ADT CORP.

FCC TEST REPORT

REPORT NO.: RF920327R02
MODEL NO.: GN-WLMR101
RECEIVED: Mar. 27, 2003
TESTED: Mar. 31 ~ Apr. 30, 2003

APPLICANT: GIGA-BYTE TECHNOLOGY CO., LTD.

ADDRESS: No. 6, Bau Chiang Road, Hsin-Tien, Taiepi Hsien, Taiwan, R.O.C.

ISSUED BY: Advance Data Technology Corporation

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

This test report consists of 48 pages in total. It may be duplicated completely for legal use with the approval of the applicant. It should not be reproduced except in full, without the written approval of our laboratory. The client should not use it to claim product endorsement by CNLA, NVLAP or any government agencies. The test results in the report only apply to the tested sample.

CNLA
0528
ILAC MRA

NVLAP
Lab Code: 200102-0

Table of Contents

1 CERTIFICATION 4
2 SUMMARY OF TEST RESULTS 5
3 GENERAL INFORMATION 6
3.1 GENERAL DESCRIPTION OF EUT 6
3.2 DESCRIPTION OF TEST MODES 7
3.3 GENERAL DESCRIPTION OF APPLIED STANDARDS 7
3.4 DESCRIPTION OF SUPPORT UNITS 8
4 TEST TYPES AND RESULTS 9
4.1 CONDUCTED EMISSION MEASUREMENT 9
4.1.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT 9
4.1.2 TEST INSTRUMENTS 9
4.1.3 TEST PROCEDURES 10
4.1.4 DEVIATION FROM TEST STANDARD 10
4.1.5 TEST SETUP 11
4.1.6 EUT OPERATING CONDITIONS 11
4.1.7 TEST RESULT 12
4.2 RADIATED EMISSION MEASUREMENT 18
4.2.1 LIMITS OF RADIATED EMISSION MEASUREMENT 18
4.2.2 TEST INSTRUMENTS 19
4.2.3 TEST PROCEDURES 20
4.2.4 DEVIATION FROM TEST STANDARD 20
4.2.5 TEST SETUP 21
4.2.6 EUT OPERATING CONDITIONS 21
4.2.7 TEST RESULT 22
4.3 6dB BANDWIDTH MEASUREMENT 26
4.3.1 LIMITS OF 6dB BANDWIDTH MEASUREMENT 26
4.3.2 TEST INSTRUMENTS 26
4.3.3 TEST PROCEDURE 27
4.3.4 DEVIATION FROM TEST STANDARD 27
4.3.5 TEST SETUP 27
4.3.6 EUT OPERATING CONDITIONS 27
4.3.7 TEST RESULT 28
4.4 MAXIMUM PEAK OUTPUT POWER 32
4.4.1 LIMITS OF MAXIMUM PEAK OUTPUT POWER MEASUREMENT 32
4.4.2 TEST INSTRUMENTS 32
4.4.3 TEST PROCEDURES 33
4.4.4 DEVIATION FROM TEST STANDARD 33
4.4.5 TEST SETUP 33
4.4.6 EUT OPERATING CONDITIONS 33
4.4.7 TEST RESULT 34
4.5 POWER SPECTRAL DENSITY MEASUREMENT 35
4.5.1 LIMITS OF POWER SPECTRAL DENSITY MEASUREMENT 35

4.5.2 TEST INSTRUMENTS 35
4.5.3 TEST PROCEDURE 36
4.5.4 DEVIATION FROM TEST STANDARD 36
4.5.5 TEST SETUP 36
4.5.6 EUT OPERATING CONDITIONS 36
4.5.7 TEST RESULT 37
4.6 BAND EDGES MEASUREMENT 41
4.6.1 LIMITS OF BAND EDGES MEASUREMENT 41
4.6.2 TEST INSTRUMENTS 41
4.6.3 TEST PROCEDURE 41
4.6.4 DEVIATION FROM TEST STANDARD 41
4.6.5 EUT OPERATING CONDITION 42
4.6.6 TEST RESULT 42
4.7 ANTENNA REQUIREMENT 45
4.7.1 STANDARD APPLICABLE 45
4.7.2 ANTENNA CONNECTED CONSTRUCTION 45
5 PHOTOGRAPHS OF THE TEST CONFIGURATION 46
6 INFORMATION ON THE TESTING LABORATORIES 48

1 CERTIFICATION

PRODUCT :	IEEE 802.11b Cardbus Wireless LAN Card
MODEL NO. :	GN-WLMR101
BRAND NAME :	GIGABYTE
APPLICANT :	GIGA-BYTE 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 Mar. 31, 2003 to Apr. 30, 2003, 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.

CHECKED BY : Emily Lu, **DATE** : May 5, 2003
Emily Lu

APPROVED BY : Elis Wu for, **DATE** : May 5, 2003
Dr. Alan Lane, Manager

2 SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

APPLIED STANDARD: 47 CFR Part 15, Subpart C			
Standard Section	**Test Type and Limit**	**Result**	**REMARK**
15.207	AC Power Conducted Emission	PASS	Meet the requirement of limit Minimum passing margin is –17.46dBuV at 0.213MHz
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 –5.2dBuV at 7385.00MHz
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

PRODUCT	IEEE 802.11b Cardbus Wireless LAN Card
MODEL NO.	GN-WLMR101
POWER SUPPLY	3.3VDC from host equipment
MODULATION TYPE	DSSS
TRANSFER RATE	1/2/5.5/11Mbps
FREQUENCY RANGE	2412MHz ~ 2462MHz
NUMBER OF CHANNEL	11
OUTPUT POWER	17.45dBm
ANTENNA TYPE	Printed Patch Antenna
DATA CABLE	NA
I/O PORTS	NA
ASSOCIATED DEVICES	NA

NOTE:

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, worst case one, was chosen for final test.
2. Above 1GHz, the channel 1, 6, and 11 were tested individually.

3.3 GENERAL DESCRIPTION OF APPLIED STANDARDS

The EUT is an IEEE 802.11b Cardbus Wireless LAN Card. According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

FCC 47 CFR Part 15, Subpart C. (15.247)
ANSI C63.4 : 1992

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

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

3.4 DESCRIPTION OF SUPPORT UNITS

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

NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	Notebook	Compaq	N800C	470048-515	FCC DoC APPROVED
2	PRINTER	EPSON	LQ-300+	DCGY017096	FCC DoC APPROVED

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

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

4 TEST TYPES AND RESULTS

4.1 CONDUCTED EMISSION MEASUREMENT

4.1.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT

FREQUENCY OF EMISSION (MHz)	CONDUCTED LIMIT (dBμV)	
	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	ESCS30	847793/022	Mar. 10, 2004
ROHDE & SCHWARZ Artificial Mains Network (for EUT)	ESH2-Z5	828075/003	July 23, 2003
ROHDE & SCHWARZ 200-A Four-line V-Network	ENV4200	830326/018	Oct. 30, 2003
* ROHDE & SCHWARZ 4-wire ISN	ENY41	838119/028	Nov. 29, 2003
* ROHDE & SCHWARZ 2-wire ISN	ENY22	837497/018	Nov. 29, 2003
EMCO-L.I.S.N. (for peripheral)	3825/2	90031627	July 23, 2003
Software	Cond-V2M3	NA	NA
RF cable (JYEBAO)	5D-FB	Cable-C05.01	July 19, 2003
LYNICS Terminator (For EMCO LISN)	0900510	E1-01-305	Feb. 23, 2004
LYNICS Terminator (For EMCO LISN)	0900510	E1-01-306	Feb. 23, 2004

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. "*": These equipment are used for conducted telecom port test only (if tested).
3. The test was performed in ADT Shielded Room No. 5.
4. The VCCI Site Registration No. is C-1093.

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.

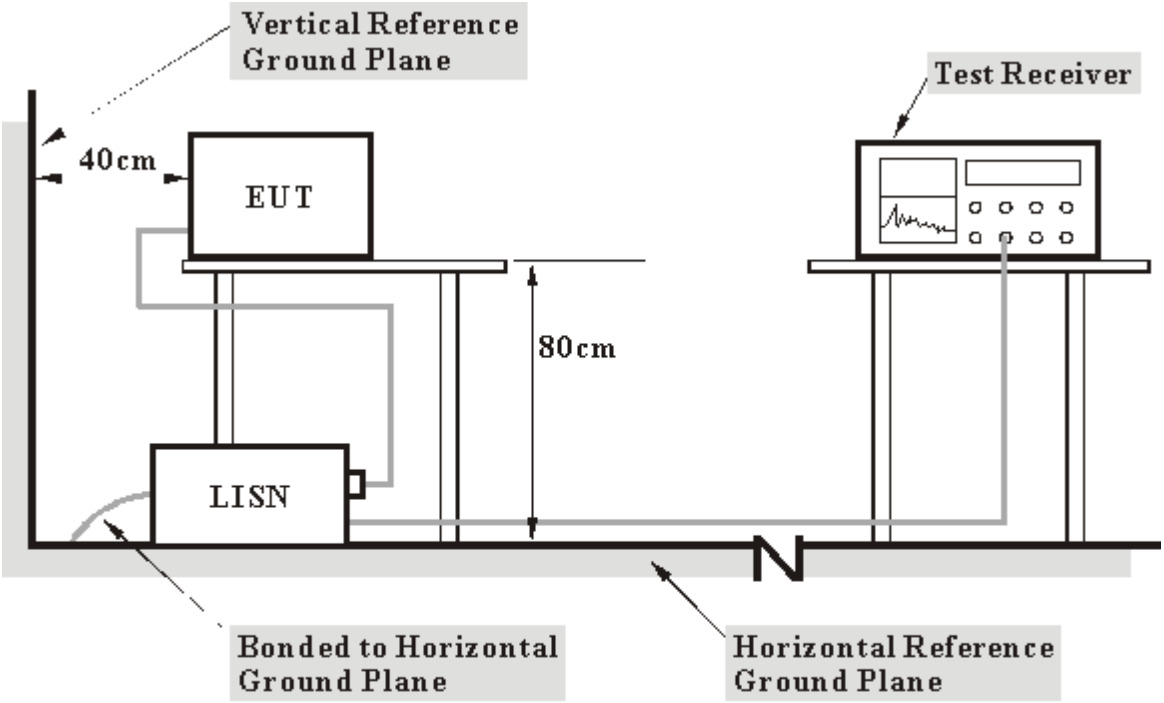
b. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.

