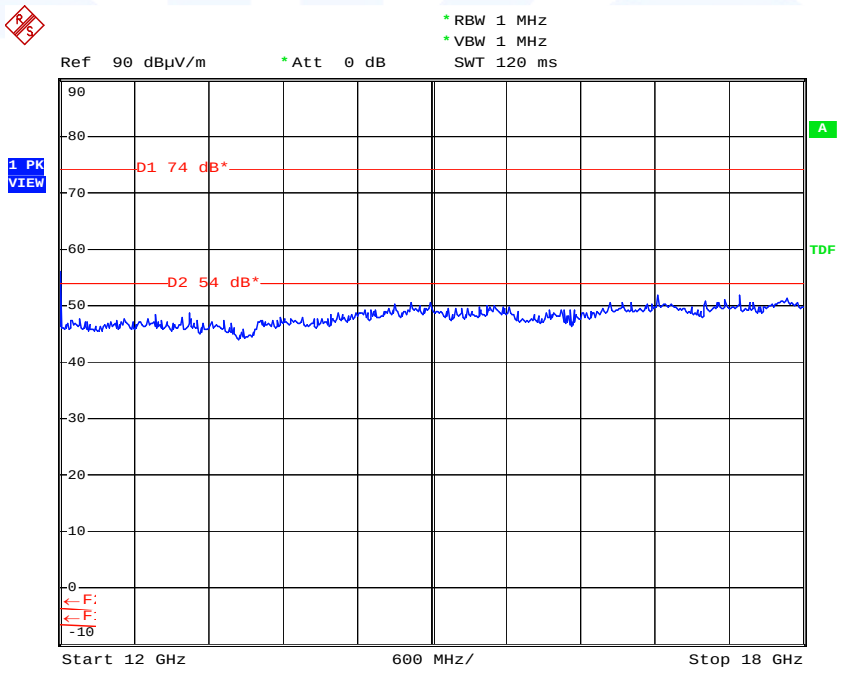
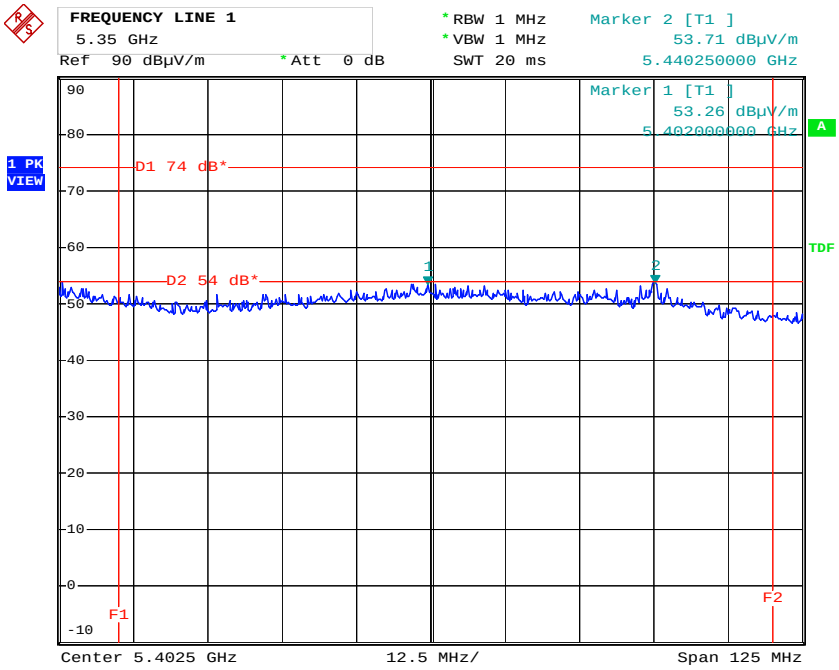


