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Test Report: 106528-1TRFWL

Applicant: VTech Technologies Canada Ltd.
12111 Jacobson Way
Richmond, B.C.
V6W 1L5

Apparatus: Wireless Internet Radio

FCC ID: EW780-6569-00

In Accordance With: FCC Part 15 Subpart C, §15.247
FHSS System and Digitally Modulated Radiators
902-928MHz, 2400 - 2483.5 MHz, 5725-5850MHz

Tested By: Nemko Canada Inc.
303 River Road
Ottawa, Ontario
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Authorized By:

A handwritten signature in blue ink, appearing to read 'Jason Nixon', with a stylized flourish at the end.

Jason Nixon, Wireless/Telecom Specialist

Date: July 2, 2008

Total Number of Pages: 39

Report Summary

These tests were conducted on a sample of the equipment for the purpose of demonstrating compliance with Part 15; Subpart C. Radiated tests were conducted in accordance with ANSI C63.4-2003.

The assessment summary is as follows:

Apparatus Assessed:	Wireless Internet Radio
Specification:	FCC Part 15 Subpart C, §15.247
Compliance Status:	Complies
Exclusions:	None
Non-compliances:	None
Report Release History:	Original Release

Author: Andrey Adelberg EMC/Wireless Specialist

Note that the results contained in this report relate only to the items tested and were obtained in the period between the date of initial receipt of samples and the date of issue of the report.

This test report has been completed in accordance with the requirements of ISO/IEC 17025.

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Section 1 : Equipment Under Test

1.1 Product Identification

The Equipment Under Test was identified as follows:

Product Category: Wireless Internet Radio
PIMA (Personal Information & Music Assistant)
Model Number: IS 9181

1.2 Samples Submitted for Assessment

The following samples of the apparatus have been submitted for type assessment:

Sample No.	Description	Serial No.
1	Internet Radio – Conducted Unit	LPA6
2	Internet Radio – Radiated Unit	N/A
3	Internet Radio – Digital Emissions	LPA10
4	Switching Mode Power Supply	GPE302-120200-1

The first samples were received on: May 1, 2008

1.3 Theory of Operation

The EUT operates in the 2.4 GHz frequency range, lets you connect IEEE 802.11b/g devices to the network with high-speed data transmissions of up to 11/54 Mbps. The product supports FM receiver as a secondary audio source.

1.4 Technical Specifications of the EUT

Operating Frequency band: 2412 – 2462 MHz

Number of Channels:

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

Channel Spacing: 5 MHz

Peak Output Power:	<u>802.11 b:</u>	<u>802.11 g (OFDM):</u>
	Conducted: 14.83 dBm	Conducted: 11.15 dBm
	EIRP: 20.83 dBm	EIRP: 17.15 dBm

Emission Designator: W7D

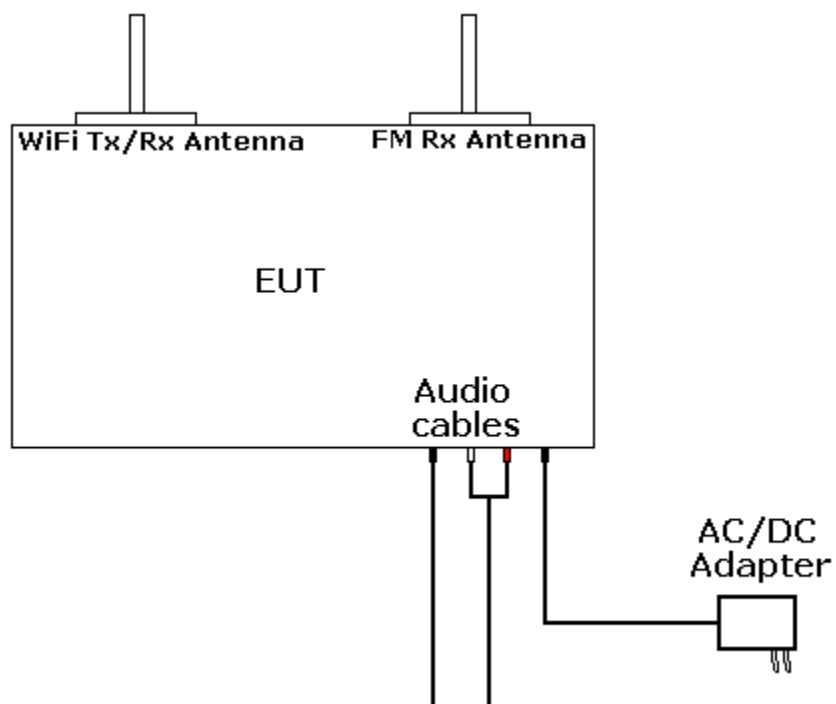
Rated Power: 15 dBm $\pm$ 1.5 dB

Modulation:	<u>802.11 b:</u>	<u>802.11 g (OFDM):</u>
	1 Mbps - BPSK	6 Mbps - BPSK
	2 Mbps - QPSK	9 Mbps - BPSK
	5.5 Mbps - CCK	12 Mbps - QPSK
	11 Mbps - CCK	18 Mbps - QPSK
		24 Mbps - QAM
	36 Mbps - QAM	
	48 Mbps - QAM	
	54 Mbps - QAM	

Antenna Data: Integrated monopole antennas with semi cylindrical ground reflectors to achieve peak gains of up to 6 dBi.

Power Source: The 12VDC is obtained using a 110VAC to 12VDC switching adapter

1.5 Block Diagram of the EUT



Section 2 : Test Conditions

2.1 Specifications

The apparatus was assessed against the following specifications:

FCC Part 15 Subpart C, 15.247

FHSS System and Digitally Modulated Radiators

902-928MHz, 2400 - 2483.5 MHz, 5725-5850MHz

2.2 Deviations From Laboratory Test Procedures

No deviations were made from laboratory test procedures.

2.3 Test Environment

All tests were performed under the following environmental conditions:

Temperature range	:	15 – 30 °C
Humidity range	:	20 - 75 %
Pressure range	:	86 - 106 kPa
Power supply range	:	+/- 5% of rated voltages

2.4 Test Equipment

Equipment	Manufacturer	Model No.	Asset/Serial No.	Next Cal.
Electro-Magnetic Interference Test Chamber	TDK	SAC-3	FA002047	May 19/08
Bilog	Sunol	JB3	FA002108	Jan. 21/09
Flush Mount Turntable	Sunol	FM2022	FA002082	NCR
Controller	Sunol	SC104V	FA002060	NCR
Mast	Sunol	TLT2	FA002061	NCR
Receiver/Spectrum Analyzer	Rohde & Schwarz	ESU 26	FA002043	Dec. 07/08
50 Coax cable	HUBER + SUHNER	None	FA002022	Sept. 19/08
50 Coax cable	HUBER + SUHNER	None	FA002015	Sept. 19/08
Horn Antenna #2	EMCO	3115	FA000825	Jan. 15/09
Spectrum Analyzer	Rohde & Schwarz	FSU	FA001877	Jan 23/09
1.0 – 2.0 GHz Amplifier	JCA	12-400	FA001498	Aug. 21/08
2.0 – 4.0 GHz Amplifier	JCA	24-600	FA001496	Aug. 21/08
4.0 – 8.0 GHz Amplifier	JCA	48-600	FA001497	Aug. 21/08
5.0 – 18.0 GHz Amplifier	NARDA	DWT-186N23U40	FA001409	COU
18.0 – 26.0 GHz Amplifier	NARDA	BBS-1826N612	FA001550	COU
Horn 18 – 26.5 GHz	Electro-Metrics	SH-50/60-1	FA000479	VOU
1 – 18 GHz Amplifier	JCA	JCA118-503	FA002091	Oct 2/08

COU – Calibrate on Use, VOU – Verify On Use

NCR – No Calibration Required

2.5 Measurement Uncertainty

Nemko Canada measurement uncertainty has been calculated using guidance of UKAS LAB 34:2003 and TIA-603-B Nov 7, 2002. All calculations have been performed to provide a confidence level of 95% and can be found in Nemko Canada document MU-003.

Section 3 : Observations

3.1 Modifications Performed During Assessment

No modifications were performed during assessment.

3.2 Record Of Technical Judgements

No technical judgements were made during the assessment.

3.3 EUT Parameters Affecting Compliance

The user of the apparatus could not alter parameters that would affect compliance.

3.4 Test Deleted

No Tests were deleted from this assessment.

3.5 Additional Observations

There were no additional observations made during this assessment.

Section 4 : Results Summary

This section contains the following:

FCC Part 15 Subpart C : Test Results

The column headed 'Required' indicates whether the associated clauses were invoked for the apparatus under test. The following abbreviations are used:

N No : not applicable / not relevant.

Y Yes : Mandatory i.e. the apparatus shall conform to these tests.

N/T Not Tested, mandatory but not assessed. (See section 3.4 Test deleted)

The results contained in this section are representative of the operation of the apparatus as originally submitted.

4.1 FCC Part 15 Subpart C : Test Results

Part 15	Test Description	Required	Result
§15.31(e)	Variation of power supply	Y	PASS
§15.207(a)	Powerline Conducted Emissions	Y	PASS
§15.209(a)	Radiated Emissions within Restricted Bands	Y	PASS
§15.247(a)(1)	Frequency hopping systems	N	---
§15.247(a)(1)(i)	Frequency hopping systems operating in the 902-928 MHz band	N	---
§15.247(a)(1)(ii)	Frequency hopping systems operating in the 5725-5850 MHz band	N	---
§15.247(a)(1)(iii)	Frequency hopping systems operating in the 2400-2483.5 MHz band	N	---
§15.247(a)(2)	Minimum 6 dB Bandwidth	Y	PASS
§15.247(b)(1)	Maximum peak output power of Frequency hopping systems operating in the 2400-2483.5 MHz band and 5725-5850 MHz band	N	---
§15.247(b)(2)	Maximum peak output power of Frequency hopping systems operating in the 902-928 MHz band	N	---
§15.247(b)(3)	Maximum peak output power of systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands	Y	PASS
§15.247(b)(4)	Maximum peak output power	Y	PASS
§15.247(c)(1)	Fixed point-to-point Operation with directional antenna gains greater than 6 dBi	N	---
§15.247(c)(2)	Transmitters operating in the 2400-2483.5 MHz band that emit multiple directional beams	N	---
§15.247(d)	Conducted Spurious Emissions	Y	PASS
§15.247(e)	Power Spectral Density for Digitally Modulated Devices	Y	PASS
§15.247(f)	Time of Occupancy for Hybrid Systems	N	---

Appendix A : Test Results

Clause 15.207(a) Powerline Conducted Emissions

§15.207 Conducted limits.

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, as measured using a 50 μ H/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the boundary between the frequency ranges.

Frequency of Emission (MHz)	Conducted limit (dB μ V)	
	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.

