## 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 |
|---|---|---|---|
| R&S SPECTRUM ANALYZER | FSP40 | 100036 | Nov. 27, 2004 |

**NOTE:**

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

### 4.6.3 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

Same as Item 4.3.5

### 4.6.5 TEST RESULTS –DSSS

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

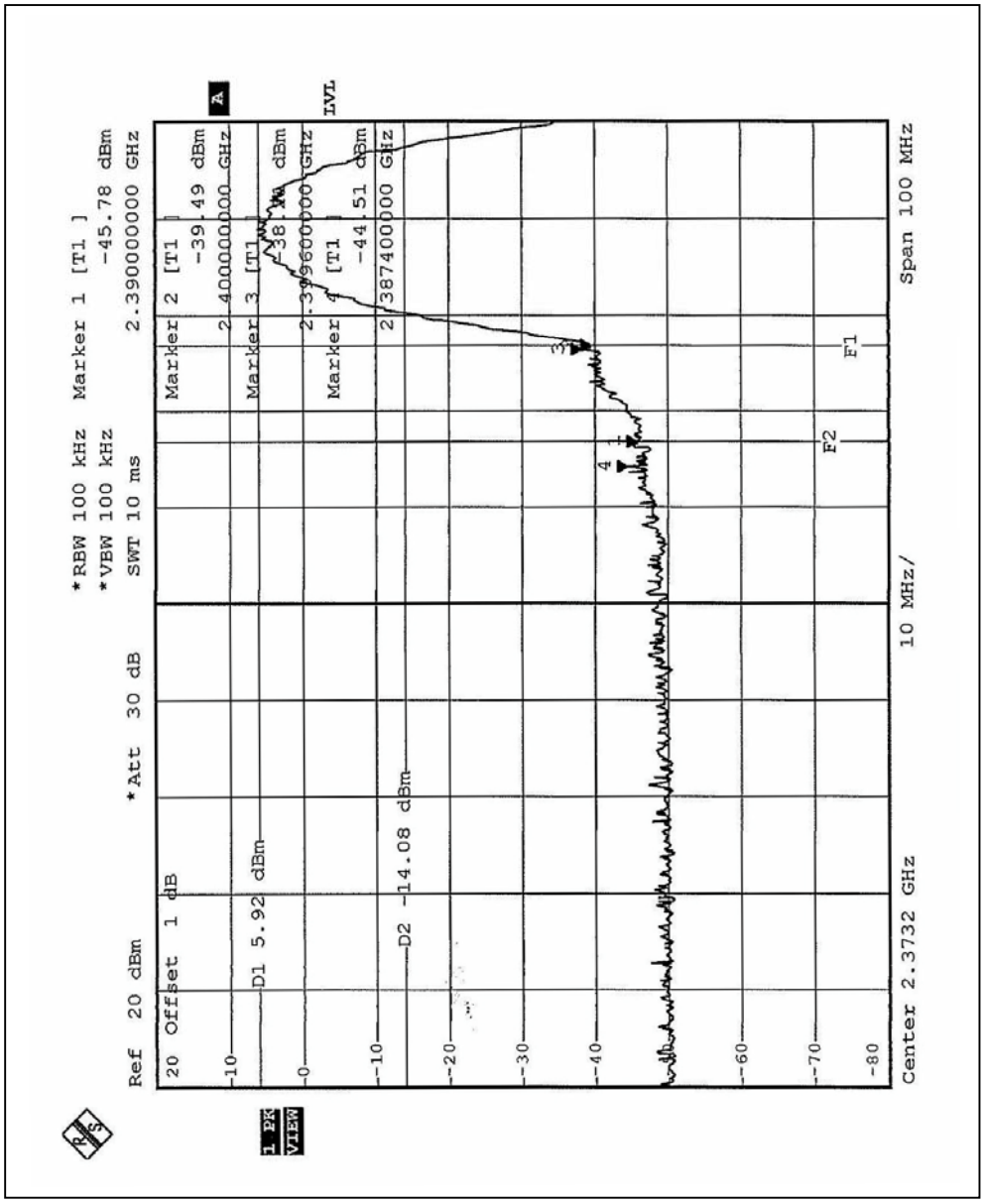
Note - The delta method is only used up to 2 MHz away from the restricted bandage, The radiated emissions which located in other restricted frequency band, the result, please refer to 4.2.

