

# FCC RF Test Report

APPLICANT : Inventec Corporation  
EQUIPMENT : PDA Phone  
BRAND NAME : Opticon  
MODEL NAME : H-19A/H-19B  
FCC ID : DGIORCHID1  
STANDARD : FCC Part 15 Subpart C §15.247  
CLASSIFICATION : Digital Transmission System (DTS)

The product was received on Apr. 10, 2010 and completely tested on May 07, 2010. We, SPORTON INTERNATIONAL INC., would like to declare that the tested sample has been evaluated in accordance with the procedures given in ANSI C63.4-2003 and shown the compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL INC., the test report shall not be reproduced except in full.

Reviewed by:



Roy Wu / Manager



**SPORTON INTERNATIONAL INC.**

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SPORTON INTERNATIONAL INC.

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FCC ID : DGIORCHID1

Page Number : 1 of 61

Report Issued Date : Jun. 04, 2010

Report Version : Rev. 01



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## REVISION HISTORY

| REPORT NO. | VERSION | DESCRIPTION             | ISSUED DATE   |
|------------|---------|-------------------------|---------------|
| FR041004B  | Rev. 01 | Initial issue of report | Jun. 04, 2010 |
|            |         |                         |               |
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|            |         |                         |               |

## SUMMARY OF TEST RESULT

| Report Section | FCC Rule              | IC Rule   | Description                   | Limit                    | Result | Remark                                   |
|----------------|-----------------------|-----------|-------------------------------|--------------------------|--------|------------------------------------------|
| 3.1            | 15.247(a)(2)          | A8.2(a)   | 6dB Bandwidth                 | $\geq 0.5\text{MHz}$     | Pass   | -                                        |
| 3.2            | 15.247(b)             | A8.4      | Power Output                  | $\leq 30\text{dBm}$      | Pass   | -                                        |
| 3.3            | 15.247(d)             | A8.5      | Frequency Band Edges          | $\leq 20\text{dBc}$      | Pass   | -                                        |
| 3.4            | 15.247(d)             | A8.5      | Spurious Emission             | $< 20\text{ dBc}$        | Pass   | -                                        |
| 3.5            | 15.247(e)             | A8.2(b)   | Power Spectral Density        | $\leq 8\text{dBm}$       | Pass   | -                                        |
| 3.6            | 15.207                | Gen 7.2.2 | AC Conducted Emission         | 15.207(a)                | Pass   | Under limit<br>21.9 dB at<br>0.422 MHz   |
| 3.7            | 15.247(d)             | A8.5      | Transmitter Radiated Emission | 15.209(a) &<br>15.247(d) | Pass   | Under limit<br>3.08 dB at<br>2483.50 MHz |
| 3.8            | 15.203 &<br>15.247(b) | A8.4      | Antenna Requirement           | N/A                      | Pass   | -                                        |

# 1 General Description

## 1.1 Applicant

Inventec Corporation

Inventec Building, No. 66, Hou-Kang Street, Shihlin District, Taipei 11170, Taiwan

## 1.2 Manufacturer

Inventec Corporation

Inventec Building, No. 66, Hou-Kang Street, Shihlin District, Taipei 11170, Taiwan

## 1.3 Feature of Equipment Under Test

| Product Feature & Specification   |                                                                                    |
|-----------------------------------|------------------------------------------------------------------------------------|
| Equipment                         | PDA Phone                                                                          |
| Brand Name                        | Opticon                                                                            |
| Model Name                        | H-19A/H-19B                                                                        |
| FCC ID                            | DGIORCHID1                                                                         |
| Sample A                          | H-19A with Scanner 1                                                               |
| Sample B                          | H-19B with Scanner 2                                                               |
| Tx/Rx Frequency Range             | 2400 MHz ~ 2483.5 MHz                                                              |
| Number of Channels                | 11                                                                                 |
| Carrier Frequency of Each Channel | 2412+(n-1)*5 MHz; n=1~11                                                           |
| Channel Spacing                   | 5 MHz                                                                              |
| Maximum Output Power to Antenna   | 802.11b : 17.72 dBm (59.16 mW)<br>802.11g : 20.72 dBm (118.03 mW)                  |
| Antenna Type                      | PIFA Antenna with gain -7 dBi                                                      |
| HW Version                        | ORCHID0223_6050A2351001_MB_X01<br>ORCHID0223_6050A2351501_SUB_X01                  |
| SW Version                        | 0.2.8.2                                                                            |
| Type of Modulation                | 802.11b : DSSS (BPSK / QPSK / CCK)<br>802.11g : OFDM (BPSK / QPSK / 16QAM / 64QAM) |
| EUT Stage                         | Production Unit                                                                    |

### Remark:

1. For other wireless features of this EUT, test report will be issued separately.
2. This test report recorded only product characteristics and test results of Digital Transmission System (DTS).
3. The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.

## 1.4 Testing Site

|                           |                                                                                                                                                              |           |                                |
|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|--------------------------------|
| <b>Test Site</b>          | SPORTON INTERNATIONAL INC.                                                                                                                                   |           |                                |
| <b>Test Site Location</b> | No. 52, Hwa Ya 1 <sup>st</sup> Rd., Hwa Ya Technology Park,<br>Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C.<br>TEL: +886-3-3273456 / FAX: +886-3-3284978 |           |                                |
| <b>Test Site No.</b>      | <b>Sporton Site No.</b>                                                                                                                                      |           | <b>FCC/IC Registration No.</b> |
|                           | CO05-HY                                                                                                                                                      | 03CH07-HY | TW1022/4086B-1                 |

## 1.5 Applied Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- ♦ FCC Part 15 Subpart C §15.247
- ♦ FCC KDB Publication No. 558074 (Measurement Guidelines of DTS)
- ♦ ANSI C63.4-2003
- ♦ IC RSS-210 Issue 7

### Remark:

1. All test items were verified and recorded according to the standards and without any deviation during the test.
2. This EUT has also been tested and complied with the requirements of FCC Part 15, Subpart B (DoC), recorded in a separate test report.

## 1.6 Ancillary Equipment List

| Item | Equipment          | Trade Name | Model Name  | FCC ID      | Data Cable | Power Cord                                                 |
|------|--------------------|------------|-------------|-------------|------------|------------------------------------------------------------|
| 1.   | System Simulator   | R&S        | CMU 200     | N/A         | N/A        | Unshielded, 1.8 m                                          |
| 2.   | GPS Station        | T&E        | GS-50       | N/A         | N/A        | Unshielded, 1.8 m                                          |
| 3.   | WLAN AP            | D-Link     | DIR-628     | KA2DIR628A2 | N/A        | Unshielded, 1.8 m                                          |
| 4.   | Notebook           | DELL       | Vostro 1510 | FCC DoC     | N/A        | AC I/P:<br>Unshielded, 1.2 m<br>DC O/P:<br>Shielded, 1.8 m |
| 5.   | Bluetooth Earphone | Nokia      | BH-102      | PYAHS-107W  | N/A        | N/A                                                        |

## 2 Test Configuration of Equipment Under Test

### 2.1 RF Power

Preliminary tests were performed in different data rate and recorded the RF power output in the following table:

| Channel | Frequency | 2.4GHz 802.11b RF Power (dBm) |        |          |         |         |
|---------|-----------|-------------------------------|--------|----------|---------|---------|
|         |           | At DSSS Data Rate             |        |          |         |         |
|         |           | 1 Mbps                        | 2 Mbps | 5.5 Mbps | 11 Mbps | 22 Mbps |
| CH 01   | 2412 MHz  | 17.20                         | 17.03  | 16.56    | 17.02   | 17.13   |
| CH 06   | 2437 MHz  | 17.21                         | 16.52  | 16.51    | 16.98   | 17.02   |
| CH 11   | 2462 MHz  | <b>17.72</b>                  | 17.05  | 16.79    | 16.84   | 16.84   |

| Channel | Frequency | 2.4GHz 802.11g RF Power (dBm) |        |         |         |         |         |         |         |              |
|---------|-----------|-------------------------------|--------|---------|---------|---------|---------|---------|---------|--------------|
|         |           | At OFDM Data Rate             |        |         |         |         |         |         |         |              |
|         |           | 6 Mbps                        | 9 Mbps | 12 Mbps | 18 Mbps | 24 Mbps | 36 Mbps | 48 Mbps | 54 Mbps | 72 Mbps      |
| CH 01   | 2412 MHz  | 15.48                         | 20.54  | 20.50   | 20.57   | 20.61   | 20.61   | 20.53   | 20.58   | <b>20.72</b> |
| CH 06   | 2437 MHz  | 16.45                         | 20.34  | 20.32   | 20.25   | 20.36   | 20.34   | 20.18   | 20.17   | 20.36        |
| CH 11   | 2462 MHz  | 17.67                         | 19.82  | 19.58   | 19.56   | 19.70   | 19.73   | 19.58   | 19.41   | 19.56        |

**Remark:**

1. The data rates of WLAN 802.11b/g were set in 1Mbps for 802.11b and 72Mbps for 802.11g, for all the test cases due to the highest RF output power.
2. The EUT is programmed to transmit signals continuously for all testing.

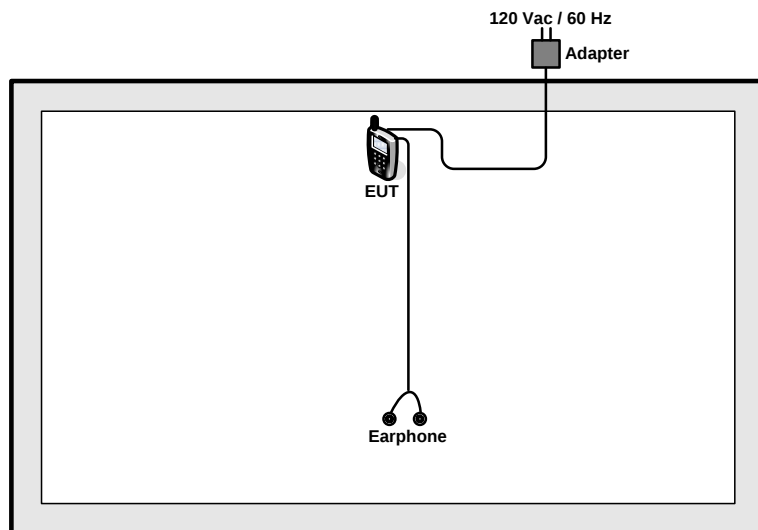
## 2.2 Test Mode

The EUT has been associated with peripherals pursuant to ANSI C63.4-2003 and configuration operated in a manner tended to maximize its emission characteristics in a typical application. Frequency range investigated: conducted emission (150 kHz to 30 MHz), radiated emission (30 MHz to the 10th harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower). Pre-scanned tests were conducted to determine the final configuration from all possible combinations. The following tables are showing the test modes as the worst cases and recorded in this report.

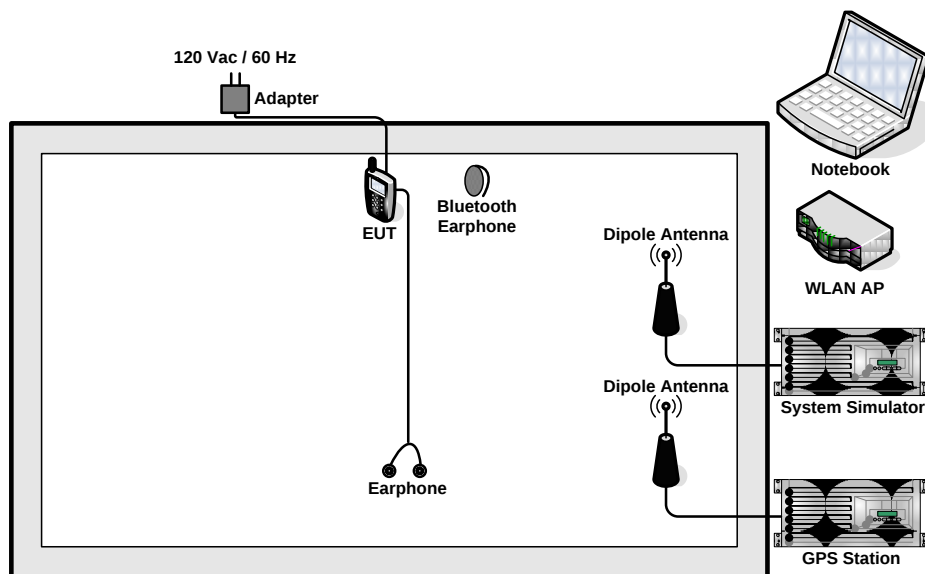
| Test Cases                                                                                     |                                                                                            |                                             |
|------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|---------------------------------------------|
| Test Item                                                                                      | 802.11b                                                                                    | 802.11g                                     |
| Conducted TCs                                                                                  | Mode 1 : 802.11b CH01_2412 MHz                                                             | Mode 4 : 802.11g CH01_2412 MHz              |
|                                                                                                | Mode 2 : 802.11b CH06_2437 MHz                                                             | Mode 5 : 802.11g CH06_2437 MHz              |
|                                                                                                | Mode 3 : 802.11b CH11_2462 MHz                                                             | Mode 6 : 802.11g CH11_2462 MHz              |
| Radiated TCs                                                                                   | Mode 1 : 802.11b CH01_2412 MHz for Sample B                                                | Mode 4 : 802.11g CH01_2412 MHz for Sample B |
|                                                                                                | Mode 2 : 802.11b CH06_2437 MHz for Sample B                                                | Mode 5 : 802.11g CH06_2437 MHz for Sample B |
|                                                                                                | Mode 3 : 802.11b CH11_2462 MHz for Sample B                                                | Mode 6 : 802.11g CH11_2462 MHz for Sample B |
|                                                                                                |                                                                                            | Mode 7 : 802.11g CH11_2462 MHz for Sample A |
| AC Conducted Emission                                                                          | Mode 1 : Sample B + GSM850 Idle + Bluetooth Link + WLAN Link + GPS Rx + Earphone + Adapter |                                             |
|                                                                                                | Mode 2 :Sample A + GSM1900 Idle + Bluetooth Link + WLAN Link + MPEG4 + Earphone + Adapter  |                                             |
| Remark: The worst case of conducted emission is mode 2; only the test data of it was reported. |                                                                                            |                                             |

## 2.3 Connection Diagram of Test System

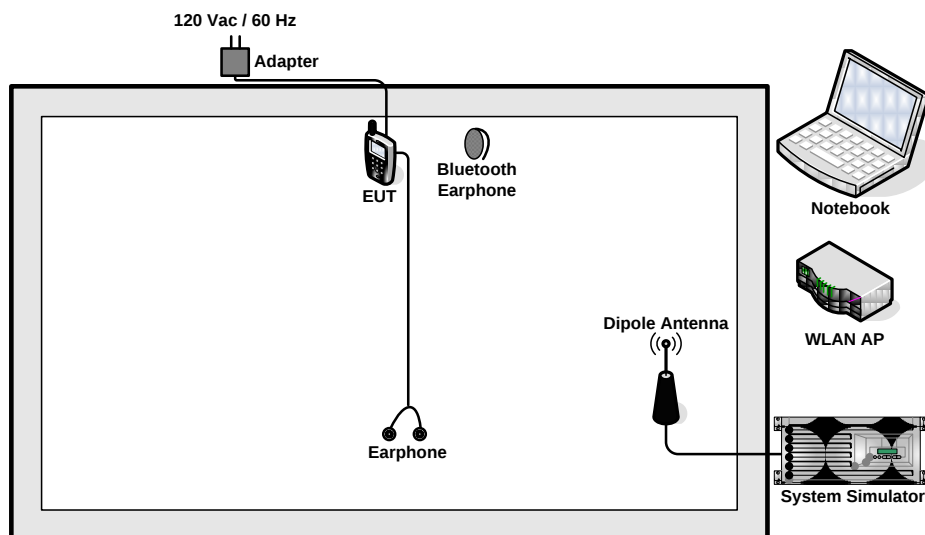
<WLAN Tx Mode>



<EUT with Adapter for GPS Rx Mode>



### <EUT with Adapter Mode>



## 2.4 RF Utility

The programmed RF utility, "RF Test(24XXC)" is installed in EUT to provide channel selection, power level, data rate and the application type. RF Utility can send transmitting signal for all testing. The RF output power selection is for the setting of RF output power expected by the customer and is going to be fixed on the firmware of the final end product.

### 3 Test Result

#### 3.1 6dB Bandwidth Measurement

##### 3.1.1 Limit of 6dB Bandwidth

The minimum 6 dB bandwidth shall be at least 500 kHz.

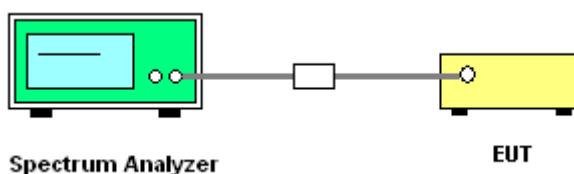
##### 3.1.2 Measuring Instruments

See list of measuring instruments of this test report.

##### 3.1.3 Test Procedures

1. The testing follows FCC KDB Publication No. 558074 (Measurement Guidelines of DTS).
2. The RF output of EUT was connected to the spectrum analyzer by a low loss cable.
3. Make the measurement with the spectrum analyzer's resolution bandwidth (RBW) = 100 kHz.  
In order to make an accurate measurement, set the span greater than RBW. The 6 dB bandwidth must be greater than 500 kHz.
4. The marker-delta reading at this point is the 6 dB bandwidth of the emission.

