

#### 4.3.7 TEST RESULTS (ANTENNA 2)

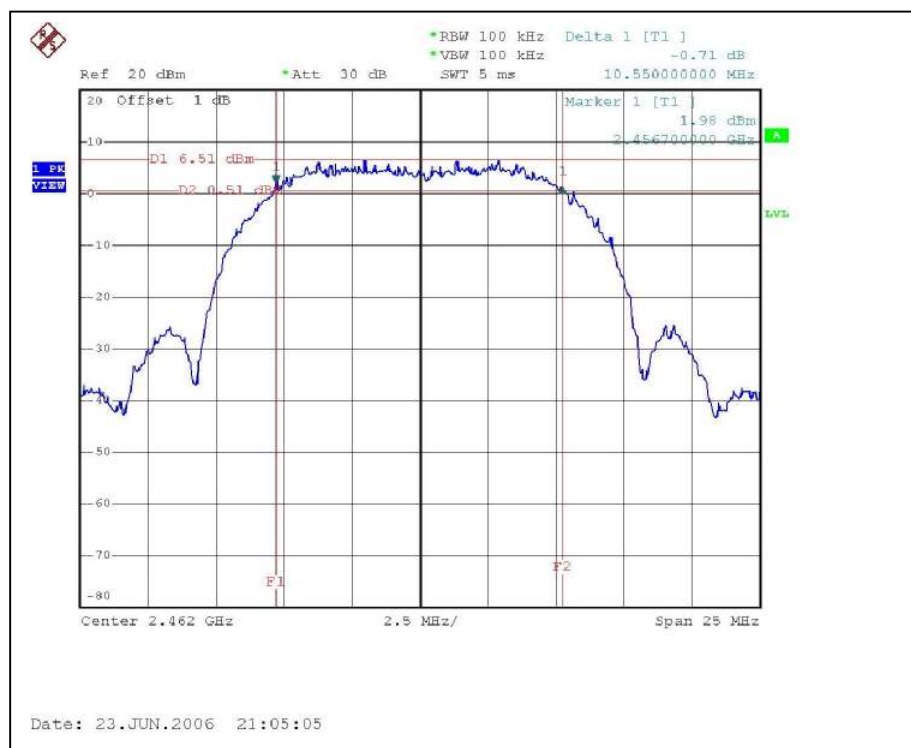
##### 802.11b DSSS modulation

|                             |               |                                 |                         |
|-----------------------------|---------------|---------------------------------|-------------------------|
| <b>MODULATION TYPE</b>      | CCK           | <b>TRANSFER RATE</b>            | 11Mbps                  |
| <b>INPUT POWER (SYSTEM)</b> | 120Vac, 60 Hz | <b>ENVIRONMENTAL CONDITIONS</b> | 25deg. C, 60%RH, 962hPa |
| <b>TESTED BY</b>            | Rex Huang     |                                 |                         |

| CHANNEL | CHANNEL FREQUENCY (MHz) | 6 dB BANDWIDTH (MHz) | MINIMUM LIMIT (MHz) | PASS/FAIL |
|---------|-------------------------|----------------------|---------------------|-----------|
| 1       | 2412                    | 10.90                | 0.5                 | PASS      |
| 6       | 2437                    | 10.65                | 0.5                 | PASS      |
| 11      | 2462                    | 10.55                | 0.5                 | PASS      |



CH11

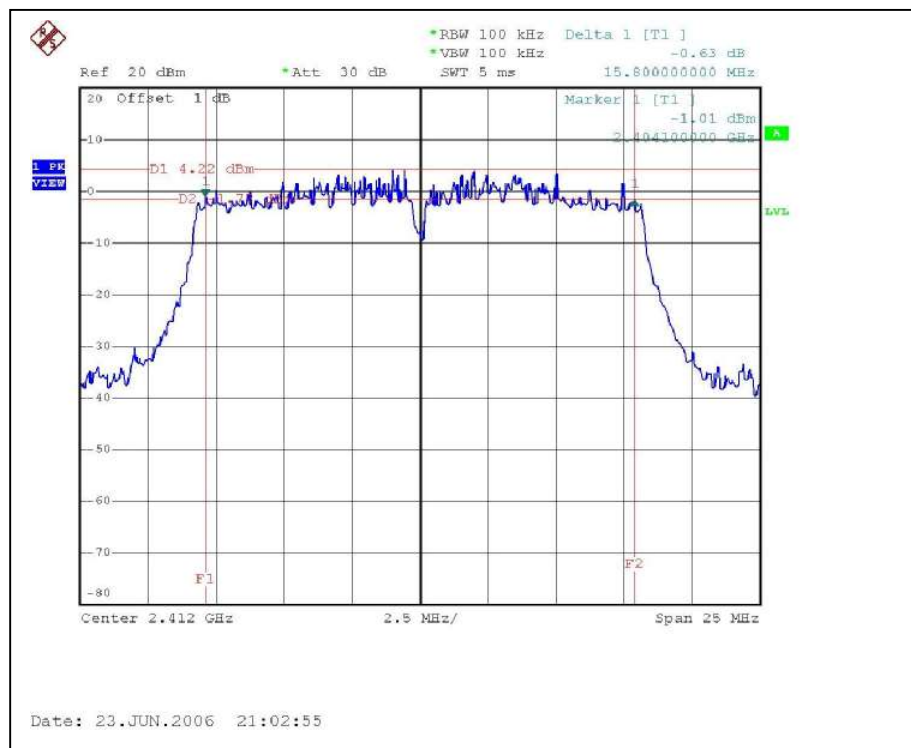


**802.11g OFDM modulation**

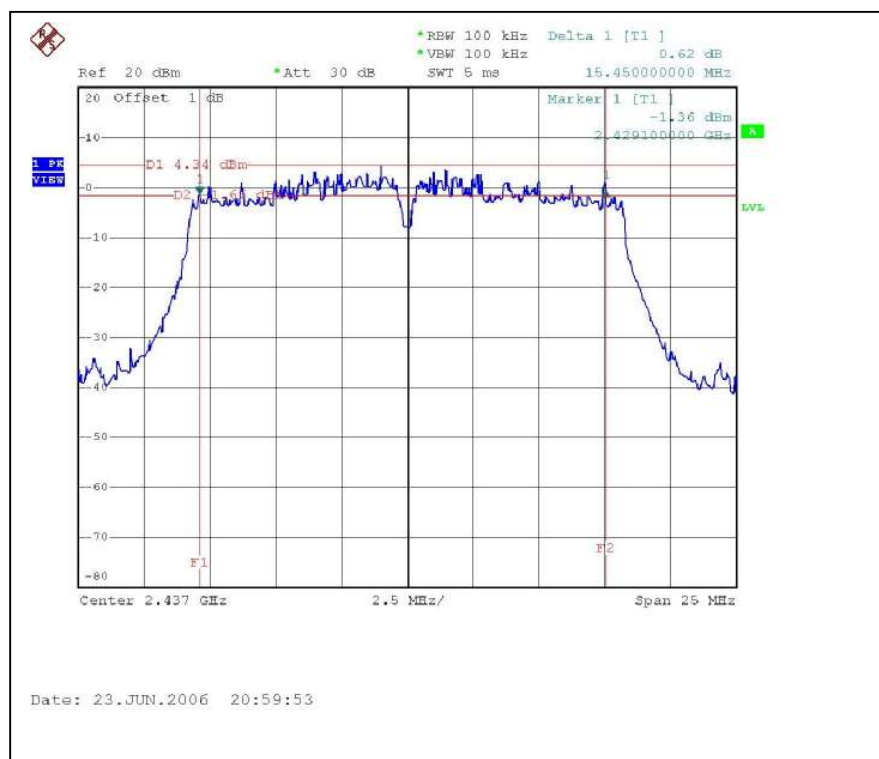
|                             |               |                                 |                         |
|-----------------------------|---------------|---------------------------------|-------------------------|
| <b>MODULATION TYPE</b>      | BPSK          | <b>TRANSFER RATE</b>            | 6Mbps                   |
| <b>INPUT POWER (SYSTEM)</b> | 120Vac, 60 Hz | <b>ENVIRONMENTAL CONDITIONS</b> | 25deg. C, 60%RH, 962hPa |
| <b>TESTED BY</b>            | Rex Huang     |                                 |                         |

| CHANNEL | CHANNEL FREQUENCY (MHz) | 6 dB BANDWIDTH (MHz) | MINIMUM LIMIT (MHz) | PASS/FAIL |
|---------|-------------------------|----------------------|---------------------|-----------|
| 1       | 2412                    | 15.80                | 0.5                 | PASS      |
| 6       | 2437                    | 15.45                | 0.5                 | PASS      |
| 11      | 2462                    | 15.85                | 0.5                 | PASS      |

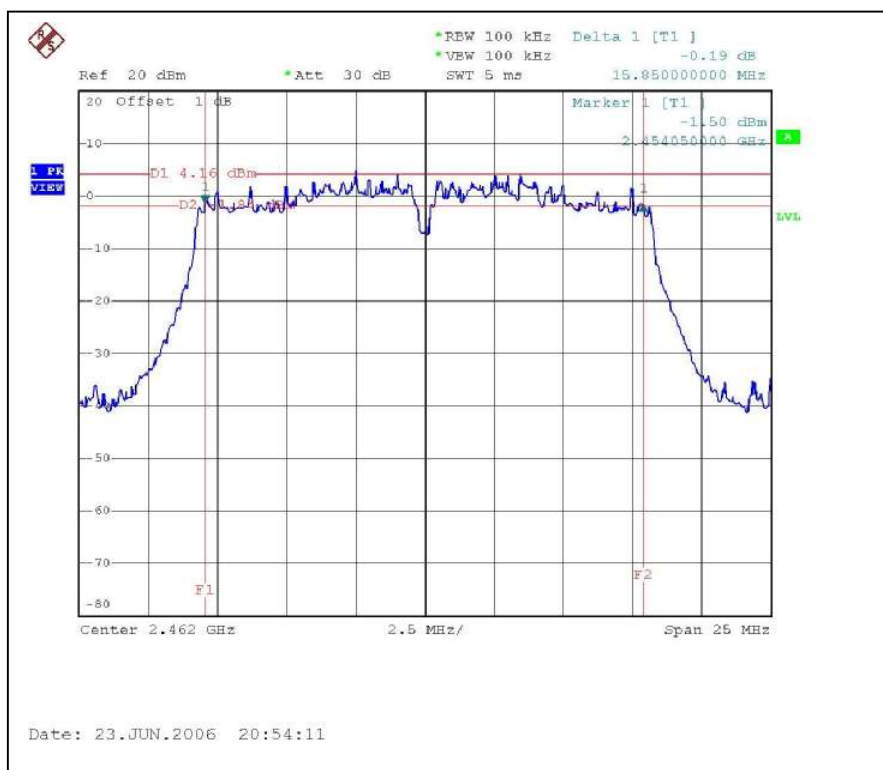
## CH1



## CH6



CH11



## 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 TEST INSTRUMENTS

| Description & Manufacturer | Model No. | Serial No. | Calibrated Until |
|----------------------------|-----------|------------|------------------|
| R&S SPECTRUM ANALYZER      | FSP40     | 100036     | Dec. 09, 2006    |
| Agilent SIGNAL GENERATOR   | E8257C    | MY43320668 | Dec. 07, 2006    |
| TEKTRONIX OSCILLOSCOPE     | TDS380    | B016335    | Jun. 21, 2007    |
| NARDA DETECTOR             | 4503A     | FSCM99899  | NA               |

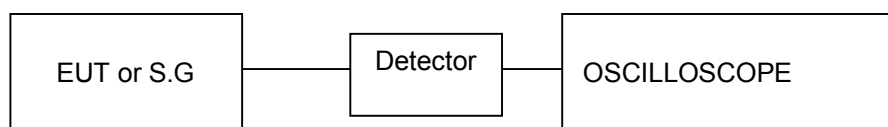
**NOTE:**

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 peak 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 peak reading on oscilloscope. Record the power level.

