



FCC TEST REPORT

REPORT NO.: RF921215R02A

MODEL NO.: NL-5354MP Plus Aries2

RECEIVED: November 12, 2003

TESTED: November 12, 2003 ~ April 16, 2004

APPLICANT: SENAO INTERNATIONAL CO., LTD.

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ILAC MRA

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1 CERTIFICATION

PRODUCT : Atheros 11a/g Mini-PCI Adapter
BRAND NAME : SENAO
MODEL NO. : NL-5354MP Plus Aries2
TEST ITEM: ENGINEERING SAMPLE
APPLICANT : SENAO INTERNATIONAL CO., LTD.
STANDARDS : FCC Part 15, Subpart C (Section 15.247),
Subpart E (Section 15.407), ANSI C63.4-2001

We, **Advance Data Technology Corporation**, hereby certify that one sample of the designation has been tested in our facility from November 12, 2003 to April 16, 2004. 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: Suntee Liu, **DATE:** April 16, 2004
Suntee Liu
APPROVED BY: Ellis Wu, **DATE:** April 16, 2004
Ellis Wu / Manager

2 SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

APPLIED STANDARD: FCC 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 -17.45dB at 0.173MHz
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 -1.72dB 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: 20dB 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.



APPLIED STANDARD: FCC Part 15, Subpart E			
Standard Section	Test Type	Result	REMARK
15.407(b)(5)	AC Power Conducted Emission	PASS	Meet the requirement of limit Minimum passing margin is -12.49dB at 0.168MHz
15.407(b/1/2/3) (b)(5)	Electric Field Strength Spurious Emissions, 30MHz ~ 40000MHz	PASS	Meet the requirement of limit Minimum passing margin is -3.18dB at 5825.00MHz
15.407(a/1/2/3)	Peak Transmit Power	PASS	Meet the requirement of limit
15.407(a)(6)	Peak Power Excursion	PASS	Meet the requirement of limit
15.407(a/1/2/3)	Peak Power Spectral Density	PASS	Meet the requirement of limit
15.407(g)	Frequency Stability	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

EUT	Atheros 11a/g Mini-PCI Adapter
MODEL NO.	NL-5354MP Plus Aries2
POWER SUPPLY	3.3Vdc from host equipment
MODULATION TYPE	BPSK, QPSK, CCK, 16QAM, 64QAM
MODULATION TECHNOLOGY	DSSS, OFDM
TRANSFER RATE	11b: 11/5.5/2/1Mbps 11g: 54/48/36/24/18/12/9/6Mbps 11a: 54/48/36/24/18/12/9/6Mbps (Turbo mode: up to 108Mbps)
FREQUENCY RANGE	11b/g: 2412~2462MHz 11a: 5.15~5.35GHz and 5.725~5.825GHz
NUMBER OF CHANNEL	11b/g: 11 for Normal mode / 1 for Turbo mode 11a: 13 for Normal mode / 5 for Turbo mode
CHANNEL SPACING	11b/g: 5MHz 11a: 20MHz for Normal mode / 40MHz for Turbo mode
OUTPUT POWER	11b: 17.60dBm 11g: 20.00dBm 11a: 12.44dBm
DATA CABLE	NA
ANTENNA TYPE	Dipole antenna with 2.0dBi antenna gain
I/O PORTS	NA
ASSOCIATED DEVICES	NA

NOTE:

1. The EUT operates in both the 5GHz and 2.4GHz Bands and compatibility with 802.11a and 802.11b, 802.11g technology.
2. This EUT is capable of providing data rates of up to 108Mbps in Turbo Mode depending upon reception quality.
3. This is a series test report of (reference report no.: RF921215R02, issued date: Dec. 25, 2003). The reason for re-testing is the EUT adding the function of 802.11a.
4. For more detailed features description, please refer to the manufacturer's specifications or User's Manual.

3.2 DESCRIPTION OF TEST MODES

802.11b and 802.11g: 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, worst case one, was chosen for final test.
2. Above 1GHz, the channel 1, 6, and 11 were tested individually.
3. Transfer rate of 11Mbps with CCK technique and 6Mbps with OFDM technique, the worst cases, were chosen for final test.

One channel is provided to this EUT for Turbo Mode.

Channel	Frequency
6	2437 MHz

NOTE: One turbo mode at frequency 2437MHz.

For 802.11a: Thirteen channels are provided to this EUT for Normal mode.

Channel	Frequency	Channel	Frequency
1	5180 MHz	8	5320 MHz
2	5200 MHz	9	5745 MHz
3	5220 MHz	10	5765 MHz
4	5240 MHz	11	5785 MHz
5	5260 MHz	12	5805 MHz
6	5280 MHz	13	5825 MHz
7	5300 MHz		

Five channels are provided to this EUT for Turbo Mode.

Channel	Frequency	Channel	Frequency
1	5210 MHz	4	5760 MHz
2	5250 MHz	5	5800 MHz
3	5290 MHz		

NOTE:

1. The EUT was tested in both normal mode (channel bandwidth of approximately 30MHz) and turbo mode (channel bandwidth of approximately 60MHz).
2. "Normal Mode" allows data rates of up to 54Mbps. The device was, therefore, tested in Normal mode at the data rate that produced the highest output power for normal mode (6Mbps).
3. "Turbo Mode" allows data rates of up to 108Mbps. At data rates higher than 12Mbps the PA gain is reduced to improve signal fidelity. The device was, therefore, tested in turbo mode at the data rate that produced the highest output power for turbo mode (12Mbps).



4. Channel 1, 4, 5, 8, 9, 12 and 13 are the closest frequencies to the band edge, were chosen for final test of Normal Mode.
5. Channel 1~5 were chosen for final test of Turbo mode.

3.3 GENERAL DESCRIPTION OF APPLIED STANDARDS

The EUT is an Atheros 11a/g Mini-PCI 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),
Subpart E (15.407). ANSI C63.4:2001**

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

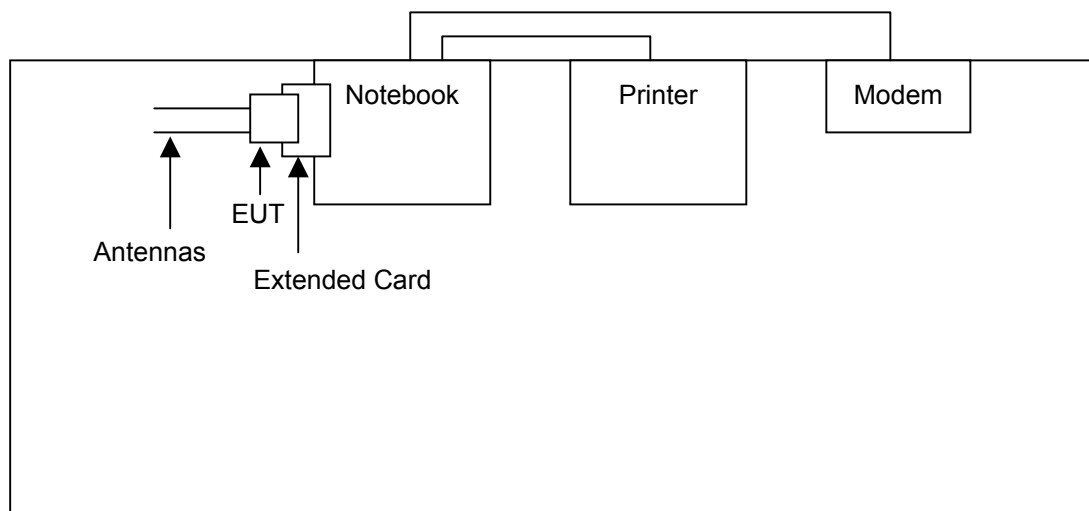
The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	Notebook	Dell	PP01L	TW-09C748-12800-16M-5064	FCC DoC Approved
2	PRINTER	EPSON	LQ-300+	DCGY017096	FCC DoC Approved
3	MODEM	ACEEX	1414	980020536	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 (FOR PART 802.11b & 802.11g)

4.1 CONDUCTED EMISSION MEASUREMENT

4.1.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT

FREQUENCY OF EMISSION (MHz)	CONDUCTED LIMIT (dBμV)	
	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	ESHS 30	828765/002	July 15, 2004
ROHDE & SCHWARZ Artificial Mains Network (for EUT)	ESH3-Z5	835239/001	Apr. 28, 2004
ROHDE & SCHWARZ Artificial Mains Network (for peripherals)	ESH3-Z5	835239/002	Apr. 28, 2004
ROHDE & SCHWARZ 4-wire ISN	ENY41	935154/007	Apr. 30, 2004
ROHDE & SCHWARZ 2-wire ISN	ENY22	833823/026	Apr. 30, 2004
Software	Cond-V2M3	NA	NA
RF cable (JYEBAO)	5D-FB	Cable-C09.01	May 23, 2004
SUHNTER Terminator (For ROHDE & SCHWARZ LISN)	65BNC-5001	E1-010789	Jun. 04, 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. 9.
 4. The VCCI Site Registration No. is C-1312.



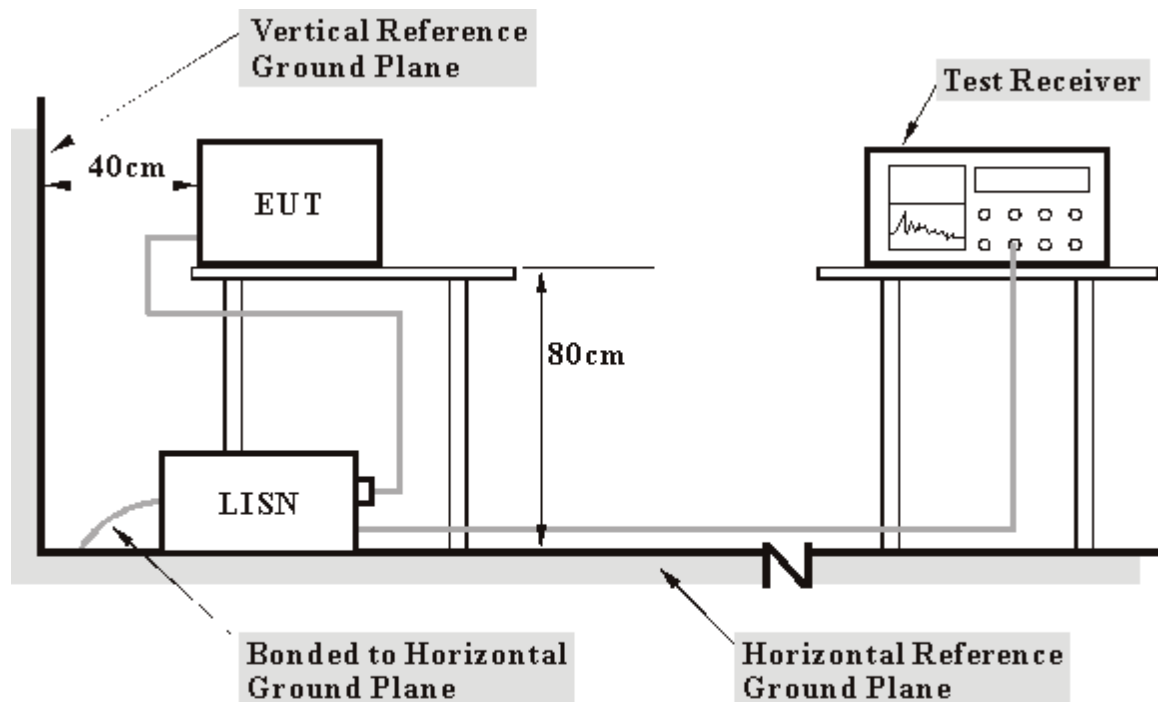
4.1.3 TEST PROCEDURES

- 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 150kHz to 30MHz was searched. Emission levels under (Limit -20dB) was not recorded.

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

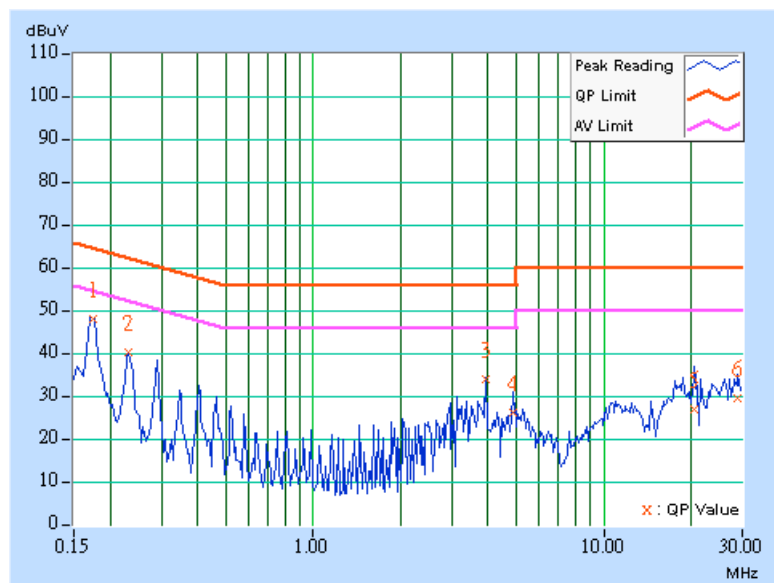
- Plug the EUT a notebook computer system placed on a testing table.
- The computer system ran a test program (provided by manufacturer) to enable EUT under transmission/receiving condition continuously at specific channel frequency.
- The computer system sent "H" messages to its screen.
- The computer system sent "H" messages to modem.
- The computer system sent "H" messages to printer, and the printer printed them on paper.
- Repeated item c ~ e.

