



# FCC TEST REPORT

**REPORT NO.:** RF910808R02A

**MODEL NO.:** WAP51AB

**RECEIVED:** Oct. 7, 2002

**TESTED:** Oct. 7 ~ Nov. 17, 2002

**APPLICANT:** The Linksys Group, Inc.

**ADDRESS:** 17401 Armstrong Ave., Irvine, CA 92614

**ISSUED BY:** Advance Data Technology Corporation

**LAB LOCATION:** 47 14<sup>th</sup> Lin, Chiapau Tsun, Linko, Taipei,  
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0528  
ILAC MRA



Lab Code: 200102-0



## Table of Contents

1.	CERTIFICATION.....	5
2.	SUMMARY OF TEST RESULTS .....	6
3.	GENERAL INFORMATION.....	8
3.1	GENERAL DESCRIPTION OF EUT .....	8
3.2	DESCRIPTION OF TEST MODES .....	9
3.3	GENERAL DESCRIPTION OF APPLIED STANDARDS .....	10
3.4	DESCRIPTION OF SUPPORT UNITS.....	11
4.	TEST TYPES AND RESULTS (FOR PART 802.11b) .....	12
4.1	CONDUCTED EMISSION MEASUREMENT.....	12
4.1.1	LIMITS OF CONDUCTED EMISSION MEASUREMENT .....	12
4.1.2	TEST INSTRUMENTS .....	12
4.1.3	TEST PROCEDURES .....	13
4.1.4	DEVIATION FROM TEST STANDARD .....	13
4.1.5	TEST SETUP .....	14
4.1.6	EUT OPERATING CONDITIONS.....	14
4.1.7	TEST RESULTS .....	15
4.2	RADIATED EMISSION MEASUREMENT.....	21
4.2.1	LIMITS OF RADIATED EMISSION MEASUREMENT .....	21
4.2.2	TEST INSTRUMENTS .....	22
4.2.3	TEST PROCEDURES .....	23
4.2.4	DEVIATION FROM TEST STANDARD .....	23
4.2.5	TEST SETUP .....	24
4.2.6	EUT OPERATING CONDITIONS.....	24
4.2.7	TEST RESULTS.....	25
4.3	6dB BANDWIDTH MEASUREMENT .....	30
4.3.1	LIMITS OF 6dB BANDWIDTH MEASUREMENT .....	30
4.3.2	TEST INSTRUMENTS .....	30
4.3.3	TEST PROCEDURE .....	31
4.3.4	DEVIATION FROM TEST STANDARD .....	31
4.3.5	TEST SETUP .....	31
4.3.6	EUT OPERATING CONDITIONS.....	31
4.3.7	TEST RESULTS .....	32
4.4	MAXIMUM PEAK OUTPUT POWER.....	36
4.4.1	LIMITS OF MAXIMUM PEAK OUTPUT POWER MEASUREMENT .....	36
4.4.2	INSTRUMENTS.....	36
4.4.3	TEST PROCEDURES .....	37
4.4.4	DEVIATION FROM TEST STANDARD .....	37
4.4.5	TEST SETUP .....	37
4.4.6	EUT OPERATING CONDITIONS.....	37



4.4.7	TEST RESULTS .....	38
4.5	POWER SPECTRAL DENSITY MEASUREMENT .....	39
4.5.1	LIMITS OF POWER SPECTRAL DENSITY MEASUREMENT .....	39
4.5.2	TEST INSTRUMENTS .....	39
4.5.3	TEST PROCEDURE .....	40
4.5.4	DEVIATION FROM TEST STANDARD .....	40
4.5.5	TEST SETUP .....	40
4.5.6	EUT OPERATING CONDITION .....	40
4.5.7	TEST RESULTS .....	41
4.6	BAND EDGES MEASUREMENT .....	45
4.6.1	LIMITS OF BAND EDGES MEASUREMENT .....	45
4.6.2	TEST INSTRUMENTS .....	45
4.6.3	TEST PROCEDURE .....	45
4.6.4	DEVIATION FROM TEST STANDARD .....	45
4.6.5	EUT OPERATING CONDITION .....	46
4.6.6	TEST RESULTS .....	46
4.7	ANTENNA REQUIREMENT .....	49
4.7.1	STANDARD APPLICABLE .....	49
4.7.2	ANTENNA CONNECTED CONSTRUCTION .....	49
5.	TEST TYPES AND RESULTS (FOR PART 802.11a) .....	50
5.1	CONDUCTED EMISSION MEASUREMENT .....	50
5.1.1	LIMITS OF CONDUCTED EMISSION MEASUREMENT .....	50
5.1.2	TEST INSTRUMENTS .....	50
5.1.3	TEST PROCEDURES .....	51
5.1.4	DEVIATION FROM TEST STANDARD .....	51
5.1.5	TEST SETUP .....	52
5.1.6	EUT OPERATING CONDITIONS .....	52
5.1.7	TEST RESULTS .....	53
5.2	RADIATED EMISSION MEASUREMENT .....	55
5.2.1	LIMITS OF RADIATED EMISSION MEASUREMENT .....	55
5.2.2	LIMITS OF UNWANTED EMISSION OUT OF THE RESTRICTED BANDS .....	55
5.2.3	TEST INSTRUMENTS .....	56
5.2.4	TEST PROCEDURES .....	57
5.2.5	DEVIATION FROM TEST STANDARD .....	57
5.2.6	TEST SETUP .....	58
5.2.7	EUT OPERATING CONDITIONS .....	58
5.2.8	TEST RESULTS .....	59
5.2.9	TEST RESULTS .....	61
5.3	PEAK TRANSMIT POWER MEASUREMENT .....	68
5.3.1	LIMITS OF PEAK TRANSMIT POWER MEASUREMENT .....	68
5.3.2	TEST INSTRUMENTS .....	68
5.3.3	TEST PROCEDURE .....	69
5.3.4	DEVIATION FROM TEST STANDARD .....	69



5.3.5	TEST SETUP .....	69
5.3.6	EUT OPERATING CONDITIONS.....	69
5.3.7	TEST RESULTS .....	70
5.4	PEAK POWER EXCURSION MEASUREMENT.....	86
5.4.1	LIMITS OF PEAK POWER EXCURSION MEASUREMENT .....	86
5.4.2	TEST INSTRUMENTS .....	86
5.4.3	TEST PROCEDURE .....	87
5.4.4	DEVIATION FROM TEST STANDARD .....	87
5.4.5	TEST SETUP .....	87
5.4.6	EUT OPERATING CONDITIONS.....	87
5.4.7	TEST RESULTS .....	88
5.5	PEAK POWER SPECTRAL DENSITY MEASUREMENT .....	97
5.5.1	LIMITS OF PEAK POWER SPECTRAL DENSITY MEASUREMENT.....	97
5.5.2	TEST INSTRUMENTS .....	97
5.5.3	TEST PROCEDURES.....	98
5.5.4	DEVIATION FROM TEST STANDARD .....	98
5.5.5	TEST SETUP .....	98
5.5.6	EUT OPERATING CONDITIONS.....	98
5.5.7	TEST RESULTS .....	99
5.6	FREQUENCY STABILITY .....	108
5.6.1	LIMITS OF FREQUENCY STABILITY MEASUREMENT .....	108
5.6.2	TEST INSTRUMENTS .....	108
5.6.3	TEST PROCEDURE .....	108
5.6.4	DEVIATION FROM TEST STANDARD .....	108
5.6.5	TEST SETUP .....	109
5.6.6	EUT OPERATING CONDITION .....	109
5.6.7	TEST RESULTS .....	110
5.7	BAND EDGES MEASUREMENT .....	111
5.7.1	TEST INSTRUMENTS .....	111
5.7.2	TEST PROCEDURE .....	111
5.7.3	EUT OPERATING CONDITION .....	111
5.7.4	TEST RESULTS .....	111
5.8	ANTENNA REQUIREMENT.....	120
5.8.1	STANDARD APPLICABLE.....	120
5.8.2	ANTENNA CONNECTED CONSTRUCTION .....	120
6.	PHOTOGRAPHS OF THE TEST CONFIGURATION .....	121
7.	INFORMATION ON THE TESTING LABORATORIES .....	123



# 1. CERTIFICATION

**PRODUCT :** Dual-Band Wireless Access Point  
**BRAND NAME :** Linksys  
**MODEL NO. :** WAP51AB  
**APPLICANT :** The Linksys Group, Inc.  
**STANDARDS :** 47 CFR Part 15, Subpart C (Section 15.247),  
Subpart E (Section 15.407), ANSI C63.4-1992

We, **Advance Data Technology Corporation**, hereby certify that one sample of the designation has been tested in our facility from Oct. 7 ~ Nov. 17, 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 : Dec. 2, 2002  
Emily Lu

APPROVED BY : Dr. Alan Lane for , DATE : Dec. 2, 2002  
Dr. Alan Lane, Manager



## 2. SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

<b>APPLIED STANDARD: 47 CFR Part 15, Subpart C</b>			
<b>Standard Section</b>	<b>Test Type and Limit</b>	<b>Result</b>	<b>REMARK</b>
15.207	AC Power Conducted Emission	PASS	Meet the requirement of limit Minimum passing margin is -12.08dBuV at 2.164MHz
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)	Radiated Emissions Limit: Table 15.209	PASS	Meet the requirement of limit Minimum passing margin is -1.4dBuV at 873.00MHz
15.247(d)	Power Spectral Density Limit: max. 8dBm	PASS	Meet the requirement of limit
15.247(c)	Band Edge Measurement Limit: 20dB less than the peak value of fundamental frequency	PASS	Meet the requirement of limit



<b>APPLIED STANDARD: 47 CFR Part 15, Subpart E</b>			
<b>Standard Section</b>	<b>Test Type</b>	<b>Result</b>	<b>REMARK</b>
15.407(b)(5)	AC Power Conducted Emission	PASS	Meet the requirement of limit Minimum passing margin is -13.61dBuV at 0.611MHz
15.407(b/1/2/3)(b)(5)	Electric Field Strength Spurious Emissions, 30 MHz – 40000 MHz	PASS	Meet the requirement of limit Minimum passing margin is -1.4dBuV at 873.00MHz
15.407(a/1/2/3)	Peak Transmit Power	PASS	Meet the requirement of limit
15.407(a)(6)	Peak Power Excursion	PASS	Meet the requirement of limit
15.407(a/1/2/3)	Peak Power Spectral Density	PASS	Meet the requirement of limit
15.407(g)	Frequency Stability	PASS	Meet the requirement of limit



### 3. GENERAL INFORMATION

#### 3.1 GENERAL DESCRIPTION OF EUT

<b>PRODUCT</b>	Dual-Band Wireless Access Point
<b>MODEL NO.</b>	WAP51AB
<b>POWER SUPPLY</b>	5VDC from power adapter
<b>MODULATION</b>	802.11b: DSSS 802.11a: OFDM
<b>TRANSFER RATE</b>	802.11b: 1 / 2 / 5.5 / 11Mbps 802.11a: 6 to 54Mbps (Turbo mode: up to 72Mbps)
<b>FREQUENCY RANGE</b>	802.11b: 2412MHz ~ 2462MHz 802.11a: 5.15GHz ~ 5.35GHz
<b>NUMBER OF CHANNEL</b>	802.11b: 11 802.11a: 8 for Normal mode / 3 for Turbo mode
<b>CHANNEL SPACING</b>	802.11b: 5MHz 802.11a: 20MHz for Normal mode / 40MHz for Turbo mode
<b>OUTPUT POWER</b>	802.11b: 14.70dBm 802.11a: 15.00dBm
<b>DATA CABLE</b>	NA
<b>ANTENNA TYPE</b>	Dipole
<b>I/O PORTS</b>	RJ45
<b>ASSOCIATED DEVICES</b>	NA

**NOTE:**

1. The EUT was powered by the following AC adapter:

<b>BRAND :</b>	LINKSYS
<b>MODEL :</b>	MS15-050250-A1D
<b>INPUT :</b>	100-240Vac 50/60Hz 0.5A
<b>OUTPUT :</b>	5.0Vdc 2.5A

2. The EUT operates in both the 5GHz and 2.4GHz Bands and Wi-Fi compatibility with 802.11a and 802.11b technology.
3. For more detailed features description, please refer to the manufacturer's specifications or User's Manual.





### 3.2 DESCRIPTION OF TEST MODES

For 802.11b: Eleven channels are provided to 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.

For 802.11a: Eight channels are provided to this EUT for Normal mode.

Channel	Frequency	Channel	Frequency
1	5180 MHz	7	5300 MHz
2	5200 MHz	8	5320 MHz
3	5220 MHz		
4	5240 MHz		
5	5260 MHz		
6	5280 MHz		

Five channels are provided to this EUT for Turbo Mode.

Channel	Frequency	Channel	Frequency
1	5210 MHz	2	5250 MHz
3	5290 MHz		

**NOTE:**

1. The EUT was transmitting at full power on the specified channel with a duty cycle of 99% (maximum allowed). The EUT was tested in both normal mode (channel bandwidth of approximately 30MHz) and turbo mode (channel bandwidth of approximately 60MHz).
2. "Normal Mode" allows data rates of up to 54Mbps. The device was, therefore, tested in Normal mode at the data rate that produced the highest output power for normal mode (6Mbps).
3. "Turbo Mode" allows data rates of up to 72Mbps. At data rates higher than 12Mbps the PA gain is reduced to improve signal fidelity. The device was, therefore, tested in turbo mode at the data rate that produced the highest output power for turbo mode (12Mbps).
4. Channel 1, 4, 5 and 8 are the closest frequencies to the band edge, were chosen for final test of Normal Mode.
5. Channel 1 ~ 3 were chosen for final test of turbo mode.



### **3.3 GENERAL DESCRIPTION OF APPLIED STANDARDS**

The EUT is a Dual-Band Wireless Access Point. 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),  
Subpart E (15.407). 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-09C748-12800-19O-B220	FCC DoC APPROVED
2	USB 10/100 FAST ETHERNET	D-LINK	DU-E100	UR15001597	FCC DoC APPROVED

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	NA
2	NA

**NOTE:** All power cords of the above support units are non shielded (1.8m).



## 4. TEST TYPES AND RESULTS (FOR PART 802.11b)

### 4.1 CONDUCTED EMISSION MEASUREMENT

#### 4.1.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT

FREQUENCY OF EMISSION (MHz)	CONDUCTED LIMIT (dB $\mu$ 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. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50 MHz.
  3. All emanations from a class A/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	834115/016	Mar. 3, 2003
ROHDE & SCHWARZ Artificial Mains Network (For EUT)	ESH3-Z5	847265/023	Jan. 10, 2003
* ROHDE & SCHWARZ 4-wire ISN	ENY41	838119/028	Dec. 10, 2002
* ROHDE & SCHWARZ 2-wire ISN	ENY22	837497/018	Dec. 10, 2002
EMCO L.I.S.N. (For peripherals)	3825/2	9504-2359	July 10, 2003
Software	Cond-V2L	NA	NA
RF cable (JYEBAO)	5D-FB	Cable-C03.01	July 11, 2003
Terminator (For EMCO LISN)	NA	E1-01-300	Feb. 20, 2003
Terminator (For EMCO LISN)	NA	E1-01-301	Feb. 20, 2003
Shielded Room	Site 3	ADT-C03	NA
VCCI Site Registration No.	Site 3	C-274	NA

- NOTE:**
1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
  2. "\*": These equipment are used for conducted telecom port test only (if tested).
  3. The test was performed in ADT Open Site No. 3.



