



# FCC TEST REPORT

**REPORT NO.:** RF930626H01

**MODEL NO.:** G-162

**RECEIVED:** Jun. 26, 2004

**TESTED:** Jul. 02, 2004

**APPLICANT:** ZyXEL Communications Corporation

**ADDRESS:** No. 6, Innovation Rd II, Science-Based  
Industrial

**ISSUED BY:** Advance Data Technology Corporation

**LAB LOCATION:** No. 19, Hwa Ya 2nd rd., Kueishan, Taoyuan,  
Taiwan, R.O.C.

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# 1 CERTIFICATION

**PRODUCT :** 802.11g Wireless CardBus Card  
**BRAND NAME :** ZyXEL  
**MODEL NO. :** G-162  
**APPLICANT :** ZyXEL Communications Corporation  
**TESTED :** Jul. 02, 2004  
**TEST ITEM :** ENGINEERING SAMPLE  
**STANDARDS :** FCC Part 15, Subpart C (Section 15.247),  
 ANSI C63.4-2001

The above equipment has been tested by **Advance Data Technology Corporation**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's EMC characteristics under the conditions specified in this report.

**PREPARED BY :** Midoli Peng , **DATE:** Jul. 12, 2004  
 ( Midoli Peng )

**TECHNICAL ACCEPTANCE :** Hank Chung , **DATE:** Jul. 12, 2004  
 Responsible for RF ( Hank Chung )

**APPROVED BY :** Eric Lin , **DATE:** Jul. 12, 2004  
 ( Eric Lin, Manager )



## 2 SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

<b>APPLIED STANDARD: FCC 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	PASS	Meet the requirement of limit Minimum passing margin is -16.64dB at 0.173MHz
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 -1.90dB at 2483.50MHz
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

**NOTE:** The information of measurement uncertainty is available upon the customer's request.



### 3 GENERAL INFORMATION

#### 3.1 GENERAL DESCRIPTION OF EUT

<b>PRODUCT</b>	802.11g Wireless CardBus Card
<b>MODEL NO.</b>	G-162
<b>POWER SUPPLY</b>	3.3Vdc from host equipment
<b>MODULATION TYPE</b>	BPSK, QPSK, CCK, 16QAM, 64QAM
<b>RADIO TECHNOLOGY</b>	DSSS, OFDM
<b>TRANSFER RATE</b>	802.11b: 11/5.5/2/1Mbps 802.11g: 54/48/36/24/18/12/9/6Mbps
<b>FREQUENCY RANGE</b>	2412MHz ~ 2462MHz
<b>NUMBER OF CHANNEL</b>	11
<b>OUTPUT POWER</b>	16.50dBm
<b>ANTENNA TYPE</b>	Printed antenna with 0dBi gain
<b>DATA CABLE</b>	NA
<b>I/O PORTS</b>	NA
<b>ASSOCIATED DEVICES</b>	NA

**NOTE:**

1. The EUT operates in the 2.4GHz frequency spectrum with throughput of up to 54Mbps.
2. The EUT complies with IEEE 802.11g draft standards and backwards compatible with IEEE 802.11b products.
3. The above EUT information was declared by manufacturer and for 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 to 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 1GHz, the channel 1, 6, and 11 were pre-tested in chamber. The channel 11, the worst case, was chosen for final test.
2. Above 1GHz, the channel 1, 6, and 11 were tested individually.
3. From our experience and technical viewpoint, we have chosen data rates 11Mbps for CCK technique and 6Mbps for OFDM technique, as the worst cases for the test among other data rates.
4. Two test results are presented in the following sections. The test results A is for CCK technique and the test results B is for OFDM technique.

### 3.3 GENERAL DESCRIPTION OF APPLIED STANDARDS

The EUT is a 802.11g Wireless CardBus Card. According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

**FCC Part 15, Subpart C. (15.247)**  
**ANSI C63.4:2001**

All test items 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 COMPUTER	DELL	PP01L	TW-09C748-12800-1 A3-1999	FCC DoC
2	PRINTER	HP	C2642A	MY79F1C3MZ	B94C2642X
3	MODEM	ACEEX	1414	0206026776	IFAXDM1414
4	Wireless Networking	Microsoft	MN-700	NA	C3KMN700

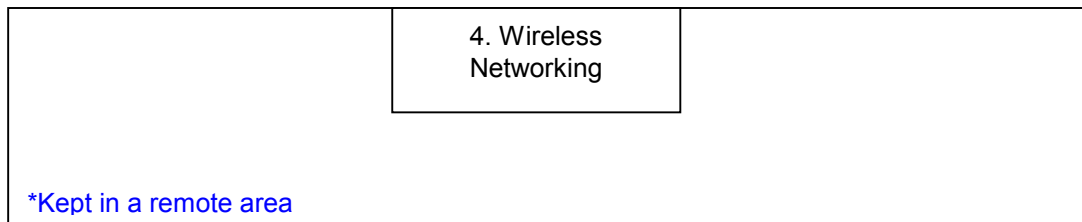
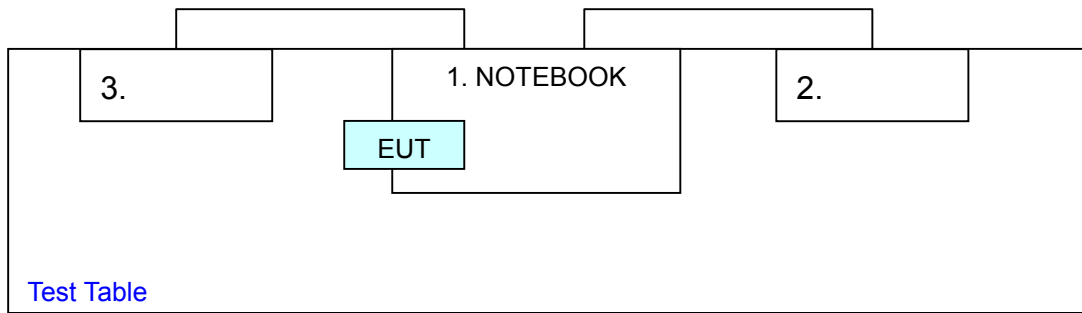
No.	Signal cable description
1	NA
2	1.2m braid shielded wire, terminated with DB25 and Centronics connector via metallic frame, w/o core.
3	1.2 m braid shielded wire, terminated with DB25 and DB9 connector via metallic frame, w/o core.
4	NA

**Note1:** The power cords of the above support units were unshielded (1.8m).

**Note2:** Item 2 act as a communication partner to transfer data.



### 3.5 CONFIGURATION OF SYSTEM UNDER TEST





## 4 TEST TYPES AND RESULTS

### 4.1 CONDUCTED EMISSION MEASUREMENT

#### 4.1.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT

FREQUENCY OF EMISSION (MHz)	CONDUCTED LIMIT (dB $\mu$ V)	
	Quasi-peak	Average
0.15-0.5	66 to 56	56 to 46
0.5-5	56	46
5-30	60	50

- NOTE:**
1. The lower limit shall apply at the transition frequencies.
  2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50 MHz.
  3. All emanations from a class A/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	ESCS 30	847124/029	Dec. 04, 2004
ROHDE & SCHWARZ LISN (for EUT)	ESHS-Z5	848773/004	Nov. 04, 2004
KYORITSU LISN (for peripheral)	KNW-407	8/1395/12	Jul. 27, 2004
RF Cable (JETBAO)	RG233/U	Cable_CA_01	Jul. 02, 2005
Terminator(for KYORITSU)	50	3	May 10, 2005
Software	Cond-V2e	NA	NA

- NOTE:**
1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
  2. The test was performed in ADT Shielded Room No. A.
  3. The VCCI Con A Registration No. is C-817.



