



# FCC TEST REPORT

**REPORT NO.:** RF900618R04A

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

**RECEIVED:** August 30, 2001

**TESTED:** Sep. 3 ~ Sep. 6, 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 Sep. 3, 2001 to Sep. 6, 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 : Steven Lu · DATE: Sept 14, 2001  
Steven Lu

CHECKED BY : Emily Lu · DATE: Sept 14, 2001  
Emily Lu

APPROVED BY : Alan Lane · DATE: Sept. 14, 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>
15.107	AC Power Conducted Emission Limit: 48dBuV	PASS	Meet the requirement of limit Minimum passing margin is -8.11dBuV at 1.318MHz
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 -2.0dBuV at 4175.50 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 host equipment
<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>	18dBm
<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. There are six dipole antenna types provided in this EUT. Please refer to ANNEX EUT PHOTOS.

<b>Antenna Type</b>	<b>ANNEX EUT PHOTOS</b>
Sleeve dipole antenna (PCB)	page 1-2
Sleeve dipole antenna	page 3
Dipole antenna (T type*2)	page 4-5
*Dipole antenna (Metal)	page 6
*Dipole antenna (T type*1)	page 7-8
Sleeve dipole antenna (Metal)	page 9

“\*” : For final test.

3. 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. There are six antennas provided in this EUT. Dipole and T type antennas. The maximum Gain of dipole antenna and maximum Gain of T type antenna were chosen for testing. The test results (A) is for dipole antenna and (B) is for T type antenna.

### 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	PERSONAL COMPUTER	NTI	P111-500	P201167	FCC DoC Approved
2	PRINTER	HP	2225C+	3123S97230	DSI6XU2225
3	MODEM	ACEEX	1414	980020510	IFAXDM1414
4	COLOR MONITOR	HP	D2842A	KR93473168	BEJCB910
5	KEYBOARD	FORWARD	FDA-104GA	FDKB8110111	F4ZDA-104G
6	PS/2 MOUSE	LOGITECH	M-S43	LZE00703207	DZL211106
7	PCI Extender	Speed Bus	PX-II	00030	NA

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.
4	1.8 m braid shielded wire, terminated with VGA connector via metallic frame, w/o core.
5	1.5 m foil shielded wire, terminated with PS/2 connector via metallic frame, w/o core.
6	1.8 m foil shielded wire, terminated with PS/2 connector via drain wire, w/o core.
7	NA

**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

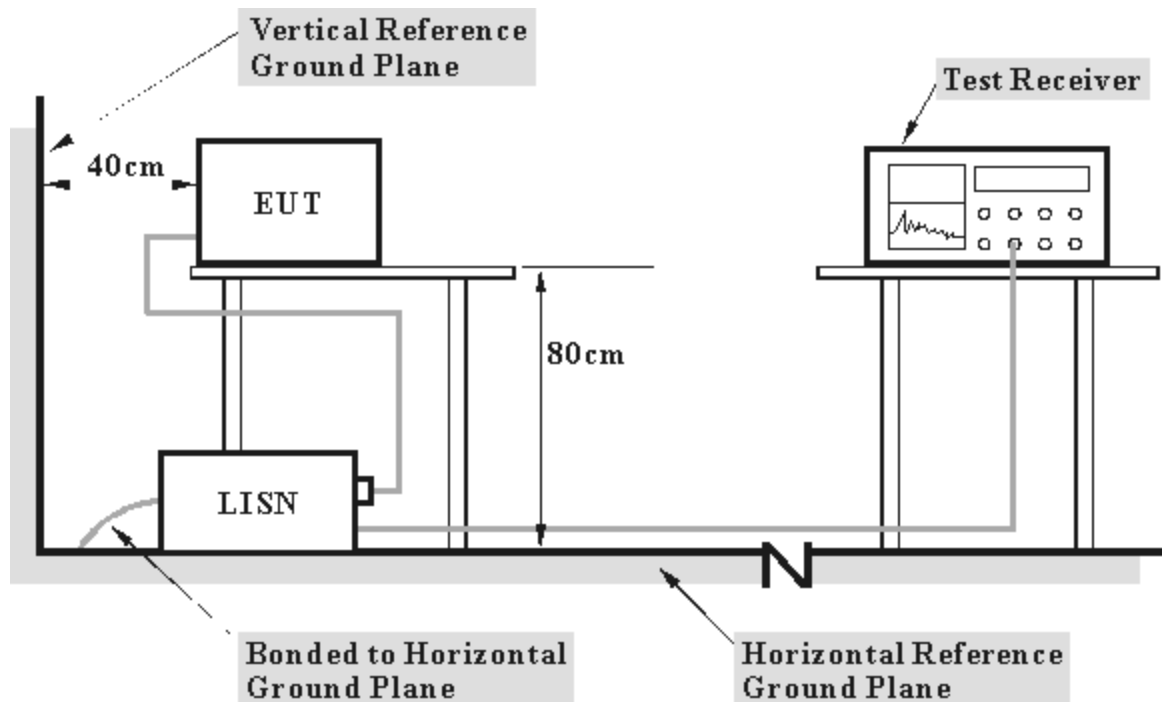
**NOTE:**

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. Plug the EUT into the PCI extender which connected 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.



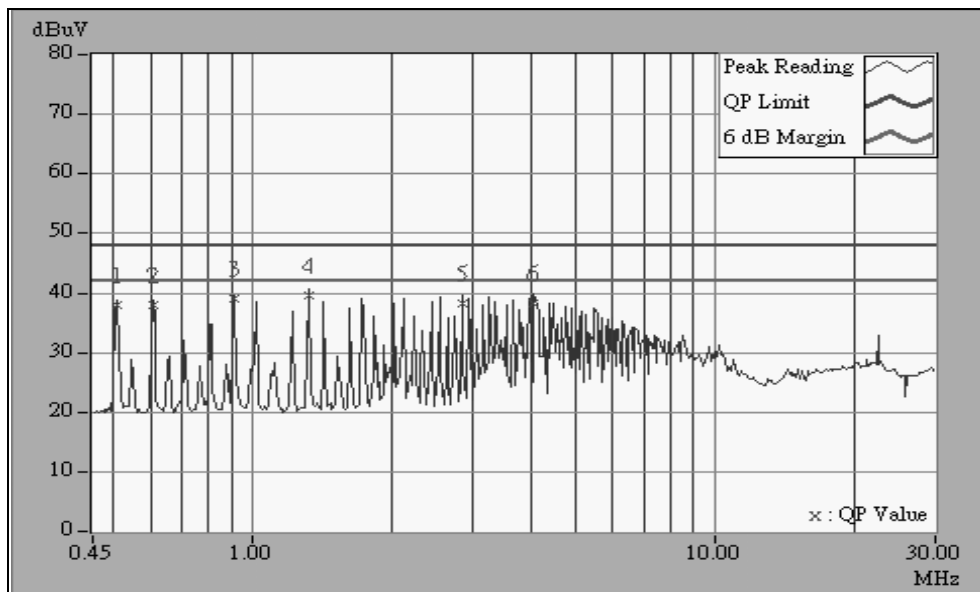
4.1.6 TEST RESULTS (A)

<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, 60%RH, 1005 hPa	<b>TESTED BY:</b> Steven Lu	

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]		Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.507	0.10	37.86	-	37.96	-	48.00	-	-10.04	-
2	0.609	0.10	38.02	-	38.12	-	48.00	-	-9.88	-
3	0.913	0.10	38.93	-	39.03	-	48.00	-	-8.97	-
4	1.319	0.10	39.51	-	39.61	-	48.00	-	-8.39	-
5	2.841	0.18	38.32	-	38.50	-	48.00	-	-9.50	-
6	4.059	0.30	38.22	-	38.52	-	48.00	-	-9.48	-

**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.



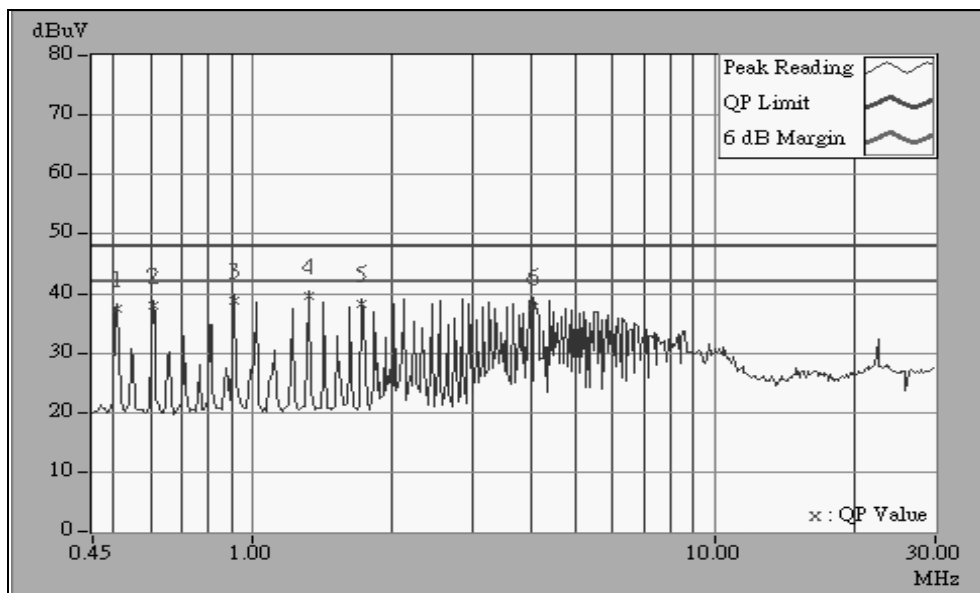


<b>EUT</b>	11Mbps Wireless LAN Mini-PCI Card	<b>MODEL</b>	WL-250F
<b>MODE</b>	Channel 1	<b>6dB BANDWIDTH</b>	10 kHz
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60 Hz	<b>PHASE</b>	Neutral (N)
<b>ENVIRONMENTAL CONDITIONS</b>	25 deg. C, 60%RH, 1005 hPa	<b>TESTED BY:</b> Steven Lu	

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.
1	0.507	0.10	37.47	-	37.57	-	48.00	-	-10.43	-
2	0.609	0.10	37.88	-	37.98	-	48.00	-	-10.02	-
3	0.914	0.10	38.77	-	38.87	-	48.00	-	-9.13	-
4	1.318	0.10	39.65	-	39.75	-	48.00	-	-8.25	-
5	1.725	0.10	38.38	-	38.48	-	48.00	-	-9.52	-
6	4.059	0.30	37.59	-	37.89	-	48.00	-	-10.11	-

**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.



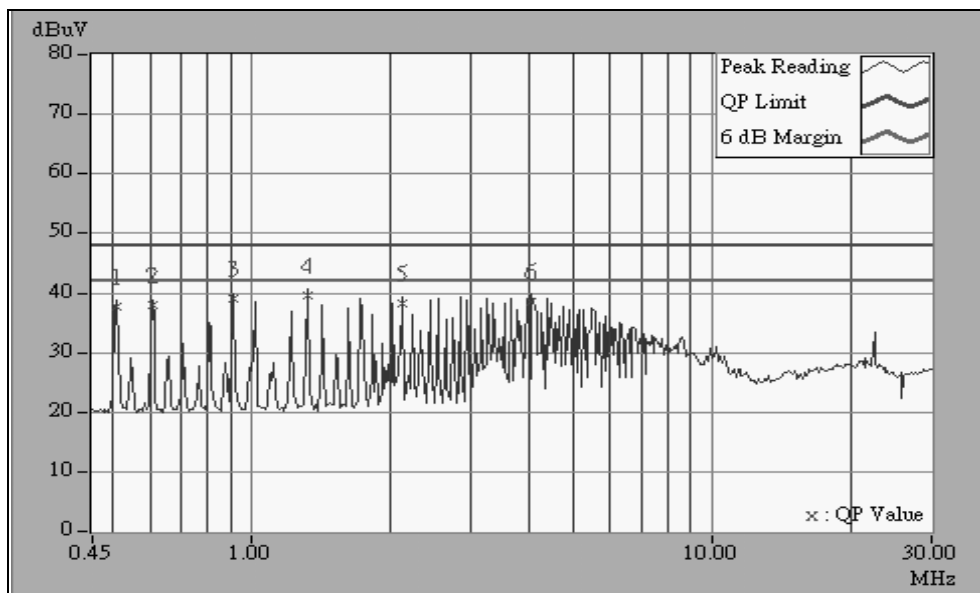


<b>EUT</b>	11Mbps Wireless LAN Mini-PCI Card	<b>MODEL</b>	WL-250F
<b>MODE</b>	Channel 6	<b>6dB BANDWIDTH</b>	10 kHz
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60 Hz	<b>PHASE</b>	Line (L)
<b>ENVIRONMENTAL CONDITIONS</b>	25 deg. C, 60%RH, 1005 hPa	<b>TESTED BY:</b> Steven Lu	

