



FCC TEST REPORT

REPORT NO.: RF910129R04

MODEL NO.: WA220

RECEIVED: Jan. 29, 2002

TESTED: Mar. 4 ~ Apr. 1, 2002

APPLICANT: REMOTEK CORPORATION

ADDRESS: 6F-6, No. 77, Sec. 1, Hsin Tai Wu Rd., Hsi-Chih,
Taipei, 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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0528
ILAC MRA



Lab Code: 200102-0



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1 CERTIFICATION

PRODUCT : Wireless LAN Access Point
BRAND NAME : REMOTEK
MODEL NO. : WA220
APPLICANT : REMOTEK CORPORATION
STANDARDS : 47 CFR Part 15, Subpart C (Section 15.247),
ANSI C63.4-1992, Canada RSS 210,
New Zealand RFS 29

We, **Advance Data Technology Corporation**, hereby certify that one sample of the designation has been tested in our facility from Mar. 4, 2002 to Apr. 1, 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.

TESTED BY: Gary Chang, DATE: April 4, 2002
Gary Chang

CHECKED BY: Demi Chen, DATE: April 4, 2002
Demi Chen

APPROVED BY: Alan Lane, DATE: April 4, 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 Limit: 48dBuV	PASS	Meet the requirement of limit Minimum passing margin is -9.01dBuV at 0.563MHz
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 -7.7dBuV at 660.00MHz
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

PRODUCT	Wireless LAN Access Point
MODEL NO.	WA220
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	15.65dBm
ANTENNA TYPE	Inverted F Antenna
I/O PORTS	RJ45 port
ASSOCIATED DEVICES	NA

NOTE:

1. The EUT is operated with the following power adapter.

Model No. :	SA0105-D
Input Power :	100-240V~, 50/60Hz, 0.3A
Output Power :	5.0V, 1.4A

2. For a more detailed features description, please refer to the manufacturer's specifications or the 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 a Wireless LAN Access Point. According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

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

ANSI C63.4 : 1992, Canada RSS 210, New Zealand RFS 29

All tests have been performed and recorded as per the above standards.

NOTE: The EUT is also considered as a kind of computer peripheral, because the connection to computer is necessary for typical use. It has been verified to comply with the requirements of FCC Part 15, Subpart B, Class B (DoC). The test report has been issued separately.



3.4 DESCRIPTION OF SUPPORT UNITS

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

NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	NOTEBOOK	DELL	PP01L	TW-09C748-12800-19O-B220	FCC DoC APPROVED
2	USB 10/100 Fast Ethernet	D-Link	DU-E100	UR15001767	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 (MHz)	Class B (dBuV)	
	Quasi-peak	Average
0.45 – 30	48	-

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

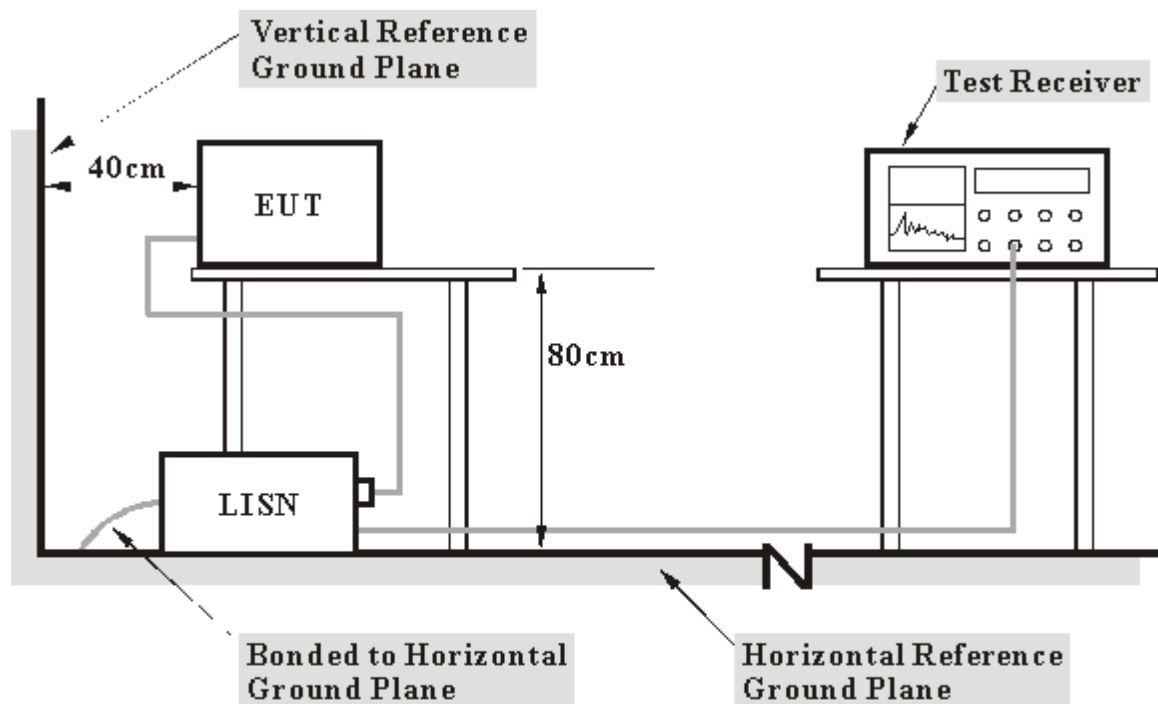
DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
ROHDE & SCHWARZ Test Receiver	ESCS30	834115/016	Mar. 3, 2003
ROHDE & SCHWARZ Artificial Mains Network (For EUT)	ESH3-Z5	847265/023	Jan. 10, 2003
* ROHDE & SCHWARZ 4-wire ISN	ENY41	838119/028	Dec. 10, 2002
* ROHDE & SCHWARZ 2-wire ISN	ENY22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

- NOTE: 1. The 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).

4.1.3 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 450 kHz to 30 MHz was searched. Emission levels over 10dB under the prescribed limits could not be reported

4.1.4 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.