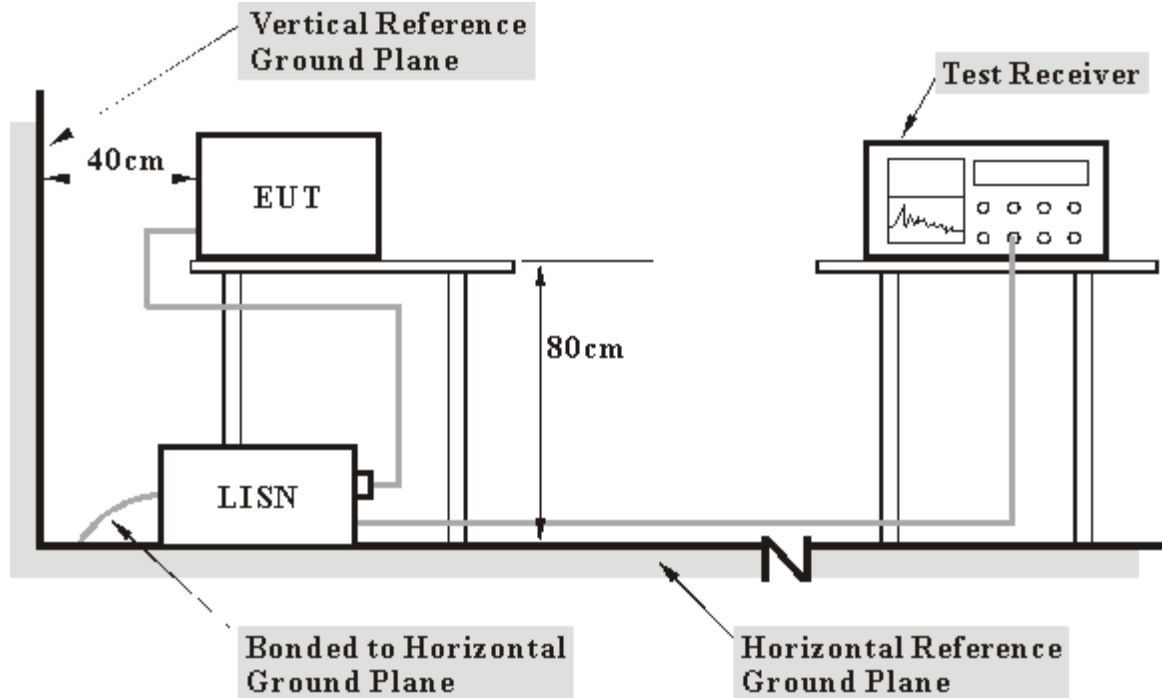
#### 4.1.3 TEST PROCEDURES

- 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 150 kHz to 30 MHz was searched. Emission levels (Limit -20dBi) was not recorded.

#### 4.1.4 DEVIATION FROM TEST STANDARD

No deviation

#### 4.1.5 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.



#### 4.1.6 EUT OPERATING CONDITIONS

- a. Connected the EUT to a notebook system placed on a testing table.
- b. The notebook system ran a test program (provided by manufacturer) to enable EUT under transmission/receiving condition continuously at specific channel frequency.
- c. The notebook system sent "H" messages to its screen.
- d. The notebook system sent "H" messages to modem.
- e. The notebook system sent "H" messages to printer, and the printer printed them on paper.
- f. Steps c~e were repeated.

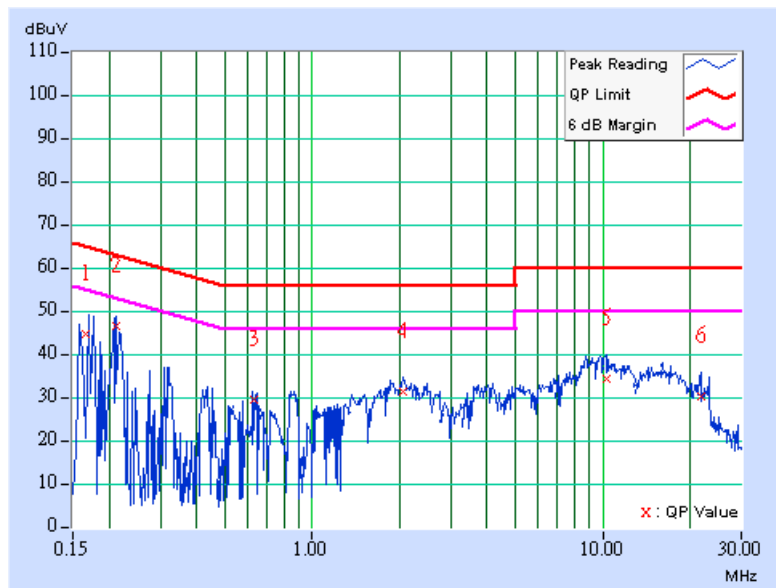


4.1.7 TEST RESULTS

<b>EUT</b>	802.11g Wireless CardBus Card	<b>MODEL</b>	G-162
<b>CHANNEL</b>	1	<b>6dB BANDWIDTH</b>	9 kHz
<b>INPUT POWER (SYSTEM)</b>	120 Vac, 60 Hz	<b>PHASE</b>	Line (L)
<b>ENVIRONMENTAL CONDITIONS</b>	25 deg. C, 70% RH, 991 hPa	<b>TESTED BY:</b> Tony Chen	

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
			1	0.165	0.11	43.91	-	44.02	-	65.19
2	0.213	0.12	45.45	-	45.57	-	63.11	53.11	-17.54	-
3	0.627	0.13	28.64	-	28.77	-	56.00	46.00	-27.23	-
4	2.061	0.16	30.49	-	30.65	-	56.00	46.00	-25.35	-
5	10.312	0.33	33.46	-	33.79	-	60.00	50.00	-26.21	-
6	21.909	1.07	29.17	-	30.24	-	60.00	50.00	-29.76	-

- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
  2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
  3. The emission levels of other frequencies were very low against the limit.
  4. Margin value = Emission level - Limit value
  5. Correction factor = Insertion loss + Cable loss
  6. Emission Level = Correction Factor + Reading Value.

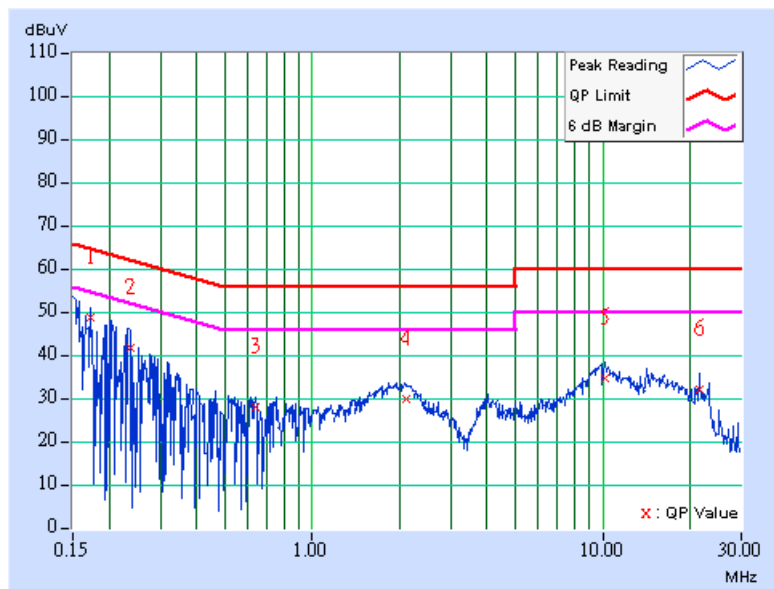




<b>EUT</b>	802.11g Wireless CardBus Card	<b>MODEL</b>	G-162
<b>CHANNEL</b>	1	<b>6dB BANDWIDTH</b>	9 kHz
<b>INPUT POWER (SYSTEM)</b>	120 Vac, 60 Hz	<b>PHASE</b>	Neutral (N)
<b>ENVIRONMENTAL CONDITIONS</b>	25 deg. C, 70% RH, 991 hPa	<b>TESTED BY:</b> Tony Chen	

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
			1	0.173	0.10	48.05	-	48.15	-	64.79
2	0.236	0.11	40.99	-	41.10	-	62.24	52.24	-21.14	-
3	0.639	0.12	27.48	-	27.60	-	56.00	46.00	-28.40	-
4	2.096	0.16	29.21	-	29.37	-	56.00	46.00	-26.63	-
5	10.161	0.29	34.15	-	34.44	-	60.00	50.00	-25.56	-
6	21.665	0.70	31.70	-	32.40	-	60.00	50.00	-27.60	-

- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
  2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
  3. The emission levels of other frequencies were very low against the limit.
  4. Margin value = Emission level - Limit value
  5. Correction factor = Insertion loss + Cable loss
  6. Emission Level = Correction Factor + Reading Value.

