



# FCC TEST REPORT

**REPORT NO.:** RF920625R01

**MODEL NO.:** DP-311P

**RECEIVED:** June. 25, 2003

**TESTED:** June. 30 ~ Aug. 07, 2003

**APPLICANT:** D-Link Corporation

**ADDRESS:** No.8, Li-Hsin VII Road Science Based Industrial  
Park Hsin-Chu, Taiwan

**ISSUED BY:** Advance Data Technology Corporation

**LAB LOCATION:** 47 14th Lin, Chiapau Tsun, Linko, Taipei, Taiwan,  
R.O.C.

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0528  
ILAC MRA



Lab Code: 200102-0



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# 1 CERTIFICATION

**PRODUCT :** Wireless Print Server  
**MODEL NO. :** DP-311P  
**BRAND:** D-Link  
**APPLICANT :** D-Link Corporation  
**TEST ITEM:** Engineer Sample  
**STANDARDS :** 47 CFR Part 15, Subpart C (Section 15.247),  
ANSI C63.4-1992

We, **Advance Data Technology Corporation**, hereby certify that one sample of the designation has been tested in our facility from June. 30 ~ Aug. 07, 2003. 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.

**PREPARED BY:** Wendy Liao, **DATE:** Aug. 11, 2003  
Wendy Liao

**APPROVED BY:** Dr. Alan Lane, **DATE:** Aug. 11, 2003  
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 -1.82dBuV at 0.470MHz
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)	Transmitter Radiated Emissions Limit: Table 15.209	PASS	Meet the requirement of limit Minimum passing margin is -2.00dBuV/m at 850 MHz
15.247(d)	Power Spectral Density Limit: max. 8dBm	PASS	Meet the requirement of limit
15.247(c)	Band Edge Measurement Limit: 20 dB less than the peak value of fundamental frequency	PASS	Meet the requirement of limit



### 3 GENERAL INFORMATION

#### 3.1 GENERAL DESCRIPTION OF EUT

<b>PRODUCT</b>	Wireless Print Server
<b>MODEL NO.</b>	DP-311P
<b>POWER SUPPLY</b>	5VDC from AC adapter
<b>MODULATION TYPE</b>	BPSK, QPSK, CCK
<b>RADIO TECHNOLOGY</b>	DSSS
<b>TRANSFER RATE</b>	1/2/5.5/11Mbps
<b>FREQUENCY RANGE</b>	2412MHz ~ 2462MHz
<b>CHANNEL SPACING</b>	5MHz
<b>NUMBER OF CHANNEL</b>	11
<b>OUTPUT POWER</b>	15.02dBm
<b>ANTENNA TYPE</b>	Dipole Antenna with 2dBi gain
<b>DATA CABLE</b>	NA
<b>I/O PORTS</b>	NA
<b>ASSOCIATED DEVICES</b>	NA

**NOTE:**

1. The following AC adapter powers the EUT.

<b>BRAND</b>	D-Link
<b>MODEL</b>	SMP-T1378
<b>INPUT</b>	100-120V, 0.5A, 50-60Hz
<b>OUTPUT</b>	+5.0V, 2.0A

2. For more detailed features description, please refer to the manufacturer's specifications or User's Manual.



### 3.2 DESCRIPTION OF TEST MODES

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.
3. Data rate 11Mbps, the worst case, were chosen for final test.

### 3.3 GENERAL DESCRIPTION OF APPLIED STANDARDS

The EUT is a Wireless Print Server. According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

**FCC 47 CFR Part 15, Subpart C. (15.247)**  
**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

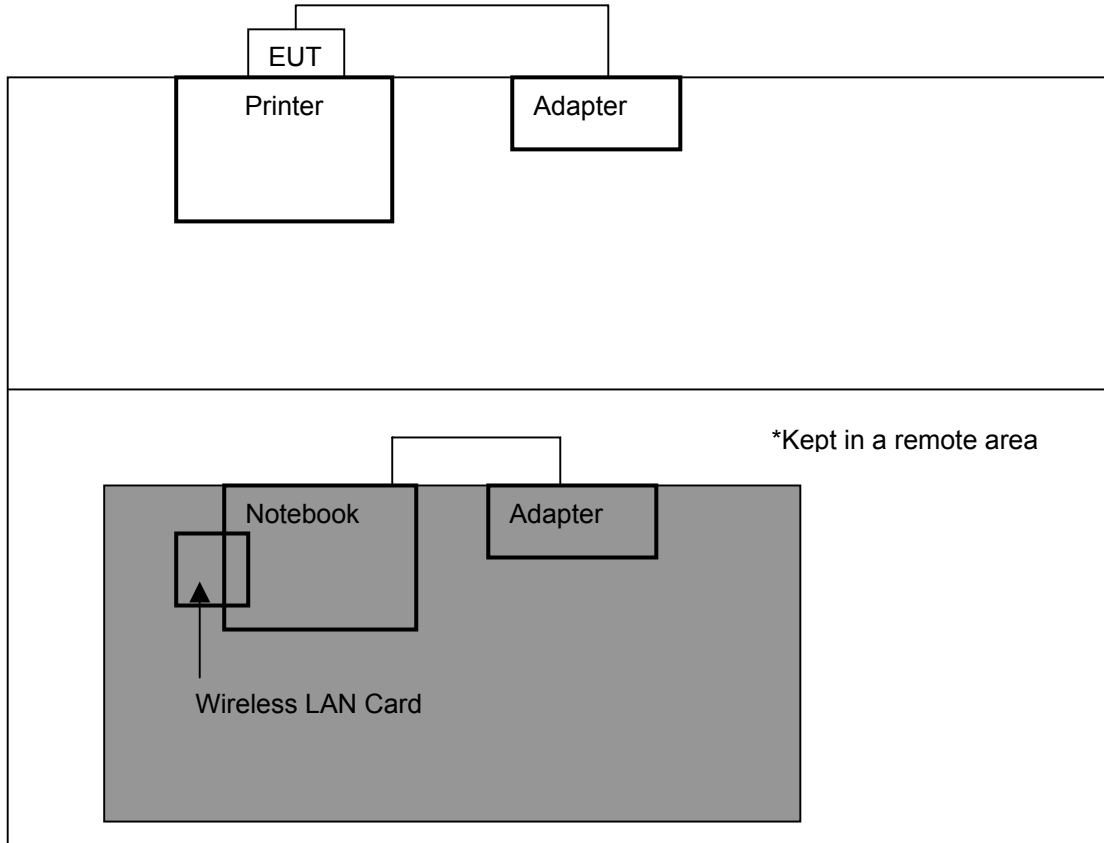
The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	Notebook	Dell	PP01L	TW-09C748-12800-190-B220	FCC DoC
5	Printer	HP	C5884A	NA	B94C2164X
6	Wireless LAN Card	D-Link	DWL-AG650	NA	NA

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

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

### 3.5 CONFIGURATION OF SYSTEM UNDER TEST





## 4 TEST TYPES AND RESULTS

### 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. All emanations from a class B digital device or system, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strengths specified above.
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	ESCS 30	838251/021	Jan. 20, 2004
ROHDE & SCHWARZ Artificial Mains Network (for EUT)	ESH3-Z5	100218	Dec. 18, 2003
ROHDE & SCHWARZ Artificial Mains Network (for peripherals)	ESH3-Z5	100219	Dec. 18, 2003
ROHDE & SCHWARZ Artificial Mains Network (for peripherals)	ESH3-Z5	100220	Dec. 18, 2003
ROHDE & SCHWARZ 4-wire ISN	ENY41	837032/016	Nov. 29 2003
ROHDE & SCHWARZ 2-wire ISN	ENY22	837497/016	Nov. 29 2003
Software	Cond-V2M3	NA	NA
RF cable (JYEBAO)	5D-FB	Cable-C10.01	May. 01, 2004
SUHNER Terminator (For ROHDE & SCHWARZ LISN)	65BNC-5001	E1-010770	Mar. 24, 2004
SUHNER Terminator (For ROHDE & SCHWARZ LISN)	65BNC-5001	E1-010773	Apr. 06, 2004

- 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 Shielded Room No. 10.
  4. The VCCI Site Registration No. is C-1312.



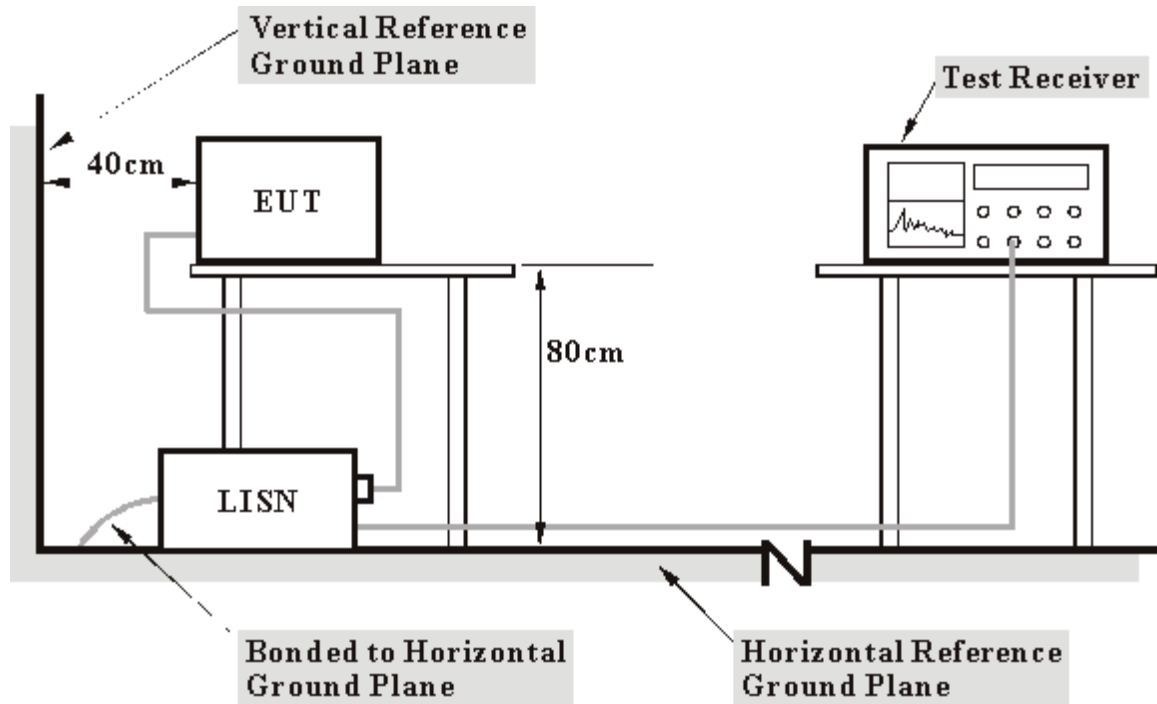
#### 4.1.3 TEST PROCEDURES

- 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 RJ45 cable.
- d. The communication partner sent data to EUT by command "PIN".

