

RFI / EMI TEST REPORT

APPLICANT : BENQ CORPORATION

E U T Type : Wireless LAN Router

MODEL NO. : AWL700

FCC ID : JVPAWL700

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

TEST SITE : PEP Testing Laboratory

TEST ENGINEER : JOHSON CHANG

TEST DATE : APR. 02, 2002

ISSUED DATE : AMY 09, 2002

REPORT NO. : E910172

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 Router *

FCC ID : JVPAWL700 *

MODEL : AWL700 *



M. Y. TSUI / President

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TABLE OF CONTENTS

I.	GENERAL INFORMATION	4
1.1	Description of EUT	
1.2	Supporting Devices for EUT testing	
1.3	EUT Test Setup Configuration	
1.4	Channels Verification (15.205)	
II.	15.207 POWER LINE CONDUCTED EMISSION TEST	8
2.1	Testing Description	
2.2	Software Using	
2.3	Test Result	
2.4	Conducted Emission Test Photo.	
III.	15.247(a)(2) -6dB BANDWIDTH FOR DIRECT SEQUENCE SYSTEMS	16
3.1	Test result of bandwidth	
3.2	Spectrum Plot Data	
IV.	15.247(b) : The MAXIMUM PEAK OUTPUT POWER ($\leq 1\text{watt}$)	20
4.1	Testing Description	
4.2	Software Using	
4.3	Test Result of Fundamental Emissions	
V.	15.247(b) (4): MAXIMUM PERMISSIBLE EXPOSURE(MPE)	28
VI.	15.247(c) : OUTSIDE BAND BELOW 1GHz	30
VII.	15.247(d) : POWER SPECTRAL DENSITY	40
VIII.	15.247(e) : PROCESSING GAIN	47
IX.	List of Test Instruments	58
X.	EUT Photos	59

FCC ID : JVPAWL700

I. General Information

The EUT is Wireless LAN Router, FCC ID: JVPAWL700, Model AWL700. The EUT that contains five RJ-45 ports (one for WAN) can be used wireless networking client devices or sharing xDSL/Cable modem. The operating fundamental frequency is 2.4120~2.4634GHz. 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 Router

FCC ID : JVPAWL700

EUT Model No. : AWL700

Frequency Range : 2.4120-2.4634GHz

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** : DVE
Model No. : DSA-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 : JVPAWL700

No.	Subject	MFR.	Model	FCC ID	Serial No.	I/P Rating	Power Cord	Data Cable
1	PC	Asus Inc	P2-99	DoC		115V 2A	Non-Shielded, Detachable, 1.8m	N/A
2	Monitor	SAMSUNG	550S	DoC	DP15H8WKB 10383B	AC100-240 V 1.2A	Non-Shielded, Detachable, 1.8m	Shielded , Non-detachable, 1.2m
3	Keyboard	BTC	5121W	E5XKB5121 WTH0110	H02608899	DC+5V 170mA	N/A	Shielded , Non-detachable, 1.6m
4	Printer	Hewlett-Packard	C2642E	B94C2642X	TH926185HY	120V 0.22A	Non-Shielded , Detachable, 1.8m	Shielded , Detachable, 1.2m
5	Modem	ACEEX	1414	IFAXDM1414	9038526	120V 12W	Non-Shielded , Detachable, 1.7m	Shielded , Detachable, 1m
6	Mouse	Logitech	M-S43	DZL211106	LEE02553536	DC+5V 2.5mA	N/A	Shielded , Non-detachable, 1.8m
7	Lan Card	D-Link	DFE-530 TX	N/A			N/A	N/A
8	Wireless Lan Card	BENQ	N/A	N/A			N/A	N/A

1.3 EUT Test Setup Configuration

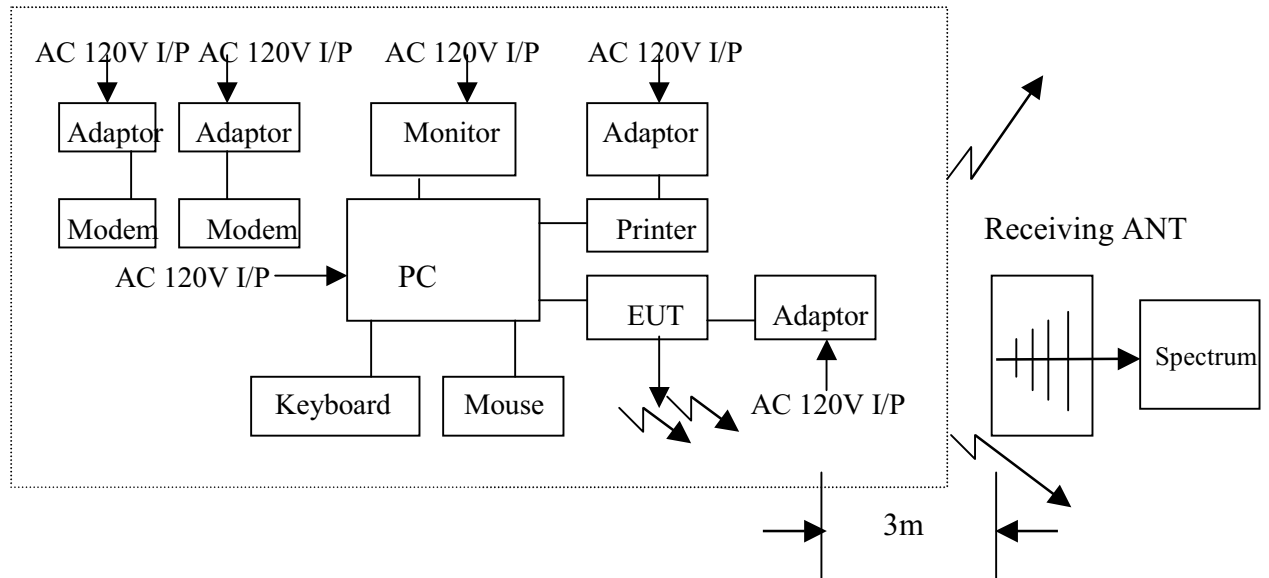
- A) Test Procedure: As required by ANSI C63.4 (1992)
- B) Channel Verification: In order to force selection of the typical channels for testing, RJ-45 Cable was connected between the EUT and control PC through RS232 interface and using the driver “RFTEST.exe”, supplied from BenQ, under Win98 to force 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 2.4120-2.4634GHz 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 2.4120GHz 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 : JVPAWL700