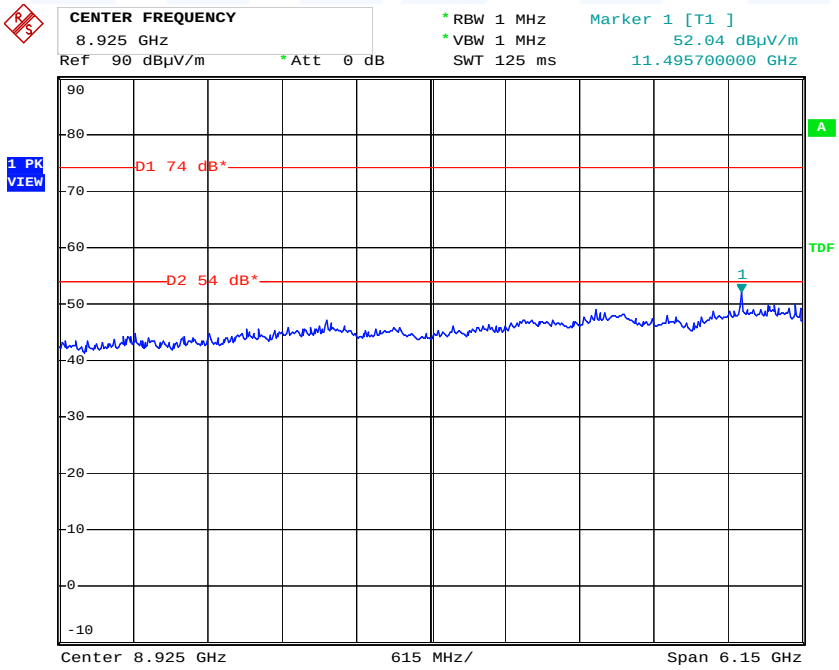
Date: 15.NOV.2010 14:25:17

FCC ID: VEB-NKRDCMA82

5.7.6.5 Antenna: Koppler 5 GHz



Date: 16.NOV.2010 12:08:03