Test Conditions:

Sample Number:	3	Temperature (°C):	24
Date:	May 15, 2008	Humidity (%):	45
Modification State:	0	Tester:	Andrey Adelberg
		Laboratory:	SAC Ottawa

Test Results: **Complies**
See Attached Plots.

Additional Observations:

Preview measurements:

0.15MHz to 30MHz

Receiver settings:

- Peak Detector, Max Hold and Average
- 9kHz RBW

Final measurement:

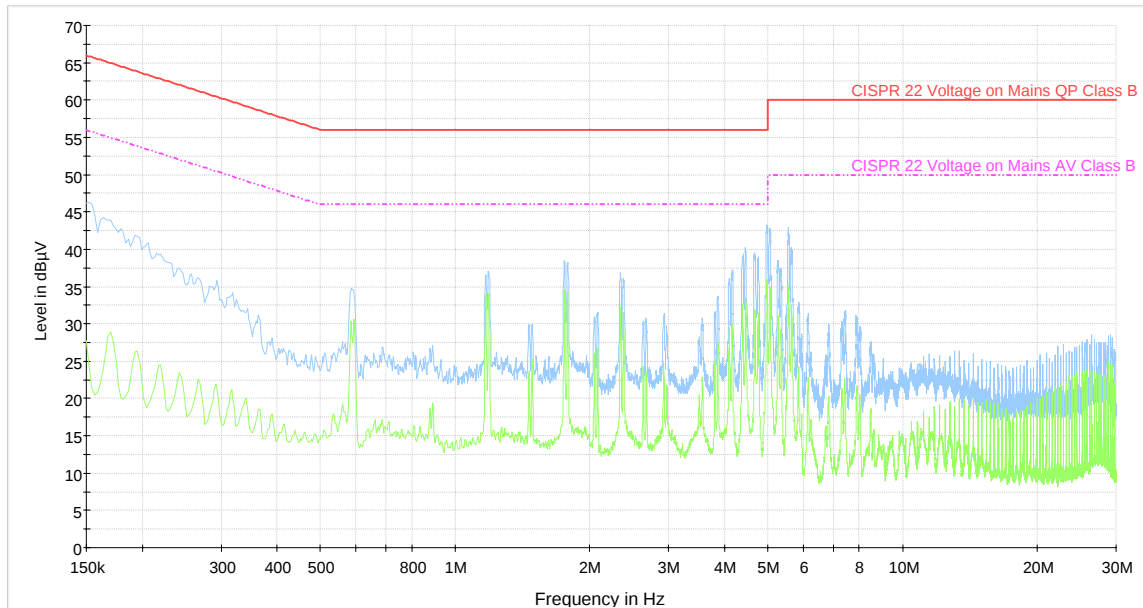
0.15MHz to 30MHz

Receiver settings:

- Q-Peak Detector and Average
- 9kHz RBW

- Spectral plots have been corrected for transducer factors; cable loss, LISN, and attenuator.
- No emissions within 6dB of limit were detected.

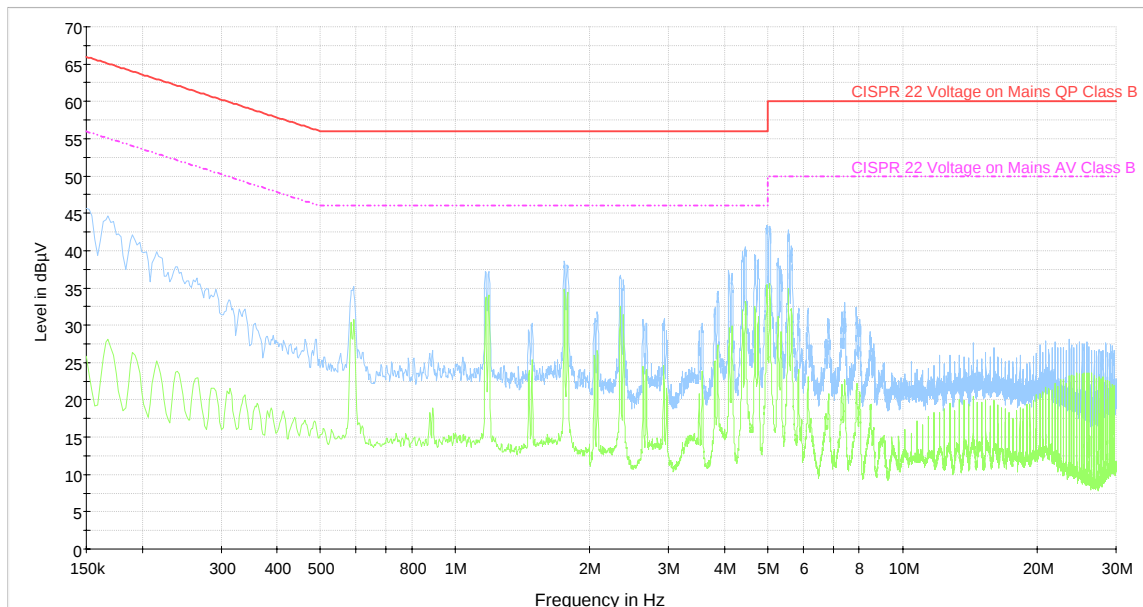
Conducted emissions on Phase Line



Conducted Emissions on AC mains Phase line

- CISPR 22 Voltage on Mains QP Class B.LimitLine
- - - CISPR 22 Voltage on Mains AV Class B.LimitLine
- Preview Peak Result
- Preview Average Result

Conducted emissions on Neutral Line



Conducted Emissions on AC Mains Neutral line

- CISPR 22 Voltage on Mains QP Class B.LimitLine
- - - CISPR 22 Voltage on Mains AV Class B.LimitLine
- Preview Peak Result
- Preview Average Result

Clause 15.209(a) Radiated Emissions within Restricted Bands

§ 15.209 (a) Radiated emission limits; general requirements

Except as provided elsewhere in this subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Frequency (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
0.009-0.490	2400/F (kHz)	300
0.490-1.705	24000/F (kHz)	30
1.705-30.0	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

Test Conditions:

Sample Number:	2	Temperature (°C):	25
Date:	May 15, 2008	Humidity (%):	48
Modification State:	0	Tester:	Andrey Adelberg
		Laboratory:	SAC Ottawa

Test Results: Complies

See Attached Table for Results

Additional Observations:

The Spectrum was searched from 30MHz to the 10th Harmonic (25 GHz).

These results apply to emissions found in the Restricted bands defined in FCC Part 15 Subpart C, 15.205.

All measurements were performed at a distance of 3 meters.

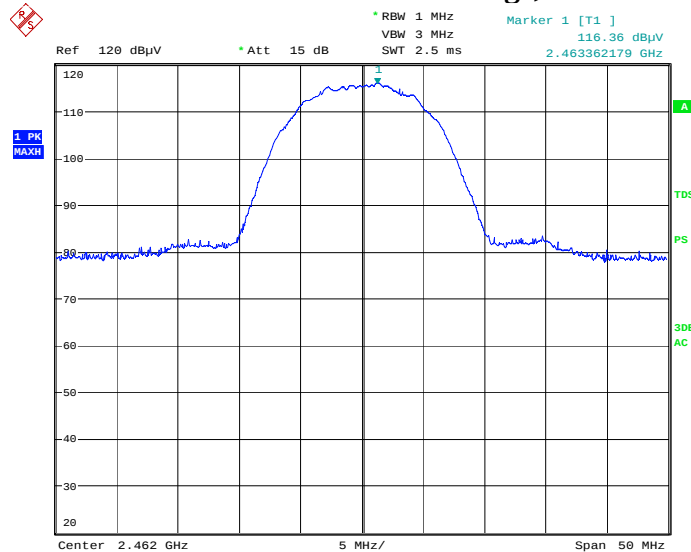
Test receiver with 120 kHz RBW was used below 1GHz.

Spectrum Analyzer with 1 MHz RBW / 3 MHz VBW for peak measurements was used above 1GHz.

Frequency (MHz)		Antenna	Polarity	RCVD Signal (dBμV)	Ant. Factor (dB)	Amp. Gain (dB)	Cable Loss (dB)	Duty Cycle Corr.	Emission Level (dBμV /m)	Limit (dBμV /m)	Margin (dB)	Detector
Mode: 802.11 b												
Lowest Channel												
1	4823.919872	Horn	V	70.40	33.2	52	6.6	-24.1	58.20	74.00	15.80	Peak
									34.10	54.00	19.90	Average
2	7237.282051	Horn	V	63.58	36.2	52	8.2	-24.1	55.98	74.00	18.02	Peak
									31.88	54.00	22.12	Average
Middle Channel												
1	4873.839744	Horn	V	71.38	33.2	52	6.6	-24.1	59.18	74.00	14.82	Peak
									35.08	54.00	18.92	Average
2	7305.471154	Horn	V	63.51	36.2	52	8.2	-24.1	55.91	74.00	18.09	Peak
									31.81	54.00	22.19	Average
Highest Channel												
1	4924.040064	Horn	V	71.84	33.2	52	6.6	-24.1	59.64	74.00	14.36	Peak
									35.54	54.00	18.46	Average
2	7389.205128	Horn	V	63.35	36.2	52	8.2	-24.1	55.75	74.00	18.25	Peak
									31.65	54.00	22.35	Average
Mode: 802.11 g												
Lowest Channel												
1	4829.128205	Horn	V	66.95	33.2	52	6.6	-24.1	54.75	74.00	19.25	Peak
									30.65	54.00	23.35	Average
2	7240.246795	Horn	V	61.84	36.2	52	8.2	-24.1	54.24	74.00	19.76	Peak
									30.14	54.00	23.86	Average
Middle Channel												
1	4877.125000	Horn	V	67.02	33.2	52	6.6	-24.1	54.82	74.00	19.18	Peak
									30.72	54.00	23.28	Average
2	7303.467949	Horn	V	61.99	36.2	52	8.2	-24.1	54.39	74.00	19.61	Peak
									30.29	54.00	23.71	Average
Highest Channel												
1	4933.855769	Horn	V	67.23	33.2	52	6.6	-24.1	55.03	74.00	18.97	Peak
									30.93	54.00	23.07	Average
2	7381.592949	Horn	V	61.79	36.2	52	8.2	-24.1	54.19	74.00	19.81	Peak
									30.09	54.00	23.91	Average
Note 1 – Duty cycle correction was calculated from data provided by customer, that could be found in <i>PIMA Transmit Duty Cycle Statement.pdf</i> file attached												

Duty Cycle Correction calculation:

Duty Cycle correction (within 100ms) = $20 \log(0.240 \times 26/100) = -24.1 \text{ dB}$