##### 3.1.4 Test Setup



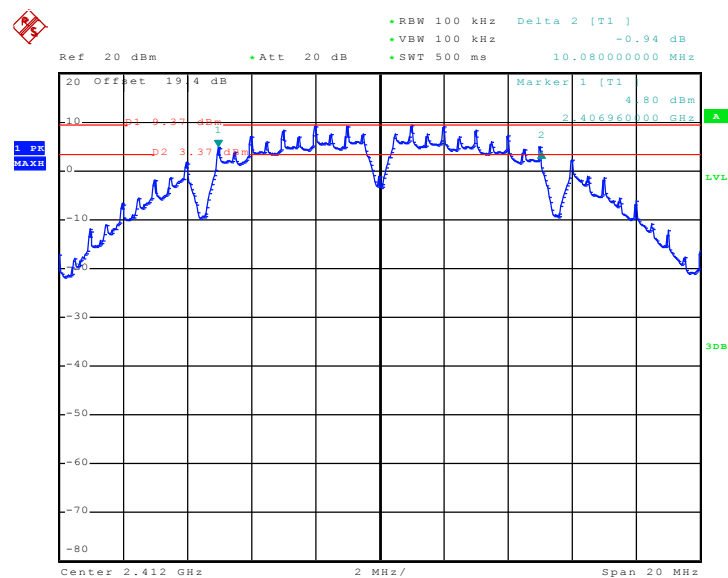


## 3.1.5 Test Result of 6dB Bandwidth

|                 |               |                     |        |
|-----------------|---------------|---------------------|--------|
| Test Mode :     | Mode 1, 2, 3  | Temperature :       | 25~27℃ |
| Test Engineer : | Lancelot Chen | Relative Humidity : | 47~50% |

| Channel | Frequency<br>(MHz) | 802.11b<br>6dB Bandwidth (MHz) | 6dB Bandwidth<br>Min. Limit (MHz) | Pass/Fail |
|---------|--------------------|--------------------------------|-----------------------------------|-----------|
| 01      | 2412               | 10.08                          | 0.5                               | Pass      |
| 06      | 2437               | 10.12                          | 0.5                               | Pass      |
| 11      | 2462               | 10.12                          | 0.5                               | Pass      |

Mode 1 : 6 dB Bandwidth Plot on 802.11b Channel 01



Date: 21.APR.2010 10:00:29



Ref 20 dBm Att 20 dB RBW 100 kHz VBW 100 kHz SWT 500 ms Delta 2 [T1] 0.01 dB 10.12000000 MHz

20 Offset 19.4 dB

Marker 1 [T1] 2.17 dBm 2.43192000 GHz

p1 7.9 dBm p2 1.9 dBm

Center 2.437 GHz 2 MHz/ Span 20 MHz

Date: 21 . APR . 2010 10:05:00

Ref 20 dBm      Att 20 dB      RBW 100 kHz      VBW 100 kHz      SWT 500 ms      Delta 2 [T1]      1.120000000 MHz

20 Off set 19.4 dB

Marker 1 1 98 dBm  
2.45692000 GHz

P1 7.6 dBm  
P2 1.6 dBm

1 2

Center 2.462 GHz      2 MHz/      Span 20 MHz

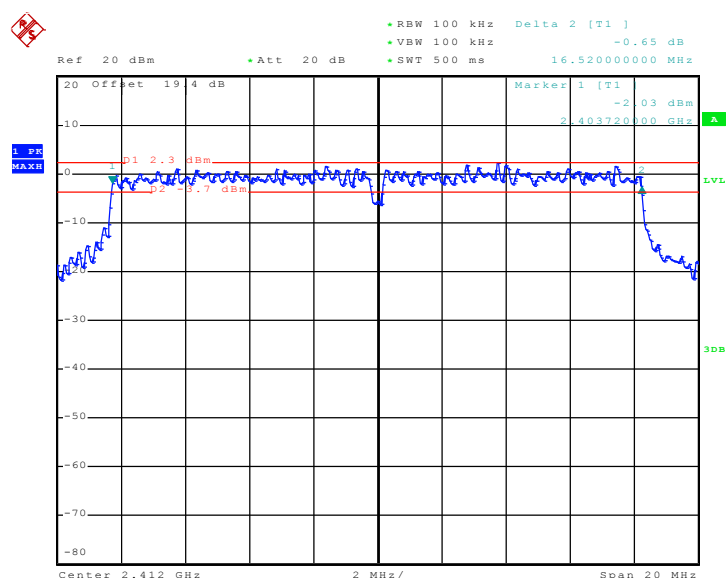
Date: 21.APR.2010 10:06:02



|                        |               |                            |         |
|------------------------|---------------|----------------------------|---------|
| <b>Test Mode :</b>     | Mode 4, 5, 6  | <b>Temperature :</b>       | 25~27°C |
| <b>Test Engineer :</b> | Lancelot Chen | <b>Relative Humidity :</b> | 47~50%  |

| Channel | Frequency<br>(MHz) | 802.11g<br>6dB Bandwidth (MHz) | 6dB Bandwidth<br>Min. Limit (MHz) | Pass/Fail |
|---------|--------------------|--------------------------------|-----------------------------------|-----------|
| 01      | 2412               | 16.52                          | 0.5                               | Pass      |
| 06      | 2437               | 16.52                          | 0.5                               | Pass      |
| 11      | 2462               | 16.40                          | 0.5                               | Pass      |

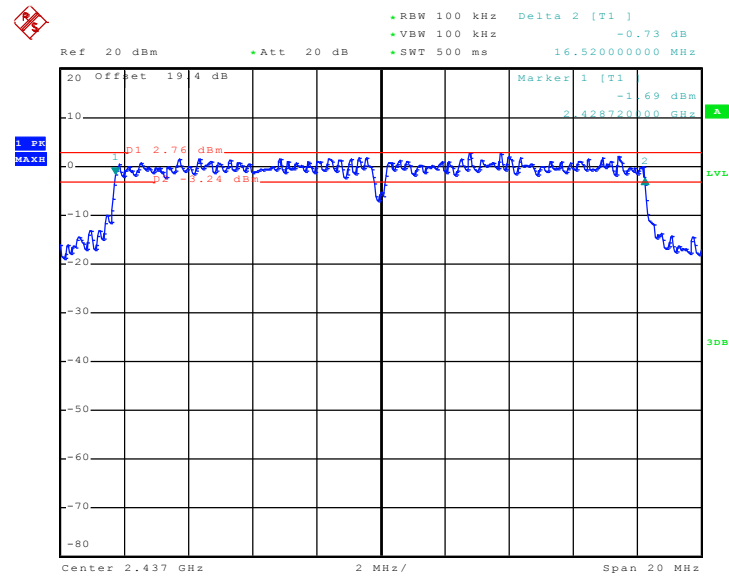
**Mode 4 : 6 dB Bandwidth Plot on 802.11g Channel 01**



Date: 21.APR.2010 10:46:32

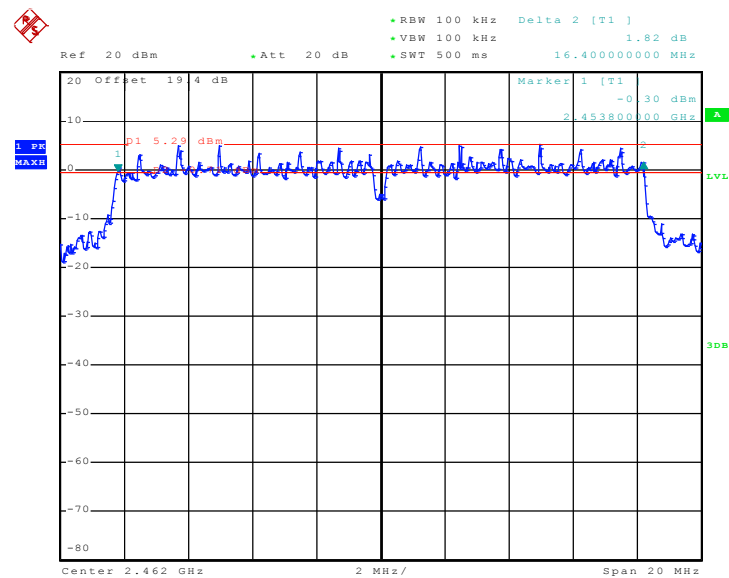


Mode 5 : 6 dB Bandwidth Plot on 802.11g Channel 06



Date: 21.APR.2010 10:59:05

Mode 6 : 6 dB Bandwidth Plot on 802.11g Channel 11



Date: 21.APR.2010 11:00:59

## 3.2 Output Power Measurement

### 3.2.1 Limit of Output Power

For systems using digital modulation in the 2400-2483.5MHz, the limit for peak output power is 30dBm. If transmitting antenna of directional gain greater than 6dBi are used the peak output power from the intentional radiator shall be reduced below the above stated value by the amount in dB that the directional gain of the antenna exceeds 6 dBi. In case of point-to-point operation, the limit has to be reduced by 1dB for every 3dB that the directional gain of the antenna exceeds 6dBi.

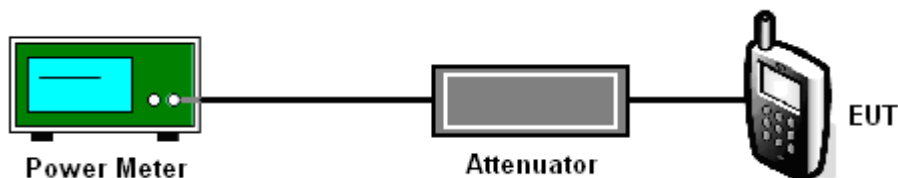
### 3.2.2 Measuring Instruments

See list of measuring instruments of this test report.

### 3.2.3 Test Procedures

1. The testing follows FCC KDB Publication No. 558074 (Measurement Guidelines of DTS).
2. The RF output of EUT was connected to the power meter by a low loss cable.
3. Measure the power by power meter.

### 3.2.4 Test Setup



**3.2.5 Test Result of Output Power**

|                        |               |                            |        |
|------------------------|---------------|----------------------------|--------|
| <b>Test Mode :</b>     | Mode 1, 2, 3  | <b>Temperature :</b>       | 25~27℃ |
| <b>Test Engineer :</b> | Lancelot Chen | <b>Relative Humidity :</b> | 47~50% |

| Channel | Frequency<br>(MHz) | 802.11b<br>Measured Output Power (dBm) | Max. Limits<br>(dBm) | Pass/Fail |
|---------|--------------------|----------------------------------------|----------------------|-----------|
| 01      | 2412               | 17.20                                  | 30                   | Pass      |
| 06      | 2437               | 17.21                                  | 30                   | Pass      |
| 11      | 2462               | 17.72                                  | 30                   | Pass      |

|                        |               |                            |        |
|------------------------|---------------|----------------------------|--------|
| <b>Test Mode :</b>     | Mode 4, 5, 6  | <b>Temperature :</b>       | 25~27℃ |
| <b>Test Engineer :</b> | Lancelot Chen | <b>Relative Humidity :</b> | 47~50% |

| Channel | Frequency<br>(MHz) | 802.11g<br>Measured Output Power (dBm) | Max. Limits<br>(dBm) | Pass/Fail |
|---------|--------------------|----------------------------------------|----------------------|-----------|
| 01      | 2412               | 20.72                                  | 30                   | Pass      |
| 06      | 2437               | 20.36                                  | 30                   | Pass      |
| 11      | 2462               | 19.56                                  | 30                   | Pass      |

### 3.3 Band Edges Measurement

#### 3.3.1 Limit of Band Edges

In any 100 kHz bandwidth outside the intentional radiation frequency band, the radio frequency power shall be at least 20 dB below the highest level of the radiated power. If the output power of this device was measured by spectrum analyzer, the attenuation under this paragraph shall be 30 dB instead of 20 dB.

#### 3.3.2 Measuring Instruments

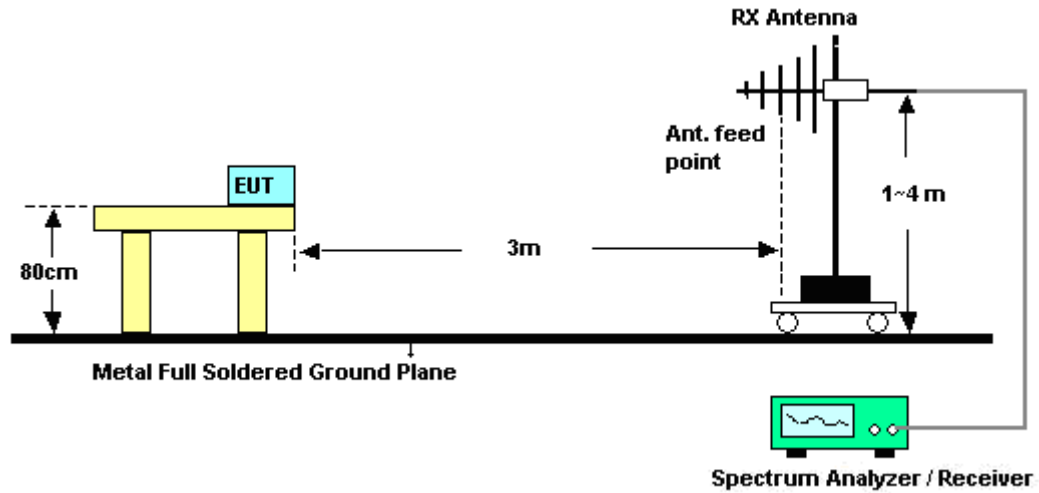
See list of measuring instruments of this test report.

#### 3.3.3 Test Procedures

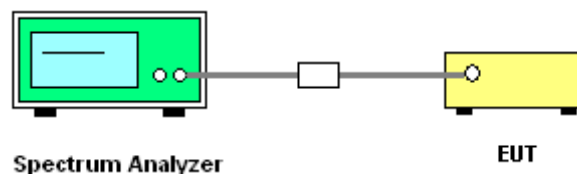
1. The testing follows the guidelines in ANSI C63.4-2003 and FCC KDB Publication No. 558074 (Measurement Guidelines of DTS).
2. Conducted emission test: Set RBW = 100 kHz, Video bandwidth (VBW)  $\geq$  RBW. Band edge emissions must be at least 20 dB down from the highest emission level within the authorized band as measured with a 100 kHz RBW. Note: If the device complies with the use of power option 2 the attenuation under this paragraph shall be 30 dB instead of 20 dB.
3. Radiated emission test: Apply to band edge emissions that fall in the restricted bands listed in FCC Section 15.205. The maximum permitted average field strength is listed in FCC Section 15.209. A pre-amp is necessary for this measurement. For measurements above 1 GHz, set RBW = 1MHz, VBW = 10 Hz, Sweep=Auto. If the emission is pulsed, modify the unit for continuous operation; use the settings shown above, then correct the reading by subtracting the peak-average correction factor, derived from the appropriate duty cycle calculation as in FCC Section 15.35(b) and (c).

### 3.3.4 Test Setup

#### <Radiated Band Edges>



#### <Conducted Band Edges>



### 3.3.5 Test Result of Radiated Band Edges

|                       |         |                            |            |
|-----------------------|---------|----------------------------|------------|
| <b>Test Mode :</b>    | Mode 1  | <b>Temperature :</b>       | 22~24℃     |
| <b>Test Band :</b>    | 802.11b | <b>Relative Humidity :</b> | 48~49%     |
| <b>Test Channel :</b> | 01      | <b>Test Engineer :</b>     | Ivan Jiang |

| ANTENNA POLARITY : HORIZONTAL |                     |                         |                             |                           |                             |                         |                            |                      |                         |         |
|-------------------------------|---------------------|-------------------------|-----------------------------|---------------------------|-----------------------------|-------------------------|----------------------------|----------------------|-------------------------|---------|
| Frequency<br>( MHz )          | Level<br>( dBuV/m ) | Over<br>Limit<br>( dB ) | Limit<br>Line<br>( dBuV/m ) | Read<br>Level<br>( dBuV ) | Antenna<br>Factor<br>( dB ) | Cable<br>Loss<br>( dB ) | Preamp<br>Factor<br>( dB ) | Ant<br>Pos<br>( cm ) | Table<br>Pos<br>( deg ) | Remark  |
| 2386.38                       | 52.24               | -21.76                  | 74                          | 48.8                      | 32.13                       | 5.46                    | 34.15                      | 111                  | 327                     | Peak    |
| 2386.38                       | 42.83               | -11.17                  | 54                          | 39.39                     | 32.13                       | 5.46                    | 34.15                      | 111                  | 327                     | Average |

| ANTENNA POLARITY : VERTICAL |                     |                         |                             |                           |                             |                         |                            |                      |                         |         |
|-----------------------------|---------------------|-------------------------|-----------------------------|---------------------------|-----------------------------|-------------------------|----------------------------|----------------------|-------------------------|---------|
| Frequency<br>( MHz )        | Level<br>( dBuV/m ) | Over<br>Limit<br>( dB ) | Limit<br>Line<br>( dBuV/m ) | Read<br>Level<br>( dBuV ) | Antenna<br>Factor<br>( dB ) | Cable<br>Loss<br>( dB ) | Preamp<br>Factor<br>( dB ) | Ant<br>Pos<br>( cm ) | Table<br>Pos<br>( deg ) | Remark  |
| 2386.38                     | 51.54               | -22.46                  | 74                          | 48.1                      | 32.13                       | 5.46                    | 34.15                      | 104                  | 304                     | Peak    |
| 2386.38                     | 42.08               | -11.92                  | 54                          | 38.64                     | 32.13                       | 5.46                    | 34.15                      | 104                  | 304                     | Average |

|                       |         |                            |            |
|-----------------------|---------|----------------------------|------------|
| <b>Test Mode :</b>    | Mode 3  | <b>Temperature :</b>       | 22~24℃     |
| <b>Test Band :</b>    | 802.11b | <b>Relative Humidity :</b> | 48~49%     |
| <b>Test Channel :</b> | 11      | <b>Test Engineer :</b>     | Ivan Jiang |

| ANTENNA POLARITY : HORIZONTAL |                     |                         |                             |                           |                             |                         |                            |                      |                         |         |
|-------------------------------|---------------------|-------------------------|-----------------------------|---------------------------|-----------------------------|-------------------------|----------------------------|----------------------|-------------------------|---------|
| Frequency<br>( MHz )          | Level<br>( dBuV/m ) | Over<br>Limit<br>( dB ) | Limit<br>Line<br>( dBuV/m ) | Read<br>Level<br>( dBuV ) | Antenna<br>Factor<br>( dB ) | Cable<br>Loss<br>( dB ) | Preamp<br>Factor<br>( dB ) | Ant<br>Pos<br>( cm ) | Table<br>Pos<br>( deg ) | Remark  |
| 2488.22                       | 56.6                | -17.4                   | 74                          | 53.12                     | 32.3                        | 5.37                    | 34.19                      | 104                  | 317                     | Peak    |
| 2488.22                       | 50.38               | -3.62                   | 54                          | 46.9                      | 32.3                        | 5.37                    | 34.19                      | 104                  | 317                     | Average |