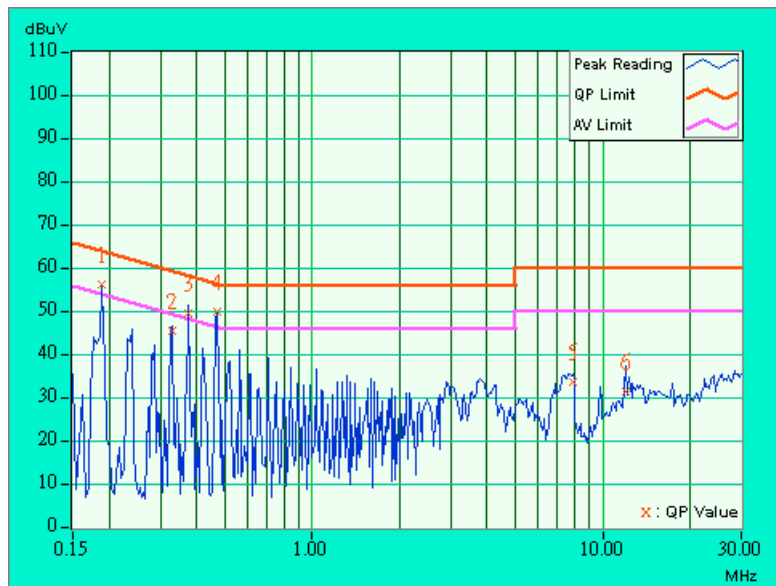


4.1.7 TEST RESULTS

<b>EUT</b>	Wireless Print Server	<b>MODEL</b>	DP-311P
<b>MODE</b>	Channel 1	<b>6dB BANDWIDTH</b>	9 kHz
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60 Hz	<b>PHASE</b>	Line (L)
<b>ENVIRONMENTAL CONDITIONS</b>	29 deg. C, 65%RH, 991 hPa	<b>TESTED BY:</b> Steven Lu	

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.189	0.06	55.81	48.83	55.87	48.89	64.08	54.08	-8.21	-5.19
2	0.330	0.06	45.07	-	45.13	-	59.46	49.46	-14.33	-
3	0.377	0.06	49.16	43.39	49.22	43.45	58.35	48.35	-9.13	-4.90
4	0.470	0.07	49.48	44.62	49.55	44.69	56.51	46.51	-6.96	-1.82
5	7.930	0.35	33.30	-	33.65	-	60.00	50.00	-26.35	-
6	12.016	0.47	30.90	-	31.37	-	60.00	50.00	-28.63	-

- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
  2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
  3. The emission levels of other frequencies were very low against the limit.
  4. Margin value = Emission level - Limit value
  5. Correction factor = Insertion loss + Cable loss
  6. Emission Level = Correction Factor + Reading Value.

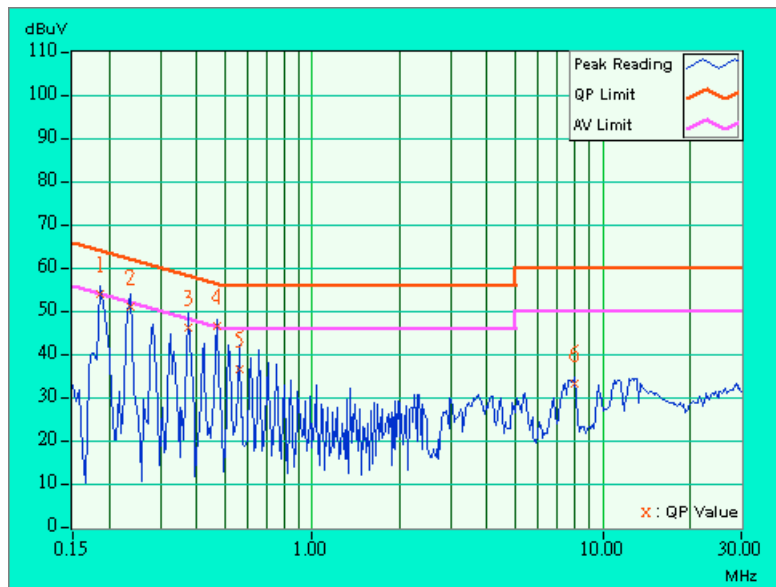




<b>EUT</b>	Wireless Print Server	<b>MODEL</b>	DP-311P
<b>MODE</b>	Channel 1	<b>6dB BANDWIDTH</b>	9 kHz
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60 Hz	<b>PHASE</b>	Neutral (N)
<b>ENVIRONMENTAL CONDITIONS</b>	29 deg. C, 65%RH, 991 hPa	<b>TESTED BY:</b> Steven Lu	

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.185	0.05	53.72	-	53.77	-	64.25	54.25	-10.48	-
2	0.236	0.05	50.66	-	50.71	-	62.24	52.24	-11.53	-
3	0.373	0.05	45.86	-	45.91	-	58.44	48.44	-12.53	-
4	0.470	0.06	46.26	-	46.32	-	56.51	46.51	-10.19	-
5	0.560	0.08	36.23	-	36.31	-	56.00	46.00	-19.69	-
6	8.027	0.33	32.91	-	33.24	-	60.00	50.00	-26.76	-

- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
  2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
  3. The emission levels of other frequencies were very low against the limit.
  4. Margin value = Emission level - Limit value
  5. Correction factor = Insertion loss + Cable loss
  6. Emission Level = Correction Factor + Reading Value.

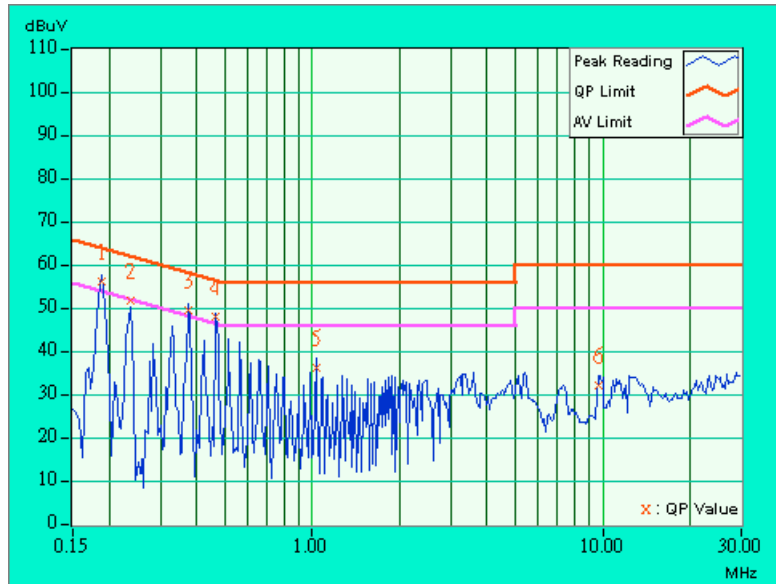




<b>EUT</b>	Wireless Print Server	<b>MODEL</b>	DP-311P
<b>MODE</b>	Channel 6	<b>6dB BANDWIDTH</b>	9 kHz
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60 Hz	<b>PHASE</b>	Line (L)
<b>ENVIRONMENTAL CONDITIONS</b>	29 deg. C, 65%RH, 991 hPa	<b>TESTED BY:</b> Steven Lu	

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.189	0.06	55.75	49.08	55.81	49.14	64.08	54.08	-8.27	-4.94
2	0.236	0.06	51.59	-	51.65	-	62.24	52.24	-10.59	-
3	0.377	0.06	49.14	43.16	49.20	43.22	58.35	48.35	-9.15	-5.13
4	0.466	0.07	47.92	42.76	47.99	42.83	56.58	46.58	-8.59	-3.75
5	1.031	0.16	36.08	-	36.24	-	56.00	46.00	-19.76	-
6	9.715	0.40	31.96	-	32.36	-	60.00	50.00	-27.64	-

- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
  2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
  3. The emission levels of other frequencies were very low against the limit.
  4. Margin value = Emission level - Limit value
  5. Correction factor = Insertion loss + Cable loss
  6. Emission Level = Correction Factor + Reading Value.



