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

M. Y. TSUI / President

PEP Testing Laboratory
12-3FL., NO. 27-1, Lane 169, Kang-Ning St.,
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TABLE OF CONTENTS

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: RFTEST 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.

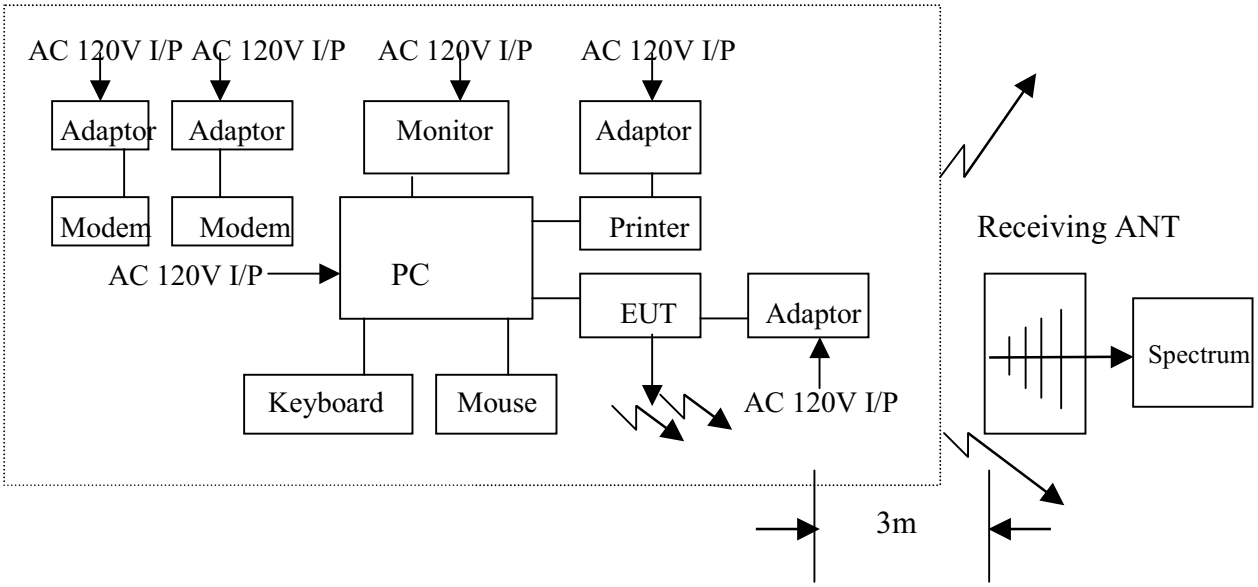
D) Test Channel: Due to the support channels are 11 channels, the selected three frequencies for testing would be 2.4120GHz near top for CH 1, 2.4382GHz near middle for CH 6 and 2.4634GHz near bottom for CH 11.

(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

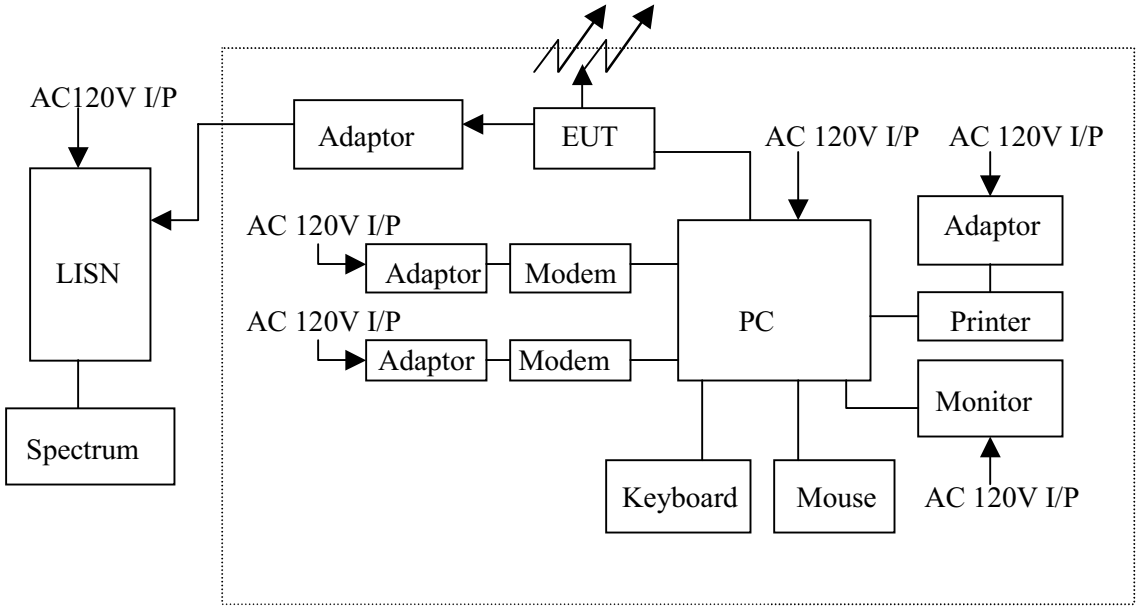
Typical Channel for testing :

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

II . 15.207 Power Line Conducted Emission Test

FCC ID ：JVPAWL700

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.