Delta Marker Measurement for 2.4835MHz Band Edge, 802.11 b

Date: 15.MAY.2008 17:13:27

Measured Field Strength for High Channel in 1MHz RBW = 116.36 dBμV/m

Delta Marker = 44.46 dB

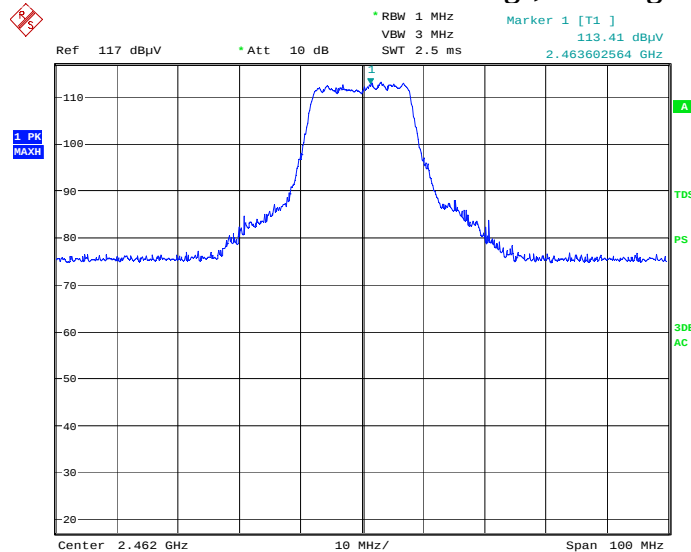
Note: For Delta Marker calculation refer to Clause 15.247(d) Conducted Spurious Emissions, Band Edge Compliance

Therefore, Peak Field Strength = 116.36 dBμV/m – 44.46 dB = 71.9 dBμV/m

Limit = 74 dBμV/m, Margin = 2.1 dB

Average Field Strength = 71.9 dBμV/m – 24.1 dB(Duty Cycle) = 47.8 dBμV/m

Limit = 54dBuV/m, Margin = 6.2 dB

Delta Marker Measurement for 2.4835MHz Band Edge, 802.11 g

Date: 15.MAY.2008 17:09:55

Measured Field Strength for High Channel in 1MHz RBW = 113.41 dBμV/m

Delta Marker = 41.32 dB

Note: For Delta Marker calculation refer to Clause 15.247(d) Conducted Spurious Emissions, Band Edge Compliance

Therefore, Peak Field Strength = 113.41 dBμV/m - 41.32 dB = 72.09 dBμV/m

Limit = 74 dBμV/m, Margin = 1.91 dB

Average Field Strength = 72.09 dBμV/m - 24.1 dB(Duty Cycle) = 47.99 dBμV/m

Limit = 54 dBμV/m, Margin = 6.01 dB

Clause 15.247(a)(2) Minimum 6 dB Bandwidth

Systems using digital modulation techniques may operate in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands. The minimum 6dB bandwidth shall be at least 500 kHz.

Test Conditions:

Sample Number:	1	Temperature (°C):	24
Date:	May 12, 2008	Humidity (%):	47
Modification State:	0	Tester:	Andrey Adelberg
		Laboratory:	Wireless Ottawa

Test Results: Complies

See Attached Table and Plots.

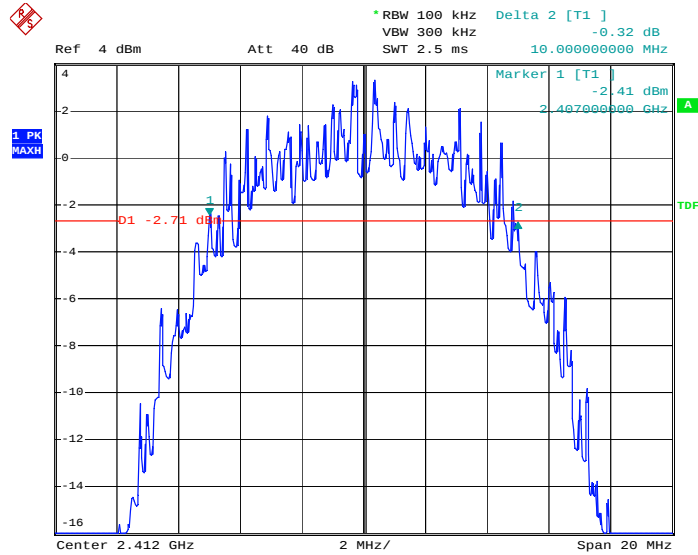
6dB Bandwidth:

Mode	Frequency, MHz	6 dB Bandwidth, kHz	Limit, kHz	Margin, kHz
802.11 b	2412	10000	500	9500
	2437	10240	500	9740
	2462	10000	500	9500
802.11 g	2412	16480	500	15980
	2437	16560	500	16060
	2462	16560	500	16060

Note: Different data rates have no affect on emission bandwidth measurements.

6 dB Bandwidth measurement:

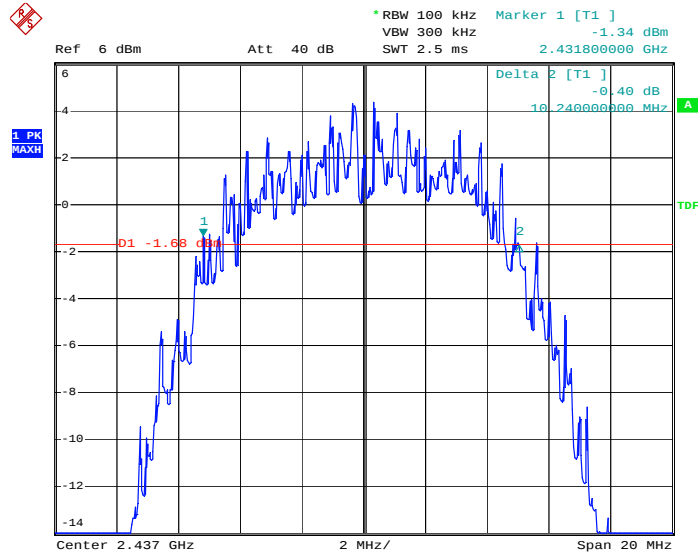
802.11 b, Lowest Channel: 2412 MHz



Date: 12.MAY.2008 14:27:39

6 dB Bandwidth measurement:

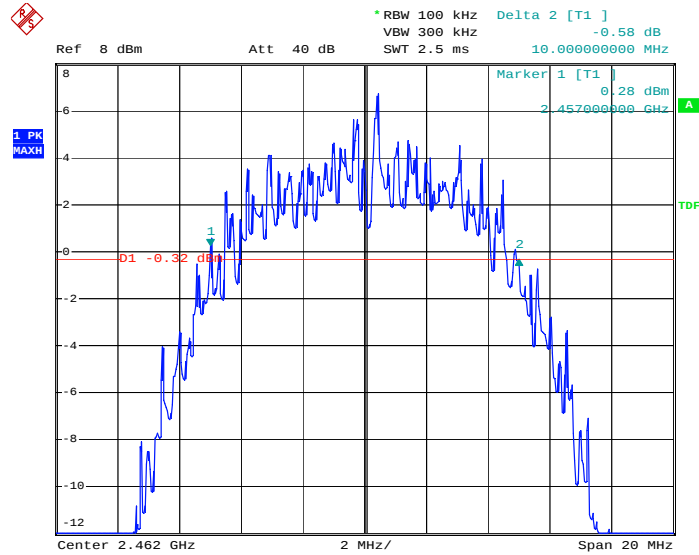
802.11 b, Middle Channel: 2437 MHz



Date: 12.MAY.2008 14:24:23

6 dB Bandwidth measurement:

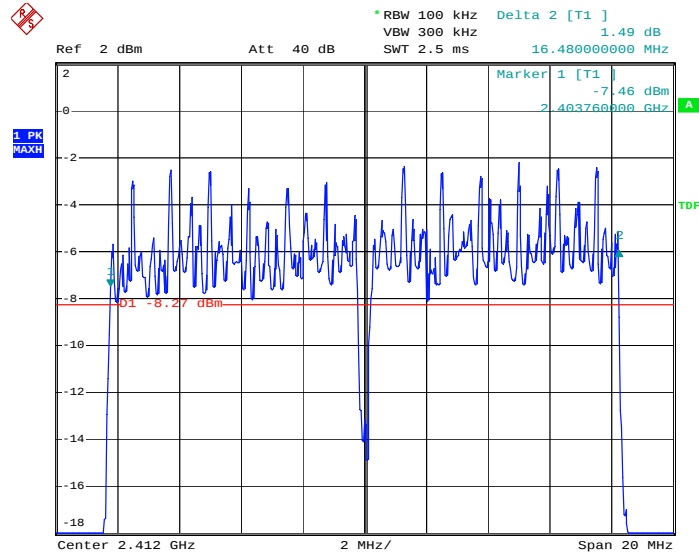
802.11 b, Highest Channel: 2462 MHz



Date: 12.MAY.2008 14:26:03

6 dB Bandwidth measurement:

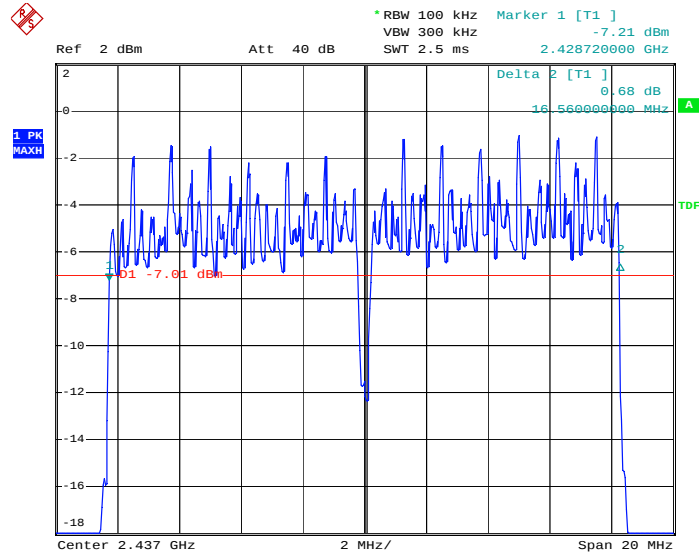
802.11 g, Lowest Channel: 2412 MHz



Date: 12.MAY.2008 14:29:52

6 dB Bandwidth measurement:

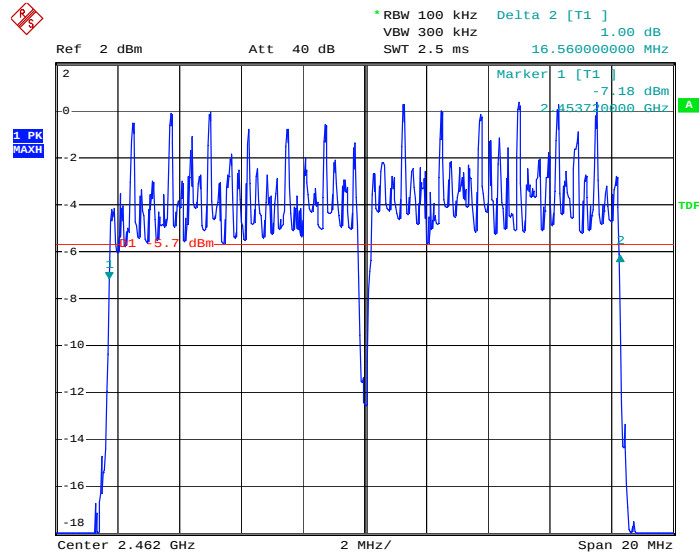
802.11 g, Middle Channel: 2437 MHz



Date: 12.MAY.2008 14:31:58

6 dB Bandwidth measurement:

802.11 g, Highest Channel: 2462 MHz



Date: 12.MAY.2008 14:33:33

Clause 15.247(b)(3) Maximum peak output power of systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands

For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt. As an alternative to a peak power measurement, compliance with the one Watt limit can be based on a measurement of the maximum conducted output power. Maximum Conducted Output Power is defined as the total transmit power delivered to all antennas and antenna elements averaged across all symbols in the signalling alphabet when the transmitter is operating at its maximum power control level. Power must be summed across all antennas and antenna elements. The average must not include any time intervals during which the transmitter is off or is transmitting at a reduced power level. If multiple modes of operation are possible (e.g., alternative modulation methods), the maximum conducted output power is the highest total transmit power occurring in any mode.