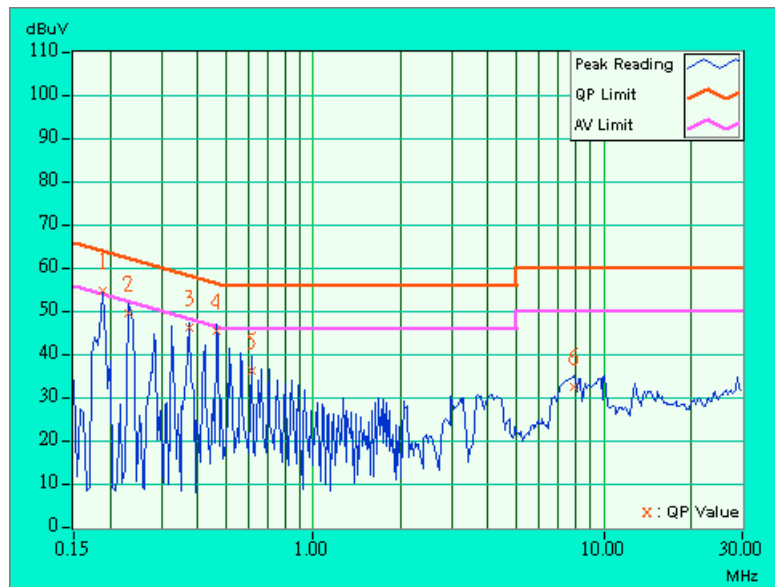




<b>EUT</b>	Wireless Print Server	<b>MODEL</b>	DP-311P
<b>MODE</b>	Channel 6	<b>6dB BANDWIDTH</b>	9 kHz
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60 Hz	<b>PHASE</b>	Neutral (N)
<b>ENVIRONMENTAL CONDITIONS</b>	29 deg. C, 65%RH, 991 hPa	<b>TESTED BY:</b> Steven Lu	

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.189	0.05	54.62	45.54	54.67	45.59	64.08	54.08	-9.41	-8.49
2	0.232	0.05	49.29	-	49.34	-	62.38	52.38	-13.04	-
3	0.373	0.05	46.06	-	46.11	-	58.44	48.44	-12.33	-
4	0.466	0.06	45.20	-	45.26	-	56.58	46.58	-11.32	-
5	0.611	0.09	35.98	-	36.07	-	56.00	46.00	-19.93	-
6	7.883	0.33	32.44	-	32.77	-	60.00	50.00	-27.23	-

- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
  2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
  3. The emission levels of other frequencies were very low against the limit.
  4. Margin value = Emission level - Limit value
  5. Correction factor = Insertion loss + Cable loss
  6. Emission Level = Correction Factor + Reading Value.

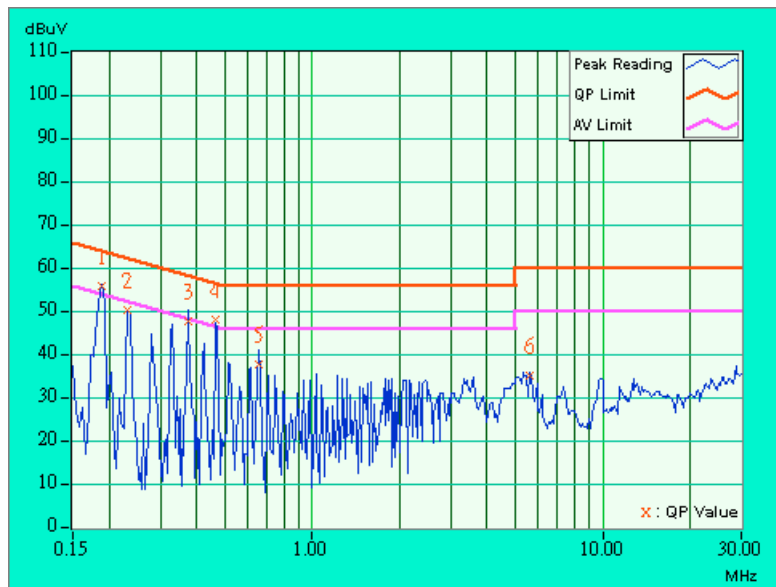




<b>EUT</b>	Wireless Print Server	<b>MODEL</b>	DP-311P
<b>MODE</b>	Channel 11	<b>6dB BANDWIDTH</b>	9 kHz
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60 Hz	<b>PHASE</b>	Line (L)
<b>ENVIRONMENTAL CONDITIONS</b>	29 deg. C, 65%RH, 991 hPa	<b>TESTED BY:</b> Steven Lu	

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.189	0.06	55.53	48.73	55.59	48.79	64.08	54.08	-8.49	-5.29
2	0.232	0.06	50.15	-	50.21	-	62.38	52.38	-12.17	-
3	0.373	0.06	47.66	-	47.72	-	58.44	48.44	-10.72	-
4	0.466	0.07	47.72	42.76	47.79	42.83	56.58	46.58	-8.79	-3.75
5	0.654	0.10	37.52	-	37.62	-	56.00	46.00	-18.38	-
6	5.629	0.28	35.00	-	35.28	-	60.00	50.00	-24.72	-

- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
  2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
  3. The emission levels of other frequencies were very low against the limit.
  4. Margin value = Emission level - Limit value
  5. Correction factor = Insertion loss + Cable loss
  6. Emission Level = Correction Factor + Reading Value.

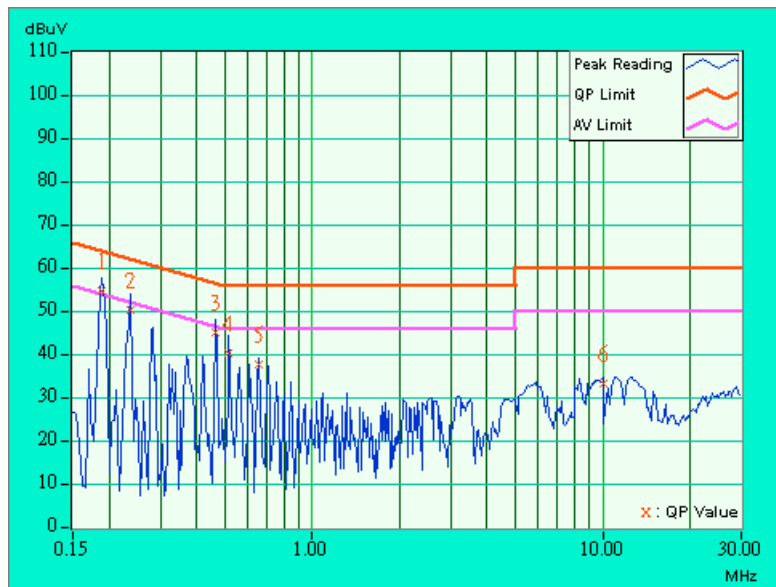




<b>EUT</b>	Wireless Print Server	<b>MODEL</b>	DP-311P
<b>MODE</b>	Channel 11	<b>6dB BANDWIDTH</b>	9 kHz
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60 Hz	<b>PHASE</b>	Neutral (N)
<b>ENVIRONMENTAL CONDITIONS</b>	29 deg. C, 65%RH, 991 hPa	<b>TESTED BY:</b> Steven Lu	

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.189	0.05	54.24	45.59	54.29	45.64	64.08	54.08	-9.79	-8.44
2	0.236	0.05	49.95	-	50.00	-	62.24	52.24	-12.24	-
3	0.466	0.06	44.78	-	44.84	-	56.58	46.58	-11.74	-
4	0.517	0.07	40.15	-	40.22	-	56.00	46.00	-15.78	-
5	0.658	0.10	37.46	-	37.56	-	56.00	46.00	-18.44	-
6	9.996	0.39	33.12	-	33.51	-	60.00	50.00	-26.49	-

- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
  2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
  3. The emission levels of other frequencies were very low against the limit.
  4. Margin value = Emission level - Limit value
  5. Correction factor = Insertion loss + Cable loss
  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

### FOR Below 1GHz

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
*HP Spectrum Analyzer	8594E	3911A07465	Jul. 07, 2004
*HP Preamplifier	8447D	2944A10386	Aug. 15, 2003
HP Preamplifier	8449B	3008A01201	Dec. 01, 2003
HP Preamplifier	8449B	3008A01292	Aug. 06, 2004
SCHAFFNER Tunable Dipole Antenna	VHBA 9123	459	Nov. 22, 2003
SCHWARZBECK Tunable Dipole Antenna	UHA 9105	977	
SCHAFFNER TEST RECEIVER	SCR 3501	409	Jan. 26, 2004
* SCHAFFNER BILOG Antenna	CBL6111C	2727	July 15, 2004
SCHWARZBECK Horn Antenna	BBHA9120-D1	D130	Jun 30, 2004
EMCO Horn Antenna	3115	9312-4192	Mar. 23 2004
* ADT. Turn Table	TT100	0201	NA
* ADT. Tower	AT100	0201	NA
* Software	ADT_Radiated_V 5.14	NA	NA
* ANRITSU RF Switches	MP59B	6100237246	Oct. 30, 2003
* TIMES RF cable	LMR-600	CABLE-ST10-01	Oct. 30, 2003

- 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. 10.
  5. The VCCI Site Registration No. is R-1625.

**FOR Above 1GHz**

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
*HP Spectrum Analyzer	8590L	3520A00667	Aug. 26, 2003
CHASE Preamplifier	CPA9231A/4	3215	Nov. 06, 2003
* HP Preamplifier	8449B	3008A01201	Dec. 01, 2003
* HP Preamplifier	8449B	3008A01292	Aug. 06, 2004
* ROHDE & SCHWARZ TEST RECEIVER	ESVS10	846285/012	Sept. 16, 2003
* ROHDE & SCHWARZ TEST RECEIVER	ESMI	839013/007 839379/002	Feb. 13, 2004
SCHAFFNER Tunable Dipole Antenna	VHBA 9123	459	Nov. 22, 2003
SCHWARZBECK Tunable Dipole Antenna	UHA 9105	977	
* CHASE BILOG Antenna	CBL6112B	2751	March 21, 2004
* SCHWARZBECK Horn Antenna	BBHA9120-D1	D130	June 30, 2004
* EMCO Horn Antenna	3115	9312-4192	Mar. 23 2004
* CHANCE Turn Table & Tower Controller	ACS-I	NA	NA
* Software	ADT_Radiate d_V5.14	NA	NA
* ANRITSU RF Switches	MP59B	M51167	Aug. 21, 2003
* TIMES RF cable	LMR-600	CABLE-ST6-01	Aug. 21, 2003

- 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. 6.
  5. The VCCI Site Registration No. is R-728.