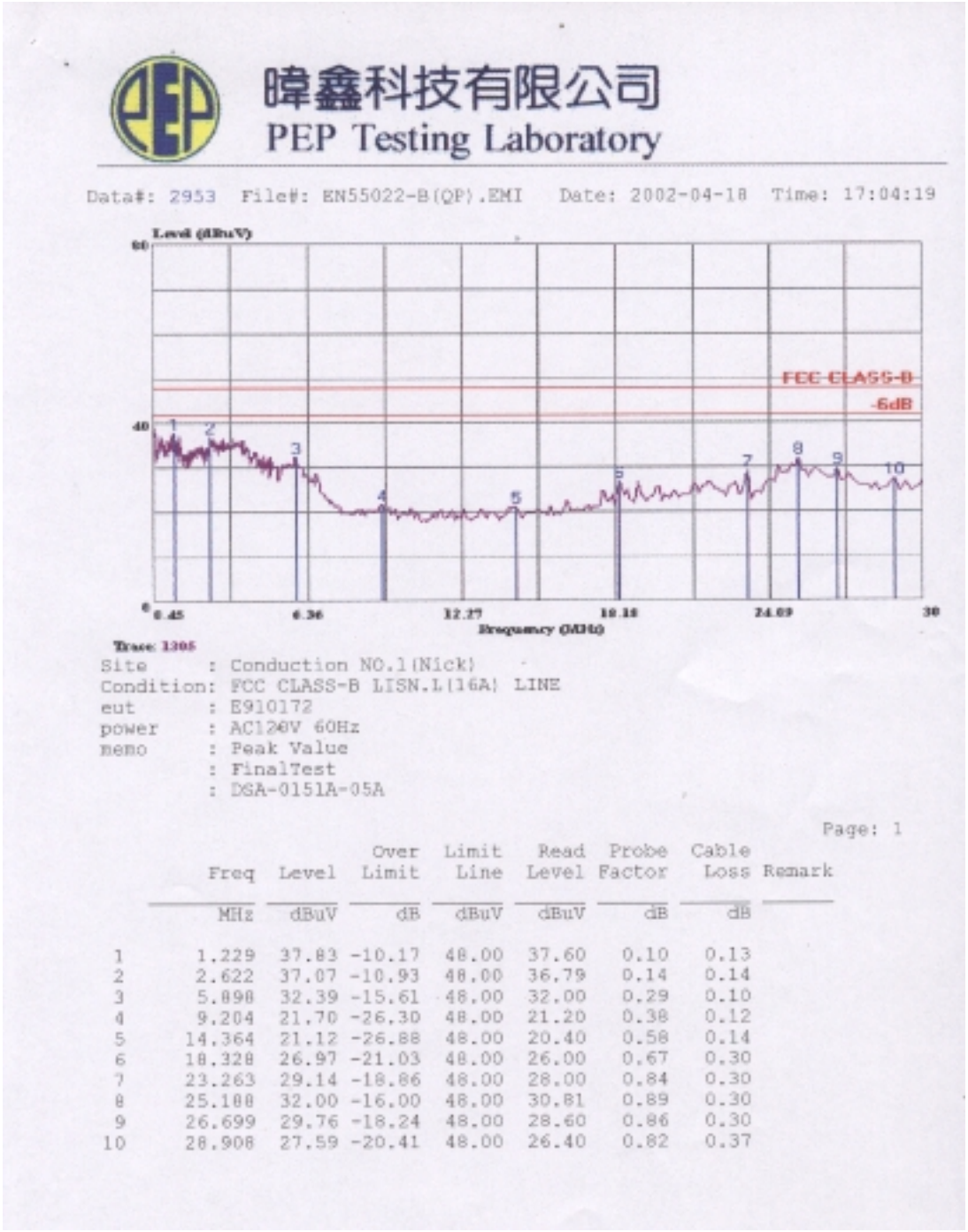
It was scanned from 450KHz to 30MHz during Signals transmitting shown above. The physical arrangement of the EUT System was varied to get the worst case.

2.3 Test Result

FCC ID ：JVPAWL700

EUT Model No. AWL700 (LINE)