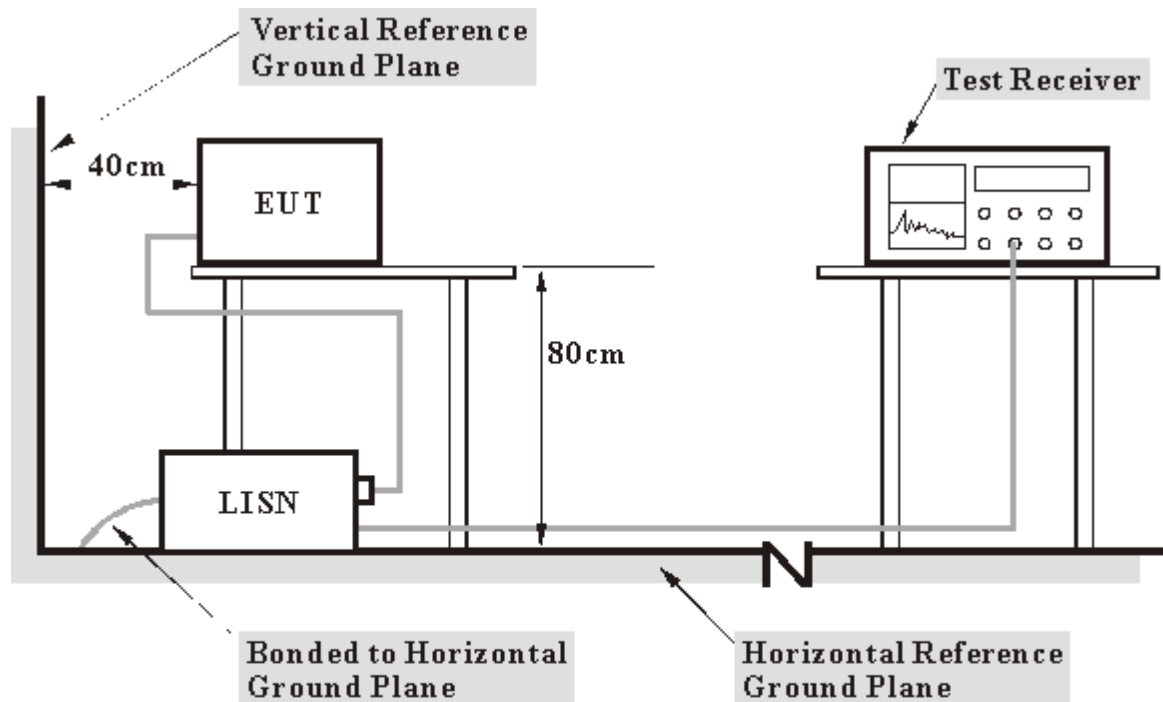
#### 4.1.3 TEST PROCEDURES

- 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. Placed the EUT on the testing table.
- b. Prepared another computer system to act as a communication partner and placed it outside of testing area.
- c. The communication partner run a test program to enable EUT under transmission/receiving condition continuously at specific channel frequency via an RJ 45 cable.
- d. The communication partner sent data to EUT by command "PIN".

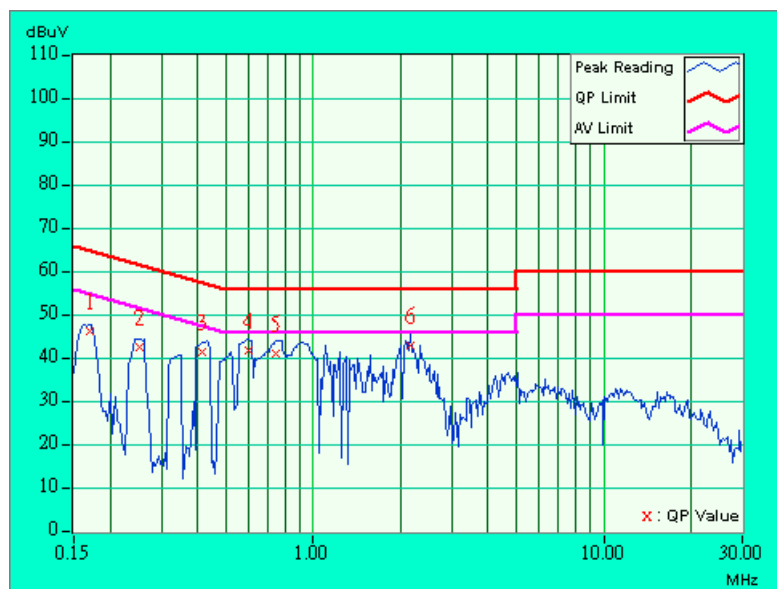


4.1.7 TEST RESULTS

<b>EUT</b>	Dual-Band Wireless Access Point	<b>MODEL</b>	WAP51AB
<b>MODE</b>	Channel 1	<b>6dB BANDWIDTH</b>	9 kHz
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60Hz	<b>PHASE</b>	Line (L)
<b>ENVIRONMENTAL CONDITIONS</b>	25deg. C, 60%RH, 1005 hPa	<b>TESTED BY:</b> Gary Chang	

No	Freq. (MHz)	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			QP.	AV.	QP.	AV.	QP.	AV.	QP.	AV.
1	0.170	0.10	46.07	-	46.17	-	64.98	54.98	-18.81	-
2	0.252	0.10	42.30	-	42.40	-	61.71	51.71	-19.31	-
3	0.416	0.10	41.24	-	41.34	-	57.54	47.54	-16.19	-
4	0.599	0.13	41.56	-	41.69	-	56.00	46.00	-14.31	-
5	0.748	0.16	40.93	-	41.09	-	56.00	46.00	-14.91	-
6	2.160	0.32	42.71	-	43.03	-	56.00	46.00	-12.97	-

- Remarks:
1. "\*\*": Undetectable
  2. QP. and AV. are abbreviations of quasi-peak and average individually.
  3. "-": NA
  4. The emission levels of other frequencies were very low against the limit.
  5. Margin value = Emission level - Limit value
  6. Emission Level = Correction Factor + Reading Value.

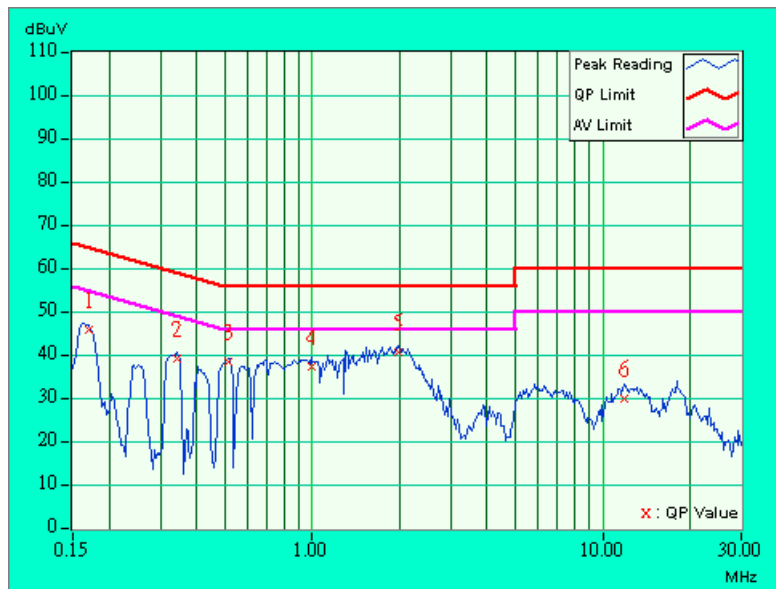




<b>EUT</b>	Dual-Band Wireless Access Point	<b>MODEL</b>	WAP51AB
<b>MODE</b>	Channel 1	<b>6dB BANDWIDTH</b>	9 kHz
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60Hz	<b>PHASE</b>	Neutral (N)
<b>ENVIRONMENTAL CONDITIONS</b>	25deg. C, 60%RH, 1005 hPa	<b>TESTED BY:</b> Gary Chang	

No	Freq. (MHz)	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			QP.	AV.	QP.	AV.	QP.	AV.	QP.	AV.
1	0.170	0.10	45.43	-	45.53	-	64.98	54.98	-19.45	-
2	0.341	0.10	38.81	-	38.91	-	59.17	49.17	-20.26	-
3	0.513	0.12	37.97	-	38.09	-	56.00	46.00	-17.91	-
4	0.994	0.20	36.94	-	37.14	-	56.00	46.00	-18.86	-
5	1.980	0.30	40.12	-	40.42	-	56.00	46.00	-15.58	-
6	11.922	0.44	29.66	-	30.10	-	60.00	50.00	-29.90	-

- Remarks:
1. "\*\*": Undetectable
  2. QP. and AV. are abbreviations of quasi-peak and average individually.
  3. "-": NA
  4. The emission levels of other frequencies were very low against the limit.
  5. Margin value = Emission level - Limit value
  6. Emission Level = Correction Factor + Reading Value.



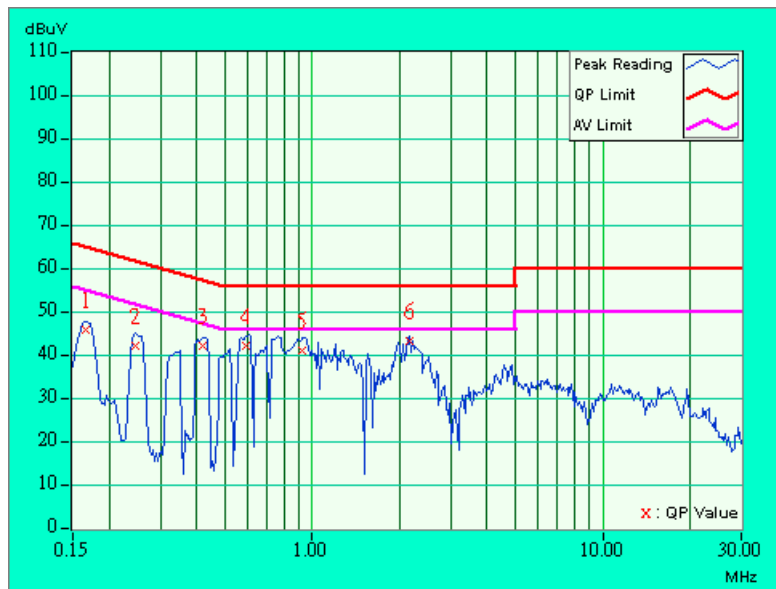




<b>EUT</b>	Dual-Band Wireless Access Point	<b>MODEL</b>	WAP51AB
<b>MODE</b>	Channel 6	<b>6dB BANDWIDTH</b>	9 kHz
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60Hz	<b>PHASE</b>	Line (L)
<b>ENVIRONMENTAL CONDITIONS</b>	25deg. C, 60%RH, 1005 hPa	<b>TESTED BY:</b> Gary Chang	

No	Freq. (MHz)	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			QP.	AV.	QP.	AV.	QP.	AV.	QP.	AV.
1	0.166	0.10	45.51	-	45.61	-	65.18	55.18	-19.57	-
2	0.248	0.10	42.02	-	42.12	-	61.84	51.84	-19.72	-
3	0.420	0.10	41.96	-	42.06	-	57.46	47.46	-15.39	-
4	0.591	0.13	41.94	-	42.07	-	56.00	46.00	-13.93	-
5	0.923	0.19	40.91	-	41.10	-	56.00	46.00	-14.90	-
6	2.164	0.32	43.17	-	43.49	-	56.00	46.00	-12.51	-

- Remarks:
1. "\*\*": Undetectable
  2. QP. and AV. are abbreviations of quasi-peak and average individually.
  3. "-": NA
  4. The emission levels of other frequencies were very low against the limit.
  5. Margin value = Emission level - Limit value
  6. Emission Level = Correction Factor + Reading Value.

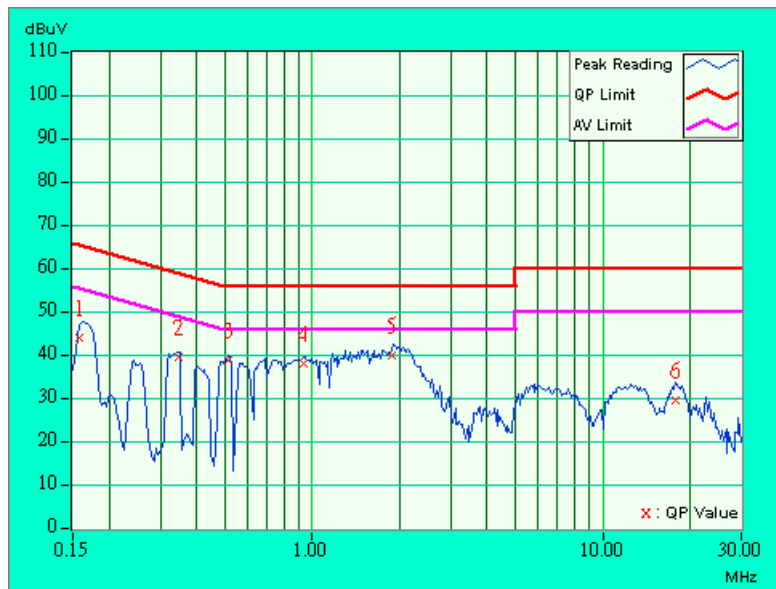




<b>EUT</b>	Dual-Band Wireless Access Point	<b>MODEL</b>	WAP51AB
<b>MODE</b>	Channel 6	<b>6dB BANDWIDTH</b>	9 kHz
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60Hz	<b>PHASE</b>	Neutral (N)
<b>ENVIRONMENTAL CONDITIONS</b>	25deg. C, 60%RH, 1005 hPa	<b>TESTED BY:</b> Gary Chang	

No	Freq. (MHz)	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			QP.	AV.	QP.	AV.	QP.	AV.	QP.	AV.
1	0.158	0.10	43.41	-	43.51	-	65.58	55.58	-22.07	-
2	0.345	0.10	39.14	-	39.24	-	59.07	49.07	-19.83	-
3	0.517	0.12	38.18	-	38.30	-	56.00	46.00	-17.70	-
4	0.931	0.19	37.70	-	37.89	-	56.00	46.00	-18.11	-
5	1.879	0.29	39.63	-	39.92	-	56.00	46.00	-16.08	-
6	17.738	0.55	28.98	-	29.53	-	60.00	50.00	-30.47	-

- Remarks:
1. "": Undetectable
  2. QP. and AV. are abbreviations of quasi-peak and average individually.
  3. "-": NA
  4. The emission levels of other frequencies were very low against the limit.
  5. Margin value = Emission level - Limit value
  6. Emission Level = Correction Factor + Reading Value.