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	0.507	0.10	37.82	-	37.92	-	48.00	-	-10.08	-
2	0.609	0.10	37.98	-	38.08	-	48.00	-	-9.92	-
3	0.912	0.10	39.03	-	39.13	-	48.00	-	-8.87	-
4	1.319	0.10	39.53	-	39.63	-	48.00	-	-8.37	-
5	2.130	0.11	38.23	-	38.34	-	48.00	-	-9.66	-
6	4.059	0.30	38.40	-	38.70	-	48.00	-	-9.30	-

**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.



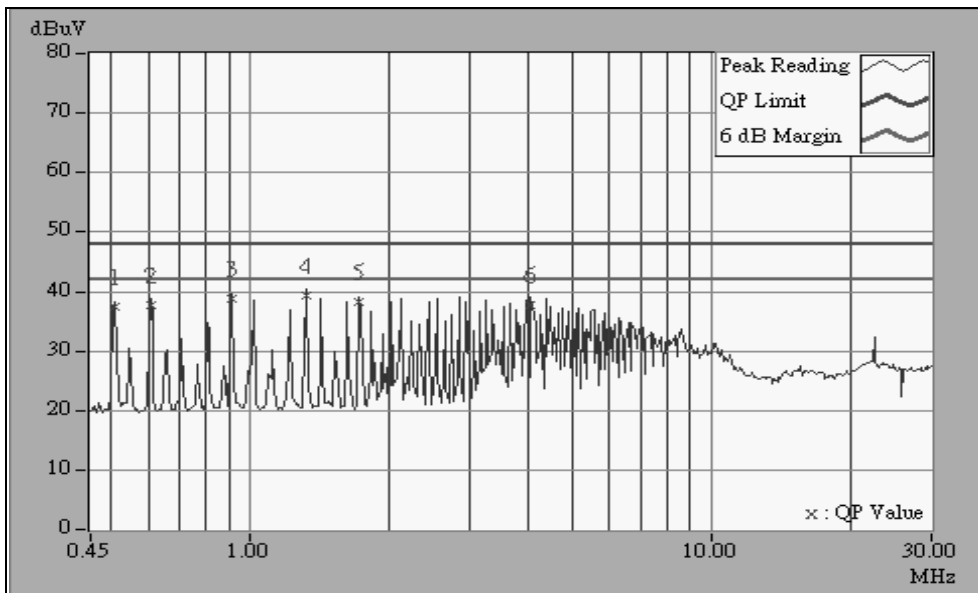


<b>EUT</b>	11Mbps Wireless LAN Mini-PCI Card	<b>MODEL</b>	WL-250F
<b>MODE</b>	Channel 6	<b>6dB BANDWIDTH</b>	10 kHz
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60 Hz	<b>PHASE</b>	Neutral (N)
<b>ENVIRONMENTAL CONDITIONS</b>	25 deg. C, 60%RH, 1005 hPa	<b>TESTED BY:</b> Steven Lu	

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.
1	0.507	0.10	37.53	-	37.63	-	48.00	-	-10.37	-
2	0.609	0.10	37.80	-	37.90	-	48.00	-	-10.10	-
3	0.913	0.10	38.87	-	38.97	-	48.00	-	-9.03	-
4	1.319	0.10	39.29	-	39.39	-	48.00	-	-8.61	-
5	1.725	0.10	38.34	-	38.44	-	48.00	-	-9.56	-
6	4.059	0.30	37.65	-	37.95	-	48.00	-	-10.05	-

**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.



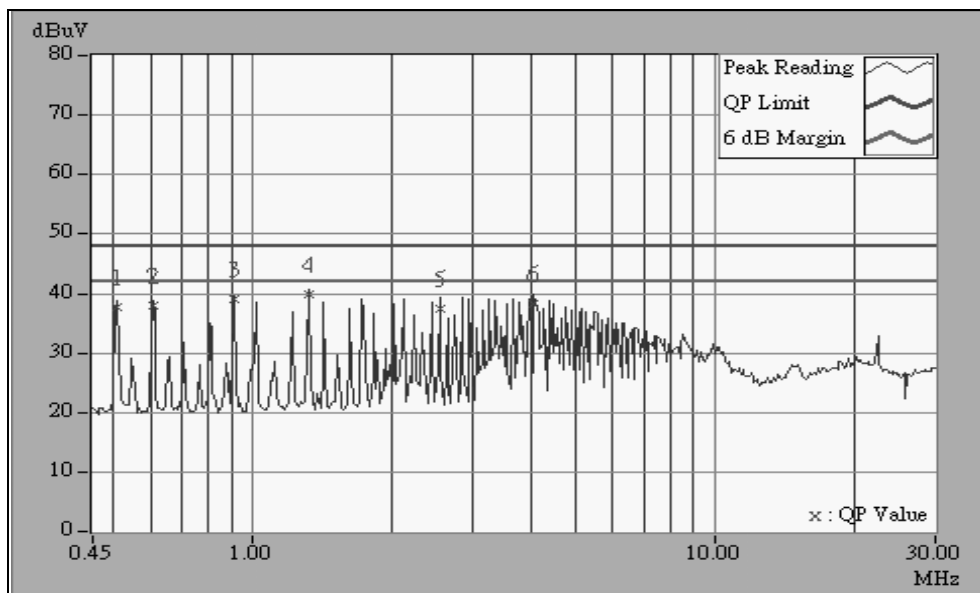


<b>EUT</b>	11Mbps Wireless LAN Mini-PCI Card	<b>MODEL</b>	WL-250F
<b>MODE</b>	Channel 11	<b>6dB BANDWIDTH</b>	10 kHz
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60 Hz	<b>PHASE</b>	Line (L)
<b>ENVIRONMENTAL CONDITIONS</b>	25 deg. C, 60%RH, 1005 hPa	<b>TESTED BY:</b> Steven Lu	

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.
1	0.508	0.10	37.75	-	37.85	-	48.00	-	-10.15	-
2	0.609	0.10	37.88	-	37.98	-	48.00	-	-10.02	-
3	0.912	0.10	39.03	-	39.13	-	48.00	-	-8.87	-
4	1.318	0.10	39.79	-	39.89	-	48.00	-	-8.11	-
5	2.538	0.15	37.49	-	37.64	-	48.00	-	-10.36	-
6	4.059	0.30	38.22	-	38.52	-	48.00	-	-9.48	-

**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.





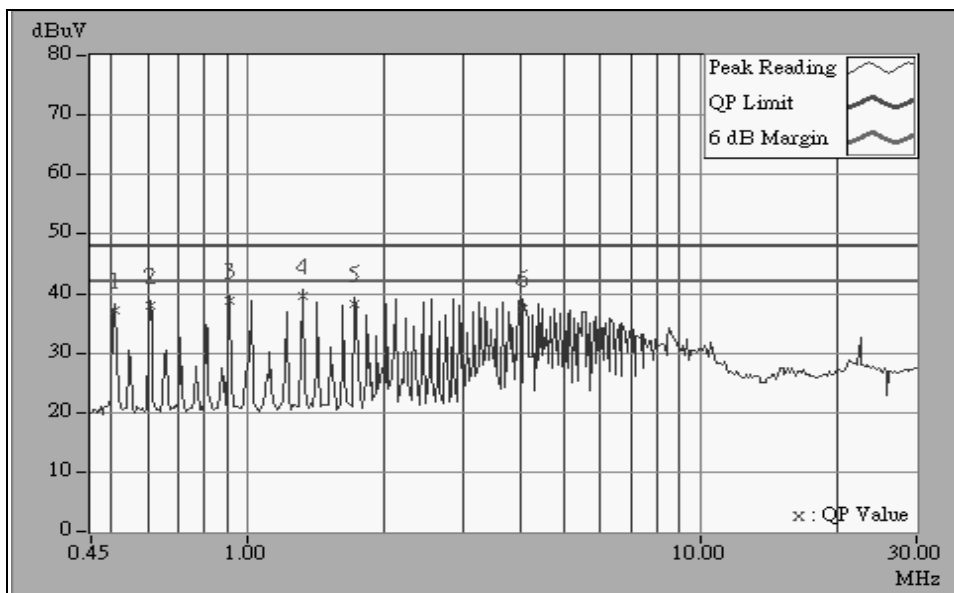


<b>EUT</b>	11Mbps Wireless LAN Mini-PCI Card	<b>MODEL</b>	WL-250F
<b>MODE</b>	Channel 11	<b>6dB BANDWIDTH</b>	10 kHz
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60 Hz	<b>PHASE</b>	Netural (N)
<b>ENVIRONMENTAL CONDITIONS</b>	25 deg. C, 60%RH, 1005 hPa	<b>TESTED BY:</b> Steven Lu	

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.
1	0.508	0.10	37.15	-	37.25	-	48.00	-	-10.75	-
2	0.609	0.10	37.86	-	37.96	-	48.00	-	-10.04	-
3	0.913	0.10	38.87	-	38.97	-	48.00	-	-9.03	-
4	1.318	0.10	39.71	-	39.81	-	48.00	-	-8.19	-
5	1.725	0.10	38.32	-	38.42	-	48.00	-	-9.58	-
6	4.059	0.30	37.57	-	37.87	-	48.00	-	-10.13	-

**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.





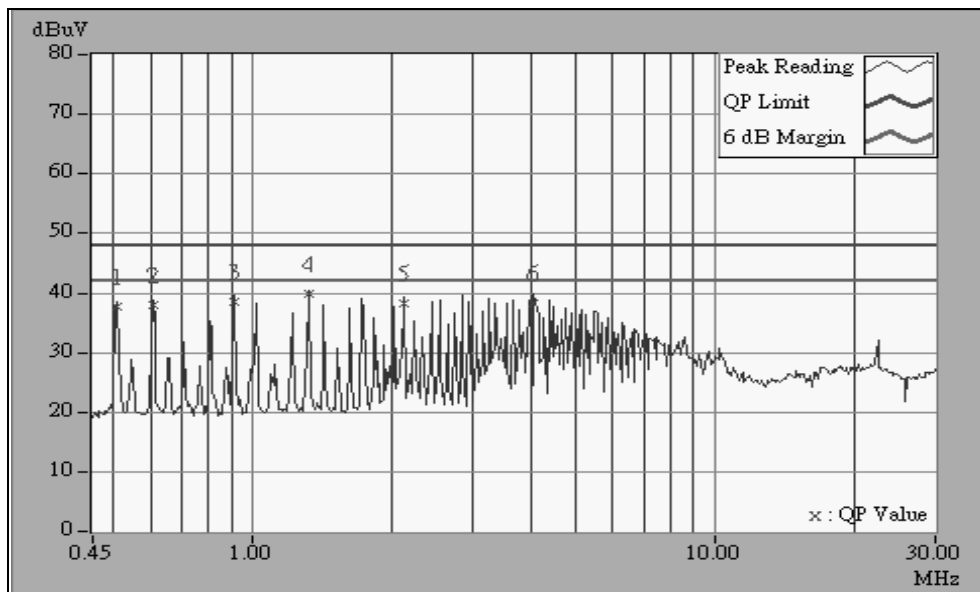
4.1.7 TEST RESULTS (B)

<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, 60%RH, 1005 hPa	<b>TESTED BY:</b> Steven Lu	

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]		Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.507	0.10	37.84	-	37.94	-	48.00	-	-10.06	-
2	0.609	0.10	38.02	-	38.12	-	48.00	-	-9.88	-
3	0.914	0.10	38.61	-	38.71	-	48.00	-	-9.29	-
4	1.318	0.10	39.79	-	39.89	-	48.00	-	-8.11	-
5	2.130	0.11	38.21	-	38.32	-	48.00	-	-9.68	-
6	4.059	0.30	38.20	-	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.