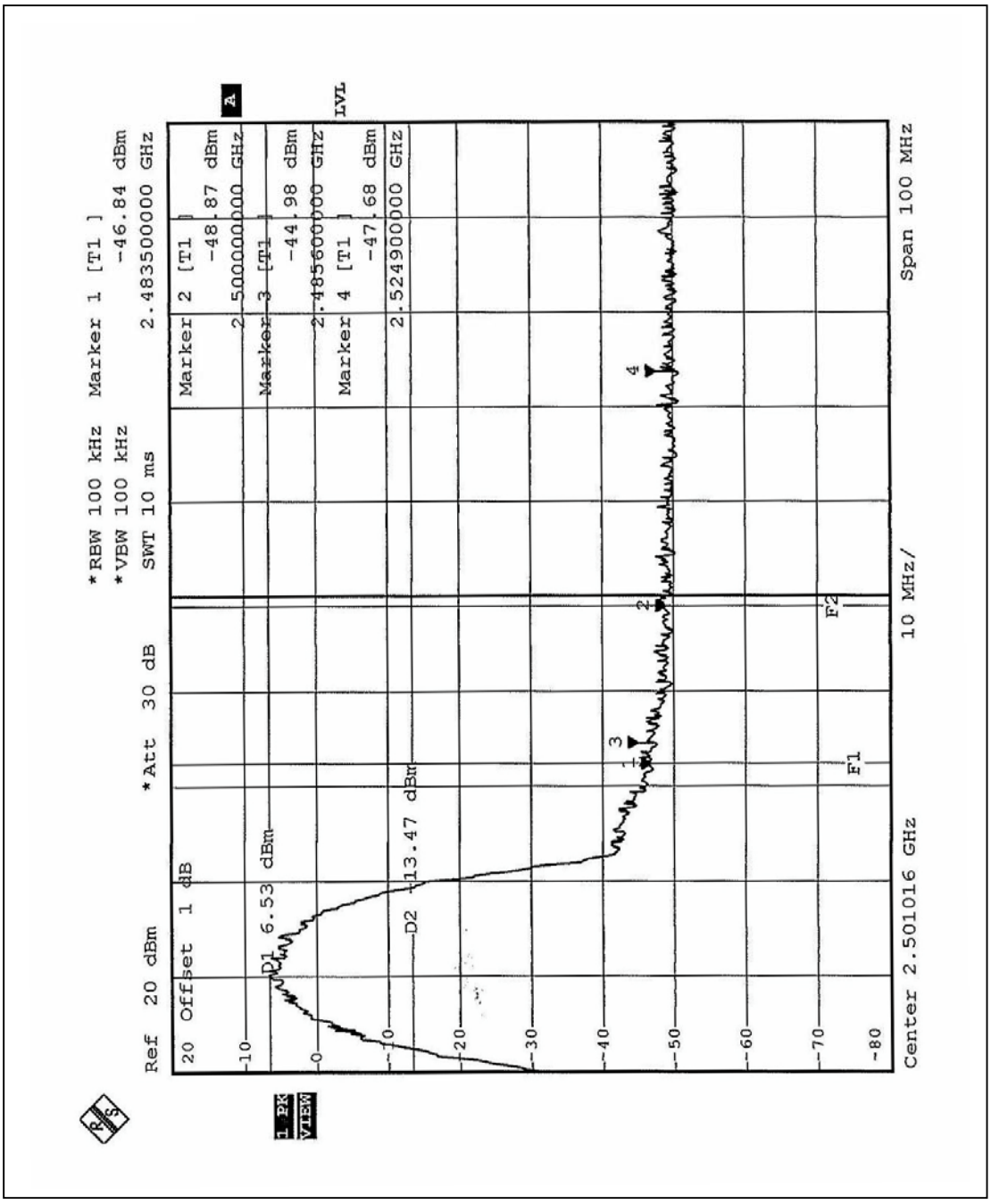
**NOTE (Peak):**
The band edge emission plot of DSSS technique on the following page 55 show 51.7dB delta between carrier maximum power and local maximum emission in restrict band (2.3900GHz). The emission of carrier strength list in the test result of channel 1 at the item 4.2 is 113.0dBuV/m, so the maximum field strength in restrict band is 113.0-51.7=61.3dBuV/m which is under 74 dBuV/m limit.

