



# FCC TEST REPORT

**REPORT NO.:** RF900618R04

**MODEL NO.:** WL-250F

**RECEIVED:** June 18, 2001

**TESTED:** June 28 ~ July 9, 2001

**APPLICANT:** GEMTEK TECHNOLOGY CO., LTD.

**ADDRESS:** No.1, Jen Ai Road, Hsinchu Industrial Park Hukou,  
Hsinchu, Taiwan, R.O.C.

**ISSUED BY:** Advance Data Technology Corporation

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

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0528



Lab Code: 200102-0

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## 1 CERTIFICATION

**PRODUCT :** 11Mbps Wireless LAN Mini-PCI Card  
**BRAND NAME :** GemTek  
**MODEL NO. :** WL-250F  
**APPLICANT :** GEMTEK TECHNOLOGY CO., LTD.  
**STANDARDS :** 47 CFR Part 15, Subpart C (Section 15.247),  
ANSI C63.4-1992

We, **Advance Data Technology Corporation**, hereby certify that one sample of the designation has been tested in our facility from June 28, 2001 to July 9, 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:** Gary Chang, **DATE:** Aug. 3, 2001  
Gary Chang

**CHECKED BY:** Demi Chen, **DATE:** Aug. 3, 2001  
Demi Chen

**APPROVED BY:** Alan Lane, **DATE:** Aug 3, 2001  
Dr. Alan Lane  
Manager

## 2 SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

APPLIED STANDARD: 47 CFR Part 15, Subpart C			
Standard Section	Test Type and Limit	Result	REMARK
15.107	AC Power Conducted Emission Limit: 48dBuV	PASS	Meet the requirement of limit Minimum passing margin is -9.50dBuV at 22.57031MHz
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)	Transmitter Radiated Emissions Limit: Table 15.209	PASS	Meet the requirement of limit Minimum passing margin is -2.2dBuV at 134.50 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>	11Mbps Wireless LAN Mini-PCI Card
<b>MODEL NO.</b>	WL-250F
<b>POWER SUPPLY</b>	3.3VDC from notebook
<b>MODULATION TYPE</b>	CCK, BPSK, QPSK
<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>	14dBm
<b>ANTENNA TYPE</b>	Dipole antenna
<b>DATA CABLE</b>	NA
<b>I/O PORTS</b>	NA
<b>ASSOCIATED DEVICES</b>	NA

**NOTE:**

1. Wireless LAN (Local Area Networks) systems offer a great number of advantages over a traditional, wired system. Wireless LANs (WLANs) are more flexible, easier to setup and manage and often more cost effective than their wired equivalence.
2. For a more detailed features description, please refer to the manufacturer's specifications or 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 11Mbps Wireless LAN Mini-PCI Card. 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**

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	DELL	PP01L	TW-0791C1H-12800-OAI-1597	FCC DoC Approved
2	PRINTER	HP	2225C+	3123S97230	DSI6XU2225
3	MODEM	ACEEX	1414	980020510	IFAXDM1414

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	NA
2	1.2m braid shielded wire, terminated with DB25 and Centronics connector via metallic frame, w/o core.
3	1.2 m braid shielded wire, terminated with DB25 and DB9 connector via metallic frame, w/o core.

**NOTE:** All power cords of the above support units are nonshielded (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	Nov. 28, 2001
ROHDE & SCHWARZ 2-wire ISN	ENY22	837497/016	Dec. 3, 2001
*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 9, 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

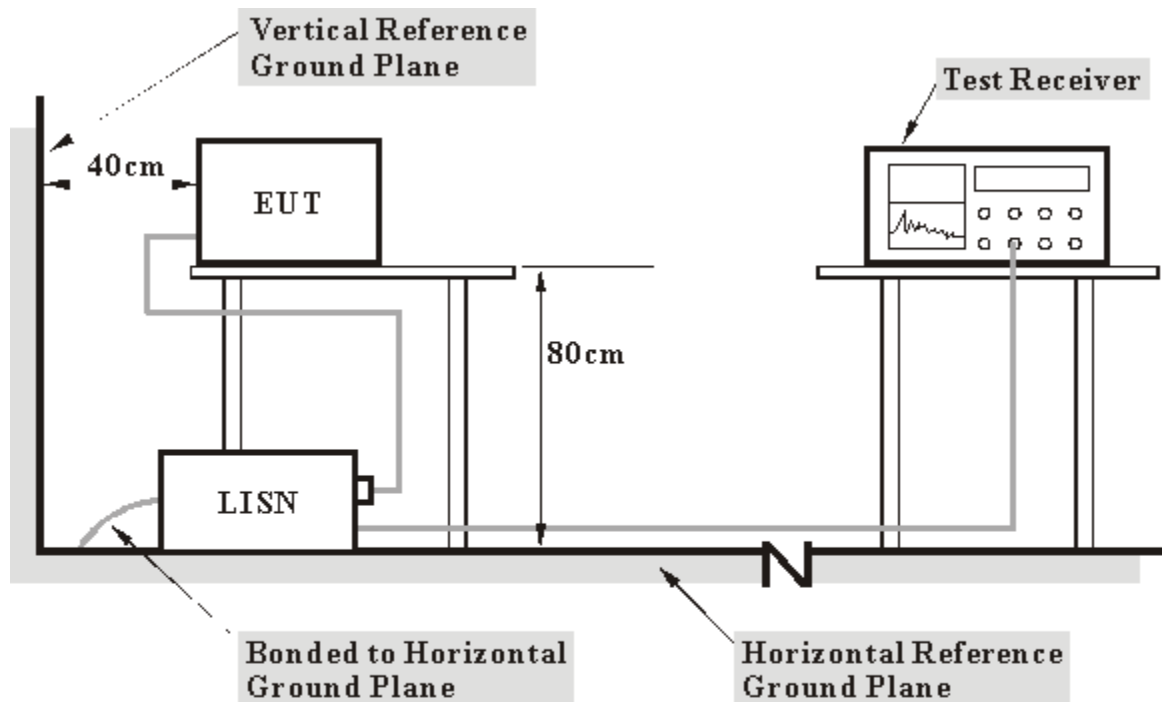
**NOTE:**

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

- 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.
- Both lines of the power mains connected to the EUT were checked for maximum conducted interference.
- 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:**
- Support units were connected to second LISN.
  - 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. Connected the EUT to a computer system placed on a testing table.
- b. The computer system ran a test program to enable EUT under transmission/receiving condition continuously at specific channel frequency.
- c. The computer system sent "H" messages to 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.