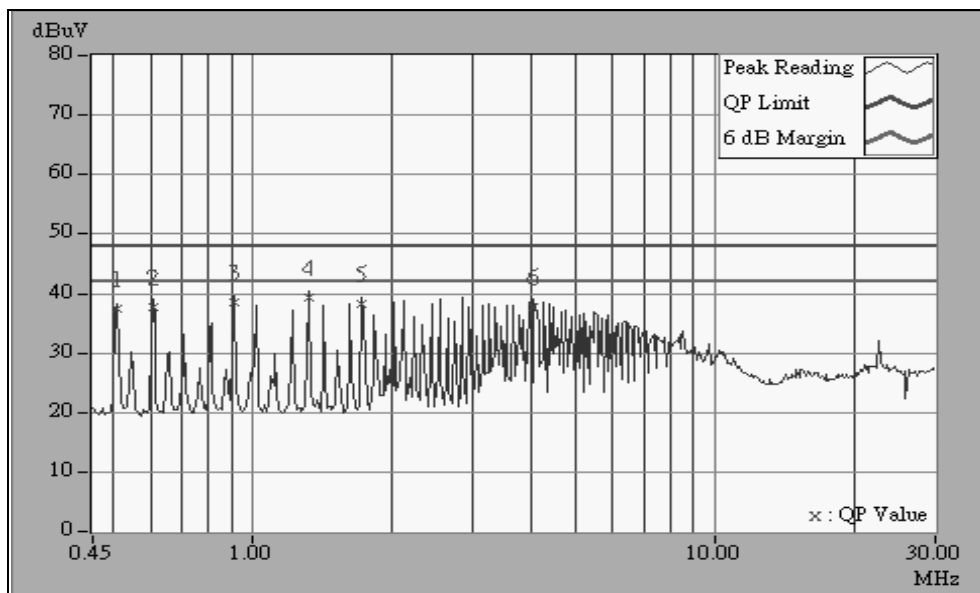


<b>EUT</b>	11Mbps Wireless LAN Mini-PCI Card	<b>MODEL</b>	WL-250F
<b>MODE</b>	Channel 1	<b>6dB BANDWIDTH</b>	10 kHz
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60 Hz	<b>PHASE</b>	Neutral (N)
<b>ENVIRONMENTAL CONDITIONS</b>	25 deg. C, 60%RH, 1005 hPa	<b>TESTED BY:</b> Steven Lu	

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.
1	0.507	0.10	37.47	-	37.57	-	48.00	-	-10.43	-
2	0.609	0.10	37.75	-	37.85	-	48.00	-	-10.15	-
3	0.914	0.10	38.61	-	38.71	-	48.00	-	-9.29	-
4	1.319	0.10	39.29	-	39.39	-	48.00	-	-8.61	-
5	1.725	0.10	38.24	-	38.34	-	48.00	-	-9.66	-
6	4.059	0.30	37.59	-	37.89	-	48.00	-	-10.11	-

**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.



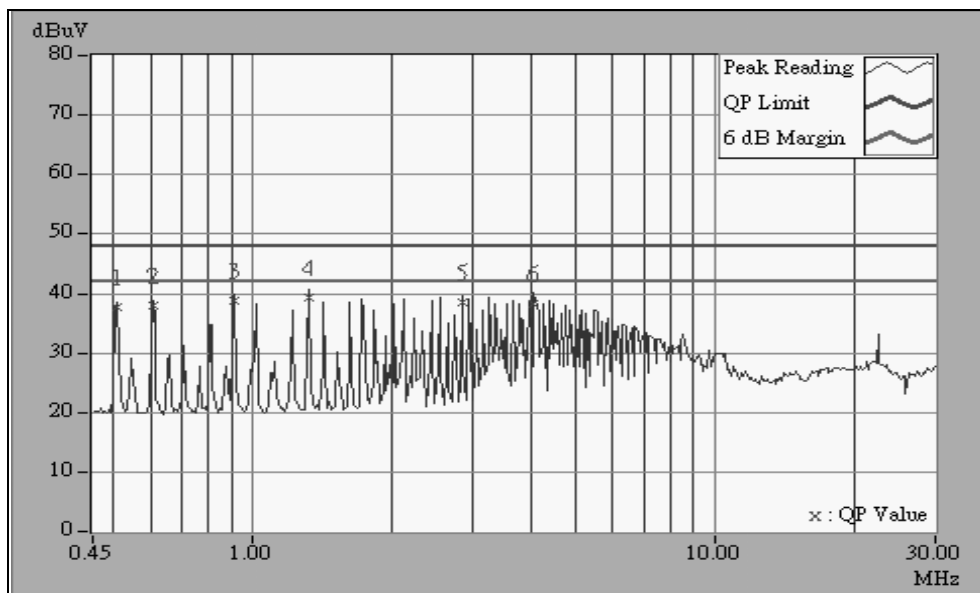


<b>EUT</b>	11Mbps Wireless LAN Mini-PCI Card	<b>MODEL</b>	WL-250F
<b>MODE</b>	Channel 6	<b>6dB BANDWIDTH</b>	10 kHz
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60 Hz	<b>PHASE</b>	Line (L)
<b>ENVIRONMENTAL CONDITIONS</b>	25 deg. C, 60%RH, 1005 hPa	<b>TESTED BY:</b> Steven Lu	

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]		Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.508	0.10	37.61	-	37.71	-	48.00	-	-10.29	-
2	0.609	0.10	38.04	-	38.14	-	48.00	-	-9.86	-
3	0.914	0.10	38.85	-	38.95	-	48.00	-	-9.05	-
4	1.319	0.10	39.33	-	39.43	-	48.00	-	-8.57	-
5	2.841	0.18	38.42	-	38.60	-	48.00	-	-9.40	-
6	4.059	0.30	38.32	-	38.62	-	48.00	-	-9.38	-

**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.



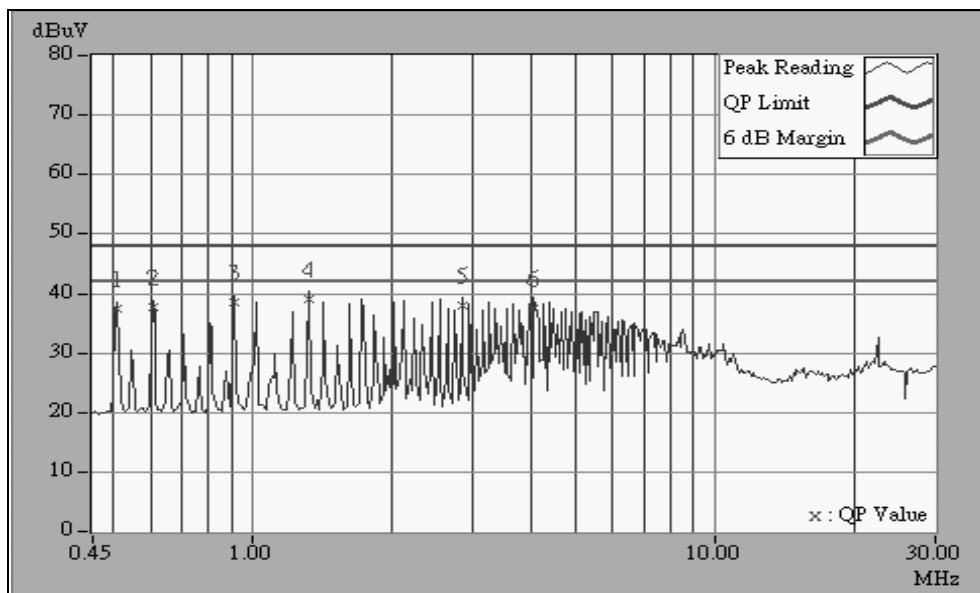


<b>EUT</b>	11Mbps Wireless LAN Mini-PCI Card	<b>MODEL</b>	WL-250F
<b>MODE</b>	Channel 6	<b>6dB BANDWIDTH</b>	10 kHz
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60 Hz	<b>PHASE</b>	Neutral (N)
<b>ENVIRONMENTAL CONDITIONS</b>	25 deg. C, 60%RH, 1005 hPa	<b>TESTED BY:</b> Steven Lu	

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	0.507	0.10	37.47	-	37.57	-	48.00	-	-10.43	-
2	0.609	0.10	37.71	-	37.81	-	48.00	-	-10.19	-
3	0.914	0.10	38.43	-	38.53	-	48.00	-	-9.47	-
4	1.320	0.10	38.96	-	39.06	-	48.00	-	-8.94	-
5	2.841	0.18	37.98	-	38.16	-	48.00	-	-9.84	-
6	4.059	0.30	37.47	-	37.77	-	48.00	-	-10.23	-

**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.



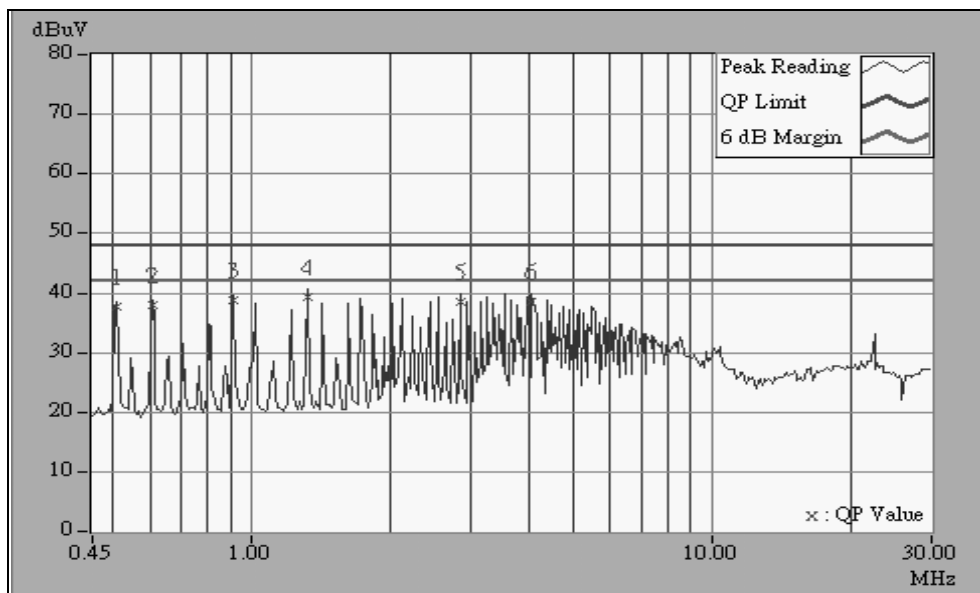


<b>EUT</b>	11Mbps Wireless LAN Mini-PCI Card	<b>MODEL</b>	WL-250F
<b>MODE</b>	Channel 11	<b>6dB BANDWIDTH</b>	10 kHz
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60 Hz	<b>PHASE</b>	Line (L)
<b>ENVIRONMENTAL CONDITIONS</b>	25 deg. C, 60%RH, 1005 hPa	<b>TESTED BY:</b> Steven Lu	

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.
1	0.507	0.10	37.82	-	37.92	-	48.00	-	-10.08	-
2	0.609	0.10	38.00	-	38.10	-	48.00	-	-9.90	-
3	0.913	0.10	38.91	-	39.01	-	48.00	-	-8.99	-
4	1.319	0.10	39.31	-	39.41	-	48.00	-	-8.59	-
5	2.841	0.18	38.48	-	38.66	-	48.00	-	-9.34	-
6	4.059	0.30	38.46	-	38.76	-	48.00	-	-9.24	-

