



FCC TEST REPORT

REPORT NO.: RF910723R04
MODEL NO.: F5D6020
RECEIVED: July 23, 2002
TESTED: July 30 ~ Oct. 8, 2002

APPLICANT: Belkin Components

ADDRESS: 501, West Walnut Street, Compton
CA 90220, USA

ISSUED BY: Advance Data Technology Corporation

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

This test report consists of 49 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.



0528
ILAC MRA



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.....	12
4.1.7	TEST RESULTS.....	13
4.2	RADIATED EMISSION MEASUREMENT	19
4.2.1	LIMITS OF RADIATED EMISSION MEASUREMENT	19
4.2.2	TEST INSTRUMENTS	20
4.2.3	TEST PROCEDURES.....	21
4.2.4	DEVIATION FROM TEST STANDARD	21
4.2.5	TEST SETUP	22
4.2.6	EUT OPERATING CONDITIONS.....	22
4.2.7	TEST RESULTS.....	23
4.3	6dB BANDWIDTH MEASUREMENT	27
4.3.1	LIMITS OF 6dB BANDWIDTH MEASUREMENT	27
4.3.2	TEST INSTRUMENTS	27
4.3.3	TEST PROCEDURE	28
4.3.4	DEVIATION FROM TEST STANDARD	28
4.3.5	TEST SETUP	28
4.3.6	EUT OPERATING CONDITIONS.....	28
4.3.7	TEST RESULTS.....	29
4.4	MAXIMUM PEAK OUTPUT POWER	33
4.4.1	LIMITS OF MAXIMUM PEAK OUTPUT POWER MEASUREMENT.....	33
4.4.2	TEST INSTRUMENTS.....	33



4.4.3	TEST PROCEDURES.....	34
4.4.4	DEVIATION FROM TEST STANDARD	34
4.4.5	TEST SETUP	34
4.4.6	EUT OPERATING CONDITIONS.....	34
4.4.7	TEST RESULTS.....	35
4.5	POWER SPECTRAL DENSITY MEASUREMENT	36
4.5.1	LIMITS OF POWER SPECTRAL DENSITY MEASUREMENT	36
4.5.2	TEST INSTRUMENTS	36
4.5.3	TEST PROCEDURE	37
4.5.4	DEVIATION FROM TEST STANDARD	37
4.5.5	TEST SETUP	37
4.5.6	EUT OPERATING CONDITIONS.....	37
4.5.7	TEST RESULTS.....	38
4.6	BAND EDGES MEASUREMENT	42
4.6.1	LIMITS OF BAND EDGES MEASUREMENT	42
4.6.2	TEST INSTRUMENTS	42
4.6.3	TEST PROCEDURE	42
4.6.4	EUT OPERATING CONDITION	43
4.6.5	DEVIATION FROM TEST STANDARD	43
4.6.6	TEST RESULTS.....	43
4.7	ANTENNA REQUIREMENT.....	46
4.7.1	STANDARD APPLICABLE.....	46
4.7.2	ANTENNA CONNECTED CONSTRUCTION.....	46
5	PHOTOGRAPHS OF THE TEST CONFIGURATION	47
6	INFORMATION ON THE TESTING LABORATORIES.....	49



1 CERTIFICATION

PRODUCT : Wireless Notebook Network Card
MODEL NO. : F5D6020
BRAND : Belkin
APPLICANT : Belkin Components
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 July 30 to Oct. 8, 2002, 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 : Oct. 9, 2002
Emily Lu

APPROVED BY : Alan Lane , DATE : Oct. 9, 2002
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 Limit: 48dBuV	PASS	Meet the requirement of limit Minimum passing margin is -17.61dBuV 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 -6.5dBuV at 2038.0MHz
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	Wireless Notebook Network Card
MODEL NO.	F5D6020
POWER SUPPLY	3.3VDC from host equipment
MODULATION TYPE	BPSK, QPSK, CCK
RADIO TECHNOLOGY	DSSS
TRANSFER RATE	1/2/5.5/11Mbps
FREQUENCY RANGE	2412MHz ~ 2462MHz
NUMBER OF CHANNEL	11
OUTPUT POWER	12.60dBm
ANTENNA TYPE	Printed Antenna
DATA CABLE	NA
I/O PORTS	NA
ASSOCIATED DEVICES	NA

NOTE:

For a more detailed features description, please refer to the manufacturer's specifications or User's Manual.



3.2 DESCRIPTION OF TEST MODES

Eleven channels are provided in this EUT.

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

NOTE:

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

3.3 GENERAL DESCRIPTION OF APPLIED STANDARDS

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

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

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

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



3.4 DESCRIPTION OF SUPPORT UNITS

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

NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	NOTEBOOK	DELL	PP01L	TW-09C748-12800-190-B220	FCC DoC APPROVED
2	MODEM	ACEEX	1414	980020503	IFAXDM1414
3	PRINTER	EPSON	LQ-300+	DCGY017096	FCC DoC APPROVED

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	NA
2	1.2 m braid shielded wire, terminated with DB25 and DB9 connector via metallic frame, w/o core.
3	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 (dB μ 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. 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	ESCS30	845552/004	Jun. 19, 2003
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. 25, 2002
* ROHDE & SCHWARZ 4-wire ISN	ENY41	838119/028	Dec. 2, 2002
* ROHDE & SCHWARZ 2-wire ISN	ENY22	837497/018	Dec. 2, 2002
EMCO-L.I.S.N. (for peripheral)	3825/2	90031627	July 23, 2003
Software	Cond-V2L	NA	NA
RF cable (JYEBAO)	5D-FB	Cable-C05.01	July 23, 2003
LYNICS Terminator (For EMCO LISN)	0900510	E1-01-305	Feb. 20, 2003
LYNICS Terminator (For EMCO LISN)	0900510	E1-01-306	Feb. 20, 2003
Shielded Room	Site 5	ADT-C05	NA
VCCI Site Registration No.	Site 5	C-1093	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 equipment are used for conducted telecom port test only (if tested).
 4. The test was performed in ADT Open Site No. 5



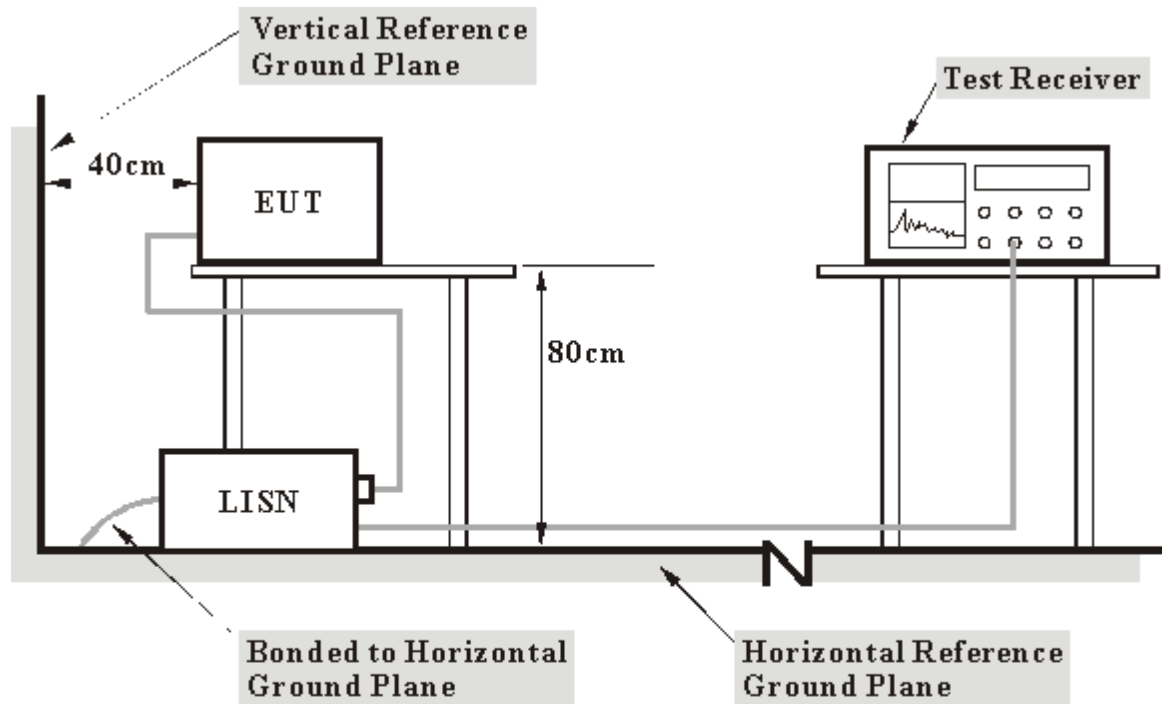
4.1.3 TEST PROCEDURES

- 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 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 modem.
- e. The computer system sent "H" messages to printer and the printer prints them on paper.



