



**Spectrum Research
& Testing Lab., Inc.**
No. 101-10, Ling 8,
Shan-Tong Li, Chung-Li
City, Taouyan, Taiwan,
R.O.C.

TEST REPORT

Reference No.:A02061306
Report No.:FCBA02061306
Page:1 of 14
Date:June 18, 2002

Product Name: Smart Wireless PCI Adapter 802.11b
Model Number: 95-20
Applicant: Madge Networks Ltd.
Wexham Springs, Framewood Road, Wexham, Slough, SL3
6PJ, UK
Date of Receipt: June 13, 2002
Finished date of Test: June 17, 2002
Applicable Standards: 47 CFR Part 15, Subpart B
ANSI C63.4:1992
ICES-003

We, **Spectrum Research & Testing Laboratory Inc.**, hereby certify that one sample of the above was tested in our laboratory with positive results according to the above-mentioned standards. The records in the report are an accurate account of the results. Details of the results are given in the subsequent pages of this report.

Tested By : Ken Su , Date: Jun. 18. 2002
(Ken Su)
Checked By : Spring Wang , Date: Jun. 18, 2002
(Spring Wang)
Approved By : Harris W. Lai , Date: June 18, 2002
(Harris W. Lai, Director)

NVLAQ[®]



TEST REPORT

Table of Contents

1. DOCUMENT POLICY AND TEST STATEMENT.....	3
1.1 DOCUMENT POLICY.....	3
1.2 TEST STATEMENT.....	3
2. DESCRIPTION OF EUT AND TEST MODE.....	4
2.1 GENERAL DESCRIPTION OF EUT.....	4
2.2 DESCRIPTION OF EUT INTERNAL DEVICE.....	4
2.3 DESCRIPTION OF TEST MODE.....	4
2.4 DESCRIPTION OF SUPPORT UNIT.....	5
3. DESCRIPTION OF APPLIED STANDARDS.....	6
4. CONDUCTED EMISSION TEST.....	6
4.1 CONDUCTED EMISSION LIMIT.....	6
4.2 TEST EQUIPMENT.....	6
4.3 TEST SETUP.....	7
4.4 TEST PROCEDURE.....	7
4.5 EUT OPERATING CONDITION.....	7
4.6 TEST RESULT.....	8
5. RADIATED EMISSION TEST.....	9
5.1 RADIATED EMISSION LIMIT.....	9
5.2 TEST EQUIPMENT.....	10
5.3 TEST SET-UP.....	11
5.4 TEST PROCEDURE.....	12
5.5 EUT OPERATING CONDITION.....	12
5.6 RADIATED EMISSION TEST RESULT.....	13
6. TERMS OF ABRIVATION.....	14

 Spectrum Research & Testing Lab., Inc. No. 101-10, Ling 8, Shan-Tong Li, Chung-Li City, Taoyuan, Taiwan	TEST REPORT	Reference No.:A02061306 Report No.:FCBA02061306 Page:3 of 14 Date:June 18, 2002
---	----------------------	--

1. DOCUMENT POLICY AND TEST STATEMENT

1.1 DOCUMENT POLICY

- The report shall not be reproduced except in full, without the written approval of SRT Lab, Inc.
- The report must not be used by the applicant to claim that the product is endorsed by NVLAP.
- The NVLAP logo applies only to the applicable standards specified in this report.

1.2 TEST STATEMENT

- The test results in the report apply only to the unit tested by SRT Lab.
- There was no deviation from the requirements of test standards during the test.
- AC power source, 120 Vac/60 Hz, was used during the test.

 Spectrum Research & Testing Lab., Inc. No. 101-10, Ling 8, Shan-Tong Li, Chung-Li City, Taoyuan, Taiwan	TEST REPORT	Reference No.:A02061306 Report No.:FCBA02061306 Page:4 of 14 Date:June 18, 2002
---	----------------------	--

2. DESCRIPTION OF EUT AND TEST MODE

2.1 GENERAL DESCRIPTION OF EUT

PRODUCT	Smart Wireless PCI Adapter 802.11b
MODEL NO.	95-20
POWER SUPPLY	DC 5V from PC
CABLE	N/A

NOTE: The EUT is a high-performance PCI-to-PC Card Adapter that supports one PC card socket complied with the 16-bit PC Card and 32-bit CardBus Card standard which is defined in 1997 PC Card Standard.

2.2 DESCRIPTION OF EUT INTERNAL DEVICE

DEVICE	BRAND / MAKER	MODEL #	REMARK
N/A			

2.3 DESCRIPTION OF TEST MODE

The worst emission was EUT full load and transmitter data to PC.