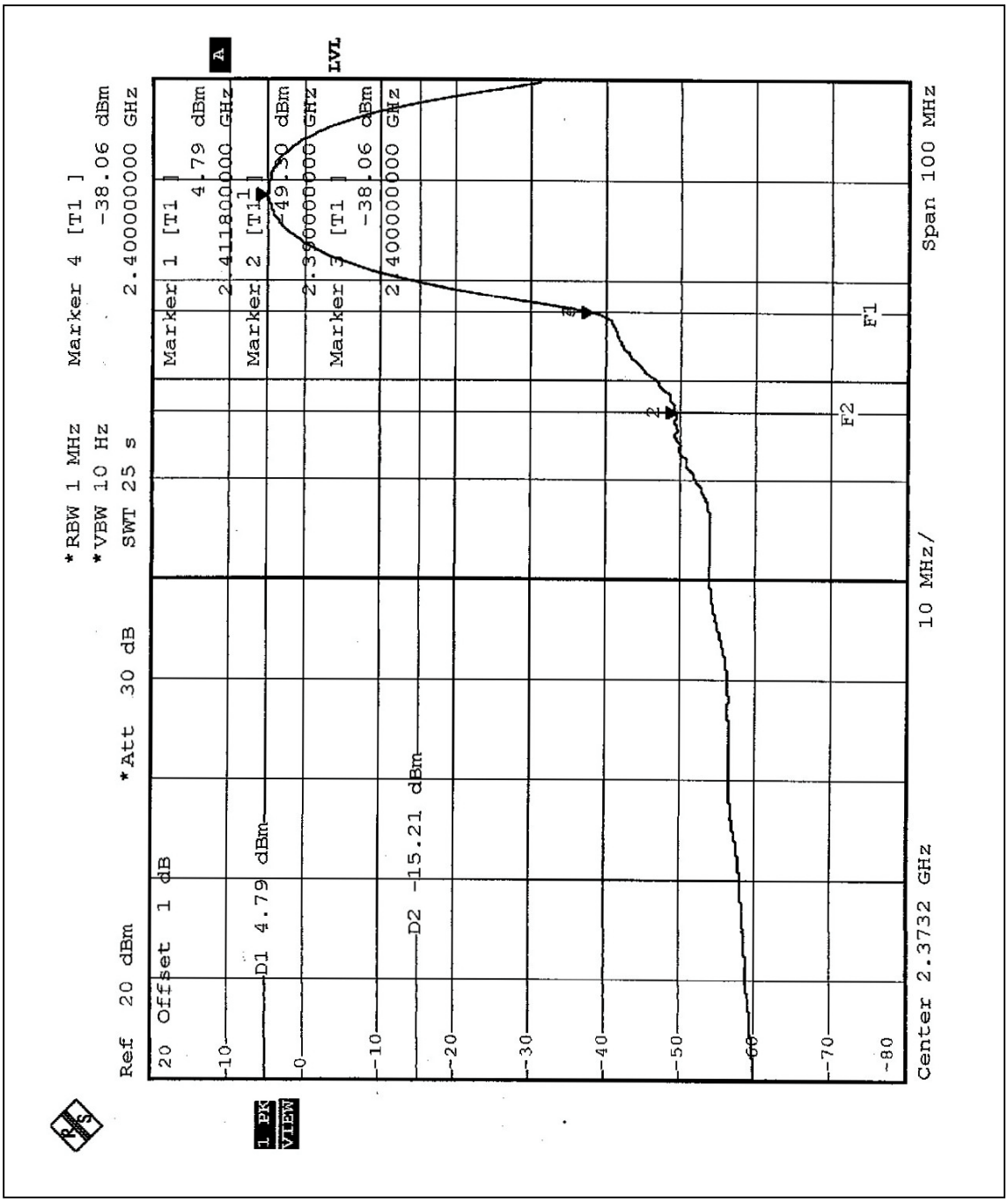
The band edge emission plot of DSSS technique on the following page 56 shows 53.37dB delta between carrier maximum power and local maximum emission in restrict band (2.4835GHz). The emission of carrier strength list in the test result of channel 11 at the item 4.2 is 112.1dBuV/m, so the maximum field strength in restrict band is 112.1-53.37=58.73dBuV/m which is under 74 dBuV/m limit.

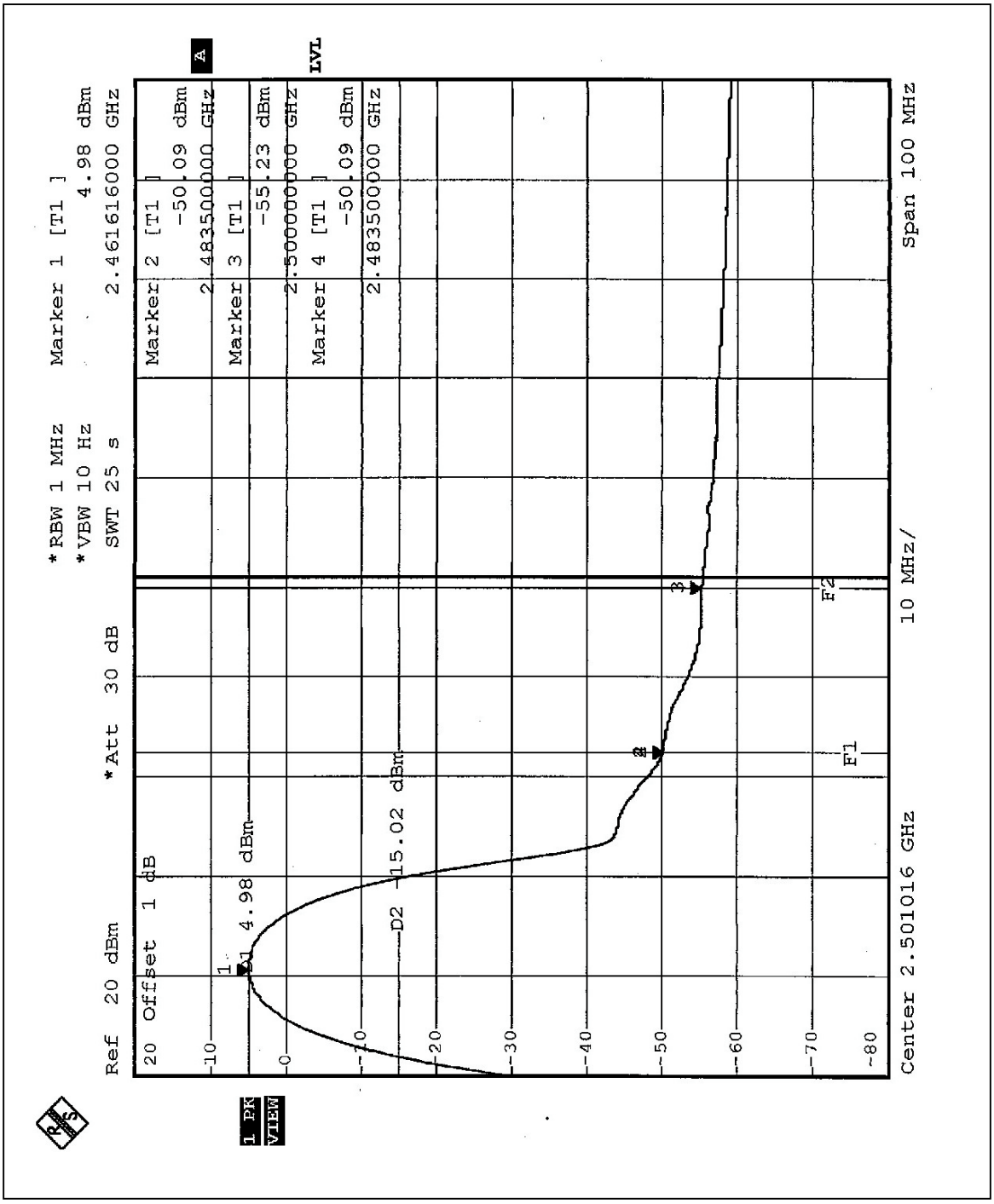
**NOTE (Average):**
The band edge emission plot of DSSS technique on the following page 57 shows 54.09dB delta between carrier maximum power and local maximum emission in restrict band (2.3900GHz). The emission of carrier strength list in the test result of channel 1 at the item 4.2 is 104.9dBuV/m, so the maximum field strength in restrict band is 104.9-54.09=50.81dBuV/m which is under 54 dBuV/m limit.