c. The frequency range from 150kHz to 30MHz was searched. Emission levels over 10dB under the prescribed limits could not be reported

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

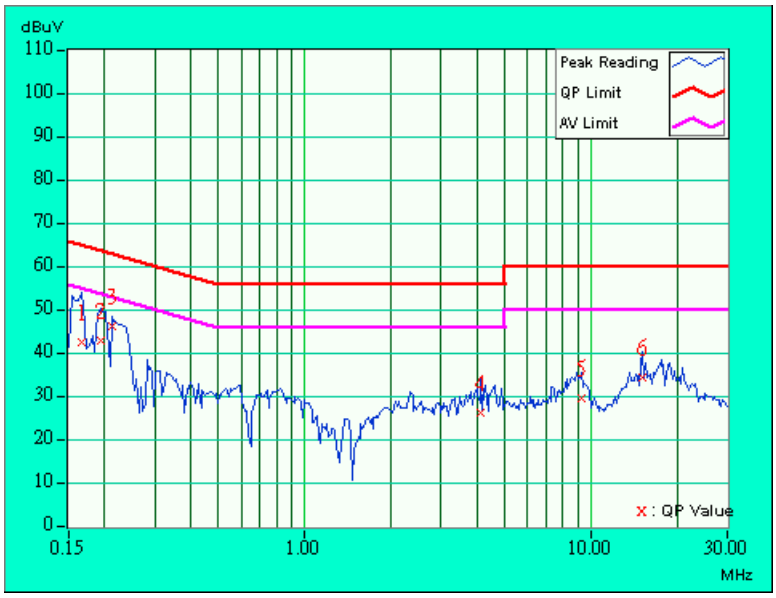
a. Connected the EUT to a computer system placed on a testing table.
b. The computer system ran a test program to enable EUT under transmission/receiving condition continuously at specific channel frequency.
c. The computer system sent "H" messages to its screen.
d. The computer system sent "H" messages to printer and the printer prints them on paper.

4.1.7 TEST RESULT

EUT	IEEE 802.11b Cardbus Wireless LAN Card	**MODEL**	GN-WLMR101
MODE	Channel 1	**6dB BANDWIDTH**	9kHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	**PHASE**	Line (L)
ENVIRONMENTAL CONDITIONS	25deg. C, 60%RH, 991hPa	**TESTED BY**: Steven Lu	

No	Freq.	Corr. Factor	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.166	0.10	41.63	-	41.73	-	65.18	55.18	-23.45	-
2	0.193	0.10	41.99	-	42.09	-	63.91	53.91	-21.82	-
3	0.213	0.10	45.55	-	45.65	-	63.11	53.11	-17.46	-
4	4.125	0.40	25.58	-	25.98	-	56.00	46.00	-30.02	-
5	9.250	0.58	29.00	-	29.58	-	60.00	50.00	-30.42	-
6	15.230	0.81	33.76	-	34.57	-	60.00	50.00	-25.43	-

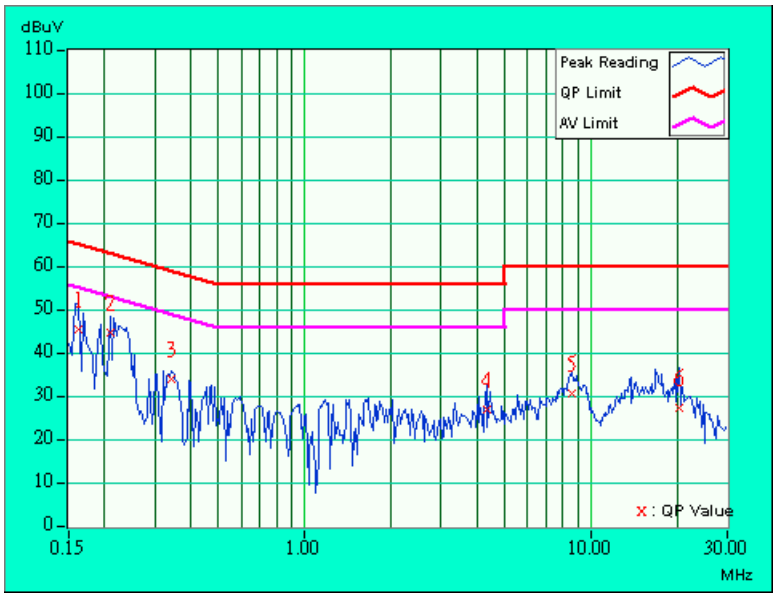
REMARKS: 1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. The emission levels of other frequencies were very low against the limit.
4. Margin value = Emission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



EUT	IEEE 802.11b Cardbus Wireless LAN Card	**MODEL**	GN-WLMR101
MODE	Channel 1	**6dB BANDWIDTH**	9kHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	**PHASE**	Neutral (N)
ENVIRONMENTAL CONDITIONS	25deg. C, 60%RH, 991hPa	**TESTED BY**: Steven Lu	

No	Freq.	Corr. Factor	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.162	0.10	44.92	-	45.02	-	65.38	55.38	-20.36	-
2	0.209	0.10	43.88	-	43.98	-	63.26	53.26	-19.28	-
3	0.341	0.10	33.35	-	33.45	-	59.17	49.17	-25.72	-
4	4.332	0.31	26.17	-	26.48	-	56.00	46.00	-29.52	-
5	8.555	0.38	30.11	-	30.49	-	60.00	50.00	-29.51	-
6	20.277	0.79	26.73	-	27.52	-	60.00	50.00	-32.48	-

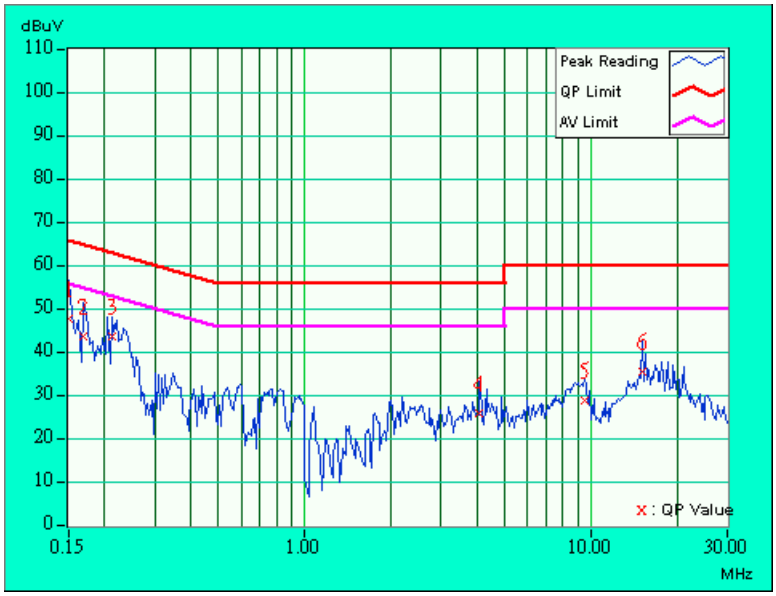
REMARKS: 1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. The emission levels of other frequencies were very low against the limit.
4. Margin value = Emission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



EUT	IEEE 802.11b Cardbus Wireless LAN Card	**MODEL**	GN-WLMR101
MODE	Channel 6	**6dB BANDWIDTH**	9kHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	**PHASE**	Line (L)
ENVIRONMENTAL CONDITIONS	25deg. C, 60%RH, 991hPa	**TESTED BY**: Steven Lu	

No	Freq.	Corr. Factor	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.150	0.10	46.99	-	47.09	-	66.00	56.00	-18.91	-
2	0.170	0.10	42.71	-	42.81	-	64.98	54.98	-22.17	-
3	0.213	0.10	42.88	-	42.98	-	63.11	53.11	-20.13	-
4	4.063	0.40	25.08	-	25.48	-	56.00	46.00	-30.52	-
5	9.543	0.58	28.07	-	28.65	-	60.00	50.00	-31.35	-
6	15.230	0.81	34.61	-	35.42	-	60.00	50.00	-24.58	-