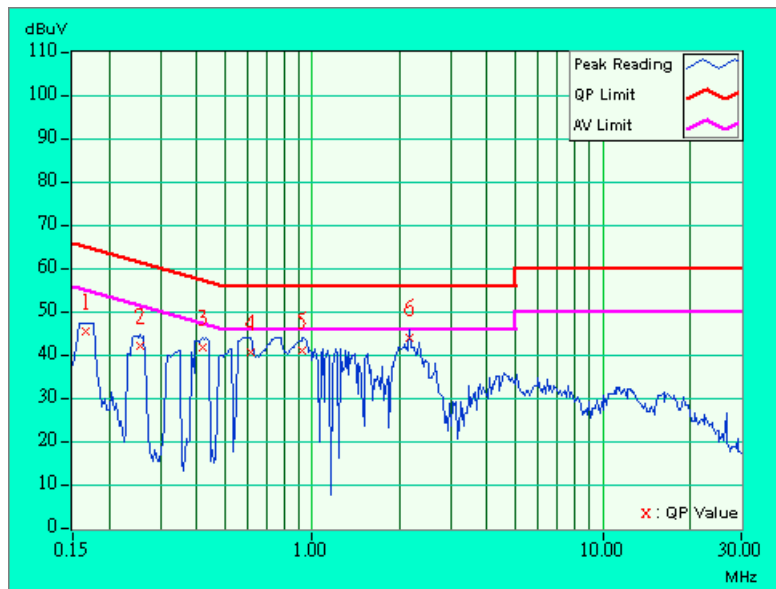




<b>EUT</b>	Dual-Band Wireless Access Point	<b>MODEL</b>	WAP51AB
<b>MODE</b>	Channel 11	<b>6dB BANDWIDTH</b>	9 kHz
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60Hz	<b>PHASE</b>	Line (L)
<b>ENVIRONMENTAL CONDITIONS</b>	25deg. C, 60%RH, 1005 hPa	<b>TESTED BY:</b> Gary Chang	

No	Freq. (MHz)	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			QP.	AV.	QP.	AV.	QP.	AV.	QP.	AV.
1	0.166	0.10	45.37	-	45.47	-	65.18	55.18	-19.71	-
2	0.255	0.10	41.97	-	42.07	-	61.58	51.58	-19.51	-
3	0.420	0.10	41.72	-	41.82	-	57.46	47.46	-15.63	-
4	0.611	0.14	40.57	-	40.71	-	56.00	46.00	-15.29	-
5	0.923	0.19	40.87	-	41.06	-	56.00	46.00	-14.94	-
6	2.164	0.32	43.60	-	43.92	-	56.00	46.00	-12.08	-

- Remarks:
1. "": Undetectable
  2. QP. and AV. are abbreviations of quasi-peak and average individually.
  3. "-": NA
  4. The emission levels of other frequencies were very low against the limit.
  5. Margin value = Emission level - Limit value
  6. Emission Level = Correction Factor + Reading Value.

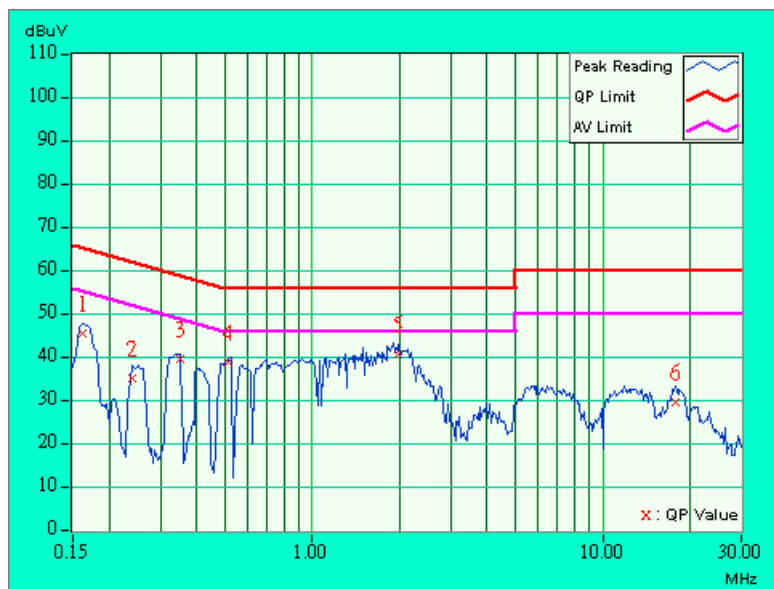




<b>EUT</b>	Dual-Band Wireless Access Point	<b>MODEL</b>	WAP51AB
<b>MODE</b>	Channel 11	<b>6dB BANDWIDTH</b>	9 kHz
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60Hz	<b>PHASE</b>	Neutral (N)
<b>ENVIRONMENTAL CONDITIONS</b>	25deg. C, 60%RH, 1005 hPa	<b>TESTED BY:</b> Gary Chang	

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]		QP.	AV.	QP.	AV.	QP.	AV.	QP.	AV.
1	0.162	0.10	45.12	-	45.22	-	65.38	55.38	-20.16	-
2	0.240	0.10	34.45	-	34.55	-	62.10	52.10	-27.55	-
3	0.349	0.10	39.18	-	39.28	-	58.98	48.98	-19.70	-
4	0.517	0.12	38.18	-	38.30	-	56.00	46.00	-17.70	-
5	1.984	0.30	40.15	-	40.45	-	56.00	46.00	-15.55	-
6	17.848	0.56	29.14	-	29.70	-	60.00	50.00	-30.30	-

- Remarks:
1. "\*" : Undetectable
  2. QP. and AV. are abbreviations of quasi-peak and average individually.
  3. "-" : NA
  4. The emission levels of other frequencies were very low against the limit.
  5. Margin value = Emission level - Limit value
  6. Emission Level = Correction Factor + Reading Value.





## 4.2 RADIATED EMISSION MEASUREMENT

### 4.2.1 LIMITS OF RADIATED EMISSION MEASUREMENT

Emissions radiated outside of the specified bands, shall be according to the general radiated limits in 15.209 as following:

Frequencies (MHz)	Field strength (microvolts/meter)	Measurement distance (meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

**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	Apr. 29, 2003
* HP Preamplifier	8449B	3008A01201	Dec. 06, 2002
* HP Preamplifier	8449B	3008A01292	Aug. 7, 2003
* ROHDE & SCHWARZ TEST RECEIVER	ESMI	839013/007 839379/002	Jan. 27, 2003
SCHWARZBECK Tunable Dipole Antenna	VHA 9103 UHA 9105	E101051 E101055	Nov. 23, 2003
* CHASE BILOG Antenna	CBL6112A	2221	Aug. 2, 2003
* SCHWARZBECK Horn Antenna	BBHA9120-D1	D130	Jul. 3, 2003
* EMCO Horn Antenna	3115	9312-4192	Apr. 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	Jul. 12, 2003
Open Field Test Site	Site 5	ADT-R05	Jul. 19, 2003
VCCI Site Registration No.	Site 5	R-1039	NA

- NOTE:** 1. The calibration interval of the above test instruments is 12 months. And the calibrations are traceable to NML/ROC and NIST/USA.
2. "\*" = These equipment are used for the final measurement.
3. The horn antenna and HP preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
4. 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 the quasi-peak method or average method as specified and then reported in Data sheet peak mode and QP mode.

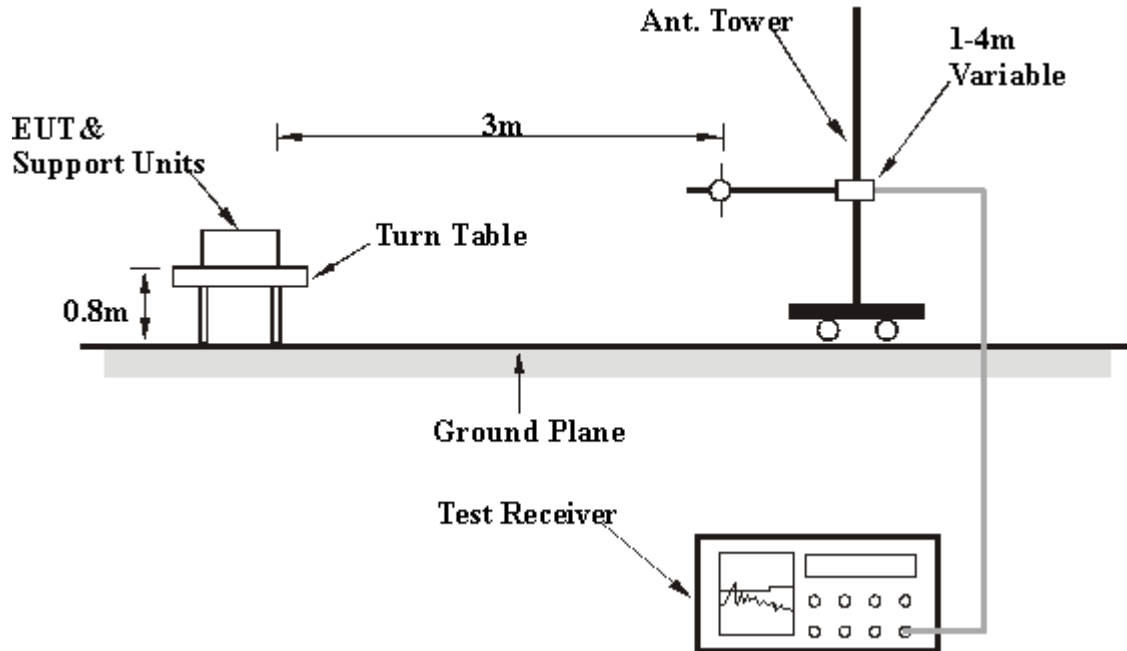
**NOTE:**

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection at frequency below 1GHz.
2. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1 MHz for Peak detection (PK) 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 4.1.6





## 4.2.7 TEST RESULTS

<b>EUT</b>	Dual-Band Wireless Access Point	<b>MODEL</b>	WAP51AB
<b>MODE</b>	Channel 11	<b>FREQUENCY RANGE</b>	30-1000 MHz
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60Hz	<b>DETECTOR FUNCTION</b>	Quasi-Peak
<b>ENVIRONMENTAL CONDITIONS</b>	25deg. C, 60%RH, 1005 hPa	<b>TESTED BY:</b> Gary Chang	

**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/m)	Cable Factor (dB)	Pre-Amp. Factor (dB)	Correction Factor (dB/m)
1	143.00	31.5 QP	43.50	-12.00	1.11H	216	19.73	10.58	1.19	0.00	-11.77
2	156.00	30.4 QP	43.50	-13.10	1.06H	89	19.42	9.88	1.10	0.00	-10.99
3	280.80	35.0 QP	46.00	-11.00	1.15H	308	20.91	12.71	1.38	0.00	-14.09
4	343.00	33.0 QP	46.00	-13.00	1.21H	359	17.48	14.07	1.45	0.00	-15.52
5	375.00	30.6 QP	46.00	-15.40	1.24H	116	13.97	15.13	1.50	0.00	-16.63
6	436.50	32.0 QP	46.00	-14.00	1.07H	201	14.11	16.30	1.59	0.00	-17.89
7	475.00	31.0 QP	46.00	-15.00	1.30H	132	12.49	16.83	1.68	0.00	-18.51
8	500.00	27.5 QP	46.00	-18.50	1.30H	309	8.49	17.26	1.75	0.00	-19.01
9	624.00	39.0 QP	46.00	-7.00	1.73H	3	18.12	18.91	1.97	0.00	-20.88
10	750.00	27.0 QP	46.00	-19.00	1.28H	2	4.64	20.18	2.18	0.00	-22.37
11	750.00	29.0 QP	46.00	-17.00	1.28H	40	6.64	20.18	2.18	0.00	-22.37
12	811.23	43.5 QP	46.00	-2.50	1.03H	214	20.55	20.64	2.31	0.00	-22.95
13	873.60	44.6 QP	46.00	-1.40	1.20H	251	21.60	20.63	2.40	0.00	-23.03
14	904.00	39.5 QP	46.00	-6.50	1.07H	297	16.23	20.82	2.44	0.00	-23.27
15	967.00	42.0 QP	54.00	-12.00	1.03H	145	18.21	21.26	2.53	0.00	-23.79

- NOTE:**
- 1 Emission level = Raw Value - Correction Factor
  - 2 Correction Factor = External Preamp. Gain - Ant. Factor - Cable loss  
(External Preamp. Gain = 0, when the test receiver is used for the test.)
  - 3 The other emission levels were very low against the limit.
  - 4 Margin value = Emission level - Limit value



<b>EUT</b>	Dual-Band Wireless Access Point	<b>MODEL</b>	WAP51AB
<b>MODE</b>	Channel 11	<b>FREQUENCY RANGE</b>	30-1000 MHz
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60Hz	<b>DETECTOR FUNCTION</b>	Quasi-Peak
<b>ENVIRONMENTAL CONDITIONS</b>	25deg. C, 60%RH, 1005 hPa	<b>TESTED BY:</b> Gary Chang	

**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/m)	Cable Factor (dB)	Pre-Amp. Factor (dB)	Correction Factor (dB/m)
1	64.00	34.0 QP	40.00	-6.00	1.64V	223	27.27	5.74	0.99	0.00	-6.73
2	125.00	30.2 QP	43.50	-13.30	1.00V	143	17.76	11.47	0.97	0.00	-12.44
3	136.00	30.0 QP	43.50	-13.50	1.47V	97	17.88	10.95	1.17	0.00	-12.12
4	280.80	29.0 QP	46.00	-17.00	1.54V	309	14.91	12.71	1.38	0.00	-14.09
5	375.00	35.5 QP	46.00	-10.50	1.76V	305	18.87	15.13	1.50	0.00	-16.63
6	468.00	33.6 QP	46.00	-12.40	1.08V	236	15.24	16.70	1.66	0.00	-18.36
7	500.00	33.0 QP	46.00	-13.00	1.09V	148	13.99	17.26	1.75	0.00	-19.01
8	531.00	35.0 QP	46.00	-11.00	1.07V	7	15.51	17.69	1.80	0.00	-19.49
9	561.50	33.0 QP	46.00	-13.00	1.00V	334	13.06	18.09	1.85	0.00	-19.94
10	624.00	39.0 QP	46.00	-7.00	1.56V	14	18.12	18.91	1.97	0.00	-20.89
11	625.00	30.0 QP	46.00	-16.00	1.12V	7	9.12	18.91	1.97	0.00	-20.89
12	748.82	39.7 QP	46.00	-6.30	1.08V	36	17.38	20.14	2.17	0.00	-22.33
13	811.25	39.0 QP	46.00	-7.00	1.29V	278	16.05	20.64	2.31	0.00	-22.95
14	873.00	44.4 QP	46.00	-1.60	1.48V	109	21.40	20.63	2.40	0.00	-23.03
15	998.00	46.0 QP	54.00	-8.00	1.53V	36	21.99	21.35	2.66	0.00	-24.01

