

### 4.3 6dB BANDWIDTH MEASUREMENT

#### 4.3.1 LIMITS OF 6dB BANDWIDTH MEASUREMENT

The Limit of 6dB Bandwidth Measurement is 0.5 MHz.

#### 4.3.2 TEST INSTRUMENTS

| Description & Manufacturer    | Model No. | Serial No.               | Calibrated Until |
|-------------------------------|-----------|--------------------------|------------------|
| ROHDE & SCHWARZ TEST RECEIVER | ESMI      | 846839/018<br>848926/005 | Mar. 03, 2001    |
| HP ATTENUATOR                 | 8496B     | 3247A18505               | Cal. on use      |
| HP PLOTTER                    | 7475A     | 2641V27755               | N/A              |

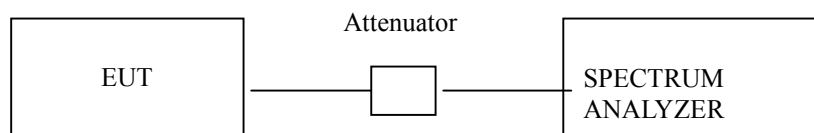
Notes:

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

#### 4.3.3 TEST PROCEDURE

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

#### 4.3.4 TEST SETUP



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

#### 4.3.5 EUT OPERATING CONDITION

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

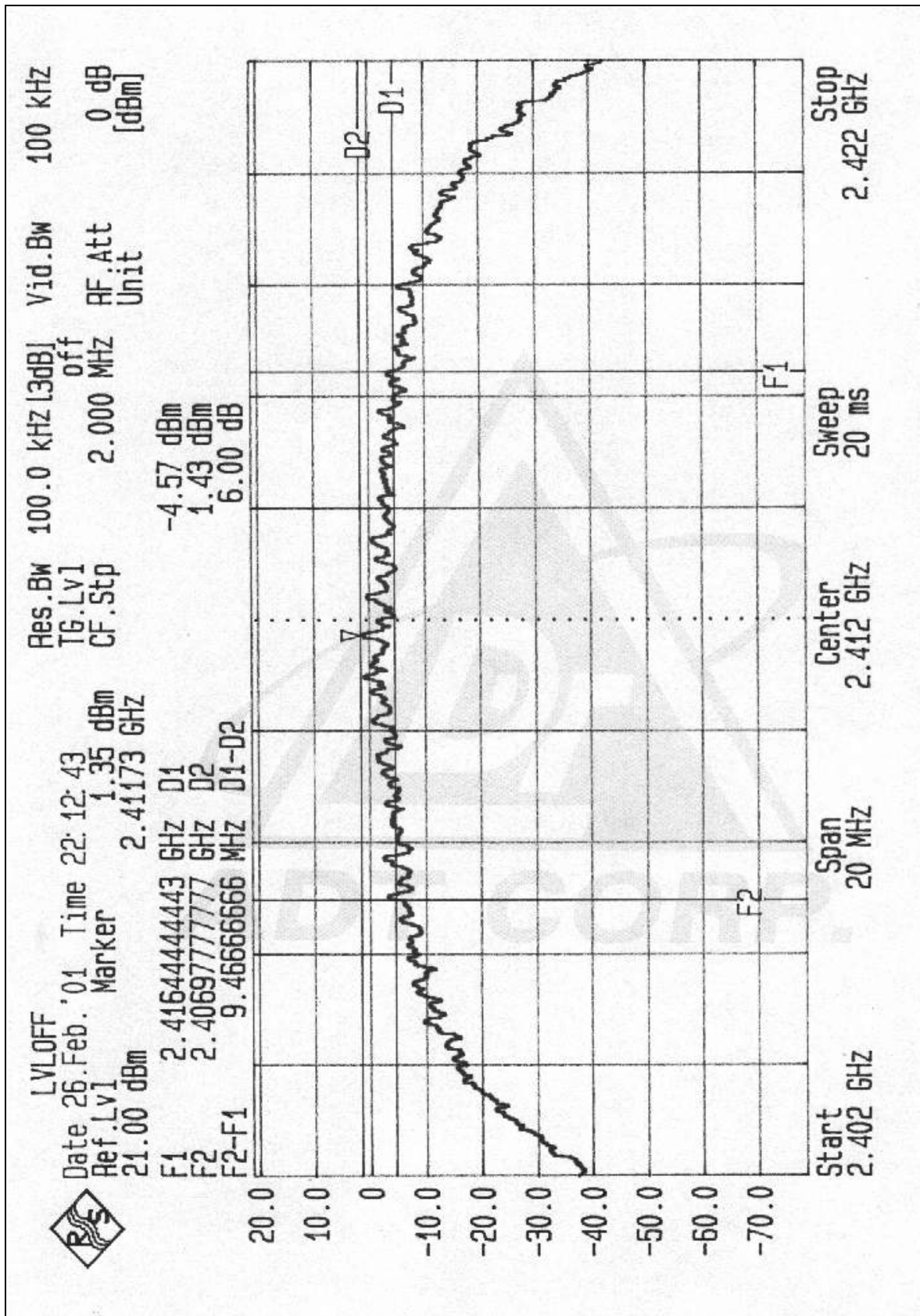


