

FCC TEST REPORT

REPORT NO.: RF90031608A

MODEL NO.: NWH4010

RECEIVED: NA

TESTED: Feb. 20, 2002

APPLICANT: NATIONAL DATACOMM CORPORATION

ADDRESS: 4F, No. 24-2, Industrial East 4th Road, Science Park,
Hsin Chu, Taiwan, R.O.C.

ISSUED BY: Advance Data Technology Corporation

LAB LOCATION: 47 14th Lin, Chiapau Tsun, Linko, Taipei,
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0528
ILAC MRA



Lab Code: 200102-0



Table of Contents

1	CERTIFICATION.....	4
2	SUMMARY OF TEST RESULTS	5
3	GENERAL INFORMATION	6
3.1	GENERAL DESCRIPTION OF EUT	6
3.2	DESCRIPTION OF TEST MODES	7
3.3	GENERAL DESCRIPTION OF APPLIED STANDARDS	7
3.4	DESCRIPTION OF SUPPORT UNITS	8
4	TEST TYPES AND RESULTS	9
4.1	CONDUCTED EMISSION MEASUREMENT.....	9
4.1.1	LIMITS OF CONDUCTED EMISSION MEASUREMENT	9
4.1.2	TEST INSTRUMENTS	9
4.1.3	TEST PROCEDURES	10
4.1.4	TEST SETUP	10
4.1.5	EUT OPERATING CONDITIONS.....	11
4.1.6	TEST RESULTS	12
4.2	RADIATED EMISSION MEASUREMENT	18
4.2.1	LIMITS OF RADIATED EMISSION MEASUREMENT	18
4.2.2	TEST INSTRUMENTS	19
4.2.3	TEST PROCEDURES	20
4.2.4	TEST SETUP	21
4.2.5	EUT OPERATING CONDITIONS.....	21
4.2.6	TEST RESULTS	22
4.3	6dB BANDWIDTH MEASUREMENT	26
4.3.1	LIMITS OF 6dB BANDWIDTH MEASUREMENT	26
4.3.2	TEST INSTRUMENTS	26
4.3.3	TEST PROCEDURE	27
4.3.4	TEST SETUP	27
4.3.5	EUT OPERATING CONDITIONS.....	27
4.3.6	TEST RESULTS	28
4.4	MAXIMUM PEAK OUTPUT POWER.....	32
4.4.1	LIMITS OF MAXIMUM PEAK OUTPUT POWER MEASUREMENT	32
4.4.2	INSTRUMENTS.....	32
4.4.3	TEST PROCEDURES	33
4.4.4	TEST SETUP	33
4.4.5	EUT OPERATING CONDITIONS.....	33
4.4.6	TEST RESULTS	34
4.5	POWER SPECTRAL DENSITY MEASUREMENT	35
4.5.1	LIMITS OF POWER SPECTRAL DENSITY MEASUREMENT	35
4.5.2	TEST INSTRUMENTS	35
4.5.3	TEST PROCEDURE	36
4.5.4	TEST SETUP	36
4.5.5	EUT OPERATING CONDITION	36
4.5.6	TEST RESULTS	37
4.6	BAND EDGES MEASUREMENT	41



4.6.1	LIMITS OF BAND EDGES MEASUREMENT	41
4.6.2	TEST INSTRUMENTS	41
4.6.3	TEST PROCEDURE	41
4.6.4	EUT OPERATING CONDITION	42
4.6.5	TEST RESULTS	42
4.7	ANTENNA REQUIREMENT	45
4.7.1	STANDARD APPLICABLE	45
4.7.2	ANTENNA CONNECTED CONSTRUCTION	45
5	PHOTOGRAPHS OF THE TEST CONFIGURATION	46
6	INFORMATION ON THE TESTING LABORATORIES.....	48



1 CERTIFICATION

PRODUCT : 11Mbps Wireless USB Adapter
BRAND NAME : InstantWave
MODEL NO. : NWH4010
APPLICANT : NATIONAL DATACOMM 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 on Feb. 20, 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: Steven Lu, DATE: Mar. 11, 2002
Steven Lu

CHECKED BY: Demi Chen, DATE: Mar. 11, 2002
Demi Chen

APPROVED BY: Alan Lane, DATE: Mar. 11, 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
15.107	AC Power Conducted Emission Limit: 48dBuV	PASS	Meet the requirement of limit Minimum passing margin is -14.08dBuV at 11.809MHz
15.247(a)(2)	Spectrum Bandwidth of a Direct Sequence Spread Spectrum System Limit: min. 500kHz	PASS	Meet the requirement of limit
15.247(b)	Maximum Peak Output Power Limit: max. 30dBm	PASS	Meet the requirement of limit
15.247(c)	Radiated Emissions Limit: Table 15.209	PASS	Meet the requirement of limit Minimum passing margin is -2.1dBuV at 132.01MHz
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	11Mbps Wireless USB Adapter
MODEL NO.	NWH4010
POWER SUPPLY	5VDC from host equipment
MODULATION TYPE	DSSS
TRANSFER RATE	1/2/5.5/11Mbps
FREQUENCY RANGE	2412MHz ~ 2462MHz
NUMBER OF CHANNEL	11
OUTPUT POWER	17.82dBm
ANTENNA TYPE	Inverted F Antenna
DATA CABLE	1.5m (Shielded)
I/O PORTS	USB port
ASSOCIATED DEVICES	NA

NOTE: For 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 an 11Mbps Wireless USB Adapter. According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

FCC CFR 47 Part 15, Subpart C. (15.247)
ANSI C63.4 : 1992

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

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

3.4 DESCRIPTION OF SUPPORT UNITS

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

NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	NOTEBOOK PC	ACER	340	9140F0144C0190119 CM	FCC DoC APPROVED
2	PRINTER	HP	2225C+	3123S97230	DSI6XU2225
3	MODEM	ACEEX	1414	980020510	IFAXDM1414

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	NA
2	1.2m braid shielded wire, terminated with DB25 and Centronics connector via metallic frame, w/o core.
3	1.2 m braid shielded wire, terminated with DB25 and DB9 connector via metallic frame, w/o core.

