

FCC TEST REPORT

REPORT NO.: RF911107R01

MODEL NO.: SL-2511AP2 PLUS

(for other models please refer to page 6)

RECEIVED: Nov. 7, 2002

TESTED: Dec. 16 ~ Dec. 30, 2002

APPLICANT: SENAIO International Co., Ltd.

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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 NAME : Wireless LAN Access Point

BRAND NAME : SENAO, EnGenius

MODEL NO. : SL-2511AP2 PLUS

(for other models please refer to page 6)

APPLICANT : SENAO International Co., Ltd.

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 Dec. 16 ~ Dec. 30, 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: Rennie Wang, **DATE:** January 2, 2003
Rennie Wang

APPROVED BY: Dr. Alan Lane for, **DATE:** January 2, 2003
Dr. Alan Lane
Manager

2 SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

APPLIED STANDARD: 47 CFR Part 15, Subpart C			
Standard Section	Test Type and Limit	Result	REMARK
15.207	AC Power Conducted Emission	PASS	Meet the requirement of limit Minimum passing margin is -21.30dBuV at 4.548MHz
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 -2.30dBuV at 6188.00MHz
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

3 GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

PRODUCT	Wireless LAN Access Point
MODEL NO.	SL-2511AP2 PLUS (for other models please refer to following NOTE 3)
POWER SUPPLY	12VDC from AC adapter
MODULATION TYPE	BPSK, QPSK, CCK (DSSS)
TRANSFER RATE	1/2/5.5/11Mbps
FREQUENCY RANGE	2412MHz ~ 2462MHz
NUMBER OF CHANNEL	11
OUTPUT POWER	20.96dBm
ANTENNA TYPE	Dipole antenna
I/O PORTS	NA
ASSOCIATED DEVICES	NA

NOTE:

1. The EUT was operated with following AC adapter:

Brand Name:	DVE
Model No.:	DV-121AT
Input power :	110VAC 60 Hz
Output power :	12VDC 1A

2. There are six models provided to this EUT. They are identical to each other except for their model name and brand name due to marketing requirement.

3. Details for six models:

Brand Name	Model Name
SL-2511AP2 PLUS	SENAO
NL-2511AP2 PLUS	SENAO
SL-2511AP PRO PLUS	SENAO
NL-2511AP PRO PLUS	SENAO
EL-2511AP2 PLUS	EnGenius
EL-2511AP PRO PLUS	EnGenius

4. 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.

3.3 GENERAL DESCRIPTION OF APPLIED STANDARDS

The EUT is a Wireless LAN Access Point. 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	USB 10/100 Fast Ethernet	D-Link	DU-E100	UR15001597	FCC DoC APPROVED
2	NOTEBOOK PC	DELL	PPX	99125	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

4.1 CONDUCTED EMISSION MEASUREMENT

4.1.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT

FREQUENCY OF EMISSION (MHz)	CONDUCTED LIMIT (dBμV)	
	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.

4.1.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
ROHDE & SCHWARZ Test Receiver	ESHS30	828109/007	July 03, 2003
ROHDE & SCHWARZ Artificial Mains Network (for EUT)	ESH3-Z5	839135/006	July 02, 2003
* ROHDE & SCHWARZ 4-wire ISN	ENY41	838119/028	Nov. 29, 2003
* ROHDE & SCHWARZ 2-wire ISN	ENY22	837497/016	Nov. 29, 2003
EMCO-L.I.S.N. (for peripheral)	3825/2	9204-1964	July 02, 2003
Software	Cond-V2M1	NA	NA
RF cable (JYEBAO)	5D-FB	Cable-C02.01	July 5, 2003
HP Terminator (For EMCO LISN)	11593A	E1-01-298	Feb. 20, 2003
HP Terminator (For EMCO LISN)	11593A	E1-01-299	Feb. 20, 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 conducted telecom port test only (if tested).
 3. The test was performed in ADT Shielded Room No. 2.
 4. The VCCI Site Registration No. is C-240.



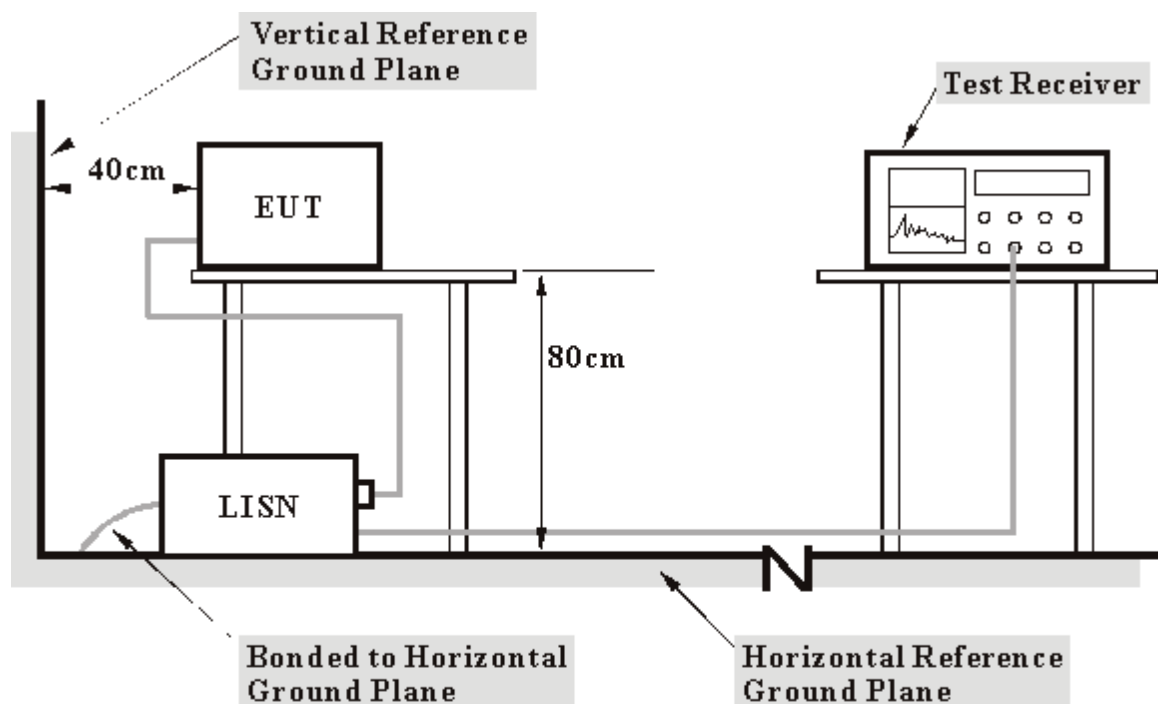
4.1.3 TEST PROCEDURES

- 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

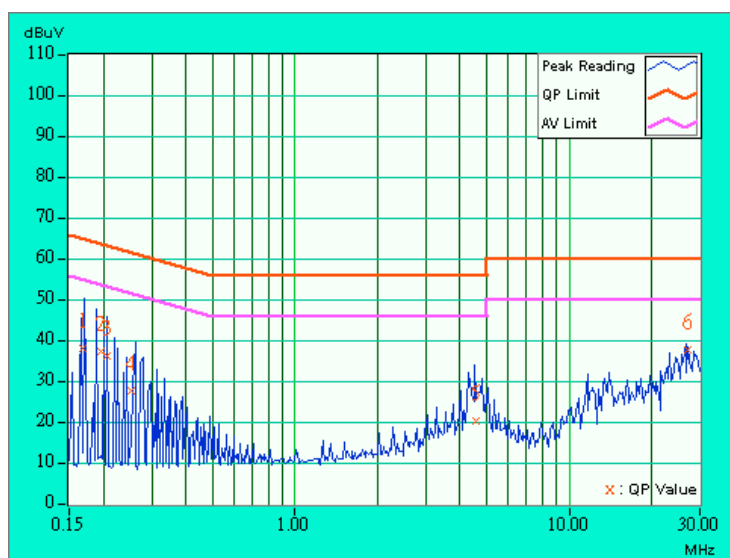
- a. Placed the EUT on the testing table.
- b. Prepared another computer system to act as a communication partner and placed it outside of testing area.
- c. The communication partner run a test program to enable EUT under transmission/receiving condition continuously at specific channel frequency via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

4.1.7 TEST RESULTS

EUT	Wireless LAN Access Point	MODEL	SL-2511AP2 PLUS
MODE	Channel 1	6dB BANDWIDTH	10 kHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	PHASE	Line (L)
ENVIRONMENTAL CONDITIONS	22deg.C, 62%RH, 1005 hPa	TESTED BY: Cody 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	0.168	0.10	36.69	-	36.79	-	65.06	55.06	-28.27	-
2	0.195	0.10	35.99	-	36.09	-	63.80	53.80	-27.71	-
3	0.207	0.10	35.04	-	35.14	-	63.32	53.32	-28.18	-
4	0.253	0.10	26.30	-	26.40	-	61.65	51.65	-35.25	-
5	4.593	0.33	18.97	-	19.30	-	56.00	46.00	-36.70	-
6	27.158	1.43	36.19	-	37.62	-	60.00	50.00	-22.38	-

