



# FCC TEST REPORT

**REPORT NO.:** RF901127A11

**MODEL NO.:** Rhine-II 210B (for Brand: MiTAC)  
Etherportal (for Brand: TROY)

**RECEIVED:** Nov. 27, 2001

**TESTED:** Dec. 19 ~ Dec. 24. 2001

**APPLICANT:** MITAC INTERNATIONAL CORP.

**ADDRESS:** 8F, No.75, Ming Sheng E. Rd., Sec. 3, Taipei,  
Taiwan, R.O.C.

**ISSUED BY:** Advance Data Technology Corporation

**LAB LOCATION:** 47 14<sup>th</sup> Lin, Chiapau Tsun, Linko, Taipei,  
Taiwan, R.O.C.

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0528  
ILAC MRA



Lab Code: 200102-0



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## 1 CERTIFICATION

**PRODUCT :** Wireless LAN Router  
**BRAND NAME :** MiTAC  
**MODEL NO. :** Rhine-II 210B  
**APPLICANT :** MITAC INTERNATIONAL CORP.  
**OEM BRAND NAME :** TROY  
**OEM MODEL NO. :** Etherportal  
**STANDARDS :** 47 CFR Part 15, Subpart C (Section 15.247),  
ANSI C63.4-1992, Canada RSS 210,  
New Zealand RFS 29

We, **Advance Data Technology Corporation**, hereby certify that one sample of the designation has been tested in our facility from Dec. 19, 2001 to Dec. 24, 2001. The test record, data evaluation and Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's EMC characteristics under the conditions herein specified.

TESTED BY: James Lee, DATE: Dec. 28, 2001  
James Lee

CHECKED BY: Demi Chen, DATE: Dec. 28, 2001  
Demi Chen

APPROVED BY: Alan Lane, DATE: Dec. 28, 2001  
Dr. Alan Lane  
Manager



## 2 SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

<b>APPLIED STANDARD: 47 CFR Part 15, Subpart C</b>			
<b>Standard Section</b>	<b>Test Type and Limit</b>	<b>Result</b>	<b>REMARK</b>
15.207	AC Power Conducted Emission Limit: 48dBuV	PASS	Meet the requirement of limit Minimum passing margin is -2.38dBuV at 0.477MHz
15.247(a)(2)	Spectrum Bandwidth of a Direct Sequence Spread Spectrum System Limit: min. 500kHz	PASS	Meet the requirement of limit
15.247(b)	Maximum Peak Output Power Limit: max. 30dBm	PASS	Meet the requirement of limit
15.247(c)	Radiated Emissions Limit: Table 15.209	PASS	Meet the requirement of limit Minimum passing margin is -4.70dBuV at 625.00 MHz
15.247(d)	Power Spectral Density Limit: max. 8dBm	PASS	Meet the requirement of limit
15.247(c)	Band Edge Measurement Limit: 20 dB less than the peak value of fundamental frequency	PASS	Meet the requirement of limit



### 3 GENERAL INFORMATION

#### 3.1 GENERAL DESCRIPTION OF EUT

<b>PRODUCT</b>	Wireless LAN Router
<b>MODEL NO.</b>	Rhine-II 210B, Etherportal
<b>POWER SUPPLY</b>	5VDC from AC adapter
<b>MODULATION TYPE</b>	BPSK, QPSK, CCK
<b>RADIO TECHNOLOGY</b>	DSSS
<b>TRANSFER RATE</b>	1/2/5.5/11Mbps
<b>FREQUENCY RANGE</b>	2412MHz ~ 2462MHz
<b>NUMBER OF CHANNEL</b>	11
<b>OUTPUT POWER</b>	16.97dBm
<b>ANTENNA TYPE</b>	Dipole antenna
<b>POWER CABLE</b>	NA
<b>I/O PORTS</b>	WAN port, LAN port, LPT port and Serial port
<b>ASSOCIATED DEVICES</b>	NA

**NOTE:**

- The EUT is operated with the following power adapter.

<b>Brand Name :</b>	POTRANS
<b>Model No. :</b>	UWP01211050AU
<b>Input Power :</b>	100-240V, 50-60Hz, 0.5A
<b>Output Power :</b>	5V, 2A

- Model: Rhine-II 210B and Etherportal are identical except brand name, model no and different housing.
- For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.



### 3.2 DESCRIPTION OF TEST MODES

Eleven channels are provided in this EUT.

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

**NOTE:**

1. Below 1 GHz, the channel 1, 6, and 11 were pre-tested in chamber. The channel 11, worst case one, was chosen for final test.
2. Above 1 GHz, the channel 1, 6, and 11 were tested individually.

### 3.3 GENERAL DESCRIPTION OF APPLIED STANDARDS

The EUT is a Wireless LAN Router. According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

**FCC CFR 47 Part 15, Subpart C. (15.247)**

**ANSI C63.4 : 1992, Canada RSS 210, New Zealand RFS 29**

All tests have been performed and recorded as per the above standards.

**NOTE:** The EUT is also considered as a kind of computer peripheral, because the connection to computer is necessary for typical use. It has been verified to comply with the requirements of FCC Part 15, Subpart B, Class B (DoC). The test report has been issued separately.



### 3.4 DESCRIPTION OF SUPPORT UNITS

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	NOTEBOOK PC	DELL	PPX	99125	FCC DoC APPROVELED
2	11Mbps Wireless LAN Card	GemTek	WL211F	NA	MXF-WL211F
3	Personal Computer	HP	Brio BA410	SG12902766	FCC DoC APPROVED
4	19" COLOR MONITOR	HP	D2842A	KR93473168	BEJCB910
5	PRINTER	HP	2225C+	3123S97230	DSI6XU2225
6	MODEM	ACEEX	1414	980020510	IFAXDM1414
7	PS/2 KEYBOARD	FORWARD	FDA-104GA	FDKB8110111	F4ZDA-104G
8	PS/2 MOUSE	LOGITECH	M-S43	LZE00703207	DZL211106

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	NA
2	NA
3	NA
4	1.8 m braid shielded wire, terminated with VGA connector via metallic frame, w/o core.
5	1.2m braid shielded wire, terminated with DB25 and Centronics connector via metallic frame, w/o core.
6	1.2 m braid shielded wire, terminated with DB25 and DB9 connector via metallic frame, w/o core.
7	1.5 m foil shielded wire, terminated with PS/2 connector via metallic frame, w/o core.
8	1.8 m foil shielded wire, terminated with PS/2 connector via drain wire, w/o core.

**NOTE:** All power cords of the above support units are non shielded (1.8m).





## 4 TEST TYPES AND RESULTS

### 4.1 CONDUCTED EMISSION MEASUREMENT

#### 4.1.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT

FREQUENCY (MHz)	Class B (dBuV)	
	Quasi-peak	Average
0.45 – 30	48	-

**NOTE:**

1. The lower limit shall apply at the transition frequencies.
2. All emanations from a class B digital device or system, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strengths specified above.