Clause 15.247(b)(4) Maximum peak output power

The conducted output power limit specified in paragraph (b) of this section 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 the intentional radiator shall be reduced below the stated values in paragraphs (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.

Test Conditions:

Sample Number:	1	Temperature (°C):	24
Date:	May 12, 2008	Humidity (%):	47
Modification State:	0	Tester:	Andrey Adelberg
		Laboratory:	Wireless Ottawa

Test Results: Complies

See Attached Table and Plots.

Additional Observations:

The output power was measured at +/-15% of the supply voltage (138VAC and 102VAC) and found that there was no noticeable change.

Note: The manufacturer modified the EUT in order to perform conducted measurements.

The output RF power was measured on the antenna port by means of a spectrum analyzer and following the '*Power Output Option 2, Method 3*' procedure from the FCC guidelines for Measurement of Digital Transmission Systems operating under Section 15.247.

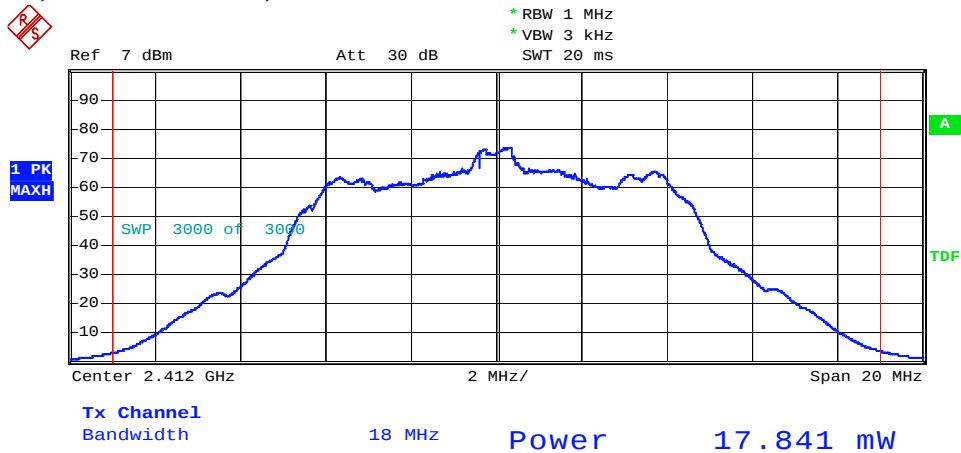
In 802.11 b mode, T on is 585.00 μ sec, therefore VBW was set to 3 kHz
In 802.11 g mode, T on is 104.25 μ sec, therefore VBW was set to 10 kHz

Mode	Frequency, MHz	Measured Output Power (mW)	Measured Output Power (dBm)	Maximum Output Power*, dBm (EIRP)	Limit, dBm (EIRP)	Margin, dB
802.11 b	2412	17.841	12.51	18.51	36.00	17.49
	2437	22.426	13.51	19.51	36.00	16.49
	2462	30.379	14.83	20.83	36.00	15.17
802.11 g	2412	7.403	8.69	14.69	36.00	21.31
	2437	9.459	9.76	15.76	36.00	20.24
	2462	13.034	11.15	17.15	36.00	18.85

* – Note: Maximum Output Power is calculated based on 6 dBi antenna gain and conducted peak power measurements.

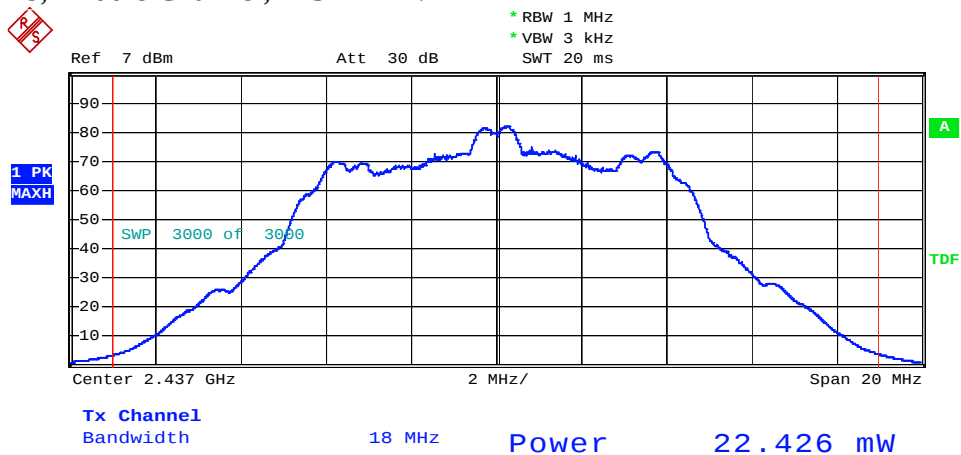
Peak Output Power (conducted)

802.11 b, Lowest Channel, 2412 MHz:



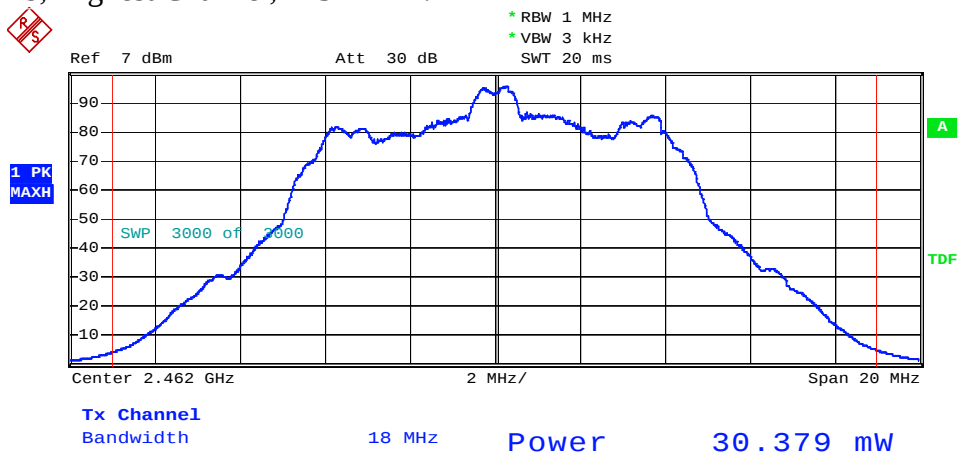
Peak Output Power (conducted)

802.11 b, Middle Channel, 2437 MHz:



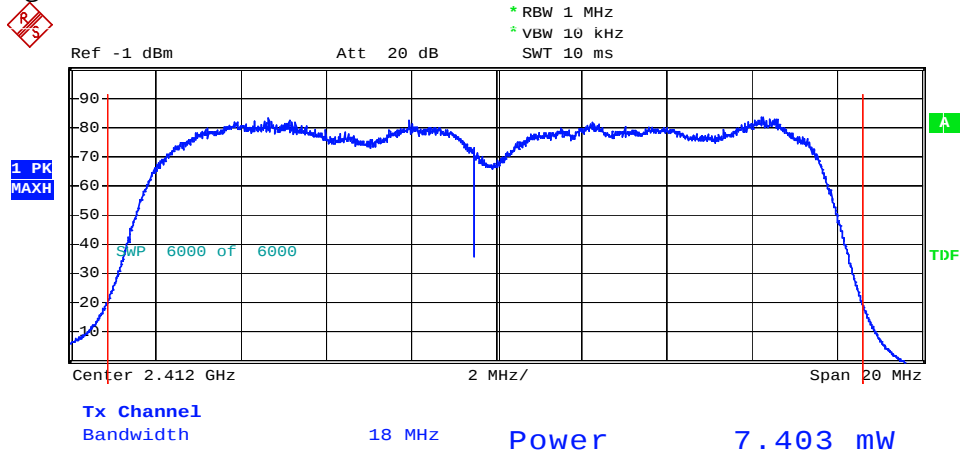
Peak Output Power (conducted)

802.11 b, Highest Channel, 2462 MHz:



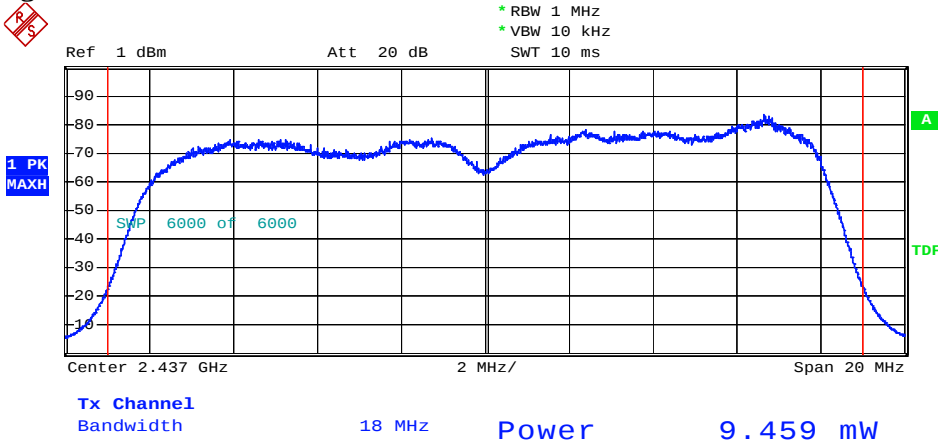
Peak Output Power (conducted)

802.11 g, Lowest Channel, 2412 MHz:



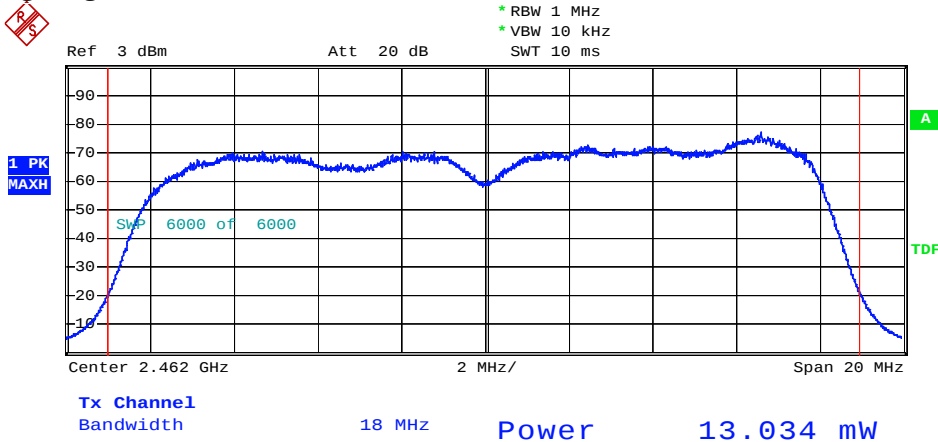
Peak Output Power (conducted)

802.11 g, Middle Channel, 2437 MHz:

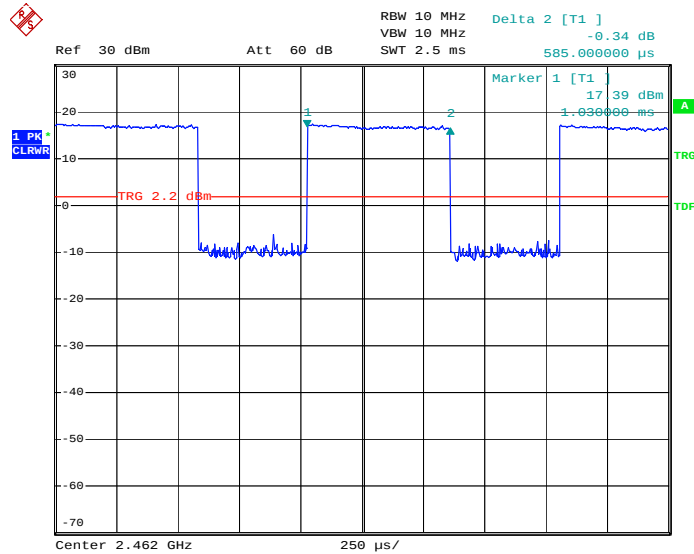


Peak Output Power (conducted)

802.11 g, Highest Channel, 2432 MHz:

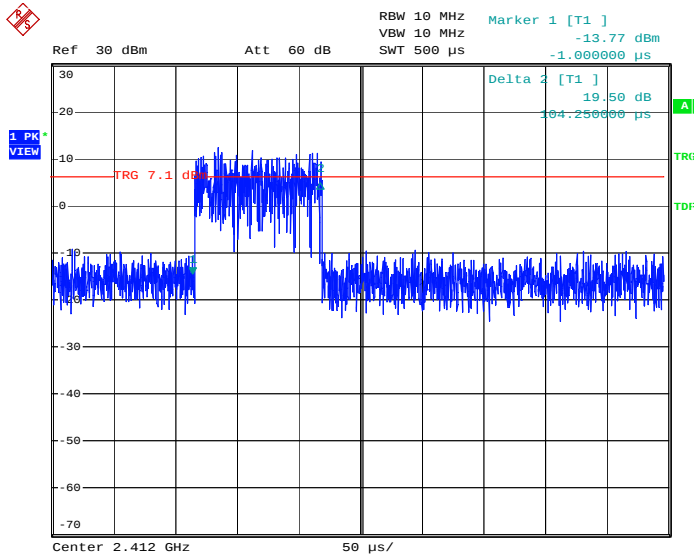


802.11 b, Pulse width



Date: 12.MAY.2008 14:52:21

802.11 g, Pulse width



Date: 12.MAY.2008 15:26:14

Clause 15.247(d) Conducted Spurious Emissions

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

Test Conditions:

Sample Number:	1	Temperature (°C):	22
Date:	May 13, 2008	Humidity (%):	47
Modification State:	0	Tester:	Andrey Adelberg
		Laboratory:	Wireless Ottawa

Test Results: Complies

See Attached Table and Plots.

The Spectrum was searched from 30 MHz to 25 GHz.

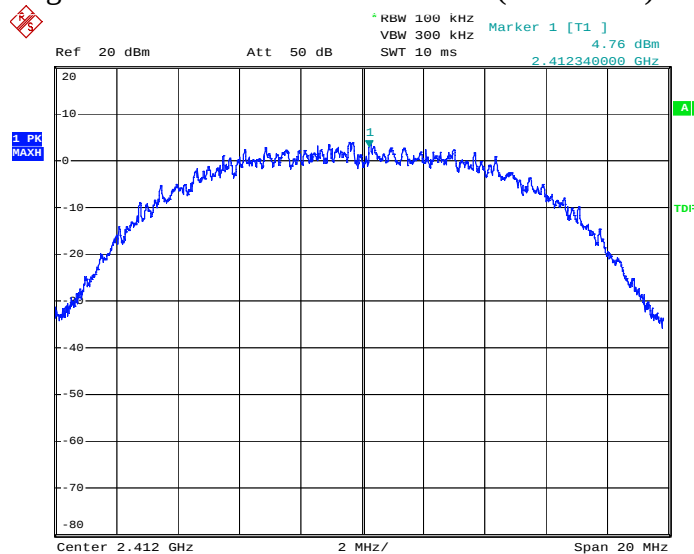
All measurements for spurious emissions were performed conducted using a Spectrum analyzer with Positive Peak Detector with 100 kHz RBW
Cable loss and attenuator factor were included in measurements.

Since 'Power Output Option 2, Method 3' procedure from the FCC guidelines for Measurement of Digital Transmission Systems operating under Section §15.247 was used for power measurements, therefore the attenuation of 30 dB down from the highest emission level within the authorized band was used instead of 20 dB.

Conducted Spurious Emissions measurements:

Mode	Channel	Frequency, MHz	Level, dBm	Limit, dBm	Margin, dB
802.11 b	Lowest	2397.925	-33.44	-25.24	8.2
		4824.240	-43.20	-25.24	17.96
	Middle	4874.180	-42.43	-24.45	17.98
		2486.780	-38.34	-23.23	15.11
802.11 g	Highest	4924.120	-42.45	-23.23	19.22
		2397.025	-34.85	-31.13	3.72
	Highest	2483.980	-40.55	-28.34	12.21

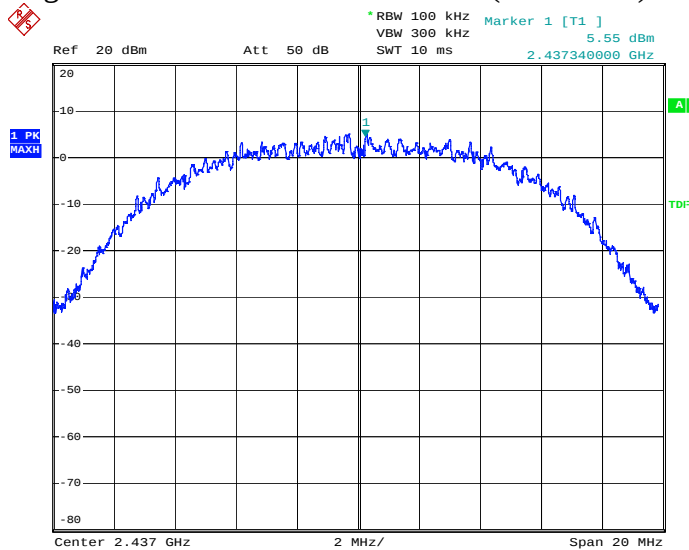
802.11 b, In-band Highest Emission at Lowest Channel (2412 MHz) using 100 kHz RBW



Date: 13.MAY.2008 08:13:21

Limit: 4.76 dBm – 30 dB = -25.24 dBm

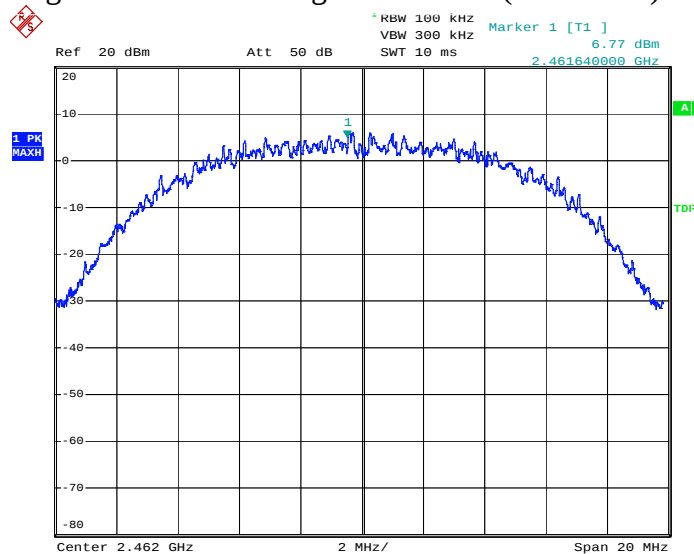
802.11 b, In-band Highest Emission at Middle Channel (2437 MHz) using 100 kHz RBW



Date: 13.MAY.2008 08:14:14

Limit: 5.55 dBm – 30 dB = -24.45 dBm

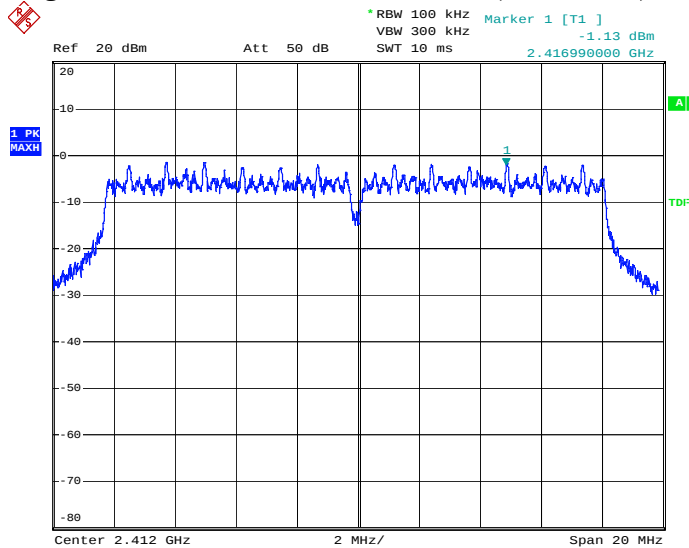
802.11 b, In-band Highest Emission at Highest Channel (2462 MHz) using 100 kHz RBW