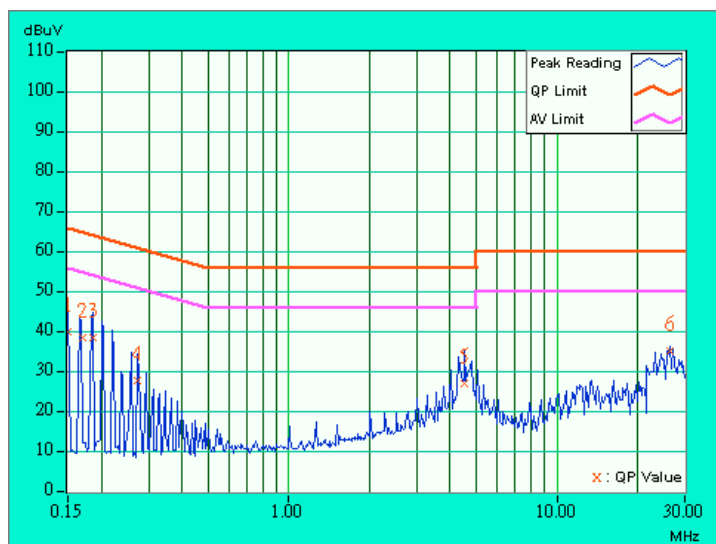
- Remarks:
1. "": Undetectable
 2. QP. and AV. are abbreviations of quasi-peak and average individually.
 3. "-": NA
 4. The emission levels of other frequencies were very low against the limit.
 5. Margin value = Emission level - Limit value
 6. Emission Level = Correction Factor + Reading Value.



EUT	Wireless LAN Access Point	MODEL	SL-2511AP2 PLUS
MODE	Channel 1	6dB BANDWIDTH	10 kHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	PHASE	Neutral (N)
ENVIRONMENTAL CONDITIONS	22deg.C, 62%RH, 1005 hPa	TESTED BY: Cody 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	0.150	0.10	38.82	-	38.92	-	66.00	56.00	-27.08	-
2	0.170	0.10	37.36	-	37.46	-	64.96	54.96	-27.50	-
3	0.186	0.10	37.44	-	37.54	-	64.21	54.21	-26.67	-
4	0.273	0.10	26.48	-	26.58	-	61.03	51.03	-34.45	-
5	4.494	0.31	25.72	-	26.03	-	56.00	46.00	-29.97	-
6	26.489	1.26	33.82	-	35.08	-	60.00	50.00	-24.92	-

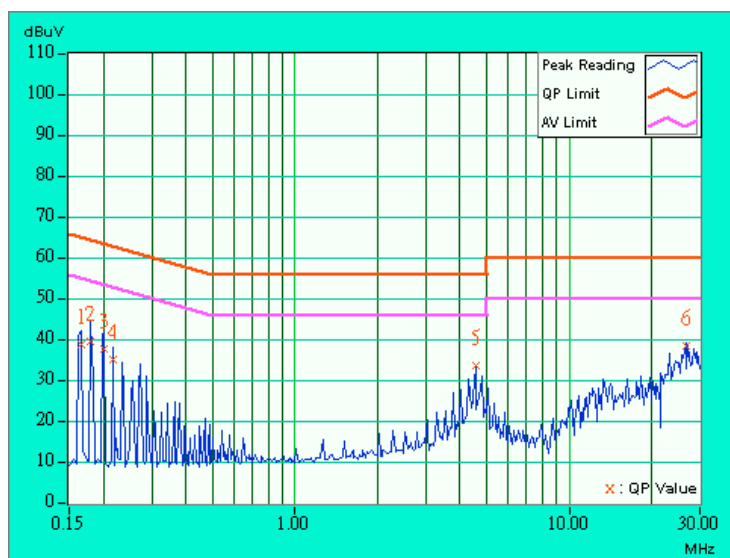
- Remarks:
1. "x": Undetectable
 2. QP. and AV. are abbreviations of quasi-peak and average individually.
 3. "-": NA
 4. The emission levels of other frequencies were very low against the limit.
 5. Margin value = Emission level - Limit value
 6. Emission Level = Correction Factor + Reading Value.



EUT	Wireless LAN Access Point	MODEL	SL-2511AP2 PLUS
MODE	Channel 6	6dB BANDWIDTH	10 kHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	PHASE	Line (L)
ENVIRONMENTAL CONDITIONS	22deg.C, 62%RH, 1005 hPa	TESTED BY: Cody 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	0.165	0.10	37.64	-	37.74	-	65.21	55.21	-27.47	-
2	0.180	0.10	38.34	-	38.44	-	64.49	54.49	-26.05	-
3	0.201	0.10	36.20	-	36.30	-	63.57	53.57	-27.27	-
4	0.216	0.10	33.88	-	33.98	-	62.97	52.97	-28.99	-
5	4.548	0.33	32.27	-	32.60	-	56.00	46.00	-23.40	-
6	26.609	1.40	37.17	-	38.57	-	60.00	50.00	-21.43	-

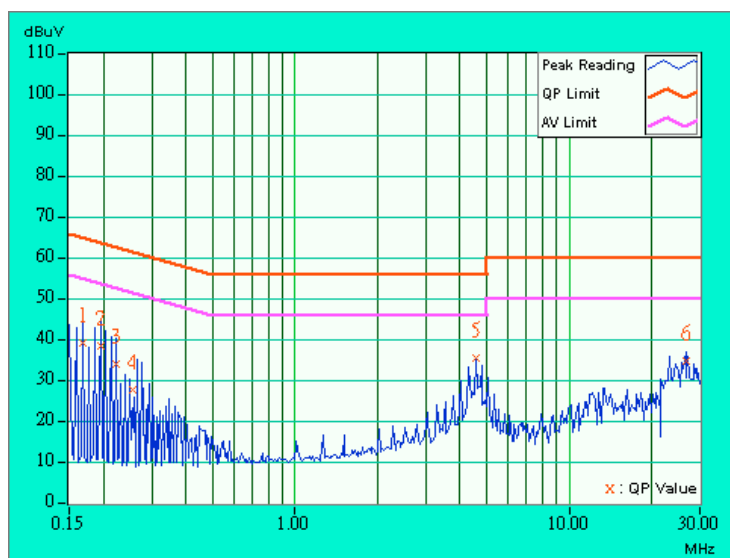
- Remarks:
1. "x": Undetectable
 2. QP. and AV. are abbreviations of quasi-peak and average individually.
 3. "-": NA
 4. The emission levels of other frequencies were very low against the limit.
 5. Margin value = Emission level - Limit value
 6. Emission Level = Correction Factor + Reading Value.



EUT	Wireless LAN Access Point	MODEL	SL-2511AP2 PLUS
MODE	Channel 6	6dB BANDWIDTH	10 kHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	PHASE	Neutral (N)
ENVIRONMENTAL CONDITIONS	22deg.C, 62%RH, 1005 hPa	TESTED BY: Cody 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	0.168	0.10	38.04	-	38.14	-	65.06	55.06	-26.92	-
2	0.195	0.10	37.18	-	37.28	-	63.82	53.82	-26.54	-
3	0.222	0.10	32.68	-	32.78	-	62.74	52.74	-29.96	-
4	0.254	0.10	26.44	-	26.54	-	61.62	51.62	-35.08	-
5	4.548	0.31	34.39	-	34.70	-	56.00	46.00	-21.30	-
6	26.612	1.26	33.70	-	34.96	-	60.00	50.00	-25.04	-

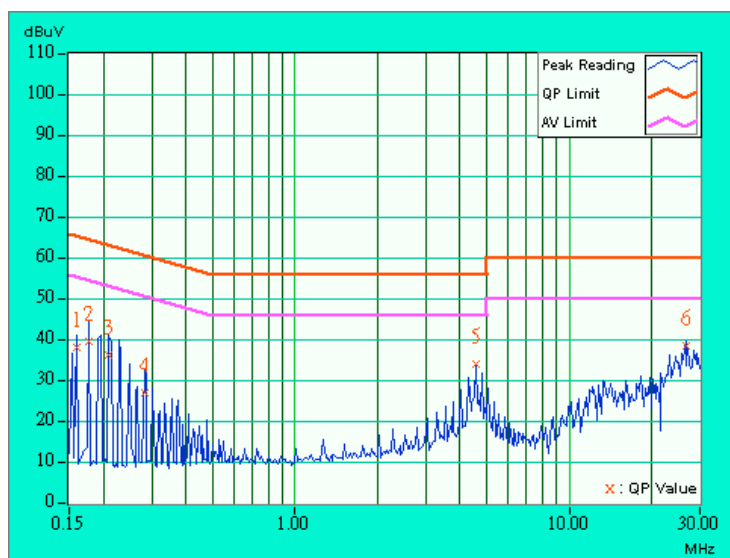
- Remarks:
1. "-": Undetectable
 2. QP. and AV. are abbreviations of quasi-peak and average individually.
 3. "-": NA
 4. The emission levels of other frequencies were very low against the limit.
 5. Margin value = Emission level - Limit value
 6. Emission Level = Correction Factor + Reading Value.