| ANTENNA POLARITY : VERTICAL |                     |                         |                             |                           |                             |                         |                            |                      |                         |         |
|-----------------------------|---------------------|-------------------------|-----------------------------|---------------------------|-----------------------------|-------------------------|----------------------------|----------------------|-------------------------|---------|
| Frequency<br>( MHz )        | Level<br>( dBuV/m ) | Over<br>Limit<br>( dB ) | Limit<br>Line<br>( dBuV/m ) | Read<br>Level<br>( dBuV ) | Antenna<br>Factor<br>( dB ) | Cable<br>Loss<br>( dB ) | Preamp<br>Factor<br>( dB ) | Ant<br>Pos<br>( cm ) | Table<br>Pos<br>( deg ) | Remark  |
| 2488.22                     | 56.88               | -17.12                  | 74                          | 53.4                      | 32.3                        | 5.37                    | 34.19                      | 100                  | 303                     | Peak    |
| 2488.22                     | 50.19               | -3.81                   | 54                          | 46.71                     | 32.3                        | 5.37                    | 34.19                      | 100                  | 303                     | Average |



|                       |         |                            |            |
|-----------------------|---------|----------------------------|------------|
| <b>Test Mode :</b>    | Mode 4  | <b>Temperature :</b>       | 22~24℃     |
| <b>Test Band :</b>    | 802.11g | <b>Relative Humidity :</b> | 48~49%     |
| <b>Test Channel :</b> | 01      | <b>Test Engineer :</b>     | Ivan Jiang |

| ANTENNA POLARITY : HORIZONTAL |                     |                         |                             |                           |                             |                         |                            |                      |                         |         |
|-------------------------------|---------------------|-------------------------|-----------------------------|---------------------------|-----------------------------|-------------------------|----------------------------|----------------------|-------------------------|---------|
| Frequency<br>( MHz )          | Level<br>( dBuV/m ) | Over<br>Limit<br>( dB ) | Limit<br>Line<br>( dBuV/m ) | Read<br>Level<br>( dBuV ) | Antenna<br>Factor<br>( dB ) | Cable<br>Loss<br>( dB ) | Preamp<br>Factor<br>( dB ) | Ant<br>Pos<br>( cm ) | Table<br>Pos<br>( deg ) | Remark  |
| 2390                          | 64.33               | -9.67                   | 74                          | 60.9                      | 32.13                       | 5.46                    | 34.16                      | 104                  | 328                     | Peak    |
| 2390                          | 46.67               | -7.33                   | 54                          | 43.24                     | 32.13                       | 5.46                    | 34.16                      | 104                  | 328                     | Average |

| ANTENNA POLARITY : VERTICAL |                     |                         |                             |                           |                             |                         |                            |                      |                         |         |
|-----------------------------|---------------------|-------------------------|-----------------------------|---------------------------|-----------------------------|-------------------------|----------------------------|----------------------|-------------------------|---------|
| Frequency<br>( MHz )        | Level<br>( dBuV/m ) | Over<br>Limit<br>( dB ) | Limit<br>Line<br>( dBuV/m ) | Read<br>Level<br>( dBuV ) | Antenna<br>Factor<br>( dB ) | Cable<br>Loss<br>( dB ) | Preamp<br>Factor<br>( dB ) | Ant<br>Pos<br>( cm ) | Table<br>Pos<br>( deg ) | Remark  |
| 2390                        | 62.44               | -11.56                  | 74                          | 59.01                     | 32.13                       | 5.46                    | 34.16                      | 101                  | 305                     | Peak    |
| 2390                        | 46.47               | -7.53                   | 54                          | 43.04                     | 32.13                       | 5.46                    | 34.16                      | 101                  | 305                     | Average |

|                       |         |                            |            |
|-----------------------|---------|----------------------------|------------|
| <b>Test Mode :</b>    | Mode 6  | <b>Temperature :</b>       | 22~24℃     |
| <b>Test Band :</b>    | 802.11g | <b>Relative Humidity :</b> | 48~49%     |
| <b>Test Channel :</b> | 11      | <b>Test Engineer :</b>     | Ivan Jiang |

| ANTENNA POLARITY : HORIZONTAL |                     |                         |                             |                           |                             |                         |                            |                      |                         |         |
|-------------------------------|---------------------|-------------------------|-----------------------------|---------------------------|-----------------------------|-------------------------|----------------------------|----------------------|-------------------------|---------|
| Frequency<br>( MHz )          | Level<br>( dBuV/m ) | Over<br>Limit<br>( dB ) | Limit<br>Line<br>( dBuV/m ) | Read<br>Level<br>( dBuV ) | Antenna<br>Factor<br>( dB ) | Cable<br>Loss<br>( dB ) | Preamp<br>Factor<br>( dB ) | Ant<br>Pos<br>( cm ) | Table<br>Pos<br>( deg ) | Remark  |
| 2483.5                        | 68.25               | -5.75                   | 74                          | 64.79                     | 32.27                       | 5.38                    | 34.19                      | 103                  | 318                     | Peak    |
| 2483.5                        | 48.23               | -5.77                   | 54                          | 44.77                     | 32.27                       | 5.38                    | 34.19                      | 103                  | 318                     | Average |

| ANTENNA POLARITY : VERTICAL |                     |                         |                             |                           |                             |                         |                            |                      |                         |         |
|-----------------------------|---------------------|-------------------------|-----------------------------|---------------------------|-----------------------------|-------------------------|----------------------------|----------------------|-------------------------|---------|
| Frequency<br>( MHz )        | Level<br>( dBuV/m ) | Over<br>Limit<br>( dB ) | Limit<br>Line<br>( dBuV/m ) | Read<br>Level<br>( dBuV ) | Antenna<br>Factor<br>( dB ) | Cable<br>Loss<br>( dB ) | Preamp<br>Factor<br>( dB ) | Ant<br>Pos<br>( cm ) | Table<br>Pos<br>( deg ) | Remark  |
| 2483.5                      | 70.87               | -3.13                   | 74                          | 67.41                     | 32.27                       | 5.38                    | 34.19                      | 100                  | 296                     | Peak    |
| 2483.5                      | 50.92               | -3.08                   | 54                          | 47.46                     | 32.27                       | 5.38                    | 34.19                      | 100                  | 296                     | Average |



|                       |         |                            |            |
|-----------------------|---------|----------------------------|------------|
| <b>Test Mode :</b>    | Mode 7  | <b>Temperature :</b>       | 22~24℃     |
| <b>Test Band :</b>    | 802.11g | <b>Relative Humidity :</b> | 48~49%     |
| <b>Test Channel :</b> | 11      | <b>Test Engineer :</b>     | Ivan Jiang |

| ANTENNA POLARITY : HORIZONTAL |                     |                         |                             |                           |                             |                         |                            |                      |                         |         |
|-------------------------------|---------------------|-------------------------|-----------------------------|---------------------------|-----------------------------|-------------------------|----------------------------|----------------------|-------------------------|---------|
| Frequency<br>( MHz )          | Level<br>( dBuV/m ) | Over<br>Limit<br>( dB ) | Limit<br>Line<br>( dBuV/m ) | Read<br>Level<br>( dBuV ) | Antenna<br>Factor<br>( dB ) | Cable<br>Loss<br>( dB ) | Preamp<br>Factor<br>( dB ) | Ant<br>Pos<br>( cm ) | Table<br>Pos<br>( deg ) | Remark  |
| 2483.5                        | 60.31               | -13.69                  | 74                          | 56.85                     | 32.27                       | 5.38                    | 34.19                      | 109                  | 3                       | Peak    |
| 2483.5                        | 43.47               | -10.53                  | 54                          | 40.01                     | 32.27                       | 5.38                    | 34.19                      | 109                  | 3                       | Average |

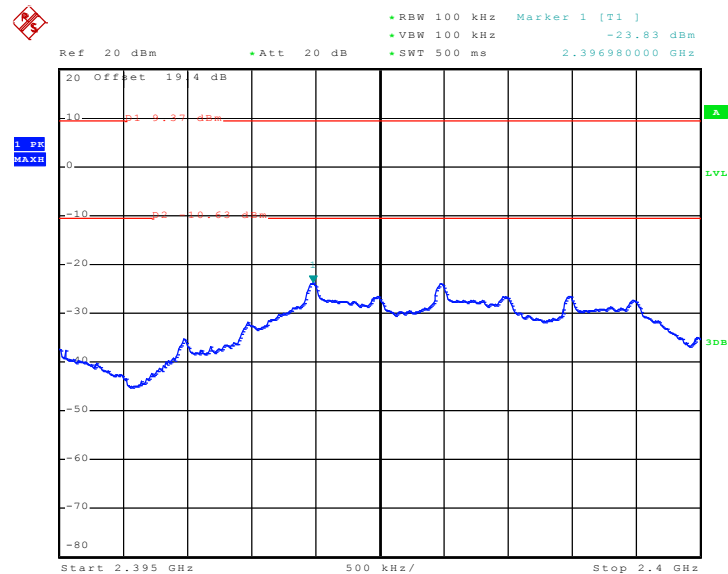
| ANTENNA POLARITY : VERTICAL |                     |                         |                             |                           |                             |                         |                            |                      |                         |         |
|-----------------------------|---------------------|-------------------------|-----------------------------|---------------------------|-----------------------------|-------------------------|----------------------------|----------------------|-------------------------|---------|
| Frequency<br>( MHz )        | Level<br>( dBuV/m ) | Over<br>Limit<br>( dB ) | Limit<br>Line<br>( dBuV/m ) | Read<br>Level<br>( dBuV ) | Antenna<br>Factor<br>( dB ) | Cable<br>Loss<br>( dB ) | Preamp<br>Factor<br>( dB ) | Ant<br>Pos<br>( cm ) | Table<br>Pos<br>( deg ) | Remark  |
| 2483.5                      | 56                  | -18                     | 74                          | 52.54                     | 32.27                       | 5.38                    | 34.19                      | 100                  | 173                     | Peak    |
| 2483.5                      | 40.2                | -13.8                   | 54                          | 36.74                     | 32.27                       | 5.38                    | 34.19                      | 100                  | 173                     | Average |



## 3.3.6 Test Plots of Conducted Band Edges

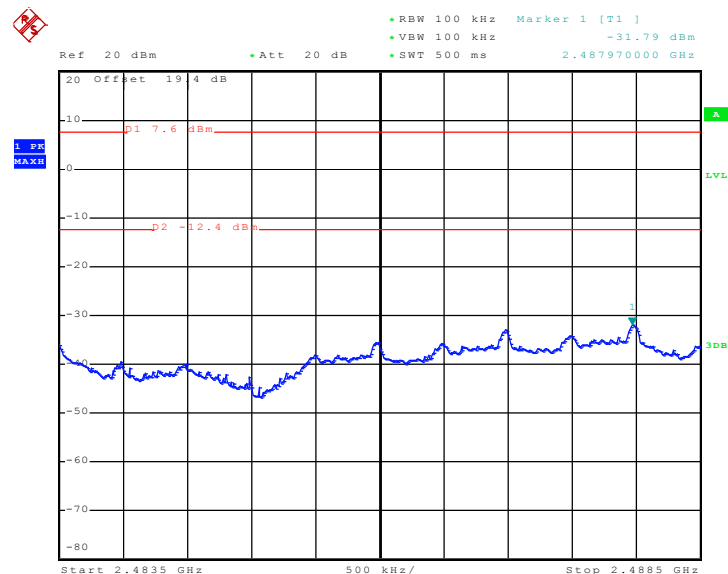
|                |              |                     |               |
|----------------|--------------|---------------------|---------------|
| Test Mode :    | Mode 1 and 3 | Temperature :       | 25~27°C       |
| Test Band :    | 802.11b      | Relative Humidity : | 47~50%        |
| Test Channel : | 01 and 11    | Test Engineer :     | Lancelot Chen |

Low Band Edge Plot on 802.11b Channel 01



Date: 21.APR.2010 10:02:52

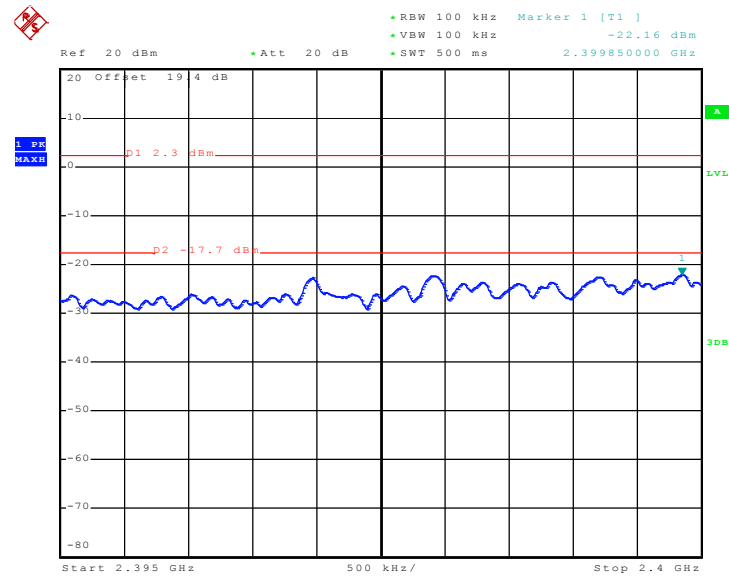
High Band Edge Plot on 802.11b Channel 11



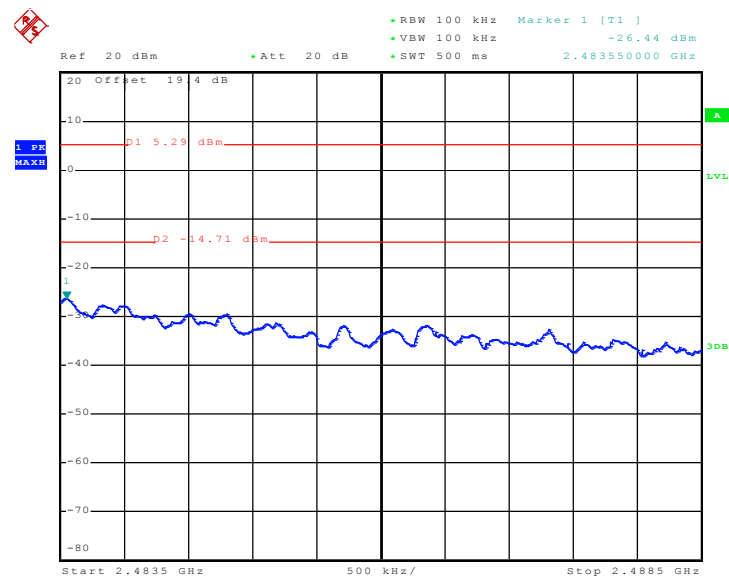
Date: 21.APR.2010 10:07:44



|                |              |                     |               |
|----------------|--------------|---------------------|---------------|
| Test Mode :    | Mode 4 and 6 | Temperature :       | 25~27°C       |
| Test Band :    | 802.11g      | Relative Humidity : | 47~50%        |
| Test Channel : | 01 and 11    | Test Engineer :     | Lancelot Chen |

**Low Band Edge Plot on 802.11g Channel 01**

Date: 21.APR.2010 10:47:27

**High Band Edge Plot on 802.11g Channel 11**

Date: 21.APR.2010 11:01:42

### 3.4 Spurious Emission Measurement

#### 3.4.1 Limit of Spurious Emission Measurement

All harmonics/spurs must be at least 20 dB down from the highest emission level within the authorized band.

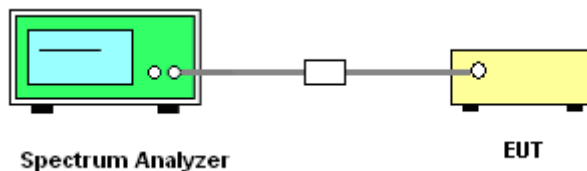
#### 3.4.2 Measuring Instruments

See list of measuring instruments of this test report.

#### 3.4.3 Test Procedure

1. The transmitter output was connected to the spectrum analyzer via a low lose cable.
2. Set RBW = 100 kHz, Video bandwidth (VBW)  $\geq$  RBW, scan up through 10th harmonic. All harmonics/spurs must be at least 20 dB down from the highest emission level within the authorized band as measured with a 100 kHz RBW.