#### 4.1.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
ROHDE & SCHWARZ Test Receiver	ESHS30	828109/007	July 4, 2002
ROHDE & SCHWARZ Artificial Mains Network (for EUT)	ESH3-Z5	839135/006	July 3, 2002
* ROHDE & SCHWARZ 4-wire ISN	ENY41	837032/016	Dec. 2, 2002
* ROHDE & SCHWARZ 2-wire ISN	ENY22	837497/016	Dec. 2, 2002
EMCO-L.I.S.N. (for peripheral)	3825/2	9204-1964	July 3, 2002
Software	Cond-V2J	NA	NA
RF cable (JYEBAO)	RG-58A/U	Cable-C02.01	July 5, 2002
HP Terminator (For EMCO LISN)	11593A	E1-01-298	Feb. 20, 2002
HP Terminator (For EMCO LISN)	11593A	E1-01-299	Feb. 20, 2002
Shielded Room	Site 2	ADT-C02	NA
VCCI Site Registration No.	Site 2	C-240	NA

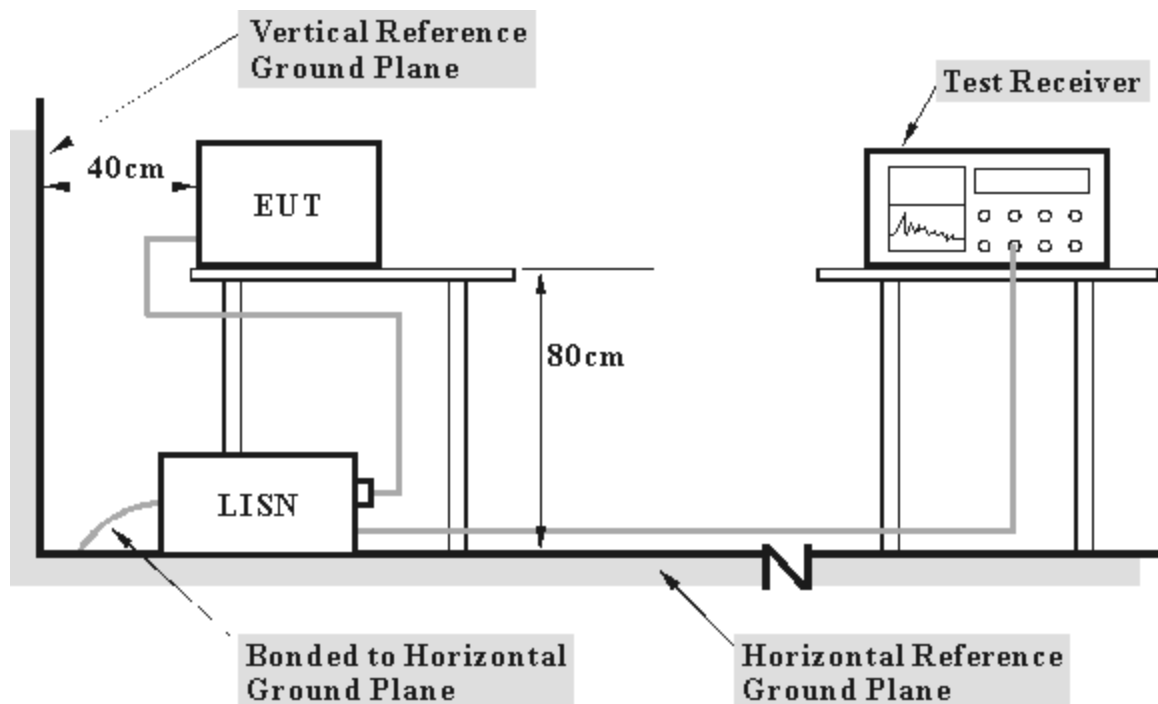
**NOTE:**

1. The measurement uncertainty is less than +/- 2.6dB, which is calculated as per the NAMAS document NIS81.
2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
3. "\*" = These equipments are used for the final measurement.

#### 4.1.3 TEST PROCEDURES

- a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance for the measuring instrument.
- b. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.
- c. The frequency range from 450 kHz to 30 MHz was searched. Emission levels over 10dB under the prescribed limits could not be reported

#### 4.1.4 TEST SETUP



- Note:**
1. Support units were connected to second LISN.
  2. Both of LISNs (AMN) 80 cm from EUT and at the least 80 cm from other units and other metal planes support units.

For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.



#### 4.1.5 EUT OPERATING CONDITIONS

- a. Placed the EUT (with a computer system) on the testing table.
- b. The computer system sent data to EUT by command "PIN" via an RJ 45 cable.
- c. The computer system sent "H" messages to Color Monitor and Monitor displayed "H" patterns on its screen.
- d. The computer system sent "H" messages to modem.
- e. The computer system sent "H" messages to printer, and the printer prints them on paper.
- f. Prepared another computer system to act as a communication partner and placed it outside of testing area.
- g. The communication partner run a test program to enable EUT under transmission/receiving condition continuously at specific channel frequency via an RJ 45 cable.
- h. The communication partner sent data to EUT by command "PIN".

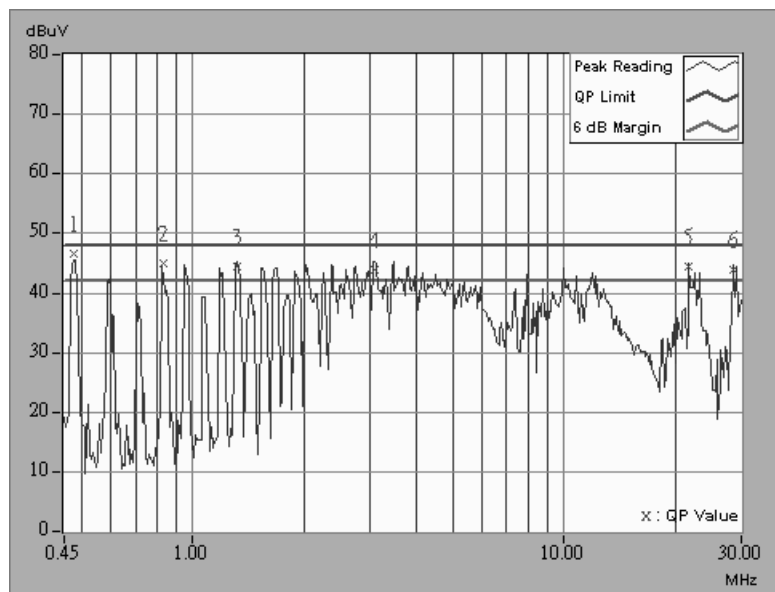


4.1.6 TEST RESULTS

<b>EUT</b>	Wireless LAN Router	<b>MODEL</b>	Rhine-II 210B
<b>MODE</b>	Channel 1	<b>6dB BANDWIDTH</b>	10 kHz
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60Hz	<b>PHASE</b>	Line (L)
<b>ENVIRONMENTAL CONDITIONS</b>	20 deg. C, 50%RH, 1005 hPa	<b>TESTED BY:</b> James Lee	

No	Freq. (MHz)	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			QP.	AV.	QP.	AV.	QP.	AV.	QP.	AV.
1	0.477	0.10	45.52	-	45.62	-	48.00	-	-2.38	-
2	0.832	0.10	43.76	-	43.86	-	48.00	-	-4.14	-
3	1.317	0.10	43.27	-	43.37	-	48.00	-	-4.63	-
4	3.088	0.21	42.70	-	42.91	-	48.00	-	-5.09	-
5	21.665	1.03	43.25	-	44.28	-	48.00	-	-3.72	-
6	28.688	1.17	42.86	-	44.03	-	48.00	-	-3.97	-

- Remarks:
1. "\*": Undetectable
  2. QP. and AV. are abbreviations of quasi-peak and average individually.
  3. "-": NA
  4. The emission levels of other frequencies were very low against the limit.
  5. Margin value = Emission level - Limit value
  6. Emission Level = Correction Factor + Reading Value.