4.1.7 TEST RESULTS

EUT	Atheros 11a/g Mini-PCI Adapter	MODEL	NL-5354MP Plus Aries2
MODE	Channel 1	6dB BANDWIDTH	9 kHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	PHASE	Line (L)
ENVIRONMENTAL CONDITIONS	24deg. C, 65%RH, 991 hPa	TESTED BY: Hardaway Lee	

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	0.175	0.10	46.60	-	46.70	-	64.73	54.73	-18.03	-
2	0.232	0.12	39.13	-	39.25	-	62.38	52.38	-23.13	-
3	3.934	0.30	32.56	-	32.86	-	56.00	46.00	-23.14	-
4	4.863	0.34	24.96	-	25.30	-	56.00	46.00	-30.70	-
5	20.488	1.12	25.54	-	26.66	-	60.00	50.00	-33.34	-
6	28.839	1.38	28.07	-	29.45	-	60.00	50.00	-30.55	-

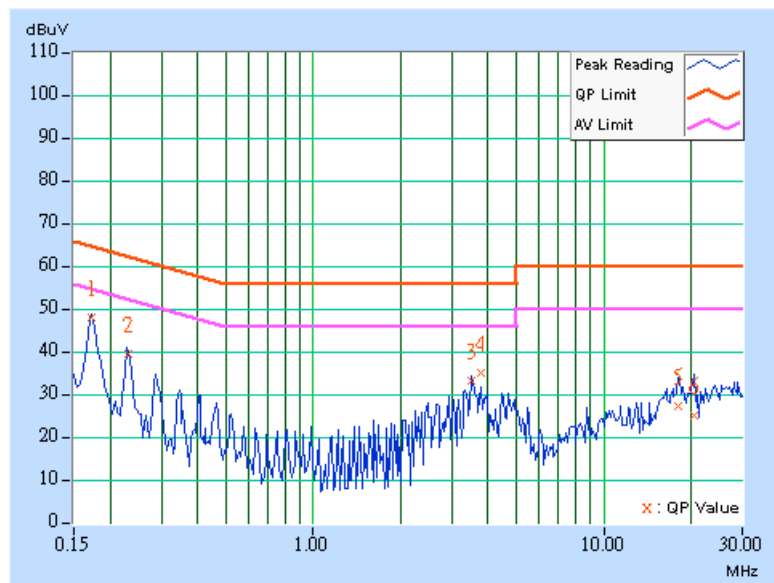
REMARKS: 1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
 2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
 3. The emission levels of other frequencies were very low against the limit.
 4. Margin value =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



EUT	Atheros 11a/g Mini-PCI Adapter	MODEL	NL-5354MP Plus Aries2
MODE	Channel 1	6dB BANDWIDTH	9 kHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	PHASE	Neutral (N)
ENVIRONMENTAL CONDITIONS	24deg. C, 65%RH, 991 hPa	TESTED BY: Hardaway Lee	

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	0.173	0.10	47.16	-	47.26	-	64.79	54.79	-17.53	-
2	0.231	0.12	38.56	-	38.68	-	62.42	52.42	-23.75	-
3	3.526	0.20	32.32	-	32.52	-	56.00	46.00	-23.48	-
4	3.758	0.20	34.40	-	34.60	-	56.00	46.00	-21.40	-
5	18.109	0.86	26.59	-	27.45	-	60.00	50.00	-32.55	-
6	20.391	0.91	24.36	-	25.27	-	60.00	50.00	-34.73	-

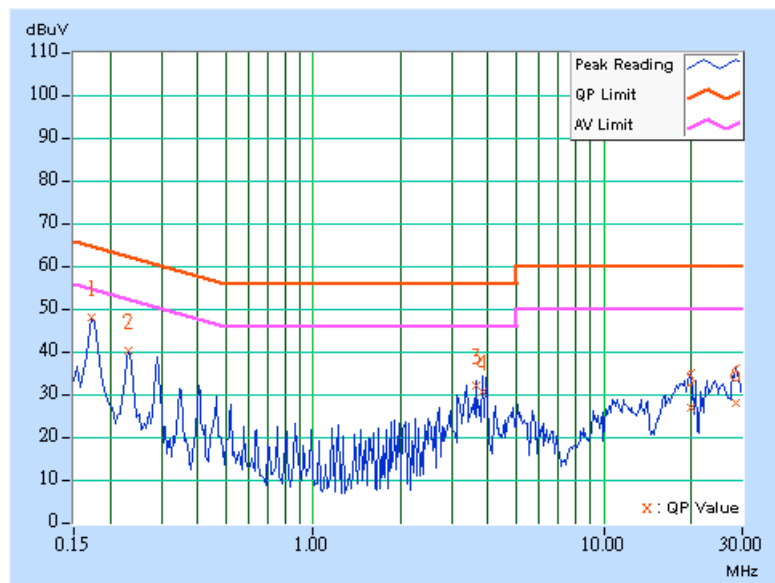
- REMARKS:** 1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. The emission levels of other frequencies were very low against the limit.
4. Margin value =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



EUT	Atheros 11a/g Mini-PCI Adapter	MODEL	NL-5354MP Plus Aries2
MODE	Channel 6	6dB BANDWIDTH	9 kHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	PHASE	Line (L)
ENVIRONMENTAL CONDITIONS	24deg. C, 65%RH, 991 hPa	TESTED BY: Hardaway Lee	

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	0.173	0.10	46.84	-	46.94	-	64.79	54.79	-17.85	-
2	0.232	0.12	39.11	-	39.23	-	62.38	52.38	-23.15	-
3	3.648	0.28	30.74	-	31.02	-	56.00	46.00	-24.98	-
4	3.824	0.29	29.21	-	29.50	-	56.00	46.00	-26.50	-
5	19.855	1.09	25.71	-	26.80	-	60.00	50.00	-33.20	-
6	28.551	1.37	26.74	-	28.11	-	60.00	50.00	-31.89	-

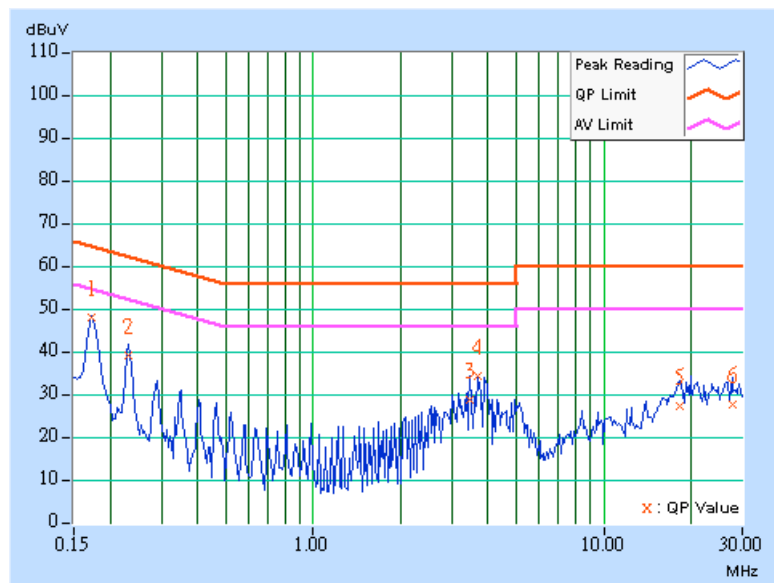
REMARKS: 1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. The emission levels of other frequencies were very low against the limit.
4. Margin value = Emission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



EUT	Atheros 11a/g Mini-PCI Adapter	MODEL	NL-5354MP Plus Aries2
MODE	Channel 6	6dB BANDWIDTH	9 kHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	PHASE	Neutral (N)
ENVIRONMENTAL CONDITIONS	24deg. C, 65%RH, 991 hPa	TESTED BY: Hardaway Lee	

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	0.173	0.10	46.92	-	47.02	-	64.79	54.79	-17.77	-
2	0.232	0.12	38.26	-	38.38	-	62.38	52.38	-24.00	-
3	3.473	0.20	28.01	-	28.21	-	56.00	46.00	-27.79	-
4	3.707	0.20	33.53	-	33.73	-	56.00	46.00	-22.27	-
5	18.293	0.87	26.48	-	27.35	-	60.00	50.00	-32.65	-
6	27.676	1.05	26.84	-	27.89	-	60.00	50.00	-32.11	-

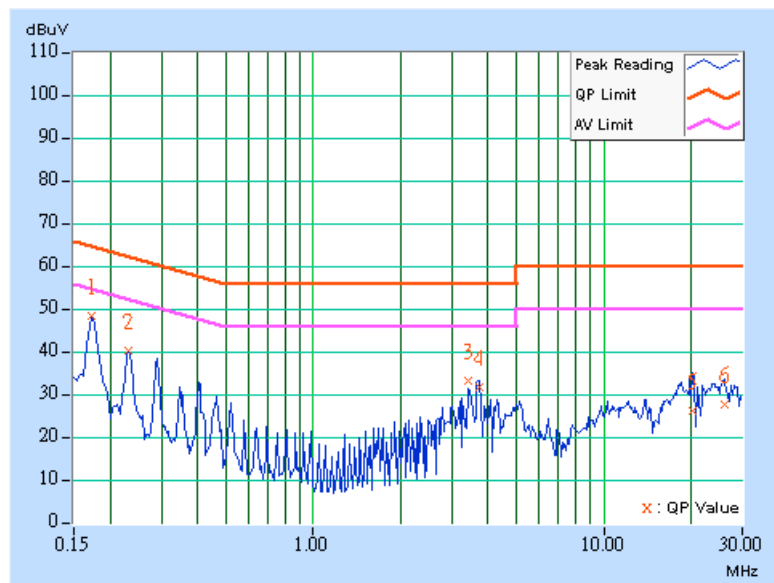
- REMARKS:** 1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. The emission levels of other frequencies were very low against the limit.
4. Margin value =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



EUT	Atheros 11a/g Mini-PCI Adapter	MODEL	NL-5354MP Plus Aries2
MODE	Channel 11	6dB BANDWIDTH	9 kHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	PHASE	Line (L)
ENVIRONMENTAL CONDITIONS	24deg. C, 65%RH, 991 hPa	TESTED BY: Hardaway Lee	

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	0.173	0.10	47.24	-	47.34	-	64.79	54.79	-17.45	-
2	0.232	0.12	39.19	-	39.31	-	62.38	52.38	-23.07	-
3	3.421	0.27	32.08	-	32.35	-	56.00	46.00	-23.65	-
4	3.711	0.29	30.41	-	30.70	-	56.00	46.00	-25.30	-
5	20.332	1.11	24.99	-	26.10	-	60.00	50.00	-33.90	-
6	25.926	1.32	26.41	-	27.73	-	60.00	50.00	-32.27	-

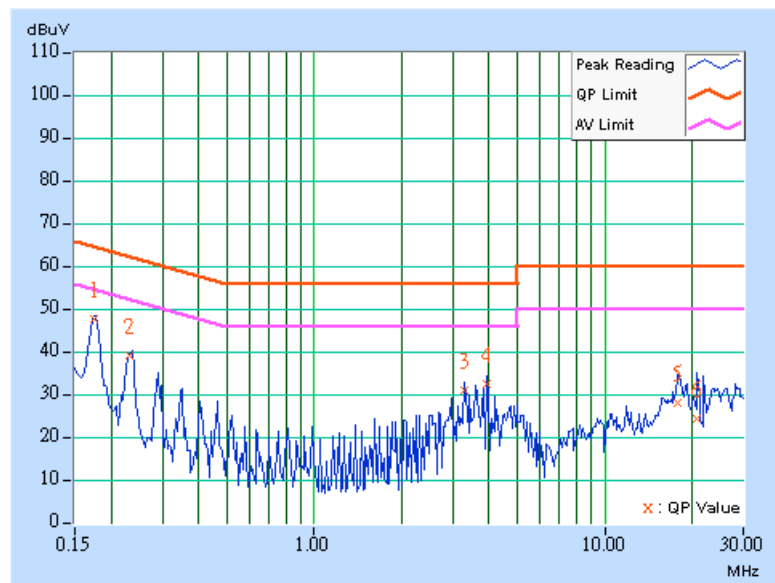
REMARKS: 1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
 2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
 3. The emission levels of other frequencies were very low against the limit.
 4. Margin value =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



EUT	Atheros 11a/g Mini-PCI Adapter	MODEL	NL-5354MP Plus Aries2
MODE	Channel 11	6dB BANDWIDTH	9 kHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	PHASE	Neutral (N)
ENVIRONMENTAL CONDITIONS	24deg. C, 65%RH, 991 hPa	TESTED BY: Hardaway Lee	

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	0.175	0.10	46.72	-	46.82	-	64.73	54.73	-17.91	-
2	0.232	0.12	38.20	-	38.32	-	62.37	52.37	-24.06	-
3	3.301	0.20	30.24	-	30.44	-	56.00	46.00	-25.56	-
4	3.938	0.20	31.77	-	31.97	-	56.00	46.00	-24.03	-
5	17.902	0.86	27.10	-	27.96	-	60.00	50.00	-32.04	-
6	20.750	0.92	23.58	-	24.50	-	60.00	50.00	-35.50	-

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	8593E	3911A07465	Jul. 7, 2004
* HP Preamplifier	8447D	2432A03504	Jun. 10, 2004
* HP Preamplifier	8449B	3008A01292	Aug. 11, 2004
SCHAFFNER Tunable Dipole Antenna	VHBA 9123	459	Jun. 26, 2004
SCHWARZBECK Tunable Dipole Antenna	UHA 9105	977	
* ROHDE & SCHWARZ Test Receiver	ESI7	838496/016	Feb. 08, 2005
* Schwarzbeck Antenna	VULB9168	137	Feb. 27, 2005
* SCHWARZBECK Horn Antenna	BBHA9120-D1	D130	Jun. 30, 2004
* ADT. Turn Table	TT100	0306	NA
* ADT. Tower	AT100	0306	NA
* Software	ADT_Radiated_V5.14	NA	NA
* TIMES RF cable	LL142	CABLE-CH6-01	Apr. 30, 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 Chamber No. 6.



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.

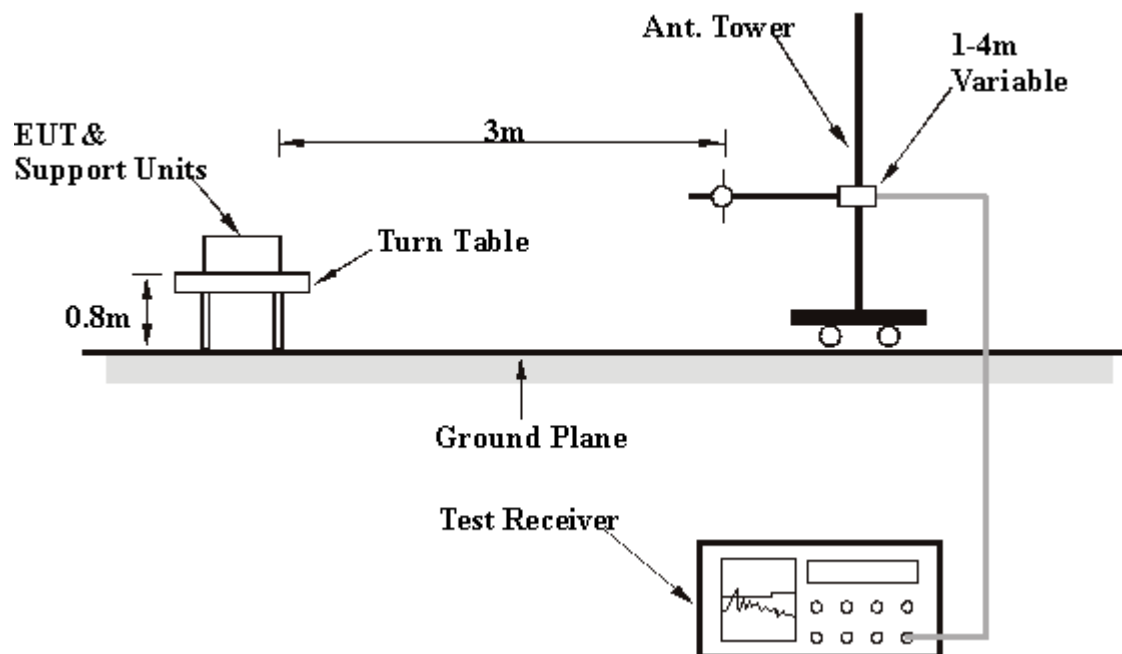
NOTE:

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 10Hz 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 11a/g Mini-PCI Adapter	MODEL	NL-5354MP Plus Aries2
CHANNEL	11	FREQUENCY RANGE	Below 1000 MHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Quasi-Peak
ENVIRONMENTAL CONDITIONS	20 deg. C, 85 % 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	100.30	38.55 QP	43.50	-4.95	2.31 H	171	27.00	11.55
2	125.04	35.24 QP	43.50	-8.26	4.00 H	85	22.42	12.82
3	133.75	35.97 QP	43.50	-7.53	2.47 H	109	23.60	12.37
4	167.15	39.15 QP	43.50	-4.35	1.81 H	210	28.54	10.61
5	200.01	41.42 QP	43.50	-2.08	1.59 H	169	30.66	10.76
6	234.50	38.84 QP	46.00	-7.16	1.23 H	161	26.11	12.73
7	267.64	39.86 QP	46.00	-6.14	1.72 H	177	24.70	15.16
8	299.07	39.18 QP	46.00	-6.82	1.14 H	69	23.54	15.64
9	334.05	40.22 QP	46.00	-5.78	1.18 H	80	24.06	16.16
10	400.65	39.51 QP	46.00	-6.49	1.20 H	334	21.26	18.25
11	432.07	35.14 QP	46.00	-10.86	1.12 H	89	16.50	18.64
12	720.01	37.22 QP	46.00	-8.78	1.55 H	330	14.06	23.16
13	749.55	34.41 QP	46.00	-11.59	1.44 H	141	10.55	23.86
14	800.00	37.68 QP	46.00	-8.32	1.00 H	69	13.99	23.69

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 11a/g Mini-PCI Adapter	MODEL	NL-5354MP Plus Aries2
CHANNEL	11	FREQUENCY RANGE	Below 1000 MHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Quasi-Peak
ENVIRONMENTAL CONDITIONS	20 deg. C, 85 % RH, 991 hPa	TESTED BY: Hardaway 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	120.04	35.31 QP	43.50	-8.19	1.33 V	276	22.23	13.08
2	133.32	36.01 QP	43.50	-7.49	1.00 V	307	23.62	12.39
3	200.02	36.85 QP	43.50	-6.65	1.14 V	119	26.09	10.76
4	233.50	36.79 QP	46.00	-9.21	1.13 V	128	24.12	12.67
5	280.05	35.39 QP	46.00	-10.61	1.91 V	164	20.06	15.33
6	460.05	39.67 QP	46.00	-6.33	1.25 V	175	20.55	19.12
7	720.01	38.11 QP	46.00	-7.89	1.54 V	61	14.95	23.16
8	920.03	36.12 QP	46.00	-9.88	1.22 V	87	11.55	24.57

- 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 11a/g Mini-PCI Adapter	MODEL	NL-5354MP Plus Aries2
CHANNEL	1	FREQUENCY RANGE	1~25 GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak(PK) Average (AV)
ENVIRONMENTAL CONDITIONS	22 deg. C, 72 % RH, 991 hPa	TEST MODE	CCK
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	42.32 PK	74.00	-31.68	1.36 H	240	12.68	29.65
2	*2412.00	94.18 PK			1.36 H	240	64.46	29.72
2	*2412.00	83.73 AV			1.36 H	240	54.01	29.72
3	2690.00	38.75 PK	74.00	-35.25	1.36 H	240	8.26	30.48
4	4824.00	51.65 PK	74.00	-22.35	1.42 H	189	16.20	35.45
4	4824.00	33.70 AV	54.00	-20.30	1.42 H	189	-1.75	35.45
5	7236.00	53.61 PK	74.00	-20.39	1.52 H	251	12.98	40.63
5	7236.00	37.87 AV	54.00	-16.13	1.52 H	251	-2.76	40.63
6	9648.00	53.17 PK	74.00	-20.83	1.78 H	36	8.70	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	59.71 PK	74.00	-14.29	1.64 V	62	30.06	29.65
1	2390.00	50.00 AV	54.00	-4.00	1.64 V	62	20.35	29.65
2	*2412.00	111.50 PK			1.64 V	62	81.78	29.72
2	*2412.00	101.79 AV			1.64 V	62	72.07	29.72
3	2690.00	54.85 PK	74.00	-19.15	1.64 V	62	24.37	30.48
3	2690.00	45.63 AV	54.00	-8.37	1.64 V	62	15.15	30.48
4	4824.00	52.58 PK	74.00	-21.42	1.66 V	208	17.13	35.45
4	4824.00	34.61 AV	54.00	-19.39	1.66 V	208	-0.84	35.45
5	7236.00	53.27 PK	74.00	-20.73	1.76 V	97	12.64	40.63
6	9648.00	53.98 PK	74.00	-20.02	2.06 V	337	9.51	44.46
6	9648.00	33.68 AV	54.00	-20.32	2.06 V	337	-10.78	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. The limit value is defined as per 15.247
 6. “ * ” : Fundamental frequency

EUT	Atheros 11a/g Mini-PCI Adapter	MODEL	NL-5354MP Plus Aries2
CHANNEL	6	FREQUENCY RANGE	1~25 GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak(PK) Average (AV)
ENVIRONMENTAL CONDITIONS	22 deg. C, 72 % RH, 991 hPa	TEST MODE	CCK
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	101.85 PK			1.21 H	74	72.06	29.79
1	*2437.00	92.71 AV			1.21 H	74	62.92	29.79
2	4874.00	52.37 PK	74.00	-21.63	1.46 H	226	16.58	35.79
2	4874.00	34.26 AV	54.00	-19.74	1.46 H	226	-1.53	35.79
3	7311.00	49.98 PK	74.00	-24.02	1.61 H	337	9.31	40.67

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	112.44 PK			1.66 V	65	82.65	29.79
1	*2437.00	103.07 AV			1.66 V	65	73.28	29.79
2	4874.00	55.67 PK	74.00	-18.33	1.97 V	275	19.88	35.79
2	4874.00	35.71 AV	54.00	-18.29	1.97 V	275	-0.08	35.79
3	7311.00	54.07 PK	74.00	-19.93	1.16 V	148	13.40	40.67
3	7311.00	37.27 AV	54.00	-16.73	1.16 V	148	-3.40	40.67

- 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. The limit value is defined as per 15.247
 6. “ * ” : Fundamental frequency

EUT	Atheros 11a/g Mini-PCI Adapter	MODEL	NL-5354MP Plus Aries2
CHANNEL	11	FREQUENCY RANGE	1~25 GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak(PK) Average (AV)
ENVIRONMENTAL CONDITIONS	22 deg. C, 72 % RH, 991 hPa	TEST MODE	CCK

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	101.13 PK			2.09 H	239	71.28	29.85
1	*2462.00	90.85 AV			2.09 H	239	61.00	29.85
2	2483.50	45.95 PK	74.00	-28.05	2.09 H	239	16.04	29.91
3	2689.00	45.70 PK	74.00	-28.30	2.09 H	239	15.22	30.48
4	4924.00	57.50 PK	74.00	-16.50	1.19 H	229	21.41	36.09
4	4924.00	35.08 AV	54.00	-18.92	1.19 H	229	-1.01	36.09
5	7386.00	54.06 PK	74.00	-19.94	1.45 H	36	13.04	41.02
5	7386.00	37.11 AV	54.00	-16.89	1.45 H	36	-3.91	41.02
6	9848.00	58.41 PK	74.00	-15.59	1.43 H	253	14.30	44.10
6	9848.00	43.91 AV	54.00	-10.09	1.43 H	253	-0.20	44.10

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	111.76 PK			1.75 V	59	81.91	29.85
1	*2462.00	102.34 AV			1.75 V	59	72.49	29.85
2	2483.50	56.58 PK	74.00	-17.42	1.75 V	59	26.67	29.91
2	2483.50	47.16 AV	54.00	-6.84	1.75 V	59	17.25	29.91
3	2689.00	56.33 PK	74.00	-17.67	1.75 V	59	25.85	30.48
3	2689.00	46.91 AV	54.00	-7.09	1.75 V	59	16.43	30.48
4	4924.00	60.75 PK	74.00	-13.25	2.14 V	167	24.66	36.09
4	4924.00	39.16 AV	54.00	-14.84	2.14 V	167	3.07	36.09
5	7386.00	55.68 PK	74.00	-18.32	1.59 V	196	14.66	41.02
5	7386.00	37.69 AV	54.00	-16.31	1.59 V	196	-3.33	41.02
6	9848.00	64.46 PK	74.00	-9.54	1.70 V	219	20.35	44.10
6	9848.00	51.65 AV	54.00	-2.35	1.70 V	219	7.54	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. The limit value is defined as per 15.247
 6. “ * ” : Fundamental frequency

EUT	Atheros 11a/g Mini-PCI Adapter	MODEL	NL-5354MP Plus Aries2
CHANNEL	1	FREQUENCY RANGE	1~25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak(PK) Average (AV)
ENVIRONMENTAL CONDITIONS	22 deg. C, 72 % RH, 991 hPa	TEST MODE	OFDM (Normal Mode)
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	54.65 PK	74.00	-19.35	1.82 H	340	25.00	29.65
1	2390.00	41.86 AV	54.00	-12.14	1.82 H	340	12.21	29.65
2	*2412.00	101.42 PK			1.82 H	340	71.70	29.72
2	*2412.00	88.63 AV			1.82 H	340	58.91	29.72
3	2689.00	46.36 PK	74.00	-27.64	1.82 H	340	15.88	30.48
4	4824.00	45.35 PK	74.00	-28.65	1.86 H	223	9.90	35.45
5	7236.00	57.60 PK	74.00	-16.40	1.43 H	241	16.97	40.63
5	7236.00	36.75 AV	54.00	-17.25	1.43 H	241	-3.88	40.63
6	9648.00	60.32 PK	74.00	-13.68	1.33 H	66	15.85	44.46
6	9648.00	41.09 AV	54.00	-12.91	1.33 H	66	-3.38	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	64.70 PK	74.00	-9.30	1.76 V	63	35.05	29.65
1	2390.00	51.89 AV	54.00	-2.11	1.76 V	63	22.24	29.65
2	*2412.00	111.47 PK			1.76 V	63	81.75	29.72
2	*2412.00	98.66 AV			1.76 V	63	68.94	29.72
3	2689.00	56.41 PK	74.00	-17.59	1.76 V	63	25.93	30.48
3	2689.00	43.60 AV	54.00	-10.40	1.76 V	63	13.12	30.48
4	4824.00	49.55 PK	74.00	-24.45	1.17 V	194	14.10	35.45
5	7236.00	59.51 PK	74.00	-14.49	1.00 V	219	18.88	40.63
5	7236.00	38.11 AV	54.00	-15.89	1.00 V	219	-2.52	40.63
6	9648.00	66.24 PK	74.00	-7.76	1.58 V	222	21.77	44.46
6	9648.00	43.59 AV	54.00	-10.41	1.58 V	222	-0.88	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. The limit value is defined as per 15.247
 6. " * " : Fundamental frequency

EUT	Atheros 11a/g Mini-PCI Adapter	MODEL	NL-5354MP Plus Aries2
CHANNEL	6	FREQUENCY RANGE	1~25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak(PK) Average (AV)
ENVIRONMENTAL CONDITIONS	22 deg. C, 72 % RH, 991 hPa	TEST MODE	OFDM (Normal Mode)
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	100.83 PK			1.08 H	44	71.04	29.79
1	*2437.00	88.82 AV			1.08 H	44	59.03	29.79
2	4874.00	47.90 PK	74.00	-26.10	1.11 H	193	12.11	35.79
3	7311.00	53.95 PK	74.00	-20.05	1.54 H	222	13.28	40.67
3	7311.00	37.33 AV	54.00	-16.67	1.54 H	222	-3.34	40.67
4	9748.00	56.59 PK	74.00	-17.41	1.92 H	122	12.40	44.20
4	9748.00	40.44 AV	54.00	-13.56	1.92 H	122	-3.75	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	112.04 PK			1.73 V	66	82.25	29.79
1	*2437.00	100.22 AV			1.73 V	66	70.43	29.79
2	4874.00	47.74 PK	74.00	-26.26	2.01 V	78	11.95	35.79
3	7311.00	53.97 PK	74.00	-20.03	1.84 V	343	13.30	40.67
3	7311.00	37.27 AV	54.00	-16.73	1.84 V	343	-3.40	40.67
4	9748.00	61.83 PK	74.00	-12.17	1.21 V	224	17.64	44.20
4	9748.00	41.67 AV	54.00	-12.33	1.21 V	224	-2.52	44.20

- 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. The limit value is defined as per 15.247
 6. “ * “ : Fundamental frequency

EUT	Atheros 11a/g Mini-PCI Adapter	MODEL	NL-5354MP Plus Aries2
CHANNEL	11	FREQUENCY RANGE	1~25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak(PK) Average (AV)
ENVIRONMENTAL CONDITIONS	22 deg. C, 72 % RH, 991 hPa	TEST MODE	OFDM (Normal Mode)
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	99.15 PK			1.92 H	264	69.30	29.85
1	*2462.00	86.62 AV			1.92 H	264	56.77	29.85
2	2483.50	50.38 PK	74.00	-23.62	1.92 H	264	20.47	29.91
3	2690.00	46.07 PK	74.00	-27.93	1.92 H	264	15.59	30.48
4	4924.00	49.72 PK	74.00	-24.28	1.87 H	182	13.63	36.09
5	7386.00	54.56 PK	74.00	-19.44	2.12 H	231	13.54	41.02
5	7386.00	37.36 AV	54.00	-16.64	2.12 H	231	-3.66	41.02
6	9848.00	55.78 PK	74.00	-18.22	1.32 H	203	11.67	44.10
6	9848.00	40.13 AV	54.00	-13.87	1.32 H	203	-3.98	44.10

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	110.01 PK			2.09 V	61	80.16	29.85
1	*2462.00	98.13 AV			2.09 V	61	68.28	29.85
2	2483.50	61.24 PK	74.00	-12.76	2.09 V	61	31.33	29.91
2	2483.50	49.36 AV	54.00	-4.64	2.09 V	61	19.45	29.91
3	2690.00	56.93 PK	74.00	-17.07	2.09 V	61	26.45	30.48
3	2690.00	45.05 AV	54.00	-8.95	2.09 V	61	14.57	30.48
4	4924.00	51.98 PK	74.00	-22.02	1.22 V	75	15.89	36.09
4	4924.00	36.22 AV	54.00	-17.78	1.22 V	75	0.13	36.09
5	7386.00	53.51 PK	74.00	-20.49	1.46 V	245	12.49	41.02
5	7386.00	36.89 AV	54.00	-17.11	1.46 V	245	-4.13	41.02
6	9848.00	62.02 PK	74.00	-11.98	1.78 V	256	17.91	44.10
6	9848.00	42.01 AV	54.00	-11.99	1.78 V	256	-2.10	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. The limit value is defined as per 15.247
 6. “ * ” : Fundamental frequency

EUT	Atheros 11a/g Mini-PCI Adapter	MODEL	NL-5354MP Plus Aries2
CHANNEL	6	FREQUENCY RANGE	1~25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak(PK) Average (AV)
ENVIRONMENTAL CONDITIONS	20 deg. C, 65 % RH, 991 hPa	TEST MODE	OFDM (Turbo Mode)
TESTED BY	Steven Lu		