#### 4.4.4 TEST SETUP



#### 4.4.5 EUT OPERATING CONDITIONS

Same as Item 4.3.5

#### 4.4.6 TEST RESULTS (ANTENNA 1)

##### 802.11b DSSS modulation

|                             |              |                                 |                         |
|-----------------------------|--------------|---------------------------------|-------------------------|
| <b>MODULATION TYPE</b>      | CCK          | <b>TRANSFER RATE</b>            | 11Mbps                  |
| <b>INPUT POWER (SYSTEM)</b> | 120Vac, 60Hz | <b>ENVIRONMENTAL CONDITIONS</b> | 25deg. C, 60%RH, 962hPa |
| <b>TESTED BY</b>            | Rex Huang    |                                 |                         |

| CHANNEL | CHANNEL FREQUENCY (MHz) | PEAK POWER OUTPUT (dBm) | PEAK POWER OUTPUT (mW) | PEAK POWER LIMIT (dBm) | PASS/FAIL |
|---------|-------------------------|-------------------------|------------------------|------------------------|-----------|
| 1       | 2412                    | 21.6                    | 144.544                | 30                     | PASS      |
| 6       | 2437                    | 21.3                    | 134.896                | 30                     | PASS      |
| 11      | 2462                    | 21.4                    | 138.038                | 30                     | PASS      |

##### 802.11g OFDM modulation

|                             |              |                                 |                         |
|-----------------------------|--------------|---------------------------------|-------------------------|
| <b>MODULATION TYPE</b>      | BPSK         | <b>TRANSFER RATE</b>            | 6Mbps                   |
| <b>INPUT POWER (SYSTEM)</b> | 120Vac, 60Hz | <b>ENVIRONMENTAL CONDITIONS</b> | 25deg. C, 60%RH, 962hPa |
| <b>TESTED BY</b>            | Rex Huang    |                                 |                         |

| CHANNEL | CHANNEL FREQUENCY (MHz) | PEAK POWER OUTPUT (dBm) | PEAK POWER OUTPUT (mW) | PEAK POWER LIMIT (dBm) | PASS/FAIL |
|---------|-------------------------|-------------------------|------------------------|------------------------|-----------|
| 1       | 2412                    | 18.6                    | 72.444                 | 30                     | PASS      |
| 6       | 2437                    | 18.8                    | 75.858                 | 30                     | PASS      |
| 11      | 2462                    | 18.9                    | 77.625                 | 30                     | PASS      |

#### 4.4.7 TEST RESULTS (ANTENNA 2)

##### 802.11b DSSS modulation

|                             |              |                                 |                         |
|-----------------------------|--------------|---------------------------------|-------------------------|
| <b>MODULATION TYPE</b>      | CCK          | <b>TRANSFER RATE</b>            | 11Mbps                  |
| <b>INPUT POWER (SYSTEM)</b> | 120Vac, 60Hz | <b>ENVIRONMENTAL CONDITIONS</b> | 25deg. C, 60%RH, 962hPa |
| <b>TESTED BY</b>            | Rex Huang    |                                 |                         |

| CHANNEL | CHANNEL FREQUENCY (MHz) | PEAK POWER OUTPUT (dBm) | PEAK POWER OUTPUT (mW) | PEAK POWER LIMIT (dBm) | PASS/FAIL |
|---------|-------------------------|-------------------------|------------------------|------------------------|-----------|
| 1       | 2412                    | 18.12                   | 64.863                 | 30                     | PASS      |
| 6       | 2437                    | 18.25                   | 66.834                 | 30                     | PASS      |
| 11      | 2462                    | 18.38                   | 68.865                 | 30                     | PASS      |

##### 802.11g OFDM modulation

|                             |              |                                 |                         |
|-----------------------------|--------------|---------------------------------|-------------------------|
| <b>MODULATION TYPE</b>      | BPSK         | <b>TRANSFER RATE</b>            | 6Mbps                   |
| <b>INPUT POWER (SYSTEM)</b> | 120Vac, 60Hz | <b>ENVIRONMENTAL CONDITIONS</b> | 25deg. C, 60%RH, 962hPa |
| <b>TESTED BY</b>            | Rex Huang    |                                 |                         |

| CHANNEL | CHANNEL FREQUENCY (MHz) | PEAK POWER OUTPUT (dBm) | PEAK POWER OUTPUT (mW) | PEAK POWER LIMIT (dBm) | PASS/FAIL |
|---------|-------------------------|-------------------------|------------------------|------------------------|-----------|
| 1       | 2412                    | 18.87                   | 77.090                 | 30                     | PASS      |
| 6       | 2437                    | 18.75                   | 74.989                 | 30                     | PASS      |
| 11      | 2462                    | 18.88                   | 77.268                 | 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 |
|----------------------------|-----------|------------|------------------|
| R&S SPECTRUM ANALYZER      | FSP40     | 100036     | Nov. 23, 2006    |

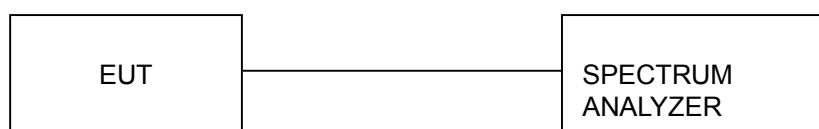
**NOTE:**

- 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.

#### 4.5.3 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



#### 4.5.5 EUT OPERATING CONDITIONS

Same as 4.3.5

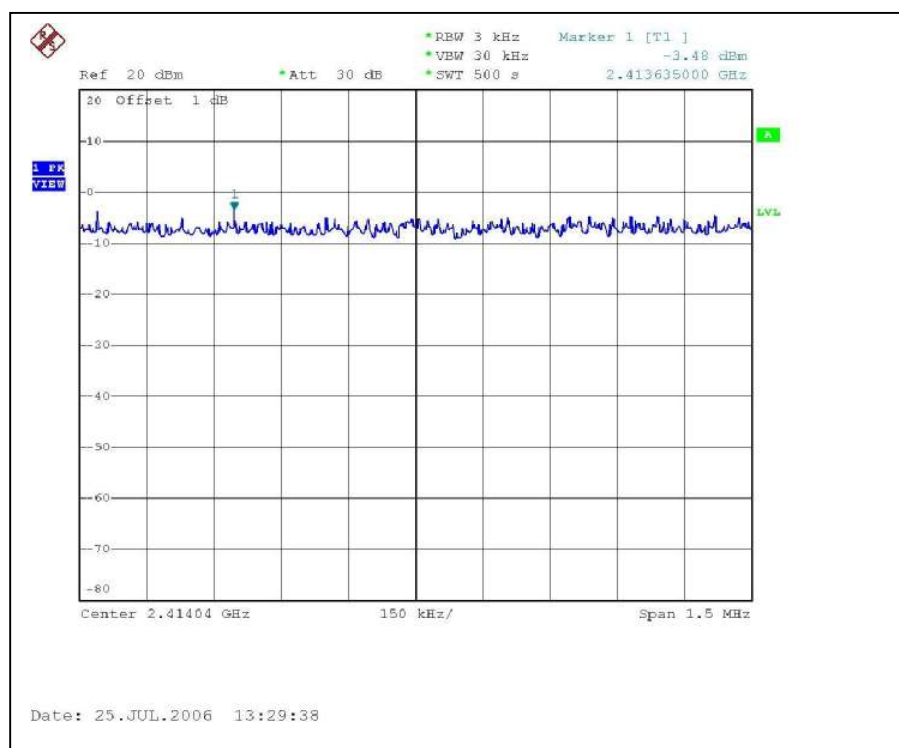
#### 4.5.6 TEST RESULTS (ANTENNA 1)

##### 802.11b DSSS modulation

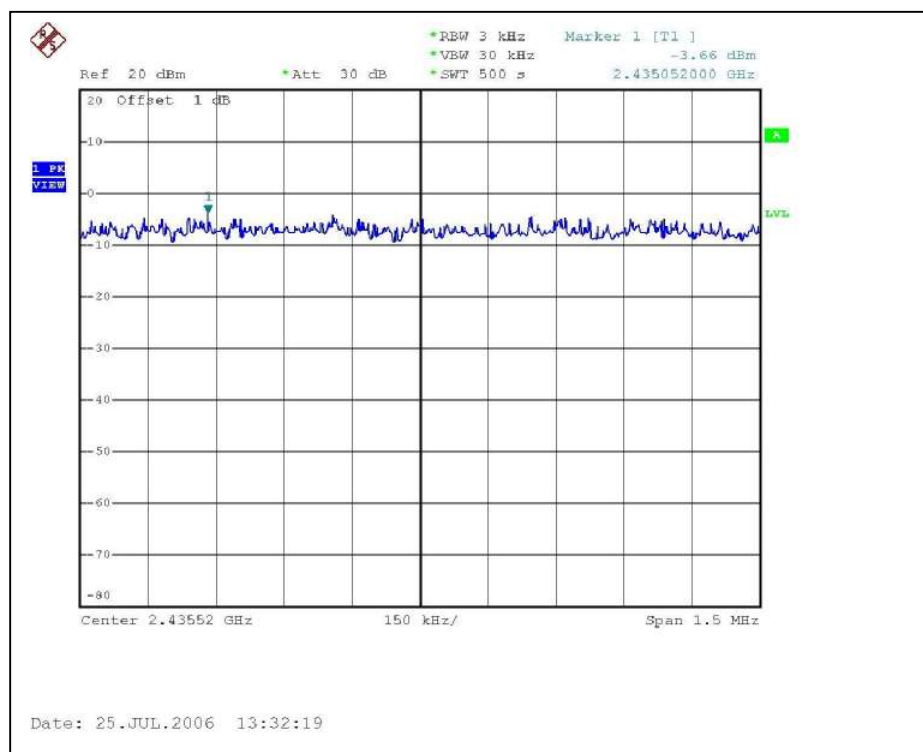
|                             |              |                                 |                         |
|-----------------------------|--------------|---------------------------------|-------------------------|
| <b>MODULATION TYPE</b>      | CCK          | <b>TRANSFER RATE</b>            | 11Mbps                  |
| <b>INPUT POWER (SYSTEM)</b> | 120Vac, 60Hz | <b>ENVIRONMENTAL CONDITIONS</b> | 25deg. C, 60%RH, 962hPa |
| <b>TESTED BY</b>            | Rex Huang    |                                 |                         |

| CHANNEL NUMBER | CHANNEL FREQUENCY (MHz ) | RF POWER LEVEL IN 3 KHz BW (dBm) | MAXIMUM LIMIT (dBm) | PASS/FAIL |
|----------------|--------------------------|----------------------------------|---------------------|-----------|
| 1              | 2412                     | -3.84                            | 8                   | PASS      |
| 6              | 2437                     | -3.66                            | 8                   | PASS      |
| 11             | 2462                     | -3.86                            | 8                   | PASS      |