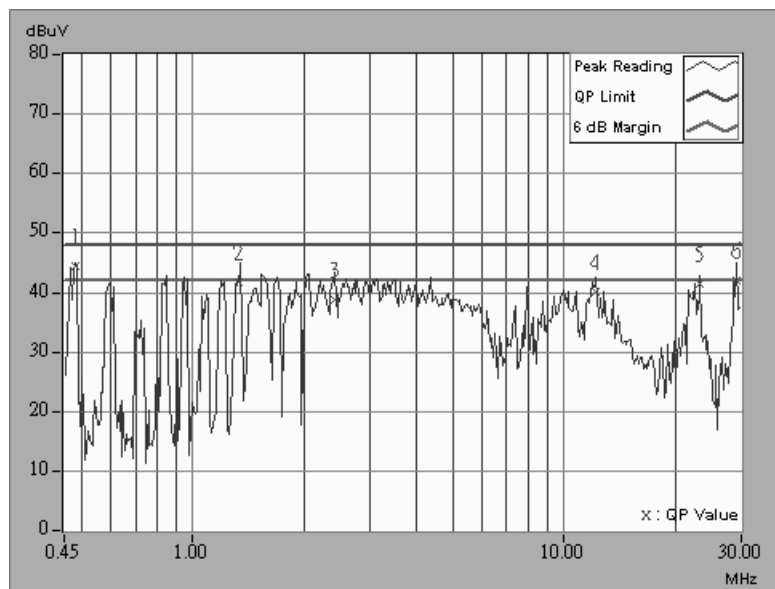




<b>EUT</b>	Wireless LAN Router	<b>MODEL</b>	Rhine-II 210B
<b>MODE</b>	Channel 1	<b>6dB BANDWIDTH</b>	10 kHz
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60Hz	<b>PHASE</b>	Neutral (N)
<b>ENVIRONMENTAL CONDITIONS</b>	20 deg. C, 50%RH, 1005 hPa	<b>TESTED BY:</b> James Lee	

No	Freq. (MHz)	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			QP.	AV.	QP.	AV.	QP.	AV.	QP.	AV.
1	0.484	0.10	43.59	-	43.69	-	48.00	-	-4.31	-
2	1.330	0.10	40.67	-	40.77	-	48.00	-	-7.23	-
3	2.403	0.14	37.72	-	37.86	-	48.00	-	-10.14	-
4	12.197	0.49	39.22	-	39.71	-	48.00	-	-8.29	-
5	23.128	0.86	40.39	-	41.25	-	48.00	-	-6.75	-
6	29.237	0.98	41.08	-	42.06	-	48.00	-	-5.94	-

- Remarks:
1. "-": Undetectable
  2. QP. and AV. are abbreviations of quasi-peak and average individually.
  3. "-": NA
  4. The emission levels of other frequencies were very low against the limit.
  5. Margin value = Emission level - Limit value
  6. Emission Level = Correction Factor + Reading Value.

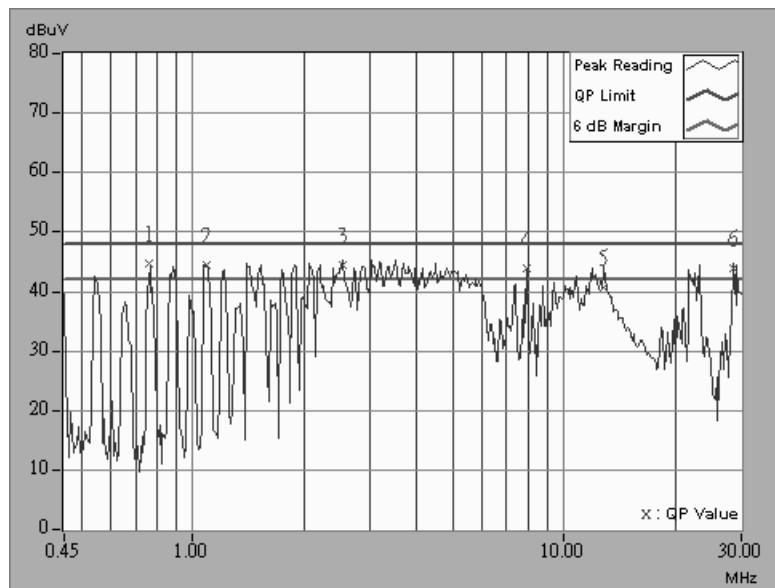




<b>EUT</b>	Wireless LAN Router	<b>MODEL</b>	Rhine-II 210B
<b>MODE</b>	Channel 6	<b>6dB BANDWIDTH</b>	10 kHz
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60Hz	<b>PHASE</b>	Line (L)
<b>ENVIRONMENTAL CONDITIONS</b>	20 deg. C, 50%RH, 1005 hPa	<b>TESTED BY:</b> James Lee	

No	Freq. (MHz)	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			QP.	AV.	QP.	AV.	QP.	AV.	QP.	AV.
1	0.764	0.10	43.54	-	43.64	-	48.00	-	-4.36	-
2	1.090	0.10	43.30	-	43.40	-	48.00	-	-4.60	-
3	2.529	0.15	43.14	-	43.29	-	48.00	-	-4.71	-
4	7.923	0.43	42.75	-	43.18	-	48.00	-	-4.82	-
5	12.809	0.67	39.57	-	40.24	-	48.00	-	-7.76	-
6	28.688	1.17	42.84	-	44.01	-	48.00	-	-3.99	-

- Remarks:
1. "\*" : Undetectable
  2. QP. and AV. are abbreviations of quasi-peak and average individually.
  3. "-" : NA
  4. The emission levels of other frequencies were very low against the limit.
  5. Margin value = Emission level - Limit value
  6. Emission Level = Correction Factor + Reading Value.

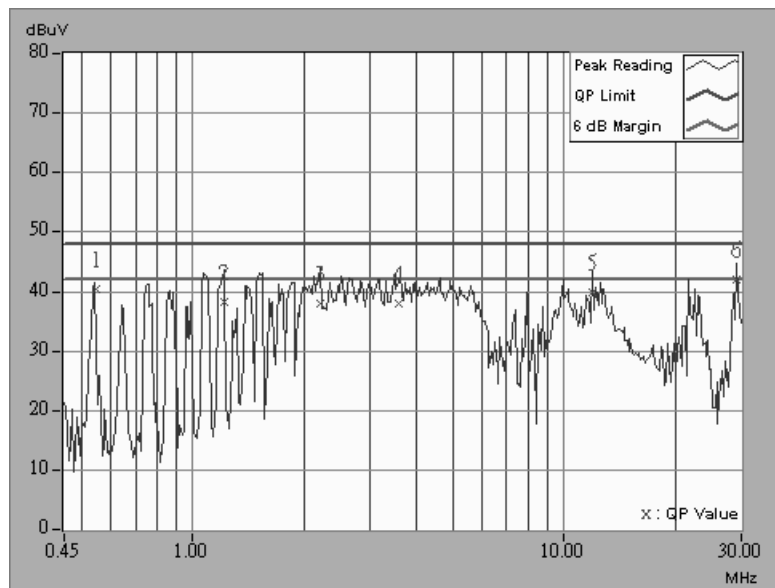




<b>EUT</b>	Wireless LAN Router	<b>MODEL</b>	Rhine-II 210B
<b>MODE</b>	Channel 6	<b>6dB BANDWIDTH</b>	10 kHz
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60Hz	<b>PHASE</b>	Neutral (N)
<b>ENVIRONMENTAL CONDITIONS</b>	20 deg. C, 50%RH, 1005 hPa	<b>TESTED BY:</b> James Lee	

No	Freq. (MHz)	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			QP.	AV.	QP.	AV.	QP.	AV.	QP.	AV.
1	0.551	0.10	39.48	-	39.58	-	48.00	-	-8.42	-
2	1.209	0.10	37.23	-	37.33	-	48.00	-	-10.67	-
3	2.197	0.12	36.90	-	37.02	-	48.00	-	-10.98	-
4	3.600	0.26	36.97	-	37.23	-	48.00	-	-10.77	-
5	11.893	0.48	39.01	-	39.49	-	48.00	-	-8.51	-
6	29.237	0.98	40.94	-	41.92	-	48.00	-	-6.08	-

- Remarks:
1. "\*\*": Undetectable
  2. QP. and AV. are abbreviations of quasi-peak and average individually.
  3. "-": NA
  4. The emission levels of other frequencies were very low against the limit.
  5. Margin value = Emission level - Limit value
  6. Emission Level = Correction Factor + Reading Value.