4.1.5 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".

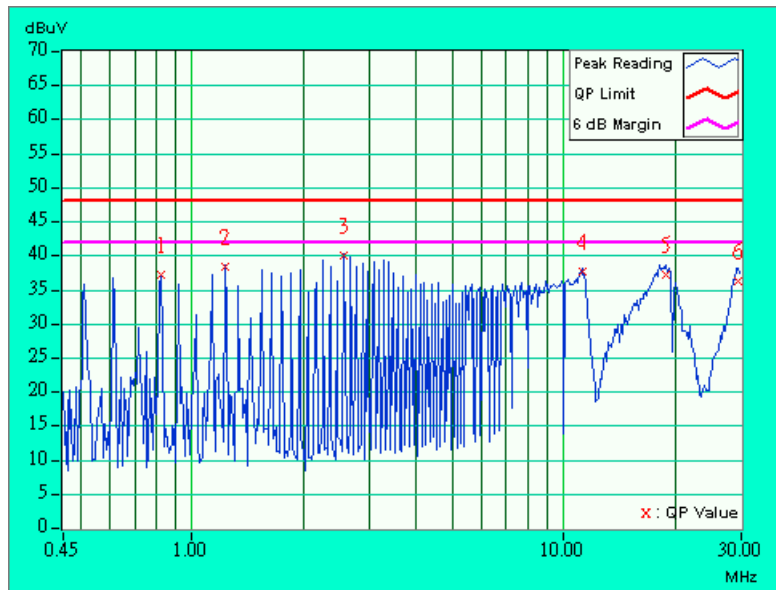


4.1.6 TEST RESULTS

EUT	Wireless LAN Access Point	MODEL	WA220
MODE	Channel 1	6dB BANDWIDTH	10 kHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	PHASE	Line (L)
ENVIRONMENTAL CONDITIONS	23 deg. C, 60%RH, 1005 hPa	TESTED BY: James 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	0.821	0.10	36.14	-	36.24	-	48.00	-	-11.76	-
2	1.230	0.10	37.25	-	37.35	-	48.00	-	-10.65	-
3	2.563	0.16	38.83	-	38.99	-	48.00	-	-9.01	-
4	11.174	0.57	36.54	-	37.11	-	48.00	-	-10.89	-
5	18.863	0.88	36.01	-	36.89	-	48.00	-	-11.11	-
6	29.424	1.19	35.18	-	36.37	-	48.00	-	-11.63	-

- 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.

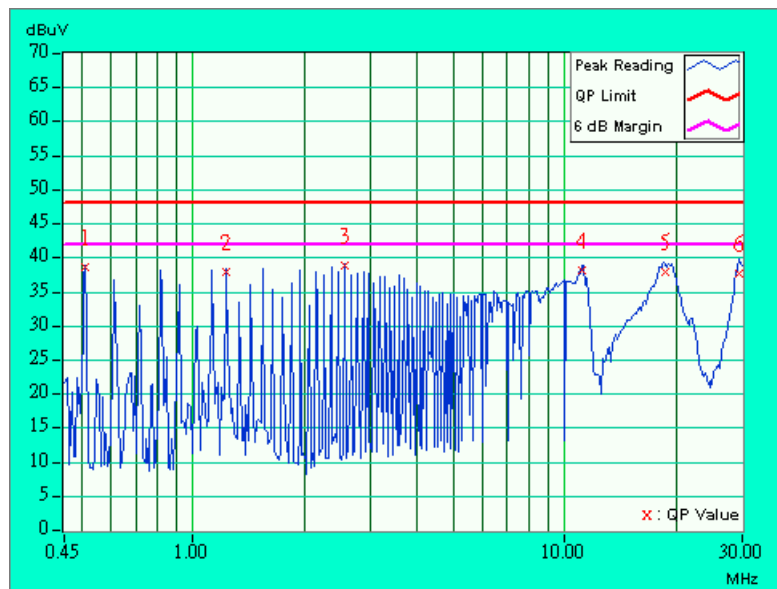




EUT	Wireless LAN Access Point	MODEL	WA220
MODE	Channel 1	6dB BANDWIDTH	10 kHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	PHASE	Neutral (N)
ENVIRONMENTAL CONDITIONS	23 deg. C, 60%RH, 1005 hPa	TESTED BY: James Lee	

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	0.513	0.10	37.89	-	37.99	-	48.00	-	-10.01	-
2	1.229	0.10	37.11	-	37.21	-	48.00	-	-10.79	-
3	2.562	0.16	38.03	-	38.19	-	48.00	-	-9.81	-
4	11.169	0.45	37.29	-	37.74	-	48.00	-	-10.26	-
5	18.549	0.67	37.15	-	37.82	-	48.00	-	-10.18	-
6	29.516	0.80	36.88	-	37.68	-	48.00	-	-10.32	-

- 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.

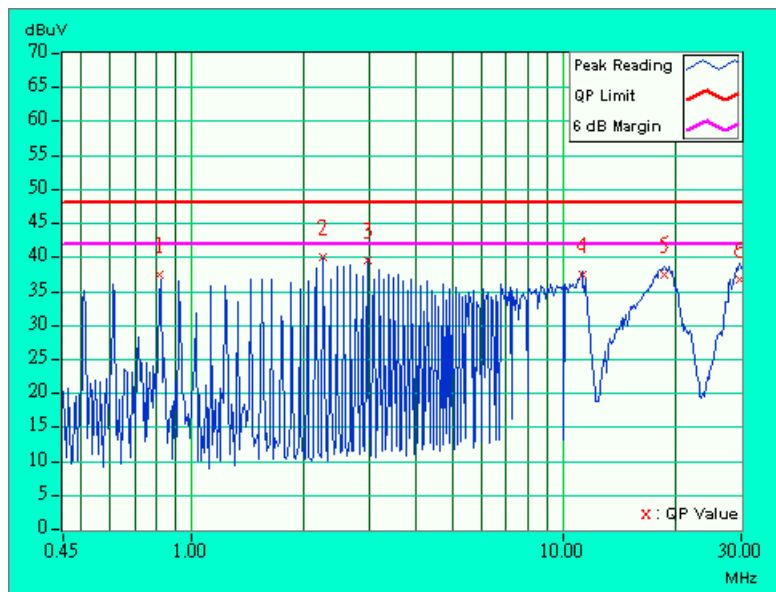




EUT	Wireless LAN Access Point	MODEL	WA220
MODE	Channel 6	6dB BANDWIDTH	10 kHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	PHASE	Line (L)
ENVIRONMENTAL CONDITIONS	23 deg. C, 60%RH, 1005 hPa	TESTED BY: James Lee	

