# 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.

**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.



0528
ILAC MRA

# Table of Contents


1 CERTIFICATION ..... 7
2 SUMMARY OF TEST RESULTS ..... 8
3 GENERAL INFORMATION ..... 10
3.1 GENERAL DESCRIPTION OF EUT ..... 10
3.2 DESCRIPTION OF TEST MODES ..... 11
3.3 GENERAL DESCRIPTION OF APPLIED STANDARDS ..... 12
3.4 DESCRIPTION OF SUPPORT UNITS ..... 13
3.5 CONFIGURATION OF SYSTEM UNDER TEST ..... 13
4 TEST TYPES AND RESULTS (FOR PART 802.11b & 802.11g) ..... 14
4.1 CONDUCTED EMISSION MEASUREMENT ..... 14
4.1.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT ..... 14
4.1.2 TEST INSTRUMENTS ..... 14
4.1.3 TEST PROCEDURES ..... 15
4.1.4 DEVIATION FROM TEST STANDARD ..... 15
4.1.5 TEST SETUP ..... 16
4.1.6 EUT OPERATING CONDITIONS ..... 16
4.1.7 TEST RESULTS ..... 17
4.2 RADIATED EMISSION MEASUREMENT ..... 23
4.2.1 LIMITS OF RADIATED EMISSION MEASUREMENT ..... 23
4.2.2 TEST INSTRUMENTS ..... 24
4.2.3 TEST PROCEDURES ..... 25
4.2.4 DEVIATION FROM TEST STANDARD ..... 25
4.2.5 TEST SETUP ..... 26
4.2.6 EUT OPERATING CONDITIONS ..... 26
4.2.7 TEST RESULTS ..... 27
4.3 6dB BANDWIDTH MEASUREMENT ..... 36
4.3.1 LIMITS OF 6dB BANDWIDTH MEASUREMENT ..... 36
4.3.2 TEST INSTRUMENTS ..... 36
4.3.3 TEST PROCEDURE ..... 37
4.3.4 DEVIATION FROM TEST STANDARD ..... 37
4.3.5 TEST SETUP ..... 37
4.3.6 EUT OPERATING CONDITIONS ..... 37
4.3.7 TEST RESULTS ..... 38

4.4 MAXIMUM PEAK OUTPUT POWER ..... 47
4.4.1 LIMITS OF MAXIMUM PEAK OUTPUT POWER MEASUREMENT ..... 47
4.4.2 INSTRUMENTS ..... 47
4.4.3 TEST PROCEDURES ..... 48
4.4.4 DEVIATION FROM TEST STANDARD ..... 48
4.4.5 TEST SETUP ..... 48
4.4.6 EUT OPERATING CONDITIONS ..... 48
4.4.7 TEST RESULTS ..... 49
4.5 POWER SPECTRAL DENSITY MEASUREMENT ..... 50
4.5.1 LIMITS OF POWER SPECTRAL DENSITY MEASUREMENT ..... 50
4.5.2 TEST INSTRUMENTS ..... 50
4.5.3 TEST PROCEDURE ..... 50
4.5.4 DEVIATION FROM TEST STANDARD ..... 50
4.5.5 TEST SETUP ..... 50
4.5.6 EUT OPERATING CONDITION ..... 51
4.5.7 TEST RESULTS ..... 51
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 ..... 61
4.7 ANTENNA REQUIREMENT ..... 75
4.7.1 STANDARD APPLICABLE ..... 75
4.7.2 ANTENNA CONNECTED CONSTRUCTION ..... 75
5 TEST TYPES AND RESULTS (FOR PART 802.11a) ..... 76
5.1 CONDUCTED EMISSION MEASUREMENT ..... 76
5.1.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT ..... 76
5.1.2 TEST INSTRUMENTS ..... 76
5.1.3 TEST PROCEDURES ..... 77
5.1.4 DEVIATION FROM TEST STANDARD ..... 77
4.7.3 TEST SETUP ..... 78
5.1.5 EUT OPERATING CONDITIONS ..... 78
5.1.6 TEST RESULTS ..... 79

5.2 RADIATED EMISSION MEASUREMENT ..... 81
5.2.1 LIMITS OF RADIATED EMISSION MEASUREMENT ..... 81
5.2.2 LIMITS OF UNWANTED EMISSION OUT OF THE RESTRICTED BANDS ..... 82
5.2.3 TEST INSTRUMENTS ..... 83
5.2.4 TEST PROCEDURES ..... 84
5.2.5 DEVIATION FROM TEST STANDARD ..... 84
5.2.6 TEST SETUP ..... 85
5.2.7 EUT OPERATING CONDITIONS ..... 85
5.2.8 TEST RESULTS ..... 86
FOR FREQUENCY 5.15~5.35GHZ ..... 100
5.3 PEAK TRANSMIT POWER MEASUREMENT ..... 100
5.3.1 LIMITS OF PEAK TRANSMIT POWER MEASUREMENT ..... 100
5.3.2 TEST INSTRUMENTS ..... 100
5.3.3 TEST PROCEDURE ..... 101
5.3.4 DEVIATION FROM TEST STANDARD ..... 101
5.3.5 TEST SETUP ..... 101
5.3.6 EUT OPERATING CONDITIONS ..... 101
5.3.7 TEST RESULTS ..... 102
5.4 PEAK POWER EXCURSION MEASUREMENT ..... 118
5.4.1 LIMITS OF PEAK POWER EXCURSION MEASUREMENT ..... 118
5.4.2 TEST INSTRUMENTS ..... 118
5.4.3 TEST PROCEDURE ..... 119
5.4.4 DEVIATION FROM TEST STANDARD ..... 119
5.4.5 TEST SETUP ..... 119
5.4.6 EUT OPERATING CONDITIONS ..... 119
5.4.7 TEST RESULTS ..... 120
5.5 PEAK POWER SPECTRAL DENSITY MEASUREMENT ..... 129
5.5.1 LIMITS OF PEAK POWER SPECTRAL DENSITY MEASUREMENT ..... 129
5.5.2 TEST INSTRUMENTS ..... 129
5.5.3 TEST PROCEDURES ..... 130
5.5.4 DEVIATION FROM TEST STANDARD ..... 130
5.5.5 TEST SETUP ..... 130
5.5.6 EUT OPERATING CONDITIONS ..... 130
5.5.7 TEST RESULTS ..... 131
5.6 FREQUENCY STABILITY ..... 140

5.6.1 LIMITS OF FREQUENCY STABILITY MEASUREMENT ..... 140
5.6.2 TEST INSTRUMENTS ..... 140
5.6.3 TEST PROCEDURE ..... 140
5.6.4 DEVIATION FROM TEST STANDARD ..... 141
5.6.5 TEST SETUP ..... 141
5.6.6 EUT OPERATING CONDITION ..... 141
5.6.7 TEST RESULTS ..... 142
5.7 BAND EDGES MEASUREMENT ..... 143
5.7.1 TEST INSTRUMENTS ..... 143
5.7.2 TEST PROCEDURE ..... 143
5.7.3 EUT OPERATING CONDITION ..... 143
5.7.4 TEST RESULTS ..... 144
5.8 ANTENNA REQUIREMENT ..... 161
5.8.1 STANDARD APPLICABLE ..... 161
5.8.2 ANTENNA CONNECTED CONSTRUCTION ..... 161
FOR FREQUENCY 5.725~5.850GHZ ..... 162
5.9 6dB BANDWIDTH MEASUREMENT ..... 162
5.9.1 LIMITS OF 6dB BANDWIDTH MEASUREMENT ..... 162
5.9.2 TEST INSTRUMENTS ..... 162
5.9.3 TEST PROCEDURE ..... 163
5.9.4 DEVIATION FROM TEST STANDARD ..... 163
5.9.5 TEST SETUP ..... 163
5.9.6 EUT OPERATING CONDITIONS ..... 163
5.9.7 TEST RESULTS ..... 164
5.10 MAXIMUM PEAK OUTPUT POWER ..... 171
5.10.1 LIMITS OF MAXIMUM PEAK OUTPUT POWER MEASUREMENT ..... 171
5.10.2 INSTRUMENTS ..... 171
5.10.3 TEST PROCEDURES ..... 172
5.10.4 DEVIATION FROM TEST STANDARD ..... 172
5.10.5 TEST SETUP ..... 172
5.10.6 EUT OPERATING CONDITIONS ..... 172
5.10.7 TEST RESULTS ..... 173
5.11 POWER SPECTRAL DENSITY MEASUREMENT ..... 174
5.11.1 LIMITS OF POWER SPECTRAL DENSITY MEASUREMENT ..... 174
5.11.2 TEST INSTRUMENTS ..... 174

5.11.3 TEST PROCEDURE.....175
5.11.4 DEVIATION FROM TEST STANDARD .....175
5.11.5 TEST SETUP .....175
5.11.6 EUT OPERATING CONDITION .....175
5.11.7 TEST RESULTS .....176
5.12 BAND EDGES MEASUREMENT .....183
5.12.1 LIMITS OF BAND EDGES MEASUREMENT .....183
5.12.2 TEST INSTRUMENTS.....183
5.12.3 TEST PROCEDURE.....183
5.12.4 DEVIATION FROM TEST STANDARD .....183
5.12.5 EUT OPERATING CONDITION .....184
5.12.6 TEST RESULTS .....184
5.13 ANTENNA REQUIREMENT .....201
5.13.1 STANDARD APPLICABLE .....201
5.13.2 ANTENNA CONNECTED CONSTRUCTION.....201
6 PHOTOGRAPHS OF THE TEST CONFIGURATION.....202
7 INFORMATION ON THE TESTING LABORATORIES .....206

# 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:** _____, **DATE:** April 16, 2004
Suntee Liu

**APPROVED BY:** _____, **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<br>Minimum passing margin is –17.45dB at 0.173MHz |
| 15.247(a)(2) | Spectrum Bandwidth of a Direct Sequence Spread Spectrum System<br>Limit: min. 500kHz | PASS | Meet the requirement of limit |
| 15.247(b) | Maximum Peak Output Power<br>Limit: max. 30dBm | PASS | Meet the requirement of limit |
| 15.247(c) | Radiated Emissions<br>Limit: Table 15.209 | PASS | Meet the requirement of limit<br>Minimum passing margin is –1.72dB at 2390.00MHz |
| 15.247(d) | Power Spectral Density<br>Limit: max. 8dBm | PASS | Meet the requirement of limit |
| 15.247(c) | Band Edge Measurement<br>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<br>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<br>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<br>11g: 54/48/36/24/18/12/9/6Mbps<br>11a: 54/48/36/24/18/12/9/6Mbps<br>(Turbo mode: up to 108Mbps) |
| **FREQUENCY RANGE** | 11b/g: 2412~2462MHz<br>11a: 5.15~5.35GHz and 5.725~5.825GHz |
| **NUMBER OF CHANNEL** | 11b/g: 11 for Normal mode / 1 for Turbo mode<br>11a: 13 for Normal mode / 5 for Turbo mode |
| **CHANNEL SPACING** | 11b/g: 5MHz<br>11a: 20MHz for Normal mode / 40MHz for Turbo mode |
| **OUTPUT POWER** | 11b: 17.60dBm<br>11g: 20.00dBm<br>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

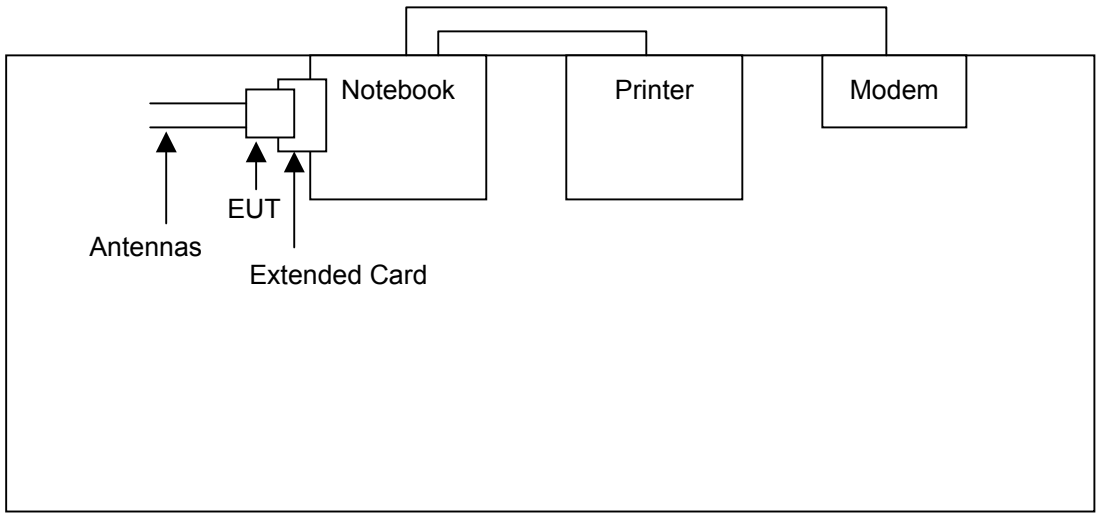
The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

| 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 |
| SUHNER 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.

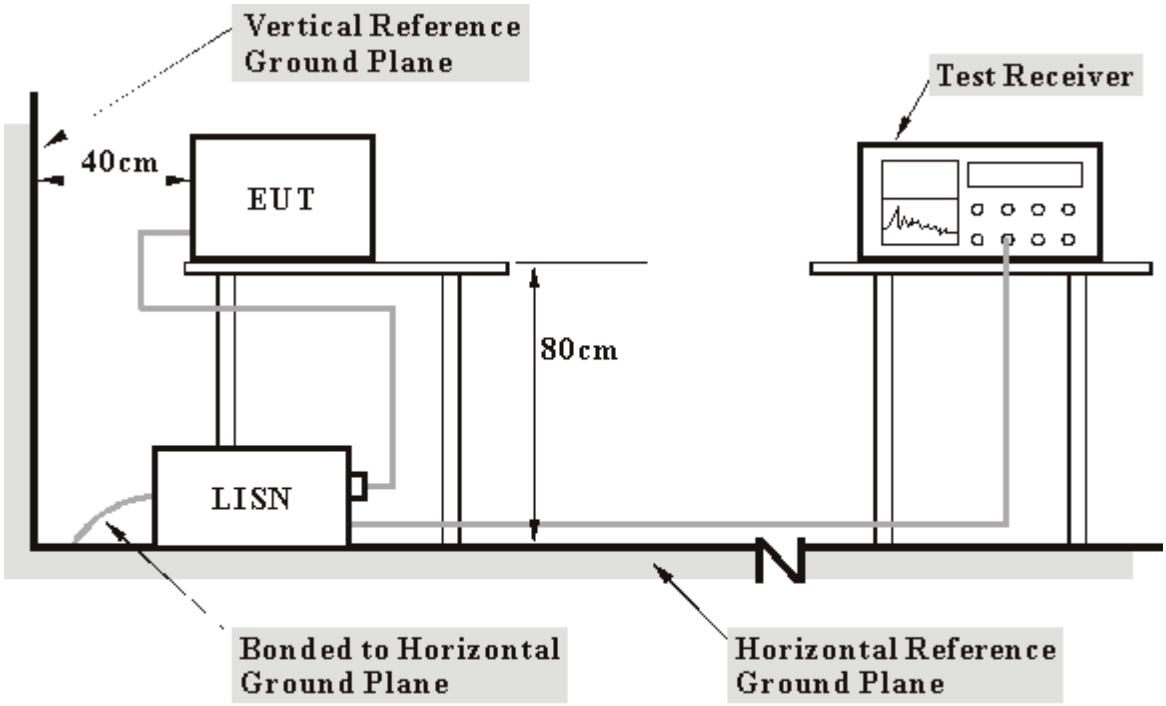
b. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.

