FCC TEST REPORT

REPORT NO.: RF90031521
MODEL NO.: WX-2211
RECEIVED: March 15, 2001
TESTED: March 26, 2001

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: 13-1, Lane 19, Wen Shan 3rd St., Kweishan,
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Accredited Laboratory

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1 CERTIFICATION

PRODUCT :	Wireless SOHO Router
BRAND NAME :	GemTek
MODEL NO. :	WX-2211
APPLICANT :	GemTek Technology Co., Ltd.
OEM BRAND HOLDER :	D-Link Corporation
OEM MODEL NO. :	DI-711
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 WX-2211, of the designation has been tested in our facility on March 26, 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: Mar. 28, 2001
Steven Lu

Prepared by : Demi Chen, Date: Mar. 28, 2001
Demi Chen

Approved by : Alan Lane, Date: Mar. 28, 2001
Mr. Alan Lane, Manager

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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 –10.40dBuV At 0.49800 MHz
15.247(a)(2)	Spectrum Bandwidth of a Direct Sequence Spread Spectrum System Spec.: min. 500 kHz	Yes	9.38 MHz > 500 kHz
15.247(b)	Maximum Peak Output Power Spec.: max. 30 dBm	Yes	17.18 dBm < 30 dBm
15.247(c)	Transmitter Radiated Emissions Spec.: Table 15.209	Yes	Minimum passing margin is –7.1 dBuV At 150.00 MHz
15.247(d)	Power Spectral Density Spec.: max. 8dBm	Yes	-13.33 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	Wireless SOHO Router
MODEL NO.	WX-2211
POWER SUPPLY	5VDC from AC Adapter
DATA CABLE	NA
BANDWIDTH OF EACH CHANNEL	5MHz
MODULATION TYPE	CCK, BPSK, QPSK
RADIO TECHNOLOGY	DSSS
TRANSFER RATE	1/2/5.5/11Mbps
FREQUENCY RANGE	2412MHz ~ 2462MHz
NUMBER OF CHANNEL	11
OUTPUT POWER	15dBm
ANTENNA TYPE	Dual monopole
ASSOCIATED DEVICES	NA
DESCRIPTION OF MODELS	

3.2 DESCRIPTION OF TEST MODES

1.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		

2.The EUT was operated with following power adapter:

Brand :	Hitron
Model No. :	HES10-05020-0-1
Input power :	100-240V, 20-40VA, 50/60Hz
Output power :	5V, 2A

3.3 GENERAL DESCRIPTION OF APPLIED STANDARDS

The EUT is a Wireless SOHO Router, 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.	FCC ID
1	Personal Computer	IBM	2187-12W	1S218714ABN A000V	-
2	MONITOR	ADI	937G	649015T001020 93A	BR8937G
3	PS/2 KEYBOARD	FORWARD	FDA-104GA	FDKB8110114	F4ZDA-104G
4	Mouse	Logitech	M-S43	LZE00703157	DZL211106
5	PRINTER	HP	2225C+	3123S97230	DSI6XU2225
6	MODEM	ACEEX	1414	980020503	IFAXDM1414
7	Notebook Computer	TECHNICL	SN386L/25	93030021	HFSPK3
8	10/100LAN CARDBUS	3COM	3CXFE575BT	10CN15G92F14	FCCDoC APPROVED

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	NA
2	1.8 m braid shielded wire, terminated with VGA connector via metallic frame, w/o core.
3	1.5 m foil shielded wire, terminated with PS/2 connector via metallic frame, w/o core.
4	1.5 m foil shielded wire, terminated with PS2 connector via drain wire, w/o core.
5	1.2m braid shielded wire, terminated with DB25 and Centronics connector via metallic frame, w/o core.
6	1.2 m braid shielded wire, terminated with DB25 and DB9 connector via metallic frame, w/o core.
7	NA
8	NA

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

4 TEST PROCEDURES AND TEST 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	ESHS30	828109/007	July 6, 2001
ROHDE & SCHWARZ Artificial Mains Network (for EUT)	ESH3-Z5	839135/006	July 9, 2001
ROHDE & SCHWARZ 4-wire ISN	ENY41	837032/016	Nov. 28, 2001
ROHDE & SCHWARZ 2-wire ISN	ENY22	837497/016	Dec. 3, 2001
EMCO-L.I.S.N. (for peripheral)	3825/2	9204-1964	July 9, 2001
Software	Cond-V2e	NA	NA
RF cable (JYEBAO)	RG-58A/U	Cable-C02.01	July 9, 2001
HP Terminator (For EMCO LISN)	11593A	E1-01-298	Feb. 20, 2002
HP Terminator (For EMCO LISN)	11593A	E1-01-299	Feb. 20, 2002
Shielded Room	Site 2	ADT-C02	NA
VCCI Site Registration No.	Site 2	C-240	NA

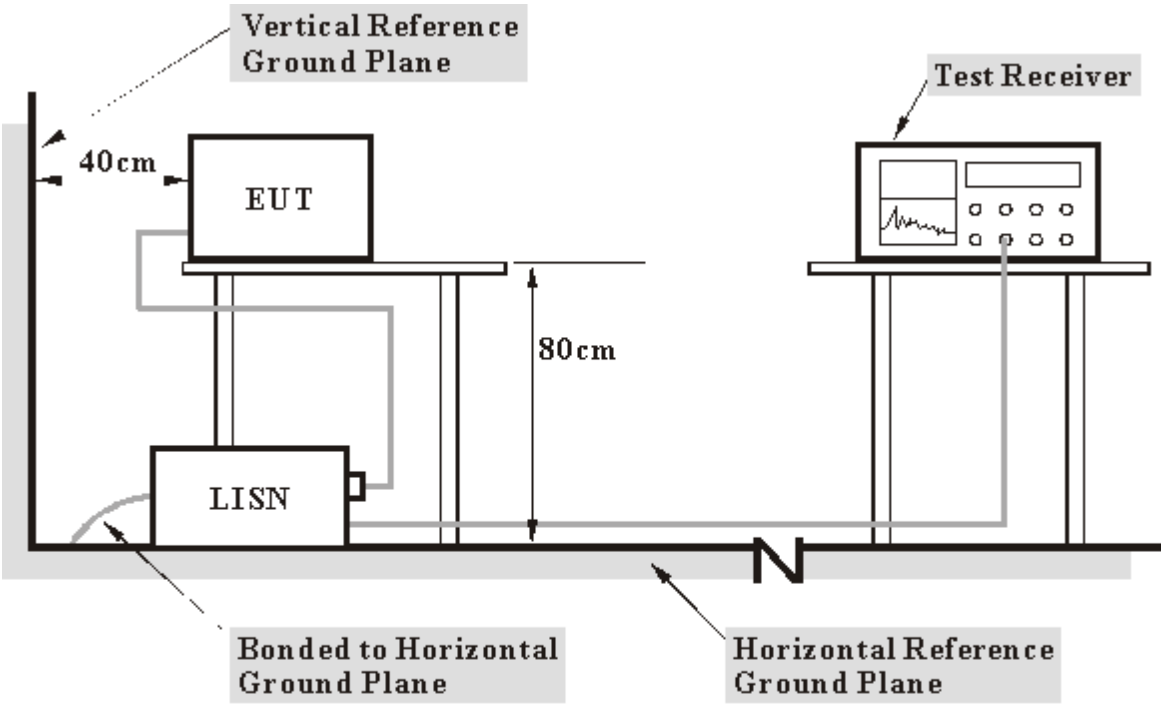
Notes:

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



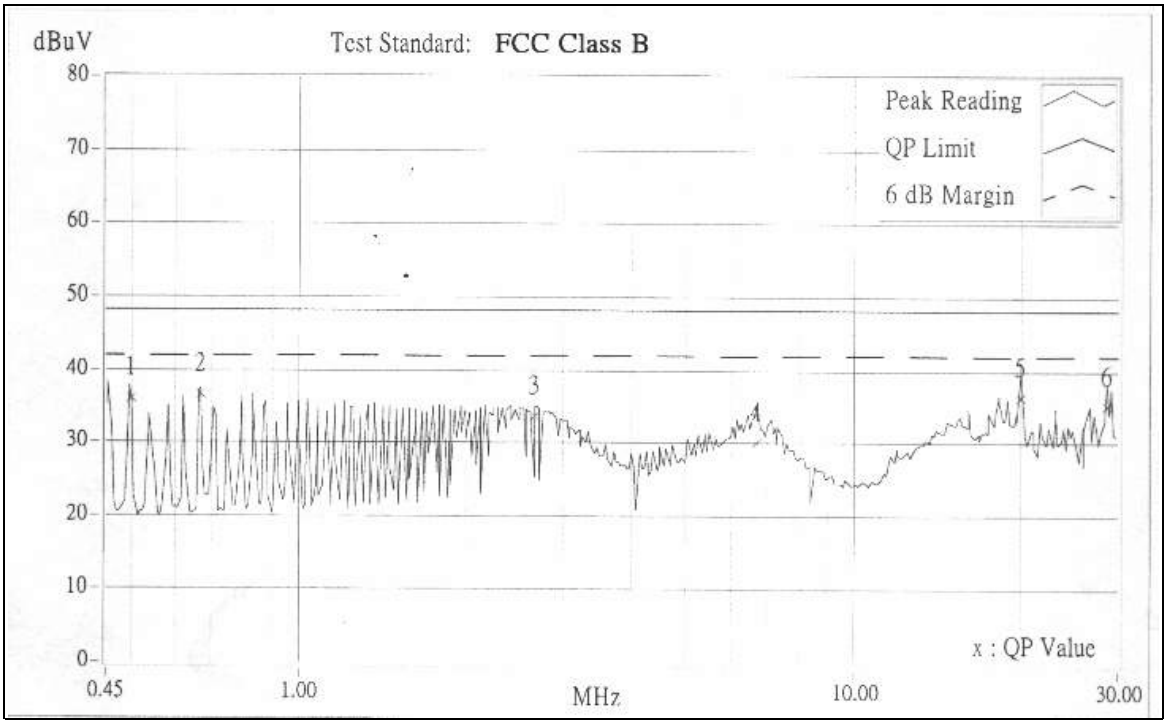
Note: 1. Support units were connected to second LISN.
2. Both of LISNs (AMN) 80 cm from EUT and at the least 80 cm from other units and other metal planes support units.

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

EUT	Wireless SOHO Router	**Model**	WX-2211
Channel	Channel 1	**Phase**	L
Environmental Conditions	24℃, 70%RH	**Tested By**	Steven Lu

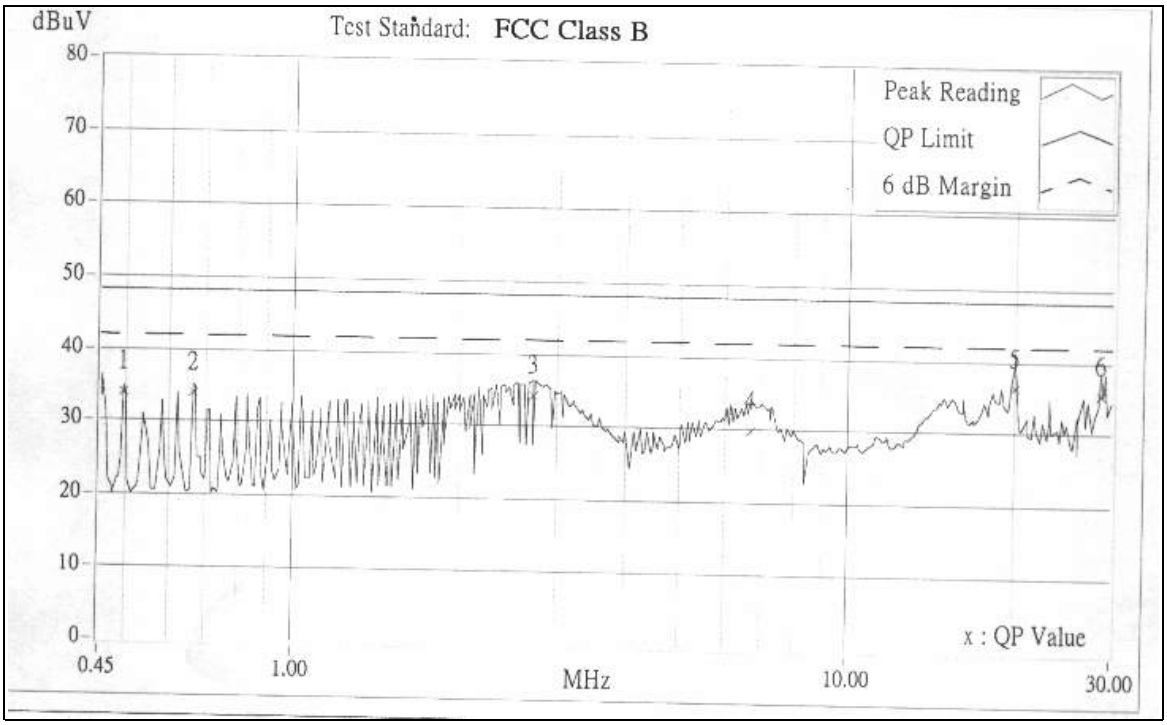
No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.50055	0.20	35.97	-	36.17	-	48.00	-	-11.83	-
2	0.66600	0.20	36.47	-	36.67	-	48.00	-	-11.33	-
3	2.66100	0.27	33.52	-	33.79	-	48.00	-	-14.21	-
4	6.68900	0.53	30.18	-	30.71	-	48.00	-	-17.29	-
5	19.99700	1.10	36.33	-	37.43	-	48.00	-	-10.57	-
6	28.68500	1.55	35.25	-	36.80	-	48.00	-	-11.52	-