EUT	Wireless LAN Access Point	MODEL	SL-2511AP2 PLUS
MODE	Channel 11	6dB BANDWIDTH	10 kHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	PHASE	Line (L)
ENVIRONMENTAL CONDITIONS	22deg.C, 62%RH, 1005 hPa	TESTED BY: Cody 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	0.159	0.10	36.90	-	37.00	-	65.52	55.52	-28.52	-
2	0.177	0.10	38.10	-	38.20	-	64.63	54.63	-26.43	-
3	0.210	0.10	35.02	-	35.12	-	63.21	53.21	-28.09	-
4	0.282	0.10	25.69	-	25.79	-	60.76	50.76	-34.97	-
5	4.548	0.33	32.71	-	33.04	-	56.00	46.00	-22.96	-
6	26.609	1.40	37.17	-	38.57	-	60.00	50.00	-21.43	-

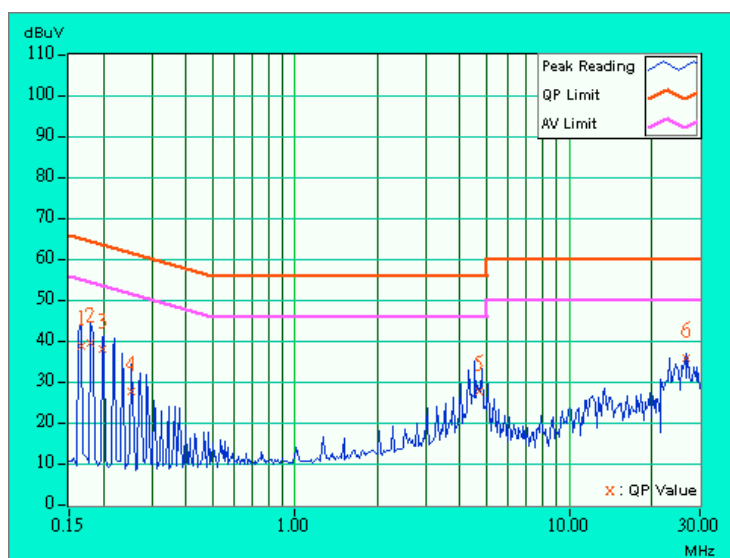
- Remarks:
1. "-": Undetectable
 2. QP. and AV. are abbreviations of quasi-peak and average individually.
 3. "-": NA
 4. The emission levels of other frequencies were very low against the limit.
 5. Margin value = Emission level - Limit value
 6. Emission Level = Correction Factor + Reading Value.



EUT	Wireless LAN Access Point	MODEL	SL-2511AP2 PLUS
MODE	Channel 11	6dB BANDWIDTH	10 kHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	PHASE	Neutral (N)
ENVIRONMENTAL CONDITIONS	22deg.C, 62%RH, 1005 hPa	TESTED BY: Cody Chang	

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	QP.	AV.	QP.	AV.	QP.	AV.	QP.	AV.
1	0.165	0.10	37.44	-	37.54	-	65.21	55.21	-27.67	-
2	0.180	0.10	38.34	-	38.44	-	64.49	54.49	-26.05	-
3	0.198	0.10	36.72	-	36.82	-	63.69	53.69	-26.87	-
4	0.252	0.10	26.59	-	26.69	-	61.69	51.69	-35.00	-
5	4.668	0.31	26.68	-	26.99	-	56.00	46.00	-29.01	-
6	26.609	1.26	34.71	-	35.97	-	60.00	50.00	-24.03	-

- 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. 01, 2003
* HP Preamplifier	8449B	3008A01292	Aug. 07, 2003
* ROHDE & SCHWARZ TEST RECEIVER	ESMI	839013/007 839379/002	Jan. 27, 2003
SCHAFFNER Tunable Dipole Antenna	VHBA 9123	459	Nov. 22, 2003
SCHWARZBECK Tunable Dipole Antenna	UHA 9105	977	
* CHASE BILOG Antenna	CBL6112A	2221	Aug. 2, 2003
* SCHWARZBECK Horn Antenna	BBHA9120-D1	D130	July 3, 2003
* EMCO Horn Antenna	3115	9312-4192	April 9, 2003
* EMCO Turn Table	1060	1115	NA
* SHOSHIN Tower	AP-4701	A6Y005	NA
* Software	ADT_Radiate d_V5.09	NA	NA
* ANRITSU RF Switches	MP59B	M35046	July 11, 2003
* TIMES RF cable	LMR-600	CABLE-ST5-01	July. 11. 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. 5.
5. The VCCI Site Registration No. is R-1039.



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.

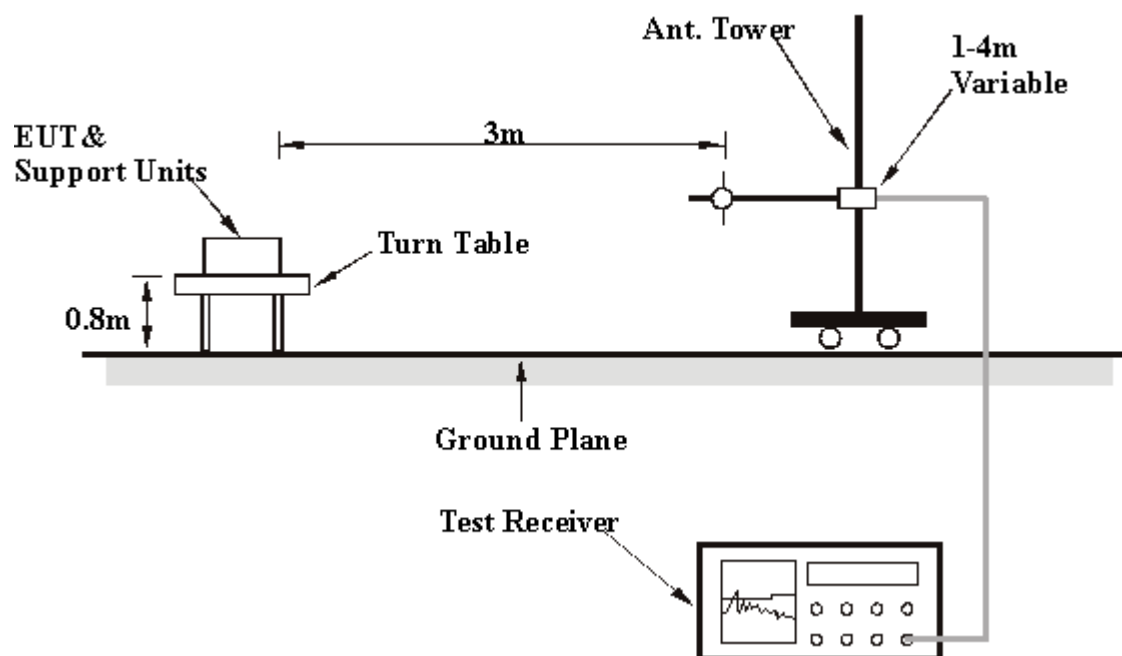
NOTE:

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

EUT	Wireless LAN Access Point	MODEL	SL-2511AP2 PLUS
MODE	Channel 11	FREQUENCY RANGE	Below 1000 MHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	DETECTOR FUNCTION	Quasi-Peak
ENVIRONMENTAL CONDITIONS	25deg. C, 60%RH, 1005 hPa	TESTED BY: 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)	Correction Factor (dB/m)
1	144.00	33.5 QP	43.50	-10.00	1.53 H	26	19.40	14.10
2	220.00	28.0 QP	46.00	-18.00	1.14 H	25	12.70	15.30
3	240.00	36.0 QP	46.00	-10.00	1.25 H	134	18.60	17.40
4	250.00	39.2 QP	46.00	-6.80	1.20 H	284	20.80	18.40
5	250.00	33.0 QP	46.00	-13.00	1.42 H	13	14.60	18.40
6	300.00	32.0 QP	46.00	-14.00	1.19 H	75	12.10	19.90
7	336.00	31.0 QP	46.00	-15.00	1.12 H	251	10.00	21.00
8	432.00	36.8 QP	46.00	-9.20	1.00 H	217	13.30	23.50
9	500.00	36.8 QP	46.00	-9.20	1.02 H	122	11.60	25.20
10	650.00	32.4 QP	46.00	-13.60	1.24 H	25	4.60	27.80
11	748.00	33.5 QP	46.00	-12.50	1.30 H	23	4.20	29.30
12	750.00	39.0 QP	46.00	-7.00	1.45 H	91	9.60	29.40
13	825.00	36.0 QP	46.00	-10.00	1.21 H	24	5.10	30.90
14	875.00	36.2 QP	46.00	-9.80	1.10 H	328	4.90	31.30