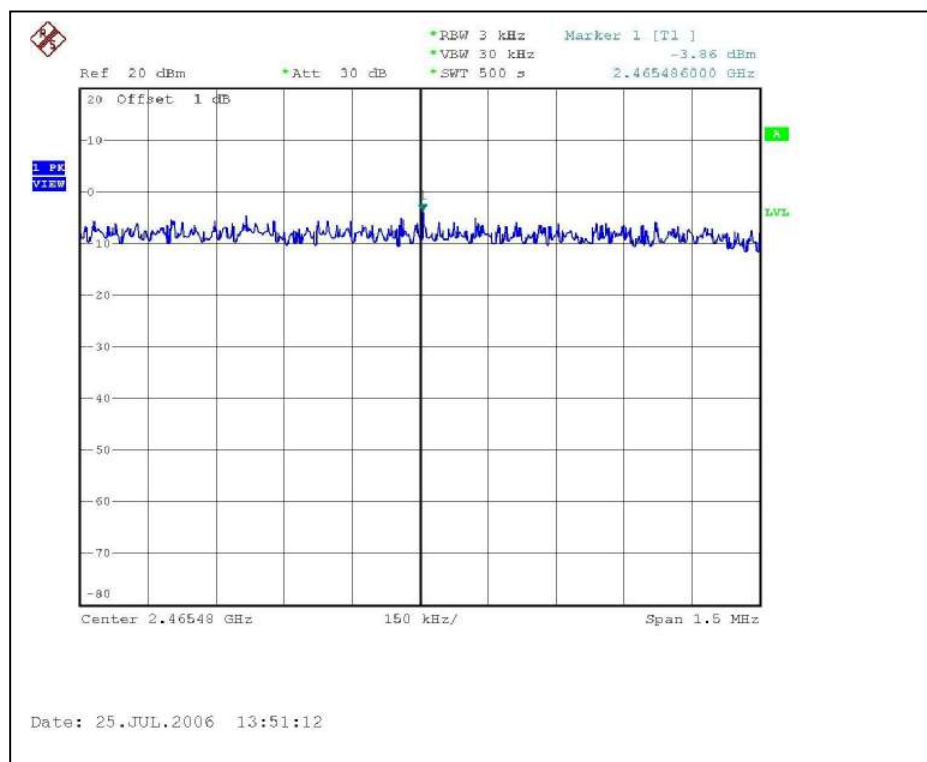
# CH1



# CH6



CH11

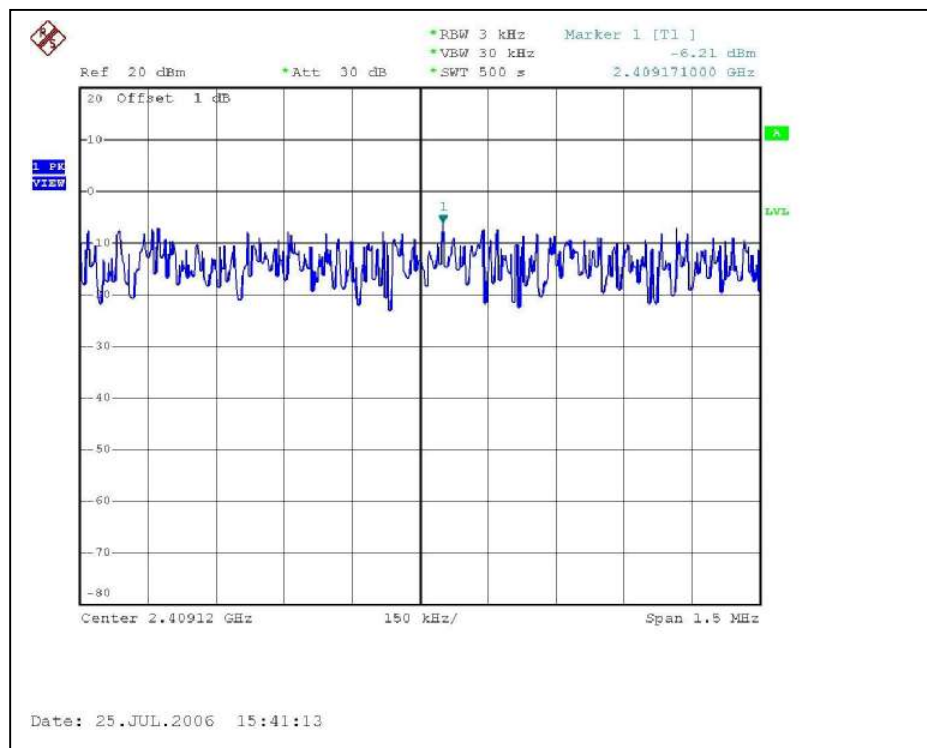


**802.11g OFDM modulation**

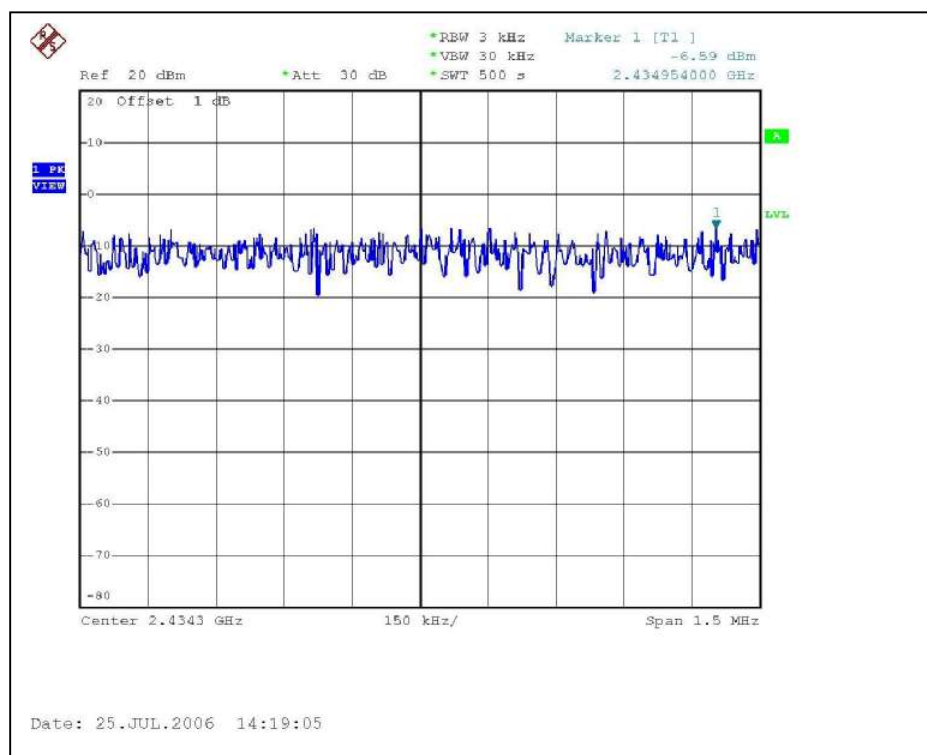
|                             |              |                                 |                         |
|-----------------------------|--------------|---------------------------------|-------------------------|
| <b>MODULATION TYPE</b>      | BPSK         | <b>TRANSFER RATE</b>            | 6Mbps                   |
| <b>INPUT POWER (SYSTEM)</b> | 120Vac, 60Hz | <b>ENVIRONMENTAL CONDITIONS</b> | 25deg. C, 60%RH, 962hPa |
| <b>TESTED BY</b>            | Rex Huang    |                                 |                         |

| <b>CHANNEL NUMBER</b> | <b>CHANNEL FREQUENCY (MHz )</b> | <b>RF POWER LEVEL IN 3 KHz BW (dBm)</b> | <b>MAXIMUM LIMIT (dBm)</b> | <b>PASS/FAIL</b> |
|-----------------------|---------------------------------|-----------------------------------------|----------------------------|------------------|
| 1                     | 2412                            | -6.21                                   | 8                          | PASS             |
| 6                     | 2437                            | -6.59                                   | 8                          | PASS             |
| 11                    | 2462                            | -5.17                                   | 8                          | PASS             |