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	2.4284		
5	2.4292		
6	2.4384		
7	2.4434		
8	2.4484		
9	2.4534		
10	2.4584		

Note :

1. All channels located in the frequency range as below :

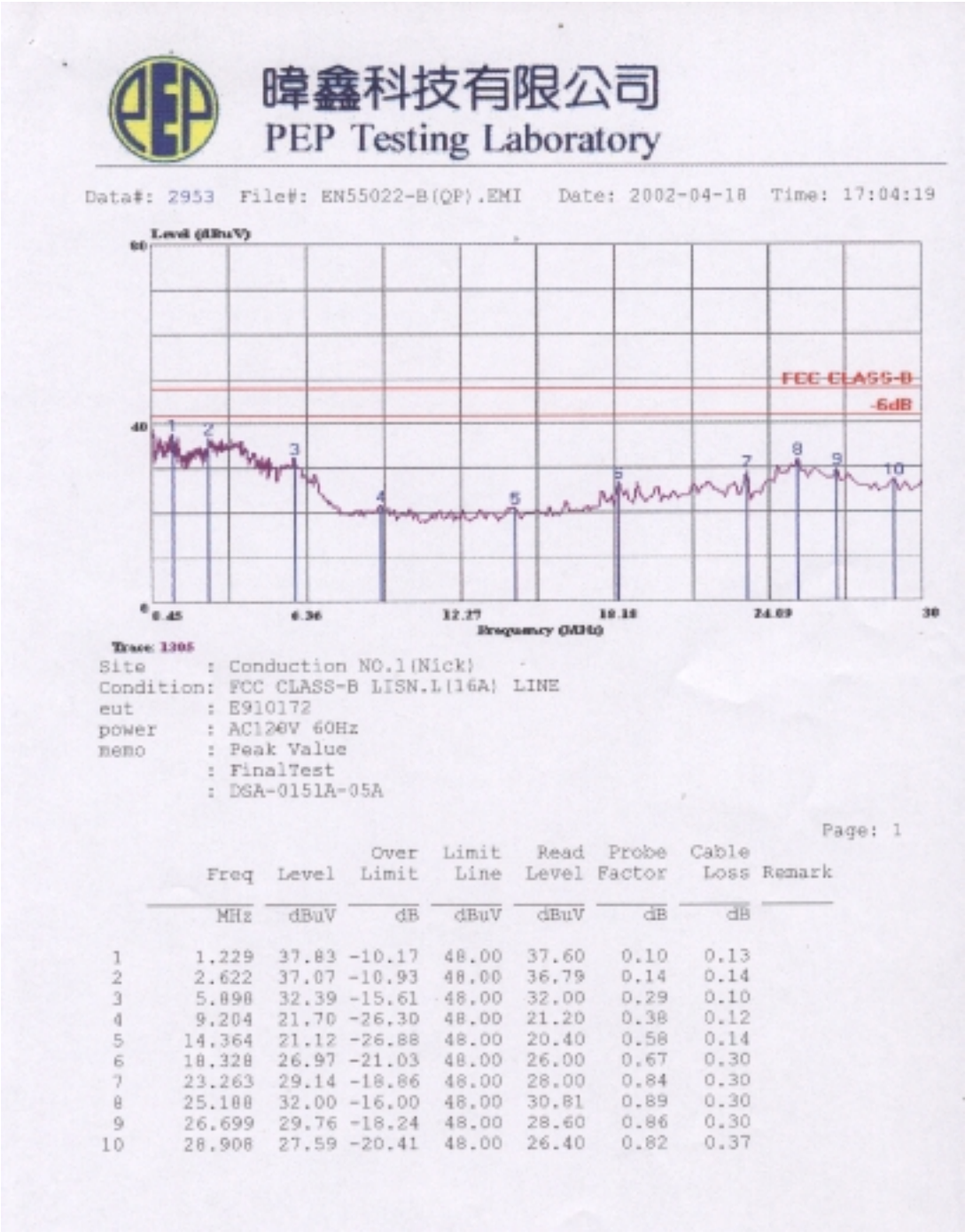
2.4 GHz --- 2.4835 GHz ☒ Yes ☐ No

Typical Channel for testing :

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

2.3 Test Result

FCC ID : JVPAWL700
EUT Model No. AWL700 (LINE)
MEMO : DSA-0151A-05A



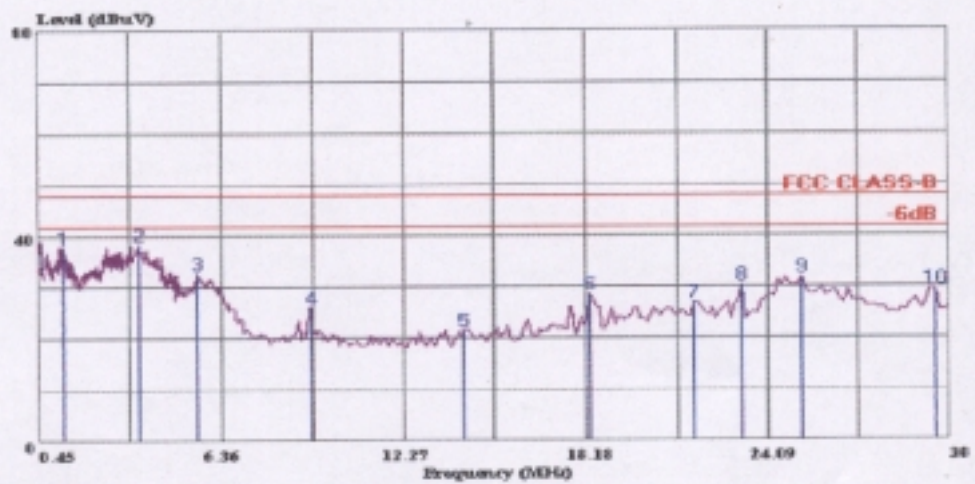
EUT Model No.: AWL700 (NEUTRAL)