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	54.18 PK	74.00	-19.82	1.78 H	10	22.70	31.48
1	2390.00	43.87 AV	54.00	-10.13	1.78 H	10	12.39	31.48
2	*2437.00	100.66 PK			1.78 H	10	69.12	31.54
2	*2437.00	90.35 AV			1.78 H	10	58.81	31.54
3	2483.50	54.14 PK	74.00	-19.86	1.78 H	10	22.54	31.60
3	2483.50	43.83 AV	54.00	-10.17	1.78 H	10	12.23	31.60
4	4874.00	52.56 PK	74.00	-21.44	1.35 H	65	14.62	37.94
4	4874.00	36.87 AV	54.00	-17.13	1.35 H	65	-1.07	37.94
5	7311.00	52.26 PK	74.00	-21.74	1.37 H	320	9.94	42.32
5	7311.00	37.95 AV	54.00	-16.05	1.37 H	320	-4.37	42.32
6	9748.00	59.52 PK	74.00	-14.48	1.11 H	222	14.70	44.82
6	9748.00	44.84 AV	54.00	-9.16	1.11 H	222	0.02	44.82

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	61.45 PK	74.00	-12.55	1.04 V	3	29.97	31.48
1	2390.00	52.28 AV	54.00	-1.72	1.04 V	3	20.80	31.48
2	*2437.00	107.93 PK			1.04 V	3	76.39	31.54
2	*2437.00	98.76 AV			1.04 V	3	67.22	31.54
3	2483.50	61.41 PK	74.00	-12.59	1.04 V	3	29.81	31.60
3	2483.50	52.24 AV	54.00	-1.76	1.04 V	3	20.64	31.60
4	4874.00	55.09 PK	74.00	-18.91	1.74 V	15	17.15	37.94
4	4874.00	40.27 AV	54.00	-13.73	1.74 V	15	2.33	37.94
5	7311.00	53.85 PK	74.00	-20.15	1.00 V	185	11.53	42.32
5	7311.00	39.55 AV	54.00	-14.45	1.00 V	185	-2.77	42.32
6	9748.00	60.15 PK	74.00	-13.85	1.25 V	33	15.33	44.82
6	9748.00	44.15 AV	54.00	-9.85	1.25 V	33	-0.67	44.82

- 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. The limit value is defined as per 15.247
 6. “ * ” : Fundamental frequency

4.3 6dB BANDWIDTH MEASUREMENT

4.3.1 LIMITS OF 6dB BANDWIDTH MEASUREMENT

The minimum of 6dB Bandwidth Measurement is 0.5 MHz.

4.3.2 TEST INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
SPECTRUM ANALYZER	FSEK 30	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 100kHz RBW and 100kHz VBW. The 6dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 6dB.

4.3.4 DEVIATION FROM TEST STANDARD

No deviation

4.3.5 TEST SETUP



4.3.6 EUT OPERATING CONDITIONS

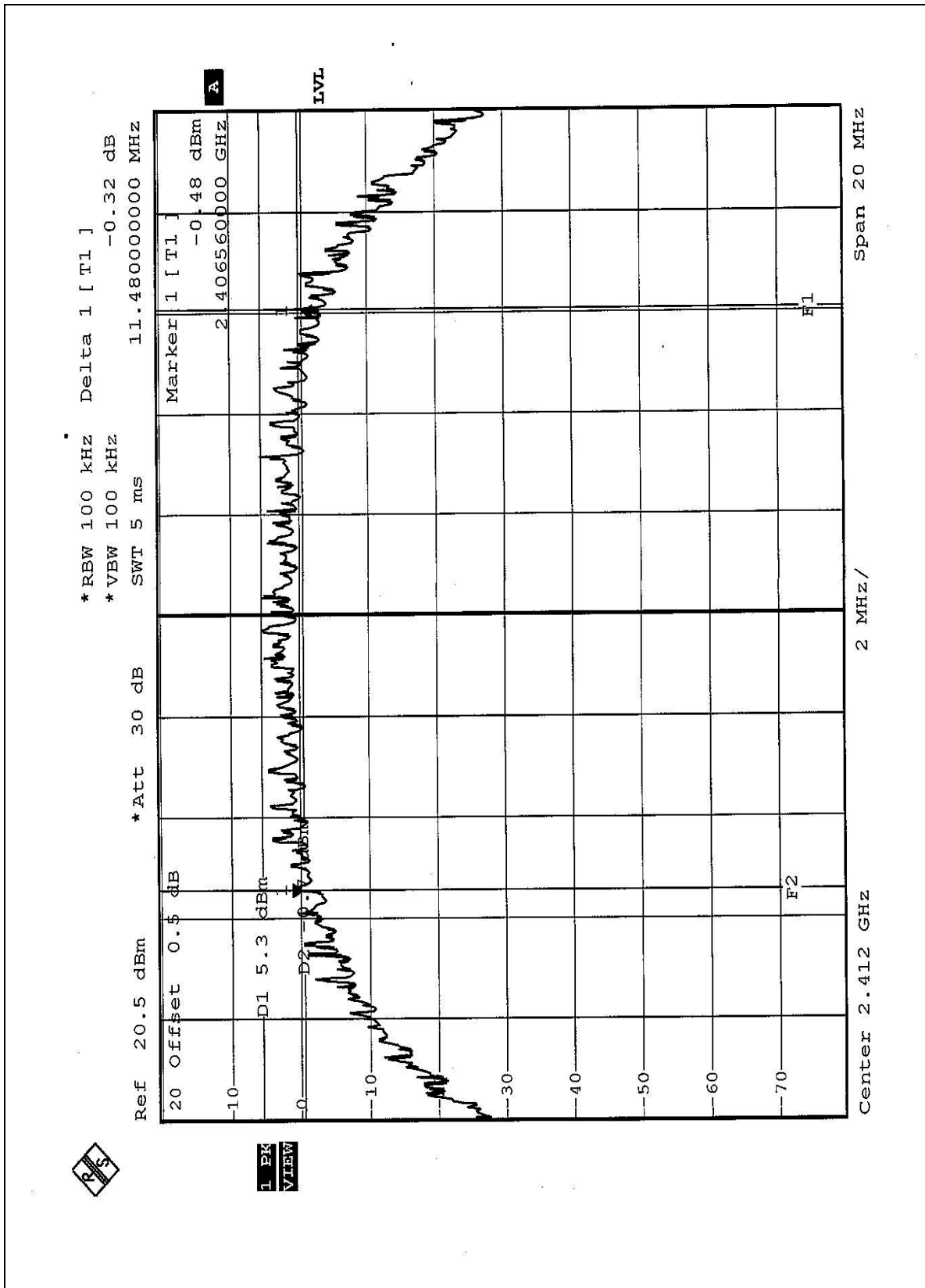
The software provided by client to enable the EUT under transmission condition continuously at lowest, middle and highest channel frequencies individually.

4.3.7 TEST RESULTS

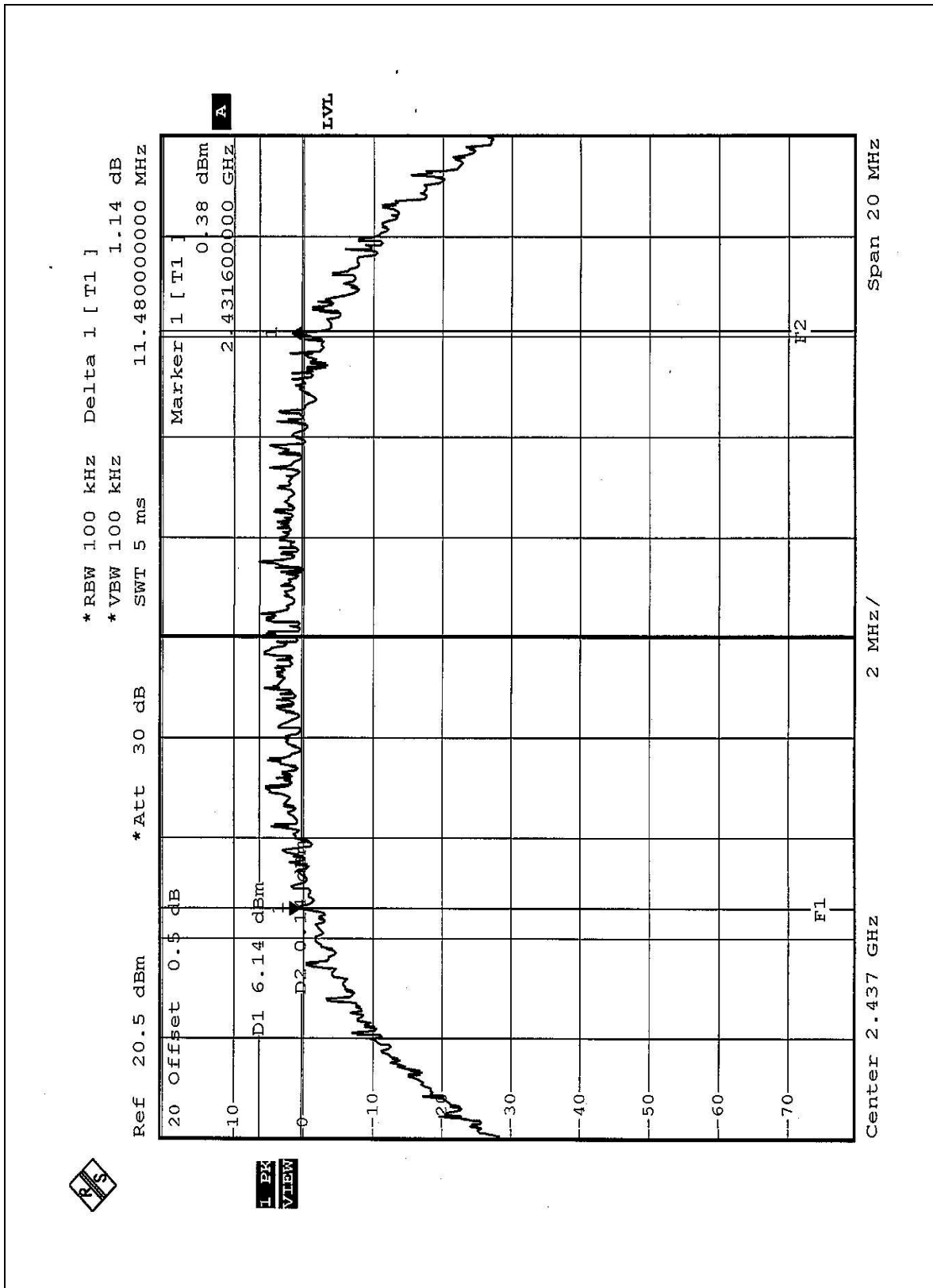
EUT	Atheros 11a/g Mini-PCI Adapter	MODEL	NL-5354MP Plus Aries2
TEST MODE	CCK	INPUT POWER (SYSTEM)	120Vac, 60 Hz
ENVIRONMENTAL CONDITIONS	20deg. C, 60%RH, 991hPa	TESTED BY	Jun Wu

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS/FAIL
1	2412	11.48	0.5	PASS
6	2437	11.48	0.5	PASS
11	2462	11.08	0.5	PASS