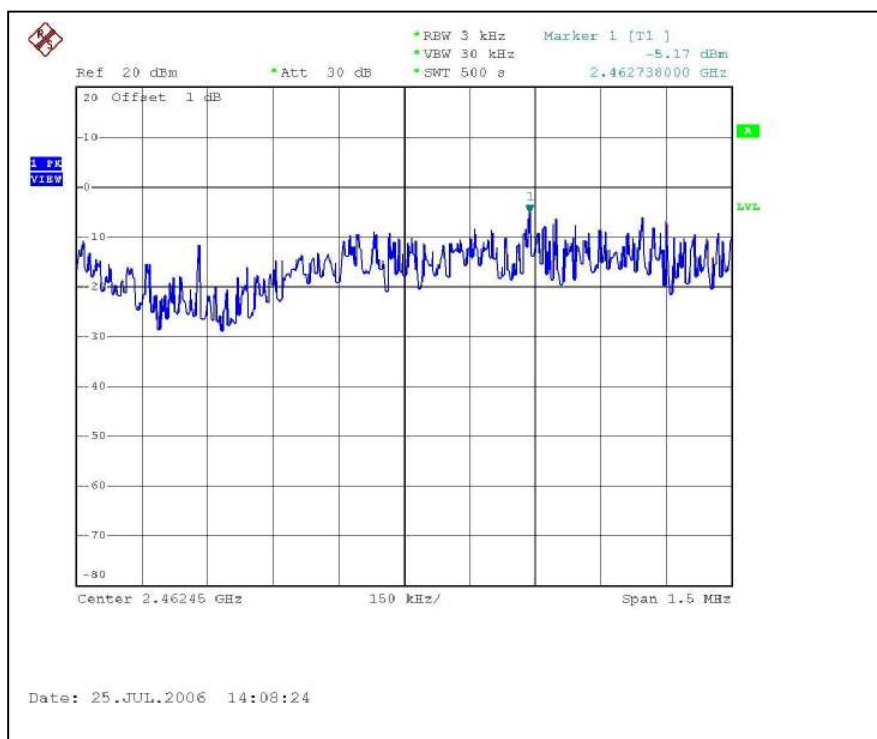
# CH1



# CH6



CH11



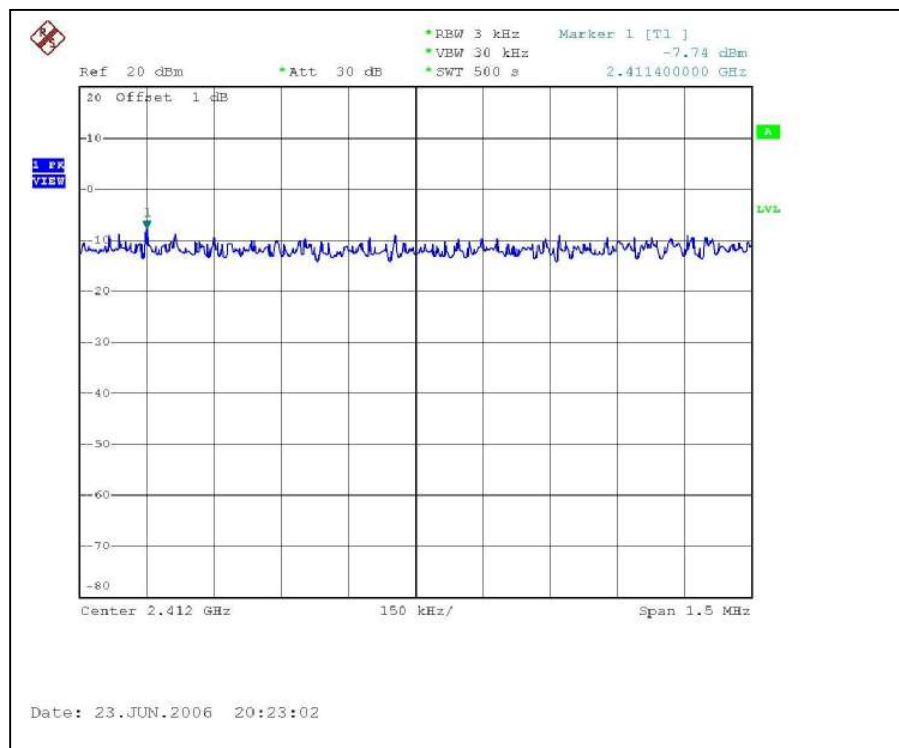
#### 4.5.7 TEST RESULTS (ANTENNA 2)

##### 802.11b DSSS modulation

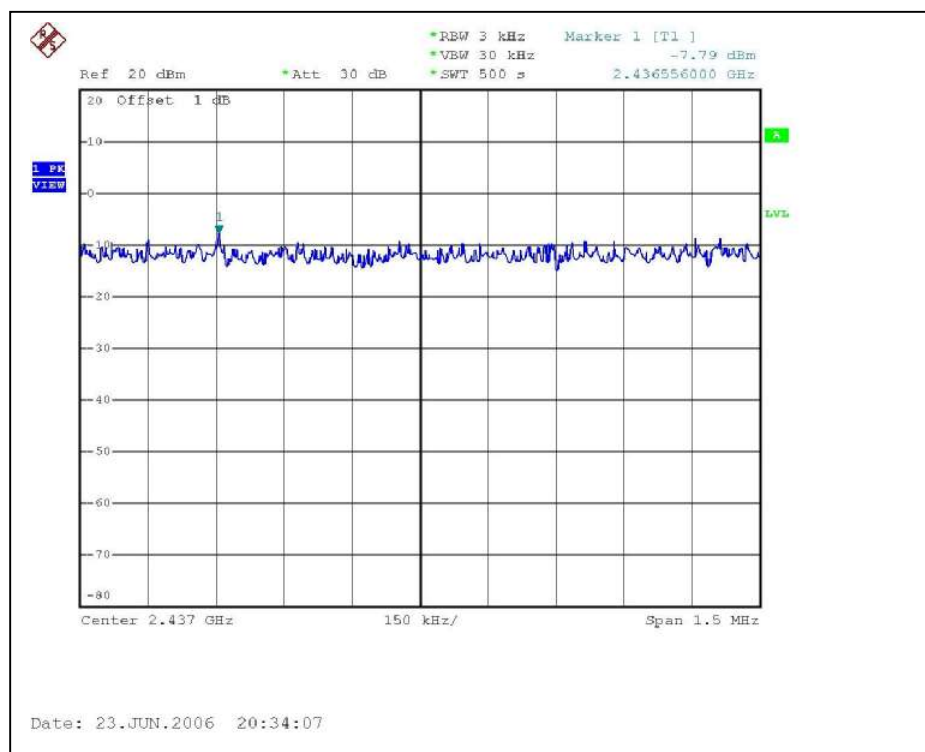
|                             |              |                                 |                         |
|-----------------------------|--------------|---------------------------------|-------------------------|
| <b>MODULATION TYPE</b>      | CCK          | <b>TRANSFER RATE</b>            | 11Mbps                  |
| <b>INPUT POWER (SYSTEM)</b> | 120Vac, 60Hz | <b>ENVIRONMENTAL CONDITIONS</b> | 25deg. C, 60%RH, 962hPa |
| <b>TESTED BY</b>            | Rex Huang    |                                 |                         |

| CHANNEL NUMBER | CHANNEL FREQUENCY (MHz ) | RF POWER LEVEL IN 3 KHz BW (dBm) | MAXIMUM LIMIT (dBm) | PASS/FAIL |
|----------------|--------------------------|----------------------------------|---------------------|-----------|
| 1              | 2412                     | -7.74                            | 8                   | PASS      |
| 6              | 2437                     | -7.79                            | 8                   | PASS      |
| 11             | 2462                     | -8.36                            | 8                   | PASS      |