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

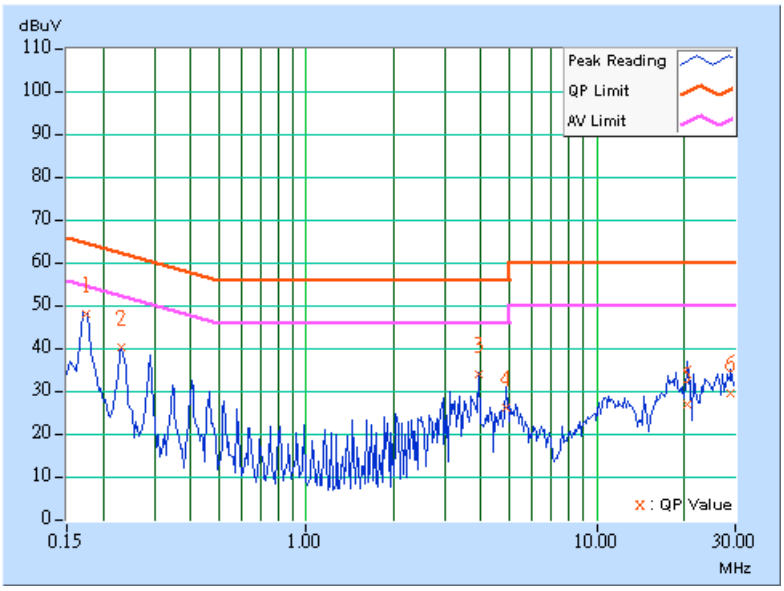
a. Plug the EUT a notebook computer system placed on a testing table.
b. The computer system ran a test program (provided by manufacturer) to enable EUT under transmission/receiving condition continuously at specific channel frequency.
c. The computer system sent "H" messages to its screen.
d. The computer system sent “H” messages to modem.
e. The computer system sent "H" messages to printer, and the printer printed them on paper.
f. 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. | Corr. Factor | Reading Value [dB (uV)] | | Emission Level [dB (uV)] | | Limit [dB (uV)] | | Margin (dB) | |
|---|---|---|---|---|---|---|---|---|---|---|
| | [MHz] | (dB) | Q.P. | AV. | Q.P. | AV. | Q.P. | AV. | Q.P. | AV. |
| 1 | 0.175 | 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 | - |

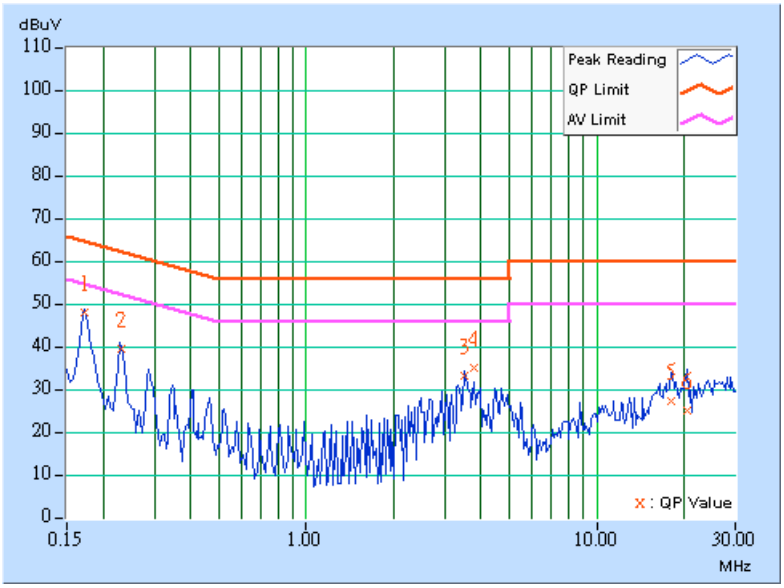
**REMARKS:** 1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. The emission levels of other frequencies were very low against the limit.
4. Margin value = 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. | Corr. Factor | Reading Value [dB (uV)] | | Emission Level [dB (uV)] | | Limit [dB (uV)] | | Margin (dB) | |
|---|---|---|---|---|---|---|---|---|---|---|
| | [MHz] | (dB) | Q.P. | AV. | Q.P. | AV. | Q.P. | AV. | Q.P. | AV. |
| 1 | 0.173 | 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 | - |

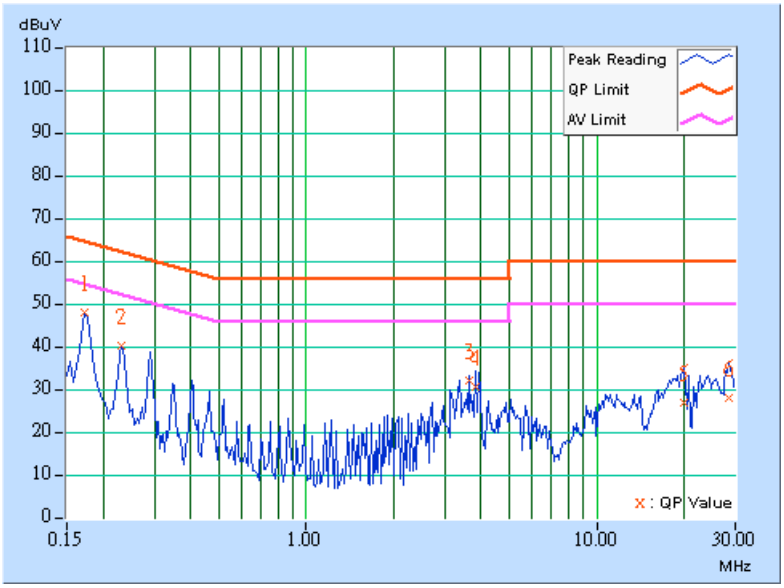
**REMARKS:** 1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. The emission levels of other frequencies were very low against the limit.
4. Margin value = 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. | Corr. Factor | Reading Value [dB (uV)] | | Emission Level [dB (uV)] | | Limit [dB (uV)] | | Margin (dB) | |
|---|---|---|---|---|---|---|---|---|---|---|
| | [MHz] | (dB) | Q.P. | AV. | Q.P. | AV. | Q.P. | AV. | Q.P. | AV. |
| 1 | 0.173 | 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 | - |

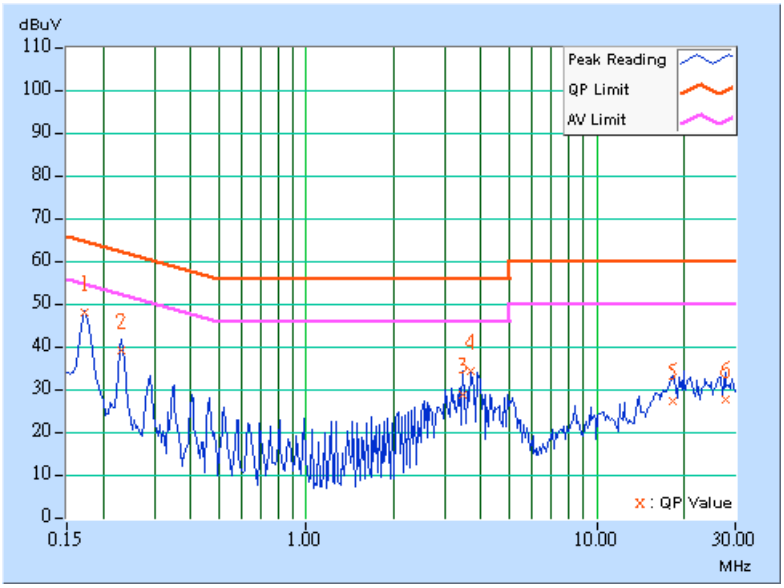
**REMARKS:** 1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. The emission levels of other frequencies were very low against the limit.
4. Margin value = 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. | Corr. Factor | Reading Value [dB (uV)] | | Emission Level [dB (uV)] | | Limit [dB (uV)] | | Margin (dB) | |
|---|---|---|---|---|---|---|---|---|---|---|
| | [MHz] | (dB) | Q.P. | AV. | Q.P. | AV. | Q.P. | AV. | Q.P. | AV. |
| 1 | 0.173 | 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 | - |

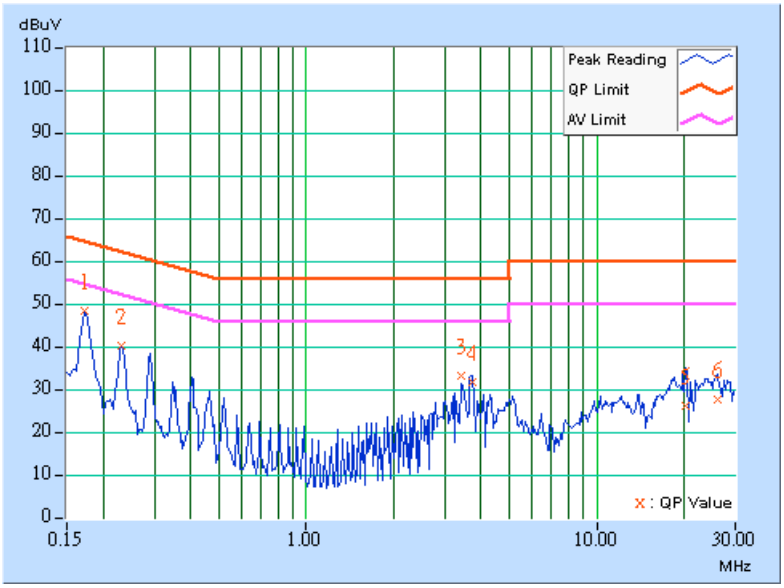
**REMARKS:** 1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. The emission levels of other frequencies were very low against the limit.
4. Margin value = 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. | Corr. Factor | Reading Value [dB (uV)] | | Emission Level [dB (uV)] | | Limit [dB (uV)] | | Margin (dB) | |
|---|---|---|---|---|---|---|---|---|---|---|
| | [MHz] | (dB) | Q.P. | AV. | Q.P. | AV. | Q.P. | AV. | Q.P. | AV. |
| **1** | **0.173** | **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 | - |

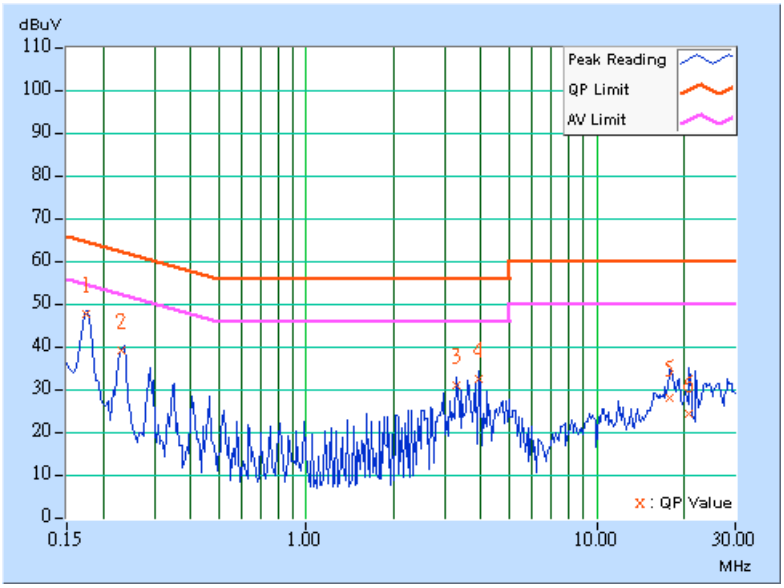
**REMARKS:** 1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. The emission levels of other frequencies were very low against the limit.
4. Margin value = 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. | Corr. Factor | Reading Value [dB (uV)] | | Emission Level [dB (uV)] | | Limit [dB (uV)] | | Margin (dB) | |
|---|---|---|---|---|---|---|---|---|---|---|
| | [MHz] | (dB) | Q.P. | AV. | Q.P. | AV. | Q.P. | AV. | Q.P. | AV. |
| 1 | 0.175 | 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.

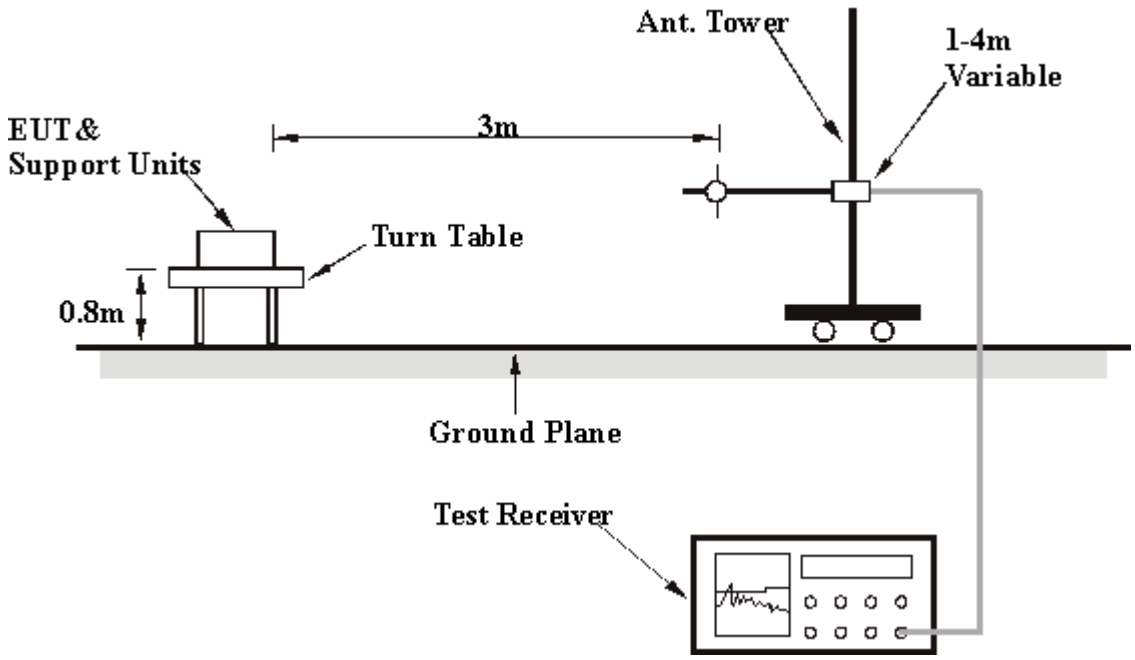
**NOTE:**

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)<br>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