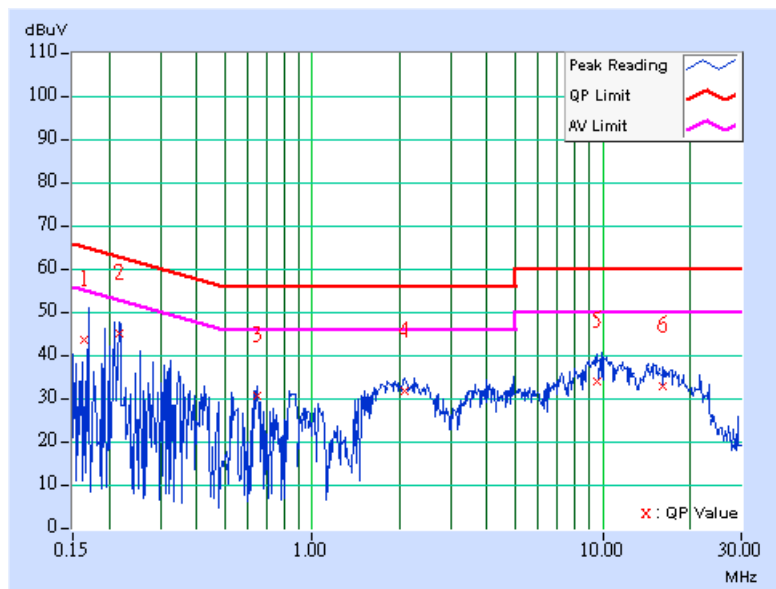




<b>EUT</b>	802.11g Wireless CardBus Card	<b>MODEL</b>	G-162
<b>CHANNEL</b>	6	<b>6dB BANDWIDTH</b>	9 kHz
<b>INPUT POWER (SYSTEM)</b>	120 Vac, 60 Hz	<b>PHASE</b>	Line (L)
<b>ENVIRONMENTAL CONDITIONS</b>	25 deg. C, 70% RH, 991 hPa	<b>TESTED BY:</b> Tony Chen	

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
			1	0.165	0.11	42.89	-	43.00	-	65.22
2	0.218	0.12	44.50	-	44.62	-	62.89	52.89	-18.27	-
3	0.647	0.13	30.04	-	30.17	-	56.00	46.00	-25.83	-
4	2.075	0.16	30.85	-	31.01	-	56.00	46.00	-24.99	-
5	9.616	0.30	33.41	-	33.71	-	60.00	50.00	-26.29	-
6	16.166	0.84	32.07	-	32.91	-	60.00	50.00	-27.09	-

- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
  2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
  3. The emission levels of other frequencies were very low against the limit.
  4. Margin value = Emission level - Limit value
  5. Correction factor = Insertion loss + Cable loss
  6. Emission Level = Correction Factor + Reading Value.



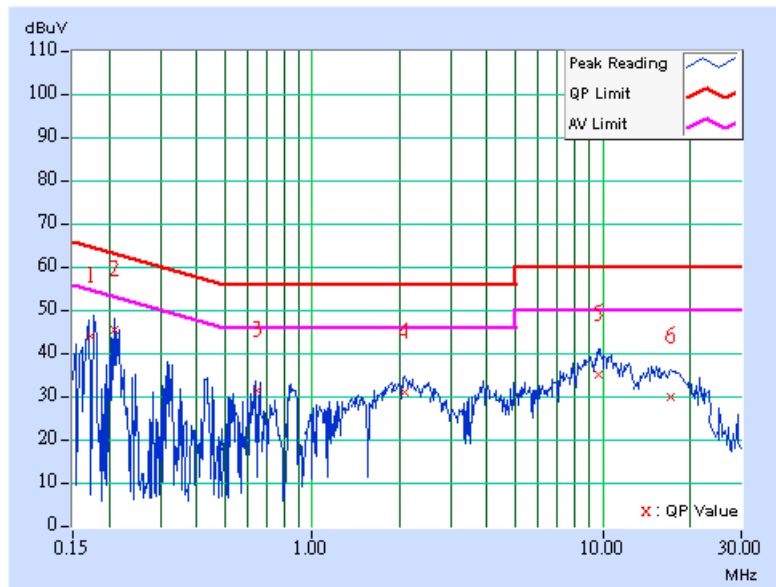




<b>EUT</b>	802.11g Wireless CardBus Card	<b>MODEL</b>	G-162
<b>CHANNEL</b>	6	<b>6dB BANDWIDTH</b>	9 kHz
<b>INPUT POWER (SYSTEM)</b>	120 Vac, 60 Hz	<b>PHASE</b>	Neutral (N)
<b>ENVIRONMENTAL CONDITIONS</b>	25deg. C, 70% RH, 991 hPa	<b>TESTED BY:</b> Tony Chen	

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
			1	0.173	0.10	43.42	-	43.52	-	64.81
2	0.209	0.11	44.92	-	45.03	-	63.26	53.26	-18.23	-
3	0.644	0.12	30.89	-	31.01	-	56.00	46.00	-24.99	-
4	2.075	0.16	30.29	-	30.45	-	56.00	46.00	-25.55	-
5	9.676	0.28	34.54	-	34.82	-	60.00	50.00	-25.18	-
6	17.244	0.67	29.23	-	29.90	-	60.00	50.00	-30.10	-

- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
  2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
  3. The emission levels of other frequencies were very low against the limit.
  4. Margin value = Emission level - Limit value
  5. Correction factor = Insertion loss + Cable loss
  6. Emission Level = Correction Factor + Reading Value.

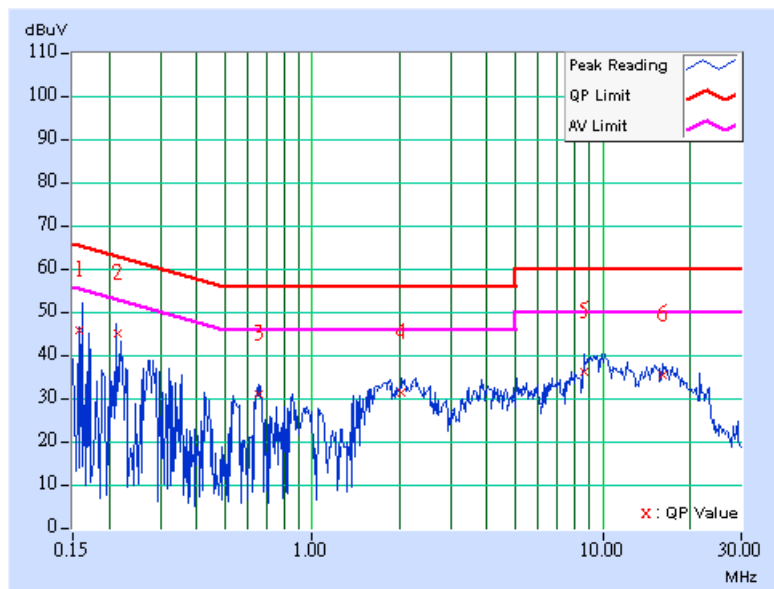




<b>EUT</b>	802.11g Wireless CardBus Card	<b>MODEL</b>	G-162
<b>CHANNEL</b>	11	<b>6dB BANDWIDTH</b>	9 kHz
<b>INPUT POWER (SYSTEM)</b>	120 Vac, 60 Hz	<b>PHASE</b>	Line (L)
<b>ENVIRONMENTAL CONDITIONS</b>	25 deg. C, 70% RH, 991 hPa	<b>TESTED BY:</b> Tony Chen	

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
			1	0.159	0.11	44.92	-	45.03	-	65.53
2	0.214	0.12	44.38	-	44.50	-	63.05	53.05	-18.55	-
3	0.658	0.13	30.41	-	30.54	-	56.00	46.00	-25.46	-
4	2.030	0.16	30.63	-	30.79	-	56.00	46.00	-25.21	-
5	8.631	0.30	35.60	-	35.90	-	60.00	50.00	-24.10	-
6	16.109	0.83	34.68	-	35.51	-	60.00	50.00	-24.49	-

- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
  2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
  3. The emission levels of other frequencies were very low against the limit.
  4. Margin value = Emission level - Limit value
  5. Correction factor = Insertion loss + Cable loss
  6. Emission Level = Correction Factor + Reading Value.

