FCC TEST REPORT

REPORT NO.: RF89122612
MODEL NO.: WL11000-2-E
RECEIVED: December 26, 2000
TESTED: January 18, 2001

APPLICANT: Eumitcom Technology Inc.

ADDRESS: 2F, No.2, Li Hsin Rd., Science-Based Industrial Park, Hsinchu, Taiwan, R.O.C.

ISSUED BY: Advance Data Technology Corporation

LAB LOCATION: 13-1, Lane 19, Wen Shan 3rd St., Kweishan, Taoyuan Hsien, Taiwan, R.O.C.

Accredited Laboratory

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1 CERTIFICATION

PRODUCT :	2.4GHz Wireless LAN Card
BRAND NAME :	Eumitcom
MODEL NO. :	WL11000-2-E
APPLICANT :	Eumitcom Technology Inc.
OEM BRAND HOLDER :	Siemens Switzerland Ltd.
BRAND NAME :	Siemens
MODEL NO.:	V4411-Z9-X303
STANDARDS :	47 CFR Part 15, Subpart C (Section 15.247), ANSI C63.4-1992
SITE REGISTERATION NO. :	90422 (FCC) IC 3789-5 (Canada IC)

We, **Advance Data Technology Corporation**, hereby certify that one sample WL11000-2-E of the designation has been tested in our facility on January 18, 2001.

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 : Steven Lu , DATE: Jan. 18, 2001
Steven Lu

PREPARED BY : Demi Chen , DATE: Jan. 18, 2001
Demi Chen

APPROVED BY : Alan Lane , DATE: Jan. 18, 2001
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 PARAGRAPH	**TEST REQUIREMENTS**	**RESULT**	**REMARK**
15.107	AC Power Conducted Emissions Spec.: 48 dBuV	Yes	Minimum passing margin is –7.65dBuV At 0.50145 MHz
15.247(a)(2)	Spectrum Bandwidth of a Direct Sequence Spread Spectrum System Spec.: min. 500 Khz	Yes	8.62 MHz > 500 kHz
15.247(b)	Maximum Peak Output Power Spec.: max. 30 dBm	Yes	15.44 dBm < 30 dBm
15.247(c)	Transmitter Radiated Emissions Spec.: Table 15.209	Yes	Minimum passing margin is –4.0 dBuV At 199.87 MHz
15.247(d)	Power Spectral Density Spec.: max. 8dBm	Yes	-10.05 dBm < 8 dBm
15.247(c)	Band Edge Measurement	Yes	N/A
15.247(e)	Processing Gain of Direct Sequence Spread Spectrum System Spec.: min. 10 dB	Yes	11.4dB≧10dB

NOTE:

The receiver portion of the EUT has been tested in ADT. The test result has been verified to comply with FCC Part 15, Subpart B, Class B – Computing Devices (FCC DoC). The engineering test report can be provided upon FCC requests.

3 GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

PRODUCT	2.4GHz Wireless LAN Card
MODEL NO.	WL11000-2-E
POWER SUPPLY	3.3V (from PCMCIA slot)
DATA CABLE	NA
I/O PORTS	NA
MODULATION TYPE	CCK, BPSK, QPSK
RADIO TECHNOLOGY	DSSS
TRANSFER RATE	1/2/5.5/11 Mbps
FREQUENCY RANGE	2400MHz ~ 2483.5MHz
NUMBER OF CHANNEL	11
OUTPUT POWER	15dBm
ANTENNA TYPE	Monopole Antenna
ASSOCIATED DEVICES	NA
DESCRIPTION BETWEEN MODELS	

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		

3.3 GENERAL DESCRIPTION OF APPLIED STANDARDS

The EUT is a 2.4GHz Wireless LAN Card, according to the specifications of the manufacturers, it must comply with the requirements of the following standards:

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

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

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.	I/O Cable
1	PC	IBM	2187-12W	1S218714ABNA001N	Nonshielded Power (1.8m)
2	MONITOR	HP	D2842A	KR93473118	Nonshielded Power (1.5m) Shielded Signal(1.8m)
3	PRINTER	HP	2225C+	3208S05355	Nonshielded Power (1.8m) Shielded Signal(1.2m)
4	MODEM	ADI	SM-5514A	521V003651A	Nonshielded Power (1.9m) Shielded Signal(1.2m)
5	KEYBOARD	FORWARD	FDA-104GA	FDKB8110116	Shielded Signal (1.2m)
6	MOUSE	LOGITECH	M-S43	LZE000703160	Nonshielded Signal(1.5m)

4 TEST PROCEDURES AND RESULTS

4.1 CONDUCTED EMISSION MEASUREMENT

4.1.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT

FREQUENCY (MHz)	Class A (dBuV)		Class B (dBuV)	
	Quasi-peak	Average	Quasi-peak	Average
0.45 – 30	48	-	48	-

NOTES: (1) The lower limit shall apply at the transition frequencies.
(2) All emanations from a class A/B digital device or system, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strengths specified above.

4.1.2 TEST INSTRUMENTS

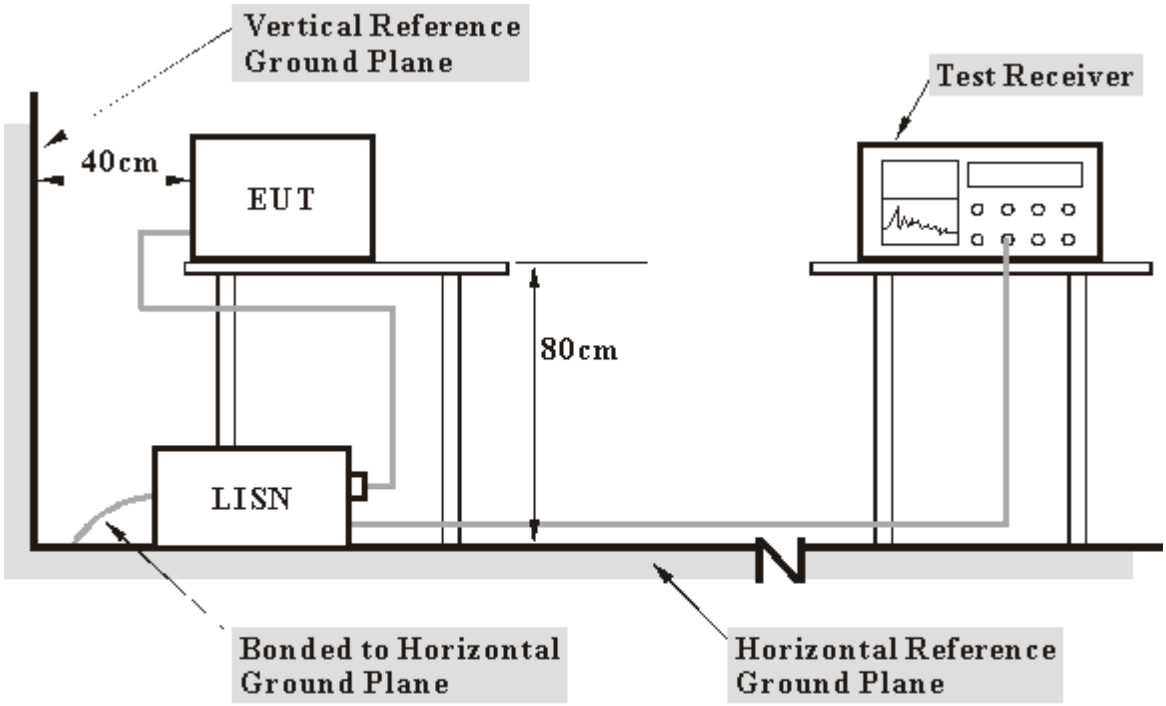
DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
ROHDE & SCHWARZ Test Receiver	ESCS30	834115/016	Feb. 22, 2001
ROHDE & SCHWARZ Artificial Mains Network	ESH2-Z5	892107/003	July 11, 2001
ROHDE & SCHWARZ 4-wire ISN	ENY41	835154/007	Apr. 26, 2001
EMCO L.I.S.N.	3825/2	9504-2359	July 11, 2001
Shielded Room	Site 3	ADT-C03	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.

4.1.3 TEST PROCEDURES

1. Place the EUT at 0.4 meter away from the conduction wall of the shielded room.
2. Connect the EUT to the power mains through a Line Impedance Stabilization Network (LISN).
3. Connect the other support units to the other LISN too.
4. Make sure the 50Ω/ 50μH coupling impedance is provided to the measurement instrument by the LISNs.
5. Measure the maximum conducted interference on both lines of the power mains connects to the EUT, within frequency range 450KHz ~ 30MHz.
6. The emission level under limit by 10dB is not needed to be reported.

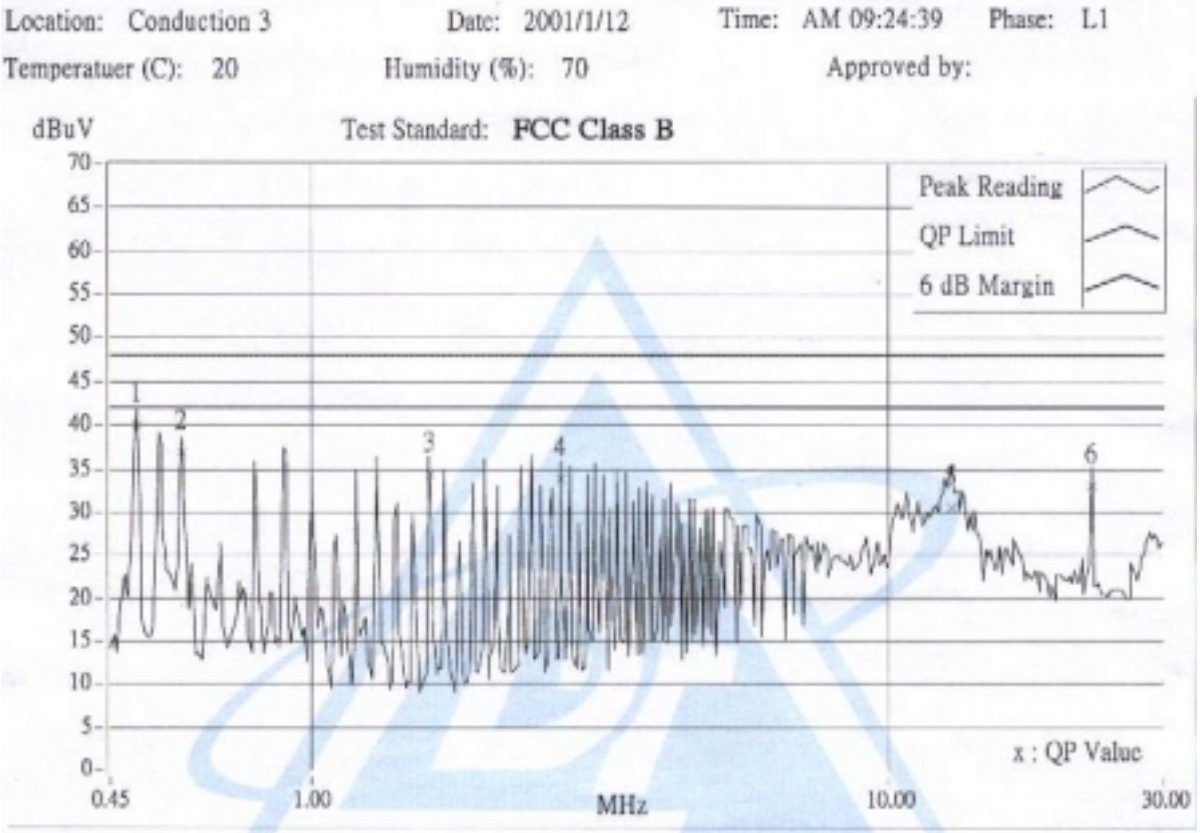
4.1.4 TEST SETUP



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 in this test report (**Photographs of the Test Configuration**).