MEMO : DSA-0151A-05A



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PEP Testing Laboratory

Data#: 2954 File#: EN55022-B(QP).EMI Date: 2002-04-18 Time: 17:06:17



Trace: 1310

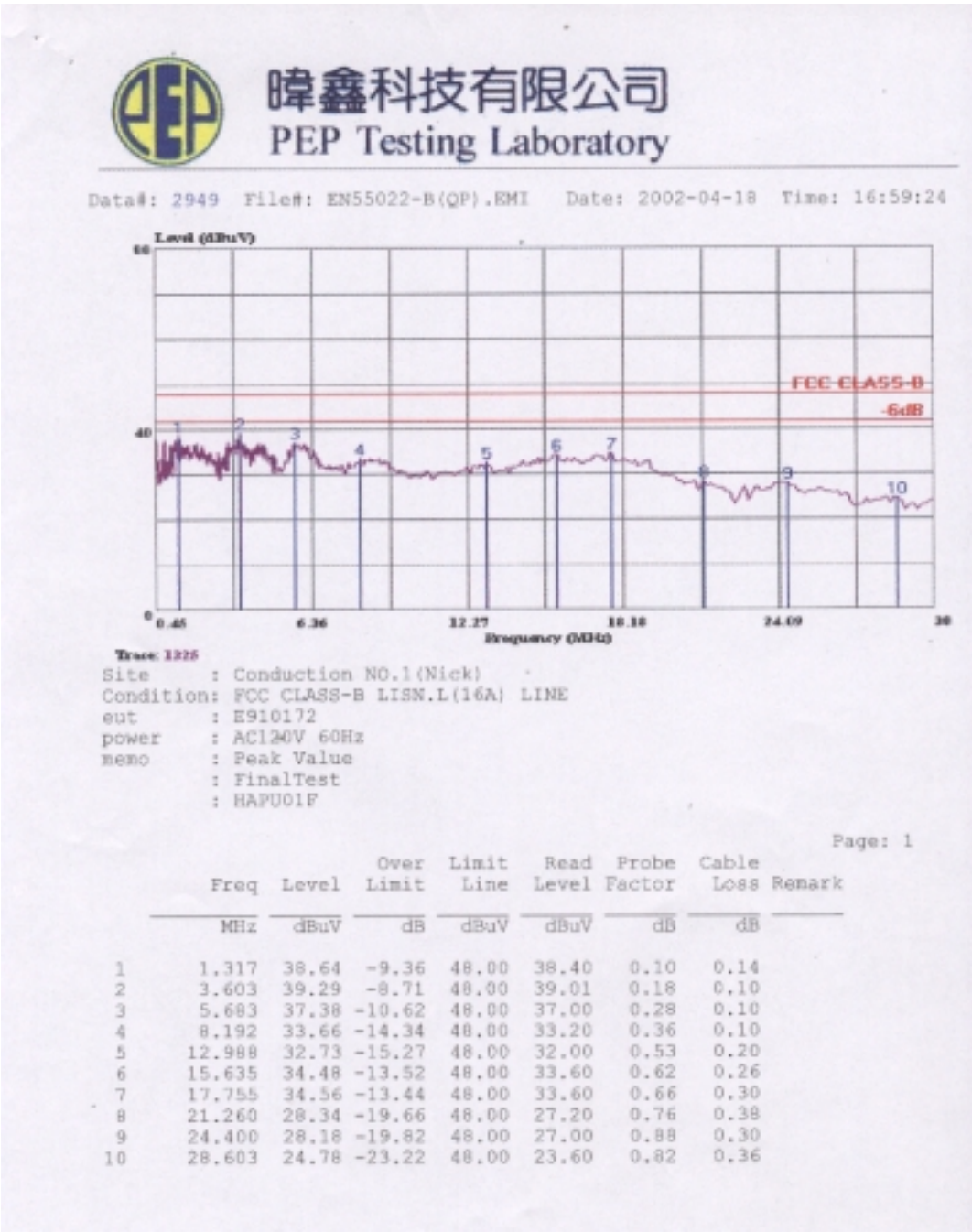
Site : Conduction NO.1(Nick)
Condition: FCC CLASS-B LISN.N(16A) NEUTRAL
eut : E910172
power : AC120V 60Hz
memo : Peak Value
: FinalTest
: DSA-0151A-05A

Page: 1

	Freq	Level	Over	Limit	Read	Probe	Cable	
	MHz	dBuV	Limit	Line	Level	Factor	Loss	Remark
			dB	dBuV	dBuV	dB	dB	
1	1.229	37.83	-10.17	48.00	37.60	0.10	0.13	
2	3.681	38.40	-9.60	48.00	38.20	0.10	0.10	
3	5.594	32.67	-15.33	48.00	32.40	0.17	0.10	
4	9.253	26.21	-21.79	48.00	25.81	0.28	0.12	
5	14.213	21.52	-26.48	48.00	21.01	0.39	0.12	
6	18.328	28.77	-19.23	48.00	28.00	0.47	0.30	
7	21.715	26.90	-21.10	48.00	26.00	0.54	0.36	
8	23.263	30.27	-17.73	48.00	29.40	0.57	0.30	
9	25.188	31.90	-16.10	48.00	31.01	0.59	0.30	
10	29.527	29.49	-18.51	48.00	28.59	0.51	0.39	

