



FCC TEST REPORT

REPORT NO.: RF921203R04

MODEL NO.: NL-3054CB Plus Aries2

RECEIVED: October 28, 2003

TESTED: October 28 ~ December 11, 2003

APPLICANT: SENAO INTERNATIONAL CO., LTD.

ADDRESS: 2F, No.531, Chung Cheng Rd., Hsin-Tien,
Taipei, Taiwan, R.O.C.

ISSUED BY: Advance Data Technology Corporation

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

This test report consists of 73 pages in total. It may be duplicated completely for legal use with the approval of the applicant. It should not be reproduced except in full, without the written approval of our laboratory. The client should not use it to claim product endorsement by CNLA, NVLAP or any government agencies. The test results in the report only apply to the tested sample.



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	DEVIATION FROM TEST STANDARD	10
4.1.5	TEST SETUP	11
4.1.6	EUT OPERATING CONDITIONS	12
4.1.7	TEST RESULTS	13
4.2	RADIATED EMISSION MEASUREMENT	19
4.2.1	LIMITS OF RADIATED EMISSION MEASUREMENT	19
4.2.2	TEST INSTRUMENTS	20
4.2.3	TEST PROCEDURES	21
4.2.4	DEVIATION FROM TEST STANDARD	21
4.2.5	TEST SETUP	22
4.2.6	EUT OPERATING CONDITIONS	22
4.2.7	TEST RESULTS	23
4.2.8	TEST RESULTS (A)	25
4.2.9	TEST RESULTS (B)	28
4.2.10	TEST RESULTS (C)	31
4.3	6dB BANDWIDTH MEASUREMENT	32
4.3.1	LIMITS OF 6dB BANDWIDTH MEASUREMENT	32
4.3.2	TEST INSTRUMENTS	32
4.3.3	TEST PROCEDURE	33
4.3.4	DEVIATION FROM TEST STANDARD	33
4.3.5	TEST SETUP	33
4.3.6	EUT OPERATING CONDITIONS	33
4.3.7	TEST RESULTS (A)	34



4.3.8	TEST RESULTS (B)	38
4.3.9	TEST RESULTS (C)	42
4.4	MAXIMUM PEAK OUTPUT POWER	44
4.4.1	LIMITS OF MAXIMUM PEAK OUTPUT POWER MEASUREMENT	44
4.4.2	TEST INSTRUMENTS	44
4.4.3	TEST PROCEDURES	45
4.4.4	DEVIATION FROM TEST STANDARD	45
4.4.5	TEST SETUP	45
4.4.6	EUT OPERATING CONDITIONS	45
4.4.7	TEST RESULTS (A)	46
4.4.8	TEST RESULTS (B)	47
4.4.9	TEST RESULTS (C)	47
4.5	POWER SPECTRAL DENSITY MEASUREMENT	48
4.5.1	LIMITS OF POWER SPECTRAL DENSITY MEASUREMENT	48
4.5.2	TEST INSTRUMENTS	48
4.5.3	TEST PROCEDURE	49
4.5.4	DEVIATION FROM TEST STANDARD	49
4.5.5	TEST SETUP	49
4.5.6	EUT OPERATING CONDITIONS	49
4.5.7	TEST RESULTS (A)	50
4.5.8	TEST RESULTS (B)	54
4.5.9	TEST RESULTS (C)	58
4.6	BAND EDGES MEASUREMENT	60
4.6.1	LIMITS OF BAND EDGES MEASUREMENT	60
4.6.2	TEST INSTRUMENTS	60
4.6.3	TEST PROCEDURE	60
4.6.4	DEVIATION FROM TEST STANDARD	60
4.6.5	EUT OPERATING CONDITION	60
4.6.6	TEST RESULTS (A)	61
4.6.7	TEST RESULTS (B)	64
4.6.8	TEST RESULTS (C)	67
4.7	ANTENNA REQUIREMENT	70
4.7.1	STANDARD APPLICABLE	70
4.7.2	ANTENNA CONNECTED CONSTRUCTION	70
5	PHOTOGRAPHS OF THE TEST CONFIGURATION	71
6	INFORMATION ON THE TESTING LABORATORIES	73



1 CERTIFICATION

PRODUCT : Atheros 11g Card Bus Adapter
BRAND NAME : SENAO
MODEL NO. : NL-3054CB Plus Aries2
TEST ITEM: Engineering Sample
APPLICANT : SENAO INTERNATIONAL CO., LTD.
STANDARDS : FCC Part 15, Subpart C (Section 15.247),
ANSI C63.4-1992

We, **Advance Data Technology Corporation**, hereby certify that one sample of the designation has been tested in our facility from October 28 to December 11, 2003. 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.

PREPARED BY: Wendy Liao, **DATE:** December 15, 2003
Wendy Liao

APPROVED BY: Ellis Wu, **DATE:** December 15, 2003
Ellis Wu / Manager



2 SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

APPLIED STANDARD: 47 CFR Part 15, Subpart C			
Standard Section	Test Type and Limit	Result	REMARK
15.207	AC Power Conducted Emission	PASS	Meet the requirement of limit Minimum passing margin is -11.21dB at 0.166MHz
15.247(a)(2)	Spectrum Bandwidth of a Direct Sequence Spread Spectrum System Limit: min. 500kHz	PASS	Meet the requirement of limit
15.247(b)	Maximum Peak Output Power Limit: max. 30dBm	PASS	Meet the requirement of limit
15.247(c)	Transmitter Radiated Emissions Limit: Table 15.209	PASS	Meet the requirement of limit Minimum passing margin is -2.01dB at 2390.00MHz
15.247(d)	Power Spectral Density Limit: max. 8dBm	PASS	Meet the requirement of limit
15.247(c)	Band Edge Measurement Limit: 20 dB less than the peak value of fundamental frequency	PASS	Meet the requirement of limit

Note: The information of measurement uncertainty is available upon the customer's request.

3 GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

PRODUCT	Atheros 11g Card Bus Adapter
MODEL NO.	NL-3054CB Plus Aries2
BRAND NAME	SENAO
POWER SUPPLY	3.3Vdc from host equipment
MODULATION TYPE	BPSK, QPSK, CCK, 16QAM, 64QAM
RADIO TECHNOLOGY	DSSS, OFDM
TRANSFER RATE	54/48/36/24/18/12/11/9/6/5.5/2/1/Mbps Turbo mode: up to 108Mbps
FREQUENCY RANGE	2412MHz ~ 2462MHz
NUMBER OF CHANNEL	11
MAXIMUN OUTPUT POWER	22.00dBm
ANTENNA TYPE	Printed antenna with 0dBi antenna gain
DATA CABLE	NA
I/O PORTS	PCMCIA
ASSOCIATED DEVICES	NA

NOTE:

1. Fully compatible with the 802.11g standard to provide a wireless data rate of up to 54Mbps.
2. The EUT complies with IEEE 802.11g draft standards, and backward compatible with IEEE 802.11b products.
3. A turbo mode at channel 6 was provided to this EUT.
4. For more detailed features description, please refer to the manufacturer's specifications or User's Manual.

3.2 DESCRIPTION OF TEST MODES

Eleven channels are provided to 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 1GHz, the channel 1, 6, and 11 were pre-tested in chamber. The channel 11, the worst case, was chosen for final test.
2. Above 1GHz, the channel 1, 6, and 11 were tested individually.
3. Transfer rate, 11Mbps with CCK technique and 6Mbps with OFDM technique, the worst cases, were chosen for final test.
4. Three test results were presented in the following sections, the test result A was for CCK technique, the test result B was for OFDM technique and the test result C was for turbo mode at channel 6.

3.3 GENERAL DESCRIPTION OF APPLIED STANDARDS

The EUT is an Atheros 11g Card Bus Adapter. According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

FCC Part 15, Subpart C. (15.247)

ANSI C63.4 : 1992

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

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

3.4 DESCRIPTION OF SUPPORT UNITS

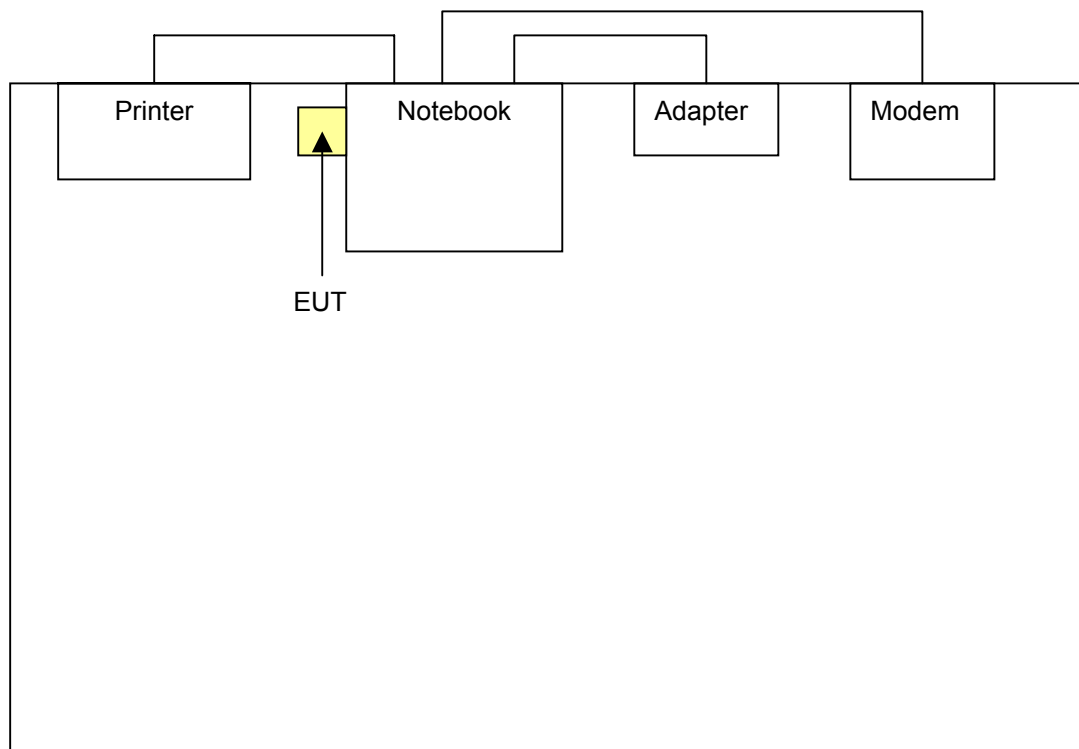
The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	NOTEBOOK	Dell	PP01L	TW-09C748-12800-190-B220	FCC DoC Approved
2	PRINTER	EPSON	LQ-300+	DCGY017096	FCC DoC Approved
3	MODEM	ACEEX	1414	980020503	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).

3.5 CONFIGURATION OF SYSTEM UNDER TEST



4 TEST TYPES AND RESULTS

4.1 CONDUCTED EMISSION MEASUREMENT

4.1.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT

FREQUENCY OF EMISSION (MHz)	CONDUCTED LIMIT (dB μ V)	
	Quasi-peak	Average
0.15-0.5	66 to 56	56 to 46
0.5-5	56	46
5-30	60	50

- NOTE:**
1. The lower limit shall apply at the transition frequencies.
 2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50 MHz.
 3. 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	ESCS 30	838251/021	Jan. 20, 2004
ROHDE & SCHWARZ Artificial Mains Network (for EUT)	ESH3-Z5	100218	Dec. 09, 2004
ROHDE & SCHWARZ Artificial Mains Network (for peripherals)	ESH3-Z5	100219	Dec. 09, 2004
ROHDE & SCHWARZ Artificial Mains Network (for peripherals)	ESH3-Z5	100220	Dec. 09, 2004
*ROHDE & SCHWARZ 4-wire ISN	ENY41	837032/016	Nov. 19, 2004
*ROHDE & SCHWARZ 2-wire ISN	ENY22	837497/016	Nov. 19, 2004
Software	Cond-V2M3	NA	NA
RF cable (JYEBAO)	5D-FB	Cable-C10.01	May 01, 2004
SUHNTER Terminator (For ROHDE & SCHWARZ LISN)	65BNC-5001	E1-010770	Mar. 24, 2004
SUHNTER Terminator (For ROHDE & SCHWARZ LISN)	65BNC-5001	E1-010773	Apr. 06, 2004

- NOTE:**
1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
 2. “*”: These equipment are used for conducted telecom port test only (if tested).
 3. The test was performed in ADT Shielded Room No. 10.
 4. The VCCI Site Registration No. is C-1312.



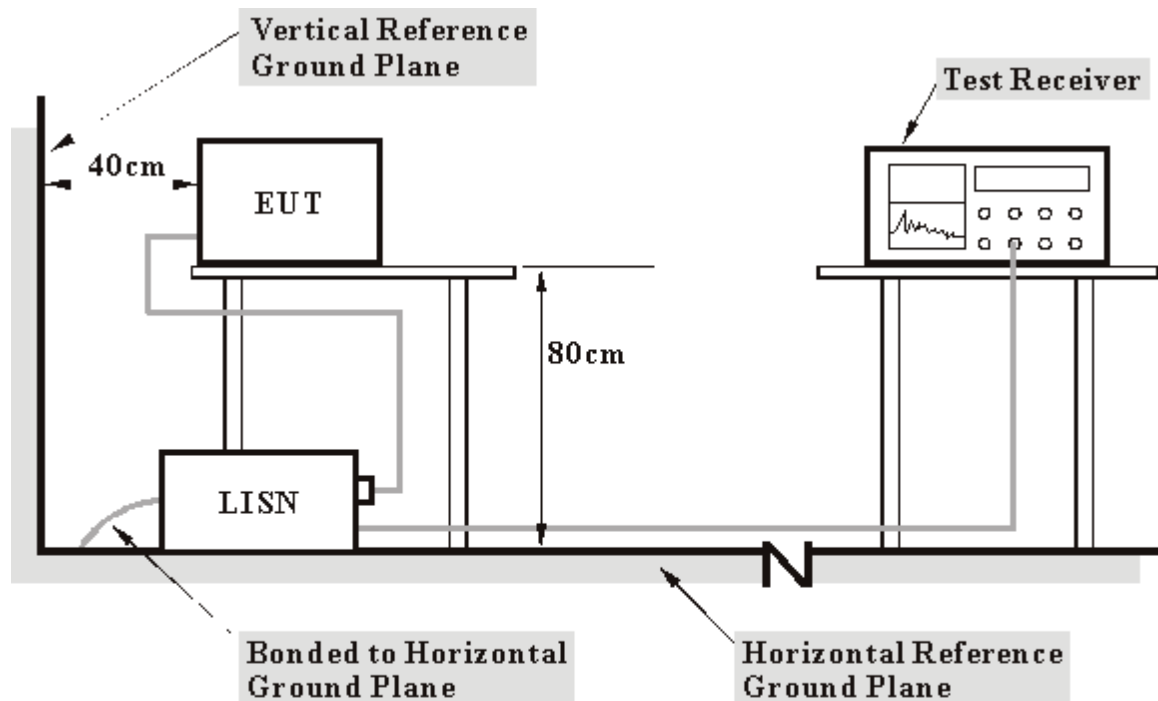
4.1.3 TEST PROCEDURES

- a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance for the measuring instrument.
- b. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.
- c. The frequency range from 150 kHz to 30 MHz was searched. Emission levels over 10dB under the prescribed limits could not be reported

4.1.4 DEVIATION FROM TEST STANDARD

No deviation

4.1.5 TEST SETUP



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

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



4.1.6 EUT OPERATING CONDITIONS

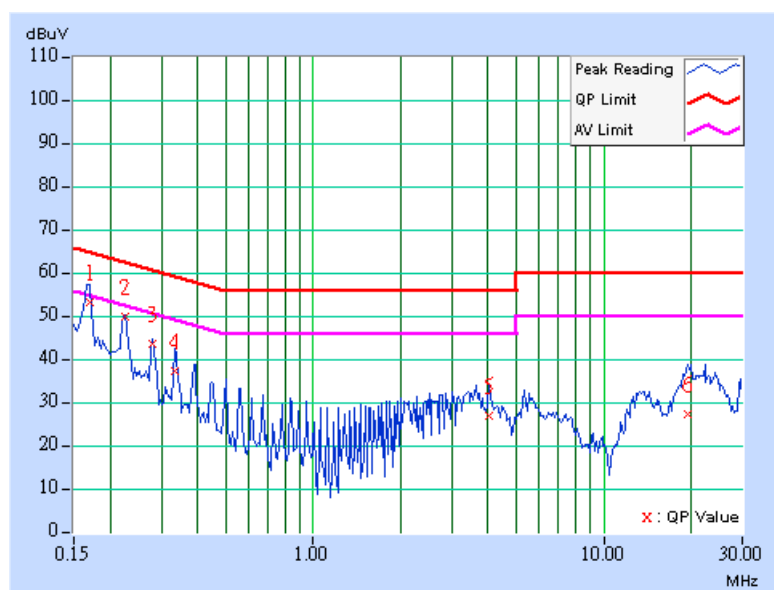
- a. Connected the EUT to a computer system placed on a testing table.
- b. The computer system ran a test program to enable EUT under transmission/receiving condition continuously at specific channel frequency.
- c. The computer system sent "H" messages to its screen.
- d. The computer system sent "H" messages to modem.
- e. The computer system sent "H" messages to printer, and the printer prints them on paper.
- f. Steps b-e are repeated.