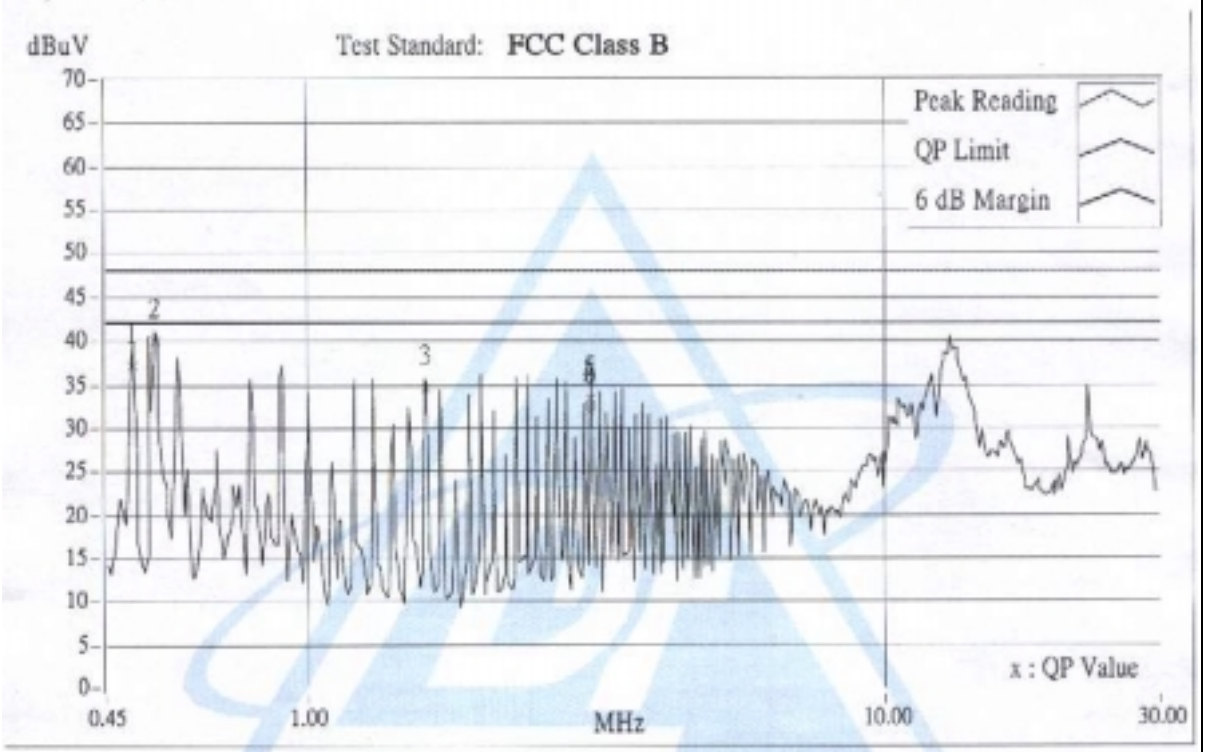
4.1.5 TEST RESULTS



	Frequency	Corr. Factor	Reading dBuV	Emission dBuV	Limit dBuV	Margins dB
No.	MHz	dB	QP	QP	QP	QP
+1	0.50145	0.22	40.13	40.35	48.00	-7.65
2	0.60225	0.23	36.86	37.09	48.00	-10.91
3	1.60411	0.30	34.38	34.68	48.00	-13.32
4	2.70440	0.34	33.93	34.27	48.00	-13.73
5	12.91263	0.66	30.59	31.25	48.00	-16.75
6	22.57081	1.10	33.02	34.12	48.00	-13.88

Location: Conduction 3 Date: 2001/1/12 Time: AM 09:29:23 Phase: N

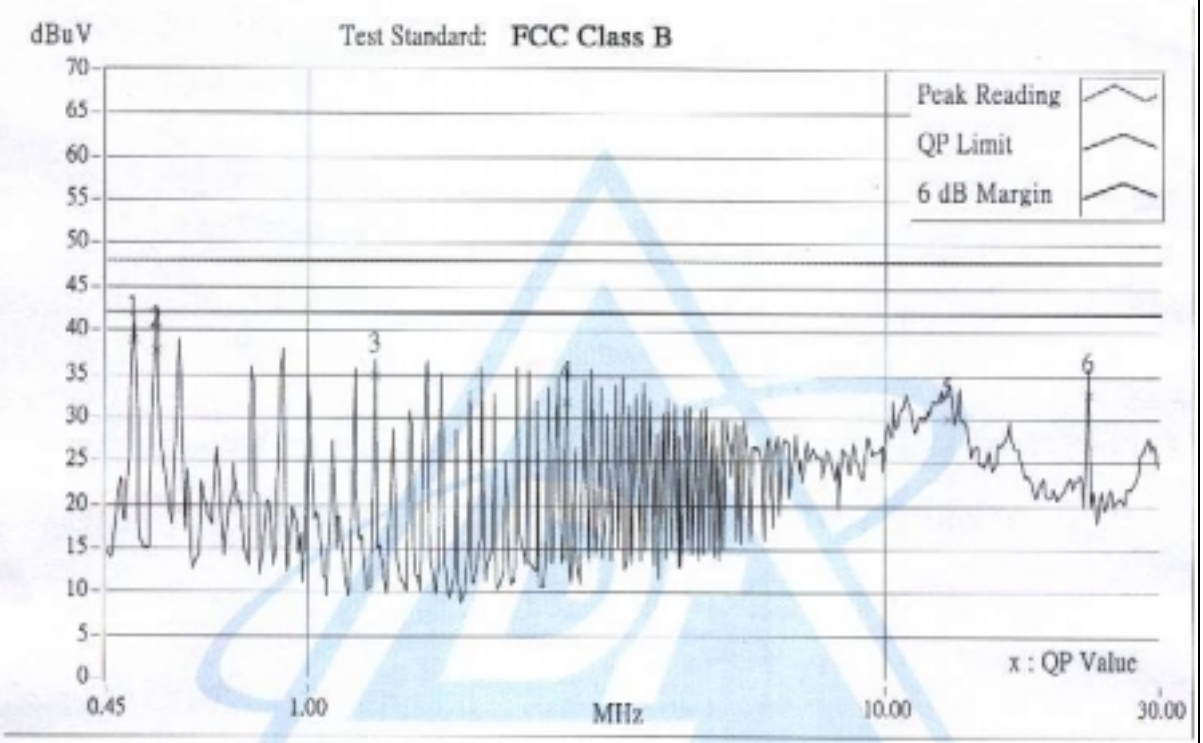
Temperatuer (C): 20 Humidity (%): 70 Approved by:



	Frequency	Corr. Factor	Reading dBuV	Emission dBuV	Limit dBuV	Margins dB
No.	MHz	dB	QP	QP	QP	QP
1	0.49952	0.22	37.29	37.51	48.00	-10.49
+2	0.54915	0.22	40.05	40.27	48.00	-7.73
3	1.60284	0.30	34.72	35.02	48.00	-12.98
4	3.10533	0.36	32.15	32.51	48.00	-15.49
5	3.10806	0.36	33.21	33.57	48.00	-14.43
6	3.10932	0.36	32.60	32.96	48.00	-15.04

Location: Conduction 3 Date: 2001/1/12 Time: AM 09:34:42 Phase: L1

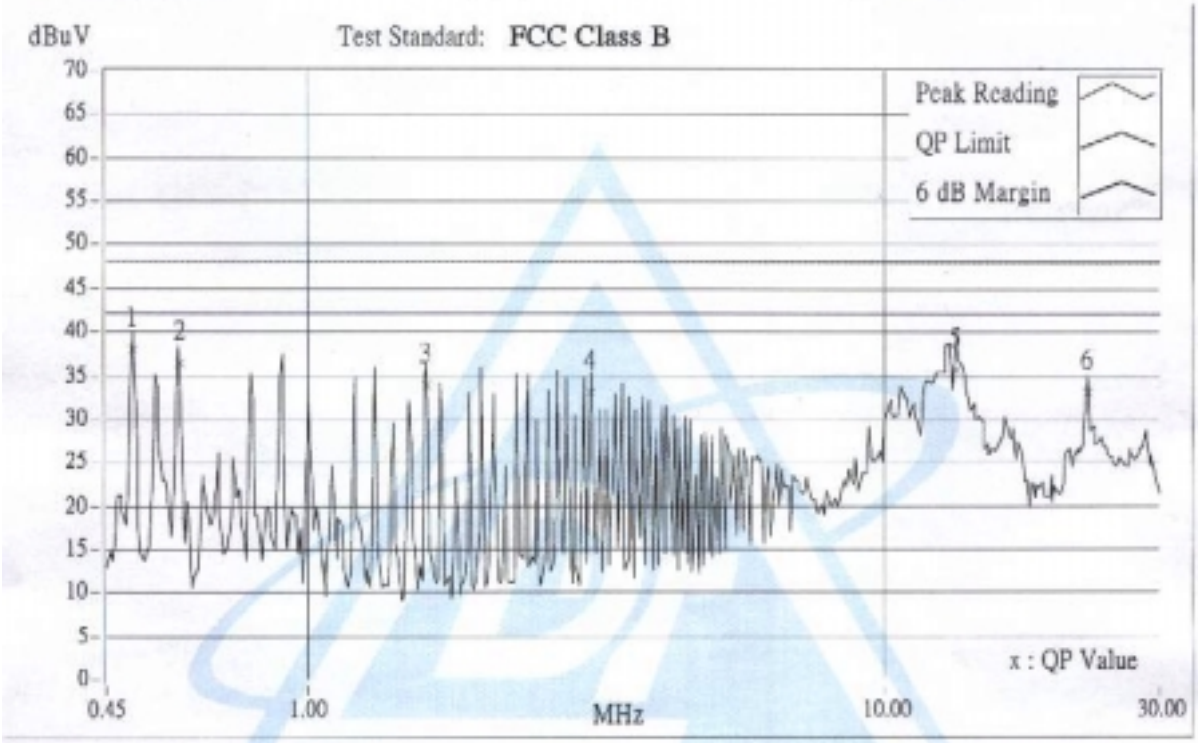
Temperatuer (C): 20 Humidity (%): 70 Approved by:



	Frequency	Corr. Factor	Reading dBuV	Emission dBuV	Limit dBuV	Margins dB
No.	MHz	dB	QP	QP	QP	QP
+1	0.49951	0.22	38.99	39.21	48.00	-8.79
2	0.55059	0.23	37.79	38.02	48.00	-9.98
3	1.30472	0.30	34.83	35.13	48.00	-12.87
4	2.80604	0.34	31.67	32.01	48.00	-15.99
5	12.84901	0.66	29.94	30.60	48.00	-17.40
6	22.56897	1.10	32.83	33.93	48.00	-14.07

Location: Conduction 3 Date: 2001/1/12 Time: AM 09:31:57 Phase: N

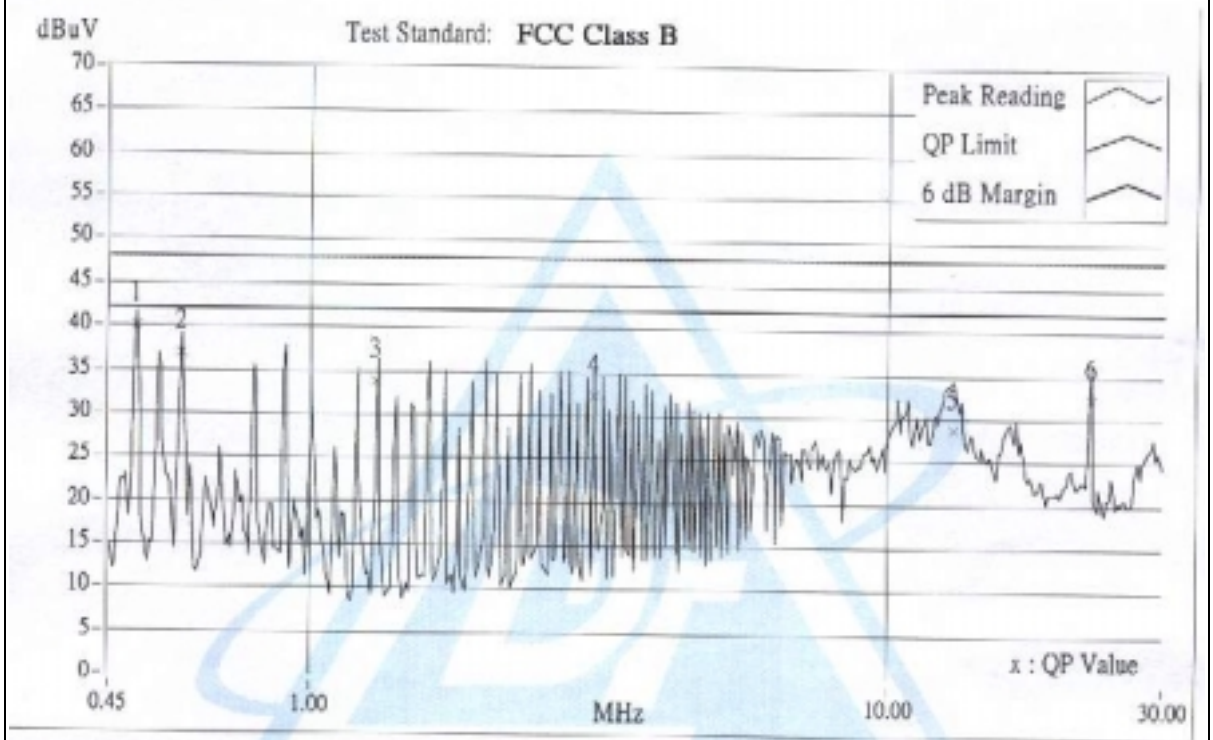
Temperatuer (C): 20 Humidity (%): 70 Approved by:



	Frequency	Corr. Factor	Reading dBuV	Emission dBuV	Limit dBuV	Margins dB
No.	MHz	dB	QP	QP	QP	QP
+1	0.50216	0.22	38.09	38.31	48.00	-9.69
2	0.60242	0.23	36.46	36.69	48.00	-11.31
3	1.60675	0.30	33.77	34.07	48.00	-13.93
4	3.10812	0.36	33.03	33.39	48.00	-14.61
5	13.33584	0.50	35.71	36.21	48.00	-11.79
6	22.57159	0.75	32.95	33.70	48.00	-14.30

Location: Conduction 3 Date: 2001/1/12 Time: AM 09:37:34 Phase: L1

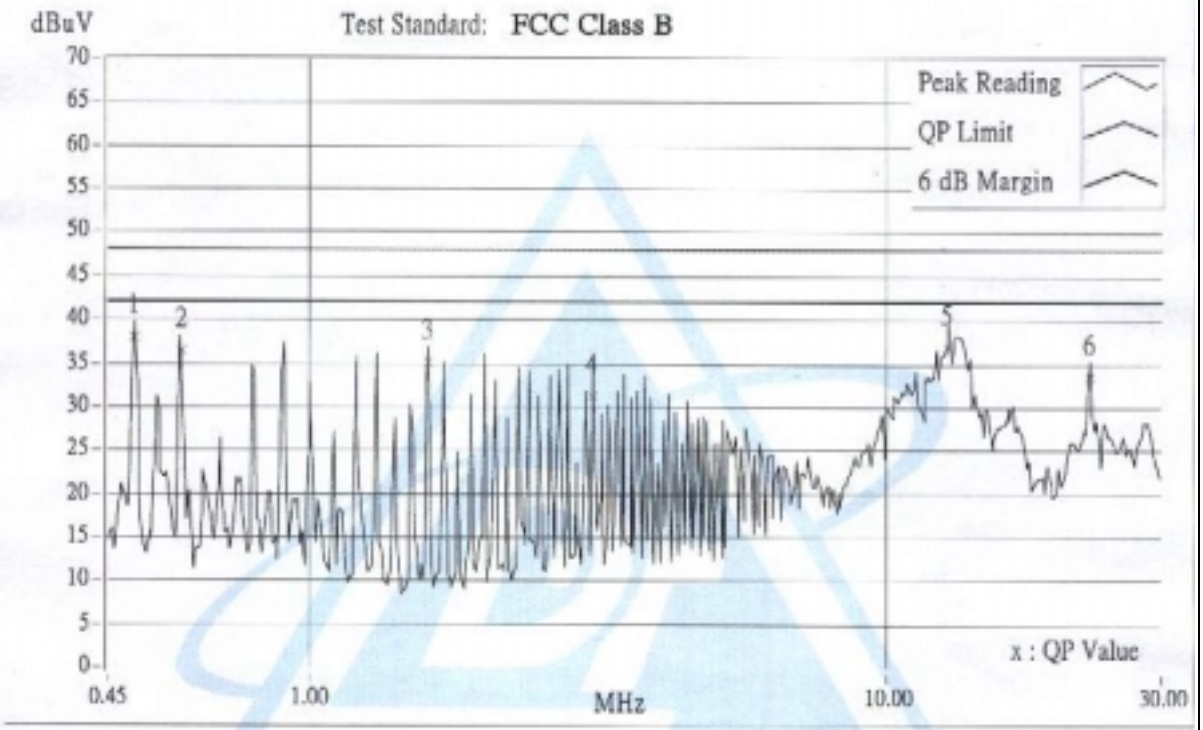
Temperatuer (C): 20 Humidity (%): 70 Approved by:



	Frequency	Corr. Factor	Reading dBuV	Emission dBuV	Limit dBuV	Margins dB
No.	MHz	dB	QP	QP	QP	QP
+1	0.50123	0.22	39.99	40.21	48.00	-7.79
2	0.60106	0.23	36.94	37.17	48.00	-10.83
3	1.30215	0.30	33.76	34.06	48.00	-13.94
4	3.10812	0.36	32.23	32.59	48.00	-15.41
5	12.97257	0.66	28.65	29.31	48.00	-18.69
6	22.56778	1.10	32.37	33.47	48.00	-14.53

Location: Conduction 3 Date: 2001/1/12 Time: AM 09:39:56 Phase: N

Temperatuer (C): 20 Humidity (%): 70 Approved by:



	Frequency	Corr. Factor	Reading dBuV	Emission dBuV	Limit dBuV	Margins dB
No.	MHz	dB	QP	QP	QP	QP
+1	0.50090	0.22	37.99	38.21	48.00	-9.79
2	0.60239	0.23	36.46	36.69	48.00	-11.31
3	1.60614	0.30	35.07	35.37	48.00	-12.63
4	3.10810	0.36	31.17	31.53	48.00	-16.47
5	12.84766	0.50	36.89	37.39	48.00	-10.61
6	22.57079	0.75	33.46	34.21	48.00	-13.79

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	
	µV/meter	dBµV/meter
30-88	100	40.0
88-216	150	43.5
216-960	200	46.0
Above 960	500	54.0

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.

LIMIT OF RADIATED EMISSION OF FCC PART 15, SUBPART B FOR FREQUENCY ABOVE 1000 MHz

FREQUENCY (MHz)	Class A (at 10m)		Class B (at 3m)	
	uV/m	dBuV/m	uV/m	dBuV/m
Above 1000	300	49.5	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) All emanation from a class A/B digital device or system, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strengths specified above.

4.2.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
HP Spectrum Analyzer	8590L	3544A01176	Apr. 18, 2001
HP Preamplifier	8447D	2944A08485	Apr. 27, 2001
HP Preamplifier	8347A	3307A01088	Sep. 04, 2001
ROHDE & SCHWARZ TEST RECEIVER	ESMI	839013/007 839379/002	Aug. 3, 2001
SCHWARZBECK Tunable Dipole Antenna	VHA 9103 UHA 9105	E101051 E101055	N/A
CHASE BILOG Antenna	CBL6112A	2221	Aug. 4, 2001
SCHWARZBECK Horn Antenna	BBHA9120-D	D130	Jul. 9, 2001
SCHWARZBECK Horn Antenna	BBHA9170	123	Jan. 30, 2001
EMCO Turn Table	1060	1115	N/A
SHOSHIN Tower	AP-4701	A6Y005	N/A
Open Field Test Site	Site 5	ADT-R05	Aug. 08, 2001

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.