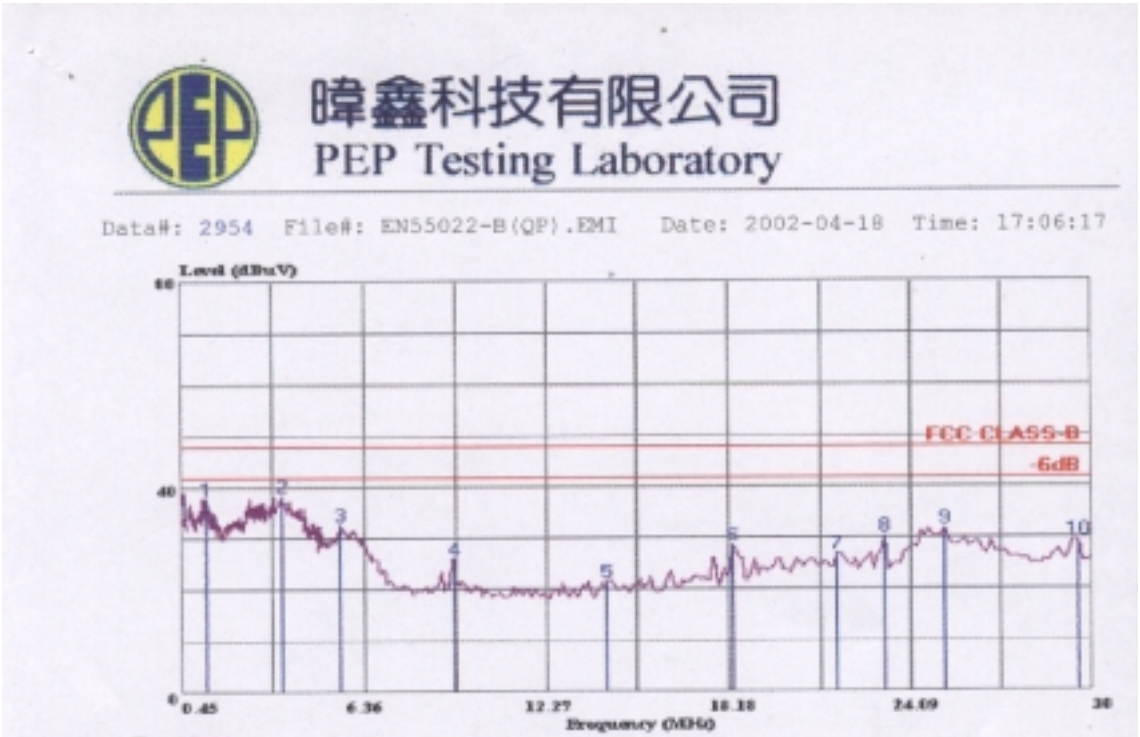
MEMO : DSA-0151A-05A



	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	1.229	37.83	-10.17	48.00	37.60	0.10	0.13	
2	2.622	37.07	-10.93	48.00	36.79	0.14	0.14	
3	5.898	32.39	-15.61	48.00	32.00	0.29	0.10	
4	9.204	21.70	-26.30	48.00	21.20	0.38	0.12	
5	14.364	21.12	-26.88	48.00	20.40	0.58	0.14	
6	18.328	26.97	-21.03	48.00	26.00	0.67	0.30	
7	23.263	29.14	-18.86	48.00	28.00	0.84	0.30	
8	25.188	32.00	-16.00	48.00	30.81	0.89	0.30	
9	26.699	29.76	-18.24	48.00	28.60	0.86	0.30	
10	28.908	27.59	-20.41	48.00	26.40	0.82	0.37	

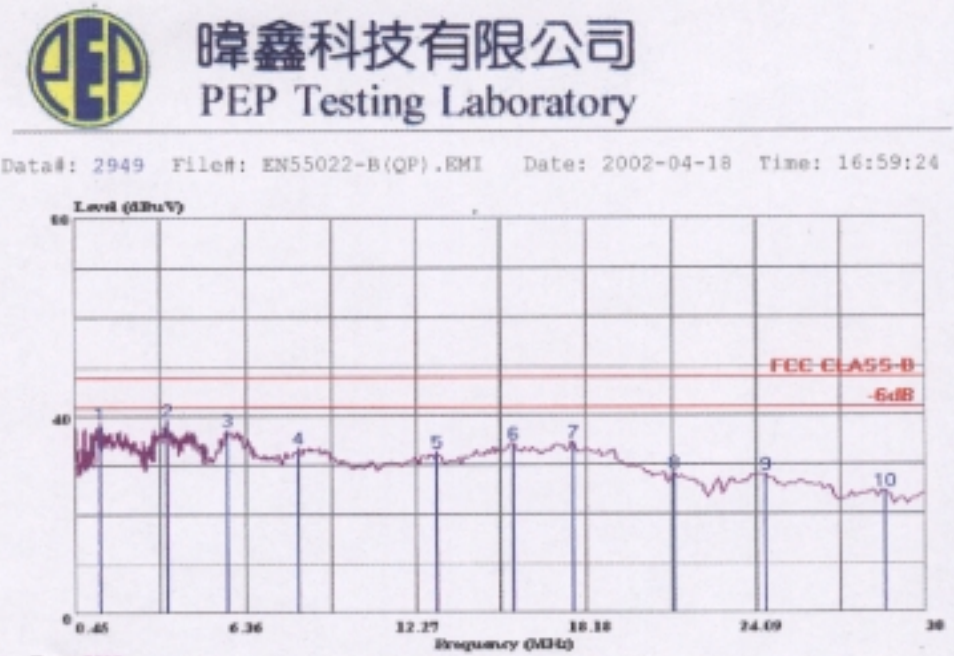
EUT Model No.: AWL700 (NEUTRAL)

MEMO : DSA-0151A-05A



	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Remark
	MHz	dBuV	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



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PEP Testing Laboratory

Data#: 2949 File#: EN55022-B(QP).EMI Date: 2002-04-18 Time: 16:59:24

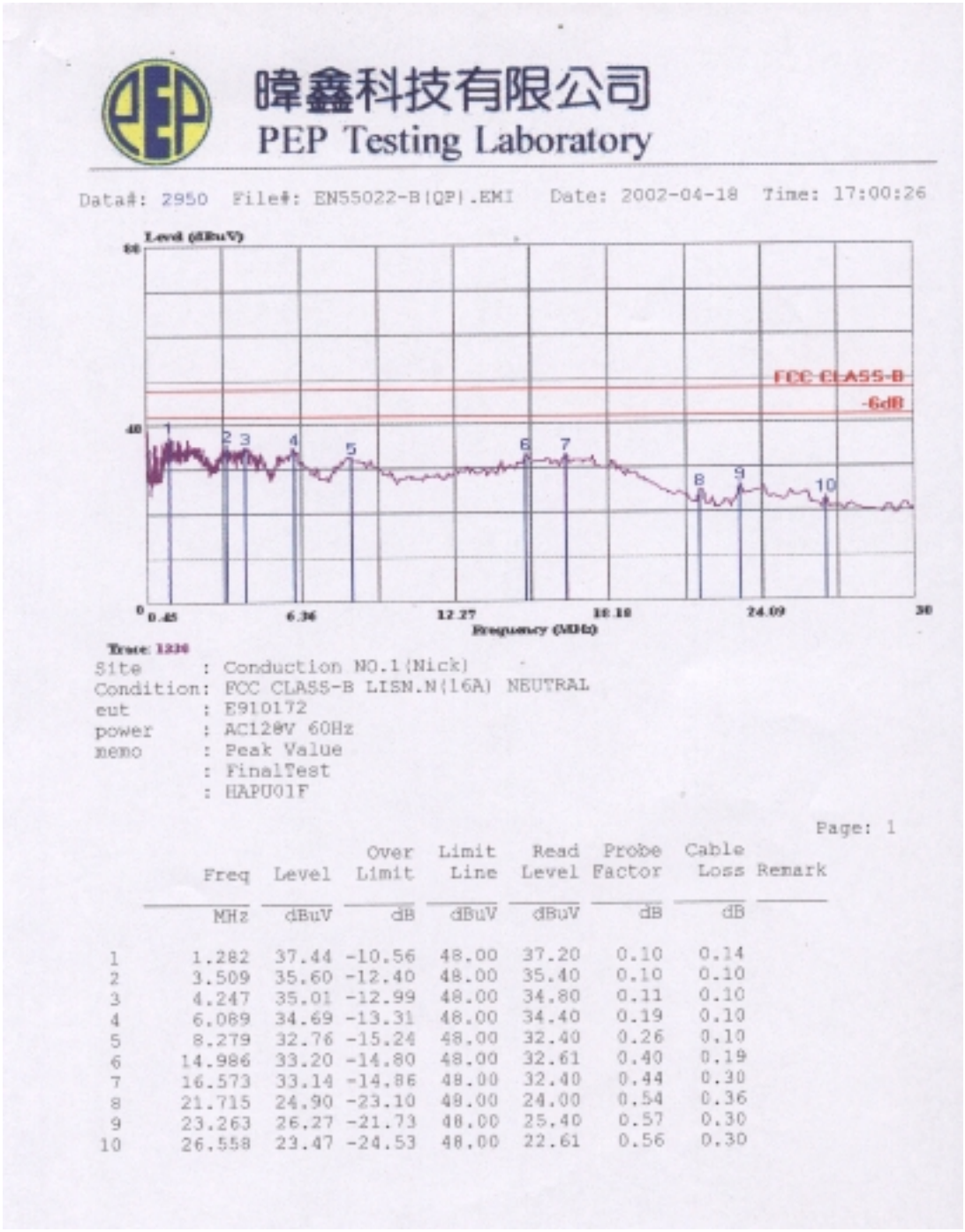
Trace: 1225
Site : Conduction NO.1(Nick)
Condition: FCC CLASS-B LISN.L(16A) LINE
eut : E910172
power : AC120V 60Hz
memo : Peak Value
: FinalTest
: HAPU01F