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	0.820	0.10	36.25	-	36.35	-	48.00	-	-11.65	-
2	2.255	0.13	38.84	-	38.97	-	48.00	-	-9.03	-
3	2.973	0.20	38.41	-	38.61	-	48.00	-	-9.39	-
4	11.176	0.57	36.22	-	36.79	-	48.00	-	-11.21	-
5	18.556	0.87	36.36	-	37.23	-	48.00	-	-10.77	-
6	29.630	1.19	35.60	-	36.79	-	48.00	-	-11.21	-

- 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.

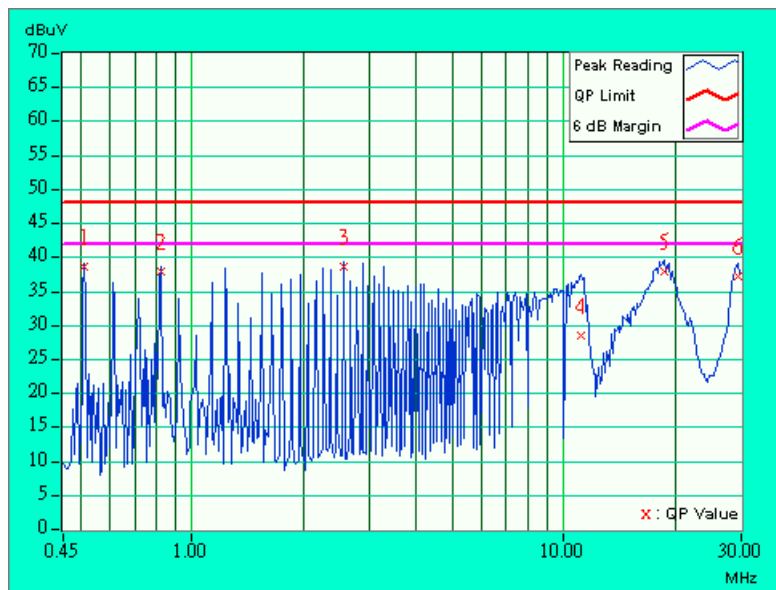




EUT	Wireless LAN Access Point	MODEL	WA220
MODE	Channel 6	6dB BANDWIDTH	10 kHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	PHASE	Neutral (N)
ENVIRONMENTAL CONDITIONS	23 deg. C, 60%RH, 1005 hPa	TESTED BY: James Lee	

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	0.513	0.10	37.79	-	37.89	-	48.00	-	-10.11	-
2	0.821	0.10	37.08	-	37.18	-	48.00	-	-10.82	-
3	2.563	0.16	37.87	-	38.03	-	48.00	-	-9.97	-
4	11.073	0.44	27.77	-	28.21	-	48.00	-	-19.79	-
5	18.557	0.67	37.17	-	37.84	-	48.00	-	-10.16	-
6	29.323	0.80	36.38	-	37.18	-	48.00	-	-10.82	-

- 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.

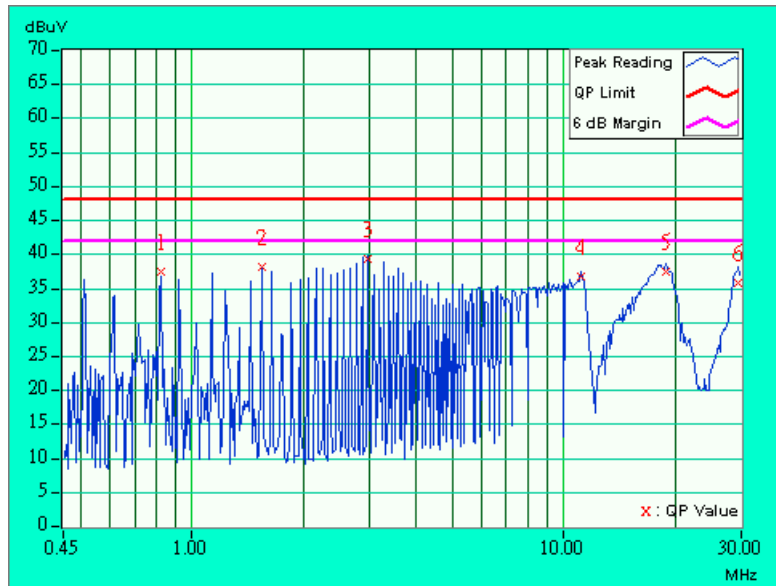




EUT	Wireless LAN Access Point	MODEL	WA220
MODE	Channel 11	6dB BANDWIDTH	10 kHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	PHASE	Line (L)
ENVIRONMENTAL CONDITIONS	23 deg. C, 60%RH, 1005 hPa	TESTED BY: James Lee	

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	0.821	0.10	36.32	-	36.42	-	48.00	-	-11.58	-
2	1.539	0.10	36.89	-	36.99	-	48.00	-	-11.01	-
3	2.973	0.20	38.26	-	38.46	-	48.00	-	-9.54	-
4	11.073	0.56	35.61	-	36.17	-	48.00	-	-11.83	-
5	18.762	0.88	36.17	-	37.05	-	48.00	-	-10.95	-
6	29.426	1.19	34.72	-	35.91	-	48.00	-	-12.09	-

- 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.