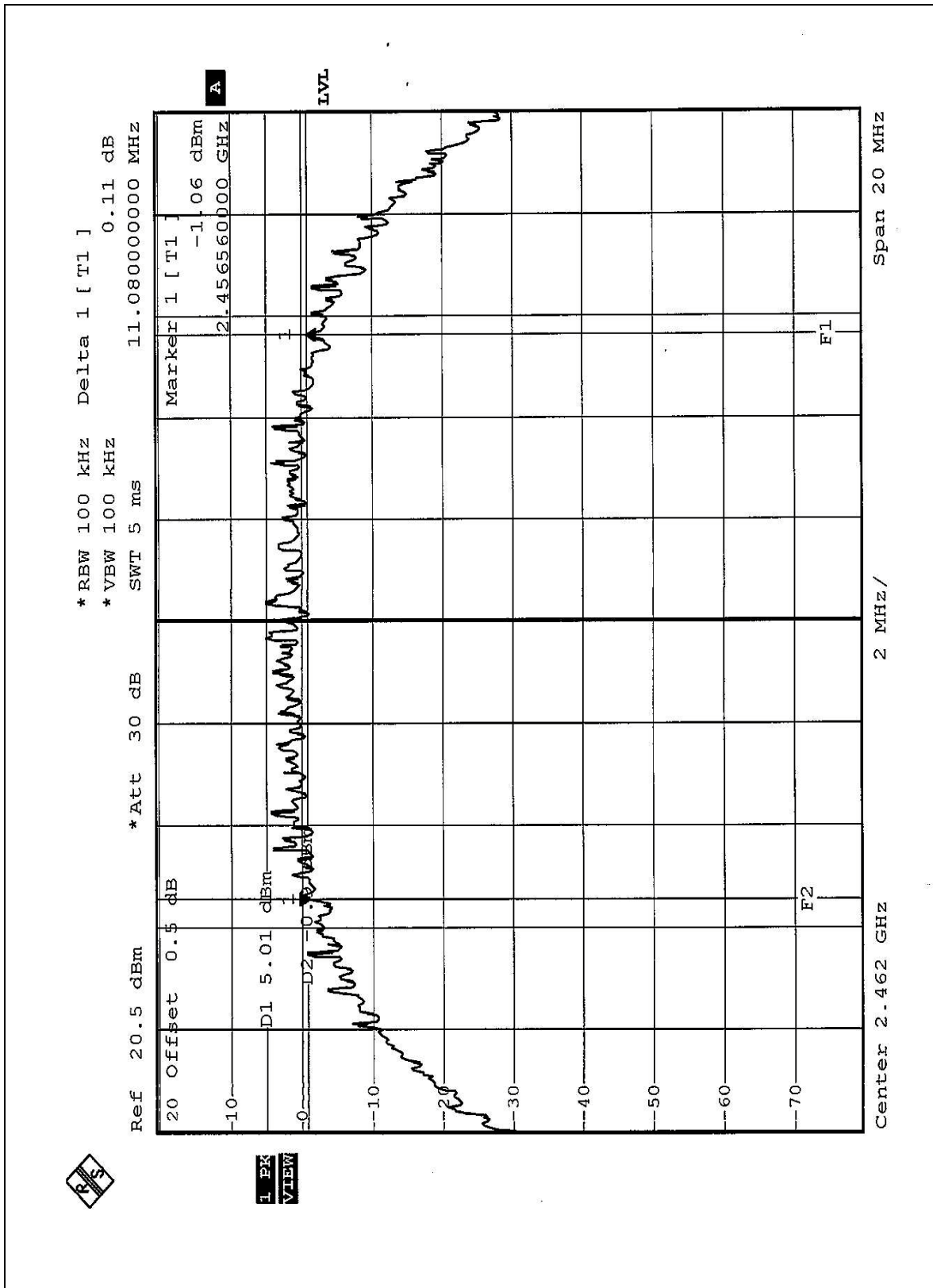
CH1



CH6



CH11

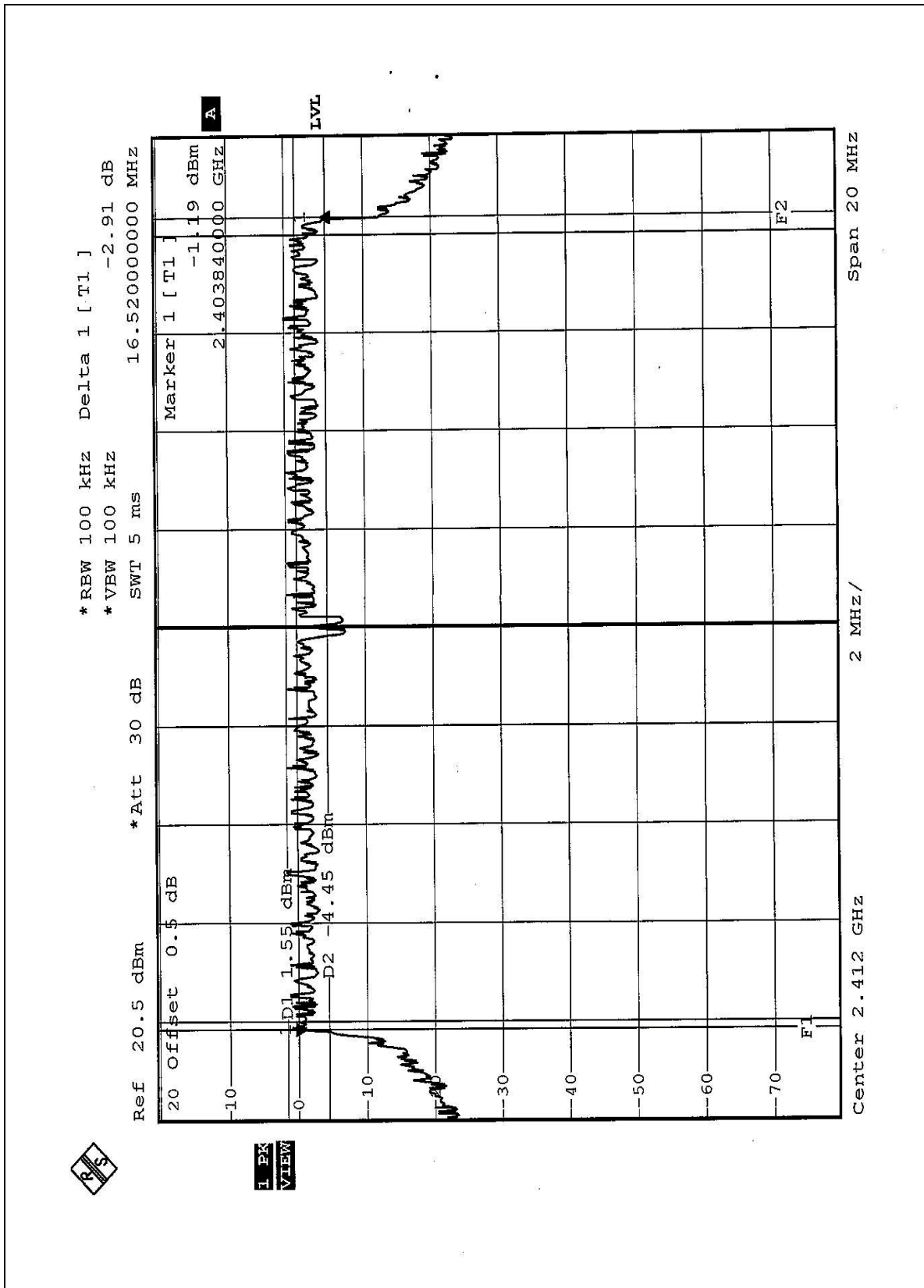




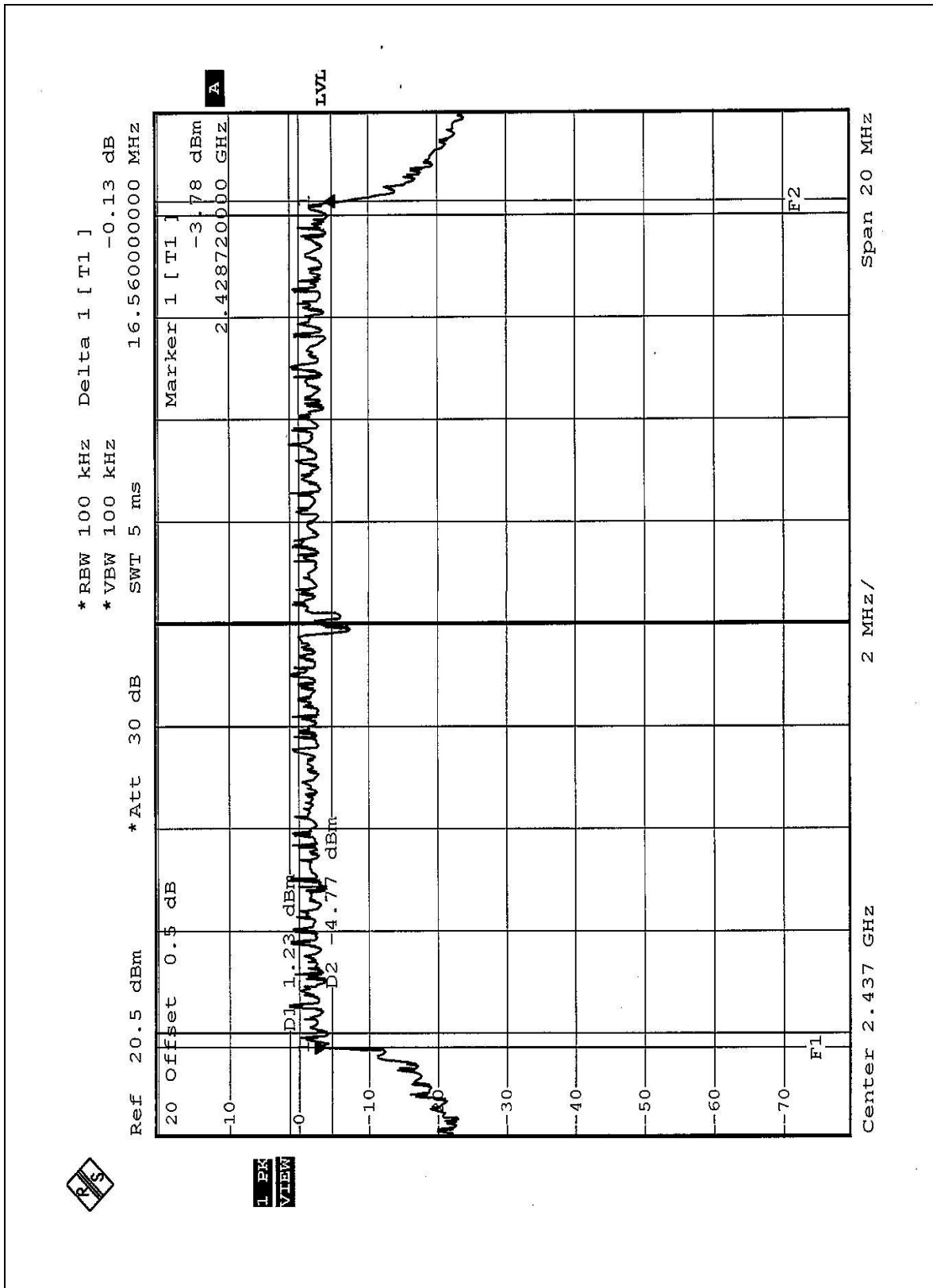
EUT	Atheros 11a/g Mini-PCI Adapter	MODEL	NL-5354MP Plus Aries2
MODE	OFDM	INPUT POWER (SYSTEM)	120Vac, 60 Hz
ENVIRONMENTAL CONDITIONS	20deg. C, 60%RH, 991hPa	TESTED BY	Jun Wu

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS/FAIL
1	2412	16.52	0.5	PASS
6	2437	16.56	0.5	PASS
11	2462	16.40	0.5	PASS
6 (Turbo)	2437	32.64	0.5	PASS

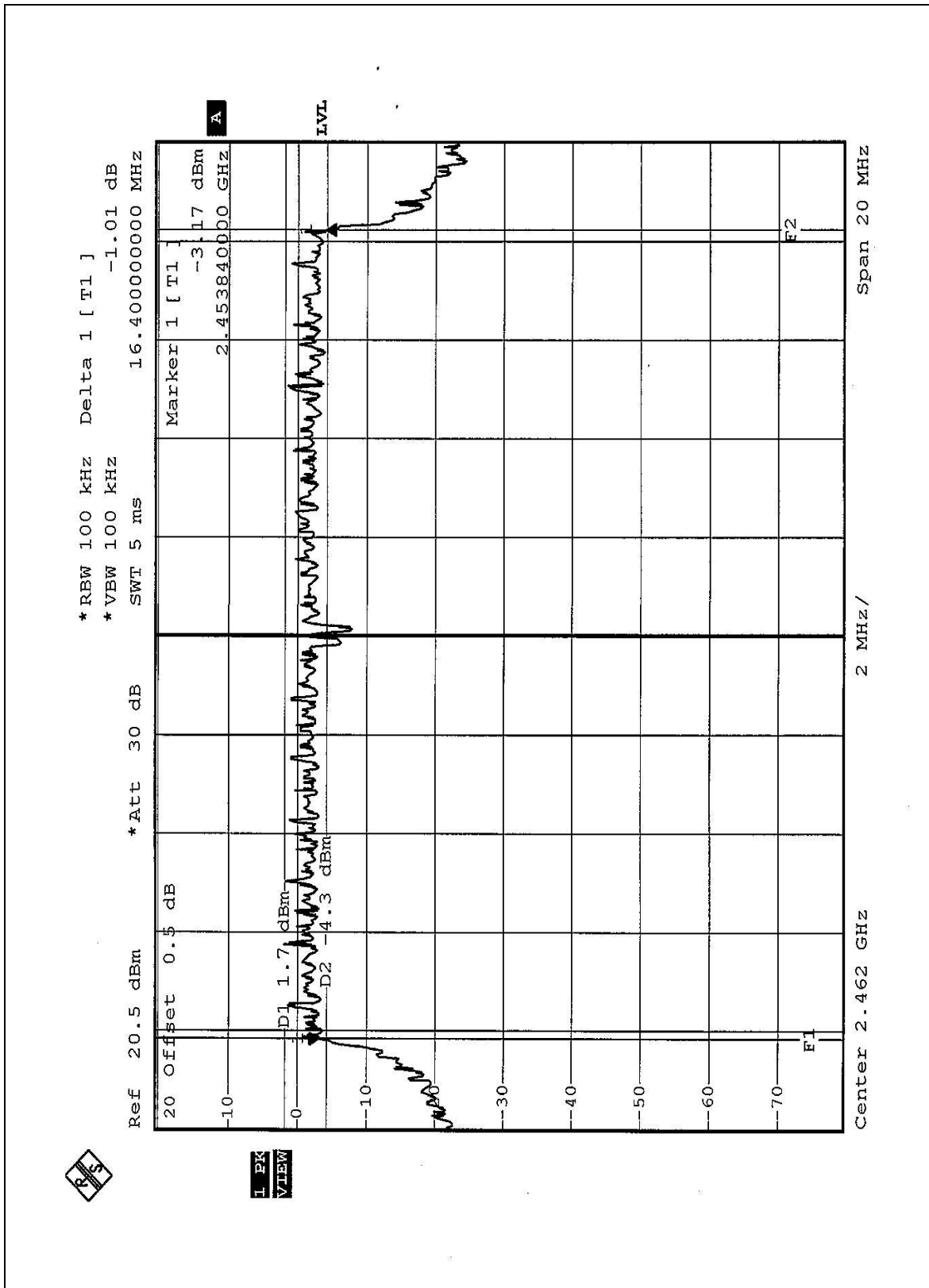
CH1



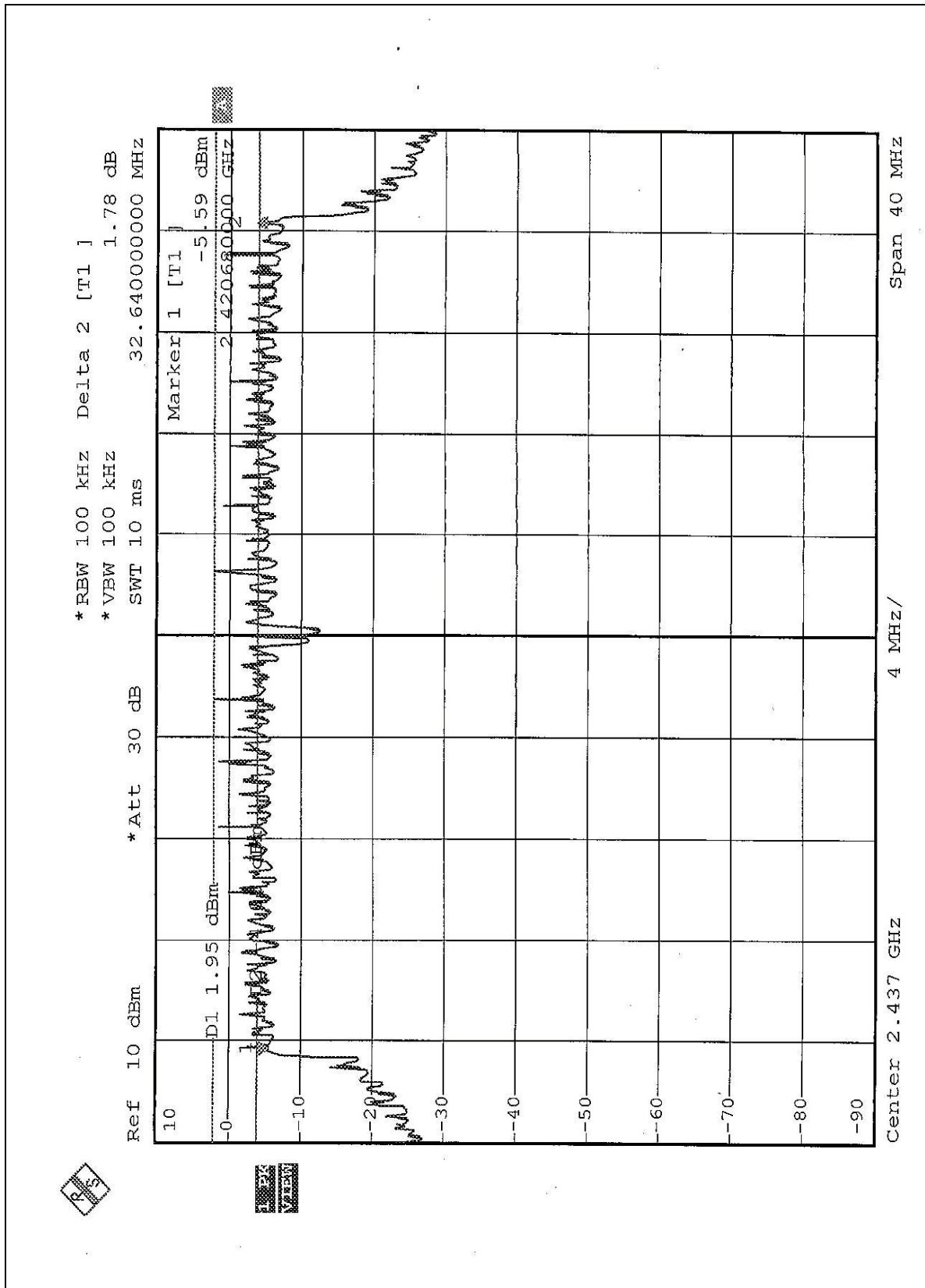
CH6



CH11



CH 6 (Turbo mode)