 Spectrum Research & Testing Lab., Inc. No. 101-10, Ling 8, Shan-Tong Li, Chung-Li City, Taoyuan, Taiwan	TEST REPORT	Reference No.:A02061306 Report No.:FCBA02061306 Page:5 of 14 Date:June 18, 2002
---	----------------------	--

2.4 DESCRIPTION OF SUPPORT UNIT

The EUT was configured by the requirement of ANSI C63.4 and CISPR 22. All interface ports were connected to the appropriate support units via specific cables. The support units and cables are listed below.

NO	DEVICE	BRAND	MODEL #	FCC ID / DOC	CABLE
1	PRINTER	EPSON	STYLUS C20SX	DOC	1.5m unshielded power cord 1.2m shielded data cable(S2)
2	MODEM	DATATRONICS	1200CK	E2050V1200CK	1.5m unshielded power cord 1.2m shielded data cable(S2)
3	MONITOR	SUNSUNG	PG17IS	DOC	1.8m unshielded power cord 1.2m shielded data cable(S2)
4	KEYBOARD	ACER	6311-TA	DOC	1.2m unshielded data cable
5	MOUSE	HP	M-S34	LZA7068626	1.2m unshielded data cable
6	PC	MSI	MS-6165	DOC	1.8m unshielded power cord

- NOTE**
1. For the actual test configuration, please refer to the photos of testing.
 2. Cable - S1 Single point shielding.
S2 360 shielding.
S3 Double point shielding

 Spectrum Research & Testing Lab., Inc. No. 101-10, Ling 8, Shan-Tong Li, Chung-Li City, Taoyuan, Taiwan	TEST REPORT	Reference No.:A02061306 Report No.:FCBA02061306 Page:6 of 14 Date:June 18, 2002
---	----------------------	--

3. DESCRIPTION OF APPLIED STANDARDS

The EUT is a kind of ITE and according to the specifications provided by the client, it must comply with the requirements of the following standards:

47 CFR Part 15 Subpart B or CISPR 22:1997 or ICES-003

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

4. CONDUCTED EMISSION TEST

4.1 CONDUCTED EMISSION LIMIT

FREQUENCY (MHz)	Class A (dBuV)	Class B (dBuV)
	Quasi-peak	Quasi-peak
0.45 - 1.705	60.0	48.0
1.705 - 30	69.5	48.0

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.

4.2 TEST EQUIPMENT

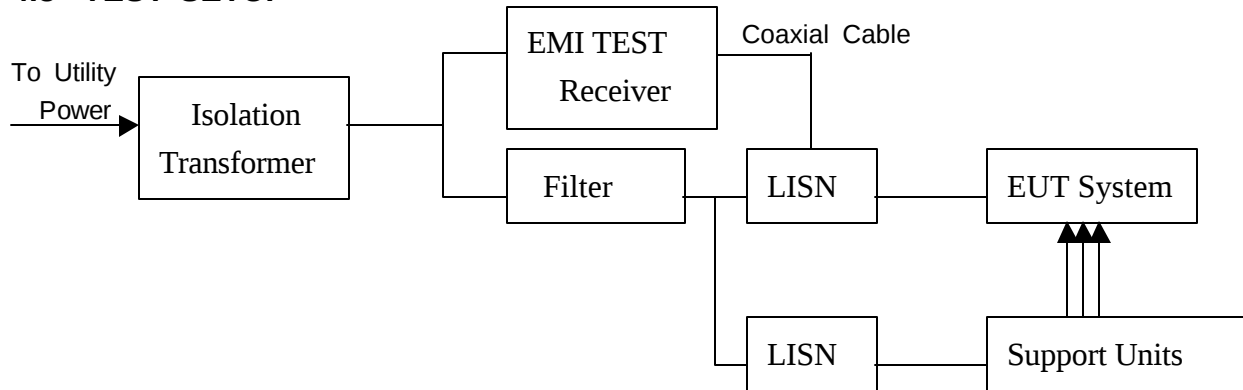
The following test equipment was used for the test:

EQUIPMENT/ FACILITIES	SPECIFICATIONS	MANUFACTURER	MODEL#/ SERIAL#	DUE DATE OF CAL. & CAL. CENTER
EMI TEST RECEIVER	9 KHz TO 2750 MHz	ROHDE & SCHWARZ	ESCS30/ 830245/012	JULY 2002 ETC
LISN	50 uH, 50 ohm	SOLAR ELECTRONICS	9252-50- R-24-BNC/ 951315	JULY 2002 ETC
LISN	50uH, 50 ohm	SOLAR ELECTRONICS	9252-50- R-24-BNC/ 951318	JUNE 2002 ETC

NOTE: The calibration interval of the above test equipment is one year and the calibrations are traceable to NML/ROC and NIST/USA.