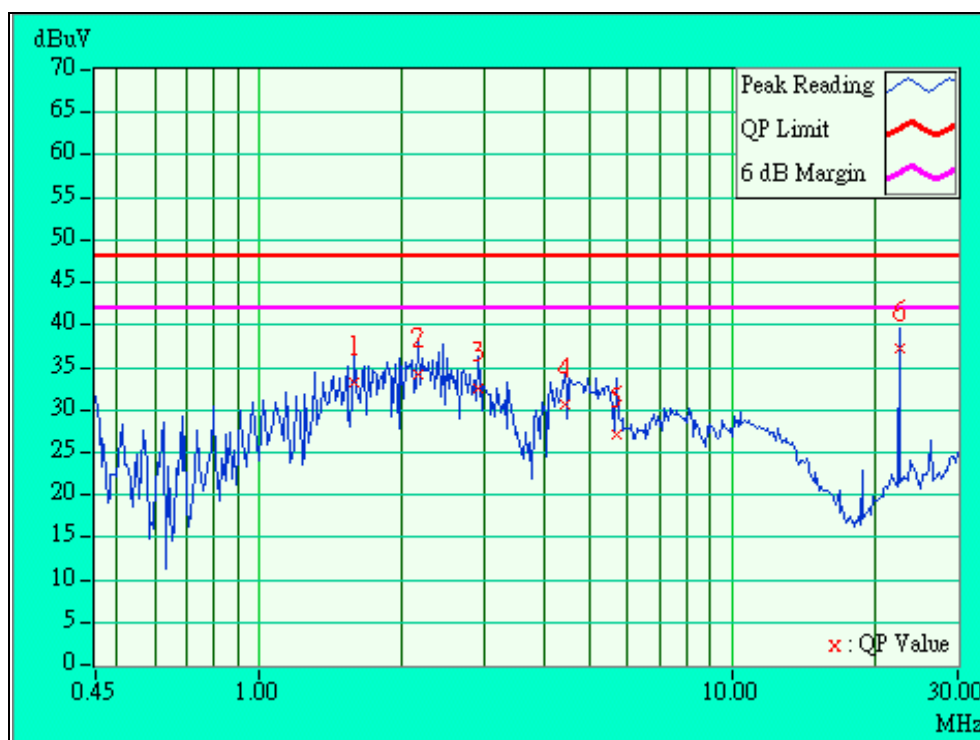
## 4.1.6 TEST RESULTS

<b>EUT</b>	11Mbps Wireless LAN Mini-PCI Card	<b>MODEL</b>	WL-250F
<b>MODE</b>	Channel 1	<b>6dB BANDWIDTH</b>	10 kHz
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60 Hz	<b>PHASE</b>	Line (L)
<b>ENVIRONMENTAL CONDITIONS</b>	25 deg. C, 55%RH, 1005 hPa	<b>TESTED BY:</b> Gary Chang	

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	1.58984	0.20	33.26	-	33.46	-	48.00	-	-14.54	-
2	2.15746	0.22	34.26	-	34.48	-	48.00	-	-13.52	-
3	2.89453	0.29	32.62	-	32.91	-	48.00	-	-15.09	-
4	4.42969	0.42	30.68	-	31.10	-	48.00	-	-16.90	-
5	5.67578	0.48	27.05	-	27.53	-	48.00	-	-20.47	-
6	22.57031	1.25	37.19	-	38.44	-	48.00	-	-9.56	-

**NOTE:**

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

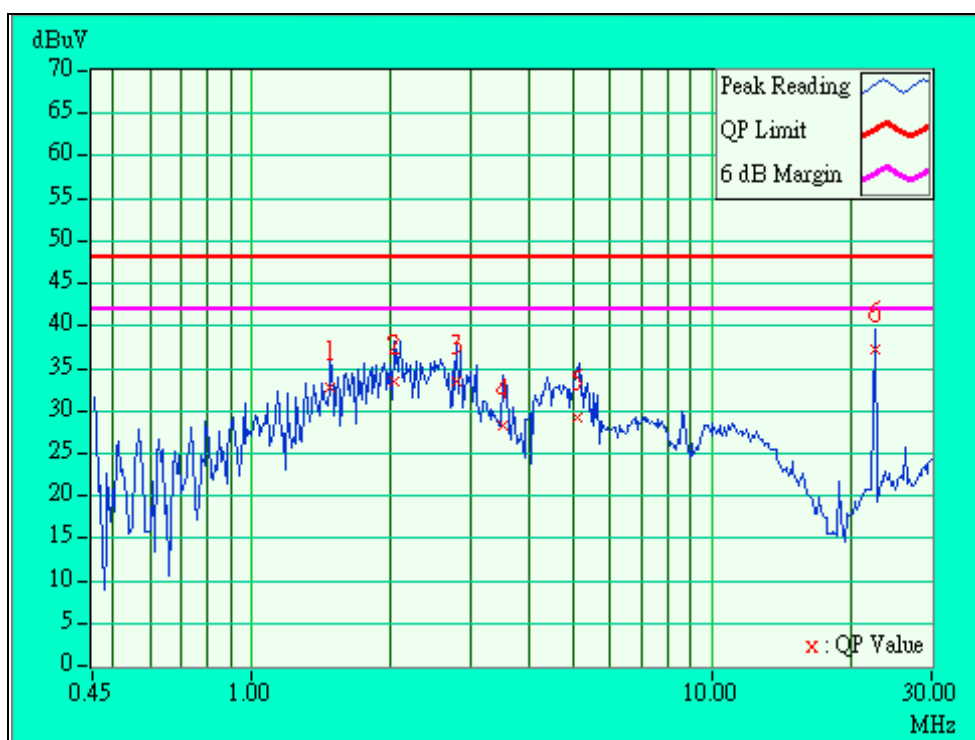


<b>EUT</b>	11Mbps Wireless LAN Mini-PCI Card	<b>MODEL</b>	WL-250F
<b>MODE</b>	Channel 1	<b>6dB BANDWIDTH</b>	10 kHz
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60 Hz	<b>PHASE</b>	Neutral (N)
<b>ENVIRONMENTAL CONDITIONS</b>	25 deg. C, 55%RH, 1005 hPa	<b>TESTED BY:</b> Gary Chang	

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	1.47656	0.20	32.83	-	33.03	-	48.00	-	-14.97	-
2	2.04688	0.20	33.36	-	33.56	-	48.00	-	-14.44	-
3	2.78125	0.28	33.46	-	33.74	-	48.00	-	-14.26	-
4	3.51953	0.35	28.35	-	28.70	-	48.00	-	-19.30	-
5	5.10723	0.44	29.34	-	29.78	-	48.00	-	-18.22	-
6	22.57031	1.15	37.35	-	38.50	-	48.00	-	-9.50	-