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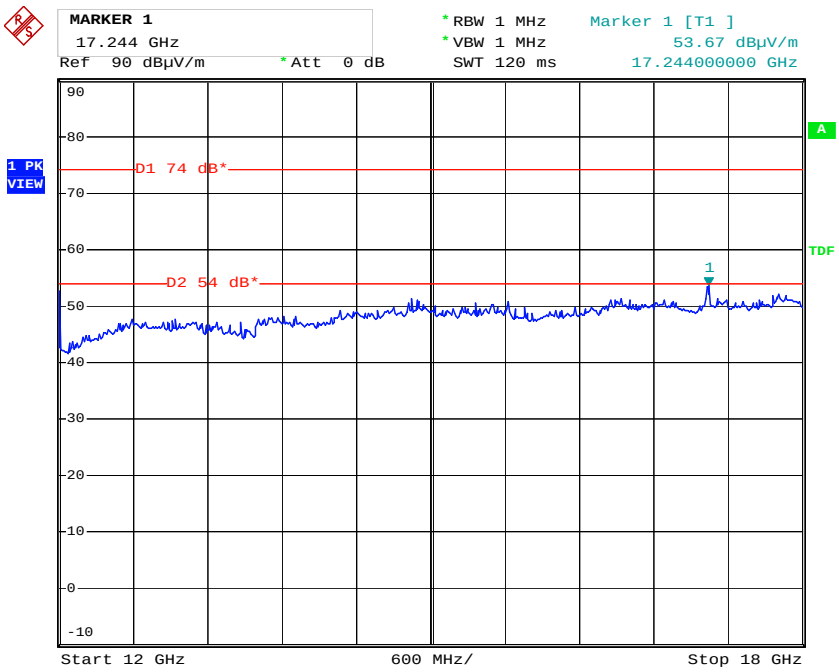
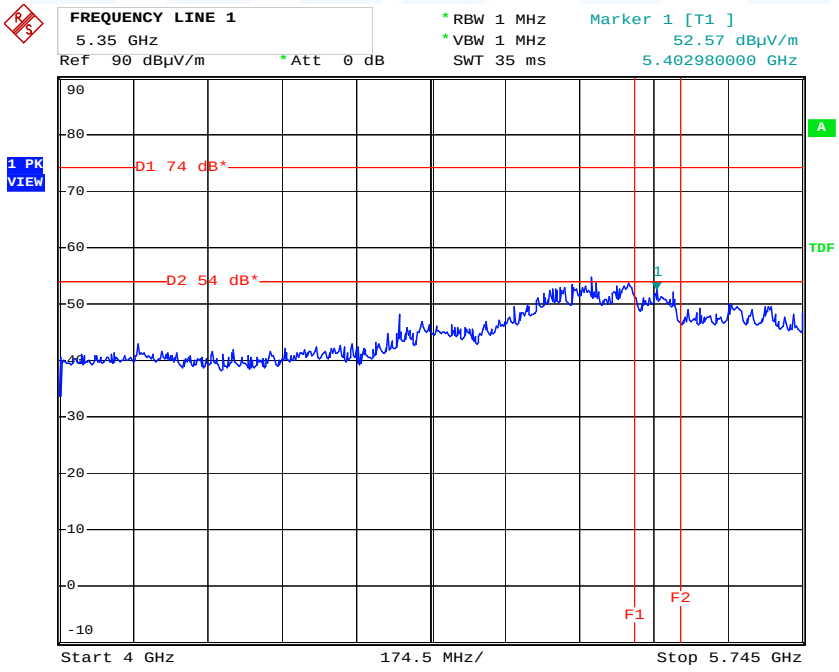
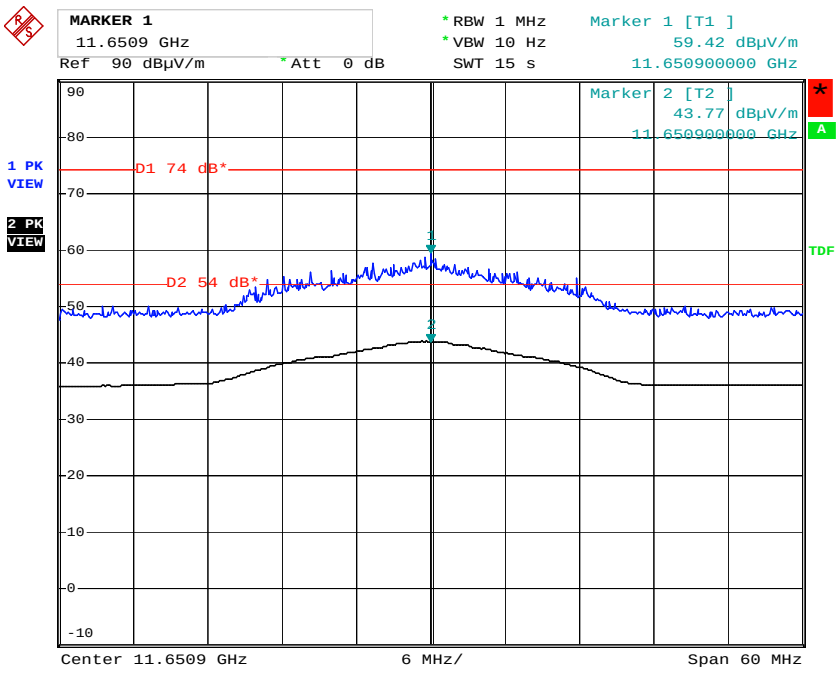