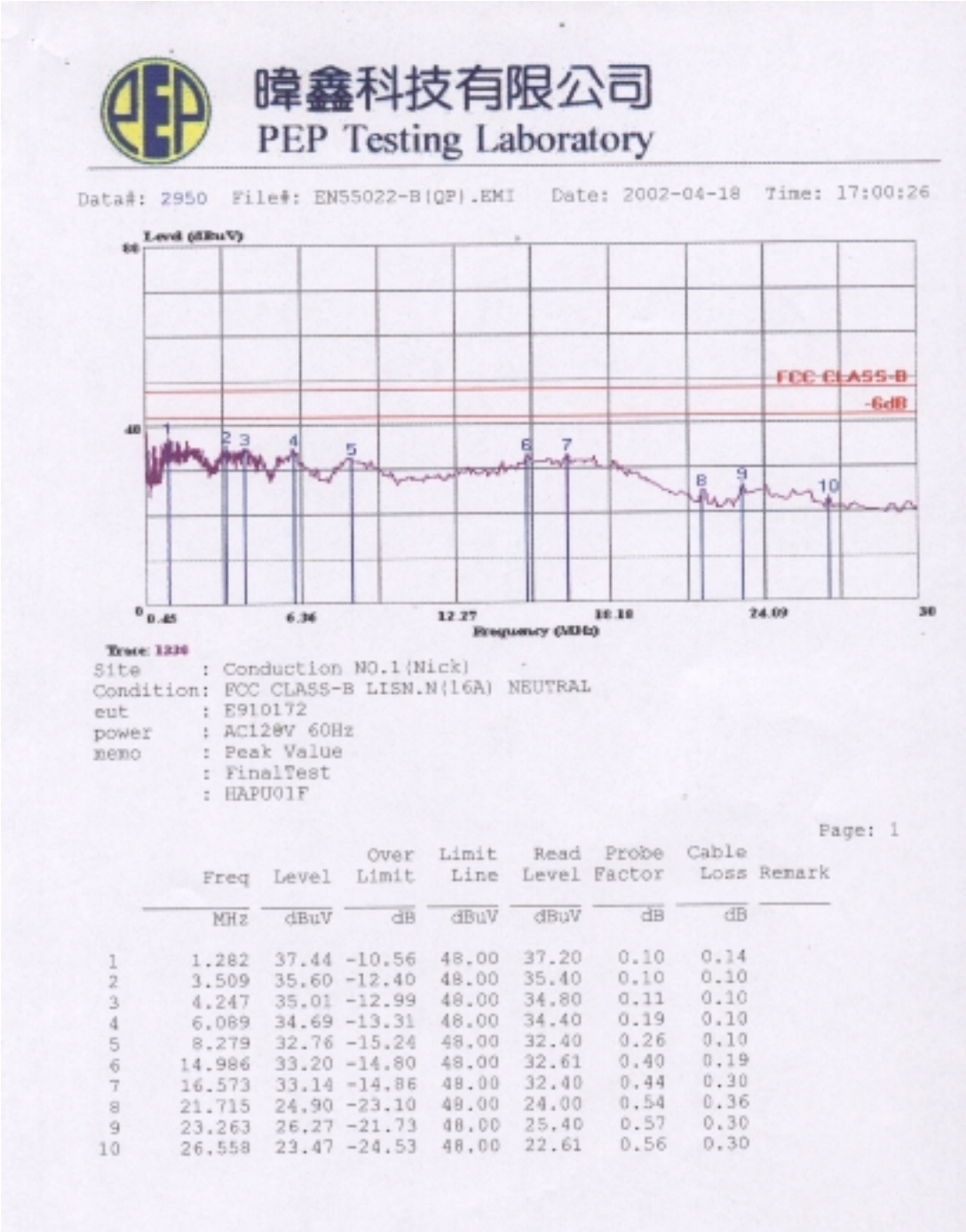
EUT Model No. AWL700 (LINE)