**NOTE:**

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

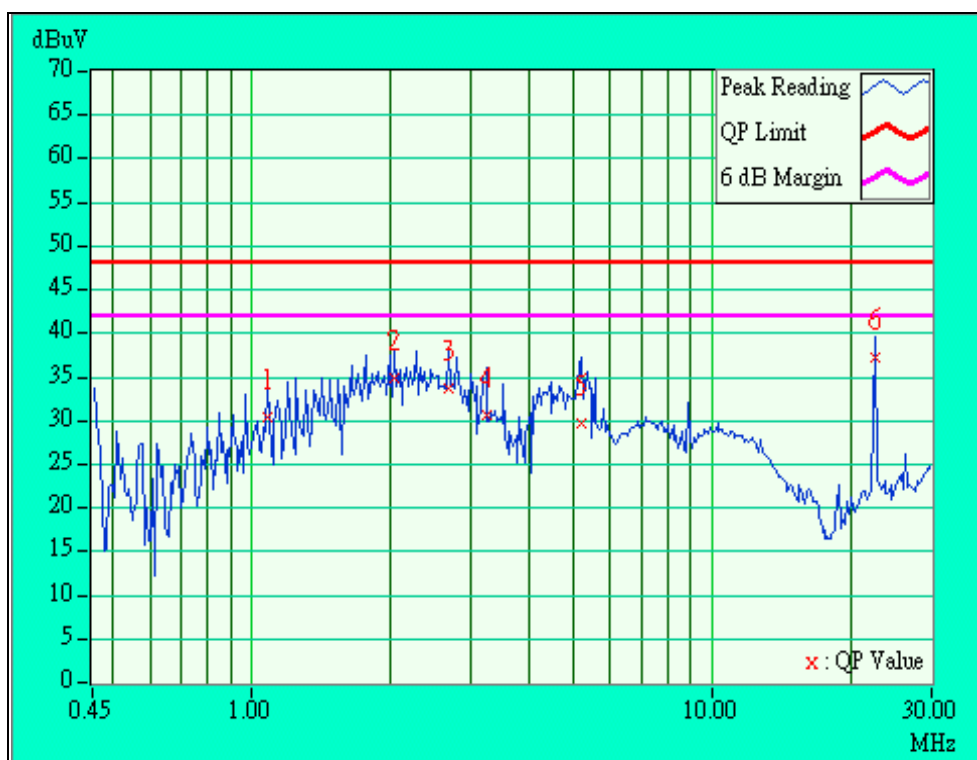


<b>EUT</b>	11Mbps Wireless LAN Mini-PCI Card	<b>MODEL</b>	WL-250F
<b>MODE</b>	Channel 6	<b>6dB BANDWIDTH</b>	10 kHz
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60 Hz	<b>PHASE</b>	Line (L)
<b>ENVIRONMENTAL CONDITIONS</b>	25 deg. C, 55%RH, 1005 hPa	<b>TESTED BY:</b> Gary Chang	

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	1.07813	0.20	30.46	-	30.66	-	48.00	-	-17.34	-
2	2.04297	0.20	34.84	-	35.04	-	48.00	-	-12.96	-
3	2.66711	0.27	33.73	-	34.00	-	48.00	-	-14.00	-
4	3.23828	0.32	30.63	-	30.95	-	48.00	-	-17.05	-
5	5.22266	0.46	29.80	-	30.26	-	48.00	-	-17.74	-
6	22.57031	1.25	37.19	-	38.44	-	48.00	-	-9.56	-

**NOTE:**

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

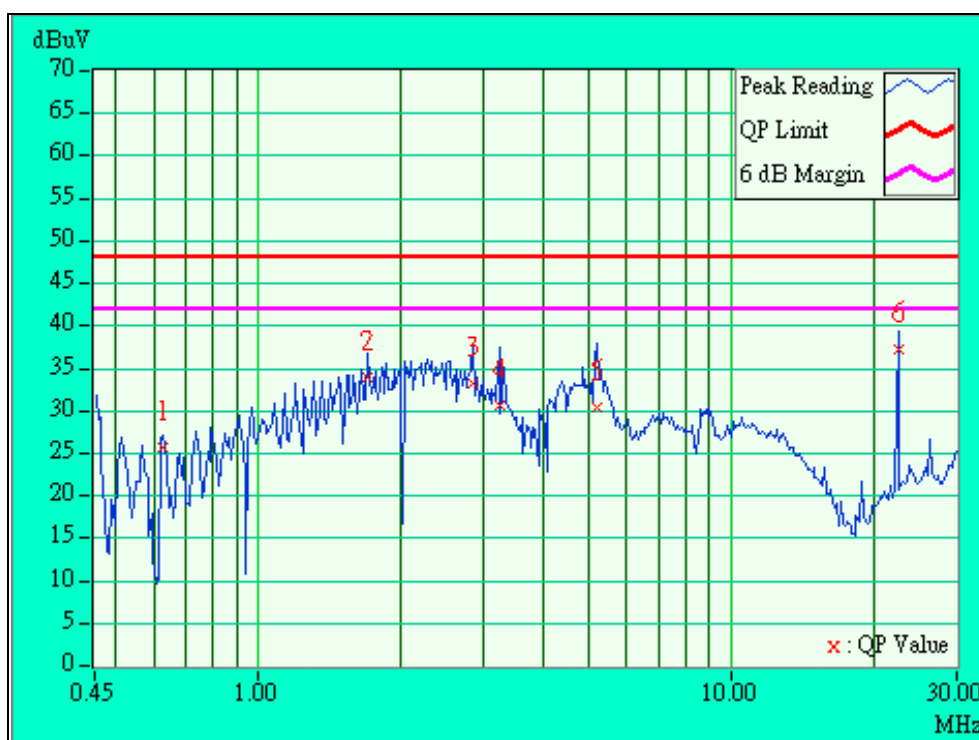


<b>EUT</b>	11Mbps Wireless LAN Mini-PCI Card	<b>MODEL</b>	WL-250F
<b>MODE</b>	Channel 6	<b>6dB BANDWIDTH</b>	10 kHz
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60 Hz	<b>PHASE</b>	Neutral (N)
<b>ENVIRONMENTAL CONDITIONS</b>	25 deg. C, 55%RH, 1005 hPa	<b>TESTED BY:</b> Gary Chang	

No	Freq.	Corr. Factor	Reading Value [dB (Uv)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.62578	0.20	25.59	-	25.79	-	48.00	-	-22.21	-
2	1.70313	0.20	33.86	-	34.06	-	48.00	-	-13.94	-
3	2.83835	0.28	33.24	-	33.52	-	48.00	-	-14.48	-
4	3.23828	0.32	30.69	-	31.01	-	48.00	-	-16.99	-
5	5.22656	0.44	30.42	-	30.86	-	48.00	-	-17.14	-
6	22.57031	1.15	37.35	-	38.50	-	48.00	-	-9.50	-