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

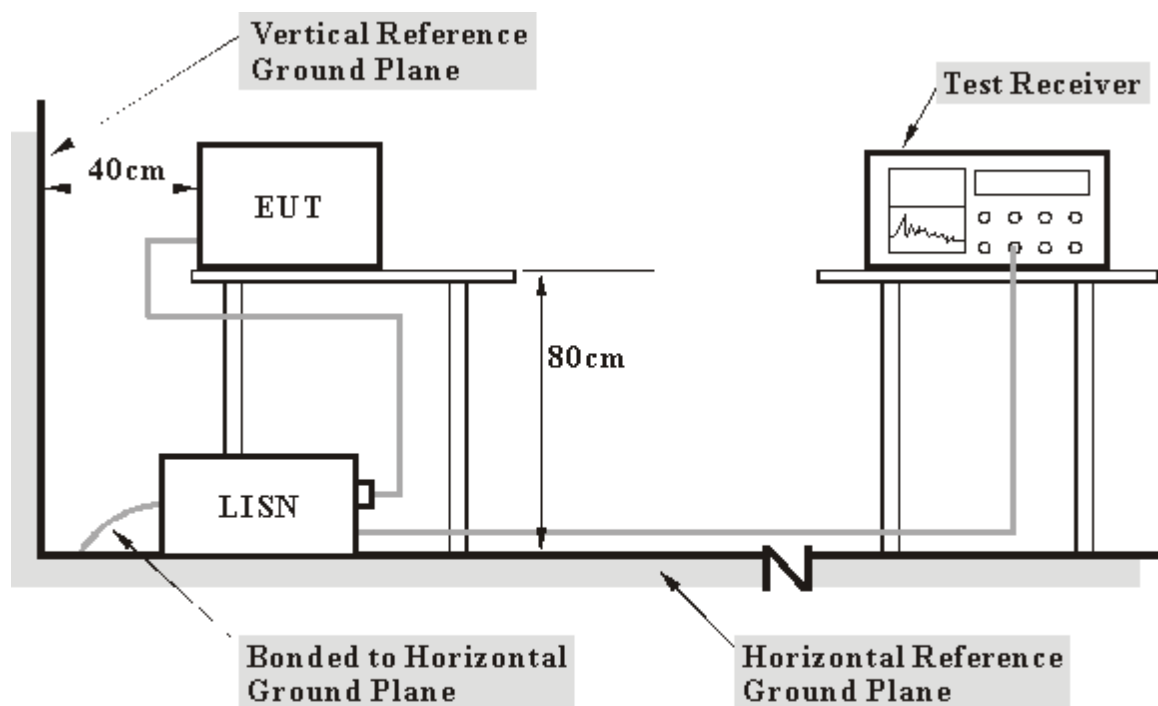
DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
ROHDE & SCHWARZ Test Receiver	ESHS30	828109/007	July 4, 2002
ROHDE & SCHWARZ Artificial Mains Network (for EUT)	ESH3-Z5	839135/006	July 3, 2002
* ROHDE & SCHWARZ 4-wire ISN	ENY41	838119/028	Dec. 2, 2002
* ROHDE & SCHWARZ 2-wire ISN	ENY22	837497/016	Dec. 2, 2002
EMCO-L.I.S.N. (for peripheral)	3825/2	9204-1964	July 3, 2002
Software	Cond-V2J	NA	NA
RF cable (JYEBAO)	RG-58A/U	Cable-C02.01	July 5, 2002
HP Terminator (For EMCO LISN)	11593A	E1-01-298	Feb. 20, 2003
HP Terminator (For EMCO LISN)	11593A	E1-01-299	Feb. 20, 2003
Shielded Room	Site 2	ADT-C02	NA
VCCI Site Registration No.	Site 2	C-240	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. Connected the EUT to a computer system placed on a testing table.
- b. The computer system ran a test program to enable EUT under transmission/receiving condition continuously at specific channel frequency.
- c. The computer system sent "H" messages to its screen.
- d. The computer system sent "H" messages to modem.
- e. The computer system sent "H" messages to printer, and the printer prints them on paper.

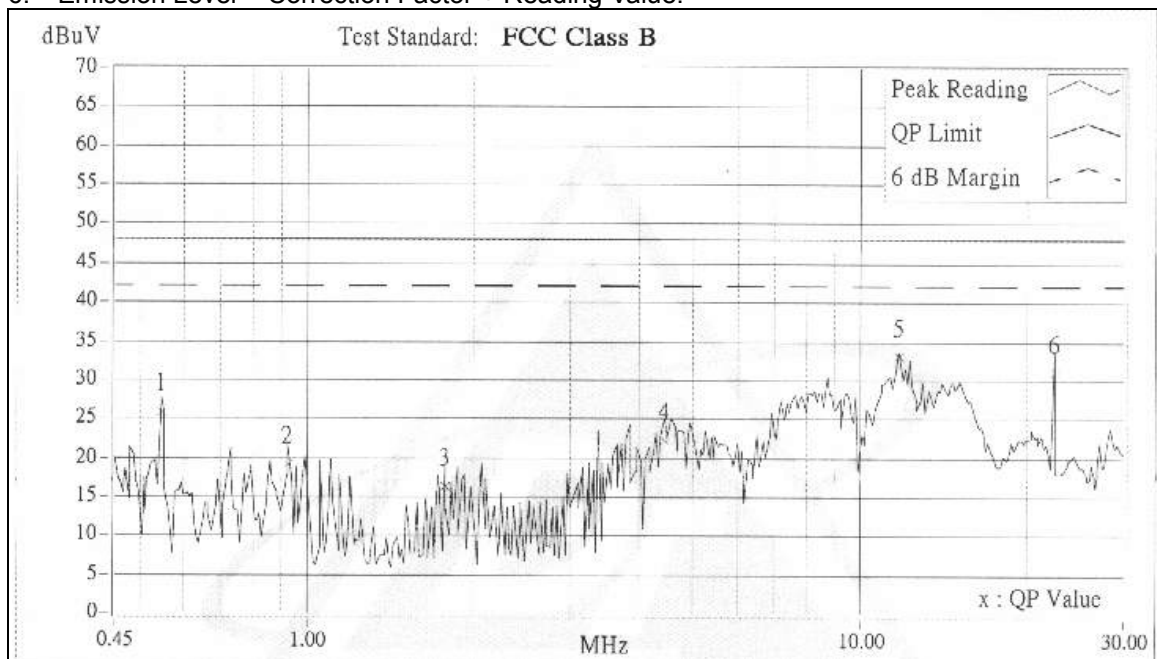
4.1.6 TEST RESULTS

EUT	11Mbps Wireless USB Adapter	MODEL	NWH4010
MODE	Channel 1	6dB BANDWIDTH	10 kHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	PHASE	Line (L)
ENVIRONMENTAL CONDITIONS	20 deg. C, 65%RH, 1005 hPa	TESTED BY: Steven Lu	

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.550	0.20	25.93	-	26.13	-	48.00	-	-21.87	-
2	0.924	0.20	19.19	-	19.39	-	48.00	-	-28.61	-
3	1.773	0.20	16.20	-	16.40	-	48.00	-	-31.60	-
4	4.422	0.42	22.11	-	22.53	-	48.00	-	-25.47	-
5	11.809	0.81	33.11	-	33.92	-	48.00	-	-14.08	-
6	22.570	1.25	30.92	-	32.17	-	48.00	-	-15.83	-

NOTE:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. The emission levels of other frequencies were very low against the limit.
4. Margin value = Emission level - Limit value
5. Correction factor = Insertion loss + Cable loss
6. Emission Level = Correction Factor + Reading Value.