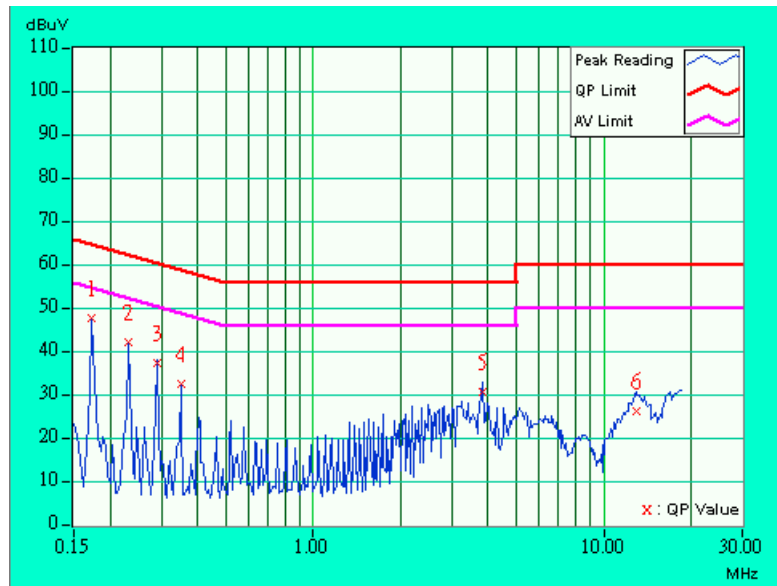
4.1.7 TEST RESULTS

EUT	Wireless Notebook Network Card	MODEL	F5D6020
MODE	Channel 1	6dB BANDWIDTH	9 kHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	PHASE	Line (L)
ENVIRONMENTAL CONDITIONS	30 deg. C, 50%RH, 1005 hPa	TESTED BY: Bunny Yao	

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	0.173	0.10	47.08	-	47.18	-	64.79	54.79	-17.61	-
2	0.232	0.10	41.52	-	41.62	-	62.38	52.38	-20.76	-
3	0.291	0.10	36.90	-	37.00	-	60.51	50.51	-23.51	-
4	0.349	0.10	31.93	-	32.03	-	58.98	48.98	-26.95	-
5	3.820	0.38	29.98	-	30.36	-	56.00	46.00	-25.64	-
6	12.906	0.66	25.65	-	26.31	-	60.00	50.00	-33.69	-

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.



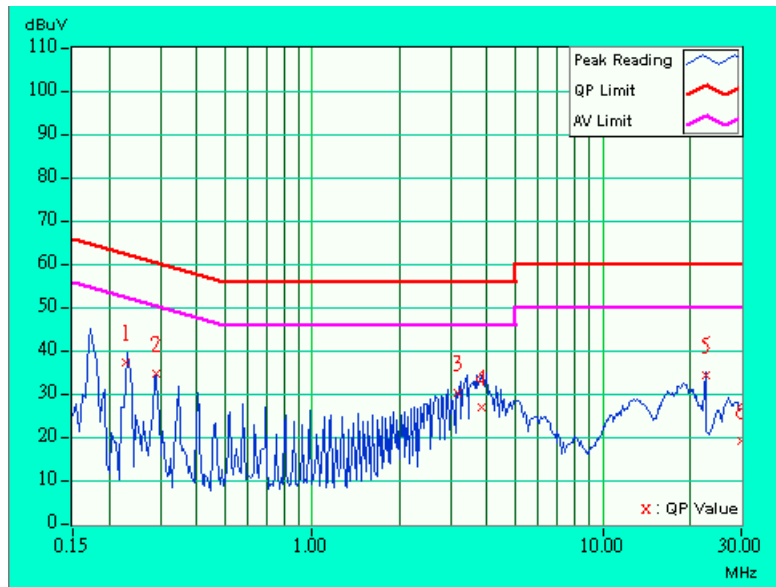


EUT	Wireless Notebook Network Card	MODEL	F5D6020
MODE	Channel 1	6dB BANDWIDTH	9 kHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	PHASE	Neutral (N)
ENVIRONMENTAL CONDITIONS	30 deg. C, 50%RH, 1005 hPa	TESTED BY: Bunny Yao	

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	0.228	0.10	36.66	-	36.76	-	62.52	52.52	-25.76	-
2	0.291	0.10	34.00	-	34.10	-	60.51	50.51	-26.41	-
3	3.180	0.26	29.75	-	30.01	-	56.00	46.00	-25.99	-
4	3.813	0.29	26.06	-	26.35	-	56.00	46.00	-29.65	-
5	22.570	0.75	33.78	-	34.53	-	60.00	50.00	-25.47	-
6	30.000	0.80	18.32	-	19.12	-	60.00	50.00	-40.88	-

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.



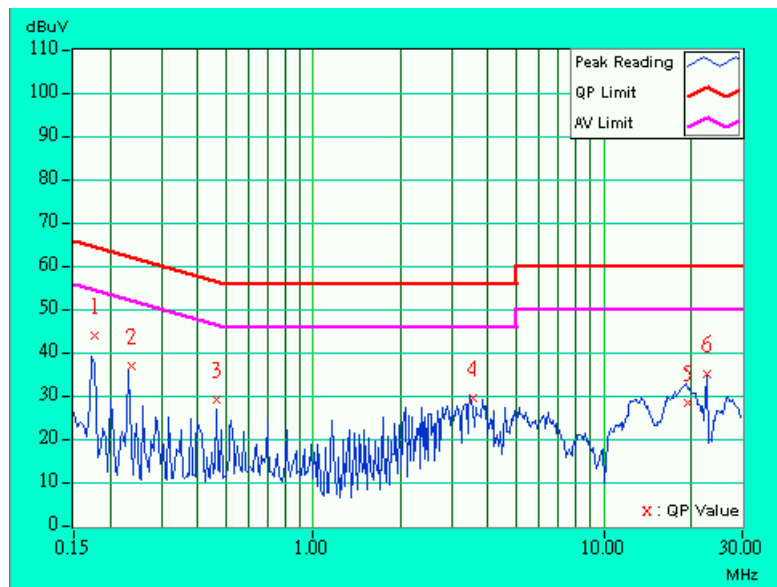


EUT	Wireless Notebook Network Card	MODEL	F5D6020
MODE	Channel 6	6dB BANDWIDTH	9 kHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	PHASE	Line (L)
ENVIRONMENTAL CONDITIONS	30 deg. C, 50%RH, 1005 hPa	TESTED BY: Bunny Yao	

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	0.177	0.10	43.06	-	43.16	-	64.61	54.61	-21.45	-
2	0.236	0.10	36.05	-	36.15	-	62.24	52.24	-26.09	-
3	0.463	0.11	27.98	-	28.09	-	56.65	46.65	-28.56	-
4	3.535	0.35	28.63	-	28.98	-	56.00	46.00	-27.02	-
5	19.523	0.97	27.60	-	28.57	-	60.00	50.00	-31.43	-
6	22.570	1.10	33.97	-	35.07	-	60.00	50.00	-24.93	-

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.



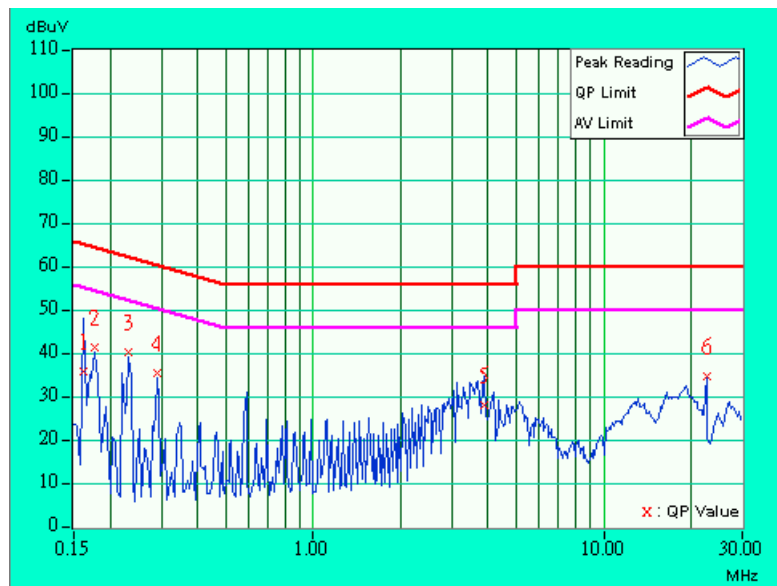


EUT	Wireless Notebook Network Card	MODEL	F5D6020
MODE	Channel 6	6dB BANDWIDTH	9 kHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	PHASE	Neutral (N)
ENVIRONMENTAL CONDITIONS	30 deg. C, 50%RH, 1005 hPa	TESTED BY: Bunny Yao	

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	0.162	0.10	35.04	-	35.14	-	65.38	55.38	-30.24	-
2	0.177	0.10	40.85	-	40.95	-	64.61	54.61	-23.66	-
3	0.232	0.10	39.51	-	39.61	-	62.38	52.38	-22.77	-
4	0.291	0.10	34.96	-	35.06	-	60.51	50.51	-25.45	-
5	3.875	0.29	27.33	-	27.62	-	56.00	46.00	-28.38	-
6	22.570	0.75	34.03	-	34.78	-	60.00	50.00	-25.22	-

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.