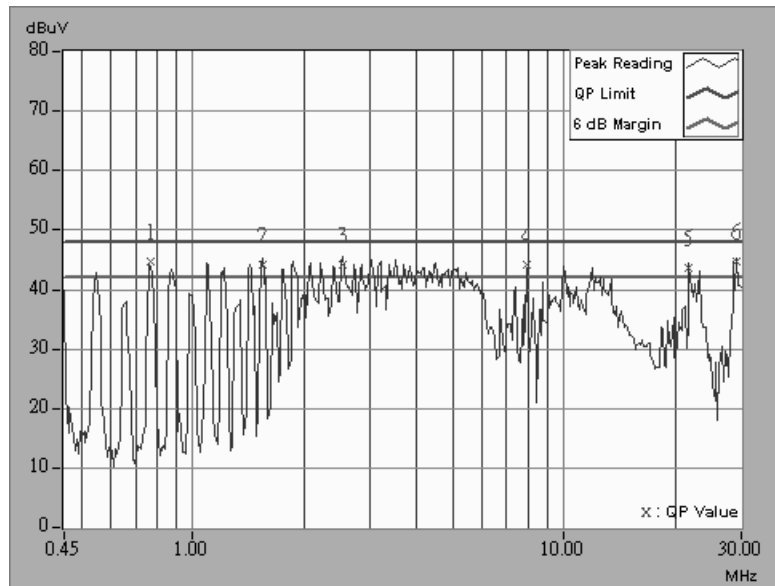




<b>EUT</b>	Wireless LAN Router	<b>MODEL</b>	Rhine-II 210B
<b>MODE</b>	Channel 11	<b>6dB BANDWIDTH</b>	10 kHz
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60Hz	<b>PHASE</b>	Line (L)
<b>ENVIRONMENTAL CONDITIONS</b>	20 deg. C, 50%RH, 1005 hPa	<b>TESTED BY:</b> James Lee	

No	Freq. (MHz)	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			QP.	AV.	QP.	AV.	QP.	AV.	QP.	AV.
1	0.767	0.10	43.56	-	43.66	-	48.00	-	-4.34	-
2	1.542	0.10	43.05	-	43.15	-	48.00	-	-4.85	-
3	2.525	0.15	43.02	-	43.17	-	48.00	-	-4.83	-
4	7.923	0.43	42.89	-	43.32	-	48.00	-	-4.68	-
5	21.665	1.03	42.32	-	43.35	-	48.00	-	-4.65	-
6	29.234	1.18	43.48	-	44.66	-	48.00	-	-3.34	-

- Remarks:
1. "\*": Undetectable
  2. QP. and AV. are abbreviations of quasi-peak and average individually.
  3. "-": NA
  4. The emission levels of other frequencies were very low against the limit.
  5. Margin value = Emission level - Limit value
  6. Emission Level = Correction Factor + Reading Value.



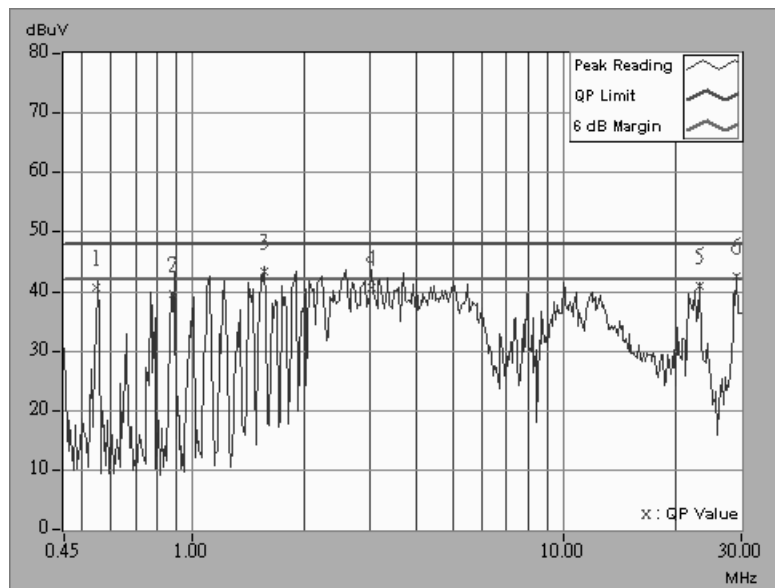




<b>EUT</b>	Wireless LAN Router	<b>MODEL</b>	Rhine-II 210B
<b>MODE</b>	Channel 11	<b>6dB BANDWIDTH</b>	10 kHz
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60Hz	<b>PHASE</b>	Neutral (N)
<b>ENVIRONMENTAL CONDITIONS</b>	20 deg. C, 50%RH, 1005 hPa	<b>TESTED BY:</b> James Lee	

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]		QP.	AV.	QP.	AV.	QP.	AV.	QP.	AV.
1	0.549	0.10	39.60	-	39.70	-	48.00	-	-8.30	-
2	0.883	0.10	38.51	-	38.61	-	48.00	-	-9.39	-
3	1.563	0.10	42.43	-	42.53	-	48.00	-	-5.47	-
4	3.015	0.20	39.57	-	39.77	-	48.00	-	-8.23	-
5	23.129	0.86	40.00	-	40.86	-	48.00	-	-7.14	-
6	29.237	0.98	41.68	-	42.66	-	48.00	-	-5.34	-

- Remarks:
1. "\*" : Undetectable
  2. QP. and AV. are abbreviations of quasi-peak and average individually.
  3. "-" : NA
  4. The emission levels of other frequencies were very low against the limit.
  5. Margin value = Emission level - Limit value
  6. Emission Level = Correction Factor + Reading Value.





## 4.2 RADIATED EMISSION MEASUREMENT

### 4.2.1 LIMITS OF RADIATED EMISSION MEASUREMENT

Field strength limits are at the distance of 3 meters, emissions radiated outside of the specified bands, shall be according to the general radiated limits in 15.209 as following:

Frequencies (MHz)	Field Strength of Fundamental	
	uV/m	dBuV/m
30-88	100	40.0
88-216	150	43.5
216-960	200	46.0
Above 960	500	54.0

**NOTE:**

1. The lower limit shall apply at the transition frequencies.
2. Emission level (dBuV/m) = 20 log Emission level (uV/m).
3. As shown in 15.35(b), for frequencies above 1000MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20dB under any condition of modulation.