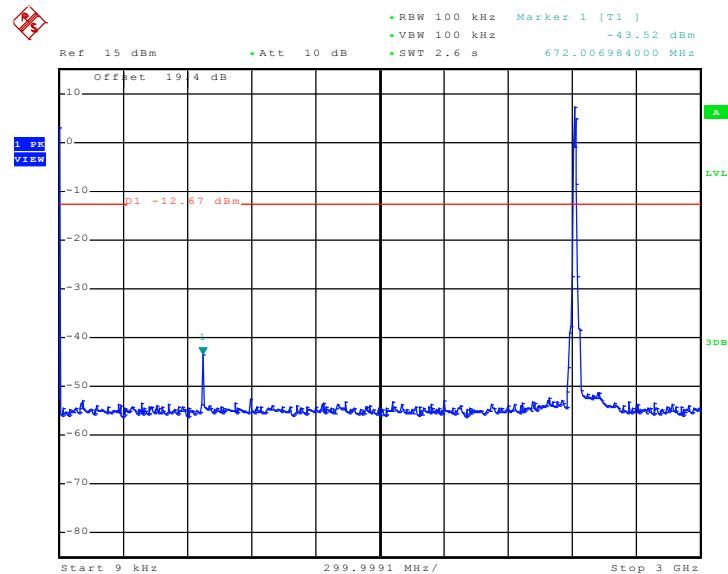
#### 3.4.4 Test Setup



### 3.4.5 Test Plots of Spurious Emission

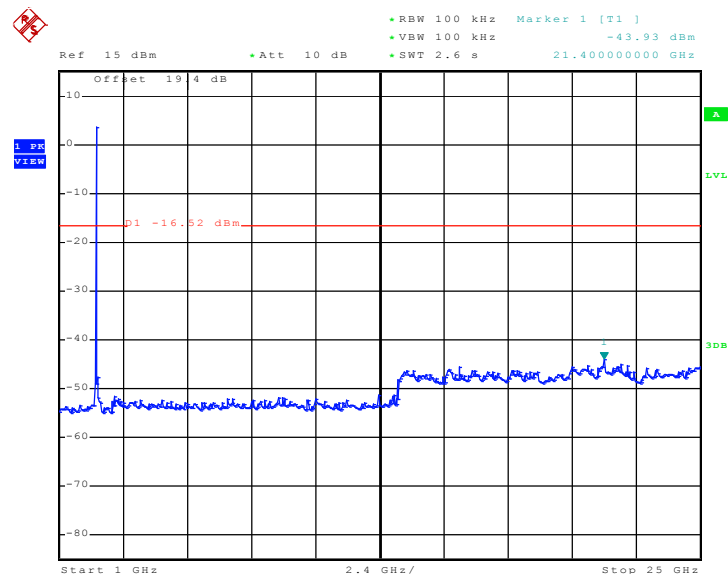
|                |         |                     |               |
|----------------|---------|---------------------|---------------|
| Test Mode :    | Mode 1  | Temperature :       | 25~27°C       |
| Test Band :    | 802.11b | Relative Humidity : | 47~50%        |
| Test Channel : | 01      | Test Engineer :     | Lancelot Chen |

#### Conducted Spurious Emission Plot between 9 kHz ~ 3 GHz



Date: 21.APR.2010 12:18:05

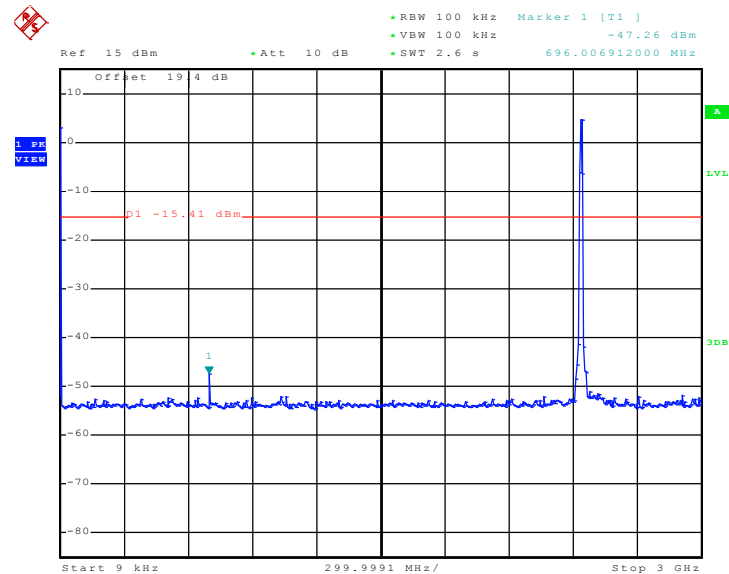
#### Conducted Spurious Emission Plot between 1 GHz ~ 25 GHz



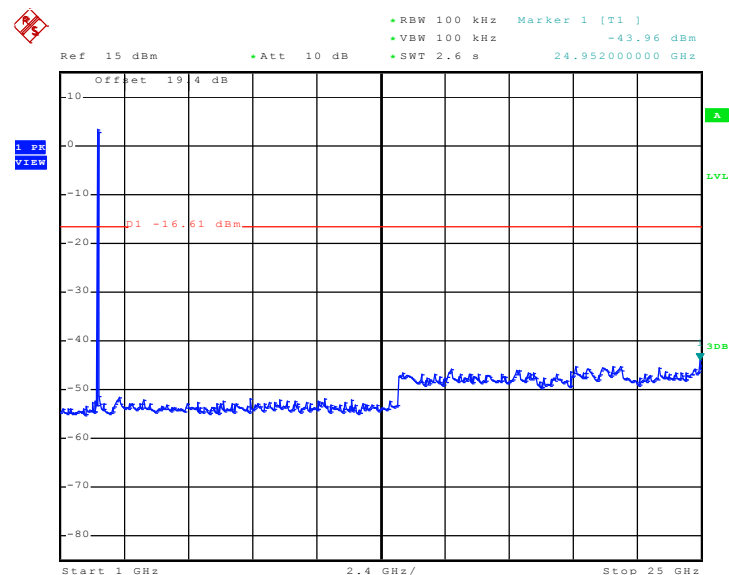
Date: 21.APR.2010 11:44:07



|                |         |                     |               |
|----------------|---------|---------------------|---------------|
| Test Mode :    | Mode 2  | Temperature :       | 25~27°C       |
| Test Band :    | 802.11b | Relative Humidity : | 47~50%        |
| Test Channel : | 06      | Test Engineer :     | Lancelot Chen |

**Conducted Spurious Emission Plot between 9 kHz ~ 3 GHz**

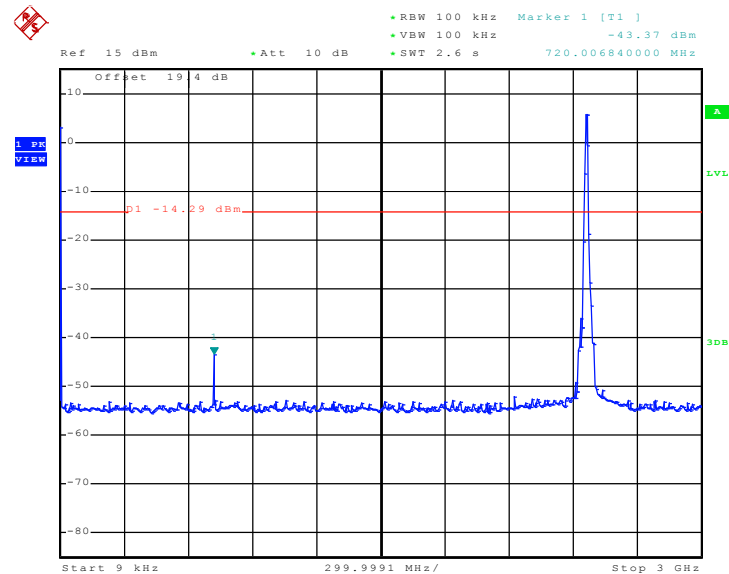
Date: 21.APR.2010 12:22:09

**Conducted Spurious Emission Plot between 1 GHz ~ 25 GHz**

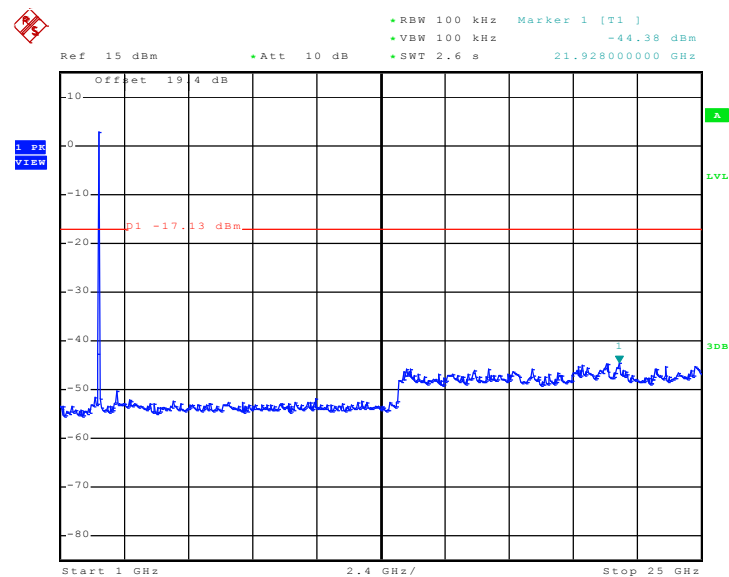
Date: 21.APR.2010 11:45:29



|                |         |                     |               |
|----------------|---------|---------------------|---------------|
| Test Mode :    | Mode 3  | Temperature :       | 25~27°C       |
| Test Band :    | 802.11b | Relative Humidity : | 47~50%        |
| Test Channel : | 11      | Test Engineer :     | Lancelot Chen |

**Conducted Spurious Emission Plot between 9 kHz ~ 3 GHz**

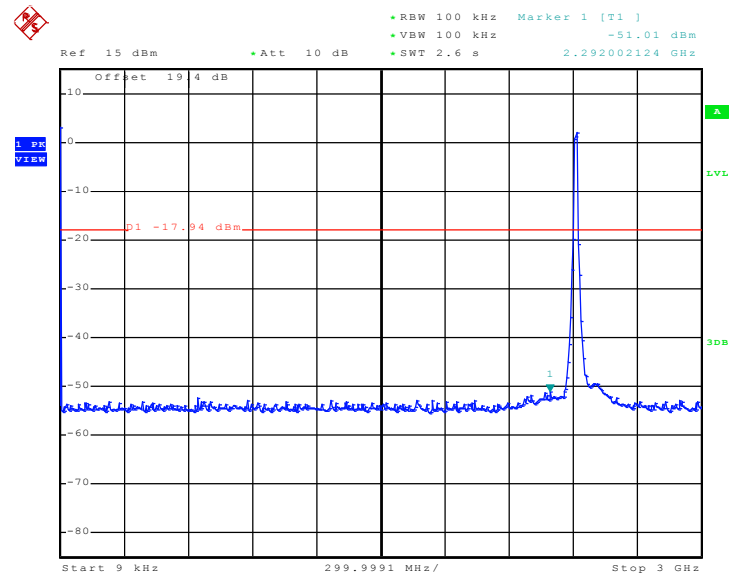
Date: 21.APR.2010 12:15:40

**Conducted Spurious Emission Plot between 1 GHz ~ 25 GHz**

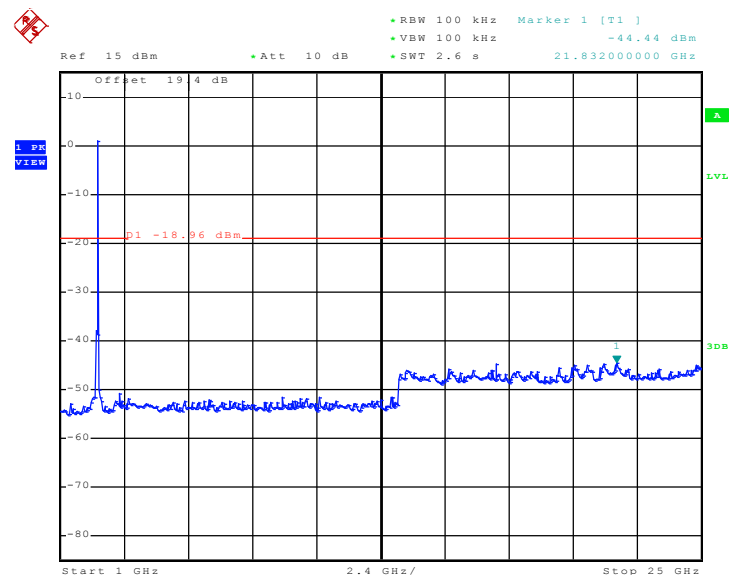
Date: 21.APR.2010 11:46:36



|                |         |                     |               |
|----------------|---------|---------------------|---------------|
| Test Mode :    | Mode 4  | Temperature :       | 25~27°C       |
| Test Band :    | 802.11g | Relative Humidity : | 47~50%        |
| Test Channel : | 01      | Test Engineer :     | Lancelot Chen |

**Conducted Spurious Emission Plot between 9 kHz ~ 3 GHz**

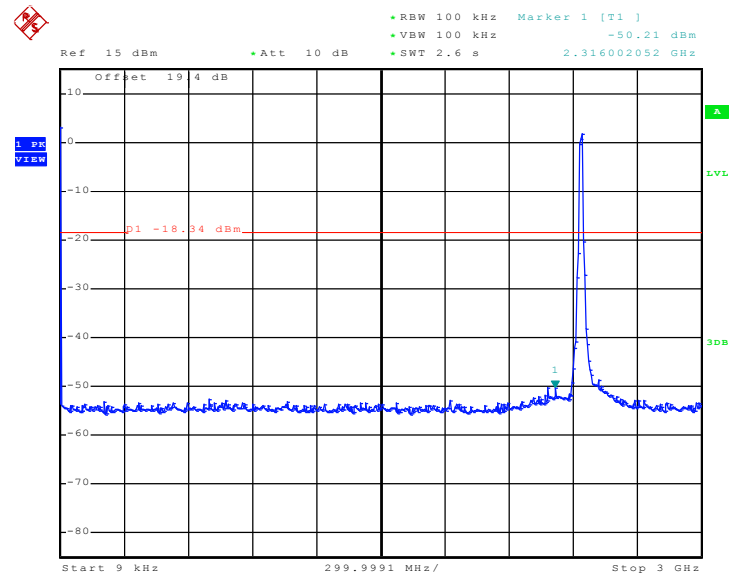
Date: 21.APR.2010 12:23:16

**Conducted Spurious Emission Plot between 1 GHz ~ 25 GHz**

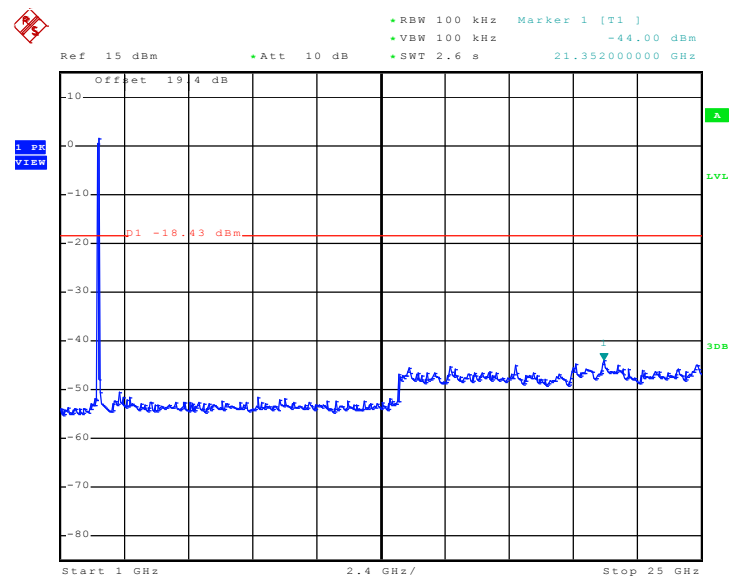
Date: 21.APR.2010 11:51:55



|                |         |                     |               |
|----------------|---------|---------------------|---------------|
| Test Mode :    | Mode 5  | Temperature :       | 25~27°C       |
| Test Band :    | 802.11g | Relative Humidity : | 47~50%        |
| Test Channel : | 06      | Test Engineer :     | Lancelot Chen |

**Conducted Spurious Emission Plot between 9 kHz ~ 3 GHz**

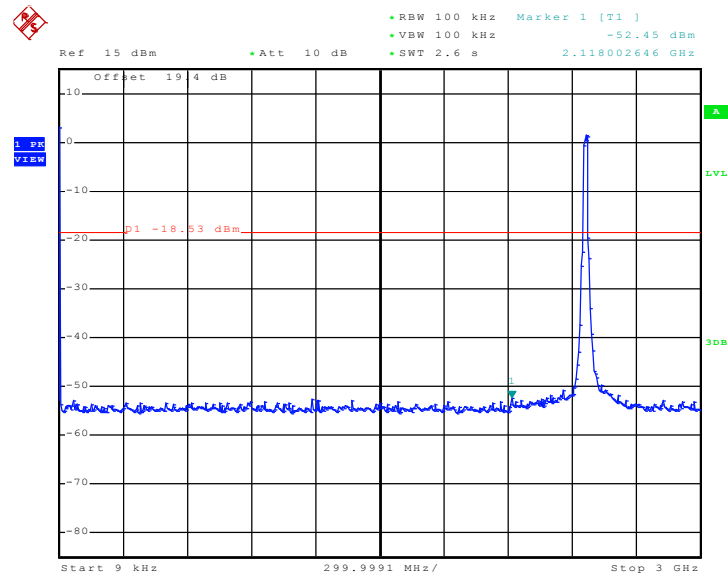
Date: 21.APR.2010 12:08:14

**Conducted Spurious Emission Plot between 1 GHz ~ 25 GHz**

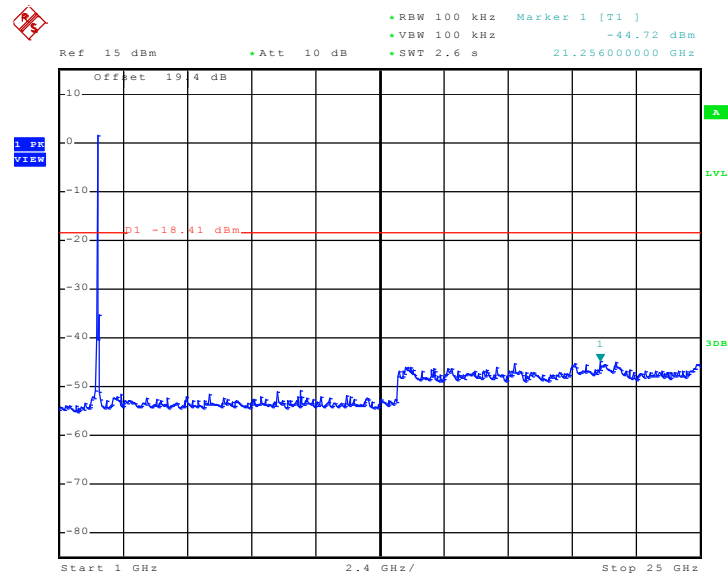
Date: 21.APR.2010 11:55:21



|                |         |                     |               |
|----------------|---------|---------------------|---------------|
| Test Mode :    | Mode 6  | Temperature :       | 25~27°C       |
| Test Band :    | 802.11g | Relative Humidity : | 47~50%        |
| Test Channel : | 11      | Test Engineer :     | Lancelot Chen |

**Conducted Spurious Emission Plot between 9 kHz ~ 3 GHz**

Date: 21.APR.2010 12:07:09

**Conducted Spurious Emission Plot between 1 GHz ~ 25 GHz**

Date: 21.APR.2010 11:57:12

### 3.5 Power Spectral Density Measurement

#### 3.5.1 Limit of Power Spectral Density

The peak power spectral density shall not be greater than 8dBm in any 3kHz band at any time interval of continuous transmission.