4.1.7 TEST RESULTS

EUT	Atheros 11g Card Bus Adapter	MODEL	NL-3054CB Plus Aries2
MODE	Channel 1	6dB BANDWIDTH	9 kHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	PHASE	Line (L)
ENVIRONMENTAL CONDITIONS	20 deg. C, 65%RH, 991 hPa	TESTED BY: Jamison Chan	

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	0.170	0.06	52.71	-	52.77	-	64.98	54.98	-12.22	-
2	0.224	0.06	49.33	-	49.39	-	62.66	52.66	-13.27	-
3	0.279	0.06	43.04	-	43.10	-	60.85	50.85	-17.75	-
4	0.334	0.06	36.61	-	36.67	-	59.36	49.36	-22.69	-
5	4.020	0.22	26.33	-	26.55	-	56.00	46.00	-29.45	-
6	19.426	0.63	26.68	-	27.31	-	60.00	50.00	-32.69	-

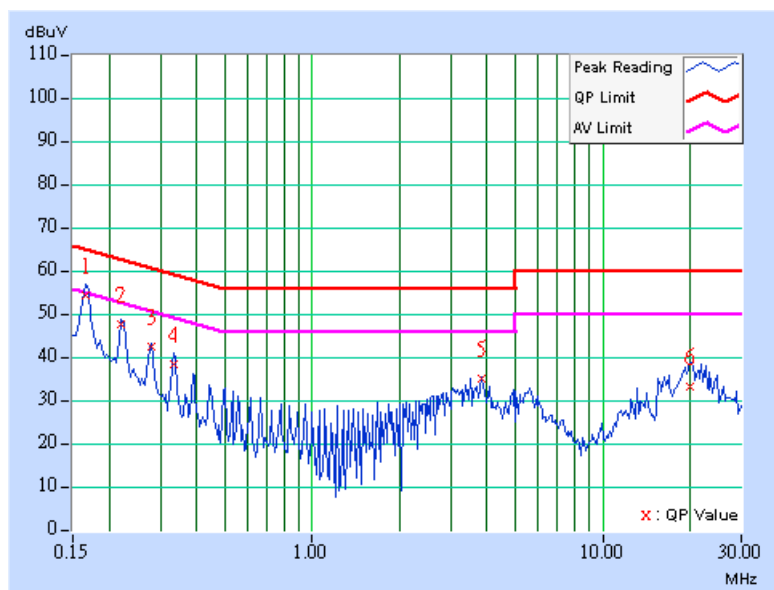
- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
 2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
 3. The emission levels of other frequencies were very low against the limit.
 4. Margin value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



EUT	Atheros 11g Card Bus Adapter	MODEL	NL-3054CB Plus Aries2
MODE	Channel 1	6dB BANDWIDTH	9 kHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	PHASE	Neutral (N)
ENVIRONMENTAL CONDITIONS	20 deg. C, 60%RH, 991 hPa	TESTED BY: Jamison Chan	

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	0.166	0.05	53.92	-	53.97	-	65.18	55.18	-11.21	-
2	0.220	0.05	47.25	-	47.30	-	62.81	52.81	-15.51	-
3	0.279	0.05	42.05	-	42.10	-	60.85	50.85	-18.75	-
4	0.334	0.05	37.93	-	37.98	-	59.36	49.36	-21.38	-
5	3.846	0.20	34.53	-	34.73	-	56.00	46.00	-21.27	-
6	19.875	0.51	32.64	-	33.15	-	60.00	50.00	-26.85	-

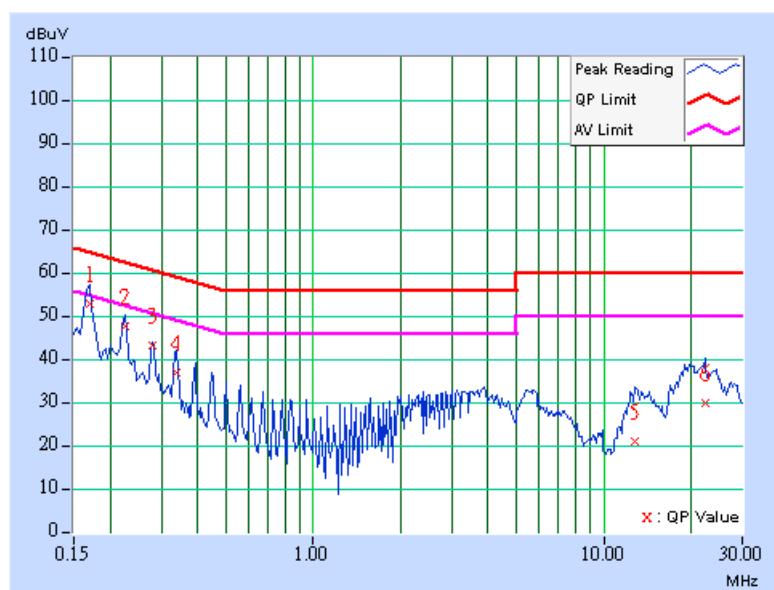
- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
 2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
 3. The emission levels of other frequencies were very low against the limit.
 4. Margin value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



EUT	Atheros 11g Card Bus Adapter	MODEL	NL-3054CB Plus Aries2
MODE	Channel 6	6dB BANDWIDTH	9 kHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	PHASE	Line (L)
ENVIRONMENTAL CONDITIONS	20 deg. C, 60%RH, 991 hPa	TESTED BY: Jamison Chan	

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	0.170	0.06	52.31	-	52.37	-	64.98	54.98	-12.62	-
2	0.224	0.06	46.96	-	47.02	-	62.66	52.66	-15.64	-
3	0.279	0.06	42.51	-	42.57	-	60.85	50.85	-18.28	-
4	0.338	0.06	36.24	-	36.30	-	59.26	49.26	-22.96	-
5	12.867	0.50	20.35	-	20.85	-	60.00	50.00	-39.15	-
6	22.324	0.76	29.20	-	29.96	-	60.00	50.00	-30.04	-

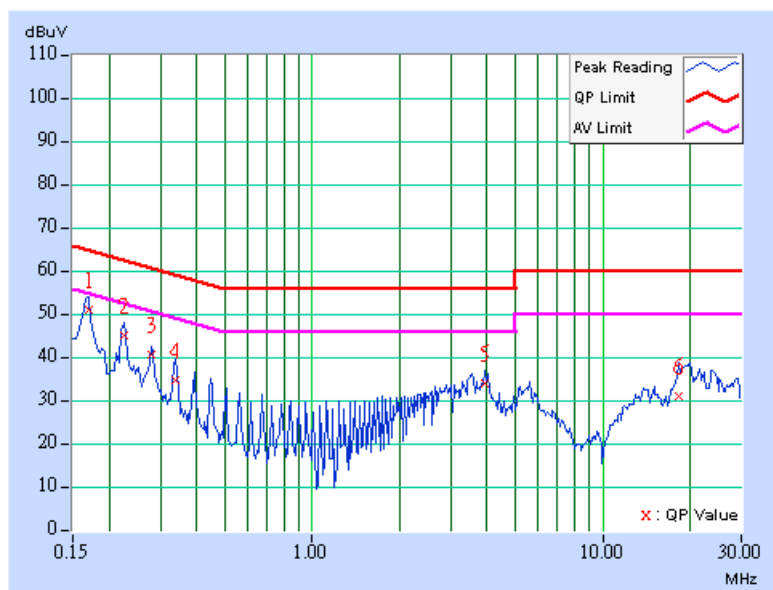
REMARKS: 1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. The emission levels of other frequencies were very low against the limit.
4. Margin value = Emission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



EUT	Atheros 11g Card Bus Adapter	MODEL	NL-3054CB Plus Aries2
MODE	Channel 6	6dB BANDWIDTH	9 kHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	PHASE	Neutral (N)
ENVIRONMENTAL CONDITIONS	20 deg. C, 60%RH, 991 hPa	TESTED BY: Jamison Chan	

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	0.170	0.05	50.57	-	50.62	-	64.98	54.98	-14.36	-
2	0.224	0.05	44.85	-	44.90	-	62.66	52.66	-17.76	-
3	0.279	0.05	40.11	-	40.16	-	60.85	50.85	-20.69	-
4	0.338	0.05	34.47	-	34.52	-	59.26	49.26	-24.74	-
5	3.922	0.21	33.72	-	33.93	-	56.00	46.00	-22.07	-
6	18.340	0.50	30.69	-	31.19	-	60.00	50.00	-28.81	-

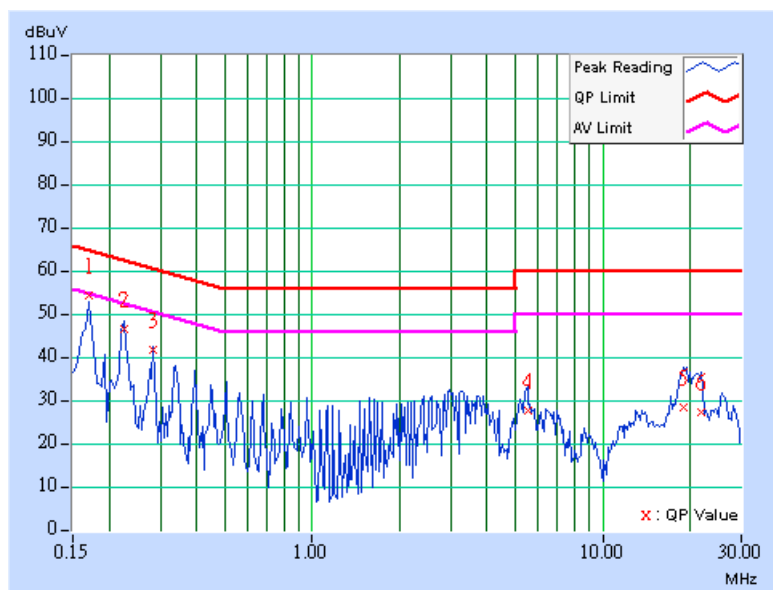
- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
 2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
 3. The emission levels of other frequencies were very low against the limit.
 4. Margin value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



EUT	Atheros 11g Card Bus Adapter	MODEL	NL-3054CB Plus Aries2
MODE	Channel 11	6dB BANDWIDTH	9 kHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	PHASE	Line (L)
ENVIRONMENTAL CONDITIONS	20 deg. C, 60%RH, 991 hPa	TESTED BY: Jamison Chan	

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	0.170	0.06	53.62	-	53.68	-	64.98	54.98	-11.31	-
2	0.224	0.06	45.97	-	46.03	-	62.66	52.66	-16.63	-
3	0.283	0.06	41.27	-	41.33	-	60.73	50.73	-19.40	-
4	5.504	0.27	27.08	-	27.35	-	60.00	50.00	-32.65	-
5	18.914	0.62	27.61	-	28.23	-	60.00	50.00	-31.77	-
6	21.848	0.73	26.75	-	27.48	-	60.00	50.00	-32.52	-

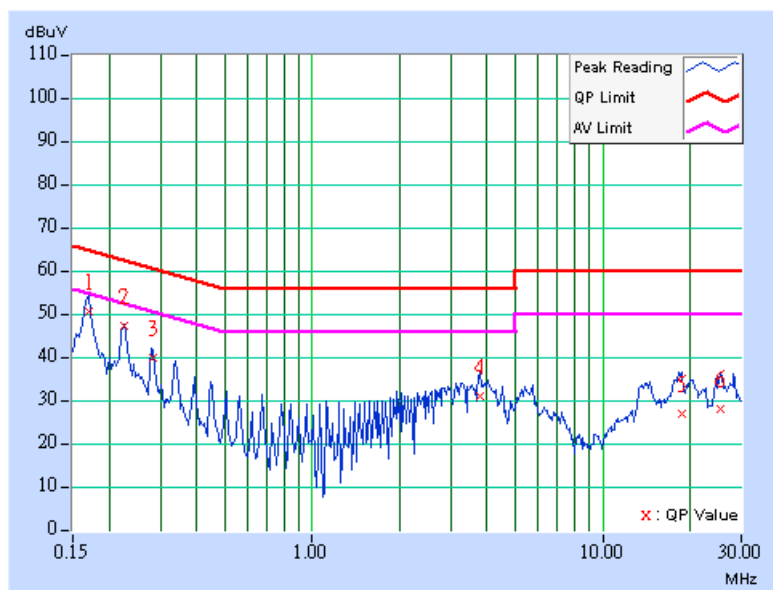
- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
 2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
 3. The emission levels of other frequencies were very low against the limit.
 4. Margin value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



EUT	Atheros 11g Card Bus Adapter	MODEL	NL-3054CB Plus Aries2
MODE	Channel 11	6dB BANDWIDTH	9 kHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	PHASE	Netural (N)
ENVIRONMENTAL CONDITIONS	20 deg. C, 60%RH, 991 hPa	TESTED BY: Jamison Chan	

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	0.170	0.05	50.19	-	50.24	-	64.98	54.98	-14.74	-
2	0.224	0.05	46.54	-	46.59	-	62.66	52.66	-16.07	-
3	0.283	0.05	39.27	-	39.32	-	60.73	50.73	-21.41	-
4	3.758	0.20	30.25	-	30.45	-	56.00	46.00	-25.55	-
5	18.691	0.50	26.30	-	26.80	-	60.00	50.00	-33.20	-
6	25.430	0.73	27.59	-	28.32	-	60.00	50.00	-31.68	-

- REMARKS:**
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

Emissions radiated outside of the specified bands, shall be according to the general radiated limits in 15.209 as following:

Frequencies (MHz)	Field strength (microvolts/meter)	Measurement distance (meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

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	Jun. 10, 2004
* HP Preamplifier	8447D	2944A08485	May 01, 2004
* HP Spectrum Analyzer	8593E	3926A04191	
* HP Preamplifier	8449B	3008A01292	Aug. 13, 2004
ROHDE & SCHWARZ TEST RECEIVER	ESI7	838496/016	Feb. 23, 2004
* ROHDE & SCHWARZ TEST RECEIVER	ESMI	839013/007 839379/002	Feb. 13, 2004
SCHAFFNER Tunable Dipole Antenna	VHBA 9123	459	Jun. 26, 2004
SCHWARZBECK Tunable Dipole Antenna	UHA 9105	977	
* CHASE BILOG Antenna	CBL6112A	2221	July 26, 2004
* SCHWARZBECK Horn Antenna	BBHA9120-D1	D130	Jun. 30, 2004
* EMCO Turn Table	1060	1115	NA
* CHANCE Tower	CM-AT40	CM-A010	NA
* Software	ADT_Radiate d_V5.14	NA	NA
* ANRITSU RF Switches	MP59B	M35046	Jan. 05, 2004
* TIMES RF cable	LMR-600	CABLE-ST5-01	Jan. 05, 2004

NOTE: 1. The calibration interval of the above test instruments is 12 months. And the calibrations are traceable to NML/ROC and NIST/USA.

2. "*" = These equipment are used for the final measurement.
3. The horn antenna and HP preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
4. The test was performed in ADT Open Site No. 5.
5. The VCCI Site Registration No. is R-1039.



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 peak, quasi-peak or average method as specified and then reported in a data sheet.