#### 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 peak, quasi-peak or average method as specified and then reported in a data sheet.

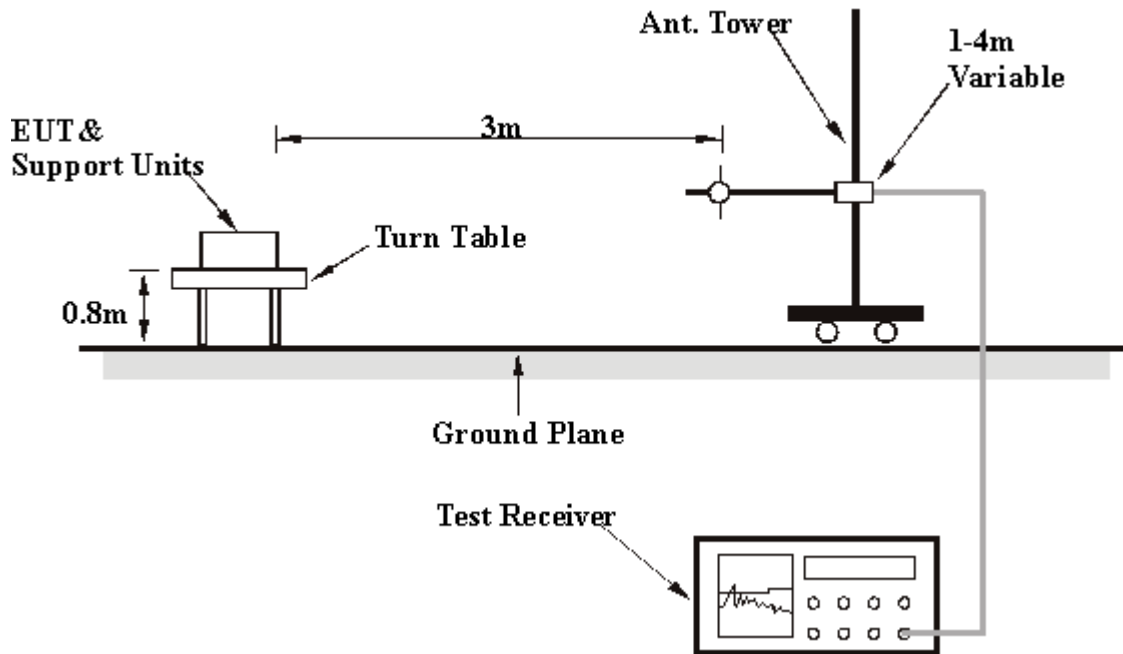
**NOTE:**

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.

#### 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>	Wireless Print Server	<b>MODEL</b>	DP-311P
<b>CHANNEL</b>	Channel 11	<b>FREQUENCY RANGE</b>	Below 1000 MHz
<b>MODE</b>	CCK	<b>INPUT POWER (SYSTEM)</b>	120Vac, 60 Hz
<b>ENVIRONMENTAL CONDITIONS</b>	35 deg. C, 60 % RH, 991 hPa	<b>DETECTOR FUNCTION</b>	Quasi-Peak
<b>TESTED BY</b>	Steven Lu		

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)	Correction Factor (dB/m)
1	150.00	41.0 QP	43.50	-2.50	1.42 H	266	27.90	13.10
2	220.00	26.6 QP	46.00	-19.40	1.27 H	337	14.10	12.50
3	249.99	36.2 QP	46.00	-9.80	1.02 H	233	21.40	14.90
4	264.00	34.2 QP	46.00	-11.80	1.29 H	163	18.50	15.70
5	308.00	23.2 QP	46.00	-22.80	1.36 H	103	7.30	15.90
6	320.00	30.0 QP	46.00	-16.00	1.02 H	266	13.80	16.20
7	350.00	39.2 QP	46.00	-6.80	1.05 H	281	22.10	17.10
8	352.00	27.6 QP	46.00	-18.40	1.24 H	303	10.40	17.20
9	396.00	31.1 QP	46.00	-14.90	1.00 H	31	12.70	18.40
10	440.00	24.2 QP	46.00	-21.80	1.02 H	289	4.80	19.40
11	450.00	32.8 QP	46.00	-13.20	2.20 H	33	13.20	19.60
12	528.05	29.7 QP	46.00	-16.30	1.52 H	144	7.80	21.90
13	550.00	42.9 QP	46.00	-3.10	1.66 H	183	20.00	23.00
14	616.02	30.4 QP	46.00	-15.60	1.00 H	299	8.00	22.40
15	650.00	43.9 QP	46.00	-2.10	2.19 H	157	20.90	23.00
16	660.02	32.9 QP	46.00	-13.10	1.67 H	143	9.80	23.20
17	750.00	42.2 QP	46.00	-3.80	2.16 H	164	17.20	25.00
18	850.00	43.8 QP	46.00	-2.20	2.31 H	204	17.90	25.90
19	950.00	44.0 QP	46.00	-2.00	1.72 H	203	16.80	27.20

**REMARKS:**

1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB)
2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
3. Margin value = Emission level - Limit value
4. The other emission levels were very low against the limit.



<b>EUT</b>	Wireless Print Server	<b>MODEL</b>	DP-311P
<b>CHANNEL</b>	Channel 11	<b>FREQUENCY RANGE</b>	Below 1000 MHz
<b>MODE</b>	CCK	<b>INPUT POWER (SYSTEM)</b>	120Vac, 60 Hz
<b>ENVIRONMENTAL CONDITIONS</b>	35 deg. C, 60 % RH, 991 hPa	<b>DETECTOR FUNCTION</b>	Quasi-Peak
<b>TESTED BY</b>	Steven Lu		

**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)	Correction Factor (dB/m)
1	150.00	39.7 QP	43.50	-3.80	1.00 V	85	26.60	13.10
2	219.99	26.6 QP	46.00	-19.40	1.03 V	227	14.10	12.50
3	249.99	33.8 QP	46.00	-12.20	1.00 V	155	18.90	14.90
4	263.99	32.6 QP	46.00	-13.40	1.22 V	34	17.00	15.70
5	320.21	30.3 QP	46.00	-15.70	1.17 V	121	14.10	16.30
6	350.01	34.2 QP	46.00	-11.80	1.59 V	122	17.10	17.10
7	351.99	28.0 QP	46.00	-18.00	1.08 V	20	10.80	17.20
8	439.99	28.4 QP	46.00	-17.60	1.33 V	359	9.10	19.40
9	450.00	36.4 QP	46.00	-9.60	1.79 V	80	16.70	19.60
10	528.05	30.6 QP	46.00	-15.40	1.01 V	33	8.80	21.90
11	549.98	43.0 QP	46.00	-3.00	1.08 V	153	20.10	23.00
12	572.01	32.2 QP	46.00	-13.80	1.36 V	6	9.60	22.60
13	616.01	30.8 QP	46.00	-15.20	1.60 V	201	8.40	22.40
14	650.00	42.7 QP	46.00	-3.30	1.00 V	170	19.70	23.00
15	660.01	30.0 QP	46.00	-16.00	1.53 V	21	6.90	23.20
16	750.00	39.3 QP	46.00	-6.70	1.00 V	174	14.20	25.00
17	850.00	44.0 QP	46.00	-2.00	1.41 V	178	18.10	25.90
18	950.00	42.4 QP	46.00	-3.60	1.41 V	132	15.20	27.20

**REMARKS:**

1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB)
2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
3. Margin value = Emission level - Limit value
4. The other emission levels were very low against the limit.



<b>EUT</b>	Wireless Print Server	<b>MODEL</b>	DP-311P
<b>CHANNEL</b>	Channel 1	<b>FREQUENCY RANGE</b>	Above 1000 MHz
<b>MODE</b>	CCK	<b>INPUT POWER (SYSTEM)</b>	120Vac, 60 Hz
<b>ENVIRONMENTAL CONDITIONS</b>	27 deg. C, 55 % RH, 991 hPa	<b>DETECTOR FUNCTION</b>	Peak / Average
<b>TESTED BY</b>	Steven Lu		

#### ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3M

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2412.00	99.9 PK			1.16 H	229	68.30	31.60
1	*2412.00	92.6 AV			1.16 H	229	61.10	31.60
2	4824.20	52.0 PK	74.00	-22.00	1.03 H	242	13.60	38.40
2	4824.20	45.6 AV	54.00	-8.40	1.03 H	242	7.10	38.40

#### ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3M

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2412.00	108.9 PK			1.20 V	118	77.30	31.60
1	*2412.00	102.3 AV			1.20 V	118	70.70	31.60
2	4824.70	52.9 PK	74.00	-21.10	1.52 V	52	14.50	38.40
2	4824.70	46.0 AV	54.00	-8.00	1.52 V	52	7.60	38.40
3	9648.22	57.9 PK	74.00	-16.10	1.52 V	91	13.70	44.20
3	9648.22	46.8 AV	54.00	-7.20	1.52 V	91	2.60	44.20

- REMARKS:**
1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB)
  2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
  3. Margin value = Emission level – Limit value.
  4. “ \* “ : Fundamental frequency.
  5. The other emission levels were very low against the limit.