Remarks:
1. "*": Undetectable
2. Q.P. 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 SOHO Router	**Model**	WX-2211
Channel	Channel 1	**Phase**	N
Environmental Conditions	24℃, 70%RH	**Tested By**	Steven Lu

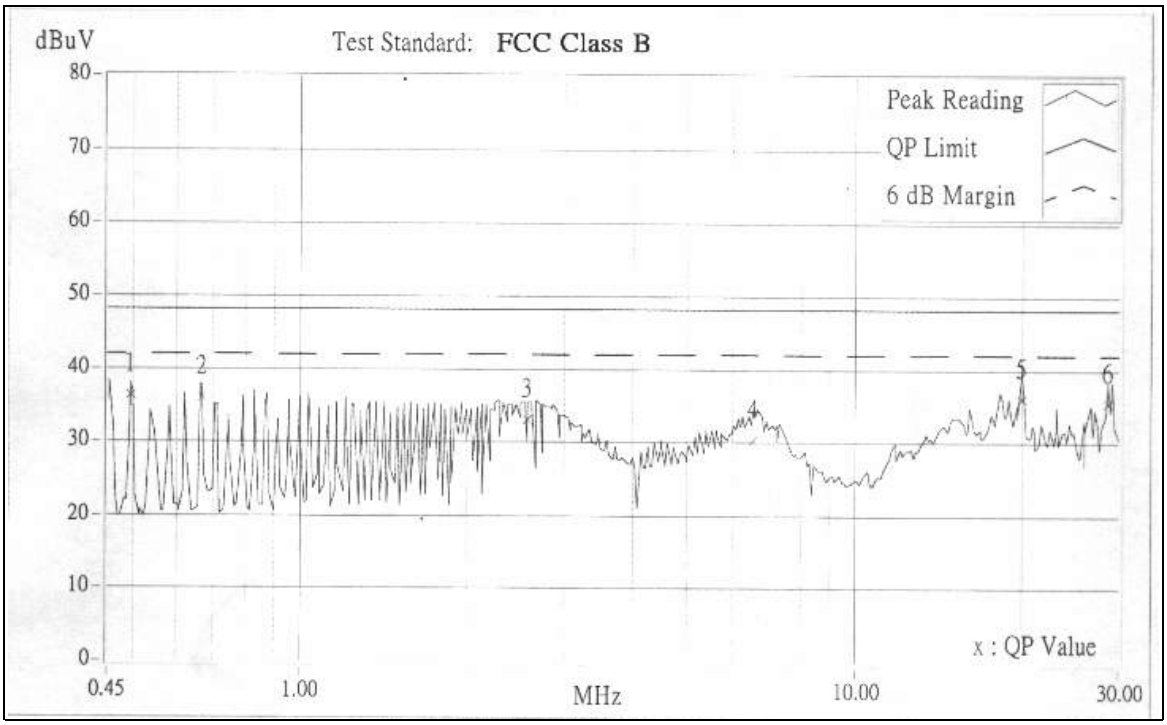
No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.49800	0.20	33.83	-	34.03	-	48.00	-	-13.97	-
2	0.66406	0.20	33.87	-	34.07	-	48.00	-	-13.93	-
3	2.70478	0.27	34.36	-	34.63	-	48.00	-	-13.37	-
4	6.68905	0.49	29.76	-	30.25	-	48.00	-	-17.75	-
5	19.99700	1.00	36.23	-	37.23	-	48.00	-	-10.77	-
6	28.68500	1.37	35.33	-	36.70	-	48.00	-	-11.30	-



Remarks:
1. "*": Undetectable
2. Q.P. 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 SOHO Router	**Model**	WX-2211
Channel	Channel 6	**Phase**	L
Environmental Conditions	24℃, 70%RH	**Tested By**	Steven Lu

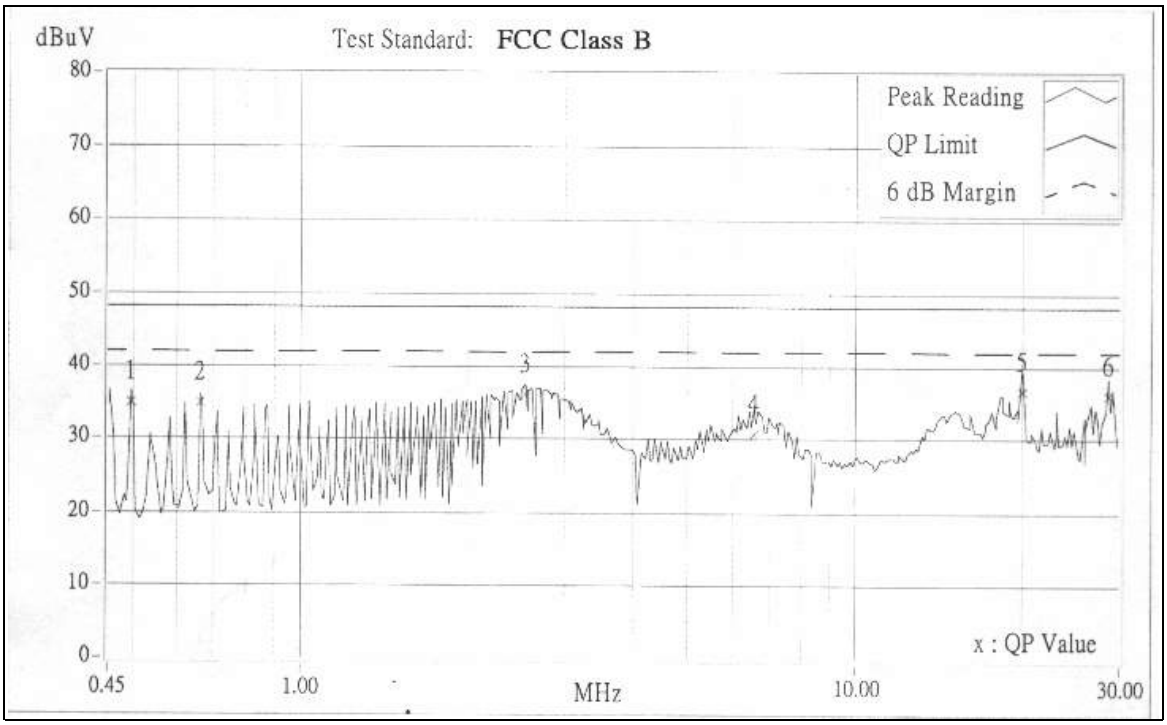
No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.49800	0.20	36.33	-	36.53	-	48.00	-	-11.47	-
2	0.66600	0.20	35.95	-	36.15	-	48.00	-	-11.85	-
3	2.57700	0.26	33.03	-	33.29	-	48.00	-	-14.71	-
4	6.56600	0.53	30.33	-	30.86	-	48.00	-	-17.14	-
5	19.99700	1.10	36.09	-	37.19	-	48.00	-	-10.81	-
6	28.68500	1.55	35.57	-	37.12	-	48.00	-	-10.88	-