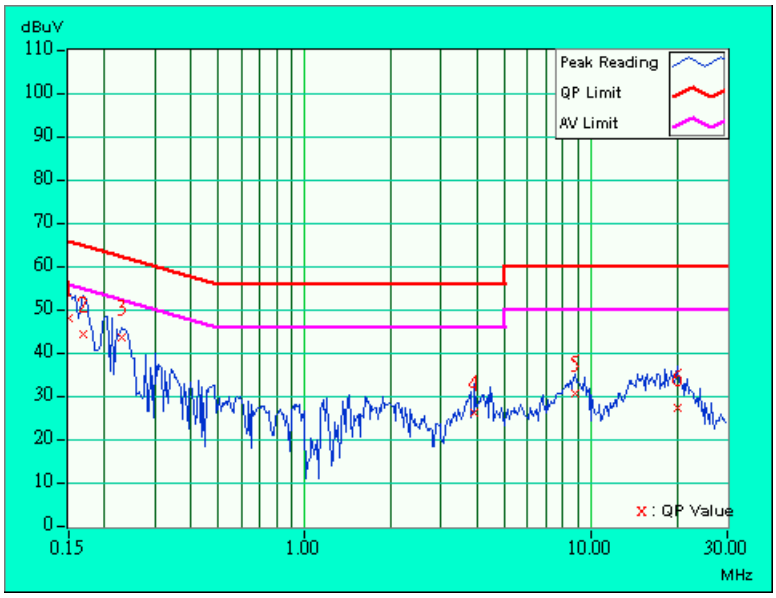
REMARKS: 1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. The emission levels of other frequencies were very low against the limit.
4. Margin value = Emission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



EUT	IEEE 802.11b Cardbus Wireless LAN Card	**MODEL**	GN-WLMR101
MODE	Channel 6	**6dB BANDWIDTH**	9kHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	**PHASE**	Neutral (N)
ENVIRONMENTAL CONDITIONS	25deg. C, 60%RH, 991hPa	**TESTED BY**: Steven Lu	

No	Freq.	Corr. Factor	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.150	0.10	47.19	-	47.29	-	66.00	56.00	-18.71	-
2	0.170	0.10	43.53	-	43.63	-	64.98	54.98	-21.35	-
3	0.228	0.10	42.93	-	43.03	-	62.52	52.52	-19.49	-
4	3.926	0.30	25.34	-	25.64	-	56.00	46.00	-30.36	-
5	8.789	0.38	30.03	-	30.41	-	60.00	50.00	-29.59	-
6	20.059	0.80	26.48	-	27.28	-	60.00	50.00	-32.72	-

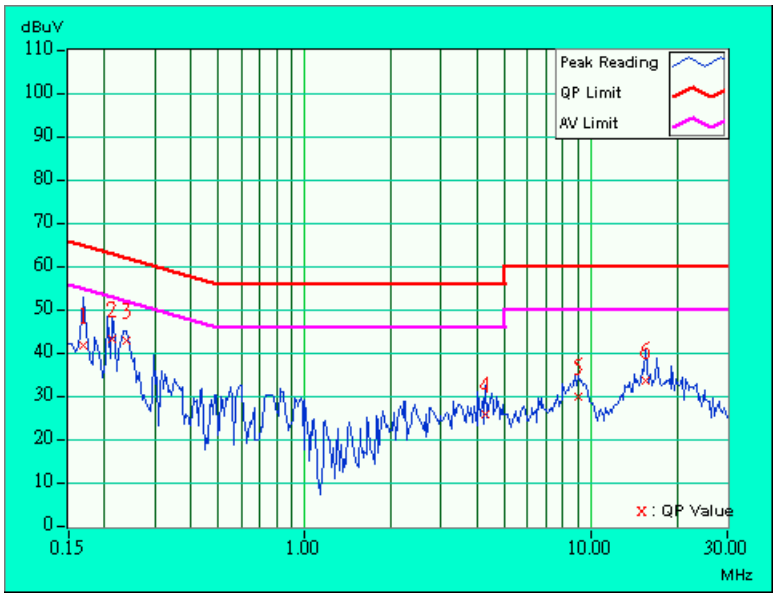
REMARKS: 1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. The emission levels of other frequencies were very low against the limit.
4. Margin value = Emission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



EUT	IEEE 802.11b Cardbus Wireless LAN Card	**MODEL**	GN-WLMR101
MODE	Channel 11	**6dB BANDWIDTH**	9kHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	**PHASE**	Line (L)
ENVIRONMENTAL CONDITIONS	25deg. C, 60%RH, 991hPa	**TESTED BY**: Steven Lu	

No	Freq.	Corr. Factor	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.170	0.10	41.15	-	41.25	-	64.98	54.98	-23.73	-
2	0.213	0.10	42.44	-	42.54	-	63.11	53.11	-20.57	-
3	0.240	0.10	42.17	-	42.27	-	62.10	52.10	-19.83	-
4	4.305	0.41	25.03	-	25.44	-	56.00	46.00	-30.56	-
5	9.035	0.57	29.00	-	29.57	-	60.00	50.00	-30.43	-
6	15.617	0.84	32.73	-	33.57	-	60.00	50.00	-26.43	-

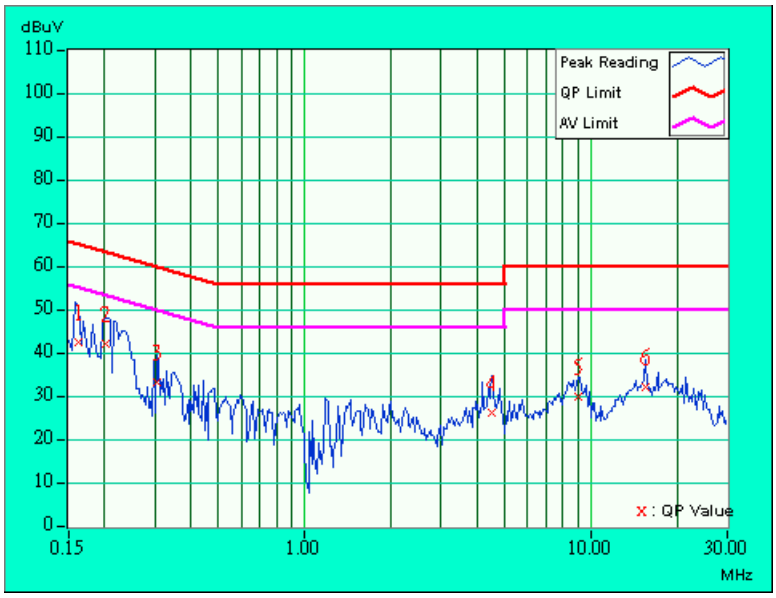
REMARKS: 1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. The emission levels of other frequencies were very low against the limit.
4. Margin value = Emission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



EUT	IEEE 802.11b Cardbus Wireless LAN Card	**MODEL**	GN-WLMR101
MODE	Channel 11	**6dB BANDWIDTH**	9kHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	**PHASE**	Neutral (N)
ENVIRONMENTAL CONDITIONS	25deg. C, 60%RH, 991hPa	**TESTED BY**: Steven Lu	

No	Freq.	Corr. Factor	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.162	0.10	41.93	-	42.03	-	65.38	55.38	-23.35	-
2	0.201	0.10	41.72	-	41.82	-	63.58	53.58	-21.76	-
3	0.306	0.10	32.64	-	32.74	-	60.07	50.07	-27.33	-
4	4.535	0.31	25.91	-	26.22	-	56.00	46.00	-29.78	-
5	9.078	0.38	29.46	-	29.84	-	60.00	50.00	-30.16	-
6	15.613	0.54	31.51	-	32.05	-	60.00	50.00	-27.95	-

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
* HP Spectrum Analyzer	8590L	3520A00667	Aug. 26, 2003
* CHASE Preamplifier	CPA9231A/4	3215	Nov. 06, 2003
* Spectrum Analyzer	8593E	3926A04191	Mar. 24, 2004
* HP Preamplifier	8449B	3008A01201	Dec. 01, 2003
* HP Preamplifier	8449B	3008A01292	Aug. 07, 2003
* ROHDE & SCHWARZ TEST RECEIVER	ESVS10	846285/012	Sept. 16, 2003
* ROHDE & SCHWARZ TEST RECEIVER	ESMI	839013/007 839379/002	Feb. 13, 2004
SCHAFFNER Tunable Dipole Antenna SCHWARZBECK Tunable Dipole Antenna	VHBA 9123 UHA 9105	459 977	Nov. 22, 2003
* CHASE BILOG Antenna	CBL6112B	2751	Mar. 21, 2004
* SCHWARZBECK Horn Antenna	BBHA9120-D1	D130	July 3, 2003
* EMCO Horn Antenna	3115	9312-4192	April 9, 2003
* CHANCE Turn Table & Tower Controller	ACS-I	NA	NA
* Software	ADT_Radiated_V5.09	NA	NA
* ANRITSU RF Switches	MP59B	M51167	Aug. 21, 2003
* TIMES RF cable	LMR-600	CABLE-ST6-01	Aug. 21, 2003

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. "*" = These equipment are used for the final measurement.
3. The horn antenna and HP preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
4. The test was performed in ADT Open Site No. 6.

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.

