ADT CORP.

FCC TEST REPORT

REPORT NO.: RF910911R02
MODEL NO.: WL-299C (**Brand: Gemtek**)
OEM MODEL NO.: T316 (**Brand: Gemtek Systems Inc.**)
RECEIVED: Sept. 11, 2002
TESTED: Sept. 12 ~ Dec. 13, 2002

APPLICANT: GEMTEK TECHNOLOGY CO., LTD.

ADDRESS: No.1, Jen Ai Road, Hsinchu Industrial Park
Hukou, Hsinchu, Taiwan, R.O.C.

ISSUED BY: Advance Data Technology Corporation

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

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1 CERTIFICATION

PRODUCT NAME :	11Mbps Wireless AP Client
BRAND NAME :	Gemtek
MODEL NO. :	WL-299C
OEM BRAND NAME :	Gemtek Systems Inc.
OEM MODEL NO. :	T316
APPLICANT :	GEMTEK TECHNOLOGY 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 Sept. 12 ~ Dec. 13, 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. 16, 2002

Emily Lu

APPROVED BY : Alis Wu for , DATE : Dec. 16, 2002

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 –14.25dBuV at 0.166MHz
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 –6.50dBuV at 4874.00MHz
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	11Mbps Wireless AP Client
MODEL NO.	WL-299C
OEM MODEL NO.	T316
POWER SUPPLY	5VDC from AC adapter
MODULATION TYPE	BPSK, QPSK, CCK
RADIO TECHNOLOGY	DSSS
TRANSFER RATE	1/2/5.5/11Mbps
FREQUENCY RANGE	2412MHz ~ 2462MHz
NUMBER OF CHANNEL	11
OUTPUT POWER	15.19dBm
ANTENNA TYPE	Dipole antenna
I/O PORTS	RJ-45
ASSOCIATED DEVICES	NA

NOTE:

1. The EUT is powered by the following adapter:

BRAND:	Delta
MODEL NO.:	ADP-10SB REV.H
INPUT POWER :	100-240Vac 0.4A 50-60Hz
OUTPUT POWER :	5Vdc 2A

2. Model WL-299C and T316 are identical except for their model number, brand name and model name due to marketing requirement.
3. 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 in 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 an 11Mbps Wireless AP Client. 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)

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	FAST ETHERNET PC CARD	D-Link	DFE-680TXD	RE1A044413	MQ4FE2K5MX

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	ESCS30	847793/022	Mar. 12, 2003
ROHDE & SCHWARZ Artificial Mains Network (for EUT)	ESH2-Z5	828075/003	Jul. 23, 2003
ROHDE & SCHWARZ 200-A Four-line V-Network	ENV4200	830326/018	Oct. 25, 2002
* ROHDE & SCHWARZ 4-wire ISN	ENY41	838119/028	Dec. 2, 2002
* ROHDE & SCHWARZ 2-wire ISN	ENY22	837497/018	Dec. 2, 2002
EMCO-L.I.S.N. (for peripheral)	3825/2	90031627	Jul. 23, 2003
Software	Cond-V2L	NA	NA
RF cable (JYEBAO)	5D-FB	Cable-C05.01	Jul. 23, 2003
LYNICS Terminator (For EMCO LISN)	0900510	E1-01-305	Feb. 20, 2003
LYNICS Terminator (For EMCO LISN)	0900510	E1-01-306	Feb. 20, 2003
Shielded Room	Site 5	ADT-C05	NA
VCCI Site Registration No.	Site 5	C-1093	NA

NOTE: 1. The measurement uncertainty is less than +/- 2.6dB, which is calculated as per the NAMAS document NIS81.
2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
3. "*": These equipment are used for conducted telecom port test only (if tested).
4. The test was performed in ADT Open Site No. 5.

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.

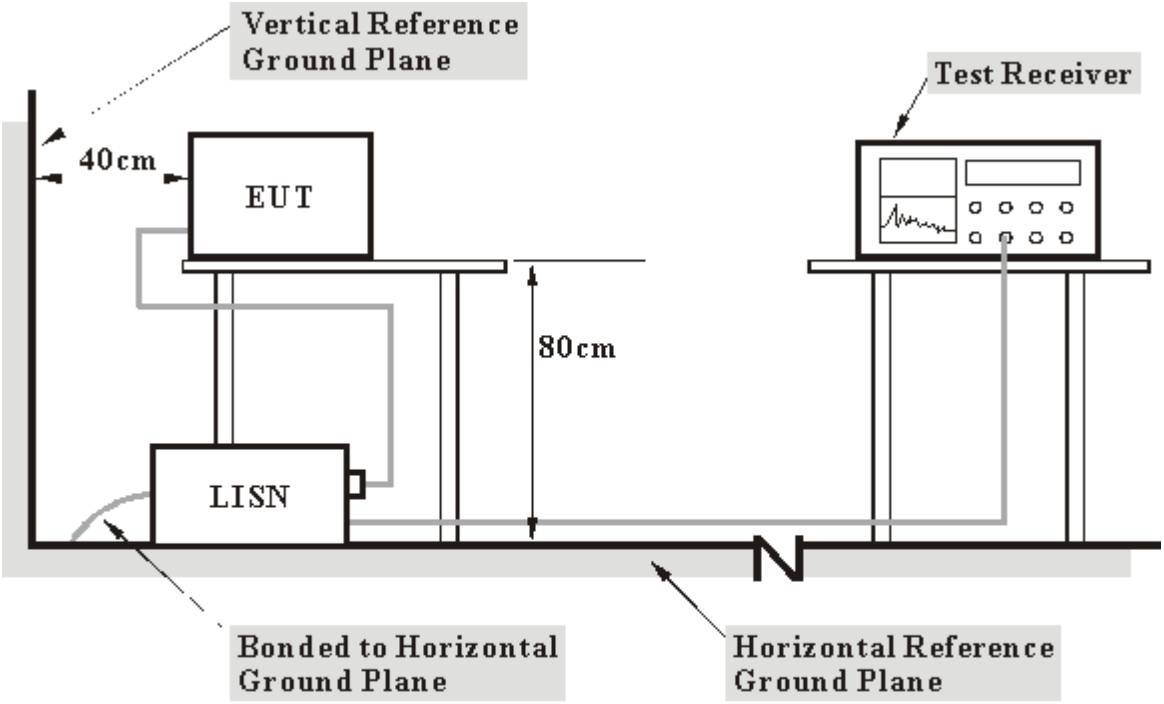
b. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.

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

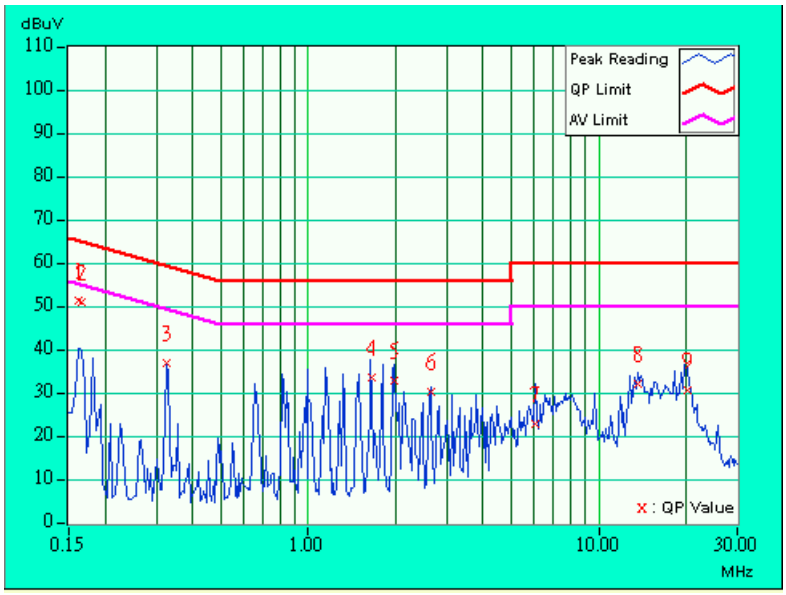
a. Placed the EUT on the testing table.
b. Prepared another computer system to act as a communication partner and placed it outside of testing area.
c. The communication partner run a test program to enable EUT under transmission/receiving condition continuously at specific channel frequency via an RJ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

4.1.7 TEST RESULTS

EUT	11Mbps Wireless AP Client	**MODEL**	WL-299C
MODE	Channel 1	**6dB BANDWIDTH**	9 kHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	**PHASE**	Line (L)
ENVIRONMENTAL CONDITIONS	35deg.C, 50%RH, 1005 hPa	**TESTED BY**: Eric Lee	

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	0.162	0.10	50.58	-	50.68	-	65.38	55.38	-14.70	-
2	0.167	0.10	50.19	-	50.29	-	65.10	55.10	-14.81	-
3	0.326	0.10	36.06	-	36.16	-	59.56	49.56	-23.40	-
4	1.656	0.20	32.66	-	32.86	-	56.00	46.00	-23.14	-
5	1.973	0.20	32.02	-	32.22	-	56.00	46.00	-23.78	-
6	2.637	0.26	29.37	-	29.63	-	56.00	46.00	-26.37	-
7	6.035	0.47	21.81	-	22.28	-	60.00	50.00	-37.72	-
8	13.629	0.67	31.09	-	31.76	-	60.00	50.00	-28.24	-
9	20.332	1.01	29.58	-	30.59	-	60.00	50.00	-29.41	-

