

## 4.6 BAND EDGES MEASUREMENT

### 4.6.1 LIMITS OF BAND EDGES MEASUREMENT

Below -20dB of the highest emission level of operating band (in 1 MHz Resolution Bandwidth).

### 4.6.2 TEST INSTRUMENTS

| Description & Manufacturer | Model No. | Serial No. | Calibrated Until |
|----------------------------|-----------|------------|------------------|
| R&S SPECTRUM ANALYZER      | FSP40     | 100036     | Nov. 23, 2006    |

**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 RBW spectrum analyzer to 1 MHz and set VBW spectrum analyzer to 10 Hz with suitable frequency span including 1 MHz bandwidth from band edge. The band edges was measured and recorded.

The spectrum plots (Peak RBW=VBW=100kHz ; Average RBW=1MHz, VBW=10Hz) are attached on the following pages.

### 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 first page show 55.6dB 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 108.1dBuV/m, so the maximum field strength in restrict band is  $108.1 - 55.6 = 52.5$  dBuV/m which is under 74 dBuV/m limit.

The band edge emission plot of DSSS technique on the following second page shows 57.63dB 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 109.6dBuV/m, so the maximum field strength in restrict band is  $109.6 - 57.63 = 51.97$  dBuV/m which is under 74 dBuV/m limit.

##### **NOTE (Average):**

The band edge emission plot on the following third page shows 58.83dB 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 102.3dBuV/m, so the maximum field strength in restrict band is  $102.3 - 58.83 = 43.47$  BuV/m which is under 54 dBuV/m limit.

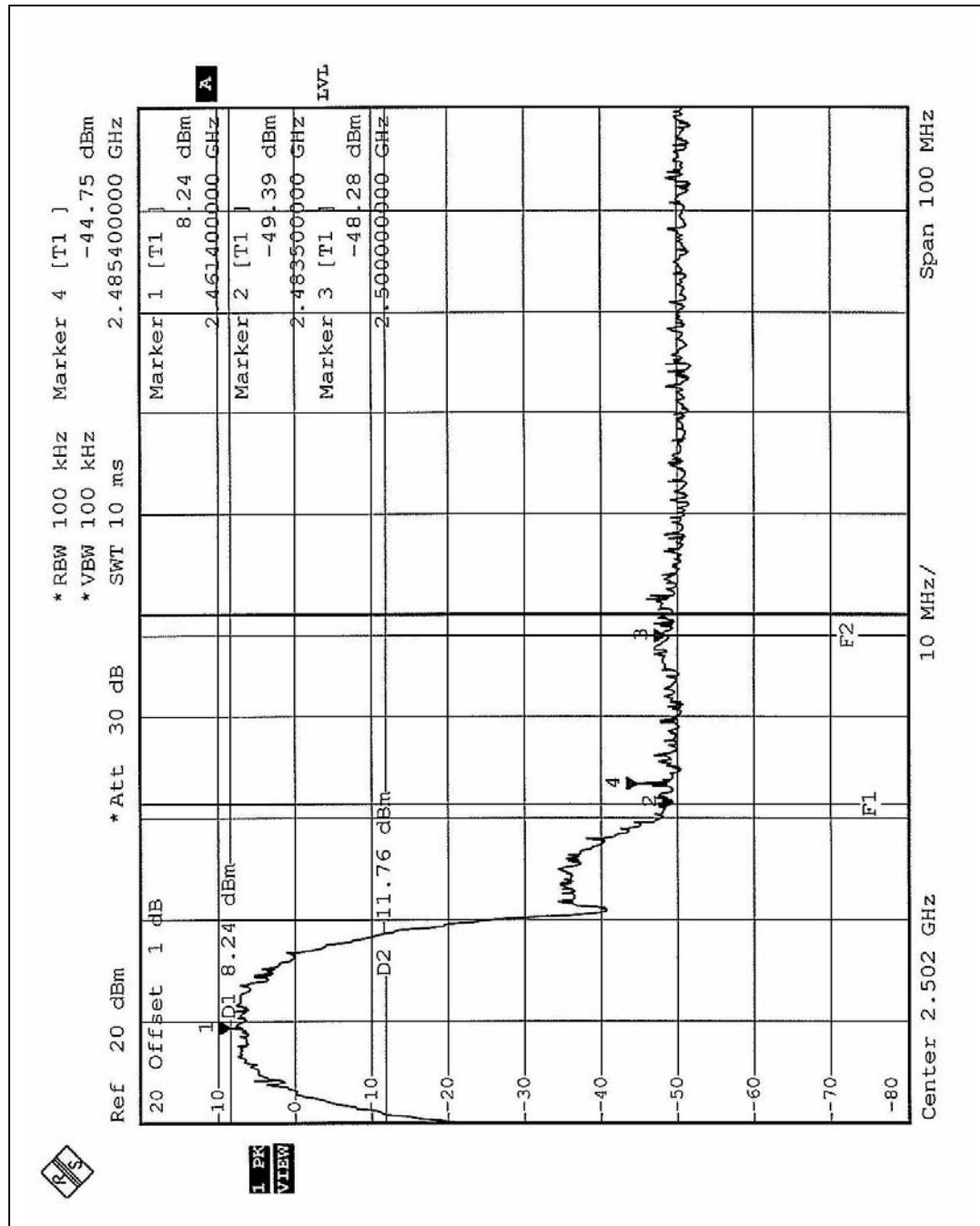
The band edge emission plot on the following fourth page shows 58.97dB delta between carrier maximum power and local maximum emission in restrict band (2.4835GHz). The emission of carrier strength list in the test result of channel 11 at the item 4.2. is 103.00dBuV/m, so the maximum field strength in restrict band is  $103.00 - 58.97 = 44.03$  dBuV/m which is under 54 dBuV/m limit.

\* RBW 100 kHz Marker 4 [T1]  
 \* VBW 100 kHz -44.48 dBm  
 \* Att 30 dB  
 \* SWT 10 ms  
 Ref 20 dBm  
 2.375600000 GHz