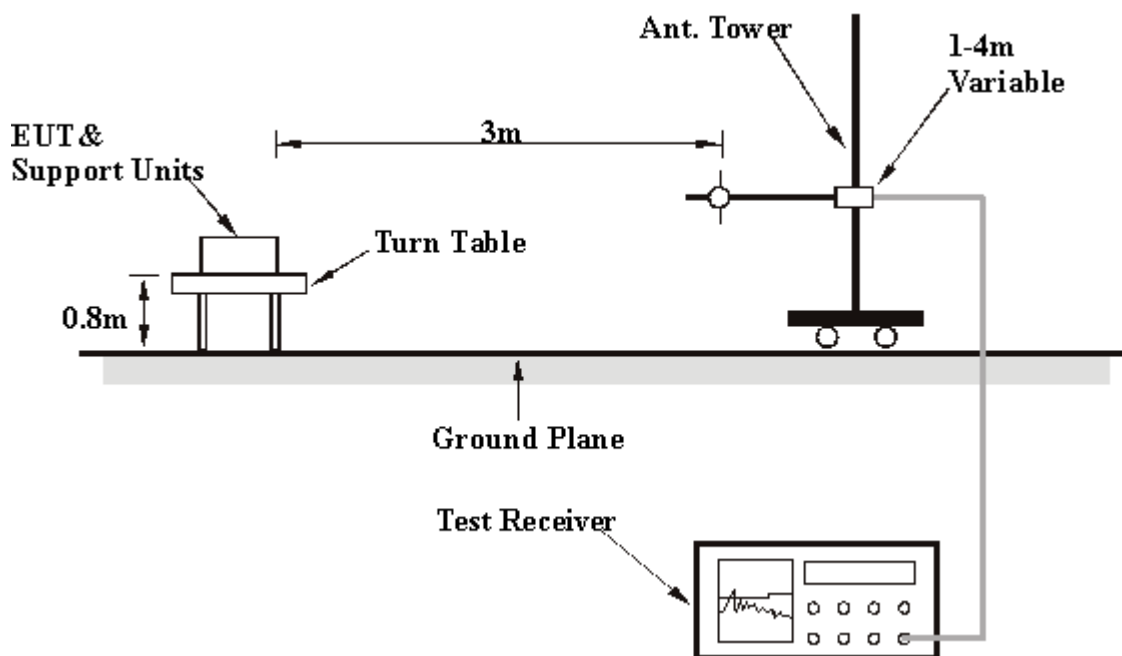
NOTE:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Peak detection (PK) and Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1 MHz for Peak detection at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 10 Hz for Average detection (AV) at frequency above 1GHz.

4.2.4 DEVIATION FROM TEST STANDARD

No deviation

4.2.5 TEST SETUP



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

4.2.6 EUT OPERATING CONDITIONS

Same as 4.1.6

4.2.7 TEST RESULTS

EUT	Atheros 11g Card Bus Adapter	MODEL	NL-3054CB Plus Aries2
MODE	Channel 11	FREQUENCY RANGE	Below 1000 MHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Quasi-Peak
ENVIRONMENTAL CONDITIONS	25 deg. C, 74 % RH, 991 hPa	TESTED BY: Martin Lee	

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	57.21	24.23 QP	40.00	-15.77	3.00 H	157	10.85	13.38
2	133.03	31.90 QP	43.50	-11.60	2.50 H	217	18.63	13.26
3	175.79	32.73 QP	43.50	-10.77	1.50 H	229	19.86	12.87
4	265.21	29.03 QP	46.00	-16.97	1.00 H	1	15.15	13.88
5	298.26	30.28 QP	46.00	-15.72	1.00 H	229	15.23	15.05
6	360.46	26.88 QP	46.00	-19.12	1.00 H	40	10.19	16.69
7	399.34	30.72 QP	46.00	-15.28	1.00 H	61	13.03	17.69
8	432.38	26.79 QP	46.00	-19.21	2.00 H	91	8.05	18.74
9	500.42	27.85 QP	46.00	-18.15	1.75 H	124	7.83	20.02
10	533.47	35.08 QP	46.00	-10.92	1.50 H	211	14.32	20.75
11	564.57	27.96 QP	46.00	-18.04	1.50 H	229	6.41	21.55
12	599.56	30.59 QP	46.00	-15.41	1.50 H	247	8.00	22.59
13	653.99	26.27 QP	46.00	-19.73	1.50 H	223	2.96	23.31
14	702.59	33.97 QP	46.00	-12.03	1.25 H	307	9.92	24.05
15	749.24	30.03 QP	46.00	-15.97	2.00 H	169	4.70	25.33
16	811.44	27.66 QP	46.00	-18.34	1.00 H	133	1.92	25.74
17	858.10	35.10 QP	46.00	-10.90	1.00 H	133	8.80	26.30
18	916.41	28.15 QP	46.00	-17.85	1.00 H	274	0.83	27.33
19	947.52	30.88 QP	46.00	-15.12	1.50 H	118	3.20	27.68

- REMARKS:**
1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB)
 2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
 3. The other emission levels were very low against the limit.
 4. Margin value = Emission level – Limit value.

EUT	Atheros 11g Card Bus Adapter	MODEL	NL-3054CB Plus Aries2
MODE	Channel 11	FREQUENCY RANGE	Below 1000 MHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Quasi-Peak
ENVIRONMENTAL CONDITIONS	25 deg. C, 74 % RH, 991 hPa	TESTED BY: Martin Lee	

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	57.21	28.37 QP	40.00	-11.63	1.25 V	250	14.99	13.38
2	133.03	33.06 QP	43.50	-10.44	1.25 V	85	19.80	13.26
3	175.79	32.81 QP	43.50	-10.69	1.00 V	49	19.94	12.87
4	300.20	30.32 QP	46.00	-15.68	1.25 V	55	15.22	15.10
5	350.74	32.54 QP	46.00	-13.46	2.50 V	88	16.10	16.44
6	399.34	32.58 QP	46.00	-13.42	1.00 V	130	14.88	17.69
7	467.37	29.22 QP	46.00	-16.78	1.00 V	169	9.67	19.55
8	498.48	31.42 QP	46.00	-14.58	1.00 V	97	11.43	19.99
9	531.52	37.38 QP	46.00	-8.62	1.00 V	94	16.67	20.71
10	564.57	29.13 QP	46.00	-16.87	1.25 V	4	7.58	21.55
11	599.56	30.90 QP	46.00	-15.10	1.00 V	163	8.32	22.59
12	630.66	29.90 QP	46.00	-16.10	1.00 V	172	6.90	23.00
13	702.59	40.18 QP	46.00	-5.82	1.50 V	169	16.13	24.05
14	733.69	27.77 QP	46.00	-18.23	1.50 V	169	2.87	24.90
15	766.73	27.49 QP	46.00	-18.51	1.75 V	61	2.05	25.44
16	799.78	29.05 QP	46.00	-16.95	1.50 V	136	3.43	25.62
17	858.10	37.29 QP	46.00	-8.71	1.25 V	166	10.99	26.30
18	912.53	29.96 QP	46.00	-16.04	1.25 V	163	2.68	27.28
19	947.52	33.02 QP	46.00	-12.98	1.25 V	340	5.34	27.68

- REMARKS:**
1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB)
 2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
 3. The other emission levels were very low against the limit.
 4. Margin value = Emission level – Limit value.

4.2.8 TEST RESULTS (A)

EUT	Atheros 11g Card Bus Adapter	MODEL	NL-3054CB Plus Aries2
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, 60 % RH, 991 hPa	TESTED BY: Hardaway Lee	

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2390.00	60.13 PK	74.00	-13.87	1.00 H	275	30.48	29.65
1	2390.00	51.07 AV	54.00	-2.93	1.00 H	275	21.42	29.65
2	*2412.00	114.30 PK			1.00 H	275	84.58	29.72
2	*2412.00	105.24 AV			1.00 H	275	75.52	29.72
3	4824.00	54.74 PK	74.00	-19.26	1.85 H	3	19.29	35.45
3	4824.00	38.39 AV	54.00	-15.61	1.85 H	3	2.94	35.45
4	7236.00	60.45 PK	74.00	-13.55	2.00 H	283	19.82	40.63
4	7236.00	46.50 AV	54.00	-7.50	2.00 H	283	5.87	40.63
5	9648.00	57.54 PK	74.00	-16.46	1.79 H	307	13.08	44.46
5	9648.00	46.25 AV	54.00	-7.75	1.79 H	307	1.79	44.46

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2390.00	57.54 PK	74.00	-16.46	1.00 V	64	27.89	29.65
1	2390.00	48.58 AV	54.00	-5.42	1.00 V	64	18.93	29.65
2	*2412.00	111.71 PK			1.00 V	64	81.99	29.72
2	*2412.00	102.75 AV			1.00 V	64	73.03	29.72
3	4824.00	57.74 PK	74.00	-16.26	1.03 V	274	22.29	35.45
3	4824.00	41.84 AV	54.00	-12.16	1.03 V	274	6.39	35.45
4	7236.00	60.03 PK	74.00	-13.97	2.35 V	316	19.40	40.63
4	7236.00	46.01 AV	54.00	-7.99	2.35 V	316	5.38	40.63
5	9648.00	58.23 PK	74.00	-15.77	2.61 V	312	13.77	44.46
5	9648.00	49.81 AV	54.00	-4.19	2.61 V	312	5.35	44.46

REMARKS:

1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB)
2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. “ * ” : Fundamental frequency

EUT	Atheros 11g Card Bus Adapter	MODEL	NL-3054CB Plus Aries2
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, 60 % RH, 991 hPa	TESTED BY: Hardaway Lee	

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2390.00	55.0 PK	74.00	-19.00	1.09 H	239	25.40	29.60
1	*2437.00	116.46 PK			1.04 H	274	86.67	29.79
1	*2437.00	107.58 AV			1.04 H	274	77.79	29.79
2	4874.00	55.52 PK	74.00	-18.48	1.66 H	276	19.73	35.79
2	4874.00	37.84 AV	54.00	-16.16	1.66 H	276	2.05	35.79
3	7311.00	62.23 PK	74.00	-11.77	2.10 H	273	21.57	40.67
3	7311.00	46.62 AV	54.00	-7.38	2.10 H	273	5.96	40.67
4	9748.00	56.23 PK	74.00	-17.77	2.12 H	14	12.03	44.20
4	9748.00	42.05 AV	54.00	-11.95	2.12 H	14	-2.15	44.20

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2437.00	113.20 PK			1.24 V	33	83.41	29.79
1	*2437.00	103.50 AV			1.24 V	33	73.71	29.79
2	4874.00	59.38 PK	74.00	-14.62	1.24 V	33	23.59	35.79
2	4874.00	42.52 AV	54.00	-11.48	1.24 V	33	6.73	35.79
3	7310.00	65.06 PK	74.00	-8.94	2.00 V	266	24.40	40.66
3	7310.00	44.08 AV	54.00	-9.92	2.00 V	266	3.42	40.66

REMARKS:

1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB)
2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. “ * ” : Fundamental frequency

EUT	Atheros 11g Card Bus Adapter	MODEL	NL-3054CB Plus Aries2
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, 60 % RH, 991 hPa	TESTED BY: Hardaway Lee	

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2462.00	112.94 PK			1.00 H	275	83.09	29.85
1	*2462.00	104.80 AV			1.00 H	275	74.95	29.85
2	2483.50	55.85 PK	74.00	-18.15	1.00 H	275	25.94	29.91
2	2483.50	47.71 AV	54.00	-6.29	1.00 H	275	17.80	29.91
3	4924.00	54.18 PK	74.00	-19.82	2.07 H	308	18.09	36.09
3	4924.00	37.99 AV	54.00	-16.01	2.07 H	308	1.90	36.09
4	7386.00	60.21 PK	74.00	-13.79	1.96 H	273	19.18	41.02
4	7386.00	45.64 AV	54.00	-8.36	1.96 H	273	4.61	41.02
5	9848.00	48.96 PK	74.00	-25.04	2.25 H	294	4.86	44.10
6	12310.00	57.92 PK	74.00	-16.08	1.34 H	248	11.98	45.94
6	12310.00	44.51 AV	54.00	-9.49	1.34 H	248	-1.43	45.94

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2462.00	110.67 PK			1.00 V	75	80.82	29.85
1	*2462.00	101.68 AV			1.00 V	75	71.83	29.85
2	2462.00	53.58 PK	74.00	-20.42	1.00 V	75	23.73	29.85
2	2462.00	44.59 AV	54.00	-9.41	1.00 V	75	14.74	29.85
3	4924.00	57.20 PK	74.00	-16.80	1.52 V	91	21.11	36.09
3	4924.00	40.10 AV	54.00	-13.90	1.52 V	91	4.01	36.09
4	7386.00	60.32 PK	74.00	-13.68	2.54 V	322	19.29	41.02
4	7386.00	46.33 AV	54.00	-7.67	2.54 V	322	5.30	41.02
5	9848.00	57.03 PK	74.00	-16.97	1.00 V	230	12.93	44.10
5	9848.00	47.73 AV	54.00	-6.27	1.00 V	230	3.63	44.10

REMARKS:

1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB)
2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. “ * ” : Fundamental frequency

4.2.9 TEST RESULTS (B)

EUT	Atheros 11g Card Bus Adapter	MODEL	NL-3054CB Plus Aries2
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, 60 % RH, 991 hPa	TESTED BY: Hardaway Lee	

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2390.00	62.13 PK	74.00	-11.87	1.00 H	0	32.48	29.65
1	2390.00	51.99 AV	54.00	-2.01	1.00 H	0	22.34	29.65
2	*2412.00	109.53 PK			1.00 H	0	79.81	29.72
2	*2412.00	99.39 AV			1.00 H	0	69.67	29.72
3	4824.00	51.50 PK	74.00	-22.50	1.85 H	215	16.05	35.45
3	4824.00	32.98 AV	54.00	-21.02	1.85 H	215	-2.47	35.45
4	7236.00	52.04 PK	74.00	-21.96	1.71H	230	11.41	40.63
4	7236.00	38.34 AV	54.00	-15.66	1.71H	230	-2.29	40.63

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2390.00	56.75 PK	74.00	-17.25	2.24 H	238	27.10	29.65
1	2390.00	47.03 AV	54.00	-6.97	2.24 H	238	17.38	29.65
2	*2412.00	104.15 PK			2.24 H	238	74.43	29.72
2	*2412.00	94.43 AV			2.24 H	238	64.71	29.72
3	4824.00	46.04 PK	74.00	-27.96	1.26 H	231	10.59	35.45
3	4824.00	32.50 AV	54.00	-21.50	1.26 H	231	-2.95	35.45

REMARKS:

1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB)
2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. “ * “ : Fundamental frequency



EUT	Atheros 11g Card Bus Adapter	MODEL	NL-3054CB Plus Aries2
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, 60 % RH, 991 hPa	TESTED BY: Hardaway Lee	

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2437.00	109.91 PK			1.22 H	99	80.12	29.79
1	*2437.00	99.52 AV			1.22 H	99	69.73	29.79
2	4874.00	45.52 PK	74.00	-28.48	1.61 H	170	9.73	35.79

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2437.00	103.70 PK			1.53 V	168	73.91	29.79
1	*2437.00	93.44 AV			1.53 V	168	63.65	29.79
2	4874.00	46.13 PK	74.00	-27.87	1.14 V	273	10.34	35.79

REMARKS:

1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB)
2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. “ * “ : Fundamental frequency



EUT	Atheros 11g Card Bus Adapter	MODEL	NL-3054CB Plus Aries2
MODE	Channel 11	FREQUENCY RANGE	Above 1000 MHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak(PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25 deg. C, 60 % RH, 991 hPa	TESTED BY: Hardaway Lee	

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2462.00	109.51 PK			1.26 H	96	79.66	29.85
1	*2462.00	100.72 AV			1.26 H	96	70.87	29.85
2	2483.60	59.51 PK	74.00	-14.49	1.26 H	96	29.60	29.91
2	2483.60	50.72 AV	54.00	-3.28	1.26 H	96	20.81	29.91
3	4924.00	49.05 PK	74.00	-24.95	1.00 H	24	12.96	36.09
3	4924.00	40.26 AV	54.00	-13.74	1.00 H	24	4.17	36.09

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2462.00	104.65 PK			1.03 V	65	74.80	29.85
1	*2462.00	94.27 AV			1.03 V	65	64.42	29.85
2	2483.60	54.65 PK	74.00	-19.35	1.03 V	65	24.74	29.91
2	2483.60	44.27 AV	54.00	-9.73	1.03 V	65	14.36	29.91
3	4924.00	47.70 PK	74.00	-26.30	1.35 V	147	11.61	36.09
3	4924.00	37.32 AV	54.00	-16.68	1.35 V	147	1.23	36.09

REMARKS:

1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB)
2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. “ * “ : Fundamental frequency

4.2.10 TEST RESULTS (C)

EUT	Atheros 11g Card Bus Adapter	MODEL	NL-3054CB Plus Aries2
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, 60 % RH, 991 hPa	TESTED BY: Hardaway Lee	

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2437.00	104.83 PK			2.11 H	199	75.04	29.79
1	*2437.00	95.47 AV			2.11 H	199	65.68	29.79
2	2483.50	52.57 PK	74.00	-21.43	2.11 H	199	22.66	29.91
2	2483.50	43.24 AV	54.00	-10.76	2.11 H	199	13.33	29.91
3	2483.50	58.61 PK	74.00	-15.39	2.11 H	199	28.70	29.91
3	2483.50	49.25 AV	54.00	-4.75	2.11 H	199	19.34	29.91
4	4874.00	45.59 PK	74.00	-28.41	1.21 H	230	9.80	35.79

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2390.00	55.63 PK	74.00	-18.37	1.42 V	71	25.98	29.65
1	2390.00	46.31 AV	54.00	-7.69	1.42 V	71	16.66	29.65
2	*2437.00	101.85 PK			1.42 V	71	72.06	29.79
2	*2437.00	92.53 AV			1.42 V	71	62.74	29.79
3	2483.50	49.59 PK	74.00	-24.41	1.42 V	71	19.68	29.91
4	4874.00	44.98 PK	74.00	-29.02	1.25 V	275	9.19	35.79

REMARKS:

1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB)
2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. “ * ” : Fundamental frequency



4.3 6dB BANDWIDTH MEASUREMENT

4.3.1 LIMITS OF 6dB BANDWIDTH MEASUREMENT

The minimum of 6dB Bandwidth Measurement is 0.5 MHz.