Remarks:
1. "*": Undetectable
2. Q.P. 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 SOHO Router	**Model**	WX-2211
Channel	Channel 6	**Phase**	N
Environmental Conditions	24℃, 70%RH	**Tested By**	Steven Lu

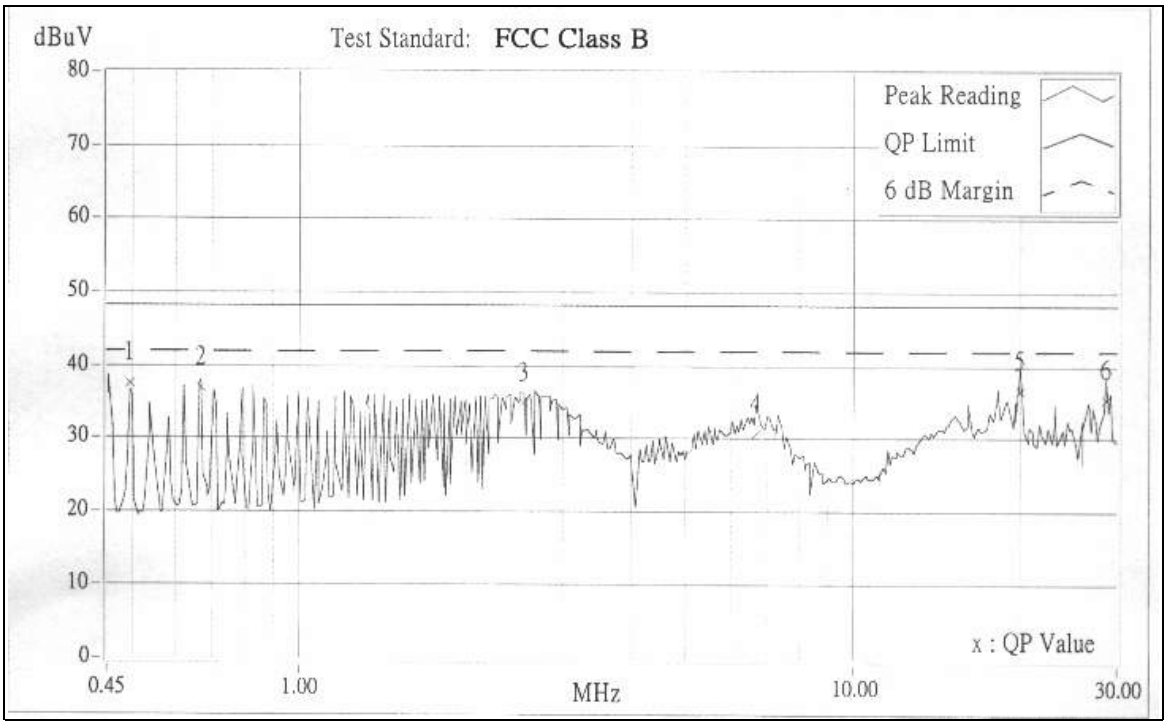
No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.49800	0.20	34.90	-	35.10	-	48.00	-	-12.90	-
2	0.66300	0.20	34.87	-	35.07	-	48.00	-	-12.93	-
3	2.53500	0.25	35.93	-	36.18	-	48.00	-	-11.82	-
4	6.56600	0.49	30.83	-	31.32	-	48.00	-	-16.68	-
5	19.99700	1.00	36.47	-	37.47	-	48.00	-	-10.53	-
6	28.68500	1.37	35.99	-	37.36	-	48.00	-	-10.64	-



Remarks:
1. "*": Undetectable
2. Q.P. 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 SOHO Router	**Model**	WX-2211
Channel	Channel 11	**Phase**	L
Environmental Conditions	24℃, 70%RH	**Tested By**	Steven Lu

