

# RFI / EMI TEST REPORT

**APPLICANT** : BENQ CORPORATION

**E U T Type** : Wireless LAN Access Point

**MODEL NO.** : AWL500

**FCC ID** : JVPAWL500

**REGULATION** : CFR 47 , Part 15 Subpart C , **Class B**

**TEST SITE** : PEP Testing Laboratory

**TEST ENGINEER** : JOHSON CHANG

**TEST DATE** : 2002-04-02

**ISSUED DATE** : MAY 09, 2002

**REPORT NO.** : E910157

**VERIFICATION****WE HEREBY VERIFY THAT:**

The EUT listed below has completed RFI testing by PEP Testing Laboratory and it does comply with the limitation of FCC Part 15, Section 15.247 limitations .

The tested configurations and the facility complies with the radiated and AC line conducted test site criteria in ANSI C63 .4 - 1992 .

Any data in this RFI report is “ **reference** “ only .

**APPLICANT** : **BENQ CORPORATION \***  
**PRODUCT** : **Wireless LAN Access Point \***  
**FCC ID** : **JVPAWL500 \***  
**MODEL** : **AWL500\***



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M. Y. TSUI / President

**PEP Testing Laboratory**

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FCC ID : JVPAWL500

## I. General Information

The EUT is Wireless LAN Access Point, FCC ID: JVPAWL500, Model AWL500. The EUT that contains one RJ-45 port can be used with relevant wireless networking devices that can allow users to access LAN wirelessly or share xDSL/Cable modem. The operating fundamental frequency is 2412.0~2463.4MHz. We tested channel 1, channel 6 and channel 11 which is controlled by applicant's software: RFTTEST program. Power provided to EUT is DC 5V by adaptor. For more detail information about the EUT, please refer to the user's manual.

### 1.1 Description of EUT

**EUT Type** : Wireless LAN Access Point  
**FCC ID** : JVPAWL500  
**EUT Model No.** : AWL500

**Frequency Range** : 2412.0 – 2463.4 MHz  
**Support Channel** : 11 channels  
**Modulation** : CCK  
**Antenna Type** : Comply with FCC Part 15, Section 15.203;  
 Build-in PCB trace type, can't be removed by the user

**Power Supply** : 1) Manufacturer : HJC  
 Model No. : HAPU01F  
 Input : AC 100~240V, 0.5A  
 Output : DC 5V, 2.5A  
 2) Manufacturer : HJC  
 Model No. : HAPU01B  
 Input : AC 100~240V, 0.5A  
 Output : DC 5V, 2A  
 3) Manufacturer : HJC  
 Model No. : PSA-0151A-05A  
 Input : AC 100~240V, 0.5A  
 Output : DC 5V, 2A

**Power Cord** : N/A

## 1.2 Supporting Devices for EUT testing

FCC ID : JVPAWL500

No	Subject	MFR.	Model	FCC ID	Serial No.	I/P Rating	Power Cord	Data Cable
1	PC	AsusInc	P2-99	DoC	N/A	115V 2A	Non-shielded	N/A
2	Monitor	SAMSUNG	550S	E5XKB	DP15H8WKB 10383B	AC100-2 40V 1.2A	Non-Shielded	Shielded, 1.2m Non- detachable
3	Keyboard	BTC	5121W	5121WTH 0110	H02608899	DC+5V 170mA	N/A	Shielded, 1.6m Non- detachable
4	Printer	HP	C2642E	B94C2642X	TH926185HY	120V 0.22A	Non-Shielded	Shielded, 1.2m Non- detachable
5	Modem	ACEEX	1414	IFAXDM 1414	9038526	120V 12W	Non-Shielded	Shielded, 1m Non- detachable
6	Mouse	Logitech	M-S43	DZL211106	LEE02553536	DC+5V 2.5mA	N/A	Shielded, 1.8m Non- detachable
7	Lan Card	D-Link	DFE-530TX	N/A	N/A	N/A	N/A	N/A
8	Wireless Lan Card	BENQ	N/A	N/A	N/A	N/A	N/A	N/A

## 1.3 EUT Test Setup Configuration

- A) Test Procedure: As required by ANSI C63.4 (1992)
- B) Channel Verification: In order to force selection of the typical channels for testing, one RJ-45 cable was connected between the EUT and control PC through RJ-45 interface and using the driver "RFTEST.exe", supplied from BenQ, under Win98 to force the channel selection by control PC, then set the EUT in high power and continuously transmitting mode for detecting the operating frequency, the test result for 11 channels is operating within 2038-2110 MHz band.
- C) Measurement Procedure: As required by FCC Part15, Section 15.31(m) measurements on intentional radiators or receiver should be performed at three frequencies for operating frequency over 10MHz, one near top, one near middle and one near bottom.
- D) Test Channel: Due to the support channels are 11 channels, the selected three frequencies for testing would be 2.4106GHz near top for CH 1, 2.4382GHz near middle for CH 6 and 2.4634GHz near bottom for CH 11.