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 The other emission levels were very low against the limit.
- 4 Margin value = Emission level - Limit value

EUT	Wireless LAN Access Point	MODEL	SL-2511AP2 PLUS
MODE	Channel 11	FREQUENCY RANGE	Below 1000 MHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	DETECTOR FUNCTION	Quasi-Peak
ENVIRONMENTAL CONDITIONS	25deg. C, 60%RH, 1005 hPa	TESTED BY: 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)	Correction Factor (dB/m)
1	75.00	30.0 QP	40.00	-10.00	1.44 V	181	21.50	8.50
2	125.00	34.0 QP	43.50	-9.50	1.42 V	18	18.90	15.10
3	144.00	38.8 QP	43.50	-4.70	1.61 V	24	24.70	14.10
4	225.00	33.5 QP	46.00	-12.50	1.10 V	115	17.70	15.80
5	240.00	38.5 QP	46.00	-7.50	1.42 V	135	21.10	17.40
6	250.00	32.2 QP	46.00	-13.80	1.04 V	241	13.80	18.40
7	300.00	32.0 QP	46.00	-14.00	1.82 V	142	12.10	19.90
8	328.00	34.0 QP	46.00	-12.00	1.36 V	152	13.30	20.70
9	336.00	35.4 QP	46.00	-10.60	1.24 V	36	14.40	21.00
10	375.00	32.0 QP	46.00	-14.00	1.25 V	136	9.80	22.20
11	403.00	35.0 QP	46.00	-11.00	1.36 V	182	11.90	23.10
12	432.00	35.0 QP	46.00	-11.00	1.62 V	171	11.50	23.50
13	528.00	34.0 QP	46.00	-12.00	1.14 V	155	8.50	25.50
14	572.00	32.0 QP	46.00	-14.00	1.14 V	124	5.50	26.50
15	704.00	33.6 QP	46.00	-12.40	1.04 V	32	5.40	28.20
16	748.00	33.8 QP	46.00	-12.20	1.42 V	157	4.40	29.30
17	750.00	37.0 QP	46.00	-9.00	1.61 V	127	7.60	29.40
18	792.00	34.7 QP	46.00	-11.30	1.52 V	143	4.20	30.50

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 The other emission levels were very low against the limit.
- 4 Margin value = Emission level - Limit value

EUT	Wireless LAN Access Point	MODEL	SL-2511AP2 PLUS
MODE	Channel 1	FREQUENCY RANGE	Above 1000 MHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	DETECTOR FUNCTION	Peak(PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 60%RH, 1005 hPa	TESTED BY: 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)	Correction Factor (dB/m)
1	2038.00	41.6 PK	74.00	-32.40	1.42 H	195	14.90	26.70
2	*2412.00	94.8 PK			1.38 H	77	65.10	29.70
2	*2412.00	91.2 AV			1.38 H	77	61.50	26.70
3	4076.00	43.3 PK	74.00	-30.70	1.20 H	3	9.50	33.80
4	4824.00	44.6 PK	74.00	-29.40	1.30 H	360	9.20	35.40
5	6113.00	52.1 PK	74.00	-21.90	1.49 H	333	14.50	37.60
5	6113.00	49.2 AV	54.00	-4.80	1.49 H	333	11.60	29.70

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	2038.00	46.6 PK	74.00	-27.40	1.26 V	74	19.90	26.70
2	2381.00	54.5 PK	74.00	-19.50	1.28 V	325	25.00	29.50
2	2381.00	43.5 AV	54.00	-10.50	1.28 V	325	14.00	26.70
3	*2412.00	101.6 PK			1.28 V	325	71.90	29.70
3	*2412.00	98.4 AV			1.28 V	325	68.70	29.50
4	4076.00	43.3 PK	74.00	-30.70	1.37 V	128	9.50	33.80
5	4824.00	44.6 PK	74.00	-29.40	1.30 V	251	9.20	35.40
6	6113.00	51.3 PK	74.00	-22.70	1.10 V	253	13.70	37.60
6	6113.00	45.8 AV	54.00	-8.20	1.10 V	253	8.20	29.70
7	7233.00	50.6 PK	74.00	-23.40	1.31 V	230	8.90	41.60
7	7233.00	43.6 AV	54.00	-10.40	1.31 V	230	1.90	33.80

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 The other emission levels were very low against the limit.
- 4 The limit value is defined as per 15.247
- 5 “ * “ : Fundamental frequency



EUT	Wireless LAN Access Point	MODEL	SL-2511AP2 PLUS
MODE	Channel 6	FREQUENCY RANGE	Above 1000 MHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	DETECTOR FUNCTION	Peak(PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 60%RH, 1005 hPa	TESTED BY: 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)	Correction Factor (dB/m)
1	2063.00	42.8 PK	74.00	-31.20	1.63 H	325	15.90	26.90
2	*2437.00	92.4 PK			1.39 H	87	62.50	29.90
2	*2437.00	91.3 AV			1.39 H	87	61.40	26.90
3	4126.00	42.2 PK	74.00	-31.80	1.59 H	30	8.30	33.90
4	4874.00	45.7 PK	74.00	-28.30	1.08 H	142	10.20	35.50
5	6188.00	54.0 PK	74.00	-20.00	1.70 H	43	16.20	37.80
5	6188.00	51.7 AV	54.00	-2.30	1.70 H	43	13.90	29.90

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)	Correction Factor (dB/m)
1	2063.00	41.4 PK	74.00	-32.60	1.02 V	217	14.50	26.90
2	*2437.00	99.3 PK			1.26 V	97	69.40	29.90
2	*2437.00	97.4 AV			1.26 V	97	67.50	26.90
3	4126.00	43.4 PK	74.00	-30.60	1.01 V	42	9.40	33.90
4	4874.00	44.6 PK	74.00	-29.40	1.11 V	217	9.10	35.50
5	6188.00	53.0 PK	74.00	-21.00	1.43 V	182	15.20	37.80
5	6188.00	50.2 AV	54.00	-3.80	1.43 V	182	12.40	29.90

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 The other emission levels were very low against the limit.
- 4 The limit value is defined as per 15.247
- 5 “ * ” : Fundamental frequency

EUT	Wireless LAN Access Point	MODEL	SL-2511AP2 PLUS
MODE	Channel 11	FREQUENCY RANGE	Above 1000 MHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	DETECTOR FUNCTION	Peak(PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 60%RH, 1005 hPa	TESTED BY: 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)	Correction Factor (dB/m)
1	2088.00	42.0 PK	74.00	-32.00	1.67 H	145	14.90	27.10
2	*2463.00	99.0 PK			1.42 H	164	68.90	30.10
2	*2463.00	97.0 AV			1.42 H	164	66.90	27.10
3	2493.00	43.7 PK	74.00	-30.30	1.47 H	158	13.40	30.40
4	4176.00	45.5 PK	74.00	-28.50	1.04 H	152	11.50	34.10
5	4924.00	47.3 PK	74.00	-26.70	1.52 H	41	11.70	35.60
6	6263.00	54.4 PK	74.00	-19.60	1.58 H	297	16.30	38.00
6	6263.00	51.4 AV	54.00	-2.60	1.58 H	297	13.30	30.10

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	2088.00	42.0 PK	74.00	-32.00	1.38 V	19	14.90	27.10
2	*2463.00	105.0 PK			1.24 V	327	74.90	30.10
2	*2463.00	100.9 AV			1.24 V	327	70.80	27.10
3	2491.00	43.2 PK	74.00	-30.80	1.29 V	14	12.90	30.30
4	4176.00	44.5 PK	74.00	-29.50	1.37 V	45	10.50	34.10
5	4924.00	45.8 PK	74.00	-28.20	1.14 V	128	10.20	35.60
6	6263.00	51.2 PK	74.00	-22.80	1.28 V	138	13.10	38.00
6	6263.00	47.4 AV	54.00	-6.60	1.28 V	138	9.30	30.10

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 The other emission levels were very low against the limit.
- 4 The limit value is defined as per 15.247
- 5 “ * ” : 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:

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

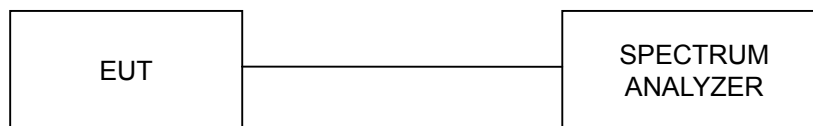
4.3.3 TEST PROCEDURE

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.