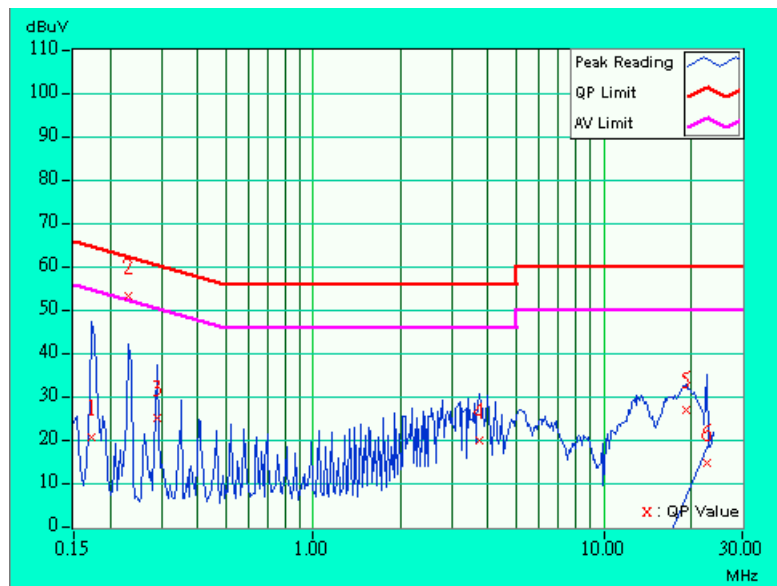


EUT	Wireless Notebook Network Card	MODEL	F5D6020
MODE	Channel 11	6dB BANDWIDTH	9 kHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	PHASE	Line (L)
ENVIRONMENTAL CONDITIONS	30 deg. C, 70%RH, 1005 hPa	TESTED BY: Bunny Yao	

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	0.173	0.10	19.59	-	19.69	-	64.79	54.79	-45.10	-
2	0.232	0.10	52.20	-	52.30	-	62.38	52.38	-10.08	-
3	0.291	0.10	23.90	-	24.00	-	60.51	50.51	-36.51	-
4	3.711	0.37	18.74	-	19.11	-	56.00	46.00	-36.89	-
5	19.199	0.95	25.84	-	26.79	-	60.00	50.00	-33.21	-
6	22.570	1.10	13.76	-	14.86	-	60.00	50.00	-45.14	-

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.



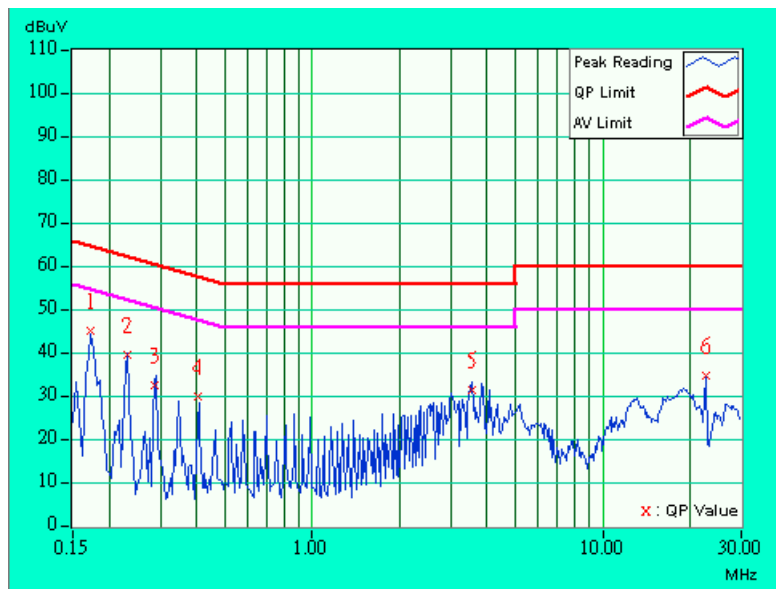


EUT	Wireless Notebook Network Card	MODEL	F5D6020
MODE	Channel 11	6dB BANDWIDTH	9 kHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	PHASE	Neutral (N)
ENVIRONMENTAL CONDITIONS	30 deg. C, 50%RH, 1005 hPa	TESTED BY: Bunny Yao	

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	0.173	0.10	44.37	-	44.47	-	64.79	54.79	-20.32	-
2	0.232	0.10	38.92	-	39.02	-	62.38	52.38	-23.36	-
3	0.287	0.10	32.01	-	32.11	-	60.62	50.62	-28.51	-
4	0.404	0.10	29.25	-	29.35	-	57.77	47.77	-28.42	-
5	3.535	0.28	30.78	-	31.06	-	56.00	46.00	-24.94	-
6	22.570	0.75	33.99	-	34.74	-	60.00	50.00	-25.26	-

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 13, 2003
* HP Preamplifier	8447D	2944A08485	Oct. 30, 2002
* HP Preamplifier	8449B	3008A01201	Dec. 06, 2002
* HP Preamplifier	8449B	3008A01292	Aug. 21, 2002
* ROHDE & SCHWARZ TEST RECEIVER	ESMI	839013/007 839379/002	Jan. 27, 2003
SCHWARZBECK Tunable Dipole Antenna	VHA 9103 UHA 9105	E101051 E101055	Nov. 23, 2002
* CHASE BILOG Antenna	CBL6112A	2221	Nov. 1, 2002
* SCHWARZBECK Horn Antenna	BBHA9120-D1	D130	July 3, 2003
* EMCO Horn Antenna	3115	9312-4192	April 9, 2003
* EMCO Turn Table	1060	1115	NA
* SHOSHIN Tower	AP-4701	A6Y005	NA
* Software	AS61D4	NA	NA
* ANRITSU RF Switches	MP59B	M35046	Jan. 25, 2003
* TIMES RF cable	LMR-600	CABLE-ST5-01	Aug. 2, 2002
Open Field Test Site	Site 5	ADT-R05	July 19, 2003
VCCI Site Registration No.	Site 5	R-1039	NA

- 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 equipment are used for the final measurement.
4. The horn antenna and HP preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
5. The test was performed in ADT Open Site No. 5



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.

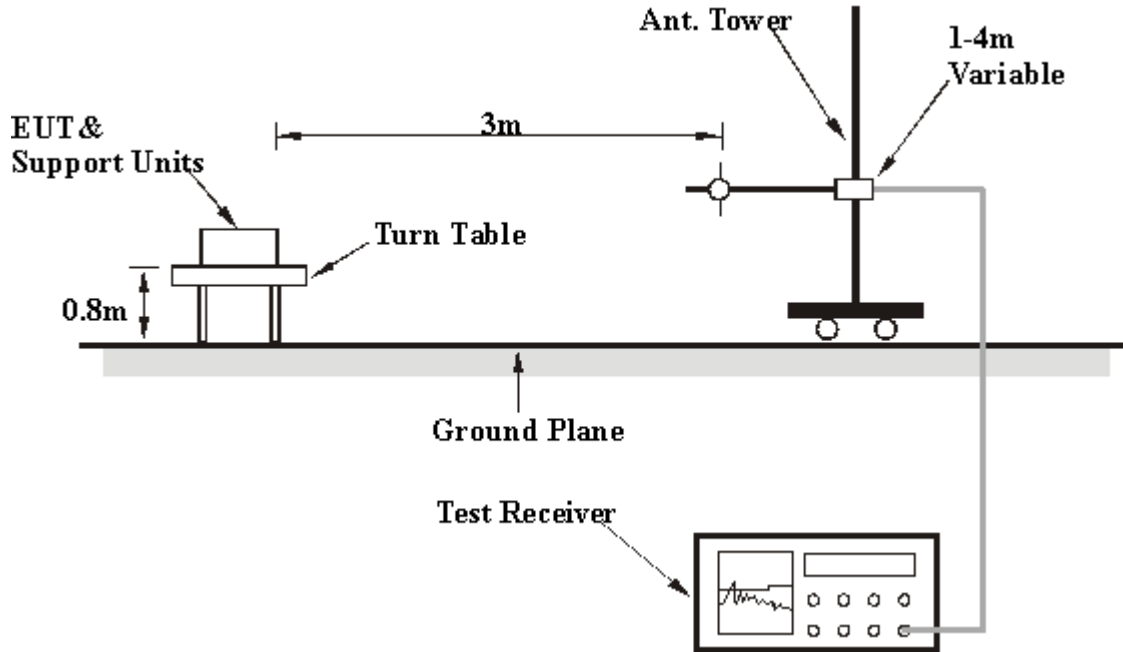
NOTE:

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 4.1.5.