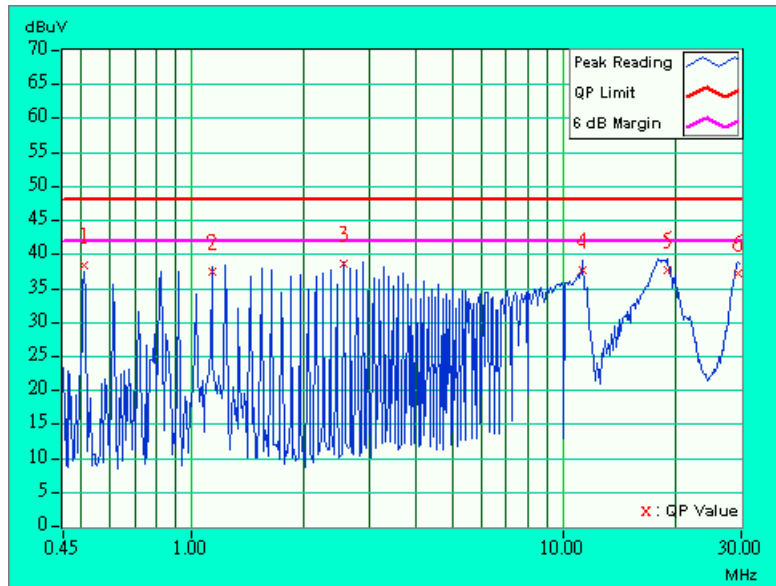




EUT	Wireless LAN Access Point	MODEL	WA220
MODE	Channel 11	6dB BANDWIDTH	10 kHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	PHASE	Neutral (N)
ENVIRONMENTAL CONDITIONS	23 deg. C, 60%RH, 1005 hPa	TESTED BY: James Lee	

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]		QP.	AV.	QP.	AV.	QP.	AV.	QP.	AV.
1	0.512	0.10	37.61	-	37.71	-	48.00	-	-10.29	-
2	1.129	0.10	36.74	-	36.84	-	48.00	-	-11.16	-
3	2.563	0.16	37.81	-	37.97	-	48.00	-	-10.03	-
4	11.277	0.45	36.80	-	37.25	-	48.00	-	-10.75	-
5	19.070	0.68	36.99	-	37.67	-	48.00	-	-10.33	-
6	29.527	0.80	36.53	-	37.33	-	48.00	-	-10.67	-

- 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 7, 2002
* HP Preamplifier	8447D	2944A08485	May 7, 2002
* HP Preamplifier	8449B	3008A01201	Dec. 06, 2002
* HP Preamplifier	8449B	3008A01292	Aug. 21, 2002
* 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, 2002
* SCHWARZBECK Horn Antenna	BBHA9120-D1	D130	July 6, 2002
* EMCO Horn Antenna	3115	9312-4192	April 15, 2002
* EMCO Turn Table	1060	1115	NA
* SHOSHIN Tower	AP-4701	A6Y005	NA
* Software	AS61D4	NA	NA
* ANRITSU RF Switches	MP59B	M35046	Aug. 2, 2002
* TIMES RF cable	LMR-600	CABLE-ST5-01	Aug. 2, 2002
* Antenna (Horn)	BBHA9120-D	D130	July 10, 2002
Open Field Test Site	Site 5	ADT-R05	July 28, 2002
VCCI Site Registration No.	Site 5	R-1039	NA
Site Registration No.	FCC: 90422 Canada IC: IC 3789 VCCI : R-1039		

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 equipments are used for the final measurement.



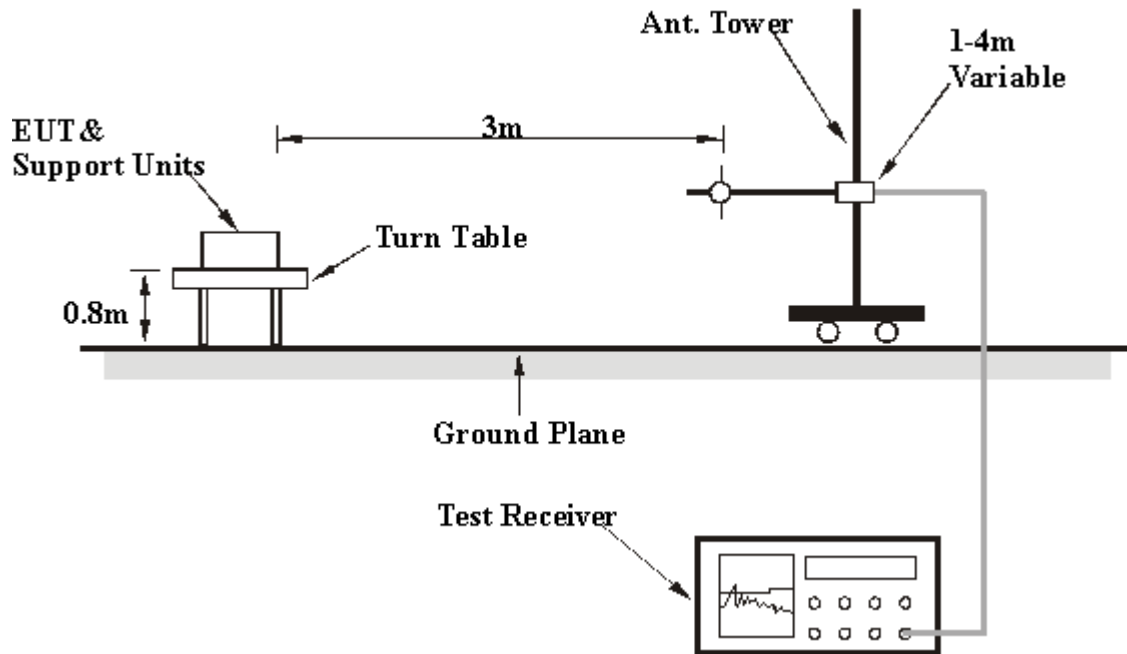
4.2.3 TEST PROCEDURES

- 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 TEST SETUP



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

4.2.5 EUT OPERATING CONDITIONS

Same as 4.1.5.