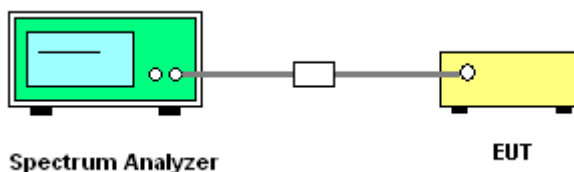
#### 3.5.2 Measuring Instruments

See list of measuring instruments of this test report.

#### 3.5.3 Test Procedures

1. The test follows FCC KDB Publication No. 558074 (Measurement Guidelines of DTS).
2. The RF output of EUT was connected to the spectrum analyzer by a low loss cable.
3. Take the measured data from spectrum analyzer.

#### 3.5.4 Test Setup



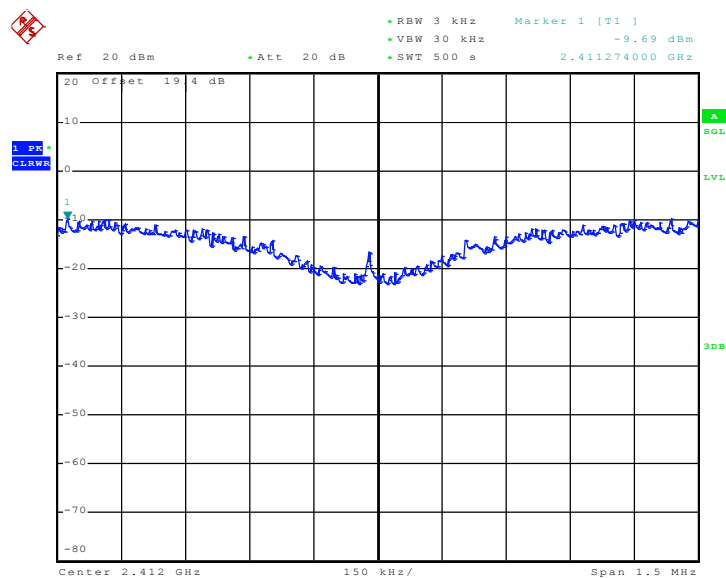


## 3.5.5 Test Result of Power Spectral Density

|                 |               |                     |        |
|-----------------|---------------|---------------------|--------|
| Test Mode :     | Mode 1, 2, 3  | Temperature :       | 25~27℃ |
| Test Engineer : | Lancelot Chen | Relative Humidity : | 47~50% |

| Channel | Frequency (MHz) | 802.11b Measured PSD (dBm) | Max. Limits (dBm) | Pass/Fail |
|---------|-----------------|----------------------------|-------------------|-----------|
| 01      | 2412            | -9.69                      | 8                 | Pass      |
| 06      | 2437            | -9.87                      | 8                 | Pass      |
| 11      | 2462            | -9.29                      | 8                 | Pass      |

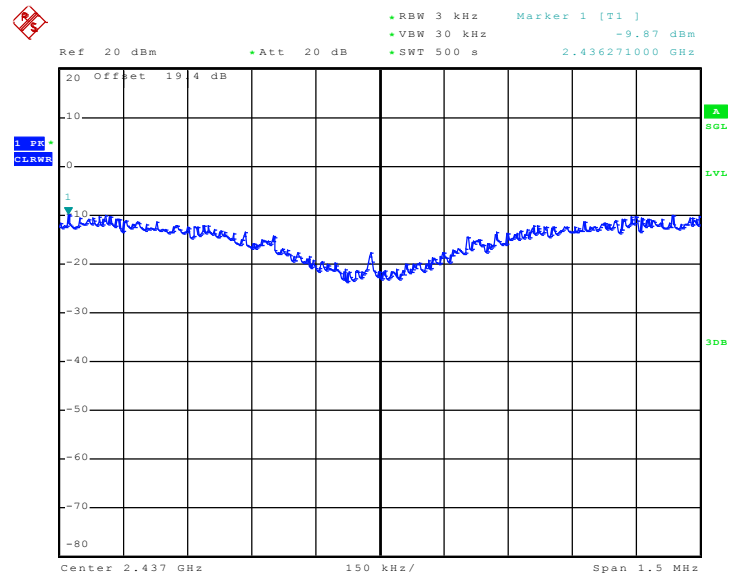
Mode 1 : PSD Plot on 802.11b Channel 01



Date: 22.APR.2010 12:35:51

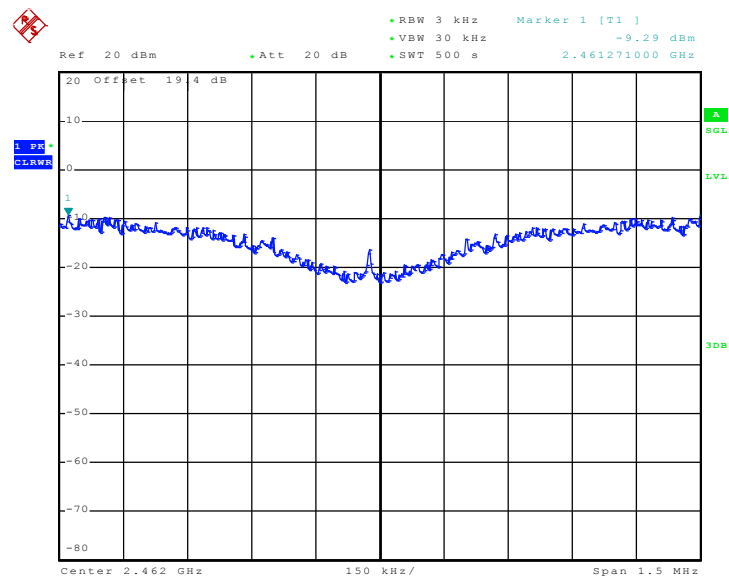


Mode 2 : PSD Plot on 802.11b Channel 06



Date: 22.APR.2010 13:38:13

Mode 3 : PSD Plot on 802.11b Channel 11



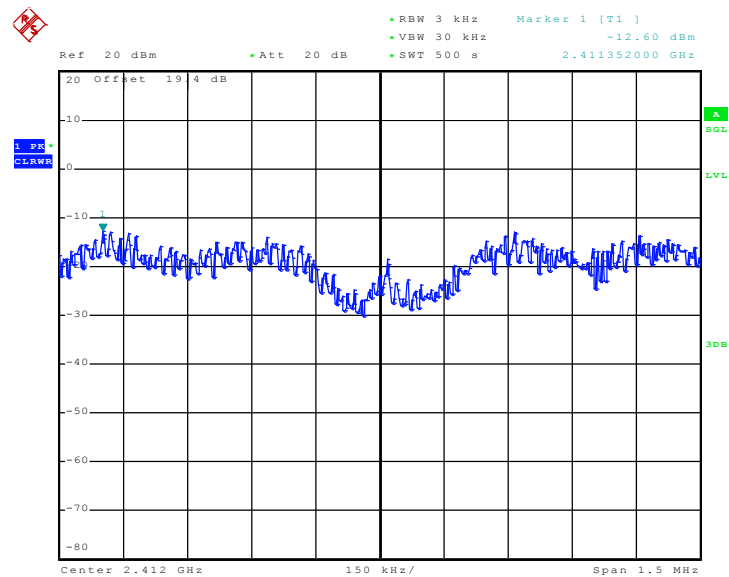
Date: 22.APR.2010 14:41:16



|                        |               |                            |         |
|------------------------|---------------|----------------------------|---------|
| <b>Test Mode :</b>     | Mode 4, 5, 6  | <b>Temperature :</b>       | 25~27°C |
| <b>Test Engineer :</b> | Lancelot Chen | <b>Relative Humidity :</b> | 47~50%  |

| Channel | Frequency (MHz) | 802.11g Measured PSD (dBm) | Max. Limits (dBm) | Pass/Fail |
|---------|-----------------|----------------------------|-------------------|-----------|
| 01      | 2412            | -12.60                     | 8                 | Pass      |
| 06      | 2437            | -13.16                     | 8                 | Pass      |
| 11      | 2462            | -13.08                     | 8                 | Pass      |

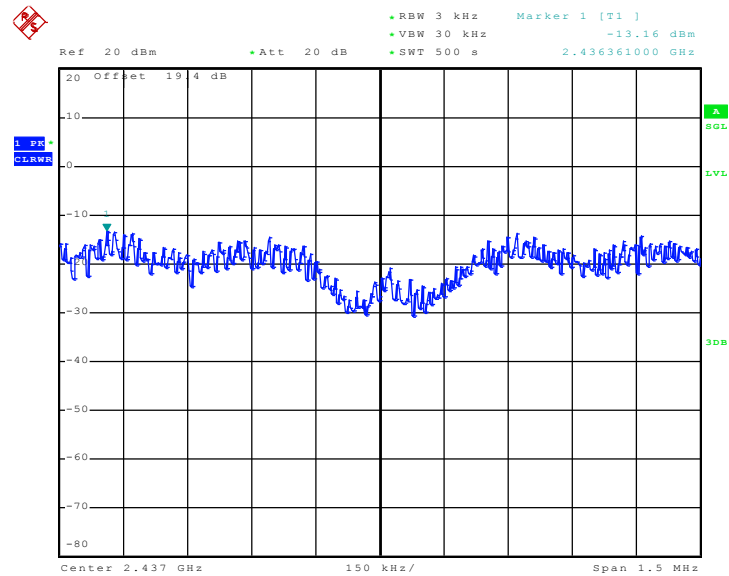
**Mode 4 : PSD Plot on 802.11g Channel 01**



Date: 22.APR.2010 15:25:07

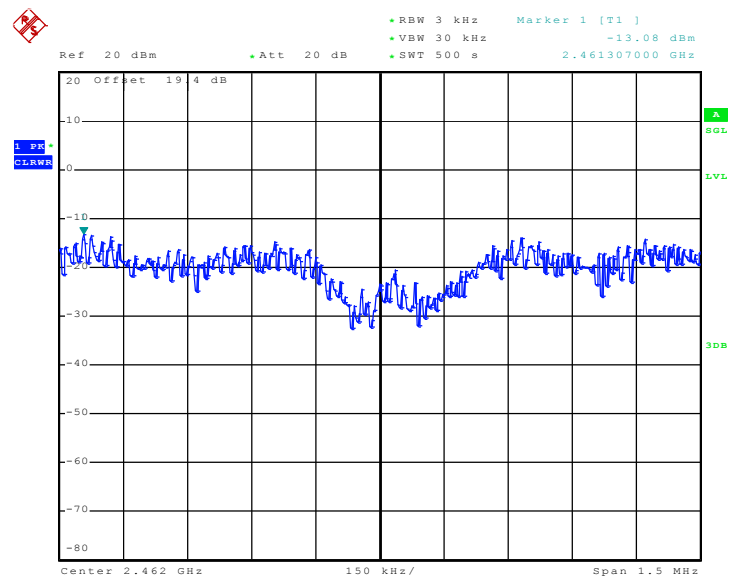


Mode 5 : PSD Plot on 802.11g Channel 06



Date: 22.APR.2010 15:02:36

Mode 6 : PSD Plot on 802.11g Channel 11



Date: 22.APR.2010 14:52:34

## 3.6 AC Conducted Emission Measurement

### 3.6.1 Limit of AC Conducted Emission

For equipment that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table.

| Frequency of Emission<br>(MHz) | Conducted Limit (dBuV) |           |
|--------------------------------|------------------------|-----------|
|                                | Quasi-Peak             | Average   |
| 0.15-0.5                       | 66 to 56*              | 56 to 46* |
| 0.5-5                          | 56                     | 46        |
| 5-30                           | 60                     | 50        |

\*Decreases with the logarithm of the frequency.

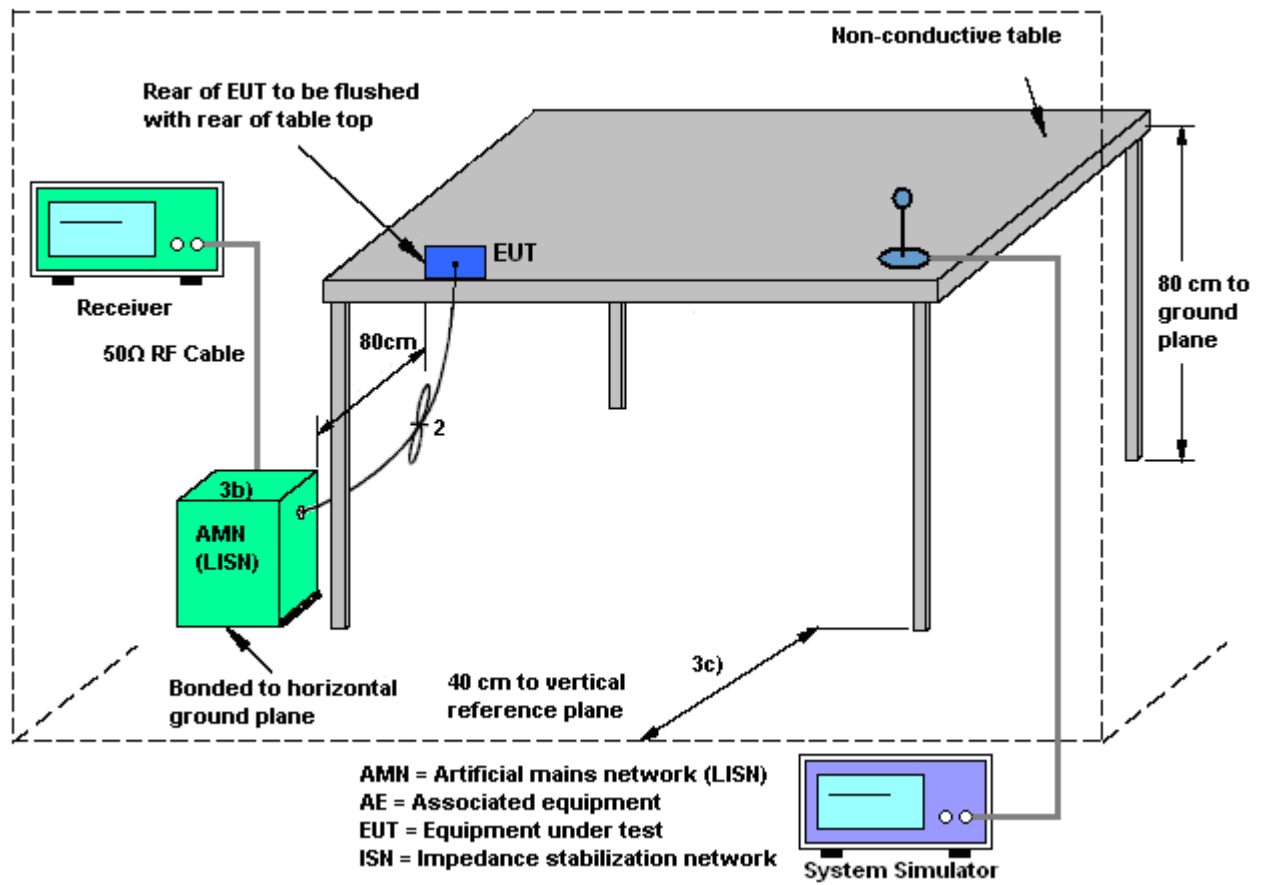
### 3.6.2 Measuring Instruments

See list of measuring instruments of this test report.

### 3.6.3 Test Procedures

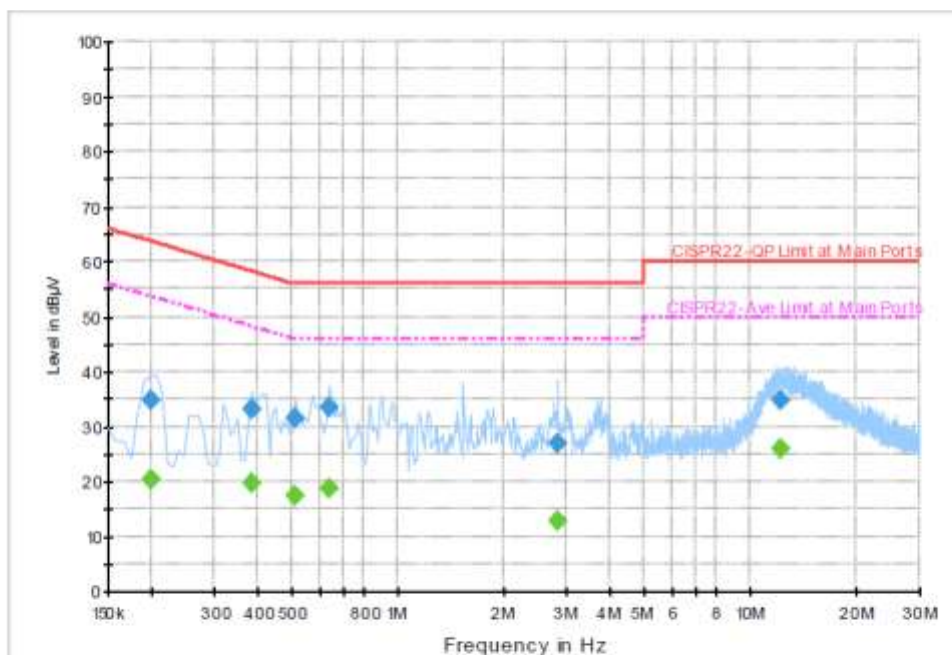
1. The testing follows the guidelines in ANSI C63.4-2003.
2. The EUT was placed 0.4 meter from the conducting wall of the shielding room, and it was kept at least 80 centimeters from any other grounded conducting surface.
3. Connect EUT to the power mains through a line impedance stabilization network (LISN).
4. All the support units are connecting to the other LISN.
5. The LISN provides 50 ohm coupling impedance for the measuring instrument.
6. The FCC states that a 50 ohm, 50 microhenry LISN should be used.
7. Both sides of AC line were checked for maximum conducted interference.
8. The frequency range from 150 kHz to 30 MHz was searched.
9. Set the test-receiver system to Peak Detect Function and specified bandwidth with Maximum Hold Mode.