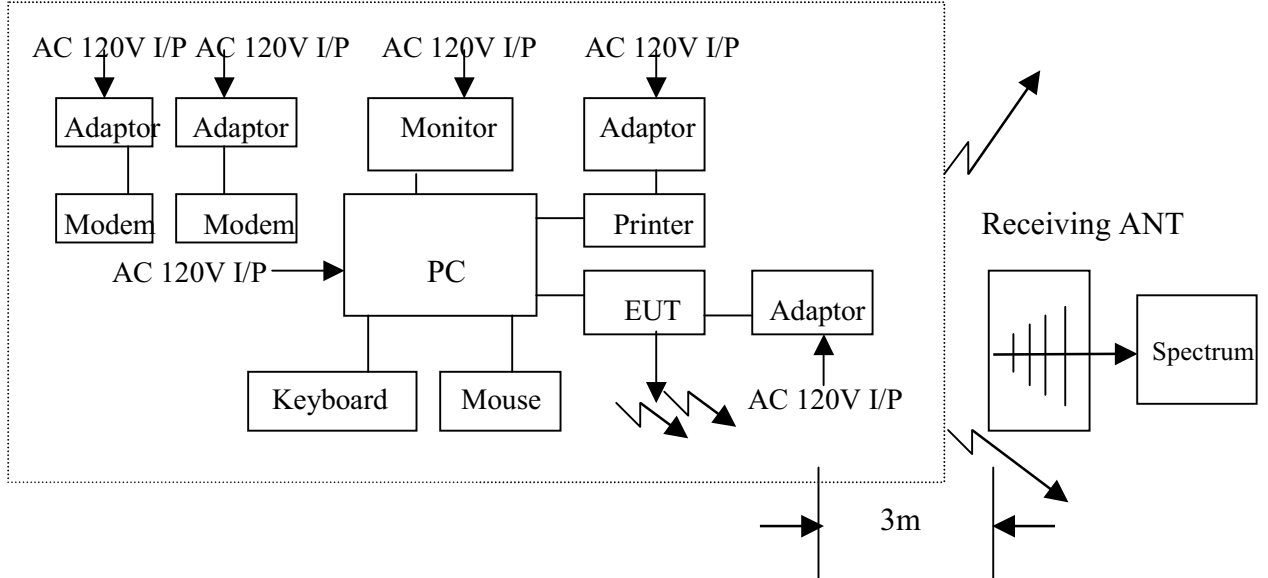
(E) At the frequencies where the peak values of the emission exceeded the quasi-peak limit, the emissions were also measured with the quasi-peak detectors. The average detector also measured the emission either (a) quasi-peak values were under quasi-peak limit but exceeded average limit, or (b) peak values were under quasi-peak limit but exceeded average limit.

(F) In this RFI test report, we provided the worst case conducted emission test data and radiated emission test data. The entire testing data was recorded and provided in this report.

### 1.4 Channels Verification

FCC ID : JVPAWL500

Charging Mode



**Frequency Range : 2.4120 GHz to 2.4634 GHz**

Channel Number	Frequency (GHz)	Channel Number	Frequency (GHz)
1	2.4120	11	2.4634
2	2.4184		
3	2.4234		
4	2.4242		
5	2.4334		
6	2.4382		
7	2.4432		
8	2.4484		
9	2.4492		
10	2.4584		

Note :

- All channels located in the frequency range as below :

2.4 GHz --- 2.4835 GHz  Yes  No

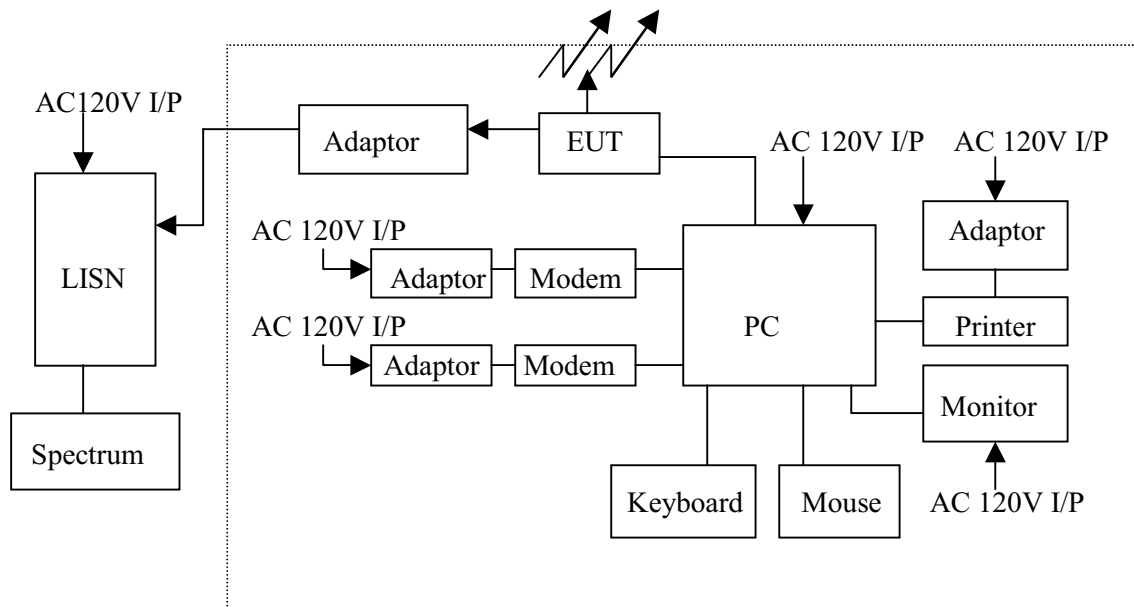
Typical Channel for testing :