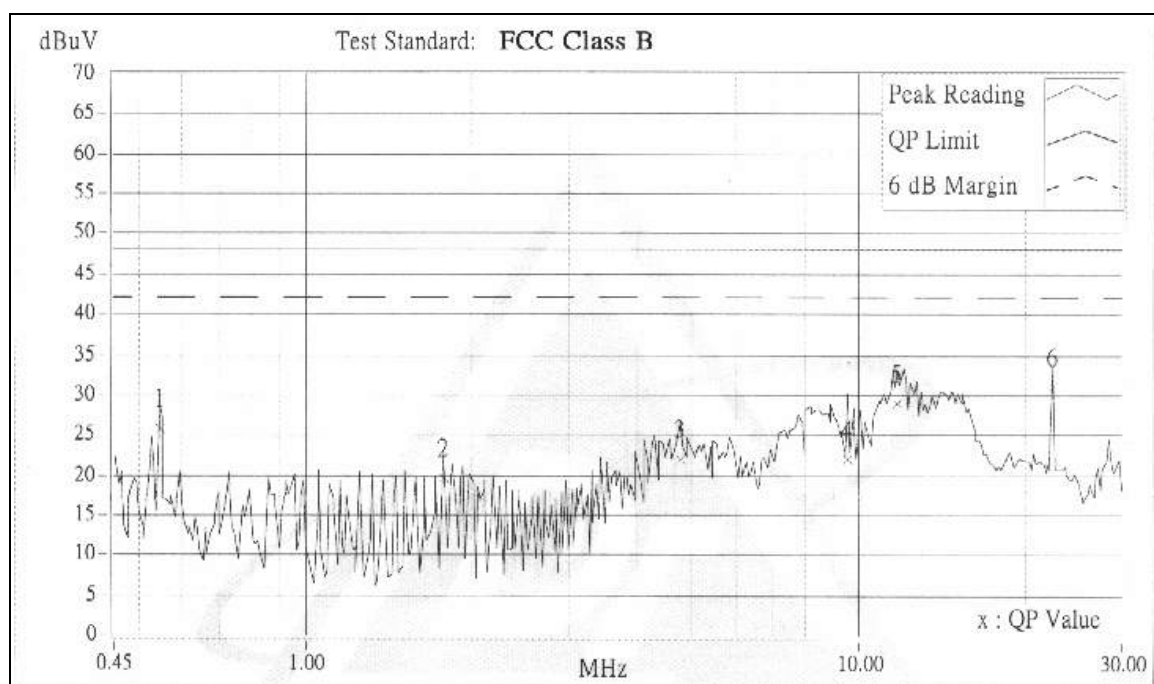


EUT	11Mbps Wireless USB Adapter	MODEL	NWH4010
MODE	Channel 1	6dB BANDWIDTH	10 kHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	PHASE	Neutral (N)
ENVIRONMENTAL CONDITIONS	20 deg. C, 65%RH, 1005 hPa	TESTED BY: Steven Lu	

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.548	0.20	25.81	-	26.01	-	48.00	-	-21.99	-
2	1.779	0.20	19.75	-	19.95	-	48.00	-	-28.05	-
3	4.750	0.43	22.01	-	22.44	-	48.00	-	-25.56	-
4	9.637	0.59	21.86	-	22.45	-	48.00	-	-25.55	-
5	11.809	0.71	29.04	-	29.75	-	48.00	-	-18.25	-
6	22.570	1.15	30.90	-	32.05	-	48.00	-	-15.95	-

NOTE:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. The emission levels of other frequencies were very low against the limit.
4. Margin value = Emission level - Limit value
5. Correction factor = Insertion loss + Cable loss
6. Emission Level = Correction Factor + Reading Value.

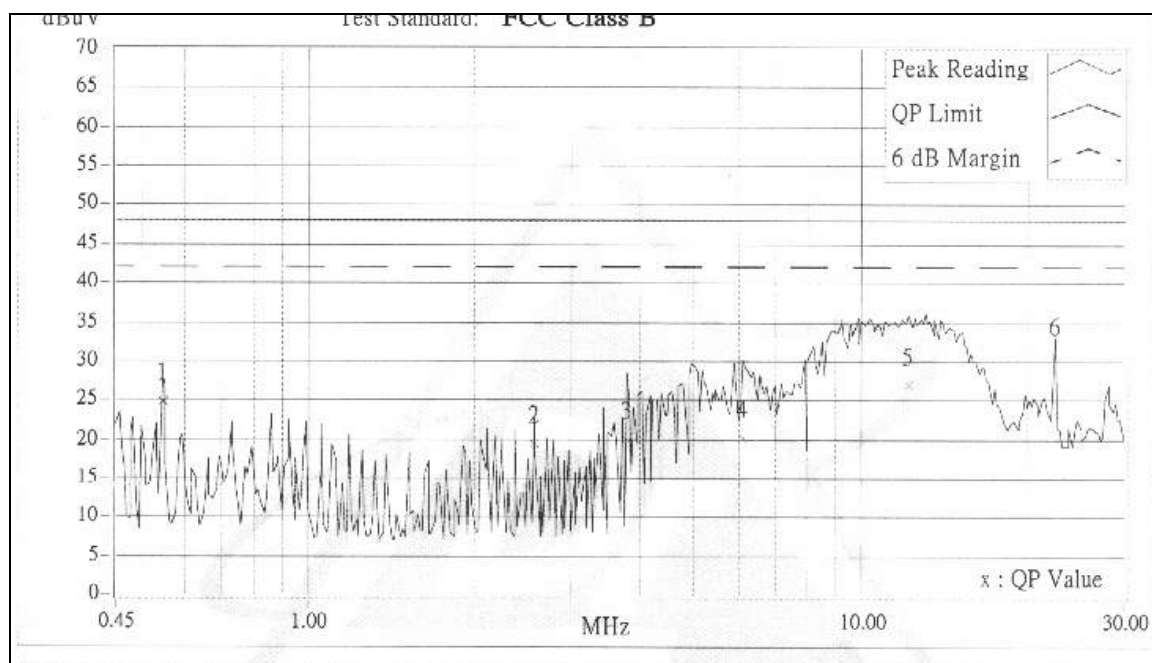


EUT	11Mbps Wireless USB Adapter	MODEL	NWH4010
MODE	Channel 6	6dB BANDWIDTH	10 kHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	PHASE	Line (L)
ENVIRONMENTAL CONDITIONS	20 deg. C, 65%RH, 1005 hPa	TESTED BY: Steven Lu	

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.548	0.20	24.85	-	25.05	-	48.00	-	-22.95	-
2	2.570	0.26	19.44	-	19.70	-	48.00	-	-28.30	-
3	3.764	0.38	19.95	-	20.33	-	48.00	-	-27.67	-
4	6.135	0.51	20.26	-	20.77	-	48.00	-	-27.23	-
5	12.270	0.84	26.90	-	27.74	-	48.00	-	-20.26	-
6	22.570	1.25	30.86	-	32.11	-	48.00	-	-15.89	-

NOTE:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. The emission levels of other frequencies were very low against the limit.
4. Margin value = Emission level - Limit value
5. Correction factor = Insertion loss + Cable loss
6. Emission Level = Correction Factor + Reading Value.