### 3.6.4 Test Setup



### 3.6.5 Test Result of AC Conducted Emission

|                        |                                                                                   |                            |         |
|------------------------|-----------------------------------------------------------------------------------|----------------------------|---------|
| <b>Test Mode :</b>     | Mode 2                                                                            | <b>Temperature :</b>       | 20~22°C |
| <b>Test Engineer :</b> | Novic Jiang                                                                       | <b>Relative Humidity :</b> | 40~42%  |
| <b>Test Voltage :</b>  | 120Vac / 60Hz                                                                     | <b>Phase :</b>             | Line    |
| <b>Function Type :</b> | Sample A + GSM1900 Idle + Bluetooth Link + WLAN Link + MPEG4 + Earphone + Adapter |                            |         |
| <b>Remark :</b>        | All emissions not reported here are more than 10 dB below the prescribed limit.   |                            |         |



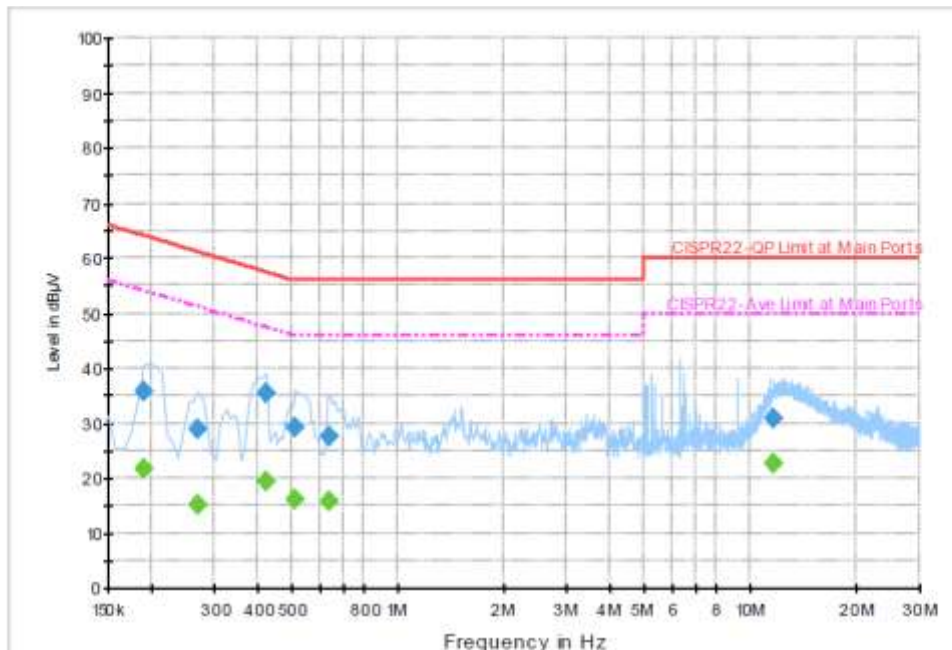
#### Final Result 1

| Frequency (MHz) | QuasiPeak (dBμV) | Filter | Line | Corr. (dB) | Margin (dB) | Limit (dBμV) |
|-----------------|------------------|--------|------|------------|-------------|--------------|
| 0.198000        | 34.7             | Off    | L1   | 19.6       | 29.0        | 63.7         |
| 0.382000        | 33.2             | Off    | L1   | 19.5       | 25.0        | 58.2         |
| 0.510000        | 31.4             | Off    | L1   | 19.4       | 24.6        | 56.0         |
| 0.638000        | 33.6             | Off    | L1   | 19.5       | 22.4        | 56.0         |
| 2.822000        | 26.9             | Off    | L1   | 19.5       | 29.1        | 56.0         |
| 12.126000       | 34.8             | Off    | L1   | 19.6       | 25.2        | 60.0         |

#### Final Result 2

| Frequency (MHz) | Average (dBμV) | Filter | Line | Corr. (dB) | Margin (dB) | Limit (dBμV) |
|-----------------|----------------|--------|------|------------|-------------|--------------|
| 0.198000        | 20.4           | Off    | L1   | 19.6       | 33.3        | 53.7         |
| 0.382000        | 19.8           | Off    | L1   | 19.5       | 28.4        | 48.2         |
| 0.510000        | 17.3           | Off    | L1   | 19.4       | 28.7        | 46.0         |
| 0.638000        | 18.8           | Off    | L1   | 19.5       | 27.2        | 46.0         |
| 2.822000        | 12.6           | Off    | L1   | 19.5       | 33.4        | 46.0         |
| 12.126000       | 25.8           | Off    | L1   | 19.6       | 24.2        | 50.0         |

|                        |                                                                                   |                            |         |
|------------------------|-----------------------------------------------------------------------------------|----------------------------|---------|
| <b>Test Mode :</b>     | Mode 2                                                                            | <b>Temperature :</b>       | 20~22°C |
| <b>Test Engineer :</b> | Novic Jiang                                                                       | <b>Relative Humidity :</b> | 40~42%  |
| <b>Test Voltage :</b>  | 120Vac / 60Hz                                                                     | <b>Phase :</b>             | Neutral |
| <b>Function Type :</b> | Sample A + GSM1900 Idle + Bluetooth Link + WLAN Link + MPEG4 + Earphone + Adapter |                            |         |
| <b>Remark :</b>        | All emissions not reported here are more than 10 dB below the prescribed limit.   |                            |         |


**Final Result 1**

| Frequency (MHz) | QuasiPeak (dBμV) | Filter | Line | Corr. (dB) | Margin (dB) | Limit (dBμV) |
|-----------------|------------------|--------|------|------------|-------------|--------------|
| 0.190000        | 35.8             | Off    | N    | 19.5       | 28.2        | 64.0         |
| 0.270000        | 28.9             | Off    | N    | 19.4       | 32.2        | 61.1         |
| 0.422000        | 35.5             | Off    | N    | 19.4       | 21.9        | 57.4         |
| 0.510000        | 29.0             | Off    | N    | 19.4       | 27.0        | 56.0         |
| 0.638000        | 27.4             | Off    | N    | 19.5       | 28.6        | 56.0         |
| 11.558000       | 31.0             | Off    | N    | 19.6       | 29.0        | 60.0         |

**Final Result 2**

| Frequency (MHz) | Average (dBμV) | Filter | Line | Corr. (dB) | Margin (dB) | Limit (dBμV) |
|-----------------|----------------|--------|------|------------|-------------|--------------|
| 0.190000        | 21.7           | Off    | N    | 19.5       | 32.3        | 54.0         |
| 0.270000        | 15.0           | Off    | N    | 19.4       | 36.1        | 51.1         |
| 0.422000        | 19.4           | Off    | N    | 19.4       | 28.0        | 47.4         |
| 0.510000        | 15.9           | Off    | N    | 19.4       | 30.1        | 46.0         |
| 0.638000        | 15.7           | Off    | N    | 19.5       | 30.3        | 46.0         |
| 11.558000       | 22.6           | Off    | N    | 19.6       | 27.4        | 50.0         |

## 3.7 Radiated Emission Measurement

### 3.7.1 Limit of Radiated Emission

In any 100 kHz bandwidth outside the intentional radiator frequency band, all harmonics/spurious must be at least 20 dB below the highest emission level within the authorized band. If the output power of this device was measured by spectrum analyzer, the attenuation under this paragraph shall be 30 dB instead of 20 dB. In addition, radiated emissions which fall in the restricted bands must also comply with the FCC section 15.209 limits as below.

| Frequency<br>(MHz) | Field Strength<br>(microvolts/meter) | Measurement Distance<br>(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                                |

### 3.7.2 Measuring Instruments

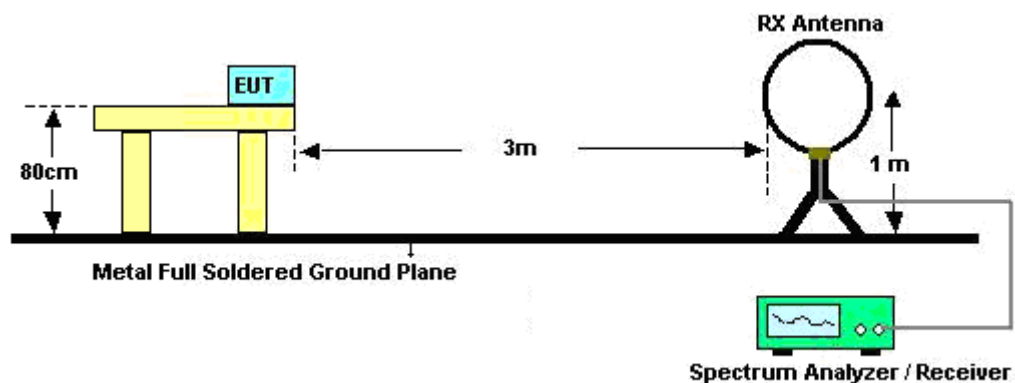
See list of measuring instruments of this test report.

### 3.7.3 Test Procedures

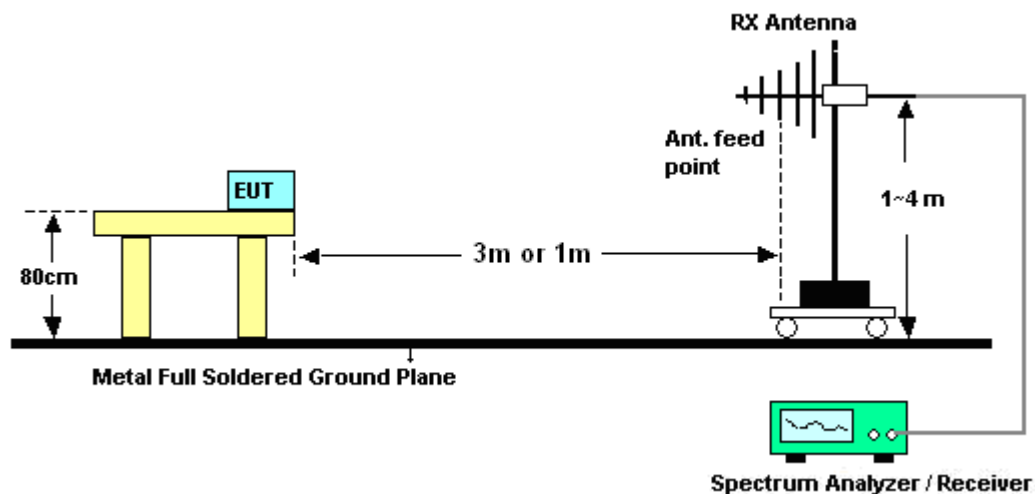
1. The testing follows the guidelines in FCC KDB Publication No. 558074 (Measurement Guidelines of DTS).
2. Use the following spectrum analyzer settings:
  - (1) Span = wide enough to fully capture the emission being measured; RBW = 1 MHz for  $f \geq 1$  GHz, 100 kHz for  $f < 1$  GHz; VBW  $\geq$  RBW; Sweep = auto; Detector function = peak; Trace = max hold.
  - (2) Above 18 GHz shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade from 3m to 1m.  
Distance extrapolation factor =  $20 \log (\text{specific distance [3m]} / \text{test distance [1m]})$  (dB)
3. Follow the guidelines in ANSI C63.4-2003 with respect to maximizing the emission by rotating the EUT, measuring the emission for three EUT orthogonal planes, and adjusting the measurement antenna height and polarization. A pre-amp and a high pass filter are used for this test in order to get the good signal level.

### 3.7.4 Test Setup

For radiated emissions below 30MHz



For radiated emissions above 30MHz



**3.7.5 Test Results of Radiated Emissions (9 kHz ~ 30 MHz)**

|                            |                         |                            |                              |               |
|----------------------------|-------------------------|----------------------------|------------------------------|---------------|
| <b>Test Engineer :</b>     | Ivan Jiang              | <b>Temperature :</b>       | 22~24℃                       |               |
|                            |                         | <b>Relative Humidity :</b> | 48~49%                       |               |
| <b>Frequency<br/>(MHz)</b> | <b>Level<br/>(dBuV)</b> | <b>Over Limit<br/>(dB)</b> | <b>Limit Line<br/>(dBuV)</b> | <b>Remark</b> |
| -                          | -                       | -                          | -                            | See Note      |

**Note:**

The amplitude of spurious emissions that are attenuated by more than 20dB below the permissible value has no need to be reported.

Distance extrapolation factor =  $40 \log (\text{specific distance} / \text{test distance})$  (dB);

Limit line = specific limits (dBuV) + distance extrapolation factor.



### 3.7.6 Test Result of Radiated Emission (30 MHz ~ 10<sup>th</sup> Harmonic)

|                        |                                                       |                            |            |
|------------------------|-------------------------------------------------------|----------------------------|------------|
| <b>Test Mode :</b>     | Mode 1                                                | <b>Temperature :</b>       | 22~24℃     |
| <b>Test Channel :</b>  | 01                                                    | <b>Relative Humidity :</b> | 48~49%     |
| <b>Test Engineer :</b> | Ivan Jiang                                            | <b>Polarization :</b>      | Horizontal |
| <b>Remark :</b>        | 2412 MHz is Fundamental Signals which can be ignored. |                            |            |

| Frequency<br>( MHz ) | Level<br>( dBuV/m ) | Over<br>Limit<br>( dB ) | Limit<br>Line<br>( dBuV/m ) | Read<br>Level<br>(dBuV) | Antenna<br>Factor<br>( dB ) | Cable<br>Loss<br>( dB ) | Preamp<br>Factor<br>( dB ) | Ant<br>Pos<br>( cm ) | Table<br>Pos<br>( deg ) | Remark  |
|----------------------|---------------------|-------------------------|-----------------------------|-------------------------|-----------------------------|-------------------------|----------------------------|----------------------|-------------------------|---------|
| 30                   | 24.01               | -15.99                  | 40                          | 35.43                   | 19.51                       | 0.53                    | 31.46                      | -                    | -                       | Peak    |
| 153.66               | 28.5                | -15                     | 43.5                        | 47.89                   | 10.95                       | 1.21                    | 31.55                      | -                    | -                       | Peak    |
| 208.74               | 28.15               | -15.35                  | 43.5                        | 49.32                   | 8.95                        | 1.35                    | 31.47                      | -                    | -                       | Peak    |
| 307                  | 30.31               | -15.69                  | 46                          | 46.18                   | 13.67                       | 1.79                    | 31.33                      | -                    | -                       | Peak    |
| 405                  | 31.44               | -14.56                  | 46                          | 44.22                   | 16.23                       | 2.16                    | 31.17                      | 100                  | 96                      | Peak    |
| 478.5                | 29.2                | -16.8                   | 46                          | 40.17                   | 17.72                       | 2.37                    | 31.06                      | -                    | -                       | Peak    |
| 2386.38              | 42.83               | -11.17                  | 54                          | 39.39                   | 32.13                       | 5.46                    | 34.15                      | 111                  | 327                     | Average |
| 2386.38              | 52.24               | -21.76                  | 74                          | 48.8                    | 32.13                       | 5.46                    | 34.15                      | 111                  | 327                     | Peak    |
| 2412                 | 99.32               | -                       | -                           | 95.88                   | 32.16                       | 5.44                    | 34.16                      | 111                  | 327                     | Average |
| 2412                 | 103.02              | -                       | -                           | 99.58                   | 32.16                       | 5.44                    | 34.16                      | 111                  | 327                     | Peak    |
| 2492                 | 47.34               | -26.66                  | 74                          | 43.87                   | 32.3                        | 5.37                    | 34.2                       | 111                  | 327                     | Peak    |
| 2492                 | 36.21               | -17.79                  | 54                          | 32.74                   | 32.3                        | 5.37                    | 34.2                       | 111                  | 327                     | Average |
| 8214                 | 54.04               | -19.96                  | 74                          | 43.16                   | 36                          | 9.98                    | 35.1                       | 114                  | 100                     | Peak    |
| 8214                 | 42.9                | -11.1                   | 54                          | 32.02                   | 36                          | 9.98                    | 35.1                       | 114                  | 100                     | Average |



|                        |                                                       |                            |          |
|------------------------|-------------------------------------------------------|----------------------------|----------|
| <b>Test Mode :</b>     | Mode 1                                                | <b>Temperature :</b>       | 22~24℃   |
| <b>Test Channel :</b>  | 01                                                    | <b>Relative Humidity :</b> | 48~49%   |
| <b>Test Engineer :</b> | Ivan Jiang                                            | <b>Polarization :</b>      | Vertical |
| <b>Remark :</b>        | 2412 MHz is Fundamental Signals which can be ignored. |                            |          |

| Frequency<br>( MHz ) | Level<br>( dBuV/m ) | Over<br>Limit<br>( dB ) | Limit<br>Line<br>( dBuV/m ) | Read<br>Level<br>(dBuV) | Antenna<br>Factor<br>( dB ) | Cable<br>Loss<br>( dB ) | Preamp<br>Factor<br>( dB ) | Ant<br>Pos<br>( cm ) | Table<br>Pos<br>( deg ) | Remark  |
|----------------------|---------------------|-------------------------|-----------------------------|-------------------------|-----------------------------|-------------------------|----------------------------|----------------------|-------------------------|---------|
| 30                   | 27.39               | -12.61                  | 40                          | 38.81                   | 19.51                       | 0.53                    | 31.46                      | -                    | -                       | Peak    |
| 91.02                | 25.46               | -18.04                  | 43.5                        | 47                      | 9.03                        | 0.95                    | 31.52                      | -                    | -                       | Peak    |
| 153.66               | 24.68               | -18.82                  | 43.5                        | 44.07                   | 10.95                       | 1.21                    | 31.55                      | -                    | -                       | Peak    |
| 307                  | 25.28               | -20.72                  | 46                          | 41.15                   | 13.67                       | 1.79                    | 31.33                      | -                    | -                       | Peak    |
| 576.5                | 36.39               | -9.61                   | 46                          | 45.11                   | 19.61                       | 2.62                    | 30.95                      | 148                  | 105                     | Peak    |
| 626.2                | 35.35               | -10.65                  | 46                          | 43.2                    | 20.27                       | 2.77                    | 30.89                      | -                    | -                       | Peak    |
| 2386.38              | 42.08               | -11.92                  | 54                          | 38.64                   | 32.13                       | 5.46                    | 34.15                      | 104                  | 304                     | Average |
| 2386.38              | 51.54               | -22.46                  | 74                          | 48.1                    | 32.13                       | 5.46                    | 34.15                      | 104                  | 304                     | Peak    |
| 2412                 | 99.13               | -                       | -                           | 95.69                   | 32.16                       | 5.44                    | 34.16                      | 104                  | 304                     | Average |
| 2412                 | 102.9               | -                       | -                           | 99.46                   | 32.16                       | 5.44                    | 34.16                      | 104                  | 304                     | Peak    |
| 2494                 | 49.95               | -24.05                  | 74                          | 46.48                   | 32.3                        | 5.37                    | 34.2                       | 104                  | 304                     | Peak    |
| 2494                 | 39.42               | -14.58                  | 54                          | 35.95                   | 32.3                        | 5.37                    | 34.2                       | 104                  | 304                     | Average |
| 8346                 | 55.09               | -18.91                  | 74                          | 44.12                   | 36                          | 10.07                   | 35.1                       | 145                  | 78                      | Peak    |
| 8346                 | 44.25               | -9.75                   | 54                          | 33.28                   | 36                          | 10.07                   | 35.1                       | 145                  | 78                      | Average |