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
R&S SPECTRUM ANALYZER	FSEK30	100049	Aug. 12, 2004
R&S SIGNAL GENERATOR	SMP04	100011	May 28, 2004
TEKTRONIX OSCILLOSCOPE	TDS 1012	C019167	Feb. 01, 2005
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

EUT	Atheros 11a/g Mini-PCI Adapter	MODEL	NL-5354MP Plus Aries2
INPUT POWER (SYSTEM)	120Vac, 60Hz	ENVIRONMENTAL CONDITIONS	22deg. C, 60%RH, 991hPa
MODE	CCK	TESTED BY	Jamison Chan

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER OUTPUT (dBm)	PEAK POWER LIMIT (dBm)	PASS/FAIL
1	2412	17.20	30	PASS
6	2437	17.60	30	PASS
11	2462	17.40	30	PASS

EUT	Atheros 11a/g Mini-PCI Adapter	MODEL	NL-5354MP Plus Aries2
INPUT POWER (SYSTEM)	120Vac, 60Hz	ENVIRONMENTAL CONDITIONS	22deg. C, 60%RH, 991hPa
MODE	OFDM	TESTED BY	Jamison Chan

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER OUTPUT (dBm)	PEAK POWER LIMIT (dBm)	PASS/FAIL
1	2412	20.00	30	PASS
6	2437	19.20	30	PASS
11	2462	19.30	30	PASS
6 (Turbo)	2437	18.00	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

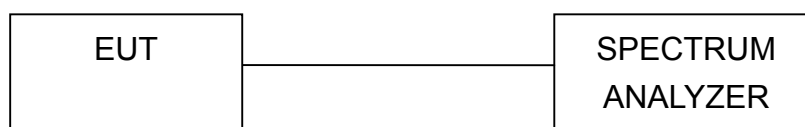
The transmitter output was connected to the spectrum analyzer through an attenuator, the bandwidth of the fundamental frequency was measured with the spectrum analyzer using 3kHz RBW and 30kHz VBW, set sweep time = span/3kHz. The power spectral density was measured and recorded.

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 CONDITION

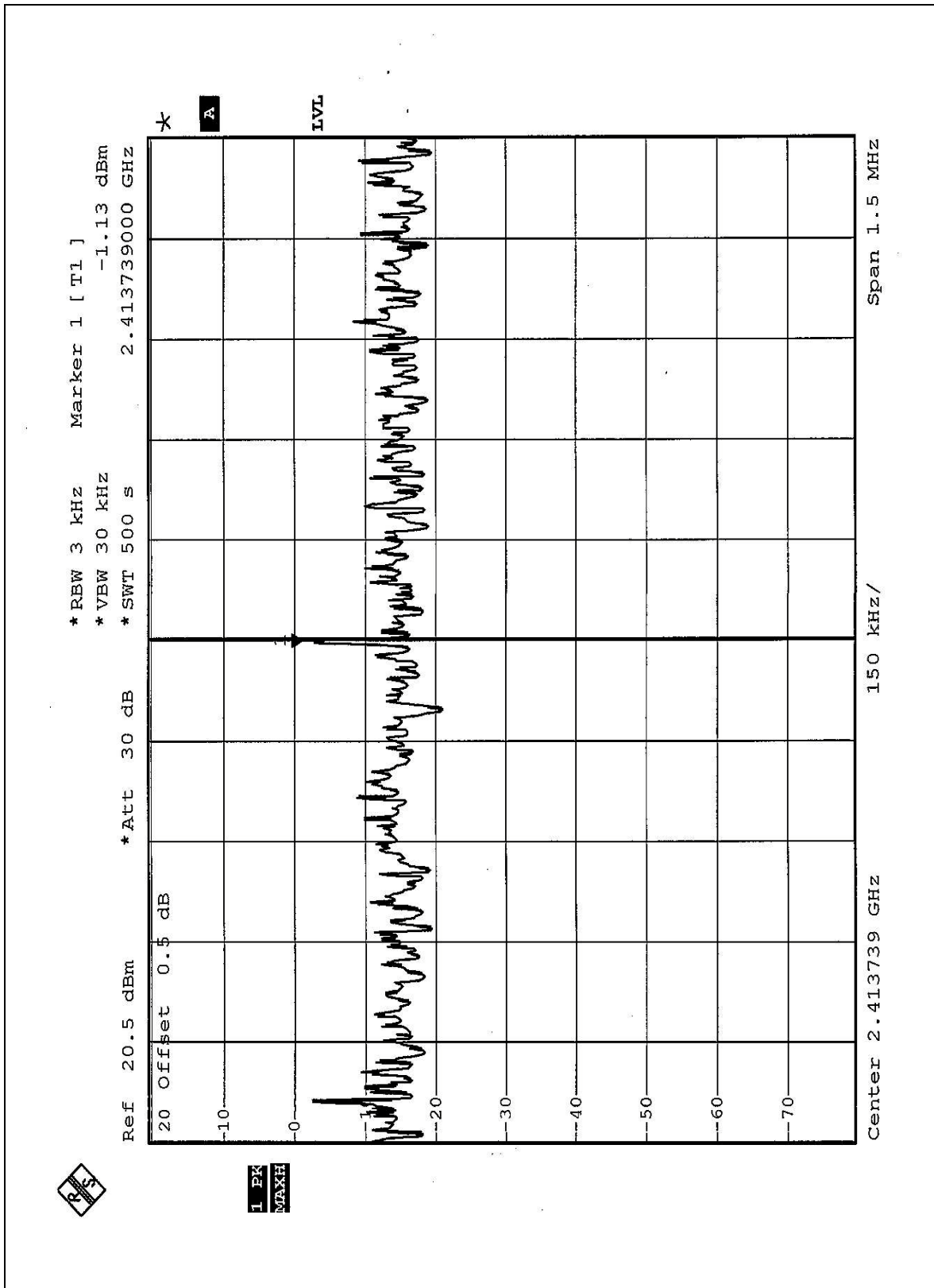
Same as Item 4.3.6

4.5.7 TEST RESULTS

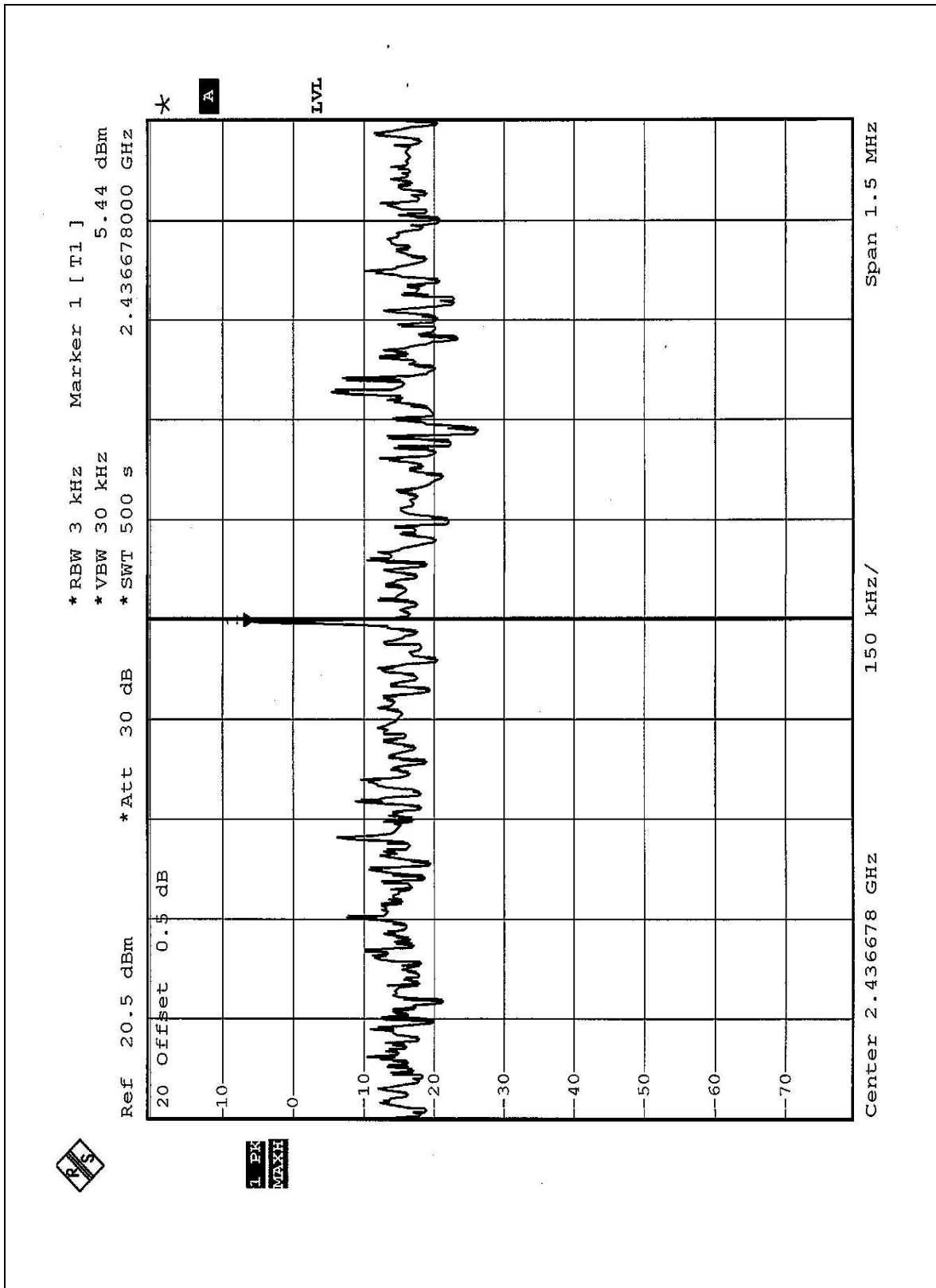
EUT	Atheros 11a/g Mini-PCI Adapter	MODEL	NL-5354MP Plus Aries2
INPUT POWER (SYSTEM)	120Vac, 60Hz	ENVIRONMENTAL CONDITIONS	20deg. C, 60%RH, 991hPa
MODE	CCK	TESTED BY	Jun Wu

CHANNEL	CHANNEL FREQUENCY (MHz)	RF POWER LEVEL IN 3kHz BW (dBm)	MAXIMUM LIMIT (dBm)	PASS/FAIL
1	2412	-1.13	8	PASS
6	2437	5.44	8	PASS
11	2462	4.44	8	PASS