- NOTE:**
- 1 Emission level = Raw Value - Correction Factor
  - 2 Correction Factor = External Preamp. Gain - Ant. Factor - Cable loss  
(External Preamp. Gain = 0, when the test receiver is used for the test.)
  - 3 The other emission levels were very low against the limit.
  - 4 Margin value = Emission level - Limit value



<b>EUT</b>	Dual-Band Wireless Access Point	<b>MODEL</b>	WAP51AB
<b>MODE</b>	Channel 1	<b>FREQUENCY RANGE</b>	Above 1000 MHz
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60Hz	<b>DETECTOR FUNCTION</b>	Peak(PK) Average (AV)
<b>ENVIRONMENTAL CONDITIONS</b>	25deg. C, 60%RH, 1005 hPa	<b>TESTED BY:</b> Gary Chang	

**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/m)	Cable Factor (dB)	Pre-Amp. Factor (dB)	Correction Factor (dB/m)
1	2381.00	43.2 PK	74.00	-30.80	1.52H	7	50.00	27.52	2.40	36.73	6.80
2	*2412.00	97.7 PK			1.31H	359	104.20	27.67	2.53	36.72	6.52
3	*2412.00	91.0 AV			1.31H	359	97.50	27.67	2.53	36.72	6.52
4	4824.00	44.5 PK	74.00	-29.50	1.19H	3	45.70	31.52	4.01	36.70	1.18
5	7239.00	48.0 PK	74.00	-26.00	1.53H	9	43.20	36.20	5.58	37.00	-4.79

**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/m)	Cable Factor (dB)	Pre-Amp. Factor (dB)	Correction Factor (dB/m)
1	2374.00	45.2 PK	74.00	-28.80	1.29V	3	52.00	27.52	2.40	36.73	6.80
2	*2412.00	102.9 AV			1.00V	358	109.40	27.67	2.53	36.72	6.52
3	*2412.00	109.7 PK			1.00V	358	116.20	27.67	2.53	36.72	6.52
4	4824.00	45.6 PK	74.00	-28.40	1.88V	348	46.80	31.52	4.01	36.70	1.18
5	7239.00	48.3 PK	74.00	-25.70	1.12V	12	43.50	36.20	5.58	37.00	-4.78

- NOTE:**
1. Emission level = Raw Value - Correction Factor
  2. Correction Factor = External Preamp. Gain - Ant. Factor - Cable loss  
(External Preamp. Gain = 0, when the test receiver is used for the test.)
  3. The other emission levels were very low against the limit.
  4. Margin value = Emission level - Limit value
  5. The limit value is defined as per 15.247
  6. " \* " : Fundamental frequency



<b>EUT</b>	Dual-Band Wireless Access Point	<b>MODEL</b>	WAP51AB
<b>MODE</b>	Channel 6	<b>FREQUENCY RANGE</b>	Above 1000 MHz
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60Hz	<b>DETECTOR FUNCTION</b>	Peak(PK) Average (AV)
<b>ENVIRONMENTAL CONDITIONS</b>	25deg. C, 60%RH, 1005 hPa	<b>TESTED BY:</b> Gary Chang	

#### 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/m)	Cable Factor (dB)	Pre-Amp. Factor (dB)	Correction Factor (dB/m)
1	*2437.00	94.8 AV			1.00H	252	101.00	27.81	2.66	36.71	6.24
2	*2437.00	101.8 PK			1.00H	252	108.00	27.81	2.66	36.71	6.24
3	4874.00	45.1 PK	74.00	-28.90	1.69H	20	46.20	31.59	4.03	36.70	1.08
4	7311.00	48.9 PK	74.00	-25.10	1.31H	356	44.00	36.26	5.65	37.02	-4.90

#### 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/m)	Cable Factor (dB)	Pre-Amp. Factor (dB)	Correction Factor (dB/m)
1	*2437.00	109.2 PK			1.01V	10	115.40	27.81	2.66	36.71	6.24
2	*2437.00	102.2 AV			1.01V	10	108.40	27.81	2.66	36.71	6.24
3	4874.00	48.1 PK	74.00	-25.90	1.38V	334	49.20	31.59	4.03	36.70	1.08
4	7311.00	48.9 PK	74.00	-25.10	1.49V	18	44.00	36.26	5.65	37.02	-4.90

- NOTE:**
1. Emission level = Raw Value - Correction Factor
  2. Correction Factor = External Preamp. Gain - Ant. Factor - Cable loss  
(External Preamp. Gain = 0, when the test receiver is used for the test.)
  3. The other emission levels were very low against the limit.
  4. Margin value = Emission level - Limit value
  5. The limit value is defined as per 15.247
  6. " \* " : Fundamental frequency



<b>EUT</b>	Dual-Band Wireless Access Point	<b>MODEL</b>	WAP51AB
<b>MODE</b>	Channel 11	<b>FREQUENCY RANGE</b>	Above 1000 MHz
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60Hz	<b>DETECTOR FUNCTION</b>	Peak(PK) Average (AV)
<b>ENVIRONMENTAL CONDITIONS</b>	25deg. C, 60%RH, 1005 hPa	<b>TESTED BY:</b> Gary Chang	

**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/m)	Cable Factor (dB)	Pre-Amp. Factor (dB)	Correction Factor (dB/m)
1	*2462.00	92.8 AV			1.26H	348	99.00	27.81	2.66	36.71	6.24
2	*2462.00	99.8 PK			1.26H	348	106.00	27.81	2.66	36.71	6.24
3	2492.00	44.4 PK	74.00	-29.60	1.39H	289	50.40	27.96	2.78	36.70	5.96
4	4924.00	46.2 PK	74.00	-27.80	1.31H	234	47.20	31.66	4.06	36.70	0.99
5	7387.00	48.6 PK	74.00	-25.40	1.28H	185	43.50	36.40	5.79	37.05	-5.14

**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/m)	Cable Factor (dB)	Pre-Amp. Factor (dB)	Correction Factor (dB/m)
1	*2463.00	107.8 PK			1.26V	103	114.00	27.81	2.66	36.71	6.24
2	*2463.00	98.8 AV			1.26V	103	105.00	27.81	2.66	36.71	6.24
3	2492.00	48.0 PK	74.00	-26.00	1.29V	74	54.00	27.96	2.78	36.70	5.96
4	4924.00	45.0 PK	74.00	-29.00	1.27V	76	46.00	31.66	4.06	36.70	0.99
5	7387.00	50.1 PK	74.00	-23.90	1.31V	131	45.00	36.40	5.79	37.05	-5.14

- NOTE:**
1. Emission level= Raw Value - Correction Factor
  2. Correction Factor = External Preamp. Gain - Ant. Factor - Cable loss  
(External Preamp. Gain = 0, when the test receiver is used for the test.)
  3. The other emission levels were very low against the limit.
  4. Margin value = Emission level - Limit value
  5. The limit value is defined as per 15.247
  6. " \* " : Fundamental frequency



### 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:** 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 100kHz RBW and 100kHz VBW. The 6dB 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



### 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

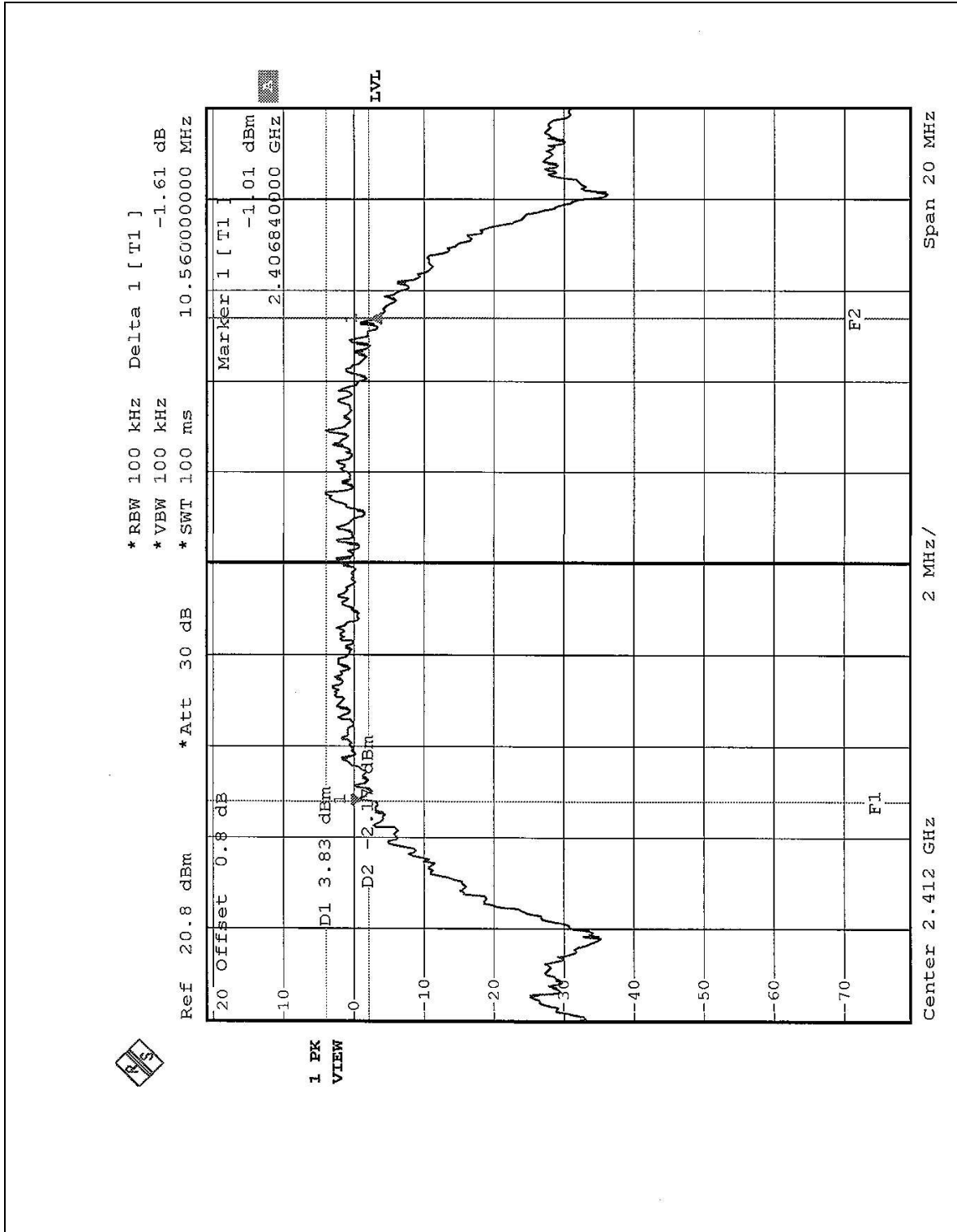
<b>EUT</b>	Dual-Band Wireless Access Point	<b>MODEL</b>	WAP51AB
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60Hz	<b>ENVIRONMENTAL CONDITIONS</b>	21deg. C, 69%RH, 1005 hPa
<b>TESTED BY:</b> Steven Lu			

<b>CHANNEL</b>	<b>CHANNEL FREQUENCY (MHz)</b>	<b>6dB BANDWIDTH (MHz)</b>	<b>MINIMUM LIMIT (MHz)</b>	<b>PASS/FAIL</b>
1	2412	10.56	0.5	PASS
6	2437	10.52	0.5	PASS
11	2462	10.56	0.5	PASS