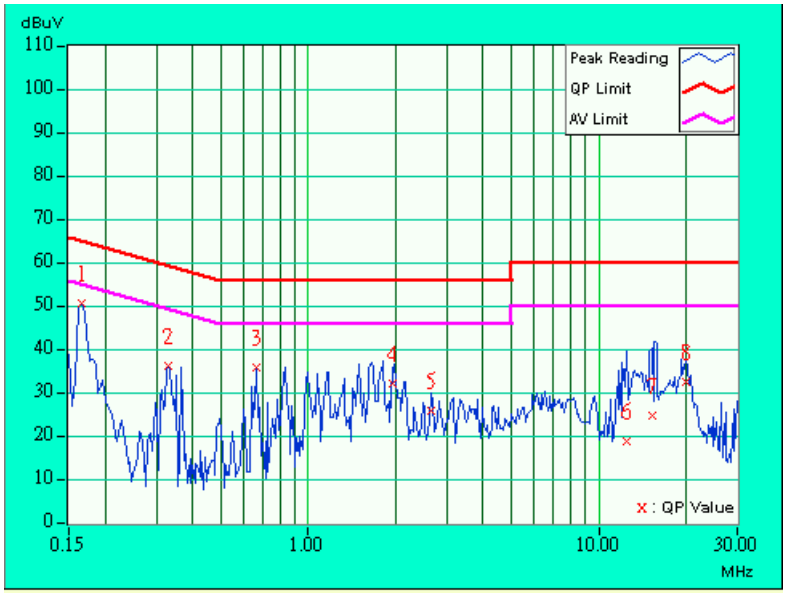
Remarks:
1. "*": Undetectable
2. QP. and AV. are abbreviations of quasi-peak and average individually.
3. "-": NA
4. The emission levels of other frequencies were very low against the limit.
5. Margin value = Emission level - Limit value
6. Emission Level = Correction Factor + Reading Value.



EUT	11Mbps Wireless AP Client	**MODEL**	WL-299C
MODE	Channel 1	**6dB BANDWIDTH**	9 kHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	**PHASE**	Neutral (N)
ENVIRONMENTAL CONDITIONS	35deg.C, 50%RH, 1005 hPa	**TESTED BY**: Eric Lee	

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	50.06	-	50.16	-	65.18	55.18	-15.02	-
2	0.332	0.10	35.43	-	35.53	-	59.41	49.41	-23.88	-
3	0.662	0.14	35.16	-	35.30	-	56.00	46.00	-20.70	-
4	1.957	0.20	31.40	-	31.60	-	56.00	46.00	-24.40	-
5	2.656	0.23	24.97	-	25.20	-	56.00	46.00	-30.80	-
6	12.438	0.45	17.92	-	18.37	-	60.00	50.00	-41.63	-
7	15.258	0.52	23.96	-	24.48	-	60.00	50.00	-35.52	-
8	19.871	0.79	31.74	-	32.53	-	60.00	50.00	-27.47	-

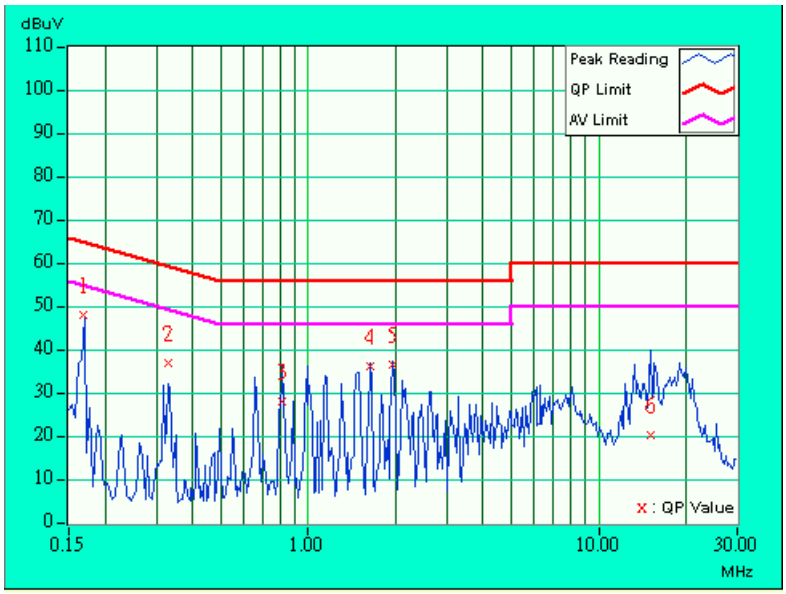
Remarks:
1. "*": Undetectable
2. QP. and AV. are abbreviations of quasi-peak and average individually.
3. "-": NA
4. The emission levels of other frequencies were very low against the limit.
5. Margin value = Emission level - Limit value
6. Emission Level = Correction Factor + Reading Value.



EUT	11Mbps Wireless AP Client	**MODEL**	WL-299C
MODE	Channel 6	**6dB BANDWIDTH**	9 kHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	**PHASE**	Line (L)
ENVIRONMENTAL CONDITIONS	35deg.C, 50%RH, 1005 hPa	**TESTED BY**: Eric Lee	

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	47.63	-	47.73	-	65.04	55.04	-17.31	-
2	0.330	0.10	36.30	-	36.40	-	59.46	49.46	-23.06	-
3	0.814	0.17	27.55	-	27.72	-	56.00	46.00	-28.28	-
4	1.629	0.20	35.75	-	35.95	-	56.00	46.00	-20.05	-
5	1.957	0.20	35.98	-	36.18	-	56.00	46.00	-19.82	-
6	15.012	0.70	19.64	-	20.34	-	60.00	50.00	-39.66	-

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	11Mbps Wireless AP Client	**MODEL**	WL-299C
MODE	Channel 6	**6dB BANDWIDTH**	9 kHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	**PHASE**	Neutral (N)
ENVIRONMENTAL CONDITIONS	35deg.C, 50%RH, 1005 hPa	**TESTED BY**: Eric Lee	

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	50.83	-	50.93	-	65.18	55.18	-14.25	-
2	0.330	0.10	36.28	-	36.38	-	59.46	49.46	-23.08	-
3	0.662	0.14	35.60	-	35.74	-	56.00	46.00	-20.26	-
4	1.801	0.20	37.36	-	37.56	-	56.00	46.00	-18.44	-
5	13.711	0.47	30.30	-	30.77	-	60.00	50.00	-29.23	-
6	15.879	0.55	30.57	-	31.12	-	60.00	50.00	-28.88	-
7	19.875	0.79	30.74	-	31.53	-	60.00	50.00	-28.47	-

Remarks:
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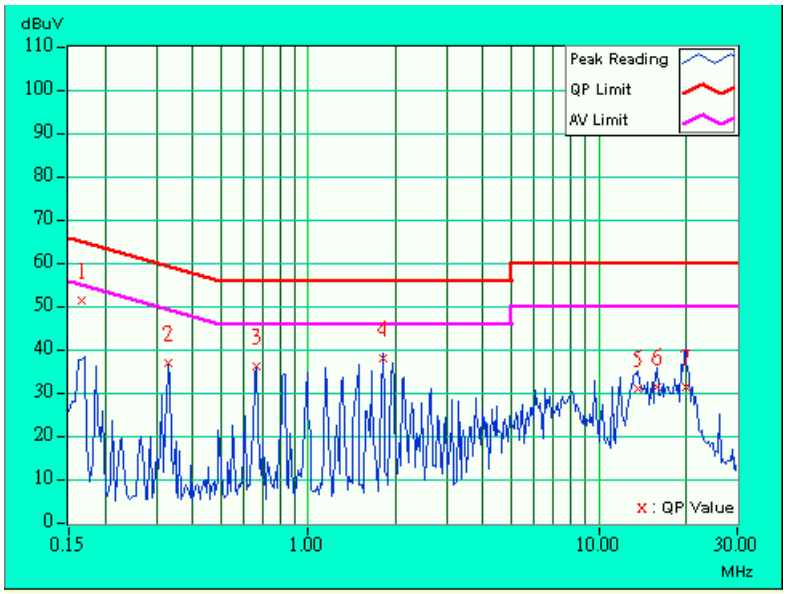
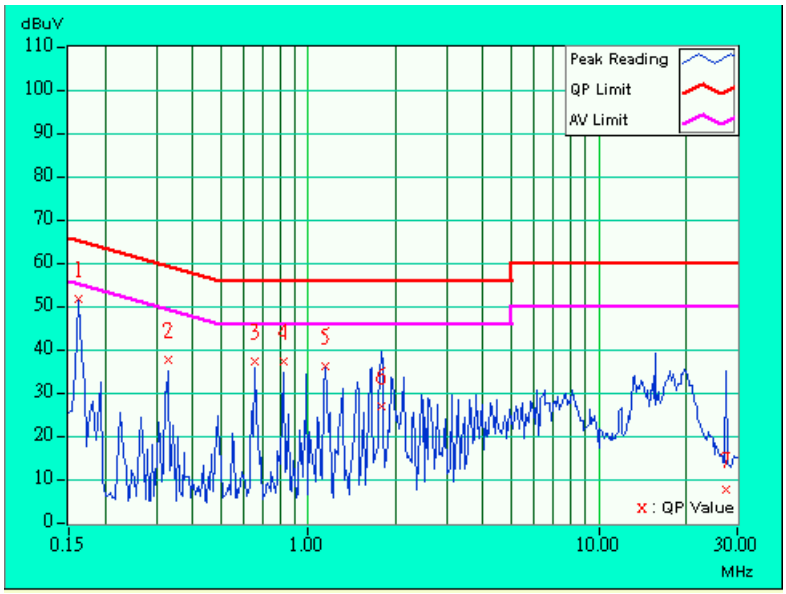
3. "-": NA
4. The emission levels of other frequencies were very low against the limit.
5. Margin value = Emission level - Limit value
6. Emission Level = Correction Factor + Reading Value.