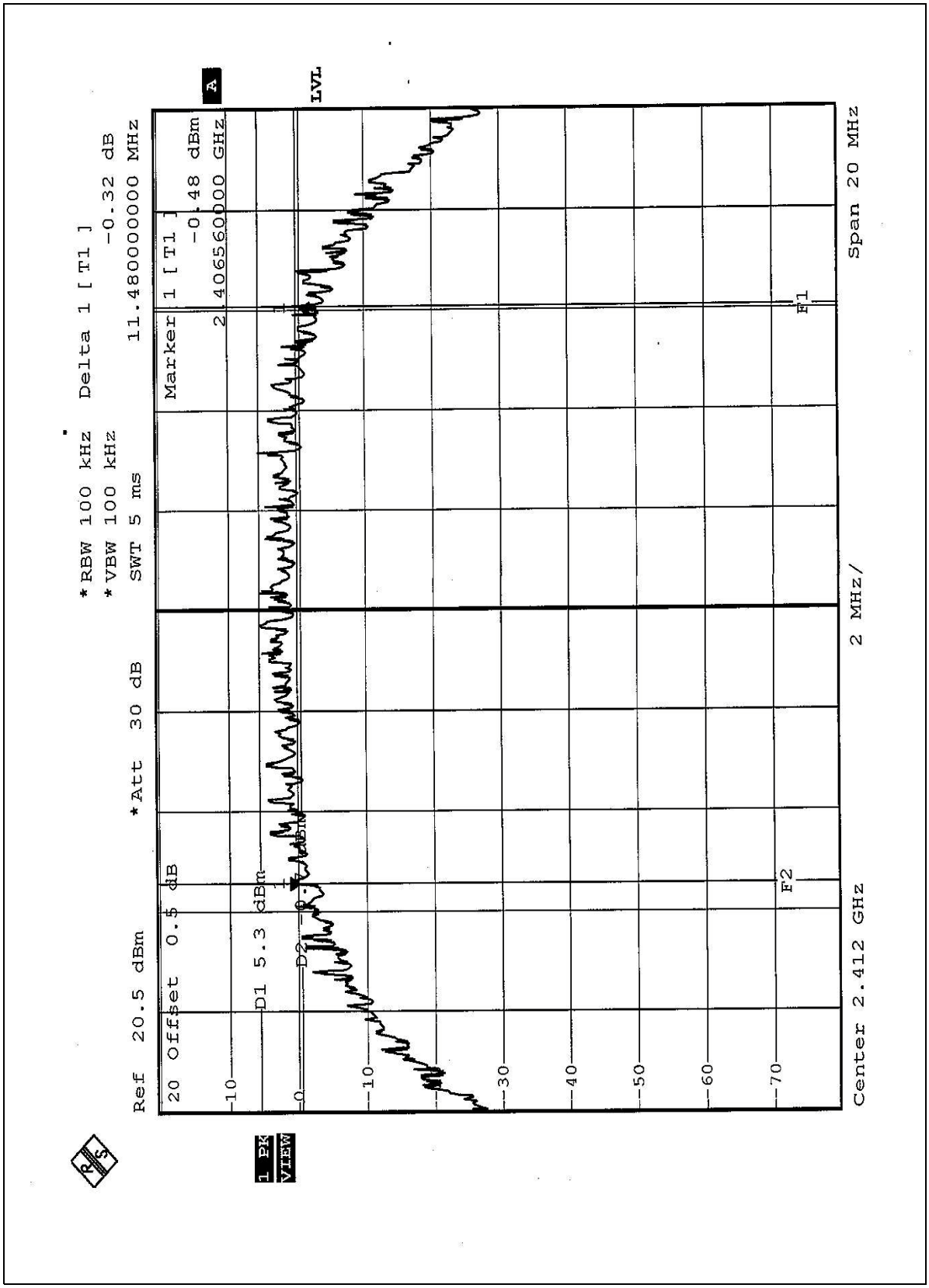
The software provided by client to enable the EUT under transmission condition continuously at lowest, middle and highest channel frequencies individually.

## 4.3.7 TEST RESULTS

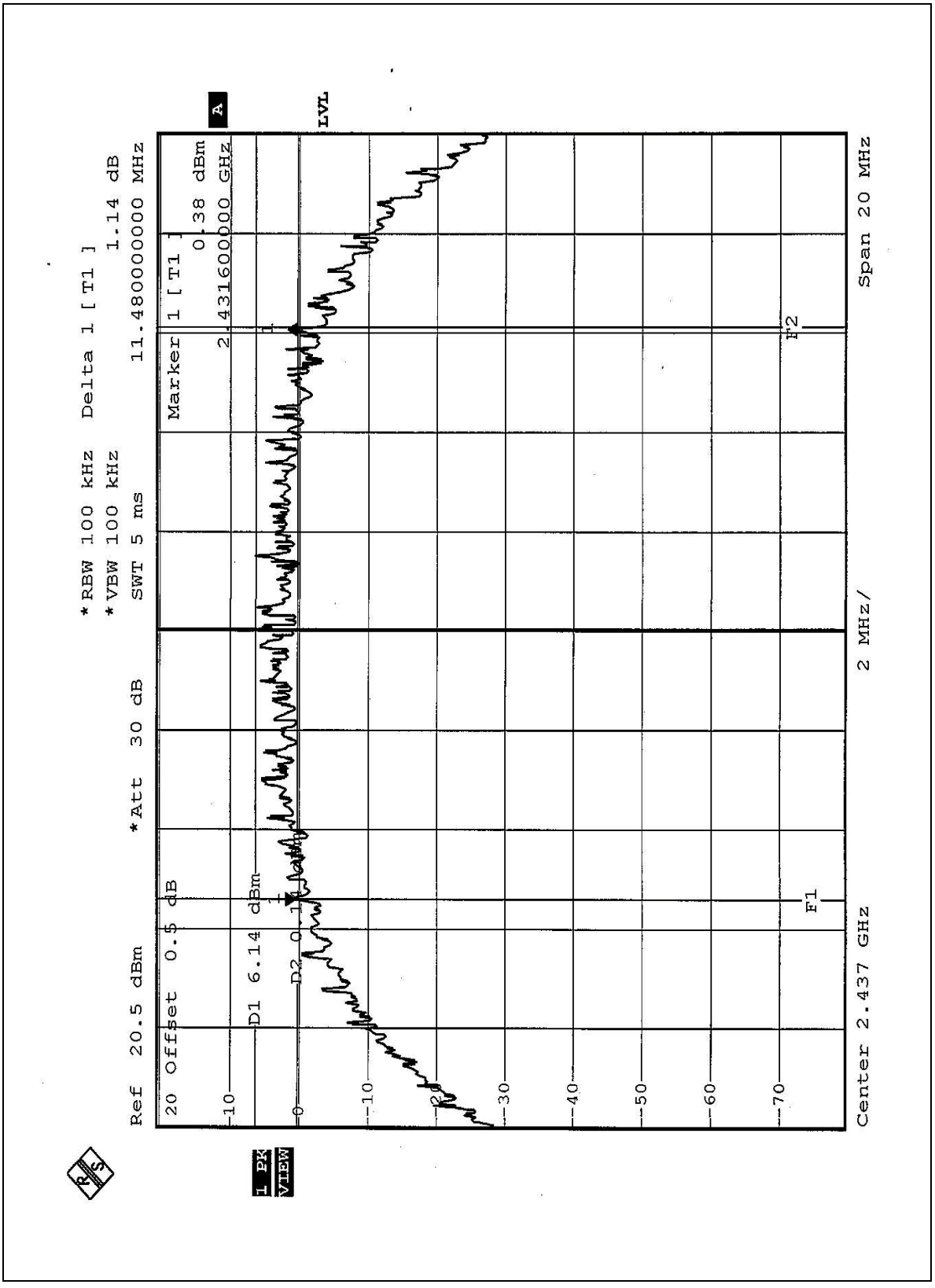
| | | | |
|---|---|---|---|
| **EUT** | Atheros 11a/g Mini-PCI Adapter | **MODEL** | NL-5354MP Plus Aries2 |
| **TEST MODE** | CCK | **INPUT POWER (SYSTEM)** | 120Vac, 60 Hz |
| **ENVIRONMENTAL CONDITIONS** | 20deg. C, 60%RH, 991hPa | **TESTED BY** | Jun Wu |

| 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 |

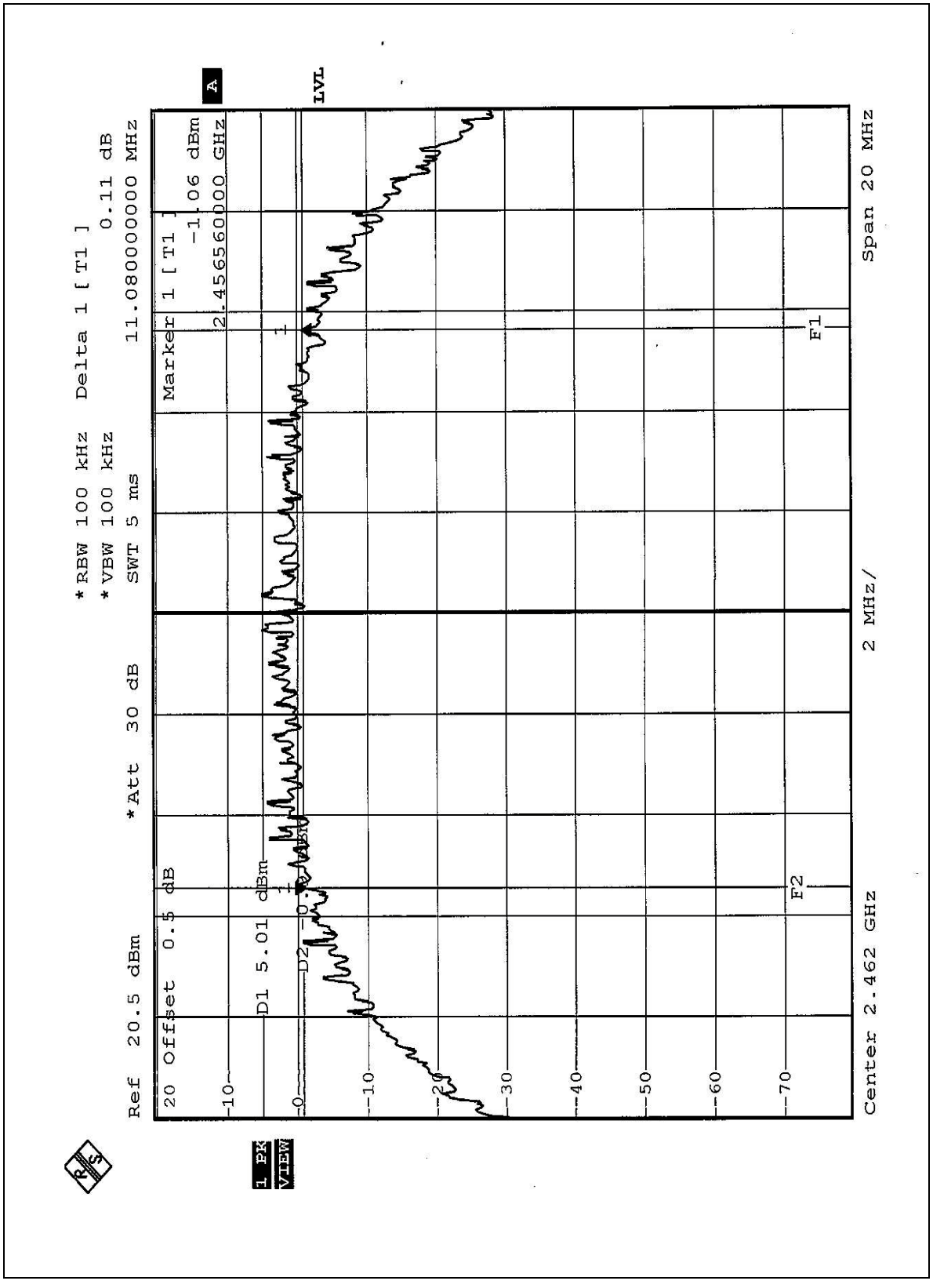
CH1


Ref 20.5 dBm
*Att 30 dB
SWT 5 ms
*VBW 100 kHz
*RBW 100 kHz
Delta 1 [T1 ]
-0.32 dB
11.480000000 MHz
Marker 1 [T1 ]
-0.48 dBm
2.406560000 GHz
Offset 0.5 dB
D1 5.3 dBm
D2 -0.7 dBm
Center 2.412 GHz
2 MHz/
Span 20 MHz
F1
F2
1 PK VIEW

CH6


RBW 100 kHz
VBW 100 kHz
SWT 5 ms
Delta 1 [T1 ]
1.14 dB
11.480000000 MHz
Marker 1 [T1 ]
0.38 dBm
2.431600000 GHz
Ref 20.5 dBm
Offset 0.5 dB
Att 30 dB
D1 6.14 dBm
D2 0.1
Center 2.437 GHz
2 MHz/
Span 20 MHz
LVL
1 PK VIEW

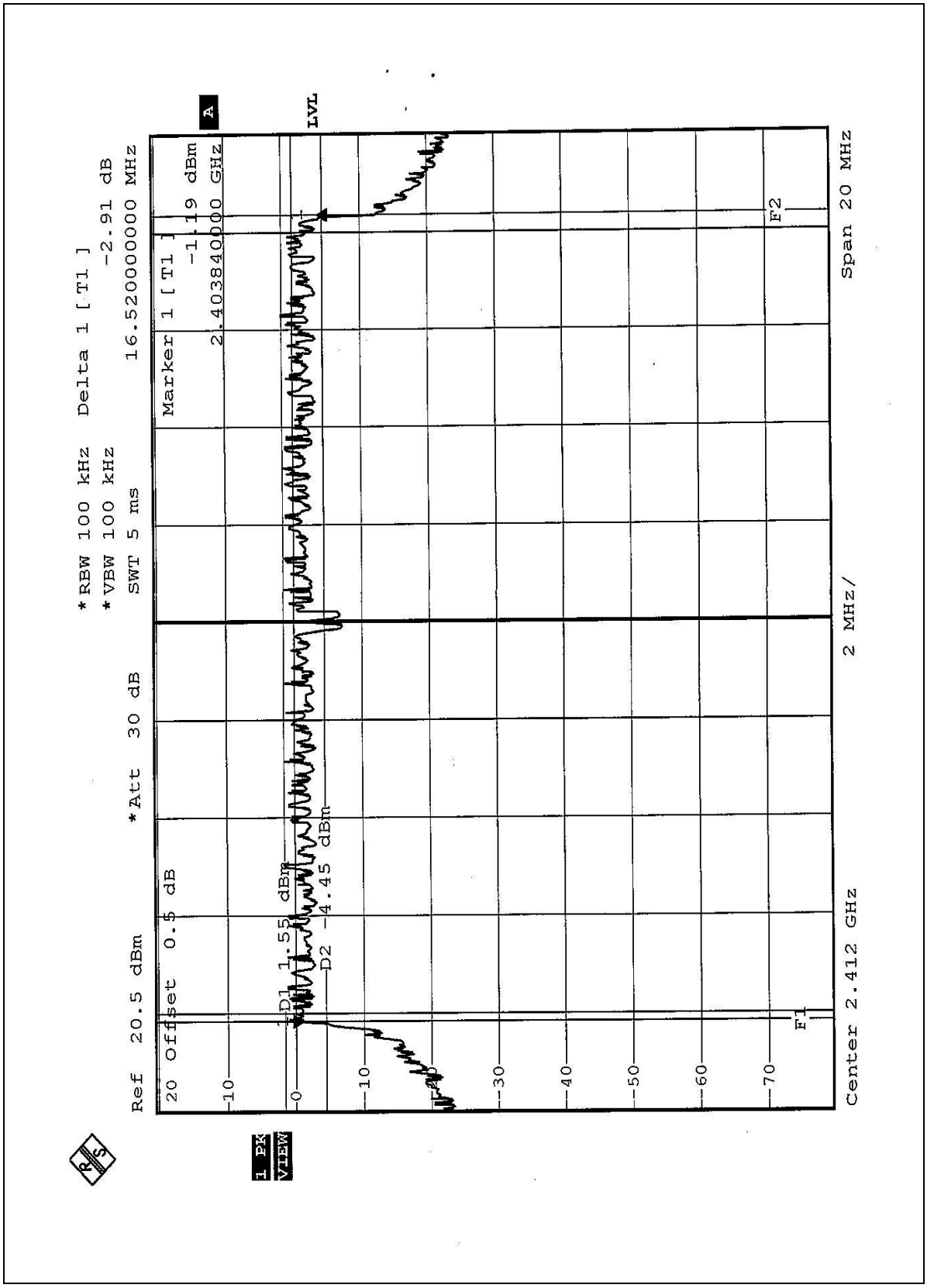
CH11


RBW 100 kHz
VBW 100 kHz
SWT 5 ms
Att 30 dB
Offset 0.5 dB
Ref 20.5 dBm
Delta 1 [T1 ]
0.11 dB
11.080000000 MHz
Marker 1 [T1 ]
-1.06 dBm
2.456560000 GHz
D1 5.01 dBm
D2 -0.11 dB
F1
F2
Center 2.462 GHz
2 MHz/
Span 20 MHz
1 PK
VIEW