4.3.2 TEST INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
SPECTRUM ANALYZER	FSEK30	100049	Aug. 12, 2004

NOTE:

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

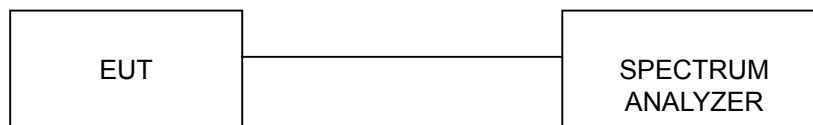
4.3.3 TEST PROCEDURE

The transmitter output was connected to the spectrum analyzer through an attenuator. The bandwidth of the fundamental frequency was measured by spectrum analyzer with 100 kHz RBW and 100 kHz VBW. The 6 dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 6 dB.

4.3.4 DEVIATION FROM TEST STANDARD

No deviation

4.3.5 TEST SETUP



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

4.3.6 EUT OPERATING CONDITIONS

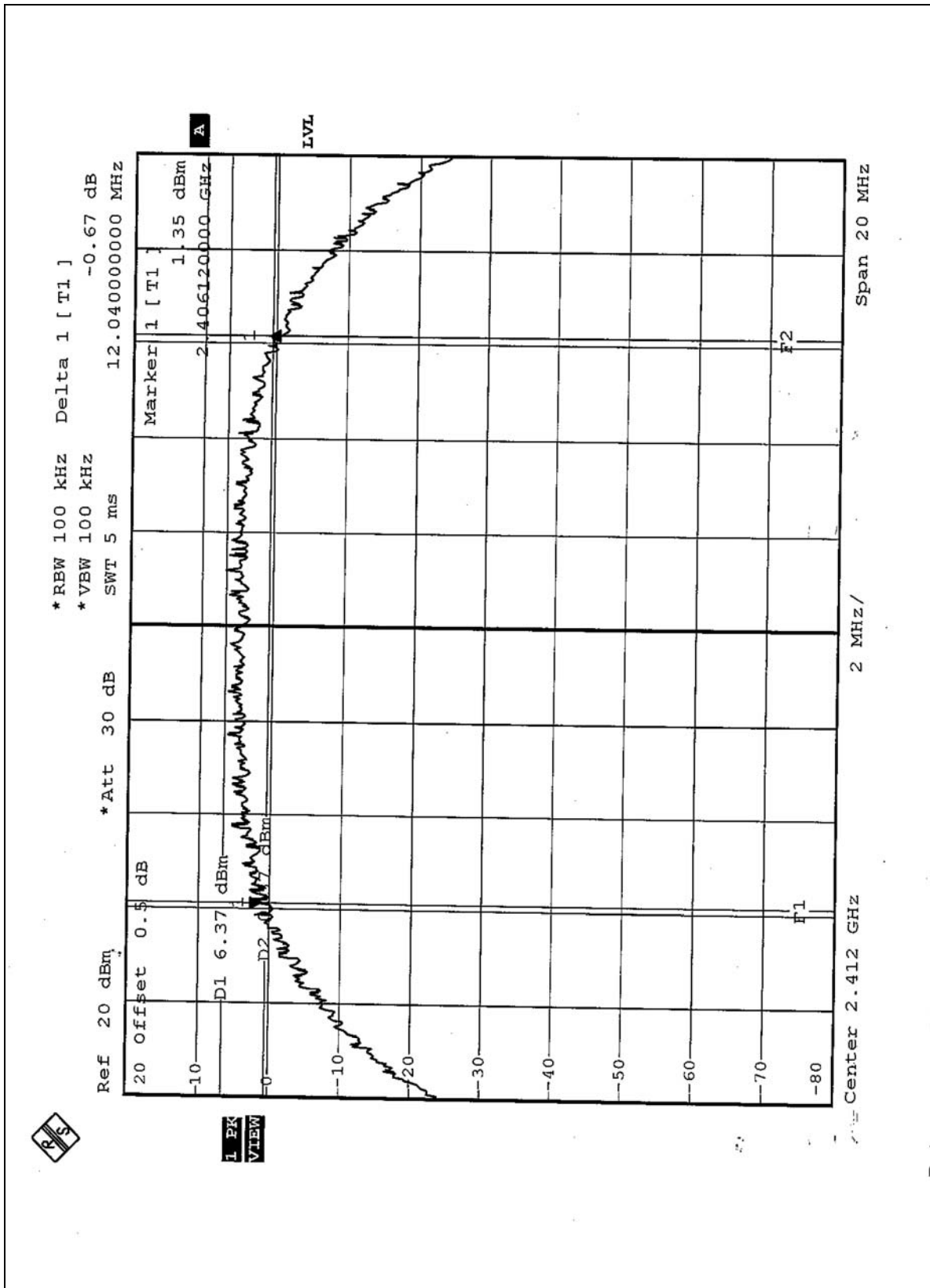
The software provided by client to enable the EUT under transmission condition continuously at lowest, middle and highest channel frequencies individually.

4.3.7 TEST RESULTS (A)

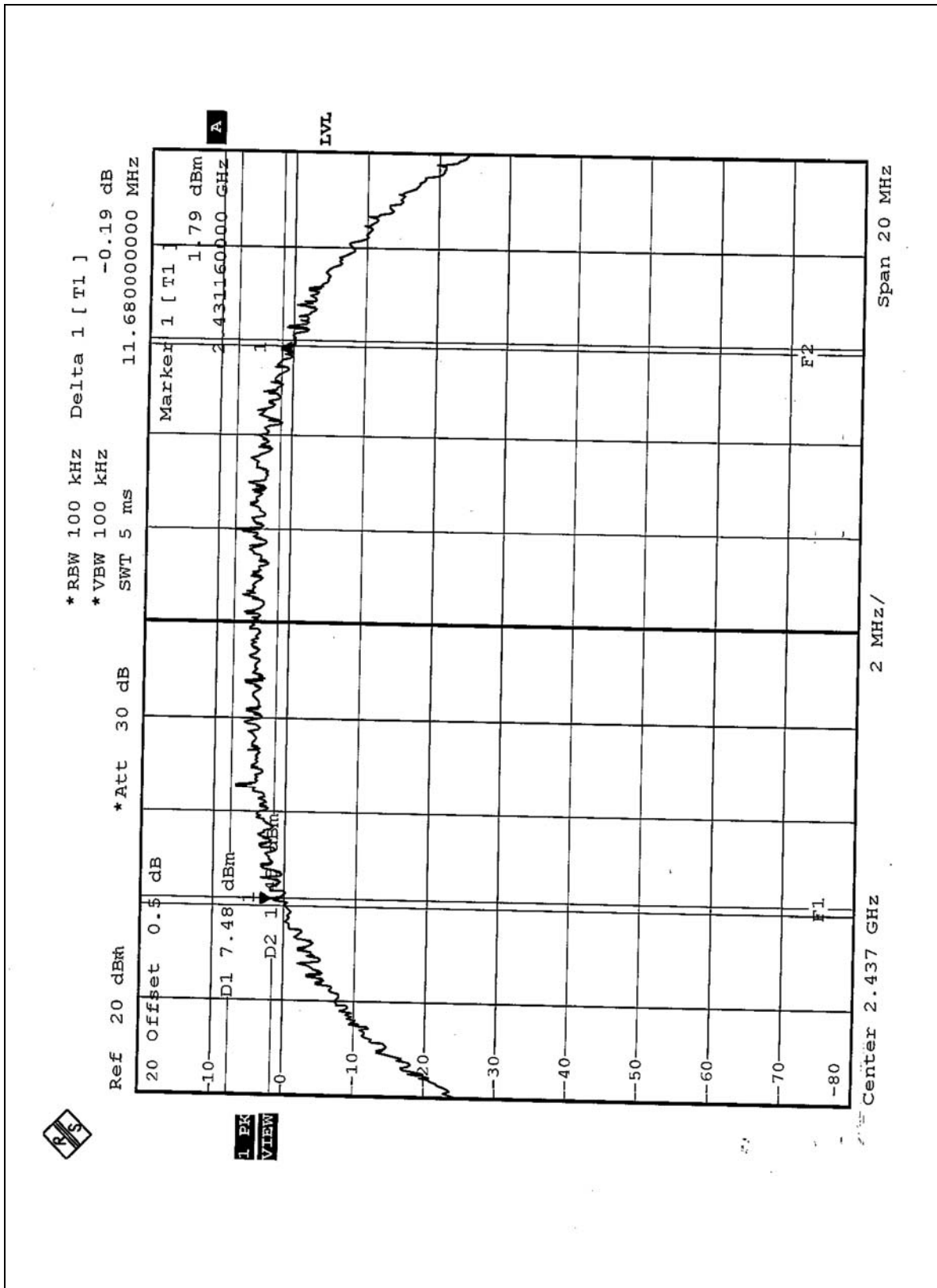
EUT	Atheros 11g Card Bus Adapter	MODEL	NL-3054CB Plus Aries2
INPUT POWER (SYSTEM)	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	23 deg. C, 65%RH, 991 hPa
TESTED BY: Jamison Chan			

CHANNEL	CHANNEL FREQUENCY (MHz)	6 dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS/FAIL
1	2412	12.04	0.5	PASS
6	2437	11.68	0.5	PASS
11	2462	11.60	0.5	PASS