Channel	Channel Number	Frequency (GHz)
Top	1	2.4120
Middle	6	2.4382
Bottom	11	2.4634

## II . Power Line Conducted Emission Test

FCC ID : JVPAWL500

### 2.1 Testing Description



### 2.2 Software Using

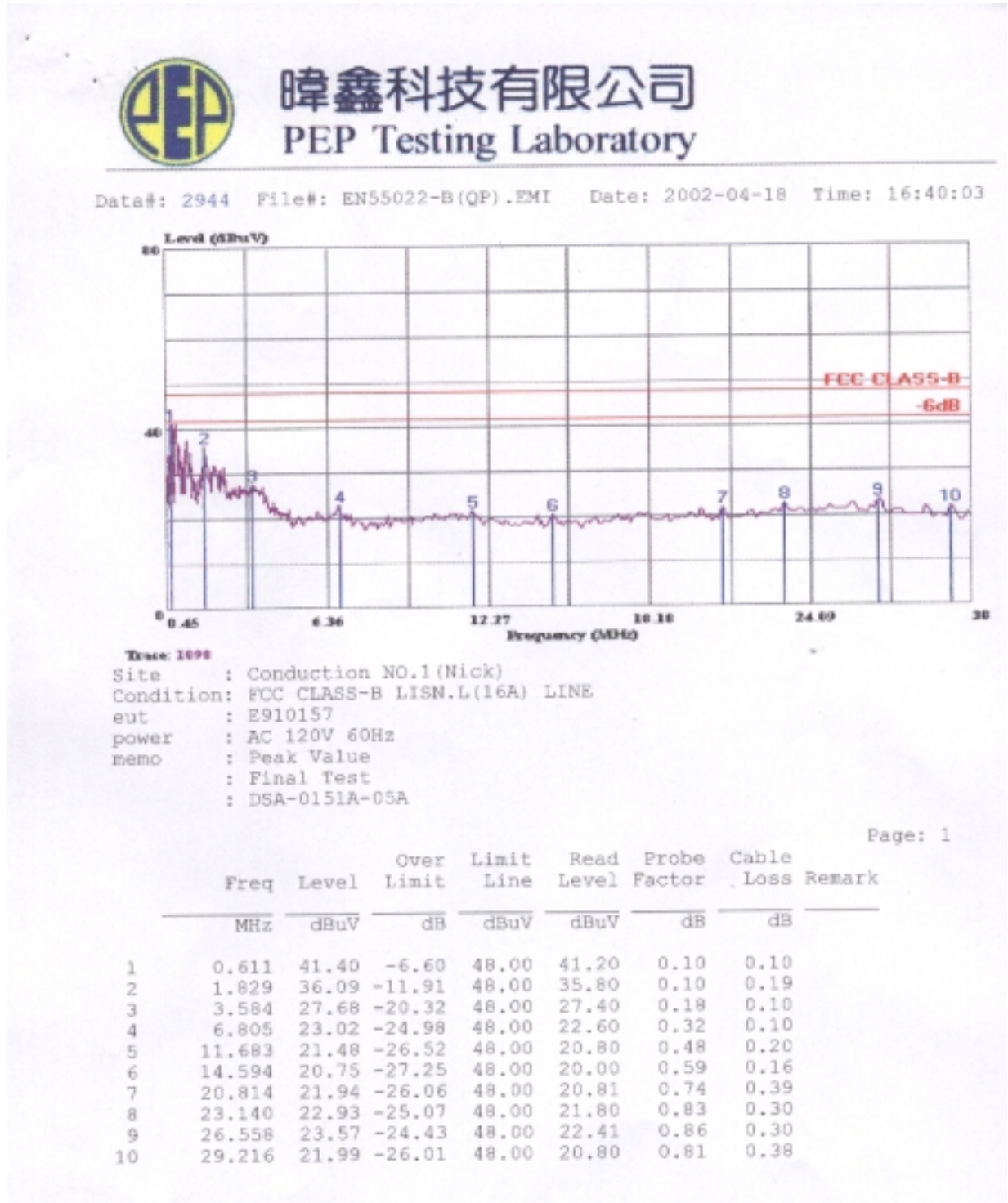
The EUT was assembled on a wooden table which is 80cm in height, and placed 40cm from the back-wall.