MEMO : HAPU01F



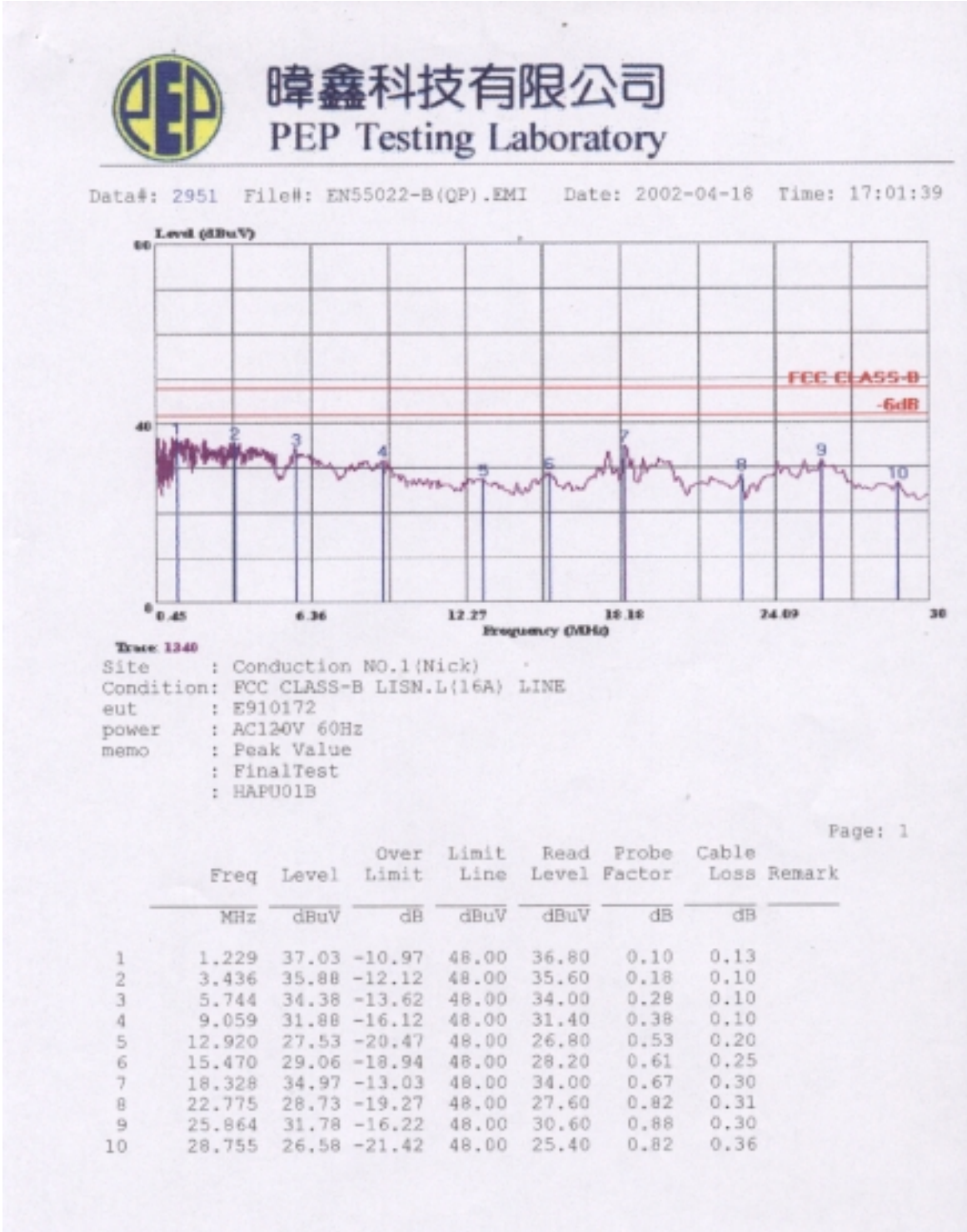
EUT Model No.: AWL700 (NEUTRAL)

MEMO : HAPU01F



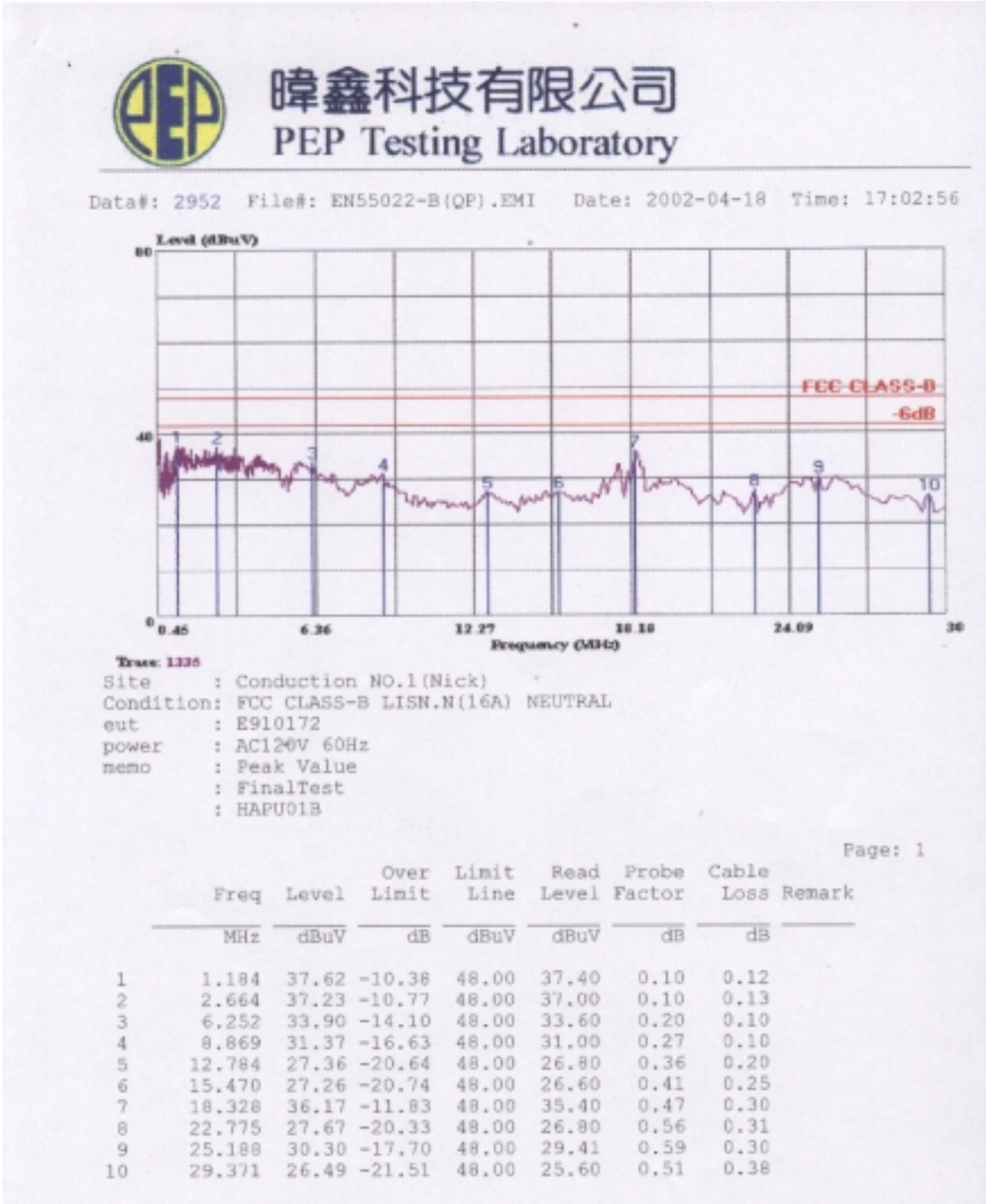
EUT Model No. AWL700 (LINE)