4.2.3 TEST PROCEDURES

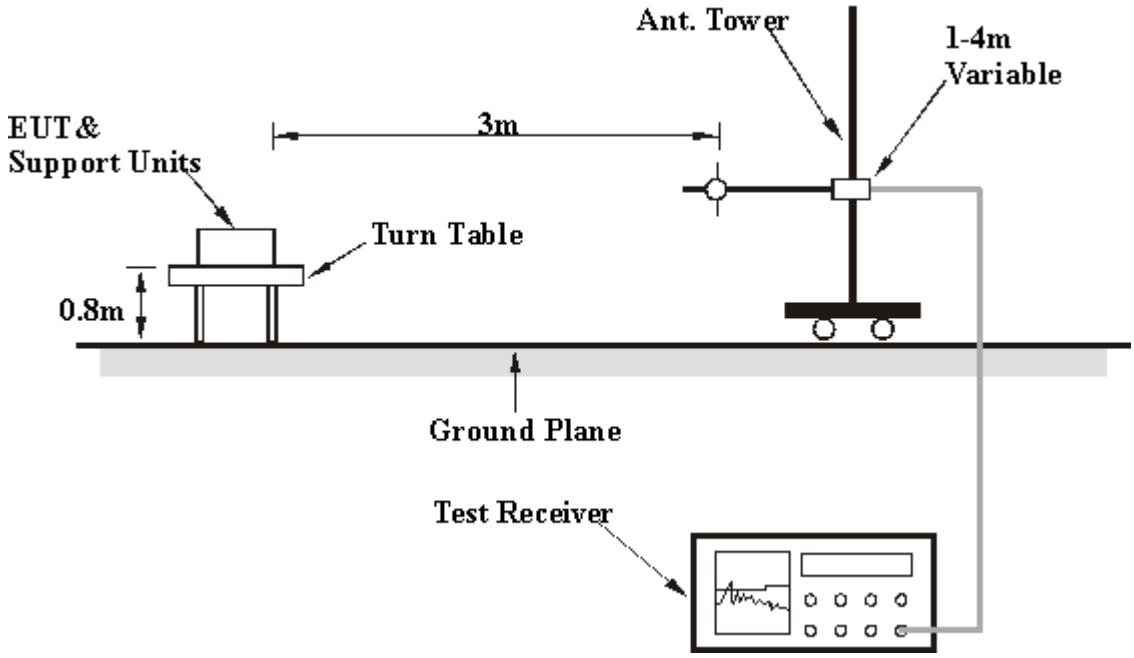
1. The EUT was placed on the turn table 0.8 meter above ground in 3 meter open area test site.
2. Set the resolution bandwidth to 120KHz in the test receiver and select Peak function to scan the frequency below 1 GHz.
3. Shift the interference-receiving antenna located in antenna tower upwards and downwards between 1 and 4 meters above ground and find out the local peak emission on frequency domain.
4. Locate the interference-receiving antenna at the position where the local peak reach the maximum emission.
5. Rotate the turn table and stop at the angle where the measurement device has maximum reading
6. Shift the interference-receiving antenna again to detect the maximum emission of the local peak
7. If the reading of the local peak under Peak function is lower than limit by 6dB, then Quasi Peak detection is not needed and this reading should be recorded. And if it is higher than Peak limit, then the test is fail. Others, switch the receiver to Quasi Peak function, set the resolution bandwidth to 100kHz and repeat the procedures C ~ F. If the reading is lower than limit, this reading should be recorded, otherwise, the test is fail.
8. Set the resolution and video bandwidth of the spectrum analyzer to 1MHz and repeat procedures C ~ F for frequency band from 1 GHz to 10 times carrier frequency.
9. If the reading for the local peak is lower than the Average limit, no further testing is needed in this local peak and this reading should be recorded. If it is higher than Average limit but lower than Peak limit, then set the resolution bandwidth to 1MHz and video bandwidth to 300Hz. Repeat procedures C ~ F. If the maximum reading is lower than Average limit, then this reading should be recorded. If it is higher, then the test is fail.

Note:1. The frequency range of verification is either from 30 MHz to 1GHz or from 30 MHz up to 10 times carrier frequency of EUT (whichever is the highest frequency range).

2. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for frequency below 1GHz.

3. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 300 Hz for frequency above 1GHz.

4.2.4 TEST SETUP



For the actual test configuration, please refer to the related Item in this test report (**Photographs of the Test Configuration**).

4.2.5 TEST RESULTS

Digital Portion

EUT	2.4GHz Wireless LAN Card	**Model**	WL11000-2-E
Mode	Channel 1	**Detector Function**	Quasi-Peak
Frequency Range	30-1000 MHz	**Test Distance**	3M
Environmental Conditions	Temperature: 20℃ Humidity: 70%	**Tested By**	Steven Lu

ANTENNA POLARITY: VERTICAL							
Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)
133.23	13.56	25.9	39.5	43.5	-4.0	99	332
199.87	15.80	23.7	39.5	43.5	-4.0	99	5
298.65	11.37	19.1	30.5	46.0	-15.5	100	34
399.74	8.24	22.4	30.6	46.0	-15.4	138	19
696.68	4.59	32.0	36.5	46.0	-9.5	111	3
895.70	2.67	35.2	37.9	46.0	-8.1	175	5

ANTENNA POLARITY: HORIZONTAL							
Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)
116.57	13.40	17.9	31.0	43.5	-12.5	177	94
133.20	13.56	23.3	36.9	43.5	-6.6	184	347
199.86	15.80	22.0	37.8	43.5	-5.7	141	131
233.18	13.68	17.6	31.3	46.0	-14.7	155	118
265.47	12.04	17.8	30.0	46.0	-16.0	154	335
299.80	11.37	24.4	35.8	46.0	-10.2	111	5
398.16	8.24	26.7	34.9	46.0	-11.1	105	291
696.69	4.59	29.1	33.7	46.0	-12.3	108	74

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

RF Portion

EUT	2.4GHz Wireless LAN Card	**Model**	WL11000-2-E
Mode	Channel 1	**Detector Function**	Quasi-Peak
Frequency Range	30-1000 MHz	**Test Distance**	3M
Environmental Conditions	Temperature: 20℃ Humidity: 70%	**Tested By**	Steven Lu

ANTENNA POLARITY: Vertical		**Detector Function :**		**6dB Bandwidth : 1MHz**				**Frequency Range : Above 1GHz**			
Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV/m)		Limit (dBuV/m)		Margin (dB)		Antenna Height (cm)	Table Angle (Degree)
		P.K.	A.V.	P.K.	A.V.	P.K.	A.V.	P.K	A.V.		
2037.8	34.57	12.0	-	46.5	-	74.0	54.0	-27.5	-	102	162
*2413.0	36.09	70.0	62.0	106.1	97.6	-	-	-	-	108	354
4075.5	43.10	10.5	-	53.6	-	74.0	54.0	-20.4	-	104	179
4824.1	43.73	7.7	-	51.4	-	74.0	54.0	-22.6	-	104	351

ANTENNA POLARITY: Horizontal		**Detector Function :**		**6dB Bandwidth:1MHz**				**Frequency Range: Above 1GHz**			
Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV/m)		Limit (dBuV/m)		Margin (dB)		Antenna Height (cm)	Table Angle (Degree)
		P.K.	A.V.	P.K.	A.V.	P.K.	A.V.	P.K	A.V.		
2037.8	34.57	14.7	-	49.3	-	74.0	54.0	-24.7	-	123	204
*2413.1	36.09	64.1	56.0	100.2	92.1	-	-	-	-	104	281
4075.4	43.10	10.3	-	53.4	-	74.0	54.0	-20.6	-	104	134
4824.3	43.73	7.1	-	50.8	-	74.0	54.0	-23.2	-	104	338

NOTES:1. Emission level (dBuV/m) = Correction Factor (dB) + Reading value (dBuV).

2. Correction Factor (dB) = Ant. Factor (dB)+Cable loss (dB)
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	2.4GHz Wireless LAN Card	**Model**	WL11000-2-E
Mode	Channel 6	**Detector Function**	Quasi-Peak
Frequency Range	30-1000 MHz	**Test Distance**	3M
Environmental Conditions	Temperature: 20℃ Humidity: 70%	**Tested By**	Steven Lu

ANTENNA POLARITY: Vertical		**Detector Function :**				**6dB Bandwidth:1MHz**				**Frequency Range: Above 1GHz**	
Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV/m)		Limit (dBuV/m)		Margin (dB)		Antenna Height (cm)	Table Angle (Degree)
		P.K.	A.V.	P.K.	A.V.	P.K.	A.V.	P.K	A.V.		
2062.6	34.78	13.0	-	47.8	-	74.0	54.0	-26.2	-	104	264
*2438.1	36.37	69.2	61.3	105.6	97.7	-	-	-	-	101	216
4125.2	42.71	10.6	-	53.3	-	74.0	54.0	-20.7	-	104	186
4874.2	43.75	7.3	-	51.0	-	74.0	54.0	-23.0	-	104	103

ANTENNA POLARITY: Horizontal		**Detector Function :**				**6dB Bandwidth:1MHz.**				**Frequency Range: Above 1GHz.**	
Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV/m)		Limit (dBuV/m)		Margin (dB)		Antenna Height (cm)	Table Angle (Degree)
		P.K.	A.V.	P.K.	A.V.	P.K.	A.V.	P.K	A.V.		
2062.8	34.78	15.4	-	50.2	-	74.0	54.0	-23.8	-	102	222
*2438.3	36.37	60.7	52.0	97.1	88.4	-	-	-	-	102	238
4125.2	42.71	10.8	-	53.5	-	74.0	54.0	-20.5	-	104	131
4874.0	43.75	6.5	-	50.3	-	74.0	54.0	-23.7	-	104	12

NOTES:1. Emission level (dBuV/m) = Correction Factor (dB) + Reading value (dBuV).

2. Correction Factor (dB) = Ant. Factor (dB)+Cable loss (dB)

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	2.4GHz Wireless LAN Card	**Model**	WL11000-2-E
Mode	Channel 11	**Detector Function**	Quasi-Peak
Frequency Range	30-1000 MHz	**Test Distance**	3M
Environmental Conditions	Temperature: 20℃ Humidity: 70%	**Tested By**	Steven Lu

ANTENNA POLARITY: Vertical		**Detector Function :**		**6dB Bandwidth:1MHz.**				**Frequency Range: Above 1GHz**			
Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV/m)		Limit (dBuV/m)		Margin (dB)		Antenna Height (cm)	Table Angle (Degree)
		P.K.	A.V.	P.K.	A.V.	P.K.	A.V.	P.K	A.V.		
2087.8	35.07	12.8	-	47.9	-	74.0	54.0	-26.1	-	99	174
*2463.0	36.44	69.8	62.0	106.2	98.4	-	-	-	-	109	335
4175.6	42.76	12.0	-	54.8	-	74.0	54.0	-20.8	-	108	193
4925.0	43.27	7.4	-	50.7	-	74.0	54.0	-23.3	-	109	98

ANTENNA POLARITY: Horizontal		**Detector Function :**		**6dB Bandwidth:1MHz.**				**Frequency Range: Above 1GHz**			
Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV/m)		Limit (dBuV/m)		Margin (dB)		Antenna Height (cm)	Table Angle (Degree)
		P.K.	A.V.	P.K.	A.V.	P.K.	A.V.	P.K	A.V.		
2088.0	35.07	14.9	-	50.0	-	74.0	54.0	-24.0	-	99	293
*2463.0	36.44	62.0	54.0	98.4	90.4	-	-	-	-	99	182
4175.3	42.76	10.4	-	52.8	-	74.0	54.0	-21.2	-	99	234
4924.0	43.27	6.5	-	49.8	-	74.0	54.0	-24.2	-	99	109

NOTES: 1. Emission level (dBuV/m) = Correction Factor (dB) + Reading value (dBuV).
2. Correction Factor (dB) = Ant. Factor (dB)+Cable loss (dB)
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 Limit of 6dB Bandwidth Measurement is 0.5 MHz.