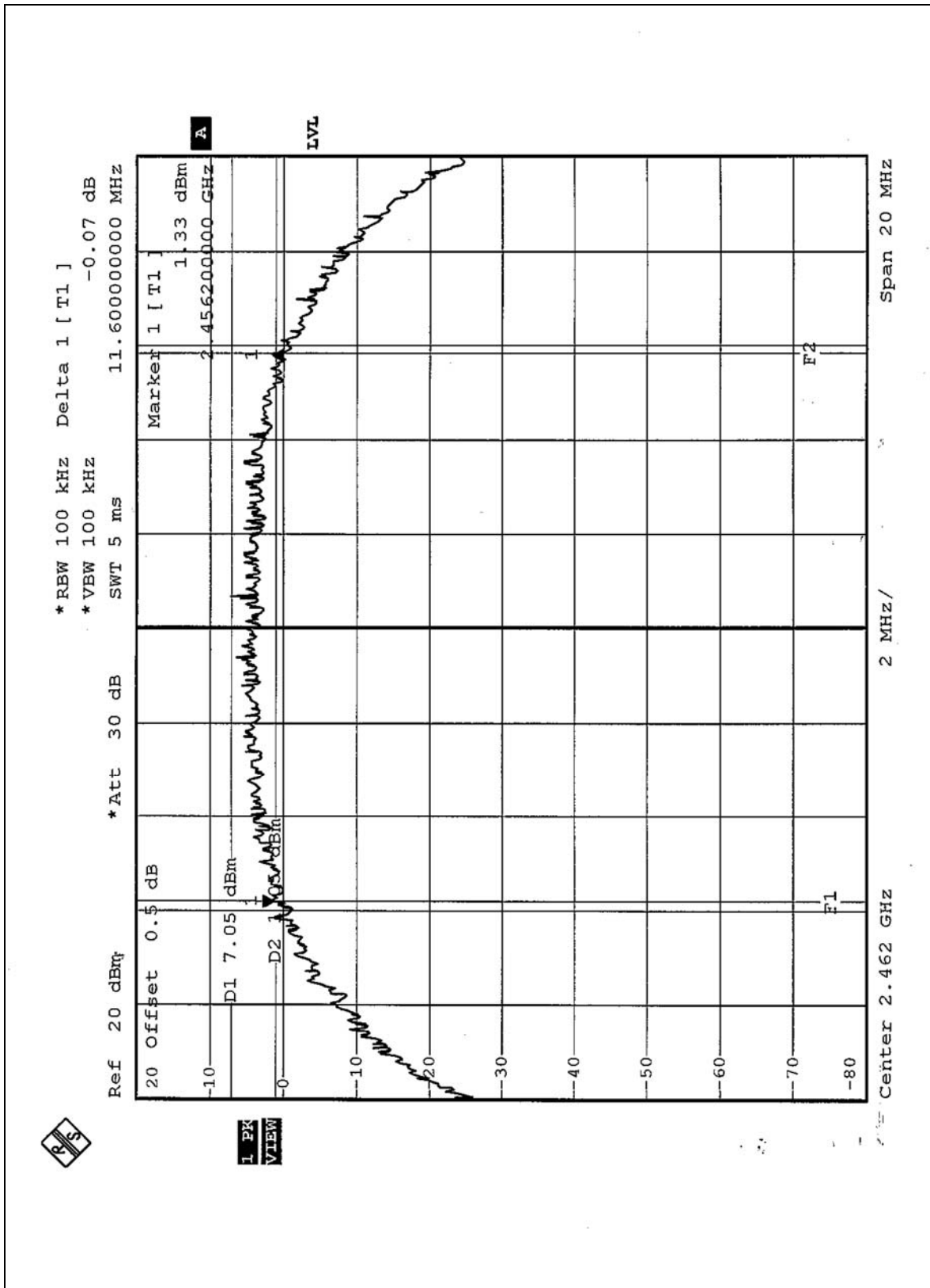
CH1



CH6



CH11

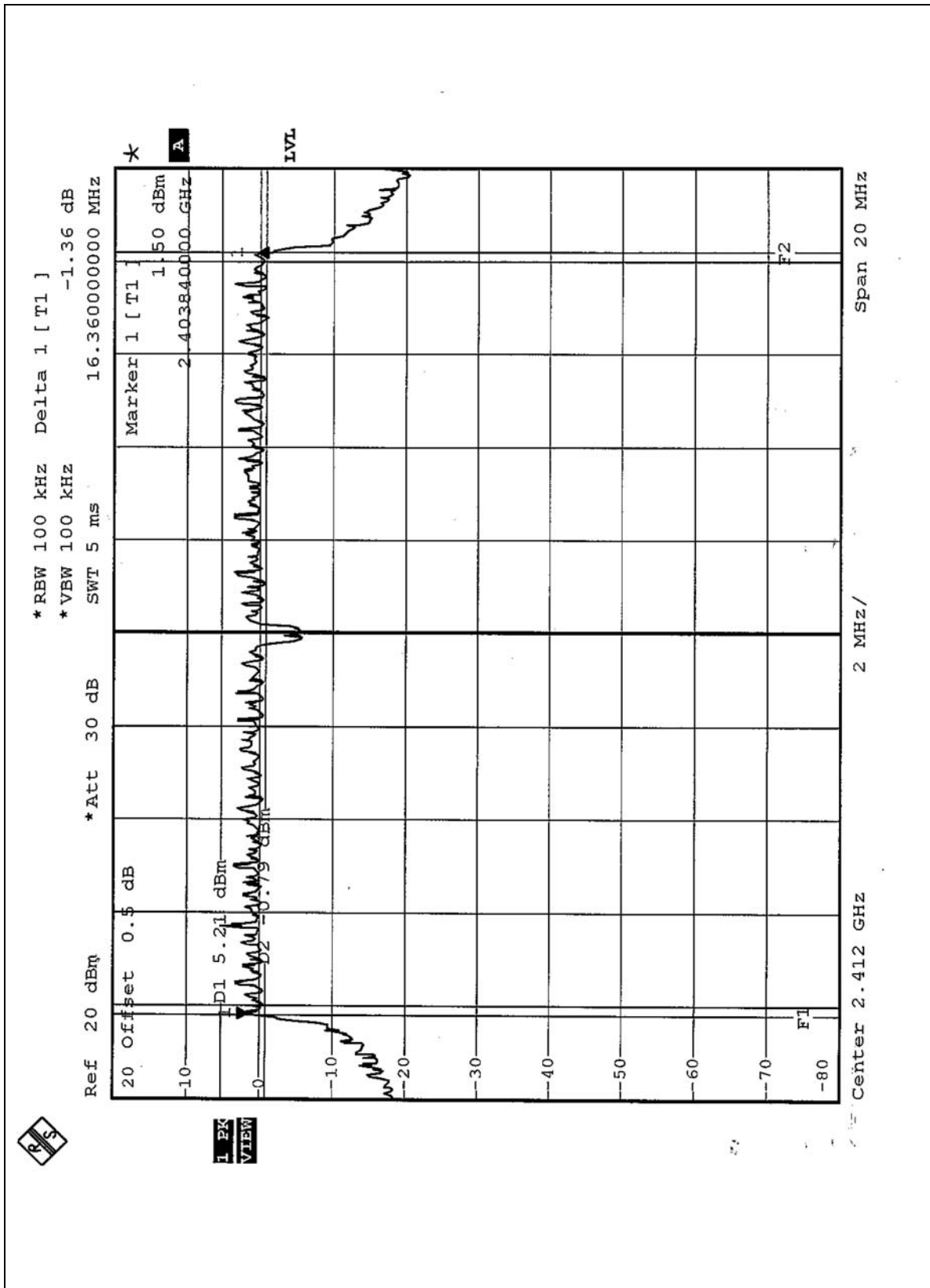


4.3.8 TEST RESULTS (B)

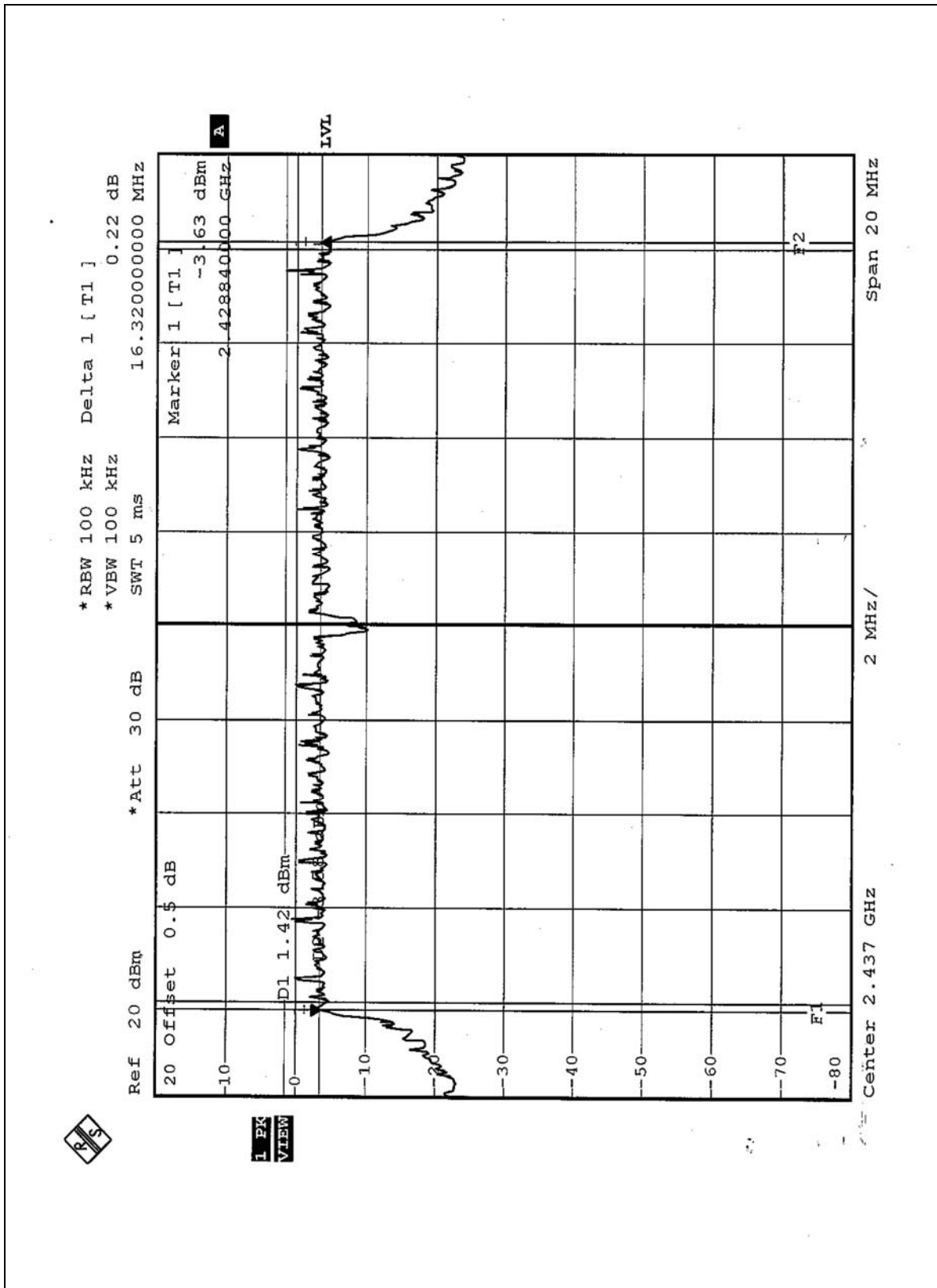
EUT	Atheros 11g Card Bus Adapter	MODEL	NL-3054CB Plus Aries2
INPUT POWER (SYSTEM)	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	23 deg. C, 65%RH, 991 hPa
TESTED BY: Jamison Chan			

CHANNEL	CHANNEL FREQUENCY (MHz)	6 dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS/FAIL
1	2412	16.36	0.5	PASS
6	2437	16.32	0.5	PASS
11	2462	16.40	0.5	PASS

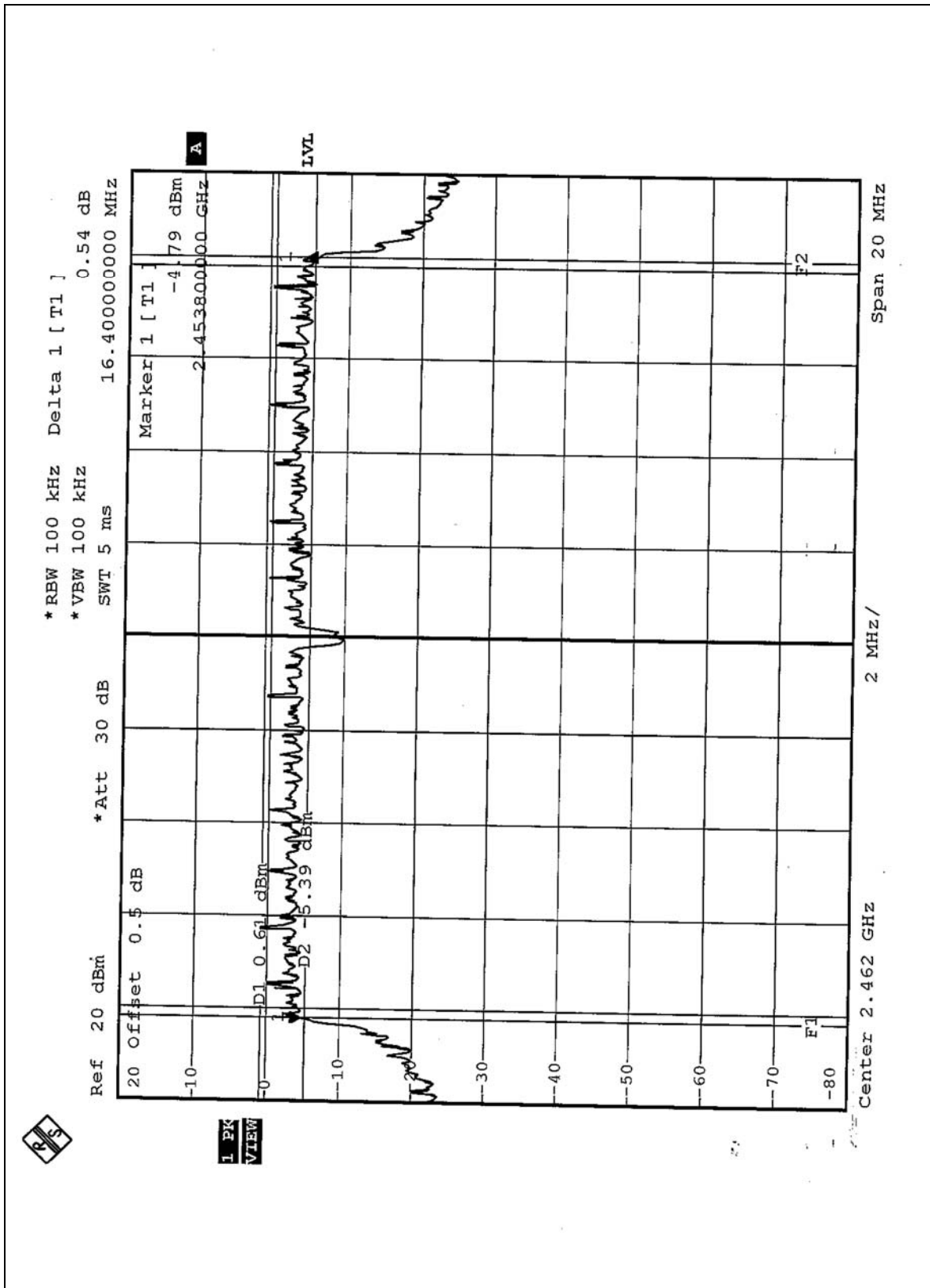
CH1



CH6



CH11



4.3.9 TEST RESULTS (C)

EUT	Atheros 11g Card Bus Adapter	MODEL	NL-3054CB Plus Aries2
INPUT POWER (SYSTEM)	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	23 deg. C, 65%RH, 991 hPa
TESTED BY: Jamison Chan			

CHANNEL	CHANNEL FREQUENCY (MHz)	6 dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS/FAIL
6	2437	32.79	0.5	PASS

Delta 1 [T1]

Ref Lvl 20 dBm

0.47 dB

32.78557114 MHz

RBW 100 kHz

VBW 100 kHz

SWT 10 ms

RF Att 30 dB

Unit dBm

Center 2.437 GHz

Span 40 MHz

1MA

D1 -3.88 dBm

1VIEW

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 TEST INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
R&S SPECTRUM ANALYZER	FSEK30	100049	Aug. 12, 2004
R&S SIGNAL GENERATOR	SMP04	100011	May 28, 2004
TEKTRONIX OSCILLOSCOPE	TDS 220	B048470	Mar. 05, 2004
NARDA DETECTOR	4503A	FSCM99899	NA

NOTE:

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

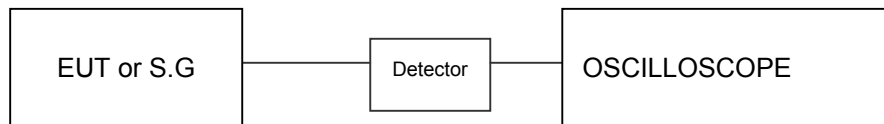
4.4.3 TEST PROCEDURES

1. A detector was used on the output port of the EUT. An oscilloscope was used to read the response of the detector.
2. Replaced the EUT by the signal generator. The center frequency of the S.G was adjusted to the center frequency of the measured channel.
3. Adjusted the power to have the same reading on oscilloscope. Record the power level.

4.4.4 DEVIATION FROM TEST STANDARD

No deviation

4.4.5 TEST SETUP



4.4.6 EUT OPERATING CONDITIONS

Same as Item 4.3.6

4.4.7 TEST RESULTS (A)

EUT	Atheros 11g Card Bus Adapter	MODEL	NL-3054CB Plus Aries2
INPUT POWER (SYSTEM)	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	23 deg. C, 65%RH, 991 hPa
TESTED BY: Jamison Chan			

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER OUTPUT (dBm)	PEAK POWER LIMIT (dBm)	PASS/FAIL
1	2412	20.03	30	PASS
6	2437	21.38	30	PASS
11	2462	18.92	30	PASS

4.4.8 TEST RESULTS (B)

EUT	Atheros 11g Card Bus Adapter	MODEL	NL-3054CB Plus Aries2
INPUT POWER (SYSTEM)	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	23 deg. C, 65%RH, 991 hPa
TESTED BY: Jamison Chan			

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER OUTPUT (dBm)	PEAK POWER LIMIT (dBm)	PASS/FAIL
1	2412	21.62	30	PASS
6	2437	22.00	30	PASS
11	2462	21.12	30	PASS

4.4.9 TEST RESULTS (C)

EUT	Atheros 11g Card Bus Adapter	MODEL	NL-3054CB Plus Aries2
INPUT POWER (SYSTEM)	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	23 deg. C, 65%RH, 991 hPa
TESTED BY: Jamison Chan			

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER OUTPUT (dBm)	PEAK POWER LIMIT (dBm)	PASS/FAIL
6	2437	20.35	30	PASS



4.5 POWER SPECTRAL DENSITY MEASUREMENT

4.5.1 LIMITS OF POWER SPECTRAL DENSITY MEASUREMENT

The Maximum of Power Spectral Density Measurement is 8dBm.

4.5.2 TEST INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
SPECTRUM ANALYZER	FSEK30	100049	Aug. 12, 2004

NOTE:

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

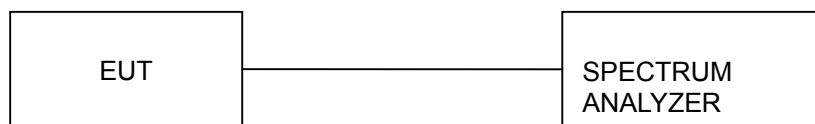
4.5.3 TEST PROCEDURE

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 DEVIATION FROM TEST STANDARD