**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.



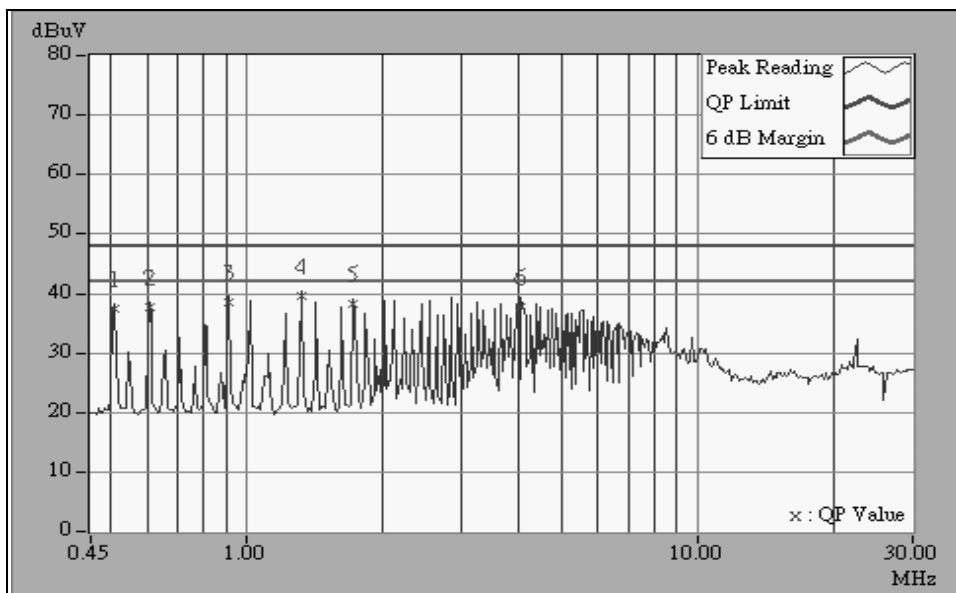


<b>EUT</b>	11Mbps Wireless LAN Mini-PCI Card	<b>MODEL</b>	WL-250F
<b>MODE</b>	Channel 11	<b>6dB BANDWIDTH</b>	10 kHz
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60 Hz	<b>PHASE</b>	Netural (N)
<b>ENVIRONMENTAL CONDITIONS</b>	25 deg. C, 60%RH, 1005 hPa	<b>TESTED BY:</b> Steven Lu	

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.
1	0.507	0.10	37.45	-	37.55	-	48.00	-	-10.45	-
2	0.609	0.10	37.82	-	37.92	-	48.00	-	-10.08	-
3	0.914	0.10	38.61	-	38.71	-	48.00	-	-9.29	-
4	1.318	0.10	39.65	-	39.75	-	48.00	-	-8.25	-
5	1.725	0.10	38.34	-	38.44	-	48.00	-	-9.56	-
6	4.059	0.30	37.65	-	37.95	-	48.00	-	-10.05	-

**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.



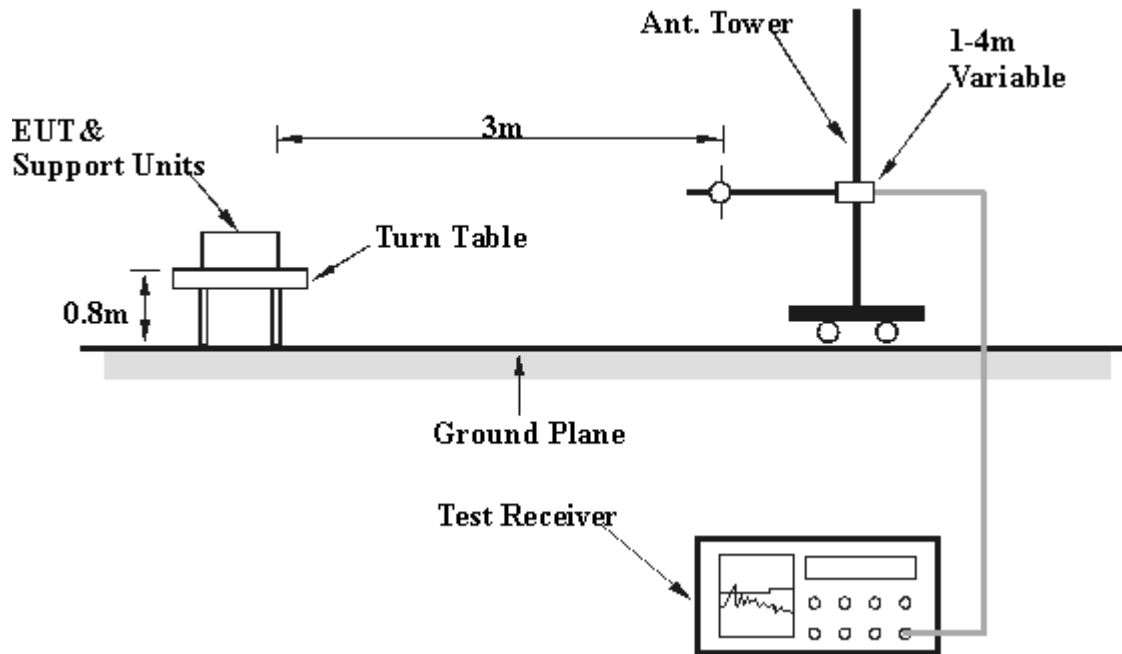
#### 4.2.3 TEST PROCEDURES

- 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 (A)

<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, 60%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	167.10	36.7 QP	43.50	-6.80	1.29H	357	26.10	9.35	1.30	0.00	-10.65
2	199.66	40.5 QP	43.50	-3.00	1.73H	42	30.10	8.98	1.42	0.00	-10.40
3	220.00	36.4 QP	46.00	-9.60	1.24H	217	24.80	10.12	1.51	0.00	-11.63
4	232.81	43.4 QP	46.00	-2.60	1.27H	20	30.80	10.98	1.58	0.00	-12.56
5	396.02	35.6 QP	46.00	-10.40	2.11H	99	17.40	15.96	2.22	0.00	-18.18
6	433.88	34.9 QP	46.00	-11.10	1.10H	42	16.27	16.29	2.36	0.00	-18.65
7	528.04	35.9 QP	46.00	-10.10	2.03H	15	15.70	17.62	2.60	0.00	-20.22
8	748.58	36.1 QP	46.00	-9.90	1.61H	147	12.70	20.14	3.26	0.00	-23.40

**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	166.50	36.0 QP	43.50	-7.50	1.32V	37	25.30	9.44	1.29	0.00	-10.73
2	201.20	29.0 QP	43.50	-14.50	2.25V	23	18.50	9.11	1.43	0.00	-10.54
3	219.50	36.1 QP	46.00	-9.90	1.00V	356	24.50	10.12	1.51	0.00	-11.63
4	232.50	40.6 QP	46.00	-5.40	1.11V	338	28.00	10.98	1.58	0.00	-12.56
5	352.10	32.1 QP	46.00	-13.90	1.46V	59	15.70	14.31	2.05	0.00	-16.36
6	396.00	31.0 QP	46.00	-15.00	1.43V	298	12.80	15.96	2.22	0.00	-18.18
7	528.10	35.6 QP	46.00	-10.40	1.42V	290	15.40	17.62	2.60	0.00	-20.22
8	598.10	36.1 QP	46.00	-9.90	1.61V	303	14.70	18.58	2.82	0.00	-21.40
9	748.10	34.1 QP	46.00	-11.90	1.51V	251	10.70	20.14	3.26	0.00	-23.40
10	792.40	35.4 QP	46.00	-10.60	1.82V	282	11.50	20.60	3.31	0.00	-23.91
11	880.13	33.6 QP	46.00	-12.40	1.86V	298	9.40	20.68	3.55	0.00	-24.23

**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, 60%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	48.0 PK	74.00	-26.00	1.39H	190	19.47	25.27	3.29	0.00	-28.57
2	*2413.10	103.2 PK	-	-	1.10H	320	72.37	27.19	3.62	0.00	-30.82
3	*2413.10	93.5 AV	-	-	1.10H	320	62.70	27.19	3.62	0.00	-30.82
4	4075.50	49.1 PK	74.00	-24.90	1.03H	236	14.20	30.18	4.77	0.00	-34.95
5	4824.40	50.3 PK	74.00	-23.70	1.23H	52	13.70	31.43	5.21	0.00	-36.65

#### 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	2037.80	48.6 PK	74.00	-25.40	1.10V	341	20.00	25.27	3.29	0.00	-28.57
2	*2413.10	99.9 PK	-	-	1.00V	13	69.05	27.19	3.62	0.00	-30.81.
3	*2413.10	91.0 AV	-	-	1.00V	13	60.20	27.19	3.62	0.00	-30.81.
4	4075.80	51.6 PK	74.00	-22.40	1.10V	127	16.70	30.18	4.77	0.00	-34.95
5	4824.20	50.7 PK	74.00	-23.30	1.37V	248	14.10	31.43	5.21	0.00	-36.64
6	6113.20	51.8 PK	74.00	-22.20	1.76V	339	13.00	32.83	5.98	0.00	-38.81

#### 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.



<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, 60%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	2062.80	47.9 PK	74.00	-26.10	1.34H	112	19.20	25.39	3.31	0.00	-28.70
2	*2438.10	102.4 PK	-	-	1.91H	347	71.48	27.30	3.64	0.00	-30.95
3	*2438.10	94.3 AV	-	-	1.91H	347	63.40	27.30	3.64	0.00	-30.95
4	4125.40	49.9 PK	74.00	-24.10	1.04H	139	14.80	30.28	4.79	0.00	-35.07
5	4874.10	50.3 PK	74.00	-23.70	1.10H	74	13.60	31.47	5.25	0.00	-36.73
6	6188.20	49.3 PK	74.00	-24.70	1.45H	100	10.10	33.19	6.01	0.00	-39.20

#### 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	2062.80	48.1 PK	74.00	-25.90	1.36V	108	19.41	25.39	3.31	0.00	-28.70
2	*2438.00	103.1 PK	-	-	1.17V	48	72.14	27.30	3.64	0.00	-30.94.
3	*2438.00	95.0 AV	-	-	1.17V	48	64.10	27.30	3.64	0.00	-30.94.
4	4125.40	51.9 PK	74.00	-22.10	1.21V	153	16.80	30.28	4.79	0.00	-35.07
5	4874.30	50.4 PK	74.00	-23.60	1.30V	154	13.70	31.47	5.25	0.00	-36.72
6	6188.20	52.4 PK	74.00	-21.60	1.47V	10	13.17	33.19	6.01	0.00	-39.20
7	8250.90	57.3 PK	74.00	-16.70	1.19V	337	13.58	36.70	7.01	0.00	-43.72
8	8250.90	45.5 AV	54.00	-8.50	1.19V	337	1.80	36.70	7.01	0.00	-43.71

#### 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>	25 deg. C, 60%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	2087.80	48.5 PK	74.00	-25.50	1.08H	133	19.70	25.50	3.33	0.00	-28.83
2	*2463.10	101.8 PK	-	-	2.12H	311	70.77	27.41	3.66	0.00	-31.08
3	*2463.10	100.5 AV	-	-	2.12H	311	69.40	27.41	3.66	0.00	-31.08
4	2483.50	59.6 PK	74.00	-14.40	1.21H	62	28.40	27.52	3.68	0.00	-31.20
5	2483.50	49.3 AV	54.00	-4.70	1.21H	62	18.05	27.52	3.68	0.00	-31.20
6	4175.50	51.0 PK	74.00	-23.00	1.07H	183	15.80	30.38	4.81	0.00	-35.19
7	4924.10	51.6 PK	74.00	-22.40	1.77H	11	14.80	31.51	5.28	0.00	-36.81
8	6263.20	50.7 PK	74.00	-23.30	1.90H	221	11.20	33.46	6.03	0.00	-39.49