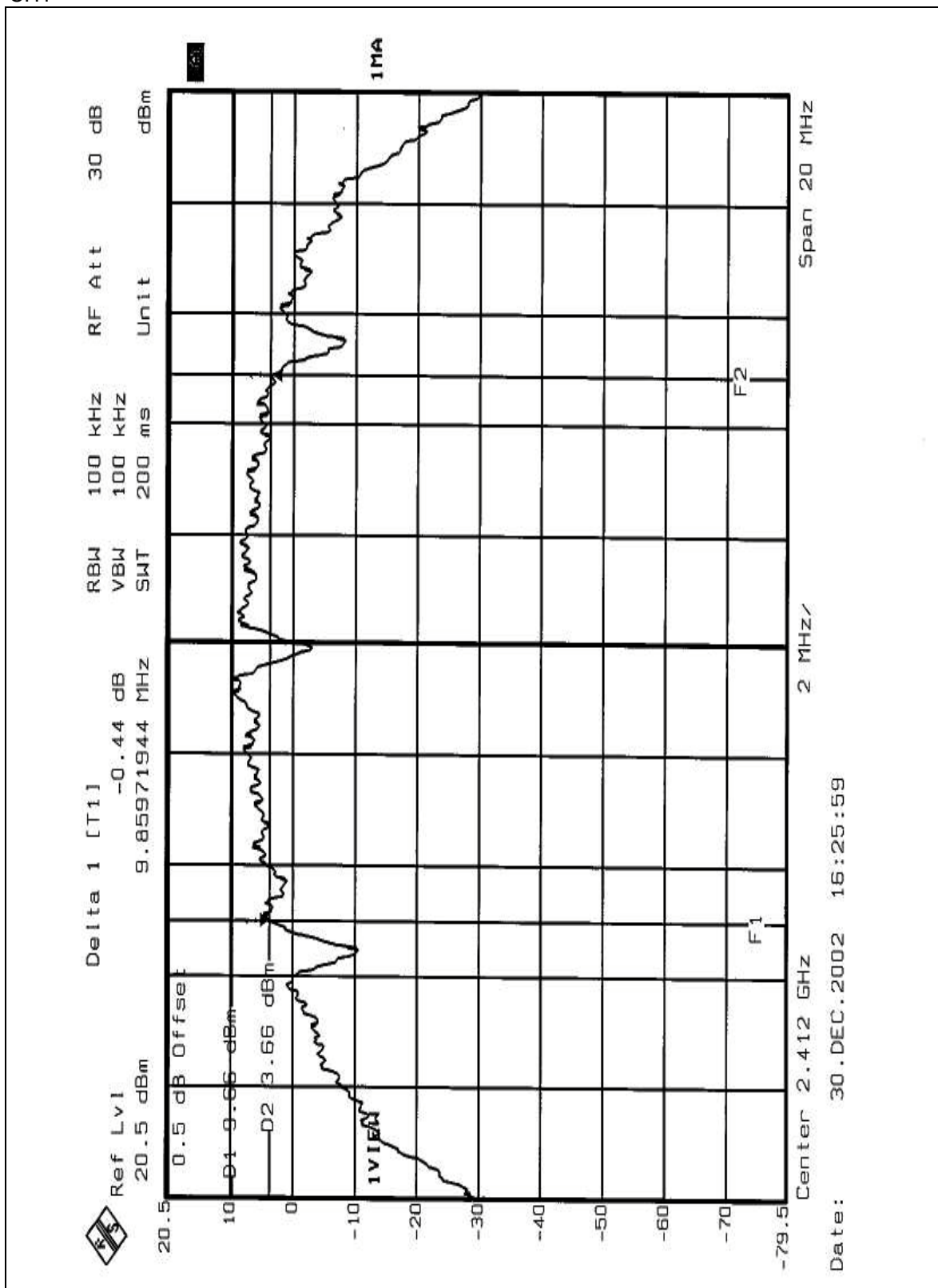


4.3.7 TEST RESULTS

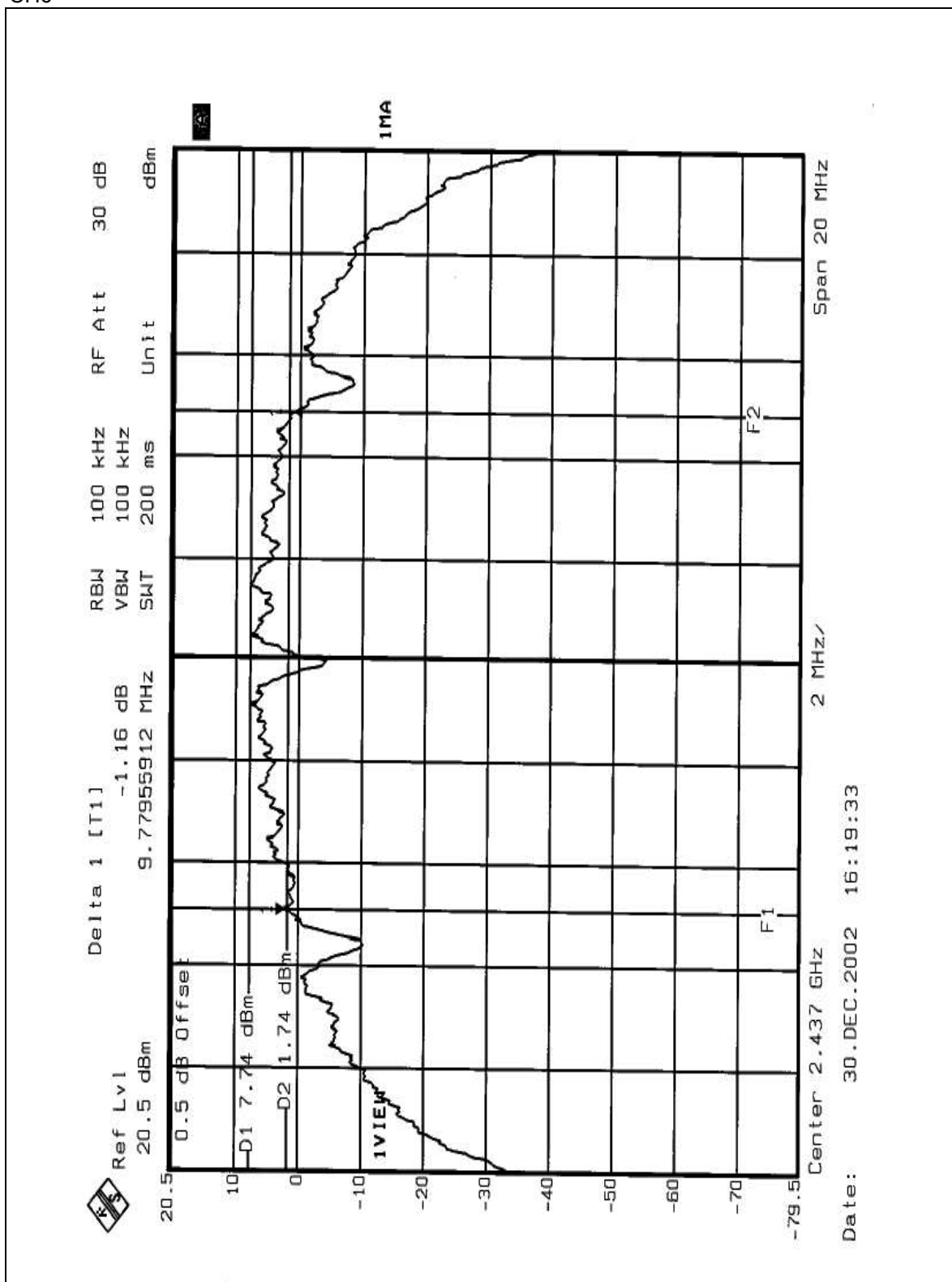
EUT	Wireless LAN Access Point	MODEL	SL-2511AP2 PLUS
INPUT POWER (SYSTEM)	120Vac, 60Hz	ENVIRONMENTAL CONDITIONS	19deg. C, 67%RH, 1005 hPa
TESTED BY: Ansen Lei			

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS/FAIL
1	2412	9.86	0.5	PASS
6	2437	9.78	0.5	PASS
11	2462	10.18	0.5	PASS