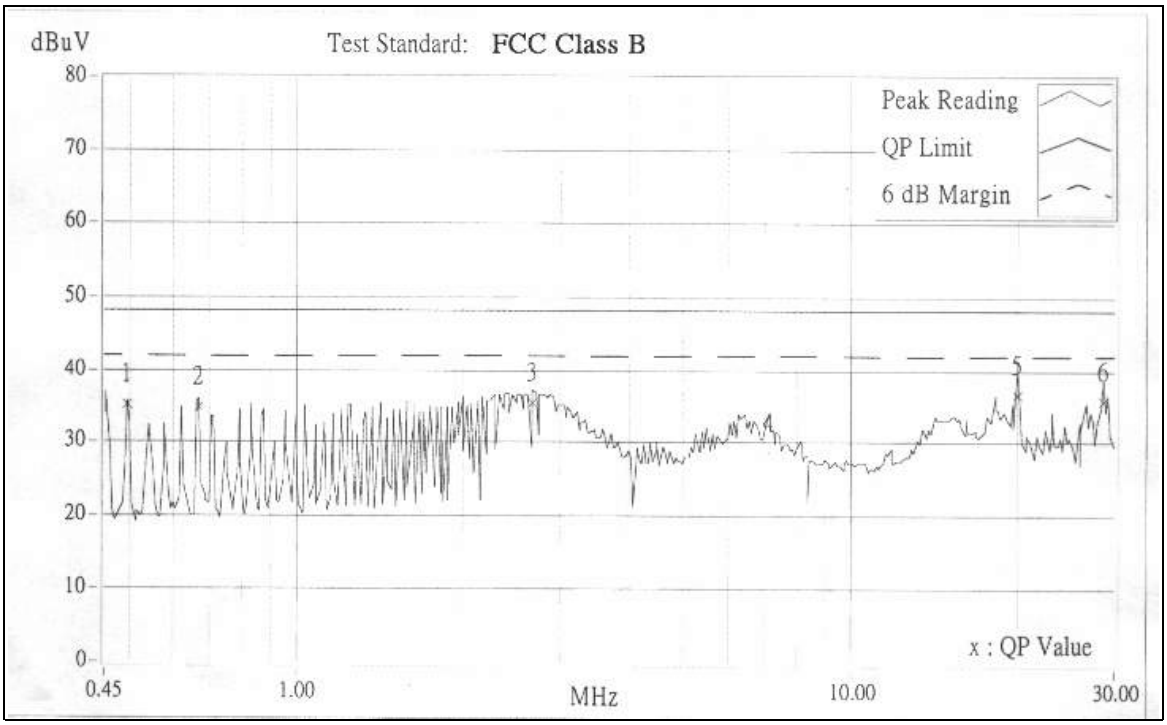
No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.49800	0.20	37.40	-	37.60	-	48.00	-	-10.40	-
2	0.66600	0.20	37.02	-	37.22	-	48.00	-	-10.78	-
3	2.53500	0.25	34.83	-	35.08	-	48.00	-	-12.92	-
4	6.68600	0.53	30.80	-	31.33	-	48.00	-	-16.67	-
5	19.99700	1.10	36.49	-	37.59	-	48.00	-	-10.41	-
6	28.68500	1.55	35.29	-	36.84	-	48.00	-	-11.16	-



Remarks:
1. "*": Undetectable
2. Q.P. 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 SOHO Router	**Model**	WX-2211
Channel	Channel 11	**Phase**	N
Environmental Conditions	24℃, 70%RH	**Tested By**	Steven Lu

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.49800	0.20	35.03	-	35.23	-	48.00	-	-12.77	-
2	0.66600	0.20	34.95	-	35.15	-	48.00	-	-12.85	-
3	2.65800	0.27	35.39	-	35.66	-	48.00	-	-12.34	-
4	7.11200	0.50	28.61	-	29.11	-	48.00	-	-18.89	-
5	19.99700	1.00	36.47	-	37.47	-	48.00	-	-10.53	-
6	28.68500	1.37	35.81	-	37.18	-	48.00	-	-10.82	-



Remarks:
1. "*": Undetectable
2. Q.P. 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	
	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	April 18, 2001
HP Preamplifier	8447D	2944A08485	April 26, 2001
* HP Preamplifier	8449B	3008A01201	Dec. 13, 2001
* ROHDE & SCHWARZ TEST RECEIVER	ESMI	839013/007 839379/002	Jan. 25, 2002
SCHWARZBECK Tunable Dipole Antenna	VHA 9103 UHA 9105	E101051 E101055	Nov. 23, 2001
* CHASE BILOG Antenna	CBL6112A	2221	Aug. 4, 2001
* EMCO Turn Table	1060	1115	NA
* SHOSHIN Tower	AP-4701	A6Y005	NA
* Software	AS61D	NA	NA
* ANRITSU RF Switches	MP59B	M35046	Aug. 4, 2001
* TIMES RF cable	LMR-600	CABLE-ST5-01	Aug. 4, 2001
Open Field Test Site	Site 5	ADT-R05	July 28, 2001
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 equipments are used for the final measurement.

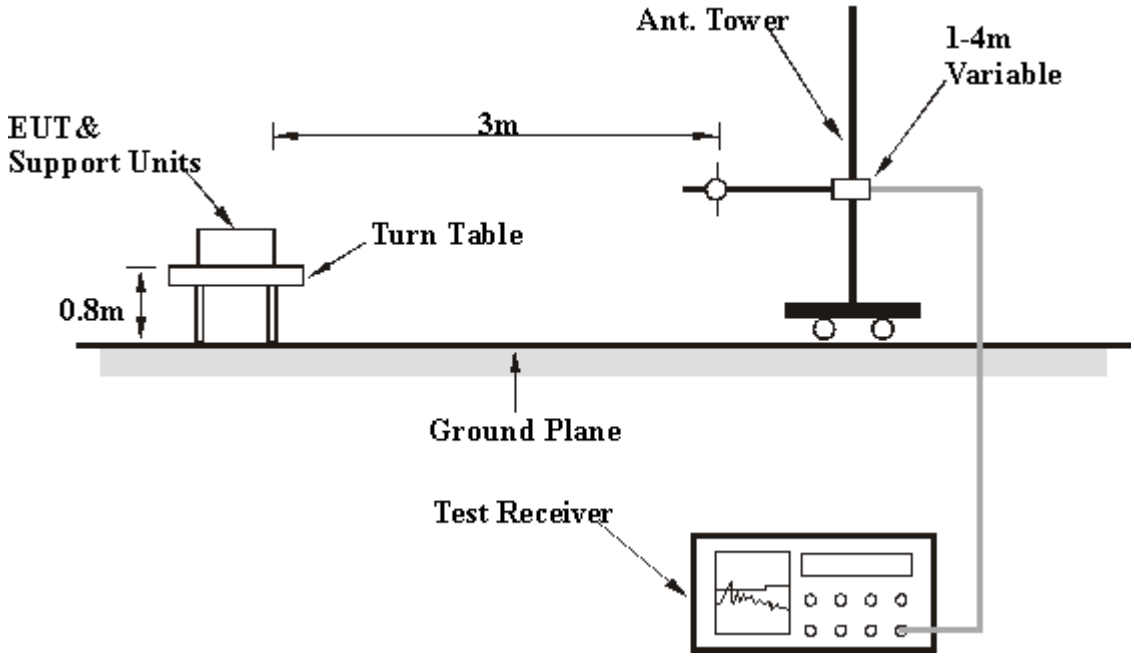
4.2.3 TEST PROCEDURES

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.