No deviation

4.5.5 TEST SETUP



4.5.6 EUT OPERATING CONDITIONS

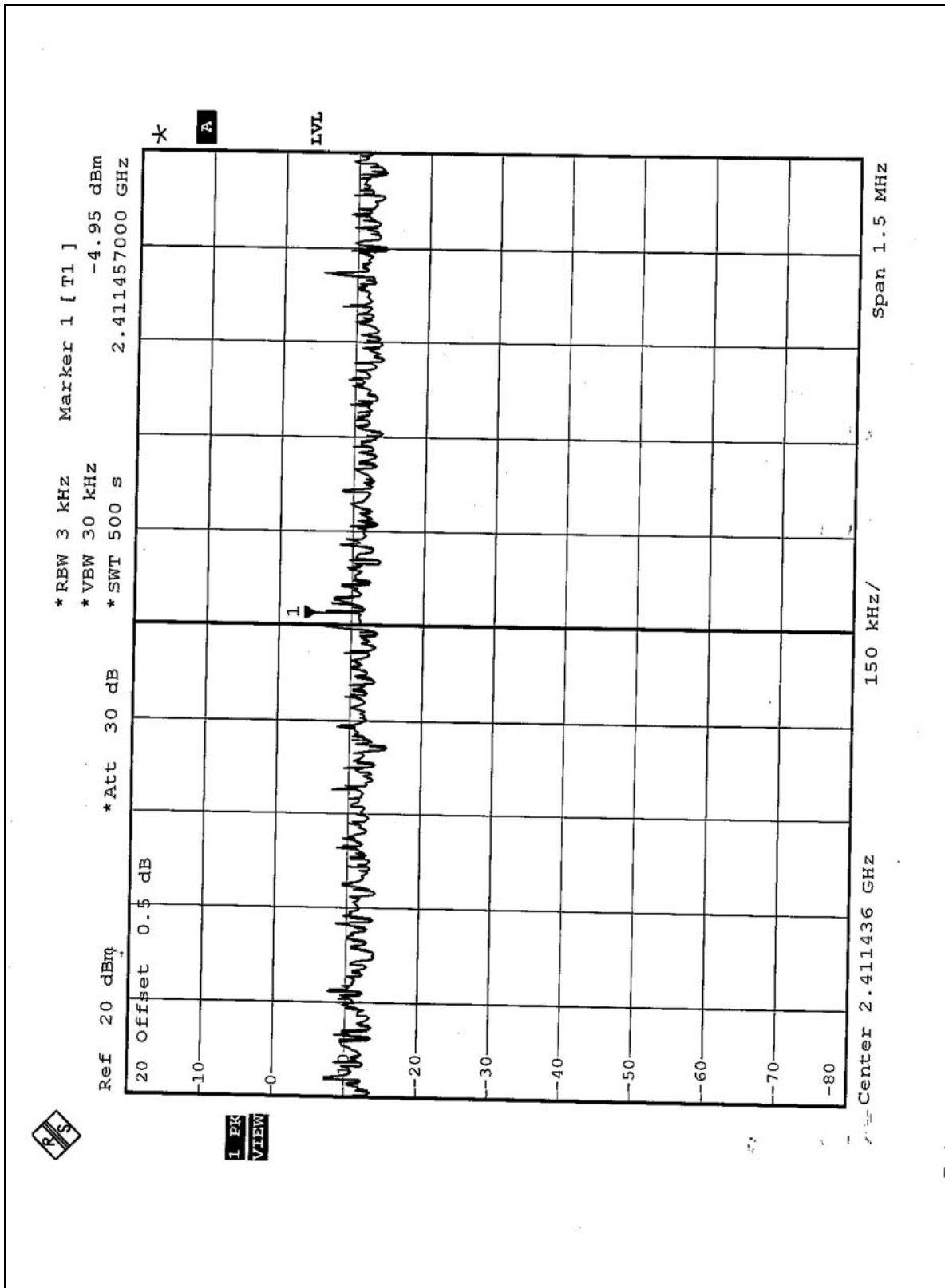
Same as 4.3.6

4.5.7 TEST RESULTS (A)

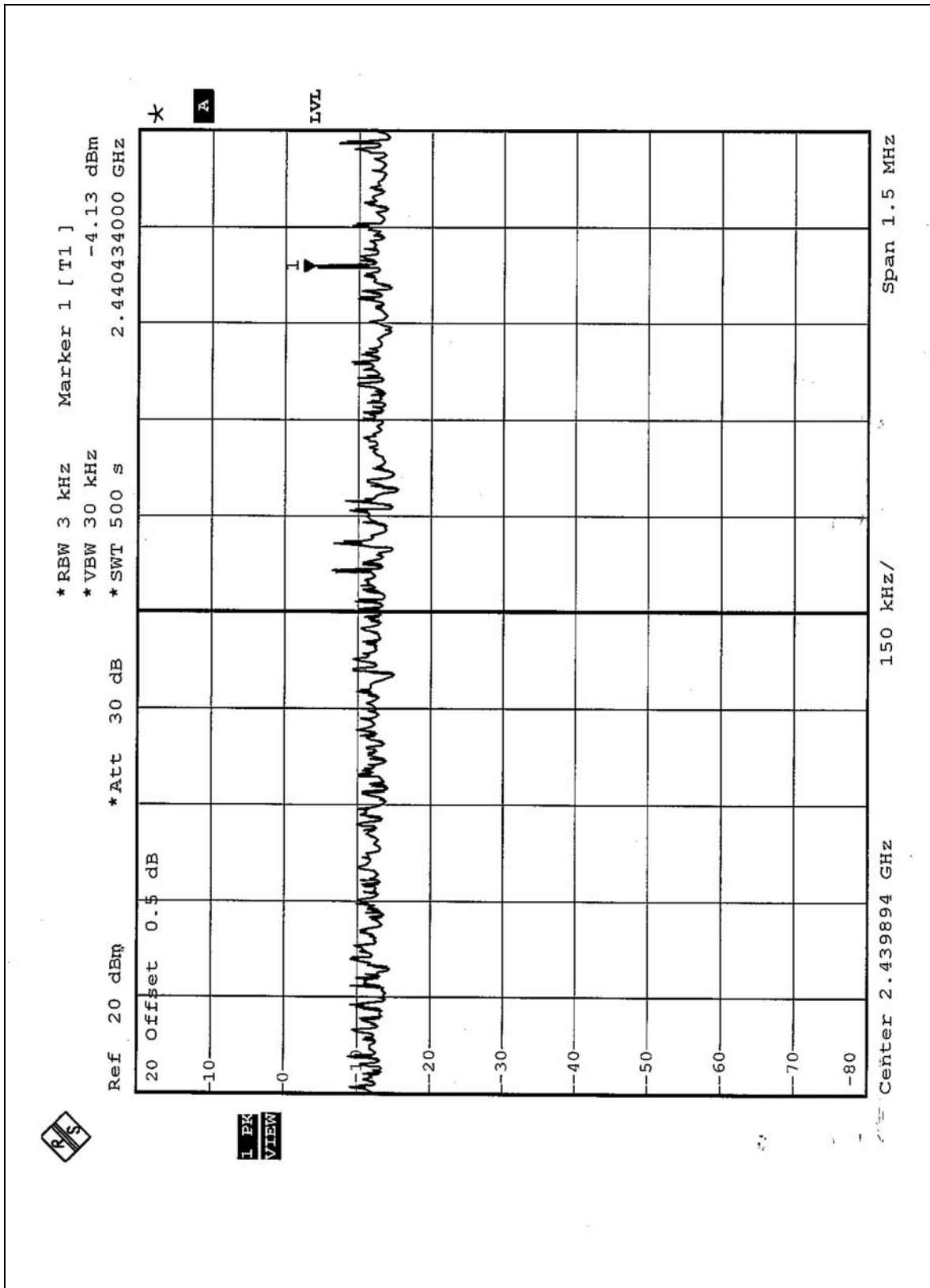
EUT	Atheros 11g Card Bus Adapter	MODEL	NL-3054CB Plus Aries2
INPUT POWER (SYSTEM)	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	23 deg. C, 65%RH, 991 hPa
TESTED BY: Jamison Chan			

CHANNEL NUMBER	CHANNEL FREQUENCY (MHz)	RF POWER LEVEL IN 3 KHz BW (dBm)	MAXIMUM LIMIT (dBm)	PASS/FAIL
1	2412	-4.95	8	PASS
6	2437	-4.13	8	PASS
11	2462	-4.37	8	PASS

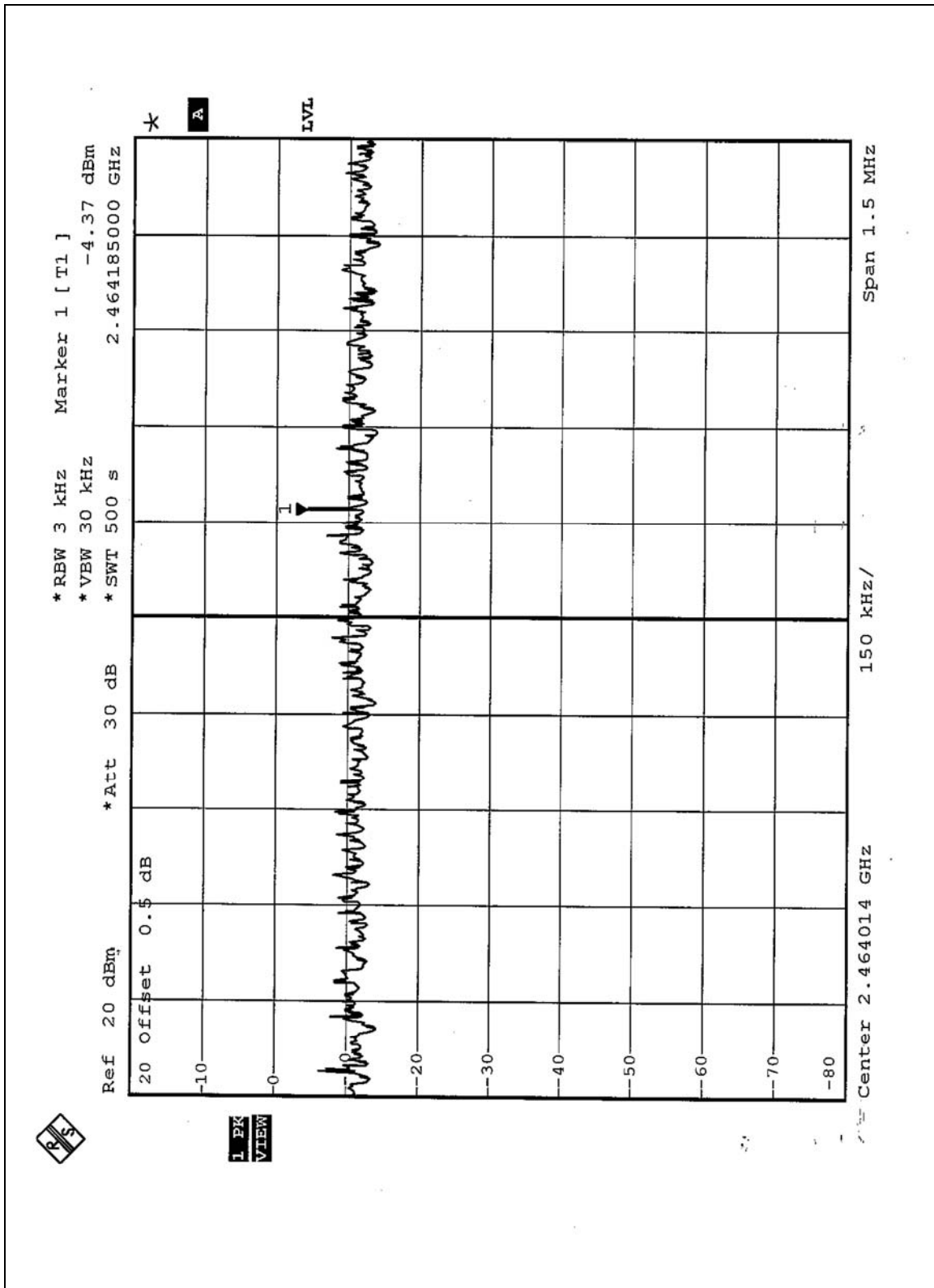
CH1



CH6



CH11



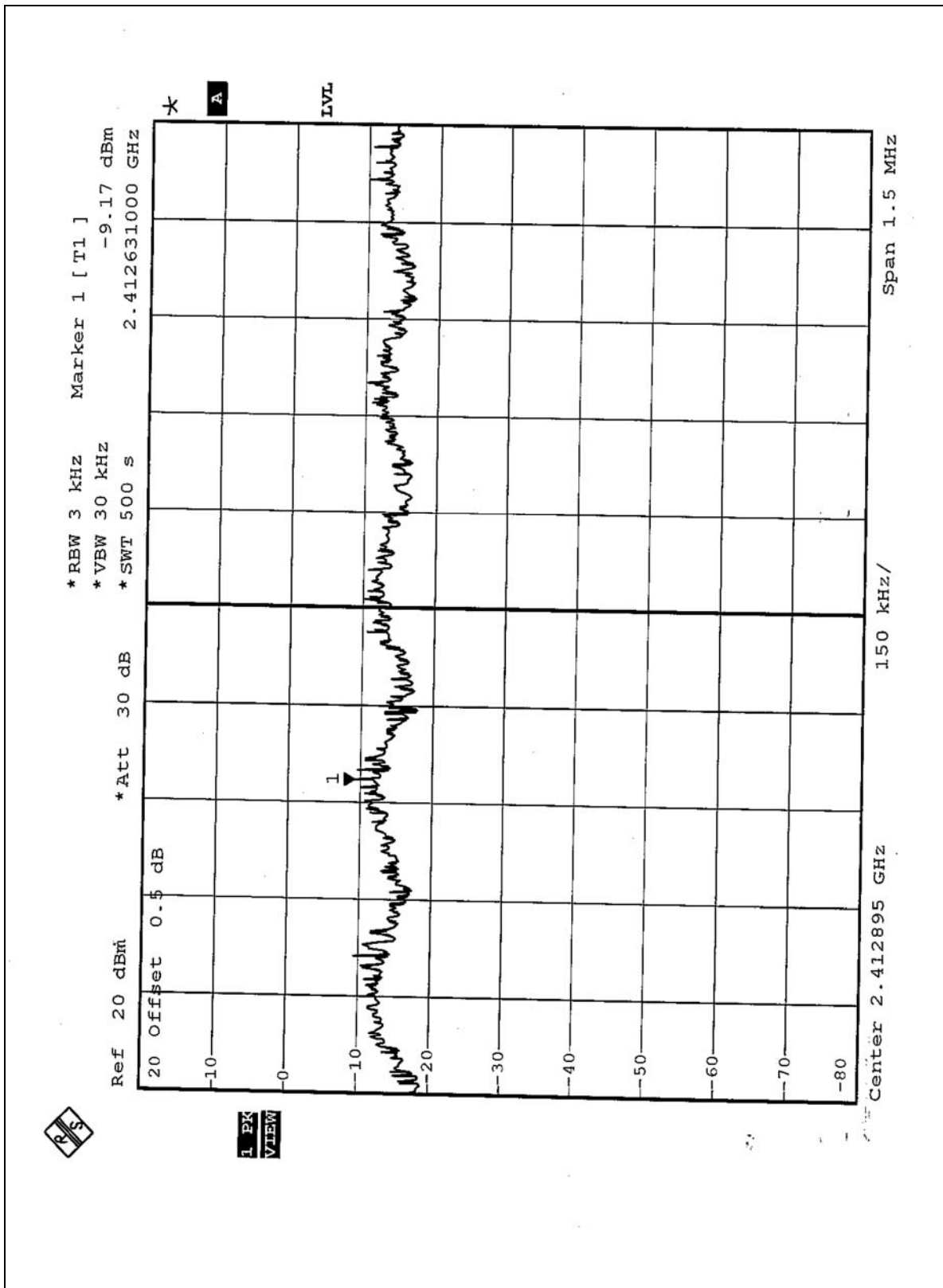
4.5.8 TEST RESULTS (B)

EUT	Atheros 11g Card Bus Adapter	MODEL	NL-3054CB Plus Aries2
INPUT POWER (SYSTEM)	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	23 deg. C, 65%RH, 991 hPa
TESTED BY: Jamison Chan			

CHANNEL NUMBER	CHANNEL FREQUENCY (MHz)	RF POWER LEVEL IN 3 KHz BW (dBm)	MAXIMUM LIMIT (dBm)	PASS/FAIL
1	2412	-9.17	8	PASS
6	2437	-13.62	8	PASS
11	2462	-12.72	8	PASS

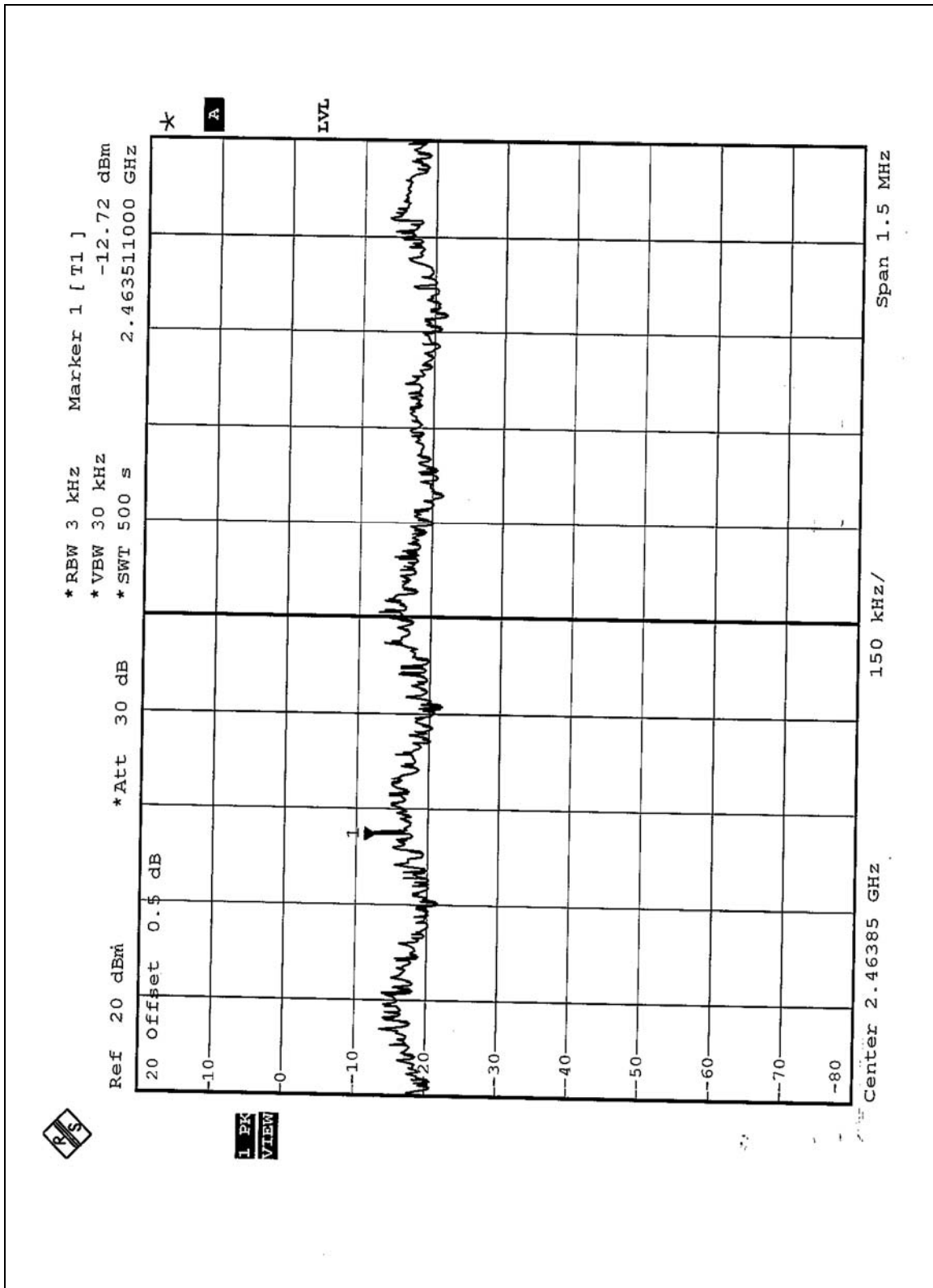


CH1



* RBW 3 kHz
 * VBW 30 kHz
 * SWT 500 S
 * Att 30 dB
 * Ref 20 dBm
 * Offset 0.5 dB
 * Marker 1 [T1]
 * -13.62 dBm
 * Center 2.429476 GHz
 * Span 1.5 MHz