Page: 1

	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	1.317	38.64	-9.36	48.00	38.40	0.10	0.14	
2	3.603	39.29	-8.71	48.00	39.01	0.18	0.10	
3	5.683	37.38	-10.62	48.00	37.00	0.28	0.10	
4	8.192	33.66	-14.34	48.00	33.20	0.36	0.10	
5	12.988	32.73	-15.27	48.00	32.00	0.53	0.20	
6	15.635	34.48	-13.52	48.00	33.60	0.62	0.26	
7	17.755	34.56	-13.44	48.00	33.60	0.66	0.30	
8	21.260	28.34	-19.66	48.00	27.20	0.76	0.38	
9	24.400	28.18	-19.82	48.00	27.00	0.88	0.30	
10	28.603	24.78	-23.22	48.00	23.60	0.82	0.36	

EUT Model No.: AWL700 (NEUTRAL)

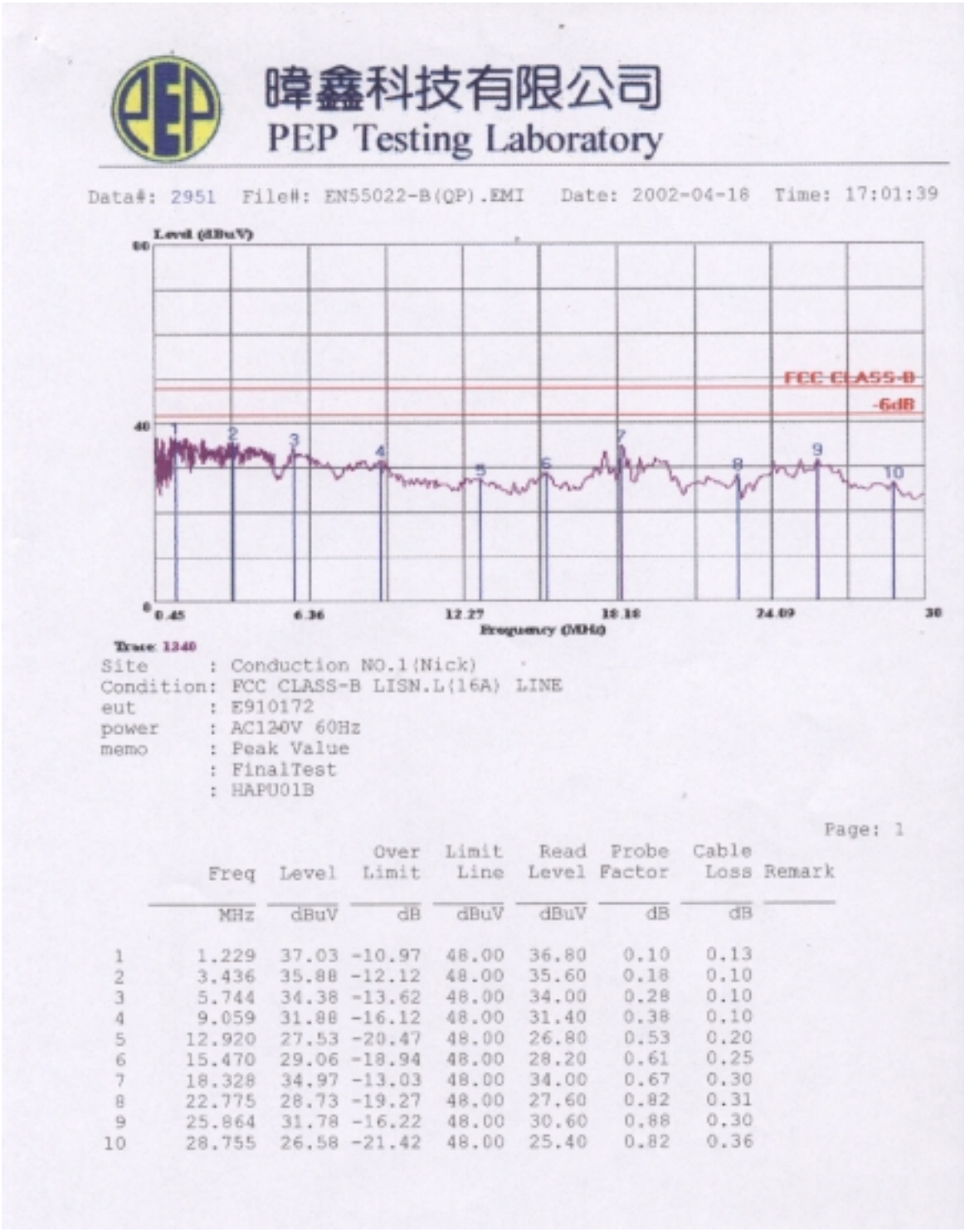
MEMO : HAPU01F



	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	1.282	37.44	-10.56	48.00	37.20	0.10	0.14	
2	3.509	35.60	-12.40	48.00	35.40	0.10	0.10	
3	4.247	35.01	-12.99	48.00	34.80	0.11	0.10	
4	6.089	34.69	-13.31	48.00	34.40	0.19	0.10	