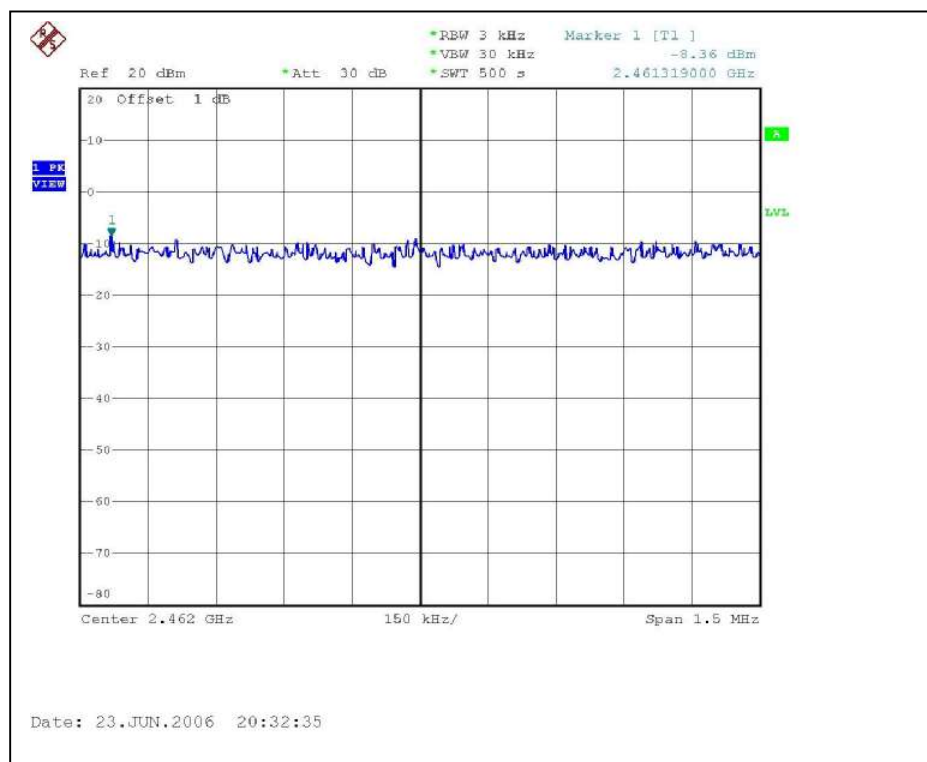
# CH1



# CH6



CH11

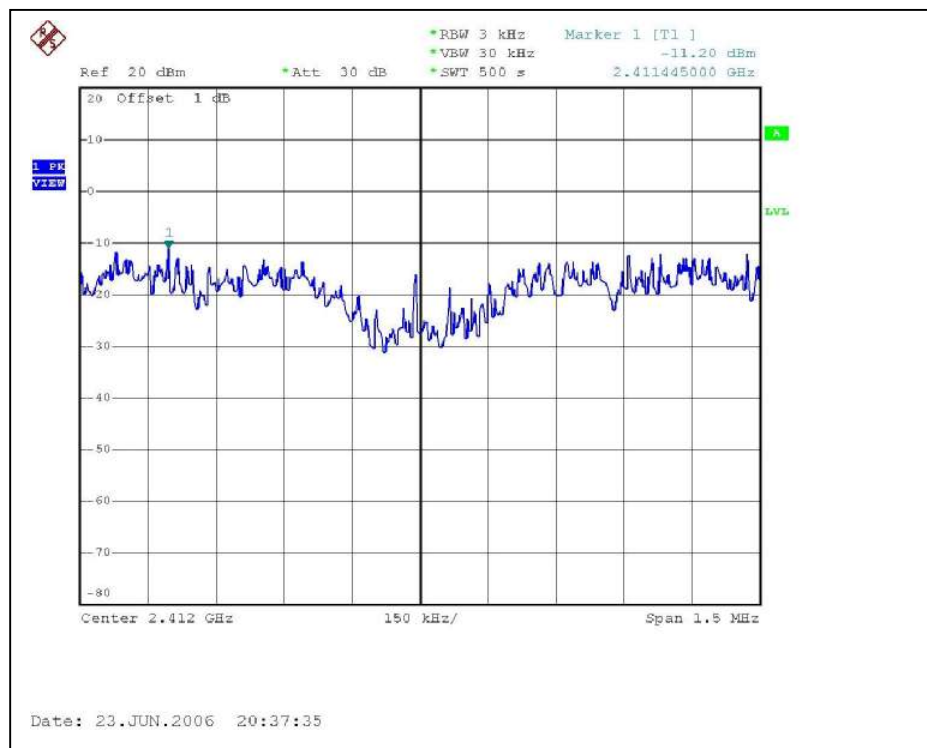


**802.11g OFDM modulation**

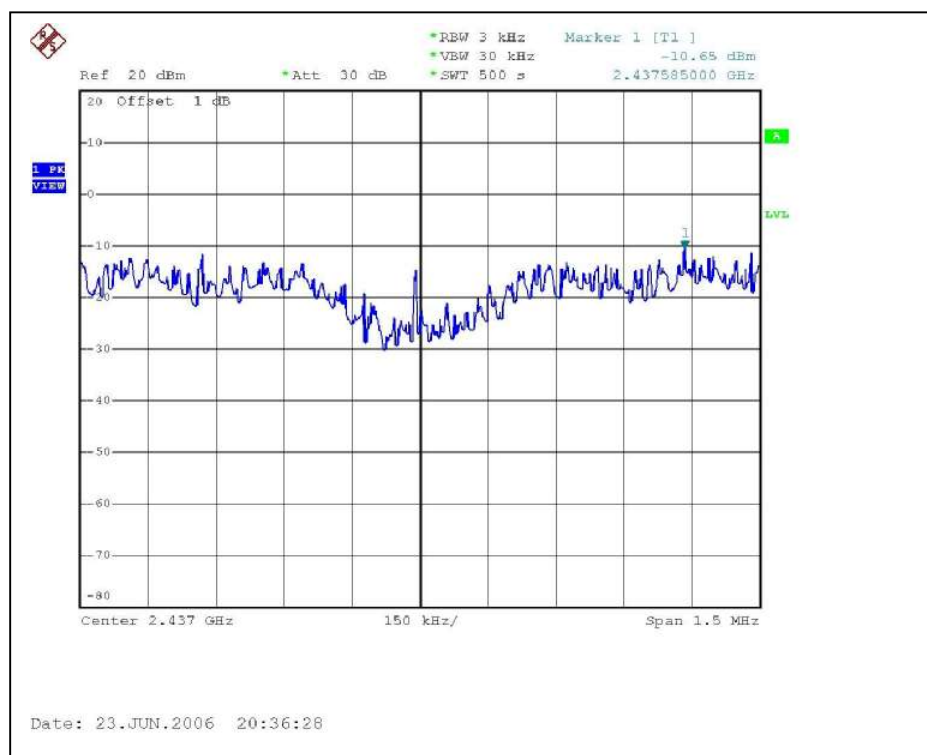
|                             |              |                                 |                         |
|-----------------------------|--------------|---------------------------------|-------------------------|
| <b>MODULATION TYPE</b>      | BPSK         | <b>TRANSFER RATE</b>            | 6Mbps                   |
| <b>INPUT POWER (SYSTEM)</b> | 120Vac, 60Hz | <b>ENVIRONMENTAL CONDITIONS</b> | 25deg. C, 60%RH, 962hPa |
| <b>TESTED BY</b>            | Rex Huang    |                                 |                         |

| <b>CHANNEL NUMBER</b> | <b>CHANNEL FREQUENCY (MHz )</b> | <b>RF POWER LEVEL IN 3 KHz BW (dBm)</b> | <b>MAXIMUM LIMIT (dBm)</b> | <b>PASS/FAIL</b> |
|-----------------------|---------------------------------|-----------------------------------------|----------------------------|------------------|
| 1                     | 2412                            | -11.20                                  | 8                          | PASS             |
| 6                     | 2437                            | -10.65                                  | 8                          | PASS             |
| 11                    | 2462                            | -11.19                                  | 8                          | PASS             |

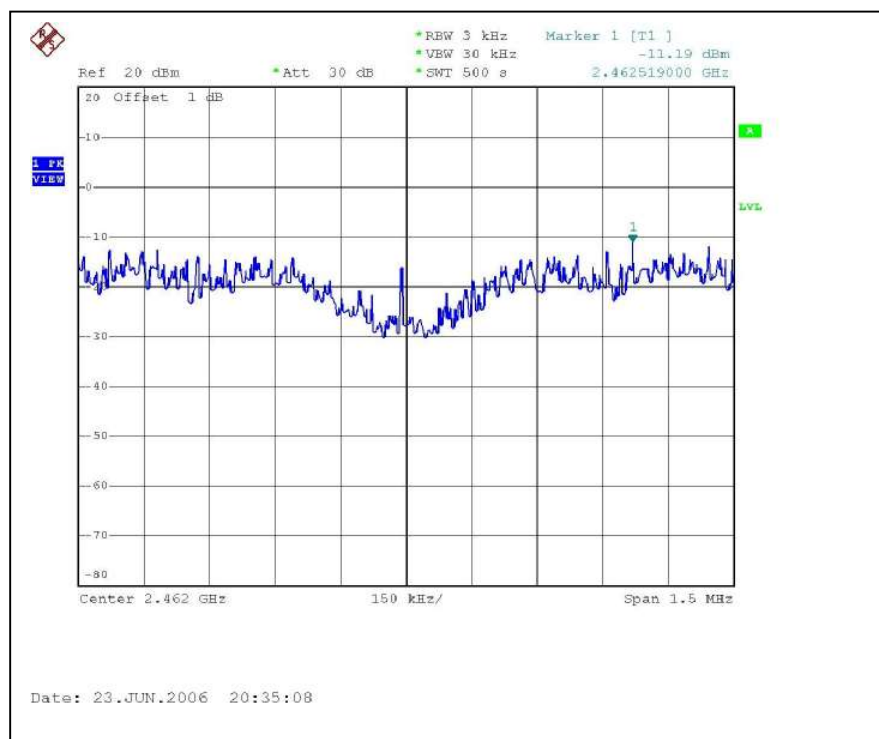
# CH1



# CH6



CH11



## 4.6 CONDUCTED EMISSION AND BAND EDGES MEASUREMENT

### 4.6.1 LIMITS OF CONDUCTED EMISSION AND 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. 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 loss cable. Set both RBW and VBW of spectrum analyzer to 100kHz with suitable frequency span including 100 MHz bandwidth from band edge. The band edges were measured and recorded.

The spectrum plots (RBW = VBW = 100kHz) are attached on the following pages.

### 4.6.4 DEVIATION FROM TEST STANDARD

No deviation

### 4.6.5 EUT OPERATING CONDITION

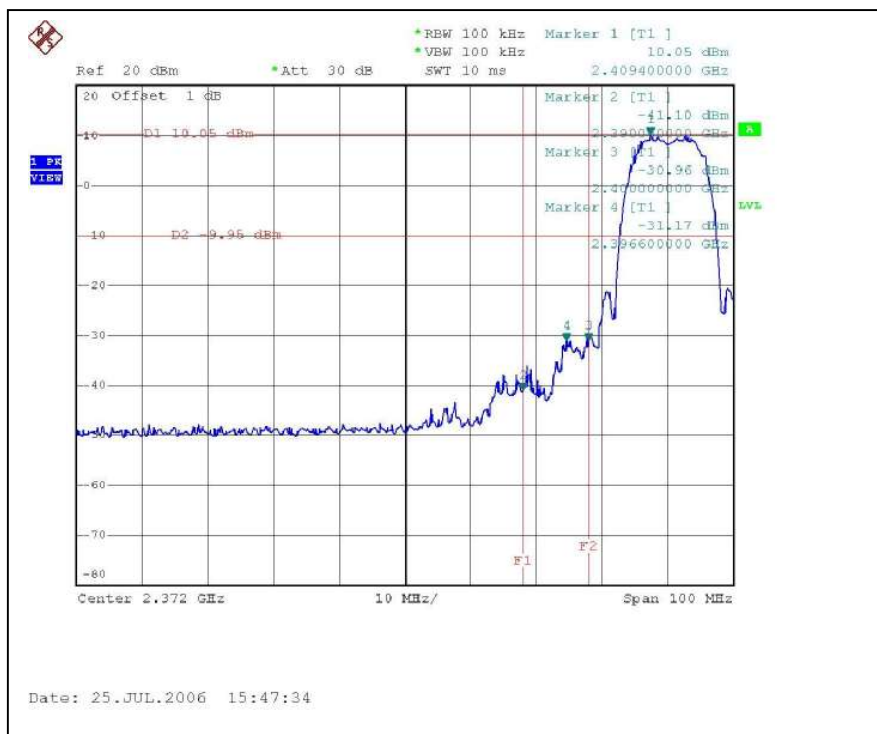
Same as Item 4.3.6

#### 4.6.6 TEST RESULTS (ANTENNA 1)

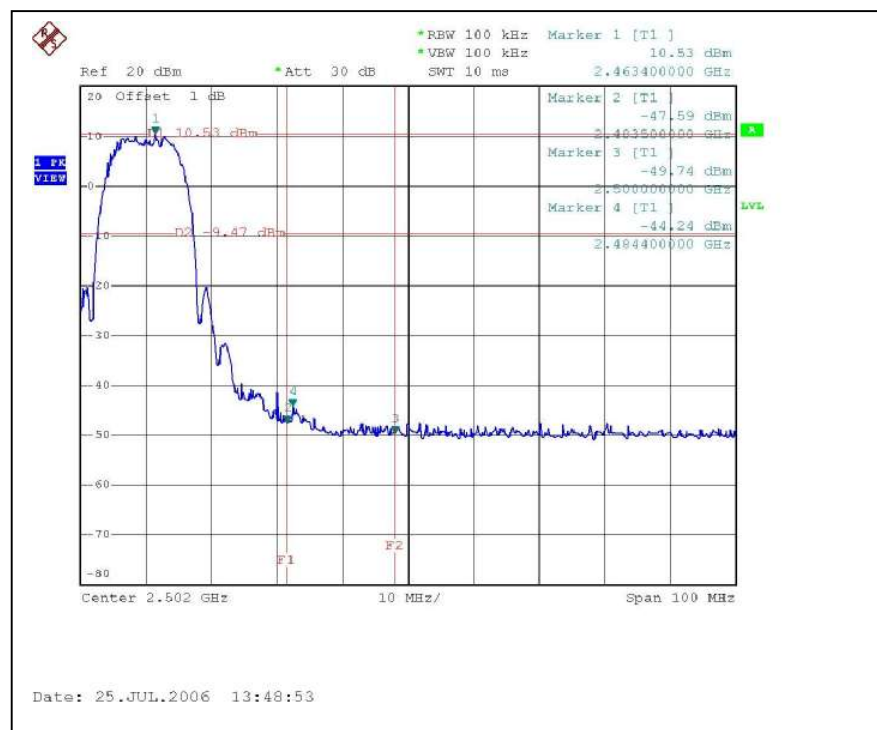
The spectrum plots are attached on the following 8 images. D1 line indicates the highest level, and D2 line indicates the 20dB offset below D1. It shows compliance with the requirement in part 15.247(d).