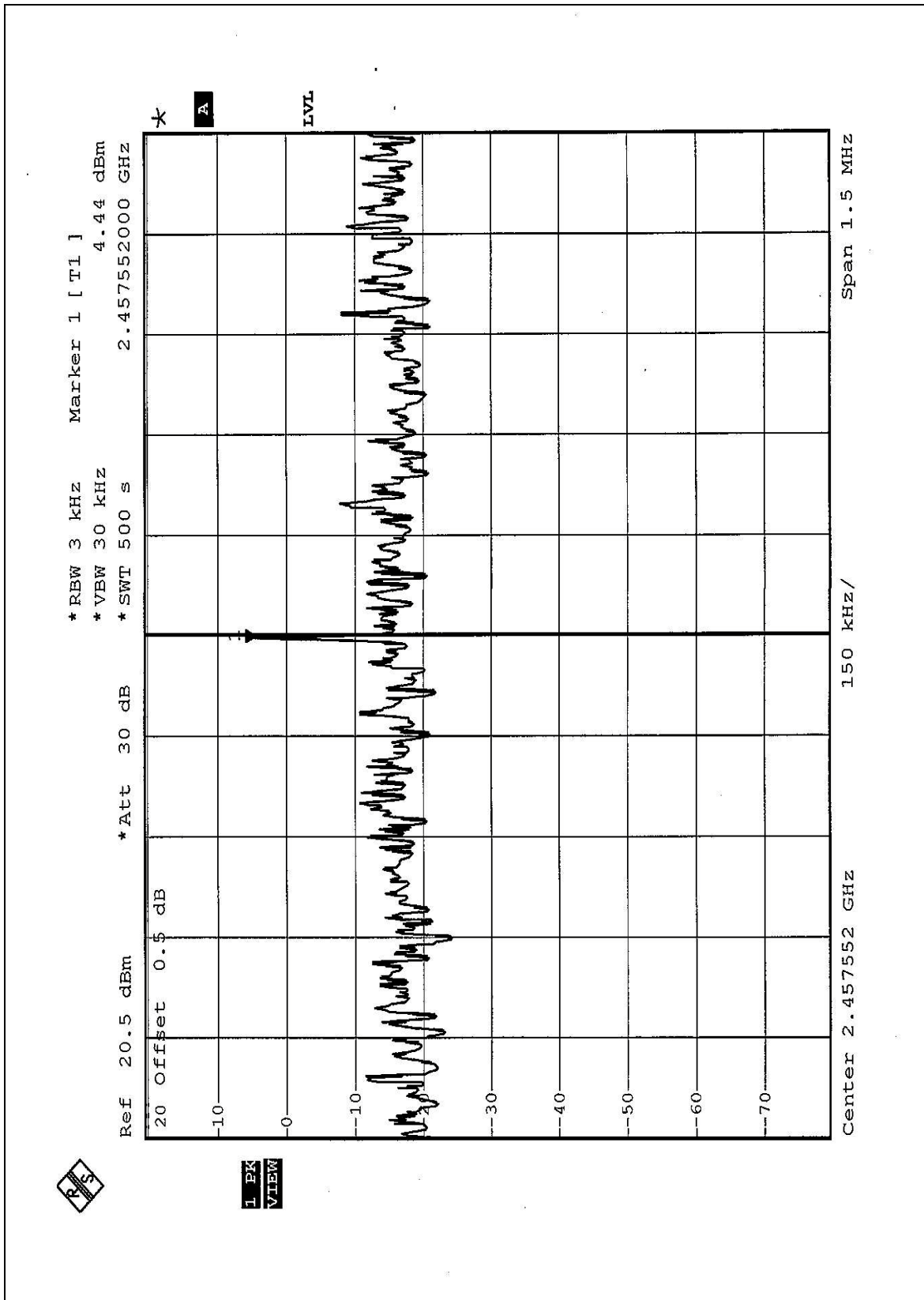
CH1



CH6



CH11

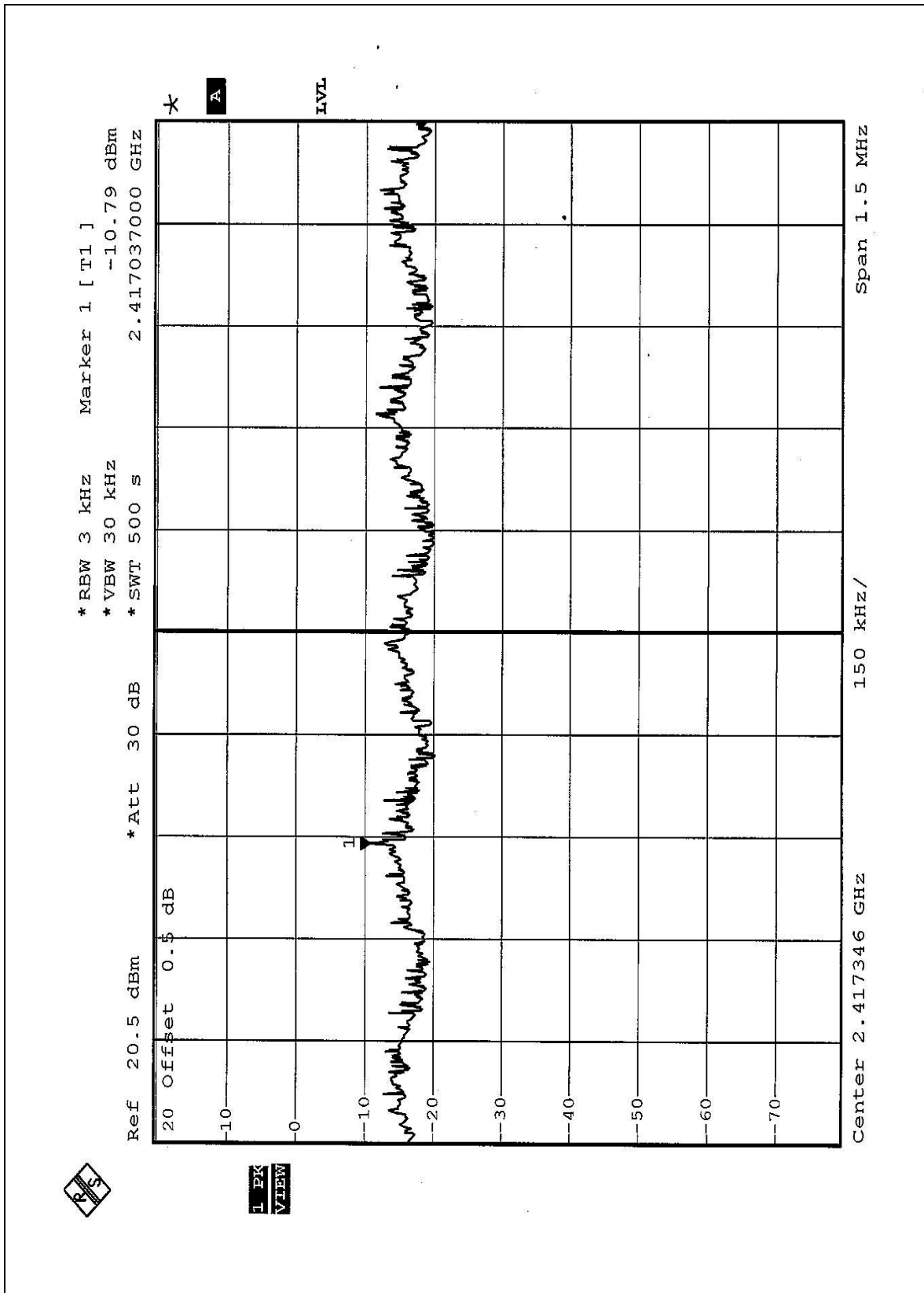




EUT	Atheros 11a/g Mini-PCI Adapter	MODEL	NL-5354MP Plus Aries2
INPUT POWER (SYSTEM)	120Vac, 60Hz	ENVIRONMENTAL CONDITIONS	20deg.C, 63%RH, 991hPa
MODE	OFDM	TESTED BY	Jun Wu

CHANNEL	CHANNEL FREQUENCY (MHz)	RF POWER LEVEL IN 3kHz BW (dBm)	MAXIMUM LIMIT (dBm)	PASS/FAIL
1	2412	-10.79	8	PASS
6	2437	-7.58	8	PASS
11	2462	-11.99	8	PASS
6 (Turbo)	2437	-6.05	8	PASS

CH1



RB/S

1 PK VIEW

*** RBW 3 kHz**
*** VBW 30 kHz**
*** SWT 500 s**

Marker 1 [T1]
-7.58 dBm
2.43702000 GHz

Ref 20.5 dBm
*** Att 30 dB**

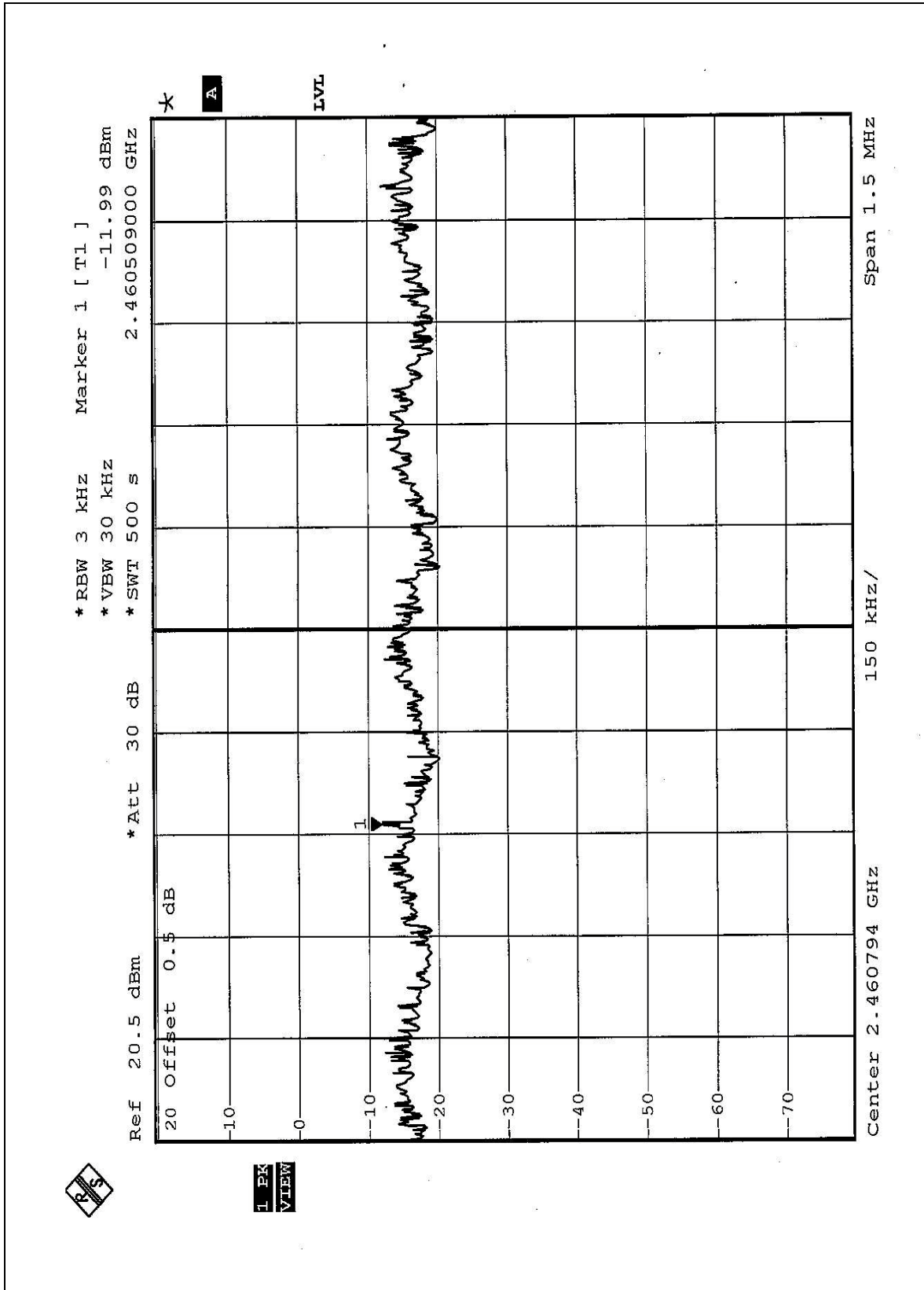
20 Offset 0.5 dB

LVL

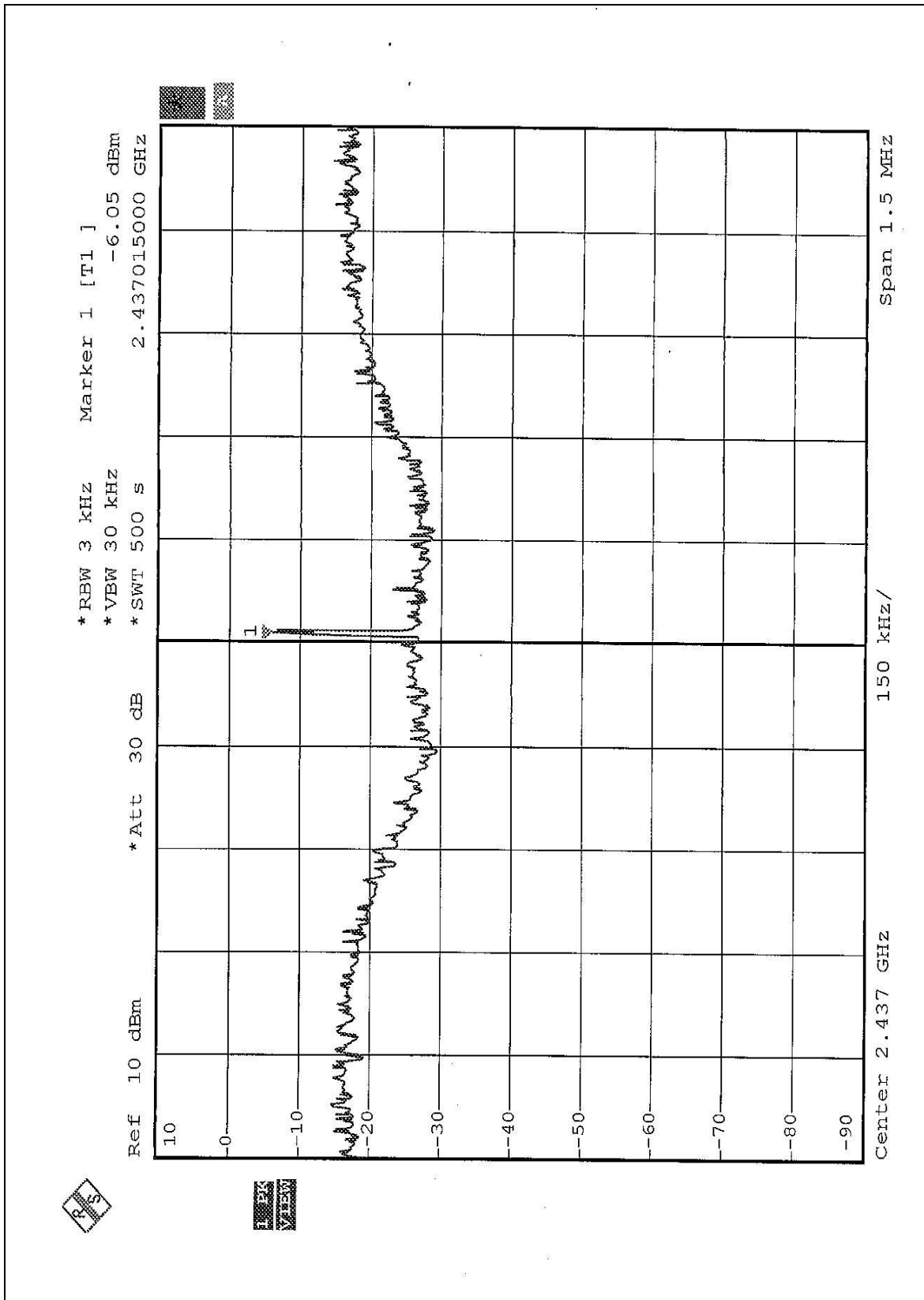
Center 2.437023 GHz
Span 1.5 MHz
150 kHz/



CH11



CH6 (Turbo mode)



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	8564EC	4208A00660	August 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 1MHz and 10Hz with suitable frequency span including 100MHz 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

The spectrum plots are attached on the following 12 pages. D2 line indicates the highest level, and D1 line indicates the 20dB offset below D2. It shows compliance with the requirement in part 15.247(C).

CCK:

The band edge emission plot on the following 1~2 pages show 50.46dB delta between carrier maximum power and local maximum emission in restrict band (2.3716GHz). The emission of carrier strength list in the test result of channel 1 at the item 4.2.7 is 101.79dBuV/m, so the maximum field strength in restrict band is $101.79 - 50.46 = 51.33$ dBuV/m which is under 54 dBuV/m limit.

The band edge emission plot on the following 3~4 pages show 53.78dB 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 11 at the item 4.2.7 is 102.34dBuV/m, so the maximum field strength in restrict band is $102.34 - 53.78 = 48.56$ dBuV/m which is under 54 dBuV/m limit.

OFDM (Normal mode):

The band edge emission plot on the following 5~6 pages show 47.30dB delta between carrier maximum power and local maximum emission in restrict band (2.3900GHz). The emission of carrier strength list in the test result of channel 1 at the item 4.2.7 is 98.66dBuV/m, so the maximum field strength in restrict band is $98.66 - 47.30 = 51.36$ dBuV/m which is under 54 dBuV/m limit.