CH11

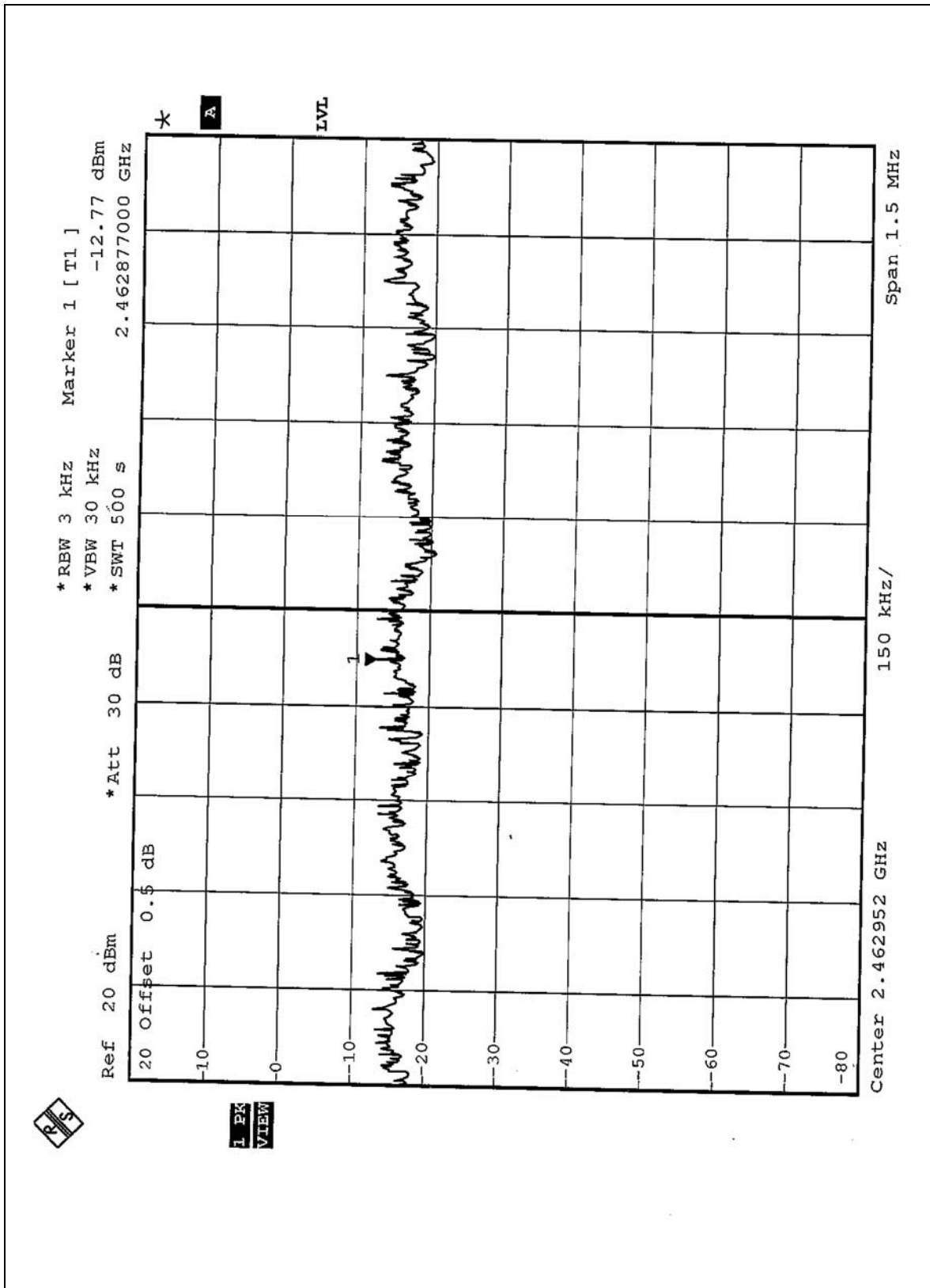


4.5.9 TEST RESULTS (C)

EUT	Atheros 11g Card Bus Adapter	MODEL	NL-3054CB Plus Aries2
INPUT POWER (SYSTEM)	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	23 deg. C, 65%RH, 991 hPa
TESTED BY: Jamison Chan			

CHANNEL NUMBER	CHANNEL FREQUENCY (MHz)	RF POWER LEVEL IN 3 KHz BW (dBm)	MAXIMUM LIMIT (dBm)	PASS/FAIL
6	2437	-7.46	8	PASS

CH6



4.6 BAND EDGES MEASUREMENT

4.6.1 LIMITS OF BAND EDGES MEASUREMENT

Below -20dB of the highest emission level of operating band (in 100KHz Resolution Bandwidth).

4.6.2 TEST INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
SPECTRUM ANALYZER	FSEK30	100049	Aug. 12, 2004

NOTE:

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

4.6.3 TEST PROCEDURE

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

4.6.4 DEVIATION FROM TEST STANDARD

No deviation

4.6.5 EUT OPERATING CONDITION

Same as Item 4.3.6



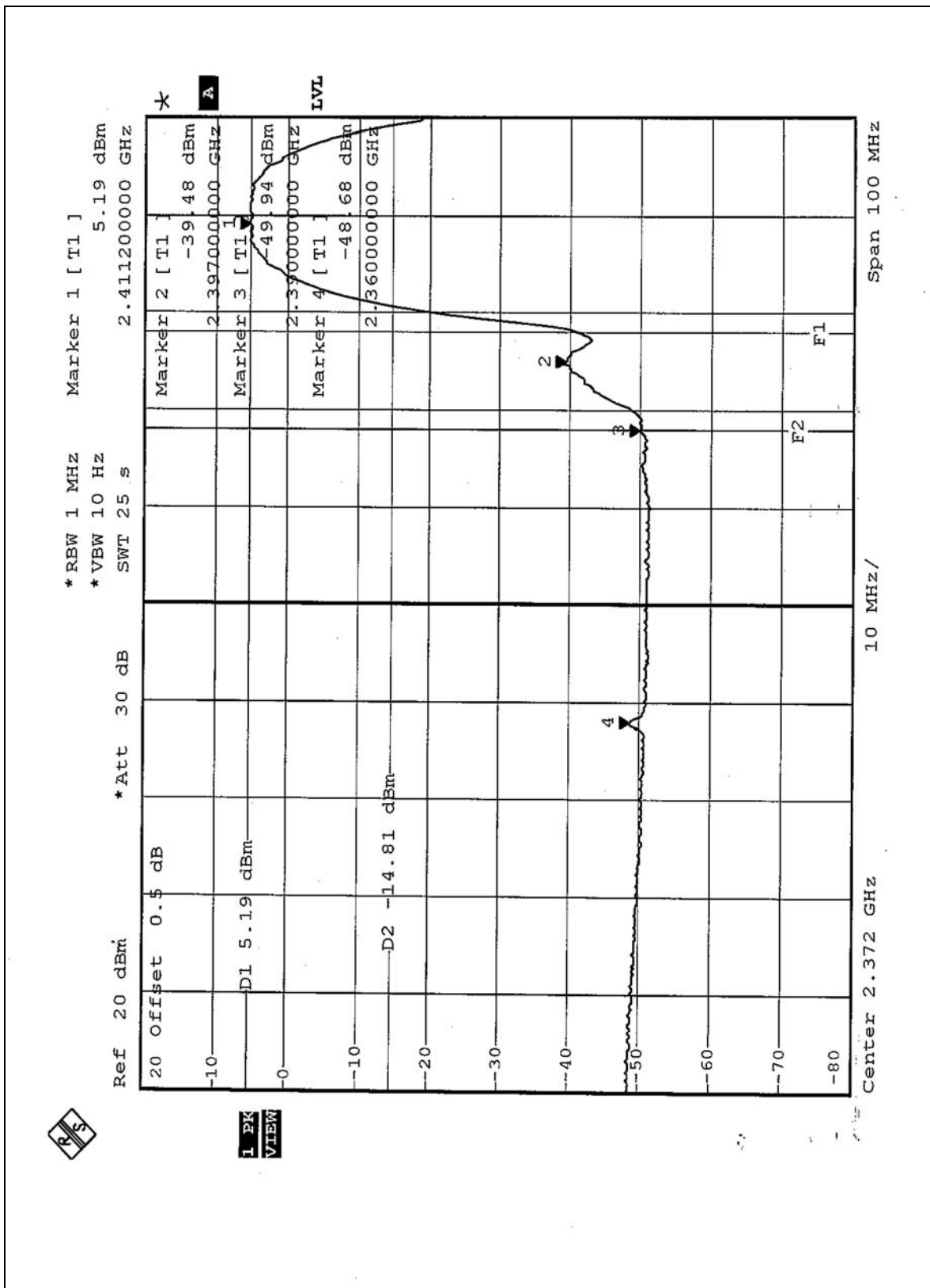
4.6.6 TEST RESULTS (A)

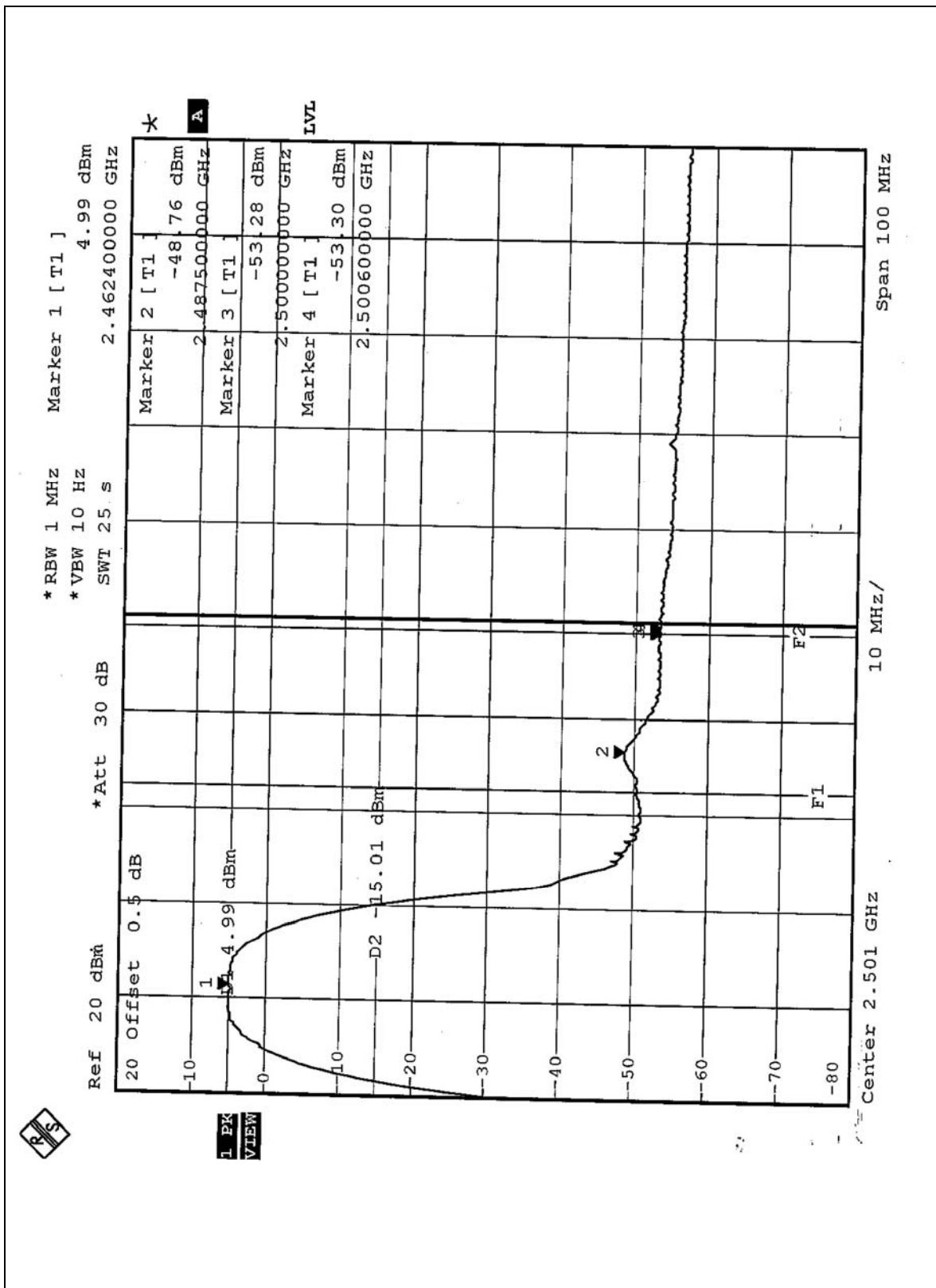
The spectrum plots are attached on the following 2 pages. D2 line indicates the highest level, D1 line indicates the 20dB offset below D2. It shows compliance with the requirement in part 15.247(C).

NOTE:

The band edge emission plot on the following first pages shows 53.87dB delta between carrier maximum power and local maximum emission in restrict band (2.3600GHz). The emission of carrier strength list in the test result of channel 1 at the item 4.2.8 is 105.24dBuV/m, so the maximum field strength in restrict band is $105.24 - 53.87 = 51.37$ dBuV/m which is under 54 dBuV/m limit.

The band edge emission plot on the following second pages shows 53.75dB delta between carrier maximum power and local maximum emission in restrict band (2.4875GHz). The emission of carrier strength list in the test result of channel 11 at the item 4.2.8 is 104.80dBuV/m, so the maximum field strength in restrict band is $104.80 - 53.75 = 51.05$ dBuV/m which is under 54 dBuV/m limit.