## 802.11b DSSS MODULATION:

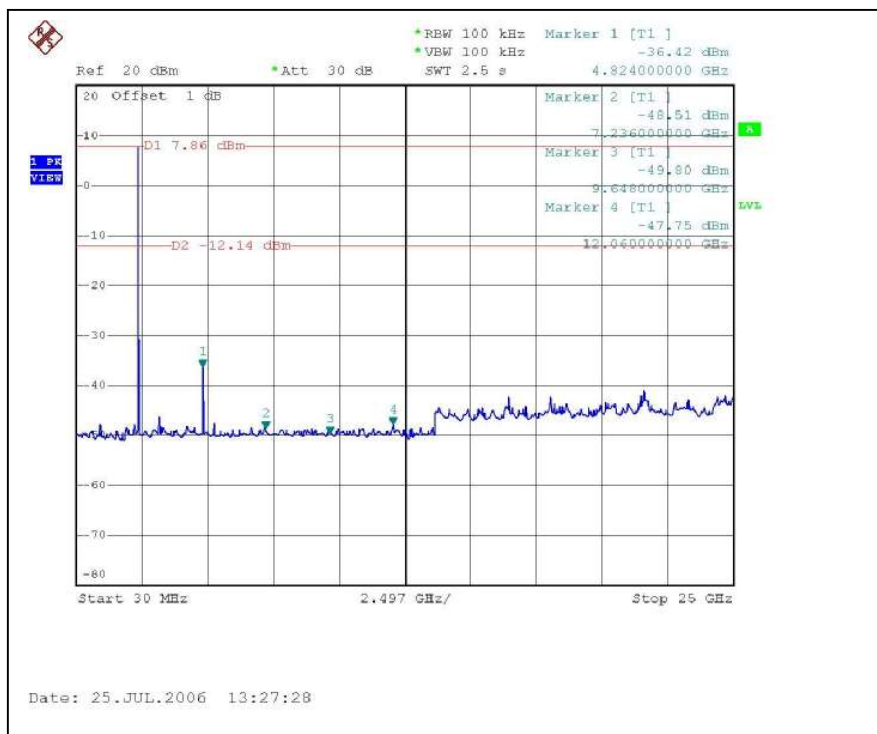
CH1



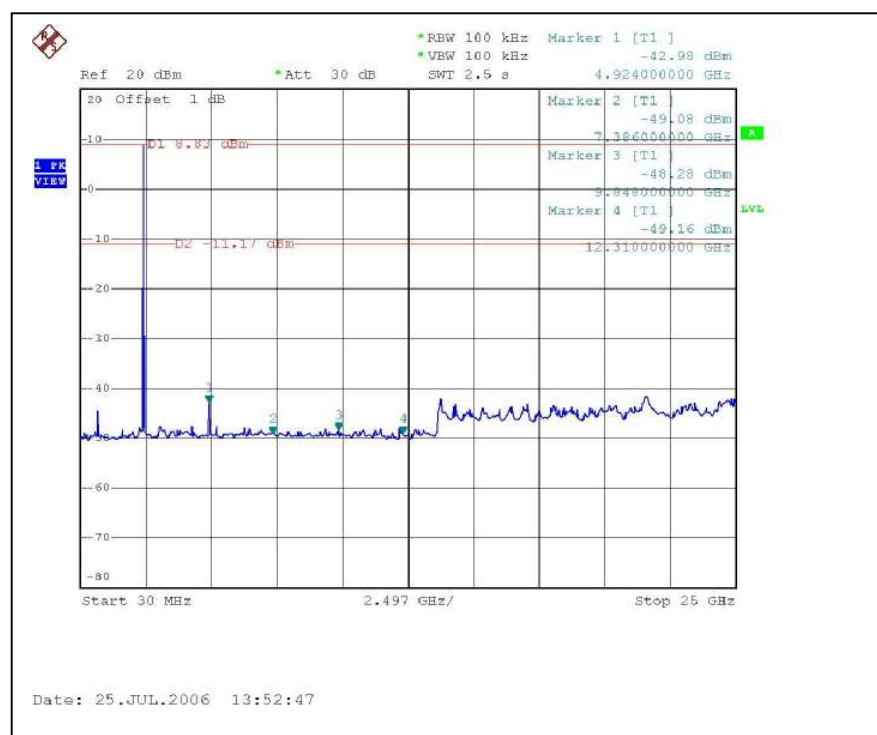
CH11



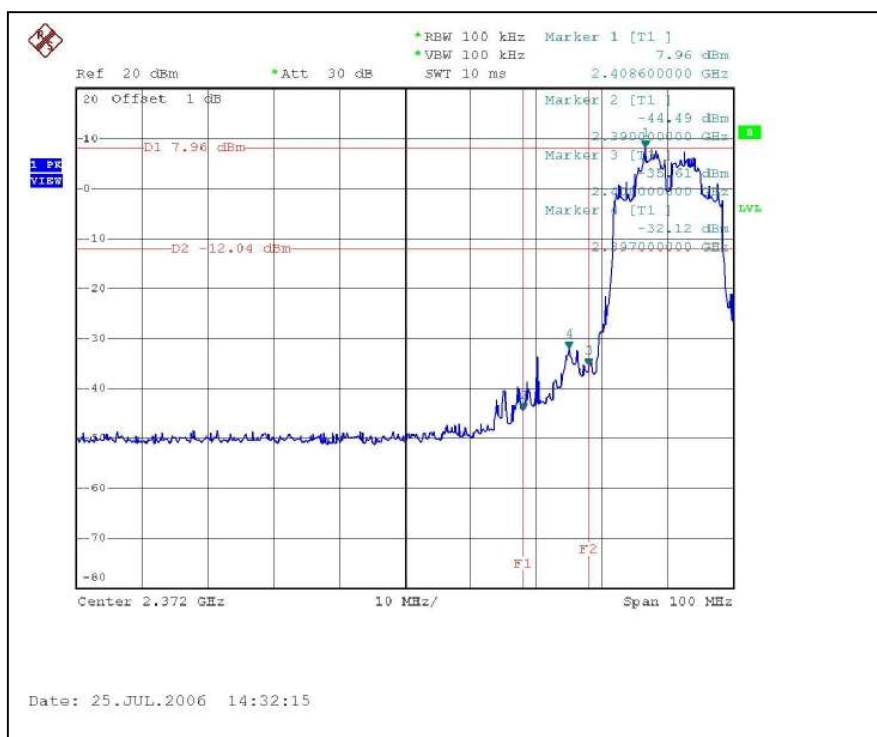
CH1



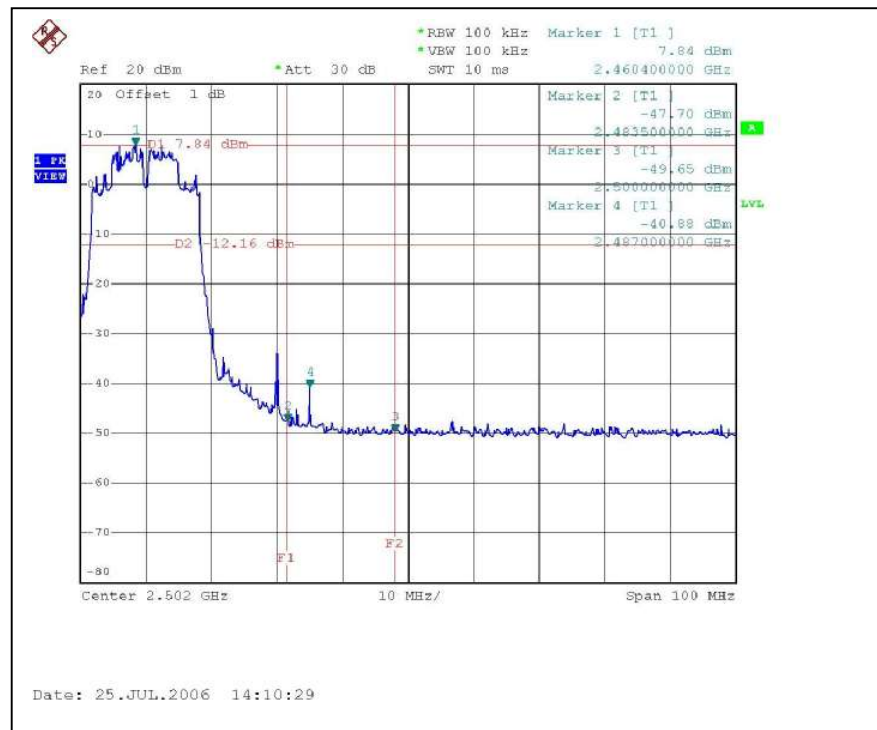
CH11



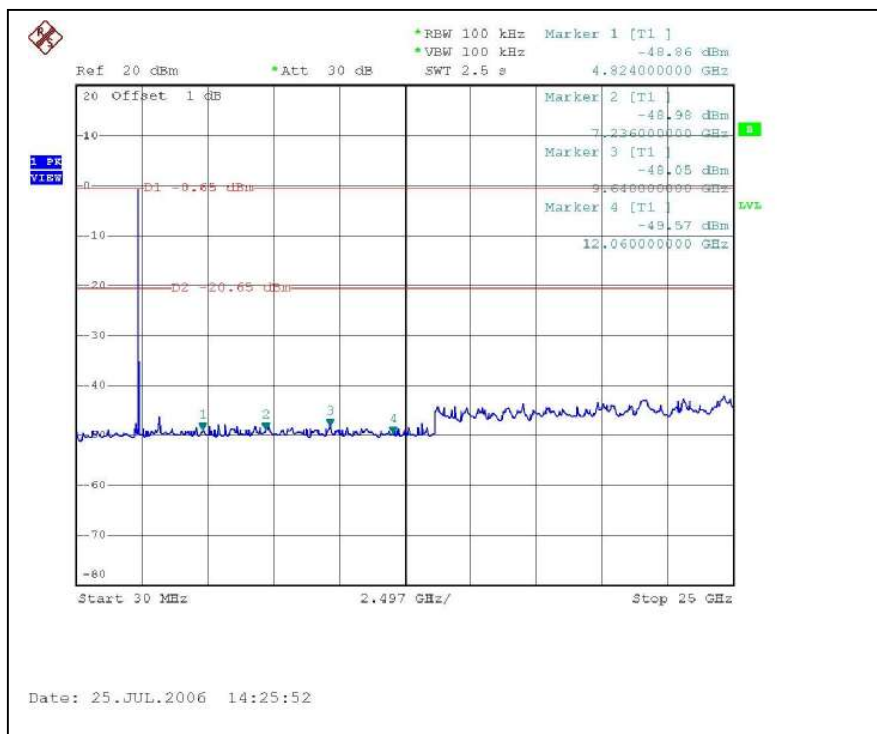
## 802.11g OFDM MODULATION: CH1



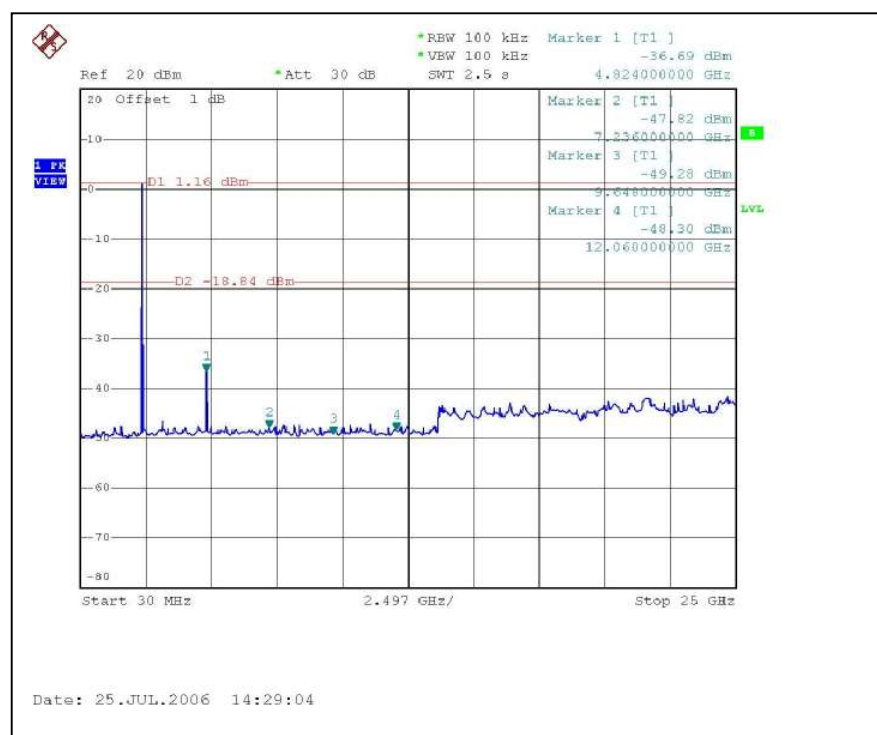