### 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	2087.30	50.3 PK	74.00	-23.70	2.02V	257	21.50	25.50	3.33	0.00	-28.83
2	*2463.00	102.4 PK	-	-	1.29V	38	71.31	27.41	3.66	0.00	-31.07
3	*2463.00	94.4 AV	-	-	1.29V	38	63.28	27.41	3.66	0.00	-31.07
4	2483.50	58.6 PK	74.00	-15.40	1.10V	16	27.40	27.52	3.68	0.00	-31.20
5	2483.50	49.3 AV	54.00	-4.70	1.10V	16	18.12	27.52	3.68	0.00	-31.20
6	4175.40	54.1 PK	74.00	-19.90	1.04V	343	18.90	30.38	4.81	0.00	-35.19
7	4175.40	50.6 AV	54.00	-3.40	1.04V	343	15.40	30.38	4.81	0.00	-35.19
8	4924.70	51.6 PK	74.00	-22.40	1.00V	68	14.80	31.51	5.28	0.00	-36.81
9	6263.20	55.3 PK	74.00	-18.70	1.77V	78	15.80	33.46	6.03	0.00	-39.49
10	6263.20	46.9 AV	54.00	-7.10	1.77V	78	7.38	33.46	6.03	0.00	-39.49
11	8315.10	57.6 PK	74.00	-16.40	1.10V	350	13.83	36.72	7.05	0.00	-43.78
12	8315.10	46.3 AV	54.00	-7.70	1.10V	350	2.50	36.72	7.05	0.00	-43.78

#### 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.



## 4.2.7 TEST RESULTS (B)

<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, 60%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	167.10	34.0 QP	43.50	-9.50	1.91H	337	23.40	9.35	1.30	0.00	-10.65
2	201.30	39.5 QP	43.50	-4.00	1.09H	334	29.00	9.11	1.43	0.00	-10.54
3	232.40	42.4 QP	46.00	-3.60	1.35H	216	30.00	10.84	1.57	0.00	-12.41
4	264.01	33.0 QP	46.00	-13.00	1.25H	259	18.40	12.89	1.70	0.00	-14.58
5	395.57	34.6 QP	46.00	-11.40	2.01H	159	16.40	15.96	2.22	0.00	-18.18
6	440.17	33.0 QP	46.00	-13.00	1.54H	354	14.30	16.32	2.38	0.00	-18.69
7	528.04	37.4 QP	46.00	-8.60	2.21H	356	17.20	17.62	2.60	0.00	-20.23
8	603.05	38.9 QP	46.00	-7.10	1.62H	190	17.40	18.64	2.84	0.00	-21.49
9	660.40	34.7 QP	46.00	-11.30	1.65H	102	12.40	19.25	3.05	0.00	-22.29
10	748.01	37.6 QP	46.00	-8.40	1.18H	5	14.20	20.14	3.26	0.00	-23.40.

**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	167.75	34.0 QP	43.50	-9.50	1.15V	66	23.40	9.35	1.30	0.00	-10.65
2	200.65	35.1 QP	43.50	-8.40	1.08V	12	24.70	8.98	1.42	0.00	-10.40
3	220.14	32.0 QP	46.00	-14.00	1.08V	181	20.40	10.12	1.51	0.00	-11.63
4	232.08	41.0 QP	46.00	-5.00	1.03V	291	28.60	10.84	1.57	0.00	-12.41
5	352.01	33.1 QP	46.00	-12.90	1.52V	234	16.70	14.31	2.05	0.00	-16.36
6	396.01	35.6 QP	46.00	-10.40	1.91V	353	17.40	15.96	2.22	0.00	-18.18
7	528.01	35.2 QP	46.00	-10.80	1.15V	50	15.00	17.62	2.60	0.00	-20.23
8	660.01	36.4 QP	46.00	-9.60	1.83V	51	14.10	19.25	3.05	0.00	-22.29
9	748.10	37.6 QP	46.00	-8.40	1.58V	195	14.20	20.14	3.26	0.00	-23.41
10	792.40	37.3 QP	46.00	-8.70	1.57V	86	13.40	20.60	3.31	0.00	-23.91

**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, 60%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	47.8 PK	74.00	-26.20	1.45H	355	19.20	25.27	3.29	0.00	-28.57
2	*2412.40	103.5 PK	-	-	1.82H	26	72.71	27.19	3.62	0.00	-30.81.
3	*2412.40	93.6 AV	-	-	1.82H	26	62.80	27.19	3.62	0.00	-30.81.
4	4075.50	50.6 PK	74.00	-23.40	1.24H	27	15.70	30.18	4.77	0.00	-34.96
5	4824.30	51.0 PK	74.00	-23.00	1.20H	265	14.37	31.43	5.21	0.00	-36.64

#### 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	2037.80	47.8 PK	74.00	-26.20	1.33V	58	19.20	25.27	3.29	0.00	-28.57
2	*2413.00	105.2 PK	-	-	1.16V	356	74.43	27.19	3.62	0.00	-30.82
3	*2413.00	98.0 AV	-	-	1.16V	356	67.20	27.19	3.62	0.00	-30.82
4	4075.40	50.3 PK	74.00	-23.70	2.06V	291	15.40	30.18	4.77	0.00	-34.95
5	4824.20	50.7 PK	74.00	-23.30	1.49V	259	14.11	31.43	5.21	0.00	-36.64
6	6113.20	49.5 PK	74.00	-24.50	1.95V	87	10.70	32.83	5.98	0.00	-38.81

#### 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.



<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, 60%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	49.4 PK	74.00	-24.60	1.62H	11	20.70	25.39	3.31	0.00	-28.70
2	*2438.00	105.1 PK	-	-	1.29H	334	74.13	27.30	3.64	0.00	-30.94
3	*2438.00	96.3 AV	-	-	1.29H	334	65.40	27.30	3.64	0.00	-30.94
4	4125.70	50.9 PK	74.00	-23.10	1.00H	353	15.80	30.28	4.79	0.00	-35.07
5	4874.30	50.4 PK	74.00	-23.60	1.18H	301	13.72	31.47	5.25	0.00	-36.72
6	6188.10	49.0 PK	74.00	-25.00	1.94H	24	9.80	33.19	6.01	0.00	-39.21

#### 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	2062.80	47.9 PK	74.00	-26.10	1.49V	333	19.20	25.39	3.31	0.00	-28.70
2	*2438.00	103.2 PK	-	-	1.09V	40	72.25	27.30	3.64	0.00	-30.94.
3	*2438.00	95.1 AV	-	-	1.09V	40	64.17	27.30	3.64	0.00	-30.94.
4	4125.50	51.9 PK	74.00	-22.10	1.03V	7	16.80	30.28	4.79	0.00	-35.08
5	4874.50	50.9 PK	74.00	-23.10	1.15V	338	14.20	31.47	5.25	0.00	-36.72
6	6188.20	53.4 PK	74.00	-20.60	1.85V	354	14.24	33.19	6.01	0.00	-39.20
7	6188.20	44.5 AV	54.00	-9.50	1.85V	354	5.28	33.19	6.01	0.00	-39.20

#### 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>	25 deg. C, 60%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	2087.80	49.2 PK	74.00	-24.80	1.08H	101	20.40	25.50	3.33	0.00	-28.83
2	*2463.20	104.8 PK	-	-	1.00H	164	73.74	27.41	3.66	0.00	-31.08
3	*2463.20	98.0 AV	-	-	1.00H	164	66.89	27.41	3.66	0.00	-31.08
4	2483.50	56.9 PK	74.00	-17.10	1.04H	81	25.70	27.52	3.68	0.00	-31.20
5	2483.50	50.6 AV	54.00	-3.40	1.04H	81	19.40	27.52	3.68	0.00	-31.20
6	4175.10	51.6 PK	74.00	-22.40	1.18H	256	16.40	30.38	4.81	0.00	-35.19
7	4924.10	50.7 PK	74.00	-23.30	1.11H	329	13.90	31.51	5.28	0.00	-36.80
8	6263.20	51.2 PK	74.00	-22.80	1.28H	304	11.70	33.46	6.03	0.00	-39.49

#### 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	2087.80	47.2 PK	74.00	-26.80	1.48V	357	18.40	25.50	3.33	0.00	-28.83
2	*2463.10	104.4 PK	-	-	1.59V	315	73.29	27.41	3.66	0.00	-31.08
3	*2463.10	95.8 AV	-	-	1.59V	315	64.70	27.41	3.66	0.00	-31.08
4	2483.50	58.6 PK	74.00	-15.40	1.00V	14	27.40	27.52	3.68	0.00	-31.20.
5	2483.50	51.3 AV	54.00	-2.70	1.00V	14	20.11	27.52	3.68	0.00	-31.20
6	4175.50	53.4 PK	74.00	-20.60	1.18V	21	18.20	30.38	4.81	0.00	-35.19
7	4175.50	52.0 AV	54.00	-2.00	1.18V	21	16.80	30.38	4.81	0.00	-35.19
8	4924.70	50.5 PK	74.00	-23.50	1.50V	234	13.70	31.51	5.28	0.00	-36.80
9	6263.90	51.7 PK	74.00	-22.30	1.83V	326	12.20	33.46	6.03	0.00	-39.49
10	8350.90	58.0 PK	74.00	-16.00	1.53V	4	14.20	36.74	7.07	0.00	-43.82
11	8350.90	46.9 AV	54.00	-7.10	1.53V	4	3.10	36.74	7.07	0.00	-43.81.

#### 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

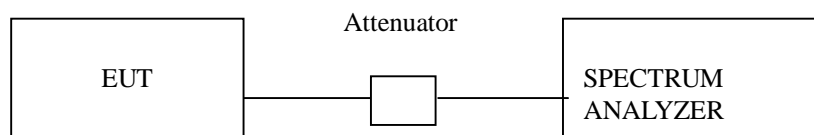
**NOTE:**

- 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.