EUT	11Mbps Wireless AP Client	**MODEL**	WL-299C
MODE	Channel 11	**6dB BANDWIDTH**	9 kHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	**PHASE**	Line (L)
ENVIRONMENTAL CONDITIONS	35deg.C, 50%RH, 1005 hPa	**TESTED BY**: Eric Lee	

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	0.162	0.10	50.73	-	50.83	-	65.38	55.38	-14.55	-
2	0.330	0.10	36.42	-	36.52	-	59.46	49.46	-22.94	-
3	0.658	0.14	36.07	-	36.21	-	56.00	46.00	-19.79	-
4	0.822	0.17	36.32	-	36.49	-	56.00	46.00	-19.51	-
5	1.152	0.20	35.20	-	35.40	-	56.00	46.00	-20.60	-
6	1.781	0.20	25.77	-	25.97	-	56.00	46.00	-30.03	-
7	27.520	1.25	6.69	-6.11	7.94	-4.86	60.00	50.00	-52.06	-54.86

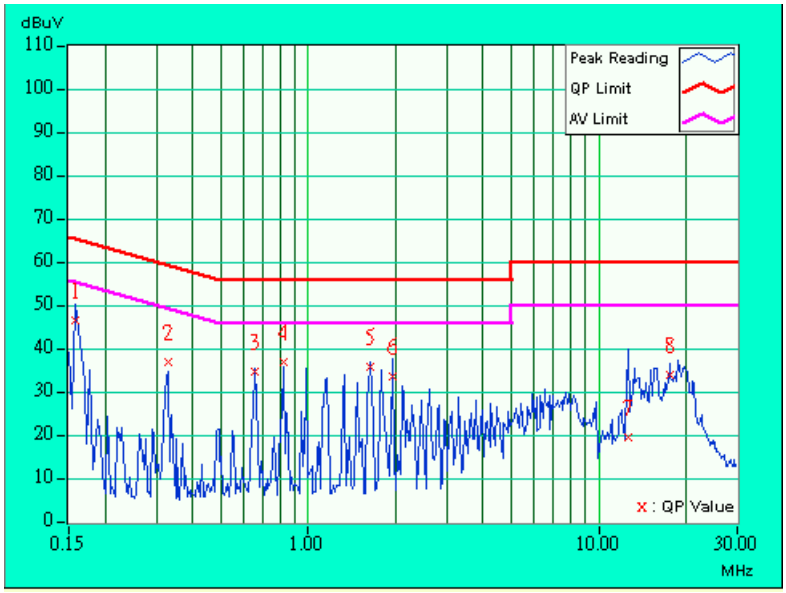
Remarks:
1. "*": Undetectable
2. QP. and AV. are abbreviations of quasi-peak and average individually.
3. "-": NA
4. The emission levels of other frequencies were very low against the limit.
5. Margin value = Emission level - Limit value
6. Emission Level = Correction Factor + Reading Value.



EUT	11Mbps Wireless AP Client	**MODEL**	WL-299C
MODE	Channel 11	**6dB BANDWIDTH**	9 kHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	**PHASE**	Neutral (N)
ENVIRONMENTAL CONDITIONS	35deg.C, 50%RH, 1005 hPa	**TESTED BY**: Eric Lee	

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	0.158	0.10	45.87	-	45.97	-	65.58	55.58	-19.61	-
2	0.330	0.10	36.36	-	36.46	-	59.46	49.46	-23.00	-
3	0.654	0.14	34.21	-	34.35	-	56.00	46.00	-21.65	-
4	0.822	0.17	36.38	-	36.55	-	56.00	46.00	-19.45	-
5	1.637	0.20	35.43	-	35.63	-	56.00	46.00	-20.37	-
6	1.949	0.20	33.20	-	33.40	-	56.00	46.00	-22.60	-
7	12.668	0.45	19.16	-	19.61	-	60.00	50.00	-40.39	-
8	17.563	0.65	33.30	-	33.95	-	60.00	50.00	-26.05	-

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

Field strength limits are at the distance of 3 meters, emissions radiated outside of the specified bands, shall be according to the general radiated limits in 15.209 as following:

Frequencies (MHz)	Field Strength of Fundamental	
	uV/m	dBuV/m
30-88	100	40.0
88-216	150	43.5
216-960	200	46.0
Above 960	500	54.0

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	Oct. 30, 2002
* 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, 2002
* 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 measurement uncertainty is less than +/- 3.0dB, which is calculated as per the NAMAS document NIS81.
2. The calibration interval of the above test instruments is 12 months. And the calibrations are traceable to NML/ROC and NIST/USA.
3. "*" = These equipment are used for the final measurement.
4. The horn antenna and HP preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
5. 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.

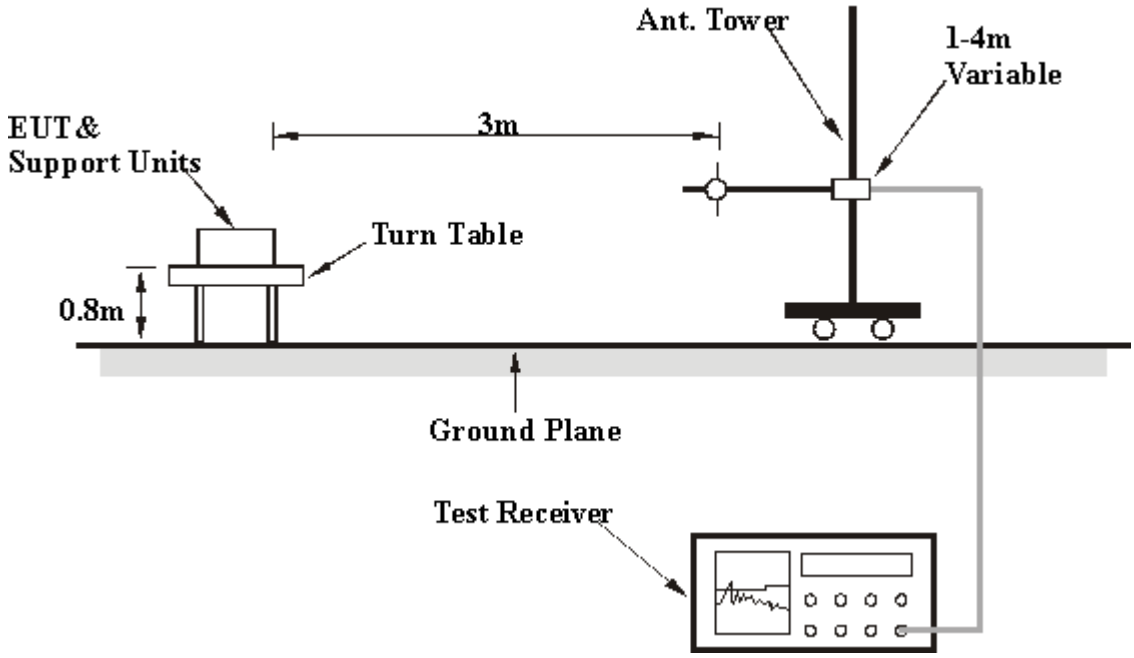
NOTE:

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

EUT	11Mbps Wireless AP Client	**MODEL**	WL-299C
MODE	Channel 11	**FREQUENCY RANGE**	30-1000 MHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	**DETECTOR FUNCTION**	Quasi-Peak
ENVIRONMENTAL CONDITIONS	20deg. C, 45%RH, 1005 hPa	**TESTED BY**: Bunny Yao	

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	120.00	22.4 QP	43.50	-21.10	1.37 H	351	7.10	15.30
2	160.00	22.7 QP	43.50	-20.80	1.31 H	295	9.80	12.90
3	240.00	28.8 QP	46.00	-17.20	1.37 H	262	11.40	17.40
4	360.00	23.5 QP	46.00	-22.50	1.19 H	163	1.80	21.70
5	880.00	33.7 QP	46.00	-12.30	1.31 H	43	2.30	31.30

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	120.00	36.9 QP	43.50	-6.60	1.32 V	132	21.60	15.30
2	160.45	25.4 QP	43.50	-18.10	1.25 V	52	12.60	12.90
3	240.00	30.9 QP	46.00	-15.10	1.66 V	46	13.50	17.40
4	320.50	25.1 QP	46.00	-20.90	1.25 V	96	4.60	20.50
5	359.99	26.6 QP	46.00	-19.40	1.66 V	3	4.90	21.70
6	880.09	31.7 QP	46.00	-14.30	1.25 V	271	0.40	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.