5	8.279	32.76	-15.24	48.00	32.40	0.26	0.10	
6	14.986	33.20	-14.80	48.00	32.61	0.40	0.19	
7	16.573	33.14	-14.86	48.00	32.40	0.44	0.30	
8	21.715	24.90	-23.10	48.00	24.00	0.54	0.36	
9	23.263	26.27	-21.73	48.00	25.40	0.57	0.30	
10	26.558	23.47	-24.53	48.00	22.61	0.56	0.30	

EUT Model No. AWL700 (LINE)

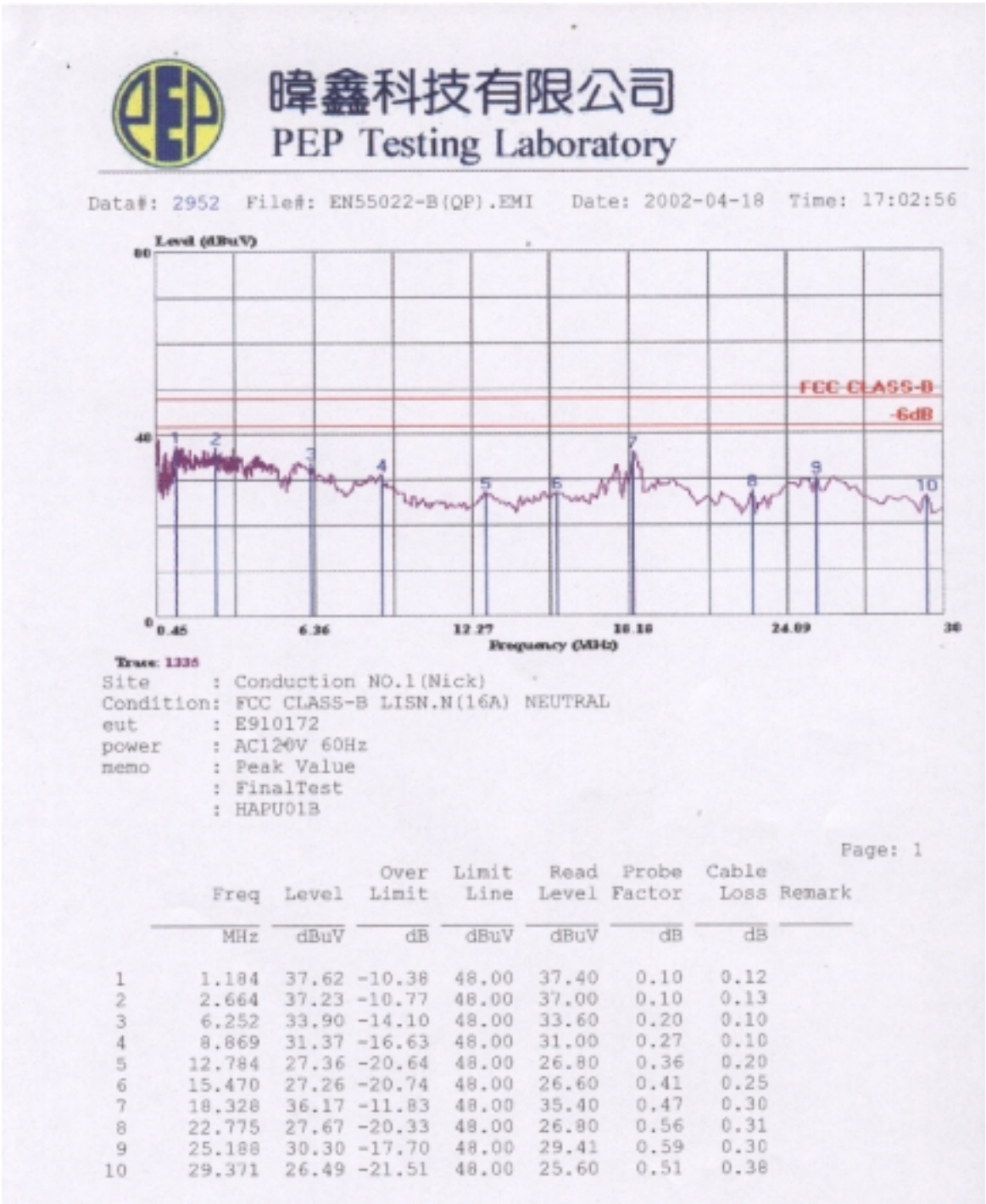
MEMO : HAPU01B



	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	1.229	37.03	-10.97	48.00	36.80	0.10	0.13	
2	3.436	35.88	-12.12	48.00	35.60	0.18	0.10	
3	5.744	34.38	-13.62	48.00	34.00	0.28	0.10	
4	9.059	31.88	-16.12	48.00	31.40	0.38	0.10	
5	12.920	27.53	-20.47	48.00	26.80	0.53	0.20	
6	15.470	29.06	-18.94	48.00	28.20	0.61	0.25	
7	18.328	34.97	-13.03	48.00	34.00	0.67	0.30	
8	22.775	28.73	-19.27	48.00	27.60	0.82	0.31	
9	25.864	31.78	-16.22	48.00	30.60	0.88	0.30	
10	28.755	26.58	-21.42	48.00	25.40	0.82	0.36	