<b>EUT</b>	Wireless Print Server	<b>MODEL</b>	DP-311P
<b>CHANNEL</b>	Channel 6	<b>FREQUENCY RANGE</b>	Above 1000 MHz
<b>MODE</b>	CCK	<b>INPUT POWER (SYSTEM)</b>	120Vac, 60 Hz
<b>ENVIRONMENTAL CONDITIONS</b>	27 deg. C, 55 % RH, 991 hPa	<b>DETECTOR FUNCTION</b>	Peak / Average
<b>TESTED BY</b>	Steven Lu		

<b>ANTENNA POLARITY &amp; TEST DISTANCE: HORIZONTAL AT 3M</b>								
No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2437.00	99.7 PK			1.00 H	138	68.10	31.60
1	*2437.00	92.0 AV			1.00 H	138	60.40	31.60
2	4874.13	50.5 PK	74.00	-23.50	1.52 H	138	12.00	38.50
3	9748.25	57.4 PK	74.00	-16.60	1.25 H	145	12.80	44.60
3	9748.25	44.0 AV	54.00	-10.00	1.25 H	145	-0.60	44.60

<b>ANTENNA POLARITY &amp; TEST DISTANCE: VERTICAL AT 3M</b>								
No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2437.00	107.7 PK			1.16 V	161	76.10	31.60
1	*2437.00	101.1 AV			1.16 V	161	69.50	31.60
2	4874.15	54.5 PK	74.00	-19.50	1.08 V	244	16.10	38.50
2	4874.15	49.2 AV	54.00	-4.80	1.08 V	244	10.70	38.50
3	9748.25	58.5 PK	74.00	-15.50	1.14 V	172	13.90	44.60
3	9748.25	46.5 AV	54.00	-7.50	1.14 V	172	1.90	44.60

- REMARKS:**
1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB)
  2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
  3. Margin value = Emission level – Limit value.
  4. “ \* “ : Fundamental frequency.
  5. The other emission levels were very low against the limit.



<b>EUT</b>	Wireless Print Server	<b>MODEL</b>	DP-311P
<b>CHANNEL</b>	Channel 11	<b>FREQUENCY RANGE</b>	Above 1000 MHz
<b>MODE</b>	CCK	<b>INPUT POWER (SYSTEM)</b>	120Vac, 60 Hz
<b>ENVIRONMENTAL CONDITIONS</b>	27 deg. C, 55 % RH, 991 hPa	<b>DETECTOR FUNCTION</b>	Peak / Average
<b>TESTED BY</b>	Steven Lu		

**ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3M**

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2462.00	97.8 PK			1.86 H	118	66.10	31.70
1	*2462.00	90.3 AV			1.86 H	118	58.60	31.70
2	4924.00	54.2 PK	74.00	-19.80	1.11 H	237	15.70	38.50
2	4924.00	49.2 AV	54.00	-4.80	1.11 H	237	10.70	38.50
3	9848.19	57.3 PK	74.00	-16.70	1.11 H	200	12.50	44.80
3	9848.19	44.7 AV	54.00	-9.30	1.11 H	200	-0.10	44.80

**ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3M**

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2462.00	106.3 PK			1.40 V	360	74.60	31.70
1	*2462.00	98.2 AV			1.40 V	360	66.50	31.70
2	4924.20	54.4 PK	74.00	-19.60	1.59 V	40	15.90	38.50
2	4924.20	49.7 AV	54.00	-4.30	1.59 V	40	11.20	38.50
3	9648.31	57.8 PK	74.00	-16.20	1.53 V	293	13.60	44.20
3	9648.31	46.5 AV	54.00	-7.50	1.53 V	293	2.30	44.20

- REMARKS:**
1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB)
  2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
  3. Margin value = Emission level – Limit value.
  4. “ \* “ : Fundamental frequency.
  5. The other emission levels were very low against the limit.



### 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 23, 2004

**NOTE:**

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

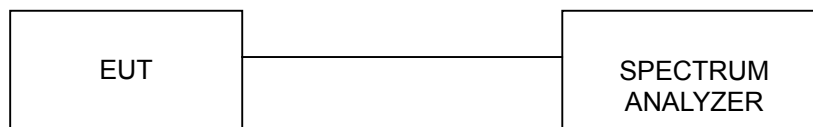
#### 4.3.3 TEST PROCEDURE

The transmitter output was connected to the spectrum analyzer through an attenuator. The bandwidth of the fundamental frequency was measured by spectrum analyzer with 100 kHz RBW and 100 kHz VBW. The 6 dB 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

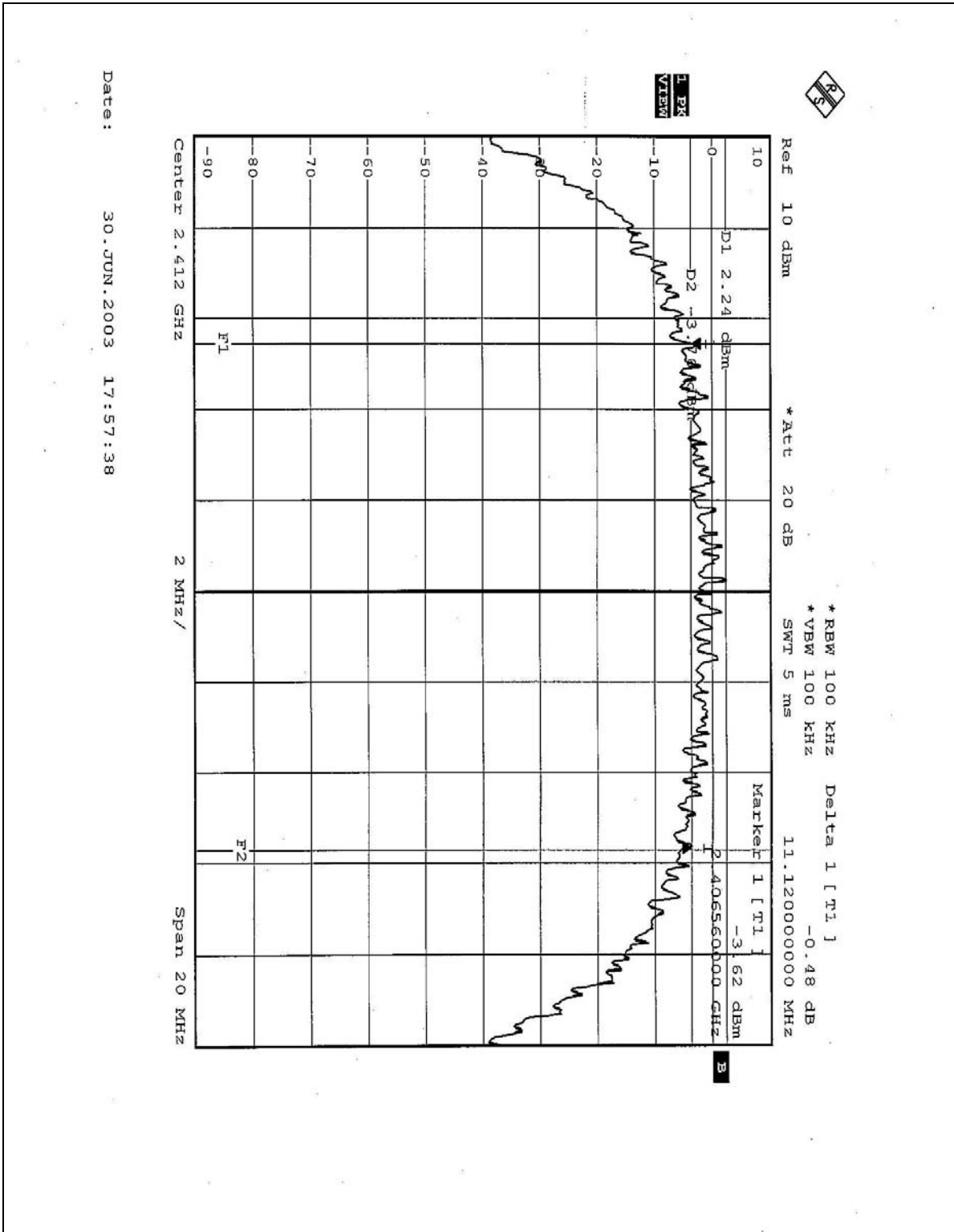
<b>EUT</b>	Wireless Print Server	<b>MODEL</b>	DP-311P
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60 Hz	<b>ENVIRONMENTAL CONDITIONS</b>	29 deg. C, 52%RH, 991 hPa
<b>MODE</b>	CCK	<b>TESTED BY</b>	Steven Lu

<b>CHANNEL</b>	<b>CHANNEL FREQUENCY (MHz)</b>	<b>6 dB BANDWIDTH (MHz)</b>	<b>MINIMUM LIMIT (MHz)</b>	<b>PASS/FAIL</b>
1	2412	11.12	0.5	PASS
6	2437	11.04	0.5	PASS
11	2462	11.08	0.5	PASS