4.2.8 TEST RESULTS

EUT	11Mbps Wireless AP Client	**MODEL**	WL-299C
MODE	Channel 1	**FREQUENCY RANGE**	Above 1000 MHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	**DETECTOR FUNCTION**	Peak(PK) Average (AV)
ENVIRONMENTAL CONDITIONS	20deg. C, 45%RH, 1005 hPa	**TESTED BY**: Bunny Yao	

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	2390.00	55.3 PK	74.00	-18.70	1.46 H	32	25.80	29.50
1	2390.00	46.3 AV	54.00	-7.70	1.46 H	32	16.80	29.50
2	*2412.00	102.0 PK			1.46 H	32	72.30	29.70
2	*2412.00	95.6 AV			1.46 H	32	65.90	29.70
3	4824.00	48.8 PK	74.00	-25.20	1.08 H	287	13.40	35.40
4	7236.00	53.8 PK	74.00	-20.20	1.28 H	90	12.10	41.60
4	7236.00	43.8 AV	54.00	-10.20	1.28 H	90	2.10	35.40
5	9648.00	55.7 PK	82.00	-26.30	1.69 H	167	11.80	43.80
5	9648.00	54.0 AV	75.60	-21.60	1.69 H	167	10.10	41.60

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	2390.00	60.8 PK	74.00	-13.20	1.25 V	45	31.30	29.50
1	2390.00	51.4 AV	54.00	-2.60	1.25 V	45	21.90	29.50
2	*2412.00	108.6 PK			1.25 V	45	78.90	29.70
2	*2412.00	100.1 AV			1.25 V	45	70.40	29.70
3	4824.00	52.5 PK	74.00	-21.50	1.09 V	195	17.10	35.40
3	4824.00	49.6 AV	54.00	-4.40	1.09 V	195	14.20	35.40
4	7236.00	53.1 PK	74.00	-20.90	1.59 V	14	11.40	41.60
4	7236.00	43.4 AV	54.00	-10.60	1.59 V	14	1.70	41.60
5	9648.00	62.5 PK	88.60	-26.10	1.59 V	14	18.60	43.80
5	9648.00	60.9 AV	80.10	-19.20	1.59 V	14	17.10	43.80

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. Margin value = Emission level – Limit value.
5. " * " : Fundamental frequency
6. The other emission levels were very low against the limit.

EUT	11Mbps Wireless AP Client	**MODEL**	WL-299C
MODE	Channel 6	**FREQUENCY RANGE**	Above 1000 MHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	**DETECTOR FUNCTION**	Peak(PK) Average (AV)
ENVIRONMENTAL CONDITIONS	20deg. C, 45%RH, 1005 hPa	**TESTED BY**: Bunny Yao	

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	*2437.00	101.4 PK			1.36 H	40	71.40	29.90
1	*2437.00	94.9 AV			1.36 H	40	65.00	29.90
2	4874.00	47.9 PK	74.00	-26.10	1.66 H	97	12.40	35.50
3	7311.00	53.0 PK	74.00	-21.00	1.34 H	148	11.10	41.90
3	7311.00	43.8 AV	54.00	-10.20	1.34 H	148	1.90	35.50
4	9748.00	60.6 PK	81.40	-20.80	1.50 H	141	16.80	43.80
4	9748.00	57.7 AV	74.90	-17.20	1.50 H	141	13.90	41.90

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	*2437.00	107.6 PK	74.00	33.60	1.35 V	224	77.90	29.70
1	*2437.00	99.4 AV	54.00	45.40	1.35 V	224	69.70	29.70
2	4874.00	49.8 PK	74.00	-24.20	1.35 V	224	14.30	35.50
3	7311.00	52.6 PK	74.00	-21.40	1.17 V	242	10.70	41.90
3	7311.00	43.0 AV	54.00	-11.00	1.17 V	242	1.10	35.50
4	9748.00	64.4 PK	87.60	-23.20	1.24 V	358	20.60	43.80
4	9748.00	62.3 AV	79.40	-17.10	1.24 V	358	18.50	41.90

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. Margin value = Emission level – Limit value.
5. " * " : Fundamental frequency
6. The other emission levels were very low against the limit.

EUT	11Mbps Wireless AP Client	**MODEL**	WL-299C
MODE	Channel 11	**FREQUENCY RANGE**	Above 1000 MHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	**DETECTOR FUNCTION**	Peak(PK) Average (AV)
ENVIRONMENTAL CONDITIONS	20deg. C, 45%RH, 1005 hPa	**TESTED BY**: Bunny Yao	

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	*2462.00	102.6 PK			1.50 H	20	72.50	30.10
1	*2462.00	95.0 AV			1.50 H	20	64.90	30.10
2	2484.00	48.0 PK	74.00	-26.00	1.50 H	20	17.80	30.30
3	4924.00	48.7 PK	74.00	-25.30	1.71 H	36	13.10	35.60
4	7386.00	54.1 PK	74.00	-19.90	1.70 H	197	11.90	42.20
4	7386.00	43.1 AV	54.00	-10.90	1.70 H	197	0.90	30.30
5	9848.00	56.6 PK	82.60	-26.00	1.46 H	135	12.80	43.80
5	9848.00	54.9 AV	75.00	-20.10	1.46 H	135	11.10	35.60

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	*2462.00	107.0 PK			1.21 V	48	76.90	30.10
1	*2462.00	99.9 AV			1.21 V	48	69.80	30.10
2	2484.00	3.6 PK	74.00	-70.40	1.21 V	48	-26.60	30.30
3	4924.00	50.7 PK	74.00	-23.30	1.15 V	149	15.10	35.60
3	4924.00	48.0 AV	54.00	-6.00	1.15 V	149	12.40	30.30
4	7386.00	51.3 PK	74.00	-22.70	1.88 V	14	9.10	42.20
4	7386.00	43.0 AV	54.00	-11.00	1.88 V	14	0.80	35.60
5	9848.00	63.9 PK	87.00	-23.10	1.02 V	109	20.10	43.80
5	9848.00	61.4 AV	79.90	-18.50	1.02 V	109	17.60	42.20

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. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. " * " : Fundamental frequency
6. 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 24, 2003

NOTE:

1. The measurement uncertainty is less than +/- 2.6dB, which is calculated as per the NAMAS document NIS81.
2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