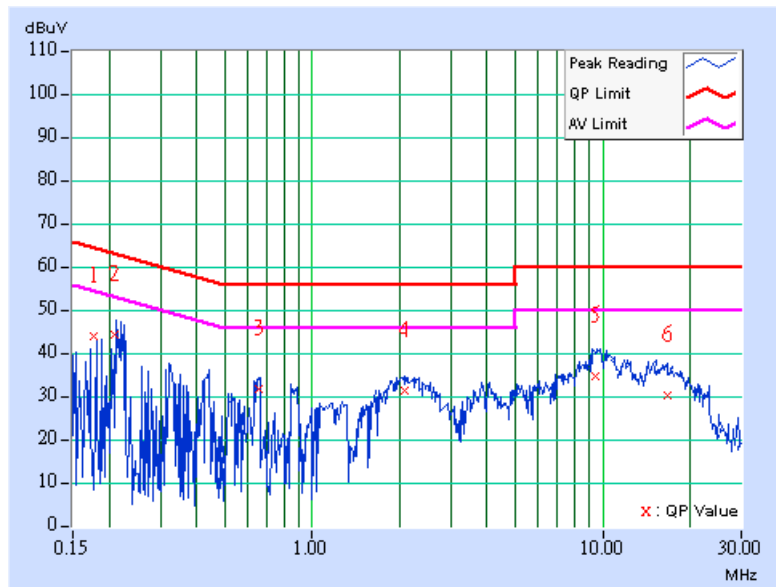




<b>EUT</b>	802.11g Wireless CardBus Card	<b>MODEL</b>	G-162
<b>CHANNEL</b>	11	<b>6dB BANDWIDTH</b>	9 kHz
<b>INPUT POWER (SYSTEM)</b>	120 Vac, 60 Hz	<b>PHASE</b>	Netural (N)
<b>ENVIRONMENTAL CONDITIONS</b>	25 deg. C, 70% RH, 991 hPa	<b>TESTED BY:</b> Tony Chen	

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
			1	0.176	0.11	43.38	-	43.49	-	64.66
2	0.209	0.11	43.81	-	43.92	-	63.25	53.25	-19.33	-
3	0.654	0.12	31.34	-	31.46	-	56.00	46.00	-24.54	-
4	2.090	0.16	30.67	-	30.83	-	56.00	46.00	-25.17	-
5	9.467	0.28	34.30	-	34.58	-	60.00	50.00	-25.42	-
6	16.670	0.66	29.85	-	30.51	-	60.00	50.00	-29.49	-

- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
  2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
  3. The emission levels of other frequencies were very low against the limit.
  4. Margin value = Emission level - Limit value
  5. Correction factor = Insertion loss + Cable loss
  6. Emission Level = Correction Factor + Reading Value.





## 4.2 RADIATED EMISSION MEASUREMENT

### 4.2.1 LIMITS OF RADIATED EMISSION MEASUREMENT

Emissions radiated outside of the specified bands, shall be according to the general radiated limits in 15.209 as following:

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

**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
Test Receiver ROHDE & SCHWARZ	ESI7	100033	May 28, 2004
Spectrum Analyzer ROHDE & SCHWARZ	FSP40	100040	Dec. 15, 2004
BILOG Antenna SCHWARZBECK	VULB9168	9168-153	Feb. 03, 2005
HORN Antenna SCHWARZBECK	9120D	9120D-408	Feb. 03, 2005
HORN Antenna SCHWARZBECK	BBHA 9170	BBHA 9170243	Feb. 23, 2005
Preamplifier Agilent	8447D	2944A10633	Jan. 15, 2005
Preamplifier Agilent	8449B	3008A01964	Jan. 27, 2005
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	218183/4	Mar. 05, 2005
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	218195/4	Mar. 05, 2005
Software ADT.	ADT_Radiated_V5.14	NA	NA
Antenna Tower inn-co GmbH	MA 4000	013303	NA
Antenna Tower Controller inn-co GmbH	CO2000	017303	NA
Turn Table ADT.	TT100.	TT93021703	NA
Turn Table Controller ADT.	SC100.	SC93021703	NA

- NOTE:** 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in HwaYa Chamber 3.
3. The horn antenna and HP preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
4. The IC Site Registration No. is IC4924-3.



#### 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.

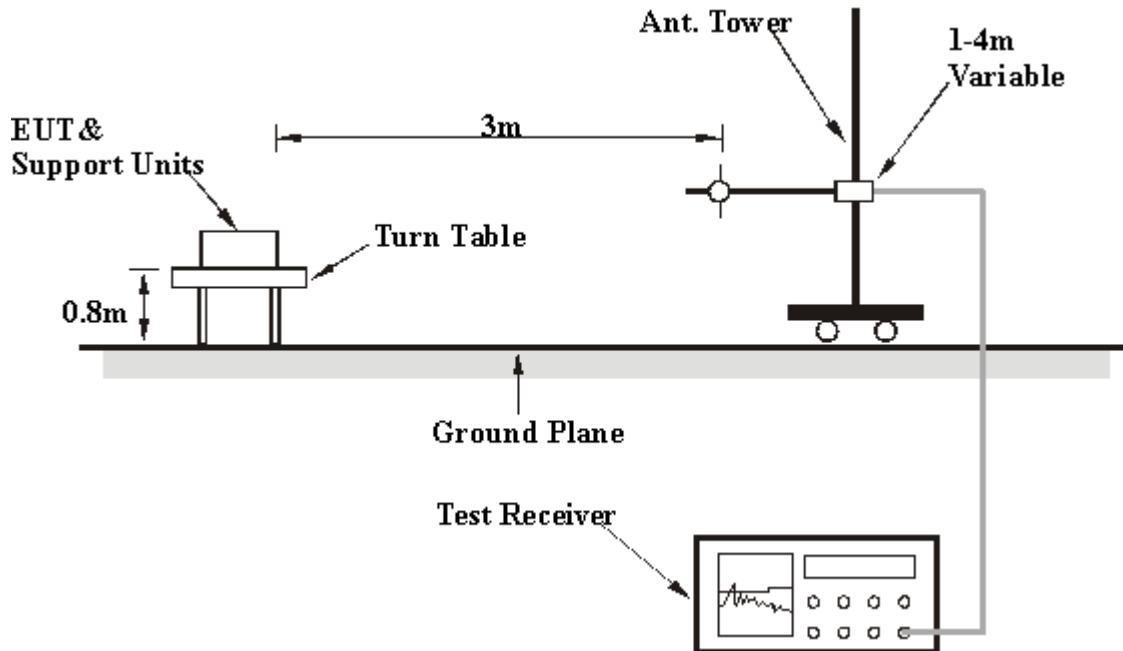
**NOTE:**

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 10 Hz for Average detection (AV) at frequency above 1GHz.