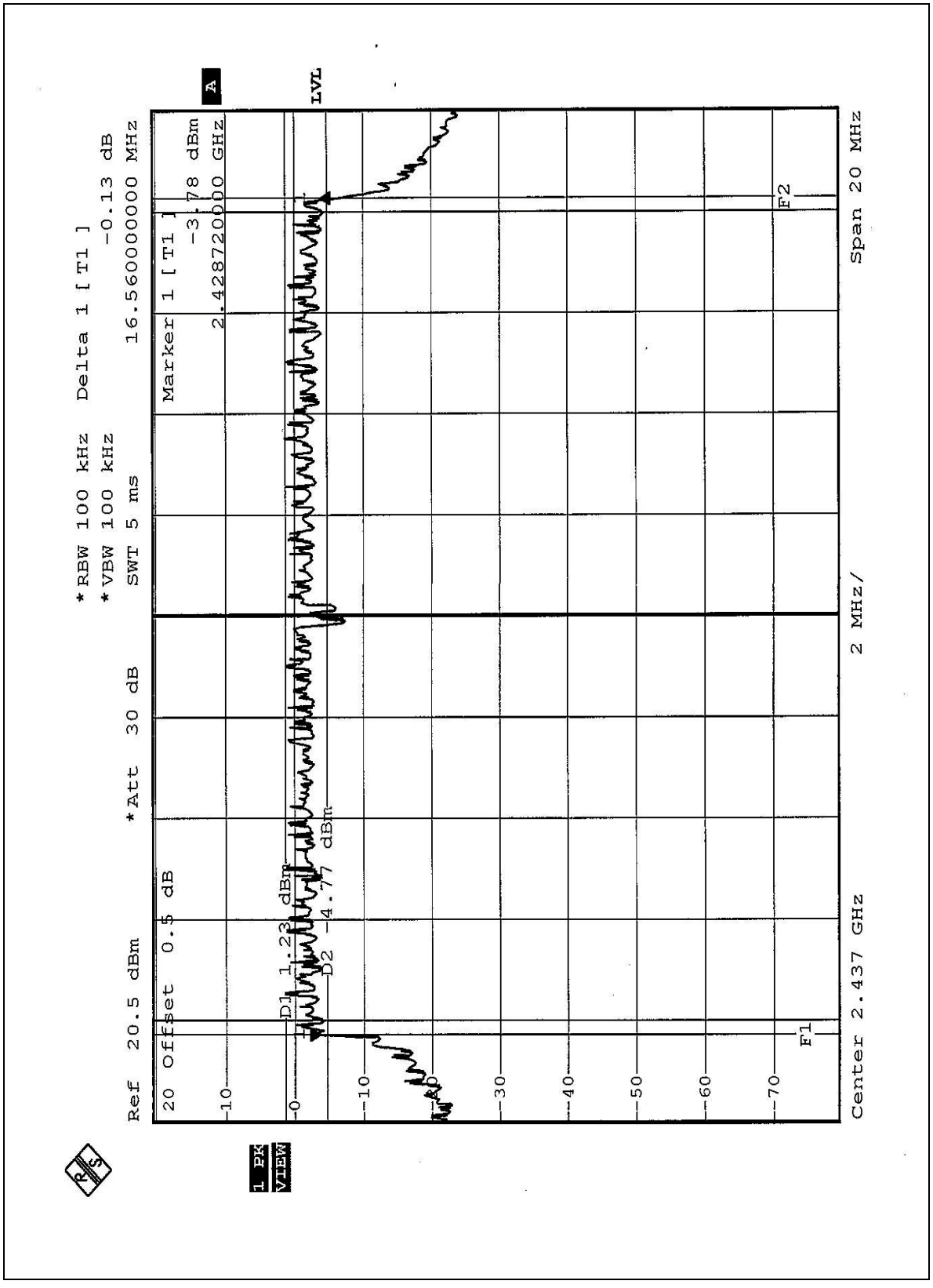
| | | | |
|---|---|---|---|
| **EUT** | Atheros 11a/g Mini-PCI Adapter | **MODEL** | NL-5354MP Plus Aries2 |
| **MODE** | OFDM | **INPUT POWER (SYSTEM)** | 120Vac, 60 Hz |
| **ENVIRONMENTAL CONDITIONS** | 20deg. C, 60%RH, 991hPa | **TESTED BY** | Jun Wu |

| 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 |

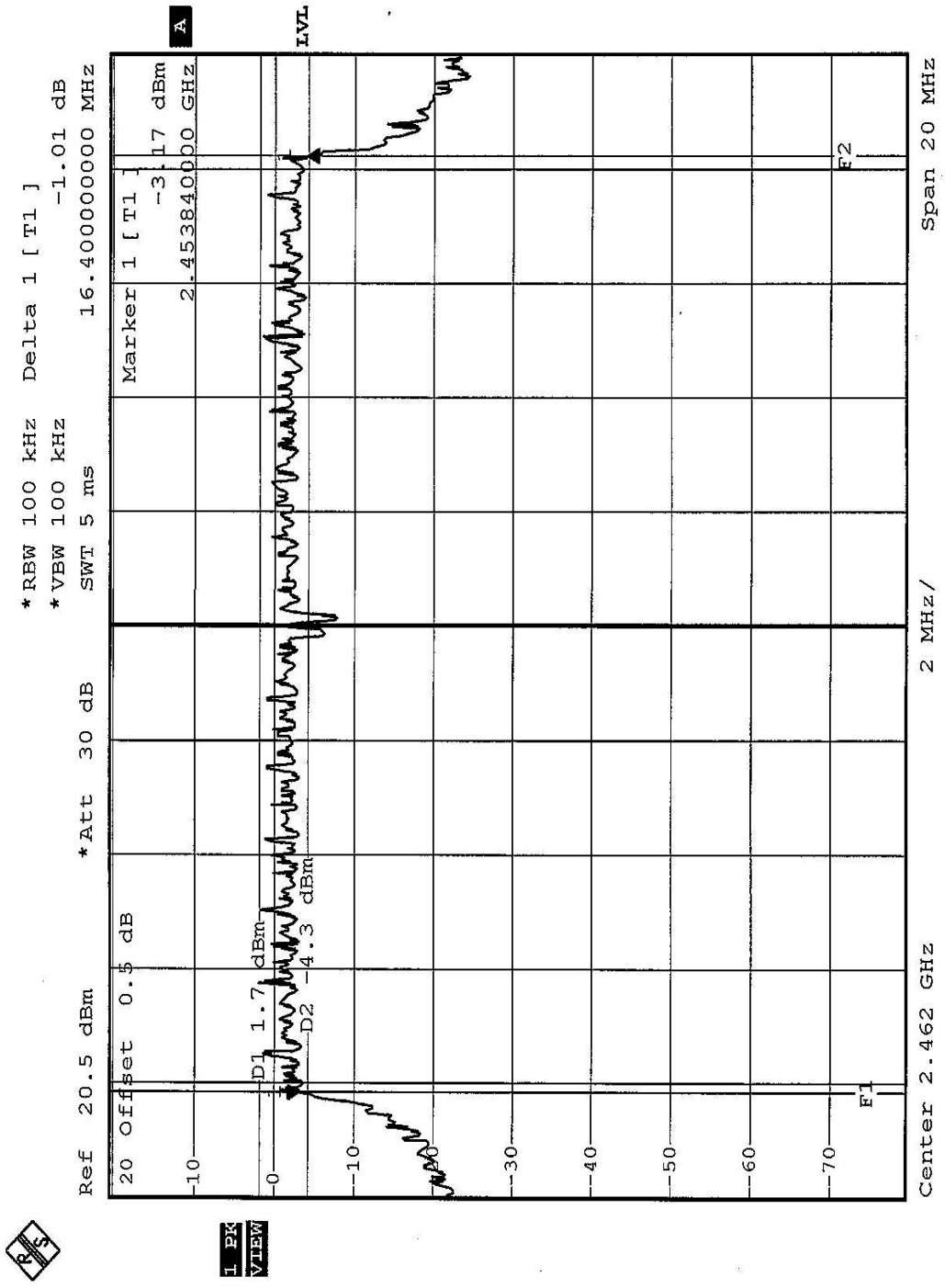
CH1


RBW 100 kHz
VBW 100 kHz
SWT 5 ms
Delta 1 [T1 ]
-2.91 dB
16.520000000 MHz
Marker 1 [T1 ]
-1.19 dBm
2.403840000 GHz
Ref 20.5 dBm
Offset 0.5 dB
Att 30 dB
D1 1.55 dBm
D2 -4.45 dBm
Center 2.412 GHz
2 MHz/
Span 20 MHz
1 PK VIEW
LVL
F1
F2

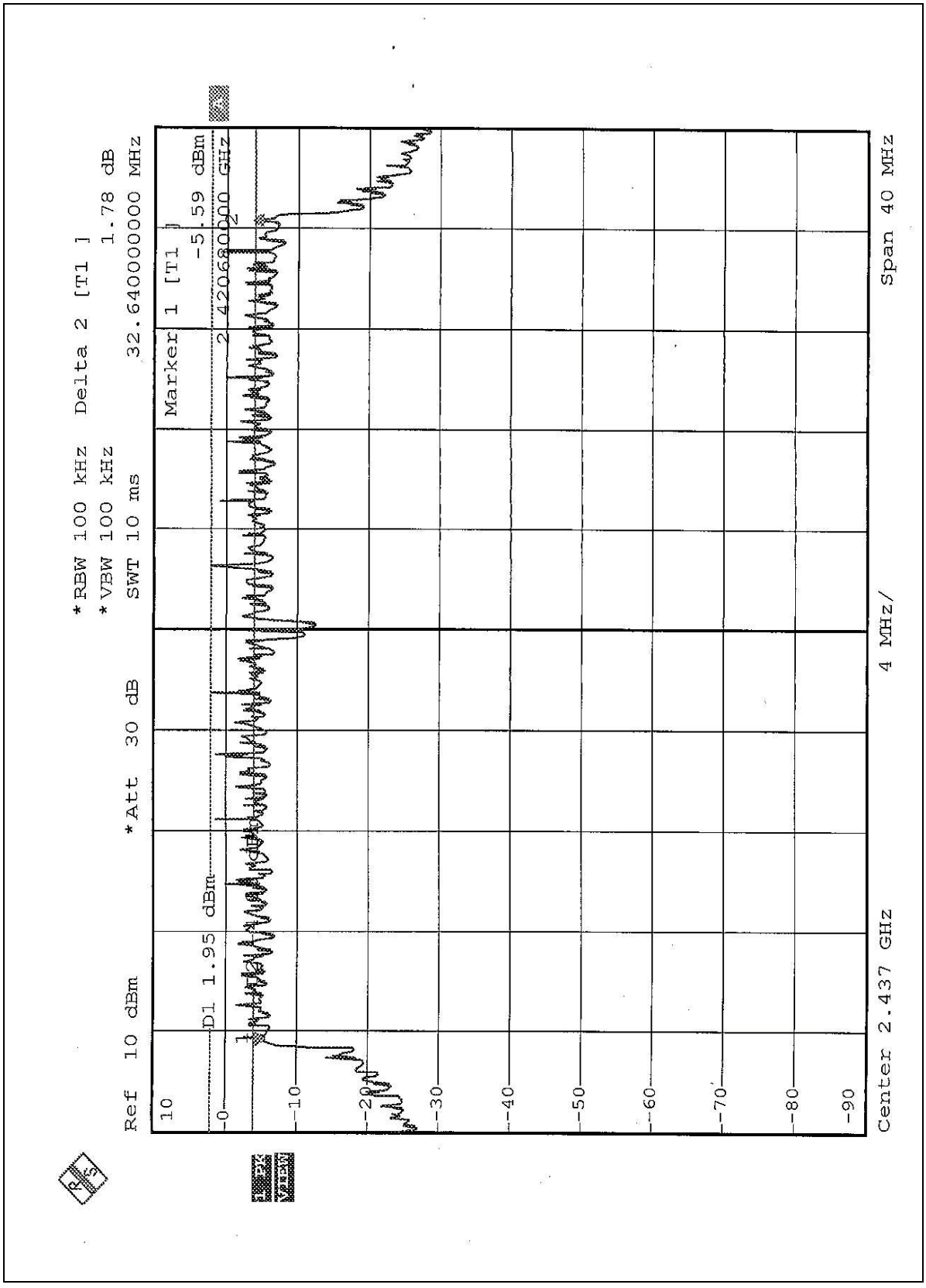
CH6


RBW 100 kHz
VBW 100 kHz
SWT 5 ms
Delta 1 [T1 ]
-0.13 dB
16.560000000 MHz
Marker 1 [T1 ]
-3.78 dBm
2.428720000 GHz
Ref 20.5 dBm
20 Offset 0.5 dB
*Att 30 dB
D1 1.23 dBm
D2 -4.77 dBm
Center 2.437 GHz
2 MHz/
Span 20 MHz
F1
F2
1 PK VIEW

CH11


RBW 100 kHz
VBW 100 kHz
SWT 5 ms
Delta 1 [ T1 ]
-1.01 dB
16.400000000 MHz
Marker 1 [ T1 ]
-3.17 dBm
2.45384000 GHz
Ref 20.5 dBm
Offset 0.5 dB
Att 30 dB
D1 1.7 dBm
D2 -4.3 dBm
Center 2.462 GHz
2 MHz/
Span 20 MHz
1 PK VIEW

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.