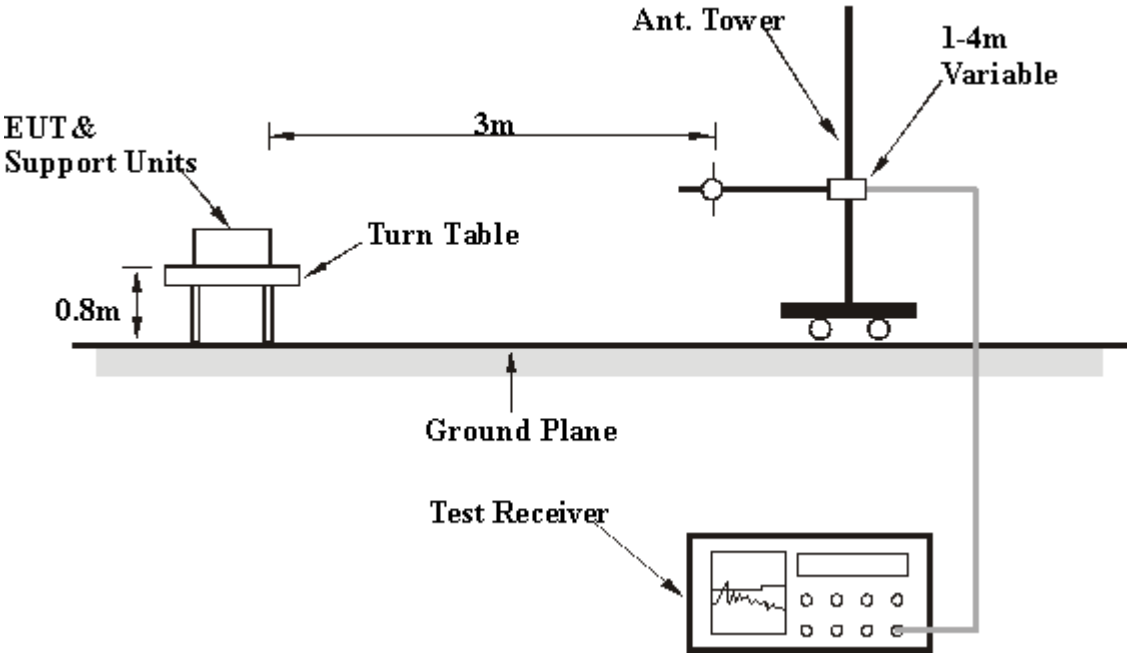
NOTE:

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 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 RESULT

EUT	IEEE 802.11b Cardbus Wireless LAN Card	**MODEL**	GN-WLMR101
MODE	Channel 11	**FREQUENCY RANGE**	Below 1000 MHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	**DETECTOR FUNCTION**	Quasi-Peak
ENVIRONMENTAL CONDITIONS	25deg. C, 60%RH, 991hPa	**TESTED BY**: Steven Lu	

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	264.00	30.4 QP	46.00	-15.60	1.22 H	45	16.20	14.20
2	396.00	31.5 QP	46.00	-14.50	1.20 H	164	14.00	17.50
3	484.00	29.0 QP	46.00	-17.00	1.01 H	24	10.10	18.90
4	704.00	30.5 QP	46.00	-15.50	1.03 H	241	8.90	21.60
5	792.00	33.4 QP	46.00	-12.60	1.35 H	242	10.90	22.50
6	836.00	29.4 QP	46.00	-16.60	1.13 H	352	6.50	22.90
7	880.00	30.9 QP	46.00	-15.10	1.48 H	31	7.80	23.10

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	308.00	27.0 QP	46.00	-19.00	1.65 V	24	12.30	14.70
2	352.00	28.0 QP	46.00	-18.00	1.11 V	237	12.20	15.80
3	704.00	31.4 QP	46.00	-14.60	1.47 V	24	9.80	21.60
4	748.00	29.0 QP	46.00	-17.00	1.52 V	41	6.70	22.30
5	792.00	31.0 QP	46.00	-15.00	1.02 V	245	8.50	22.50
6	836.00	29.6 QP	46.00	-16.40	1.32 V	32	6.70	22.90
7	880.00	27.0 QP	46.00	-19.00	1.51 V	24	3.90	23.10

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.

EUT	IEEE 802.11b Cardbus Wireless LAN Card	**MODEL**	GN-WLMR101
MODE	Channel 1	**FREQUENCY RANGE**	Above 1000 MHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	**DETECTOR FUNCTION**	Peak(PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 60%RH, 991hPa	**TESTED BY**: Steven Lu	

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	*2412.00	110.0 PK			1.43 H	292	79.00	32.00
1	*2412.00	103.6 AV			1.43 H	292	71.60	32.00
2	4824.00	49.7 PK	74.00	-24.30	1.52 H	34	11.20	38.50
3	7236.00	55.5 PK	74.00	-18.50	1.05 H	47	10.90	44.60
3	7236.00	48.5 AV	54.00	-5.50	1.05 H	47	3.90	38.50
4	9648.00	53.9 PK	74.00	-20.10	1.16 H	41	7.60	46.30
4	9648.00	44.9 AV	54.00	-9.10	1.16 H	41	-1.40	44.60

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	*2412.00	103.5 PK			1.55 V	21	71.50	32.00
1	*2412.00	95.3 AV			1.55 V	21	63.20	32.00
2	4824.00	51.2 PK	74.00	-22.80	2.18 V	304	12.70	38.50
2	4824.00	42.7 AV	54.00	-11.30	2.18 V	304	4.20	38.50
3	7236.00	53.5 PK	74.00	-20.50	1.55 V	74	8.90	44.60
3	7236.00	44.5 AV	54.00	-9.50	1.55 V	74	-0.10	44.60
4	9648.00	55.4 PK	74.00	-18.60	1.45 V	241	9.10	46.30
4	9648.00	46.9 AV	54.00	-7.10	1.45 V	241	0.60	46.30

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.

EUT	IEEE 802.11b Cardbus Wireless LAN Card	**MODEL**	GN-WLMR101
MODE	Channel 6	**FREQUENCY RANGE**	Above 1000 MHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	**DETECTOR FUNCTION**	Peak(PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 60%RH, 991hPa	**TESTED BY**: Steven Lu	

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	*2437.00	107.2 PK			1.05 H	48	78.00	32.20
1	*2437.00	100.2 AV			1.05 H	48	68.00	32.20
2	4874.00	49.6 PK	74.00	-24.40	1.05 H	48	10.90	38.70
3	7311.00	55.2 PK	74.00	-18.80	1.30 H	27	10.60	44.60
3	7311.00	45.0 AV	54.00	-9.00	1.30 H	27	0.40	38.70
4	9848.00	54.2 PK	74.00	-19.80	1.52 H	45	8.90	45.30
4	9848.00	46.6 AV	54.00	-7.40	1.52 H	45	1.30	44.60

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	*2437.00	104.0 PK			1.11 V	32	71.80	32.20
1	*2437.00	96.1 AV			1.11 V	32	63.80	32.20
2	4874.00	49.7 PK	74.00	-24.30	1.63 V	286	11.00	38.70
3	7311.00	54.5 PK	74.00	-19.50	1.54 V	224	9.90	44.60
3	7311.00	44.1 AV	54.00	-9.90	1.54 V	224	-0.50	38.70
4	9748.00	55.4 PK	74.00	-18.60	1.16 V	254	9.60	45.80
4	9748.00	47.4 AV	54.00	-6.60	1.16 V	254	1.60	44.60

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.

EUT	IEEE 802.11b Cardbus Wireless LAN Card	**MODEL**	GN-WLMR101
MODE	Channel 11	**FREQUENCY RANGE**	Above 1000 MHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	**DETECTOR FUNCTION**	Peak(PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 60%RH, 991hPa	**TESTED BY**: Steven Lu	

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	109.5 PK			1.01 H	257	77.00	32.50
1	*2462.00	101.5 AV			1.01 H	257	69.00	32.50
2	4924.00	50.2 PK	74.00	-23.80	1.73 H	4	11.40	38.80
3	7385.00	55.8 PK	74.00	-18.20	1.08 H	154	10.80	45.00
3	7385.00	48.8 AV	54.00	-5.20	1.08 H	154	3.80	45.00
4	9848.00	54.1 PK	74.00	-19.90	1.26 H	220	8.80	45.30
4	9848.00	46.6 AV	54.00	-7.40	1.26 H	220	1.30	45.30

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	103.8 PK			1.42 V	27	71.30	32.50
1	*2462.00	95.5 AV			1.42 V	27	63.00	32.50
2	4924.00	50.5 PK	74.00	-23.50	1.31 V	71	11.70	38.80
3	7385.00	55.6 PK	74.00	-18.40	1.33 V	120	10.60	45.00
3	7385.00	46.8 AV	54.00	-7.20	1.33 V	120	1.80	45.00
4	9848.00	55.1 PK	74.00	-18.90	1.12 V	35	9.80	45.30
4	9848.00	47.7 AV	54.00	-6.30	1.12 V	35	2.40	45.30

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 0.5 MHz.