#### 4.2.4 DEVIATION FROM TEST STANDARD

No deviation

#### 4.2.5 TEST SETUP



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

#### 4.2.6 EUT OPERATING CONDITIONS

Same as 4.1.6



## 4.2.7 TEST RESULTS

<b>EUT</b>	802.11g Wireless CardBus Card	<b>MODEL</b>	G-162
<b>CHANNEL</b>	11	<b>FREQUENCY RANGE</b>	Below 1000 MHz
<b>INPUT POWER (SYSTEM)</b>	120 Vac, 60Hz	<b>DETECTOR FUNCTION</b>	Quasi-Peak
<b>ENVIRONMENTAL CONDITIONS</b>	27 deg. C, 59% RH, 991 hPa	<b>TESTED BY:</b> Tony Chen	

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)	Correction Factor (dB/m)
1	67.14	21.50 QP	40.00	-18.50	1.18 H	93	15.60	6.00
2	240.01	29.20 QP	46.00	-16.80	1.02 H	91	16.20	12.90
3	299.97	35.90 QP	46.00	-10.10	1.05 H	2	20.50	15.40
4	480.00	32.90 QP	46.00	-13.10	1.00 H	282	12.00	20.90
5	560.00	27.70 QP	46.00	-18.30	1.00 H	207	4.70	23.00
6	640.00	30.20 QP	46.00	-15.80	1.40 H	301	6.50	23.70
7	699.96	32.90 QP	46.00	-13.10	1.23 H	52	8.70	24.20
8	799.99	27.60 QP	46.00	-18.40	1.14 H	338	1.60	26.00

- REMARKS:**
1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB)
  2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
  3. The other emission levels were very low against the limit.
  4. Margin value = Emission level – Limit value.





<b>EUT</b>	802.11g Wireless CardBus Card	<b>MODEL</b>	G-162
<b>CHANNEL</b>	11	<b>FREQUENCY RANGE</b>	Below 1000 MHz
<b>INPUT POWER (SYSTEM)</b>	120 Vac, 60 Hz	<b>DETECTOR FUNCTION</b>	Quasi-Peak
<b>ENVIRONMENTAL CONDITIONS</b>	27 deg. C, 59% RH, 991 hPa	<b>TESTED BY:</b> Tony Chen	

<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)	Correction Factor (dB/m)
1	200.00	25.60 QP	43.50	-17.90	1.26 V	247	15.80	9.80
2	240.01	24.40 QP	46.00	-21.60	1.00 V	154	11.50	12.90
3	299.90	26.70 QP	46.00	-19.30	1.04 V	121	11.30	15.40
4	399.99	27.70 QP	46.00	-18.30	1.57 V	205	9.00	18.70
5	420.00	31.30 QP	46.00	-14.70	1.42 V	194	12.10	19.20
6	480.00	28.40 QP	46.00	-17.60	1.16 V	168	7.50	20.90
7	799.99	26.40 QP	46.00	-19.60	1.00 V	204	0.40	26.00

- REMARKS:**
1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB)
  2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
  3. The other emission levels were very low against the limit.
  4. Margin value = Emission level – Limit value.



4.2.8 TEST RESULTS (A)

<b>EUT</b>	802.11g Wireless CardBus Card	<b>MODEL</b>	G-162
<b>CHANNEL</b>	1	<b>FREQUENCY RANGE</b>	1~25 GHz
<b>INPUT POWER (SYSTEM)</b>	120 Vac, 60 Hz	<b>DETECTOR FUNCTION</b>	Peak (PK) Average (AV)
<b>ENVIRONMENTAL CONDITIONS</b>	25 deg. C, 65% RH, 991 hPa	<b>TESTED BY:</b> Tony Chen	

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)	Correction Factor (dB/m)
1	2390.00	54.37 PK	74.00	-19.63	1.35 H	97	23.23	31.14
1	2390.00	42.76 AV	54.00	-11.24	1.35 H	97	11.62	31.14
2	*2412.00	113.28 PK			1.35 H	97	82.07	31.21
2	*2412.00	101.67 AV			1.35 H	97	70.46	31.21
3	4076.00	46.75 PK	74.00	-27.25	1.41 H	32	11.22	35.53
4	4824.00	53.01 PK	74.00	-20.99	1.00 H	352	15.13	37.88
4	4824.00	48.41 AV	54.00	-5.59	1.00 H	352	10.53	37.88

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)	Correction Factor (dB/m)
1	2390.00	50.10 PK	74.00	-23.90	1.12 V	71	18.96	31.14
1	2390.00	39.00 AV	54.00	-15.00	1.12 V	71	7.86	31.14
2	*2412.00	109.01 PK			1.04 V	65	77.80	31.21
2	*2412.00	97.90 AV			1.04 V	65	66.69	31.21
3	4076.00	48.03 PK	74.00	-25.97	1.59 V	311	12.50	35.53
4	4824.00	55.91 PK	74.00	-18.09	1.35 V	44	18.03	37.88
4	4824.00	44.13 AV	54.00	-9.87	1.35 V	44	6.25	37.88

**REMARKS:**

1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB)
2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. " \* " : Fundamental frequency



<b>EUT</b>	802.11g Wireless CardBus Card	<b>MODEL</b>	G-162
<b>CHANNEL</b>	6	<b>FREQUENCY RANGE</b>	1~25 GHz
<b>INPUT POWER (SYSTEM)</b>	120 Vac, 60 Hz	<b>DETECTOR FUNCTION</b>	Peak(PK) Average (AV)
<b>ENVIRONMENTAL CONDITIONS</b>	25 deg. C, 65% RH, 991 hPa	<b>TESTED BY:</b> Tony Chen	

<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)	Correction Factor (dB/m)
1	*2437.00	113.06 PK			1.29 H	259	81.72	31.34
1	*2437.00	102.35 AV			1.29 H	259	71.01	31.34
2	4126.00	46.50 PK	74.00	-27.50	1.55 H	322	10.69	35.81
3	4874.00	52.28 PK	74.00	-21.72	1.44 H	4	14.29	37.99
3	4874.00	43.84 AV	54.00	-10.16	1.44 H	4	5.85	37.99

<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)	Correction Factor (dB/m)
1	*2437.00	109.65 PK			1.11 V	65	78.31	31.34
1	*2437.00	98.62 AV			1.11 V	65	67.28	31.34
2	4126.00	48.13 PK	74.00	-25.87	1.47 V	34	12.32	35.81
3	4874.00	55.28 PK	74.00	-18.72	1.65 V	358	17.29	37.99
3	4874.00	47.68 AV	54.00	-6.32	1.65 V	358	9.69	37.99

**REMARKS:**

1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB)
2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. " \* " : Fundamental frequency



<b>EUT</b>	802.11g Wireless CardBus Card	<b>MODEL</b>	G-162
<b>CHANNEL</b>	11	<b>FREQUENCY RANGE</b>	1~25 GHz
<b>INPUT POWER (SYSTEM)</b>	120 Vac, 60 Hz	<b>DETECTOR FUNCTION</b>	Peak(PK) Average (AV)
<b>ENVIRONMENTAL CONDITIONS</b>	25 deg. C, 65% RH, 991 hPa	<b>TESTED BY:</b> Tony Chen	

**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)	Correction Factor (dB/m)
1	*2462.00	113.48 PK			1.19 H	62	82.02	31.46
1	*2462.00	103.13 AV			1.19 H	62	71.67	31.46
2	2483.50	55.52 PK	74.00	-18.48	1.19 H	62	23.95	31.57
2	2483.50	45.17 AV	54.00	-8.83	1.19 H	62	13.60	31.57
3	4176.00	48.30 PK	74.00	-25.70	1.26 H	199	12.20	36.10
4	4924.00	54.91 PK	74.00	-19.09	1.07 H	153	16.80	38.11
4	4924.00	46.86 AV	54.00	-7.14	1.07 H	153	8.75	38.11