It was scanned from 450KHz to 30MHz during signals transmitting shown above. The physical arrangement of the EUT System was varied to get the worst case.



2.3 Test Result

FCC ID : JVPAWL500  
 EUT Model No. AWL500 (LINE)  
 Memo : HAS-0151A-05A



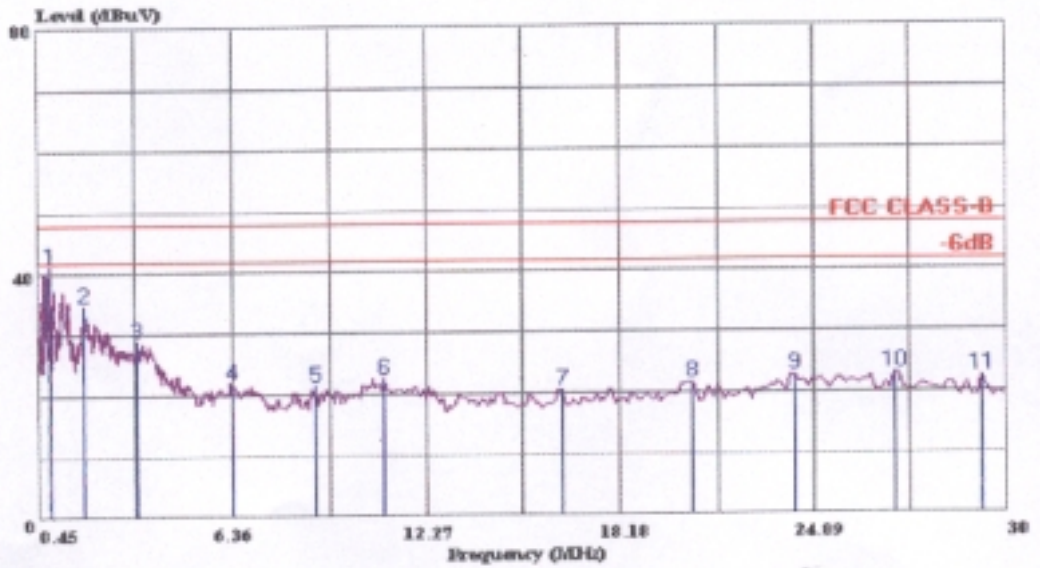
EUT Model No.: AWL500 (NEUTRAL)

Memo : HAS-0151A-05A



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PEP Testing Laboratory

Data#: 2948 File#: EN55022-B(QP).EMI Date: 2002-04-18 Time: 16:49:26



Trace: 1093  
 Site : Conduction NO.1(Nick)  
 Condition: FCC CLASS-B LISN.N(16A) NEUTRAL  
 eut : E910157  
 power : AC 120V 60Hz  
 memo : Peak Value  
 : Final Test  
 : DSA-0151A-05A

Page: 1

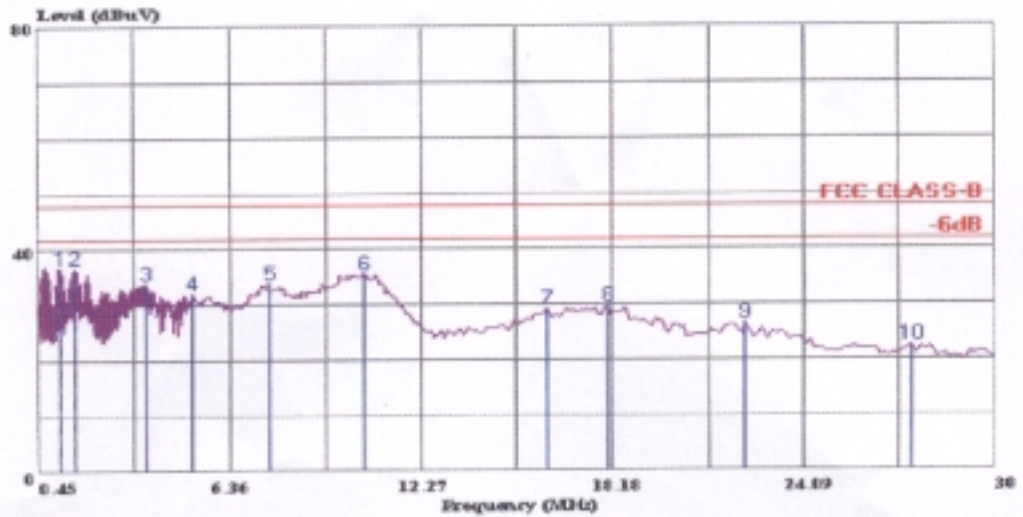
	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.751	41.20	-6.80	48.00	41.00	0.10	0.10	
2	1.829	34.69	-13.31	48.00	34.40	0.10	0.19	
3	3.436	28.88	-19.12	48.00	28.68	0.10	0.10	
4	6.352	22.00	-26.00	48.00	21.70	0.20	0.10	
5	8.916	21.48	-26.52	48.00	21.11	0.27	0.10	
6	10.963	22.65	-25.35	48.00	22.13	0.32	0.20	
7	16.398	20.73	-27.27	48.00	20.00	0.43	0.30	
8	20.377	21.69	-26.31	48.00	20.81	0.51	0.37	
9	23.511	22.95	-25.05	48.00	22.08	0.57	0.30	
10	26.558	23.17	-24.83	48.00	22.31	0.56	0.30	
11	29.216	22.79	-25.21	48.00	21.90	0.51	0.38	