## 4.3.6 TEST RESULTS

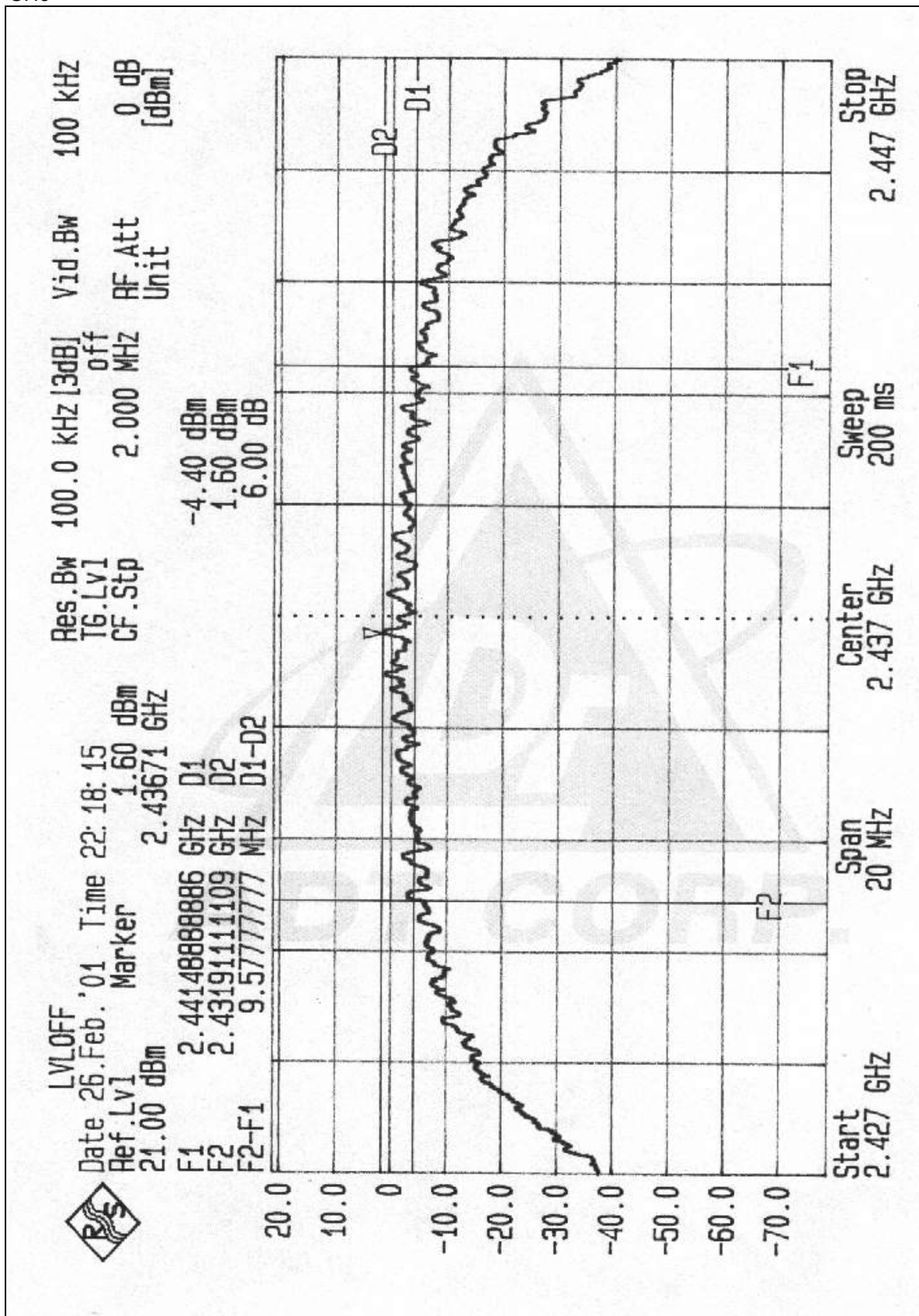
|                                 |                              |                  |                      |
|---------------------------------|------------------------------|------------------|----------------------|
| <b>EUT</b>                      | 11Mbps Wireless Access Point | <b>Model</b>     | LM-WS110<br>LM-WS130 |
| <b>Environmental Conditions</b> | 20°C, 70%RH                  | <b>Tested By</b> | Steven Lu            |

| CHANNEL | CHANNEL<br>FREQUENCY<br>(MHz) | 6 dB BANDWIDTH<br>(MHz) | MINIMUM<br>LIMIT<br>(MHz) | PASS/FAIL |
|---------|-------------------------------|-------------------------|---------------------------|-----------|
| 1       | 2412                          | 9.47                    | 0.5                       | PASS      |
| 6       | 2437                          | 9.58                    | 0.5                       | PASS      |
| 11      | 2462                          | 9.58                    | 0.5                       | PASS      |