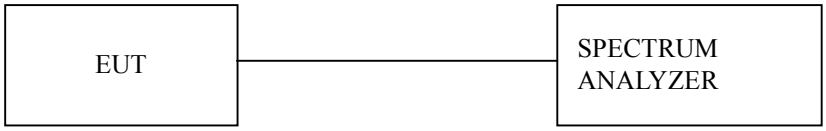
4.3.3 TEST PROCEDURE

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

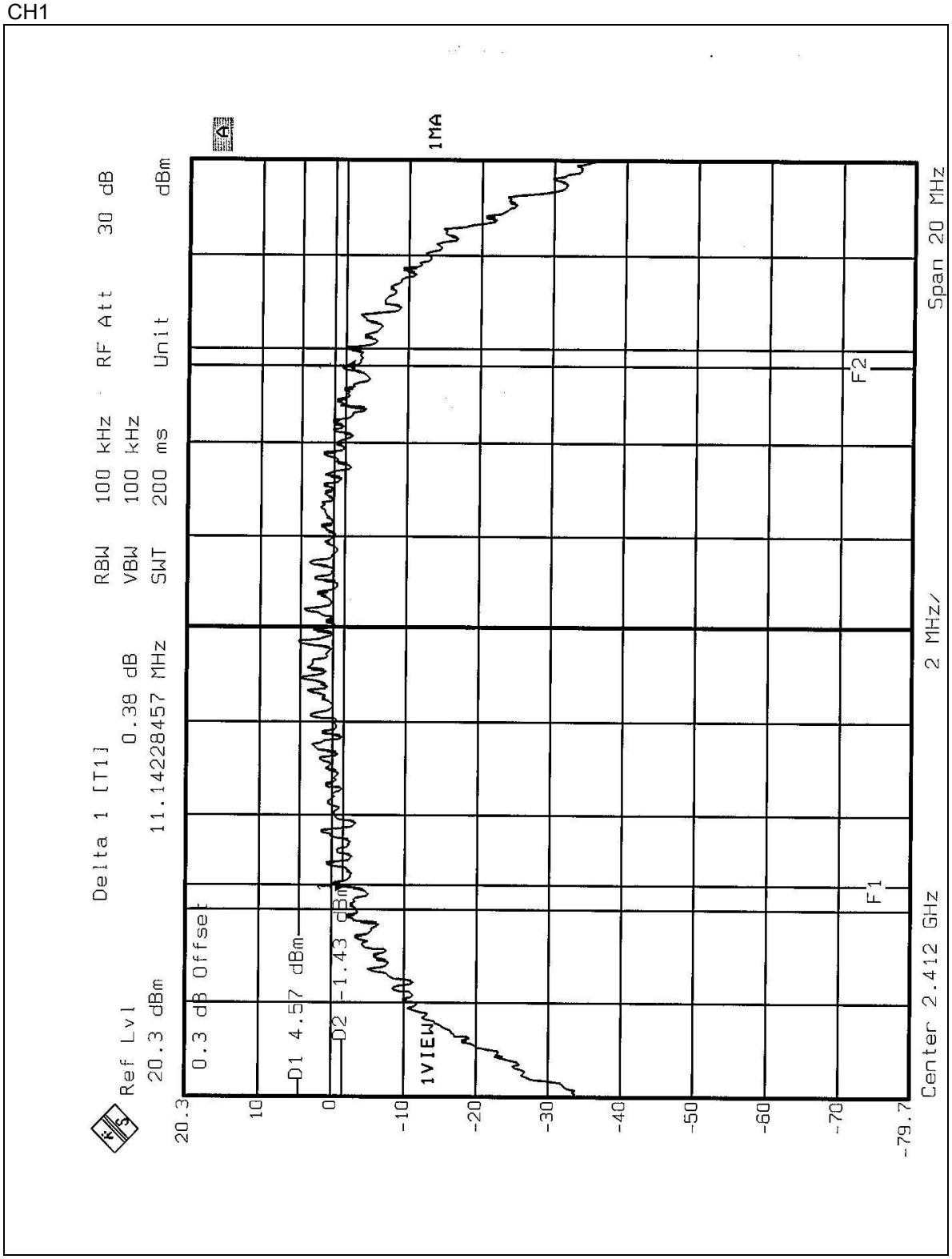
The software provided by client to enable the EUT under transmission condition continuously at lowest, middle and highest channel frequencies individually.

4.3.7 TEST RESULTS

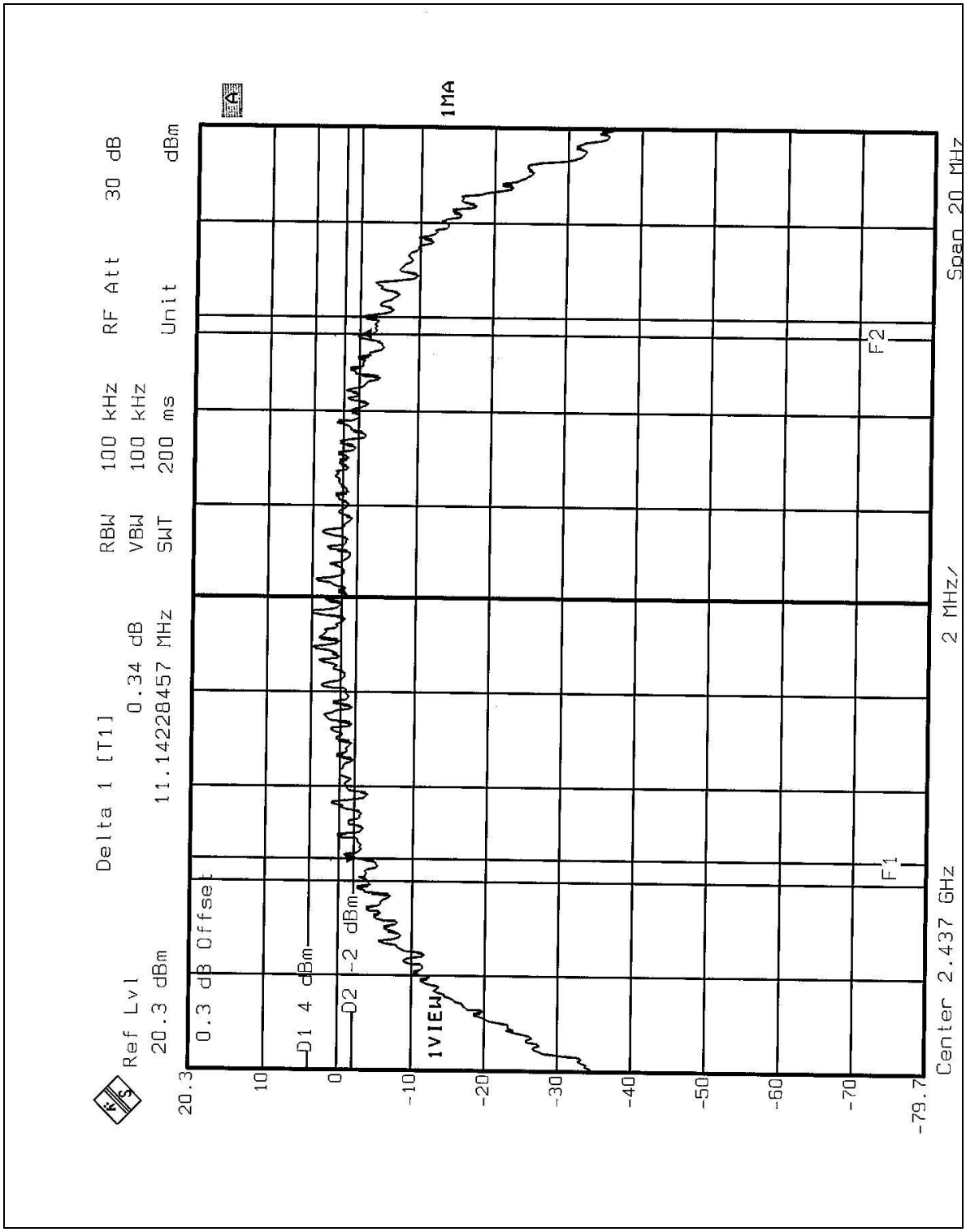
EUT	11Mbps Wireless AP Client	**MODEL**	WL-299C
INPUT POWER (SYSTEM)	120Vac, 60Hz	**ENVIRONMENTAL CONDITIONS**	26deg. C, 63%RH, 1005 hPa
TESTED BY: Steven Lu			

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS/FAIL
1	2412	11.14	0.5	PASS
6	2437	11.14	0.5	PASS
11	2462	11.14	0.5	PASS

CH1


Ref Lvl
20.3 dBm
0.3 dB Offset
Delta 1 [T1]
0.38 dB
11.14228457 MHz
RBW 100 kHz
VBW 100 kHz
SWT 200 ms
RF Att 30 dB
Unit dBm
D1 4.57 dBm
D2 -1.43 dBm
1VIEW
1MA
F1
F2
Center 2.412 GHz
2 MHz/
Span 20 MHz
20.3
10
0
-10
-20
-30
-40
-50
-60
-70
-79.7

CH6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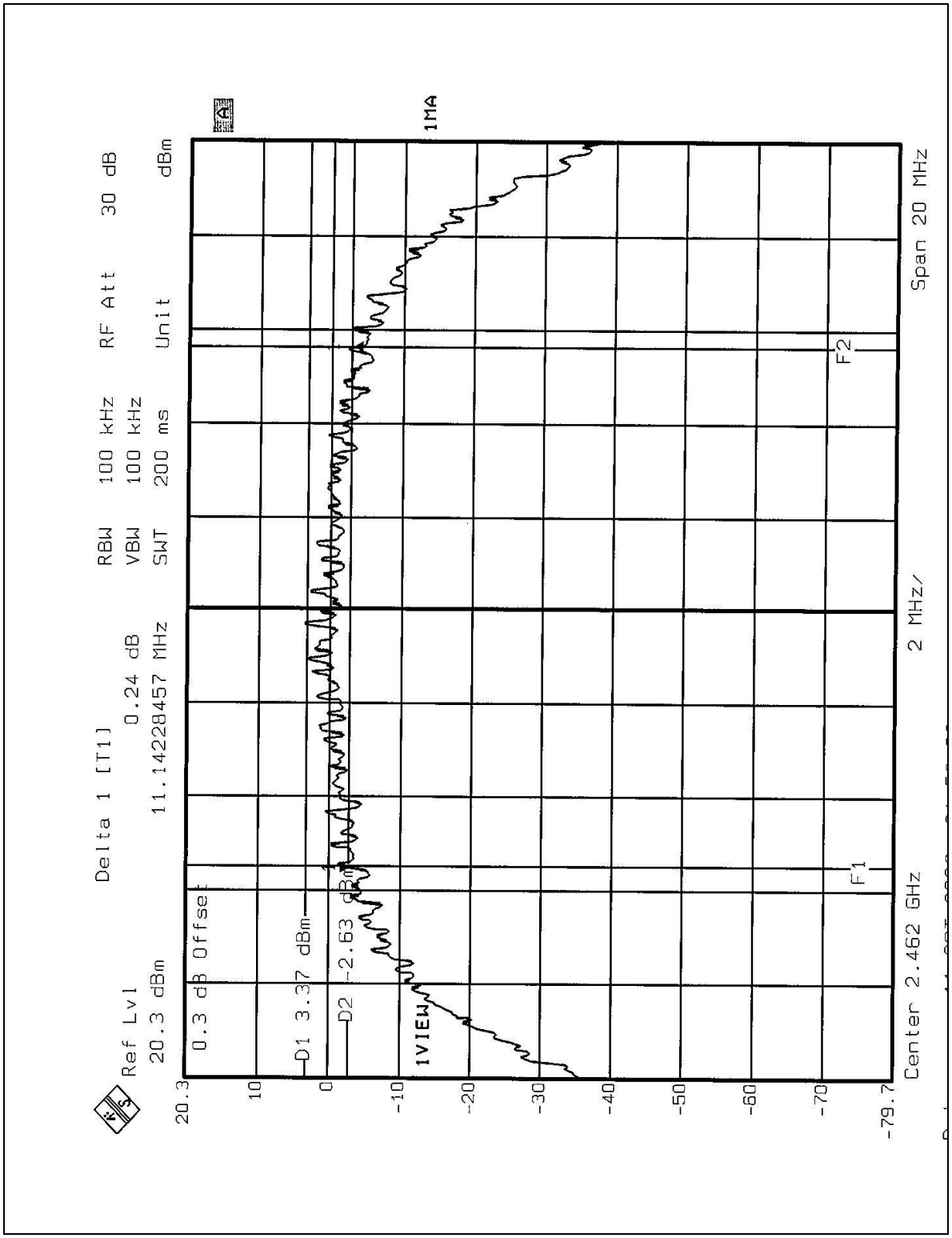
0.3 dB Offset
D1 4 dBm
D2 -2 dBm
Delta 1 [T1]
0.34 dB
11.14228457 MHz
RBW 100 kHz
VBW 100 kHz
SWT 200 ms
RF Att 30 dB
Unit dBm
1MA
1VIEW
F1
F2
Center 2.437 GHz
2 MHz/
Span 20 MHz
20.3
10
0
-10
-20
-30
-40
-50
-60
-70
-79.7