FCC ID : JVPAWL500  
 EUT Model No. AWL500 (LINE)  
 Memo : HAPU01F



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Data#: 2942 File#: EN55022-B(QP).EMI Date: 2002-04-18 Time: 16:37:25



Trace: 1000  
 Site : Conduction NO.1(Nick)  
 Condition: FCC CLASS-B LISN.L(16A) LINE  
 eut : E910157  
 power : AC 120V 60Hz  
 memo : Peak Value  
 : Final Test  
 : HAPU01F

Page: 1

	Freq	Level	Over	Limit	Read	Probe	Cable	
	MHz	dBuV	Limit	Line	Level	Factor	Loss	Remark
			dB	dBuV	dBuV	dB	dB	
1	1.117	36.82	-11.18	48.00	36.61	0.10	0.11	
2	1.552	36.66	-11.34	48.00	36.40	0.10	0.16	
3	3.740	33.89	-14.11	48.00	33.60	0.19	0.10	
4	5.194	32.16	-15.84	48.00	31.80	0.26	0.10	
5	7.566	33.84	-14.16	48.00	33.40	0.34	0.10	
6	10.508	35.42	-12.58	48.00	34.80	0.42	0.20	
7	16.140	29.13	-18.87	48.00	28.20	0.63	0.30	
8	18.039	29.76	-18.24	48.00	28.79	0.67	0.30	
9	22.298	26.53	-21.47	48.00	25.40	0.80	0.33	
10	27.416	22.56	-25.44	48.00	21.39	0.85	0.32	

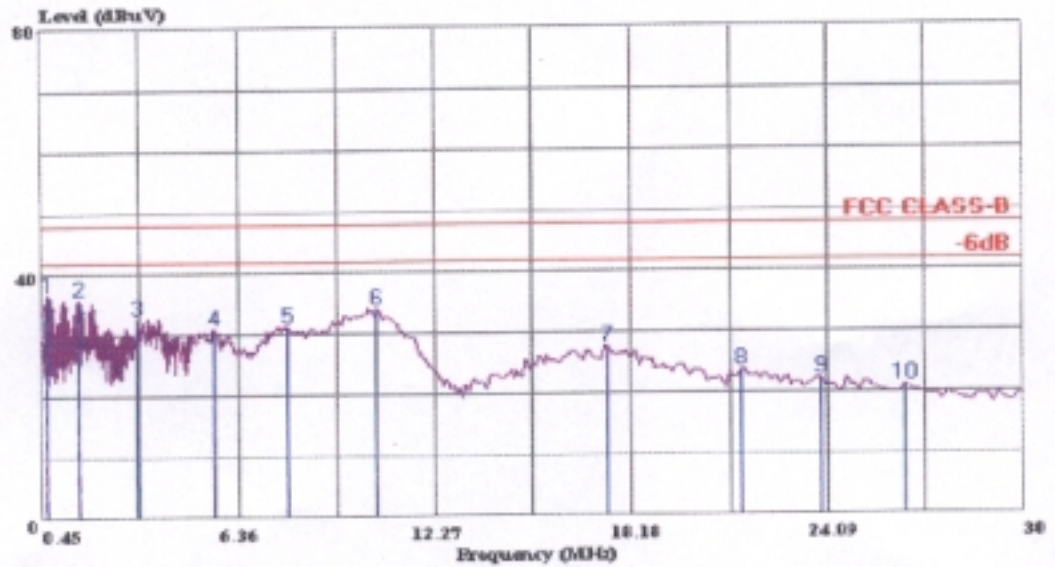
EUT Model No.: AWL500 (NEUTRAL)

Memo : HAPU01F



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Data#: 2943 File#: EN55022-B(QP).EMI Date: 2002-04-18 Time: 16:38:32



Trace: 1003  
 Site : Conduction NO.1 (Nick)  
 Condition: FCC CLASS-B LISN.N(16A) NEUTRAL  
 eut : E910157  
 power : AC 120V 60Hz  
 memo : Peak Value  
       : Final Test  
       : HAPU01F