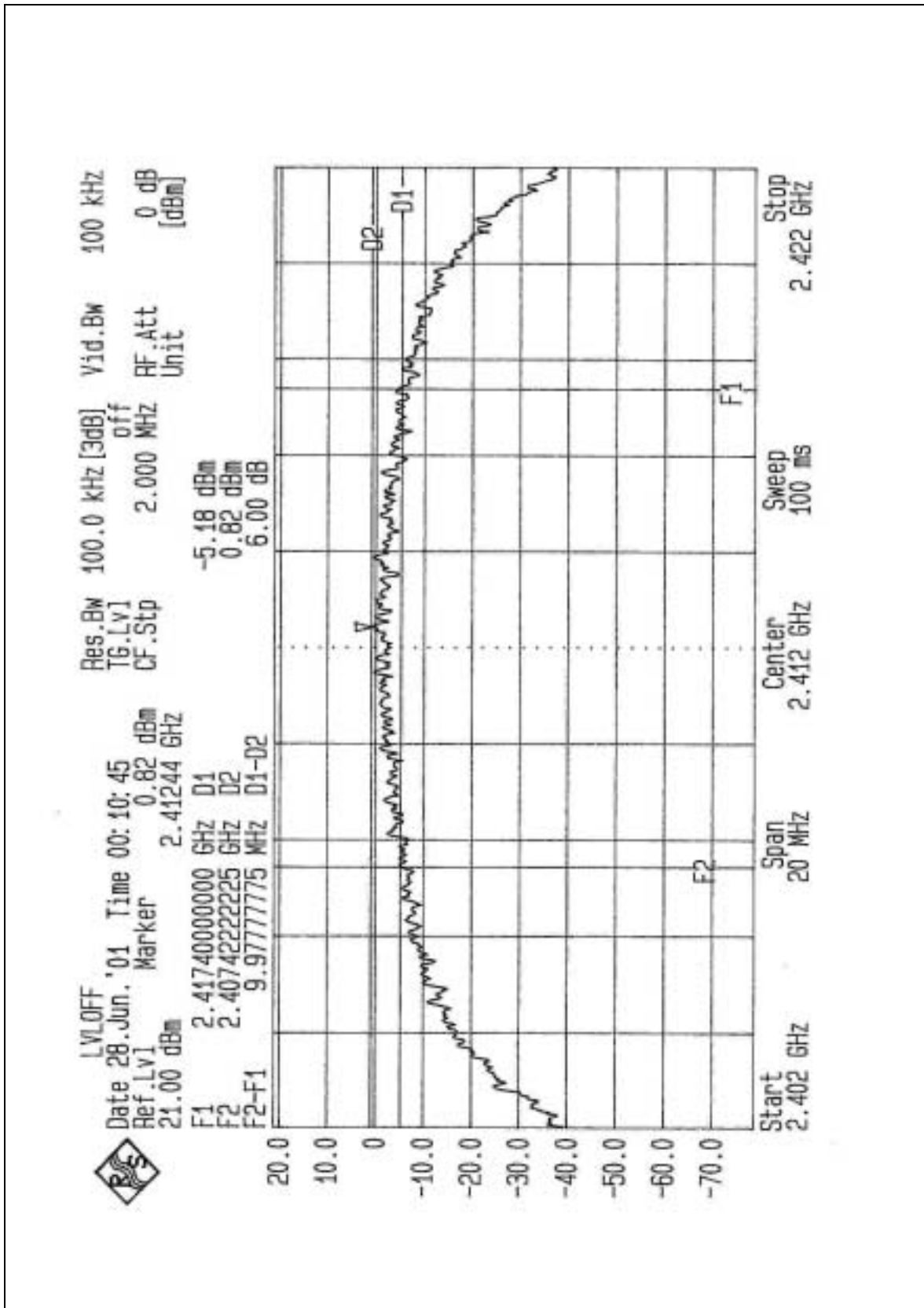
4.3.6 TEST RESULTS

<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

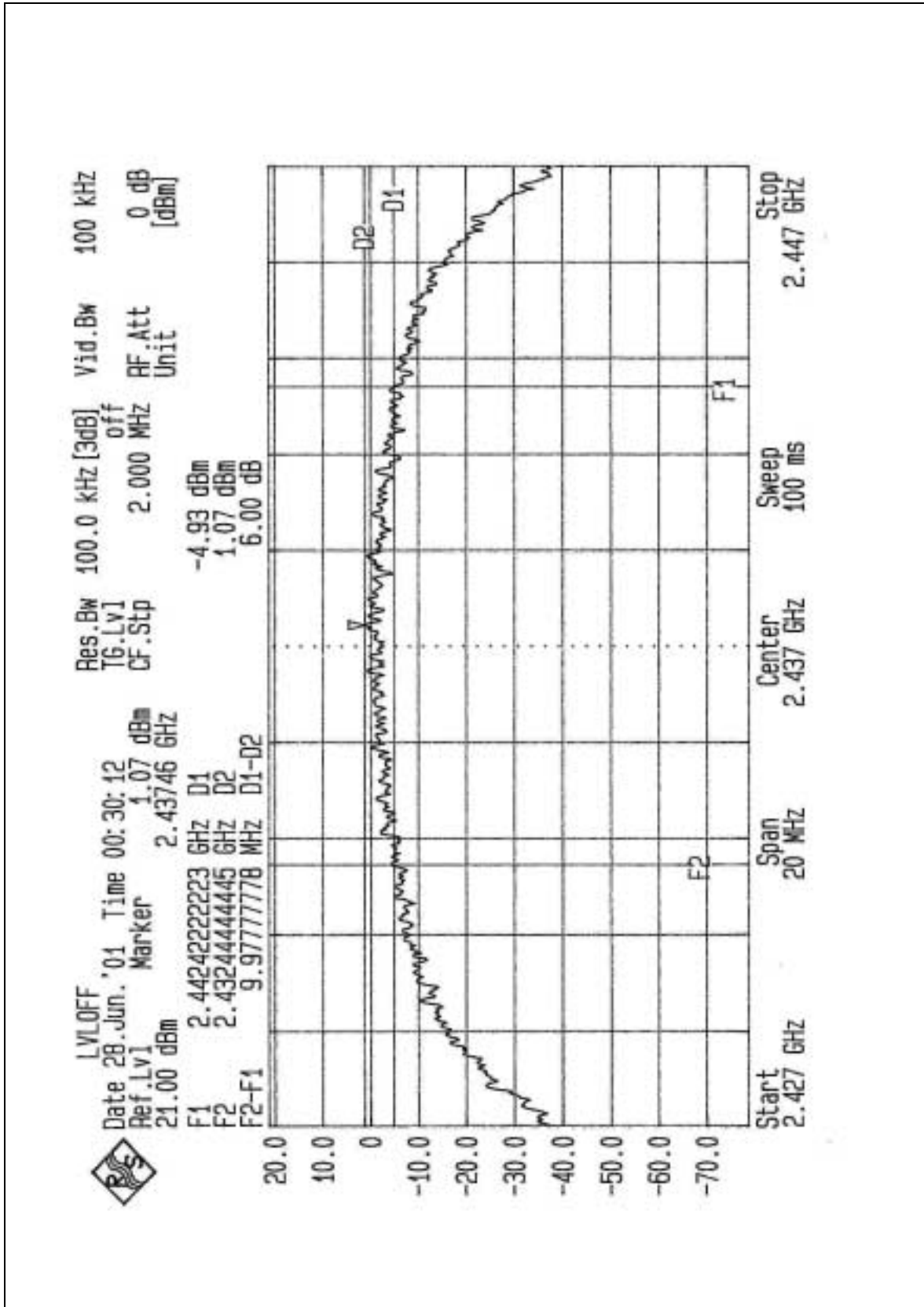


CH1





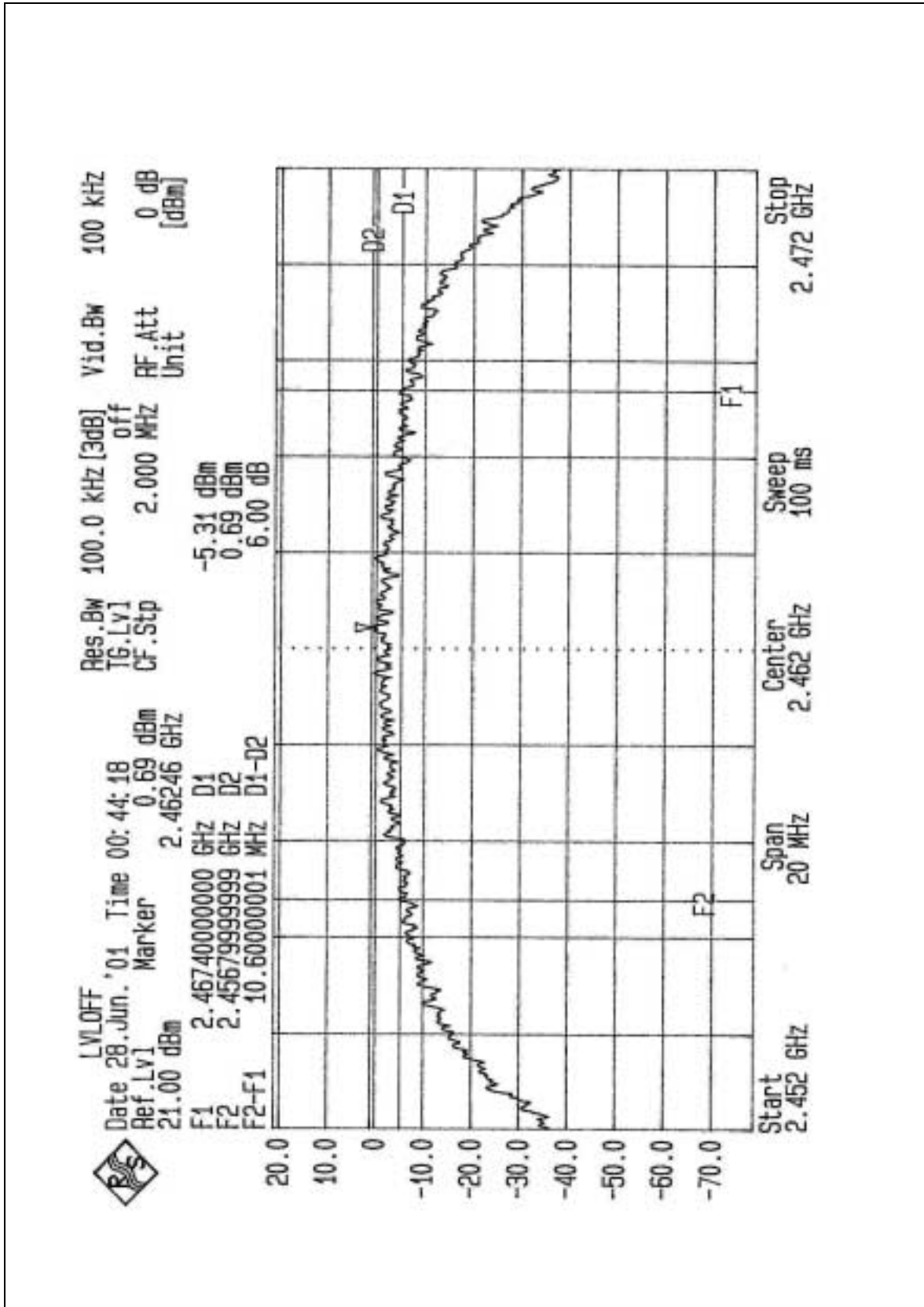
CH6







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.

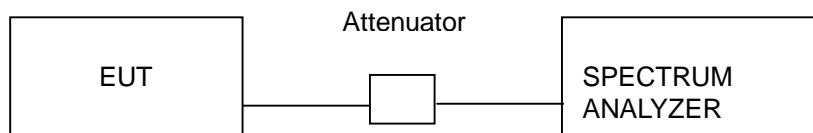


#### 4.4.3 TEST PROCEDURES

- 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			

<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	18.50	30	PASS
6	2437	18.30	30	PASS
11	2462	18.22	30	PASS



## 4.5 POWER SPECTRAL DENSITY MEASUREMENT

### 4.5.1 LIMITS OF POWER SPECTRAL DENSITY MEASUREMENT

The Maximum of Power Spectral Density Measurement is 8dBm.

### 4.5.2 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

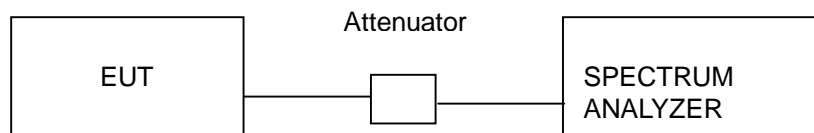
**NOTE:**

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.

### 4.5.3 TEST PROCEDURE

The transmitter output was connected to the spectrum analyzer through an attenuator, the bandwidth of the fundamental frequency was measured with the spectrum analyzer using 3 kHz RBW and 30 kHz VBW, set sweep time=span/3kHz. The power spectral density was measured and recorded. The sweep time is allowed to be longer than span/3KHz for a full response of the mixer in the spectrum analyzer.