4.3 TEST SETUP



NOTE :

1. The EUT was put on a wooden table with 0.8m height above ground plane, and 0.4m away from reference ground plane (> 2m*2m)
2. For the actual test configuration, please refer to the photos of testing.

4.4 TEST PROCEDURE

The EUT was tested according to the requirement of ANSI C63.4 and CISPR 22. The frequency spectrum from 0.45 MHz to 30 MHz was investigated. The LISN used was 50 ohm/50uH as specified. All readings were quasi-peak values with 10 kHz resolution bandwidth of the test receiver. The EUT system was operated in all typical methods by users. Both lines of the power mains of EUT were measured and the cables connected to EUT and support units were moved to find the maximum emission levels for each frequency.

4.5 EUT OPERATING CONDITION

1. Under WIN ME run "EMI TEST" program.
PC sent "H" pattern or accessed the following peripherals
 - Color Monitor or VGA
 - RS232 (modem)
 - Keyboard
 - Printer
 - FDD
 - HDD
2. Under WIN ME run "XCOPY" program.

 Spectrum Research & Testing Lab., Inc. No. 101-10, Ling 8, Shan-Tong Li, Chung-Li City, Taoyuan, Taiwan	TEST REPORT	Reference No.:A02061306 Report No.:FCBA02061306 Page:8 of 14 Date:June 18, 2002
---	----------------------	--

4.6 TEST RESULT

Temperature:	23 Deg.C	Humidity:	52 %RH
Ferquency Range:	0.45 – 30 MHz	Test Mode:	N/A
Detector:	Q.P.	Tested By:	Ken Su

Power Line Measured : Line 1

Frequency [MHz]	Correct. Factor (dB)	Reading Value	Emission Level	Limit	Margin
		[dB (uV)]	[dB (uV)]	[dB (uV)]	(dB)
		Q.P.	Q.P.	Q.P.	Q.P.
0.583	0.20	34.5	34.7	48.0	-13.3
0.973	0.20	36.2	36.4	48.0	-11.6
1.442	0.20	36.1	36.3	48.0	-11.7
5.770	0.33	28.9	29.2	48.0	-18.8
9.040	0.38	36.2	36.6	48.0	-11.4
10.579	0.41	35.5	35.9	48.0	-12.1

Power Line Measured : Neutral

Frequency [MHz]	Correct. Factor (dB)	Reading Value	Emission Level	Limit	Margin
		[dB (uV)]	[dB (uV)]	[dB (uV)]	(dB)
		Q.P.	Q.P.	Q.P.	Q.P.
0.587	0.20	34.7	34.9	48.0	-13.1
0.977	0.20	36.3	36.5	48.0	-11.5
1.446	0.20	35.7	35.9	48.0	-12.1
2.309	0.20	30.0	30.2	48.0	-17.8
10.489	0.41	35.4	35.8	48.0	-12.2
10.583	0.41	34.9	35.3	48.0	-12.7

- NOTE :**
1. Measurement uncertainty is less than +/- 2dB
 2. Emission level = Reading value + Correction factor
 3. Correction Factor = Cable loss + Insertion loss of LISN
 4. "": Measurement does not apply for this frequency.
 5. Margin value = Emission level - Limit
 6. The emission of other frequencies were very low against the limit.

 Spectrum Research & Testing Lab., Inc. No. 101-10, Ling 8, Shan-Tong Li, Chung-Li City, Taoyuan, Taiwan	TEST REPORT	Reference No.:A02061306 Report No.:FCBA02061306 Page:9 of 14 Date:June 18, 2002
---	----------------------	--

5. RADIATED EMISSION TEST

5.1 RADIATED EMISSION LIMIT

CISPR 22 limits of radiated emission measurement for frequency below 1000 MHz

FREQUENCY (MHz)	Class A (at 10m)	Class B (at 10m)
	dBuV/m	dBuV/m
30 – 230	40	30
230 - 1000	47	37

NOTE: 1. The lower limit shall apply at the transition frequencies.
 2. Emission level (dBuV/m) = 20 log Emission level (uV/m).