4.3.2 TEST INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
ROHDE & SCHWARZ TEST RECEIVER	ESMI	846839/018 848926/005	Mar. 03, 2001
HP ATTENUATOR	8496B	3247A18505	Cal. on use
HP PLOTTER	7475A	2641V27755	N/A

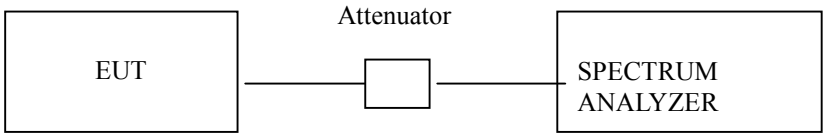
NOTE: 1. The measurement uncertainty is less than +/- 2.6dB, which is calculated as per the NAMAS document NIS81.

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



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

4.3.5 EUT OPERATING CONDITION

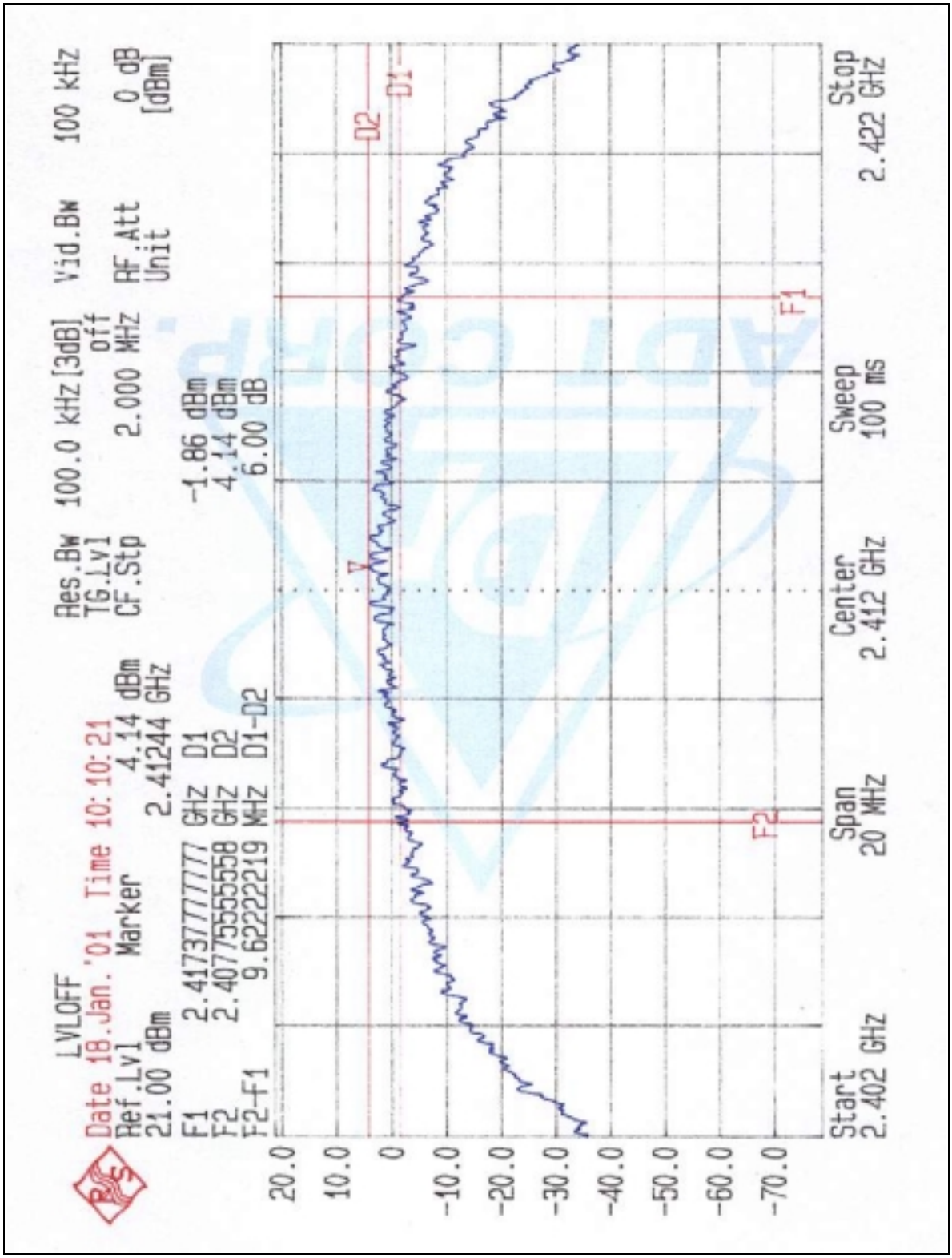
The software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel frequencies individually.

4.3.6 TEST RESULTS

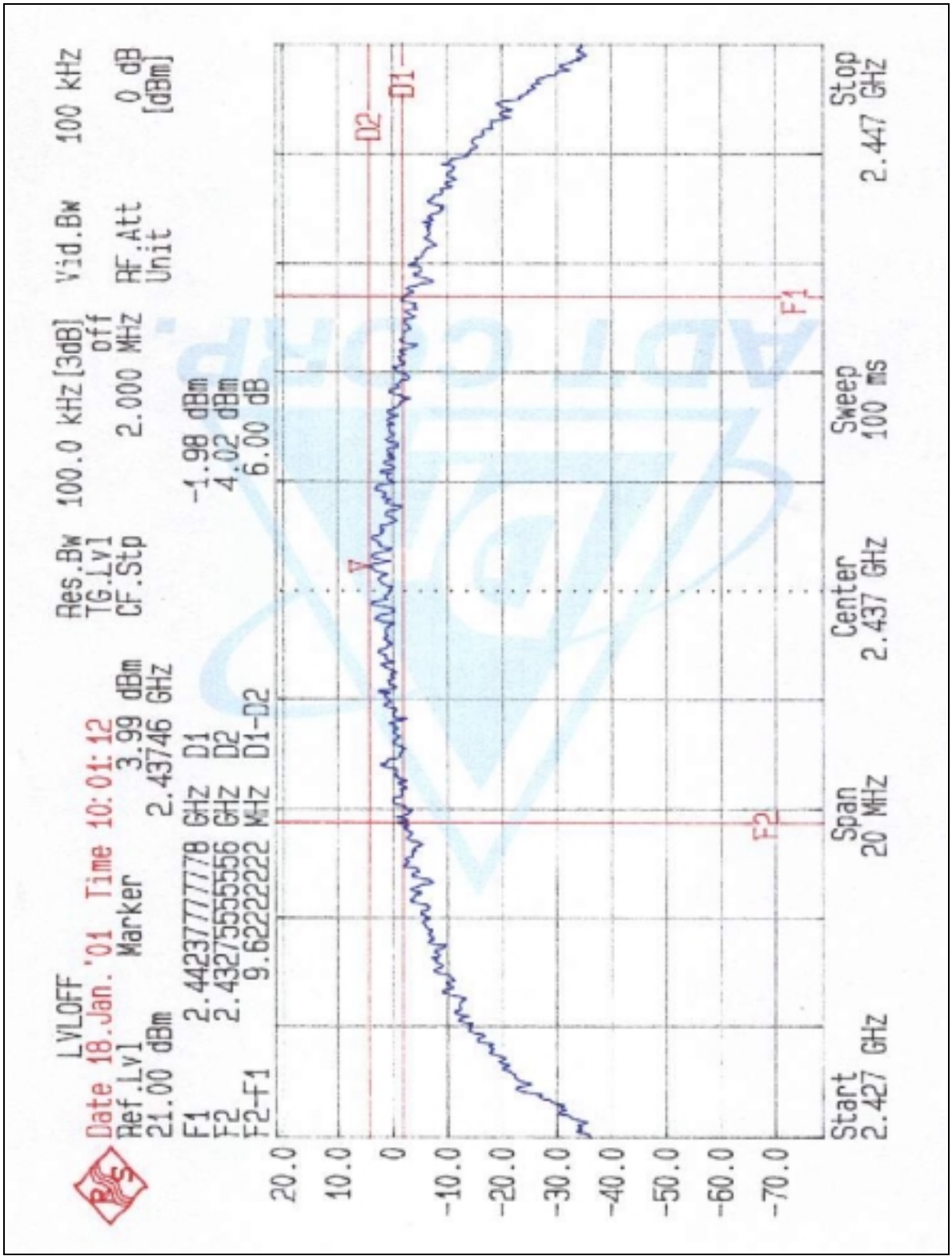
EUT	2.4GHz Wireless LAN Card	**Model**	WL11000-2-E
Environmental Conditions	Temperature:20℃ Humidity:70%	**Tested By**	Steven Lu

CHANNEL	CHANNEL FREQUENCY (MHz)	6 dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS/FAIL
1	2412	9.62	0.5	PASS
6	2437	9.62	0.5	PASS
11	2462	8.62	0.5	PASS