CH11



CH1



CH11

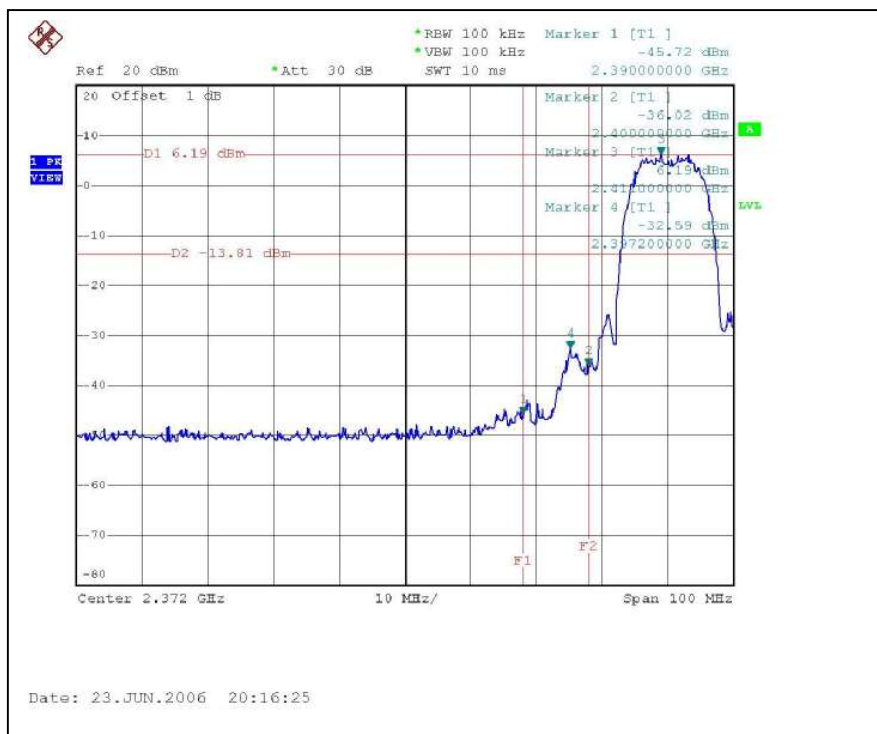


#### 4.6.7 TEST RESULTS (ANTENNA 2)

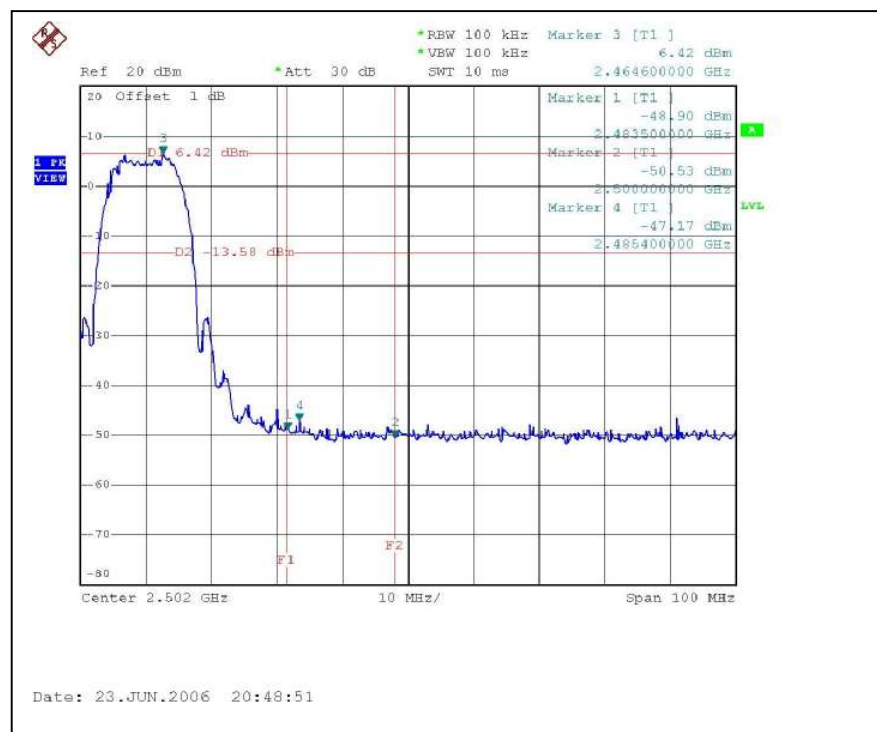
The spectrum plots are attached on the following 8 images. D1 line indicates the highest level, and D2 line indicates the 20dB offset below D1. It shows compliance with the requirement in part 15.247(d).