EUT Model No.: AWL700 (NEUTRAL)

MEMO : HAPU01B



暐鑫科技有限公司
PEP Testing Laboratory

Data#: 2952 File#: EN55022-B(QP).EMI Date: 2002-04-18 Time: 17:02:56

Trace: 1336
Site : Conduction NO.1(Nick)
Condition: FCC CLASS-B LISN.N(16A) NEUTRAL
eut : E910172
power : AC120V 60Hz
memo : Peak Value
: FinalTest
: HAPU01B

Page: 1

	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	1.184	37.62	-10.38	48.00	37.40	0.10	0.12	
2	2.664	37.23	-10.77	48.00	37.00	0.10	0.13	
3	6.252	33.90	-14.10	48.00	33.60	0.20	0.10	
4	8.869	31.37	-16.63	48.00	31.00	0.27	0.10	
5	12.784	27.36	-20.64	48.00	26.80	0.36	0.20	
6	15.470	27.26	-20.74	48.00	26.60	0.41	0.25	
7	18.328	36.17	-11.83	48.00	35.40	0.47	0.30	
8	22.775	27.67	-20.33	48.00	26.80	0.56	0.31	
9	25.188	30.30	-17.70	48.00	29.41	0.59	0.30	
10	29.371	26.49	-21.51	48.00	25.60	0.51	0.38	

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

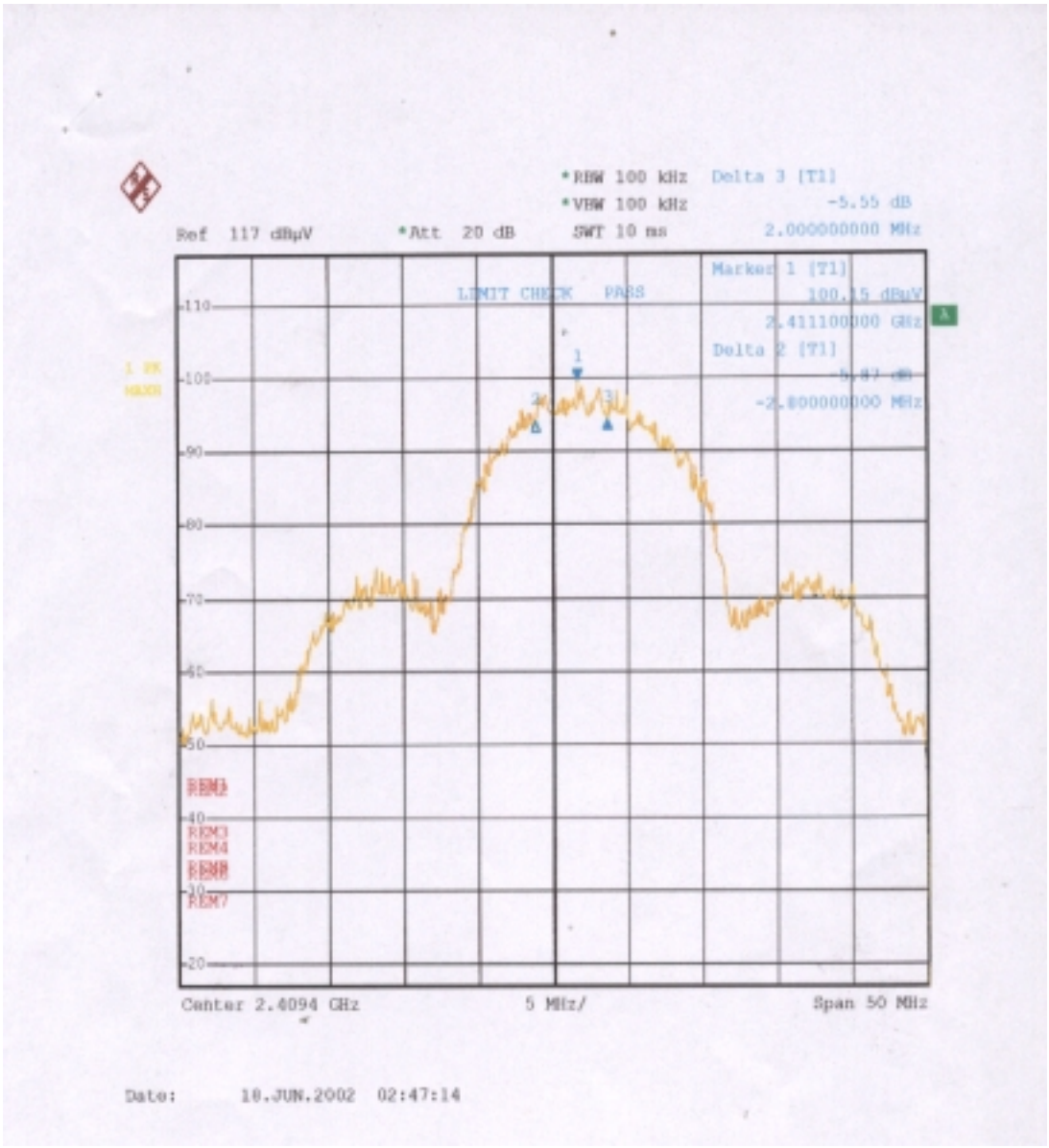
Middle Channel : 6
Frequency : 2.4361 GHz
-6dB bandwidth : 5.7 MHz > 500 KHz