4.2.6 TEST RESULTS

EUT	Wireless LAN Access Point	MODEL	WA220
MODE	Channel 11	FREQUENCY RANGE	30-1000 MHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	DETECTOR FUNCTION	Quasi-Peak
ENVIRONMENTAL CONDITIONS	20 deg. C, 70%RH, 1005 hPa	TESTED BY: James Lee	

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-Amp. Factor (dB)	Correction Factor (dB/m)
1	132.00	30.5 QP	43.50	-13.00	1.18H	161	18.20	11.16	1.13	0.00	-12.29
2	150.00	28.5 QP	43.50	-15.00	1.28H	74	17.00	10.30	1.20	0.00	-11.52
3	200.00	28.4 QP	43.50	-15.10	1.11H	151	18.00	8.98	1.42	0.00	-10.41
4	220.00	30.6 QP	46.00	-15.40	1.55H	307	19.00	10.12	1.51	0.00	-11.63
5	308.00	32.3 QP	46.00	-13.70	1.11H	21	17.00	13.38	1.91	0.00	-15.29
6	352.00	32.4 QP	46.00	-13.60	1.73H	340	16.00	14.31	2.05	0.00	-16.36
7	572.00	38.0 QP	46.00	-8.00	1.64H	46	17.00	18.25	2.75	0.00	-21.00
8	660.00	38.3 QP	46.00	-7.70	1.43H	354	16.00	19.25	3.05	0.00	-22.30
9	748.00	35.4 QP	46.00	-10.60	1.13H	30	12.00	20.14	3.26	0.00	-23.41
10	748.00	33.8 QP	46.00	-12.20	1.02H	349	10.40	20.14	3.26	0.00	-23.40
11	792.00	34.9 QP	46.00	-11.10	1.46H	135	11.00	20.60	3.31	0.00	-23.91
12	836.00	34.0 QP	46.00	-12.00	1.22H	123	10.00	20.54	3.45	0.00	-23.99

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



EUT	Wireless LAN Access Point	MODEL	WA220
MODE	Channel 11	FREQUENCY RANGE	30-1000 MHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	DETECTOR FUNCTION	Quasi-Peak
ENVIRONMENTAL CONDITIONS	20 deg. C, 70%RH, 1005 hPa	TESTED BY: James Lee	

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-Amp. Factor (dB)	Correction Factor (dB/m)
1	132.00	27.3 QP	43.50	-16.20	1.07V	3	15.00	11.16	1.13	0.00	-12.29
2	150.00	26.7 QP	43.50	-16.80	1.17V	288	15.20	10.30	1.20	0.00	-11.51
3	220.00	31.6 QP	46.00	-14.40	1.16V	357	20.00	10.12	1.51	0.00	-11.63
4	288.00	31.7 QP	46.00	-14.30	1.04V	358	17.00	12.88	1.81	0.00	-14.69
5	308.00	31.3 QP	46.00	-14.70	1.49V	3	16.00	13.38	1.91	0.00	-15.30
6	320.00	31.8 QP	46.00	-14.20	1.56V	175	16.20	13.62	1.95	0.00	-15.57
7	352.00	34.4 QP	46.00	-11.60	1.60V	350	18.00	14.31	2.05	0.00	-16.36
8	440.00	33.9 QP	46.00	-12.10	1.35V	225	15.20	16.32	2.38	0.00	-18.69
9	484.00	34.4 QP	46.00	-11.60	1.29V	131	15.00	16.96	2.47	0.00	-19.43
10	572.00	36.4 QP	46.00	-9.60	1.20V	84	15.40	18.25	2.75	0.00	-21.00
11	748.00	34.4 QP	46.00	-11.60	1.30V	356	11.00	20.14	3.26	0.00	-23.40
12	792.00	34.3 QP	46.00	-11.70	1.35V	61	10.40	20.60	3.31	0.00	-23.91
13	836.00	33.5 QP	46.00	-12.50	1.28V	347	9.50	20.54	3.45	0.00	-23.99

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



EUT	Wireless LAN Access Point	MODEL	WA220
MODE	Channel 1	FREQUENCY RANGE	Above 1000 MHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	DETECTOR FUNCTION	Peak(PK) Average (AV)
ENVIRONMENTAL CONDITIONS	20 deg. C, 70%RH, 1005 hPa	TESTED BY: James Lee	

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-Amp. Factor (dB)	Correction Factor (dB/m)
1	2038.0	51.2 PK	74.00	-22.80	1.23H	282	56.04	25.20	4.86	34.90	4.84
2	*2412.0	100.3 PK	-	-	1.90H	60	67.90	27.33	5.08	0.00	-32.41
3	*2412.0	95.4 AV	-	-	1.90H	60	63.00	27.33	5.08	0.00	-32.41
4	4076.0	46.0 PK	74.00	-28.00	1.43H	297	43.61	30.13	6.78	34.52	-2.39
5	4824.0	45.0 PK	74.00	-29.00	1.28H	172	40.98	31.43	7.23	34.63	-4.02

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-Amp. Factor (dB)	Correction Factor (dB/m)
1	2038.0	49.0 PK	74.00	-25.00	1.21V	333	53.84	25.20	4.86	34.90	4.84
2	*2412.0	100.2 PK	-	-	1.73V	16	67.80	27.33	5.08	0.00	-32.41
3	*2412.0	94.8 AV	-	-	1.73V	16	62.40	27.33	5.08	0.00	-32.41
4	4076.0	46.0 PK	74.00	-28.00	1.33V	139	43.61	30.13	6.78	34.52	-2.39
5	4824.0	45.4 PK	74.00	-28.60	1.38V	355	41.38	31.43	7.23	34.63	-4.02

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



EUT	Wireless LAN Access Point	MODEL	WA220
MODE	Channel 6	FREQUENCY RANGE	Above 1000 MHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	DETECTOR FUNCTION	Peak(PK) Average (AV)
ENVIRONMENTAL CONDITIONS	20 deg. C, 70%RH, 1005 hPa	TESTED BY: James Lee	