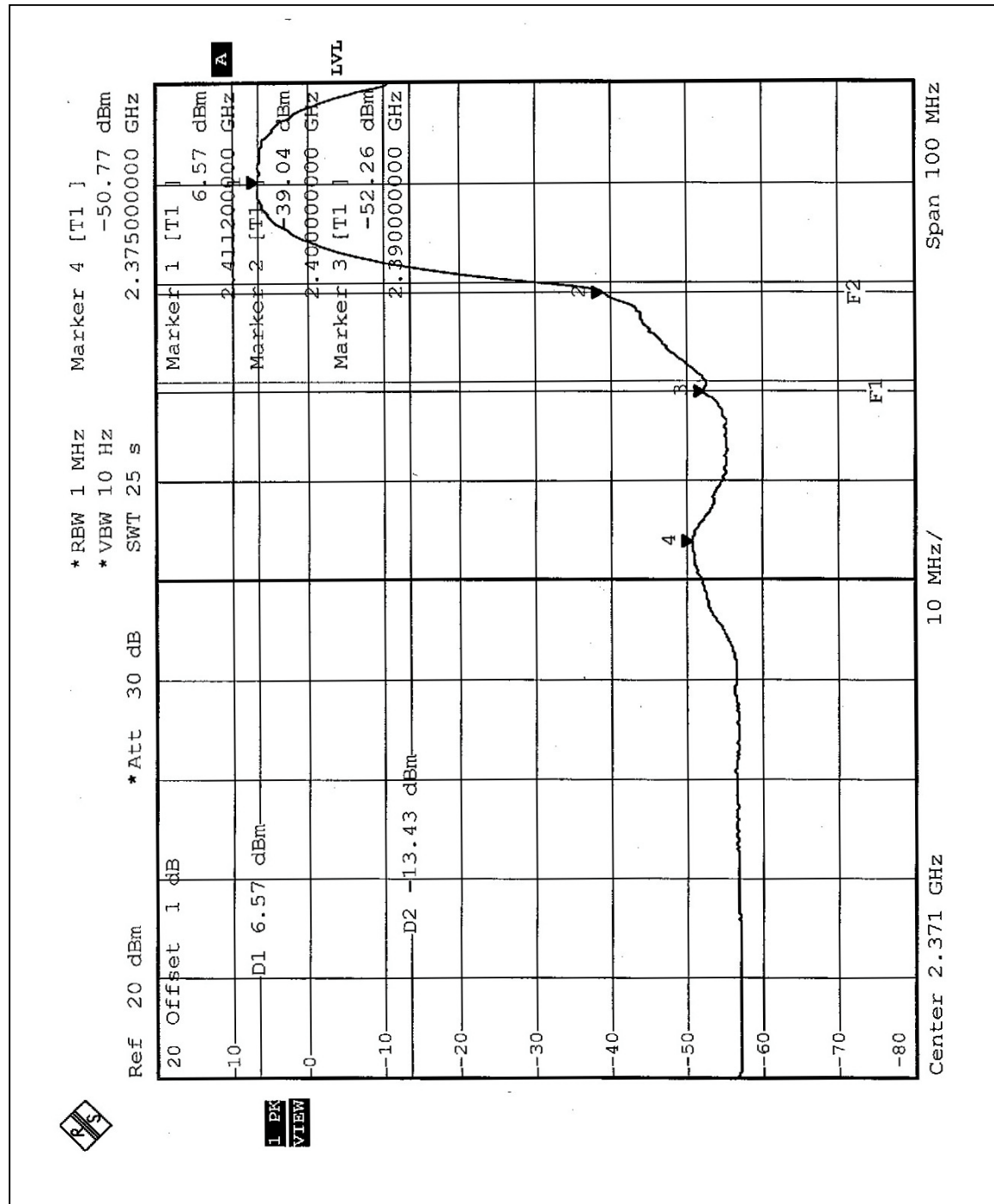
| Marker        | Frequency [GHz] | Power [dBm] |
|---------------|-----------------|-------------|
| Marker 1 [T1] | 2.366000000     | -36.49      |
| Marker 2 [T1] | 2.367000000     | -47.79      |
| Marker 3 [T1] | 2.369600000     | -35.43      |
| Marker 4 [T1] | 2.371000000     | -12.19      |