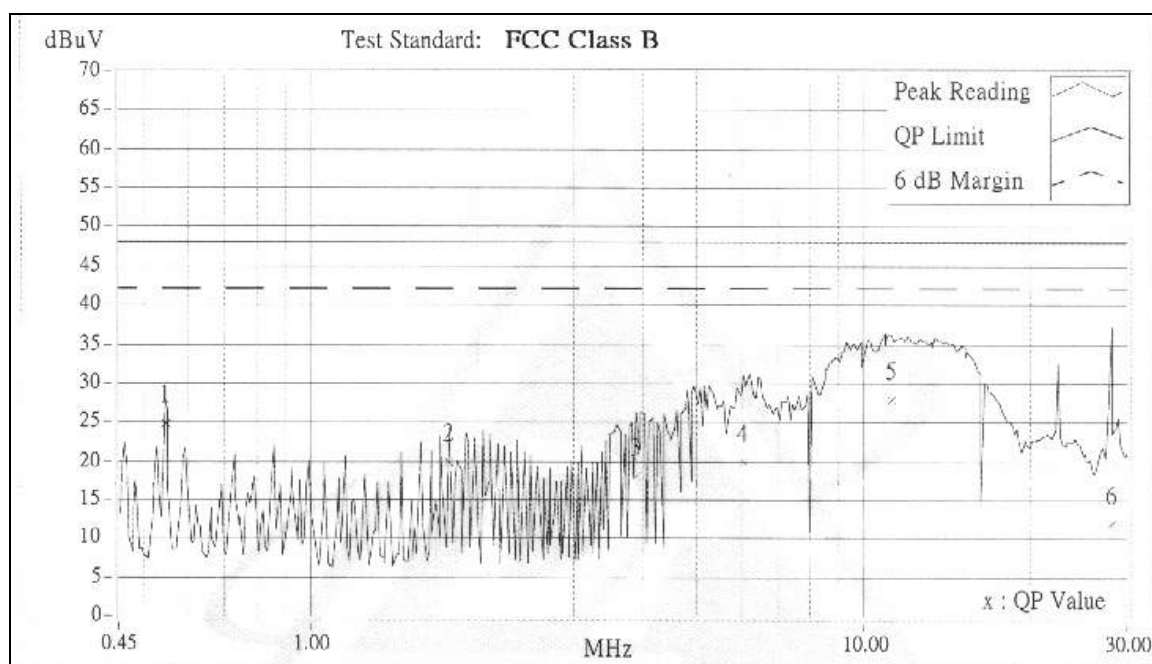


EUT	11Mbps Wireless USB Adapter	MODEL	NWH4010
MODE	Channel 6	6dB BANDWIDTH	10 kHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	PHASE	Neutral (N)
ENVIRONMENTAL CONDITIONS	20 deg. C, 65%RH, 1005 hPa	TESTED BY: Steven Lu	

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.548	0.20	24.90	-	25.10	-	48.00	-	-22.90	-
2	1.780	0.20	19.83	-	20.03	-	48.00	-	-27.97	-
3	3.894	0.39	17.99	-	18.38	-	48.00	-	-29.62	-
4	6.070	0.47	19.92	-	20.39	-	48.00	-	-27.61	-
5	11.281	0.68	27.93	-	28.61	-	48.00	-	-19.39	-
6	28.162	1.36	11.98	-	13.34	-	48.00	-	-34.66	-

NOTE:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. The emission levels of other frequencies were very low against the limit.
4. Margin value = Emission level - Limit value
5. Correction factor = Insertion loss + Cable loss
6. Emission Level = Correction Factor + Reading Value.

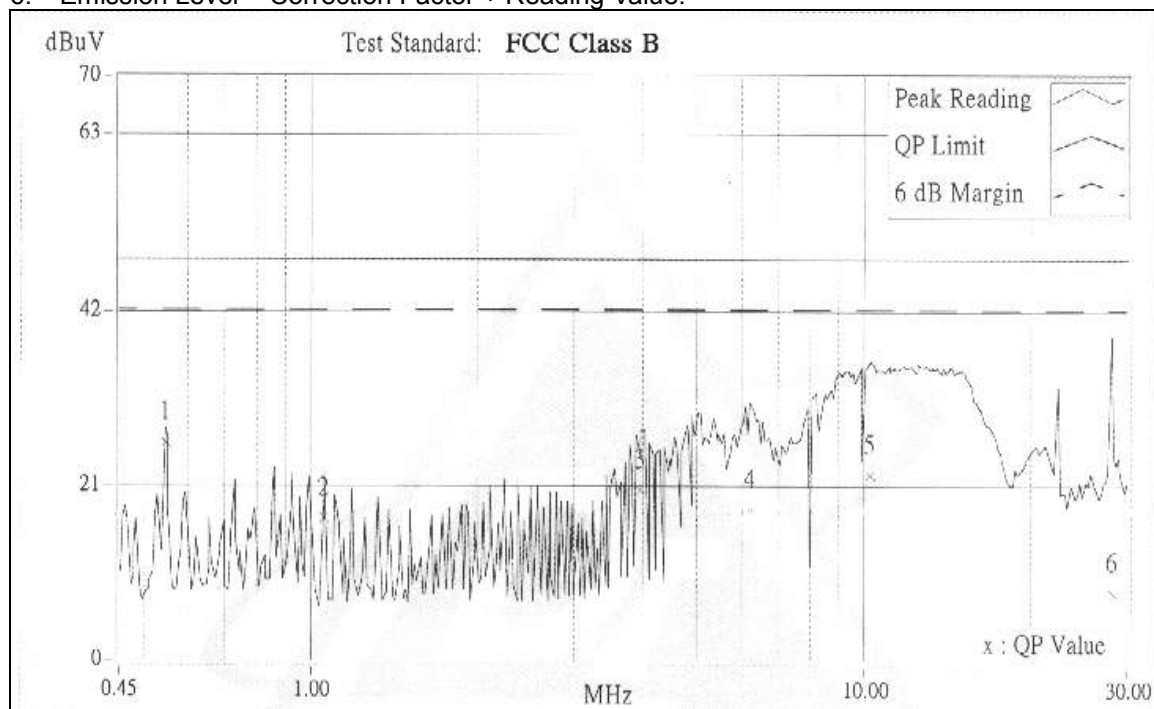


EUT	11Mbps Wireless USB Adapter	MODEL	NWH4010
MODE	Channel 11	6dB BANDWIDTH	10 kHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	PHASE	Line (L)
ENVIRONMENTAL CONDITIONS	20 deg. C, 65%RH, 1005 hPa	TESTED BY: Steven Lu	

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.548	0.20	26.16	-	26.36	-	48.00	-	-21.64	-
2	1.055	0.20	17.10	-	17.30	-	48.00	-	-30.70	-
3	3.957	0.40	20.49	-	20.89	-	48.00	-	-27.11	-
4	6.266	0.51	18.09	-	18.60	-	48.00	-	-29.40	-
5	10.289	0.72	22.16	-	22.88	-	48.00	-	-25.12	-
6	28.056	1.52	8.28	-	9.80	-	48.00	-	-38.20	-

NOTE:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. The emission levels of other frequencies were very low against the limit.
4. Margin value = Emission level - Limit value
5. Correction factor = Insertion loss + Cable loss
6. Emission Level = Correction Factor + Reading Value.