Date: 16.NOV.2010 12:02:03



Date: 16.NOV.2010 12:11:31

FCC ID: VEB-NKRDCMA82



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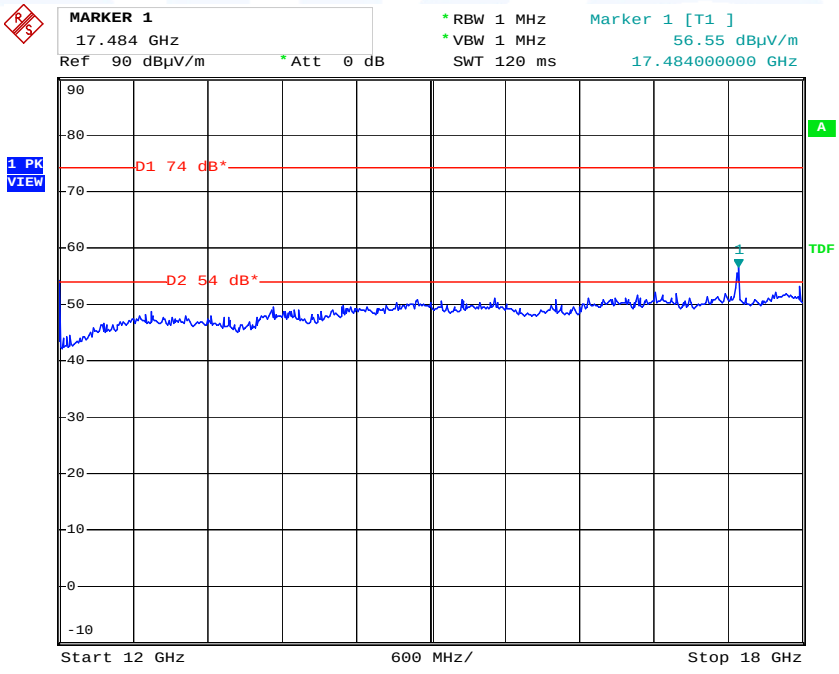

Date: 16.NOV.2010 11:55:02

5.8 Antenna application - Detailed photos see attachment B

5.8.1 Applicable standard

According to FCC Part 15C, Section 15.203:
An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit that broken antennas can be replaced by the user, but the use of a standard antenna jack is prohibited.

The EuT has a reverse SMA plug to connect the defined antennas supplied by the manufacturer.
All supplied antennas meet the requirements of part 15.203 and 15.204.

5.8.2 Antenna requirements

According to FCC Part 15C, Section 15.247(b)(4):
The conducted output power limit specified in paragraph (b) of 15.247 is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from intentional radiator shall be reduced below the stated values in paragraph (b)(1), (b)(2) and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

The necessary output power reduction depends on the used antenna type. The value of output power is controlled by firmware of the EuT and will be automatically set by selecting the antenna.

6 USED TEST EQUIPMENT AND ACCESSORIES

All test instruments used are calibrated and verified regularly. The calibration history is available on request.

Test ID	Model Type	Equipment No.	Next Calib.	Last Calib.	Next Verif.	Last Verif.
A 4	ESHS 30	02-02/03-05-002	18/06/2011	18/06/2010		
	ESH 2 - Z 5	02-02/20-05-004	13/03/2011	13/03/2008	22/06/2011	22/12/2010
	N-4000-BNC	02-02/50-05-138				
	N-1500-N	02-02/50-05-140				
	ESH 3 - Z 2	02-02/50-05-155			07/04/2011	07/10/2010
CPC 3	FSP 30	02-02/11-05-001	04/05/2011	04/05/2010		
	HM8143	02-02/50-10-016				
MB	FSP 30	02-02/11-05-001	04/05/2011	04/05/2010		
	HM8143	02-02/50-10-016				
SER 3	FSP 30	02-02/11-05-001	04/05/2011	04/05/2010		
	AFS4-01000400-10-10P-4	02-02/17-05-003				
	AMF-4F-04001200-15-10P	02-02/17-05-004				
	AFS5-12001800-18-10P-6	02-02/17-06-002				
	BBHA 9120 E 251	02-02/24-05-006			13/06/2011	13/12/2010
	WBH2-18HN	02-02/24-05-007				
	WLJS 1200-3EF	02-02/50-05-041				
	Sucoflex N-2000-SMA	02-02/50-05-075				
	WHK 3.0/18G-10EF	02-02/50-05-180				
	Multiflex 141-SMA-N-1500	02-02/50-09-015				
	Multiflex 141-SMA-N-1500	02-02/50-09-016				