CH11


Ref Lvl
20.3 dBm
0.3 dB Offset
Delta 1 [T1]
0.24 dB
11.14228457 MHz
RBW 100 kHz
VBW 100 kHz
SWT 200 ms
RF Att 30 dB
Unit dBm
D1 3.37 dBm
D2 -2.63 dBm
1MA
1VIEW
F1
F2
Center 2.462 GHz
2 MHz/
Span 20 MHz
20.3
10
0
-10
-20
-30
-40
-50
-60
-70
-79.7

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:

1. The measurement uncertainty is less than +/- 2.6dB, which is calculated as per the NAMAS document NIS81.
2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

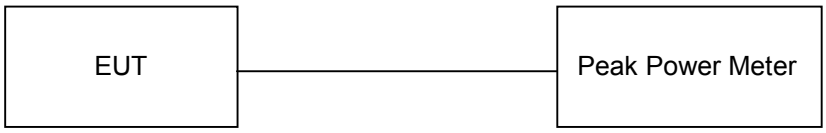
4.4.3 TEST PROCEDURES

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

EUT	11Mbps Wireless AP Client	**MODEL**	WL-299C
INPUT POWER (SYSTEM)	120Vac, 60Hz	**ENVIRONMENTAL CONDITIONS**	26deg. C, 63%RH, 1005 hPa
TESTED BY: Steven Lu			

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER OUTPUT (dBm)	PEAK POWER LIMIT (dBm)	PASS/FAIL
1	2412	15.19	30	PASS
6	2437	14.71	30	PASS
11	2462	13.96	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 measurement uncertainty is less than +/- 2.6dB, which is calculated as per the NAMAS document NIS81.
2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