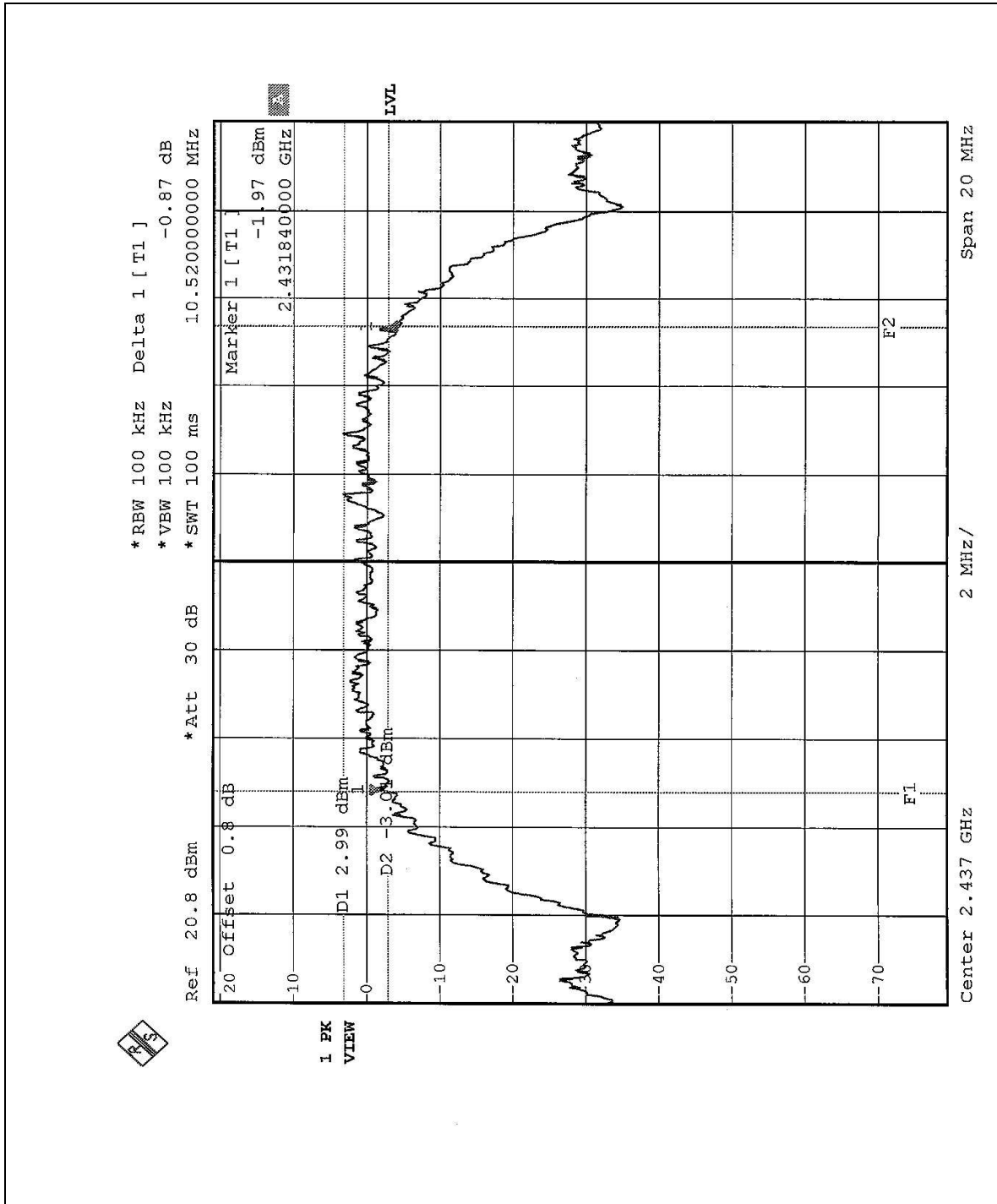


CH1



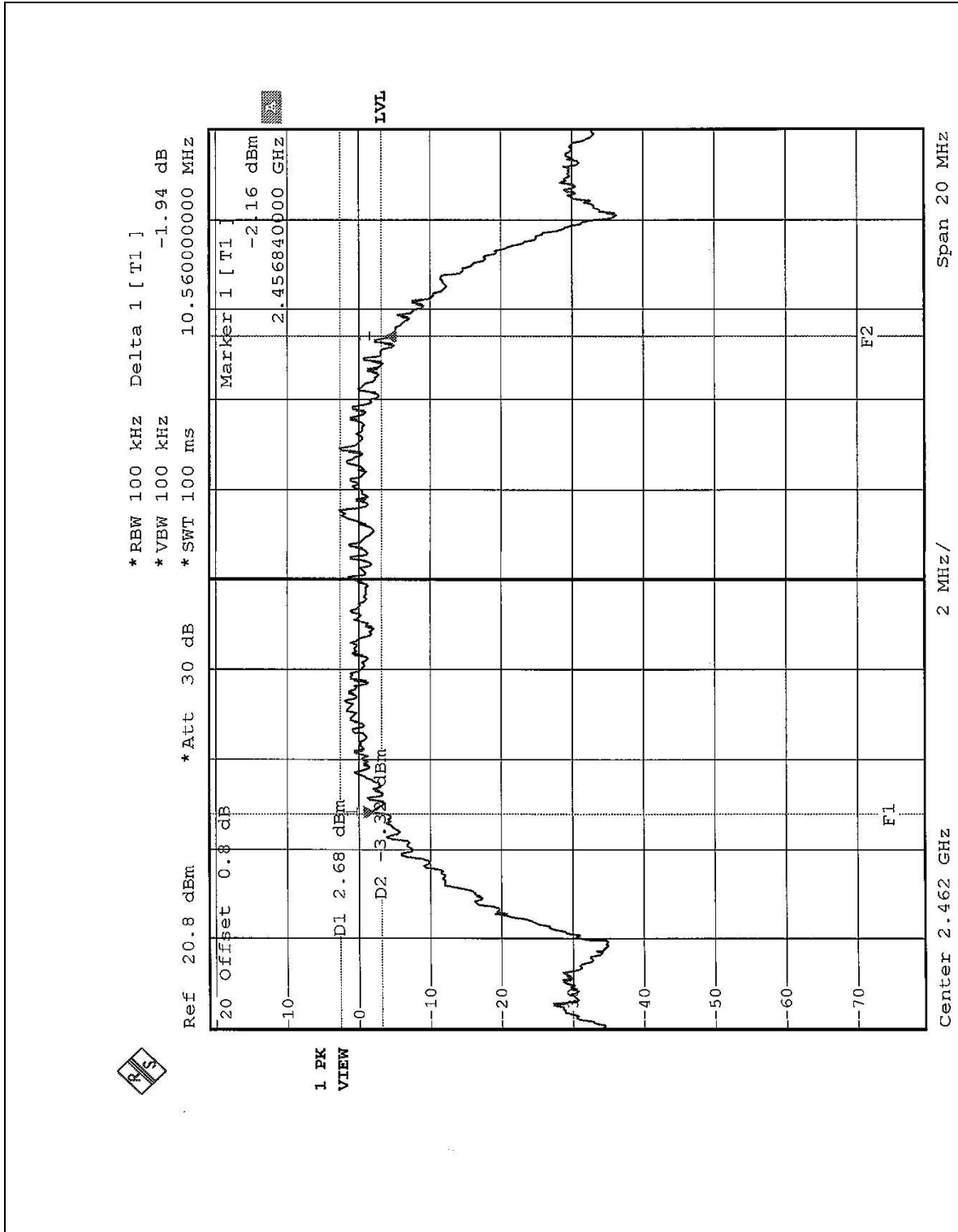


CH6





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 INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
SINGLE CHANNEL POWER METER	NRVS	100026	Feb. 23, 2003
PEAK POWER SENSOR	NRV-Z32	100013	Feb. 23, 2003

**NOTE:** 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

<b>EUT</b>	Dual-Band Wireless Access Point	<b>MODEL</b>	WAP51AB
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60Hz	<b>ENVIRONMENTAL CONDITIONS</b>	21deg.C, 69%RH, 1005 hPa
<b>TESTED BY:</b> Steven Lu			

<b>CHANNEL</b>	<b>CHANNEL FREQUENCY (MHz)</b>	<b>PEAK POWER OUTPUT (dBm)</b>	<b>PEAK POWER LIMIT (dBm)</b>	<b>PASS/FAIL</b>
1	2412	14.62	30	PASS
6	2437	14.70	30	PASS
11	2462	14.22	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:** 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

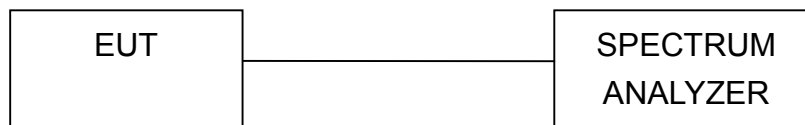
The transmitter output was connected to the spectrum analyzer through an attenuator, the bandwidth of the fundamental frequency was measured with the spectrum analyzer using 3 kHz RBW and 30 kHz VBW, set sweep time = span/3 kHz. The power spectral density was measured and recorded.

The sweep time is allowed to be longer than span/3 kHz 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 CONDITION

Same as Item 4.3.6





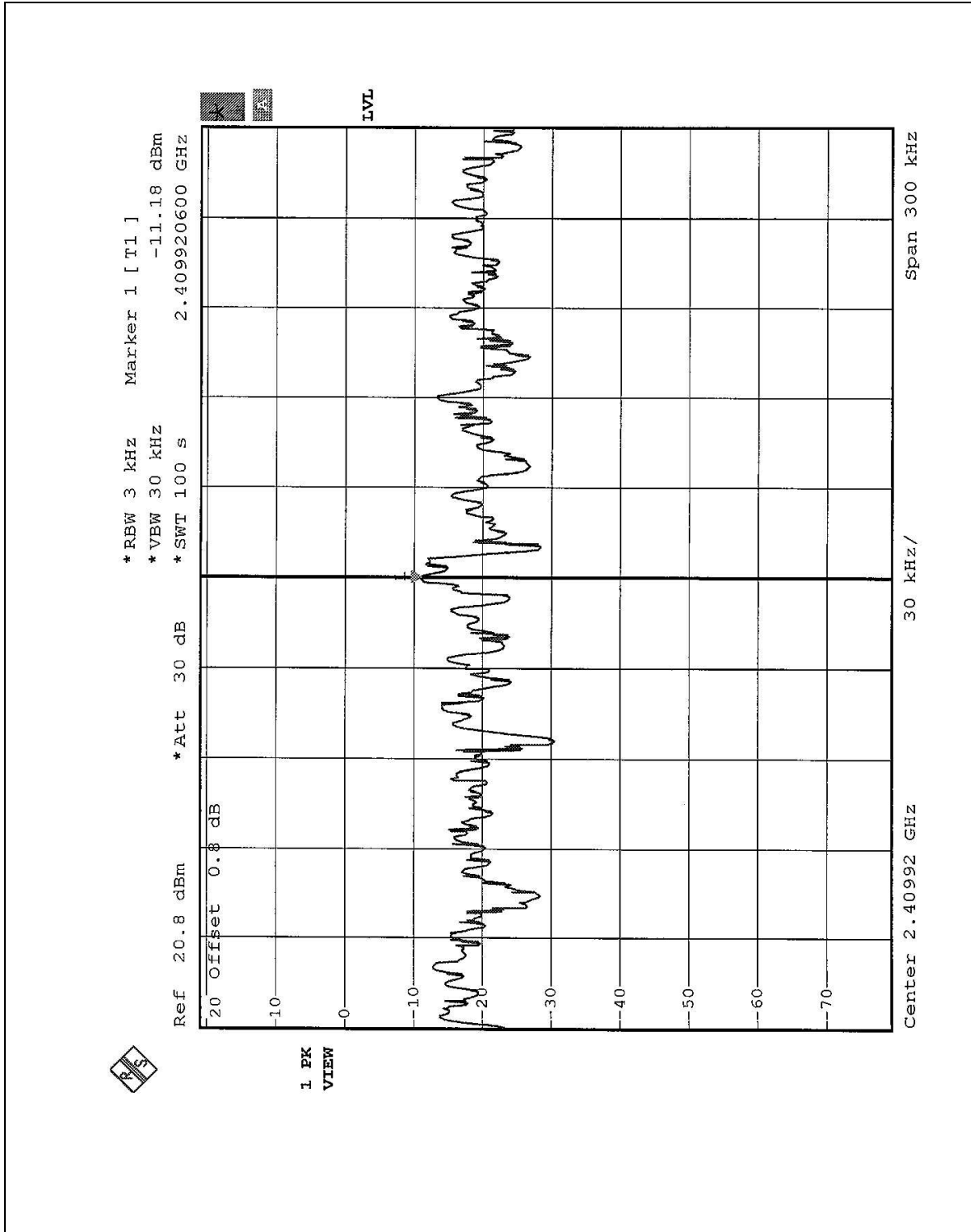
## 4.5.7 TEST RESULTS

<b>EUT</b>	Dual-Band Wireless Access Point	<b>MODEL</b>	WAP51AB
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60Hz	<b>ENVIRONMENTAL CONDITIONS</b>	21deg. C, 69%RH, 1005 hPa
<b>TESTED BY:</b> Steven Lu			

<b>CHANNEL NUMBER</b>	<b>CHANNEL FREQUENCY (MHz )</b>	<b>RF POWER LEVEL IN 3 kHz BW (dBm)</b>	<b>MAXIMUM LIMIT (dBm)</b>	<b>PASS/FAIL</b>
1	2412	-11.18	8	PASS
6	2437	-11.91	8	PASS
11	2462	-11.96	8	PASS