CHI

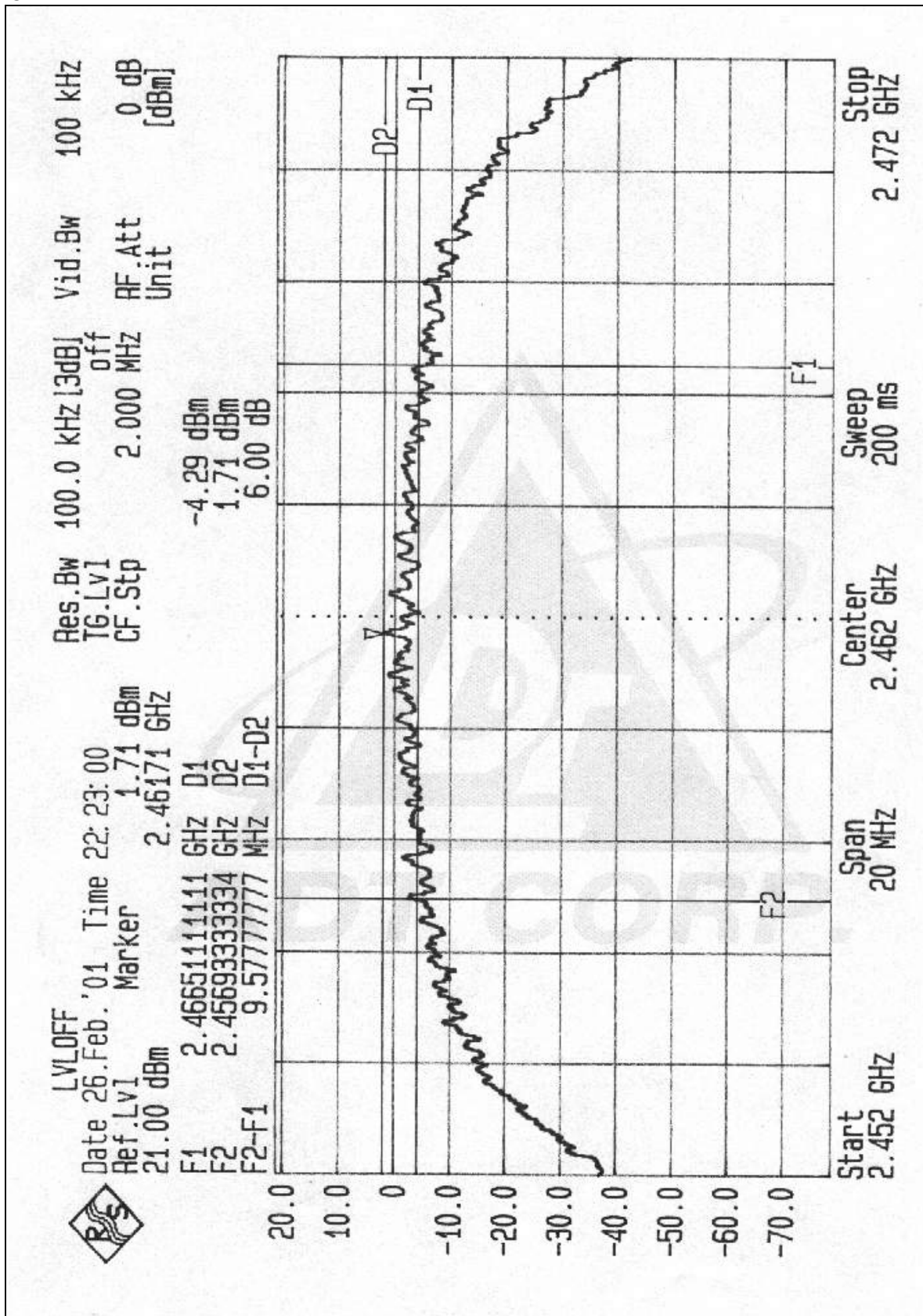


CH6





CH11



#### 4.4 MAXIMUM PEAK OUTPUT POWER

##### 4.4.1 LIMITS OF MAXIMUM PEAK OUTPUT POWER MEASUREMENT

The Limit of Maximum Peak Output Power Measurement is 30dBm.

##### 4.4.2 INSTRUMENTS

| Description & Manufacturer | Model No. | Serial No. | Calibrated Until |
|----------------------------|-----------|------------|------------------|
| HP SPECTRUM ANALYZER       | 8593E     | 3926A04191 | Mar. 03, 2001    |
| HP ATTENUATOR              | 8496B     | 3247A18505 | Cal. on use      |
| HP PLOTTER                 | 7475A     | 2641V27755 | N/A              |

Notes:

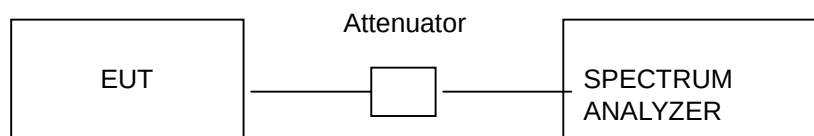
- 1.The measurement uncertainty is less than +/- 2.6dB, which is calculated as per the NAMAS document NIS81.
- 2.The calibration interval of the above test instruments is 12 months. And the calibrations are traceable to NML/ROC and NIST/USA.

#### 4.4.3 TEST PROCEDURES

1. The transmitter output was connected to the spectrum analyzer through an attenuator.
2. The center frequency of the spectrum analyzer is set to the fundamental frequency and using 3 MHz RBW and 3 MHz VBW.
3. The span of the spectrum analyzer should be larger than 6dB BandWidth plus 10MHz.
4. Use Peak Search to read the peak power after Maximum Hold function is activated.
5. Shift the marker to +/- 3MHz and +/-6MHz, and record the reading.
6. The Maximum Peak Output Power is the linear summation of the 5 readings in (4) and (5).