**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)	Correction Factor (dB/m)
1	*2462.00	109.87 PK			1.11 V	54	78.41	31.46
1	*2462.00	99.37 AV			1.11 V	54	67.91	31.46
2	2483.50	51.91 PK	74.00	-22.09	1.11 V	54	20.34	31.57
2	2483.50	41.41 AV	54.00	-12.59	1.11 V	54	9.84	31.57
3	4176.00	47.95 PK	74.00	-26.05	1.46 V	314	11.85	36.10
4	4924.00	53.28 PK	74.00	-20.72	1.16 V	24	15.17	38.11
4	4924.00	47.86 AV	54.00	-6.14	1.16 V	24	9.75	38.11

**REMARKS:**

1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB)
2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. “ \* “ : Fundamental frequency



4.2.9 TEST RESULTS (B)

<b>EUT</b>	802.11g Wireless CardBus Card	<b>MODEL</b>	G-162
<b>CHANNEL</b>	1	<b>FREQUENCY RANGE</b>	1~25 GHz
<b>INPUT POWER (SYSTEM)</b>	120 Vac, 60 Hz	<b>DETECTOR FUNCTION</b>	Peak(PK) Average (AV)
<b>ENVIRONMENTAL CONDITIONS</b>	25 deg. C, 65% RH, 991 hPa	<b>TESTED BY:</b> Tony Chen	

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)	Correction Factor (dB/m)
1	2390.00	61.24 PK	74.00	-12.76	1.05 H	223	30.10	31.14
1	2390.00	51.65 AV	54.00	-2.35	1.05 H	223	20.51	31.14
2	*2412.00	107.47 PK			1.05 H	223	76.26	31.21
2	*2412.00	97.88 AV			1.05 H	223	66.67	31.21
3	4076.00	48.51 PK	74.00	-25.49	1.02 H	345	12.98	35.53
4	4824.00	49.40 PK	74.00	-24.60	1.15 H	20	11.52	37.88

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)	Correction Factor (dB/m)
1	2390.00	58.83 PK	74.00	-15.17	1.01 V	274	27.69	31.14
1	2390.00	48.06 AV	54.00	-5.94	1.01 V	274	16.92	31.14
2	*2412.00	105.06 PK			1.42 V	131	73.85	31.21
2	*2412.00	94.29 AV			1.42 V	131	63.08	31.21
3	4076.00	46.90 PK	74.00	-27.10	1.37 V	325	11.37	35.53
4	4824.00	50.37 PK	74.00	-23.63	1.01 V	274	12.49	37.88

**REMARKS:**

1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB)
2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. “ \* “ : Fundamental frequency



<b>EUT</b>	802.11g Wireless CardBus Card	<b>MODEL</b>	G-162
<b>CHANNEL</b>	6	<b>FREQUENCY RANGE</b>	1~25 GHz
<b>INPUT POWER (SYSTEM)</b>	120 Vac, 60 Hz	<b>DETECTOR FUNCTION</b>	Peak(PK) Average (AV)
<b>ENVIRONMENTAL CONDITIONS</b>	25 deg. C, 65% RH, 991 hPa	<b>TESTED BY:</b> Tony Chen	

<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)	Correction Factor (dB/m)
1	*2437.00	108.21 PK			1.05 H	221	76.87	31.34
1	*2437.00	97.53 AV			1.05 H	221	66.19	31.34
2	4126.00	46.64 PK	74.00	-27.36	1.31 H	352	10.83	35.81
3	4874.00	49.44 PK	74.00	-24.56	1.45 H	34	11.45	37.99

<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)	Correction Factor (dB/m)
1	*2437.00	104.88 PK			1.51 V	158	73.54	31.34
1	*2437.00	95.48 AV			1.51 V	158	64.15	31.34
2	4126.00	47.60 PK	74.00	-26.40	1.09 V	11	11.79	35.81
3	4874.00	50.12 PK	74.00	-23.88	1.51 V	305	12.13	37.99

**REMARKS:**

1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB)
2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. “ \* “ : Fundamental frequency



<b>EUT</b>	802.11g Wireless CardBus Card	<b>MODEL</b>	G-162
<b>CHANNEL</b>	11	<b>FREQUENCY RANGE</b>	1~25 GHz
<b>INPUT POWER (SYSTEM)</b>	120 Vac, 60 Hz	<b>DETECTOR FUNCTION</b>	Peak(PK) Average (AV)
<b>ENVIRONMENTAL CONDITIONS</b>	25 deg. C, 65% RH, 991 hPa	<b>TESTED BY:</b> Tony Chen	

<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)	Correction Factor (dB/m)
1	*2462.00	107.82 PK			1.12 H	224	76.36	31.46
1	*2462.00	97.59 AV			1.12 H	224	66.13	31.46
2	2483.50	62.33 PK	74.00	-11.67	1.12 H	224	30.76	31.57
<b>2</b>	<b>2483.50</b>	<b>52.10 AV</b>	<b>54.00</b>	<b>-1.90</b>	<b>1.12 H</b>	<b>224</b>	<b>20.53</b>	<b>31.57</b>
3	4176.00	48.70 PK	74.00	-25.30	1.17 H	22	12.60	36.10
4	4924.00	48.78 PK	74.00	-25.22	1.56 H	332	10.67	38.11

<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)	Correction Factor (dB/m)
1	*2462.00	104.85 PK			1.51 V	125	73.39	31.46
1	*2462.00	94.81 AV			1.51 V	125	63.35	31.46
2	2483.50	59.36 PK	74.00	-14.64	1.51 V	125	27.79	31.57
2	2483.50	49.32 AV	54.00	-4.68	1.51 V	125	17.75	31.57
3	4176.00	47.76 PK	74.00	-26.24	1.68 V	131	11.66	36.10
4	4924.00	54.36 PK	74.00	-19.64	1.33 V	10	16.25	38.11
4	4924.00	39.23 AV	54.00	-14.77	1.33 V	10	1.12	38.11

**REMARKS:**

1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB)
2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. “ \* “ : Fundamental frequency



### 4.3 6dB BANDWIDTH MEASUREMENT

#### 4.3.1 LIMITS OF 6dB BANDWIDTH MEASUREMENT

The minimum of 6dB Bandwidth Measurement is 0.5MHz.

#### 4.3.2 TEST INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
SPECTRUM ANALYZER	FSEK30	100049	Aug. 12, 2004

**NOTE:**

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



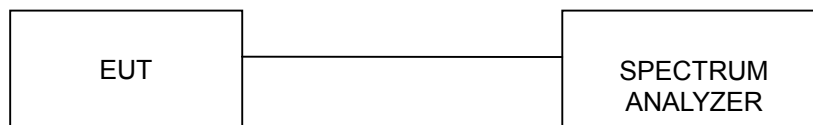
#### 4.3.3 TEST PROCEDURE

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

#### 4.3.4 DEVIATION FROM TEST STANDARD

No deviation

#### 4.3.5 TEST SETUP



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

#### 4.3.6 EUT OPERATING CONDITIONS

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



## 4.3.7 TEST RESULTS (A)

<b>EUT</b>	802.11g Wireless CardBus Card	<b>MODEL</b>	G-162
<b>INPUT POWER (SYSTEM)</b>	120 Vac, 60 Hz	<b>ENVIRONMENTAL CONDITIONS</b>	25 deg. C, 60% RH, 991 hPa
<b>TESTED BY</b>	Tony Chen		

<b>CHANNEL</b>	<b>CHANNEL FREQUENCY (MHz)</b>	<b>6dB BANDWIDTH (MHz)</b>	<b>MINIMUM LIMIT (MHz)</b>	<b>PASS/FAIL</b>
1	2412	11.56	0.5	PASS
6	2437	11.80	0.5	PASS
11	2462	11.76	0.5	PASS