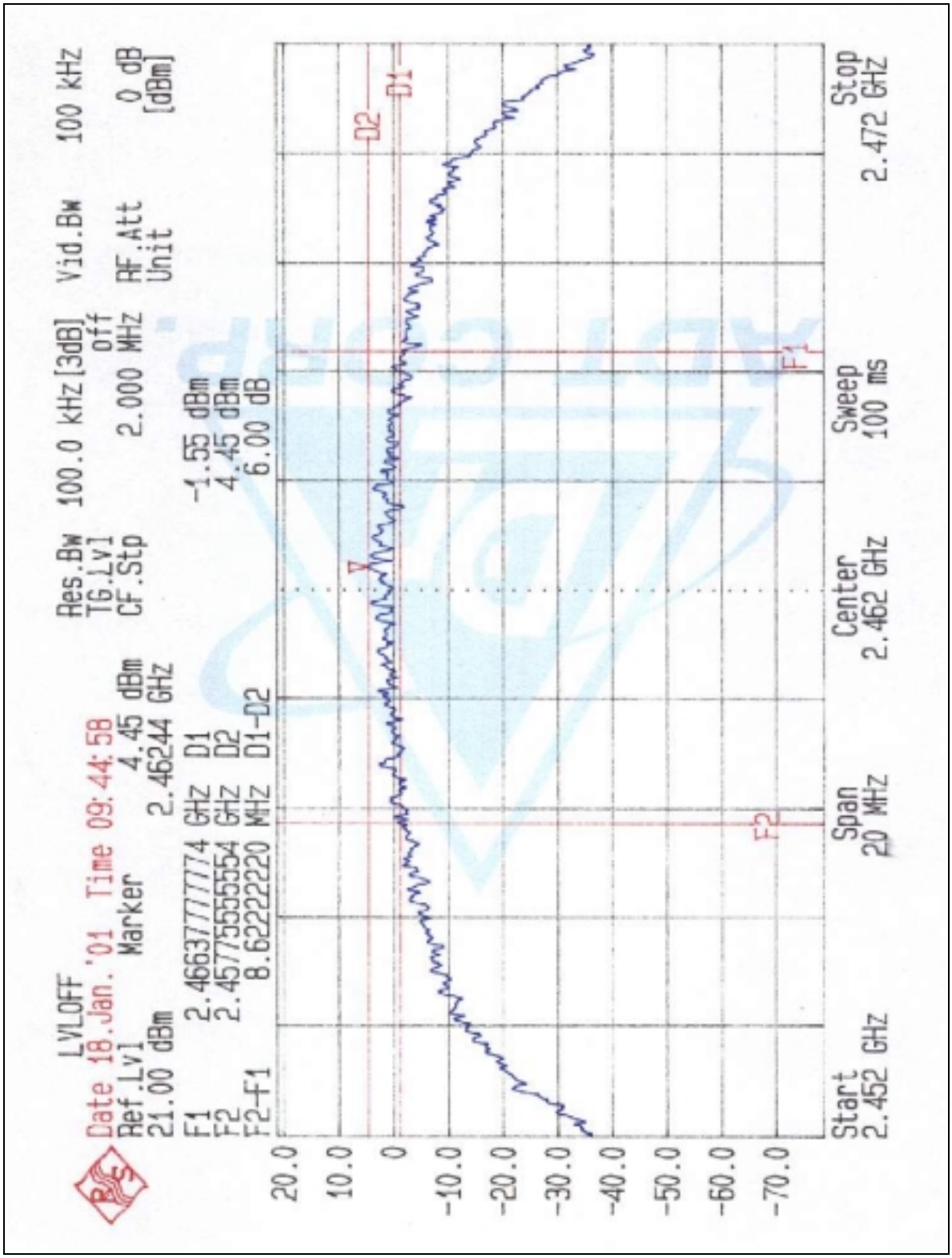
CH1


LVLOFF
Date 18.Jan.'01 Time 10:10:21
Ref.Lvl
21.00 dBm
Marker
4.14 dBm
2.41244 GHz
F1 2.417377777 GHz D1 -1.86 dBm
F2 2.407755558 GHz D2 4.14 dBm
F2-F1 9.62222219 MHz D1-D2 6.00 dB
Res.Bw 100.0 kHz [3dB]
TG.Lvl off
CF.Stp 2.000 MHz
Vid.Bw 100 kHz
RF.Att 0 dB
Unit [dBm]
Start 2.402 GHz
Span 20 MHz
Center 2.412 GHz
Sweep 100 ms
Stop 2.422 GHz
D1
D2
F1
F2
20.0
10.0
0
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0

CH6


LVLOFF
Date 18.Jan.'01 Time 10:01:12
Ref.Lvl
21.00 dBm
Marker
F1 2.442377777778 GHz D1 3.99 dBm
F2 2.432755555556 GHz D2 2.43746 GHz
F2-F1 9.622222222 MHz D1-D2
Res.Bw 100.0 kHz[3dB]
TG.Lvl off
CF.Stp 2.000 MHz
-1.98 dBm
4.02 dBm
6.00 dB
Vid.Bw 100 kHz
RF.Att 0 dB
Unit [dBm]
D1
D2
F1
F2
20.0
10.0
0
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
Start 2.427 GHz
Span 20 MHz
Center 2.437 GHz
Sweep 100 ms
Stop 2.447 GHz

CH11


LVLOFF
Date 18.Jan. '01 Time 09:44:58
Ref.Lvl
21.00 dBm
Marker
F1 2.46637777774 GHz D1 4.45 dBm
F2 2.45755555554 GHz D2 2.46244 GHz
F2-F1 8.62222220 MHz D1-D2
Res.Bw 100.0 kHz[3dB] Vid.Bw 100 kHz
T6.Lvl off 0 dB
CF.Stp 2.000 MHz RF.Att [dBm]
Unit
-1.55 dBm
4.45 dBm
6.00 dB
Start 2.452 GHz
Span 20 MHz
Center 2.462 GHz
Sweep 100 ms
Stop 2.472 GHz
D1
D2
F1
F2
20.0
10.0
0
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0

4.4 MAXIMUM PEAK OUTPUT POWER

4.4.1 LIMITS OF MAXIMUM PEAK OUTPUT POWER MEASUREMENT

The Limit of Maximum Peak Output Power Measurement is 30dBm.

4.4.2 INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
HP SPECTRUM ANALYZER	8593E	3926A04191	Mar. 03, 2001
HP ATTENUATOR	8496B	3247A18505	Cal. on use
HP PLOTTER	7475A	2641V27755	N/A

NOTE: 1. The measurement uncertainty is less than +/- 2.6dB, which is calculated as per the NAMAS document NIS81.

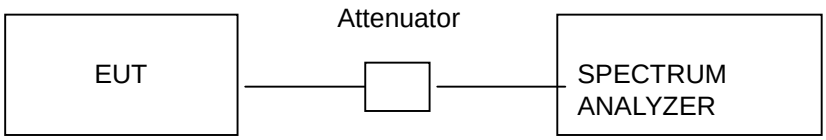
2. The calibration interval of the above test instruments is 12 months. And the calibrations are traceable to NML/ROC and NIST/USA.

4.4.3 TEST PROCEDURES

1. The transmitter output was connected to the spectrum analyzer through an attenuator.
2. The center frequency of the spectrum analyzer is set to the fundamental frequency and using 3 MHz RBW and 3 MHz VBW.
3. The span of the spectrum analyzer should be larger than 6dB BandWidth plus 10MHz.
4. Use Peak Search to read the peak power after Maximum Hold function is activated.
5. Shift the marker to +/- 3MHz and +/-6MHz, and record the reading.
6. The Maximum Peak Output Power is the linear summation of the 5 readings in (4) and (5).

Note: This measurement is the total power of 15MHz bandwidth which is far more wider than 6dB bandwidth.

4.4.4 TEST SETUP



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

4.4.5 EUT OPERATING CONDITION

The software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel frequencies individually.

4.4.6 TEST RESULTS

Output Power Into Antenna:

EUT	2.4GHz Wireless LAN Card	**Model**	WL11000-2-E
Environmental Conditions	Temperature:20℃ Humidity:60%	**Tested By**	Steven Lu

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER OUTPUT (dBm)	PEAK POWER LIMIT (dBm)	PASS/FAIL
1	2412	15.04	30	PASS
6	2437	15.44	30	PASS
11	2462	15.06	30	PASS

4.5 POWER SPECTRAL DENSITY MEASUREMENT

4.5.1 LIMITS OF POWER SPECTRAL DENSITY MEASUREMENT

The Limit of Power Spectral Density Measurement is 8dBm.

4.5.2 TEST INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
ROHDE & SCHWARZ TEST RECEIVER	ESMI	846839/018 848926/005	Mar. 03, 2001
HP ATTENUATOR	8496B	3247A18505	Cal. on use
HP PLOTTER	7475A	2641V27755	N/A

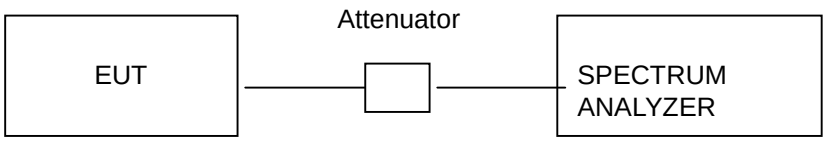
NOTE: 1. The measurement uncertainty is less than +/- 2.6dB, which is calculated as per the NAMAS document NIS81.

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/3kHz. The power spectral density was measured and recorded.
The sweep time is allowed to be longer than span/3KHz for a full response of the mixer in the spectrum analyzer.

4.5.4 TEST SETUP



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

4.5.5 EUT OPERATING CONDITION

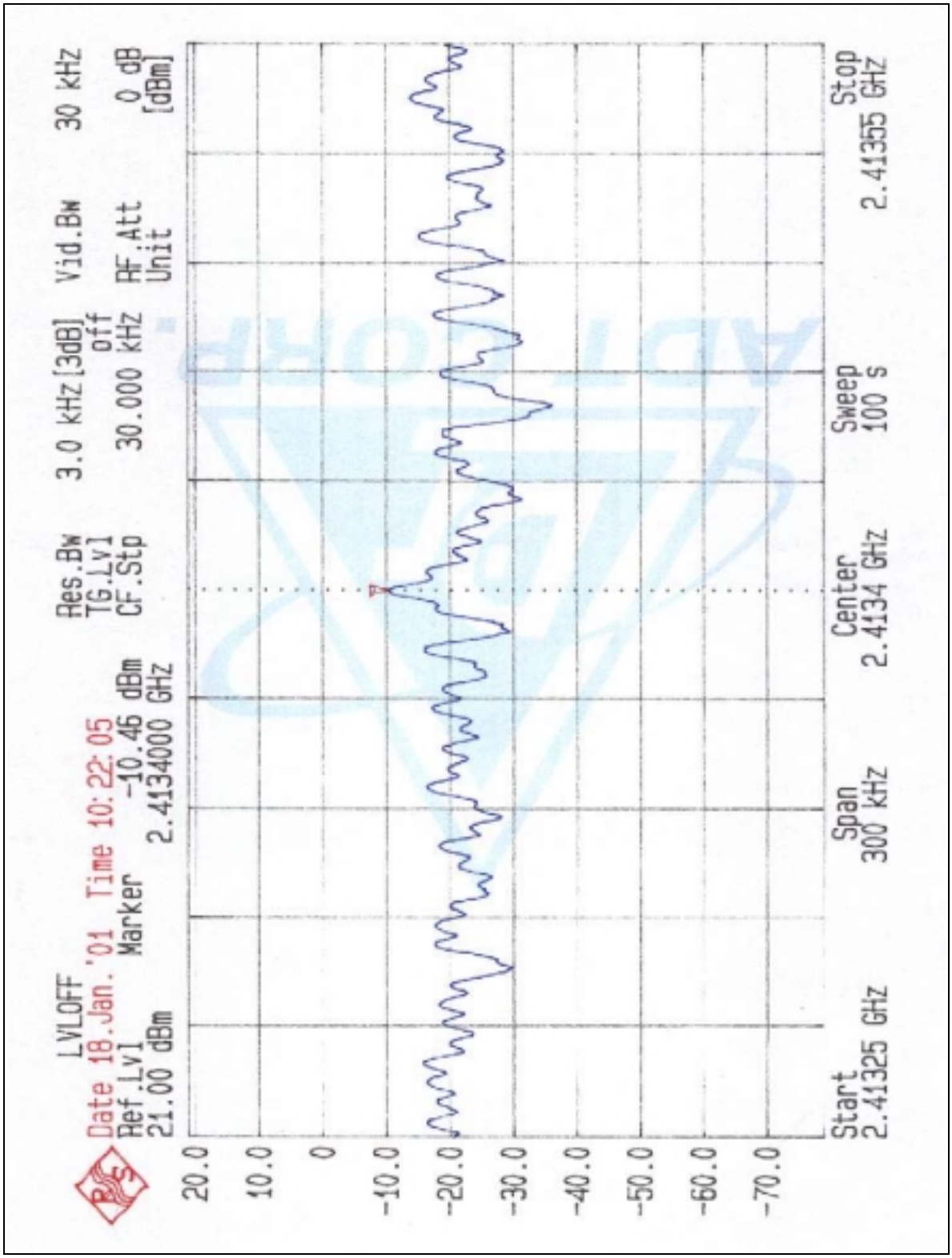
The software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel frequencies individually.