|                        |                                                       |                            |            |
|------------------------|-------------------------------------------------------|----------------------------|------------|
| <b>Test Mode :</b>     | Mode 2                                                | <b>Temperature :</b>       | 22~24℃     |
| <b>Test Channel :</b>  | 06                                                    | <b>Relative Humidity :</b> | 48~49%     |
| <b>Test Engineer :</b> | Ivan Jiang                                            | <b>Polarization :</b>      | Horizontal |
| <b>Remark :</b>        | 2437 MHz is Fundamental Signals which can be ignored. |                            |            |

| Frequency<br>( MHz ) | Level<br>( dBuV/m ) | Over<br>Limit<br>( dB ) | Limit<br>Line<br>( dBuV/m ) | Read<br>Level<br>(dBuV) | Antenna<br>Factor<br>( dB ) | Cable<br>Loss<br>( dB ) | Preamp<br>Factor<br>( dB ) | Ant<br>Pos<br>( cm ) | Table<br>Pos<br>( deg ) | Remark  |
|----------------------|---------------------|-------------------------|-----------------------------|-------------------------|-----------------------------|-------------------------|----------------------------|----------------------|-------------------------|---------|
| 30.54                | 23.51               | -16.49                  | 40                          | 35.48                   | 18.95                       | 0.54                    | 31.46                      | -                    | -                       | Peak    |
| 149.61               | 26.68               | -16.82                  | 43.5                        | 45.78                   | 11.25                       | 1.21                    | 31.56                      | -                    | -                       | Peak    |
| 209.01               | 28.29               | -15.21                  | 43.5                        | 49.43                   | 8.97                        | 1.36                    | 31.47                      | -                    | -                       | Peak    |
| 307                  | 30.61               | -15.39                  | 46                          | 46.48                   | 13.67                       | 1.79                    | 31.33                      | -                    | -                       | Peak    |
| 405                  | 31.46               | -14.54                  | 46                          | 44.24                   | 16.23                       | 2.16                    | 31.17                      | 100                  | 214                     | Peak    |
| 478.5                | 28.81               | -17.19                  | 46                          | 39.78                   | 17.72                       | 2.37                    | 31.06                      | -                    | -                       | Peak    |
| 2372                 | 48.27               | -25.73                  | 74                          | 44.84                   | 32.11                       | 5.47                    | 34.15                      | 106                  | 319                     | Peak    |
| 2372                 | 36.23               | -17.77                  | 54                          | 32.8                    | 32.11                       | 5.47                    | 34.15                      | 106                  | 319                     | Average |
| 2437                 | 104.11              | -                       | -                           | 100.66                  | 32.19                       | 5.43                    | 34.17                      | 106                  | 319                     | Peak    |
| 2437                 | 100.49              | -                       | -                           | 97.03                   | 32.22                       | 5.41                    | 34.17                      | 106                  | 319                     | Average |
| 2484                 | 49.51               | -24.49                  | 74                          | 46.05                   | 32.27                       | 5.38                    | 34.19                      | 106                  | 319                     | Peak    |
| 2484                 | 37.54               | -16.46                  | 54                          | 34.08                   | 32.27                       | 5.38                    | 34.19                      | 106                  | 319                     | Average |
| 8289                 | 54.54               | -19.46                  | 74                          | 43.6                    | 36                          | 10.04                   | 35.1                       | 100                  | 124                     | Peak    |
| 8289                 | 43.6                | -10.4                   | 54                          | 32.66                   | 36                          | 10.04                   | 35.1                       | 100                  | 124                     | Average |



|                        |                                                       |                            |          |
|------------------------|-------------------------------------------------------|----------------------------|----------|
| <b>Test Mode :</b>     | Mode 2                                                | <b>Temperature :</b>       | 22~24℃   |
| <b>Test Channel :</b>  | 06                                                    | <b>Relative Humidity :</b> | 48~49%   |
| <b>Test Engineer :</b> | Ivan Jiang                                            | <b>Polarization :</b>      | Vertical |
| <b>Remark :</b>        | 2437 MHz is Fundamental Signals which can be ignored. |                            |          |

| Frequency<br>( MHz ) | Level<br>( dBuV/m ) | Over<br>Limit<br>( dB ) | Limit<br>Line<br>( dBuV/m ) | Read<br>Level<br>(dBuV) | Antenna<br>Factor<br>( dB ) | Cable<br>Loss<br>( dB ) | Preamp<br>Factor<br>( dB ) | Ant<br>Pos<br>( cm ) | Table<br>Pos<br>( deg ) | Remark  |
|----------------------|---------------------|-------------------------|-----------------------------|-------------------------|-----------------------------|-------------------------|----------------------------|----------------------|-------------------------|---------|
| 30                   | 27.61               | -12.39                  | 40                          | 39.03                   | 19.51                       | 0.53                    | 31.46                      | -                    | -                       | Peak    |
| 91.02                | 24.22               | -19.28                  | 43.5                        | 45.76                   | 9.03                        | 0.95                    | 31.52                      | -                    | -                       | Peak    |
| 153.66               | 25.42               | -18.08                  | 43.5                        | 44.81                   | 10.95                       | 1.21                    | 31.55                      | -                    | -                       | Peak    |
| 307                  | 25.33               | -20.67                  | 46                          | 41.2                    | 13.67                       | 1.79                    | 31.33                      | -                    | -                       | Peak    |
| 576.5                | 36.72               | -9.28                   | 46                          | 45.44                   | 19.61                       | 2.62                    | 30.95                      | 126                  | 151                     | Peak    |
| 626.2                | 35.6                | -10.4                   | 46                          | 43.45                   | 20.27                       | 2.77                    | 30.89                      | -                    | -                       | Peak    |
| 2372                 | 46.18               | -27.82                  | 74                          | 42.75                   | 32.11                       | 5.47                    | 34.15                      | 100                  | 304                     | Peak    |
| 2372                 | 34.28               | -19.72                  | 54                          | 30.85                   | 32.11                       | 5.47                    | 34.15                      | 100                  | 304                     | Average |
| 2437                 | 103.09              | -                       | -                           | 99.63                   | 32.22                       | 5.41                    | 34.17                      | 100                  | 304                     | Peak    |
| 2437                 | 99.37               | -                       | -                           | 95.91                   | 32.22                       | 5.41                    | 34.17                      | 100                  | 304                     | Average |
| 2492                 | 51.31               | -22.69                  | 74                          | 47.84                   | 32.3                        | 5.37                    | 34.2                       | 100                  | 304                     | Peak    |
| 2492                 | 39.21               | -14.79                  | 54                          | 35.74                   | 32.3                        | 5.37                    | 34.2                       | 100                  | 304                     | Average |
| 8490                 | 53.82               | -20.18                  | 74                          | 42.74                   | 36                          | 10.18                   | 35.1                       | 161                  | 100                     | Peak    |
| 8490                 | 42.59               | -11.41                  | 54                          | 31.51                   | 36                          | 10.18                   | 35.1                       | 161                  | 100                     | Average |



|                        |                                                       |                            |            |
|------------------------|-------------------------------------------------------|----------------------------|------------|
| <b>Test Mode :</b>     | Mode 3                                                | <b>Temperature :</b>       | 22~24℃     |
| <b>Test Channel :</b>  | 11                                                    | <b>Relative Humidity :</b> | 48~49%     |
| <b>Test Engineer :</b> | Ivan Jiang                                            | <b>Polarization :</b>      | Horizontal |
| <b>Remark :</b>        | 2462 MHz is Fundamental Signals which can be ignored. |                            |            |

| Frequency<br>( MHz ) | Level<br>( dBuV/m ) | Over<br>Limit<br>( dB ) | Limit<br>Line<br>( dBuV/m ) | Read<br>Level<br>(dBuV) | Antenna<br>Factor<br>( dB ) | Cable<br>Loss<br>( dB ) | Preamp<br>Factor<br>( dB ) | Ant<br>Pos<br>( cm ) | Table<br>Pos<br>( deg ) | Remark  |
|----------------------|---------------------|-------------------------|-----------------------------|-------------------------|-----------------------------|-------------------------|----------------------------|----------------------|-------------------------|---------|
| 30                   | 23.6                | -16.4                   | 40                          | 35.02                   | 19.51                       | 0.53                    | 31.46                      | -                    | -                       | Peak    |
| 149.61               | 27.02               | -16.48                  | 43.5                        | 46.12                   | 11.25                       | 1.21                    | 31.56                      | -                    | -                       | Peak    |
| 295.14               | 26.67               | -19.33                  | 46                          | 42.88                   | 13.39                       | 1.73                    | 31.33                      | -                    | -                       | Peak    |
| 307                  | 30.4                | -15.6                   | 46                          | 46.27                   | 13.67                       | 1.79                    | 31.33                      | -                    | -                       | Peak    |
| 405                  | 31.25               | -14.75                  | 46                          | 44.03                   | 16.23                       | 2.16                    | 31.17                      | 100                  | 196                     | Peak    |
| 478.5                | 29.24               | -16.76                  | 46                          | 40.21                   | 17.72                       | 2.37                    | 31.06                      | -                    | -                       | Peak    |
| 2388                 | 47.54               | -26.46                  | 74                          | 44.1                    | 32.13                       | 5.46                    | 34.15                      | 104                  | 317                     | Peak    |
| 2388                 | 35.46               | -18.54                  | 54                          | 32.02                   | 32.13                       | 5.46                    | 34.15                      | 104                  | 317                     | Average |
| 2462                 | 105.52              | -                       | -                           | 102.06                  | 32.24                       | 5.4                     | 34.18                      | 104                  | 317                     | Peak    |
| 2462                 | 101.93              | -                       | -                           | 98.47                   | 32.24                       | 5.4                     | 34.18                      | 104                  | 317                     | Average |
| 2488.22              | 50.38               | -3.62                   | 54                          | 46.9                    | 32.3                        | 5.37                    | 34.19                      | 104                  | 317                     | Average |
| 2488.22              | 56.6                | -17.4                   | 74                          | 53.12                   | 32.3                        | 5.37                    | 34.19                      | 104                  | 317                     | Peak    |
| 8454                 | 54.72               | -19.28                  | 74                          | 43.68                   | 36                          | 10.14                   | 35.1                       | 133                  | 67                      | Peak    |
| 8454                 | 44.02               | -9.98                   | 54                          | 32.98                   | 36                          | 10.14                   | 35.1                       | 133                  | 67                      | Average |



|                        |                                                       |                            |          |
|------------------------|-------------------------------------------------------|----------------------------|----------|
| <b>Test Mode :</b>     | Mode 3                                                | <b>Temperature :</b>       | 22~24℃   |
| <b>Test Channel :</b>  | 11                                                    | <b>Relative Humidity :</b> | 48~49%   |
| <b>Test Engineer :</b> | Ivan Jiang                                            | <b>Polarization :</b>      | Vertical |
| <b>Remark :</b>        | 2462 MHz is Fundamental Signals which can be ignored. |                            |          |

| Frequency<br>( MHz ) | Level<br>( dBuV/m ) | Over<br>Limit<br>( dB ) | Limit<br>Line<br>( dBuV/m ) | Read<br>Level<br>(dBuV) | Antenna<br>Factor<br>( dB ) | Cable<br>Loss<br>( dB ) | Preamp<br>Factor<br>( dB ) | Ant<br>Pos<br>( cm ) | Table<br>Pos<br>( deg ) | Remark  |
|----------------------|---------------------|-------------------------|-----------------------------|-------------------------|-----------------------------|-------------------------|----------------------------|----------------------|-------------------------|---------|
| 30                   | 27.01               | -12.99                  | 40                          | 38.43                   | 19.51                       | 0.53                    | 31.46                      | -                    | -                       | Peak    |
| 91.02                | 24.43               | -19.07                  | 43.5                        | 45.97                   | 9.03                        | 0.95                    | 31.52                      | -                    | -                       | Peak    |
| 151.5                | 25.18               | -18.32                  | 43.5                        | 44.41                   | 11.12                       | 1.21                    | 31.56                      | -                    | -                       | Peak    |
| 307                  | 25.8                | -20.2                   | 46                          | 41.67                   | 13.67                       | 1.79                    | 31.33                      | -                    | -                       | Peak    |
| 576.5                | 36.47               | -9.53                   | 46                          | 45.19                   | 19.61                       | 2.62                    | 30.95                      | 127                  | 164                     | Peak    |
| 626.2                | 35.3                | -10.7                   | 46                          | 43.15                   | 20.27                       | 2.77                    | 30.89                      | -                    | -                       | Peak    |
| 2340                 | 46.12               | -27.88                  | 74                          | 42.71                   | 32.05                       | 5.5                     | 34.14                      | 100                  | 303                     | Peak    |
| 2340                 | 33.62               | -20.38                  | 54                          | 30.21                   | 32.05                       | 5.5                     | 34.14                      | 100                  | 303                     | Average |
| 2462                 | 104.31              | -                       | -                           | 100.85                  | 32.24                       | 5.4                     | 34.18                      | 100                  | 303                     | Peak    |
| 2462                 | 100.71              | -                       | -                           | 97.25                   | 32.24                       | 5.4                     | 34.18                      | 100                  | 303                     | Average |
| 2488.22              | 50.19               | -3.81                   | 54                          | 46.71                   | 32.3                        | 5.37                    | 34.19                      | 100                  | 303                     | Average |
| 2488.22              | 56.88               | -17.12                  | 74                          | 53.4                    | 32.3                        | 5.37                    | 34.19                      | 100                  | 303                     | Peak    |
| 8382                 | 54.6                | -19.4                   | 74                          | 43.6                    | 36                          | 10.1                    | 35.1                       | 142                  | 112                     | Peak    |
| 8382                 | 43.33               | -10.67                  | 54                          | 32.33                   | 36                          | 10.1                    | 35.1                       | 142                  | 112                     | Average |



|                        |                                                       |                            |            |
|------------------------|-------------------------------------------------------|----------------------------|------------|
| <b>Test Mode :</b>     | Mode 4                                                | <b>Temperature :</b>       | 22~24℃     |
| <b>Test Channel :</b>  | 01                                                    | <b>Relative Humidity :</b> | 48~49%     |
| <b>Test Engineer :</b> | Ivan Jiang                                            | <b>Polarization :</b>      | Horizontal |
| <b>Remark :</b>        | 2412 MHz is Fundamental Signals which can be ignored. |                            |            |

| Frequency<br>( MHz ) | Level<br>( dBuV/m ) | Over<br>Limit<br>( dB ) | Limit<br>Line<br>( dBuV/m ) | Read<br>Level<br>(dBuV) | Antenna<br>Factor<br>( dB ) | Cable<br>Loss<br>( dB ) | Preamp<br>Factor<br>( dB ) | Ant<br>Pos<br>( cm ) | Table<br>Pos<br>( deg ) | Remark  |
|----------------------|---------------------|-------------------------|-----------------------------|-------------------------|-----------------------------|-------------------------|----------------------------|----------------------|-------------------------|---------|
| 30                   | 23.27               | -16.73                  | 40                          | 34.69                   | 19.51                       | 0.53                    | 31.46                      | -                    | -                       | Peak    |
| 153.66               | 26.66               | -16.84                  | 43.5                        | 46.05                   | 10.95                       | 1.21                    | 31.55                      | -                    | -                       | Peak    |
| 209.01               | 27.81               | -15.69                  | 43.5                        | 48.95                   | 8.97                        | 1.36                    | 31.47                      | -                    | -                       | Peak    |
| 307                  | 30.37               | -15.63                  | 46                          | 46.24                   | 13.67                       | 1.79                    | 31.33                      | -                    | -                       | Peak    |
| 405                  | 31.38               | -14.62                  | 46                          | 44.16                   | 16.23                       | 2.16                    | 31.17                      | 117                  | 46                      | Peak    |
| 478.5                | 28.89               | -17.11                  | 46                          | 39.86                   | 17.72                       | 2.37                    | 31.06                      | -                    | -                       | Peak    |
| 2390                 | 46.67               | -7.33                   | 54                          | 43.24                   | 32.13                       | 5.46                    | 34.16                      | 104                  | 328                     | Average |
| 2390                 | 64.33               | -9.67                   | 74                          | 60.9                    | 32.13                       | 5.46                    | 34.16                      | 104                  | 328                     | Peak    |
| 2412                 | 92.81               | -                       | -                           | 89.37                   | 32.16                       | 5.44                    | 34.16                      | 104                  | 328                     | Average |
| 2412                 | 103.37              | -                       | -                           | 99.93                   | 32.16                       | 5.44                    | 34.16                      | 104                  | 328                     | Peak    |
| 2484                 | 49.43               | -24.57                  | 74                          | 45.97                   | 32.27                       | 5.38                    | 34.19                      | 104                  | 328                     | Peak    |
| 2484                 | 37.46               | -16.54                  | 54                          | 34                      | 32.27                       | 5.38                    | 34.19                      | 104                  | 328                     | Average |
| 8346                 | 54.37               | -19.63                  | 74                          | 43.4                    | 36                          | 10.07                   | 35.1                       | 100                  | 128                     | Peak    |
| 8346                 | 43.75               | -10.25                  | 54                          | 32.78                   | 36                          | 10.07                   | 35.1                       | 100                  | 128                     | Average |