4.3.2 TEST INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
SPECTRUM ANALYZER	FSEK30	100049	July 24, 2003

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

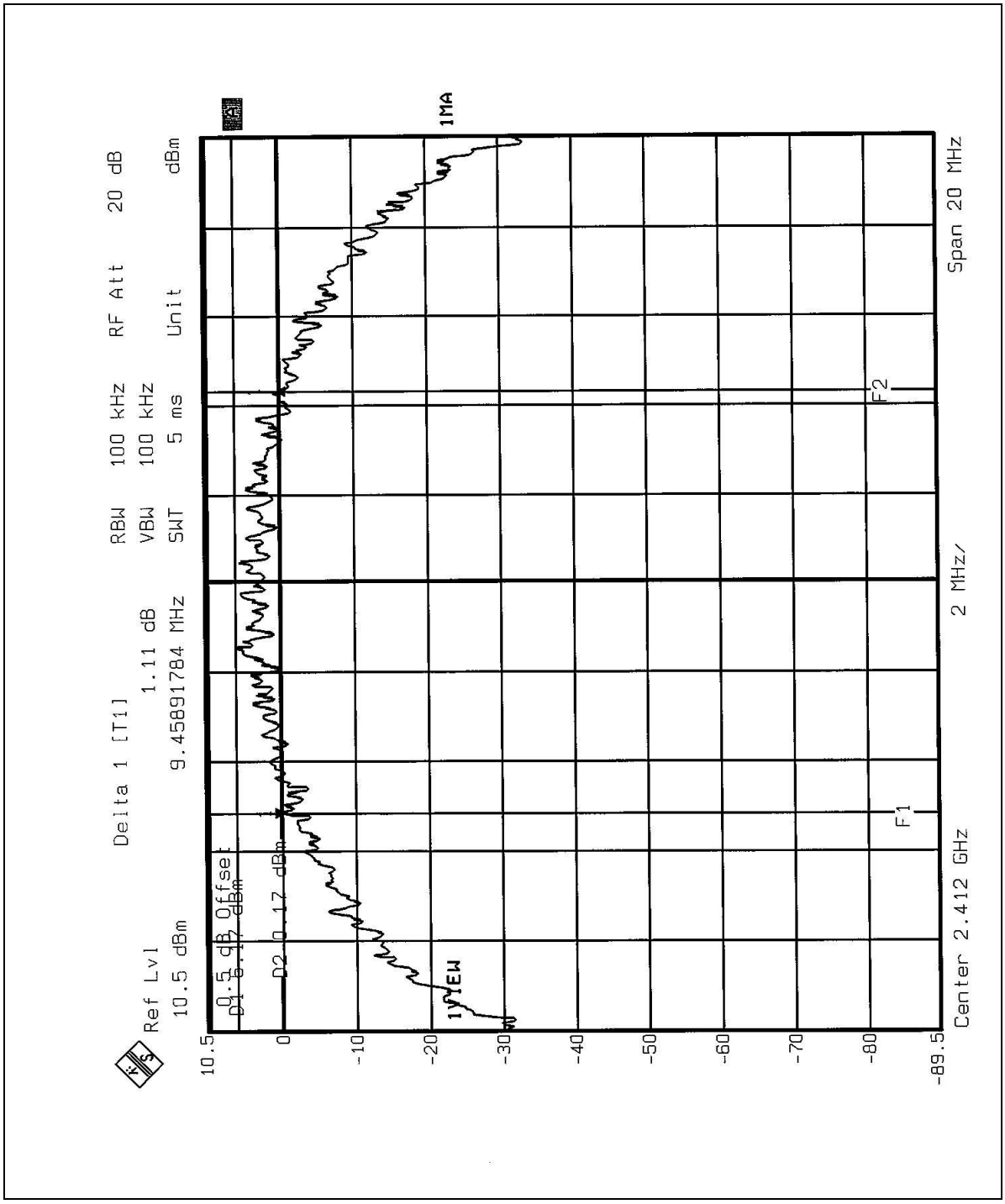
The software provided by client to enable the EUT under transmission condition continuously at lowest, middle and highest channel frequencies individually.

4.3.7 TEST RESULT

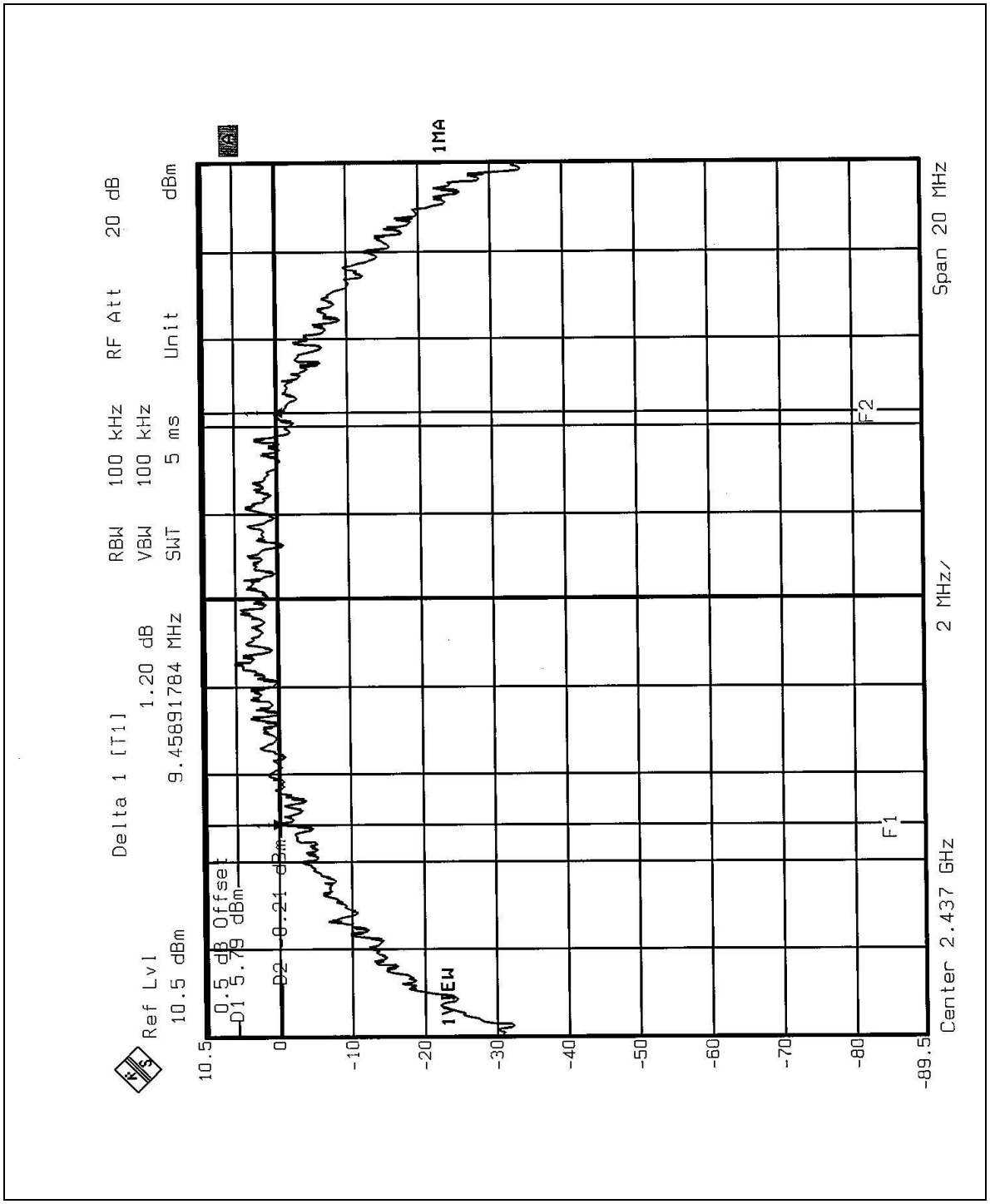
EUT	IEEE 802.11b Cardbus Wireless LAN Card	**MODEL**	GN-WLMR101
INPUT POWER (SYSTEM)	120Vac, 60 Hz	**ENVIRONMENTAL CONDITIONS**	24deg. C, 65%RH, 991hPa
TESTED BY: Ansen Lei			

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS/FAIL
1	2412	9.459	0.5	PASS
6	2437	9.459	0.5	PASS
11	2462	9.419	0.5	PASS