The band edge emission plot of DSSS technique on the following page 58 shows 55.07dB 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 is 104.4dBuV/m, so the maximum field strength in restrict band is 104.4-55.07=49.33dBuV/m which is under 54 dBuV/m limit.


*RBW 100 kHz
*VBW 100 kHz
SWT 10 ms
Marker 1 [T1 ]
-45.78 dBm
2.39000000 GHz
Ref 20 dBm
Offset 1 dB
*Att 30 dB
Marker 2 [T1 ]
-39.49 dBm
2.40000000 GHz
Marker 3 [T1 ]
38.74 dBm
2.39600000 GHz
Marker 4 [T1 ]
-44.51 dBm
2.38740000 GHz
D1 5.92 dBm
D2 -14.08 dBm
1 PK VIEW
Center 2.3732 GHz
10 MHz/
Span 100 MHz
F1
F2


*RBW 100 kHz
*VBW 100 kHz
SWT 10 ms
Marker 1 [T1 ]
-46.84 dBm
2.483500000 GHz
Ref 20 dBm
Offset 1 dB
*Att 30 dB
Marker 2 [T1 ]
-48.87 dBm
2.500000000 GHz
Marker 3 [T1 ]
-44.98 dBm
2.485600000 GHz
Marker 4 [T1 ]
-47.68 dBm
2.524900000 GHz
D1 6.53 dBm
D2 -13.47 dBm
1 PK
VIEW
Center 2.501016 GHz
10 MHz/
Span 100 MHz


Ref 20 dBm
20 Offset 1 dB
*Att 30 dB
*RBW 1 MHz
*VBW 10 Hz
SWT 25 s
Marker 4 [T1 ]
-38.06 dBm
2.400000000 GHz
Marker 1 [T1 ]
4.79 dBm
2.411800000 GHz
Marker 2 [T1 ]
-49.30 dBm
2.390000000 GHz
Marker 3 [T1 ]
-38.06 dBm
2.400000000 GHz
D1 4.79 dBm
D2 -15.21 dBm
LVL
A
1 PK
VIEW
F1
F2
Center 2.3732 GHz
10 MHz/
Span 100 MHz


Ref 20 dBm
20 Offset 1 dB
*Att 30 dB
*RBW 1 MHz
*VBW 10 Hz
SWT 25 s
Marker 1 [T1 ]
4.98 dBm
2.46161600 GHz
Marker 2 [T1 ]
-50.09 dBm
2.48350000 GHz
Marker 3 [T1 ]
-55.23 dBm
2.50000000 GHz
Marker 4 [T1 ]
-50.09 dBm
2.48350000 GHz
D1 4.98 dBm
D2 -15.02 dBm
Center 2.501016 GHz
10 MHz/
Span 100 MHz
1 PK VIEW
LVL
A