**NOTE:**

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

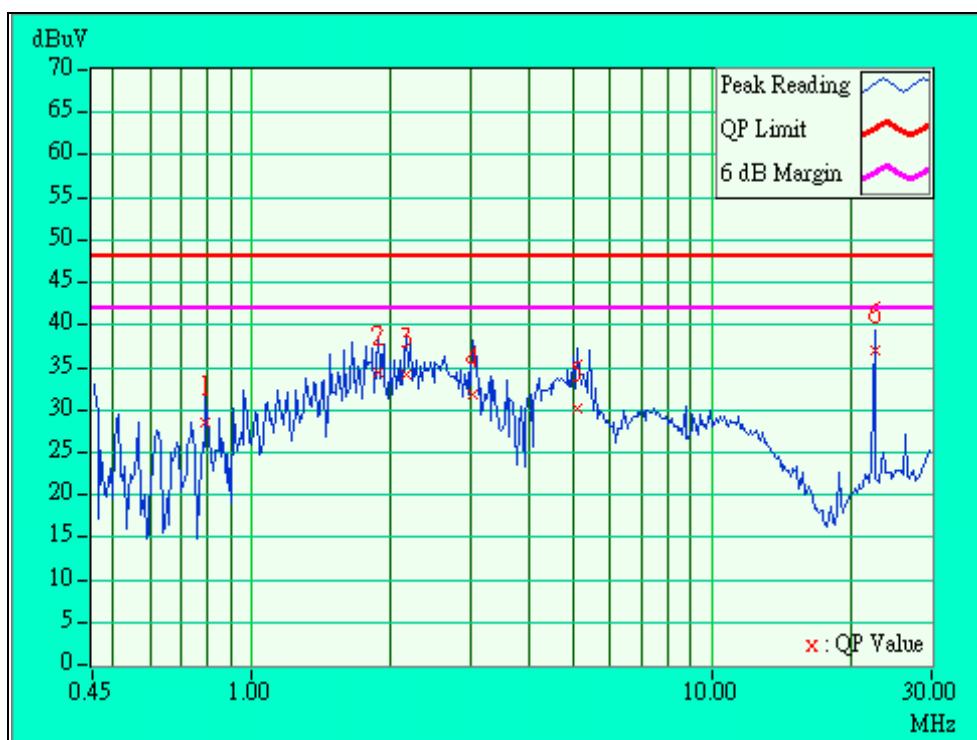


<b>EUT</b>	11Mbps Wireless LAN Mini-PCI Card	<b>MODEL</b>	WL-250F
<b>MODE</b>	Channel 11	<b>6dB BANDWIDTH</b>	10 kHz
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60 Hz	<b>PHASE</b>	Line (L)
<b>ENVIRONMENTAL CONDITIONS</b>	25 deg. C, 55%RH, 1005 hPa	<b>TESTED BY:</b> Gary Chang	

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.79375	0.20	28.57	-	28.77	-	48.00	-	-19.23	-
2	1.87500	0.20	34.49	-	34.69	-	48.00	-	-13.31	-
3	2.15625	0.22	34.15	-	34.37	-	48.00	-	-13.63	-
4	3.01172	0.30	31.91	-	32.21	-	48.00	-	-15.79	-
5	5.10979	0.46	30.11	-	30.57	-	48.00	-	-17.43	-
6	22.57031	1.25	36.93	-	38.18	-	48.00	-	-9.82	-

**NOTE:**

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



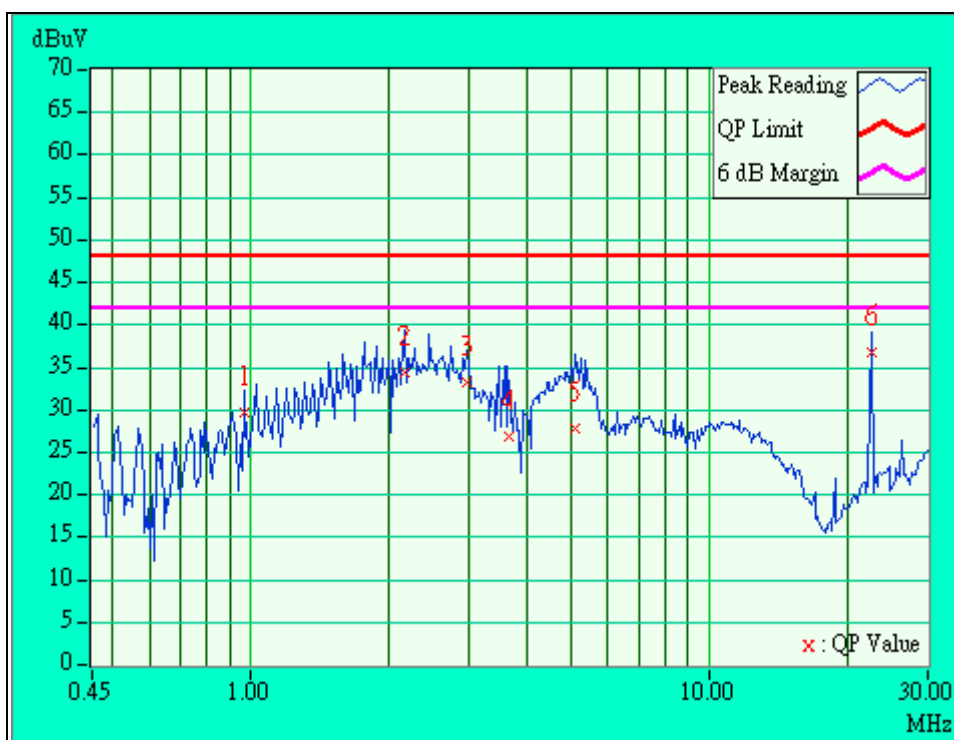


<b>EUT</b>	11Mbps Wireless LAN Mini-PCI Card	<b>MODEL</b>	WL-250F
<b>MODE</b>	Channel 11	<b>6dB BANDWIDTH</b>	10 kHz
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60 Hz	<b>PHASE</b>	Netural (N)
<b>ENVIRONMENTAL CONDITIONS</b>	25 deg. C, 55%RH, 1005 hPa	<b>TESTED BY:</b> Gary Chang	

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.96562	0.20	29.76	-	29.96	-	48.00	-	-18.04	-
2	2.15719	0.22	34.30	-	34.52	-	48.00	-	-13.48	-
3	2.95313	0.30	33.28	-	33.58	-	48.00	-	-14.42	-
4	3.63748	0.36	26.95	-	27.31	-	48.00	-	-20.69	-
5	5.11719	0.44	27.76	-	28.20	-	48.00	-	-19.80	-
6	22.57031	1.15	36.84	-	37.99	-	48.00	-	-10.01	-

**NOTE:**

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



## 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	Nov. 3, 2001
* HP Preamplifier	8449B	3008A01201	Dec. 13, 2001
* HP Preamplifier	8449B	3008A01292	Aug. 21, 2001
* ROHDE & SCHWARZ TEST RECEIVER	ESMI	839013/007 839379/002	Jan. 25, 2002
SCHWARZBECK Tunable Dipole Antenna	VHA 9103 UHA 9105	E101051 E101055	Nov. 23, 2001
* 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.