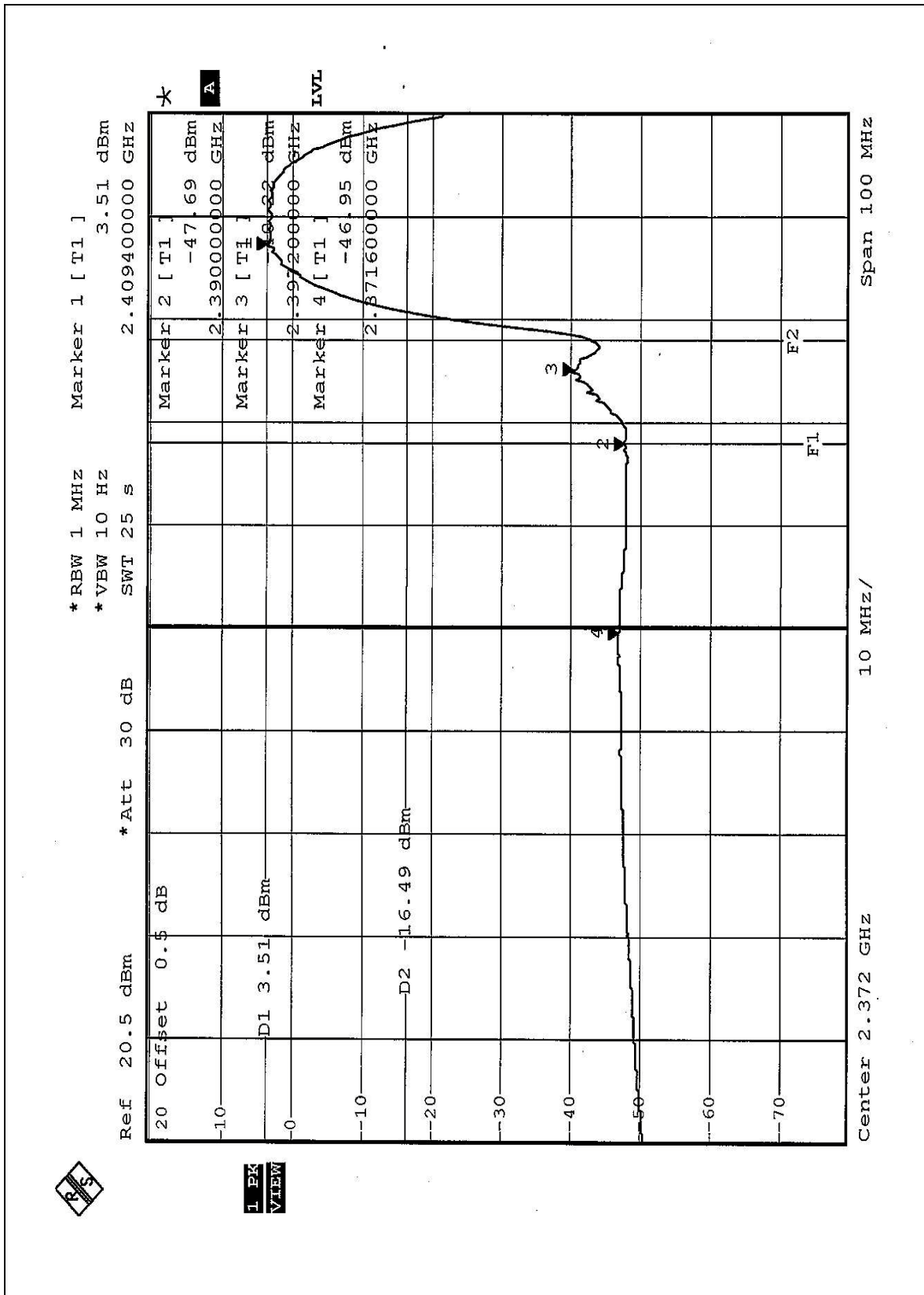
The band edge emission plot on the following 7~8 pages show 48.70dB delta between carrier maximum power and local maximum emission in restrict band (2.4835GHz). The emission of carrier strength list in the test result of channel 11 at the item 4.2.7 is 98.13dBuV/m, so the maximum field strength in restrict band is $98.13 - 48.70 = 49.43$ dBuV/m which is under 54 dBuV/m limit.

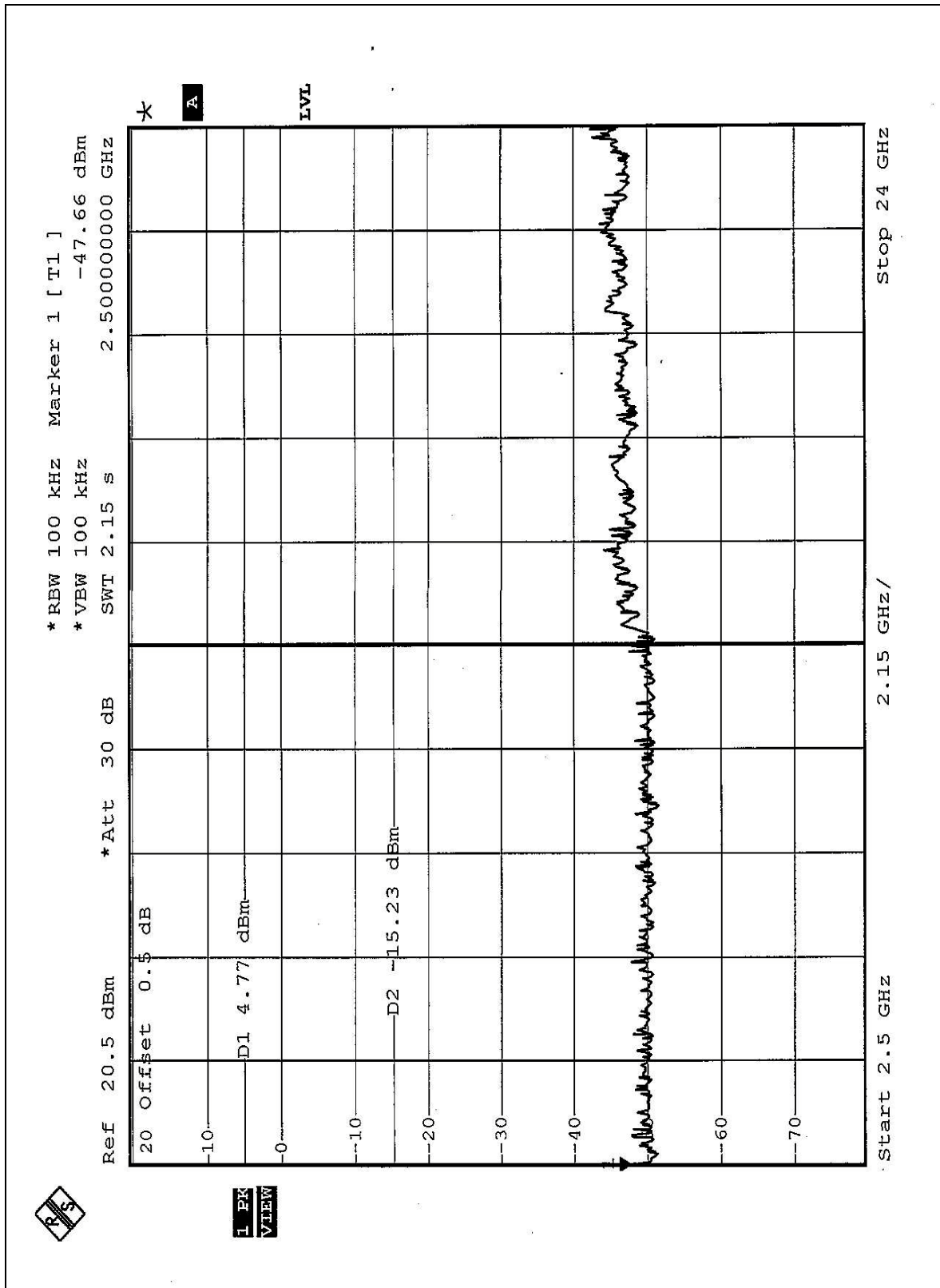
**OFDM (Turbo mode):**

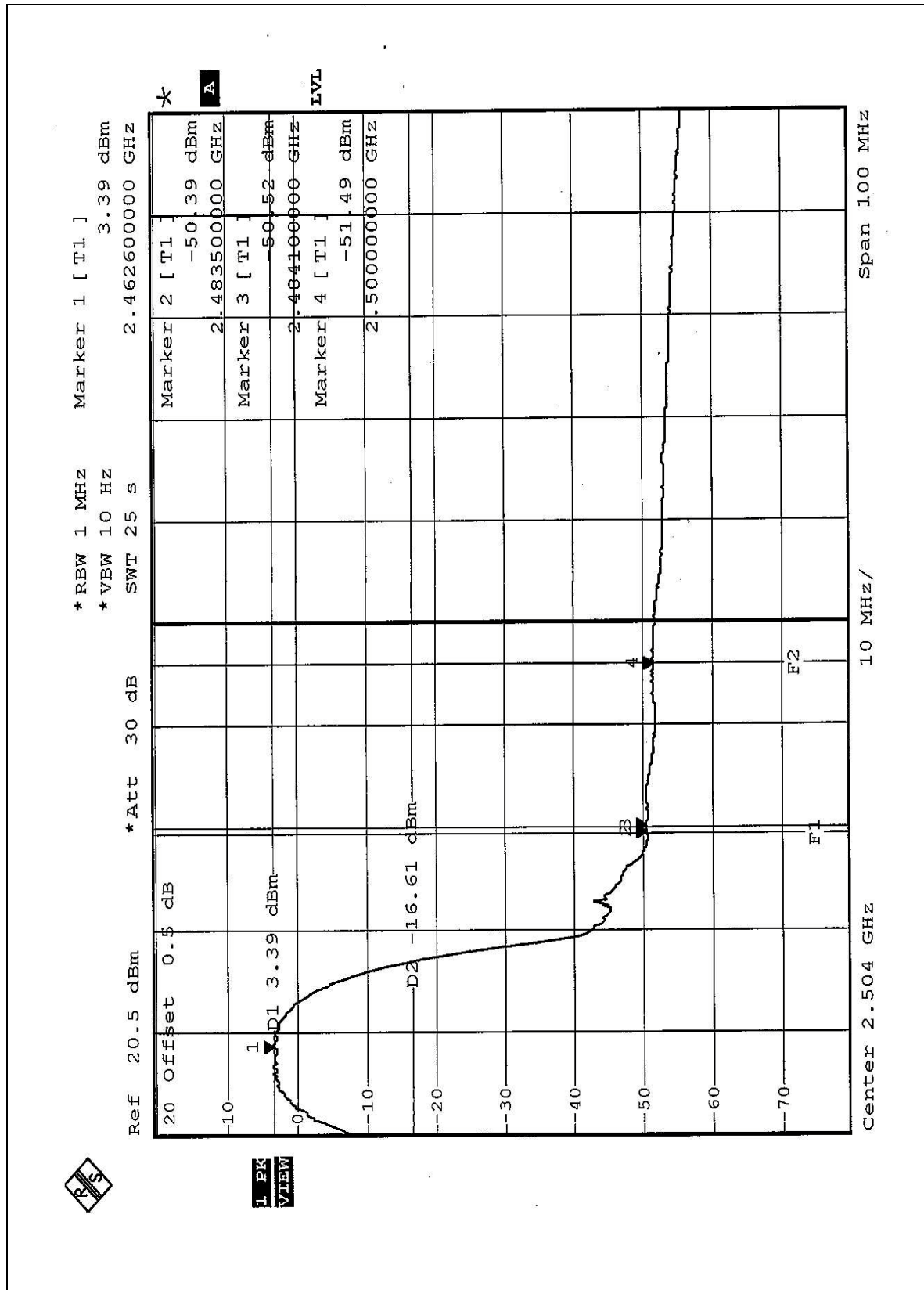
The band edge emission plot on the following 9~10 pages show 45.59dB delta between carrier maximum power and local maximum emission in restrict band (2.3898GHz). The emission of carrier strength list in the test result of channel 6 at the item 4.2.7 is 98.76dBuV/m, so the maximum field strength in restrict band is $98.76 - 45.59 = 53.17$ BuV/m which is under 54 dBuV/m limit.

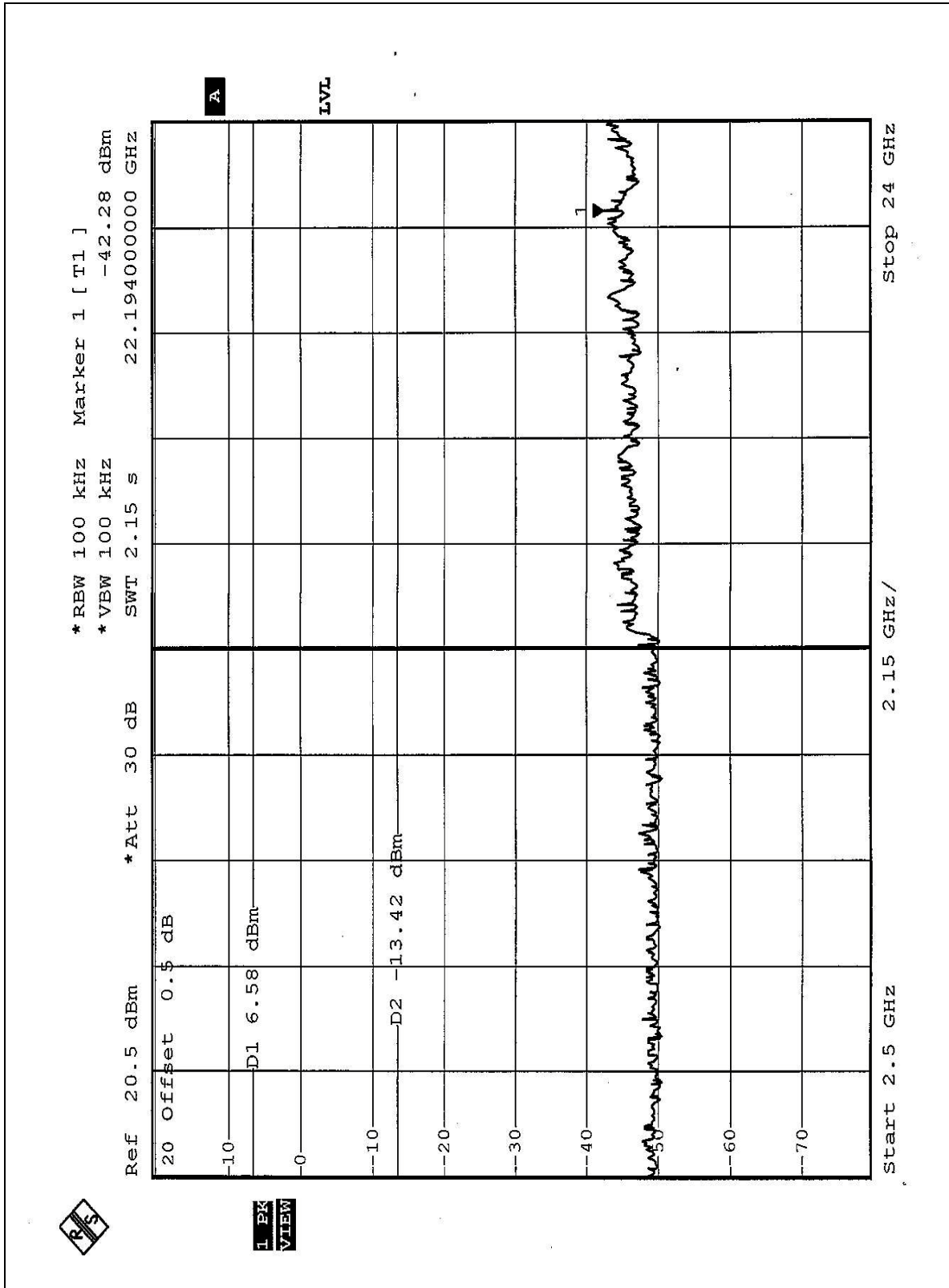
The band edge emission plot on the following 11~12 pages show 47.72dB delta between carrier maximum power and local maximum emission in restrict band (2.4838GHz). The emission of carrier strength list in the test result of channel 6 at the item 4.2.7 is 98.76dBuV/m, so the maximum field strength in restrict band is $98.76 - 47.72 = 51.04$ dBuV/m which is under 54 dBuV/m limit.

CCK









OFDM (Normal mode)