Center 2.371 GHz  
 10 MHz/  
 Span 100 MHz

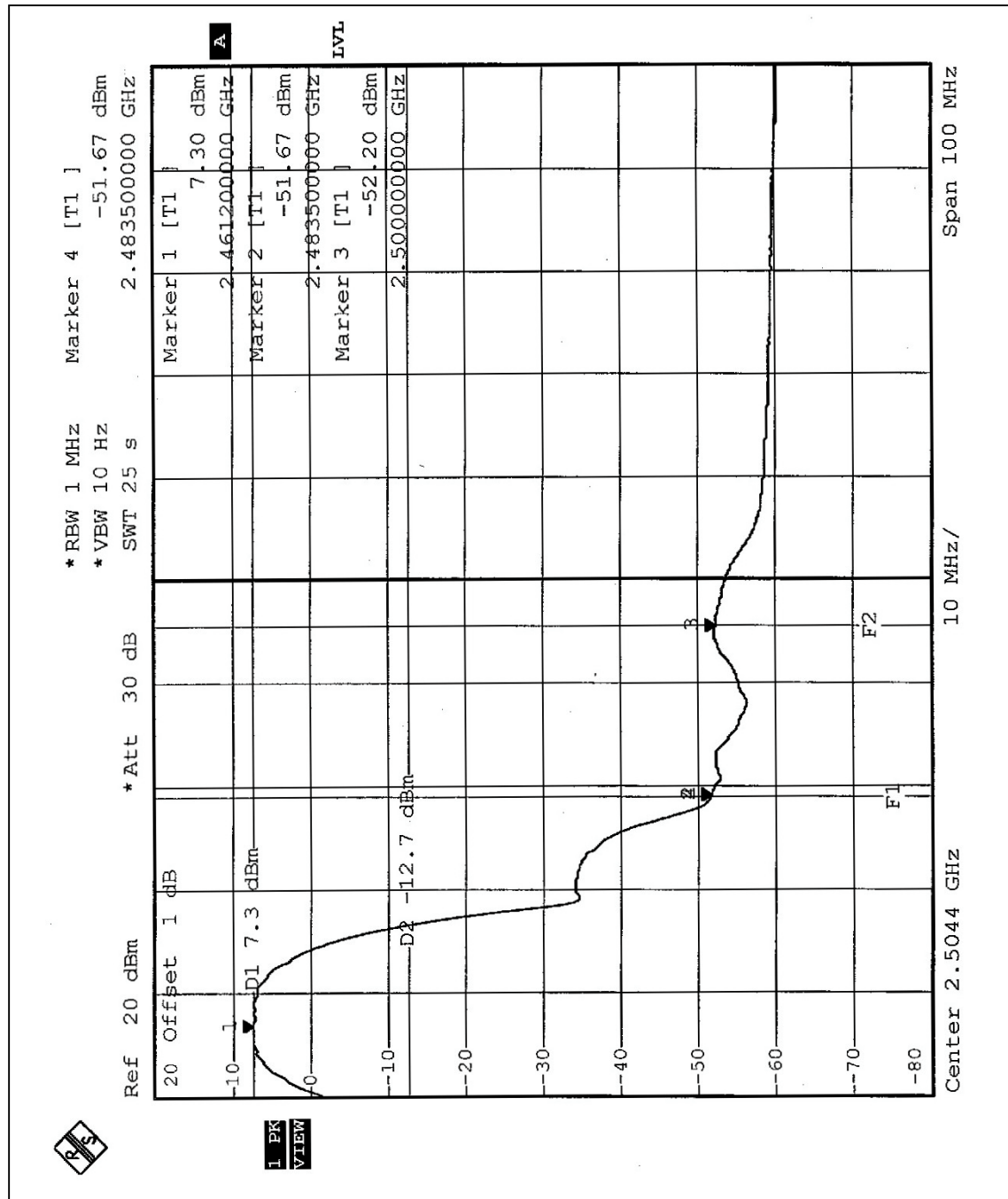
## CH11



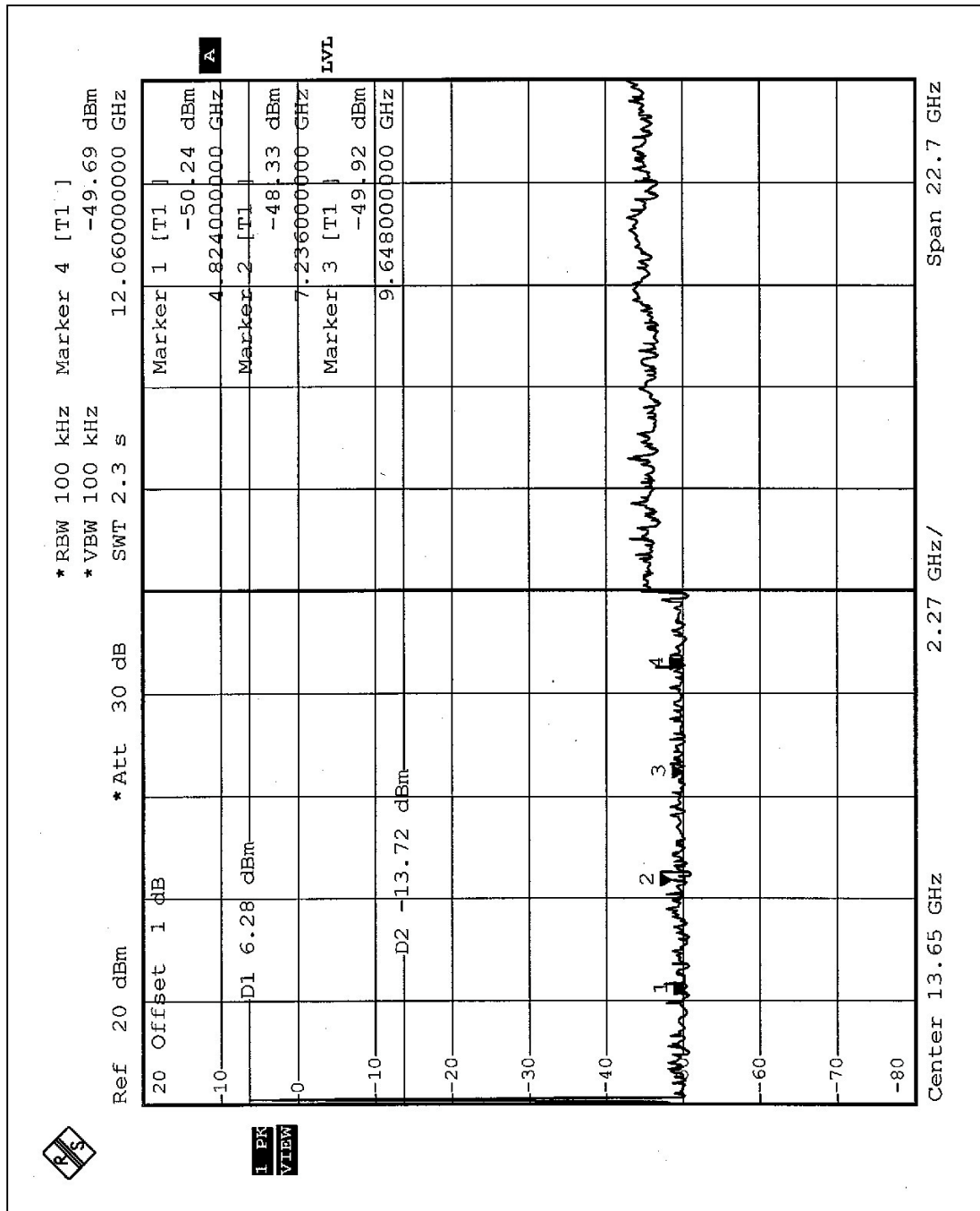
CH1



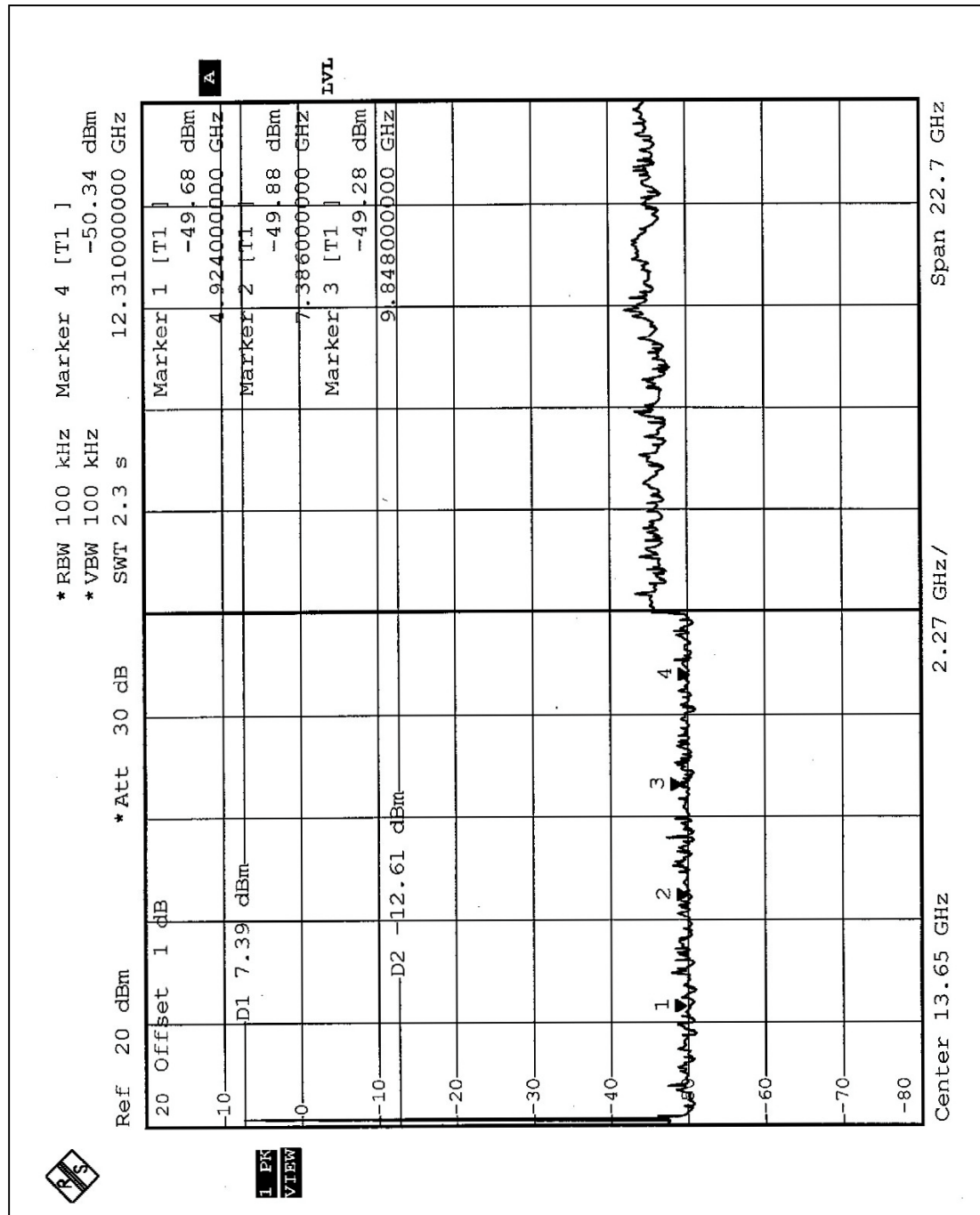
## CH11



CH1



## CH11







#### 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 first page show 40.37dB 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 107.1dBuV/m, so the maximum field strength in restrict band is  $107.1 - 40.37 = 66.73$ dBuV/m which is under 74 dBuV/m limit.