### 4.6.6 TEST RESULTS- OFDM

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

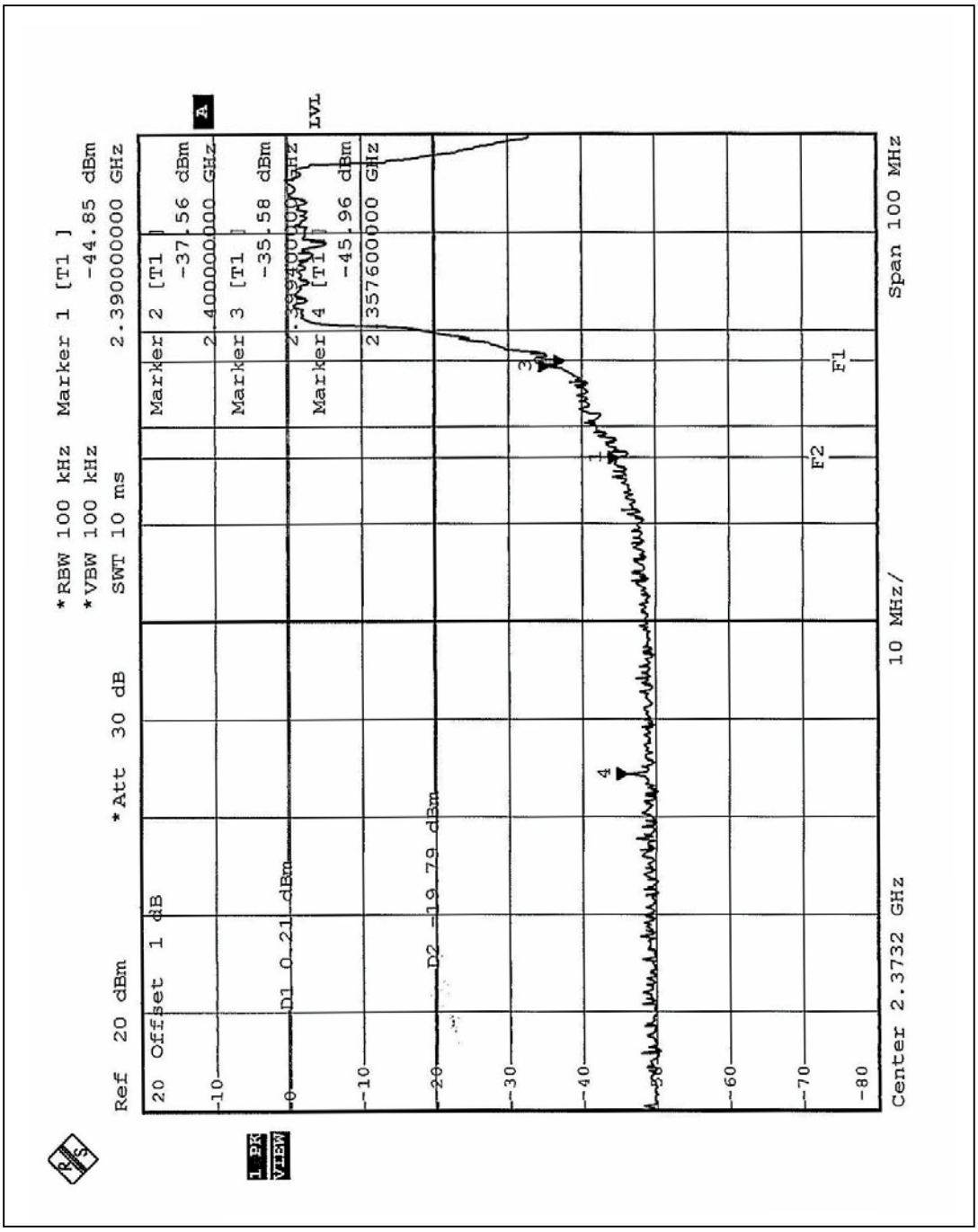
Note - The delta method is only used up to 2 MHz away from the restricted bandage, The radiated emissions which located in other restricted frequency band, the result, please refer to 4.2.