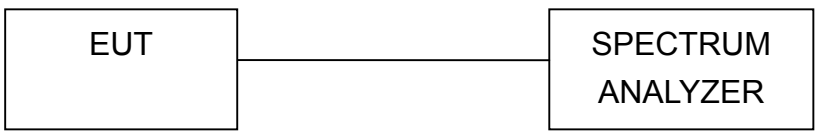
### 4.5.3 TEST PROCEDURE

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

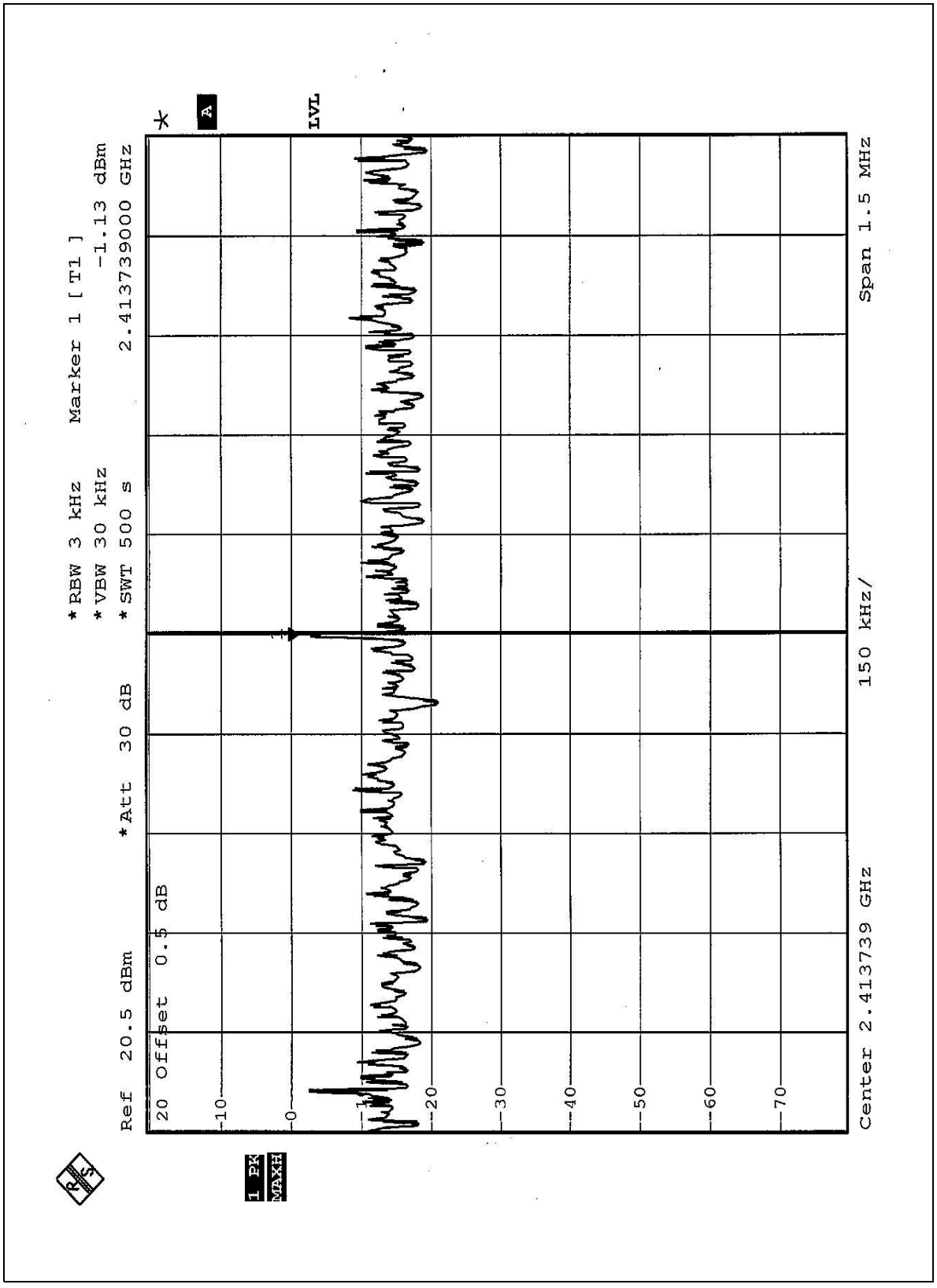
Same as Item 4.3.6

### 4.5.7 TEST RESULTS

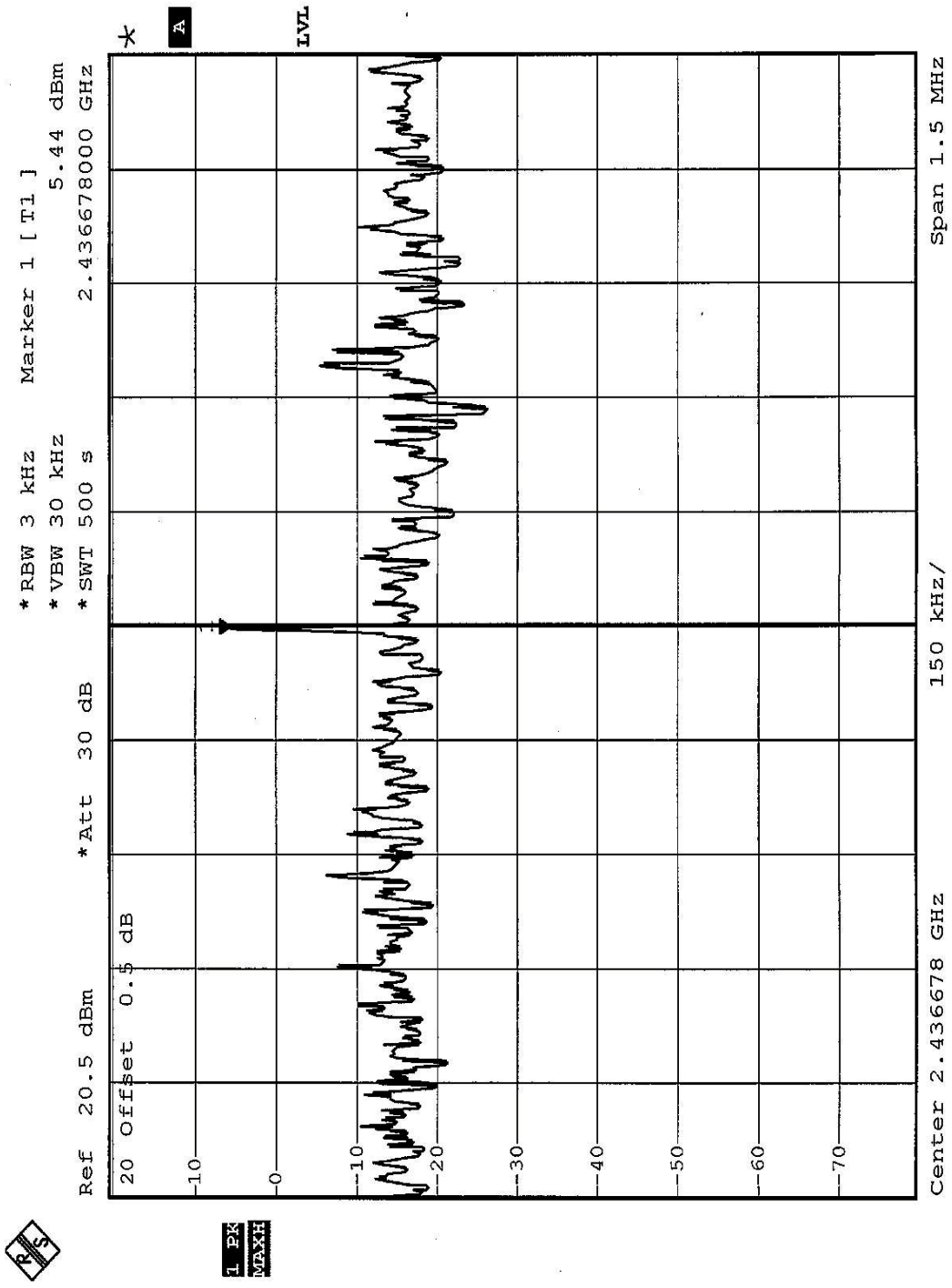
| | | | |
|---|---|---|---|
| **EUT** | Atheros 11a/g Mini-PCI Adapter | **MODEL** | NL-5354MP Plus Aries2 |
| **INPUT POWER (SYSTEM)** | 120Vac, 60Hz | **ENVIRONMENTAL CONDITIONS** | 20deg. C, 60%RH, 991hPa |
| **MODE** | CCK | **TESTED BY** | Jun Wu |

| 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 |

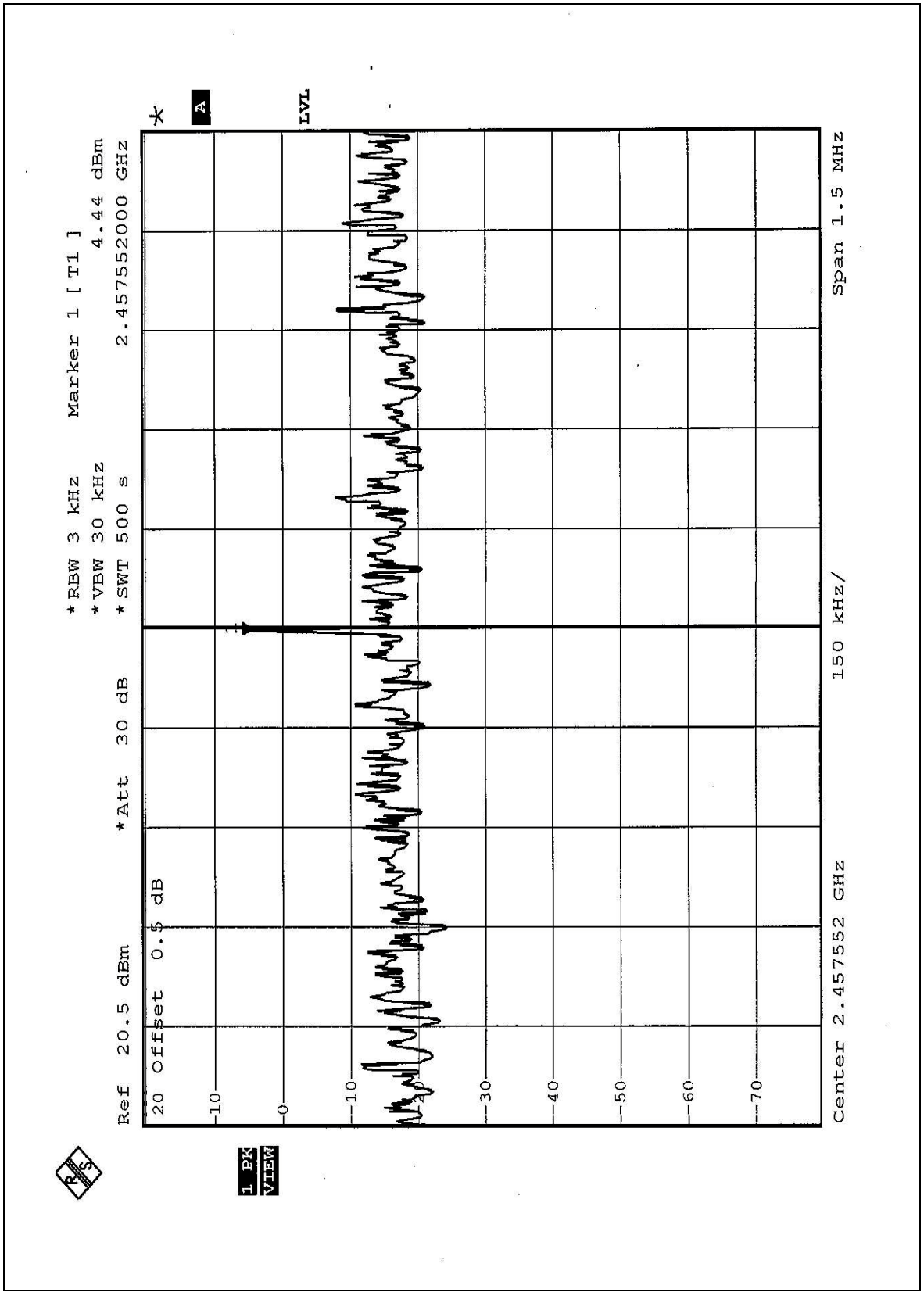
CH1


Ref 20.5 dBm
20 Offset 0.5 dB
*Att 30 dB
*RBW 3 kHz
*VBW 30 kHz
*SWT 500 s
Marker 1 [T1 ]
-1.13 dBm
2.41373900 GHz
LVL
Center 2.413739 GHz
150 kHz/
Span 1.5 MHz
1 PK MAXH

CH6


Ref 20.5 dBm
20 Offset 0.5 dB
*Att 30 dB
*RBW 3 kHz
*VBW 30 kHz
*SWT 500 s
Marker 1 [T1 ]
5.44 dBm
2.436678000 GHz
1 PK
MAXH
A
1VL
Center 2.436678 GHz
150 kHz/
Span 1.5 MHz

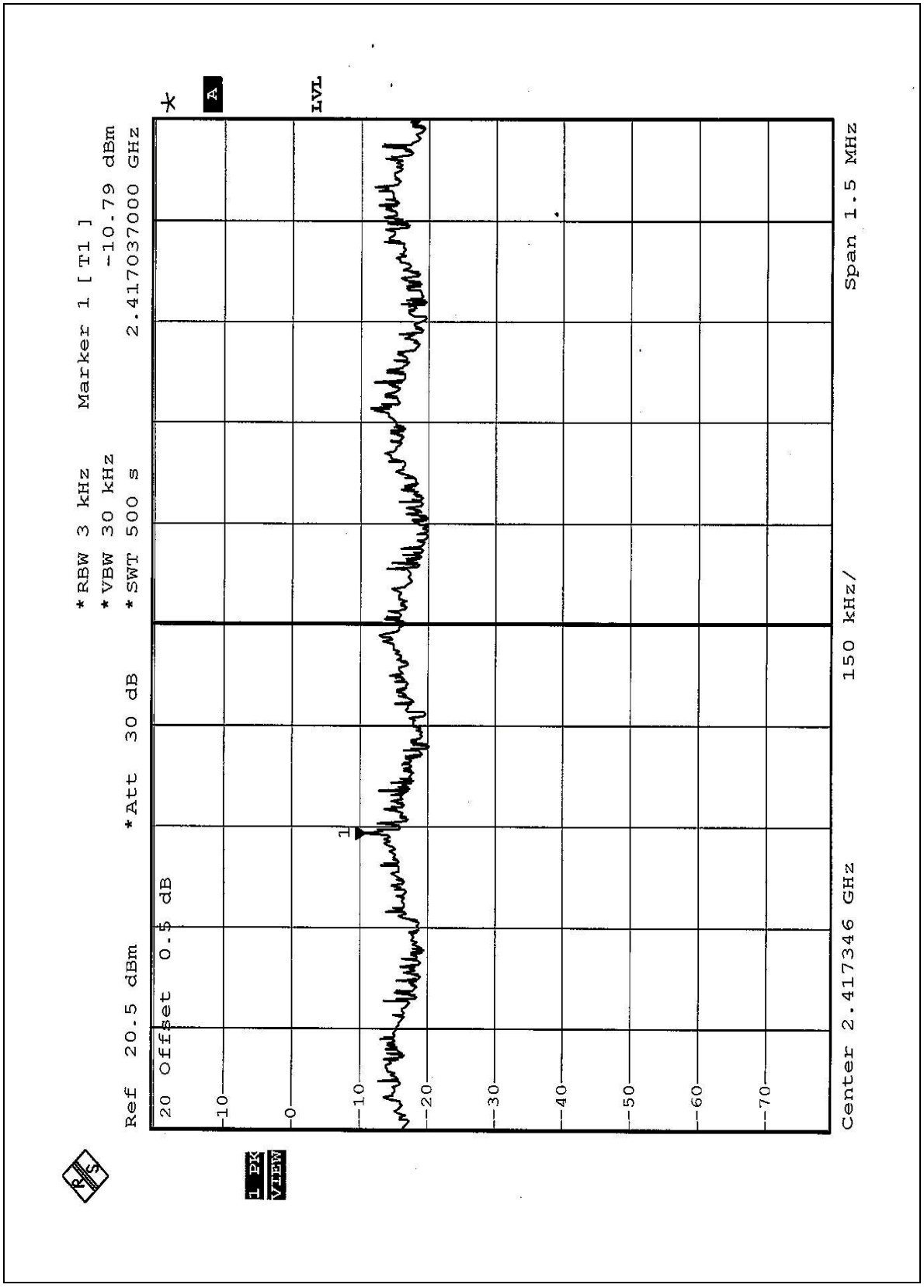
CH11


Ref 20.5 dBm
20 Offset 0.5 dB
*Att 30 dB
*RBW 3 kHz
*VBW 30 kHz
*SWT 500 s
Marker 1 [T1 ]
4.44 dBm
2.457552000 GHz
LVL
A
1 PK
VIEW
Center 2.457552 GHz
150 kHz/
Span 1.5 MHz