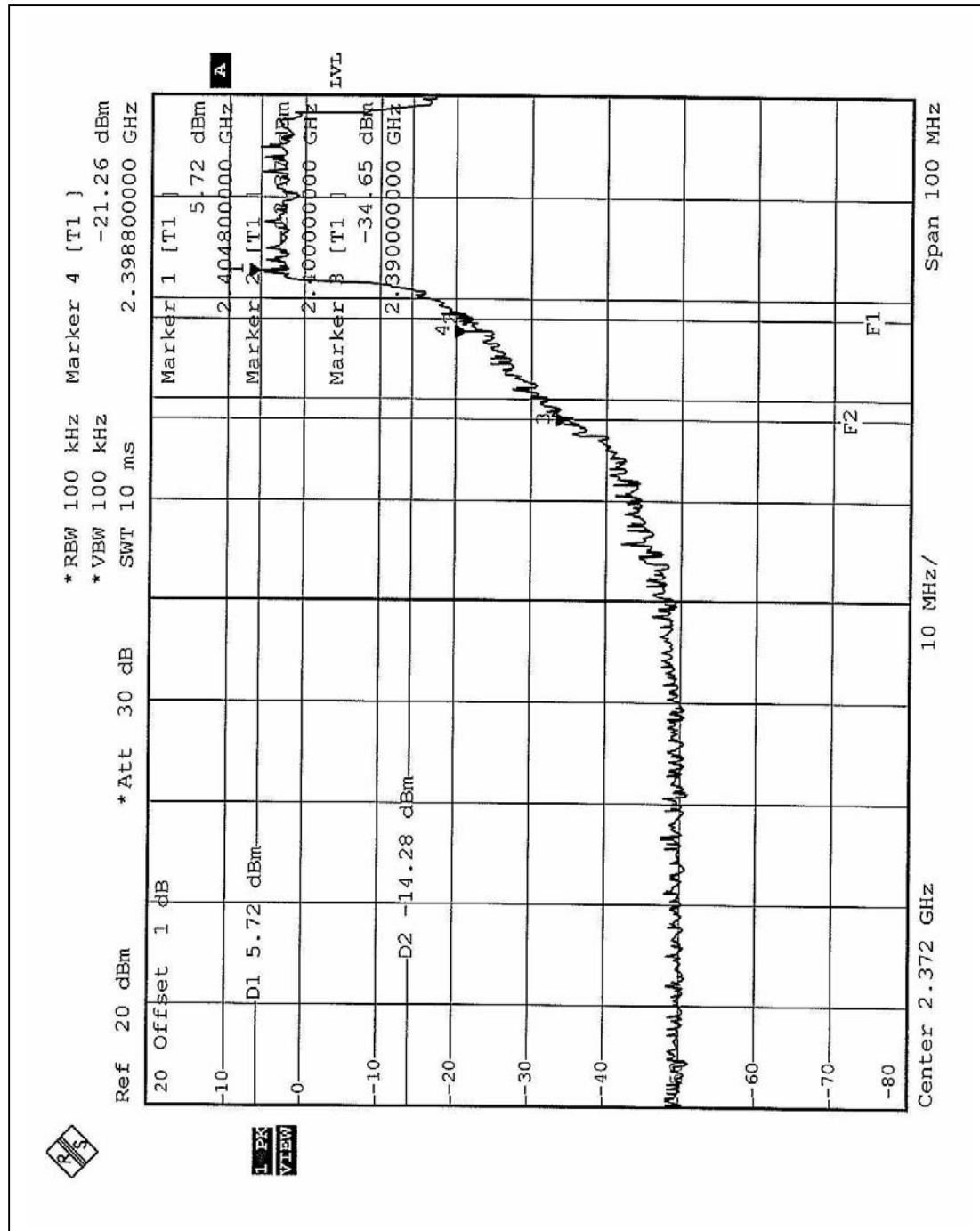
The band edge emission plot of OFDM technique on the following second page shows 41.01dB delta between carrier maximum power and local maximum emission in restrict band (2.4835GHz). The emission of carrier strength list in the test result of channel 11 at the item 4.2 is 107.3dBuV/m, so the maximum field strength in restrict band is  $107.3 - 41.01 = 66.29$ dBuV/m which is under 74 dBuV/m limit.

##### **NOTE (Average):**

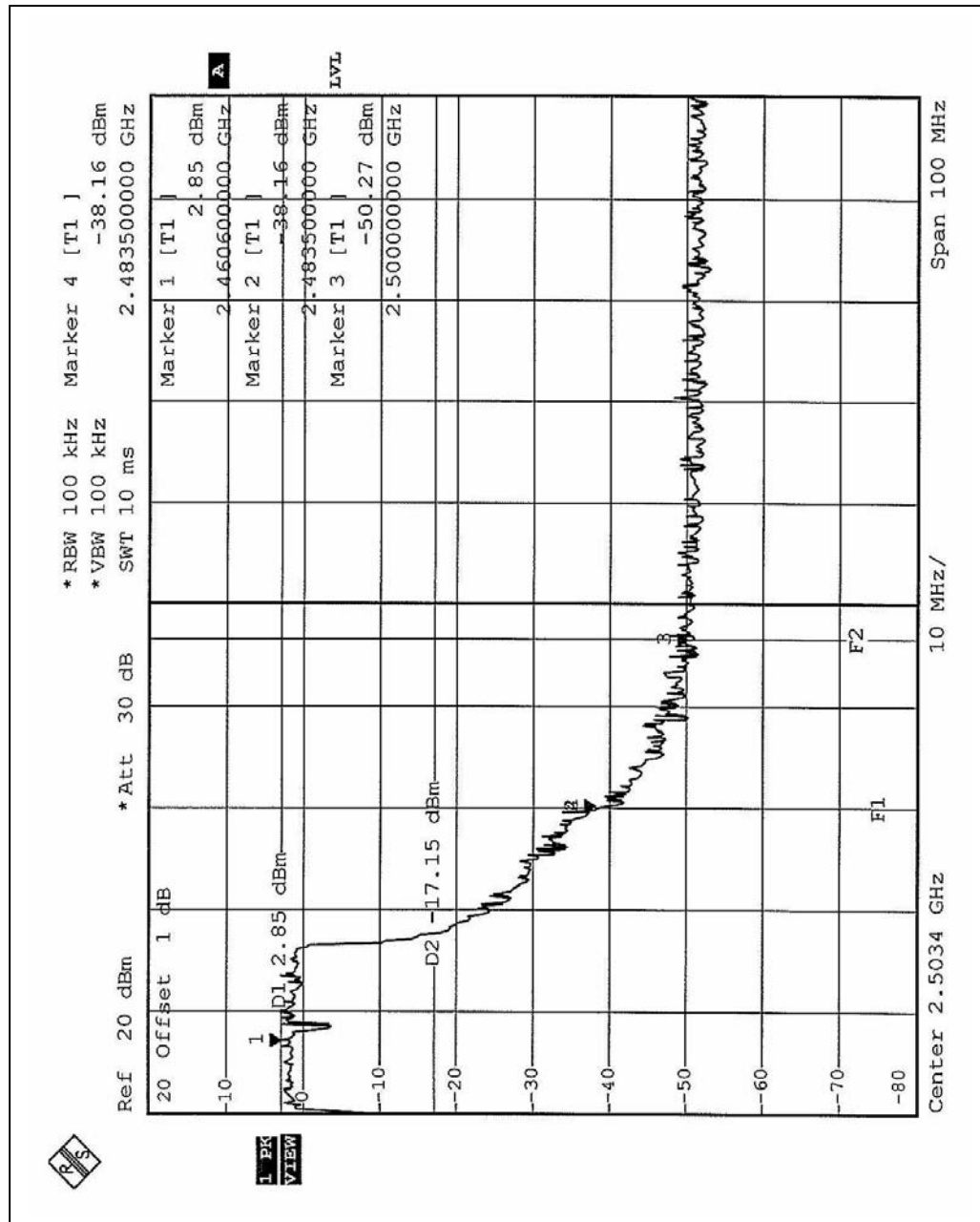
The band edge emission plot on the following third page shows 50.66dB delta between carrier maximum power and local maximum emission in restrict band (2.3900GHz). The emission of carrier strength list in the test result of channel 1 at the item 4.2. is 98.2dBuV/m, so the maximum field strength in restrict band is  $98.2 - 50.66 = 47.54$ dBuV/m which is under 54 dBuV/m limit.