Note: This measurement is the total power of 15MHz bandwidth which is far more wider than 6dB bandwidth.

#### 4.4.4 TEST SETUP



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

#### 4.4.5 EUT OPERATING CONDITION

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





#### 4.4.6 TEST RESULTS

Output Power Into Antenna:

|                                 |                              |                  |                      |
|---------------------------------|------------------------------|------------------|----------------------|
| <b>EUT</b>                      | 11Mbps Wireless Access Point | <b>Model</b>     | LM-WS110<br>LM-WS130 |
| <b>Environmental Conditions</b> | 20°C, 70%RH                  | <b>Tested By</b> | Steven Lu            |

| CHANNEL | CHANNEL FREQUENCY (MHz) | PEAK POWER OUTPUT (dBm) | PEAK POWER LIMIT (dBm) | PASS/FAIL |
|---------|-------------------------|-------------------------|------------------------|-----------|
| 1       | 2412                    | 17.36                   | 30                     | PASS      |
| 6       | 2437                    | 17.79                   | 30                     | PASS      |
| 11      | 2462                    | 18.10                   | 30                     | PASS      |

## 4.5 POWER SPECTRAL DENSITY MEASUREMENT

### 4.5.1 LIMITS OF POWER SPECTRAL DENSITY MEASUREMENT

The Limit of Power Spectral Density Measurement is 8dBm.

### 4.5.2 TEST INSTRUMENTS

| Description & Manufacturer    | Model No. | Serial No.               | Calibrated Until |
|-------------------------------|-----------|--------------------------|------------------|
| ROHDE & SCHWARZ TEST RECEIVER | ESMI      | 846839/018<br>848926/005 | Mar. 03, 2001    |
| HP ATTENUATOR                 | 8496B     | 3247A18505               | Cal. on use      |
| HP PLOTTER                    | 7475A     | 2641V27755               | N/A              |

Notes:

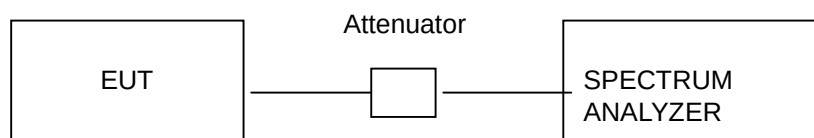
- 1.The measurement uncertainty is less than +/- 2.6dB, which is calculated as per the NAMAS document NIS81.
- 2.The calibration interval of the above test instruments is 12 months. And the calibrations are traceable to NML/ROC and NIST/USA.

#### 4.5.3 TEST PROCEDURE

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

The sweep time is allowed to be longer than span/3KHz for a full response of the mixer in the spectrum analyzer.