Notes:

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	Wireless SOHO Router	**Model**	WX-2211
Mode	Channel 1	**Detector Function**	Quasi-Peak
Frequency Range	30-1000 MHz	**Test Distance**	3M
Environmental Conditions	24℃, 75%RH	**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)
150.00	14.38	22.02	36.4	43.5	-7.1	112	324
250.00	12.61	13.39	26.0	46.0	-20.0	103	75
350.00	9.83	21.27	31.1	46.0	-14.9	113	358
440.02	8.18	29.12	37.3	46.0	-8.7	103	336
550.00	6.24	31.96	38.2	46.0	-7.8	112	-2
875.00	2.90	30.0	32.9	46.0	-13.1	115	182

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)
150.00	14.38	14.02	28.4	43.5	-15.1	140	248
350.00	9.83	21.37	31.2	46.0	-14.8	116	208
400.00	8.18	29.52	37.7	46.0	-8.3	100	87
450.00	7.70	29.90	37.6	46.0	-8.4	122	294
550.00	6.24	31.46	37.7	46.0	-8.3	129	96
849.99	3.15	29.95	33.1	46.0	-8.8	120	55

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	Wireless SOHO Router	**Model**	WX-2211
Mode	Channel 1	**Detector Function**	Peak Average
Frequency Range	Above 1000 MHz	**Test Distance**	3M
Environmental Conditions	24℃, 75%RH	**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	31.19	14.44	-	45.6	-	74.0	54.0	-28.4	-	101	164
*2413.5	32.40	73.56	66.35	106.0	98.8	-	-	-	-	101	-2
4076.0	37.13	10.37	-	47.5	-	74.0	54.0	-26.5	-	103	143
4824.0	38.05	10.55	-	48.6	-	74.0	54.0	-25.4	-	101	75

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	31.19	15.11	-	46.3	-	74.0	54.0	-27.7	-	103	198
*2413.5	32.40	70.86	63.40	103.3	95.8	-	-	-	-	100	300
4076.0	37.13	9.77	-	46.9	-	74.0	54.0	-27.1	-	100	294
4824.0	38.05	10.55	-	48.6	-	74.0	54.0	-25.4	-	102	313

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	Wireless SOHO Router	**Model**	WX-2211
Mode	Channel 6	**Detector Function**	Peak Average
Frequency Range	Above 1000 MHz	**Test Distance**	3M
Environmental Conditions	24℃, 75%RH	**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.		
2062.8	31.26	15.04	-	46.3	-	74.0	54.0	-27.7	-	102	9
*2437.6	32.49	72.12	65.71	104.6	98.2	-	-	-	-	100	315
4126.0	37.14	10.46	-	47.6	-	74.0	54.0	-26.4	-	102	93
4874.0	38.19	8.71	-	46.9	-	74.0	54.0	-27.1	-	102	173

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.		
2062.9	31.26	12.20	-	43.5	-	74.0	54.0	-30.5	-	100	363
*2437.8	32.49	71.24	63.05	103.7	95.5	-	-	-	-	103	250
4126.0	37.14	10.36	-	47.5	-	74.0	54.0	-26.5	-	100	66
4874.0	38.19	8.01	-	46.2	-	74.0	54.0	-27.8	-	100	163

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	Wireless SOHO Router	**Model**	WX-2211
Mode	Channel 11	**Detector Function**	Peak Average
Frequency Range	Above 1000 MHz	**Test Distance**	3M
Environmental Conditions	24℃, 75%RH	**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	31.35	13.8	-	45.2	-	74.0	54.0	-28.8	-	103	23
*2462.2	32.56	73.0	64.9	105.	97.5	-	-	-	-	104	311
4176.0	37.14	10.4	-	47.6	-	74.0	54.0	-26.4	-	100	125
4924.0	38.33	8.57	-	46.9	-	74.0	54.0	-27.1	-	100	222

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.		
2088.1	31.35	12.09	-	43.4	-	74.0	54.0	-30.6	-	101	4
*2462.7	32.56	68.63	61.59	101.2	94.2	-	-	-	-	102	250
4176.0	37.14	9.16	-	46.3	-	74.0	54.0	-27.7	-	104	227
4924.0	38.33	6.97	-	45.3	-	74.0	54.0	-28.7	-	103	193

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	839379/002	Aug. 04, 2001
HP ATTENUATOR	8496B	3247A18505	Cal. on use
HP PLOTTER	7475A	2641V27755	N/A

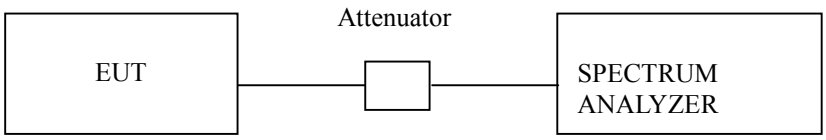
Notes:

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

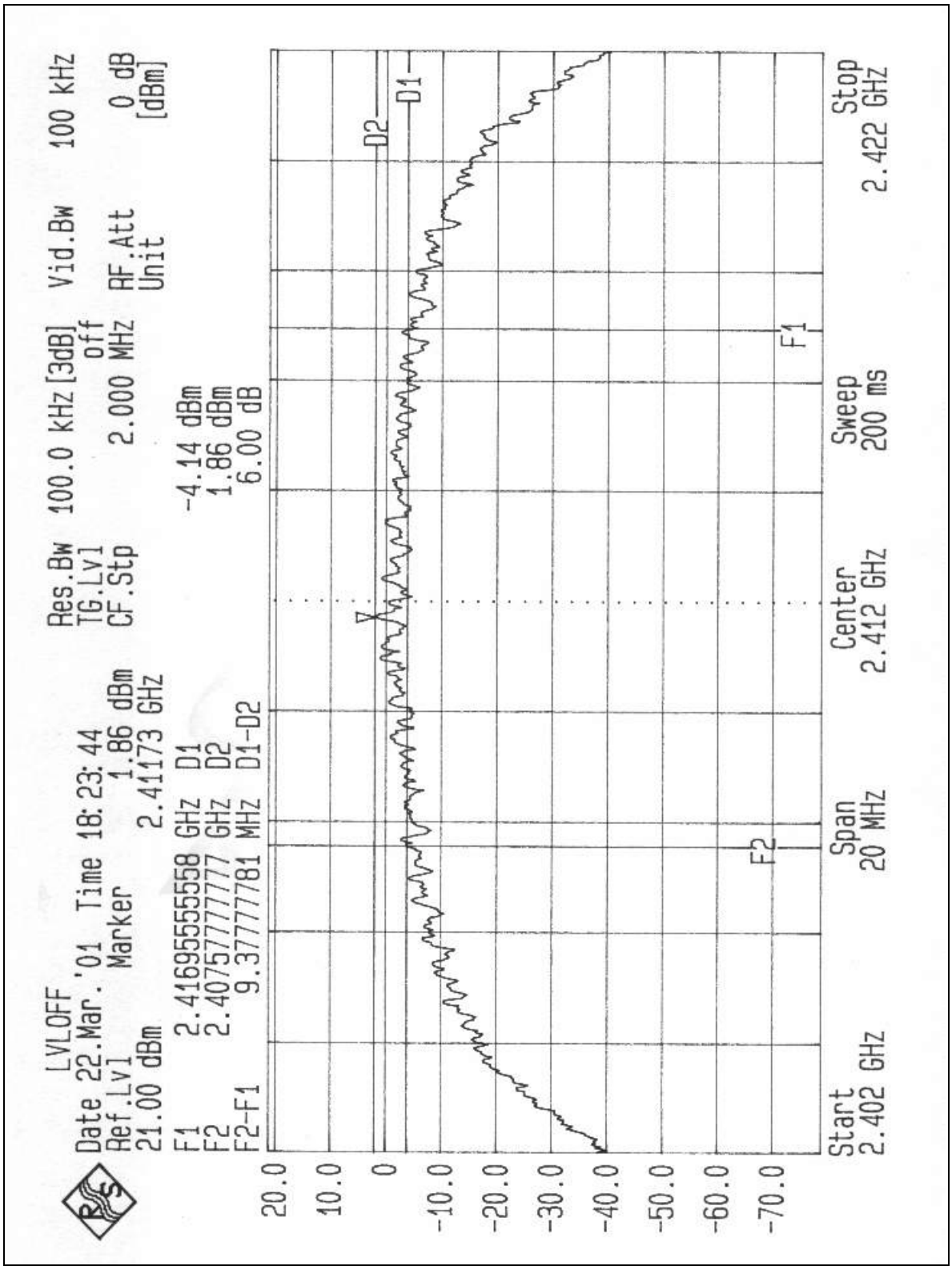
The software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel frequencies individually.