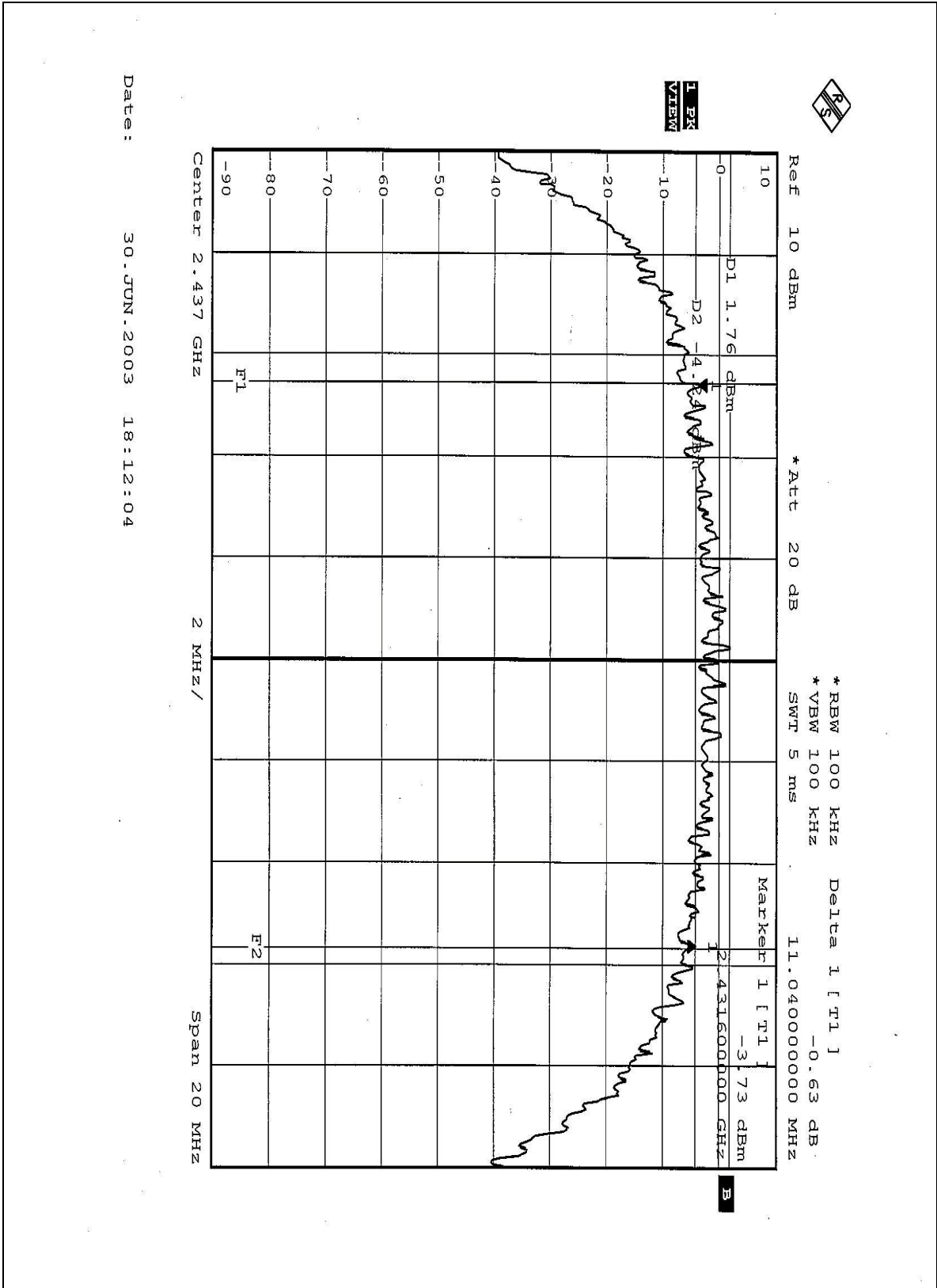


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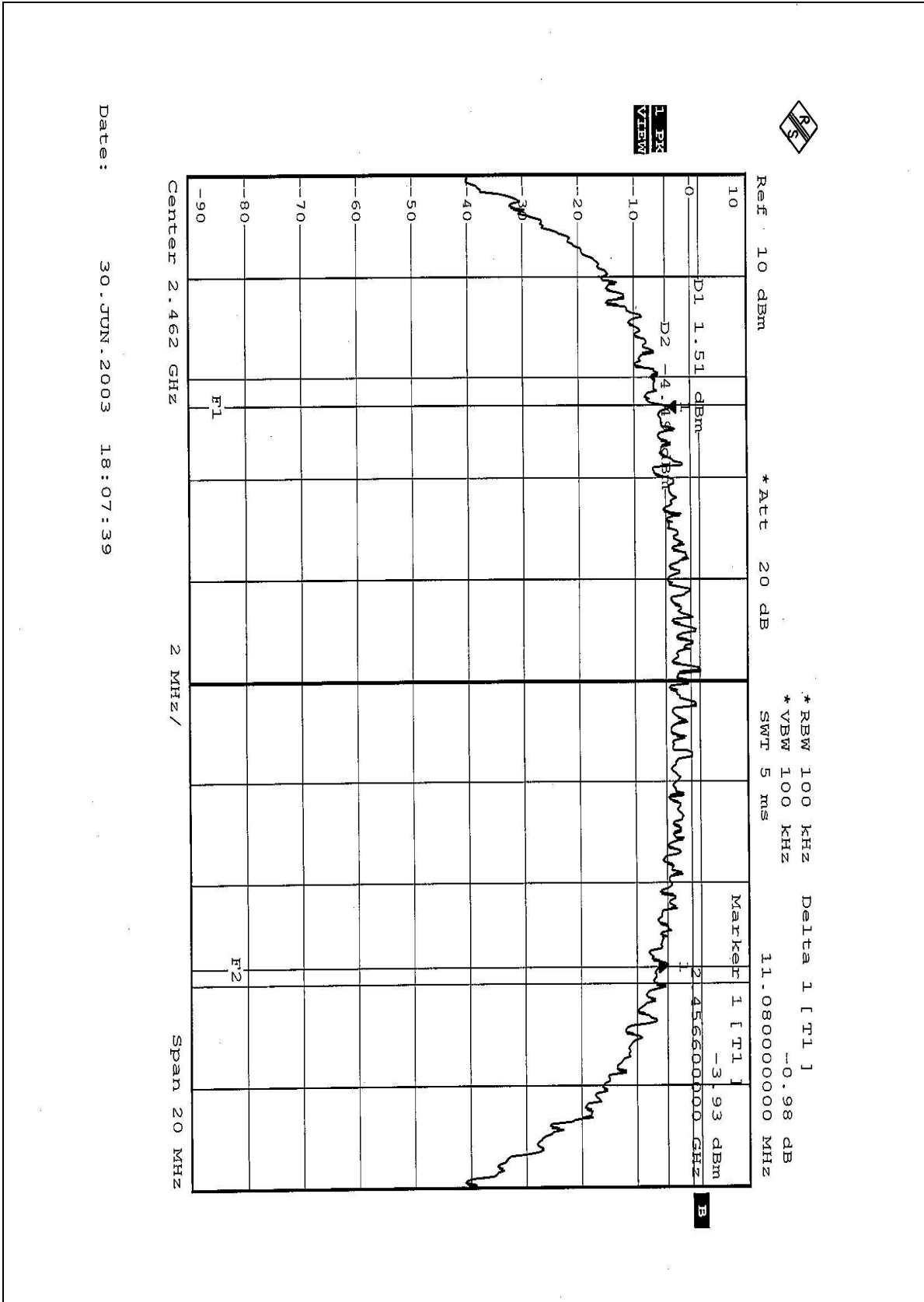


CH6





CH11



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#### 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 TEST INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
R&S SPECTRUM ANALYZER	FSEK30	100049	Jul. 24, 2003
R&S SIGNAL GENERATOR	SMP04	100011	May 28, 2004
TEKTRONIX OSCILLOSCOPE	TDS 220	B048470	Mar. 05, 2004
NARDA DETECTOR	4503A	FSCM99899	NA

**NOTE:**

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



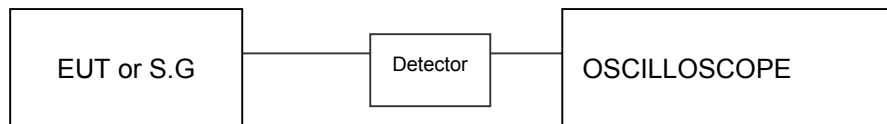
#### 4.4.3 TEST PROCEDURES

1. A detector was used on the output port of the EUT. An oscilloscope was used to read the response of the detector.
2. Replaced the EUT by the signal generator . The center frequency of the S.G was adjusted to the center frequency of the measured channel.
3. Adjusted the power to have the same reading on oscilloscope. Record the power level.

#### 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>	Wireless Print Server	<b>MODEL</b>	DP-311P
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60 Hz	<b>ENVIRONMENTAL CONDITIONS</b>	29 deg. C, 52%RH, 991 hPa
<b>MODE</b>	CCK	<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	15.02	30	PASS
6	2437	14.94	30	PASS
11	2462	14.97	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 23, 2004

**NOTE:**

1. 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/3kHz. The power spectral density was measured and recorded. The sweep time is allowed to be longer than span/3KHz 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 CONDITIONS