#### 4.5.4 TEST SETUP



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

#### 4.5.5 EUT OPERATING CONDITION

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

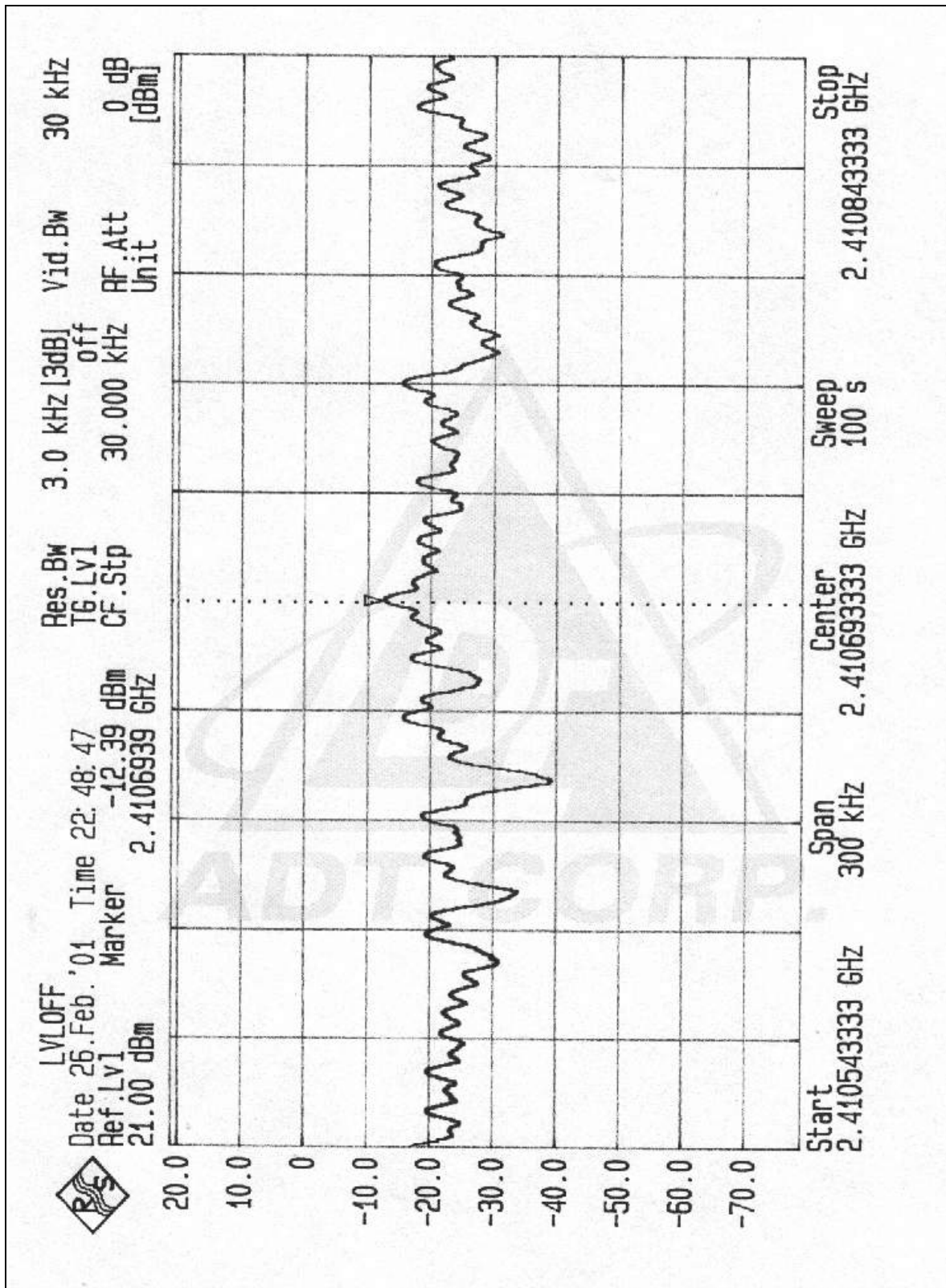


## 4.5.6 TEST RESULTS

|                                 |                              |                  |                      |
|---------------------------------|------------------------------|------------------|----------------------|
| <b>EUT</b>                      | 11Mbps Wireless Access Point | <b>Model</b>     | LM-WS110<br>LM-WS130 |
| <b>Environmental Conditions</b> | 20°C, 70%RH                  | <b>Tested By</b> | Steven Lu            |

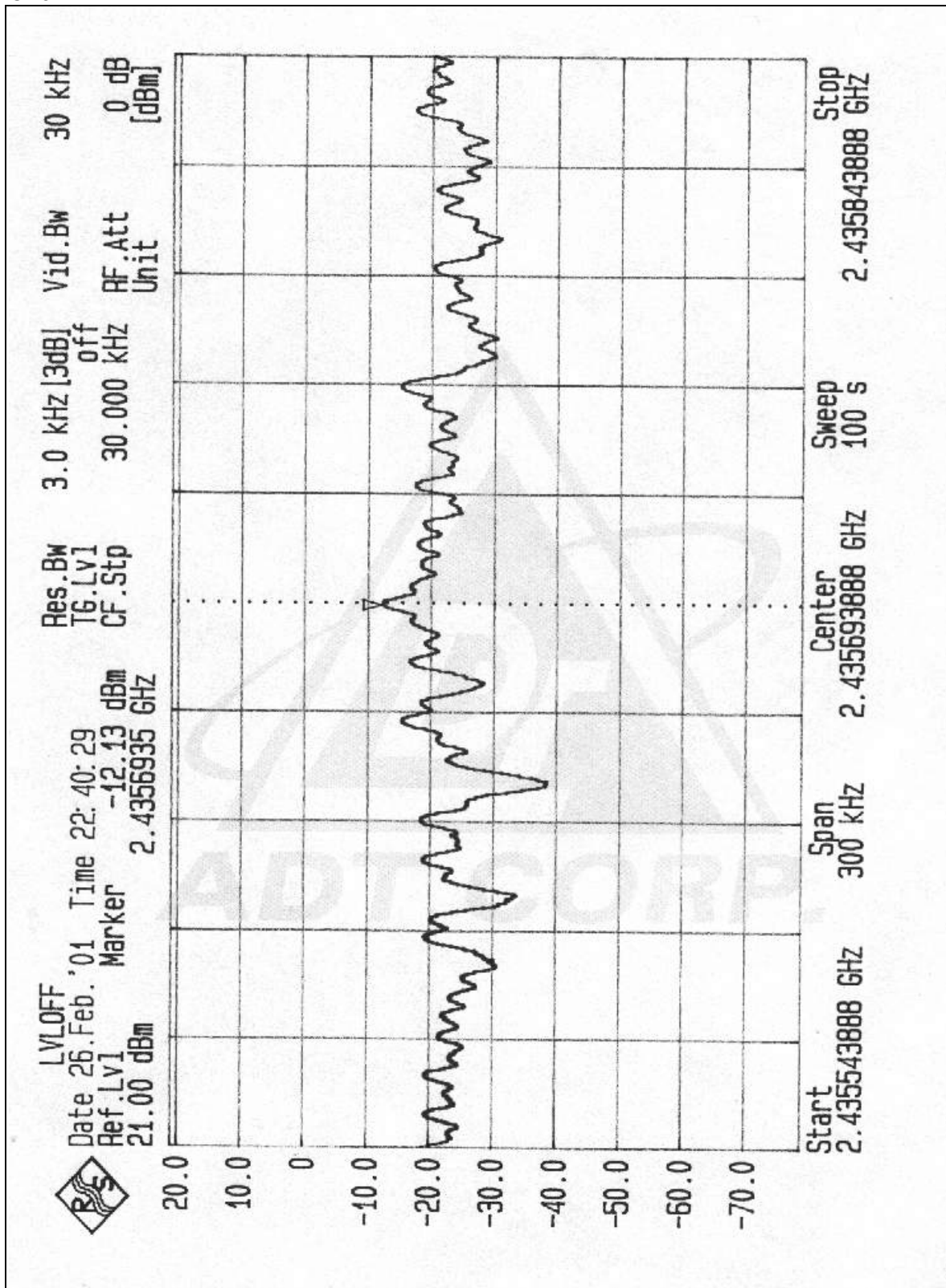
| CHANNEL NUMBER | CHANNEL FREQUENCY (MHz ) | RF POWER LEVEL IN 3 KHz BW (dBm) | MAXIMUM LIMIT (dBm) | PASS/FAIL |
|----------------|--------------------------|----------------------------------|---------------------|-----------|
| 1              | 2412                     | -12.39                           | 8                   | PASS      |
| 6              | 2437                     | -12.13                           | 8                   | PASS      |
| 11             | 2462                     | -11.98                           | 8                   | PASS      |