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M											
No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-Amp. Factor (dB)	Correction Factor (dB/m)
1	2063.0	48.7 PK	74.00	-25.30	1.61H	62	53.23	25.41	4.96	34.90	4.53
2	*2463.0	101.9 PK	-	-	1.54H	348	69.50	27.33	5.08	0.00	-32.40
3	*2463.0	94.8 AV	-	-	1.54H	348	62.40	27.33	5.08	0.00	-32.40
4	4126.0	48.0 PK	74.00	-26.00	1.28H	266	45.54	30.32	6.70	34.56	-2.46
5	4874.0	47.1 PK	74.00	-26.90	1.43H	314	43.05	31.47	7.21	34.63	-4.05

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M											
No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-Amp. Factor (dB)	Correction Factor (dB/m)
1	2063.0	45.5 PK	74.00	-28.50	1.38V	5	50.00	25.41	4.96	34.90	4.53
2	*2438.0	100.7 PK	-	-	1.37V	334	68.30	27.33	5.08	0.00	-32.40
3	*2438.0	94.4 AV	-	-	1.37V	334	62.00	27.33	5.08	0.00	-32.40
4	4126.0	49.5 PK	74.00	-24.50	1.24V	75	47.00	30.32	6.70	34.56	-2.46
5	4874.0	50.1 PK	74.00	-23.90	1.57V	294	46.00	31.47	7.21	34.63	-4.05

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



EUT	Wireless LAN Access Point	MODEL	WA220
MODE	Channel 11	FREQUENCY RANGE	Above 1000 MHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	DETECTOR FUNCTION	Peak(PK) Average (AV)
ENVIRONMENTAL CONDITIONS	20 deg. C, 70%RH, 1005 hPa	TESTED BY: James Lee	

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-Amp. Factor (dB)	Correction Factor (dB/m)
1	2088.0	50.4 PK	74.00	-23.60	1.64H	310	54.66	25.62	5.02	34.90	4.26
2	*2463.0	104.2 PK	-	-	1.56H	356	71.80	27.33	5.08	0.00	-32.41
3	*2463.0	98.4 AV	-	-	1.56H	356	66.00	27.33	5.08	0.00	-32.41
4	2487.0	49.2 PK	74.00	-24.80	1.63H	149	51.51	27.54	5.06	34.90	2.31
5	4176.0	46.7 PK	74.00	-27.30	1.46H	333	44.19	30.41	6.68	34.58	-2.51
6	4924.0	47.3 PK	74.00	-26.70	1.46H	5	43.20	31.51	7.21	34.62	-4.11

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-Amp. Factor (dB)	Correction Factor (dB/m)
1	2088.0	46.7 PK	74.00	-27.30	1.36V	328	51.00	25.62	5.02	34.90	4.26
2	*2463.0	103.4 PK	-	-	1.61V	352	71.00	27.33	5.08	0.00	-32.41
3	*2463.0	97.4 AV	-	-	1.61V	352	65.00	27.33	5.08	0.00	-32.41
4	2486.0	47.7 PK	74.00	-26.30	1.42V	4	50.00	27.54	5.06	34.90	2.31
5	4176.0	47.5 PK	74.00	-26.50	1.20V	102	45.00	30.41	6.68	34.58	-2.51
6	4924.0	49.3 PK	74.00	-24.70	1.19V	349	45.20	31.51	7.21	34.62	-4.10

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



4.3 6dB BANDWIDTH MEASUREMENT

4.3.1 LIMITS OF 6dB BANDWIDTH MEASUREMENT

The minimum of 6dB Bandwidth Measurement is 0.5 MHz.

4.3.2 TEST INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
SPECTRUM ANALYZER	FSEK30	100049	July 17, 2002

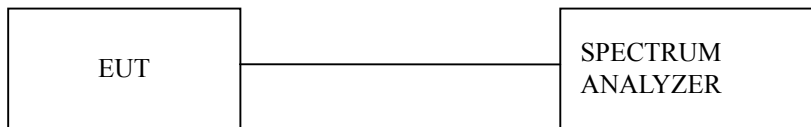
NOTE:

- 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 TEST SETUP



4.3.5 EUT OPERATING CONDITIONS

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



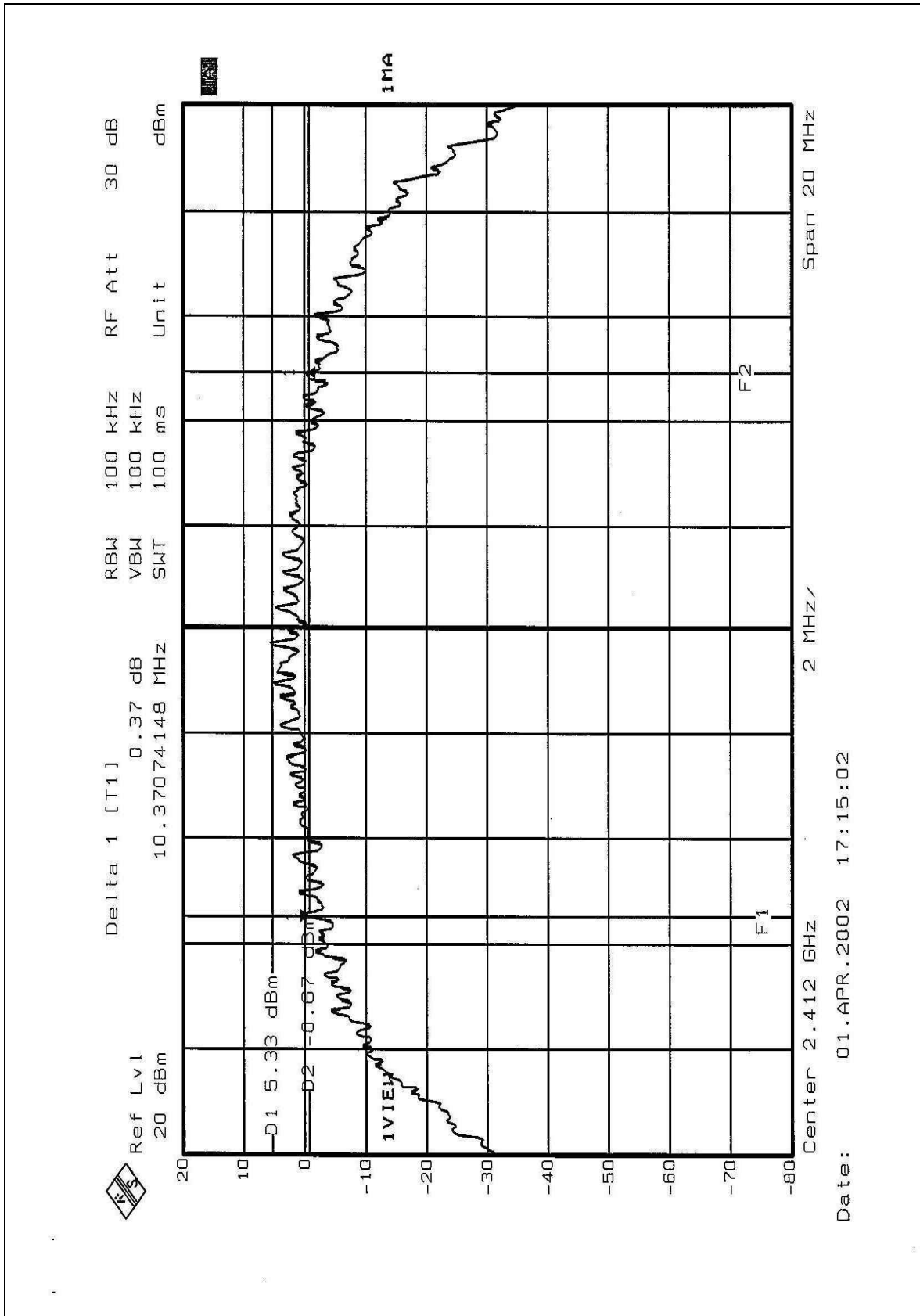
4.3.6 TEST RESULTS

EUT	Wireless LAN Access Point	MODEL	WA220
INPUT POWER (SYSTEM)	120Vac, 60Hz	ENVIRONMENTAL CONDITIONS	22 deg. C, 65%RH, 1005 hPa
TESTED BY: Bunny Yao			

CHANNEL	CHANNEL FREQUENCY (MHz)	6 dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS/FAIL
1	2412	10.37	0.5	PASS
6	2437	10.30	0.5	PASS
11	2462	8.78	0.5	PASS