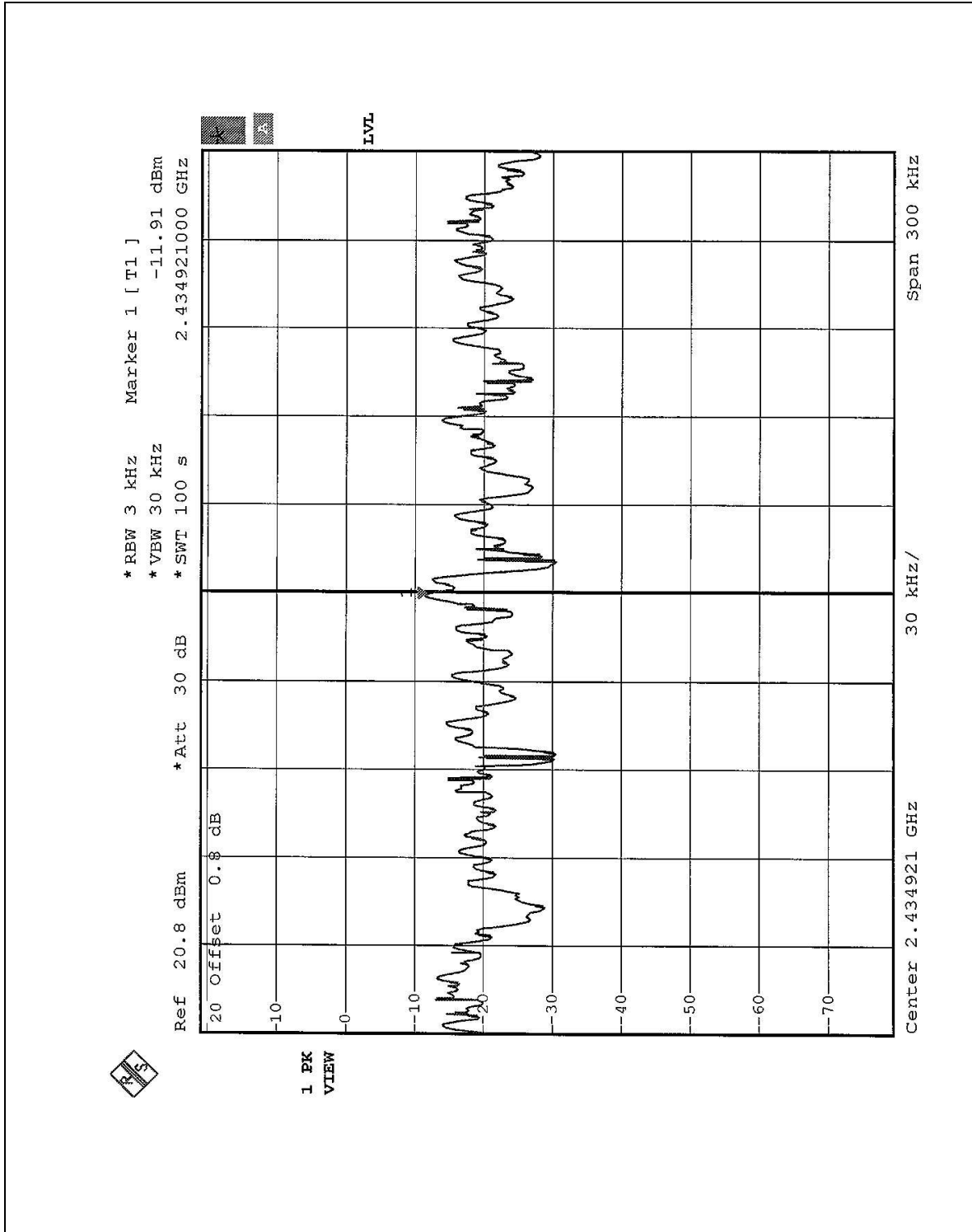


CH1



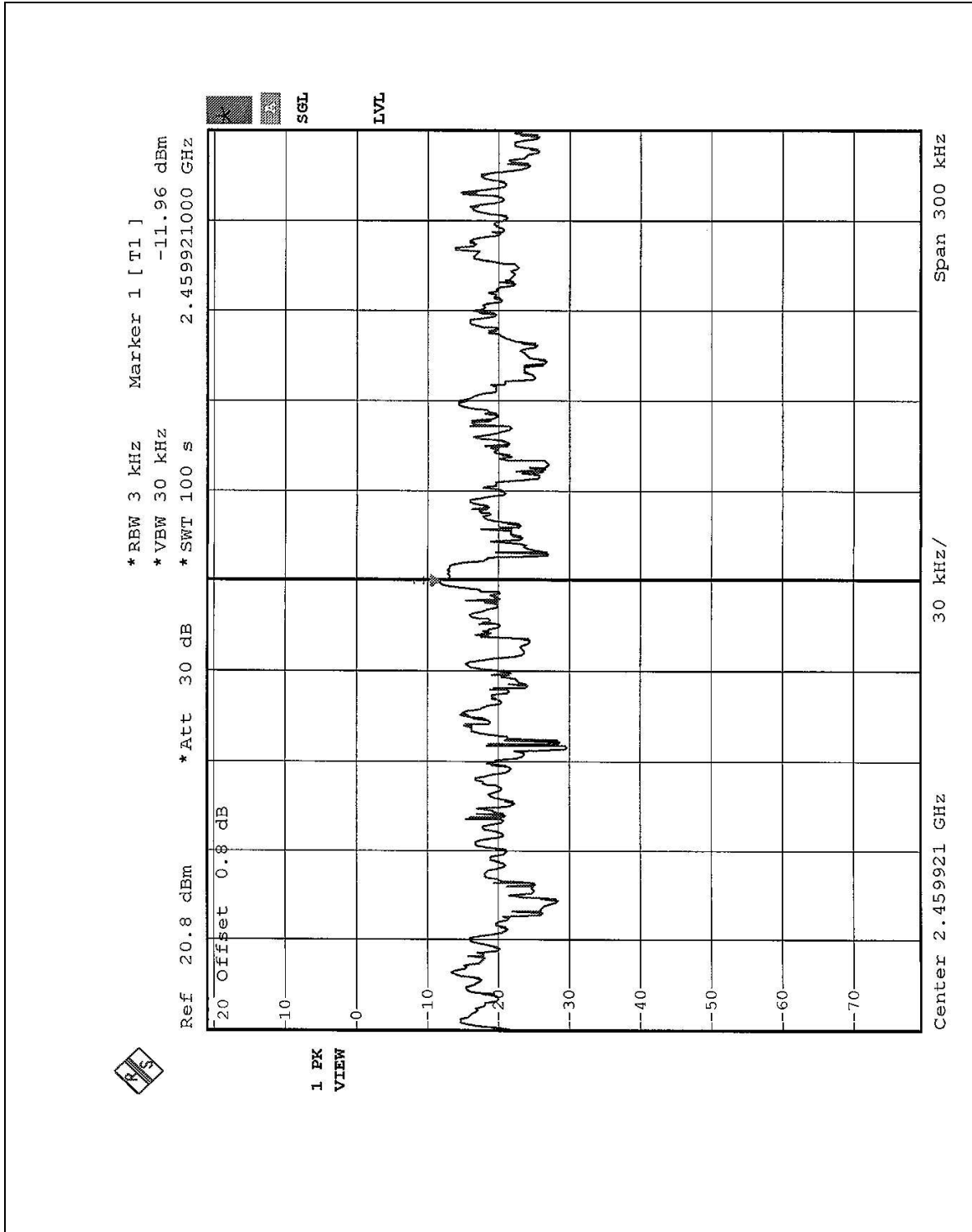


CH6





CH11





## 4.6 BAND EDGES MEASUREMENT

### 4.6.1 LIMITS OF BAND EDGES MEASUREMENT

Below  $-20\text{dB}$  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:** 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 DEVIATION FROM TEST STANDARD

No deviation



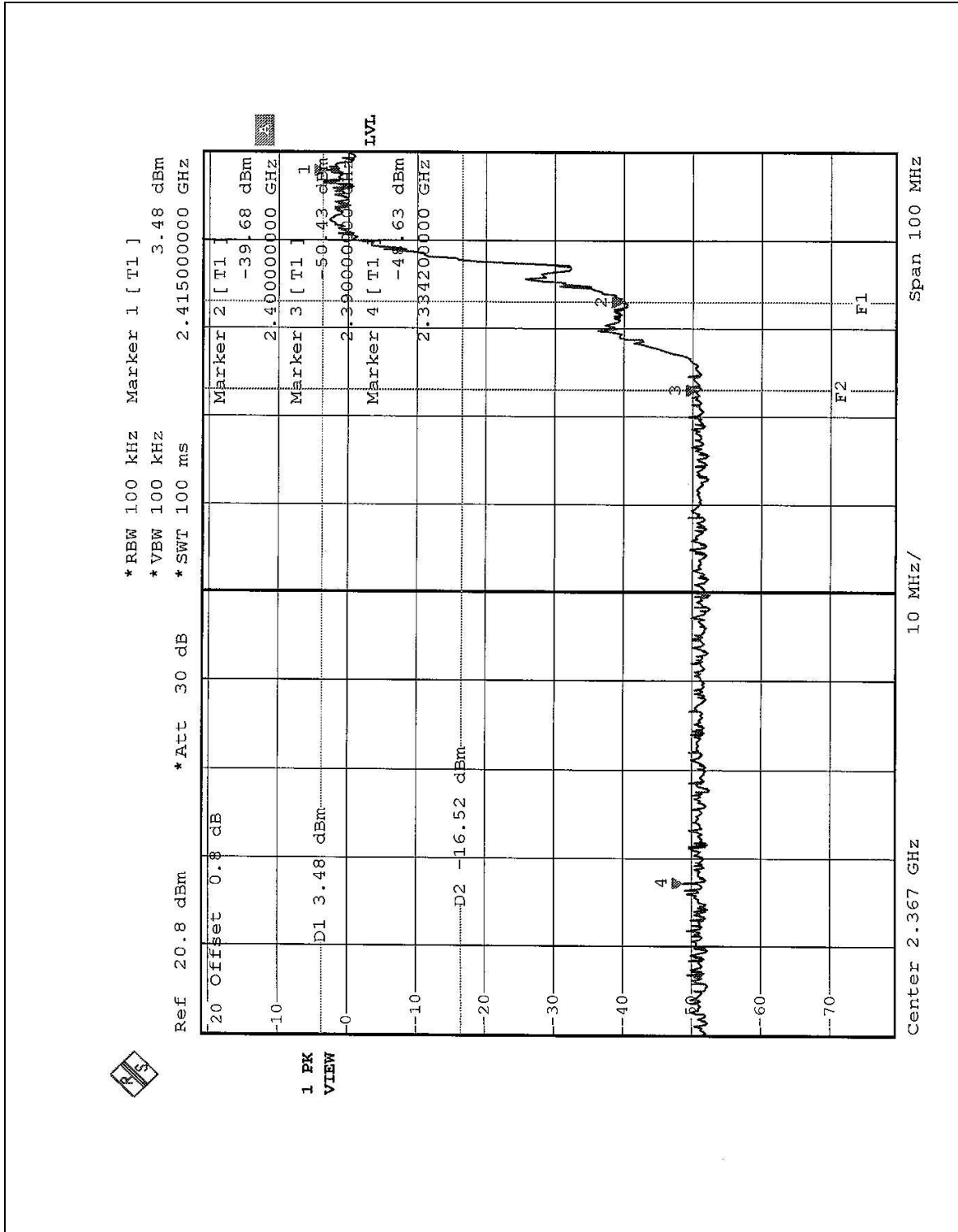
#### 4.6.5 EUT OPERATING CONDITION

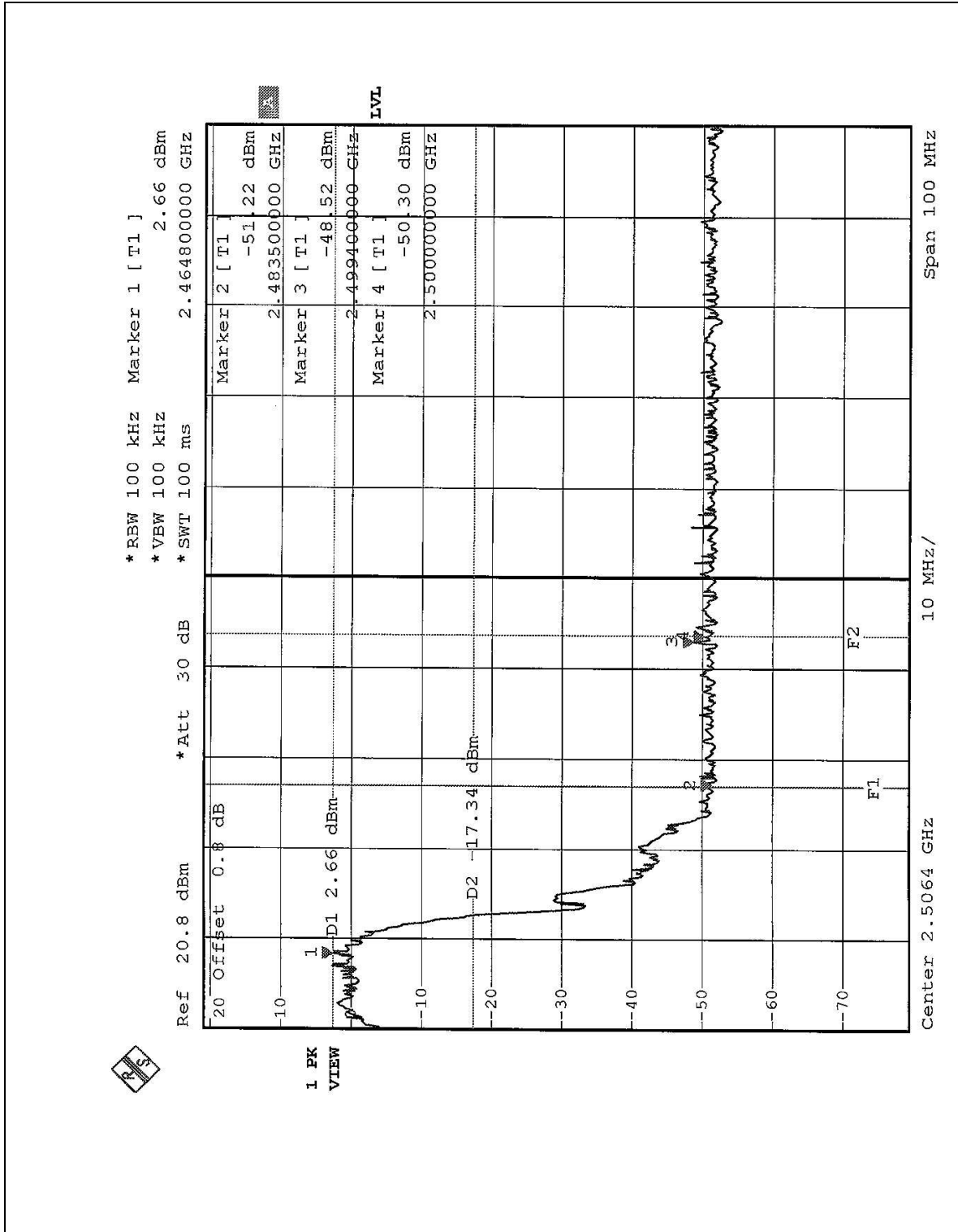
Same as Item 4.3.6

#### 4.6.6 TEST RESULTS

The spectrum plots are attached on the following 2 pages. D2 line indicates the highest level, and 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 52.11dB/ 51.18dB delta between carrier maximum power and local maximum emission in restrict band (2.3342GHz / 2.4994GHz). The emission of carrier strength list in the test result of channel 1 at the item 4.2.7 is 102.9dBuV/m, so the maximum field strength in restrict band is  $102.9 - 52.11 = 50.79$ dBuV/m which is under 54dBuV/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 Dipole Antenna without antenna connector. The maximum Gain of the antenna is 1dBi only.



## 5. TEST TYPES AND RESULTS (FOR PART 802.11a)

### 5.1 CONDUCTED EMISSION MEASUREMENT

#### 5.1.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT

FREQUENCY OF EMISSION (MHz)	CONDUCTED LIMIT (dB $\mu$ 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. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50 MHz.
  3. All emanations from a class A/B digital device or system, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strengths specified above.

#### 5.1.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
ROHDE & SCHWARZ Test Receiver	ESCS30	834115/016	Mar. 3, 2003
ROHDE & SCHWARZ Artificial Mains Network (For EUT)	ESH3-Z5	847265/023	Jan. 10, 2003
* ROHDE & SCHWARZ 4-wire ISN	ENY41	838119/028	Dec. 10, 2002
* ROHDE & SCHWARZ 2-wire ISN	ENY22	837497/018	Dec. 10, 2002
EMCO L.I.S.N. (For peripherals)	3825/2	9504-2359	July 10, 2003
Software	Cond-V2L	NA	NA
RF cable (JYEBAO)	5D-FB	Cable-C03.01	July 11, 2003
Terminator (For EMCO LISN)	NA	E1-01-300	Feb. 20, 2003
Terminator (For EMCO LISN)	NA	E1-01-301	Feb. 20, 2003
Shielded Room	Site 3	ADT-C03	NA
VCCI Site Registration No.	Site 3	C-274	NA

- NOTE:**
1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
  2. "\*": These equipment are used for conducted telecom port test only (if tested).
  3. The test was performed in ADT Open Site No. 3.



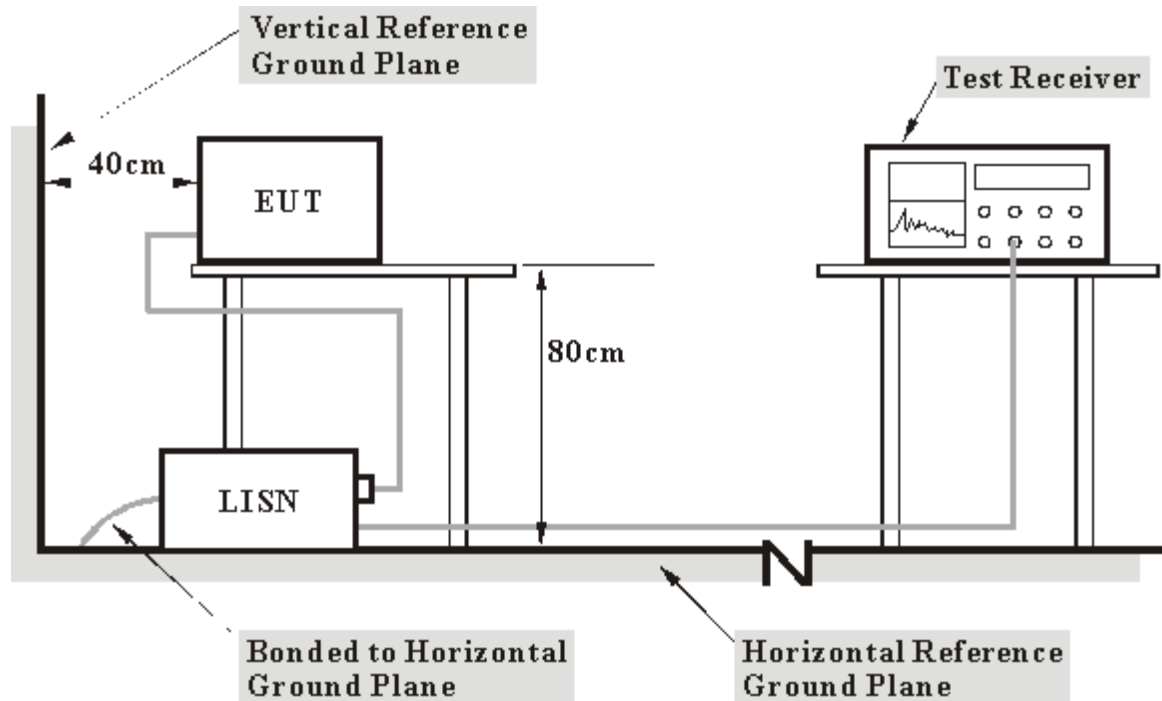
### 5.1.3 TEST PROCEDURES

- 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

### 5.1.4 DEVIATION FROM TEST STANDARD

No deviation

### 5.1.5 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.

### 5.1.6 EUT OPERATING CONDITIONS

Same as 4.1.6.