CHI

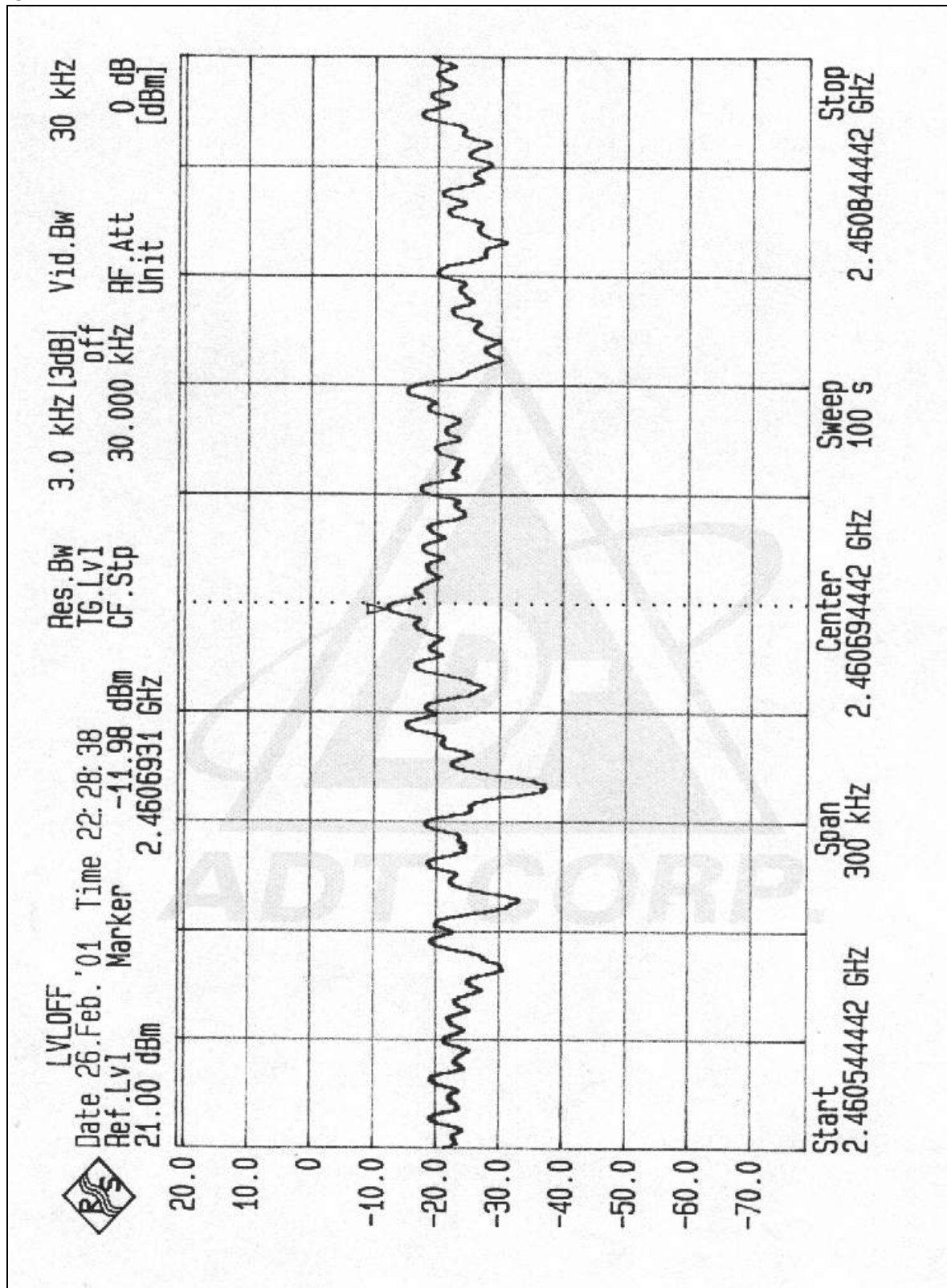




CH6



CH11



## 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 RB).

### 4.6.2 TEST INSTRUMENTS

| Description & Manufacturer    | Model No. | Serial No.               | Calibrated Until |
|-------------------------------|-----------|--------------------------|------------------|
| ROHDE & SCHWARZ TEST RECEIVER | ESMI      | 848926/005<br>846839/018 | Dec 03, 2001     |
| HP ATTENUATOR                 | 8496B     | 3247A18505               | Cal. on use      |
| HP PLOTTER                    | 7475A     | 2641V27755               | N/A              |