4.2.7 TEST RESULTS

EUT	Wireless Notebook Network Card	MODEL	F5D6020
MODE	Channel 11	FREQUENCY RANGE	30-1000 MHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Quasi-Peak
ENVIRONMENTAL CONDITIONS	35 deg. C, 50 % RH, 1050 hPa	TESTED BY: Bunny Yao	

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	220.00	23.6 QP	46.00	-22.40	1.32H	301	9.60	10.12	3.85	0.00	-13.96
2	264.00	24.0 QP	46.00	-22.00	1.31H	186	6.72	12.89	4.44	0.00	-17.32
3	340.00	30.6 QP	46.00	-15.40	1.38H	247	11.06	14.02	5.52	0.00	-19.53
4	352.00	25.6 QP	46.00	-20.40	1.00H	255	5.61	14.31	5.68	0.00	-19.99
5	396.00	22.7 QP	46.00	-23.30	1.44H	224	0.52	15.96	6.20	0.00	-22.16
6	440.00	24.0 QP	46.00	-22.00	1.64H	249	0.81	16.32	6.87	0.00	-23.19
7	460.00	32.1 QP	46.00	-13.90	2.02H	187	8.46	16.53	7.11	0.00	-23.64
8	528.00	27.9 QP	46.00	-18.10	1.88H	221	2.46	17.62	7.82	0.00	-25.44
9	590.00	32.6 QP	46.00	-13.40	1.45H	314	5.70	18.48	8.42	0.00	-26.90
10	748.00	35.2 QP	46.00	-10.80	1.04H	180	4.93	20.14	10.17	0.00	-30.31

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	240.00	24.3 QP	46.00	-21.70	1.23V	2	8.73	11.41	4.16	0.00	-15.57
2	288.00	29.5 QP	46.00	-16.50	1.72V	66	11.80	12.88	4.81	0.00	-17.70
3	340.00	33.6 QP	46.00	-12.40	1.27V	212	14.05	14.02	5.52	0.00	-19.53
4	396.00	28.0 QP	46.00	-18.00	1.47V	95	5.84	15.96	6.20	0.00	-22.16
5	460.00	38.5 QP	46.00	-7.50	1.31V	96	14.86	16.53	7.11	0.00	-23.65
6	548.00	31.2 QP	46.00	-14.80	1.53V	211	5.17	17.93	8.11	0.00	-26.03
7	748.00	33.3 QP	46.00	-12.70	1.37V	51	2.99	20.14	10.17	0.00	-30.31

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.



EUT	Wireless Notebook Network Card	MODEL	F5D6020
MODE	Channel 1	FREQUENCY RANGE	Above 1000 MHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak(PK) Average (AV)
ENVIRONMENTAL CONDITIONS	35 deg. C, 50 % RH, 1050 hPa	TESTED BY: Bunny Yao	

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	2038.00	51.3 PK	74.00	-22.70	1.43H	151	55.00	26.37	4.86	34.90	3.67
2	2038.00	47.5 AV	54.00	-6.50	1.43H	138	51.20	26.37	4.86	34.90	3.67
3	*2412.00	92.8 AV			1.00H	81	60.00	27.67	5.10	0.00	-32.78
4	*2412.00	97.0 PK			1.00H	81	64.20	27.67	5.10	0.00	-32.78
5	2580.00	35.3 AV	54.00	-18.70	1.03H	137	37.00	28.10	5.14	34.91	1.68
6	2580.00	48.3 PK	74.00	-25.70	1.03H	137	50.00	28.10	5.14	34.91	1.69

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB)	Cable Factor (dB)	Pre-Amp. Factor (dB)	Correction Factor (dB)
1	2038.00	42.7 AV	54.00	-11.30	1.58V	199	46.40	26.37	4.86	34.90	3.67
2	2038.00	48.1 PK	74.00	-25.90	1.58V	199	51.80	26.37	4.86	34.90	3.68
3	*2412.00	85.1 AV			1.00V	188	52.30	27.67	5.10	0.00	-32.78
4	*2412.00	90.8 PK			1.00V	188	58.00	27.67	5.10	0.00	-32.78
5	2580.00	33.5 AV	54.00	-20.50	1.09V	244	35.20	28.10	5.14	34.91	1.68
6	2580.00	46.8 PK	74.00	-27.20	1.09V	244	48.50	28.10	5.14	34.91	1.69

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.



EUT	Wireless Notebook Network Card	MODEL	F5D6020
MODE	Channel 6	FREQUENCY RANGE	Above 1000 MHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak(PK) Average (AV)
ENVIRONMENTAL CONDITIONS	35 deg. C, 50 % RH, 1050 hPa	TESTED BY: Bunny Yao	

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	2063.00	44.6 AV	54.00	-9.40	1.01H	164	48.00	26.51	4.96	34.90	3.43
2	2063.00	48.9 PK	74.00	-25.10	1.01H	164	52.30	26.51	4.96	34.90	3.43
3	2341.00	37.3 AV	54.00	-16.70	1.12H	196	39.70	27.52	4.98	34.90	2.40
4	2341.00	50.6 PK	74.00	-23.40	1.12H	196	53.00	27.52	4.98	34.90	2.40
5	*2437.00	88.4 AV			1.06H	206	55.50	27.81	5.08	0.00	-32.89
6	*2437.00	92.5 PK			1.06H	206	59.60	27.81	5.08	0.00	-32.89

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	2063.00	42.7 AV	54.00	-11.30	1.03V	240	46.10	26.51	4.96	34.90	3.43
2	2063.00	46.1 PK	74.00	-27.90	1.03V	240	49.50	26.51	4.96	34.90	3.43
3	*2437.00	85.9 AV			1.16V	222	53.00	27.81	5.08	0.00	-32.89
4	*2437.00	90.4 PK			1.16V	222	57.50	27.81	5.08	0.00	-32.89

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.



EUT	Wireless Notebook Network Card	MODEL	F5D6020
MODE	Channel 11	FREQUENCY RANGE	Above 1000 MHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak(PK) Average (AV)
ENVIRONMENTAL CONDITIONS	35 deg. C, 50 % RH, 1050 hPa	TESTED BY: Bunny Yao	

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB)	Cable Factor (dB)	Pre-Amp. Factor (dB)	Correction Factor (dB)
1	2088.00	42.5 AV	54.00	-11.50	1.34H	127	45.70	26.66	5.02	34.90	3.23
2	2088.00	49.8 PK	74.00	-24.20	1.34H	127	53.00	26.66	5.02	34.90	3.23
3	2351.00	51.5 PK	74.00	-22.50	1.22H	118	53.90	27.52	4.98	34.90	2.40
4	2351.00	39.9 AV	54.00	-14.10	1.22H	118	42.30	27.52	4.98	34.90	2.40
5	*2462.00	92.5 AV			1.00H	142	59.60	27.81	5.08	0.00	-32.89
6	*2462.00	96.6 PK			1.00H	142	63.70	27.81	5.08	0.00	-32.89

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB)	Cable Factor (dB)	Pre-Amp. Factor (dB)	Correction Factor (dB)
1	2088.00	42.7 AV	54.00	-11.30	1.00V	189	45.90	26.66	5.02	34.90	3.23
2	2088.00	49.5 PK	74.00	-24.50	1.00V	189	52.70	26.66	5.02	34.90	3.23
3	*2462.00	84.9 AV			1.16V	222	52.00	27.81	5.08	0.00	-32.89
4	*2462.00	88.5 PK			1.16V	222	55.60	27.81	5.08	0.00	-32.89

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
SPECTRUM ANALYZER	FSEK30	100049	July 24, 2003

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.

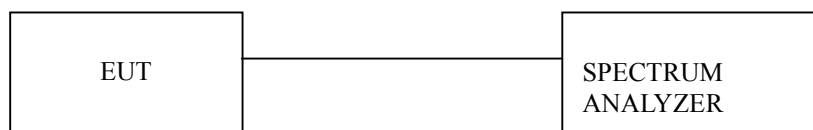
4.3.3 TEST PROCEDURE

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 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.