Same as 4.3.6





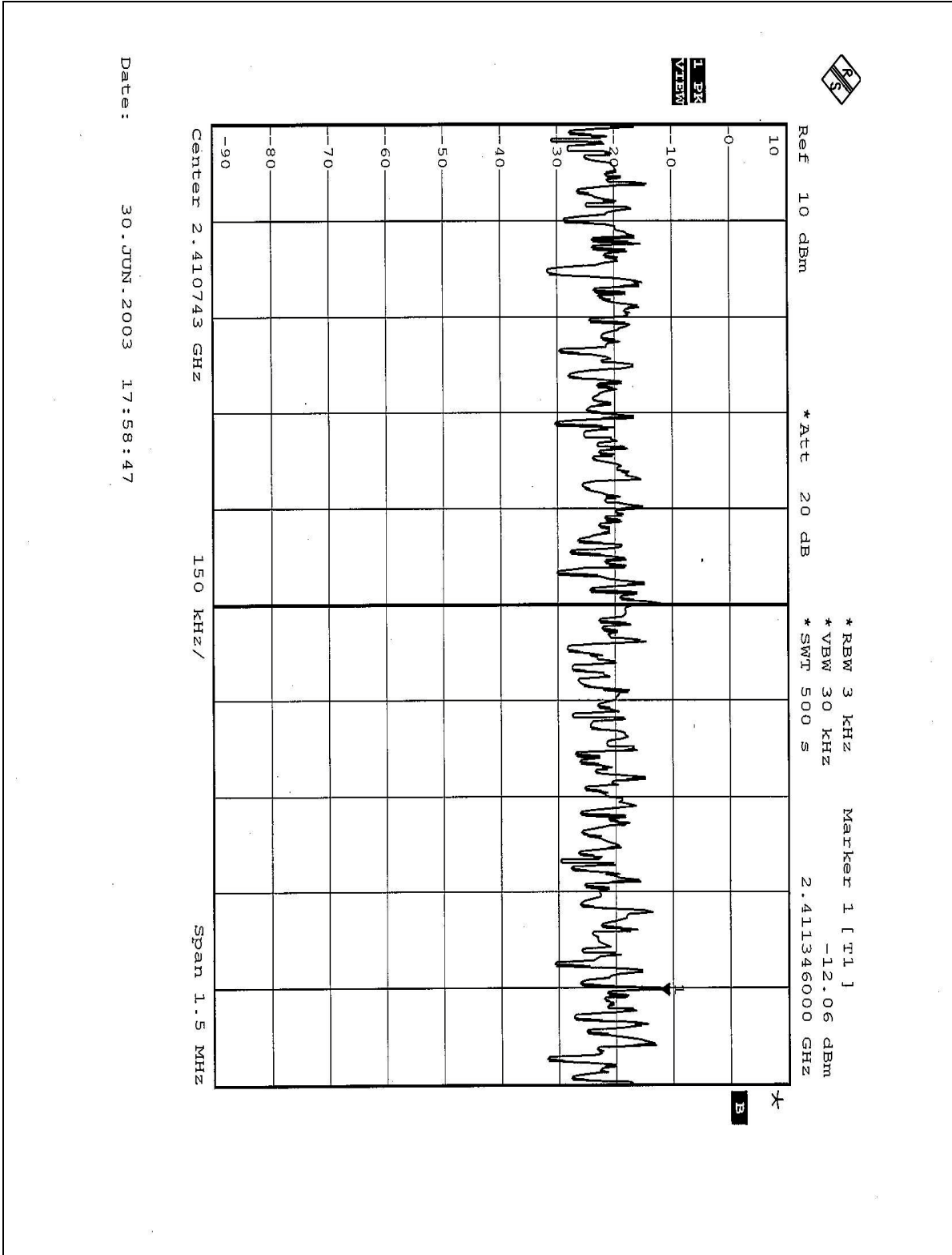
## 4.5.7 TEST RESULTS

<b>EUT</b>	Wireless Print Server	<b>MODEL</b>	DP-311P
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60 Hz	<b>ENVIRONMENTAL CONDITIONS</b>	29 deg. C, 52%RH, 991 hPa
<b>MODE</b>	CCK	<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	-12.06	8	PASS
6	2437	-12.62	8	PASS
11	2462	-12.86	8	PASS