FCC Part 15, Subpart B limit of radiated emission for frequency above 1000 MHz

FREQUENCY (MHz)	Class A (dBuV/m) (at 3m)		Class B (dBuV/m) (at 3m)	
	PEAK	AVERAGE	PEAK	AVERAGE
Above 1000	80.0	60.0	74.0	54.0

 Spectrum Research & Testing Lab., Inc. No. 101-10, Ling 8, Shan-Tong Li, Chung-Li City, Taouyan, Taiwan	TEST REPORT	Reference No.:A02061306 Report No.:FCBA02061306 Page:10 of 14 Date:June 18, 2002
---	----------------------	---

5.2 TEST EQUIPMENT

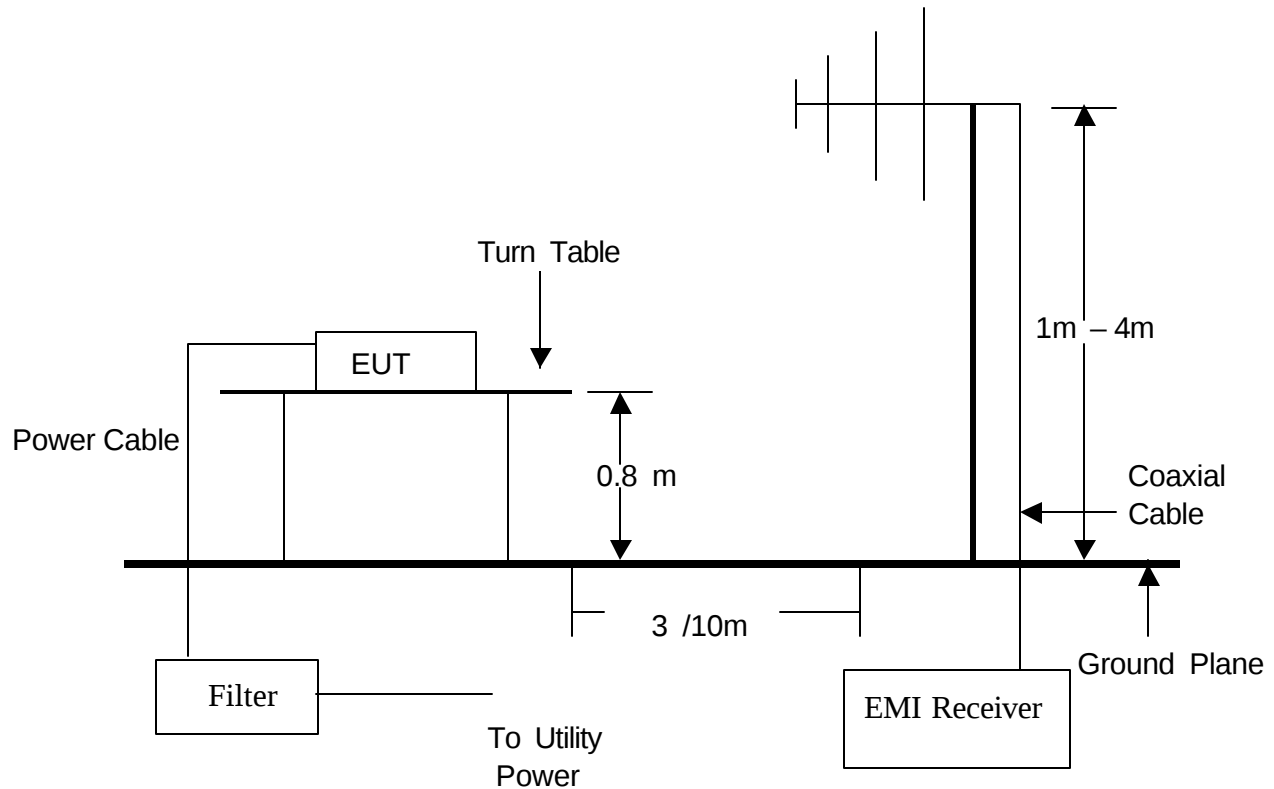
The following test equipment was used during the radiated emission test