Date: 13.MAY.2008 08:14:57

Limit calculation: 6.77 dBm – 30 dB = -23.23 dBm

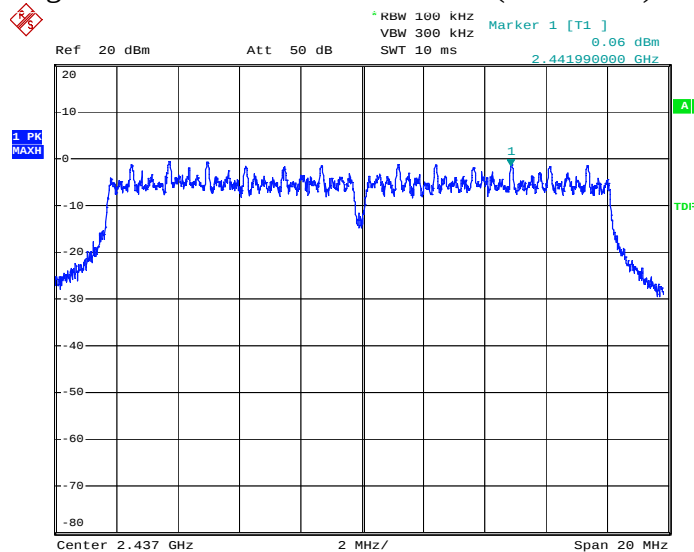
802.11 g, In-band Highest Emission at Lowest Channel (2412 MHz) using 100 kHz RBW



Date: 13.MAY.2008 08:22:36

Limit calculation: -1.13 dBm – 30 dB = -31.13 dBm

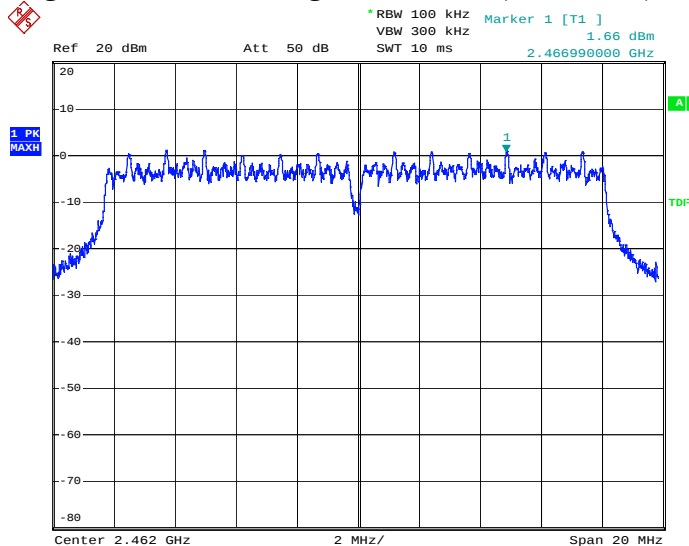
802.11 g, In-band Highest Emission at Middle Channel (2437 MHz) using 100 kHz RBW



Date: 13.MAY.2008 08:21:45

Limit calculation: $0.06 \text{ dBm} - 30 \text{ dB} = -29.94 \text{ dBm}$

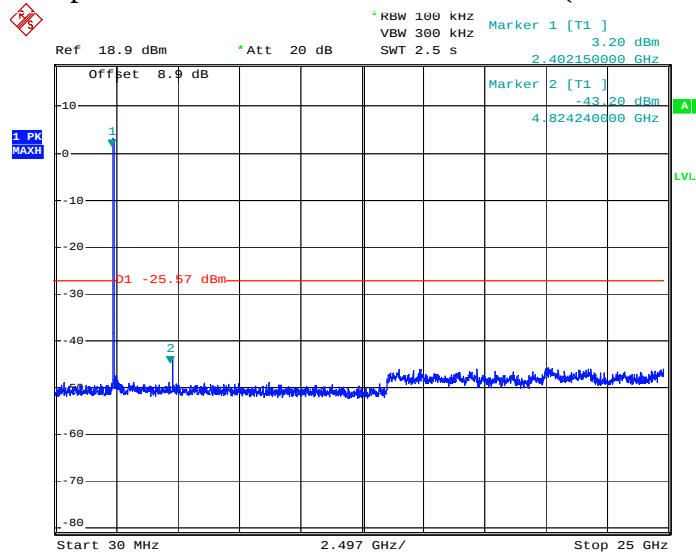
802.11 g, In-band Highest Emission at Highest Channel (2462 MHz) using 100 kHz RBW



Date: 13.MAY.2008 08:16:02

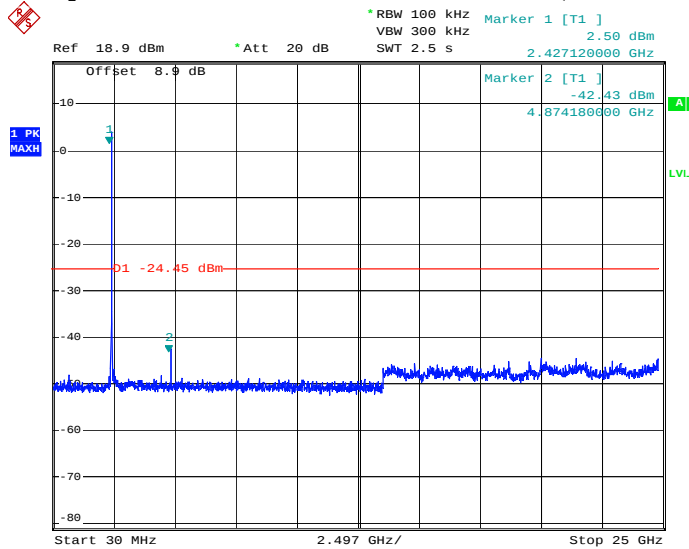
Limit calculation: $1.66 \text{ dBm} - 30 \text{ dB} = -28.34 \text{ dBm}$

802.11 b, Conducted Spurious Emissions at Lowest Channel (2412 MHz)



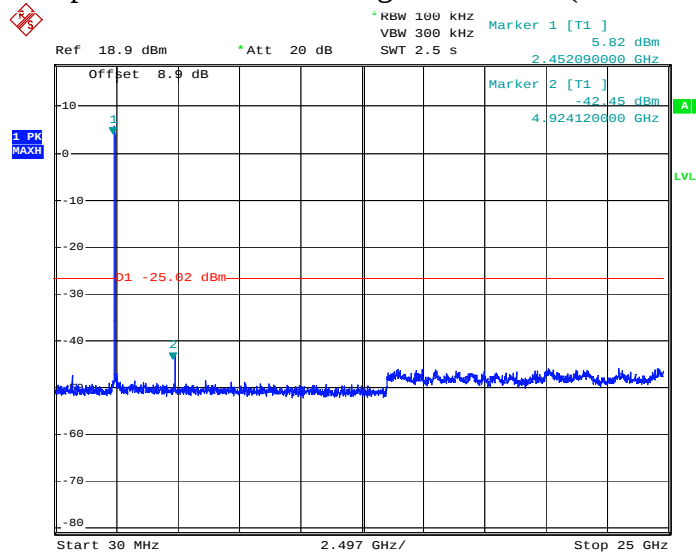
Date: 13.MAY.2008 09:07:25

802.11 b, Conducted Spurious Emissions at Middle Channel (2437 MHz)



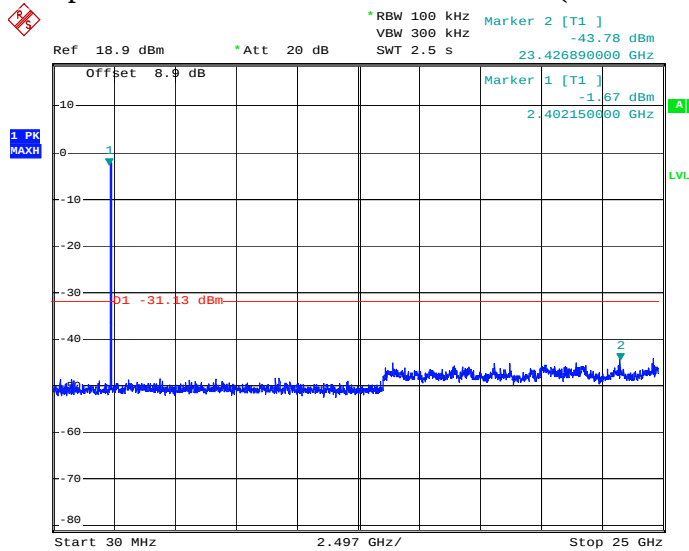
Date: 13.MAY.2008 09:08:54

802.11 b, Conducted Spurious Emissions at Highest Channel (2462 MHz)



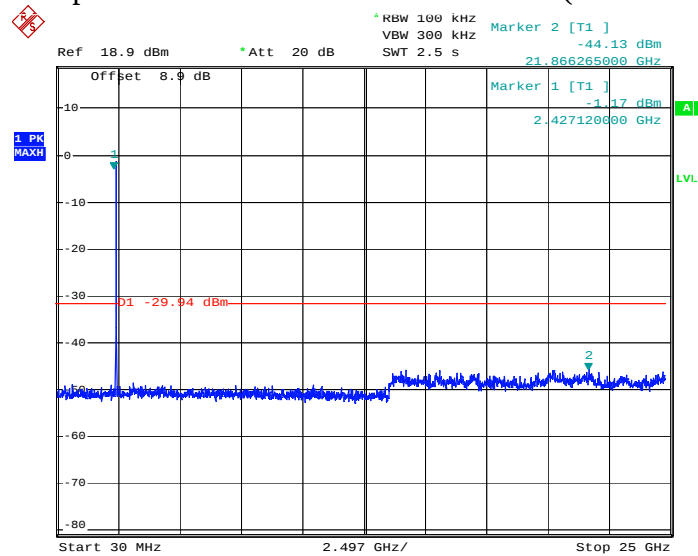
Date: 13.MAY.2008 09:11:00

802.11 g, Conducted Spurious Emissions at Lowest Channel (2412 MHz)



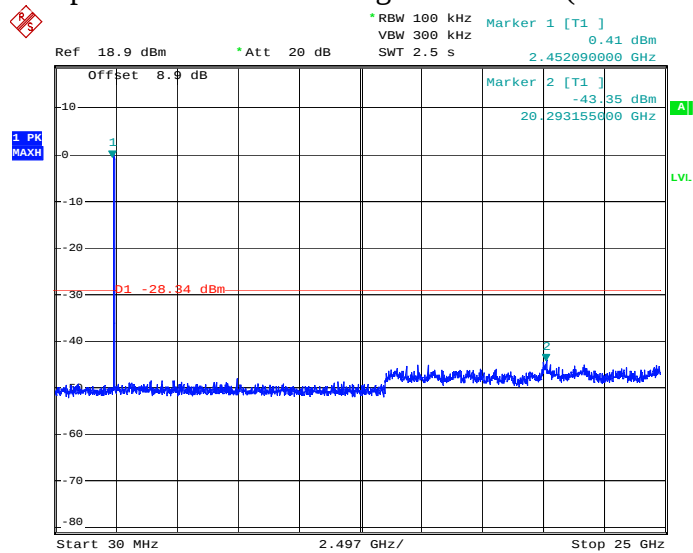
Date: 13.MAY.2008 09:15:13

802.11 g, Conducted Spurious Emissions at Middle Channel (2437 MHz)