4.3.6 TEST RESULTS

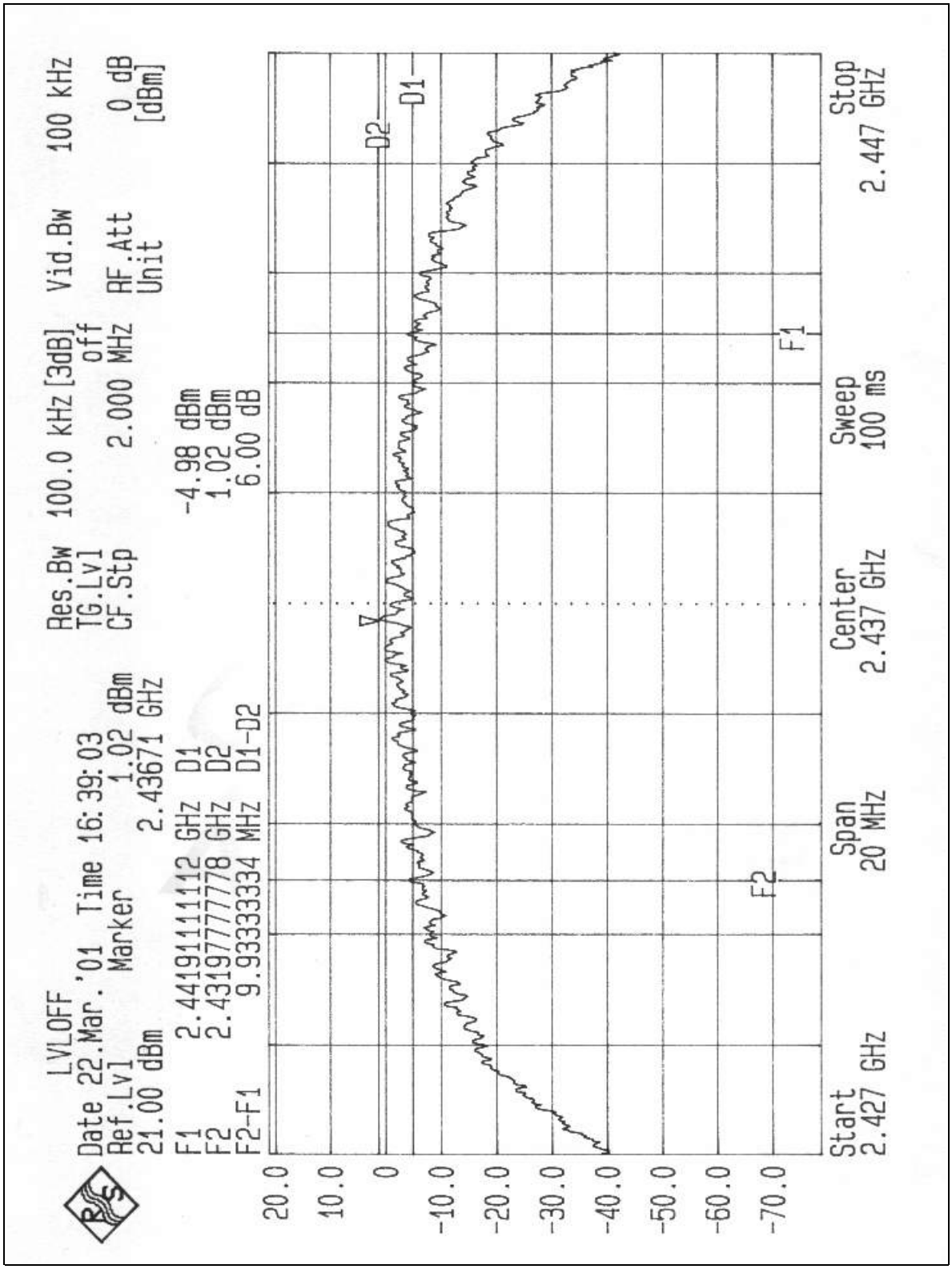
EUT	Wireless SOHO Router	**Model**	WX-2211
Environmental Conditions	24℃, 70%RH	**Tested By**	Steven Lu

CHANNEL	CHANNEL FREQUENCY (MHz)	6 dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS/FAIL
1	2412	9.38	0.5	PASS
6	2437	9.93	0.5	PASS
11	2462	9.98	0.5	PASS