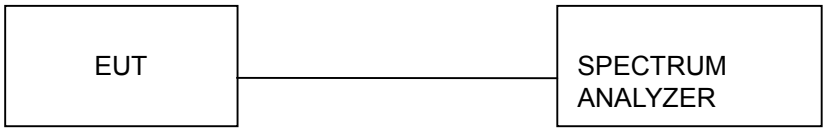
4.5.3 TEST PROCEDURE

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

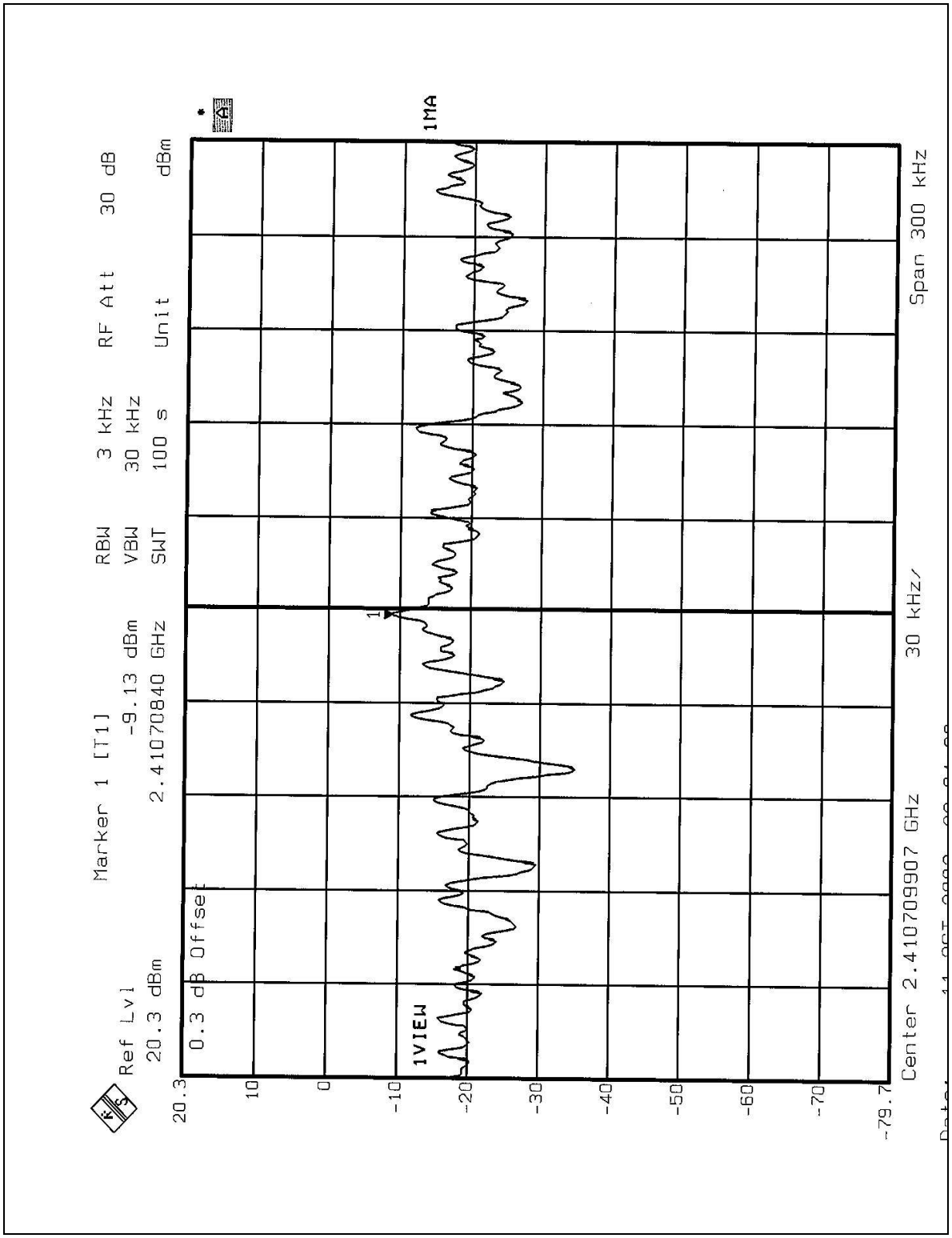
Same as Item 4.3.6

4.5.7 TEST RESULTS

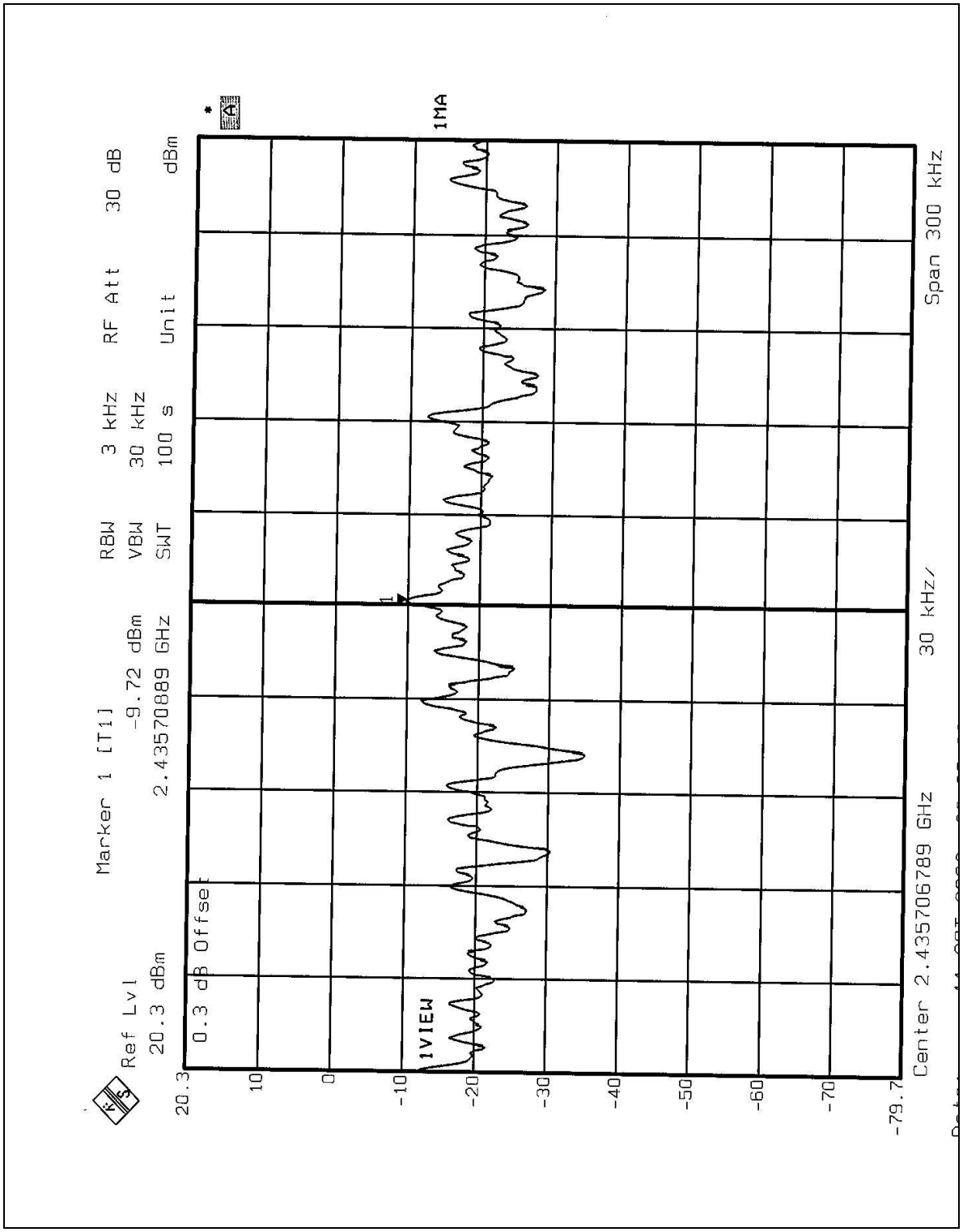
EUT	11Mbps Wireless AP Client	**MODEL**	WL-299C
INPUT POWER (SYSTEM)	120Vac, 60Hz	**ENVIRONMENTAL CONDITIONS**	26deg. C, 63%RH, 1005 hPa
TESTED BY: Steven Lu			

CHANNEL NUMBER	CHANNEL FREQUENCY (MHz)	RF POWER LEVEL IN 3 kHz BW (dBm)	MAXIMUM LIMIT (dBm)	PASS/FAIL
1	2412	-9.13	8	PASS
6	2437	-9.72	8	PASS
11	2462	-10.50	8	PASS

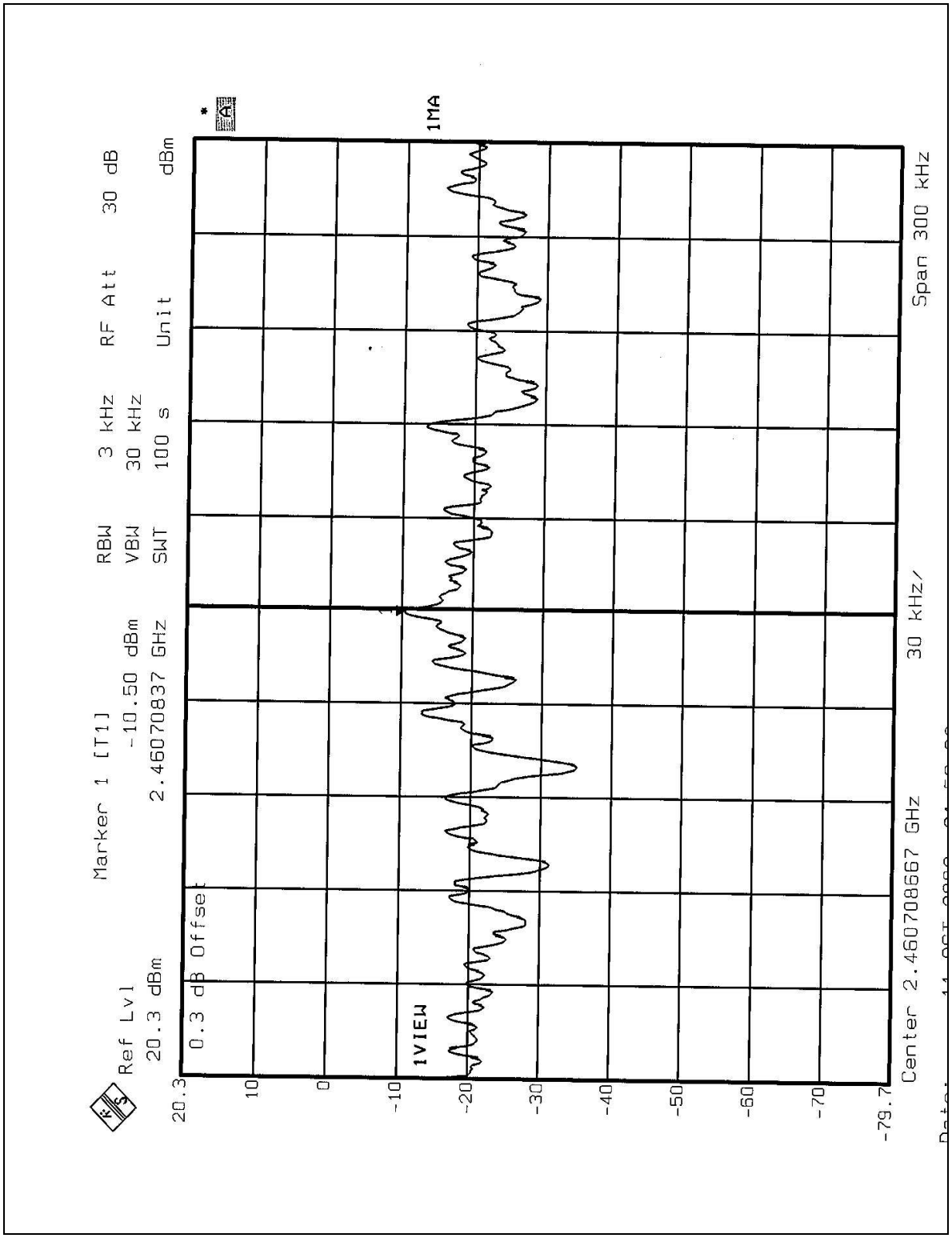
CH1


Ref Lvl
20.3 dBm
0.3 dB Offset
Marker 1 [T1]
-9.13 dBm
2.41070840 GHz
RBW 3 kHz
VBW 30 kHz
SWT 100 s
RF Att 30 dB
Unit dBm
1VIEW
1MA
20.3
10
0
-10
-20
-30
-40
-50
-60
-70
-79.7
Center 2.41709907 GHz
30 kHz/
Span 300 kHz

CH6


Ref Lvl
20.3 dBm
0.3 dB Offset
Marker 1 [T1]
-9.72 dBm
2.43570889 GHz
RBW 3 kHz
VBW 30 kHz
SWT 100 s
RF Att 30 dB
Unit dBm
1VIEW
1MA
Center 2.435706789 GHz
30 kHz/
Span 300 kHz

CH11


Ref Lvl
20.3 dBm
0.3 dB Offset
Marker 1 [T1]
-10.50 dBm
2.46070837 GHz
RBW 3 kHz
VBW 30 kHz
SWT 100 s
RF Att 30 dB
Unit dBm
1VIEW
1MA
20.3
10
0
-10
-20
-30
-40
-50
-60
-70
-79.7
Center 2.460708667 GHz
30 kHz/
Span 300 kHz

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 measurement uncertainty is less than +/- 2.6dB, which is calculated as per the NAMAS document NIS81.
2. 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