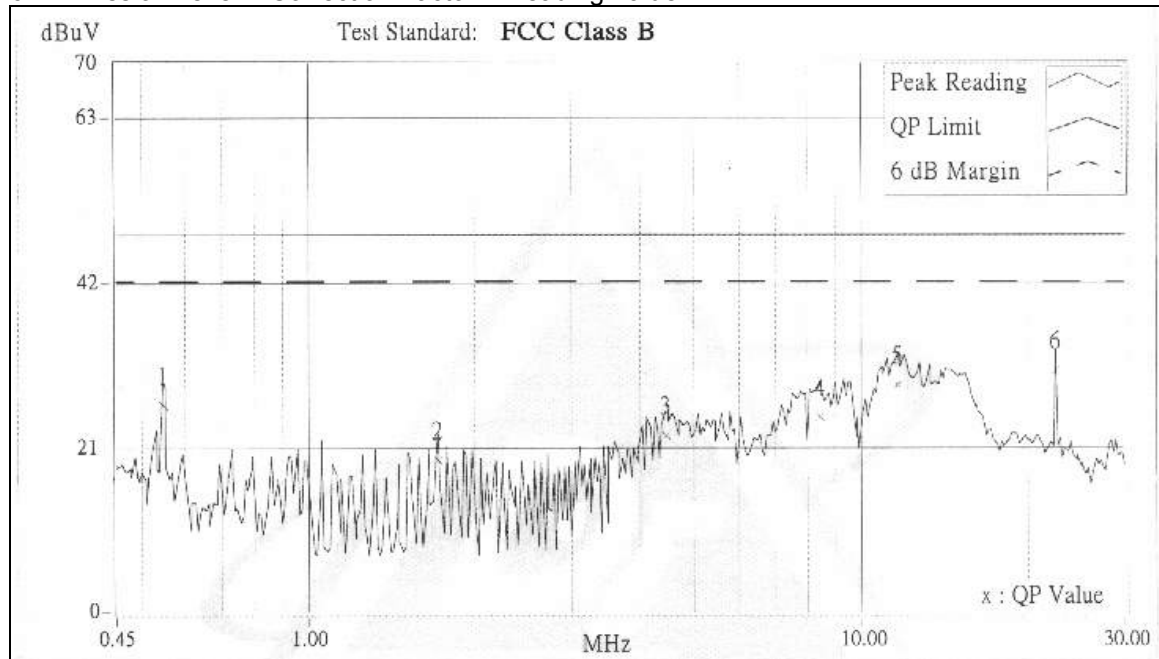


EUT	11Mbps Wireless USB Adapter	MODEL	NWH4010
MODE	Channel 11	6dB BANDWIDTH	10 kHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	PHASE	Neutral (N)
ENVIRONMENTAL CONDITIONS	20 deg. C, 65%RH, 1005 hPa	TESTED BY: Steven Lu	

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.549	0.20	26.40	-	26.60	-	48.00	-	-21.40	-
2	1.715	0.20	19.35	-	19.55	-	48.00	-	-28.45	-
3	4.418	0.41	22.54	-	22.95	-	48.00	-	-25.05	-
4	8.445	0.55	24.72	-	25.27	-	48.00	-	-22.73	-
5	11.676	0.70	28.90	-	29.60	-	48.00	-	-18.40	-
6	22.570	1.15	30.70	-	31.85	-	48.00	-	-16.15	-

NOTE:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. The emission levels of other frequencies were very low against the limit.
4. Margin value = Emission level - Limit value
5. Correction factor = Insertion loss + Cable loss
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 equipment are used for the final measurement.

4. The horn antenna and HP preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.

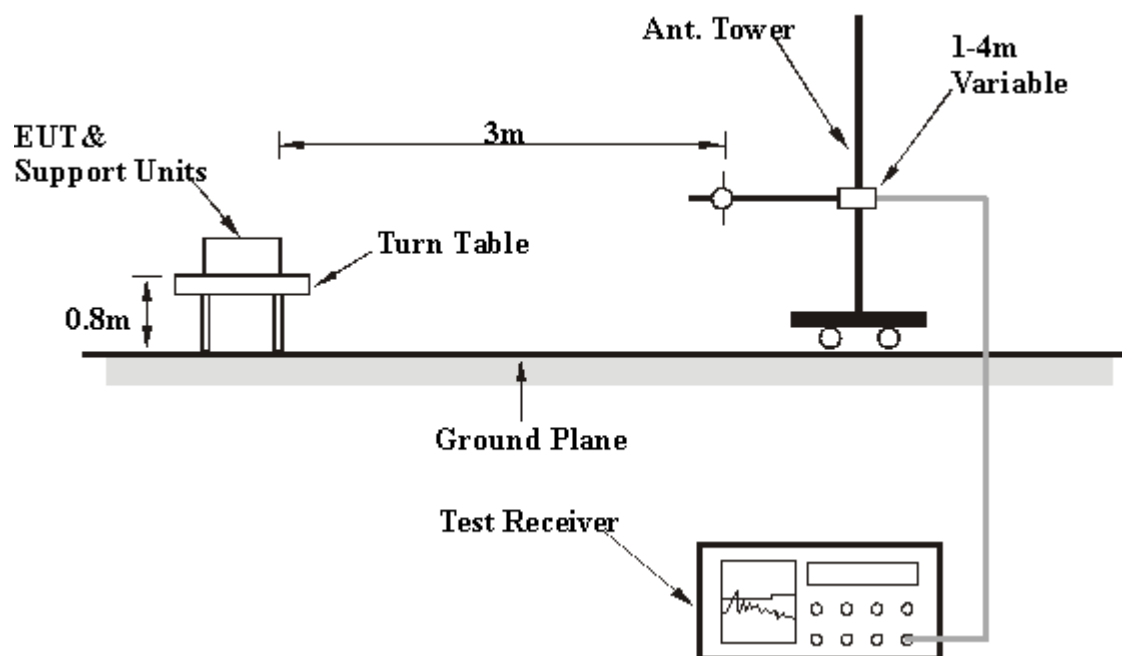
4.2.3 TEST PROCEDURES

- 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	11Mbps Wireless USB Adapter	MODEL	NWH4010
MODE	Channel 11	FREQUENCY RANGE	30-1000 MHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Quasi-Peak
ENVIRONMENTAL CONDITIONS	30 deg. C, 70%RH, 1005 hPa	TESTED BY: Steven Lu	

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M											
No.	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB)	Cable Factor (dB)	Pre-Amp. Factor (dB)	Correction Factor (dB)
1	132.03	41.3 QP	43.50	-2.20	2.74H	242	29.00	11.16	1.13	0.00	-12.29
2	176.02	36.4 QP	43.50	-7.10	2.06H	178	26.00	9.08	1.33	0.00	-10.42
3	216.02	32.2 QP	46.00	-13.80	1.24H	254	20.70	9.97	1.50	0.00	-11.47
4	220.02	32.5 QP	46.00	-13.50	1.83H	132	20.90	10.12	1.51	0.00	-11.63
5	360.02	33.9 QP	46.00	-12.10	1.09H	256	17.20	14.58	2.08	0.00	-16.66
6	432.02	34.2 QP	46.00	-11.80	1.12H	78	15.60	16.28	2.35	0.00	-18.64
7	528.02	31.4 QP	46.00	-14.60	2.13H	177	11.20	17.62	2.60	0.00	-20.22

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M											
No.	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB)	Cable Factor (dB)	Pre-Amp. Factor (dB)	Correction Factor (dB)
1	132.01	41.4 QP	43.50	-2.10	1.11V	267	29.10	11.16	1.13	0.00	-12.29
2	176.02	32.1 QP	43.50	-11.40	1.02V	10	21.70	9.08	1.33	0.00	-10.42
3	216.01	32.0 QP	46.00	-14.00	1.30V	7	20.50	9.97	1.50	0.00	-11.47
4	220.02	36.6 QP	46.00	-9.40	1.00V	52	25.00	10.12	1.51	0.00	-11.64
5	360.02	31.0 QP	46.00	-15.00	1.11V	61	14.30	14.58	2.08	0.00	-16.66
6	432.02	34.3 QP	46.00	-11.70	1.50V	102	15.70	16.28	2.35	0.00	-18.63
7	528.02	32.9 QP	46.00	-13.10	1.04V	160	12.70	17.62	2.60	0.00	-20.22

NOTE:

1. Emission level(dBuV/m)=Raw Value(dBuV) – Correction Factor(dB)
2. Correction Factor(dB) = Pre-Amplifier Factor (dB) - Antenna Factor (dB) - Cable Factor (dB)
3. Pre-Amplifier Factor (dB) = 0, when the test receiver is used to read the value and because it did not use the Pre-Amplifier.
4. The other emission levels were very low against the limit.
5. Margin value = Emission level – Limit value.