Page: 1

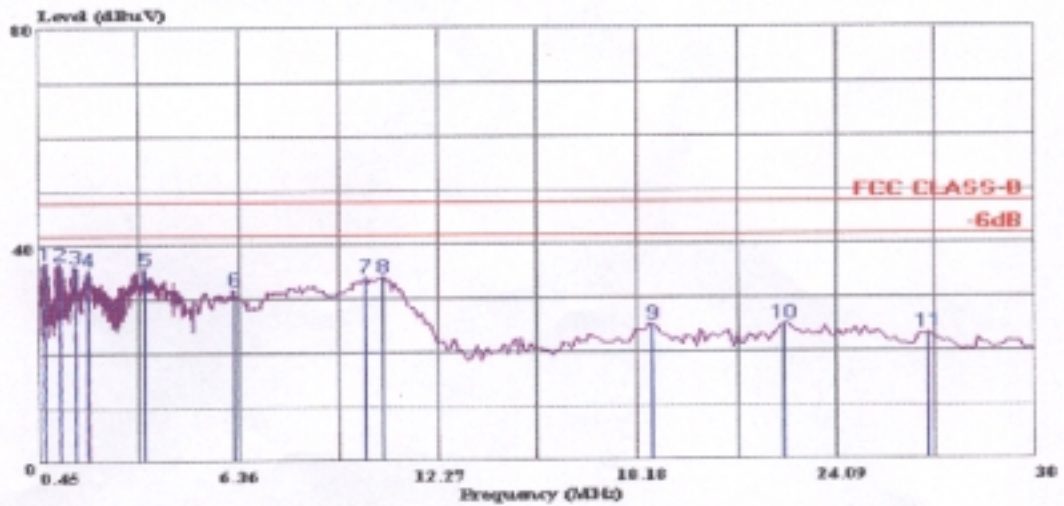
	Freq	Level	Over	Limit	Read	Probe	Cable	
	MHz	dBuV	Limit	Line	Level	Factor	Loss	Remark
			dB	dBuV	dBuV	dB	dB	
1	0.579	36.60	-11.40	48.00	36.40	0.10	0.10	
2	1.552	35.86	-12.14	48.00	35.60	0.10	0.16	
3	3.310	32.60	-15.40	48.00	32.40	0.10	0.10	
4	5.623	30.87	-17.13	48.00	30.60	0.17	0.10	
5	7.852	31.15	-16.85	48.00	30.80	0.25	0.10	
6	10.508	34.11	-13.89	48.00	33.60	0.31	0.20	
7	17.475	27.95	-20.05	48.00	27.19	0.46	0.30	
8	21.486	23.71	-24.29	48.00	22.81	0.53	0.37	
9	23.888	22.48	-25.52	48.00	21.60	0.58	0.30	
10	26.418	21.27	-26.73	48.00	20.40	0.57	0.30	

FCC ID : JVPAWL500  
 EUT Model No. AWL500 (LINE)  
 Memo : HAPU01B



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Data#: 2946 File#: EN55022-B(QP).EMI Date: 2002-04-18 Time: 16:44:04



Trace: 1013  
 Site : Conduction NO.1(Nick)  
 Condition: FCC CLASS-B LISN.L(16A) LINE  
 eut : E910157  
 power : AC 120V 60Hz  
 memo : Peak Value  
 : Final Test  
 : HAPU01B

Page: 1

	Freq	Level	Over	Limit	Read	Probe	Cable	Remark
	MHz	dBuV	Limit	Line	Level	Factor	Loss	
			dB	dBuV	dBuV	dB	dB	
1	0.595	37.00	-11.00	48.00	36.80	0.10	0.10	
2	1.043	36.81	-11.19	48.00	36.60	0.10	0.11	
3	1.480	36.06	-11.94	48.00	35.81	0.10	0.15	
4	1.908	35.69	-12.31	48.00	35.40	0.10	0.19	
5	3.547	35.48	-12.52	48.00	35.20	0.18	0.10	
6	6.219	31.80	-16.20	48.00	31.40	0.30	0.10	
7	10.125	34.01	-13.99	48.00	33.40	0.41	0.20	
8	10.676	34.03	-13.97	48.00	33.40	0.43	0.20	
9	18.622	25.18	-22.82	48.00	24.20	0.68	0.30	
10	22.535	25.13	-22.87	48.00	24.00	0.81	0.32	
11	26.841	23.56	-24.44	48.00	22.40	0.86	0.30	