The band edge emission plot on the following fourth page shows 49.77dB 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 98.2dBuV/m, so the maximum field strength in restrict band is  $98.2 - 49.77 = 48.43$ dBuV/m which is under 54 dBuV/m limit.

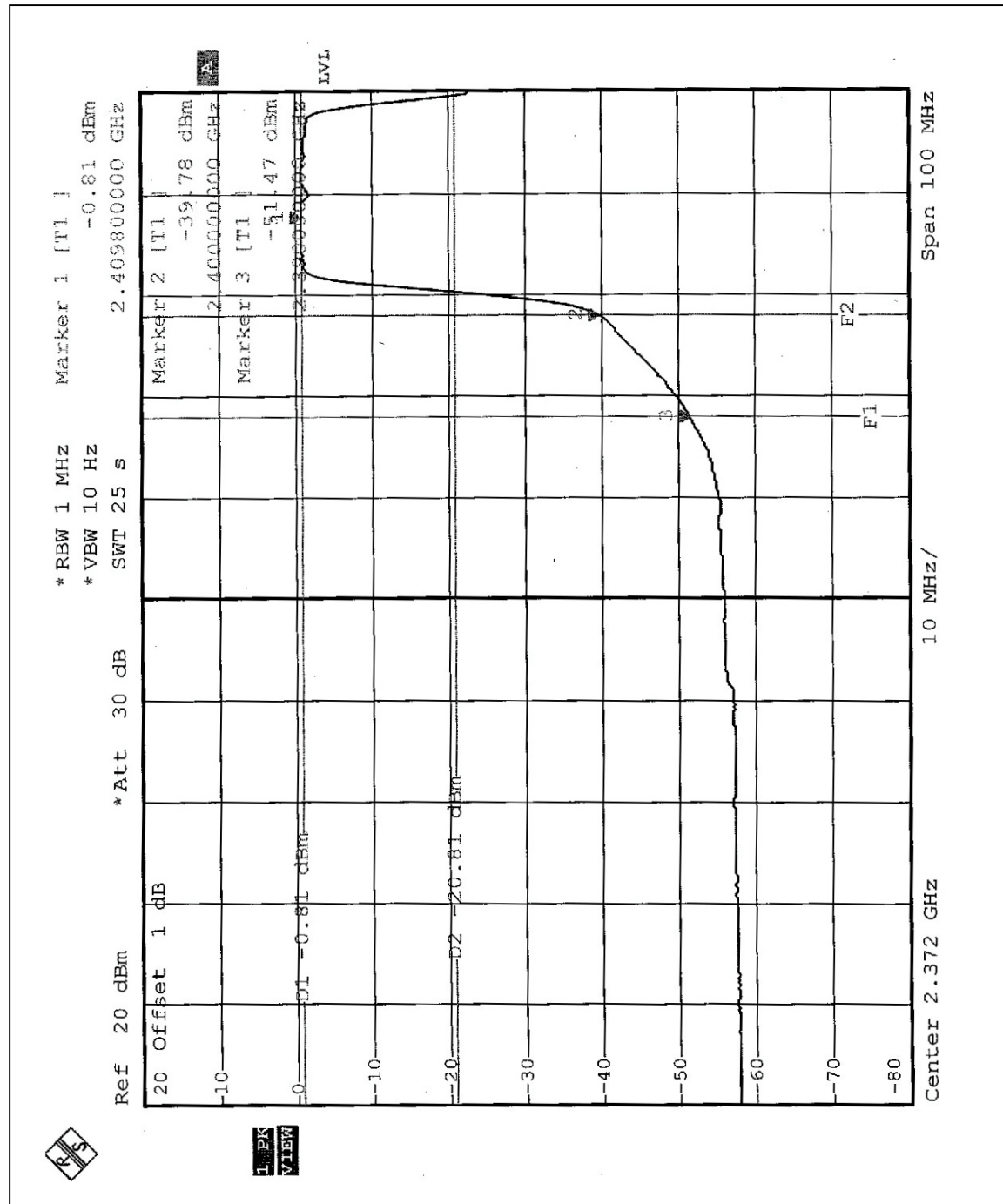
CH1



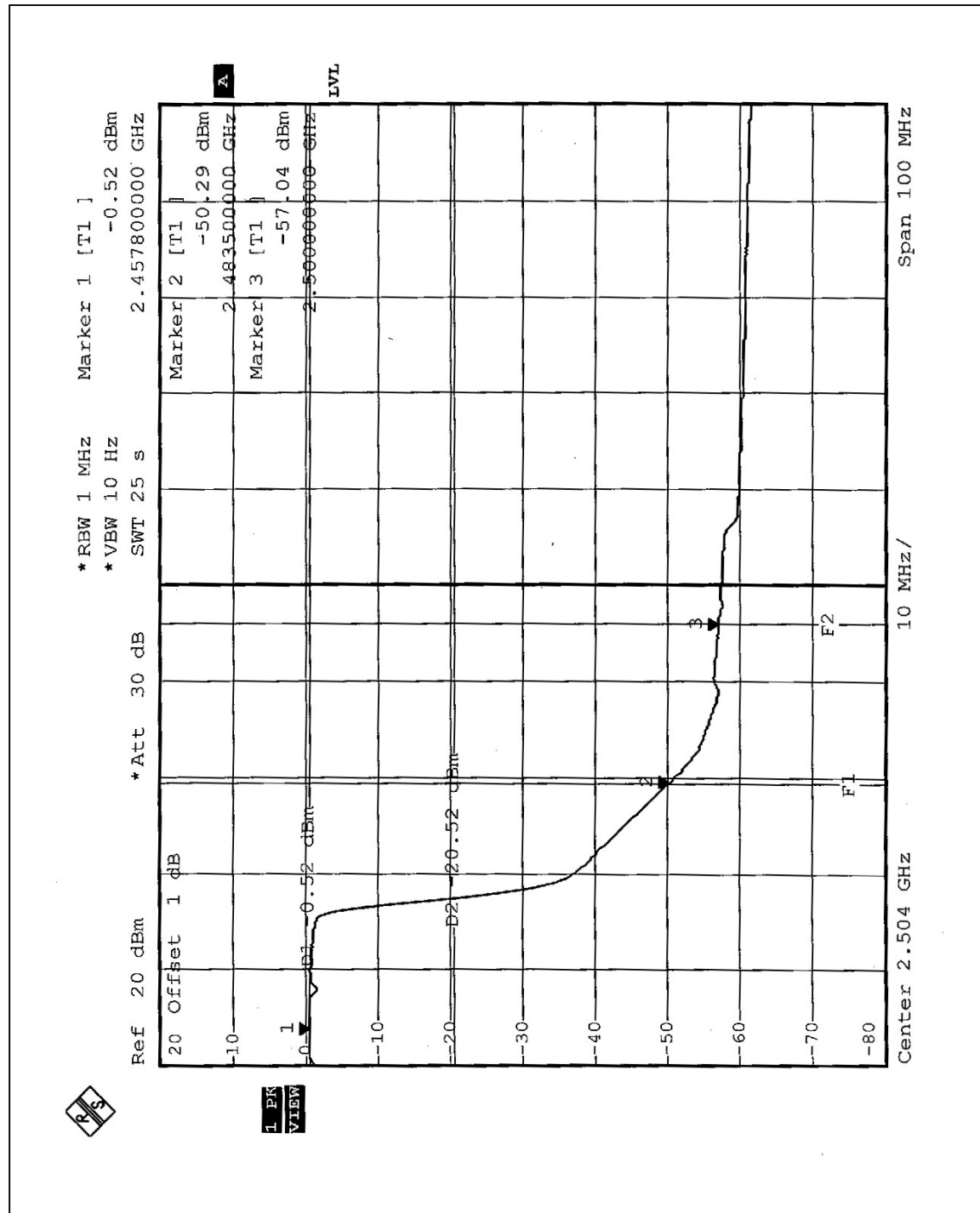
## CH11



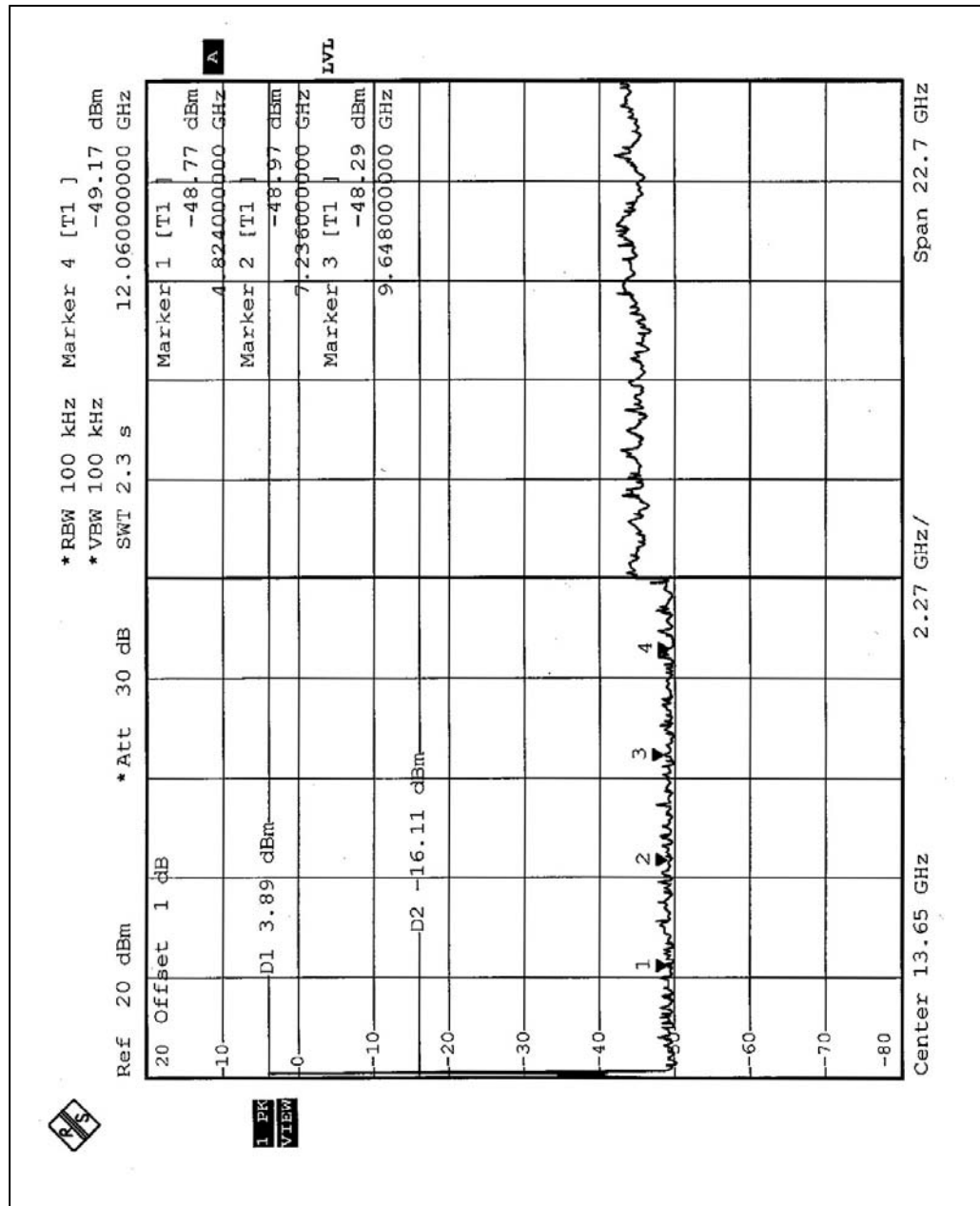