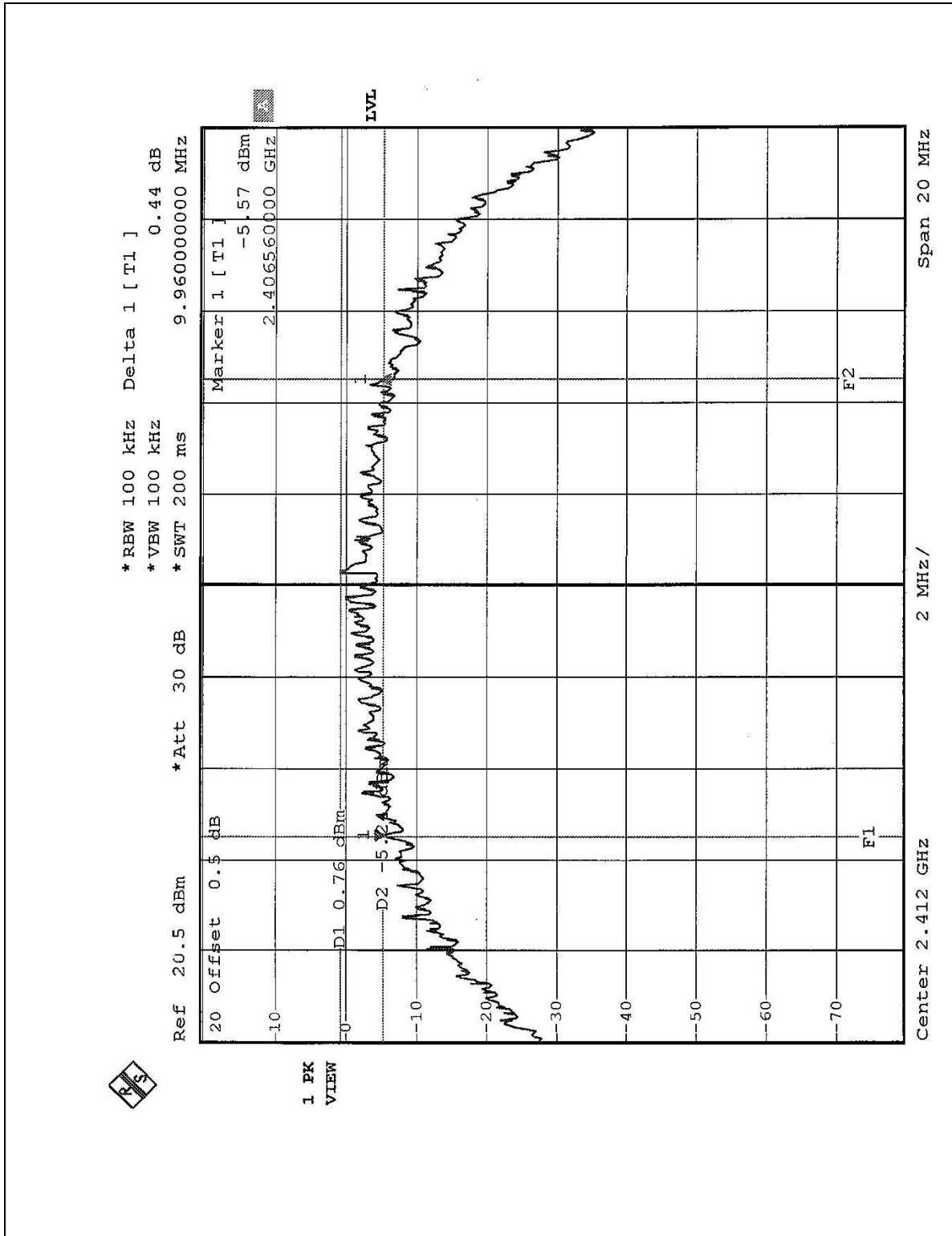
4.3.7 TEST RESULTS

EUT	Wireless Notebook Network Card	MODEL	F5D6020
INPUT POWER (SYSTEM)	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	26 deg. C, 62%RH, 1005 hPa
TESTED BY: Steven Lu			

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS/FAIL
1	2412	9.96	0.5	PASS
6	2437	10.00	0.5	PASS
11	2462	10.40	0.5	PASS

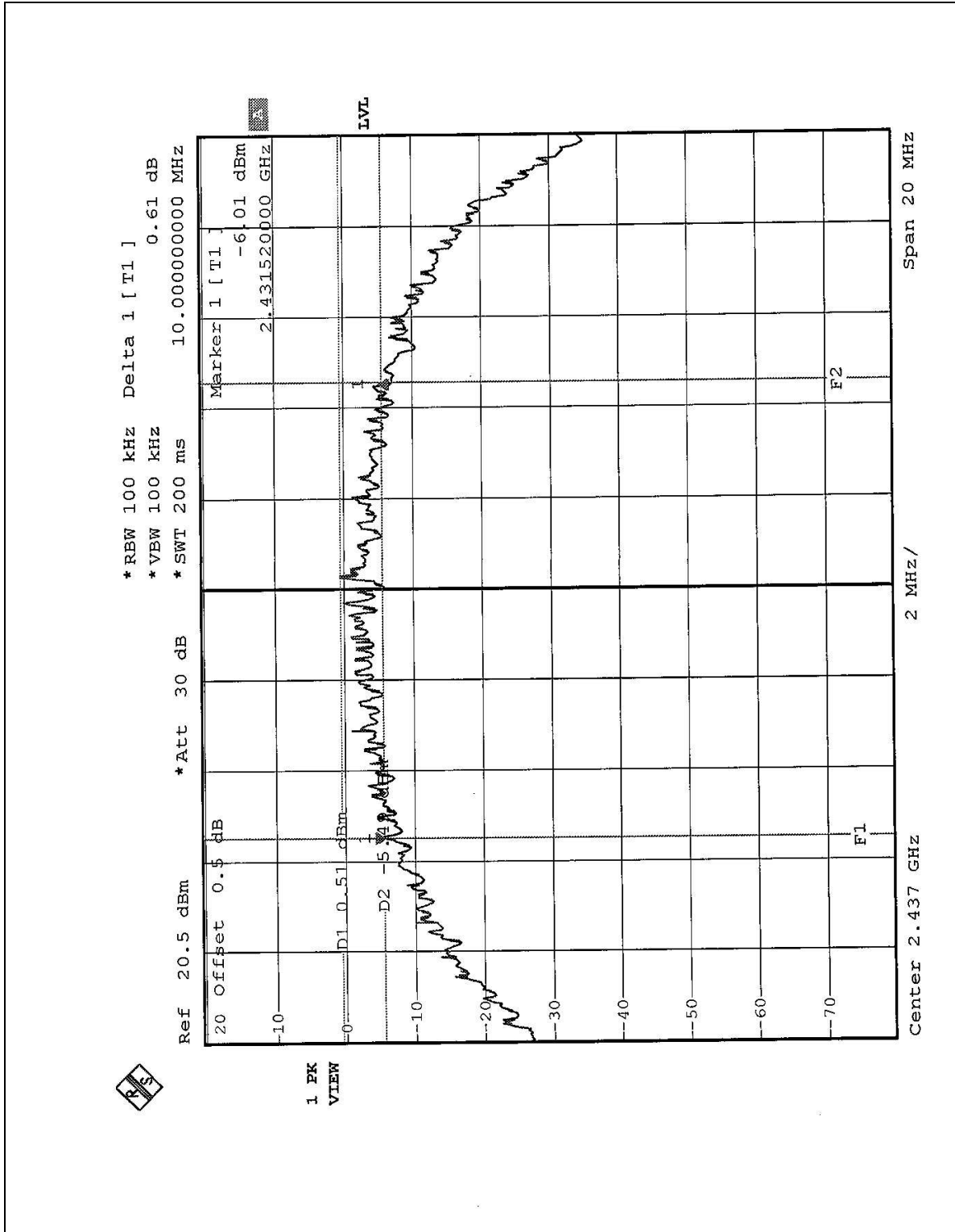


CH1



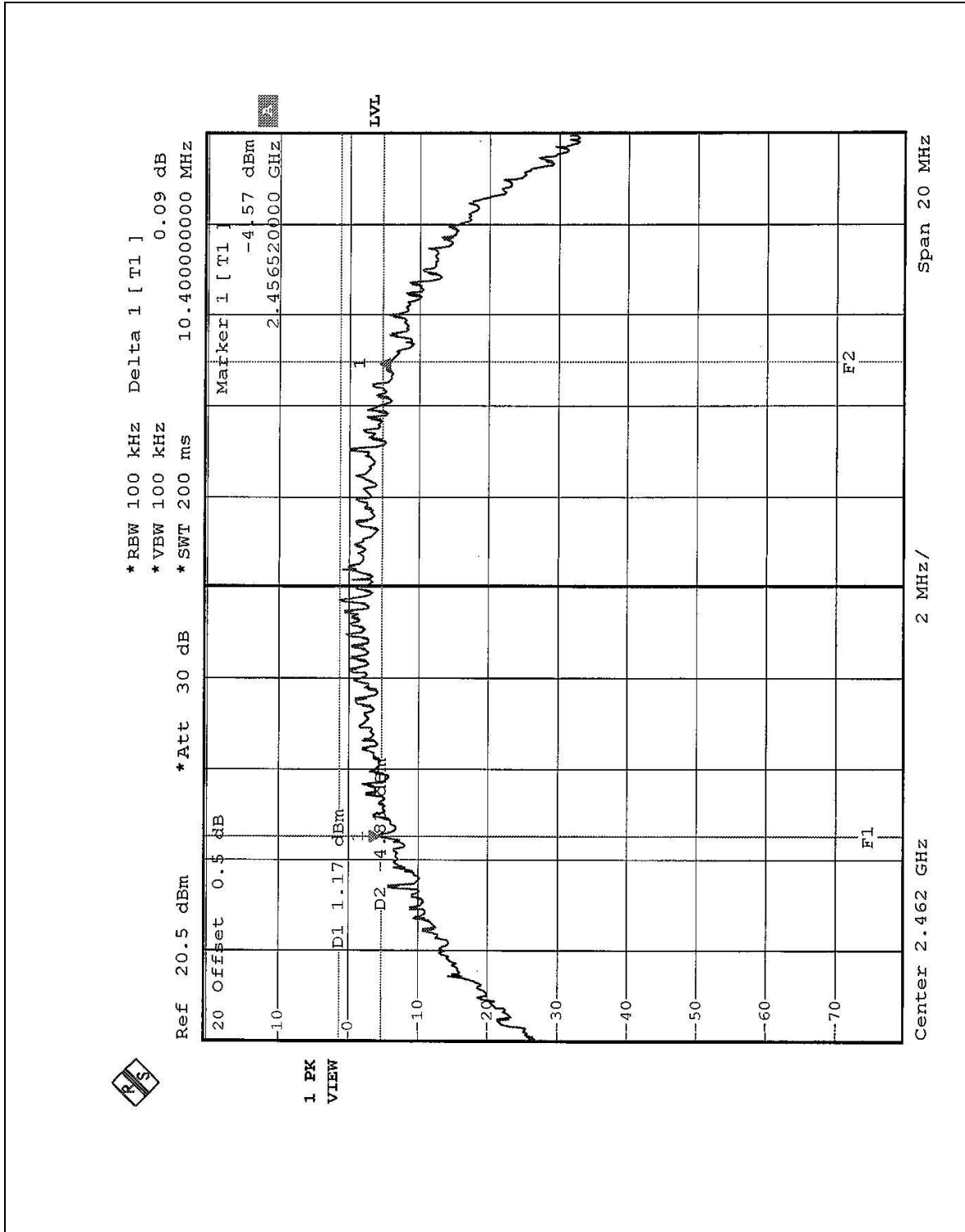


CH6





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
SINGLE CHANNEL POWER METER	NRVS	100026	Feb. 21, 2003
PEAK POWER SENSOR	NRV-Z32	100013	Feb. 21, 2003

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.