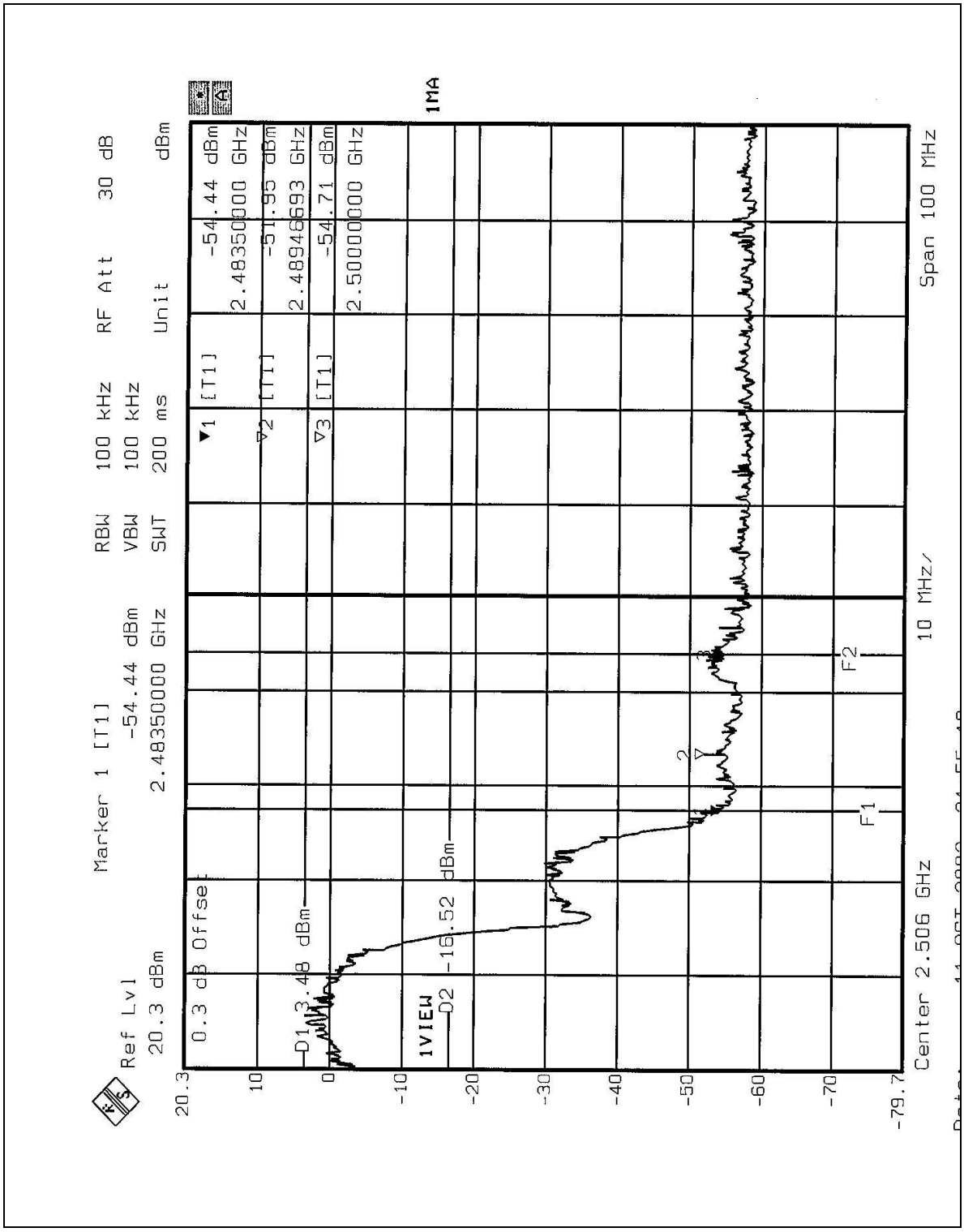
4.6.5 EUT OPERATING CONDITION

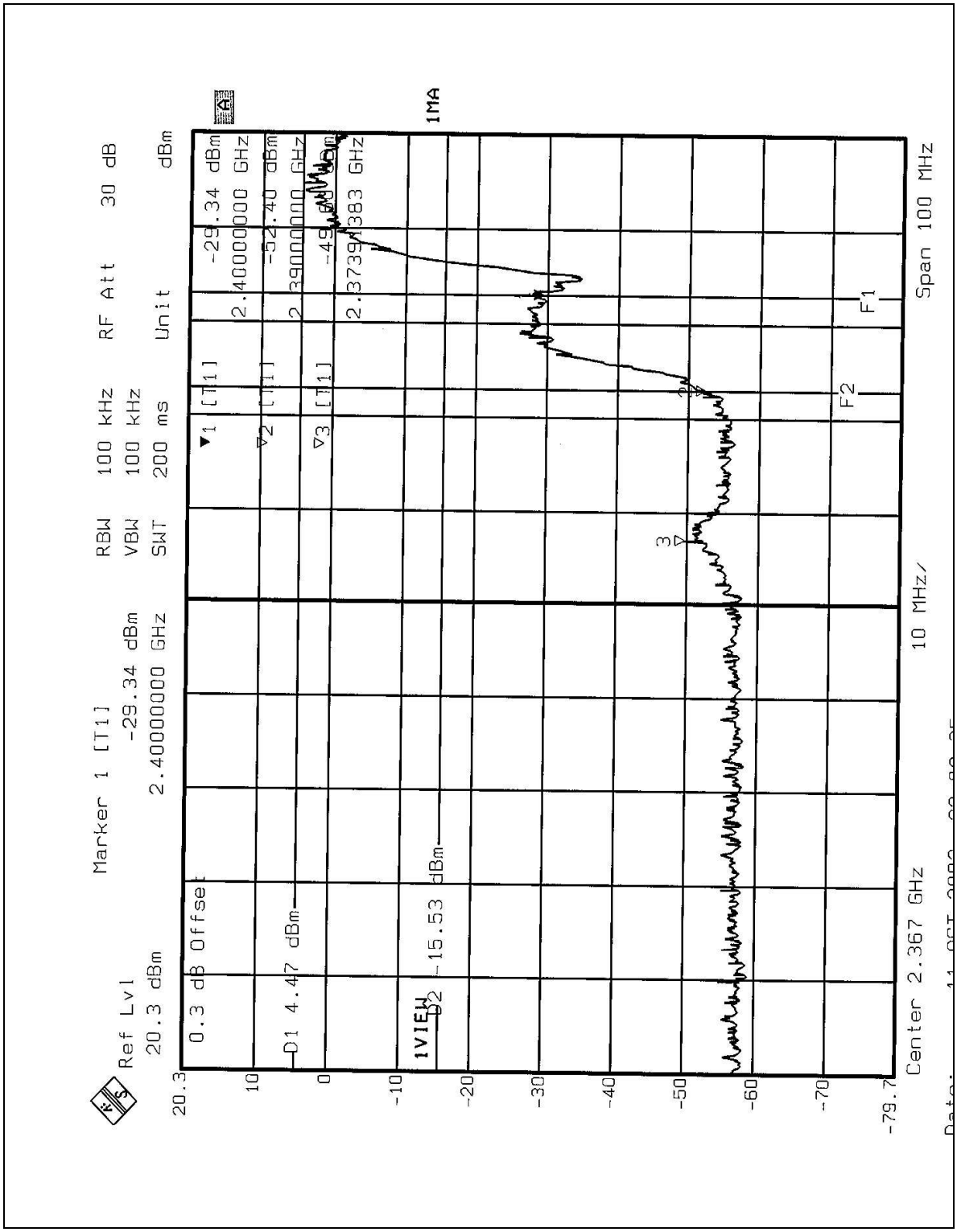
Same as Item 4.3.6

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).

NOTE: The band edge emission plot on the following 2 pages shows 55.43dB / 54.07dB delta between carrier maximum power and local maximum emission in restrict band (2.4895GHz / 2.3739GHz). The emission of carrier strength list in the test result of channel 1 at the item 4.2.8 is 100.1dBuV/m, so the maximum field strength in restrict band is 100.1-54.07=46.03dBuV/m which is under 54dBuV/m limit.


Ref Lvl
20.3 dBm
0.3 dB Offset
Marker 1 [T1]
-54.44 dBm
2.48350000 GHz
RBW 100 kHz
VBW 100 kHz
SWT 200 ms
RF Att 30 dB
Unit dBm
1MA
1VIEW
D1 3.48 dBm
D2 -16.52 dBm
▼1 [T1] -54.44 dBm 2.48350000 GHz
▽2 [T1] -51.95 dBm 2.48946693 GHz
▽3 [T1] -54.71 dBm 2.50000000 GHz
F1
F2
Center 2.506 GHz
10 MHz/
Span 100 MHz


Ref Lvl
20.3 dBm
0.3 dB Offset
D1 4.47 dBm
D2 -15.53 dBm
Marker 1 [T1]
-29.34 dBm
2.40000000 GHz
RBW 100 kHz
VBW 100 kHz
SWT 200 ms
RF Att 30 dB
Unit dBm
1MA
1VIEW
Center 2.367 GHz
10 MHz/
Span 100 MHz
F1
F2

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 connector. The maximum Gain of the antenna is 1dBi only.

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:

Lin Kou EMC Lab:
Tel: 886-2-26052180
Fax: 886-2-26052943

Hsin Chu EMC Lab:
Tel: 886-35-935343
Fax: 886-35-935342

Lin Kou Safety Lab:
Tel: 886-2-26093195
Fax: 886-2-26093184

Lin Kou RF&Telecom Lab
Tel: 886-3-3270910
Fax: 886-3-3270892

Email: service@mail.adt.com.tw
Web Site: www.adt.com.tw

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