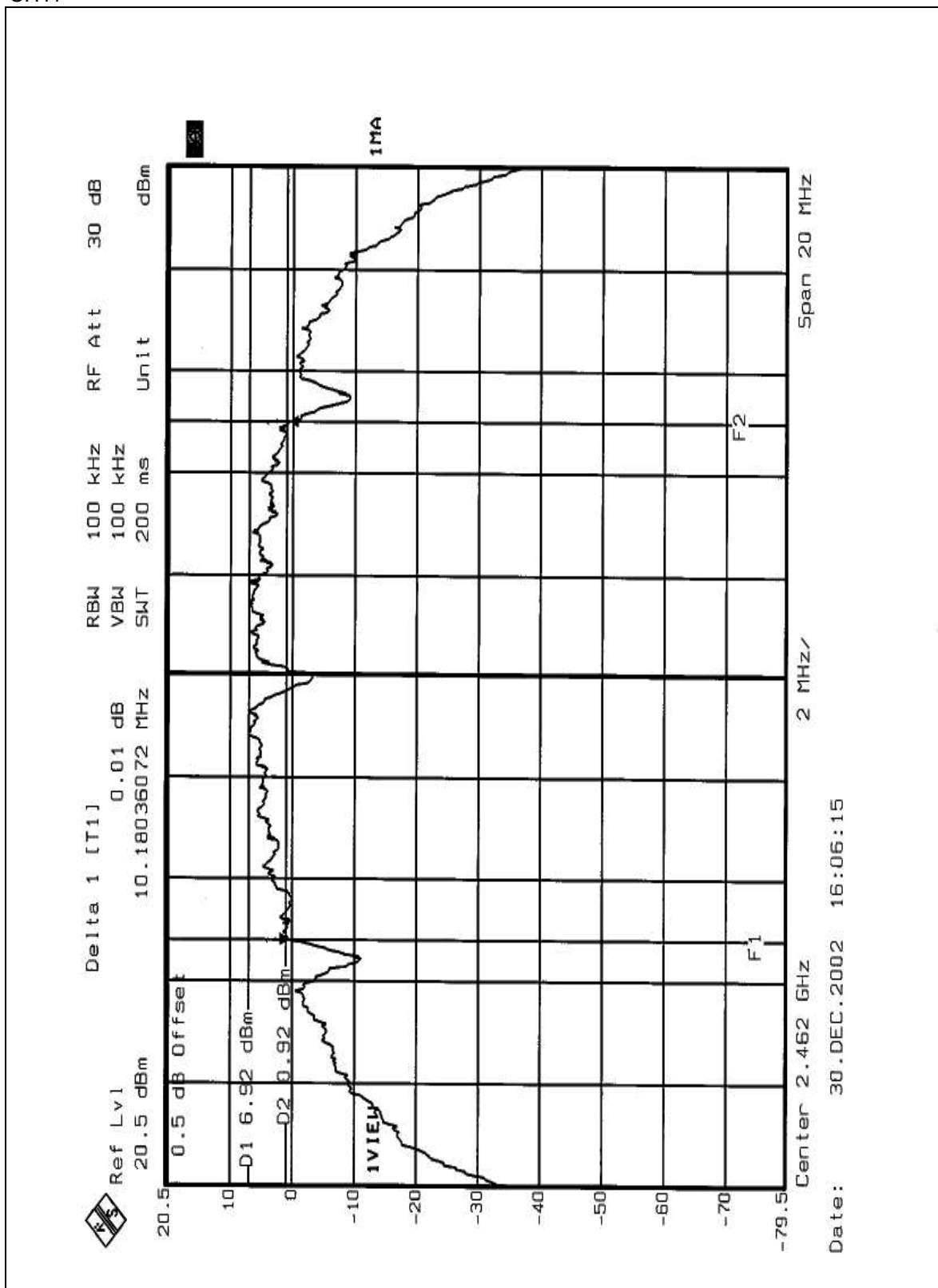
CH1



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
POWER METER	E4416A	GB41291118	Jul. 30, 2003
PEAK POWER SENSOR	E9327A	US40440722	Jul. 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.

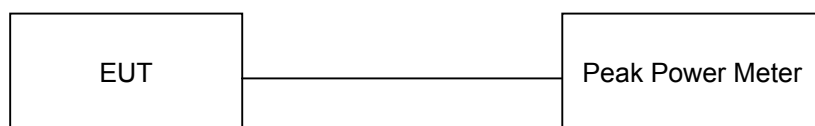
4.4.3 TEST PROCEDURES

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

**TEST RESULTS**

EUT	Wireless LAN Access Point	MODEL	SL-2511AP2 PLUS
INPUT POWER (SYSTEM)	120Vac, 60Hz	ENVIRONMENTAL CONDITIONS	19deg. C, 67%RH, 1005 hPa
TESTED BY: Hardaway Lee			

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER OUTPUT (dBm)	PEAK POWER LIMIT (dBm)	PASS/FAIL
1	2412	20.96	30	PASS
6	2437	20.92	30	PASS
11	2462	20.89	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:

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

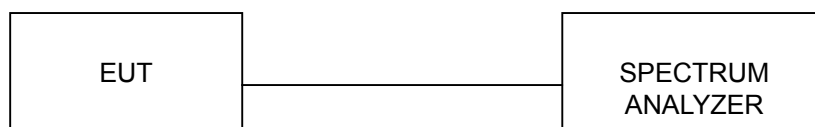
The transmitter output was connected to the spectrum analyzer through an attenuator, the bandwidth of the fundamental frequency was measured with the spectrum analyzer using 3 kHz RBW and 30 kHz VBW, set sweep time = span/3 kHz. The power spectral density was measured and recorded.