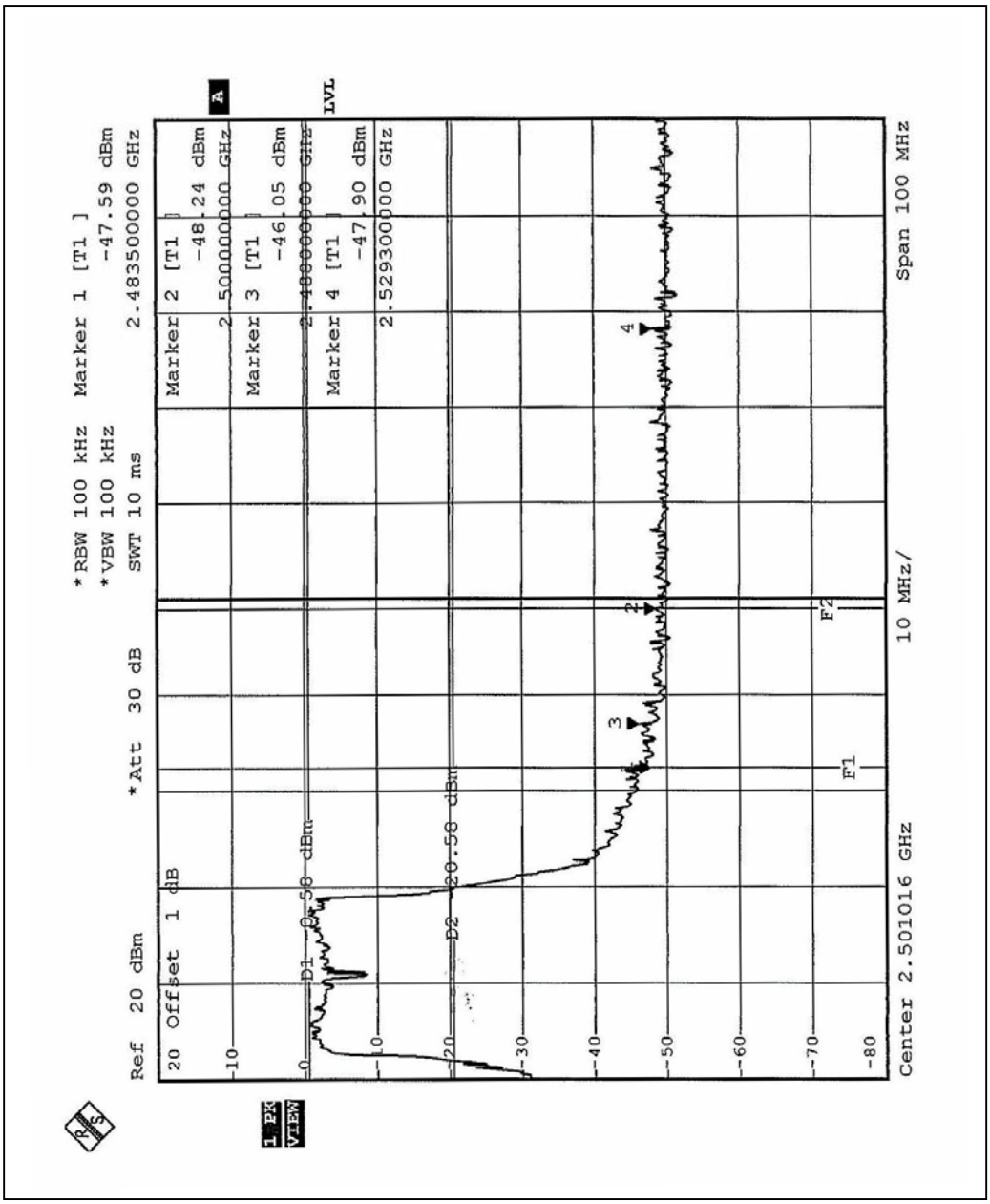
**NOTE (Peak):**
The band edge emission plot of OFDM technique on the following page 60 show 45.06dB delta between carrier maximum power and local maximum emission in restrict band (2.3900GHz). The emission of carrier strength list in the test result of channel 1 at the item 4.2 is 111.6dBuV/m, so the maximum field strength in restrict band is 111.6-45.06=66.54dBuV/m which is under 74 dBuV/m limit.

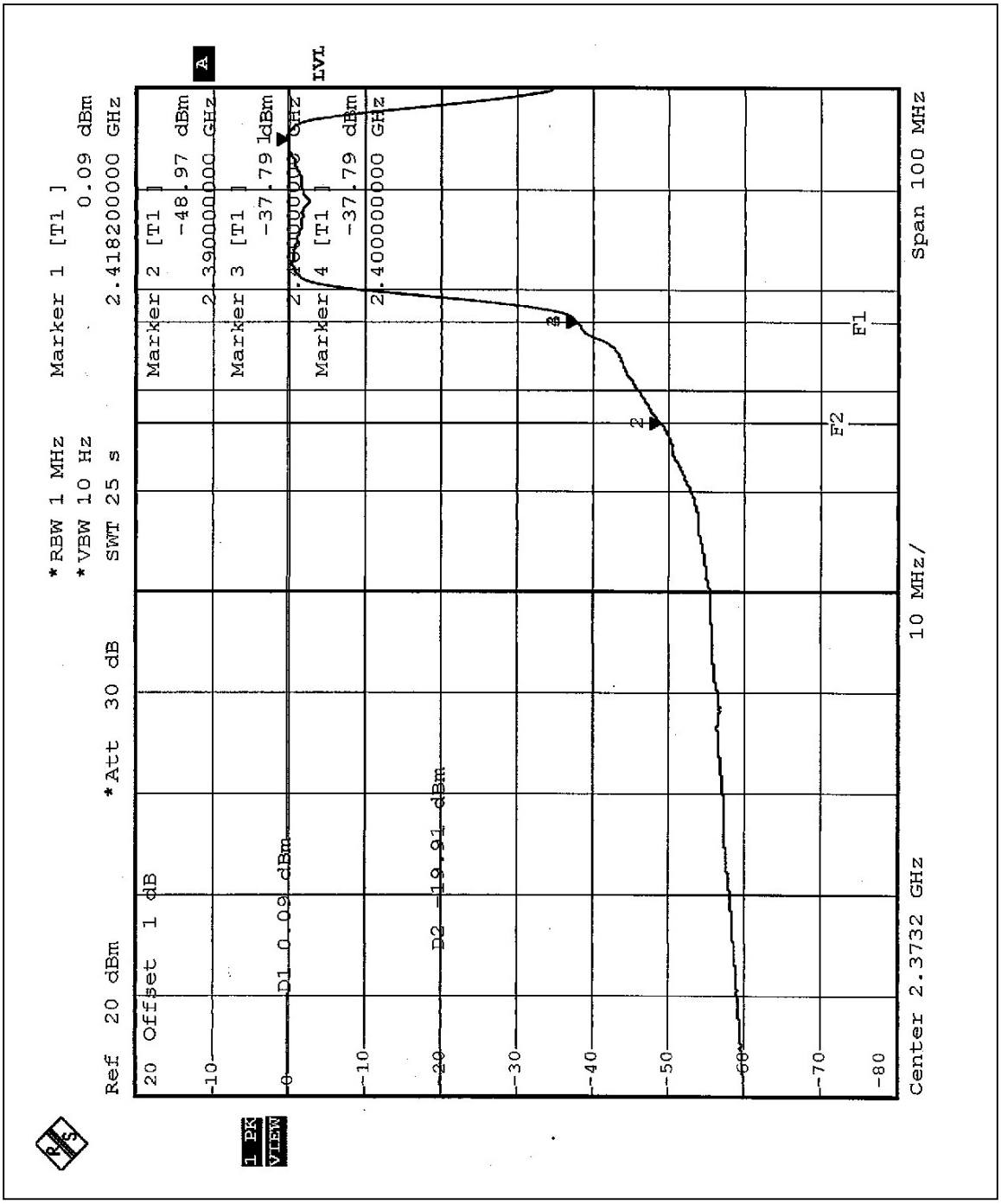
The band edge emission plot of OFDM technique on the following page 61 shows 47.01dB delta between carrier maximum power and local maximum emission in restrict band (2.4835GHz). The emission of carrier strength list in the test result of channel 11 at the item 4.2 is 110.9dBuV/m, so the maximum field strength in restrict band is 110.9-47.01=63.89dBuV/m which is under 74 dBuV/m limit.