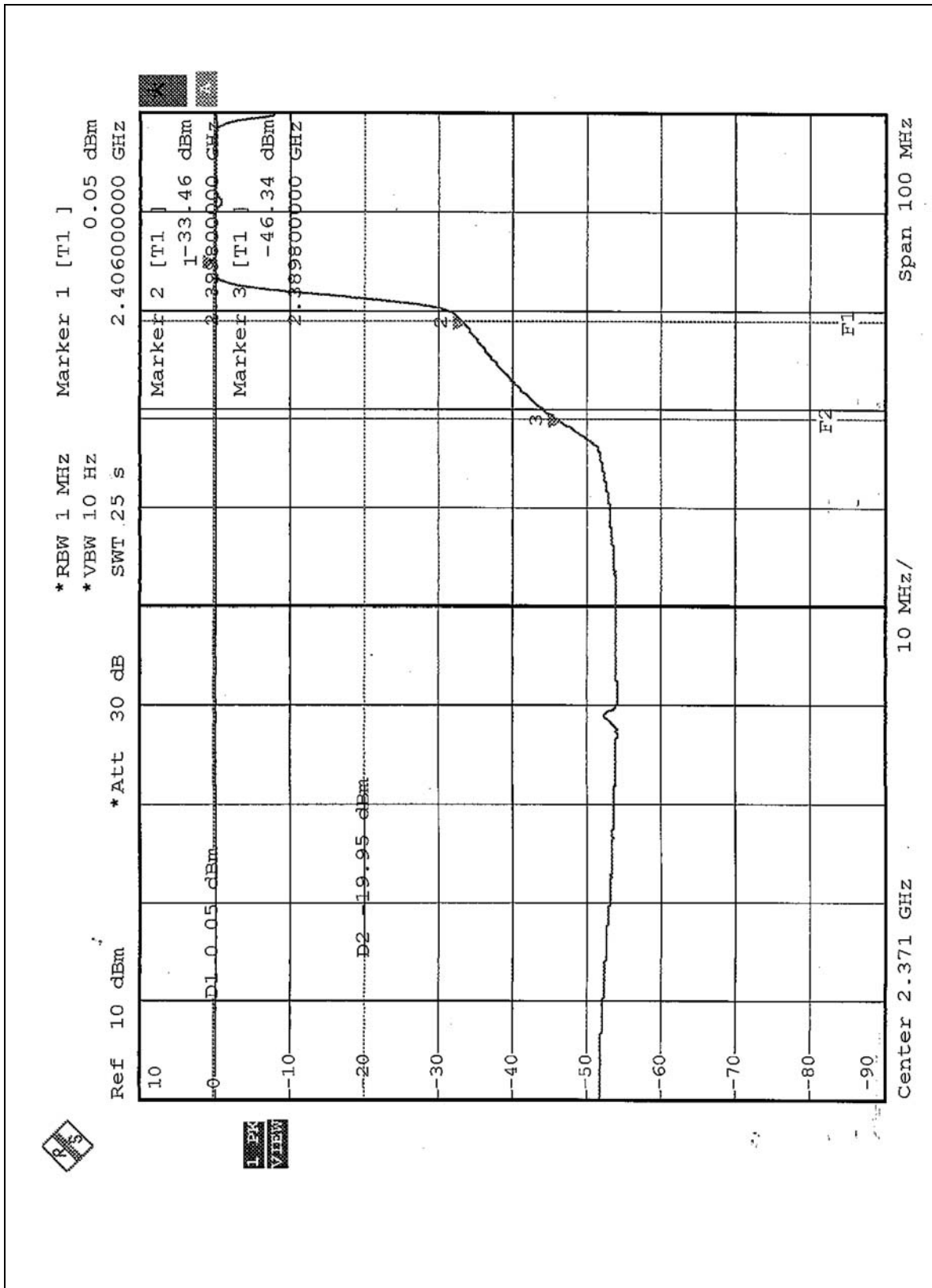
4.6.7 TEST RESULTS (B)

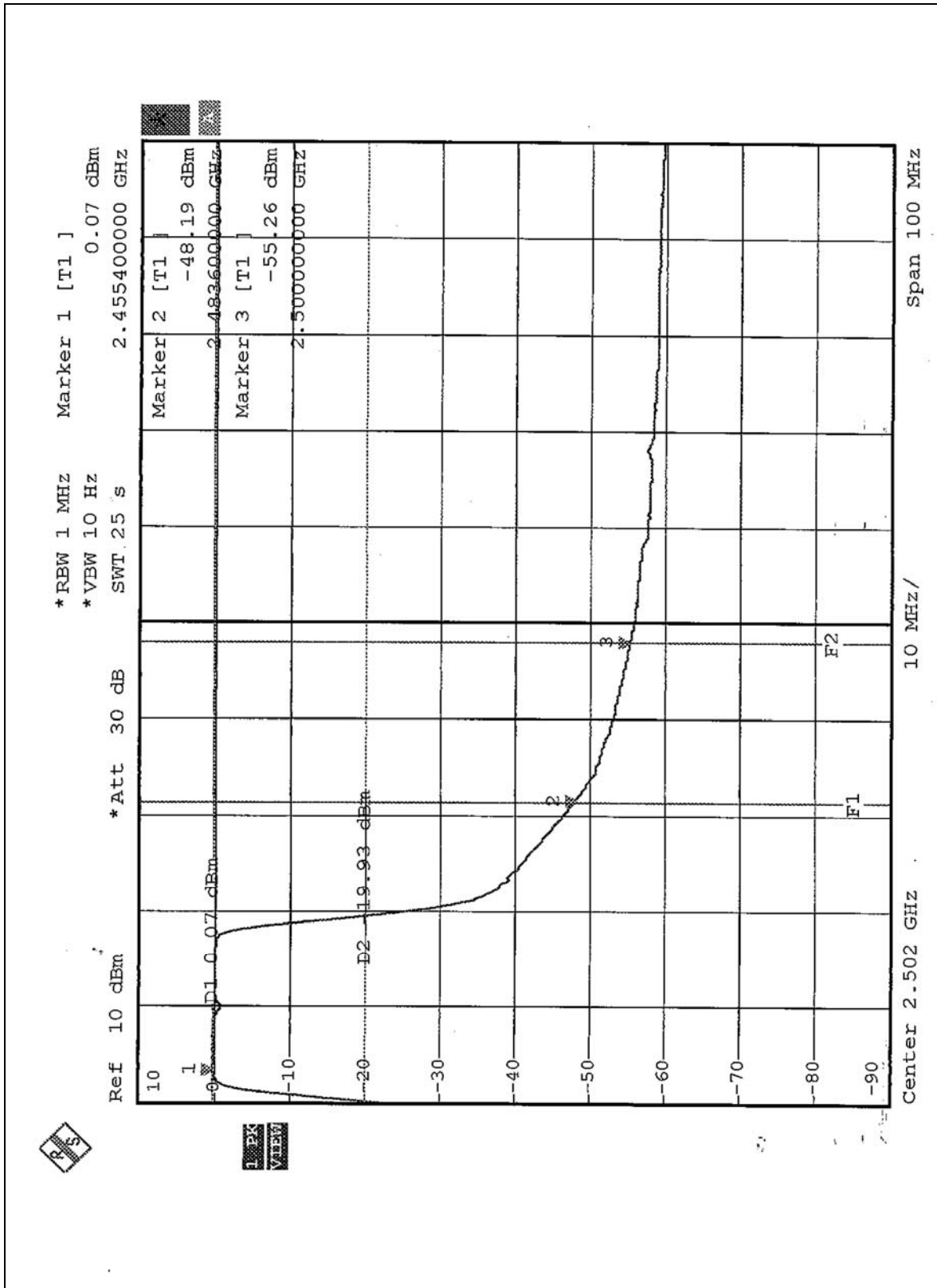
The spectrum plots are attached on the following 2 pages. D2 line indicates the highest level, D1 line indicates the 20dB offset below D2. It shows compliance with the requirement in part 15.247(C).

NOTE:

The band edge emission plot on the following first pages shows 46.39dB delta between carrier maximum power and local maximum emission in restrict band (2.3898GHz). The emission of carrier strength list in the test result of channel 1 at the item 4.2.9 is 99.39dBuV/m, so the maximum field strength in restrict band is $99.39 - 46.39 = 53.00$ dBuV/m which is under 54 dBuV/m limit.

The band edge emission plot on the following second pages shows 48.26dB delta between carrier maximum power and local maximum emission in restrict band (2.4836GHz). The emission of carrier strength list in the test result of channel 11 at the item 4.2.9 is 100.72dBuV/m, so the maximum field strength in restrict band is $100.72 - 48.26 = 52.46$ dBuV/m which is under 54 dBuV/m limit.







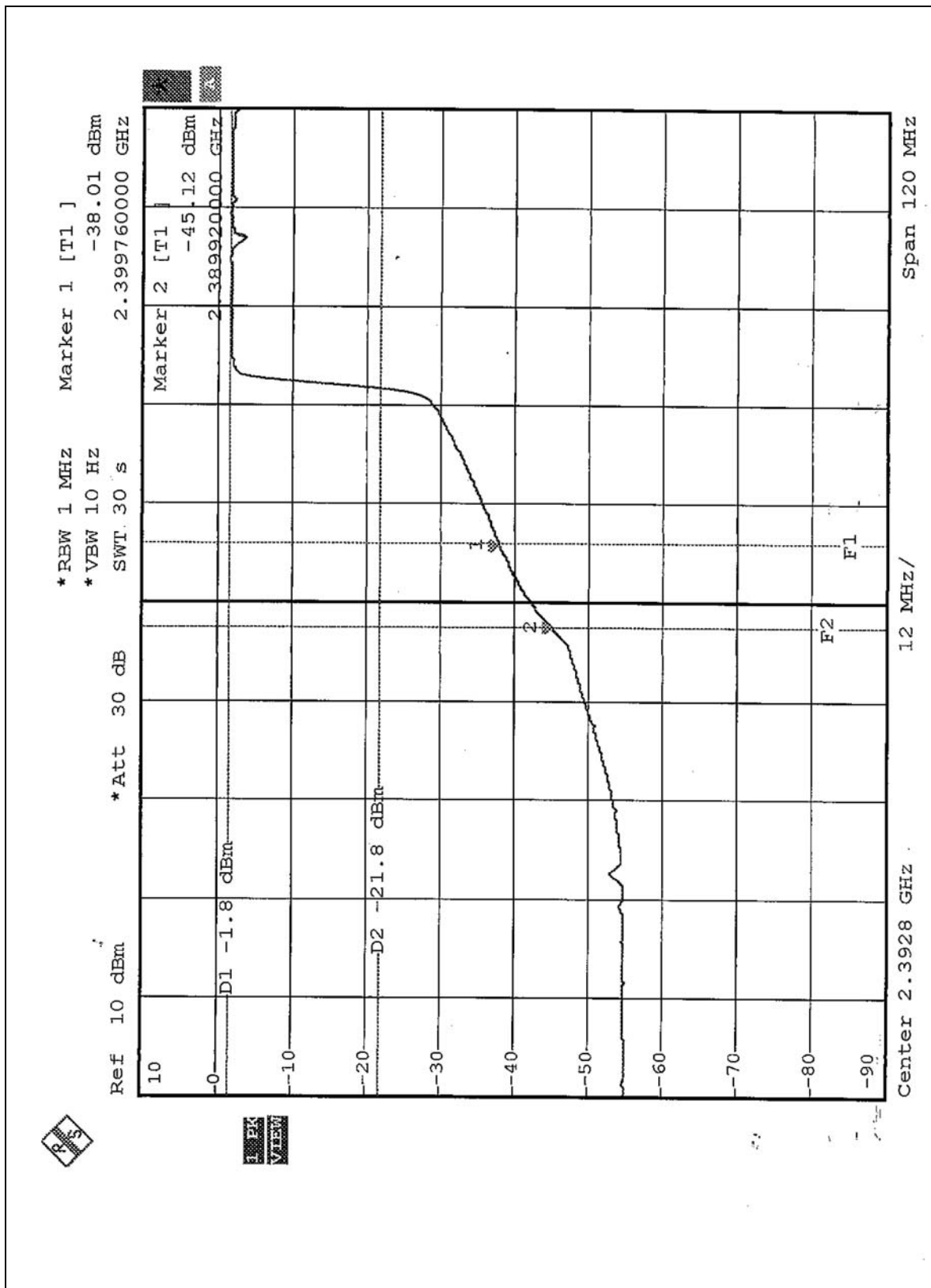
4.6.8 TEST RESULTS (C)

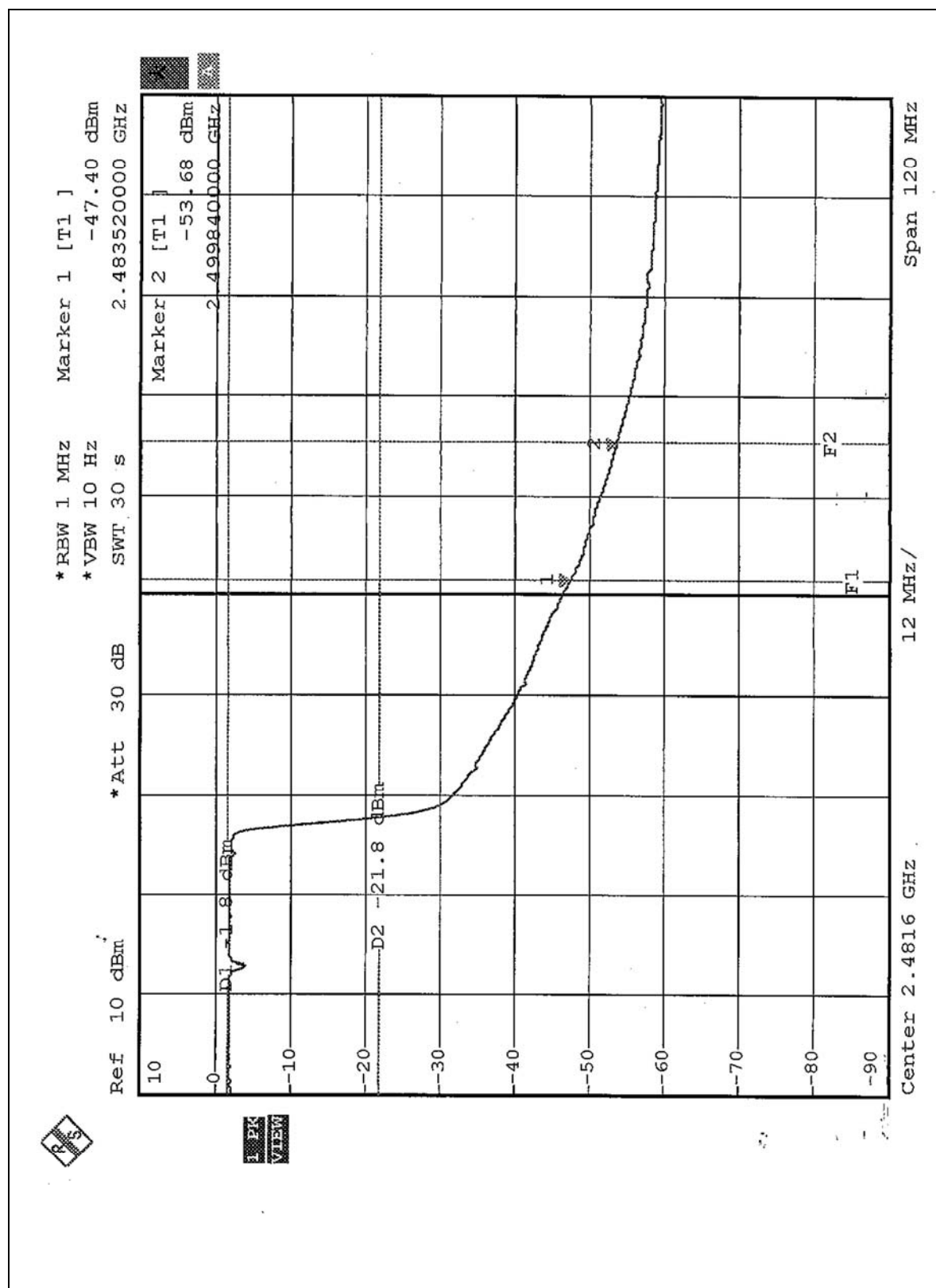
The spectrum plots are attached on the following 2 pages. D2 line indicates the highest level, D1 line indicates the 20dB offset below D2. It shows compliance with the requirement in part 15.247(C).

NOTE:

The band edge emission plot on the following first pages shows 43.32dB delta between carrier maximum power and local maximum emission in restrict band (2.3899GHz). The emission of carrier strength list in the test result of channel 6 at the item 4.2.10 is 95.47dBuV/m, so the maximum field strength in restrict band is $95.47 - 43.32 = 52.15$ dBuV/m which is under 54 dBuV/m limit.

The band edge emission plot on the following second pages shows 45.60dB delta between carrier maximum power and local maximum emission in restrict band (2.4835GHz). The emission of carrier strength list in the test result of channel 6 at the item 4.2.10 is 95.47dBuV/m, so the maximum field strength in restrict band is $95.47 - 45.60 = 49.87$ dBuV/m which is under 54 dBuV/m limit.







4.7 ANTENNA REQUIREMENT

4.7.1 STANDARD APPLICABLE

For intentional device, according to FCC 47 CFR Section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

And according to FCC 47 CFR Section 15.247 (b), if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

4.7.2 ANTENNA CONNECTED CONSTRUCTION

The antenna used in this product is Printed antenna without any antenna connector. And the maximum Gain of this antenna is 0dBi.

5 PHOTOGRAPHS OF THE TEST CONFIGURATION

CONDUCTED EMISSION TEST



RADIATED EMISSION TEST





6 INFORMATION ON THE TESTING LABORATORIES

We, ADT Corp., were founded in 1988 to provide our best service in EMC and Safety consultation. Our laboratories are accredited and approved by the following approval agencies according to ISO/IEC 17025, Guide 25 or EN 45001:

USA	FCC, NVLAP
Germany	TUV Rheinland
Japan	VCCI
New Zealand	MoC
Norway	NEMKO
R.O.C.	BSMI, DGT, CNLA

Copies of accreditation certificates of our laboratories obtained from approval agencies can be downloaded from our web site:

www.adt.com.tw/index.5/phtml.

If you have any comments, please feel free to contact us at the following:

Lin Kou EMC Lab:

Tel: 886-2-26052180

Fax: 886-2-26052943

Hsin Chu EMC Lab:

Tel: 886-35-935343

Fax: 886-35-935342

Lin Kou Safety Lab:

Tel: 886-2-26093195

Fax: 886-2-26093184

Lin Kou RF&Telecom Lab

Tel: 886-3-3270910

Fax: 886-3-3270892

Email: service@mail.adt.com.tw

Web Site: www.adt.com.tw

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