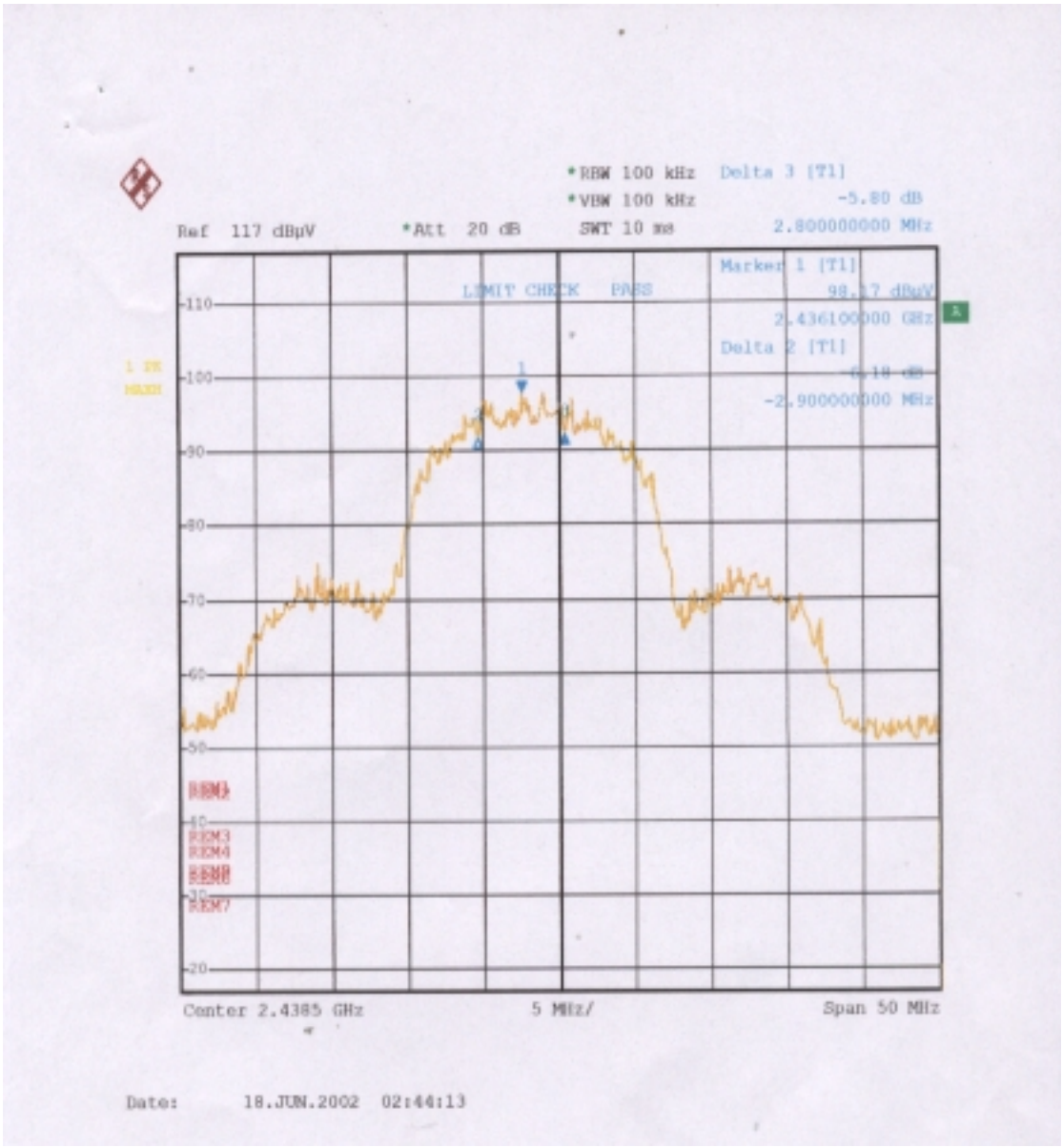
Bottom Channel : 11
Frequency : 2.4625 GHz
-6dB bandwidth : 6.3 MHz > 500 KHz