### 4.5.4 TEST SETUP



### 4.5.5 EUT OPERATING CONDITIONS

Same as 4.3.5



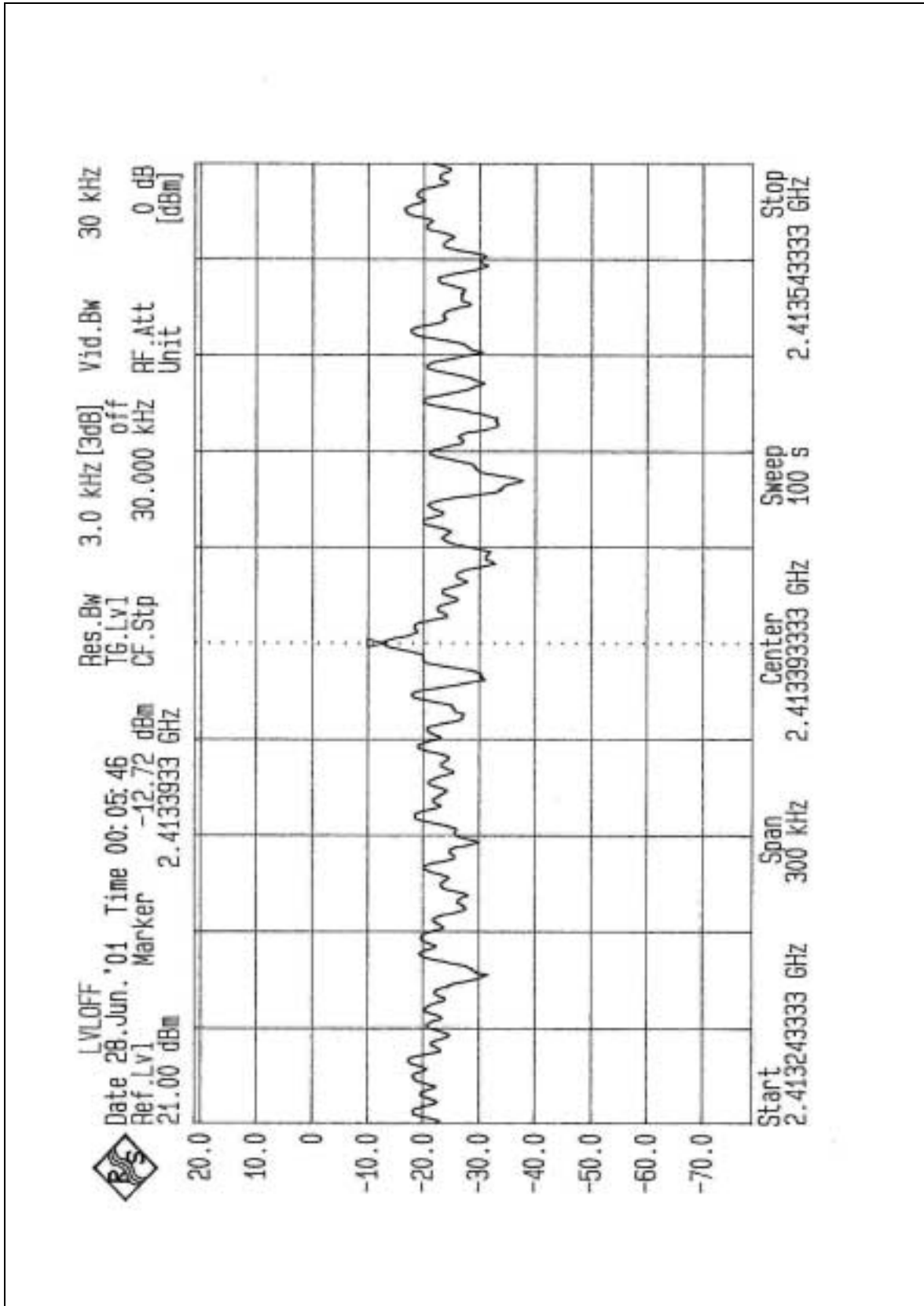
## 4.5.6 TEST RESULTS

<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 NUMBER</b>	<b>CHANNEL FREQUENCY (MHz )</b>	<b>RF POWER LEVEL IN 3 KHz BW (dBm)</b>	<b>MAXIMUM LIMIT (dBm)</b>	<b>PASS/FAIL</b>
1	2412	-12.72	8	PASS
6	2437	-12.57	8	PASS
11	2462	-12.82	8	PASS



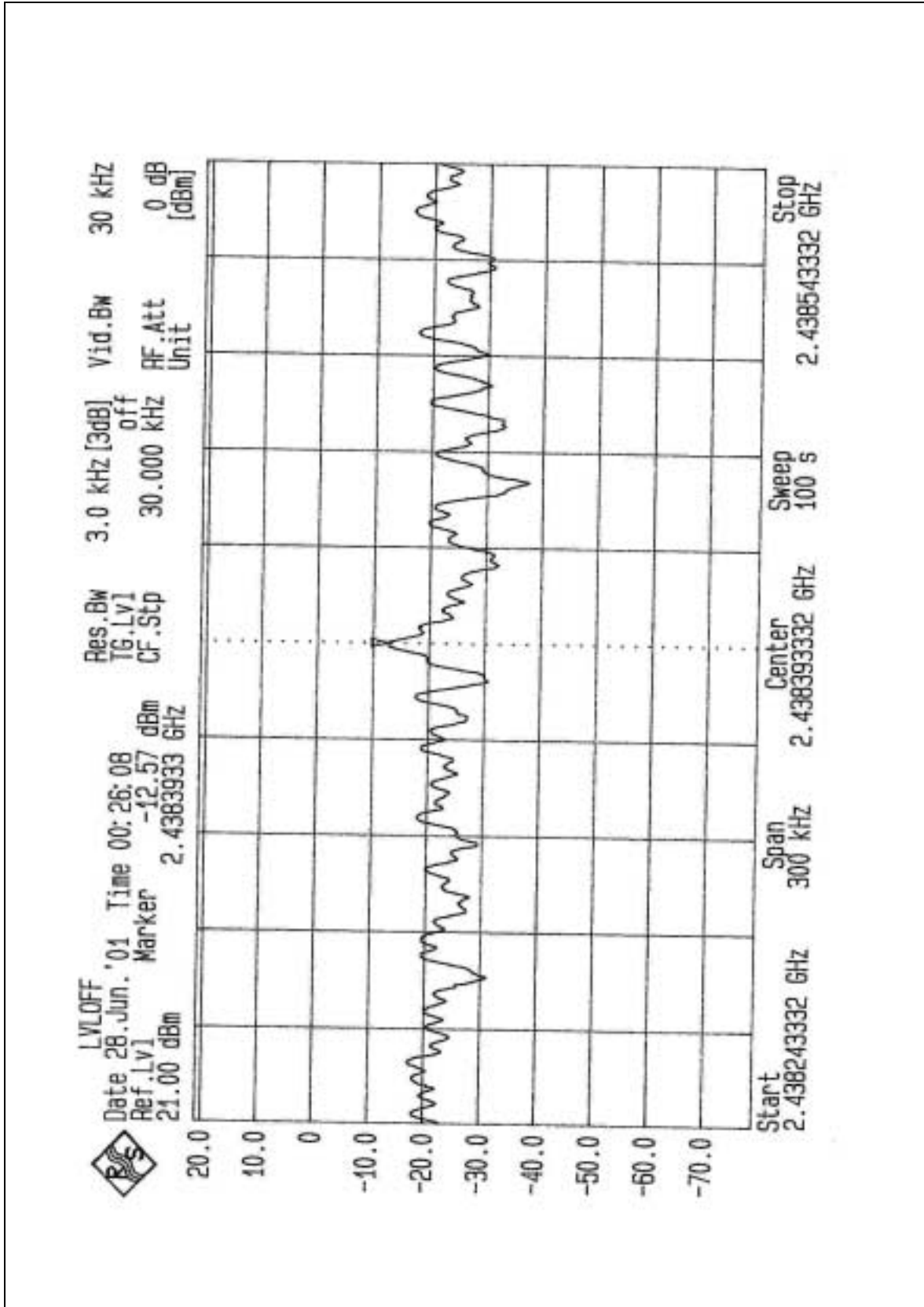
CH1





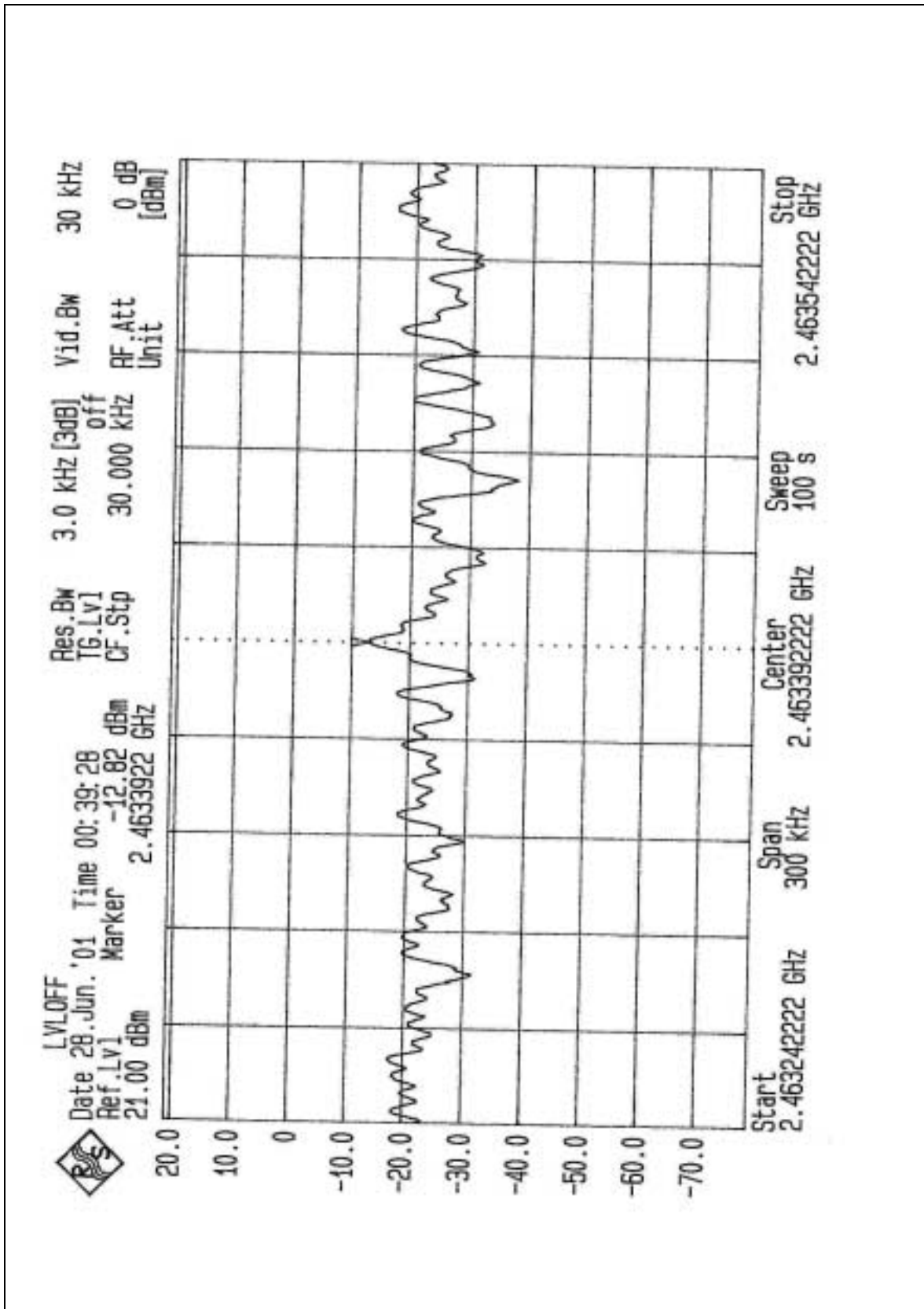


CH6





CH11





## 4.6 BAND EDGES MEASUREMENT

### 4.6.1 LIMITS OF BAND EDGES MEASUREMENT

Below  $-20\text{dB}$  of the highest emission level of operating band (in 100KHz Resolution Bandwidth).

### 4.6.2 TEST INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
ROHDE & SCHWARZ TEST RECEIVER	ESMI	848926/005 846839/018	Dec 28, 2001
HP ATTENUATOR	8496B	3247A18505	Cal. on use
HP PLOTTER	7475A	2641V27755	N/A

**NOTE:**

1. The measurement uncertainty is less than  $\pm 2.6\text{dB}$ , 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.

### 4.6.3 TEST PROCEDURE

The transmitter output was connected to the spectrum analyzer via a low lose cable. Set both RBW and VBW of spectrum analyzer to 100 kHz with suitable frequency span including 100 kHz bandwidth from band edge. The band edges was measured and recorded.