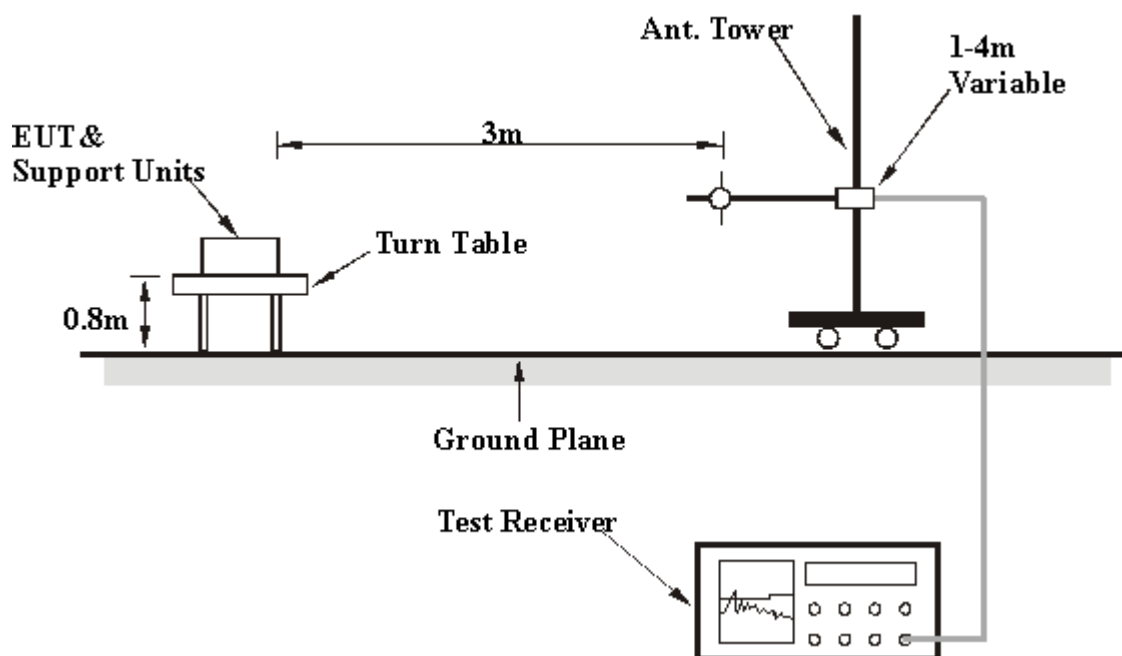
#### 4.2.3 TEST PROCEDURES

- 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 peak, quasi-peak or average method as specified and then reported in a data sheet.

**NOTE:**

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Peak detection (PK) and Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1 MHz for Peak detection 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>	11Mbps Wireless LAN Mini-PCI Card	<b>MODEL</b>	WL-250F
<b>MODE</b>	Channel 11	<b>FREQUENCY RANGE</b>	30-1000 MHz
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60 Hz	<b>DETECTOR FUNCTION</b>	Quasi-Peak
<b>ENVIRONMENTAL CONDITIONS</b>	25 deg. C, 55 % RH, 1050 hPa	<b>TESTED BY:</b> Gary Chang	

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)	Cable Factor (dB)	Pre-Amp. Factor (dB)	Correction Factor (dB)
1	132.42	40.9 QP	43.50	-2.60	2.51H	198	27.40	10.97	2.52	0.00	-13.49
2	134.50	41.3 QP	43.50	-2.20	2.03H	174	27.90	10.90	2.54	0.00	-13.44
3	176.24	35.7 QP	43.50	-7.80	1.07H	113	24.30	8.73	2.65	0.00	-11.38
4	200.21	36.9 QP	43.50	-6.60	1.69H	1	25.70	8.41	2.79	0.00	-11.20
5	220.40	33.3 QP	46.00	-12.70	1.20H	309	20.70	9.73	2.83	0.00	-12.56
6	572.10	36.4 QP	46.00	-9.60	1.65H	334	15.40	17.38	3.61	0.00	-20.99
7	660.14	37.8 QP	46.00	-8.20	1.72H	204	16.20	17.77	3.84	0.00	-21.61
8	836.45	34.4 QP	46.00	-11.60	1.41H	155	10.70	19.60	4.10	0.00	-23.70

**NOTE:**

1. Emission level = Raw value - Correction Factor
2. Correction Factor = Pre-Amp. Factor - Ant. Factor - Cable loss  
(Pre-Amp. Factor = 0, when a Pre-Amplifier is not used for the test.)
3. Margin value = Emission level - Limit value
4. The other emission levels were very low against the limit.

<b>EUT</b>	11Mbps Wireless LAN Mini-PCI Card	<b>MODEL</b>	WL-250F
<b>MODE</b>	Channel 11	<b>FREQUENCY RANGE</b>	30-1000 MHz
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60 Hz	<b>DETECTOR FUNCTION</b>	Quasi-Peak
<b>ENVIRONMENTAL CONDITIONS</b>	25 deg. C, 55 % RH, 1050 hPa	<b>TESTED BY:</b> Gary Chang	

<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)	Cable Factor (dB)	Pre-Amp. Factor (dB)	Correction Factor (dB)
1	132.45	38.6 QP	43.50	-4.90	1.63V	358	25.10	10.97	2.52	0.00	-13.49
2	133.72	39.2 QP	43.50	-4.30	1.00V	64	25.80	10.90	2.54	0.00	-13.45
3	176.23	37.5 QP	43.50	-6.00	1.00V	1	26.10	8.73	2.65	0.00	-11.38
4	220.42	34.3 QP	46.00	-11.70	1.04V	320	21.70	9.73	2.83	0.00	-12.56
5	308.24	36.3 QP	46.00	-9.70	2.02V	119	20.40	12.77	3.15	0.00	-15.92
6	455.70	34.0 QP	46.00	-12.00	1.24V	87	14.50	16.20	3.28	0.00	-19.48
7	660.14	37.0 QP	46.00	-9.00	1.15V	206	15.40	17.77	3.84	0.00	-21.61

**NOTE:**

1. Emission level = Raw value - Correction Factor
2. Correction Factor = Pre-Amp. Factor - Ant. Factor - Cable loss  
(Pre-Amp. Factor = 0, when a Pre-Amplifier is not used for the test.)
3. Margin value = Emission level - Limit value
4. The other emission levels were very low against the limit.

<b>EUT</b>	11Mbps Wireless LAN Mini-PCI Card	<b>MODEL</b>	WL-250F
<b>MODE</b>	Channel 1	<b>FREQUENCY RANGE</b>	Above 1000 MHz
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60 Hz	<b>DETECTOR FUNCTION</b>	Peak(PK) Average (AV)
<b>ENVIRONMENTAL CONDITIONS</b>	25 deg. C, 55 % RH, 1050 hPa	<b>TESTED BY:</b> Gary Chang	

#### 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)	Cable Factor (dB)	Pre-Amp. Factor (dB)	Correction Factor (dB)
1	2037.80	50.9 PK	74.00	-23.10	1.08H	112	21.30	26.31	3.29	0.00	-29.60
2	*2412.60	102.3 PK	-	-	1.68H	346	71.20	27.45	3.62	0.00	-31.08
3	*2412.60	96.4 AV	-	-	1.68H	346	65.30	27.45	3.62	0.00	-31.08
4	4075.40	51.6 PK	74.00	-22.40	1.00H	96	16.80	30.03	4.77	0.00	-34.80
5	4824.40	52.8 PK	74.00	-21.20	1.11H	156	16.20	31.35	5.21	0.00	-36.56

#### 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)	Cable Factor (dB)	Pre-Amp. Factor (dB)	Correction Factor (dB)
1	2038.10	52.0 PK	74.00	-22.00	1.00V	211	22.40	26.31	3.29	0.00	-29.60
2	*2412.30	100.5 PK	-	-	1.64V	17	69.45	27.45	3.62	0.00	-31.07.
3	*2412.30	93.8 AV	-	-	1.64V	17	62.70	27.45	3.62	0.00	-31.07.
4	4075.40	50.5 PK	74.00	-23.50	1.21V	334	15.70	30.03	4.77	0.00	-34.80
5	4824.30	51.5 PK	74.00	-22.50	1.03V	263	14.90	31.35	5.21	0.00	-36.56

#### NOTE:

1. Emission level = Raw value - Correction Factor
2. Correction Factor = Pre-Amp. Factor - Ant. Factor - Cable loss  
(Pre-Amp. Factor = 0, when a Pre-Amplifier is not used for the test.)
3. Margin value = Emission level - Limit value
4. " \* " : Fundamental frequency
5. The other emission levels were very low against the limit.