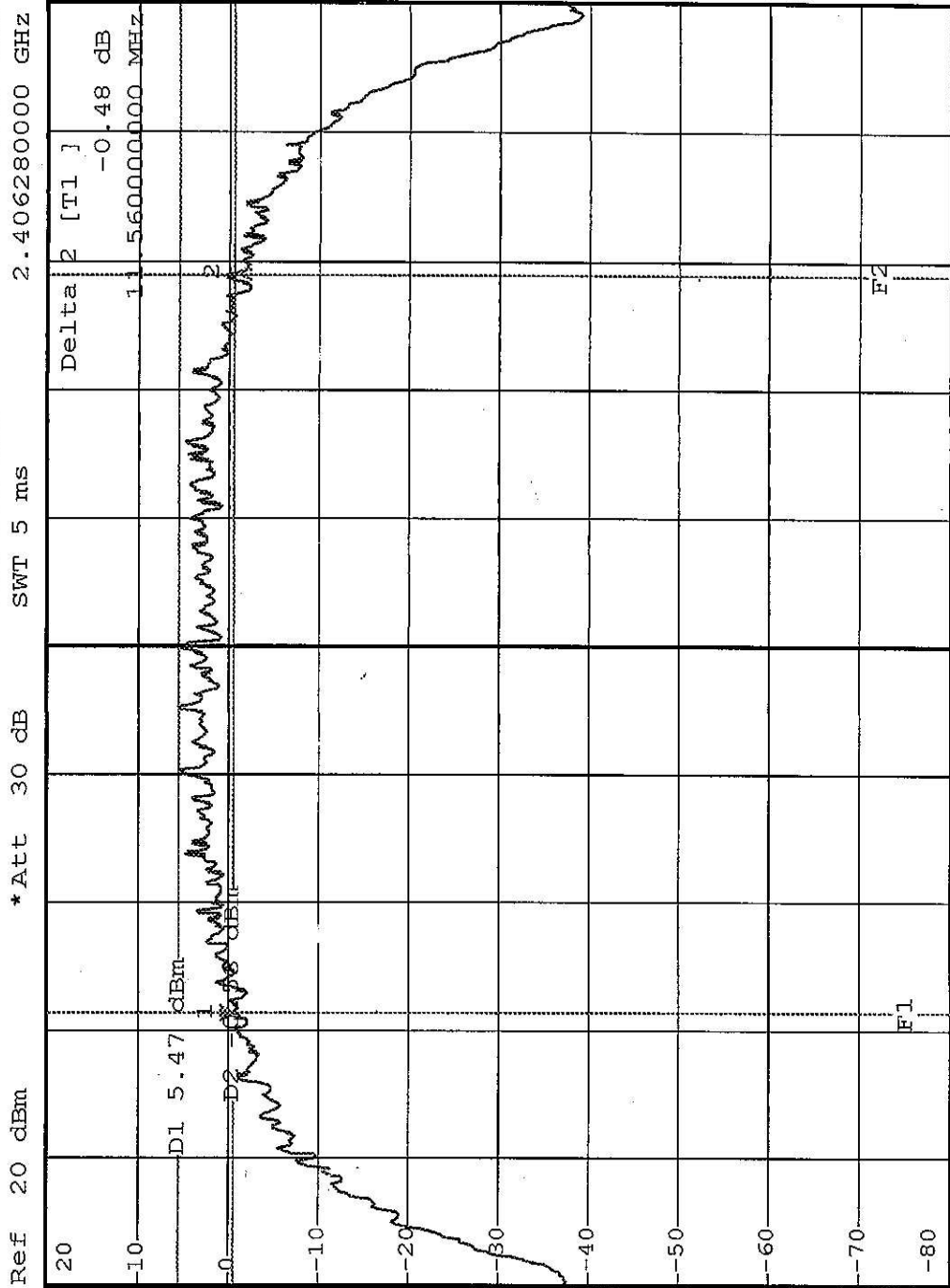


CH1

\*RBW 100 kHz  
\*VBW 100 kHz  
\*Att 30 dB  
SWT 5 ms

Marker 1 [T1]