Notes:

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

### 4.6.3 TEST PROCEDURE

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



#### 4.6.4 EUT OPERATING CONDITION

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

#### 4.6.5 TEST RESULTS

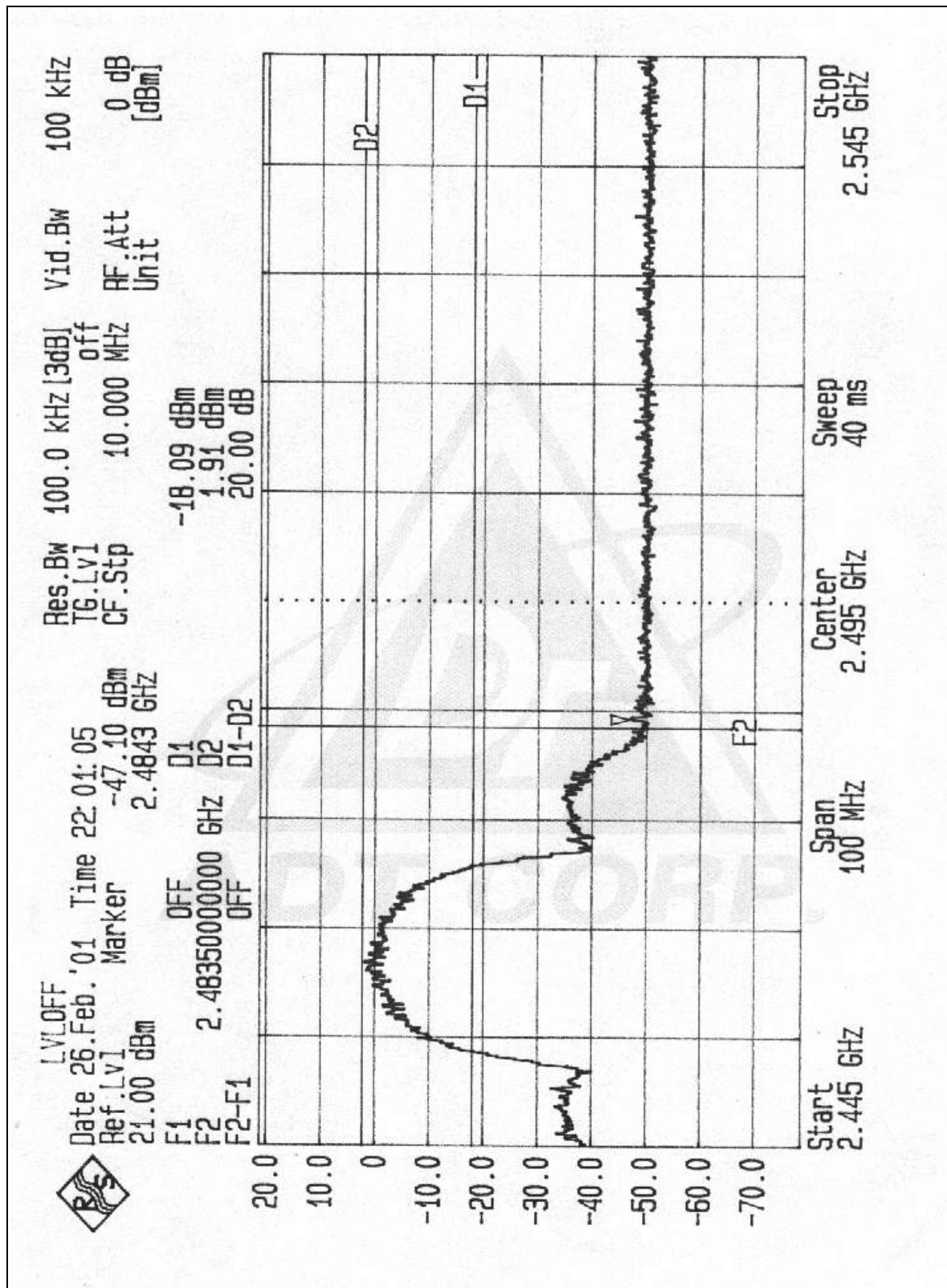
The spectrum plots are attached below. D2 line indicates the highest level, D1 line indicates the 20dB offset below D2. It shows compliance with the requirement in part 15.247(C).