<b>EUT</b>	11Mbps Wireless LAN Mini-PCI Card	<b>MODEL</b>	WL-250F
<b>MODE</b>	Channel 6	<b>FREQUENCY RANGE</b>	Above 1000 MHz
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60 Hz	<b>DETECTOR FUNCTION</b>	Peak(PK) Average (AV)
<b>ENVIRONMENTAL CONDITIONS</b>	25 deg. C, 55 % RH, 1050 hPa	<b>TESTED BY:</b> Gary Chang	

#### 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)	Cable Factor (dB)	Pre-Amp. Factor (dB)	Correction Factor (dB)
1	2062.70	51.4 PK	74.00	-22.60	1.73H	111	21.70	26.37	3.31	0.00	-29.68
2	*2437.80	103.5 PK	-	-	1.11H	334	72.35	27.52	3.64	0.00	-31.17
3	*2437.80	98.3 AV	-	-	1.11H	334	67.10	27.52	3.64	0.00	-31.17
4	4125.60	52.7 PK	74.00	-21.30	1.05H	60	17.80	30.10	4.79	0.00	-34.90
5	4874.20	52.6 PK	74.00	-21.40	1.30H	138	15.90	31.44	5.25	0.00	-36.69

#### 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)	Cable Factor (dB)	Pre-Amp. Factor (dB)	Correction Factor (dB)
1	2062.40	51.1 PK	74.00	-22.90	1.10V	72	21.40	26.37	3.31	0.00	-29.68
2	*2435.70	99.4 PK	-	-	2.09V	349	68.20	27.52	3.64	0.00	-31.17
3	*2435.70	93.6 AV	-	-	2.09V	349	62.40	27.52	3.64	0.00	-31.17
4	4125.30	52.3 PK	74.00	-21.70	1.03V	118	17.40	30.10	4.79	0.00	-34.89
5	4874.20	52.5 PK	74.00	-21.50	1.42V	20	15.80	31.44	5.25	0.00	-36.70

#### NOTE:

1. Emission level = Raw value - Correction Factor
2. Correction Factor = Pre-Amp. Factor - Ant. Factor - Cable loss  
(Pre-Amp. Factor = 0, when a Pre-Amplifier is not used for the test.)
3. Margin value = Emission level - Limit value
4. " \* " : Fundamental frequency
5. The other emission levels were very low against the limit.

<b>EUT</b>	11Mbps Wireless LAN Mini-PCI Card	<b>MODEL</b>	WL-250F
<b>MODE</b>	Channel 11	<b>FREQUENCY RANGE</b>	Above 1000 MHz
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60 Hz	<b>DETECTOR FUNCTION</b>	Peak(PK) Average (AV)
<b>ENVIRONMENTAL CONDITIONS</b>	18 deg. C, 73 % RH, 1050 hPa	<b>TESTED BY:</b> Gary Chang	

#### 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)	Cable Factor (dB)	Pre-Amp. Factor (dB)	Correction Factor (dB)
1	2088.00	47.6 PK	74.00	-26.40	1.32H	86	17.80	26.44	3.33	0.00	-29.77
2	*2462.70	103.2 PK	-	-	1.16H	92	72.00	27.59	3.66	0.00	-31.26
3	*2462.70	98.4 AV	-	-	1.16H	92	67.20	27.59	3.66	0.00	-31.26
4	2483.70	56.3 PK	74.00	-17.70	1.35H	86	25.00	27.66	3.68	0.00	-31.34
5	2483.70	42.1 AV	54.00	-11.90	1.35H	86	10.76	27.66	3.68	0.00	-31.33
6	4176.50	52.4 PK	74.00	-21.60	1.28H	90	17.40	30.18	4.81	0.00	-34.98
7	4924.50	52.1 PK	74.00	-21.90	1.44H	153	15.30	31.53	5.28	0.00	-36.81

#### 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)	Cable Factor (dB)	Pre-Amp. Factor (dB)	Correction Factor (dB)
1	2088.40	50.2 PK	74.00	-23.80	1.16V	60	20.40	26.44	3.33	0.00	-29.77
2	*2462.70	102.4 PK	-	-	1.00V	354	71.20	27.59	3.66	0.00	-31.26
3	*2462.70	95.3 AV	-	-	1.00V	354	64.10	27.59	3.66	0.00	-31.26
4	2485.50	52.7 PK	74.00	-21.30	1.50V	190	21.40	27.66	3.68	0.00	-31.33
5	4175.80	53.2 PK	74.00	-20.80	1.06V	18	18.20	30.18	4.81	0.00	-34.98
6	4924.20	52.5 PK	74.00	-21.50	1.22V	156	15.70	31.53	5.28	0.00	-36.81

#### NOTE:

1. Emission level = Raw value - Correction Factor
2. Correction Factor = Pre-Amp. Factor - Ant. Factor - Cable loss  
(Pre-Amp. Factor = 0, when a Pre-Amplifier is not used for the test.)
3. Margin value = Emission level - Limit value
4. " \* " : Fundamental frequency
5. The other emission levels were very low against the limit.

### 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	839379/002	Dec. 28, 2001
HP ATTENUATOR	8496B	3247A18505	Cal. on use
HP PLOTTER	7475A	2641V27755	N/A

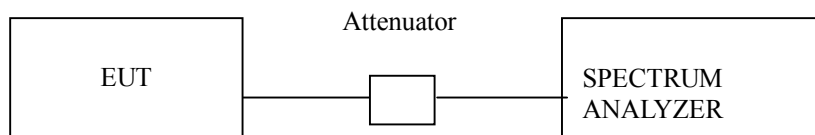
**NOTE:**

- 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.