EUT	11Mbps Wireless USB Adapter	MODEL	NWH4010
MODE	Channel 1	FREQUENCY RANGE	Above 1000 MHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak(PK) Average (AV)
ENVIRONMENTAL CONDITIONS	30 deg. C, 70%RH, 1005 hPa	TESTED BY: Steven Lu	

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

No.	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB)	Cable Factor (dB)	Pre-Amp. Factor (dB)	Correction Factor (dB)
1	2037.90	45.2 PK	74.00	-28.80	1.07H	199	16.60	25.27	3.29	0.00	-28.57
2	*2413.50	102.7 PK	-	-	1.59H	59	71.90	27.19	3.62	0.00	-30.81.
3	*2413.50	92.0 AV	-	-	1.59H	59	61.20	27.19	3.62	0.00	-30.81.
4	4075.20	44.8 PK	74.00	-29.20	1.00H	232	9.90	30.18	4.77	0.00	-34.96
5	4824.30	46.5 PK	74.00	-27.50	1.03H	172	9.90	31.43	5.21	0.00	-36.65

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

No.	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB)	Cable Factor (dB)	Pre-Amp. Factor (dB)	Correction Factor (dB)
1	2038.00	44.2 PK	74.00	-29.80	1.05V	244	15.60	25.27	3.29	0.00	-28.57
2	*2413.20	101.8 PK	-	-	1.01V	189	71.00	27.19	3.62	0.00	-30.82
3	*2413.20	94.2 AV	-	-	1.01V	189	63.40	27.19	3.62	0.00	-30.82
4	4076.00	45.2 PK	74.00	-28.80	1.00V	130	10.30	30.18	4.77	0.00	-34.95
5	4824.60	46.7 PK	74.00	-27.30	1.00V	4	10.10	31.43	5.21	0.00	-36.64

NOTE:

1. Emission level(dBuV/m)=Raw Value(dBuV) – Correction Factor(dB)
2. Correction Factor(dB) = Pre-Amplifier Factor (dB) - Antenna Factor (dB) - Cable Factor (dB)
3. Pre-Amplifier Factor (dB) = 0, when the test receiver is used to read the value and because it did not use the Pre-Amplifier.
4. The other emission levels were very low against the limit.
5. Margin value = Emission level – Limit value.
6. “ * ” = Fundamental frequency

EUT	11Mbps Wireless USB Adapter	MODEL	NWH4010
MODE	Channel 6	FREQUENCY RANGE	Above 1000 MHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak(PK) Average (AV)
ENVIRONMENTAL CONDITIONS	30 deg. C, 70%RH, 1005 hPa	TESTED BY: Steven Lu	

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

No.	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB)	Cable Factor (dB)	Pre-Amp. Factor (dB)	Correction Factor (dB)
1	2063.00	42.1 PK	74.00	-31.90	1.02H	149	13.40	25.39	3.31	0.00	-28.70
2	*2438.10	100.3 PK	-	-	1.02H	243	69.40	27.30	3.64	0.00	-30.94.
3	*2438.10	93.8 AV	-	-	1.02H	243	62.90	27.30	3.64	0.00	-30.94.
4	4126.00	44.6 PK	74.00	-29.40	1.00H	229	9.50	30.28	4.79	0.00	-35.08
5	4876.00	44.9 PK	74.00	-29.10	1.00H	158	8.20	31.47	5.25	0.00	-36.73

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

No.	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB)	Cable Factor (dB)	Pre-Amp. Factor (dB)	Correction Factor (dB)
1	2062.90	44.4 PK	74.00	-29.60	1.06V	251	15.70	25.39	3.31	0.00	-28.70
2	*2438.20	101.2 PK	-	-	1.00V	104	70.30	27.30	3.64	0.00	-30.95
3	*2438.20	94.2 AV	-	-	1.00V	104	63.30	27.30	3.64	0.00	-30.95
4	4126.00	45.5 PK	74.00	-28.50	1.02V	220	10.40	30.28	4.79	0.00	-35.07
5	4874.00	45.2 PK	74.00	-28.80	1.02V	129	8.50	31.47	5.25	0.00	-36.73

NOTE:

1. Emission level(dBuV/m)=Raw Value(dBuV) – Correction Factor(dB)
2. Correction Factor(dB) = Pre-Amplifier Factor (dB) - Antenna Factor (dB) - Cable Factor (dB)
3. Pre-Amplifier Factor (dB) = 0, when the test receiver is used to read the value and because it did not use the Pre-Amplifier.
4. The other emission levels were very low against the limit.
5. Margin value = Emission level – Limit value.
6. “ * ” = Fundamental frequency



EUT	11Mbps Wireless USB Adapter	MODEL	NWH4010
MODE	Channel 11	FREQUENCY RANGE	Above 1000 MHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak(PK) Average (AV)
ENVIRONMENTAL CONDITIONS	30 deg. C, 70%RH, 1005 hPa	TESTED BY: Steven Lu	

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

No.	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB)	Cable Factor (dB)	Pre-Amp. Factor (dB)	Correction Factor (dB)
1	2088.10	42.3 PK	74.00	-31.70	1.02H	227	13.50	25.50	3.33	0.00	-28.83
2	*2463.10	102.5 PK	-	-	1.06H	192	71.40	27.41	3.66	0.00	-31.07.
3	*2463.10	95.9 AV	-	-	1.06H	192	64.80	27.41	3.66	0.00	-31.07.
4	2483.50	55.8 PK	74.00	-18.20	1.01H	197	24.60	27.52	3.68	0.00	-31.21
5	2483.50	46.2 AV	54.00	-7.80	1.01H	197	15.00	27.52	3.68	0.00	-31.20
6	4176.50	45.1 PK	74.00	-28.90	1.00H	309	9.90	30.38	4.81	0.00	-35.19
7	4924.10	45.4 PK	74.00	-28.60	1.04H	181	8.60	31.51	5.28	0.00	-36.80

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

No.	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB)	Cable Factor (dB)	Pre-Amp. Factor (dB)	Correction Factor (dB)
1	2087.80	42.6 PK	74.00	-31.40	1.06V	266	13.80	25.50	3.33	0.00	-28.83
2	*2463.20	99.9 PK	-	-	1.04V	178	68.80	27.41	3.66	0.00	-31.07.
3	*2463.20	91.8 AV	-	-	1.04V	178	60.70	27.41	3.66	0.00	-31.07.
4	2487.90	52.9 PK	74.00	-21.10	1.03V	297	21.70	27.52	3.68	0.00	-31.20
5	4176.50	45.1 PK	74.00	-28.90	1.02V	194	9.90	30.38	4.81	0.00	-35.19
6	4924.80	45.2 PK	74.00	-28.80	1.03V	276	8.40	31.51	5.28	0.00	-36.80