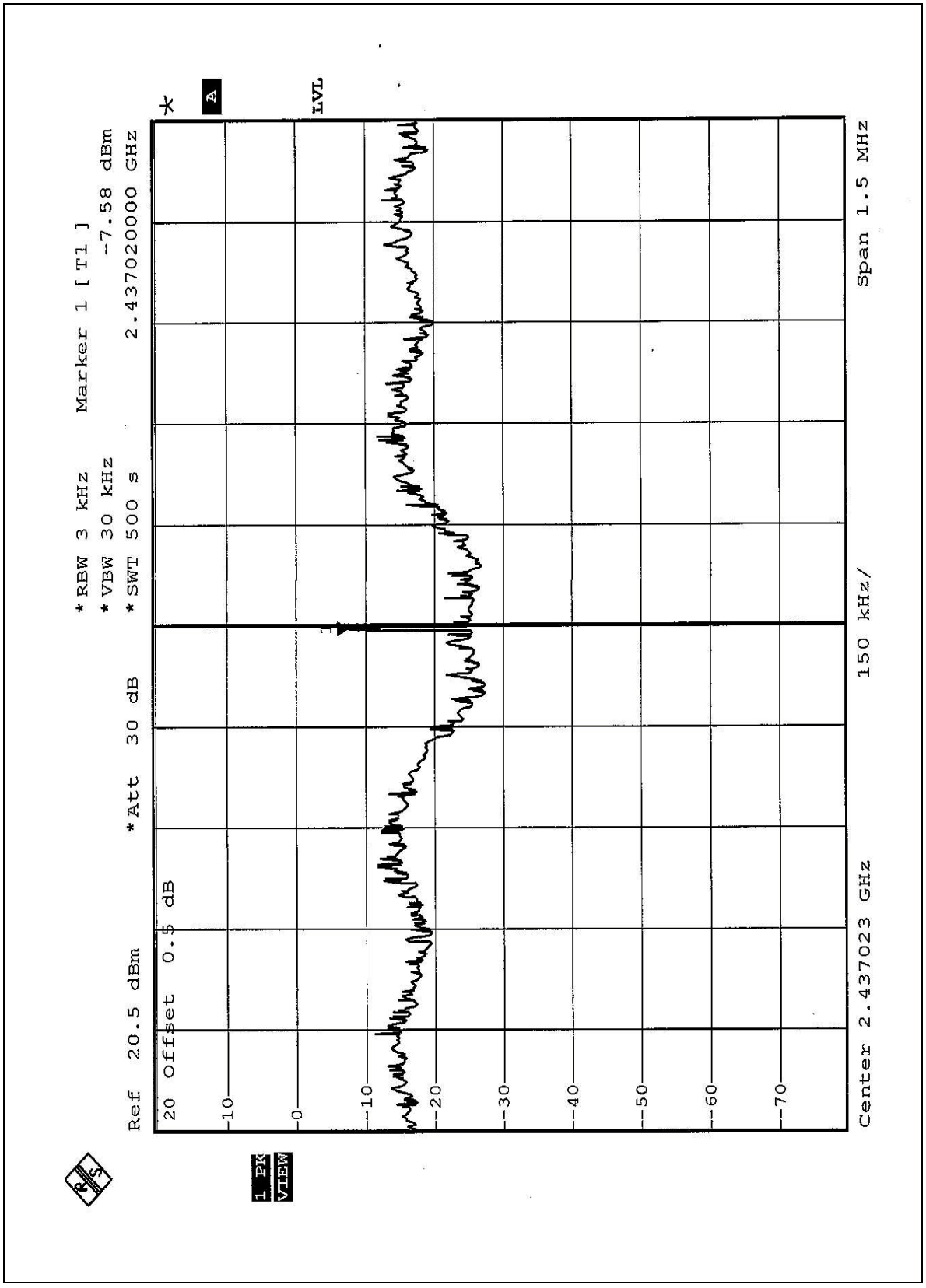
| EUT | Atheros 11a/g Mini-PCI Adapter | MODEL | NL-5354MP Plus Aries2 |
|---|---|---|---|
| INPUT POWER (SYSTEM) | 120Vac, 60Hz | ENVIRONMENTAL CONDITIONS | 20deg.C, 63%RH, 991hPa |
| MODE | OFDM | TESTED BY | Jun Wu |

| 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 |

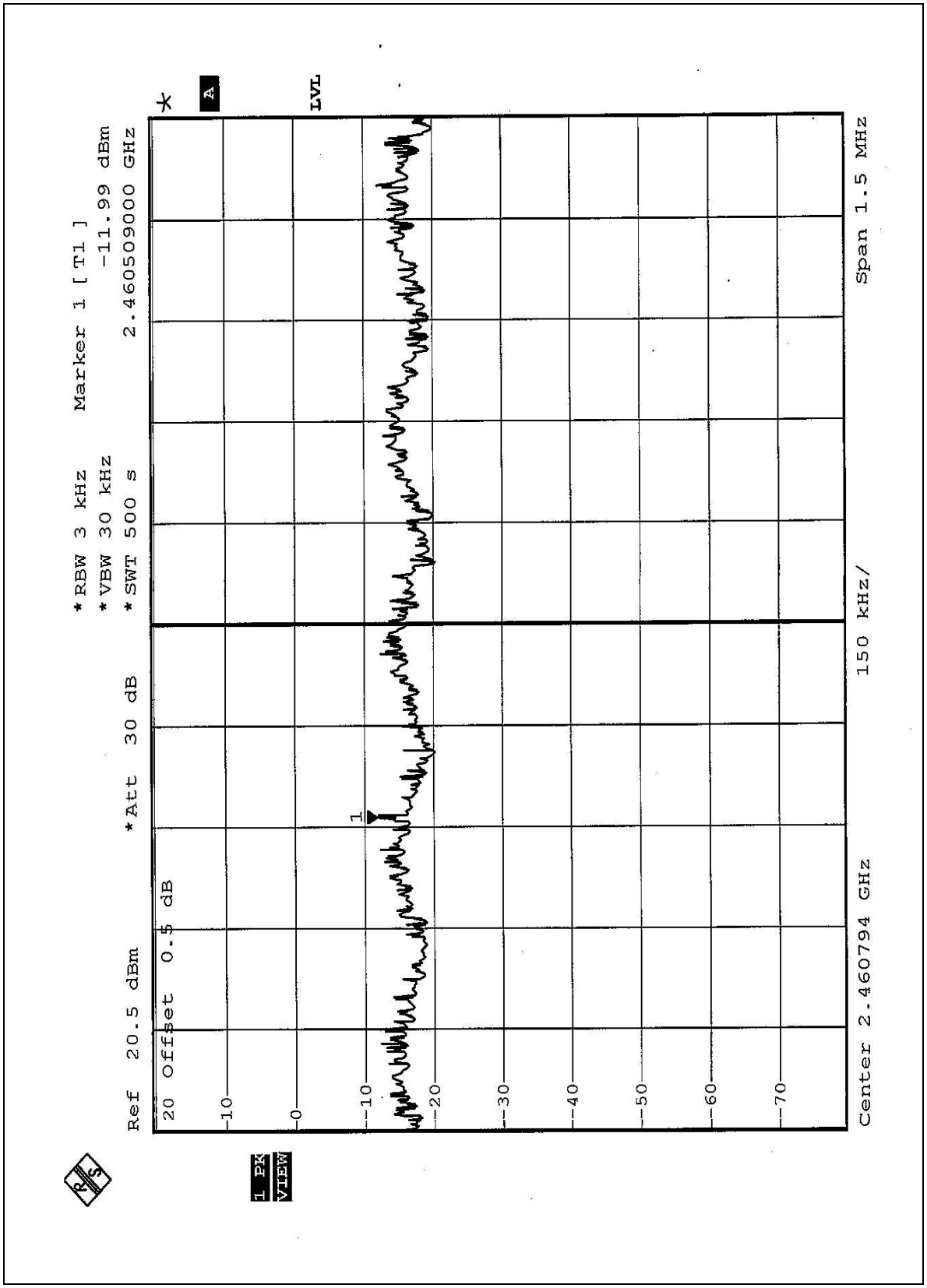
CH1


RBW 3 kHz
VBW 30 kHz
SWT 500 s
Marker 1 [T1 ]
-10.79 dBm
2.417037000 GHz
Ref 20.5 dBm
Offset 0.5 dB
Att 30 dB
Center 2.417346 GHz
150 kHz/
Span 1.5 MHz
1 PK
VIEW

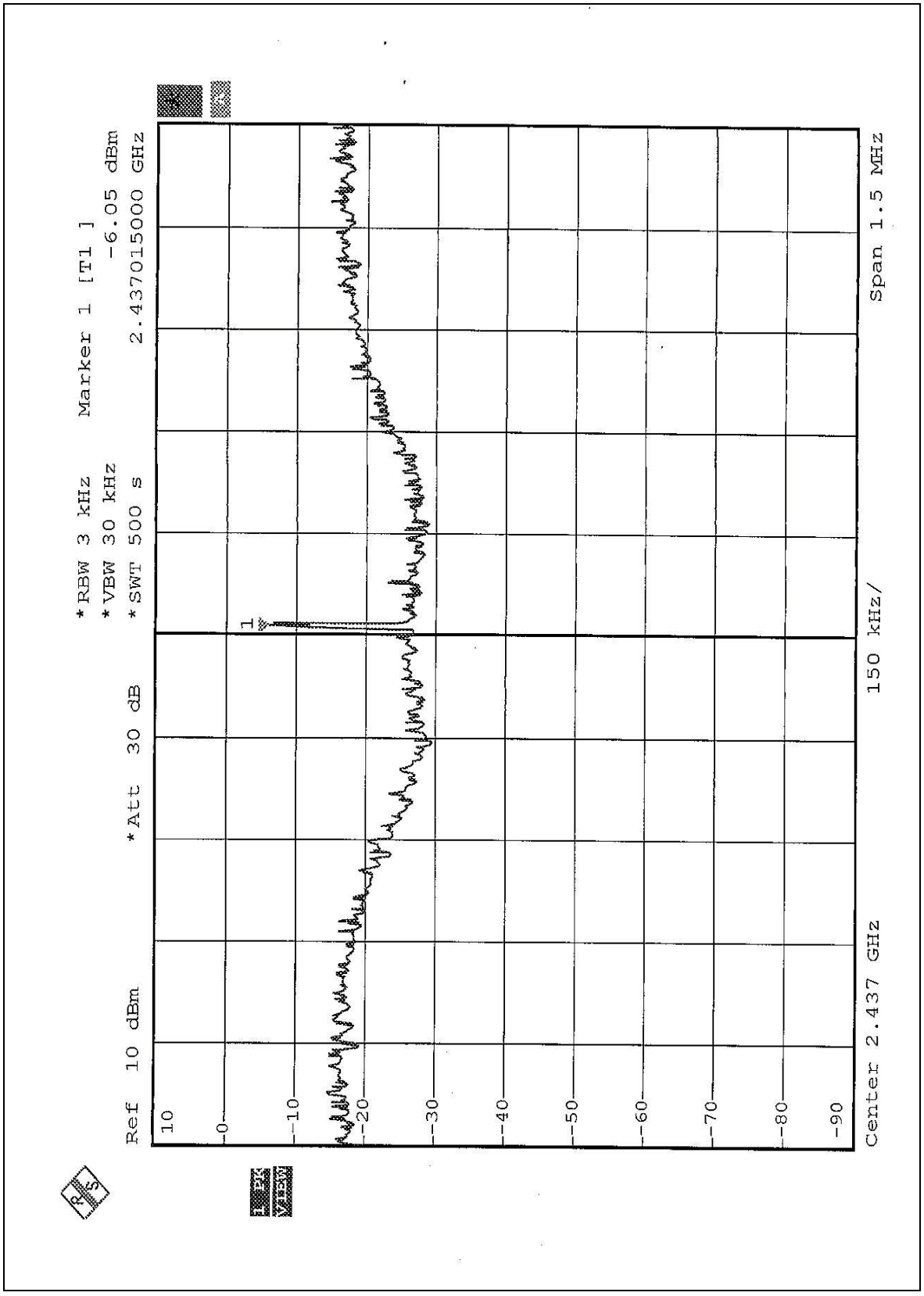
CH6


Ref 20.5 dBm
20 Offset 0.5 dB
*Att 30 dB
*RBW 3 kHz
*VBW 30 kHz
*SWT 500 s
Marker 1 [T1 ]
-7.58 dBm
2.437020000 GHz
Center 2.437023 GHz
150 kHz/
Span 1.5 MHz
1 PK
VIEW

CH11


Ref 20.5 dBm
20 Offset 0.5 dB
*Att 30 dB
*RBW 3 kHz
*VBW 30 kHz
*SWT 500 s
Marker 1 [T1 ]
-11.99 dBm
2.46050900 GHz
Center 2.460794 GHz
150 kHz/
Span 1.5 MHz
1 PK VIEW
A
LVL

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=51.33dBuV/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=48.56dBuV/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=51.36dBuV/m which is under 54 dBuV/m limit.

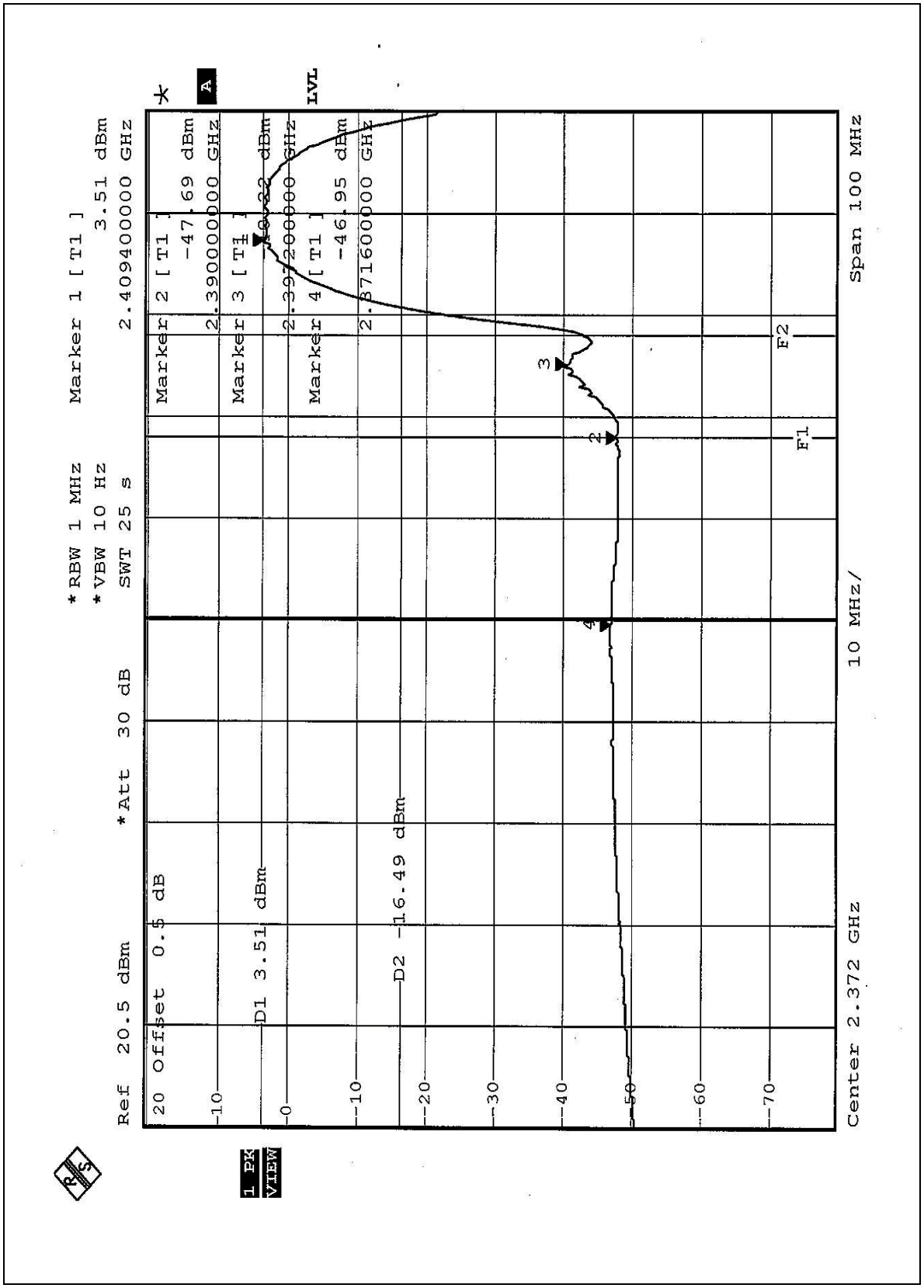
The band edge emission plot on the following 7~8 pages show 48.70dB delta between carrier maximum power and local maximum emission in restrict band (2.4835GHz). The emission of carrier strength list in the test result of channel 11 at the item 4.2.7 is 98.13dBuV/m, so the maximum field strength in restrict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