#### 4.3.3 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



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

#### 4.3.5 EUT OPERATING CONDITIONS

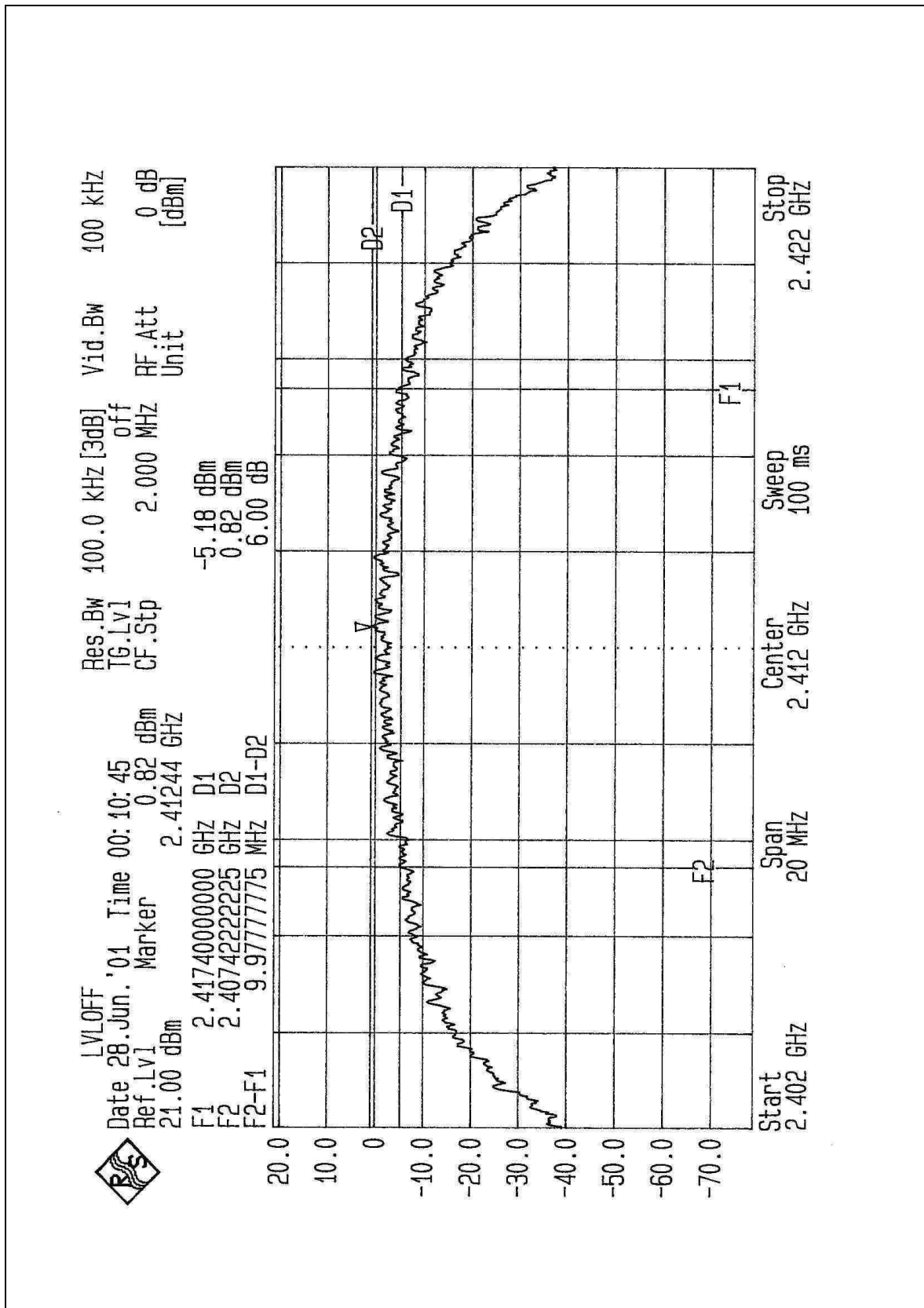
The software provided by client to enable the EUT under transmission condition continuously at lowest, middle and highest channel frequencies individually.

## 4.3.6 TEST RESULTS

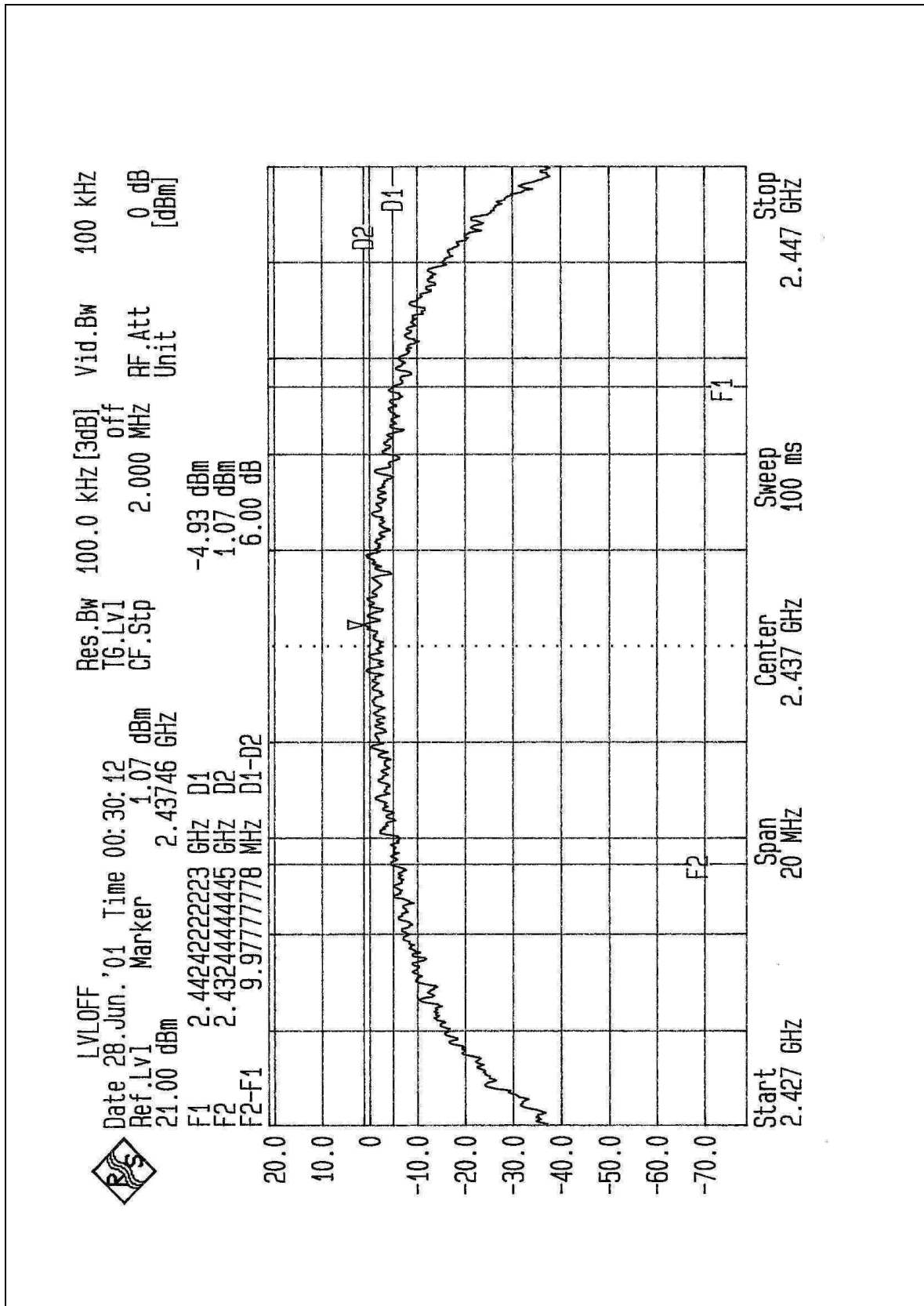
<b>EUT</b>	11Mbps Wireless LAN Mini-PCI Card	<b>MODEL</b>	WL-250F
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60 Hz	<b>ENVIRONMENTAL CONDITIONS</b>	27 deg. C, 70%RH, 1005 hPa
<b>TESTED BY:</b> Gary Chang			