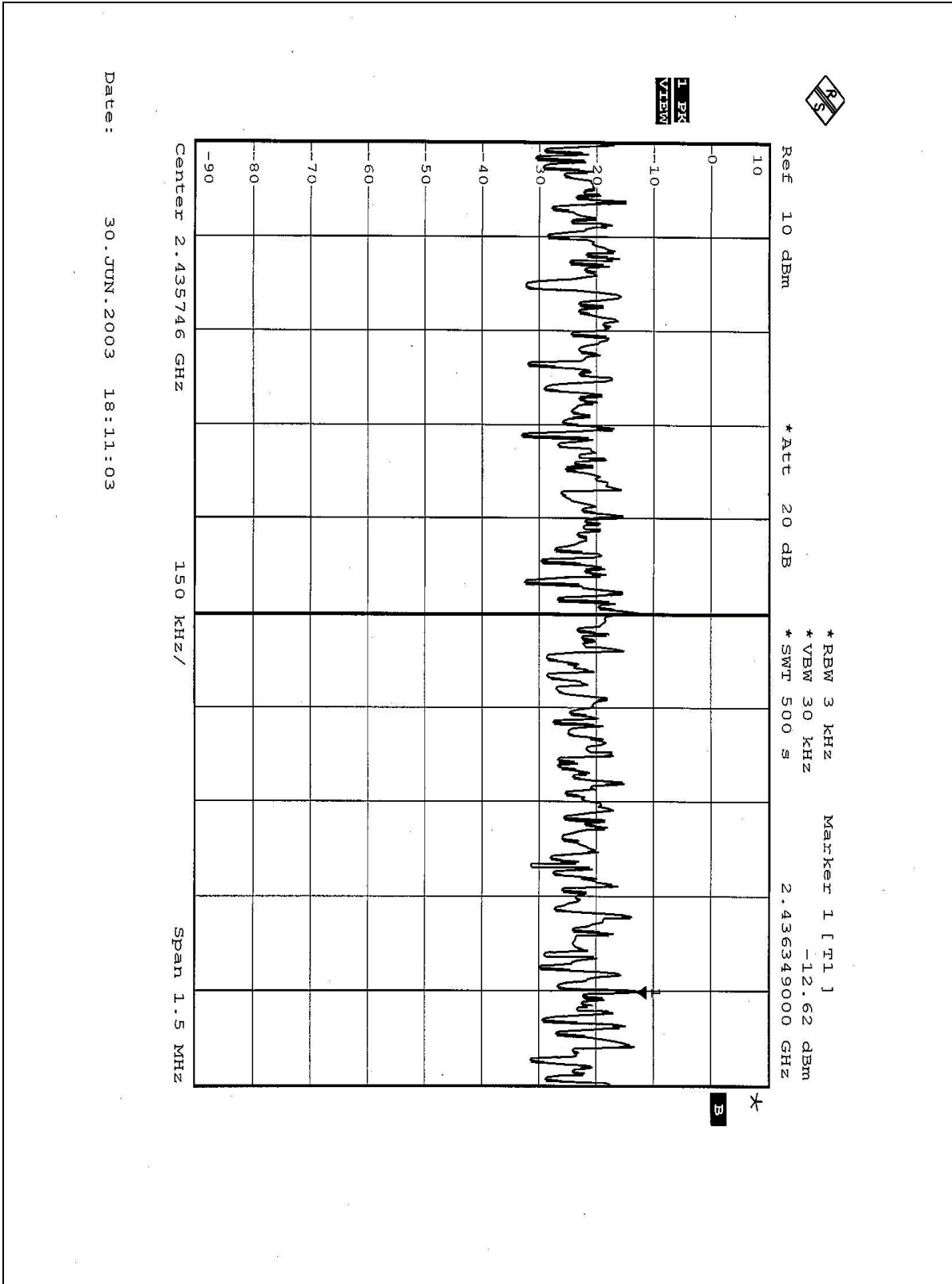


CH1



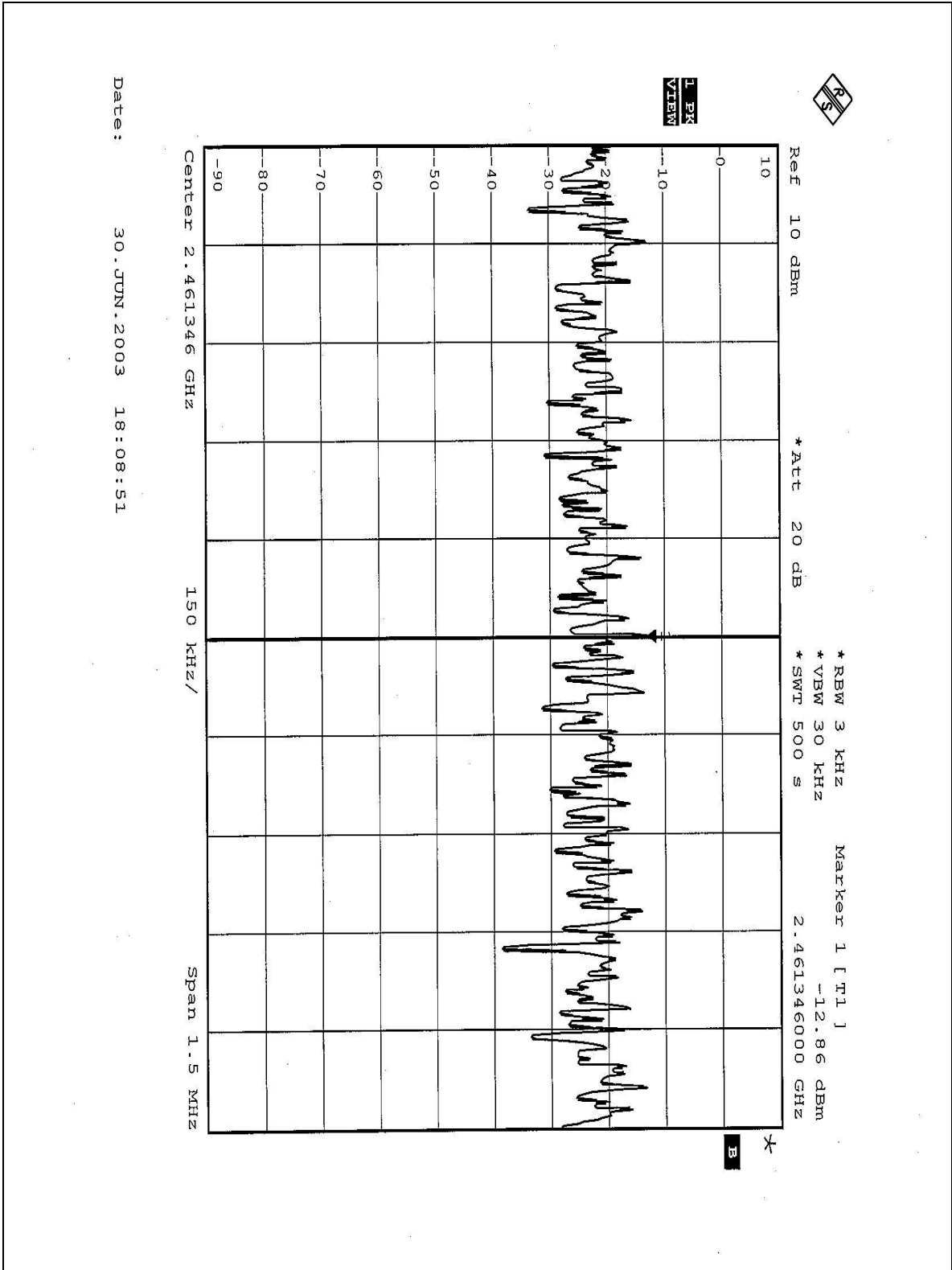


CH6





CH11





**4.6 BAND EDGES MEASUREMENT**

**4.6.1 LIMITS OF BAND EDGES MEASUREMENT**

Below -20dB 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 23, 2004

**NOTE:**

1. 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



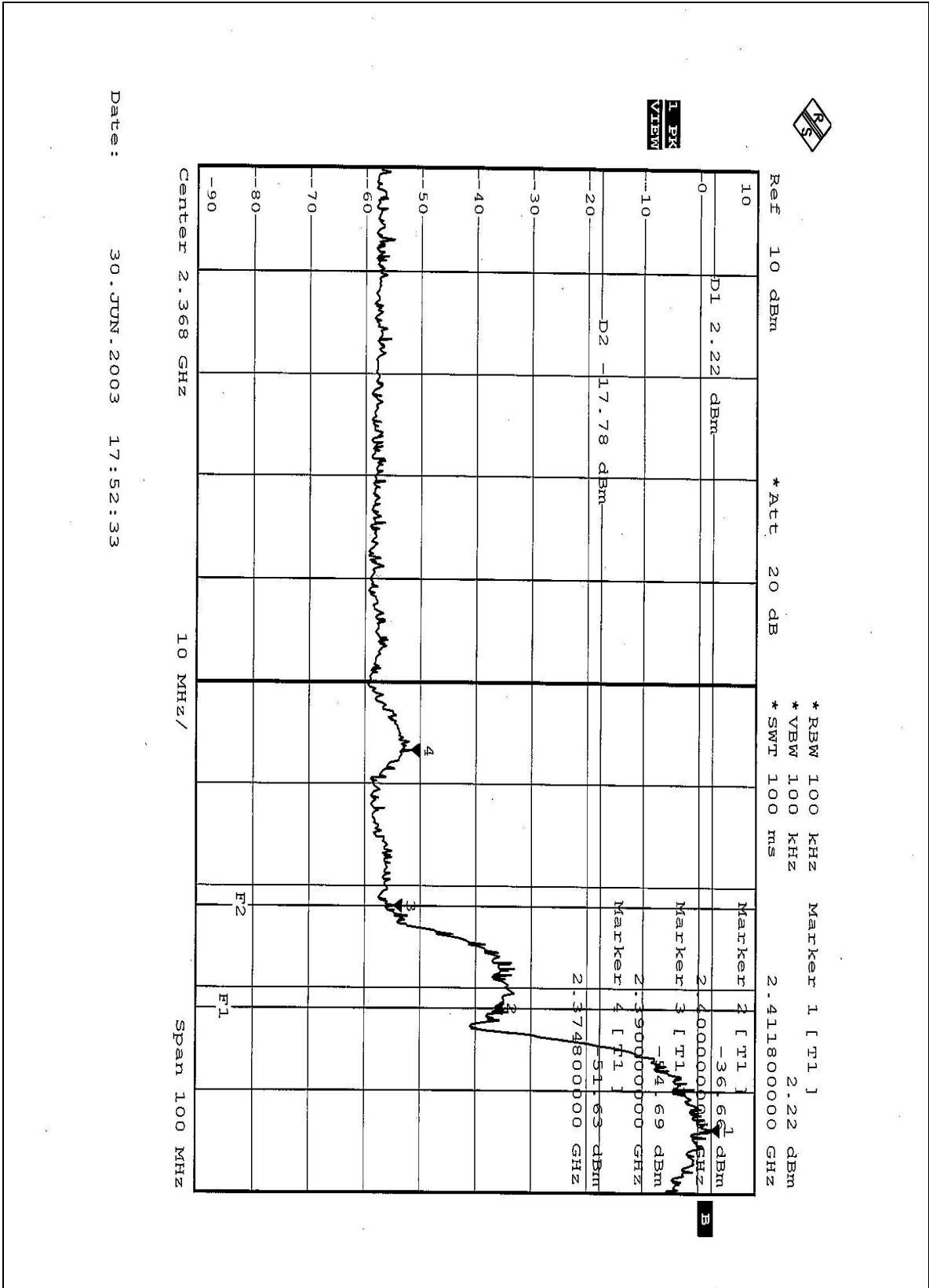
#### 4.6.5 EUT OPERATING CONDITION

Same as Item 4.3.6

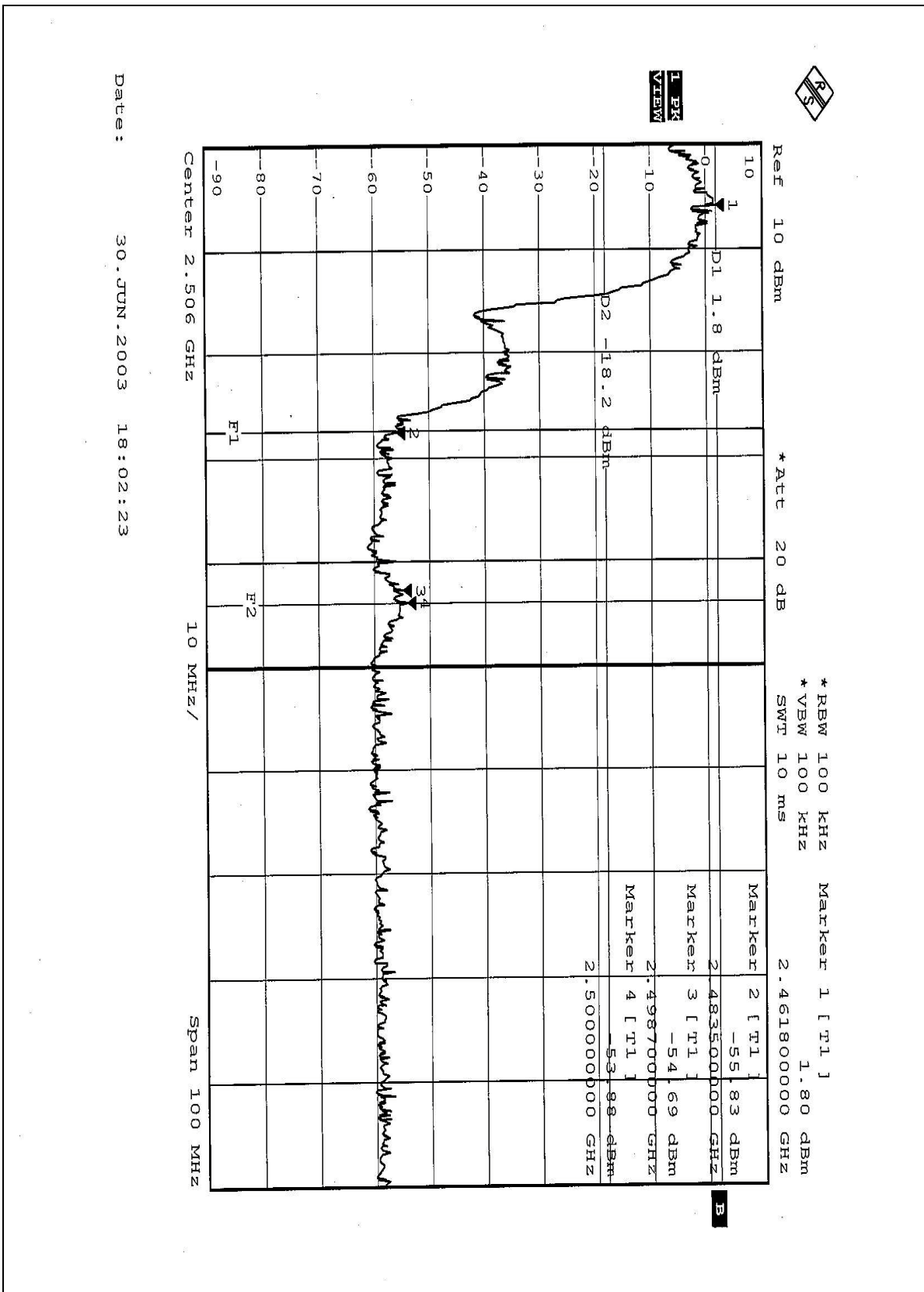
#### 4.6.6 TEST RESULTS

The spectrum plots are attached on the following 2 pages. D2 line indicates the highest level, D1 line indicates the 20dB offset below D2. It shows compliance with the requirement in part 15.247(C).

**NOTE1:** The band edge emission plot on the following 1-2 page shows 53.85dB / 55.68dB delta between carrier maximum power and local maximum emission in restrict band (2.3748GHz / 2.5000GHz). The emission of carrier strength list in the test result of channel 11 mode at the item 4.2.7 (page 27) is 102.3dBuV/m, so the maximum field strength in restrict band is  $102.3 - 53.85 = 48.45$ dBuV/m which is under 54dBuV/m limit.



Date: 30.JUN.2003 17:52:33



Date: 30.JUN.2003 18:02:23





## **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 with no antenna connector. The maximum Gain of this antenna is 2dBi.

## 5 PHOTOGRAPHS OF THE TEST CONFIGURATION

### CONDUCTED EMISSION TEST



### RADIATED EMISSION TEST





## 6 INFORMATION ON THE TESTING LABORATORIES

We, ADT Corp., were founded in 1988 to provide our best service in EMC and Safety consultation. Our laboratories are accredited and approved by the following approval agencies according to ISO/IEC 17025, Guide 25 or EN 45001:

<b>USA</b>	FCC, NVLAP
<b>Germany</b>	TUV Rheinland
<b>Japan</b>	VCCI
<b>New Zealand</b>	MoC
<b>Norway</b>	NEMKO
<b>R.O.C.</b>	BSMI, DGT, CNLA

Copies of accreditation certificates of our laboratories obtained from approval agencies can be downloaded from our web site:

[www.adt.com.tw/index.5/phtml](http://www.adt.com.tw/index.5/phtml).

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The address and road map of all our labs can be found in our web site also.