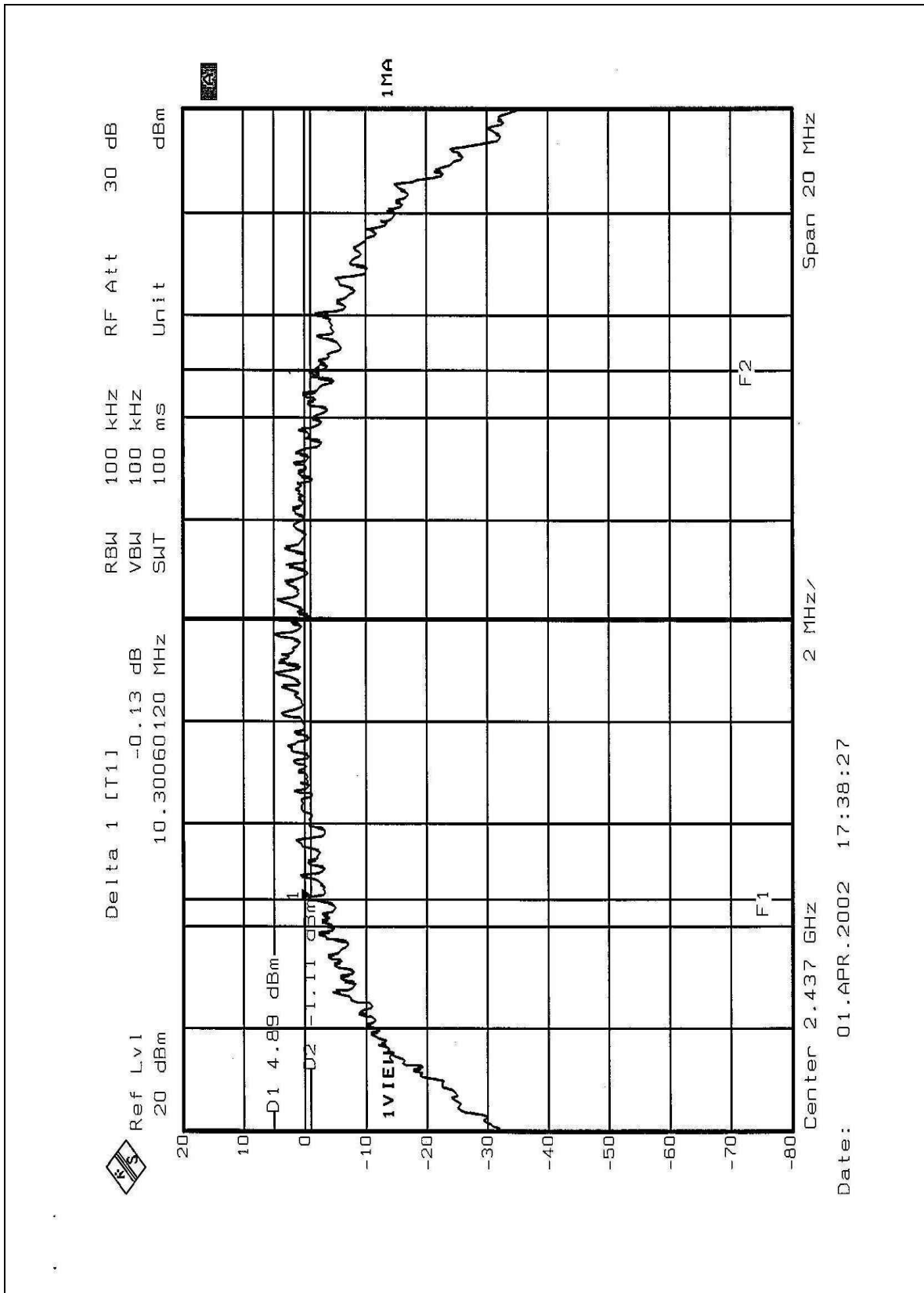


CH1



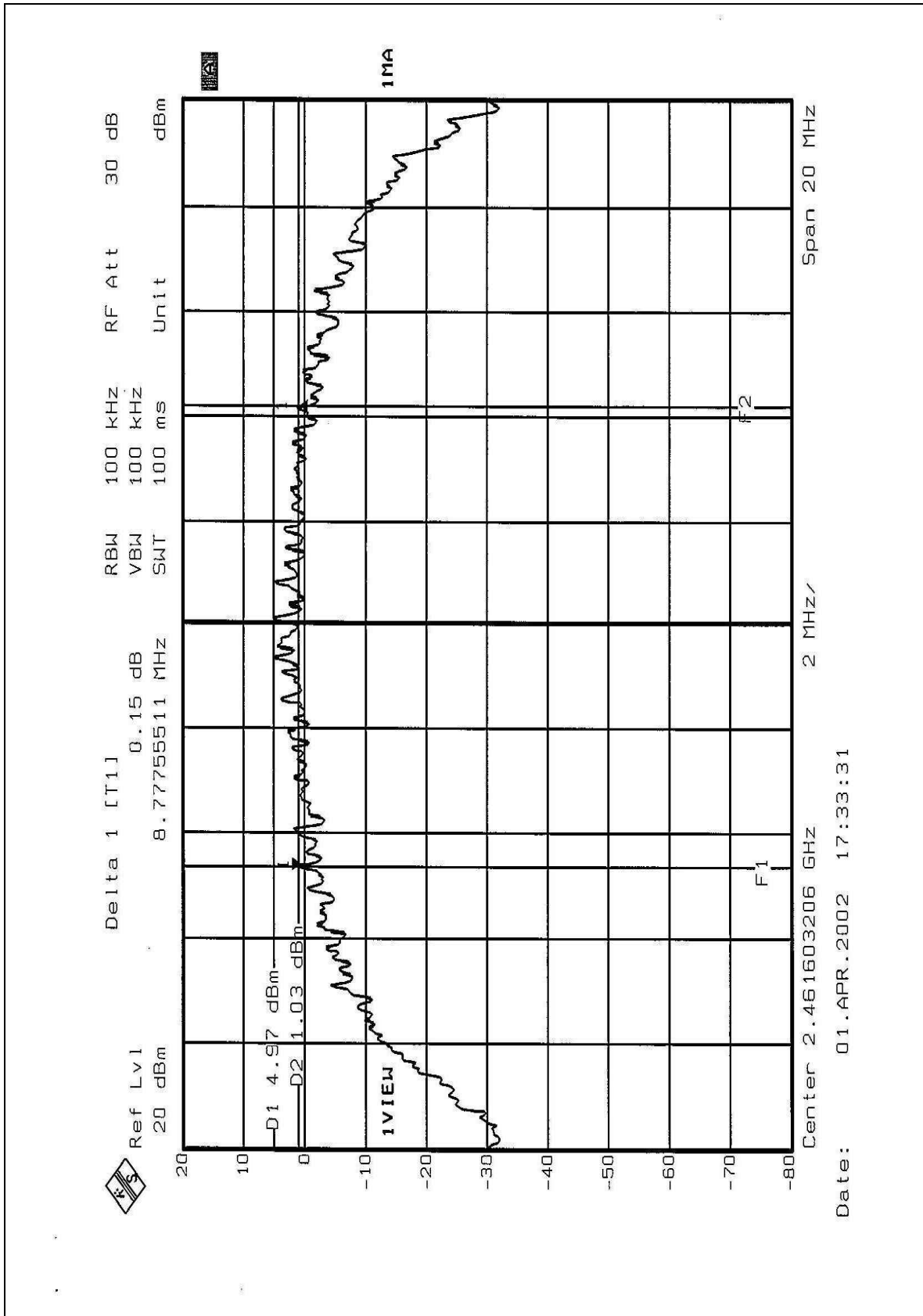


CH6





CH11





4.4 MAXIMUM PEAK OUTPUT POWER

4.4.1 LIMITS OF MAXIMUM PEAK OUTPUT POWER MEASUREMENT

The Maximum Peak Output Power Measurement is 30dBm.

4.4.2 INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
SINGLE CHANNEL POWER METER	NRVS	100026	Feb. 21, 2003
PEAK POWER SENSOR	NRV-Z32	100013	Feb. 21, 2003

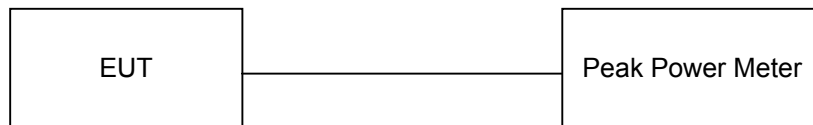
NOTE:

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

1. The transmitter output was connected to the peak power meter.

4.4.4 TEST SETUP



4.4.5 EUT OPERATING CONDITIONS

Same as Item 3.4.5



4.4.6 TEST RESULTS

EUT	Wireless LAN Access Point	MODEL	WA220
INPUT POWER (SYSTEM)	120Vac, 60Hz	ENVIRONMENTAL CONDITIONS	22 deg. C, 65%RH, 1005 hPa
TESTED BY: Bunny Yao			

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER OUTPUT (dBm)	PEAK POWER LIMIT (dBm)	PASS/FAIL
1	2412	15.65	30	PASS
6	2437	15.56	30	PASS
11	2462	15.61	30	PASS