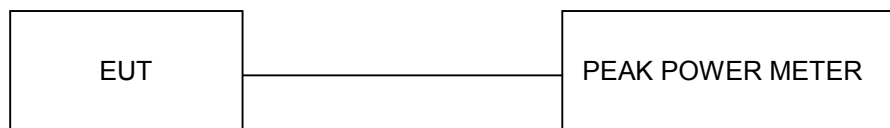
4.4.3 TEST PROCEDURES

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 RESULTS

EUT	Wireless Notebook Network Card	MODEL	F5D6020
INPUT POWER (SYSTEM)	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	26 deg. C, 62 %RH, 1005 hPa
TESTED BY: Steven Lu			

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER OUTPUT (dBm)	PEAK POWER LIMIT (dBm)	PASS/FAIL
1	2412	12.53	30	PASS
6	2437	12.52	30	PASS
11	2462	12.60	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:

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.

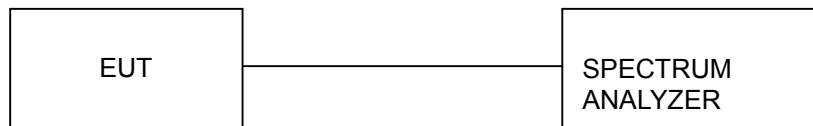
4.5.3 TEST PROCEDURE

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 DEVIATION FROM TEST STANDARD

No deviation

4.5.5 TEST SETUP



4.5.6 EUT OPERATING CONDITIONS

Same as 4.3.6



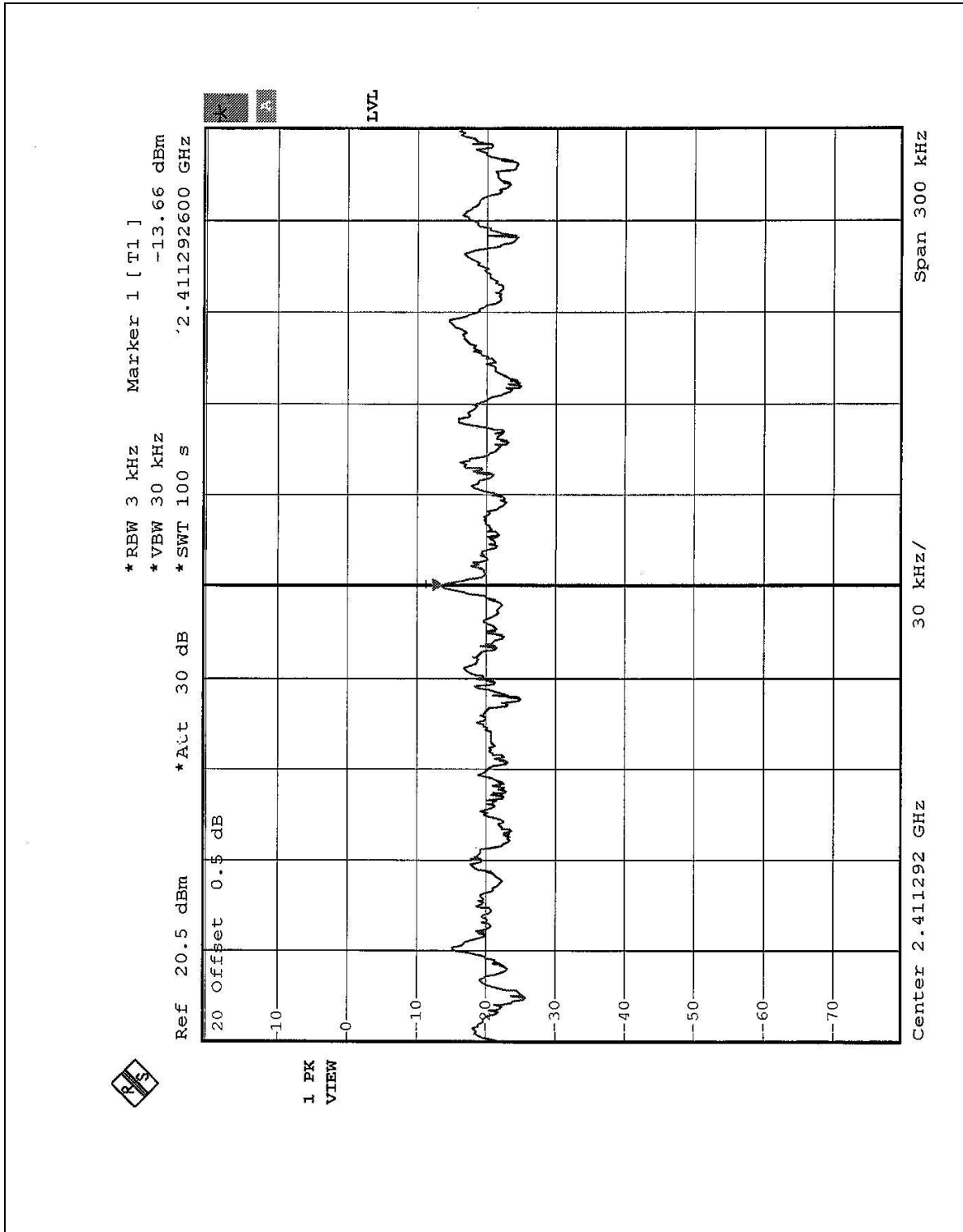
4.5.7 TEST RESULTS

EUT	Wireless Notebook Network Card	MODEL	F5D6020
INPUT POWER (SYSTEM)	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	26 deg. C, 62 %RH, 1005 hPa
TESTED BY: Steven Lu			

CHANNEL NUMBER	CHANNEL FREQUENCY (MHz)	RF POWER LEVEL IN 3 KHz BW (dBm)	MAXIMUM LIMIT (dBm)	PASS/FAIL
1	2412	-13.66	8	PASS
6	2437	-13.72	8	PASS
11	2462	-12.63	8	PASS