NOTE:

1. Emission level(dBuV/m)=Raw Value(dBuV) – Correction Factor(dB)
2. Correction Factor(dB) = Pre-Amplifier Factor (dB) - Antenna Factor (dB) - Cable Factor (dB)
3. Pre-Amplifier Factor (dB) = 0, when the test receiver is used to read the value and because it did not use the Pre-Amplifier.
4. The other emission levels were very low against the limit.
5. Margin value = Emission level – Limit value.
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
R&S SPECTRUM ANALYZER	FSEK30	100049	Jul. 16, 2002

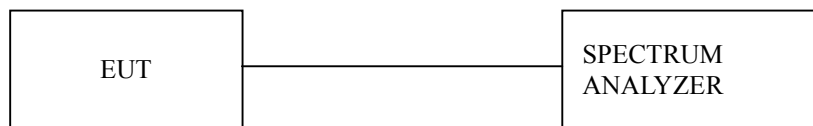
Notes:

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



4.3.5 EUT OPERATING CONDITIONS

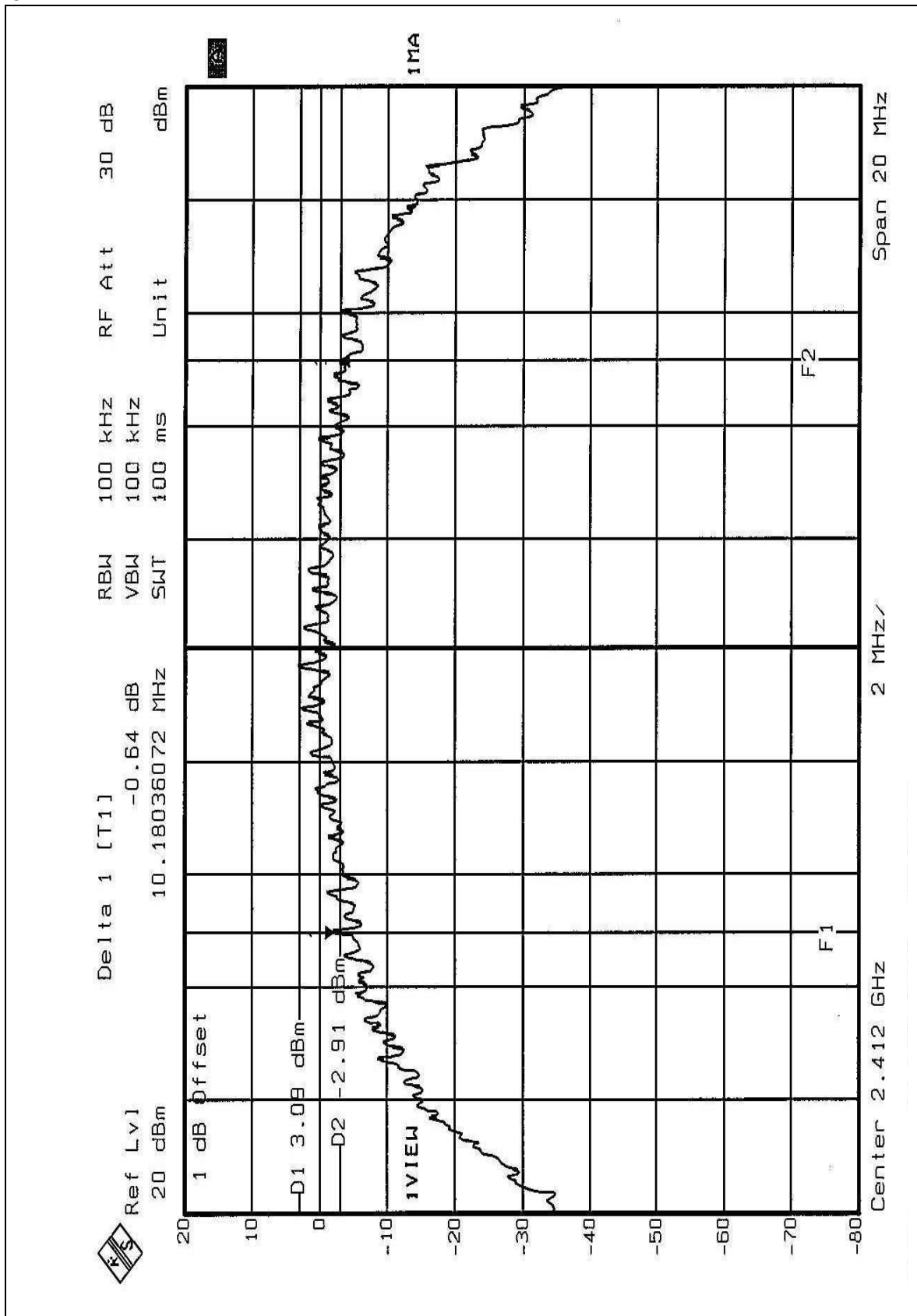
The software provided by client to enable the EUT under transmission condition continuously at lowest, middle and highest channel frequencies individually.