## 802.11b DSSS MODULATION:

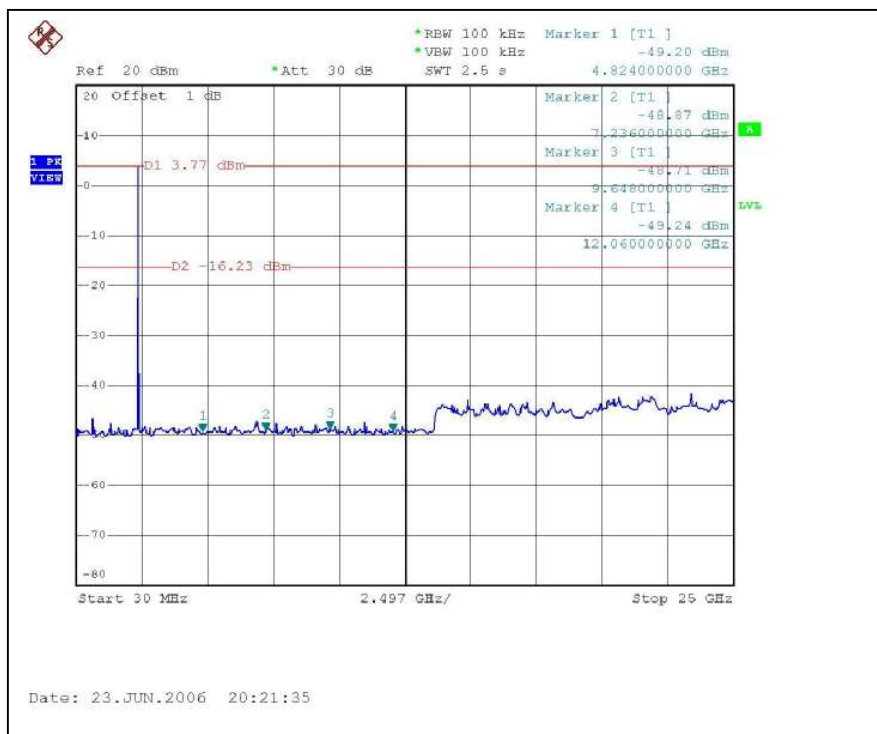
CH1



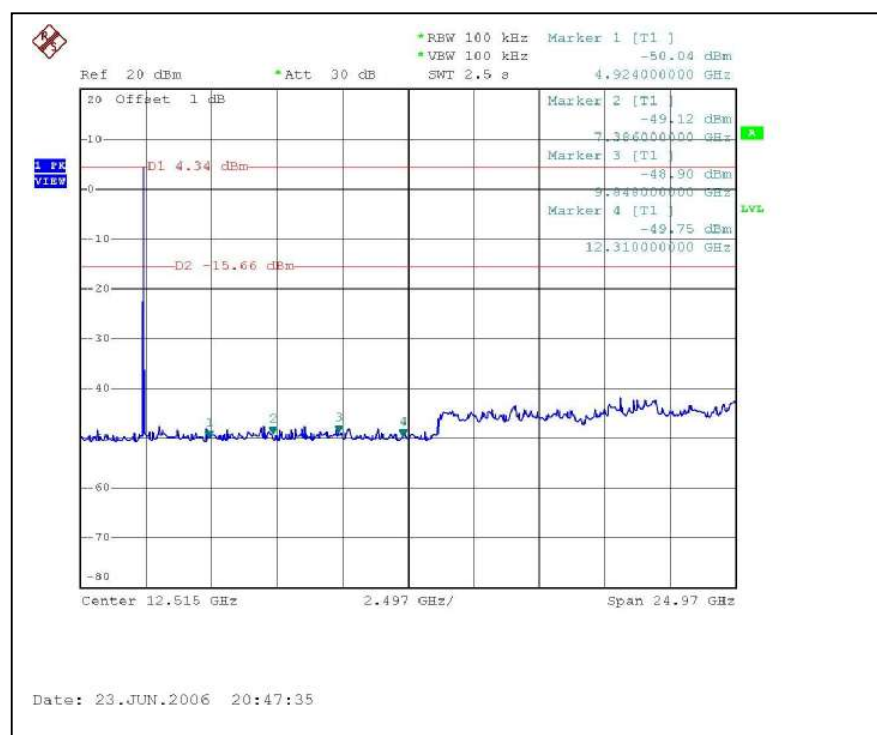
CH11



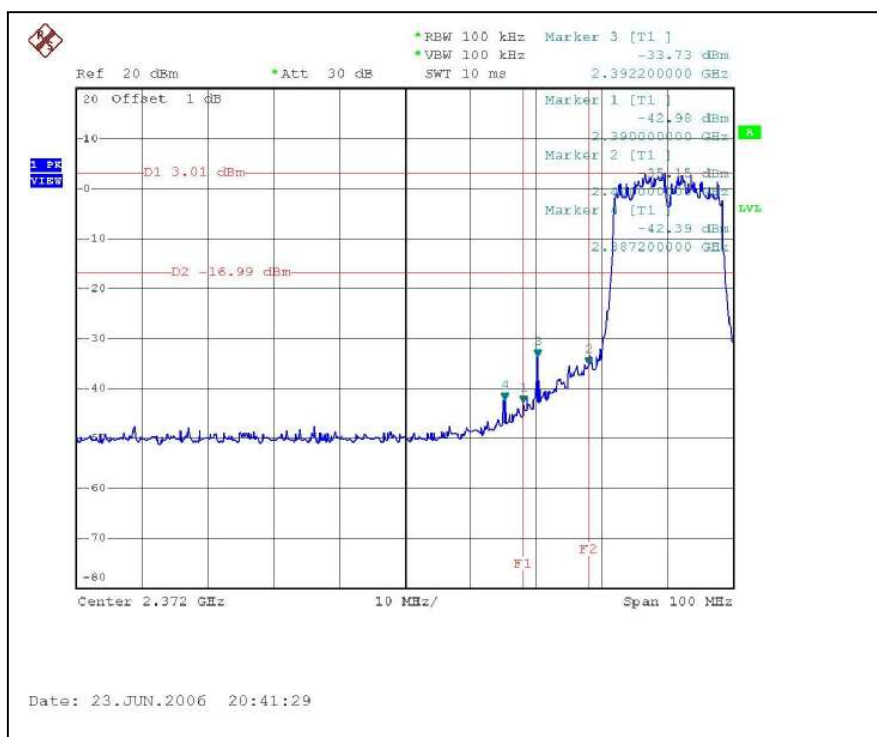
CH1



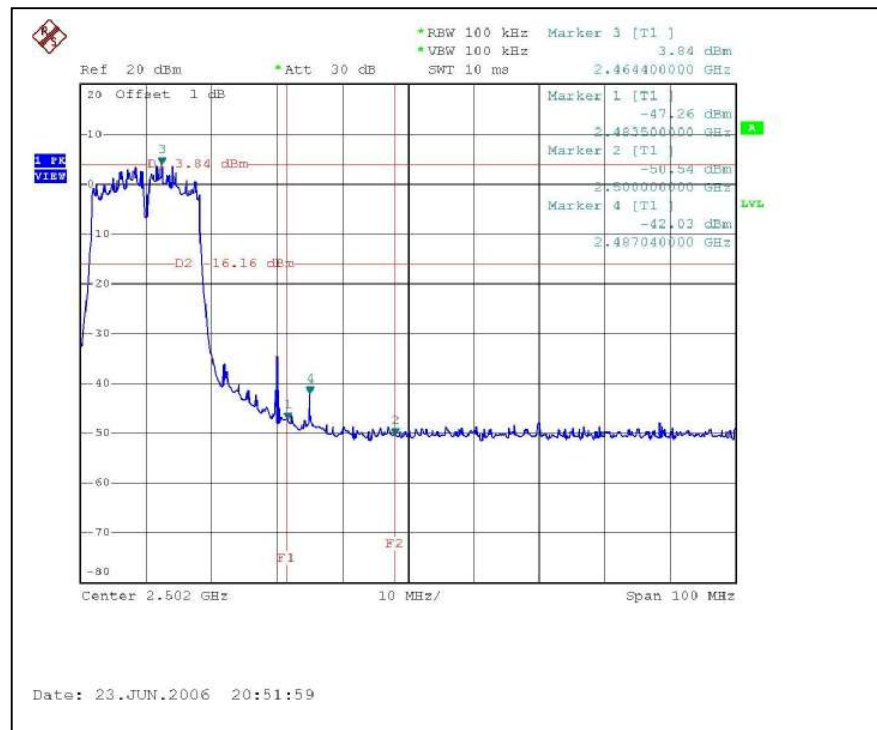
CH11



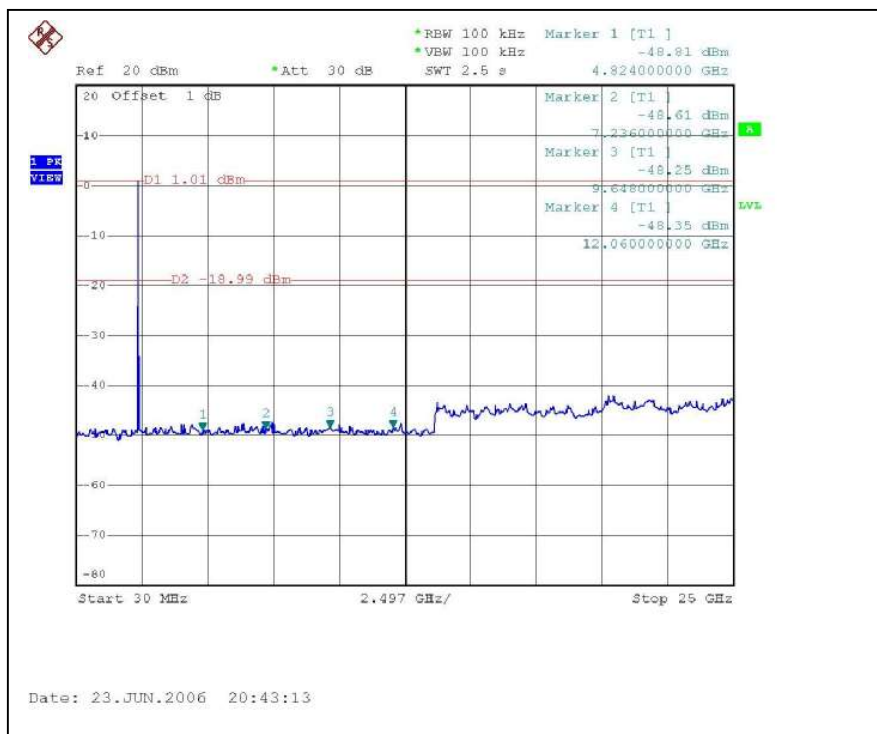
## 802.11g OFDM MODULATION: CH1



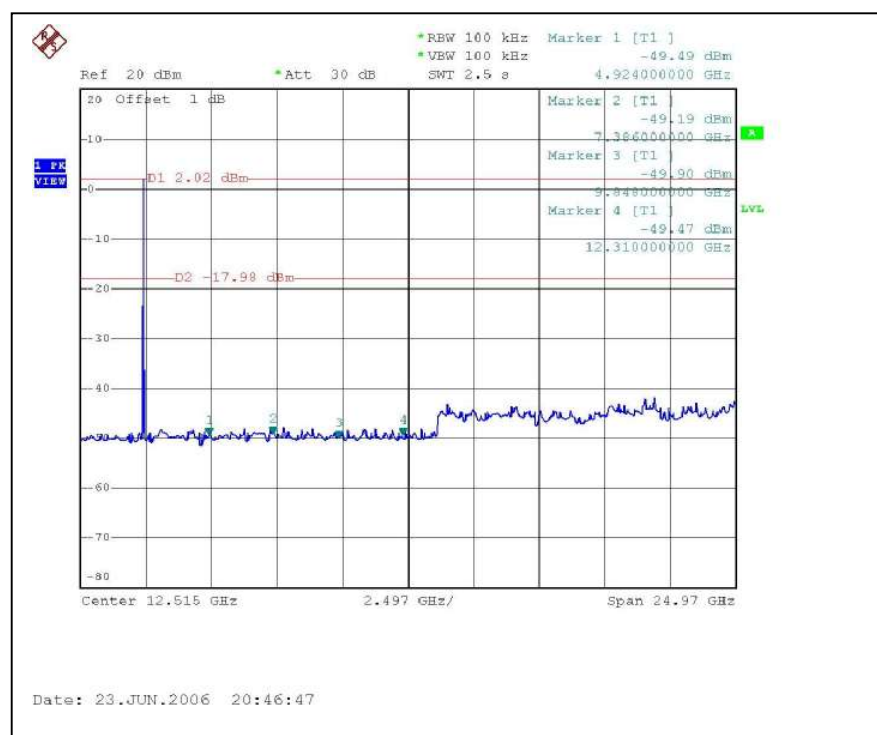
## CH11



CH1



CH11



## 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

There are two antennas provided to this EUT, please refer to the following table:

| No. | Antenna Description    | Antenna Type                             | Gain   | Connector    |
|-----|------------------------|------------------------------------------|--------|--------------|
| 1   | Chip Antenna           | 1. Chip Antenna<br>2. Internal Antenna   | 4.1dBi | No Connector |
| 2   | Extended Range Antenna | 1. Dipole Antenna<br>2. External Antenna | 3dBi   | Reverse SMA  |

## 5 PHOTOGRAPHS OF THE TEST CONFIGURATION

### CONDUCTED EMISSION TEST



## RADIATED EMISSION TEST (with Antenna 1)



## RADIATED EMISSION TEST (with Antenna 2)



## 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:

**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

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

## **APPENDIX-A**

### **MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB**

No any modifications are made to the EUT by the lab during the test.