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

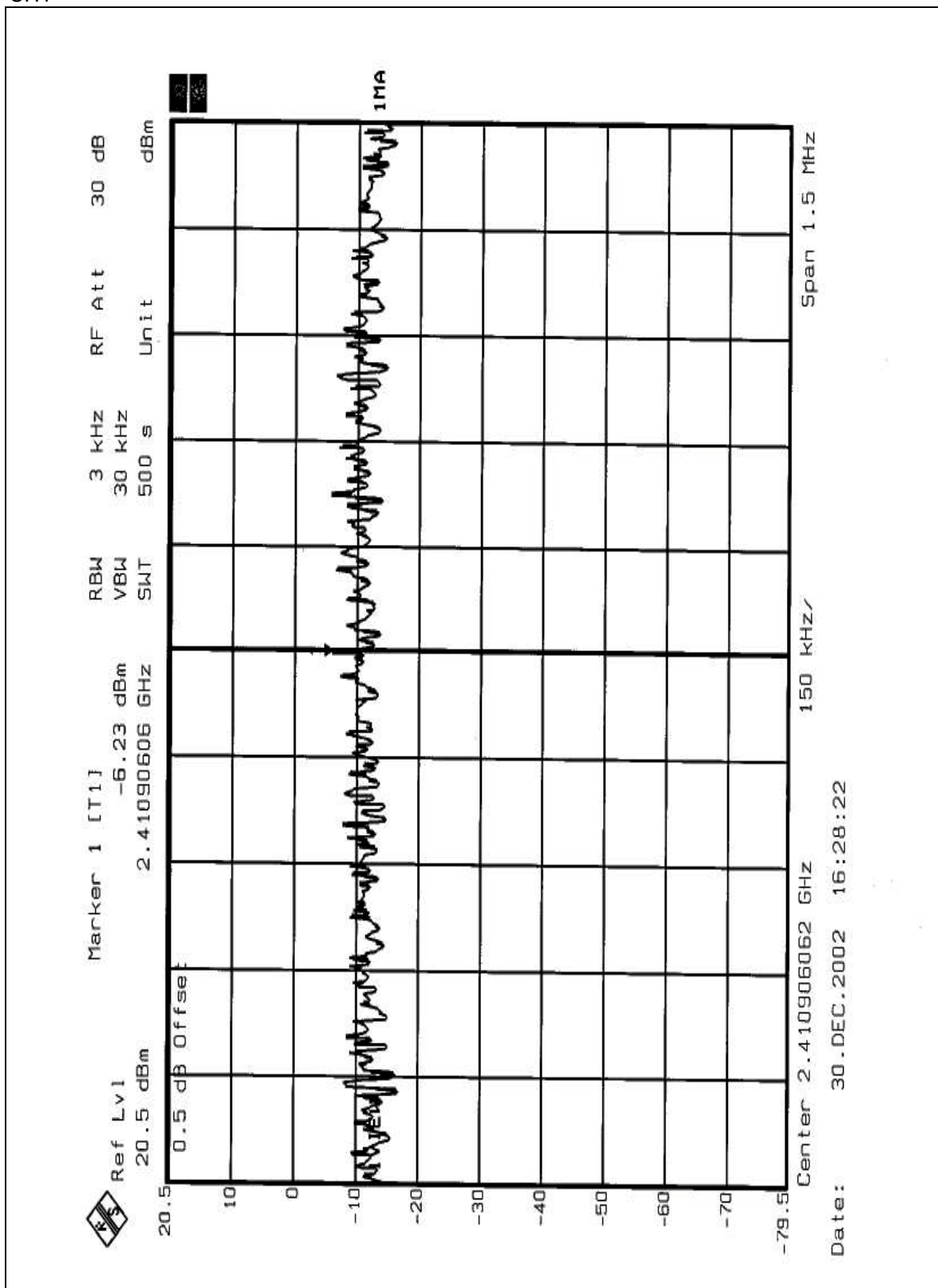


4.5.7 TEST RESULTS

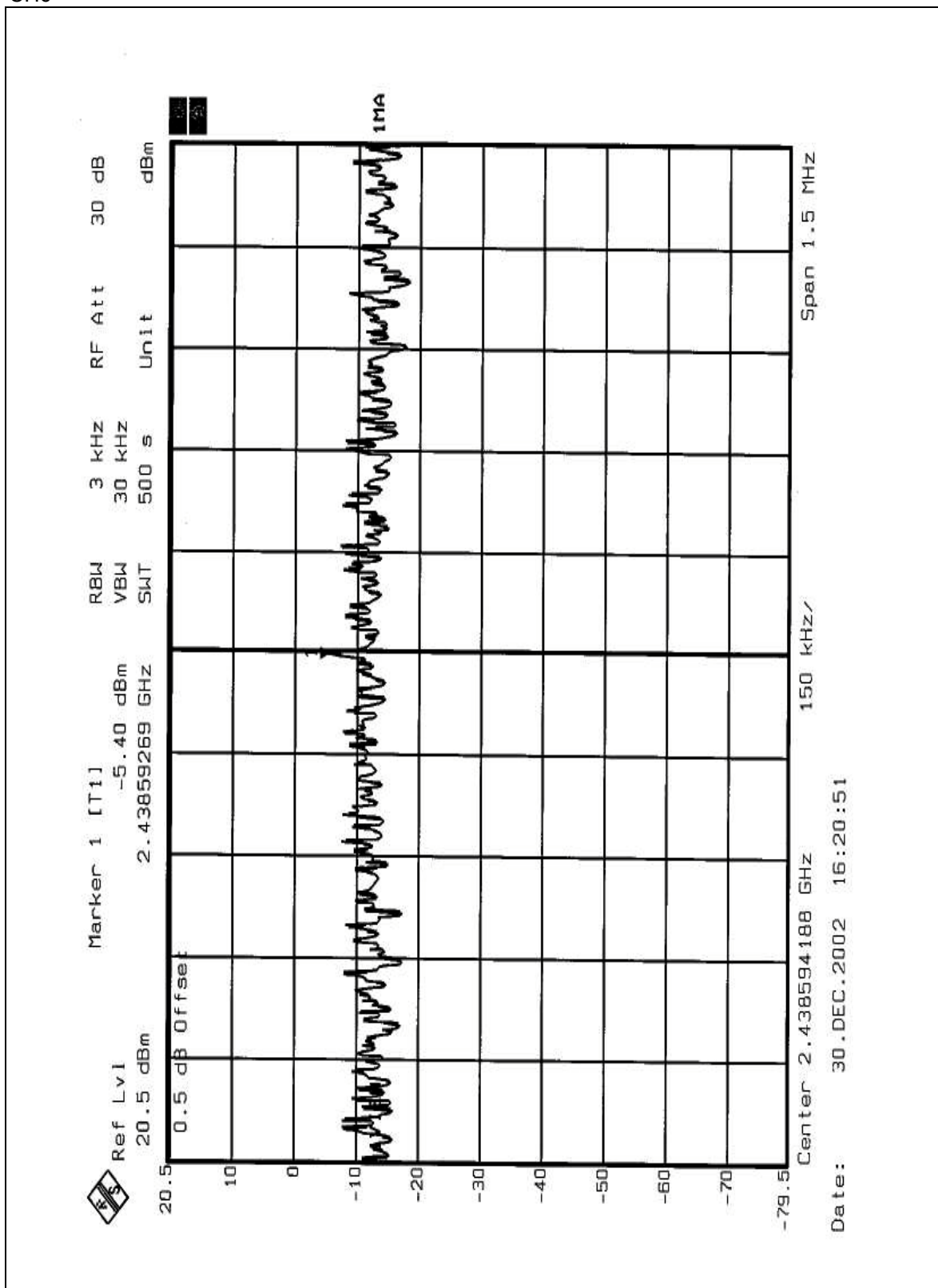
EUT	Wireless LAN Access Point	MODEL	SL-2511AP2 PLUS
INPUT POWER (SYSTEM)	120Vac, 60Hz	ENVIRONMENTAL CONDITIONS	19deg. C, 67%RH, 1005 hPa
TESTED BY: Ansen Lei			

CHANNEL NUMBER	CHANNEL FREQUENCY (MHz)	RF POWER LEVEL IN 3 kHz BW (dBm)	MAXIMUM LIMIT (dBm)	PASS/FAIL
1	2412	-6.23	8	PASS
6	2437	-5.40	8	PASS
11	2462	-5.71	8	PASS

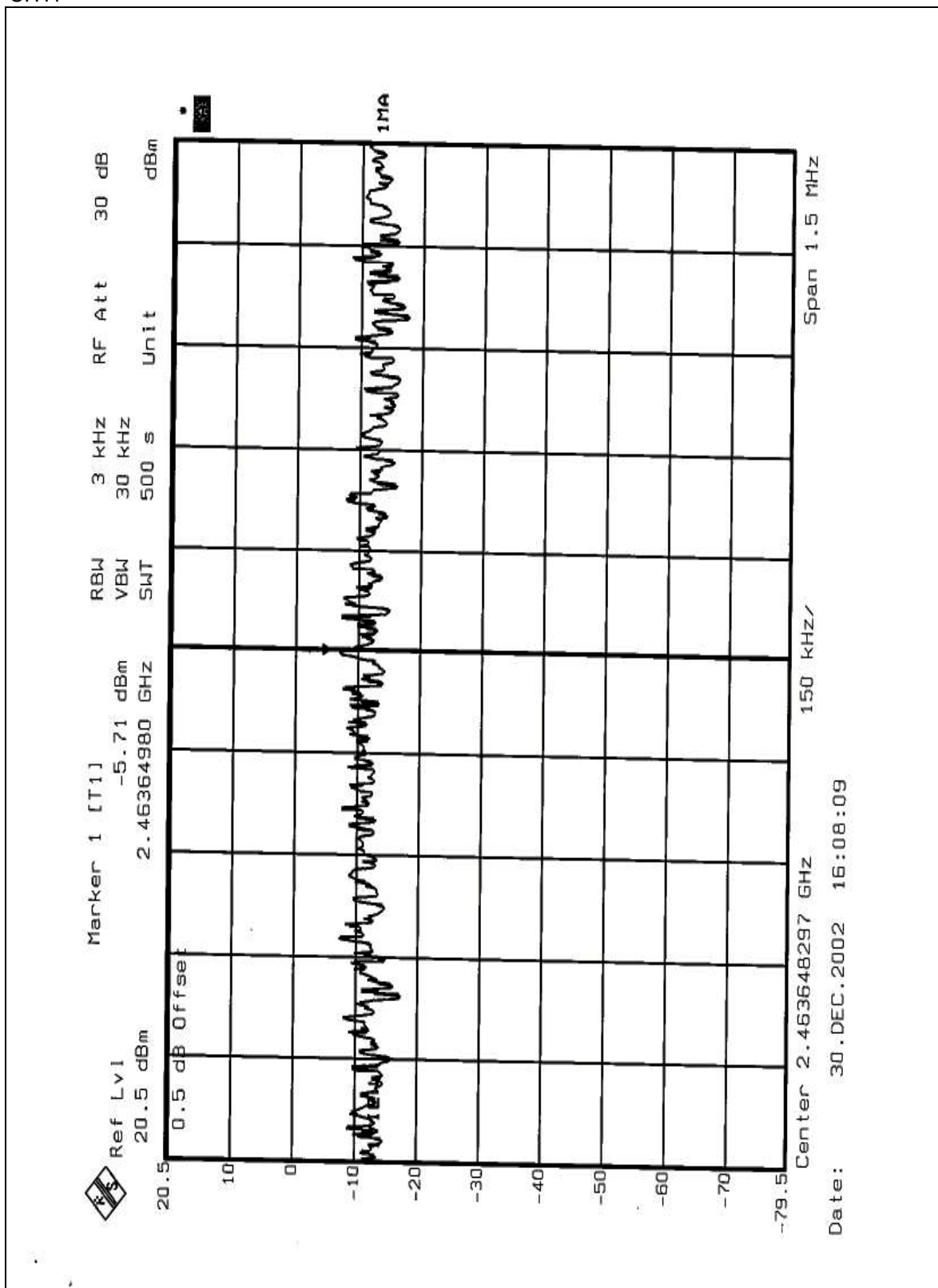
CH1



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 24, 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.