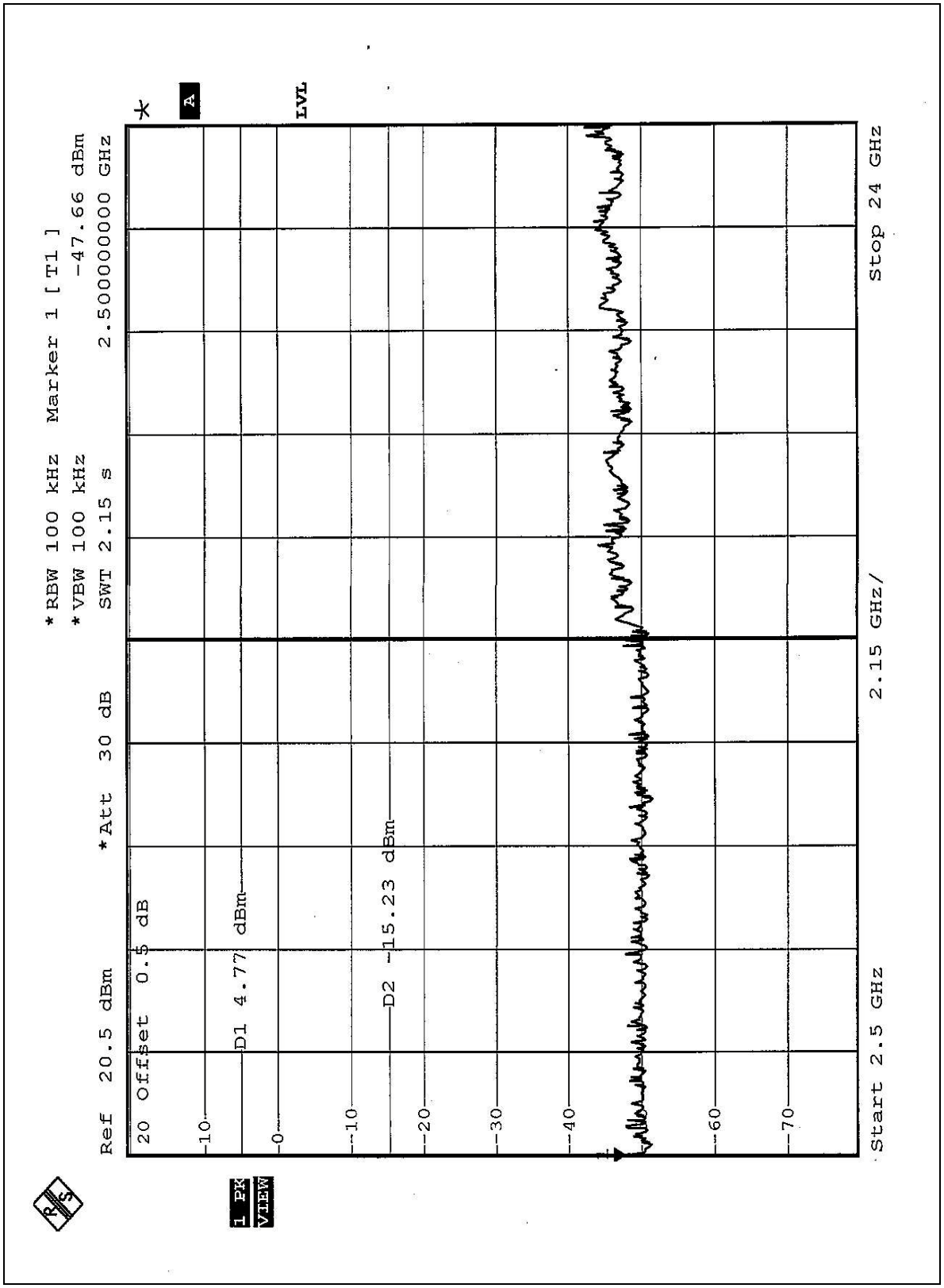
**OFDM (Turbo mode):**

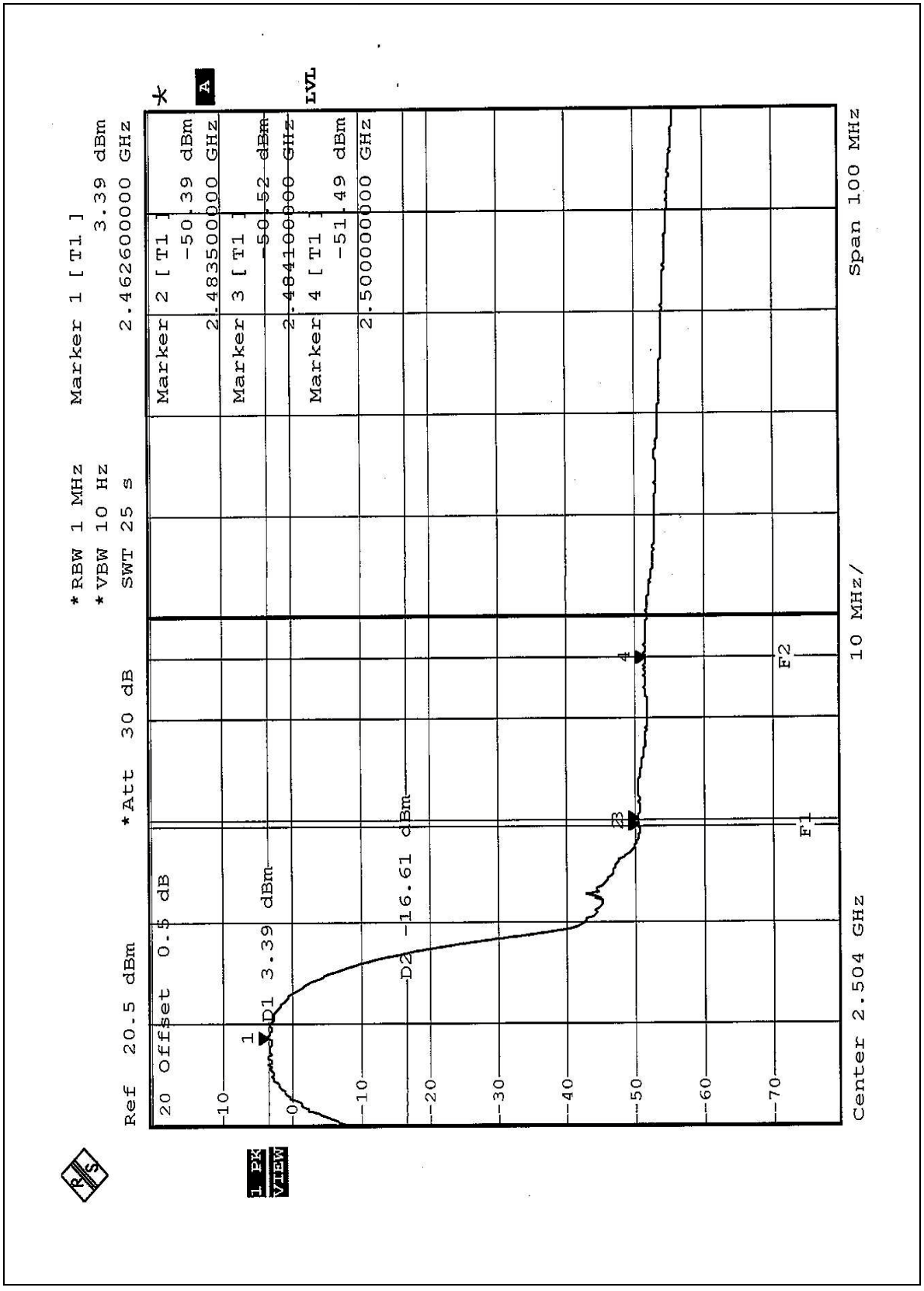
The band edge emission plot on the following 9~10 pages show 45.59dB delta between carrier maximum power and local maximum emission in restrict band (2.3898GHz). The emission of carrier strength list in the test result of channel 6 at the item 4.2.7 is 98.76dBuV/m, so the maximum field strength in restrict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

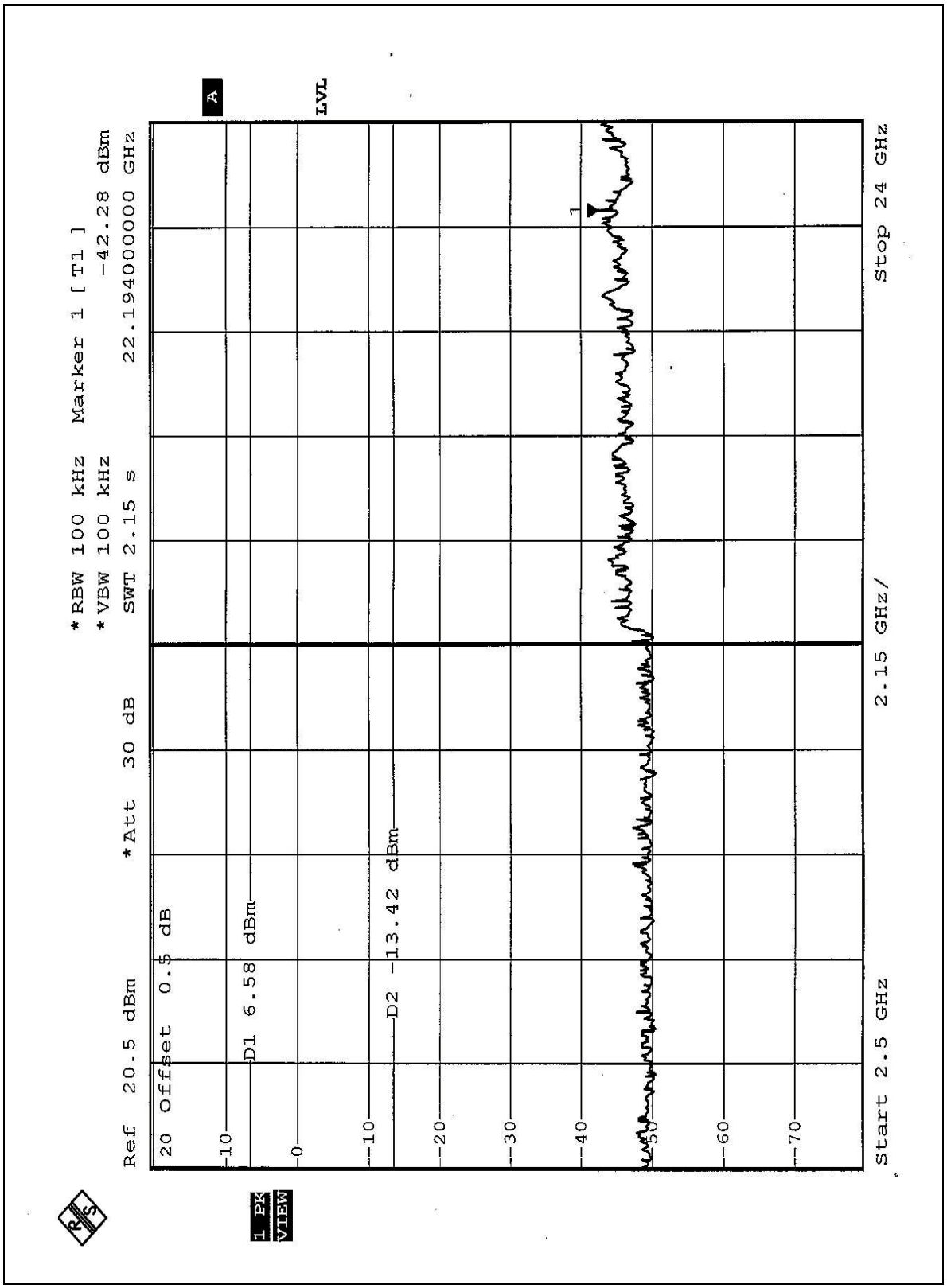
The band edge emission plot on the following 11~12 pages show 47.72dB delta between carrier maximum power and local maximum emission in restrict band (2.4838GHz). The emission of carrier strength list in the test result of channel 6 at the item 4.2.7 is 98.76dBuV/m, so the maximum field strength in restrict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

CCK

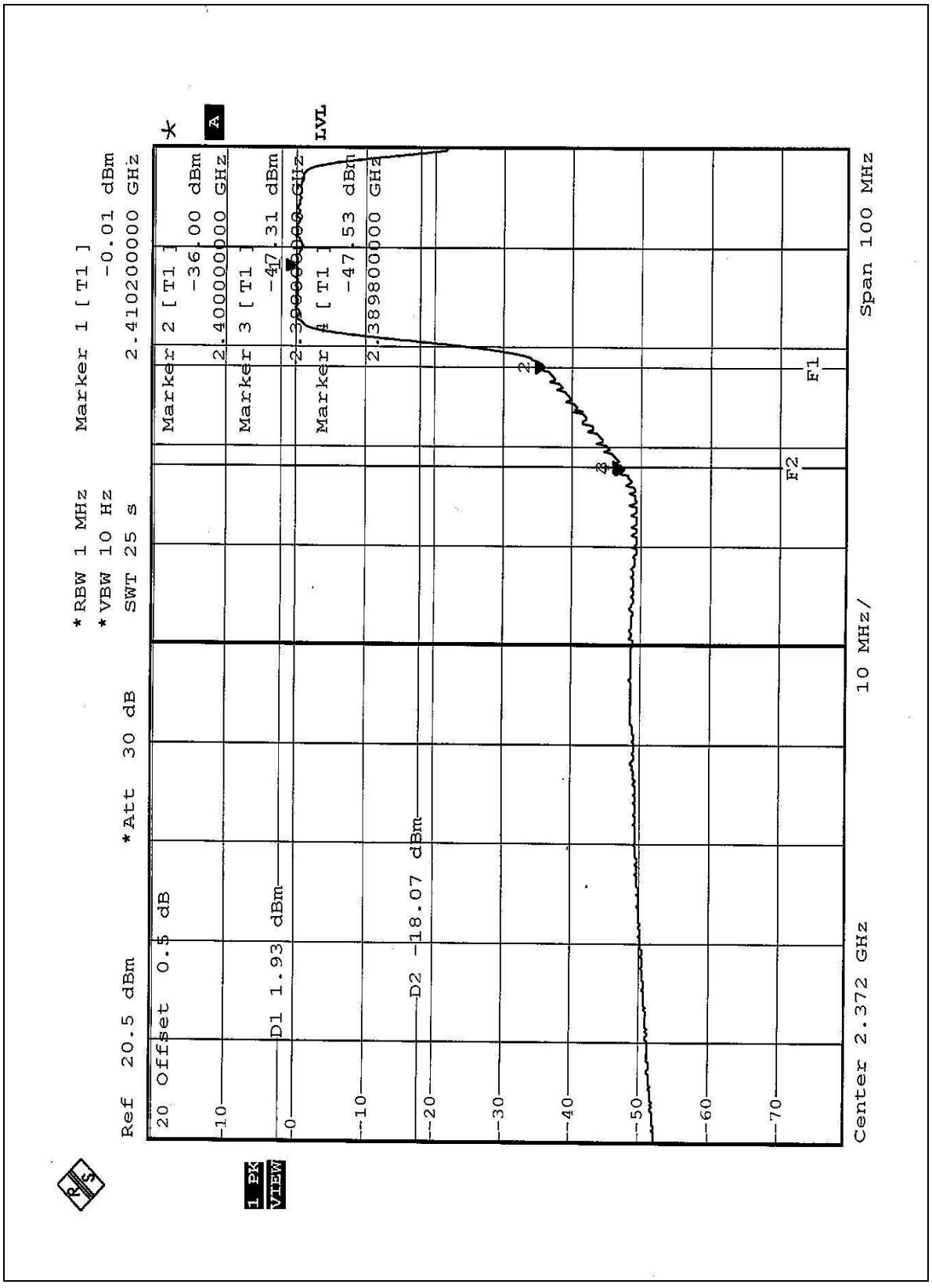

RBW 1 MHz
VBW 10 Hz
SWT 25 s
Att 30 dB
Offset 0.5 dB
Ref 20.5 dBm
Marker 1 [T1 ]
3.51 dBm
2.409400000 GHz
Marker 2 [T1 ]
-47.69 dBm
2.390000000 GHz
Marker 3 [T1 ]
-40.32 dBm
2.397200000 GHz
Marker 4 [T1 ]
-46.95 dBm
2.487160000 GHz
D1 3.51 dBm
D2 -16.49 dBm
Center 2.372 GHz
Span 100 MHz
10 MHz/
F1
F2
LVL
1 PK VIEW