EQUIPMENT/ FACILITIES	SPECIFICATIONS	MANUFACTURER	MODEL#/ SERIAL#	DUE DATE OF CAL. & CAL. CENTER
TEST RECEIVER	20 MHz TO 1000 MHz	ROHDE & SCHWARZ	ESVS30/ 841977/003	JUNE 2002 ETC
SPECTRUM ANALYZER	9 kHz TO 22 GHz	HP	8593E/ 3322A00670	FEB. 2003 ITRI
DIPOLE ANTENNA	28 MHz TO 1000 MHz	EMCO	3121C/ 9611-1239	FEB. 2003 SRT
BI-LOG ANTENNA	30 MHz TO 2 GHz	SCHAFFNER- CHASE	CBL6141A/ 4181	JULY 2002 ETC
RE-AMPLIFIER	0.1 MHz TO 1300 MHz	HP	8447D/ 2944A08402	MARCH 2003 SRT
HORN ANTENNA	1 GHz TO 18 GHz	EMCO	3115/ 9012-3619	JAN. 2003 ETC
OATS	3 - 10 M measurement	SRT	SRT-1	JUNE 2003

NOTE: The calibration interval of the above test equipment is one year and the calibrations are traceable to NML/ROC and NIST/USA.



5.3 TEST SET-UP



NOTE :

1. The EUT system was put on a wooden table with 0.8m height above a ground plane.
2. For the actual test configuration, please refer to the photos of testing.

 Spectrum Research & Testing Lab., Inc. No. 101-10, Ling 8, Shan-Tong Li, Chung-Li City, Taouyan, Taiwan	TEST REPORT	Reference No.:A02061306 Report No.:FCBA02061306 Page:12 of 14 Date:June 18, 2002
---	----------------------	---

5.4 TEST PROCEDURE

The EUT was tested according to the requirement of ANSI C63.4 and CISPR 22. The measurements were made at an open area test site with 10 meter measurement distance under 1 GHz and with 3m distance above 1GHz. The frequency spectrum measured started from 30 MHz. Under 1 GHz. All readings were quasi-peak values with 120 kHz resolution bandwidth of the test receiver. Above 1 GHz, the measurements were made at an open area test site with 3 meter measurement distance and all readings were peak or average values with 1 MHz resolution bandwidth of the test receiver. The EUT system was operated in all typical methods by users. The cables connected to EUT and support units were moved to find the maximum emission levels for each frequency.

5.5 EUT OPERATING CONDITION

Same as section 4.5 of this report.



TEST REPORT

5.6 RADIATED EMISSION TEST RESULT

Temperature: 23 Deg.C Humidity: 52 %RH
Ferquency Range: 30 – 1000 MHz Test Mode: N/A
Detector: Q.P. and AV. Tested By: Ken Su

Antenna Polarization:Horizontal

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB)	Reading Data (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	EL (m)	AZ(°)
145.222	1.8	12.4	11.2	25.4	30.0	-4.6	1.5	12.0
154.339	1.8	13.0	9.5	24.3	30.0	-5.7	1.3	113.0
163.069	1.9	11.4	12.9	26.2	30.0	-3.8	1.4	52.0
179.361	2.1	10.1	13.5	25.7	30.0	-4.3	1.5	348.0
187.090	2.2	9.8	11.9	23.9	30.0	-6.2	1.4	61.0
195.717	2.2	9.8	13.2	25.2	30.0	-4.9	1.4	198.0

Antenna Polarization:Vertical

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB)	Reading Data (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	EL (m)	AZ(°)
67.289	1.2	8.5	12.5	22.2	30.0	-7.9	1.3	27.0
145.222	1.8	12.4	10.1	24.3	30.0	-5.7	1.2	15.0
167.938	1.9	10.9	12.7	25.5	30.0	-4.6	1.1	55.0
195.717	2.2	9.8	11.5	23.5	30.0	-6.6	1.2	200.0
212.638	2.2	10.2	11.7	24.1	30.0	-5.9	1.2	346.0
500.360	3.2	17.4	10.1	30.7	37.0	-6.3	1.3	89.0

- NOTE :** 1. Measurement uncertainty is less than +/- 4dB
2. "": Measurement does not apply for this frequency.
3. Emission Level = Reading Value + Ant. Factor + Cable Loss
4. The field strength of other emission frequencies were very low against the limit.

 Spectrum Research & Testing Lab., Inc. No. 101-10, Ling 8, Shan-Tong Li, Chung-Li City, Taoyuan, Taiwan	TEST REPORT	Reference No.:A02061306 Report No.:FCBA02061306 Page:14 of 14 Date:June 18, 2002
---	----------------------	---

6. TERMS OF ABRIVATION

AV.	Average detection
AZ(°)	Turn table azimuth
Correct.	Correction
EL(m)	Antenna height (meter)
EUT	Equipment Under Test
Horiz.	Horizontal direction
LISN	Line Impedance Stabilization Network
Q.P.	Quasi-peak detection
SRT Lab	Spectrum Research & Testing Laboratory, Inc.
Vert.	Vertical direction