4.5.6 TEST RESULTS

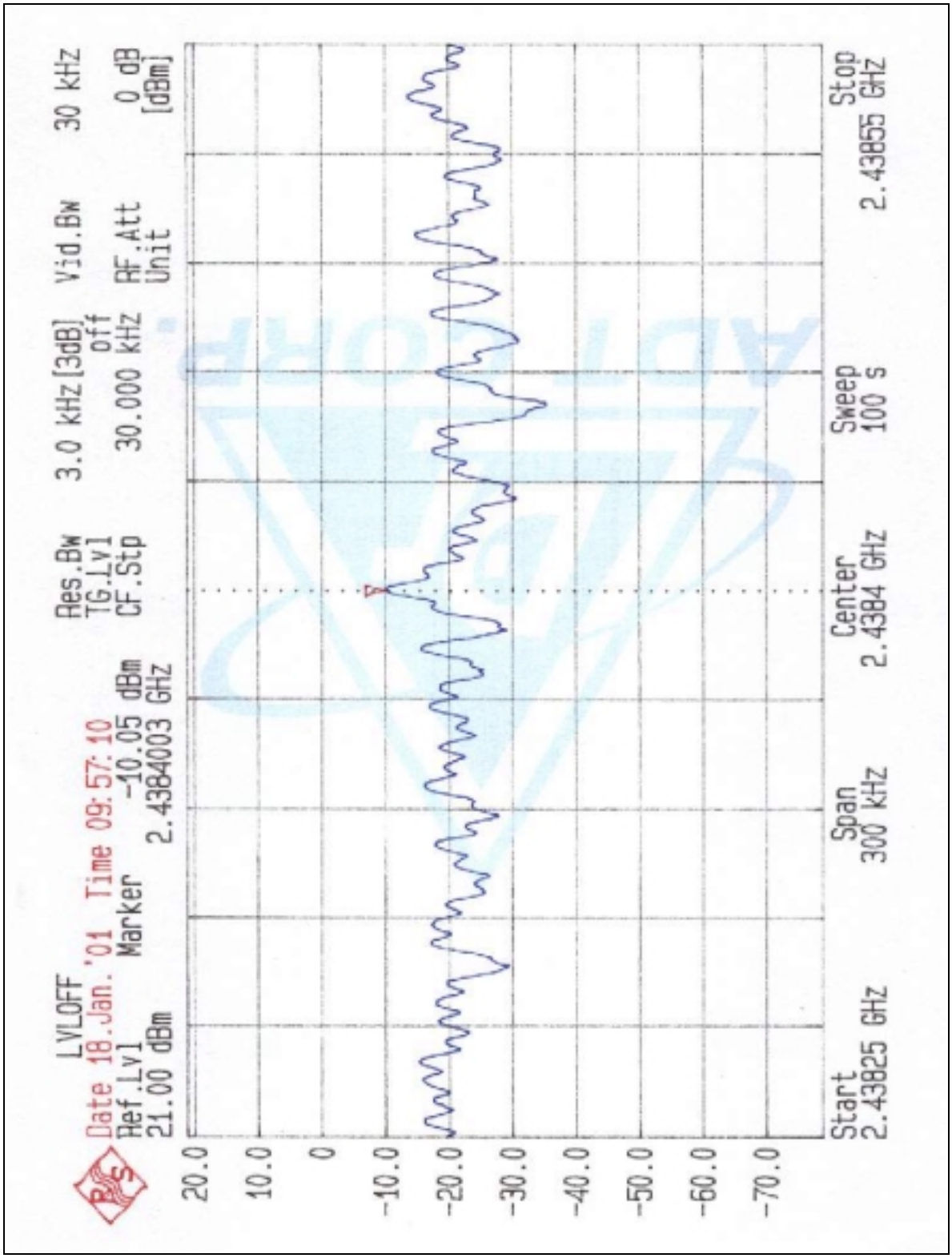
EUT	2.4GHz Wireless LAN Card	**Model**	WL11000-2-E
Environmental Conditions	Temperature:20℃ Humidity:70%	**Tested By**	Steven Lu

CHANNEL NUMBER	CHANNEL FREQUENCY (MHz)	RF POWER LEVEL IN 3 KHz BW (dBm)	MAXIMUM LIMIT (dBm)	PASS/FAIL
1	2412	-10.46	8	PASS
6	2437	-10.05	8	PASS
11	2462	-10.69	8	PASS

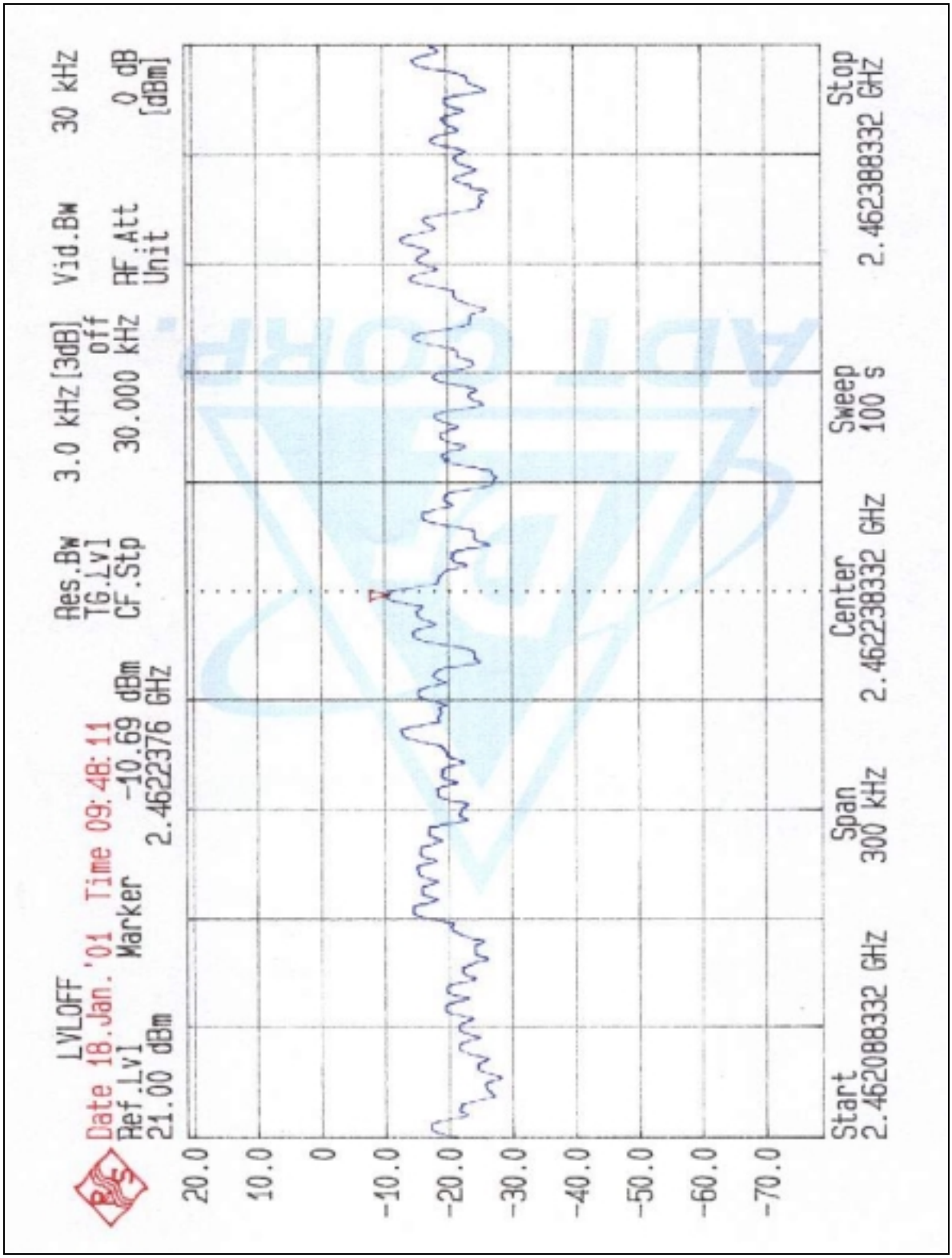
CH1


LVLOFF
Date 18.Jan. '01 Time 10:22:05
Ref.Lvl
21.00 dBm
Marker
-10.46 dBm
2.4134000 GHz
Res.Bw 3.0 kHz
TG.Lvl
CF.Stp
3.0 kHz [3dB]
off
30.000 kHz
Vid.Bw 30 kHz
RF.Att 0 dB
Unit [dBm]
Start
2.41325 GHz
Span
300 kHz
Center
2.4134 GHz
Sweep
100 s
Stop
2.41355 GHz
20.0
10.0
0
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0

CH6


LVLOFF
Date 18.Jan. '01 Time 09:57:10
Ref.Lvl
21.00 dBm
Marker
-10.05 dBm
2.4384003 GHz
Res.Bw 3.0 kHz
TG.Lvl
CF.Stp
3.0 kHz [3dB]
off
30.000 kHz
Vid.Bw 30 kHz
RF.Att 0 dB
Unit [dBm]
Start
2.43825 GHz
Span
300 kHz
Center
2.4384 GHz
Sweep
100 s
Stop
2.43855 GHz
20.0
10.0
0
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0

CH11


LVLOFF
Date 18.Jan.'01 Time 09:48:11
Ref.Lvl
21.00 dBm
Marker
-10.69 dBm
2.4622376 GHz
Res.Bw 3.0 kHz
T6.Lvl
CF.Stp
30.000 kHz
Vid.Bw 30 kHz
RF.Att 0 dB
Unit [dBm]
Start
2.46208332 GHz
Span
300 kHz
Center
2.46238332 GHz
Sweep
100 s
Stop
2.46388332 GHz
20.0
10.0
0
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0

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 RB).