## 4.2.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
* HP Spectrum Analyzer	8590L	3544A01176	May 7, 2002
* HP Preamplifier	8447D	2944A08485	May 7, 2002
* HP Preamplifier	8449B	3008A01201	Dec. 06, 2002
* HP Preamplifier	8449B	3008A01292	Aug. 21, 2002
* ROHDE & SCHWARZ TEST RECEIVER	ESMI	839013/007 839379/002	Jan. 25, 2002
SCHWARZBECK Tunable Dipole Antenna	VHA 9103 UHA 9105	E101051 E101055	Nov. 23, 2002
* CHASE BILOG Antenna	CBL6112A	2221	Aug. 2, 2002
* SCHWARZBECK Horn Antenna	BBHA9120-D1	D130	July 6, 2002
* EMCO Horn Antenna	3115	9312-4192	April 15, 2002
* EMCO Turn Table	1060	1115	NA
* SHOSHIN Tower	AP-4701	A6Y005	NA
* Software	AS61D4	NA	NA
* ANRITSU RF Switches	MP59B	M35046	Aug. 2, 2002
* TIMES RF cable	LMR-600	CABLE-ST5-01	Aug. 2, 2002
* Antenna (Horn)	BBHA9120-D	D130	July 10, 2002
Open Field Test Site	Site 5	ADT-R05	July 28, 2002
VCCI Site Registration No.	Site 5	R-1039	NA
Site Registration No.	FCC: 90422 Canada IC: IC 3789 VCCI : R-1039		

**NOTE:** 1.The measurement uncertainty is less than +/- 3.0dB, which is calculated as per the NAMAS document NIS81.

2.The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

3.“\*” = These equipments are used for the final measurement.



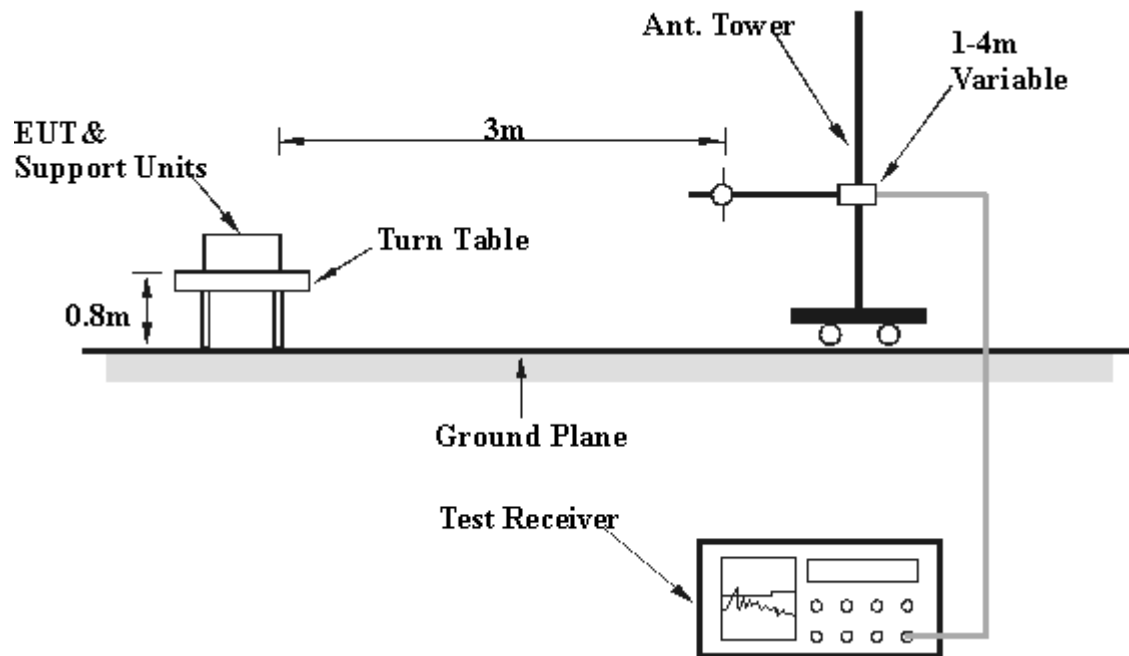
#### 4.2.3 TEST PROCEDURES

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 10 meter open area test site. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The antenna is a broadband antenna, and its height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- f. If the emission level of the EUT in peak mode was 10 dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10 dB margin would be re-tested one by one using the quasi-peak method or average method as specified and then reported in Data sheet peak mode and QP mode.

**NOTE:**

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection at frequency below 1GHz.
2. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1 MHz for Peak detection (PK) at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 300 Hz for Average detection (AV) at frequency above 1GHz.

#### 4.2.4 TEST SETUP



For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

#### 4.2.5 EUT OPERATING CONDITIONS

Same as 4.1.5.



## 4.2.6 TEST RESULTS

<b>EUT</b>	Wireless LAN Router	<b>MODEL</b>	Rhine-II 210B
<b>MODE</b>	Channel 11	<b>FREQUENCY RANGE</b>	30-1000 MHz
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60Hz	<b>DETECTOR FUNCTION</b>	Quasi-Peak
<b>ENVIRONMENTAL CONDITIONS</b>	18 deg. C, 70%RH, 1005 Hpa	<b>TESTED BY:</b> James Lee	

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M											
No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-Amp. Factor (dB)	Correction Factor (dB/m)
1	150.00	30.0 QP	43.50	-13.50	1.79H	59	18.50	10.30	1.20	0.00	-11.51
2	220.00	29.1 QP	46.00	-16.90	1.61H	138	17.50	10.12	1.51	0.00	-11.63
3	250.00	33.2 QP	46.00	-12.80	2.07H	278	19.50	12.02	1.66	0.00	-13.69
4	300.00	32.6 QP	46.00	-13.40	1.57H	313	17.50	13.18	1.88	0.00	-15.06
5	325.00	34.2 QP	46.00	-11.80	1.00H	279	18.50	13.72	1.96	0.00	-15.68
6	351.00	33.8 QP	46.00	-12.20	1.47H	302	17.50	14.21	2.04	0.00	-16.25
7	375.00	35.8 QP	46.00	-10.20	1.87H	208	18.50	15.13	2.14	0.00	-17.27
8	450.00	38.3 QP	46.00	-7.70	1.18H	84	19.50	16.37	2.41	0.00	-18.78
9	500.00	38.3 QP	46.00	-7.70	1.56H	54	18.50	17.26	2.50	0.00	-19.76
10	528.00	35.7 QP	46.00	-10.30	1.22H	146	15.50	17.62	2.60	0.00	-20.22
11	550.00	37.1 QP	46.00	-8.90	1.04H	178	16.50	17.93	2.68	0.00	-20.60
12	625.00	40.3 QP	46.00	-5.70	1.47H	271	18.50	18.91	2.92	0.00	-21.83
13	650.30	37.8 QP	46.00	-8.20	1.27H	298	15.50	19.23	3.02	0.00	-22.25
14	750.10	38.9 QP	46.00	-7.10	1.81H	335	15.50	20.18	3.26	0.00	-23.44
15	850.00	37.5 QP	46.00	-8.50	1.18H	250	13.50	20.48	3.50	0.00	-23.98

- NOTE:**
- 1 Emission level = Raw Value - Correction Factor
  - 2 Correction Factor = External Preamp. Gain - Ant. Factor - Cable loss  
(External Preamp. Gain = 0, when the test receiver is used for the test.)
  - 3 The other emission levels were very low against the limit.
  - 4 Margin value = Emission level - Limit value