MEMO : HAPU01B



EUT Model No.: AWL700 (NEUTRAL)

MEMO : HAPU01B



2.4 Conducted Emission Test Photo.

FCC ID : JVPAWL700

EUT Model No. AWL700

< FRONT VIEW >



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

FCC ID : JVPAWL700

3.1 Test result of bandwidth

EUT Model No. AWL700

Top Channel : 1

Frequency : 2.4111 GHz

-6dB bandwidth : 4.8 MHz > 500 KHz

Middle Channel : 6

Frequency : 2.4361 GHz

-6dB bandwidth : 5.7 MHz > 500 KHz

Bottom Channel : 11

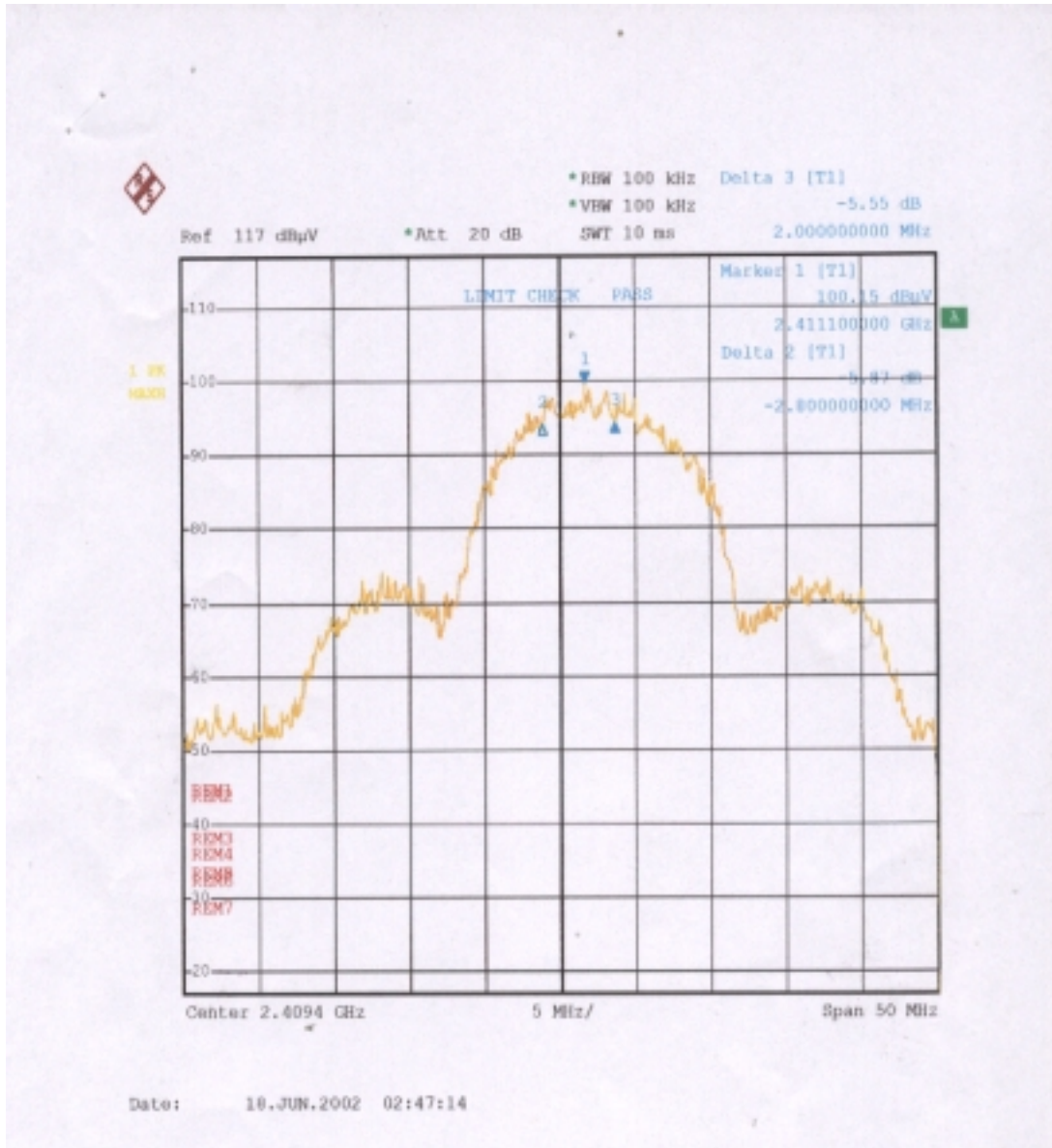
Frequency : 2.4625 GHz

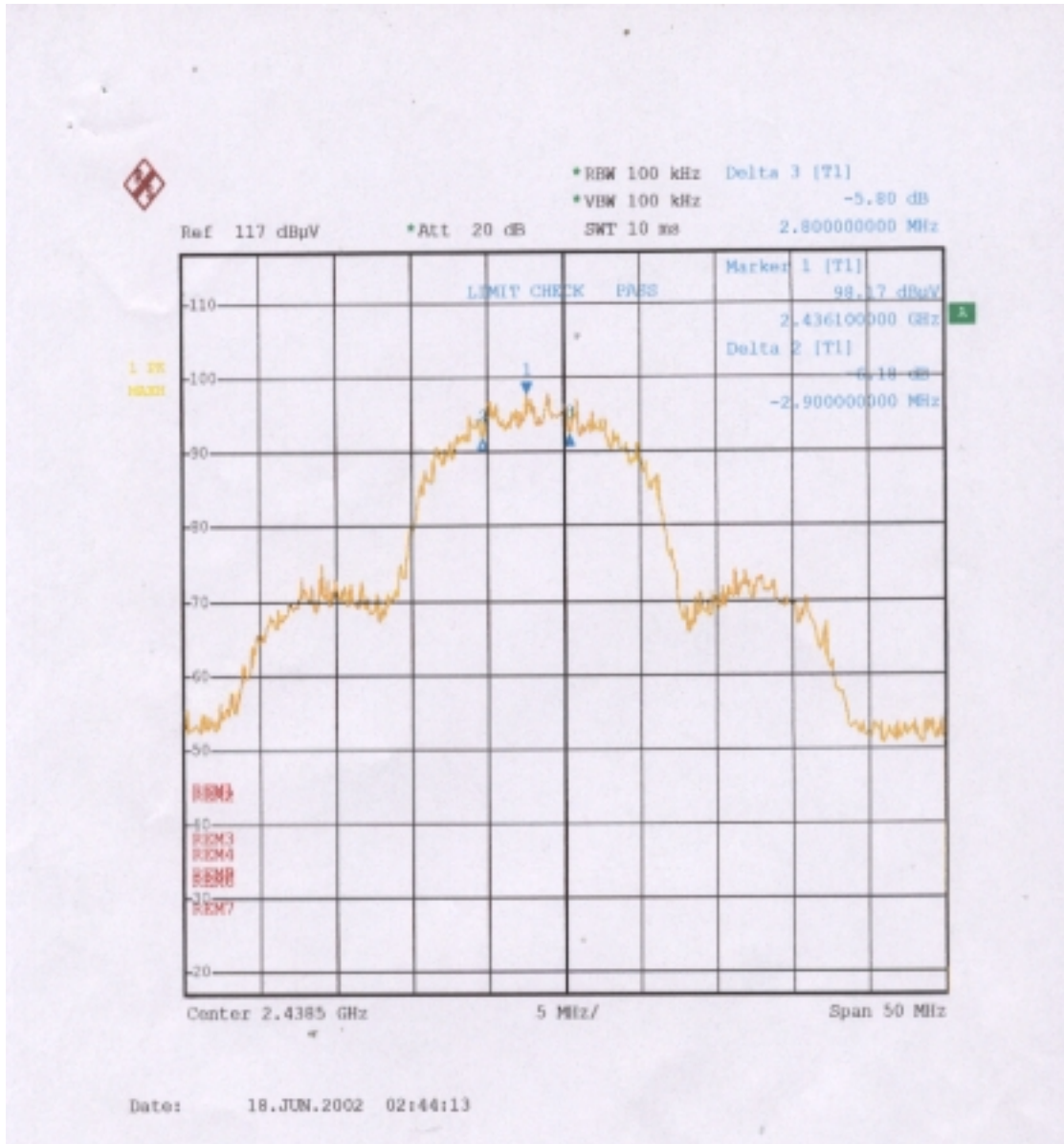
-6dB bandwidth : 6.3 MHz > 500 KHz

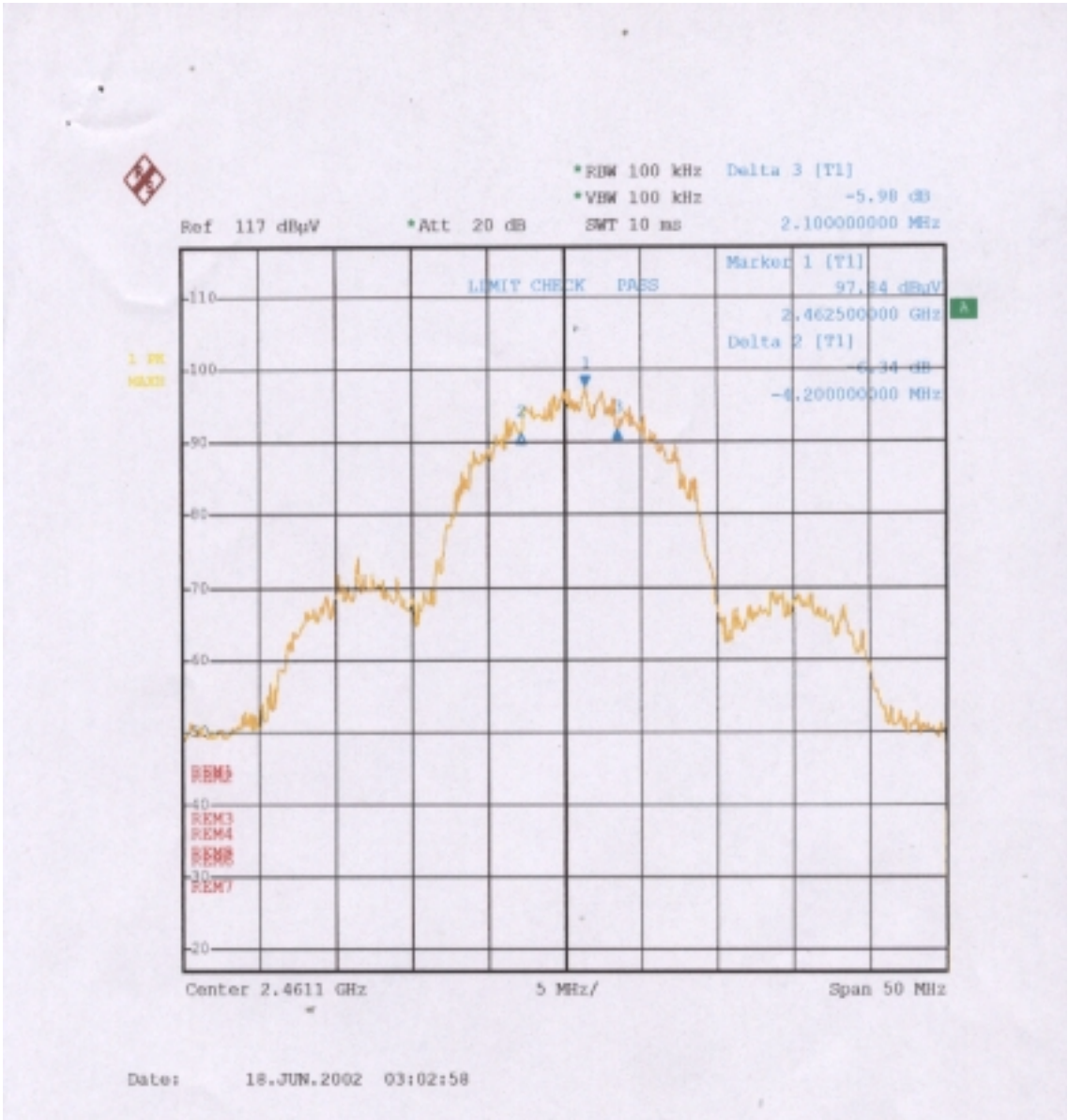
3.2 Spectrum Plot Data

FCC ID : JVPAWL700

EUT Model No. AWL700



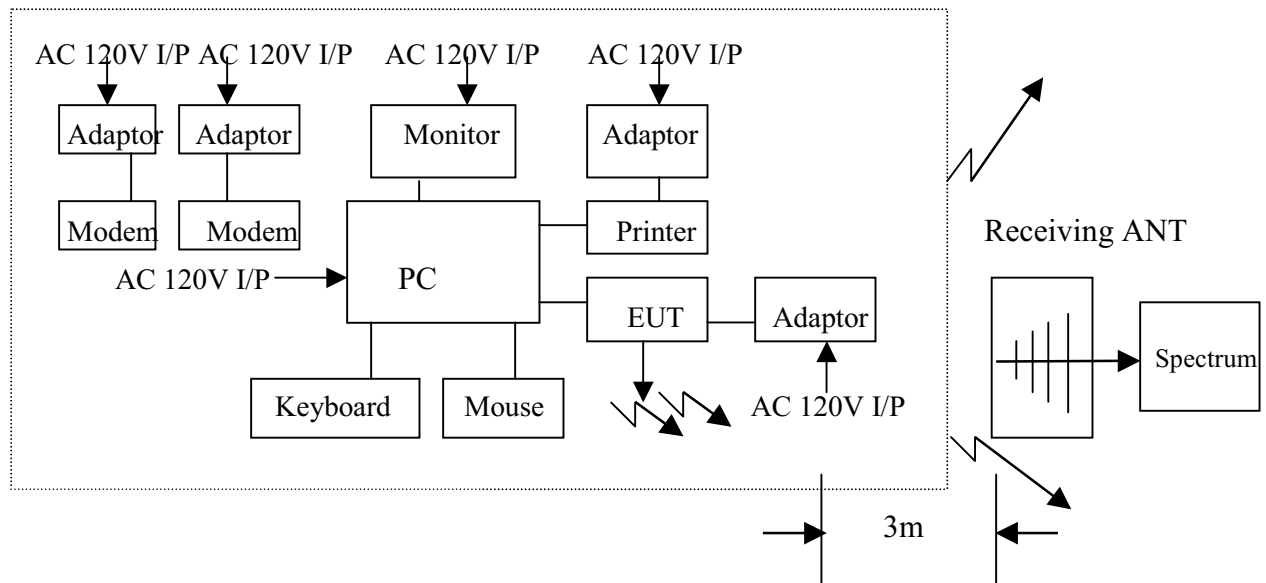