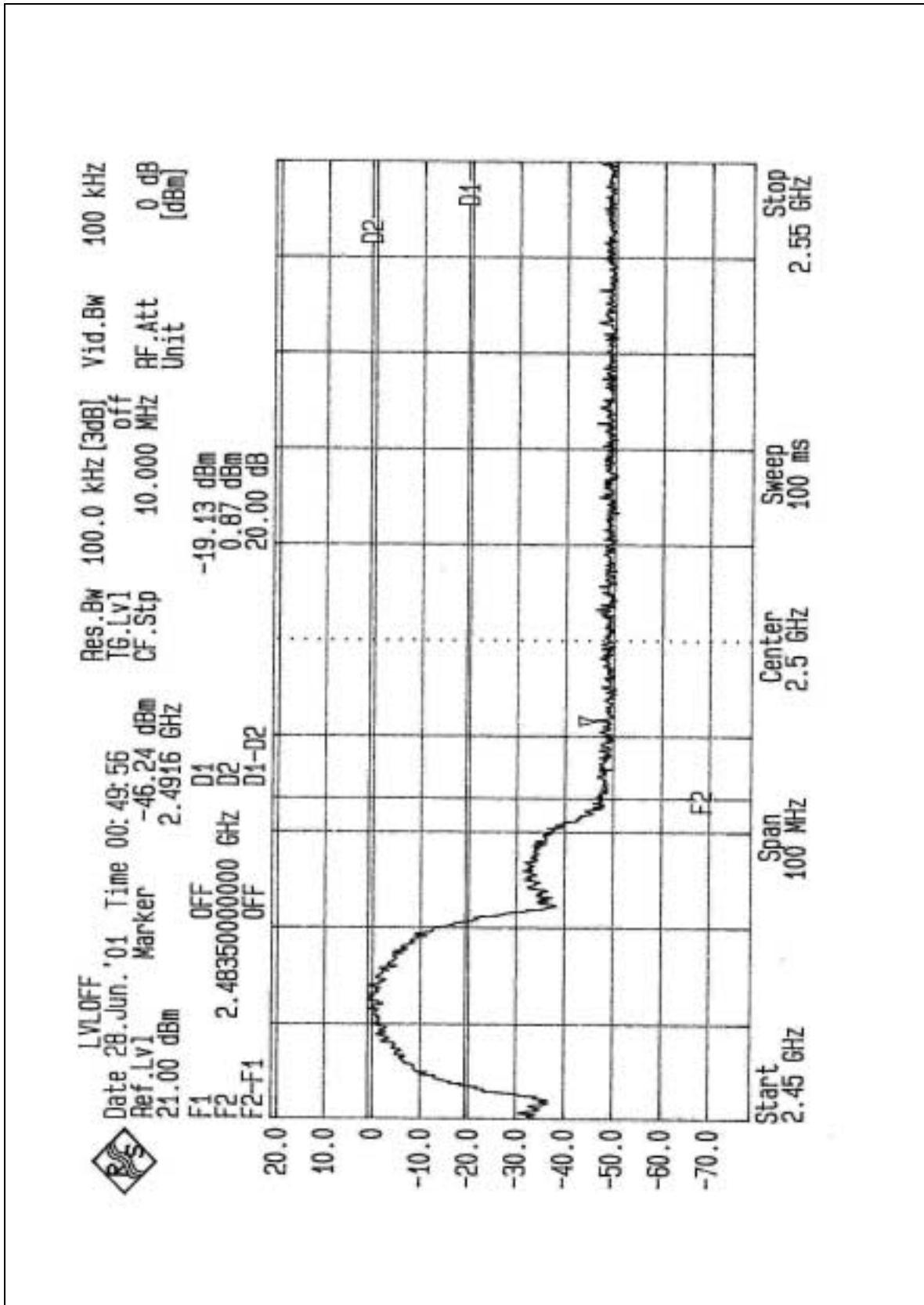
#### 4.6.4 EUT OPERATING CONDITION

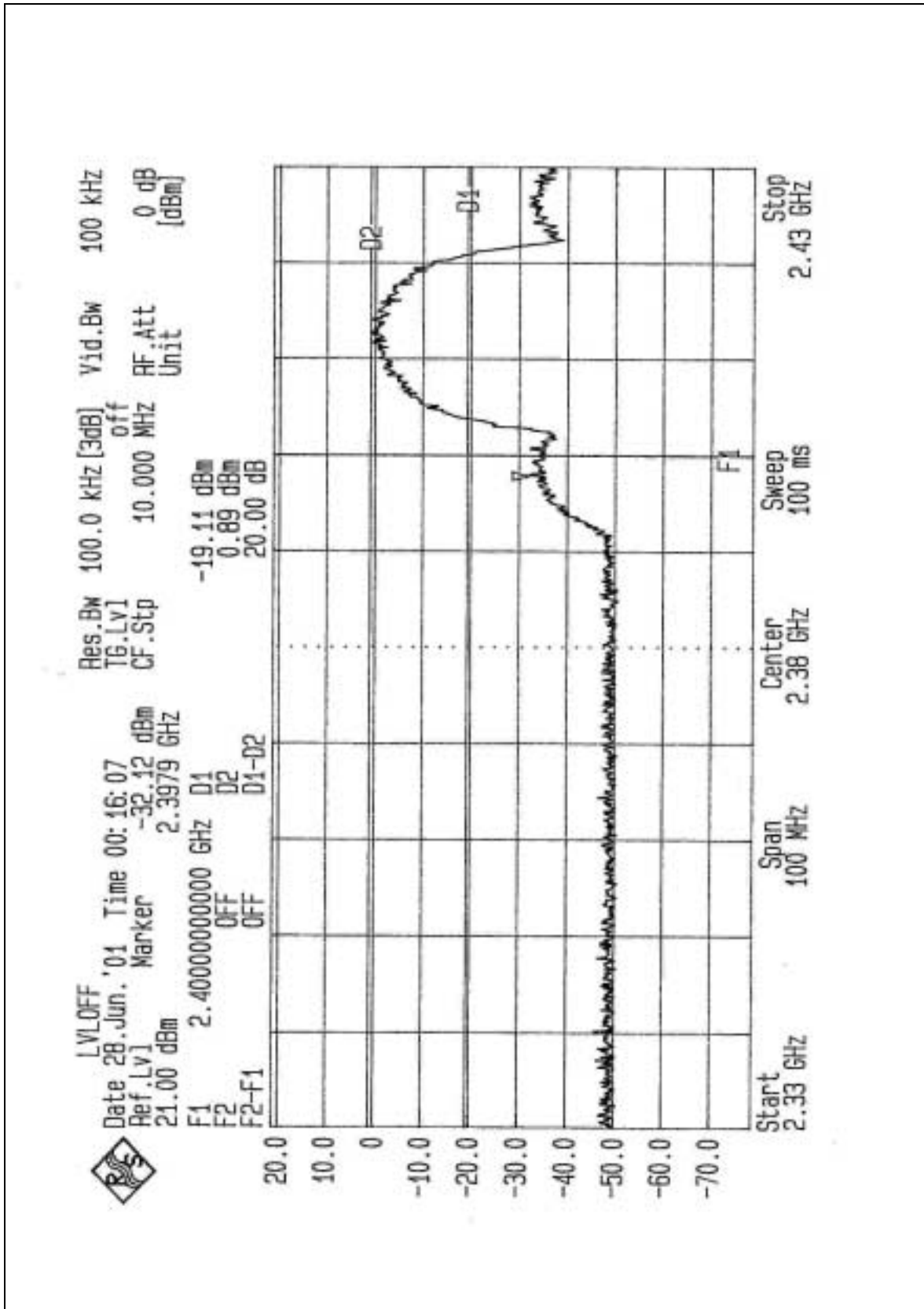
Same as Item 4.3.5

#### 4.6.5 TEST RESULTS

The spectrum plots are attached on the following 2 pages. D2 line indicates the highest level, D1 line indicates the 20dB offset below D2. It shows compliance with the requirement in part 15.247(C).

**NOTE:** The band edge emission plot on the following 2 pages shows 20.0dB delta between carrier maximum power and local maximum emission in restrict band (2.4916GHz). The emission of carrier strength list in the test result of channel 11 at the item 4.2.6 (Page 31) is 100.5dBuV/m, so the maximum field strength in restrict band is  $100.5 - 47.11 = 53.39$  dBuV/m which is under 54 dBuV/m limit.







## **4.7 ANTENNA REQUIREMENT**

### **4.7.1 STANDARD APPLICABLE**

For intentional device, according to FCC 47 CFR Section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

And according to FCC 47 CFR Section 15.247 (b), if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

### **4.7.2 ANTENNA CONNECTED CONSTRUCTION**

The maximum Gain antenna used in this product is dipole antenna. All the antenna connector types is UFL. And the maximum Gain of these antennas is only 0dBi.

## 5 PHOTOGRAPHS OF THE TEST CONFIGURATION

### CONDUCTED EMISSION TEST(A)

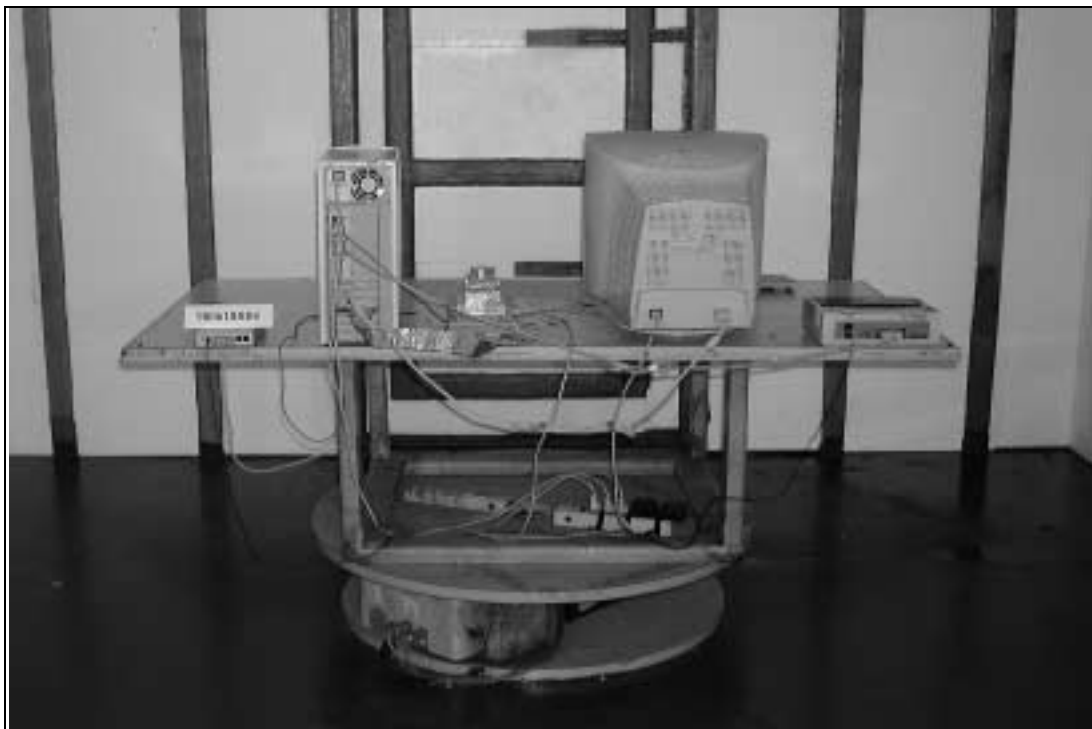




CONDUCTED EMISSION TEST(B)



RADIATED EMISSION TEST(A)



RADIATED EMISSION TEST(B)





## 6 INFORMATION ON THE TESTING LABORATORIES

We, ADT Corp., were founded in 1988 to provide our best service in EMC and Safety consultation. Our laboratories are accredited and approved by the following approval agencies according to ISO/IEC 17025, Guide 25 or EN 45001:

<b>USA</b>	FCC, NVLAP
<b>Germany</b>	TUV Rheinland
<b>Japan</b>	VCCI
<b>New Zealand</b>	MoC
<b>Norway</b>	NEMKO
<b>R.O.C.</b>	BSMI, DGT, CNLA

Copies of accreditation certificates of our laboratories obtained from approval agencies can be downloaded from our web site:

[www.adt.com.tw/index.5/phtml](http://www.adt.com.tw/index.5/phtml).

If you have any comments, please feel free to contact us at the following:

**Lin Kou EMC Lab:**

Tel: 886-2-26052180

Fax: 886-2-26052943

**Hsin Chu EMC Lab:**

Tel: 886-35-935343

Fax: 886-35-935342

**Lin Kou Safety Lab:**

Tel: 886-2-26093195

Fax: 886-2-26093184

**Lin Kou RF&Telecom Lab**

Tel: 886-3-3270910

Fax: 886-3-3270892

**Email:** [service@mail.adt.com.tw](mailto:service@mail.adt.com.tw)

**Web Site:** [www.adt.com.tw](http://www.adt.com.tw)

The address and road map of all our labs can be found in our web site also.