<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	9.98	0.5	PASS
6	2437	9.98	0.5	PASS
11	2462	10.60	0.5	PASS

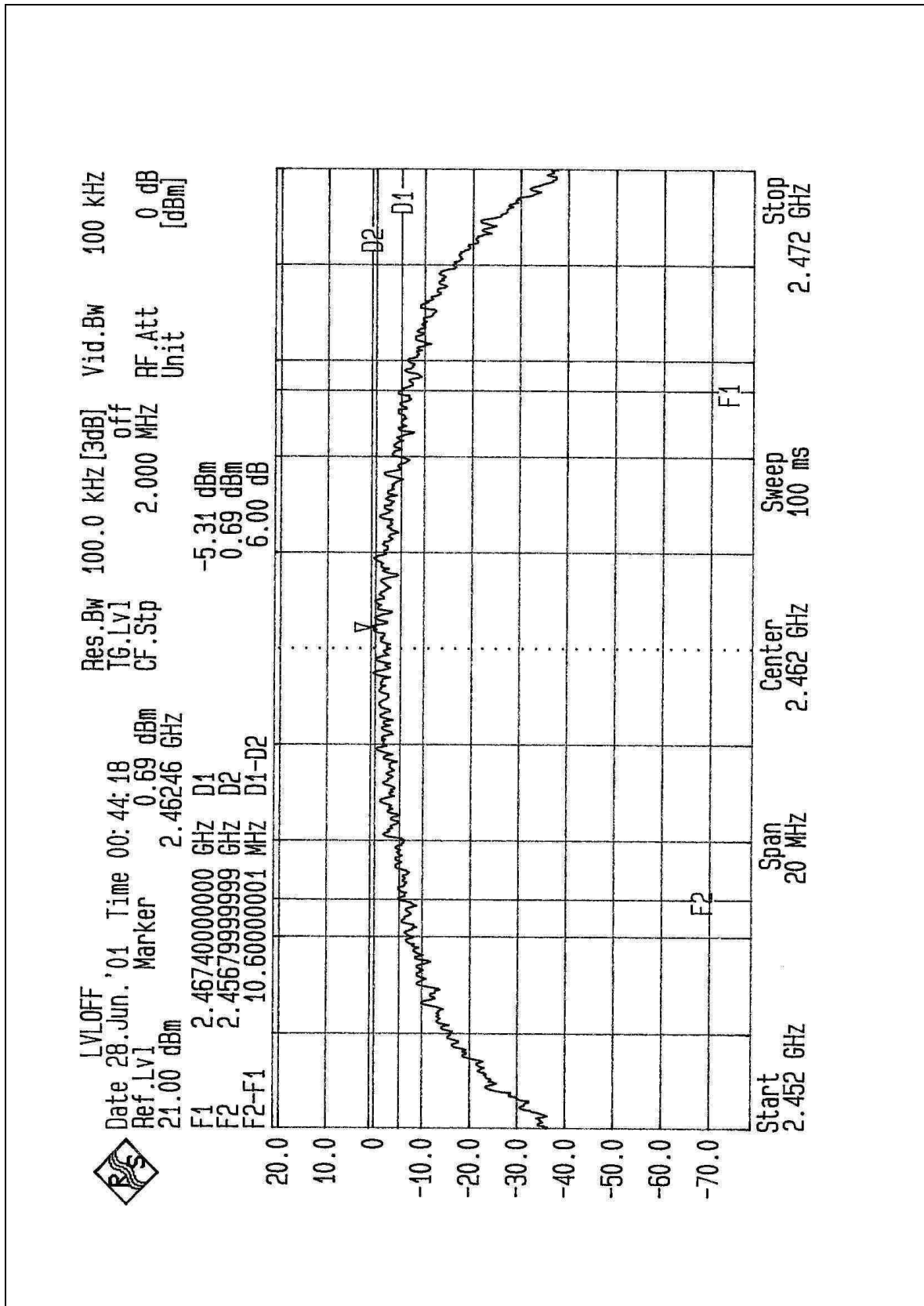
CH1



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 TEST INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
ROHDE & SCHWARZ TEST RECEIVER	ESMI	839379/002	Dec. 28, 2001
HP ATTENUATOR	8496B	3247A18505	Cal. on use
HP PLOTTER	7475A	2641V27755	N/A

**NOTE:**

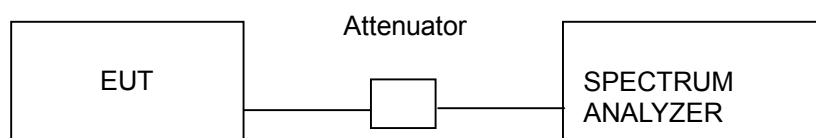
1. The measurement uncertainty is less than +/- 2.6dB, which is calculated as per the NAMAS document NIS81.
2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

#### 4.4.3 TEST PROCEDURES

- a. The transmitter output was connected to the spectrum analyzer through an attenuator.
- b. The center frequency of the spectrum analyzer was set to the fundamental frequency and using 3 MHz RBW and 3 MHz VBW.
- c. The span of the spectrum analyzer should be larger than 6dB BandWidth plus 10MHz.
- d. Used Peak Search to read the peak power after Maximum Hold function was activated.
- e. Shifted the marker to +/- 3MHz and +/-6MHz, and recorded the reading.
- f. The Maximum Peak Output Power was the linear summation of the 5 readings in (4) and (5).

**NOTE:** This measurement is the total power of 15MHz bandwidth which is far more wider than 6dB bandwidth.

#### 4.4.4 TEST SETUP



#### 4.4.5 EUT OPERATING CONDITIONS

Same as Item 4.3.5

## 4.4.6 TEST RESULTS

<b>EUT</b>	11Mbps Wireless LAN Mini-PCI Card	<b>MODEL</b>	WL-250F
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60 Hz	<b>ENVIRONMENTAL CONDITIONS</b>	27 deg. C, 70%RH, 1005 hPa
<b>TESTED BY:</b> Gary Chang			

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER OUTPUT (dBm)	PEAK POWER LIMIT (dBm)	PASS/FAIL
1	2412	18.50	30	PASS
6	2437	18.30	30	PASS
11	2462	18.22	30	PASS