4.3.6 TEST RESULTS

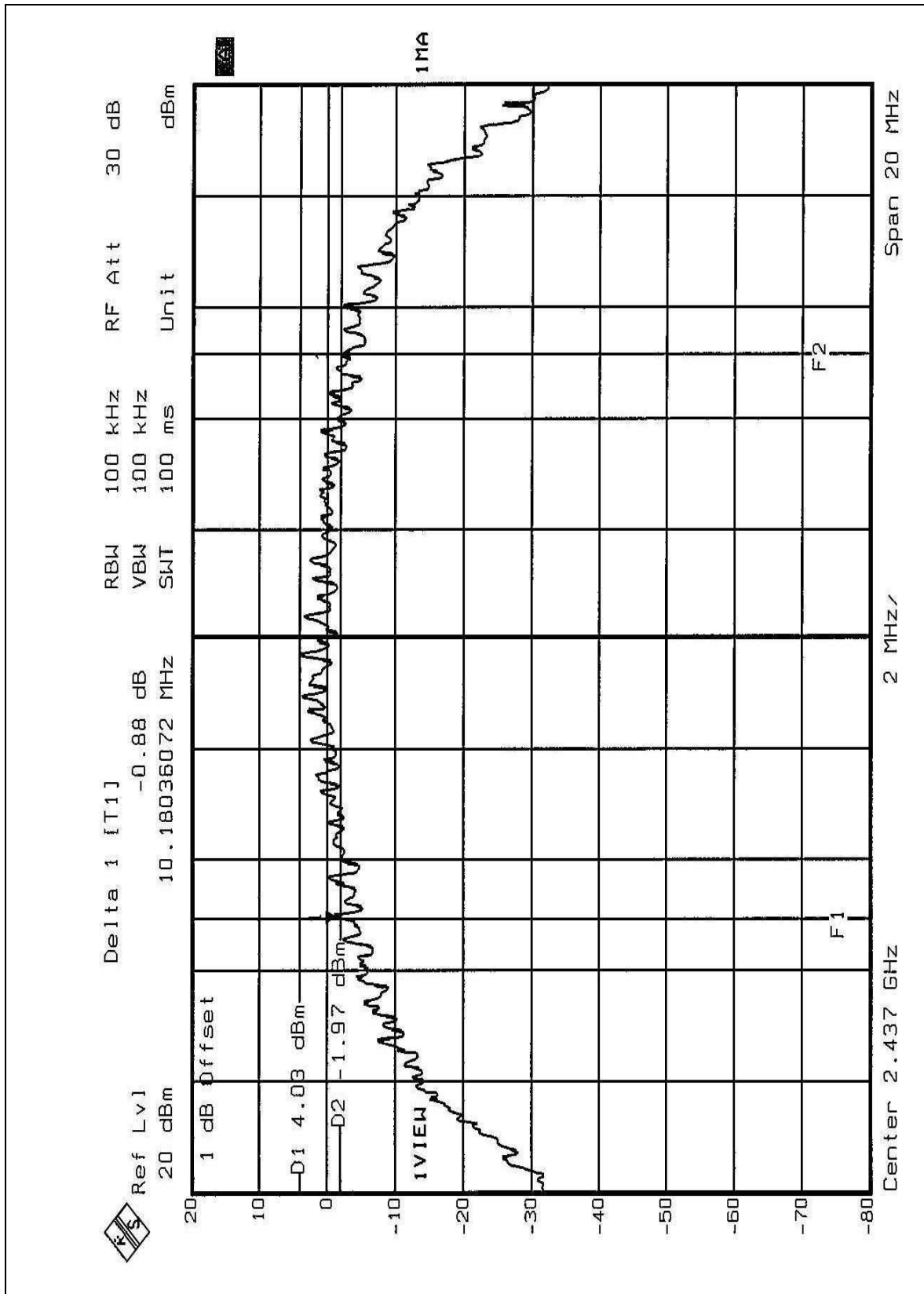
EUT	11Mbps Wireless USB Adapter	MODEL	NWH4010
INPUT POWER (SYSTEM)	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	20 deg. C, 65%RH, 1005 hPa
TESTED BY: Bruce Shiau			

CHANNEL	CHANNEL FREQUENCY (MHz)	6 dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS/FAIL
1	2412	10.18	0.5	PASS
6	2437	10.18	0.5	PASS
11	2462	10.02	0.5	PASS

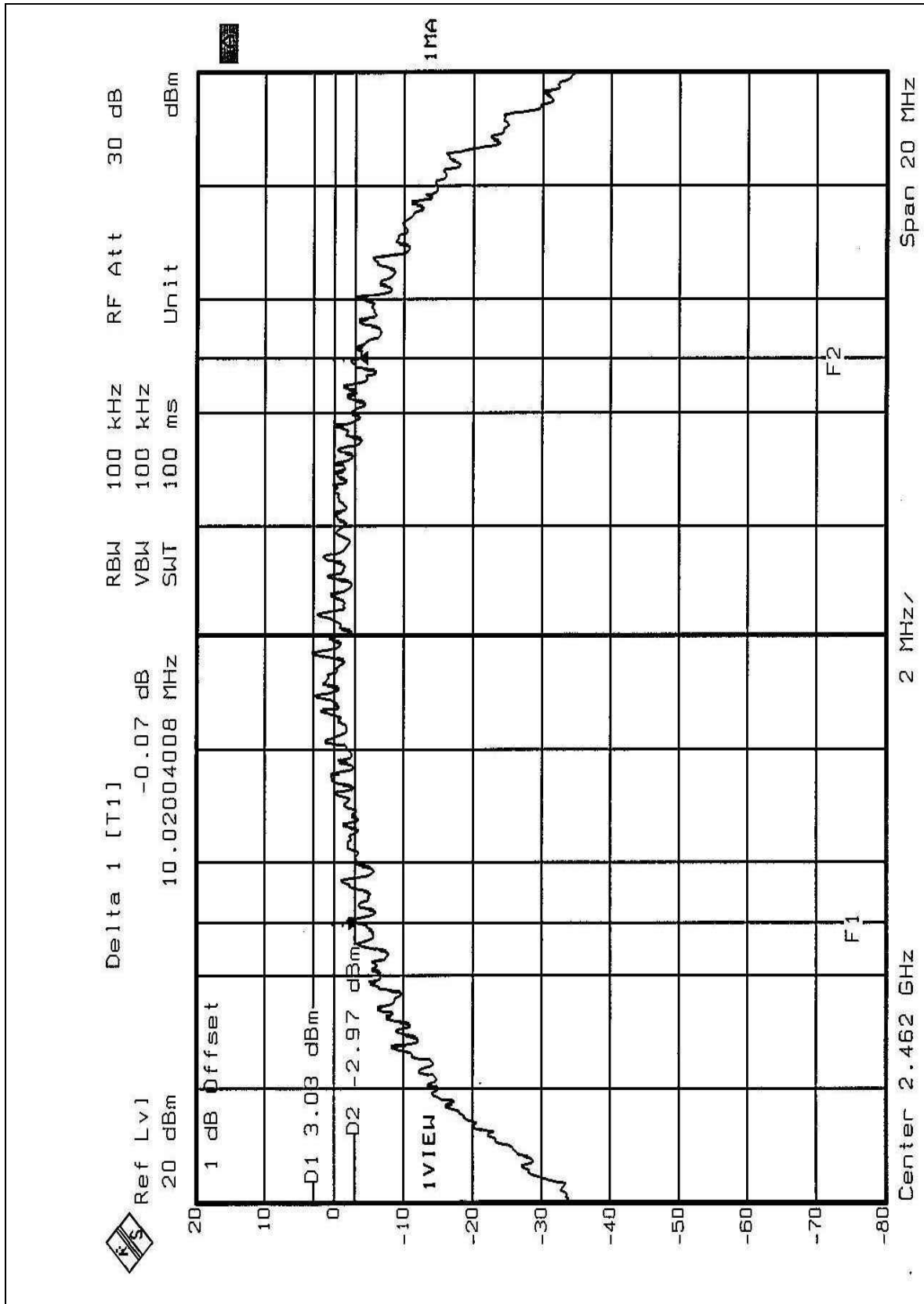
CH1



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

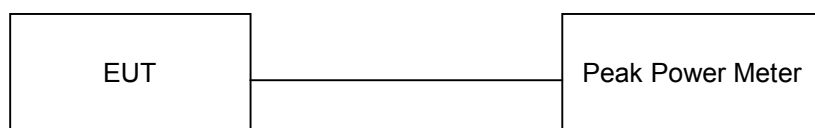
Description & Manufacturer	Model No.	Serial No.	Calibrated Until
Peak Power Sensor	NRV-Z32	100013	Feb. 21, 2003
Power Meter	NRVS	100026	Feb. 21, 2003

- 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	11Mbps Wireless USB Adapter	MODEL	NWH4010
INPUT POWER (SYSTEM)	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	20 deg. C, 55%RH, 1005 hPa
TESTED BY: Bruce Shiau			

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER OUTPUT (dBm)	PEAK POWER LIMIT (dBm)	PASS/FAIL
1	2412	13.51	30	PASS
6	2437	13.82	30	PASS
11	2462	13.39	30	PASS