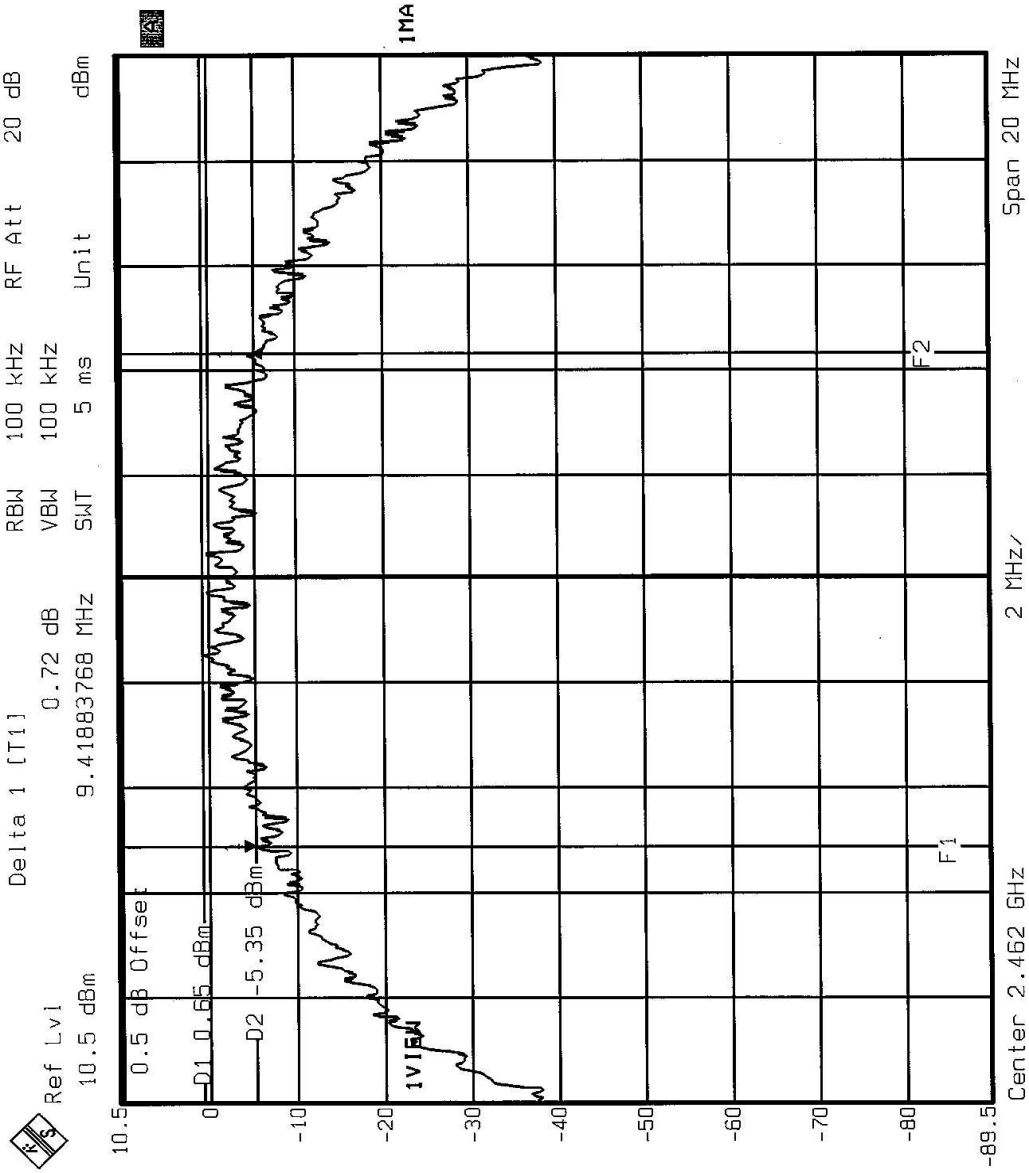
CH1


Ref Lvl
10.5 dBm
Delta 1 [T1]
1.11 dB
9.45891784 MHz
RBW 100 kHz
VBW 100 kHz
SWT 5 ms
RF Att 20 dB
Unit dBm
0.5 dB Offset
D1 6.17 dBm
D2 0.17 dBm
1MA
1VIEW
F1
F2
Center 2.412 GHz
2 MHz/
Span 20 MHz
10.5
0
-10
-20
-30
-40
-50
-60
-70
-80
-89.5

CH6


Ref Lvl
10.5 dBm
Delta 1 [T1]
1.20 dB
9.45891784 MHz
RBW 100 kHz
VBW 100 kHz
SWT 5 ms
RF Att 20 dB
Unit dBm
0.5 dB Offset
D1 5.79 dBm
D2 -0.21 dBm
1MA
1VIEW
F1
F2
Center 2.437 GHz
2 MHz/
Span 20 MHz
10.5
0
-10
-20
-30
-40
-50
-60
-70
-80
-89.5

CH11


Ref Lvl
10.5 dBm
Delta 1 [T1]
0.72 dB
9.41883768 MHz
RBW 100 kHz
VBW 100 kHz
SWT 5 ms
RF Att 20 dB
Unit dBm
0.5 dB Offset
D1 0.65 dBm
D2 -5.35 dBm
1MA
1VI
F1
F2
10.5
0
-10
-20
-30
-40
-50
-60
-70
-80
-89.5
Center 2.462 GHz
2 MHz/
Span 20 MHz

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
POWER METER	E4416A	GB41291118	Jul. 30, 2003
PEAK POWER SENSOR	E9327A	US40440722	Jul. 30, 2003

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

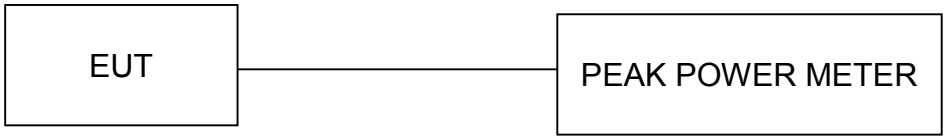
4.4.3 TEST PROCEDURES

The transmitter output was connected to the peak power meter.

4.4.4 DEVIATION FROM TEST STANDARD

No deviation

4.4.5 TEST SETUP



4.4.6 EUT OPERATING CONDITIONS

Same as Item 4.3.6

4.4.7 TEST RESULT

EUT	IEEE 802.11b Cardbus Wireless LAN Card	**MODEL**	GN-WLMR101
INPUT POWER (SYSTEM)	120Vac, 60 Hz	**ENVIRONMENTAL CONDITIONS**	24deg. C, 65%RH, 991hPa
TESTED BY: Ansen Lei			

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER OUTPUT (dBm)	PEAK POWER LIMIT (dBm)	PASS/FAIL
1	2412	17.45	30	PASS
6	2437	17.42	30	PASS
11	2462	17.38	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
SPECTRUM ANALYZER	FSEK30	100049	July 24, 2003

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

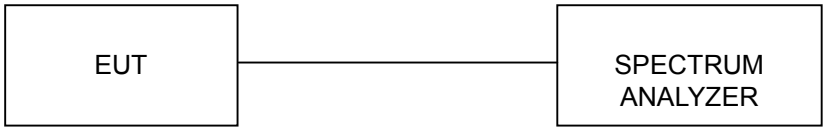
4.5.3 TEST PROCEDURE

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 3kHz RBW and 30kHz 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 DEVIATION FROM TEST STANDARD