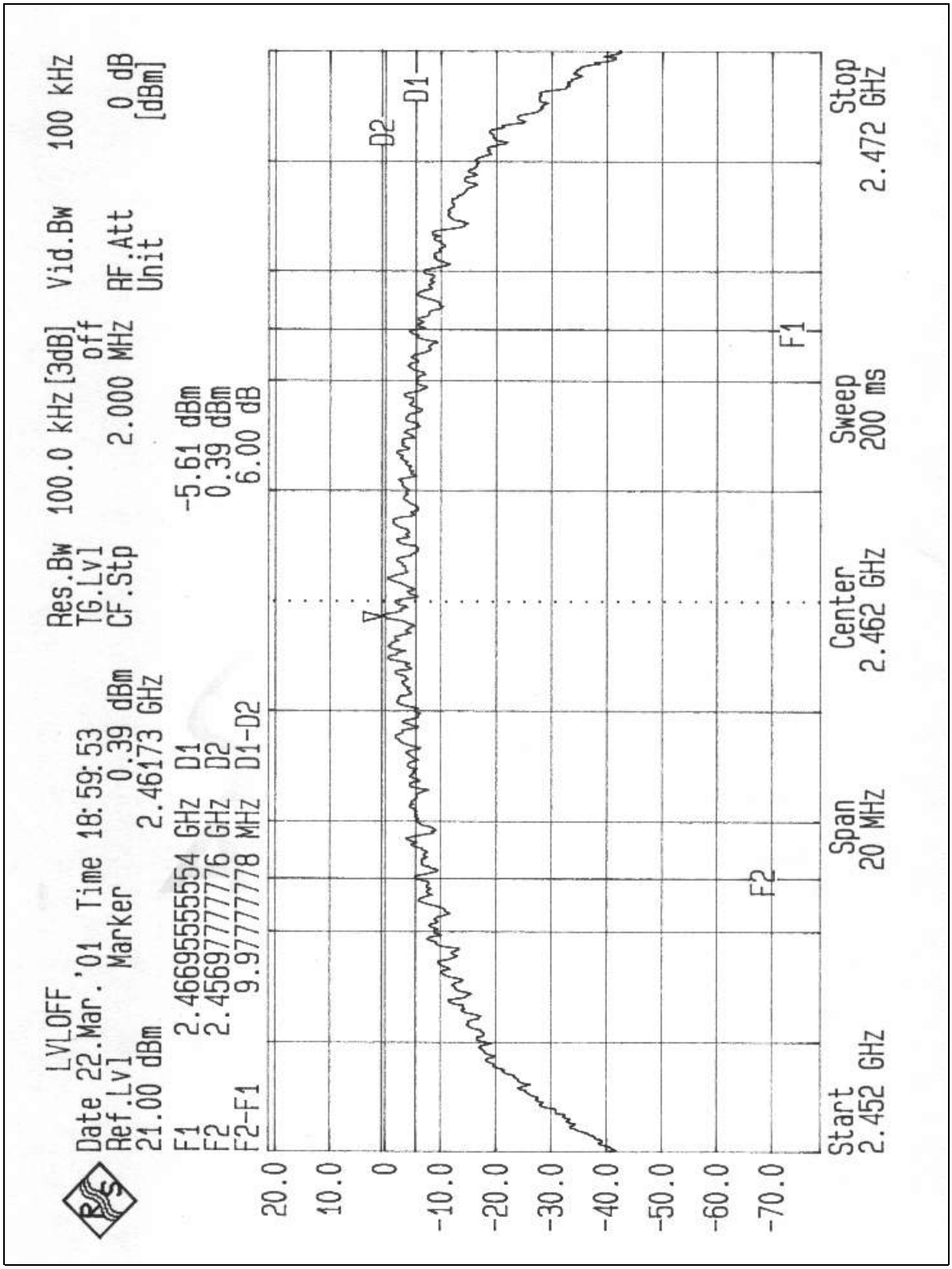
CH1


LVLOFF
Date 22.Mar.'01 Time 18:23:44
Ref.Lvl Marker 1.86 dBm
21.00 dBm 2.41173 GHz
F1 2.41695555558 GHz D1
F2 2.40757777777 GHz D2
F2-F1 9.37777781 MHz D1-D2
Res.Bw 100.0 kHz [3dB] Vid.Bw 100 kHz
TG.Lvl off
CF.Stp 2.000 MHz RF.Att 0 dB
Unit [dBm]
-4.14 dBm
1.86 dBm
6.00 dB
20.0
10.0
0
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
D2
D1
F1
F2
Start 2.402 GHz
Span 20 MHz
Center 2.412 GHz
Sweep 200 ms
Stop 2.422 GHz

CH6


LVLOFF
Date 22.Mar.'01 Time 16:39:03
Ref.Lvl Marker
21.00 dBm 2.43671 GHz
1.02 dBm
F1 2.441911111112 GHz D1
F2 2.431977777778 GHz D2
F2-F1 9.93333334 MHz D1-D2
Res.Bw 100.0 kHz [3dB]
TG.Lvl off
CF.Stp 2.000 MHz
-4.98 dBm
1.02 dBm
6.00 dB
Vid.Bw 100 kHz
RF.Att 0 dB
Unit [dBm]
D2
D1
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 22.Mar.'01 Time 18:59:53
Ref.Lvl Marker 0.39 dBm
21.00 dBm 2.46173 GHz
F1 2.46695555554 GHz D1
F2 2.45697777776 GHz D2
F2-F1 9.97777778 MHz D1-D2
Res.Bw 100.0 kHz [3dB] off
TG.Lvl 2.000 MHz
CF.Stp
-5.61 dBm
0.39 dBm
6.00 dB
Vid.Bw 100 kHz
RF.Att 0 dB
Unit [dBm]
20.0
10.0
0
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
D2
D1
F1
F2
Start 2.452 GHz
Span 20 MHz
Center 2.462 GHz
Sweep 200 ms
Stop 2.472 GHz

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
ROHDE & SCHWARZ TEST RECEIVER	ESMI	839379/002	Aug. 04, 2001
HP ATTENUATOR	8496B	3247A18505	Cal. on use
HP PLOTTER	7475A	2641V27755	N/A

Notes:

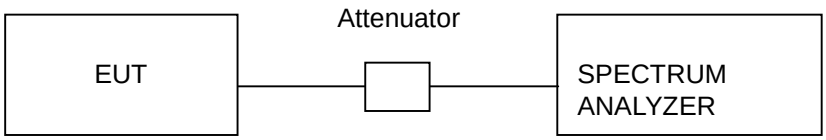
1. The measurement uncertainty is less than +/- 2.6dB, which is calculated as per the NAMAS document NIS81.
2. The calibration interval of the above test instruments is 12 months. And the calibrations are traceable to NML/ROC and NIST/USA.

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	Wireless SOHO Router	**Model**	WX-2211
Environmental Conditions	24℃, 70%RH	**Tested By**	Steven Lu

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER OUTPUT (dBm)	PEAK POWER LIMIT (dBm)	PASS/FAIL
1	2412	17.18	30	PASS
6	2437	16.73	30	PASS
11	2462	15.56	30	PASS