CH1



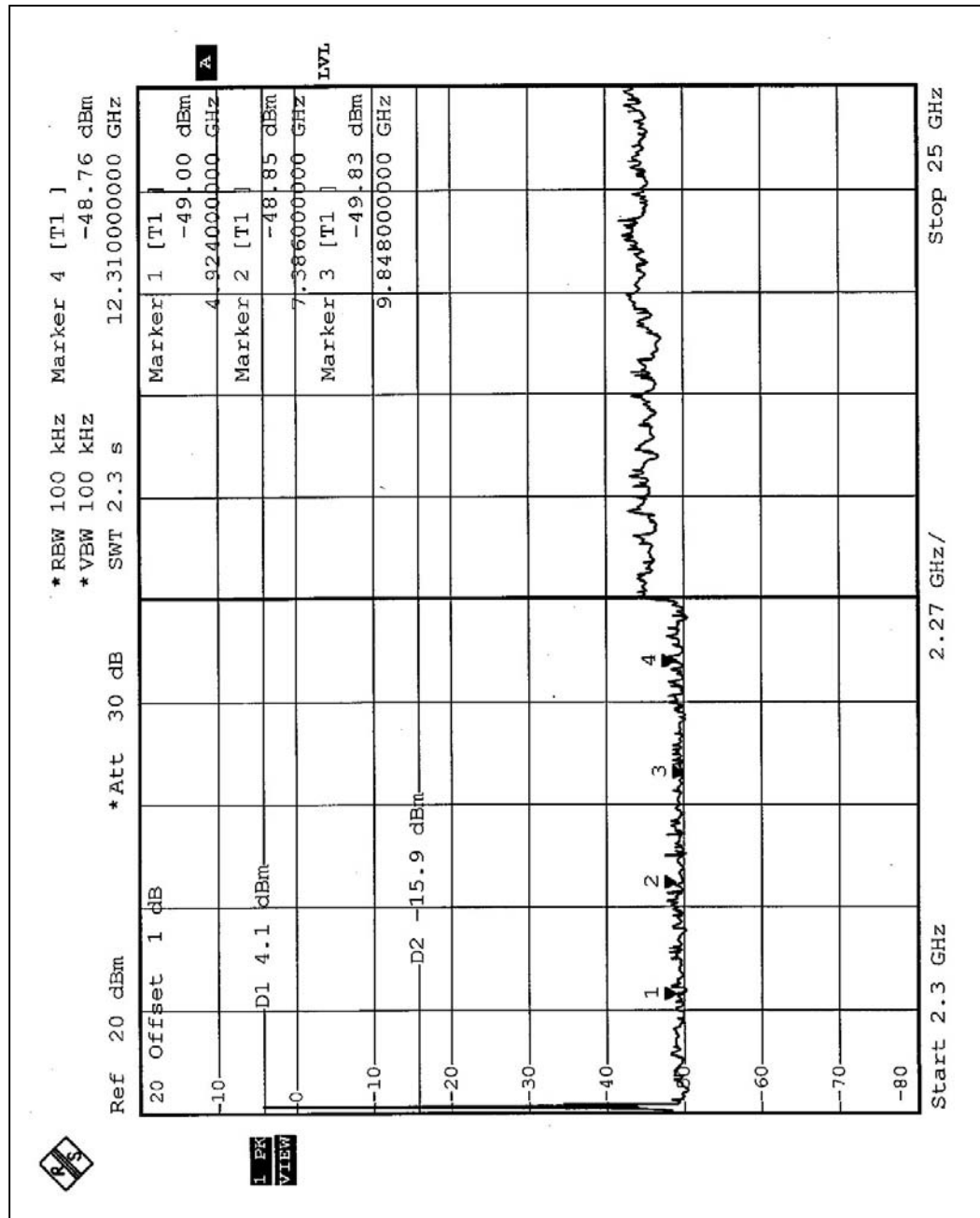
## CH11



CH1



CH11







### 802.11g Turbo OFDM modulation

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 first page show 45.31dB 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 6 at the item 4.2 is 104.5dBuV/m, so the maximum field strength in restrict band is  $104.5 - 45.31 = 59.19$ dBuV/m which is under 74 dBuV/m limit.