<b>EUT</b>	Wireless LAN Router	<b>MODEL</b>	Rhine-II 210B
<b>MODE</b>	Channel 11	<b>FREQUENCY RANGE</b>	30-1000 MHz
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60Hz	<b>DETECTOR FUNCTION</b>	Quasi-Peak
<b>ENVIRONMENTAL CONDITIONS</b>	18 deg. C, 70%RH, 1005 Hpa	<b>TESTED BY:</b> James Lee	

### ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-Amp. Factor (dB)	Correction Factor (dB/m)
1	150.00	30.5 QP	43.50	-13.0	1.02V	32	19.00	10.30	1.20	0.00	-11.51
2	220.00	31.4 QP	46.00	-14.6	1.22V	355	19.80	10.12	1.51	0.00	-11.63
3	250.00	32.3 QP	46.00	-13.7	0.99V	269	18.60	12.02	1.66	0.00	-13.69
4	325.00	32.2 QP	46.00	-13.8	1.57V	356	16.50	13.72	1.96	0.00	-15.68
5	350.00	32.1 QP	46.00	-13.9	1.29V	5	15.80	14.21	2.04	0.00	-16.25
6	352.00	32.8 QP	46.00	-13.2	1.53V	267	16.40	14.31	2.05	0.00	-16.36
7	375.00	35.8 QP	46.00	-10.2	1.78V	342	18.50	15.13	2.14	0.00	-17.27
8	400.00	36.2 QP	46.00	-9.8	0.99V	239	17.90	16.11	2.24	0.00	-18.35
9	450.00	37.3 QP	46.00	-8.7	1.63V	342	18.50	16.37	2.41	0.00	-18.78
10	500.00	35.4 QP	46.00	-10.6	1.97V	18	15.60	17.26	2.50	0.00	-19.76
11	528.00	36.0 QP	46.00	-10.0	1.25V	250	15.80	17.62	2.60	0.00	-20.22
12	550.00	37.5 QP	46.00	-8.5	1.48V	327	16.86	17.93	2.68	0.00	-20.60
13	600.00	37.2 QP	46.00	-8.8	1.02V	0	15.80	18.61	2.83	0.00	-21.44
14	625.00	41.3 QP	46.00	-4.7	1.78V	91	19.50	18.91	2.92	0.00	-21.83
15	650.00	38.7 QP	46.00	-7.3	0.99V	48	16.40	19.23	3.02	0.00	-22.25
16	750.00	38.9 QP	46.00	-7.1	1.78V	144	15.50	20.18	3.26	0.00	-23.44
17	792.00	36.4 QP	46.00	-9.6	1.39V	96	12.50	20.60	3.31	0.00	-23.91
18	850.00	38.6 QP	46.00	-7.4	1.22V	30	14.60	20.48	3.50	0.00	-23.98

- NOTE:**
- 1 Emission level = Raw Value - Correction Factor
  - 2 Correction Factor = External Preamp. Gain - Ant. Factor - Cable loss  
(External Preamp. Gain = 0, when the test receiver is used for the test.)
  - 3 The other emission levels were very low against the limit.
  - 4 Margin value = Emission level - Limit value



<b>EUT</b>	Wireless LAN Router	<b>MODEL</b>	Rhine-II 210B
<b>MODE</b>	Channel 1	<b>FREQUENCY RANGE</b>	Above 1000 MHz
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60Hz	<b>DETECTOR FUNCTION</b>	Peak(PK) Average (AV)
<b>ENVIRONMENTAL CONDITIONS</b>	18 deg. C, 70%RH, 1005 Hpa	<b>TESTED BY:</b> James Lee	

<b>ANTENNA POLARITY &amp; TEST DISTANCE: HORIZONTAL AT 3 M</b>											
No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-Amp. Factor (dB)	Correction Factor (dB/m)
1	2037.8	47.7 PK	74.00	-26.30	1.64H	8	52.50	25.20	4.86	34.90	4.84
2	*2410.8	104.1 PK	-	-	1.96H	348	71.90	27.11	5.10	0.00	-32.21
3	*2410.8	98.1 AV	-	-	1.96H	348	65.90	27.11	5.10	0.00	-32.21
4	4075.5	48.9 PK	74.00	-25.10	1.00H	74	46.50	30.13	6.78	34.52	-2.39
5	6113.5	50.0 PK	74.00	-24.00	1.17H	317	43.60	32.80	8.23	34.60	-6.43

<b>ANTENNA POLARITY &amp; TEST DISTANCE: VERTICAL AT 3 M</b>											
No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-Amp. Factor (dB)	Correction Factor (dB/m)
1	2037.9	49.5 PK	74.00	-24.50	1.22V	350	54.30	25.20	4.86	34.90	4.84
2	*2411.0	106.9 PK	-	-	1.47V	29	74.70	27.11	5.10	0.00	-32.22
3	*2411.0	100.9 AV	-	-	1.47V	29	68.70	27.11	5.10	0.00	-32.22
4	4075.5	49.9 PK	74.00	-24.10	1.52V	181	47.50	30.13	6.78	34.52	-2.39
5	6113.0	50.9 PK	74.00	-23.10	1.14V	165	44.50	32.80	8.23	34.60	-6.43

- NOTE:**
1. Emission level = Raw Value - Correction Factor
  2. Correction Factor = External Preamp. Gain - Ant. Factor - Cable loss  
(External Preamp. Gain = 0, when the test receiver is used for the test.)
  3. The other emission levels were very low against the limit.
  4. Margin value = Emission level - Limit value
  5. The limit value is defined as per 15.247
  6. " \* " : Fundamental frequency





<b>EUT</b>	Wireless LAN Router	<b>MODEL</b>	Rhine-II 210B
<b>MODE</b>	Channel 6	<b>FREQUENCY RANGE</b>	Above 1000 MHz
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60Hz	<b>DETECTOR FUNCTION</b>	Peak(PK) Average (AV)
<b>ENVIRONMENTAL CONDITIONS</b>	18 deg. C, 70%RH, 1005 Hpa	<b>TESTED BY:</b> James Lee	

<b>ANTENNA POLARITY &amp; TEST DISTANCE: HORIZONTAL AT 3 M</b>											
No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-Amp. Factor (dB)	Correction Factor (dB/m)
1	2063.0	48.8 PK	74.00	-25.20	1.10H	347	53.30	25.41	4.96	34.90	4.53
2	*2438.5	104.3 PK	-	-	1.25H	12	71.90	27.33	5.08	0.00	-32.41
3	*2438.5	98.3 AV	-	-	1.25H	12	65.90	27.33	5.08	0.00	-32.41
4	4125.5	49.0 PK	74.00	-25.00	1.17H	234	46.50	30.32	6.70	34.56	-2.46
5	6188.3	51.0 PK	74.00	-23.00	1.00H	135	44.50	33.14	8.01	34.60	-6.55

<b>ANTENNA POLARITY &amp; TEST DISTANCE: VERTICAL AT 3 M</b>											
No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-Amp. Factor (dB)	Correction Factor (dB/m)
1	2062.8	49.0 PK	74.00	-25.00	1.85V	351	53.50	25.41	4.96	34.90	4.53
2	*2438.5	105.7 PK	-	-	1.41V	344	73.30	27.33	5.08	0.00	-32.40
3	*2438.5	97.7 AV	-	-	1.41V	344	65.30	27.33	5.08	0.00	-32.40
4	4125.5	50.0 PK	74.00	-24.00	1.59V	4	47.50	30.32	6.70	34.56	-2.46
5	6188.3	51.5 PK	74.00	-22.50	1.15V	333	45.00	33.14	8.01	34.60	-6.55