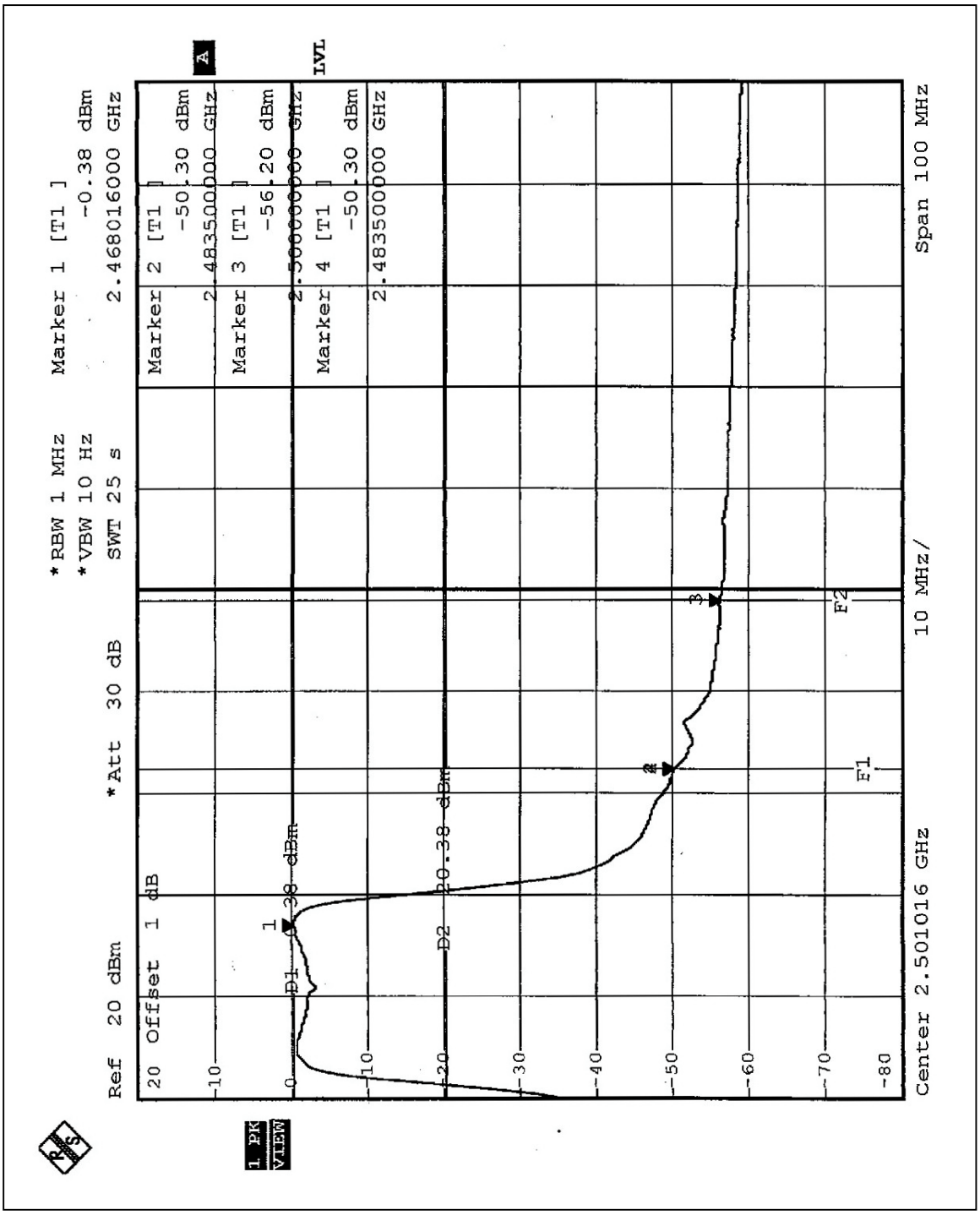
**NOTE (Average):**
The band edge emission plot of OFDM technique on the following page 62 shows 49.06dB delta between carrier maximum power and local maximum emission in restrict band (2.3900GHz). The emission of carrier strength list in the test result of channel 1 at the item 4.2 is 100.9dBuV/m, so the maximum field strength in restrict band is 100.9-49.06=51.84dBuV/m which is under 54 dBuV/m limit.