The band edge emission plot of OFDM technique on the following first page shows 46.42dB delta between carrier maximum power and local maximum emission in restrict band (2.4835GHz). The emission of carrier strength list in the test result of channel 6 at the item 4.2 is 104.5dBuV/m, so the maximum field strength in restrict band is  $104.5 - 46.42 = 58.08$ dBuV/m which is under 74 dBuV/m limit.

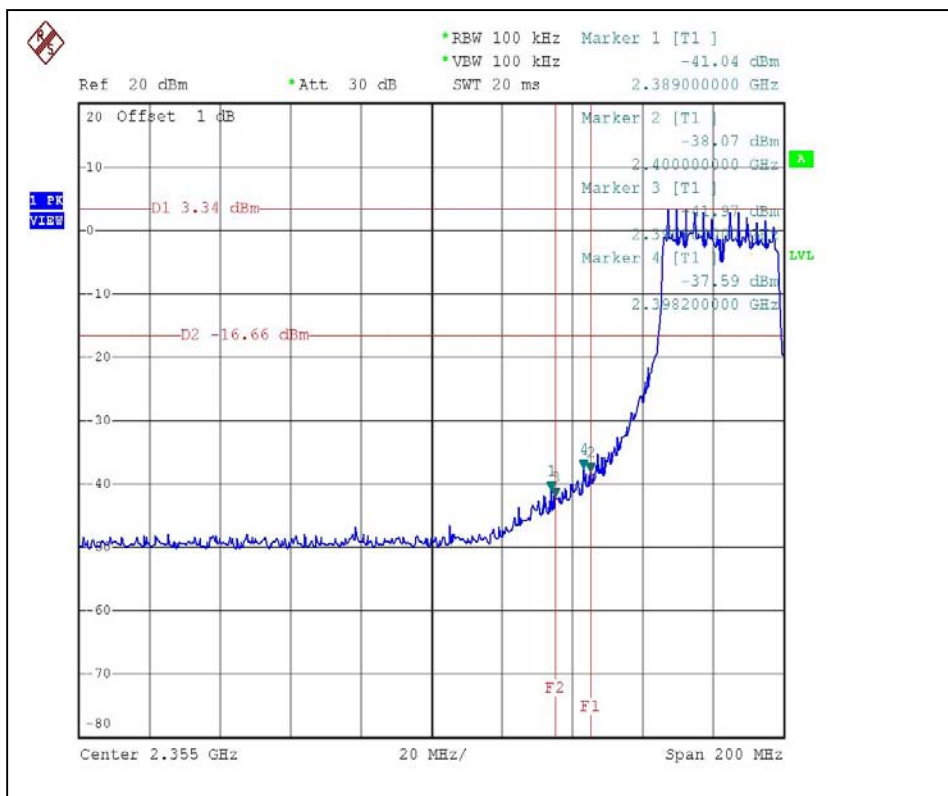
#### NOTE (Average):

The band edge emission plot of OFDM technique on the following second page shows 45.81dB 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 6 at the item 4.2 is 96.5dBuV/m, so the maximum field strength in restrict band is  $96.5 - 45.81 = 50.69$ dBuV/m which is under 54 dBuV/m limit.

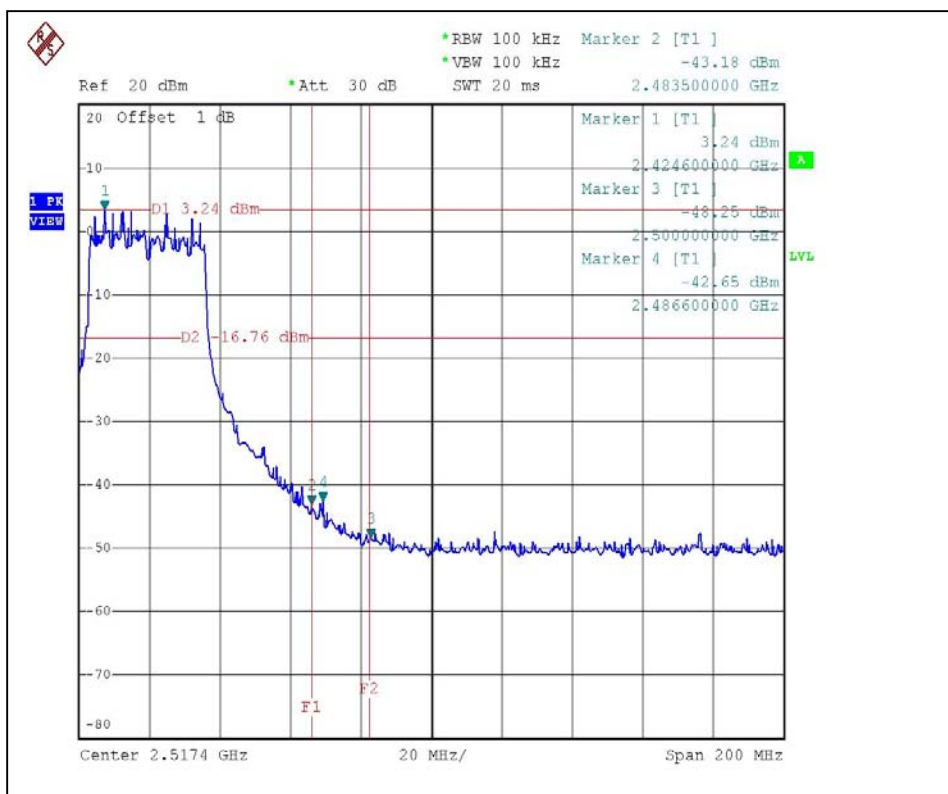
The band edge emission plot of OFDM technique on the following second page shows 46.98dB delta between carrier maximum power and local maximum emission in restrict band (2.4835GHz). The emission of carrier strength list in the test result of channel 6 at the item 4.2 is 96.5dBuV/m, so the maximum field strength in restrict band is  $96.5 - 46.98 = 49.52$ dBuV/m which is under 54 dBuV/m limit.