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

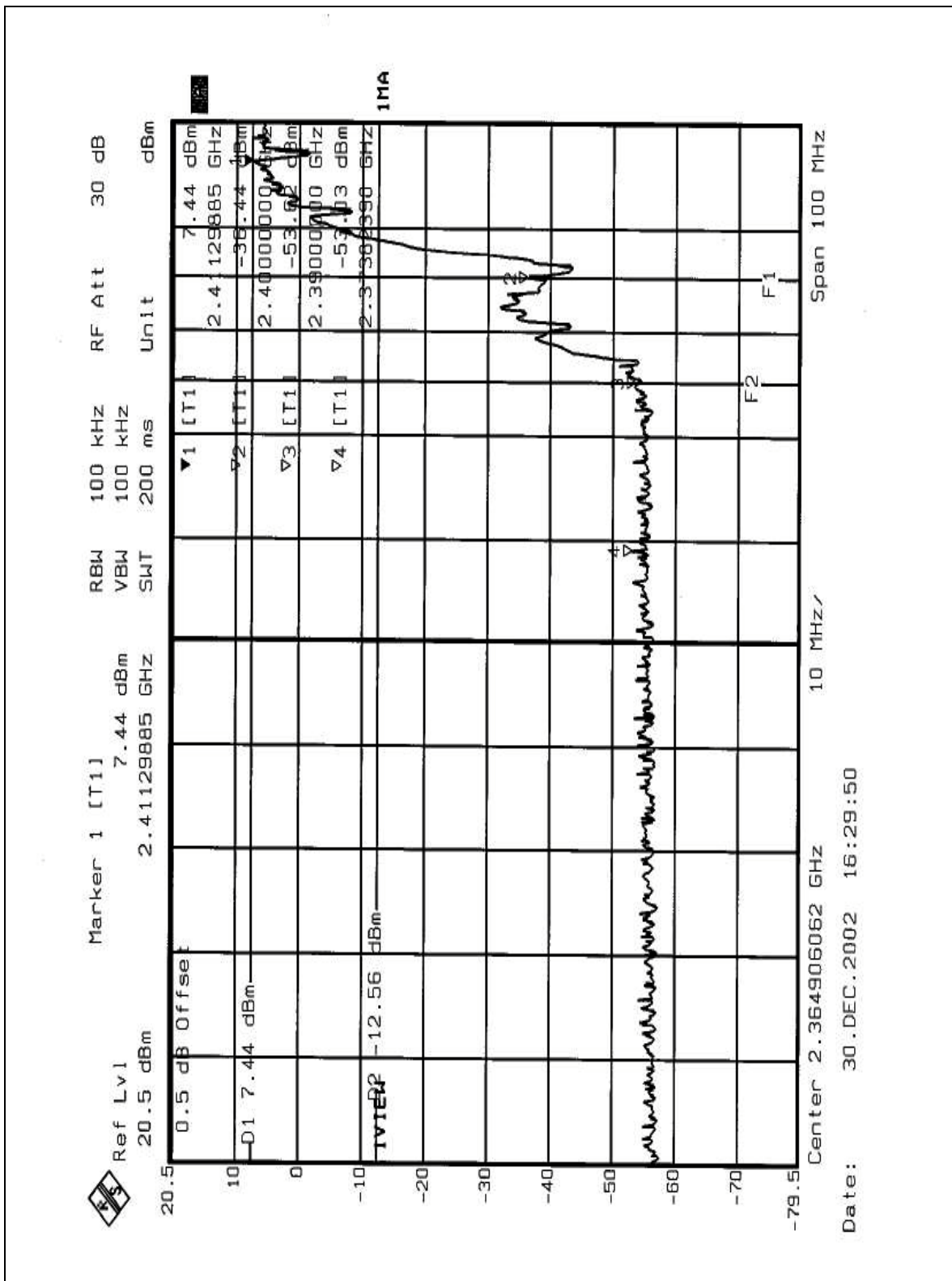
Same as Item 4.3.6

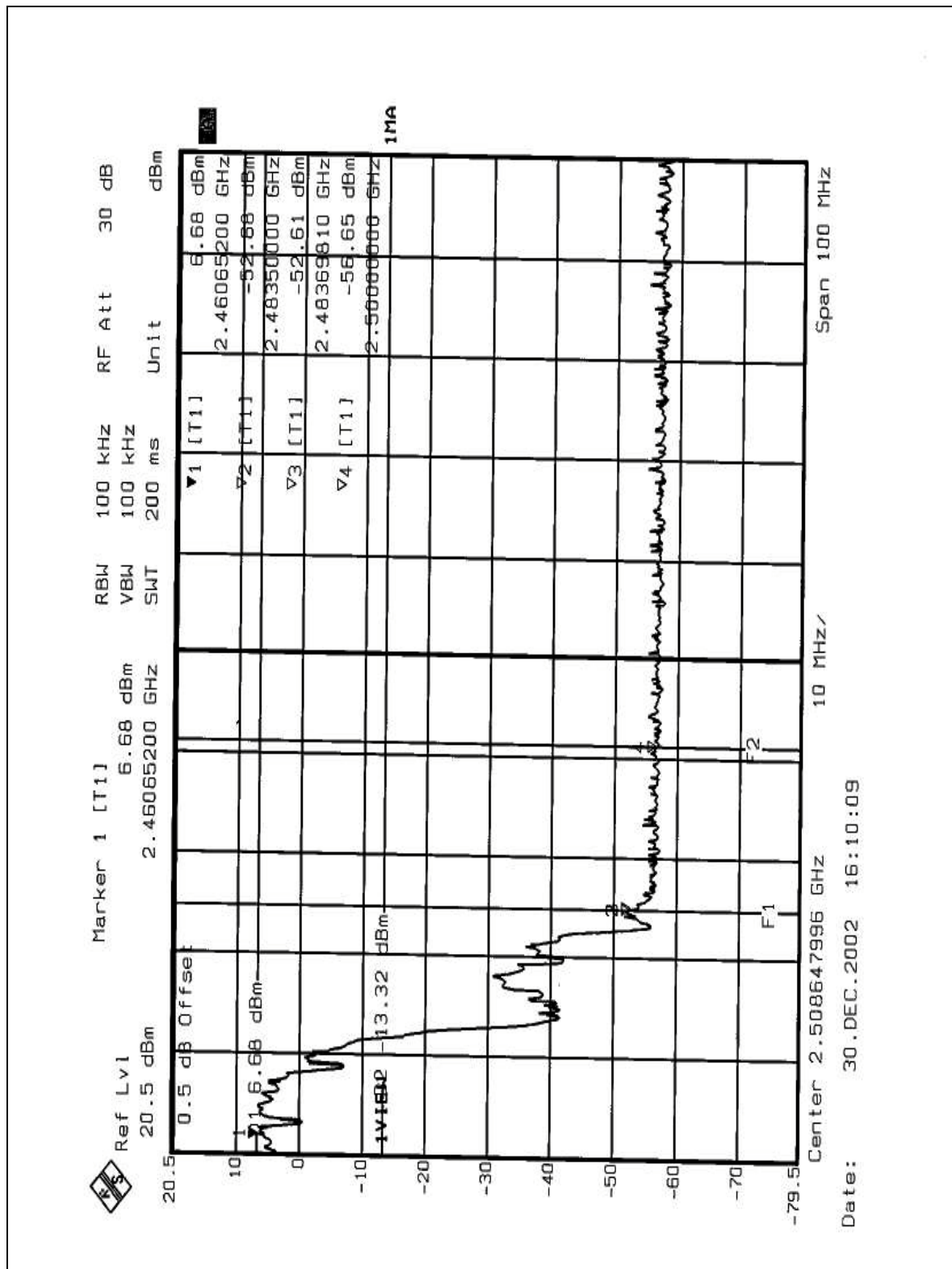
4.6.6 TEST RESULTS

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 first page shows 60.47dB delta between carrier maximum power and local maximum emission in restrict band (2.3738GHz). The emission of carrier strength list in the test result of channel 1 at the item 4.2.7 (Page 24) is 98.4dBuV/m, so the maximum field strength in restrict band is $98.4 - 60.47 = 37.93$ dBuV/m which is under 54dBuV/m limit.

NOTE2: The band edge emission plot on the following second page shows 59.29dB delta between carrier maximum power and local maximum emission in restrict band (2.4836GHz). The emission of carrier strength list in the test result of channel 11 at the item 4.2.7 (Page 26) is 100.9dBuV/m, so the maximum field strength in restrict band is $100.9 - 59.29 = 41.61$ 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 with MMCX connector. The maximum Gain of the antenna is 1.46dBi.

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:

USA	FCC, NVLAP, UL
Germany	TUV Rheinland
Japan	VCCI
New Zealand	MoC
Norway	NEMKO
R.O.C.	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.

If you have any comments, please feel free to contact us at the following:

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