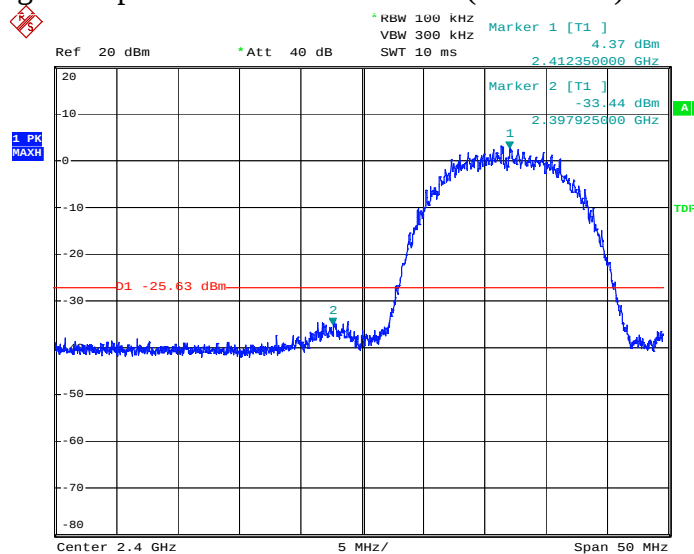
Date: 13.MAY.2008 09:13:51

802.11 g, Conducted Spurious Emissions at Highest Channel (2462 MHz)



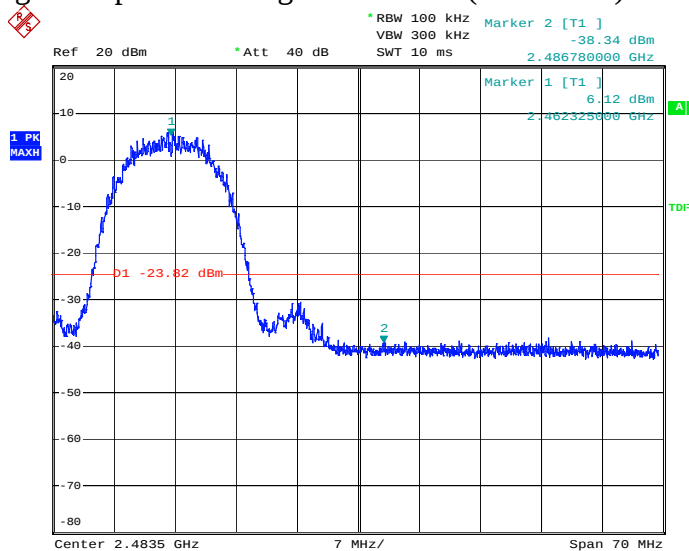
Date: 13.MAY.2008 09:12:42

802.11 b, Band Edge Compliance at Lowest Channel (2412 MHz)



Date: 13.MAY.2008 08:50:01

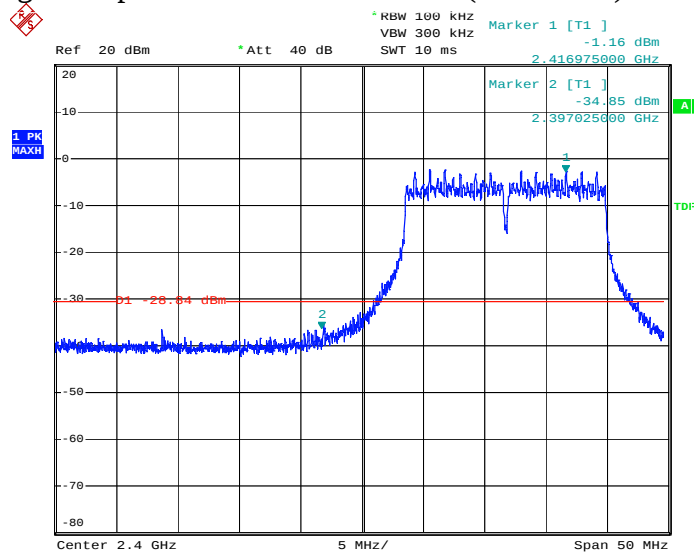
802.11 b, Band Edge Compliance at Highest Channel (2462 MHz)



Date: 13.MAY.2008 08:55:01

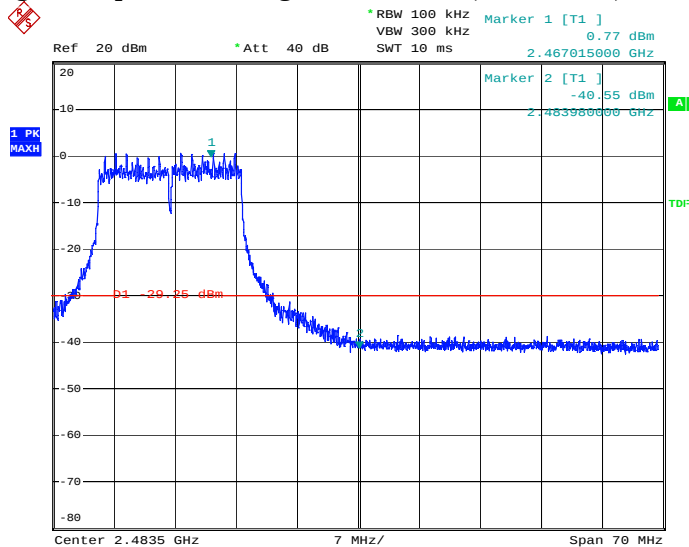
Delta marker calculation: Fundamental Power – Band Edge Power = 6.15 dBm – (-38.34 dBm) = 44.46 dB

802.11 g, Band Edge Compliance at Lowest Channel (2412 MHz)



Date: 13.MAY.2008 08:51:40

802.11 g, Band Edge Compliance at Highest Channel (2462 MHz)



Date: 13.MAY.2008 08:53:51

Delta marker calculation: Fundamental Power – Band Edge Power = 0.77 dBm – (-40.55 dBm) = 41.32 dB

Clause 15.247(e) Power Spectral Density for Digitally Modulated Devices

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.

Test Conditions:

Sample Number:	1	Temperature (°C):	25
Date:	May 12, 2008	Humidity (%):	48
Modification State:	0	Tester:	Andrey Adelberg
		Laboratory:	Wireless Ottawa

Test Results: Complies

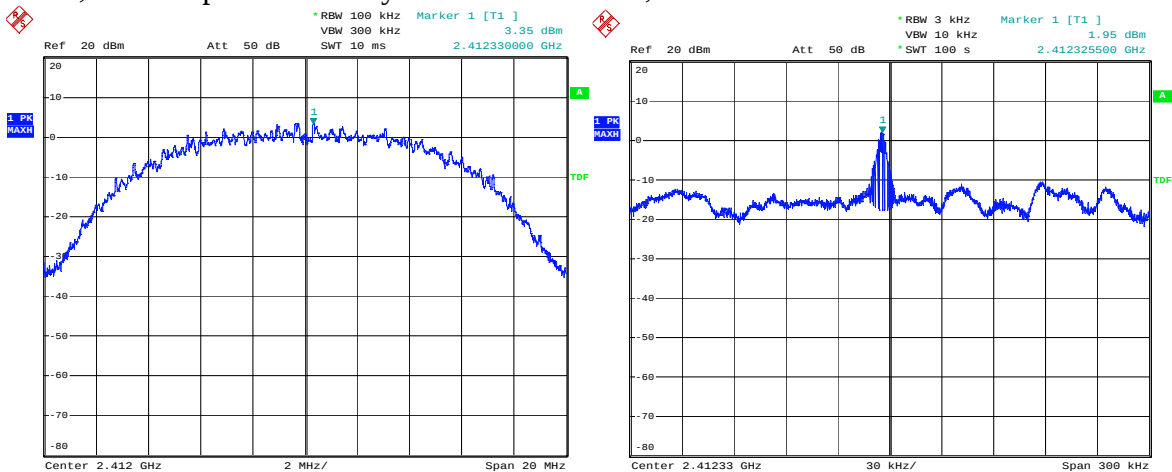
See attached Plots and Table

The Power Spectral Density was measured on the antenna port by means of a spectrum analyzer and following procedure described in '*PSD Option 1*' in FCC guidelines for Measurement of Digital Transmission Systems operating under Section 15.247 (because condition 2 in '*PSD Option 2*' could not be achieved, the test procedure was reverted to '*PSD Option 1*').

Power Spectral Density:

Mode	Channel	Frequency, MHz	Power Spectral Density, dBm/3kHz	Limit, dBm/3kHz	Margin, dB
802.11 b	Lowest	2412.32550	1.95	8.00	6.05
802.11 b	Middle	2438.01175	-5.03	8.00	13.03
802.11 b	Highest	2462.32700	4.32	8.00	3.68
802.11 g	Lowest	2416.97145	-17.72	8.00	25.72
802.11 g	Middle	2441.97550	-16.74	8.00	24.74
802.11 g	Highest	2466.96965	-15.15	8.00	23.15

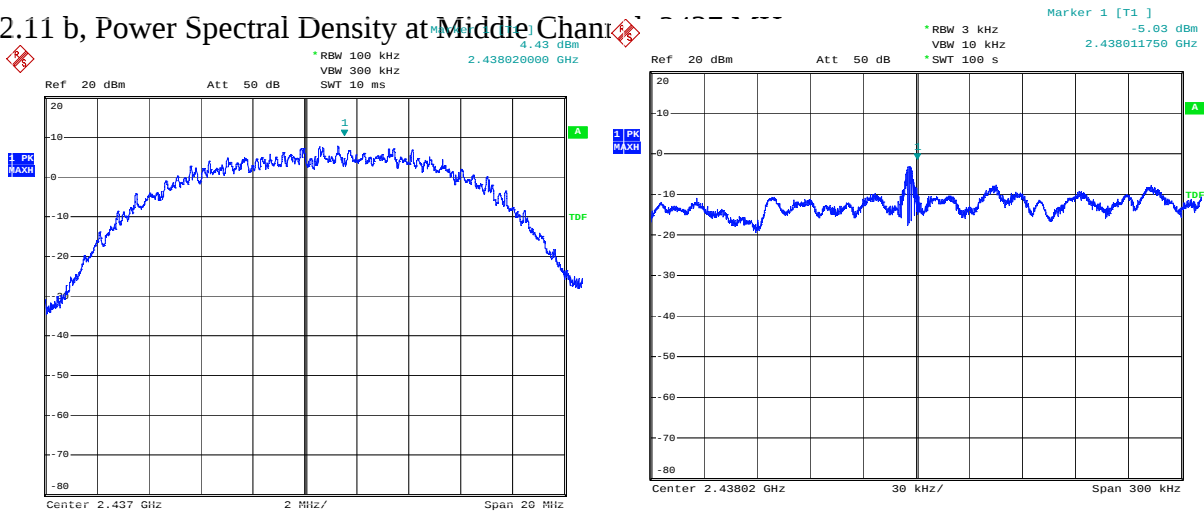
802.11 b, Power Spectral Density at Lowest Channel, 2412 MHz