The band edge emission plot of OFDM technique on the following page 63 shows 49.92dB 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 is 100.7dBuV/m, so the maximum field strength in restrict band is 100.7-49.92=50.78dBuV/m which is under 54 dBuV/m limit.


*RBW 100 kHz
*VBW 100 kHz
SWT 10 ms
Marker 1 [T1 ]
-44.85 dBm
2.390000000 GHz
Ref 20 dBm
20 Offset 1 dB
*Att 30 dB
Marker 2 [T1 ]
-37.56 dBm
2.400000000 GHz
Marker 3 [T1 ]
-35.58 dBm
Marker 4 [T1 ]
-45.96 dBm
2.357600000 GHz
D1 0.21 dBm
D2 -19.79 dBm
LVL
1 PK VIEW
Center 2.3732 GHz
10 MHz/
Span 100 MHz
F1
F2


*RBW 100 kHz
*VBW 100 kHz
SWT 10 ms
Marker 1 [T1 ]
-47.59 dBm
2.48350000 GHz
Ref 20 dBm
Offset 1 dB
*Att 30 dB
Marker 2 [T1 ]
-48.24 dBm
2.50000000 GHz
Marker 3 [T1 ]
-46.05 dBm
2.48300000 GHz
Marker 4 [T1 ]
-47.90 dBm
2.52930000 GHz
D1 0.50 dBm
D2 20.50 dBm
F1
F2
1 PK VIEW
Center 2.501016 GHz
10 MHz/
Span 100 MHz


*RBW 1 MHz
*VBW 10 Hz
SWT 25 s
Marker 1 [T1 ]
0.09 dBm
2.418200000 GHz
Marker 2 [T1 ]
-48.97 dBm
2.390000000 GHz
Marker 3 [T1 ]
-37.79 dBm
Marker 4 [T1 ]
-37.79 dBm
2.400000000 GHz
Ref 20 dBm
*Att 30 dB
20 Offset 1 dB
D1 0.9 dBm
D2 -19.91 dBm
Center 2.3732 GHz
10 MHz/
Span 100 MHz
F1
F2
1 PK
VIEW


*RBW 1 MHz
*VBW 10 Hz
SWT 25 s
Marker 1 [T1 ]
-0.38 dBm
2.468016000 GHz
*Att 30 dB
Ref 20 dBm
Offset 1 dB
Marker 2 [T1 ]
-50.30 dBm
2.483500000 GHz
Marker 3 [T1 ]
-56.20 dBm
2.500000000 GHz
Marker 4 [T1 ]
-50.30 dBm
2.483500000 GHz
D1 -0.38 dBm
D2 20.38 dBm
F1
F2
Center 2.501016 GHz
10 MHz/
Span 100 MHz

## 4.7 ANTENNA REQUIREMENT

### 4.7.1 STANDARD APPLICABLE

For intentional device, according to FCC 47 CFR Section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.
And according to FCC 47 CFR Section 15.247 (b), if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

### 4.7.2 ANTENNA CONNECTED CONSTRUCTION

The antenna used in this product is Dipole antenna (Antenna cable with one core) with UFL connector. The maximum Gain of the antenna is 3.3dBi.

# 5 PHOTOGRAPHS OF THE TEST CONFIGURATION

**CONDUCTED EMISSION TEST**



930624H05

## RADIATED EMISSION TEST



930624H05

# 6 INFORMATION ON THE TESTING LABORATORIES

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

| | |
|---|---|
| **USA** | FCC, UL, A2LA |
| **Germany** | TUV Rheinland |
| **Japan** | VCCI |
| **Norway** | NEMKO |
| **Canada** | INDUSTRY CANADA, CSA |
| **R.O.C.** | CNLA, BSMI, DGT |
| **Netherlands** | Telefication |
| **Singapore** | PSB, GOST-ASIA (MOU) |
| **Russia** | CERTIS (MOU) |

Copies of accreditation certificates of our laboratories obtained from approval agencies can be downloaded from our web site: www.adt.com.tw/index.5/phtml. If you have any comments, please feel free to contact us at the following:

**Linko EMC/RF Lab**:
Tel: 886-2-26052180
Fax: 886-2-26052943

**Hsin Chu EMC/RF Lab**:
Tel: 886-3-5935343
Fax: 886-3-5935342

**Hwa Ya EMC/RF/Safety/Telecom Lab**:
Tel: 886-3-3183232
Fax: 886-3-3185050

**Email**: service@adt.com.tw
**Web Site**: www.adt.com.tw

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