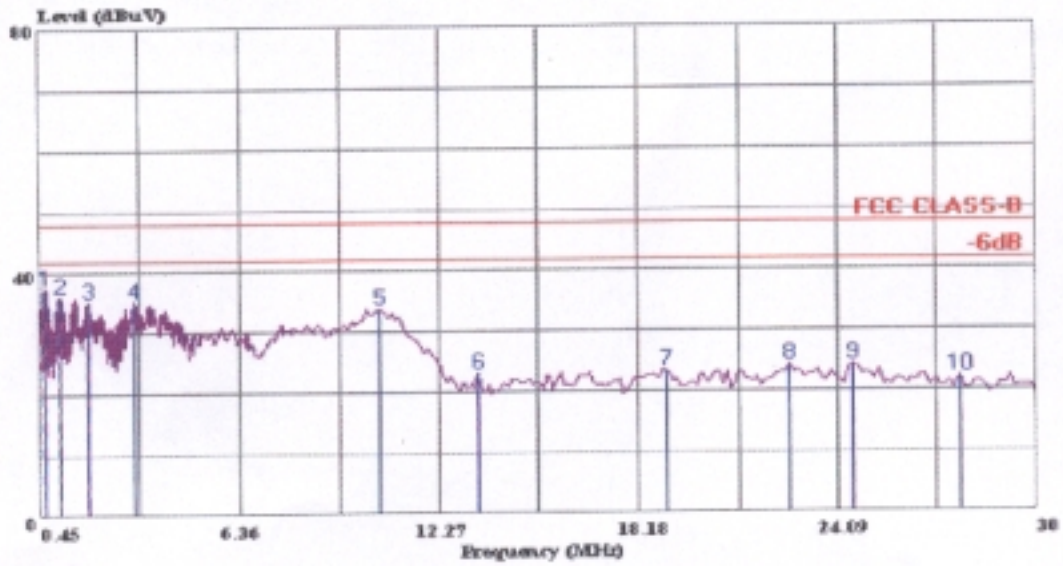
EUT Model No.: AWL500 (NEUTRAL)

Memo : HAPU01B



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PEP Testing Laboratory

Data#: 2947 File#: EN55022-B(QP).EMI Date: 2002-04-18 Time: 16:45:09



Trace: 1010

Site : Conduction NO.1(Nick)  
Condition: FCC CLASS-B LISN.N(16A) NEUTRAL  
eut : E910157  
power : AC 120V 60Hz  
memo : Peak Value  
: Final Test  
: HAPU01B

Page: 1

	Freq	Level	Over	Limit	Read	Probe	Cable	Remark
	MHz	dBuV	Limit	Line	Level	Factor	Loss	
			dB	dBuV	dBuV	dB	dB	
1	0.595	37.60	-10.40	48.00	37.40	0.10	0.10	
2	1.043	36.01	-11.99	48.00	35.80	0.10	0.11	
3	1.908	35.29	-12.71	48.00	35.00	0.10	0.19	
4	3.258	35.20	-12.80	48.00	35.00	0.10	0.10	
5	10.508	33.71	-14.29	48.00	33.20	0.31	0.20	
6	13.408	23.13	-24.87	48.00	22.60	0.37	0.16	
7	19.021	23.58	-24.42	48.00	22.80	0.48	0.30	
8	22.655	24.47	-23.53	48.00	23.60	0.56	0.31	
9	24.529	24.29	-23.71	48.00	23.40	0.59	0.30	
10	27.708	22.27	-25.73	48.00	21.40	0.54	0.33	