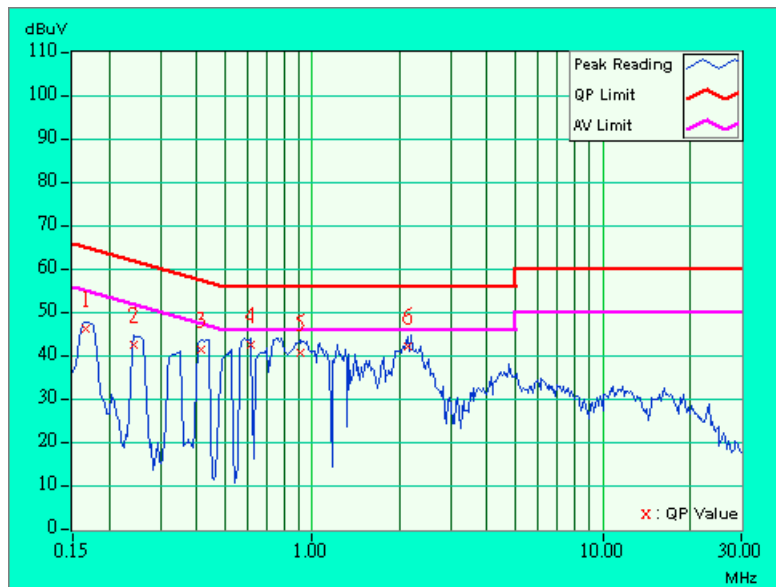
5.1.7 TEST RESULTS

<b>EUT</b>	Dual-Band Wireless Access Point	<b>MODEL</b>	WAP51AB
		<b>6dB BANDWIDTH</b>	9 kHz
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60 Hz	<b>PHASE</b>	Line (L)
<b>ENVIRONMENTAL CONDITIONS</b>	25deg. C, 60%RH, 1005 hPa	<b>TESTED BY:</b> Gary Chang	

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.166	0.10	46.07	-	46.17	-	65.18	55.18	-19.01	-
2	0.244	0.10	42.10	-	42.20	-	61.97	51.97	-19.77	-
3	0.416	0.10	41.24	-	41.34	-	57.54	47.54	-16.19	-
4	0.611	0.14	42.25	-	42.39	-	56.00	46.00	-13.61	-
5	0.908	0.18	40.34	-	40.52	-	56.00	46.00	-15.48	-
6	2.133	0.31	41.84	-	42.15	-	56.00	46.00	-13.85	-

**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.



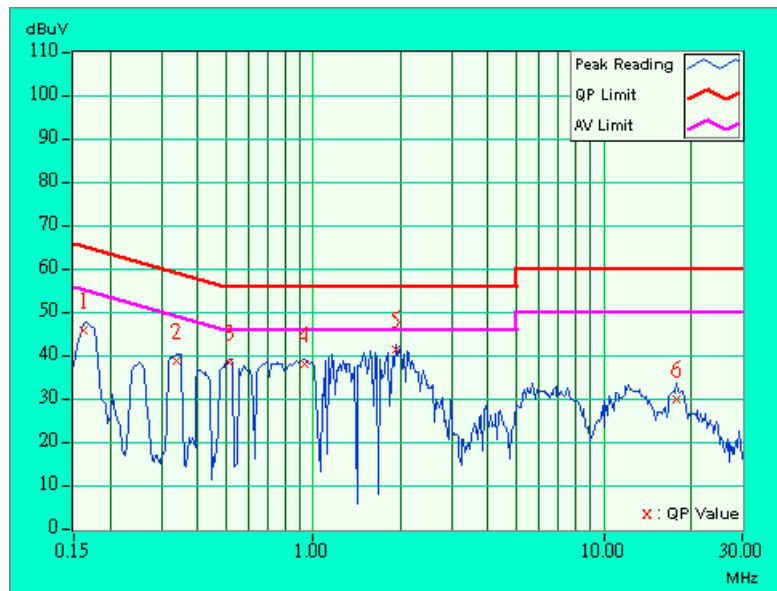


<b>EUT</b>	Dual-Band Wireless Access Point	<b>MODEL</b>	WAP51AB
		<b>6dB BANDWIDTH</b>	9 kHz
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60 Hz	<b>PHASE</b>	Neutral (N)
<b>ENVIRONMENTAL CONDITIONS</b>	25deg. C, 60%RH, 1005 hPa	<b>TESTED BY:</b> Gary Chang	

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	45.41	-	45.51	-	65.38	55.38	-19.87	-
2	0.338	0.10	38.48	-	38.58	-	59.26	49.26	-20.68	-
3	0.517	0.12	37.87	-	37.99	-	56.00	46.00	-18.01	-
4	0.935	0.19	37.42	-	37.61	-	56.00	46.00	-18.39	-
5	1.922	0.29	41.01	-	41.30	-	56.00	46.00	-14.70	-
6	17.793	0.56	29.27	-	29.83	-	60.00	50.00	-30.17	-

**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.





## 5.2 RADIATED EMISSION MEASUREMENT

### 5.2.1 LIMITS OF RADIATED EMISSION MEASUREMENT

Emissions radiated outside of the specified bands, shall be according to the general radiated limits in 15.209 as following:

Frequencies (MHz)	Field strength (microvolts/meter)	Measurement distance (meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

**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.

### 5.2.2 LIMITS OF UNWANTED EMISSION OUT OF THE RESTRICTED BANDS

Frequencies (MHz)	EIRP Limit (dBm)	Equivalent Field Strength at 3m (dBμV/m) *note 3
5150~5250	-27	68.3
5250~5350	-27	68.3
5725~5825	-27 *note 1	68.3
	-17 *note 2	78.3

**NOTE:**

1. For frequencies 10MHz or greater above or below the band edge.
2. All emissions within the frequency range from the band edge to 10MHz above or below the band edge.
3. The following formula is used to convert the equipment isotropic radiated power (eirp) to field strength

$$E = \frac{1000000\sqrt{30P}}{3} \mu\text{V/m}, \quad \text{where } P \text{ is the eirp (Watts)}$$



## 5.2.3 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
* HP Spectrum Analyzer	8590L	3544A01176	May 13, 2003
* HP Preamplifier	8447D	2944A08485	Apr. 29, 2003
* HP Preamplifier	8449B	3008A01201	Dec. 06, 2002
* HP Preamplifier	8449B	3008A01292	Aug. 7, 2003
* ROHDE & SCHWARZ TEST RECEIVER	ESMI	839013/007 839379/002	Jan. 27, 2003
SCHWARZBECK Tunable Dipole Antenna	VHA 9103 UHA 9105	E101051 E101055	Nov. 23, 2003
* CHASE BILOG Antenna	CBL6112A	2221	Aug. 2, 2003
* SCHWARZBECK Horn Antenna	BBHA9120-D1	D130	Jul. 3, 2003
* EMCO Horn Antenna	3115	9312-4192	Apr. 9, 2003
SCHWARZBECK Horn Antenna	BBHA9170	148	May 24, 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	Jul. 12, 2003
Open Field Test Site	Site 5	ADT-R05	Jul. 19, 2003
VCCI Site Registration No.	Site 5	R-1039	NA

- NOTE:** 1. The calibration interval of the above test instruments is 12 months. And the calibrations are traceable to NML/ROC and NIST/USA.
2. "\*" = These equipment are used for the final measurement.
3. The horn antenna and HP preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
4. The test was performed in ADT Open Site No. 5.





#### 5.2.4 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 10dB 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 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

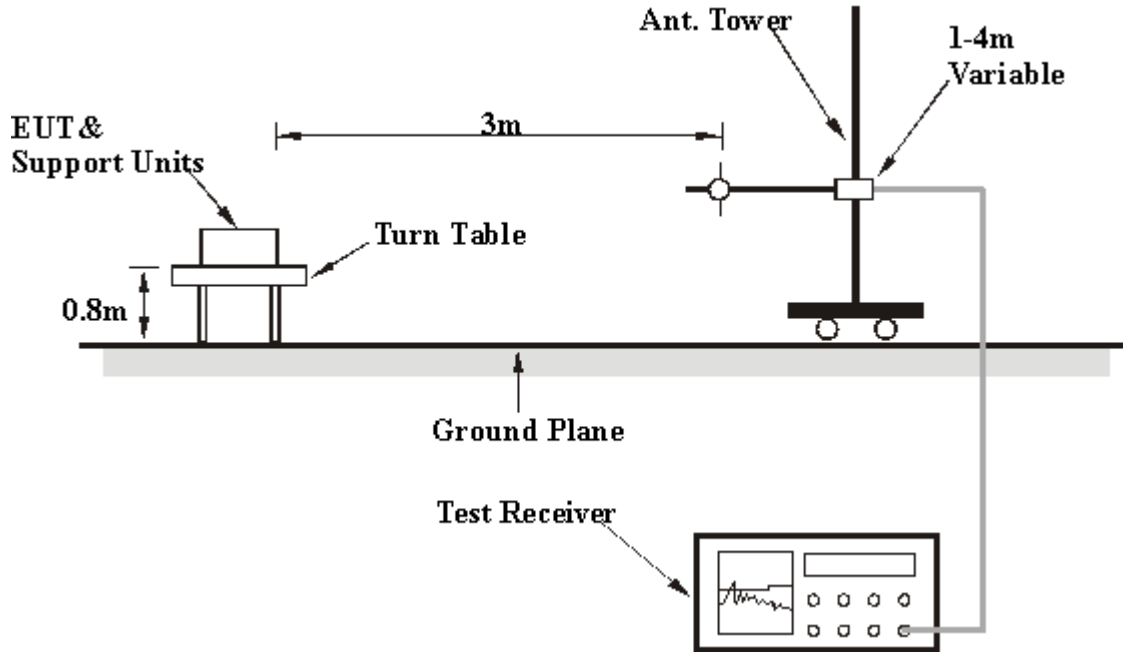
**NOTE:**

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.

#### 5.2.5 DEVIATION FROM TEST STANDARD

No deviation

### 5.2.6 TEST SETUP



For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

### 5.2.7 EUT OPERATING CONDITIONS

Same as 4.1.6.



## 5.2.8 TEST RESULTS

<b>EUT</b>	Dual-Band Wireless Access Point	<b>MODEL</b>	WAP51AB
<b>FREQUENCY RANGE</b>	30-1000 MHz	<b>DETECTOR FUNCTION</b>	Quasi-Peak
<b>ENVIRONMENTAL CONDITIONS</b>	25 deg. C, 60%RH, 1050 hPa	<b>INPUT POWER (SYSTEM)</b>	120Vac, 60Hz
<b>TESTED BY</b>	Gary Chang		

**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	143.00	31.5 QP	43.50	-12.00	1.11H	216	19.73	10.58	1.19	0.00	-11.77
2	156.00	30.4 QP	43.50	-13.10	1.06H	89	19.42	9.88	1.10	0.00	-10.99
3	280.80	35.0 QP	46.00	-11.00	1.15H	308	20.91	12.71	1.38	0.00	-14.09
4	343.00	33.0 QP	46.00	-13.00	1.21H	359	17.48	14.07	1.45	0.00	-15.52
5	375.00	30.6 QP	46.00	-15.40	1.24H	116	13.97	15.13	1.50	0.00	-16.63
6	436.50	32.0 QP	46.00	-14.00	1.07H	201	14.11	16.30	1.59	0.00	-17.89
7	475.00	31.0 QP	46.00	-15.00	1.30H	132	12.49	16.83	1.68	0.00	-18.51
8	500.00	27.5 QP	46.00	-18.50	1.30H	309	8.49	17.26	1.75	0.00	-19.01
9	624.00	39.0 QP	46.00	-7.00	1.73H	3	18.12	18.91	1.97	0.00	-20.88
10	750.00	27.0 QP	46.00	-19.00	1.28H	2	4.64	20.18	2.18	0.00	-22.37
11	750.00	29.0 QP	46.00	-17.00	1.28H	40	6.64	20.18	2.18	0.00	-22.37
12	811.23	43.5 QP	46.00	-2.50	1.03H	214	20.55	20.64	2.31	0.00	-22.95
13	873.60	44.6 QP	46.00	-1.40	1.20H	251	21.60	20.63	2.40	0.00	-23.03
14	904.00	39.5 QP	46.00	-6.50	1.07H	297	16.23	20.82	2.44	0.00	-23.27
15	967.00	42.0 QP	54.00	-12.00	1.03H	145	18.21	21.26	2.53	0.00	-23.79

**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.



<b>EUT</b>	Dual-Band Wireless Access Point	<b>MODEL</b>	WAP51AB
<b>FREQUENCY RANGE</b>	30-1000 MHz	<b>DETECTOR FUNCTION</b>	Quasi-Peak
<b>ENVIRONMENTAL CONDITIONS</b>	25 deg. C, 60%RH, 1050 hPa	<b>INPUT POWER (SYSTEM)</b>	120Vac, 60Hz
<b>TESTED BY</b>	Gary Chang		