4.6.2 TEST INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
ROHDE & SCHWARZ TEST RECEIVER	ESMI	848926/005 846839/018	Dec 03, 2001
HP ATTENUATOR	8496B	3247A18505	Cal. on use
HP PLOTTER	7475A	2641V27755	N/A

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

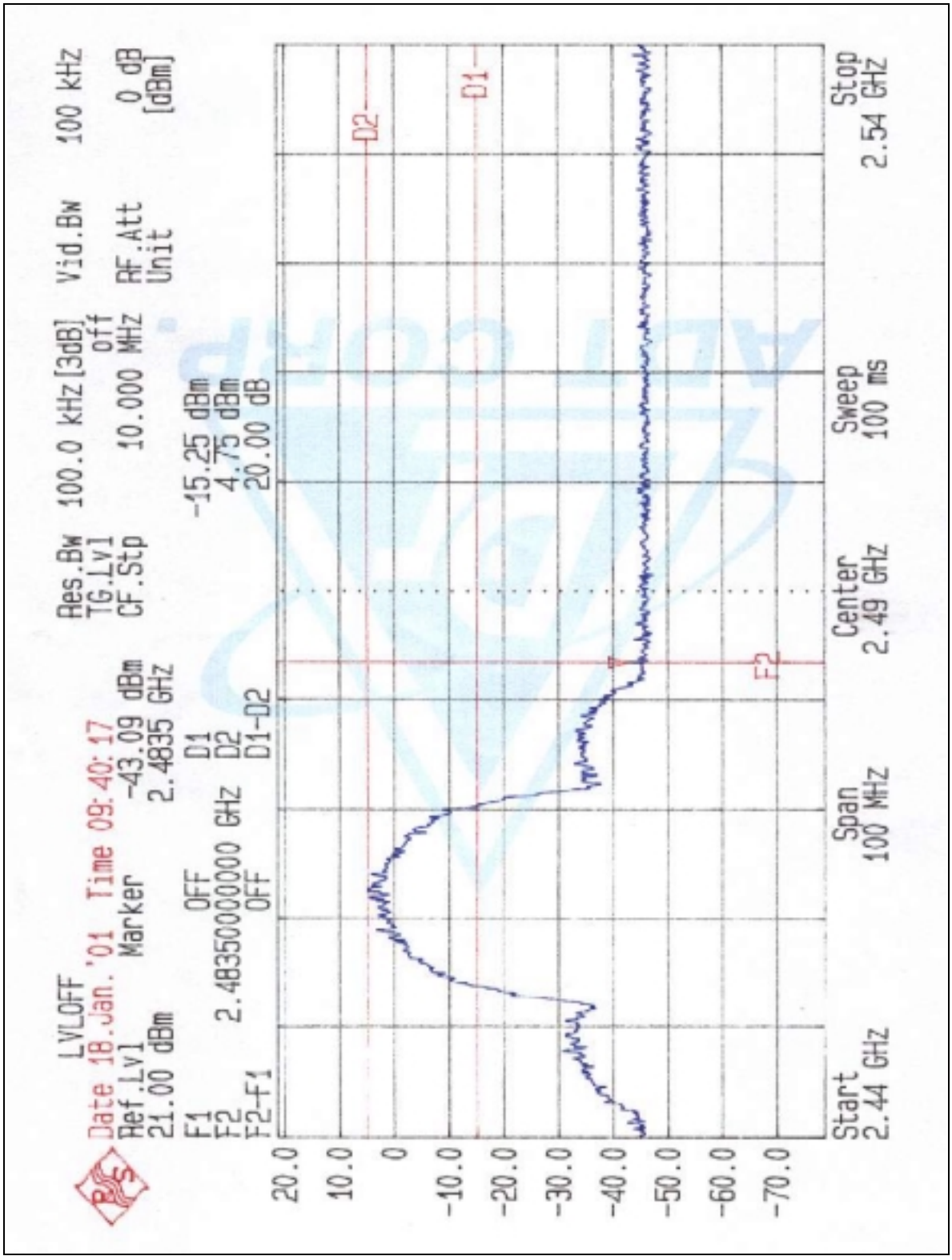
The transmitter output was connected to the spectrum analyzer via a low lose cable. Set both RBW and VBW of spectrum analyzer to 100 kHz with suitable frequency span including 100 kHz bandwidth from band edge. The band edges was measured and recorded.

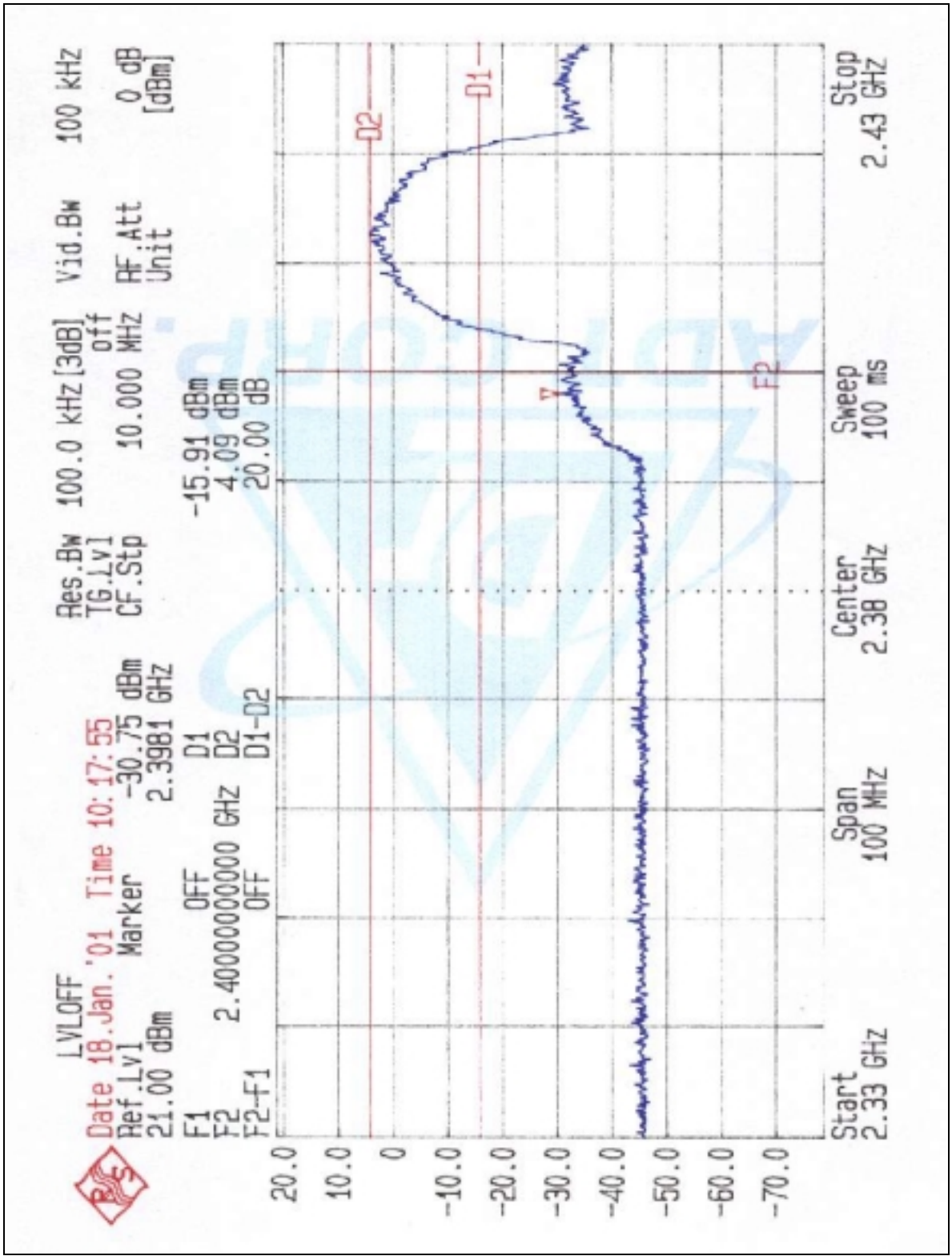
4.6.4 EUT OPERATING CONDITION

The software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel frequencies individually.

4.6.5 TEST RESULTS

The spectrum plots are attached below. 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).


LVLOFF
Date 18.Jan. '01 Time 09:40:17
Ref.Lvl
21.00 dBm
Marker
F1
F2
F2-F1
OFF
2.4835000000 GHz
OFF
-43.09 dBm
2.4835 GHz
D1
D2
D1-D2
Res.Bw 100.0 kHz [3dB]
TG.Lvl off
CF.Stp 10.000 MHz
-15.25 dBm
4.75 dBm
20.00 dB
Vid.Bw 100 kHz
RF.Att 0 dB
Unit [dBm]
D2
D1
F2
20.0
10.0
0
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
Start
2.44 GHz
Span
100 MHz
Center
2.49 GHz
Sweep
100 ms
Stop
2.54 GHz


LVLOFF
Date 18.Jan. '01 Time 10:17:55
Ref.Lvl
21.00 dBm
Marker
F1
F2
F2-F1
2.400000000 GHz
OFF
OFF
-30.75 dBm
2.3981 GHz
D1
D2
D1-D2
Res.Bw 100.0 kHz[3dB]
TG.Lvl off
CF.Stp 10.000 MHz
-15.91 dBm
4.09 dBm
20.00 dB
Vid.Bw 100 kHz
RF.Att 0 dB
Unit [dBm]
D2
D1
T
F2
20.0
10.0
0
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
Start
2.33 GHz
Span
100 MHz
Center
2.38 GHz
Sweep
100 ms
Stop
2.43 GHz

4.6.6 NOTE ON BAND EDGE EMISSION

The band edge emission plot on page 42. shows 47dB delta between carrier maximum power and local maximum emission in restrict band (2.4835GHz). The emission of carrier strength list in table of page 24 is 98.4dB μ V/m, so the maximum field strength in restrict band is 98.4-47=51.4 dB μ V/m which is under 54 dB μ V/m limit.