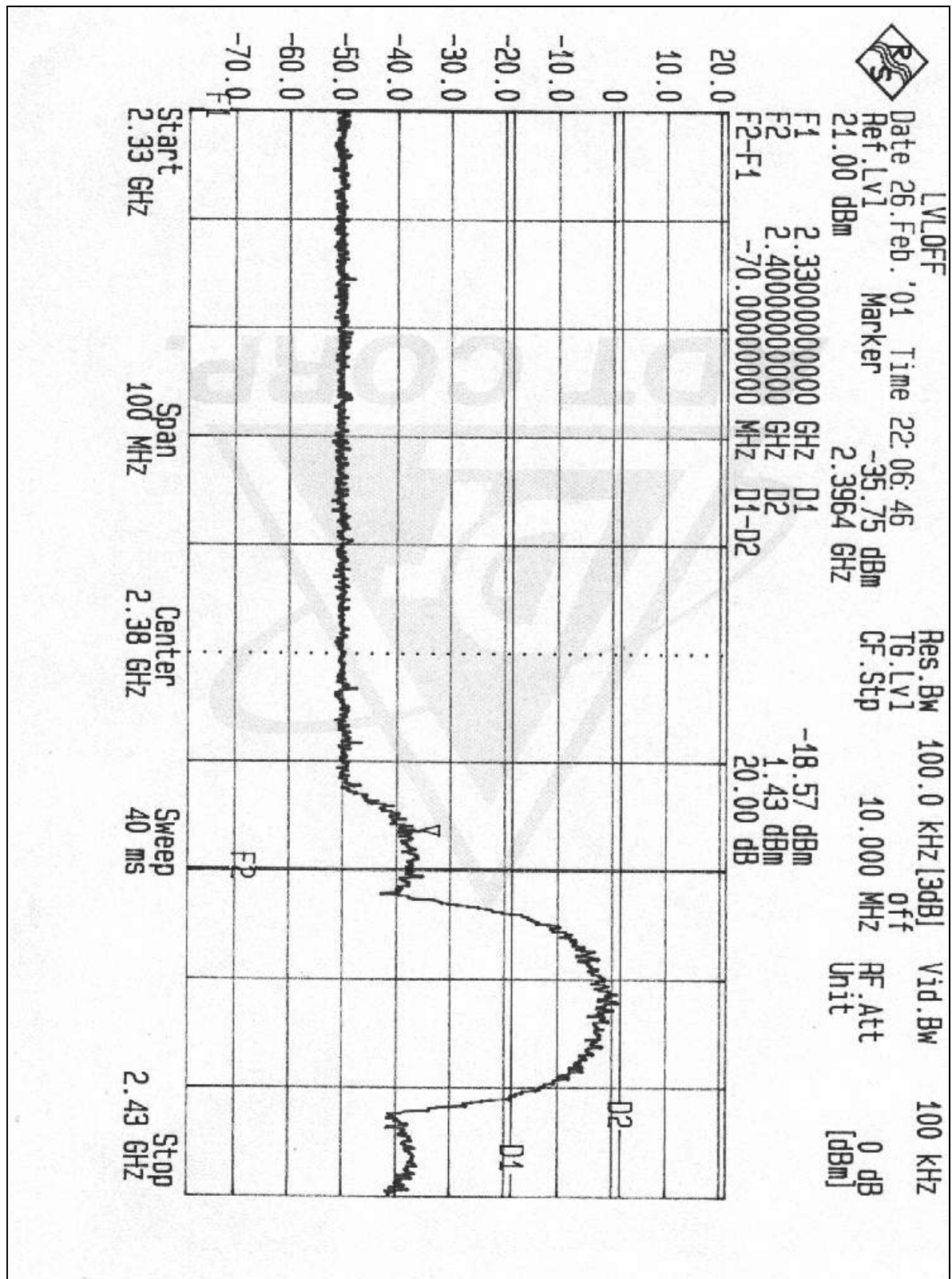
#### 4.6.6 NOTE ON BAND EDGE EMISSION

The band edge emission plot on page 43 shows 49.01dB delta between carrier maximum power and local maximum emission in restrict band (2.484GHz). The emission of carrier strength list in table of page 24 is 95.6dB  $\mu$  V/m, so the maximum field strength in restrict band is 95.6-49.01=46.59 dB  $\mu$  V/m which is under 54 dB  $\mu$  V/m limit.











## **4.7 ANTENNA REQUIREMENT**

### **4.7.1 STANDARD APPLICABLE**

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

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

### **4.7.2 ANTENNA CONNECTED CONSTRUCTION**

The antenna used in this product is Dual Monopole Antenna. There is no antenna connector. And the maximum Gain of this antenna is only 1dBi.

## 5 PHOTOGRAPHS OF THE TEST CONFIGURATION CONDUCTED EMISSION TEST



## RADIATED EMISSION TEST





## 6 INFORMATION ON THE TESTING LABORATORIES

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

|                    |               |
|--------------------|---------------|
| <b>USA</b>         | FCC, NVLAP    |
| <b>Germany</b>     | TUV Rheinland |
| <b>Japan</b>       | VCCI          |
| <b>New Zealand</b> | RFS           |
| <b>Norway</b>      | NEMKO, DNV    |
| <b>U.K.</b>        | INCHCAPE      |
| <b>R.O.C.</b>      | BSMI          |

Copies of accreditation certificates of our laboratories obtained from approval agencies can be downloaded from our web site: [www.adt.com.tw/index.5/phtml](http://www.adt.com.tw/index.5/phtml).

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

**Lin Kou EMC Lab:**

Tel: 886-2-26052180

Fax: 886-2-26052943

**Hsin Chu EMC Lab:**

Tel: 886-35-935343

Fax: 886-35-935342

**Lin Kou Safety Lab:**

Tel: 886-2-26093195

Fax: 886-2-26093184

**Design Center:**

Tel: 886-2-26093195

Fax: 886-2-26093184

**Email:** [service@mail.adt.com.tw](mailto:service@mail.adt.com.tw)

**Web Site:** [www.adt.com.tw](http://www.adt.com.tw)