IV. § 15.247(b) : The maximum peak output power ($\leq 1\text{watt}$)

4.1 Testing Description

FCC ID : JVPAWL700



Three channels were tested : CH01, CH06 AND CH11 Measurements were taken by using both horizontal and vertical antenna polarization, and the antenna was raised and lowered from one to four meters to find the worst emission levels.

4.2 Software Using

The driver of “ RFTEST.exe” is used to select the support channel as mentioned on section 1.3 (b) listed above

4.3 Test Result of Fundamental Emissions

FCC ID : JVPAWL700

EUT Model No. AWL700

channel	Frequency (MHz)	A.P. (H/V)	S.P. Read (dBuV/m)	C.F. (dB)	Level (dBuV/m)	E.I.R.P. (W)
Top	2412.1	H	109.11	2.81	111.92	0.04667
		V	94.70	2.81	97.51	0.0017
Middle	2438.2	H	109.90	2.81	112.71	0.056
		V	97.01	2.81	99.82	0.0029
Bottom	2463.4	H	109.47	2.80	112.27	0.051
		V	95.10	2.80	97.90	0.0018

Note :

1. "A.P." means antenna polarity .
2. "S.P." Read means amplitude read by spectrum analyzer .
3. "C.F." means corrected factor = antenna factor + cable loss
Preamplifier Gain .
4. Level means emission amplitude = S.P. + C.F. + duty cycle factor
5. Conducted output power : $P = (E d)^2 / 30G$
where $E (V) = \text{Level (V)}$
 $d (m) = \text{measurement distance} = 3m$
 $G = 1$ (the gain of the transmitting antenna over isotropic antenna)
 $P = \text{E.I.R.P.}$

6. Example :

$$\begin{aligned} \text{If } \text{Level} &= 120 \text{ dBuV/m} \\ 10^{(120 / 20)} \times 10^{-6} &= 1 \text{ V} \\ \text{E.I.R.P.} &= (1 \times 3)^2 / 30 = 300 \text{ mW} \end{aligned}$$