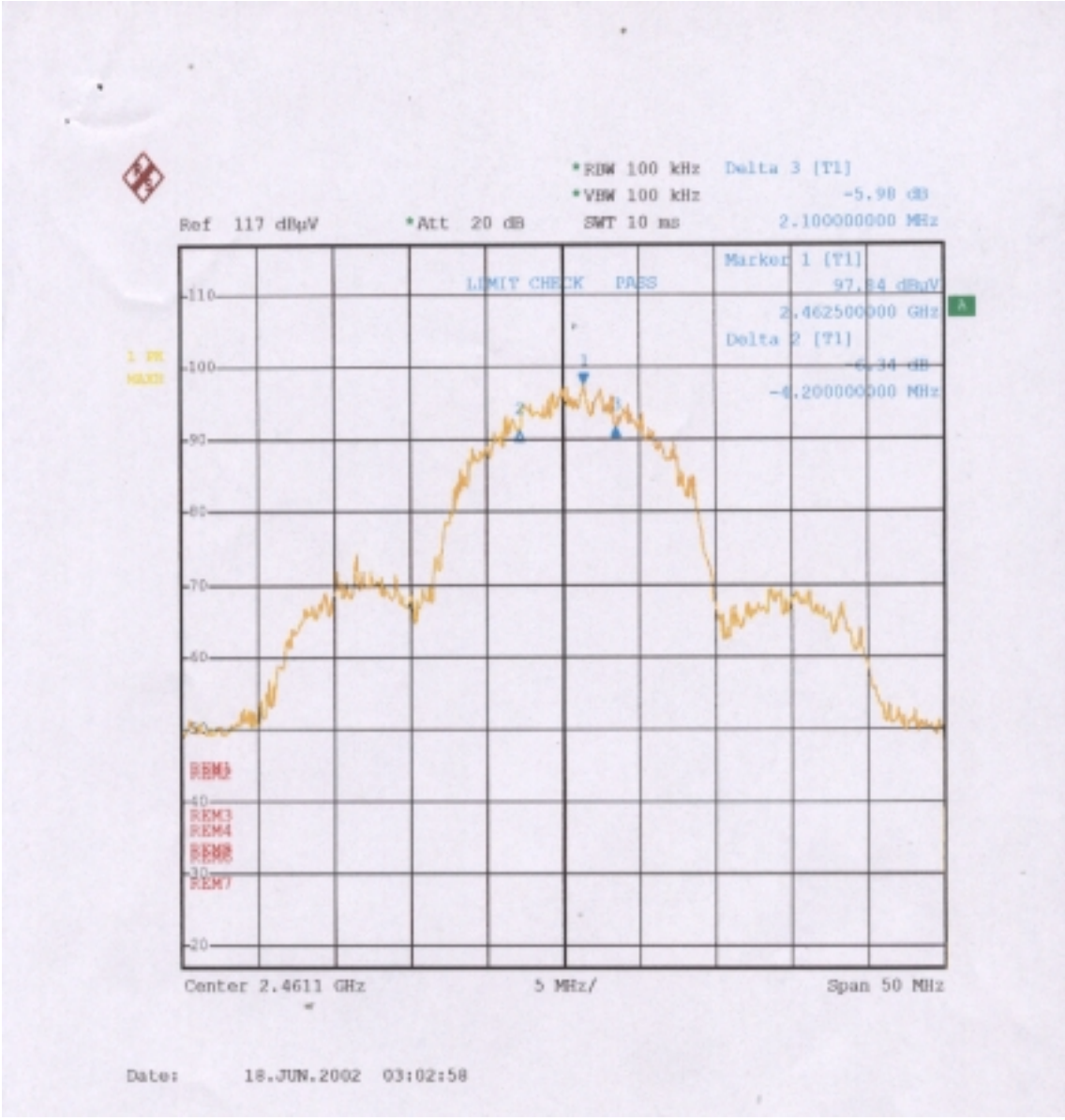
3.2 Spectrum Plot Data

FCC ID ：JVPAWL700

EUT Model No. AWL700



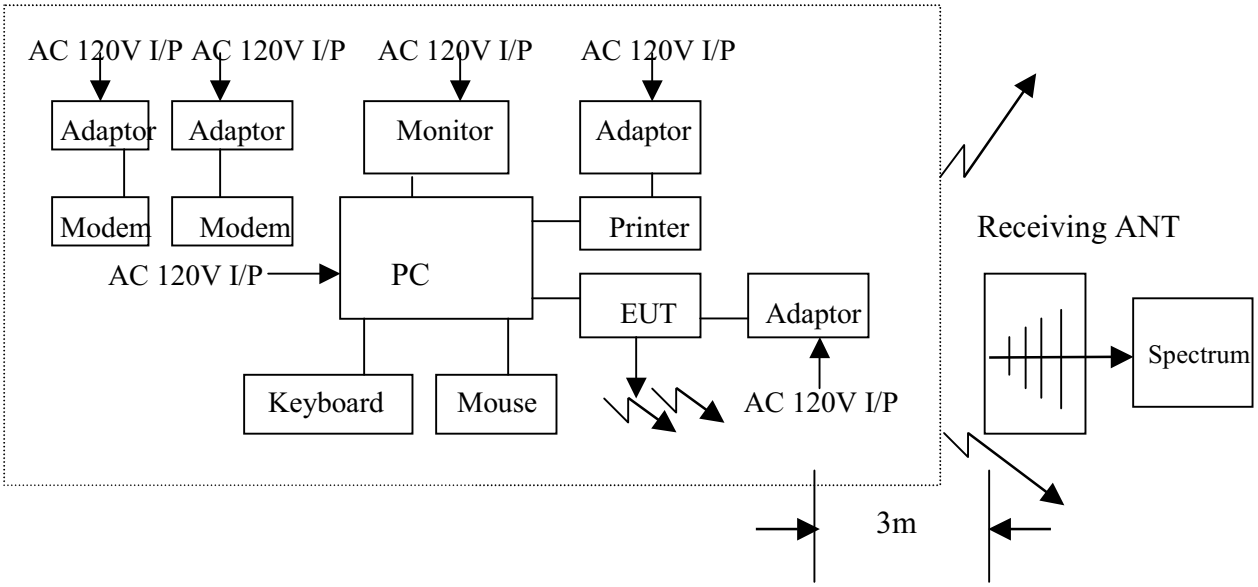

*RBW 100 kHz
*VBW 100 kHz
SWT 10 ms
Delta 3 [T1]
-5.80 dB
2.800000000 MHz
Ref 117 dBµV
*Att 20 dB
LIMIT CHECK PASS
Marker 1 [T1]
98.17 dBµV
2.436100000 GHz
Delta 2 [T1]
-2.900000000 MHz
110
100
90
80
70
60
50
40
30
20
Center 2.4385 GHz
5 MHz/
Span 50 MHz
Date: 18.JUN.2002 02:44:13


*RBW 100 kHz
*VBW 100 kHz
Ref 117 dBµV
*Att 20 dB
SWT 10 ms
Delta 3 [T1]
-5.90 dB
2.100000000 MHz
Marker 1 [T1]
LIMIT CHECK PASS
97.84 dBµV
2.462500000 GHz
Delta 2 [T1]
-6.34 dB
-4.200000000 MHz
110
100
90
80
70
60
50
40
30
20
Center 2.4611 GHz
5 MHz/
Span 50 MHz
Date: 18.JUN.2002 03:02:58

IV. §15.247(b) : The maximum peak output power (≦ 1watt)

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) = Level (V)
   d (m) = measurement distance = 3m
   G = 1 (the gain of the transmitting antenna over isotropic antenna)
   P = E.I.R.P.
6. Example :
   If Level = 120 dBuV/m
   $10^{(120/20)} \text{ X } 10^{-6} = 1$ V
   E.I.R.P. = $(1 \text{ x } 3)^2 / 30 = 300$ mW