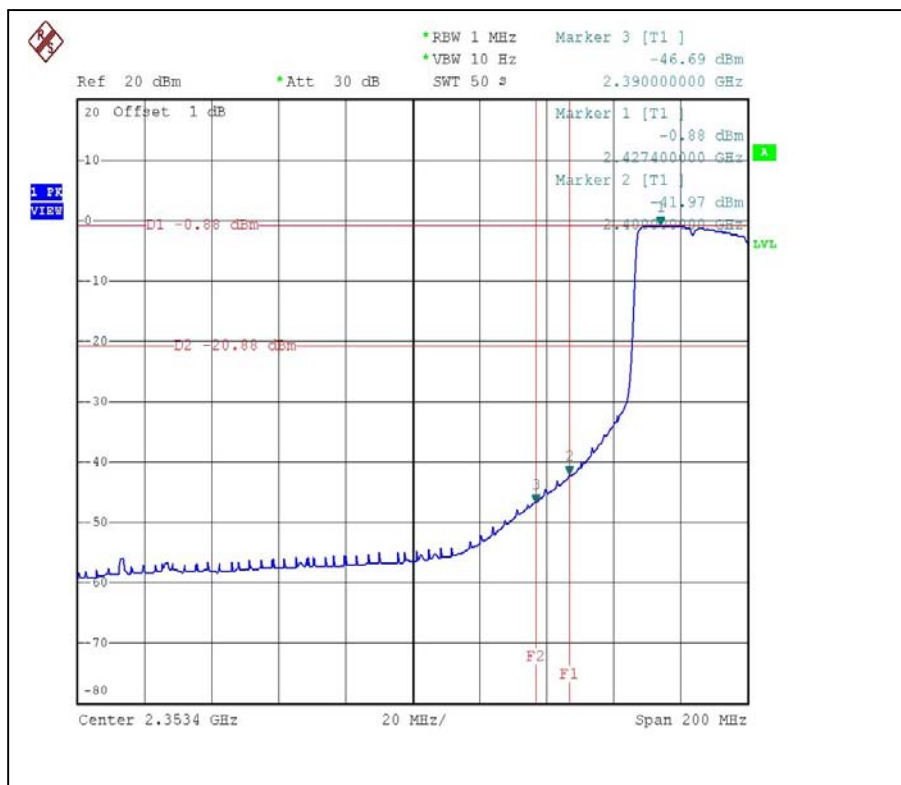
CH6



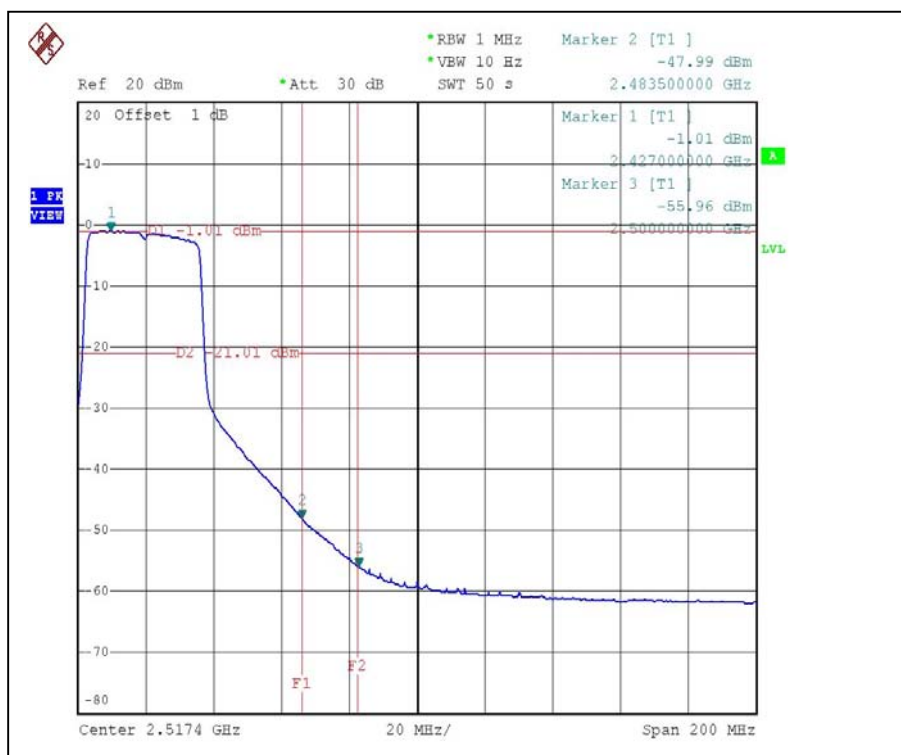
CH6



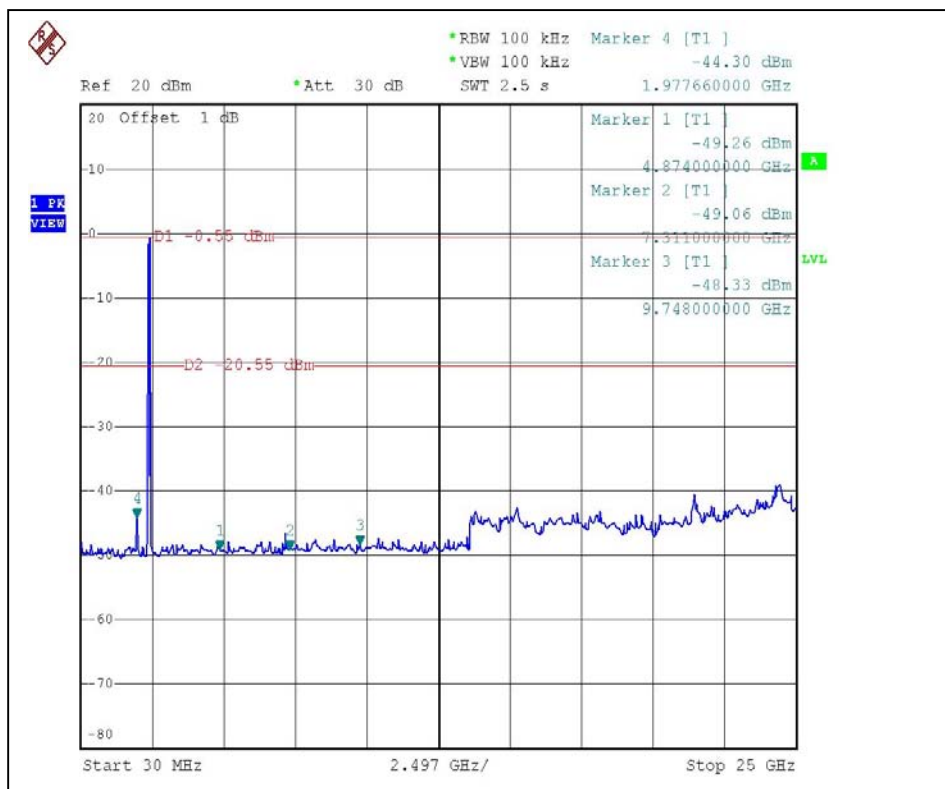
CH6



CH6



## CH6





## **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 chip antenna without connector. The maximum Gain of the antenna is 0dBi.

## 5 PHOTOGRAPHS OF THE TEST CONFIGURATION

### CONDUCTED EMISSION TEST (Without USB Cable)



### RADIATED EMISSION TEST (With USB Cable)





## 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:

|                    |                       |
|--------------------|-----------------------|
| <b>USA</b>         | FCC, UL, A2LA         |
| <b>Germany</b>     | TUV Rheinland         |
| <b>Japan</b>       | VCCI                  |
| <b>Norway</b>      | NEMKO                 |
| <b>Canada</b>      | INDUSTRY CANADA , CSA |
| <b>R.O.C.</b>      | CNLA, BSMI, DGT       |
| <b>Netherlands</b> | Telefication          |
| <b>Singapore</b>   | PSB , GOST-ASIA(MOU)  |
| <b>Russia</b>      | 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](http://www.adt.com.tw/index.5/phtml). If you have any comments, please feel free to contact us at the following:

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Fax: 886-2-26052943

**Hsin Chu EMC/RF Lab:**

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Fax: 886-3-5935342

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

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

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