Date: 12.MAY.2008 16:21:57

Date: 12.MAY.2008 16:26:12

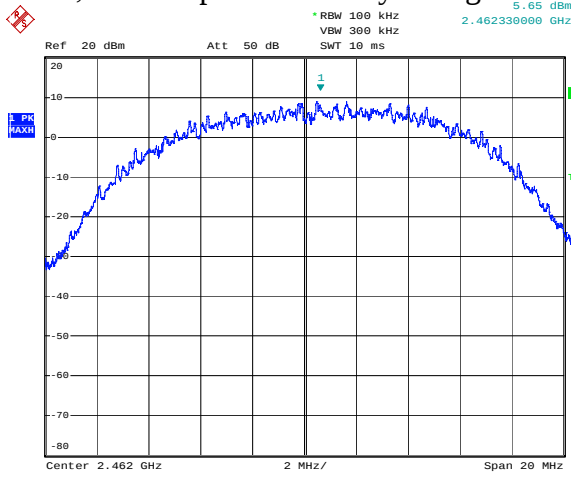
802.11 b, Power Spectral Density at Middle Chanl



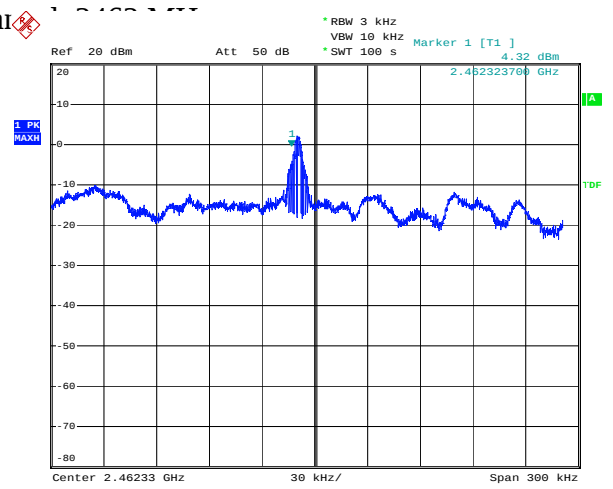
Date: 12.MAY.2008 16:27:17

Date: 12.MAY.2008 16:33:00

802.11 b, Power Spectral Density at Highest Channel

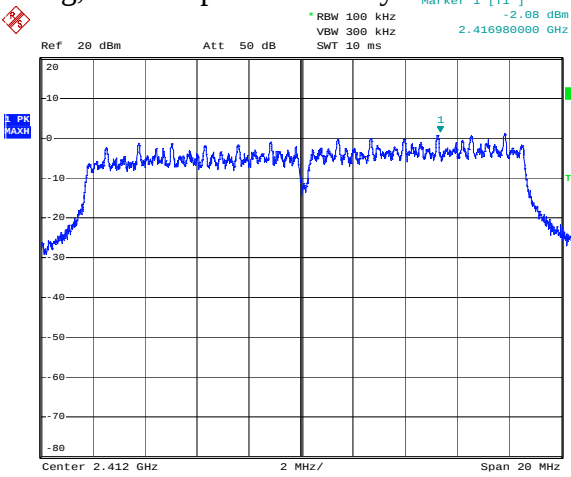


Date: 12.MAY.2008 16:33:53

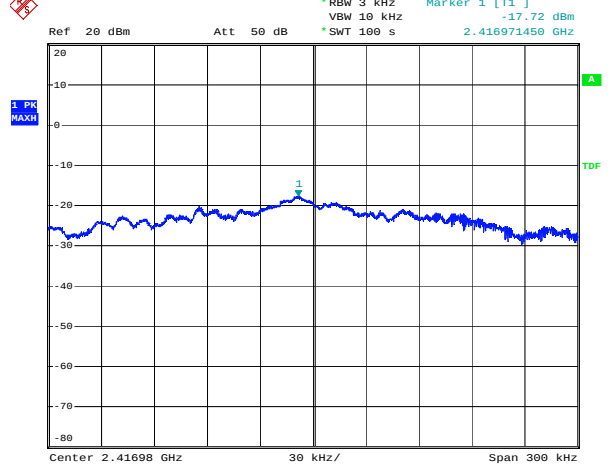


Date: 12.MAY.2008 16:37:40

802.11 g, Power Spectral Density at Lowest Channel

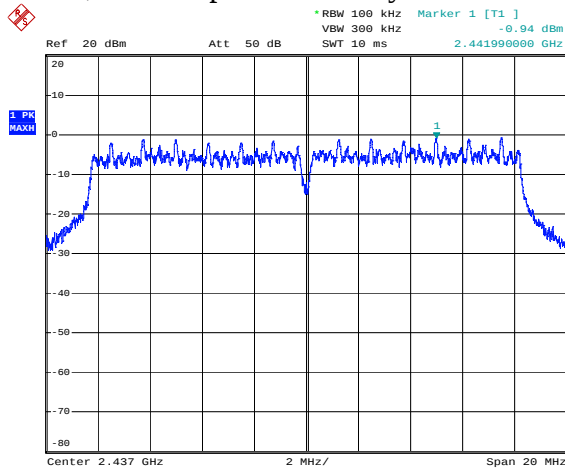


Date: 12.MAY.2008 16:12:28

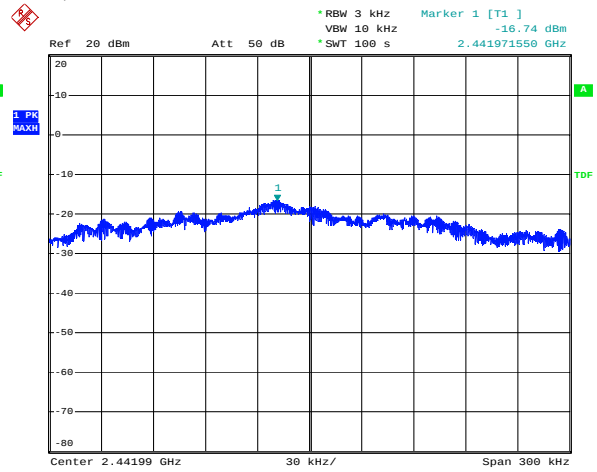


Date: 12.MAY.2008 16:17:17

802.11 b, Power Spectral Density at Middle Channel, 2437 MHz

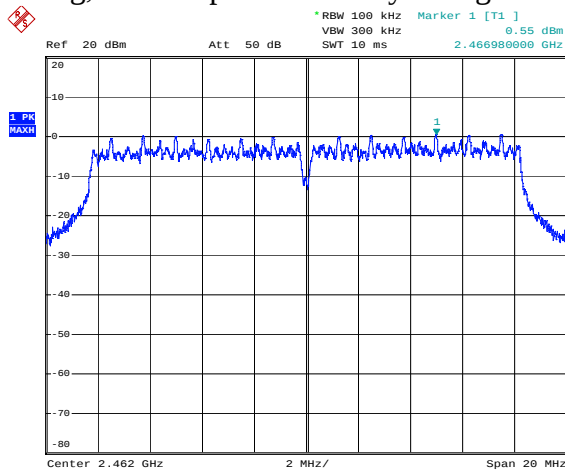


Date: 12.MAY.2008 16:07:20

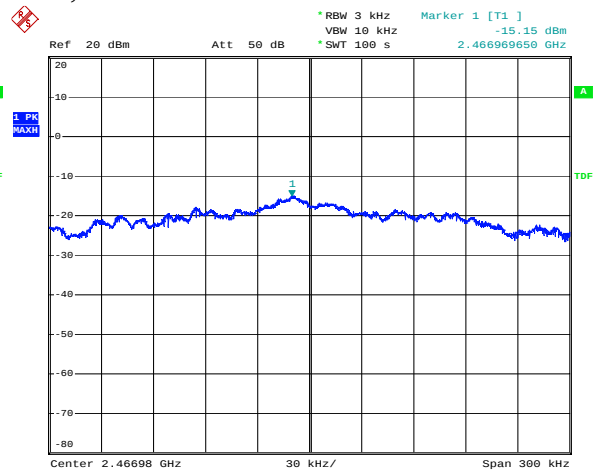


Date: 12.MAY.2008 16:11:21

802.11 g, Power Spectral Density at Highest Channel, 2462 MHz



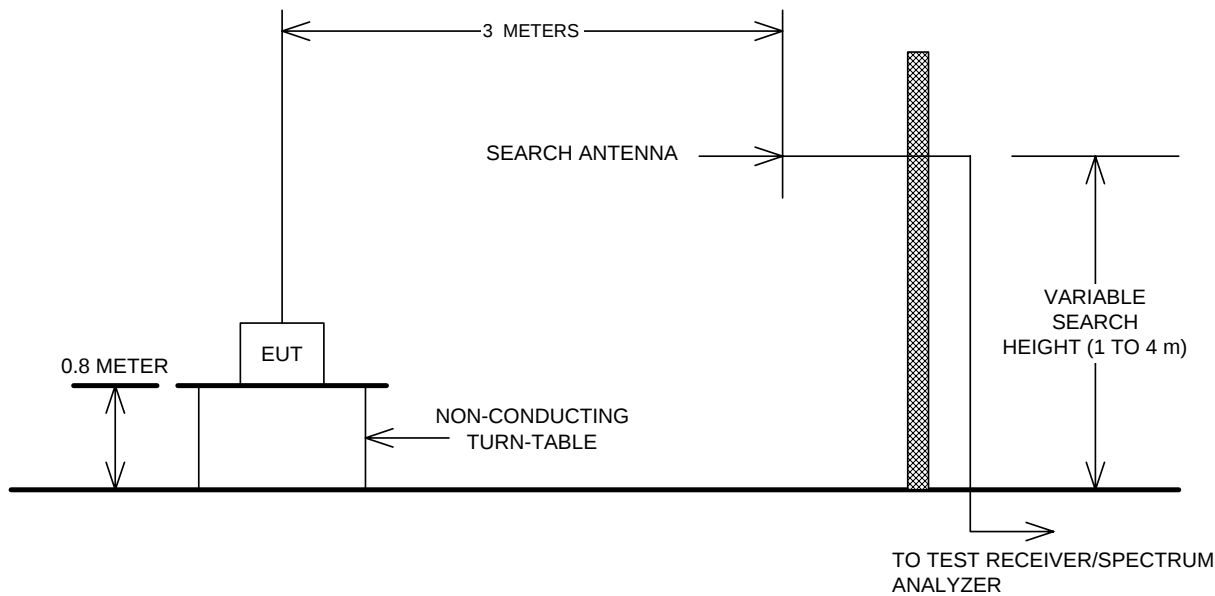
Date: 12.MAY.2008 16:00:48



Date: 12.MAY.2008 16:06:19

Appendix B : Block Diagram of Test Setups

Test Site For Radiated Emissions



Conducted Emissions