- NOTE:**
1. Emission level = Raw Value - Correction Factor
  2. Correction Factor = External Preamp. Gain - Ant. Factor - Cable loss  
(External Preamp. Gain = 0, when the test receiver is used for the test.)
  3. The other emission levels were very low against the limit.
  4. Margin value = Emission level - Limit value
  5. The limit value is defined as per 15.247
  6. “ \* “ : Fundamental frequency



<b>EUT</b>	Wireless LAN Router	<b>MODEL</b>	Rhine-II 210B
<b>MODE</b>	Channel 11	<b>FREQUENCY RANGE</b>	Above 1000 MHz
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60Hz	<b>DETECTOR FUNCTION</b>	Peak(PK) Average (AV)
<b>ENVIRONMENTAL CONDITIONS</b>	18 deg. C, 70%RH, 1005 Hpa	<b>TESTED BY:</b> James Lee	

#### ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-Amp. Factor (dB)	Correction Factor (dB/m)
1	2087.8	49.3 PK	74.00	-24.70	1.15H	346	53.60	25.62	5.02	34.90	4.26
2	*2463.5	104.9 PK	-	-	1.33H	350	72.50	27.33	5.08	0.00	-32.41
3	*2463.5	98.9 AV	-	-	1.33H	350	66.50	27.33	5.08	0.00	-32.41
4	2483.5	50.2 PK	74.00	-23.80	1.25H	47	52.50	27.54	5.06	34.90	2.32
5	4175.6	50.5 PK	74.00	-23.50	1.47H	351	48.00	30.41	6.68	34.58	-2.51
6	6263.3	50.0 PK	74.00	-24.00	1.06H	4	43.00	33.48	8.13	34.60	-7.01

#### ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-Amp. Factor (dB)	Correction Factor (dB/m)
1	2087.7	48.3 PK	74.00	-25.70	1.82V	27	52.60	25.62	5.02	34.90	4.26
2	*2463.4	105.2 PK	-	-	1.21V	354	72.80	27.33	5.08	0.00	-32.40
3	*2463.4	99.2 AV	-	-	1.21V	354	66.80	27.33	5.08	0.00	-32.40
4	2483.5	51.9 PK	74.00	-22.10	1.40V	15	54.20	27.54	5.06	34.90	2.31
5	4175.5	50.0 PK	74.00	-24.00	1.19V	351	47.50	30.41	6.68	34.58	-2.51
6	6263.2	50.5 PK	74.00	-23.50	1.20V	250	43.50	33.48	8.13	34.60	-7.01

- NOTE:**
1. Emission level= Raw Value - Correction Factor
  2. Correction Factor = External Preamp. Gain - Ant. Factor - Cable loss  
(External Preamp. Gain = 0, when the test receiver is used for the test.)
  3. The other emission levels were very low against the limit.
  4. Margin value = Emission level - Limit value
  5. The limit value is defined as per 15.247
  6. " \* " : Fundamental frequency

### 4.3 6DB BANDWIDTH MEASUREMENT

#### 4.3.1 LIMITS OF 6dB BANDWIDTH MEASUREMENT

The minimum of 6dB Bandwidth Measurement is 0.5 MHz.

#### 4.3.2 TEST INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
ROHDE & SCHWARZ TEST RECEIVER	ESMI	839013/007	Jan. 25, 2002
HP ATTENUATOR	8496B	3247A18505	Cal. on use
HP PLOTTER	7475A	2641V27755	N/A

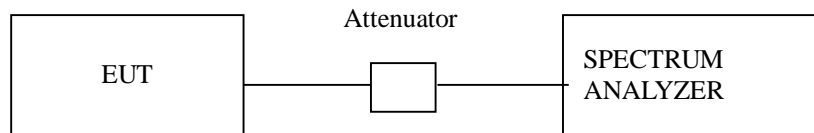
#### NOTES:

1. The measurement uncertainty is less than +/- 2.6dB, which is calculated as per the NAMAS document NIS81.
2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

### 4.3.3 TEST PROCEDURE

The transmitter output was connected to the spectrum analyzer through an attenuator. The bandwidth of the fundamental frequency was measured by spectrum analyzer with 100 kHz RBW and 100 kHz VBW. The 6 dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 6 dB.

### 4.3.4 TEST SETUP



### 4.3.5 EUT OPERATING CONDITIONS

The software provided by client to enable the EUT under transmission condition continuously at lowest, middle and highest channel frequencies individually.



4.3.6 TEST RESULTS

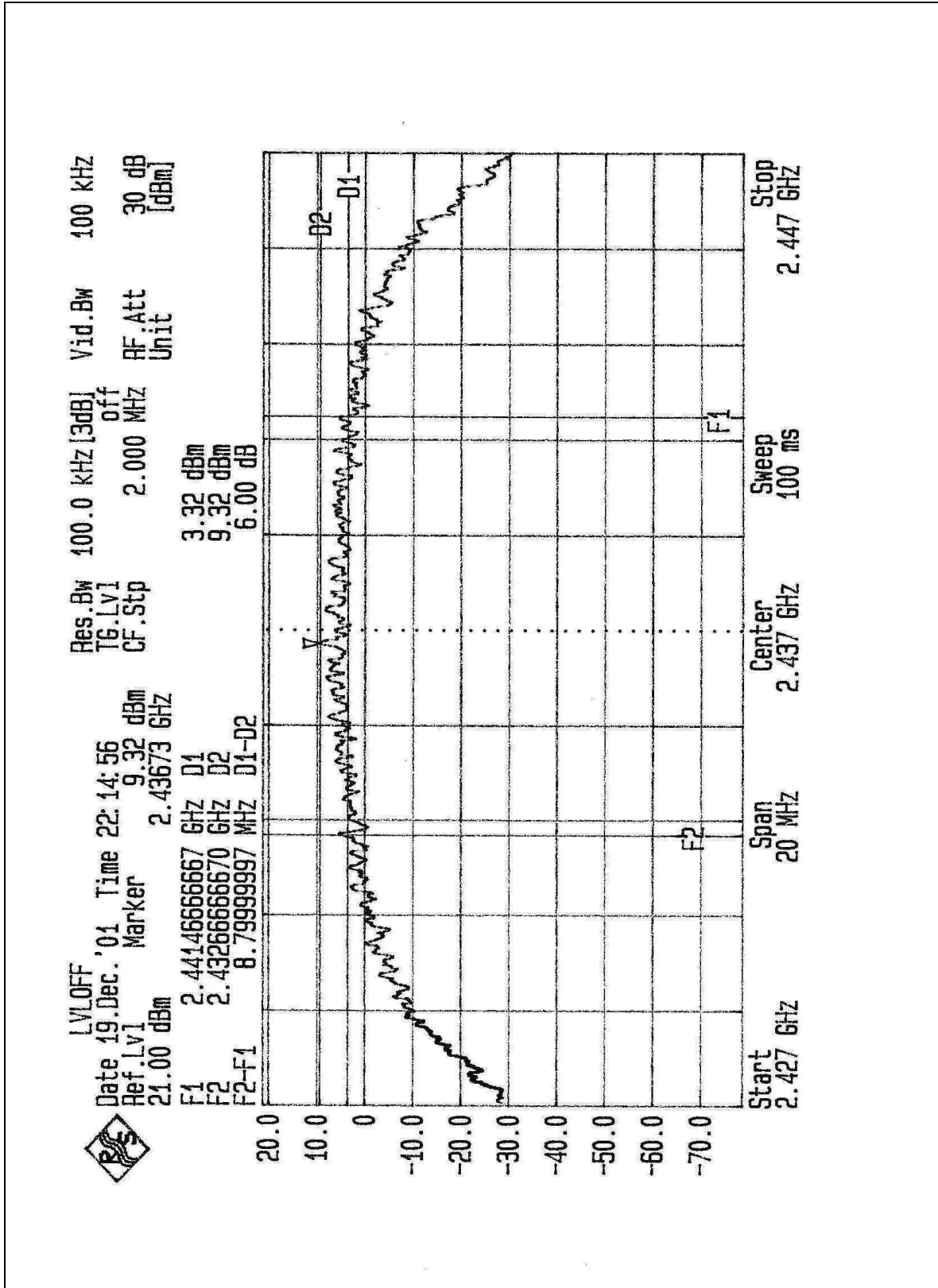
<b>EUT</b>	Wireless LAN Router	<b>MODEL</b>	Rhine-II 210B
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60Hz	<b>ENVIRONMENTAL CONDITIONS</b>	18 deg. C, 50%RH, 1005 hPa
<b>TESTED BY:</b> Bruce Shiau			