-0.70 dBm  
2.406280000 GHz

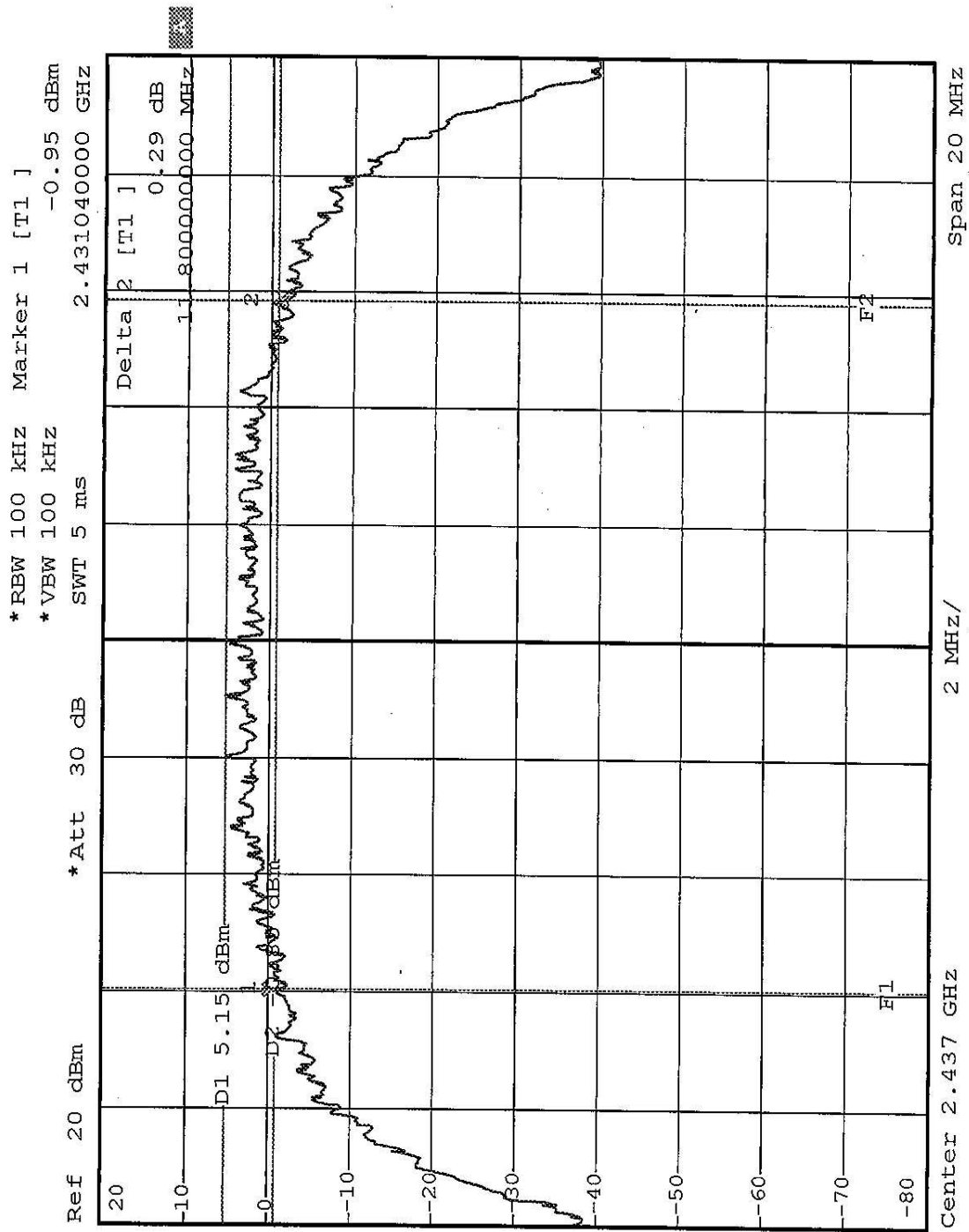


Center 2.412 GHz  
2 MHz/  
Span 20 MHz



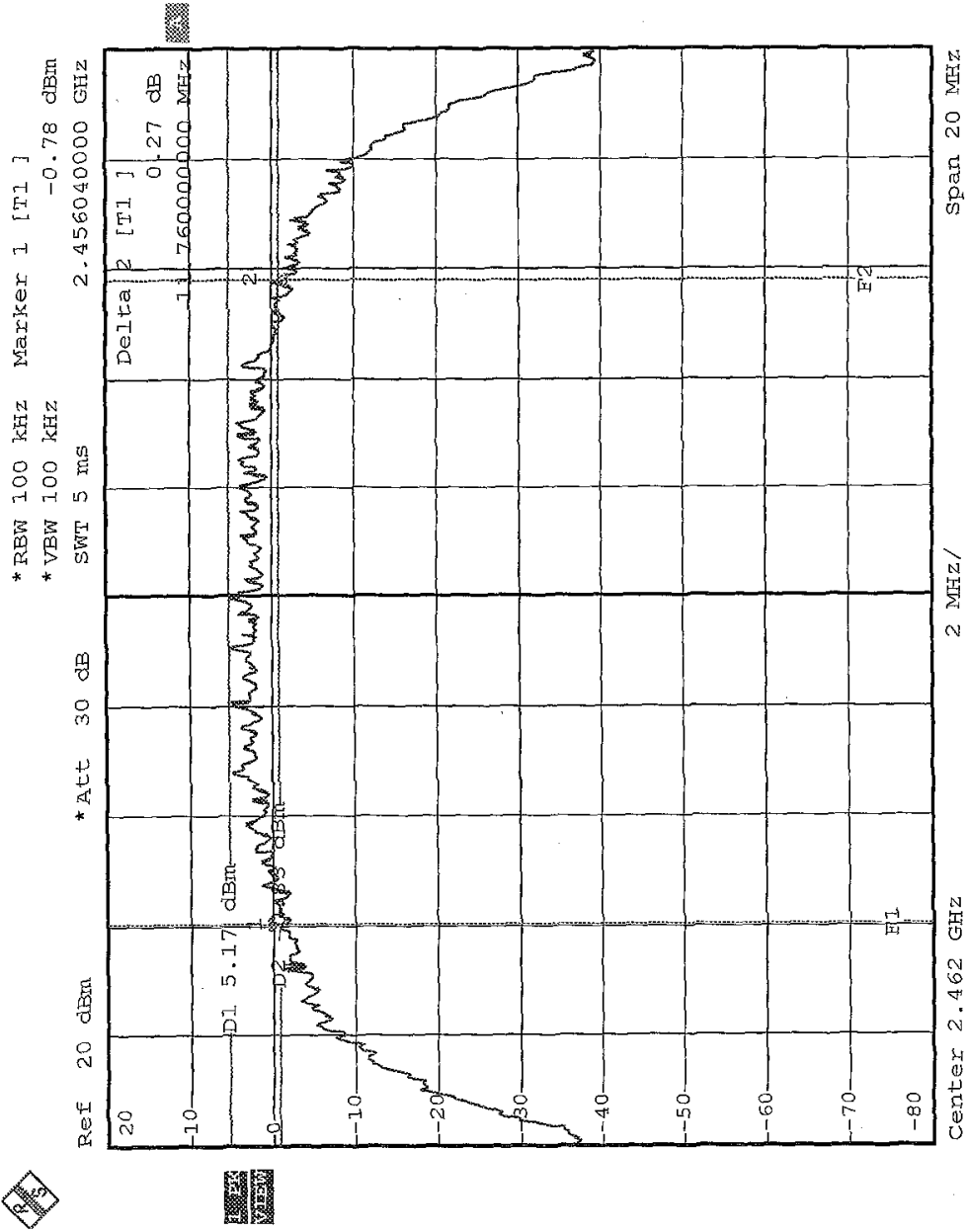


CH6





CH11



Date: 24.APR.2004 05:03:25



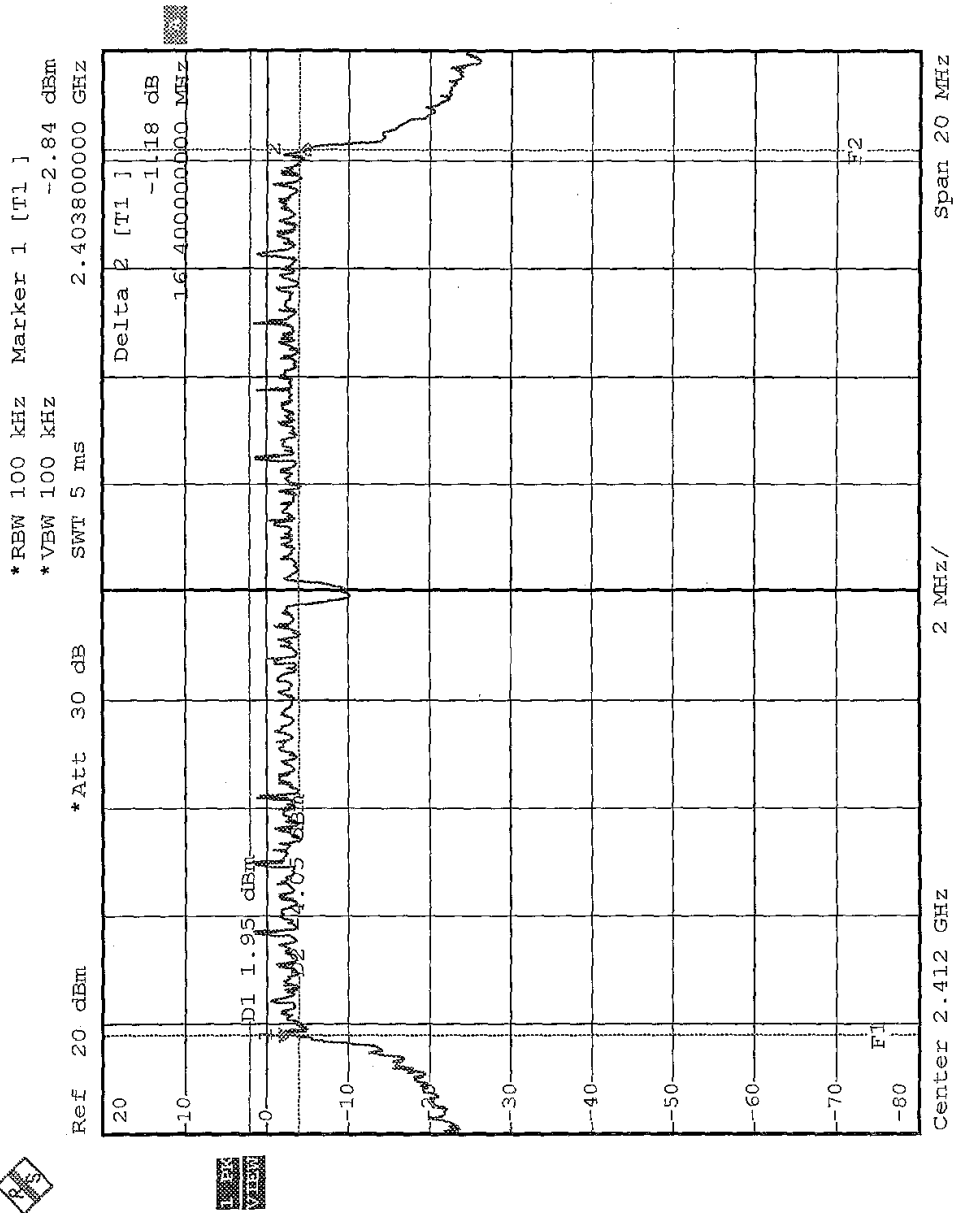
## 4.3.8 TEST RESULTS (B)

<b>EUT</b>	802.11g Wireless CardBus Card	<b>MODEL</b>	G-162
<b>INPUT POWER (SYSTEM)</b>	120 Vac, 60 Hz	<b>ENVIRONMENTAL CONDITIONS</b>	25 deg. C, 60% RH, 991 hPa
<b>TESTED BY</b>	Tony Chen		

<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	16.40	0.5	PASS
6	2437	16.40	0.5	PASS
11	2462	16.44	0.5	PASS



CH1



Date: 24-APR-2004 05:14:59



CH6

\*RBW 100 kHz  
\*Vbw 100 kHz  
\*Att 30 dB  
SWT 5 ms

Marker 1 [T1 ]

-3.48 dBm  
2.428800000 GHz