## 2.4 Conducted Emission Test Photo.

FCC ID : JVPAWL500

EUT Model No. AWL500

< FRONT VIEW >



**III . § 15.247(a)(2) : -6dB bandwidth for Direct Sequence Systems**

FCC ID : JVPWL500

**3.1 Test result of bandwidth**

**EUT Model No. AWL500**

**Top Channel : 1**

Frequency : 2.4111 GHz

-6dB bandwidth : 6.5 MHz > 500 KHz

**Middle Channel : 6**

Frequency : 2.4375 GHz

-6dB bandwidth : 4.3 MHz > 500 KHz

**Bottom Channel : 11**

Frequency : 2.4611 GHz

-6dB bandwidth : 4.7 MHz > 500 KHz

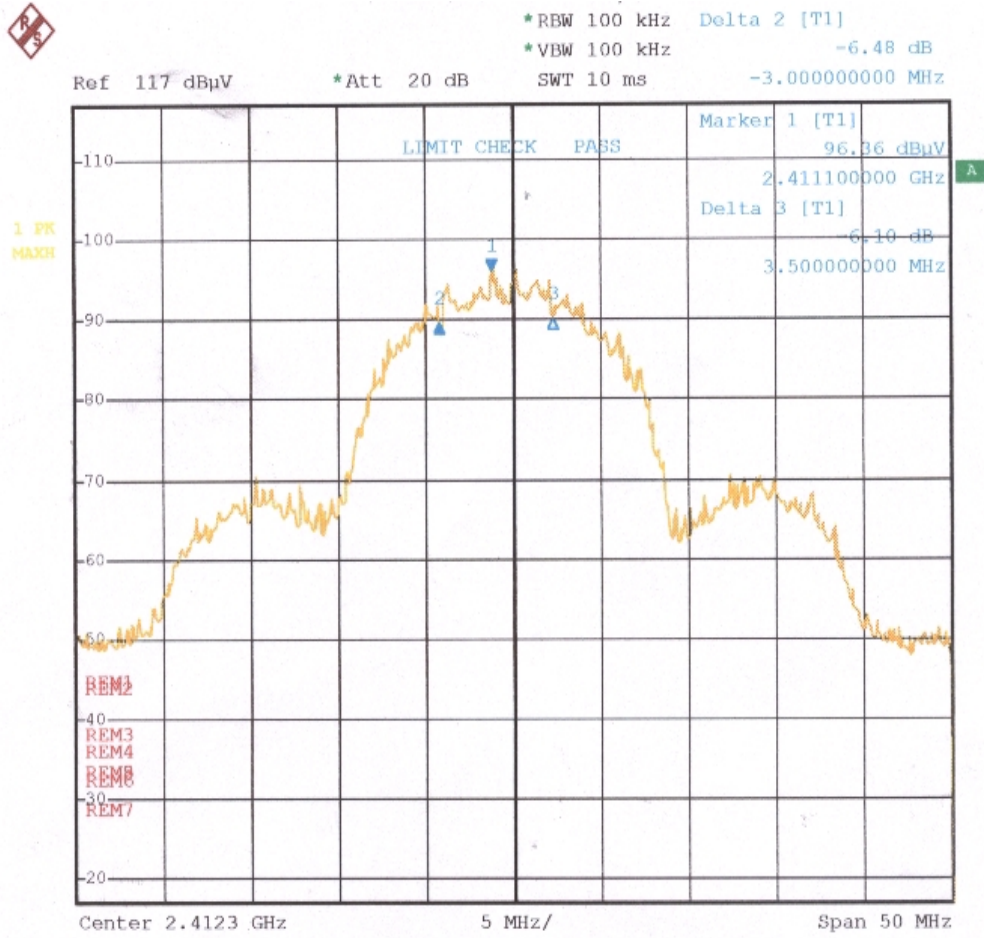


### 3.2 Spectrum Plot Data

FCC ID : JVPAWL500

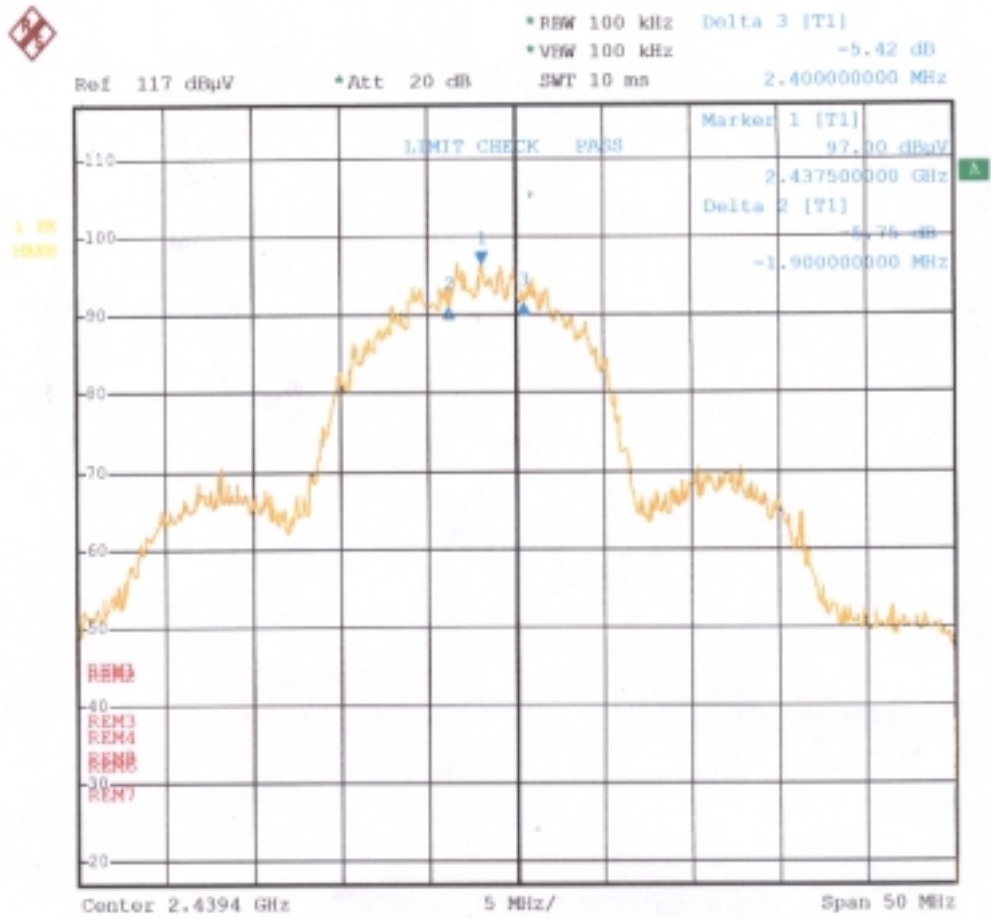
EUT Model No. AWL500

6dB Bandwidth Plot



Date: 18.JUN.2002 03:50:54

### 6dB Bandwidth Plot



Date: 18.JUN.2002 02:51:51