<b>CHANNEL</b>	<b>CHANNEL FREQUENCY (MHz)</b>	<b>6 dB BANDWIDTH (MHz)</b>	<b>MINIMUM LIMIT (MHz)</b>	<b>PASS/FAIL</b>
1	2412	8.84	0.5	PASS
6	2437	8.80	0.5	PASS
11	2462	8.80	0.5	PASS



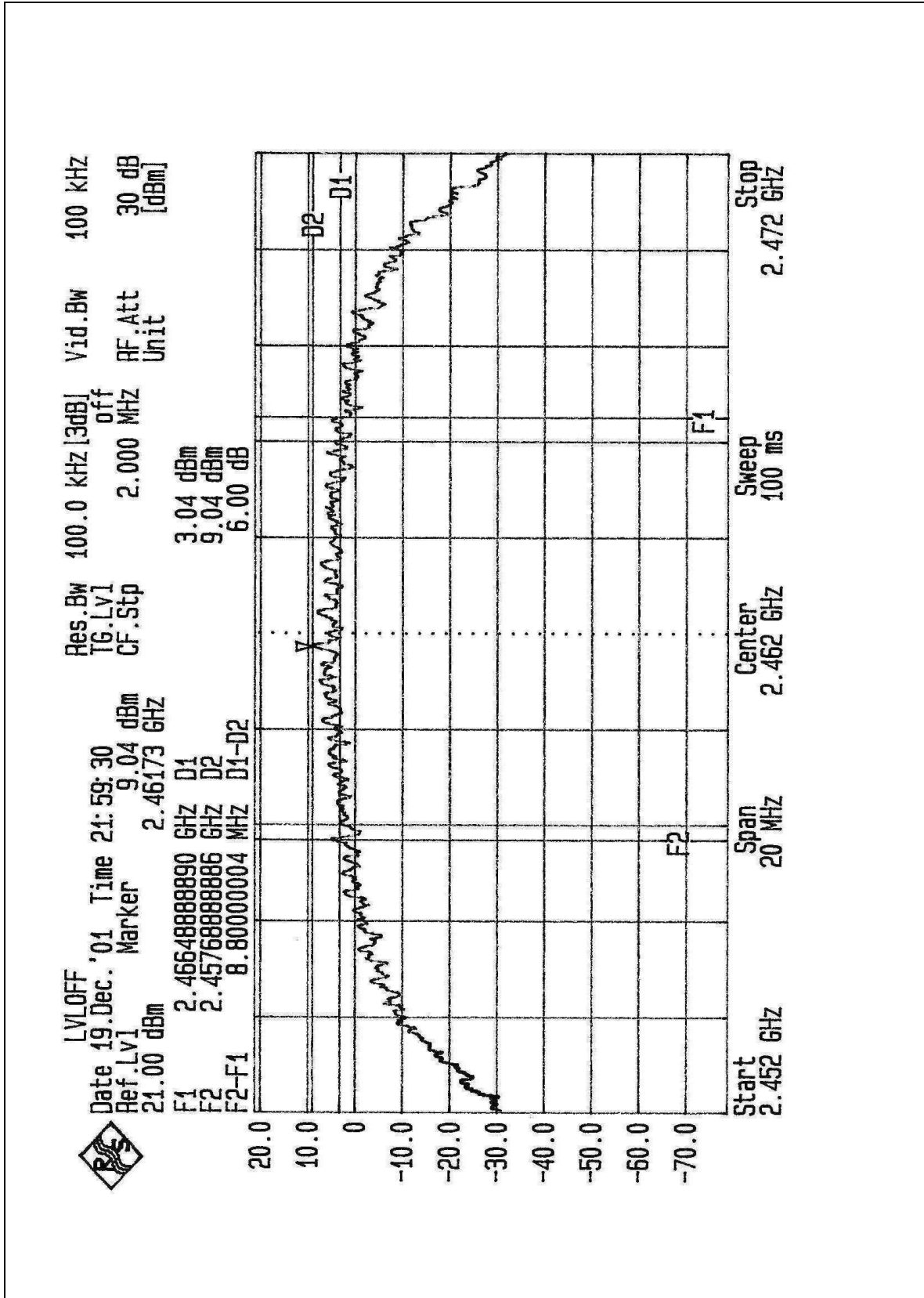


CH6





CH11







#### 4.4 MAXIMUM PEAK OUTPUT POWER

##### 4.4.1 LIMITS OF MAXIMUM PEAK OUTPUT POWER MEASUREMENT

The Maximum Peak Output Power Measurement is 30dBm.

##### 4.4.2 INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
SINGLE CHANNEL POWER METER	NRVS	100026	Feb. 21, 2002
PEAK POWER SENSOR	NRV-Z32	100013	May 23, 2002
HP PLOTTER	7475A	2641V27755	N/A

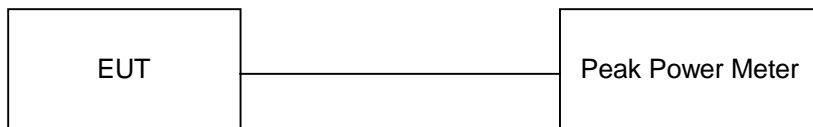
**NOTE:**

1. The measurement uncertainty is less than +/- 2.6dB, which is calculated as per the NAMAS document NIS81.
2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

#### 4.4.3 TEST PROCEDURES

1. The transmitter output was connected to the peak power meter.

#### 4.4.4 TEST SETUP



#### 4.4.5 EUT OPERATING CONDITIONS

Same as Item 3.4.5



4.4.6 TEST RESULTS

<b>EUT</b>	Wireless LAN Router	<b>MODEL</b>	Rhine-II 210B
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60Hz	<b>ENVIRONMENTAL CONDITIONS</b>	18 deg. C, 50%RH, 1005 hPa
<b>TESTED BY:</b> Bruce Shiau			

<b>CHANNEL</b>	<b>CHANNEL FREQUENCY (MHz)</b>	<b>PEAK POWER OUTPUT (dBm)</b>	<b>PEAK POWER LIMIT (dBm)</b>	<b>PASS/FAIL</b>
1	2412	16.12	30	PASS
6	2437	16.97	30	PASS
11	2462	16.78	30	PASS