No deviation

4.5.5 TEST SETUP



4.5.6 EUT OPERATING CONDITIONS

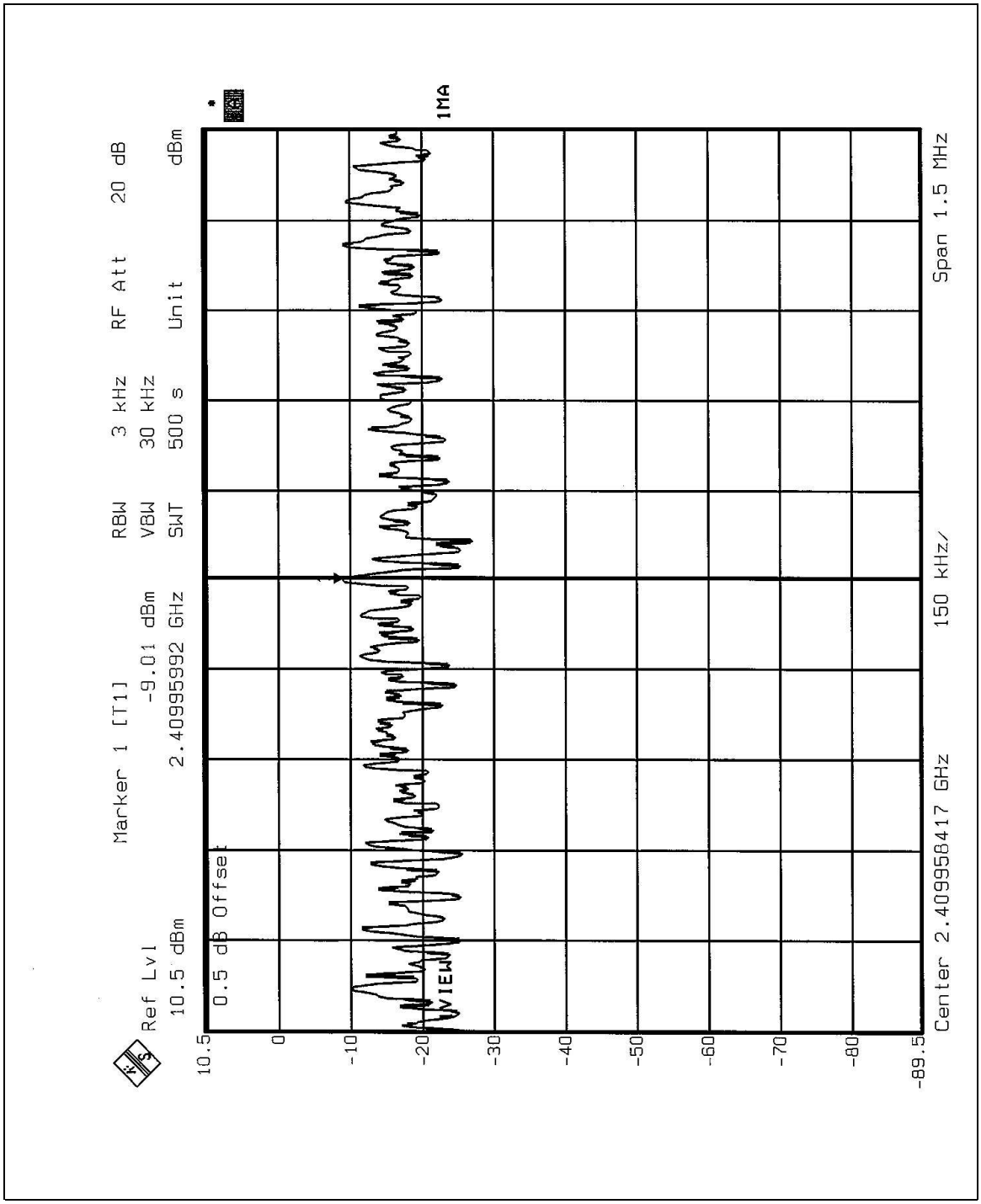
Same as 4.3.6

4.5.7 TEST RESULT

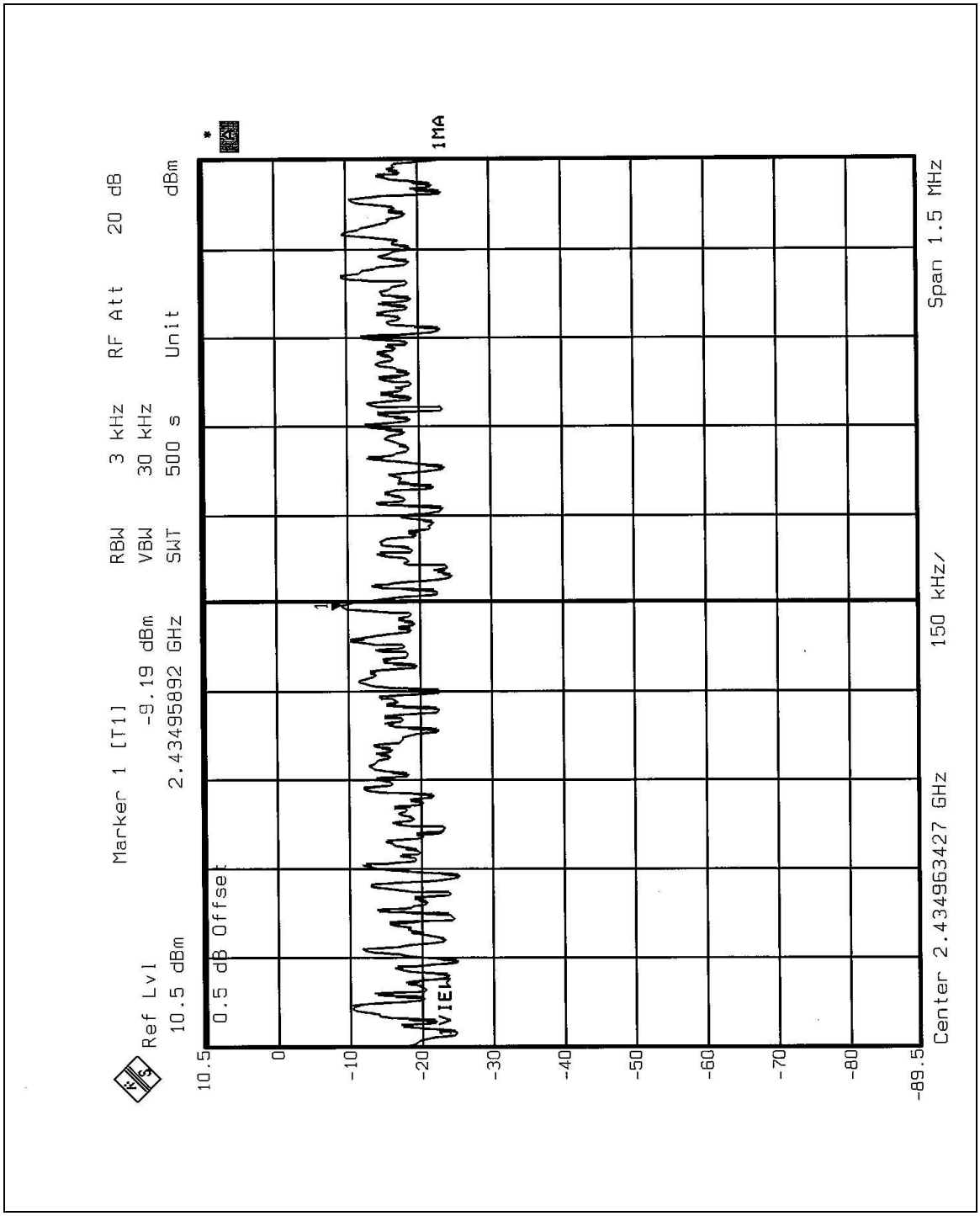
EUT	IEEE 802.11b Cardbus Wireless LAN Card	**MODEL**	GN-WLMR101
INPUT POWER (SYSTEM)	120Vac, 60 Hz	**ENVIRONMENTAL CONDITIONS**	24deg. C, 65%RH, 991hPa
TESTED BY: Ansen Lei			

CHANNEL NUMBER	CHANNEL FREQUENCY (MHz)	RF POWER LEVEL IN 3kHz BW (dBm)	MAXIMUM LIMIT (dBm)	PASS/FAIL
1	2412	-9.01	8	PASS
6	2437	-9.19	8	PASS
11	2462	-9.83	8	PASS

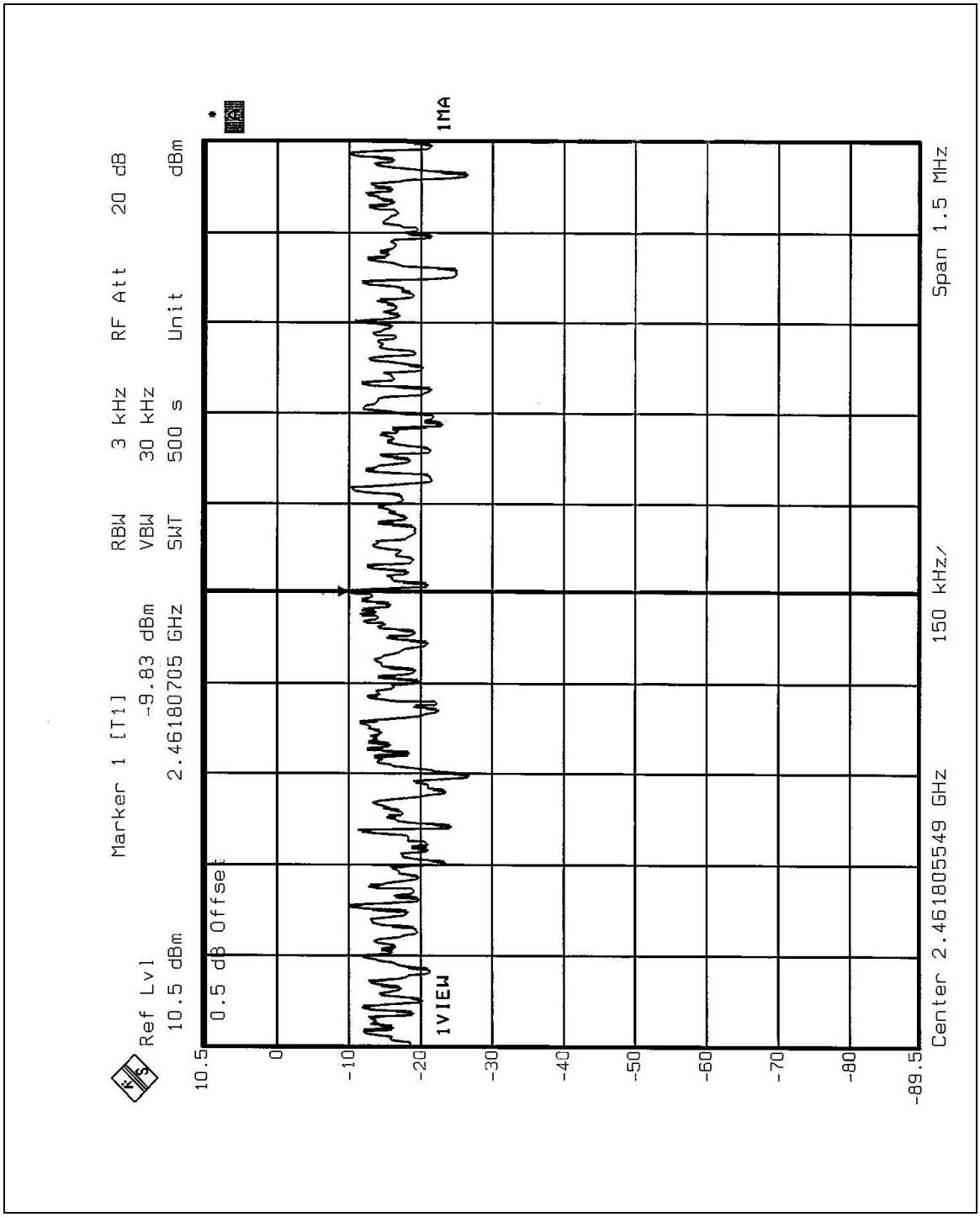
CH1


Ref Lvl
10.5 dBm
0.5 dB Offset
Marker 1 [T1]
-9.01 dBm
2.40995992 GHz
RBW 3 kHz
VBW 30 kHz
SWT 500 s
RF Att 20 dB
Unit dBm
1MA
VIEW
10.5
0
-10
-20
-30
-40
-50
-60
-70
-80
-89.5
Center 2.409958417 GHz
150 kHz/
Span 1.5 MHz

CH6


Ref Lvl
10.5 dBm
0.5 dB Offset
Marker 1 [T1]
-9.19 dBm
2.43495892 GHz
RBW 3 kHz
VBW 30 kHz
SWT 500 s
RF Att 20 dB
Unit dBm
1MA
VIEW
10.5
0
-10
-20
-30
-40
-50
-60
-70
-80
-89.5
Center 2.434963427 GHz
150 kHz/
Span 1.5 MHz

CH11


Ref Lvl
10.5 dBm
0.5 dB Offset
Marker 1 [T1]
-9.83 dBm
2.46180705 GHz
RBW 3 kHz
VBW 30 kHz
SWT 500 s
RF Att 20 dB
Unit dBm
1MA
1VIEW
10.5
0
-10
-20
-30
-40
-50
-60
-70
-80
-89.5
Center 2.461805549 GHz
150 kHz/
Span 1.5 MHz

4.6 BAND EDGES MEASUREMENT

4.6.1 LIMITS OF BAND EDGES MEASUREMENT

Below –20dB 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
SPECTRUM ANALYZER	FSEK30	100049	July 24, 2003

NOTE: 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 100kHz with suitable frequency span including 100kHz bandwidth from band edge. The band edges was measured and recorded.