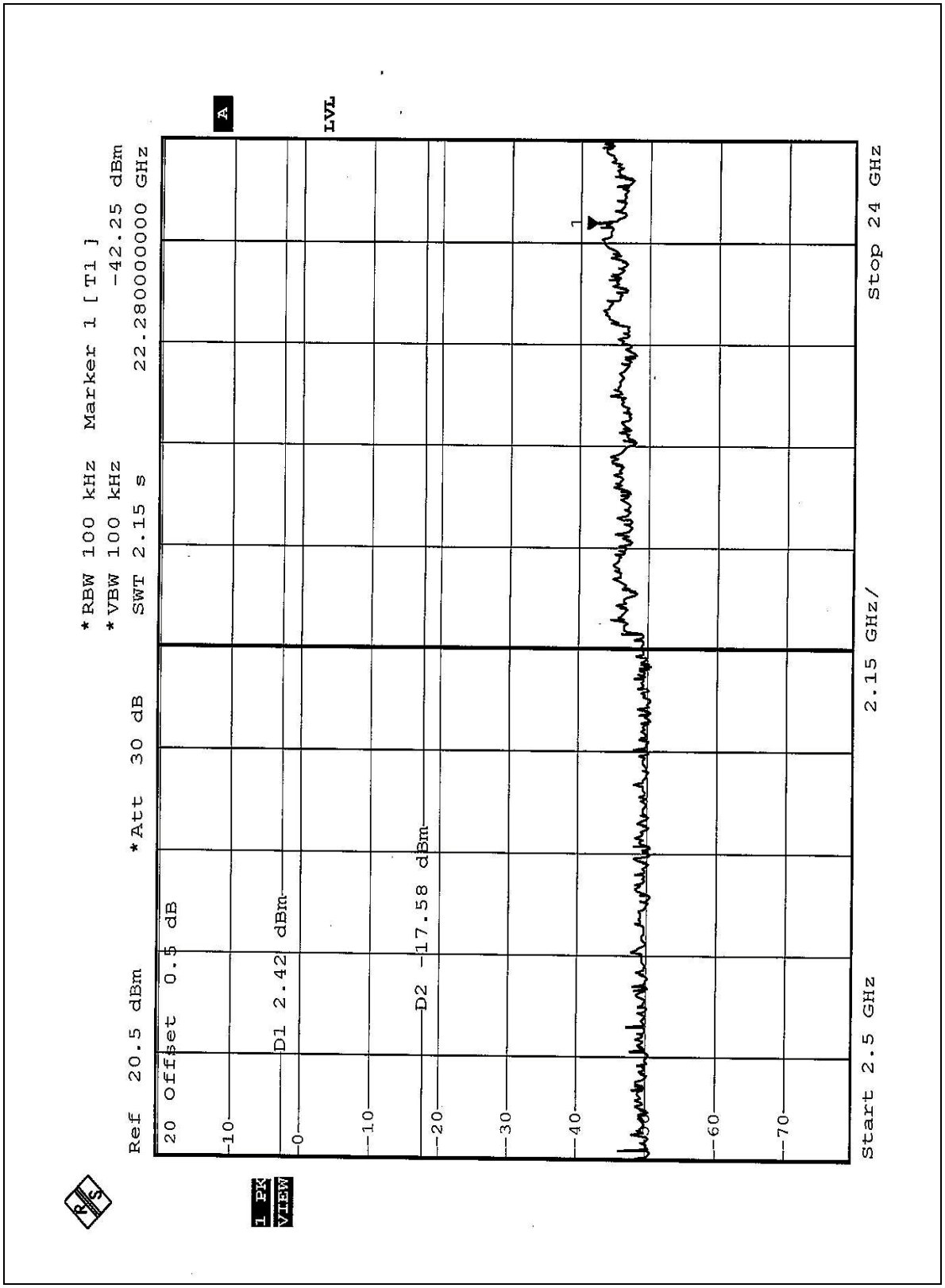

*RBW 100 kHz
*VBW 100 kHz
SWT 2.15 s
Marker 1 [T1 ]
-47.66 dBm
2.500000000 GHz
Ref 20.5 dBm
20 Offset 0.5 dB
*Att 30 dB
D1 4.77 dBm
D2 -15.23 dBm
1 PK
VIEW
LVL
A
Start 2.5 GHz
2.15 GHz/
Stop 24 GHz

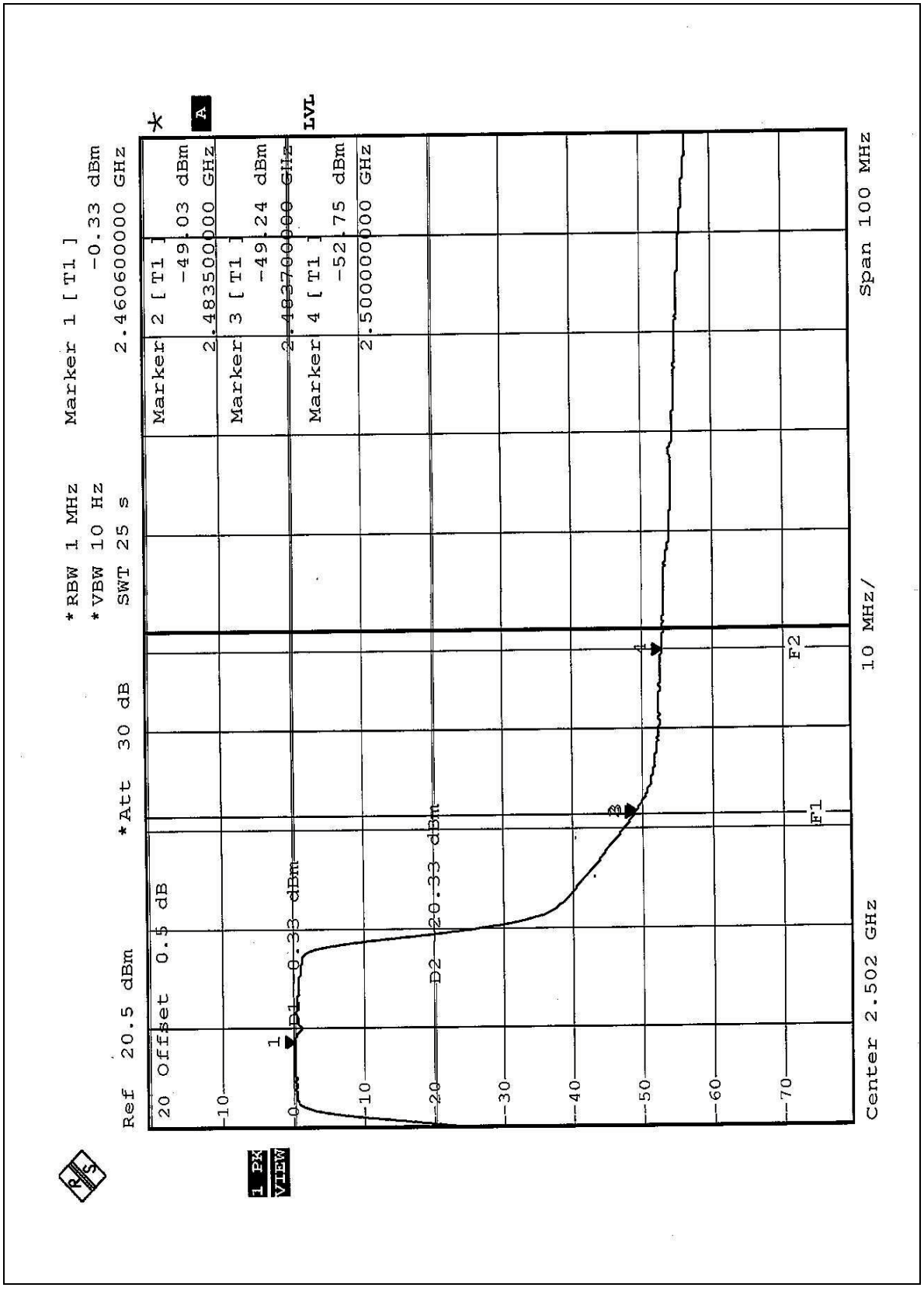

Ref 20.5 dBm
20 Offset 0.5 dB
*Att 30 dB
*RBW 1 MHz
*VBW 10 Hz
SWT 25 s
Marker 1 [T1 ]
3.39 dBm
2.462600000 GHz
D1 3.39 dBm
D2 -16.61 dBm
Marker 2 [T1 ]
-50.39 dBm
2.483500000 GHz
Marker 3 [T1 ]
-50.52 dBm
2.484100000 GHz
Marker 4 [T1 ]
-51.49 dBm
2.500000000 GHz
LVL
A
1 PK
VIEW
Center 2.504 GHz
10 MHz/
Span 100 MHz
F1
F2

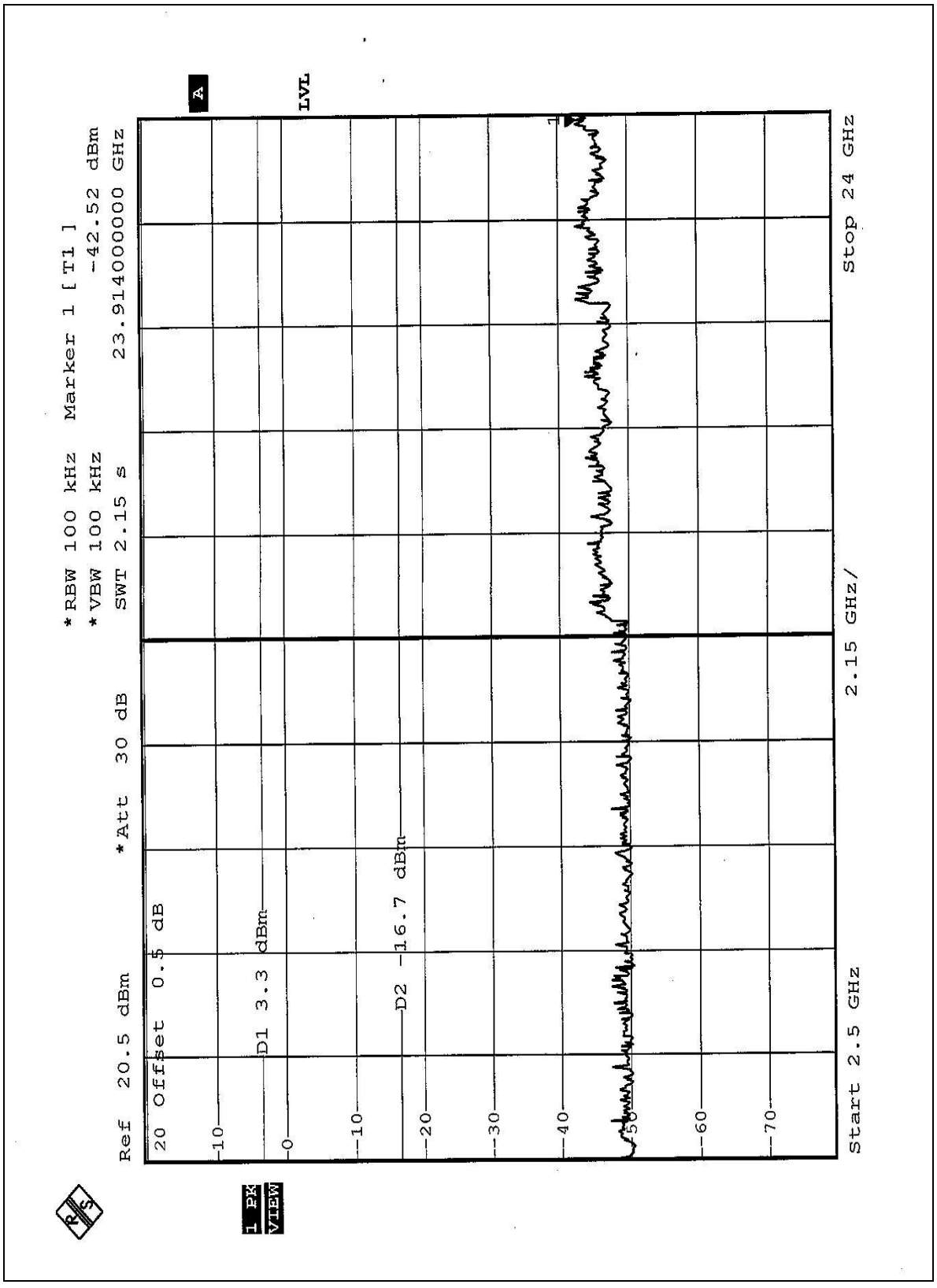

*RBW 100 kHz
*VBW 100 kHz
SWT 2.15 s
Marker 1 [T1 ]
-42.28 dBm
22.194000000 GHz
Ref 20.5 dBm
*Att 30 dB
20 Offset 0.5 dB
D1 6.58 dBm
D2 -13.42 dBm
LVL
A
1 PK VIEW
Start 2.5 GHz
2.15 GHz/
Stop 24 GHz

OFDM (Normal mode)




Ref 20.5 dBm
20 Offset 0.5 dB
*Att 30 dB
*RBW 100 kHz
*VBW 100 kHz
SWT 2.15 s
Marker 1 [T1 ]
-42.25 dBm
22.280000000 GHz
A
LVL
D1 2.42 dBm
D2 -17.58 dBm
1 PK
VIEW
Start 2.5 GHz
2.15 GHz/
Stop 24 GHz


Ref 20.5 dBm
20 Offset 0.5 dB
*Att 30 dB
*RBW 1 MHz
*VBW 10 Hz
SWT 25 s
Marker 1 [T1 ]
-0.33 dBm
2.460600000 GHz
Marker 2 [T1 ]
-49.03 dBm
2.483500000 GHz
Marker 3 [T1 ]
-49.24 dBm
2.483700000 GHz
Marker 4 [T1 ]
-52.75 dBm
2.500000000 GHz
LVL
D1 -0.33 dBm
D2 -20.33 dBm
F1
F2
Center 2.502 GHz
10 MHz/
Span 100 MHz
1 PK
VIEW


Ref 20.5 dBm
20 Offset 0.5 dB
*Att 30 dB
*RBW 100 kHz
*VBW 100 kHz
SWT 2.15 s
Marker 1 [T1 ]
-42.52 dBm
23.914000000 GHz
D1 3.3 dBm
D2 -16.7 dBm
Start 2.5 GHz
2.15 GHz/
Stop 24 GHz
1 PK VIEW