<b>ANTENNA POLARITY &amp; TEST DISTANCE: VERTICAL AT 3 M</b>											
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	64.00	34.0 QP	40.00	-6.00	1.64V	223	27.27	5.74	0.99	0.00	-6.73
2	125.00	30.2 QP	43.50	-13.30	1.00V	143	17.76	11.47	0.97	0.00	-12.44
3	136.00	30.0 QP	43.50	-13.50	1.47V	97	17.88	10.95	1.17	0.00	-12.12
4	280.80	29.0 QP	46.00	-17.00	1.54V	309	14.91	12.71	1.38	0.00	-14.09
5	375.00	35.5 QP	46.00	-10.50	1.76V	305	18.87	15.13	1.50	0.00	-16.63
6	468.00	33.6 QP	46.00	-12.40	1.08V	236	15.24	16.70	1.66	0.00	-18.36
7	500.00	33.0 QP	46.00	-13.00	1.09V	148	13.99	17.26	1.75	0.00	-19.01
8	531.00	35.0 QP	46.00	-11.00	1.07V	7	15.51	17.69	1.80	0.00	-19.49
9	561.50	33.0 QP	46.00	-13.00	1.00V	334	13.06	18.09	1.85	0.00	-19.94
10	624.00	39.0 QP	46.00	-7.00	1.56V	14	18.12	18.91	1.97	0.00	-20.89
11	625.00	30.0 QP	46.00	-16.00	1.12V	7	9.12	18.91	1.97	0.00	-20.89
12	748.82	39.7 QP	46.00	-6.30	1.08V	36	17.38	20.14	2.17	0.00	-22.33
13	811.25	39.0 QP	46.00	-7.00	1.29V	278	16.05	20.64	2.31	0.00	-22.95
14	873.00	44.4 QP	46.00	-1.60	1.48V	109	21.40	20.63	2.40	0.00	-23.03
15	998.00	46.0 QP	54.00	-8.00	1.53V	36	21.99	21.35	2.66	0.00	-24.01

**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.



5.2.9 TEST RESULTS

<b>EUT</b>	Dual-Band Wireless Access Point	<b>MODEL</b>	WAP51AB
<b>MODE</b>	Normal Mode	<b>CHANNEL</b>	1
<b>FREQUENCY RANGE</b>	Above 1000 MHz	<b>DETECTOR FUNCTION</b>	Peak(PK) Average (AV)
<b>ENVIRONMENTAL CONDITIONS</b>	25 deg. C, 60%RH, 1050 hPa	<b>INPUT POWER (SYSTEM)</b>	120Vac, 60Hz
<b>TESTED BY</b>	Gary Chang		

**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)	Remark
1	5150.00	54.2 PK	74.00	-19.80	1.04H	133	55.02	31.87	3.95	36.63	0.82	NOTE 6
2	5150.00	41.0 AV	54.00	-13.00	1.04H	133	41.82	31.87	3.95	36.63	0.82	NOTE 6
3	*5180.00	93.2 PK			1.07H	141	57.38	31.87	3.95	0.00	-35.82	
4	*5180.00	83.0 AV			1.07H	141	47.18	31.87	3.95	0.00	-35.82	
5	10360.00	61.4 PK	68.30	-6.90	1.00H	150	52.97	39.16	6.69	37.42	-8.43	

**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)	Remark
1	5150.00	69.2 PK	74.00	-4.80	1.01V	105	70.02	31.87	3.95	36.63	0.82	NOTE 6
2	5150.00	49.0 AV	54.00	-5.00	1.01V	105	49.82	31.87	3.95	36.63	0.82	NOTE 6
3	*5180.00	91.2 AV			1.13V	91	55.38	31.87	3.95	0.00	-35.82	
4	*5180.00	101.2 PK			1.13V	91	65.38	31.87	3.95	0.00	-35.82	
5	10360.00	65.4 PK	68.30	-2.90	1.11V	78	56.97	39.16	6.69	37.42	-8.44	

**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.
5. "\*" : Fundamental frequency
6. The radiated frequency falling in the restricted band.



<b>EUT</b>	Dual-Band Wireless Access Point	<b>MODEL</b>	WAP51AB
<b>MODE</b>	Normal Mode	<b>CHANNEL</b>	4
<b>FREQUENCY RANGE</b>	Above 1000 MHz	<b>DETECTOR FUNCTION</b>	Peak(PK) Average (AV)
<b>ENVIRONMENTAL CONDITIONS</b>	25 deg. C, 60%RH, 1050 hPa	<b>INPUT POWER (SYSTEM)</b>	120Vac, 60Hz
<b>TESTED BY</b>	Gary Chang		

#### 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	*5240.00	97.2 PK			1.18H	75	61.44	31.90	3.86	0.00	-35.76
2	*5240.00	87.2 AV			1.18H	75	51.44	31.90	3.86	0.00	-35.76
3	10480.00	61.2 PK	68.30	-7.10	1.15H	40	52.04	39.36	7.14	37.32	-9.19

#### 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	*5240.00	101.2 PK			1.09V	66	65.44	31.90	3.86	0.00	-35.76
2	*5240.00	92.2 AV			1.09V	66	56.44	31.90	3.86	0.00	-35.76
3	10480.00	65.2 PK	68.30	-3.10	1.13V	53	56.01	39.36	7.14	37.32	-9.19

#### 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.
5. "\*" : Fundamental frequency



<b>EUT</b>	Dual-Band Wireless Access Point	<b>MODEL</b>	WAP51AB
<b>MODE</b>	Normal Mode	<b>CHANNEL</b>	5
<b>FREQUENCY RANGE</b>	Above 1000 MHz	<b>DETECTOR FUNCTION</b>	Peak(PK) Average (AV)
<b>ENVIRONMENTAL CONDITIONS</b>	25 deg. C, 60%RH, 1050 hPa	<b>INPUT POWER (SYSTEM)</b>	120Vac, 60Hz
<b>TESTED BY</b>	Gary Chang		

### 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	*5260.00	84.5 AV			1.16H	87	48.74	31.90	3.86	0.00	-35.76
2	*5260.00	92.2 PK			1.16H	87	56.44	31.90	3.86	0.00	-35.76
3	10518.00	63.4 PK	68.30	-4.90	1.10H	75	54.04	39.43	7.22	37.28	-9.36

### 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)	Remark
1	*5260.00	99.9 PK			1.03V	83	64.14	31.90	3.86	0.00	-35.76	
2	*5260.00	92.1 AV			1.03V	83	56.34	31.90	3.86	0.00	-35.76	
3	10518.00	66.2 PK	68.30	-2.10	1.06V	90	56.84	39.43	7.22	37.28	-9.36	
4	15782.00	45.2 AV	54.00	-8.80	1.07V	93	36.97	38.23	7.29	37.29	-8.23	NOTE 6
5	15782.00	54.2 PK	74.00	-19.80	1.07V	93	45.97	38.23	7.29	37.29	-8.23	NOTE 6

#### 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.
5. "\*" : Fundamental frequency
6. The radiated frequency falling in the restricted band.



<b>EUT</b>	Dual-Band Wireless Access Point	<b>MODEL</b>	WAP51AB
<b>MODE</b>	Normal Mode	<b>CHANNEL</b>	8
<b>FREQUENCY RANGE</b>	Above 1000 MHz	<b>DETECTOR FUNCTION</b>	Peak(PK) Average (AV)
<b>ENVIRONMENTAL CONDITIONS</b>	25 deg. C, 60%RH, 1050 hPa	<b>INPUT POWER (SYSTEM)</b>	120Vac, 60Hz
<b>TESTED BY</b>	Gary Chang		

### 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)	Remark
1	*5320.00	93.6 PK			1.08H	87	57.90	31.93	3.77	0.00	-35.70	
2	*5320.00	84.5 AV			1.08H	87	48.80	31.93	3.77	0.00	-35.70	
3	5352.00	42.1 AV	54.00	-11.90	1.03H	71	42.96	31.93	3.77	36.57	0.86	NOTE 6
4	5352.00	59.5 PK	74.00	-14.50	1.03H	71	60.36	31.93	3.77	36.57	0.86	NOTE 6
5	10640.00	48.6 AV	54.00	-5.40	1.06H	84	38.96	39.61	7.22	37.18	-9.64	NOTE 6
6	10640.00	60.6 PK	74.00	-13.40	1.06H	84	50.96	39.61	7.22	37.18	-9.64	NOTE 6

### 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)	Remark
1	*5320.00	100.1 PK			1.07V	93	64.40	31.93	3.77	0.00	-35.70	
2	*5320.00	91.1 AV			1.07V	93	55.40	31.93	3.77	0.00	-35.70	
3	5352.00	42.1 AV	54.00	-11.90	1.04V	80	42.96	31.93	3.77	36.57	0.86	NOTE 6
4	5352.00	67.2 PK	74.00	-6.80	1.04V	80	68.06	31.93	3.77	36.57	0.86	NOTE 6
5	10640.00	63.6 PK	74.00	-10.40	1.01V	99	53.96	39.61	7.22	37.18	-9.64	NOTE 6
6	10640.00	51.5 AV	54.00	-2.50	1.01V	99	41.86	39.61	7.22	37.18	-9.64	NOTE 6

#### 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.
5. "\*" : Fundamental frequency
6. The radiated frequency falling in the restricted band.





<b>EUT</b>	Dual-Band Wireless Access Point	<b>MODEL</b>	WAP51AB
<b>MODE</b>	Turbo Mode	<b>CHANNEL</b>	1
<b>FREQUENCY RANGE</b>	Above 1000 MHz	<b>DETECTOR FUNCTION</b>	Peak(PK) Average (AV)
<b>ENVIRONMENTAL CONDITIONS</b>	25 deg. C, 60%RH, 1050 hPa	<b>INPUT POWER (SYSTEM)</b>	120Vac, 60Hz
<b>TESTED BY</b>	Gary Chang		

**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	*5205.00	90.2 PK			1.00H	235	54.42	31.88	3.90	0.00	-35.78
2	*5205.00	82.2 AV			1.00H	235	46.42	31.88	3.90	0.00	-35.78
3	10422.00	57.9 PK	68.30	-10.40	1.08H	252	48.96	39.30	6.99	37.35	-8.94

**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	*5205.00	101.4 PK			1.21V	216	65.62	31.88	3.90	0.00	-35.78
2	*5205.00	90.2 AV			1.21V	216	54.42	31.88	3.90	0.00	-35.78
3	10422.00	65.3 PK	68.30	-3.00	1.05V	240	56.36	39.30	6.99	37.35	-8.94

**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.
5. "\*" : Fundamental frequency



<b>EUT</b>	Dual-Band Wireless Access Point	<b>MODEL</b>	WAP51AB
<b>MODE</b>	Turbo Mode	<b>CHANNEL</b>	2
<b>FREQUENCY RANGE</b>	Above 1000 MHz	<b>DETECTOR FUNCTION</b>	Peak(PK) Average (AV)
<b>ENVIRONMENTAL CONDITIONS</b>	25 deg. C, 60%RH, 1050 hPa	<b>INPUT POWER (SYSTEM)</b>	120Vac, 60Hz
<b>TESTED BY</b>	Gary Chang		

#### 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	*5250.00	84.4 AV			1.26H	206	48.64	31.90	3.86	0.00	-35.76
2	*5250.00	92.2 PK			1.26H	206	56.44	31.90	3.86	0.00	-35.76
3	10498.00	65.9 PK	68.30	-2.40	1.21H	197	56.71	39.36	7.14	37.32	-9.19

#### 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	*5250.00	101.2 PK			1.09V	175	65.44	31.90	3.86	0.00	-35.76
2	*5250.00	91.3 AV			1.09V	175	55.54	31.90	3.86	0.00	-35.76
3	10498.00	62.7 PK	68.30	-5.60	1.18V	184	53.51	39.36	7.14	37.32	-9.19

#### 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.



<b>EUT</b>	Dual-Band Wireless Access Point	<b>MODEL</b>	WAP51AB
<b>MODE</b>	Turbo Mode	<b>CHANNEL</b>	3
<b>FREQUENCY RANGE</b>	Above 1000 MHz	<b>DETECTOR FUNCTION</b>	Peak(PK) Average (AV)
<b>ENVIRONMENTAL CONDITIONS</b>	25 deg. C, 60%RH, 1050 hPa	<b>INPUT POWER (SYSTEM)</b>	120Vac, 60Hz
<b>TESTED BY</b>	Gary Chang		

#### 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	*5290.00	83.4 AV			1.10H	186	47.66	31.92	3.82	0.00	-35.74
2	*5290.00	93.2 PK			1.10H	186	57.46	31.92	3.82	0.00	-35.74
3	10578.00	60.5 PK	68.30	-7.80	1.16H	195	51.04	39.49	7.22	37.25	-9.46

#### 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	*5285.00	100.4 PK			1.08V	198	64.66	31.92	3.82	0.00	-35.74
2	*5285.00	90.6 AV			1.08V	198	54.86	31.92	3.82	0.00	-35.74
3	10578.00	66.2 PK	68.30	-2.10	1.13V	211	56.74	39.49	7.22	37.25	-9.46

#### 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.
5. "\*" : Fundamental frequency



### 5.3 PEAK TRANSMIT POWER MEASUREMENT

#### 5.3.1 LIMITS OF PEAK TRANSMIT POWER MEASUREMENT

Frequency Band	Limit
5.15 – 5.25 GHz	The lesser of 50mW (17dBm) or 4dBm + 10logB
5.25 – 5.35 GHz	The lesser of 250mW (24dBm) or 11dBm + 10logB
5.725 – 5.825 GHz	The lesser of 1W (30dBm) or 17dBm + 10logB

**Note:** Where B is the 26dB emission bandwidth in MHz.

#### 5.3.2 TEST INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
SPECTRUM ANALYZER	FSEK30	100049	July 24, 2003

**NOTE:** The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

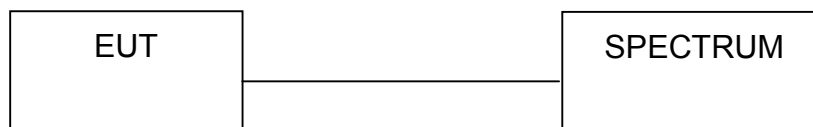
### 5.3.3 TEST PROCEDURE

1. The transmitter output was connected to the spectrum analyzer.
2. Set span to encompass the entire emission bandwidth of the signal.
3. Set RBW to 1MHz, VBW to 100kHz.
4. Using the spectrum analyzer's channel power measurement function to measure the output power.

### 5.3.4 DEVIATION FROM TEST STANDARD

No deviation

### 5.3.5 TEST SETUP



### 5.3.6 EUT OPERATING CONDITIONS

The software provided by client to enable the EUT under transmission condition continuously at specific channel frequencies individually.



## 5.3.7 TEST RESULTS

<b>EUT</b>	Dual-Band Wireless Access Point	<b>MODEL</b>	WAP51AB
<b>MODE</b>	Normal	<b>INPUT POWER (SYSTEM)</b>	120Vac, 60 Hz
<b>ENVIRONMENTAL CONDITIONS</b>	23deg. C, 64%RH, 1005 hPa	<b>TESTED BY</b>	Steven Lu

<b>CHANNEL</b>	<b>CHANNEL FREQUENCY (MHz)</b>	<b>PEAK POWER OUTPUT (dBm)</b>	<b>PEAK POWER LIMIT (dBm)</b>	<b>26dBc Occupied Bandwidth (MHz)</b>	<b>PASS/FAIL</b>
1	5180	13.27	17.00	33.60	PASS
4	5240	12.90	17.00	32.00	PASS
5	5260	14.99	24.00	36.48	PASS
8	5320	13.39	24.00	33.28	PASS

**NOTE:** The 26dBc Occupied Bandwidth plot, please refer to the following pages.