4.6.4 DEVIATION FROM TEST STANDARD

No deviation

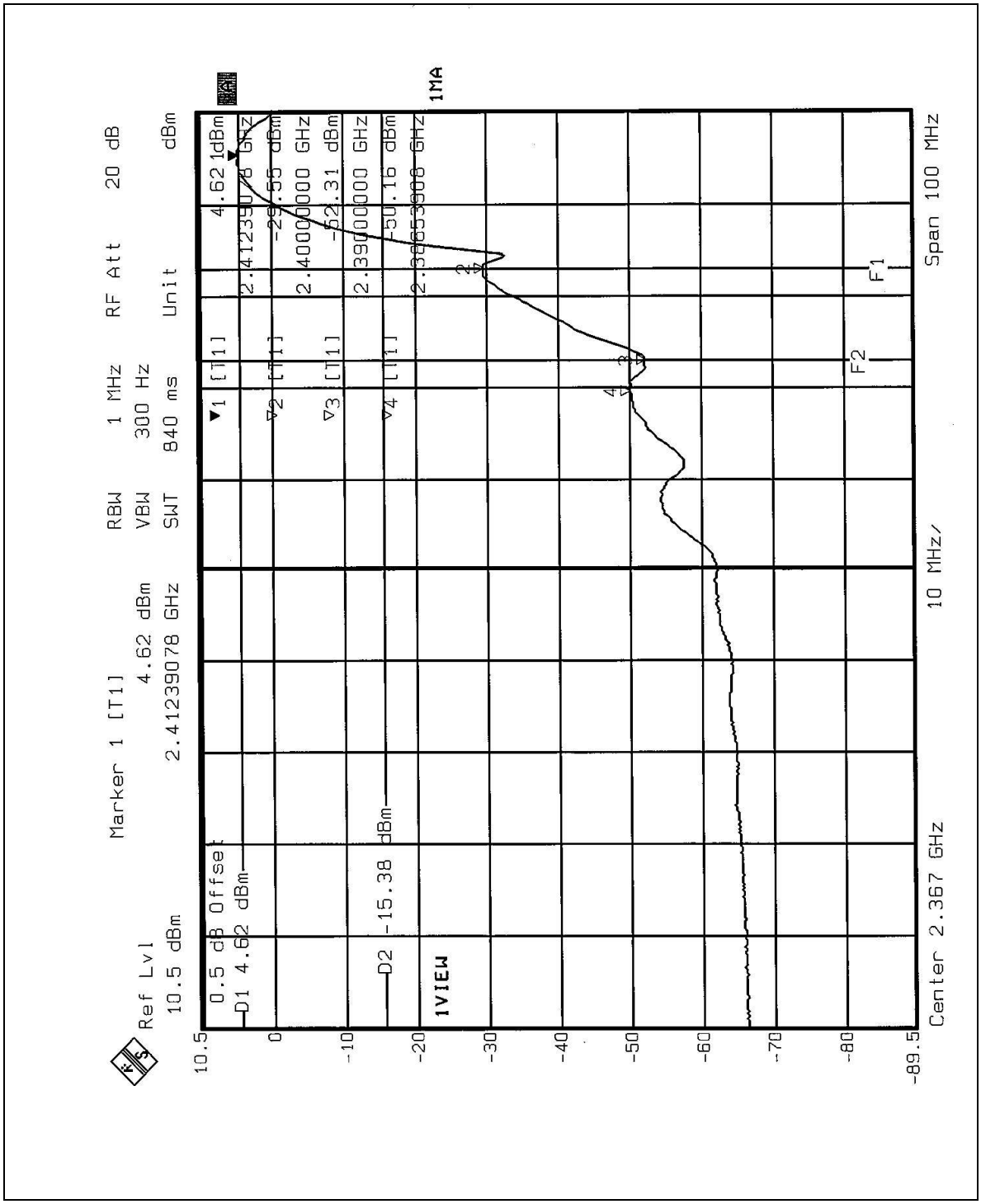
4.6.5 EUT OPERATING CONDITION

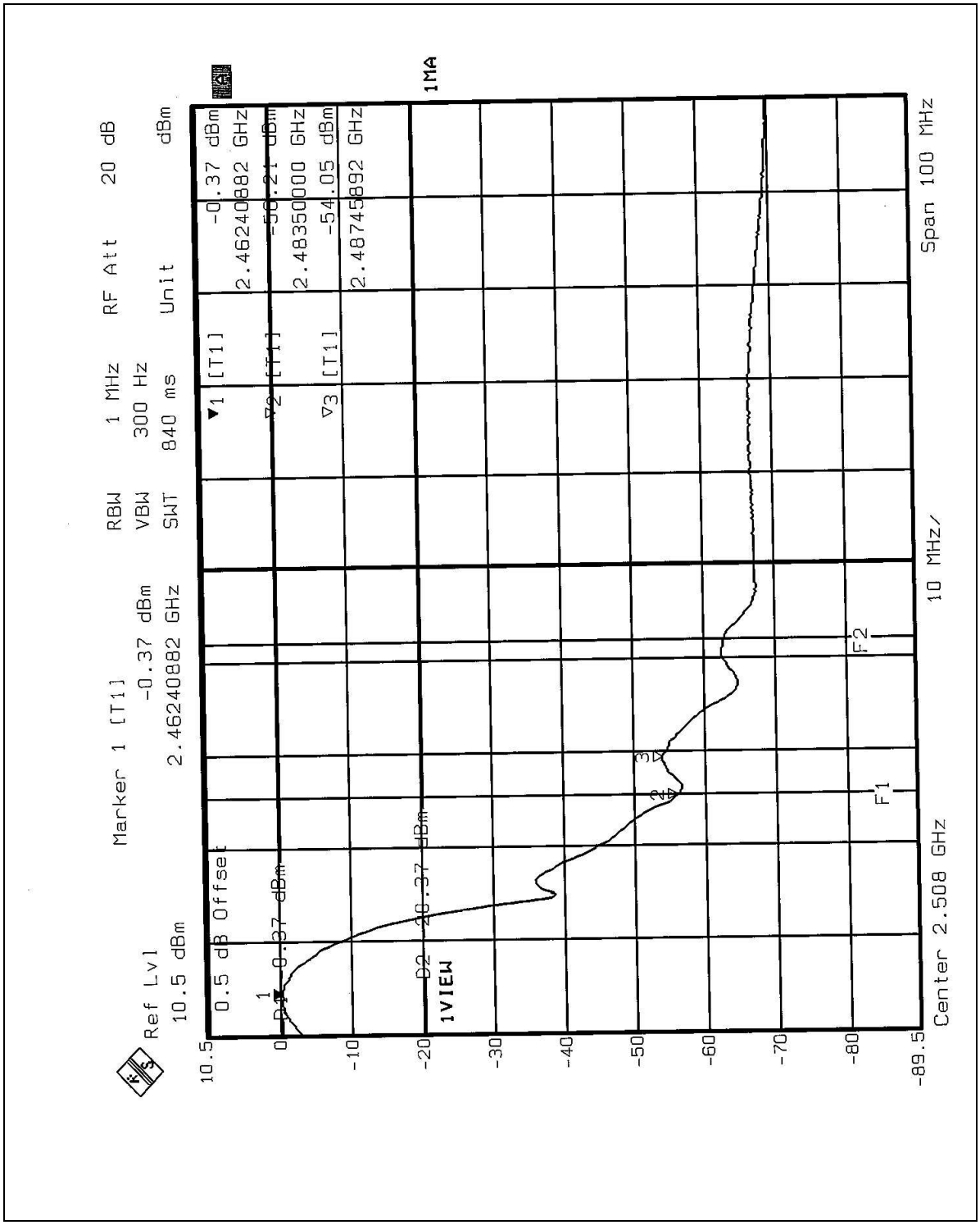
Same as Item 4.3.6

4.6.6 TEST RESULT

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 two pages shows 54.78dB / 53.68dB delta between carrier maximum power and local maximum emission in restrict band (2.3865GHz / 2.4875GHz). The emission of carrier strength list in the test result of channel 1 at the item 4.2.7 is 103.6dBuV/m, so the maximum field strength in restrict band is 103.6-54.78=48.82dBuV/m which is under 54dBuV/m limit.


Ref Lvl
10.5 dBm
Marker 1 [T1]
4.62 dBm
2.41239078 GHz
RBW 1 MHz
VBW 300 Hz
SWT 840 ms
RF Att 20 dB
Unit dBm
0.5 dB Offset
D1 4.62 dBm
D2 -15.38 dBm
1VIEW
1MA
Center 2.367 GHz
10 MHz/
Span 100 MHz
F1
F2


Ref Lvl
10.5 dBm
0.5 dB Offset
Marker 1 [T1]
-0.37 dBm
2.46240882 GHz
RBW 1 MHz
VBW 300 Hz
SWT 840 ms
RF Att 20 dB
Unit dBm
1 [T1] -0.37 dBm 2.46240882 GHz
2 [T1] -50.21 dBm 2.48350000 GHz
3 [T1] -54.05 dBm 2.48745892 GHz
1MA
1VIEW
D2 -20.37 dBm
F1
F2
Span 100 MHz
10 MHz/
Center 2.508 GHz

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 antenna type used in this product is Printed Patch Antenna. There is no antenna connector. The maximum Gain of this antenna is only 2dBi.

5 PHOTOGRAPHS OF THE TEST CONFIGURATION

CONDUCTED EMISSION TEST

RADIATED EMISSION TEST

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:

USA	FCC, NVLAP
Germany	TUV Rheinland
Japan	VCCI
New Zealand	MoC
Norway	NEMKO
R.O.C.	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.

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
Web Site: www.adt.com.tw

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