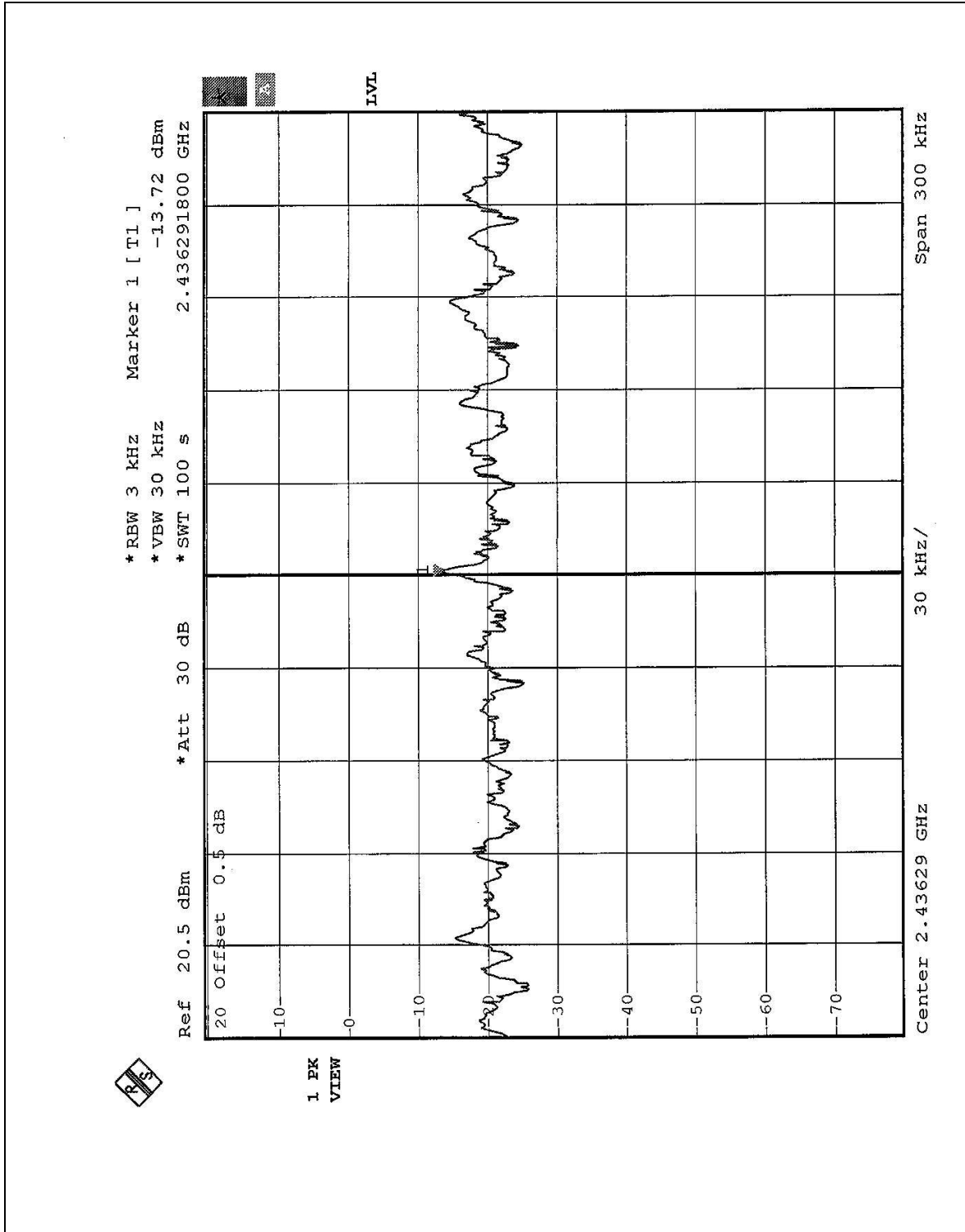


CH1



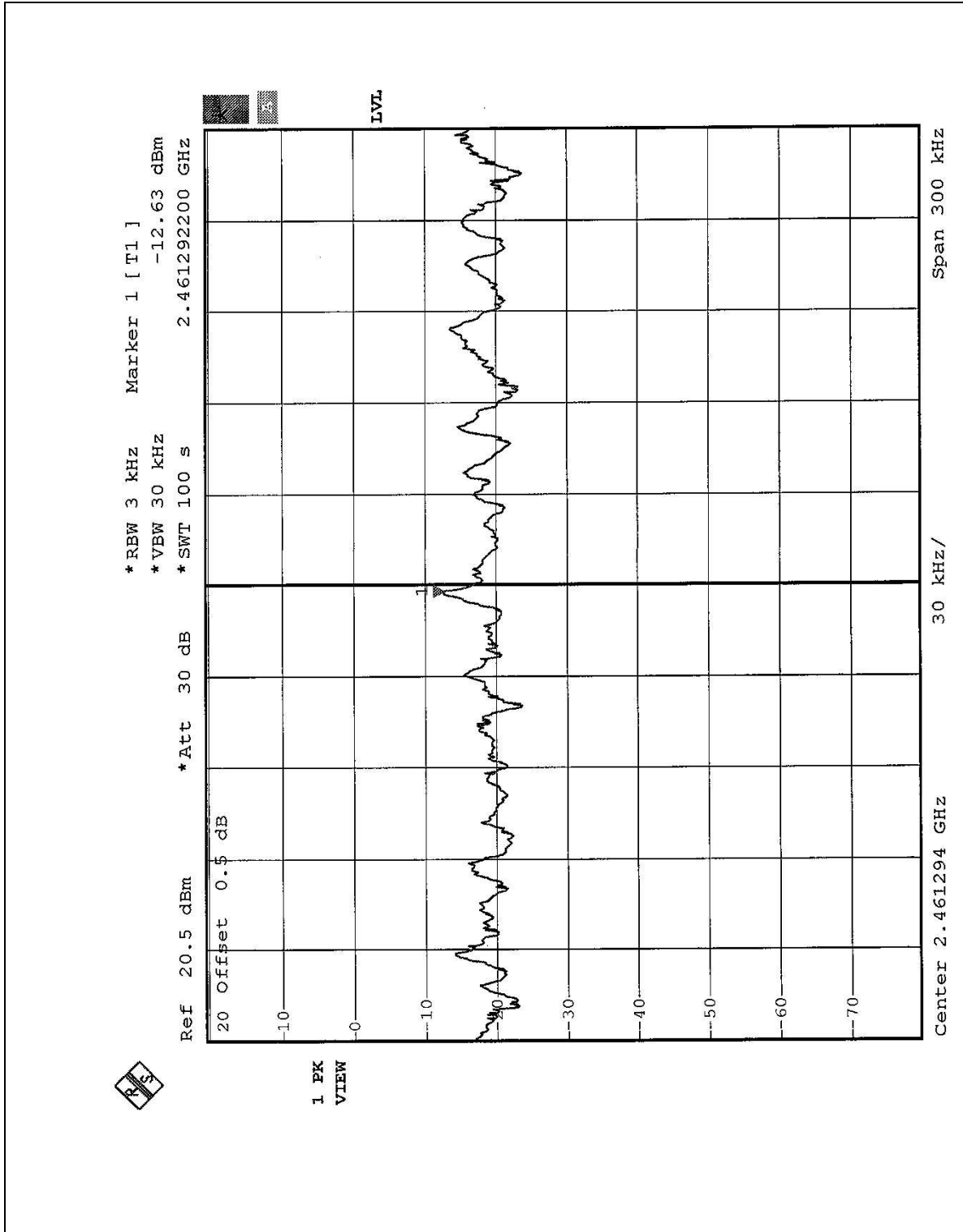


CH6





CH11





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:

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 4.3.6

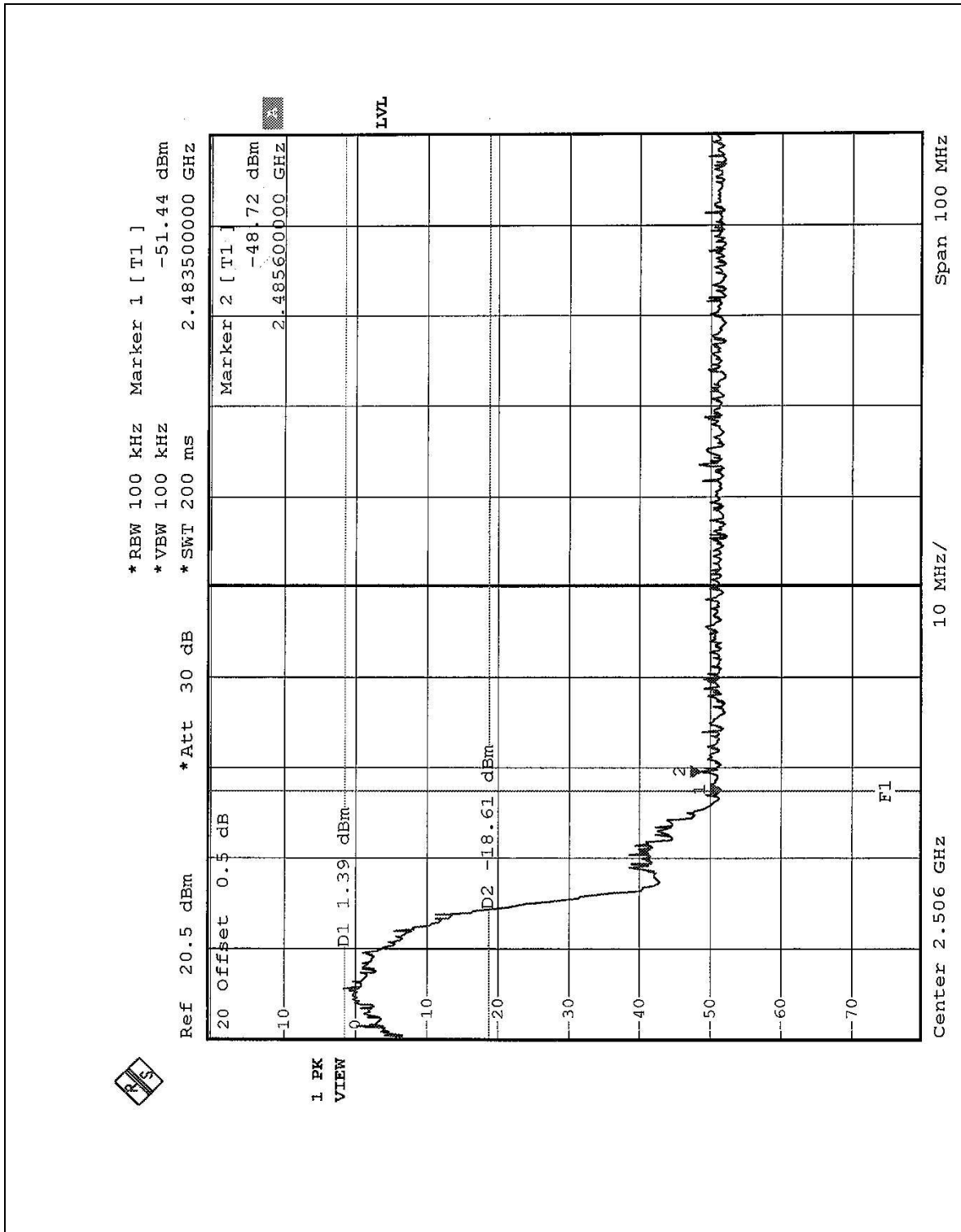
4.6.5 DEVIATION FROM TEST STANDARD

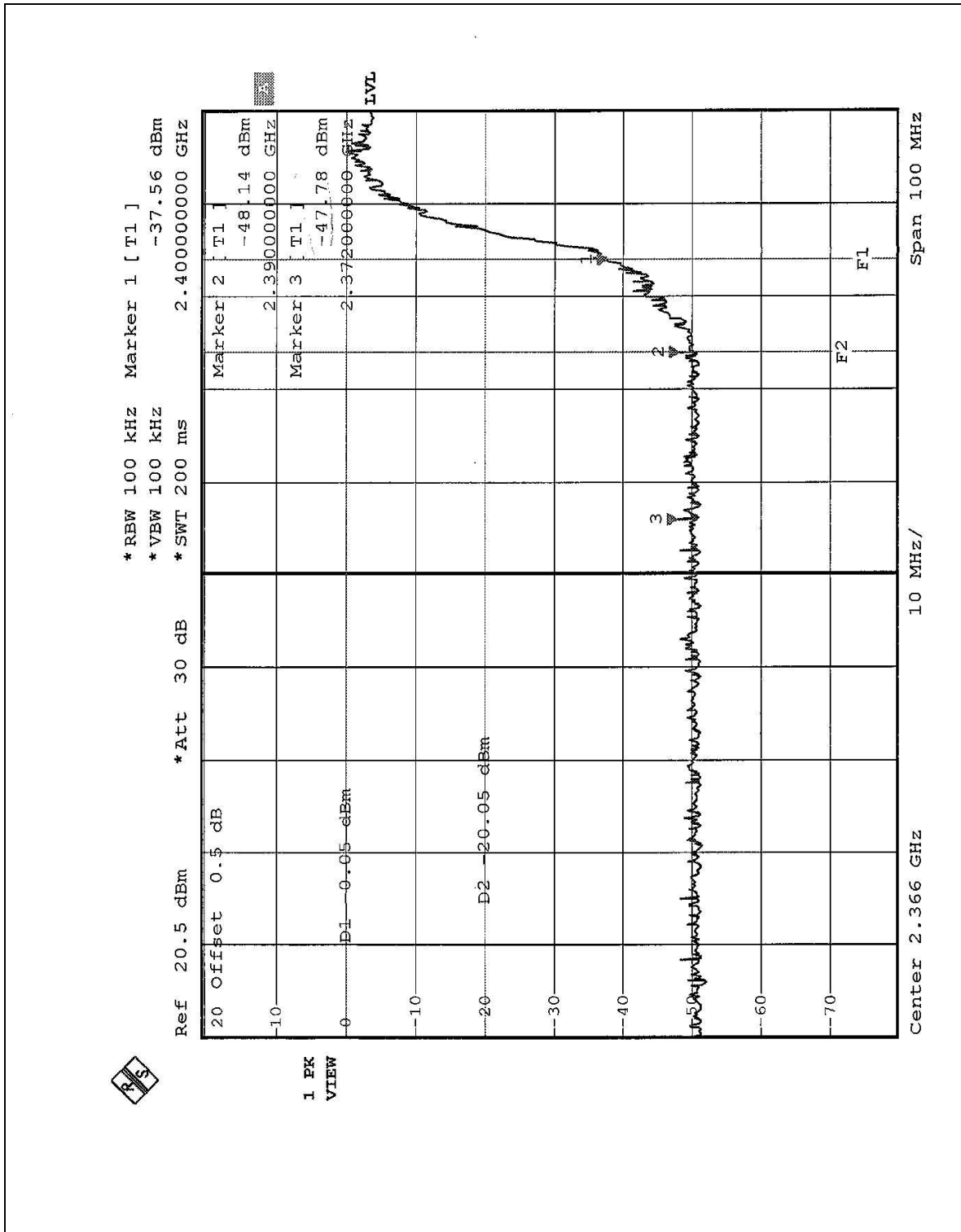
No deviation

4.6.6 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 50.11dB / 47.73dB delta between carrier maximum power and local maximum emission in restrict band (2.4856GHz / 2.3720GHz). The emission of carrier strength list in the test result of channel 11 at the item 4.2.7 (Page 26) is 92.5dBuV/m, so the maximum field strength in restrict band is $92.5 - 50.11 = 42.39$ 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

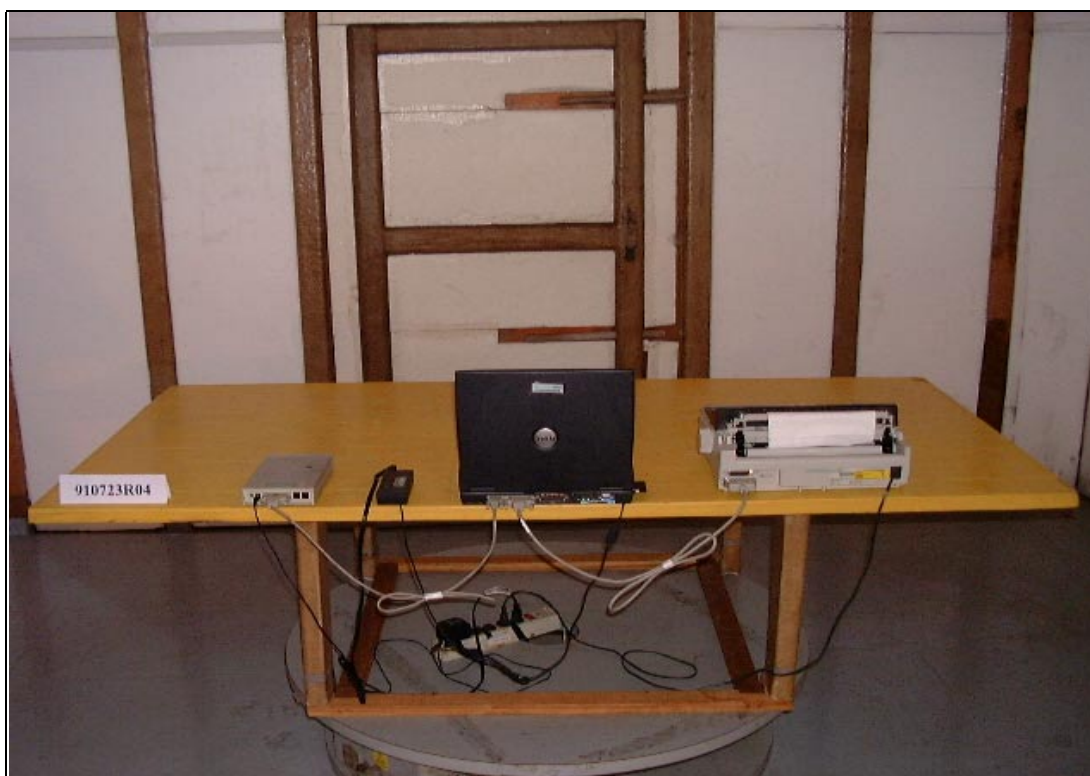
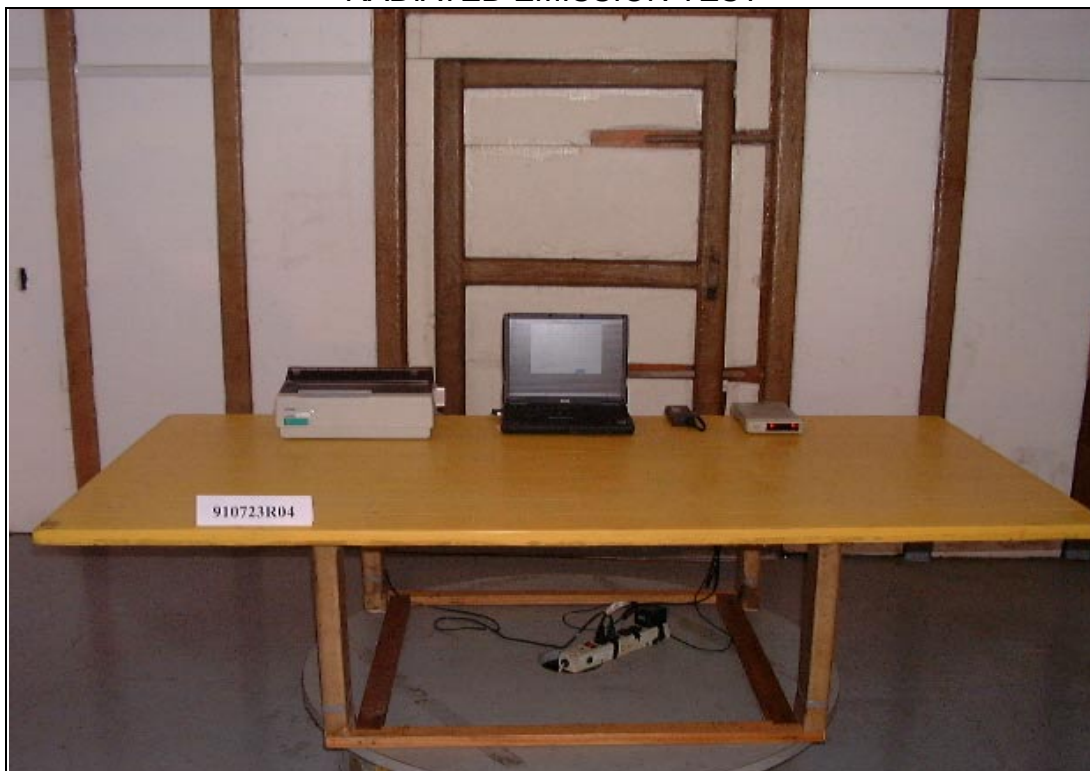
The antenna used in this product is Printed Antenna and no antenna connector. The maximum Gain of this antenna is -1dBi.

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.