|                        |                                                       |                            |          |
|------------------------|-------------------------------------------------------|----------------------------|----------|
| <b>Test Mode :</b>     | Mode 4                                                | <b>Temperature :</b>       | 22~24℃   |
| <b>Test Channel :</b>  | 01                                                    | <b>Relative Humidity :</b> | 48~49%   |
| <b>Test Engineer :</b> | Ivan Jiang                                            | <b>Polarization :</b>      | Vertical |
| <b>Remark :</b>        | 2412 MHz is Fundamental Signals which can be ignored. |                            |          |

| Frequency<br>( MHz ) | Level<br>( dBuV/m ) | Over<br>Limit<br>( dB ) | Limit<br>Line<br>( dBuV/m ) | Read<br>Level<br>(dBuV) | Antenna<br>Factor<br>( dB ) | Cable<br>Loss<br>( dB ) | Preamp<br>Factor<br>( dB ) | Ant<br>Pos<br>( cm ) | Table<br>Pos<br>( deg ) | Remark  |
|----------------------|---------------------|-------------------------|-----------------------------|-------------------------|-----------------------------|-------------------------|----------------------------|----------------------|-------------------------|---------|
| 30                   | 27.31               | -12.69                  | 40                          | 38.73                   | 19.51                       | 0.53                    | 31.46                      | -                    | -                       | Peak    |
| 91.02                | 24.44               | -19.06                  | 43.5                        | 45.98                   | 9.03                        | 0.95                    | 31.52                      | -                    | -                       | Peak    |
| 153.66               | 24.82               | -18.68                  | 43.5                        | 44.21                   | 10.95                       | 1.21                    | 31.55                      | -                    | -                       | Peak    |
| 307                  | 25.56               | -20.44                  | 46                          | 41.43                   | 13.67                       | 1.79                    | 31.33                      | -                    | -                       | Peak    |
| 576.5                | 36.24               | -9.76                   | 46                          | 44.96                   | 19.61                       | 2.62                    | 30.95                      | 120                  | 101                     | Peak    |
| 626.2                | 35.57               | -10.43                  | 46                          | 43.42                   | 20.27                       | 2.77                    | 30.89                      | -                    | -                       | Peak    |
| 2390                 | 46.47               | -7.53                   | 54                          | 43.04                   | 32.13                       | 5.46                    | 34.16                      | 101                  | 305                     | Average |
| 2390                 | 62.44               | -11.56                  | 74                          | 59.01                   | 32.13                       | 5.46                    | 34.16                      | 101                  | 305                     | Peak    |
| 2412                 | 93.49               | -                       | -                           | 90.05                   | 32.16                       | 5.44                    | 34.16                      | 101                  | 305                     | Average |
| 2412                 | 103.69              | -                       | -                           | 100.25                  | 32.16                       | 5.44                    | 34.16                      | 101                  | 305                     | Peak    |
| 2486                 | 53.2                | -20.8                   | 74                          | 49.74                   | 32.27                       | 5.38                    | 34.19                      | 101                  | 305                     | Peak    |
| 2486                 | 41.52               | -12.48                  | 54                          | 38.06                   | 32.27                       | 5.38                    | 34.19                      | 101                  | 305                     | Average |
| 8406                 | 54.28               | -19.72                  | 74                          | 43.26                   | 36                          | 10.12                   | 35.1                       | 128                  | 81                      | Peak    |
| 8406                 | 43.06               | -10.94                  | 54                          | 32.04                   | 36                          | 10.12                   | 35.1                       | 128                  | 81                      | Average |



|                        |                                                       |                            |            |
|------------------------|-------------------------------------------------------|----------------------------|------------|
| <b>Test Mode :</b>     | Mode 5                                                | <b>Temperature :</b>       | 22~24℃     |
| <b>Test Channel :</b>  | 06                                                    | <b>Relative Humidity :</b> | 48~49%     |
| <b>Test Engineer :</b> | Ivan Jiang                                            | <b>Polarization :</b>      | Horizontal |
| <b>Remark :</b>        | 2437 MHz is Fundamental Signals which can be ignored. |                            |            |

| Frequency<br>( MHz ) | Level<br>( dBuV/m ) | Over<br>Limit<br>( dB ) | Limit<br>Line<br>( dBuV/m ) | Read<br>Level<br>(dBuV) | Antenna<br>Factor<br>( dB ) | Cable<br>Loss<br>( dB ) | Preamp<br>Factor<br>( dB ) | Ant<br>Pos<br>( cm ) | Table<br>Pos<br>( deg ) | Remark  |
|----------------------|---------------------|-------------------------|-----------------------------|-------------------------|-----------------------------|-------------------------|----------------------------|----------------------|-------------------------|---------|
| 30.54                | 22.87               | -17.13                  | 40                          | 34.84                   | 18.95                       | 0.54                    | 31.46                      | -                    | -                       | Peak    |
| 149.61               | 28.32               | -15.18                  | 43.5                        | 47.42                   | 11.25                       | 1.21                    | 31.56                      | -                    | -                       | Peak    |
| 153.66               | 26.82               | -16.68                  | 43.5                        | 46.21                   | 10.95                       | 1.21                    | 31.55                      | -                    | -                       | Peak    |
| 307                  | 30.24               | -15.76                  | 46                          | 46.11                   | 13.67                       | 1.79                    | 31.33                      | -                    | -                       | Peak    |
| 379.8                | 29.57               | -16.43                  | 46                          | 43.11                   | 15.6                        | 2.1                     | 31.24                      | -                    | -                       | Peak    |
| 405                  | 31.4                | -14.6                   | 46                          | 44.18                   | 16.23                       | 2.16                    | 31.17                      | 110                  | 147                     | Peak    |
| 2380                 | 48.84               | -25.16                  | 74                          | 45.41                   | 32.11                       | 5.47                    | 34.15                      | 105                  | 318                     | Peak    |
| 2380                 | 36.17               | -17.83                  | 54                          | 32.74                   | 32.11                       | 5.47                    | 34.15                      | 105                  | 318                     | Average |
| 2437                 | 103.97              | -                       | -                           | 100.52                  | 32.19                       | 5.43                    | 34.17                      | 105                  | 318                     | Peak    |
| 2437                 | 93.69               | -                       | -                           | 90.23                   | 32.22                       | 5.41                    | 34.17                      | 105                  | 318                     | Average |
| 2486                 | 51.08               | -22.92                  | 74                          | 47.62                   | 32.27                       | 5.38                    | 34.19                      | 105                  | 318                     | Peak    |
| 2486                 | 38.48               | -15.52                  | 54                          | 35.02                   | 32.27                       | 5.38                    | 34.19                      | 105                  | 318                     | Average |
| 8466                 | 54.26               | -19.74                  | 74                          | 43.2                    | 36                          | 10.16                   | 35.1                       | 106                  | 58                      | Peak    |
| 8466                 | 44.08               | -9.92                   | 54                          | 33.02                   | 36                          | 10.16                   | 35.1                       | 106                  | 58                      | Average |



|                        |                                                       |                            |          |
|------------------------|-------------------------------------------------------|----------------------------|----------|
| <b>Test Mode :</b>     | Mode 5                                                | <b>Temperature :</b>       | 22~24℃   |
| <b>Test Channel :</b>  | 06                                                    | <b>Relative Humidity :</b> | 48~49%   |
| <b>Test Engineer :</b> | Ivan Jiang                                            | <b>Polarization :</b>      | Vertical |
| <b>Remark :</b>        | 2437 MHz is Fundamental Signals which can be ignored. |                            |          |

| Frequency<br>( MHz ) | Level<br>( dBuV/m ) | Over<br>Limit<br>( dB ) | Limit<br>Line<br>( dBuV/m ) | Read<br>Level<br>(dBuV) | Antenna<br>Factor<br>( dB ) | Cable<br>Loss<br>( dB ) | Preamp<br>Factor<br>( dB ) | Ant<br>Pos<br>( cm ) | Table<br>Pos<br>( deg ) | Remark  |
|----------------------|---------------------|-------------------------|-----------------------------|-------------------------|-----------------------------|-------------------------|----------------------------|----------------------|-------------------------|---------|
| 30                   | 27.43               | -12.57                  | 40                          | 38.85                   | 19.51                       | 0.53                    | 31.46                      | -                    | -                       | Peak    |
| 91.02                | 25.56               | -17.94                  | 43.5                        | 47.1                    | 9.03                        | 0.95                    | 31.52                      | -                    | -                       | Peak    |
| 149.61               | 25.61               | -17.89                  | 43.5                        | 44.71                   | 11.25                       | 1.21                    | 31.56                      | -                    | -                       | Peak    |
| 307                  | 25.85               | -20.15                  | 46                          | 41.72                   | 13.67                       | 1.79                    | 31.33                      | -                    | -                       | Peak    |
| 576.5                | 36.63               | -9.37                   | 46                          | 45.35                   | 19.61                       | 2.62                    | 30.95                      | 100                  | 241                     | Peak    |
| 626.2                | 35.74               | -10.26                  | 46                          | 43.59                   | 20.27                       | 2.77                    | 30.89                      | -                    | -                       | Peak    |
| 2372                 | 47.14               | -26.86                  | 74                          | 43.71                   | 32.11                       | 5.47                    | 34.15                      | 100                  | 304                     | Peak    |
| 2372                 | 34.65               | -19.35                  | 54                          | 31.22                   | 32.11                       | 5.47                    | 34.15                      | 100                  | 304                     | Average |
| 2437                 | 103.07              | -                       | -                           | 99.62                   | 32.22                       | 5.41                    | 34.18                      | 100                  | 304                     | Peak    |
| 2437                 | 92.85               | -                       | -                           | 89.39                   | 32.22                       | 5.41                    | 34.17                      | 100                  | 304                     | Average |
| 2492                 | 51.55               | -22.45                  | 74                          | 48.08                   | 32.3                        | 5.37                    | 34.2                       | 100                  | 304                     | Peak    |
| 2492                 | 39.92               | -14.08                  | 54                          | 36.45                   | 32.3                        | 5.37                    | 34.2                       | 100                  | 304                     | Average |
| 8334                 | 54.01               | -19.99                  | 74                          | 43.05                   | 36                          | 10.06                   | 35.1                       | 100                  | 162                     | Peak    |
| 8334                 | 43.65               | -10.35                  | 54                          | 32.69                   | 36                          | 10.06                   | 35.1                       | 100                  | 162                     | Average |



|                        |                                                       |                            |            |
|------------------------|-------------------------------------------------------|----------------------------|------------|
| <b>Test Mode :</b>     | Mode 6                                                | <b>Temperature :</b>       | 22~24℃     |
| <b>Test Channel :</b>  | 11                                                    | <b>Relative Humidity :</b> | 48~49%     |
| <b>Test Engineer :</b> | Ivan Jiang                                            | <b>Polarization :</b>      | Horizontal |
| <b>Remark :</b>        | 2462 MHz is Fundamental Signals which can be ignored. |                            |            |

| Frequency<br>( MHz ) | Level<br>( dBuV/m ) | Over<br>Limit<br>( dB ) | Limit<br>Line<br>( dBuV/m ) | Read<br>Level<br>(dBuV) | Antenna<br>Factor<br>( dB ) | Cable<br>Loss<br>( dB ) | Preamp<br>Factor<br>( dB ) | Ant<br>Pos<br>( cm ) | Table<br>Pos<br>( deg ) | Remark  |
|----------------------|---------------------|-------------------------|-----------------------------|-------------------------|-----------------------------|-------------------------|----------------------------|----------------------|-------------------------|---------|
| 30                   | 23.12               | -16.88                  | 40                          | 34.54                   | 19.51                       | 0.53                    | 31.46                      | -                    | -                       | Peak    |
| 149.61               | 29.03               | -14.47                  | 43.5                        | 48.13                   | 11.25                       | 1.21                    | 31.56                      | -                    | -                       | Peak    |
| 295.14               | 26.95               | -19.05                  | 46                          | 43.16                   | 13.39                       | 1.73                    | 31.33                      | -                    | -                       | Peak    |
| 307                  | 30.28               | -15.72                  | 46                          | 46.15                   | 13.67                       | 1.79                    | 31.33                      | -                    | -                       | Peak    |
| 405                  | 31.66               | -14.34                  | 46                          | 44.44                   | 16.23                       | 2.16                    | 31.17                      | 137                  | 121                     | Peak    |
| 478.5                | 28.86               | -17.14                  | 46                          | 39.83                   | 17.72                       | 2.37                    | 31.06                      | -                    | -                       | Peak    |
| 2388                 | 46.85               | -27.15                  | 74                          | 43.41                   | 32.13                       | 5.46                    | 34.15                      | 103                  | 318                     | Peak    |
| 2388                 | 35.24               | -18.76                  | 54                          | 31.8                    | 32.13                       | 5.46                    | 34.15                      | 103                  | 318                     | Average |
| 2462                 | 103.82              | -                       | -                           | 100.36                  | 32.24                       | 5.4                     | 34.18                      | 103                  | 318                     | Peak    |
| 2462                 | 94.04               | -                       | -                           | 90.58                   | 32.24                       | 5.4                     | 34.18                      | 103                  | 318                     | Average |
| 2483.5               | 48.23               | -5.77                   | 54                          | 44.77                   | 32.27                       | 5.38                    | 34.19                      | 103                  | 318                     | Average |
| 2483.5               | 68.25               | -5.75                   | 74                          | 64.79                   | 32.27                       | 5.38                    | 34.19                      | 103                  | 318                     | Peak    |
| 8298                 | 54.68               | -19.32                  | 74                          | 43.74                   | 36                          | 10.04                   | 35.1                       | 107                  | 148                     | Peak    |
| 8298                 | 44.43               | -9.57                   | 54                          | 33.49                   | 36                          | 10.04                   | 35.1                       | 107                  | 148                     | Average |



|                        |                                                       |                            |          |
|------------------------|-------------------------------------------------------|----------------------------|----------|
| <b>Test Mode :</b>     | Mode 6                                                | <b>Temperature :</b>       | 22~24℃   |
| <b>Test Channel :</b>  | 11                                                    | <b>Relative Humidity :</b> | 48~49%   |
| <b>Test Engineer :</b> | Ivan Jiang                                            | <b>Polarization :</b>      | Vertical |
| <b>Remark :</b>        | 2462 MHz is Fundamental Signals which can be ignored. |                            |          |

| Frequency<br>( MHz ) | Level<br>( dBuV/m ) | Over<br>Limit<br>( dB ) | Limit<br>Line<br>( dBuV/m ) | Read<br>Level<br>(dBuV) | Antenna<br>Factor<br>( dB ) | Cable<br>Loss<br>( dB ) | Preamp<br>Factor<br>( dB ) | Ant<br>Pos<br>( cm ) | Table<br>Pos<br>( deg ) | Remark  |
|----------------------|---------------------|-------------------------|-----------------------------|-------------------------|-----------------------------|-------------------------|----------------------------|----------------------|-------------------------|---------|
| 91.02                | 23.74               | -19.76                  | 43.5                        | 45.28                   | 9.03                        | 0.95                    | 31.52                      | -                    | -                       | Peak    |
| 91.02                | 23.74               | -19.76                  | 43.5                        | 45.28                   | 9.03                        | 0.95                    | 31.52                      | -                    | -                       | Peak    |
| 149.61               | 24.42               | -19.08                  | 43.5                        | 43.52                   | 11.25                       | 1.21                    | 31.56                      | -                    | -                       | Peak    |
| 307                  | 25.72               | -20.28                  | 46                          | 41.59                   | 13.67                       | 1.79                    | 31.33                      | -                    | -                       | Peak    |
| 576.5                | 36.55               | -9.45                   | 46                          | 45.27                   | 19.61                       | 2.62                    | 30.95                      | 100                  | 144                     | Peak    |
| 626.2                | 36.47               | -9.53                   | 46                          | 44.32                   | 20.27                       | 2.77                    | 30.89                      | -                    | -                       | Peak    |
| 2380                 | 46.44               | -27.56                  | 74                          | 43.01                   | 32.11                       | 5.47                    | 34.15                      | 100                  | 296                     | Peak    |
| 2380                 | 34.99               | -19.01                  | 54                          | 31.56                   | 32.11                       | 5.47                    | 34.15                      | 100                  | 296                     | Average |
| 2462                 | 103.95              | -                       | -                           | 100.5                   | 32.24                       | 5.4                     | 34.19                      | 100                  | 296                     | Peak    |
| 2462                 | 93.89               | -                       | -                           | 90.43                   | 32.24                       | 5.4                     | 34.18                      | 100                  | 296                     | Average |
| 2483.5               | 50.92               | -3.08                   | 54                          | 47.46                   | 32.27                       | 5.38                    | 34.19                      | 100                  | 296                     | Average |
| 2483.5               | 70.87               | -3.13                   | 74                          | 67.41                   | 32.27                       | 5.38                    | 34.19                      | 100                  | 296                     | Peak    |
| 8325                 | 54.19               | -19.81                  | 74                          | 43.23                   | 36                          | 10.06                   | 35.1                       | 130                  | 201                     | Peak    |
| 8325                 | 43.63               | -10.37                  | 54                          | 32.67                   | 36                          | 10.06                   | 35.1                       | 130                  | 201                     | Average |



|                        |                                                       |                            |            |
|------------------------|-------------------------------------------------------|----------------------------|------------|
| <b>Test Mode :</b>     | Mode 7                                                | <b>Temperature :</b>       | 22~24℃     |
| <b>Test Channel :</b>  | 11                                                    | <b>Relative Humidity :</b> | 48~49%     |
| <b>Test Engineer :</b> | Ivan Jiang                                            | <b>Polarization :</b>      | Horizontal |
| <b>Remark :</b>        | 2462 MHz is Fundamental Signals which can be ignored. |                            |            |

| Frequency<br>( MHz ) | Level<br>( dBuV/m ) | Over<br>Limit<br>( dB ) | Limit<br>Line<br>( dBuV/m ) | Read<br>Level<br>(dBuV) | Antenna<br>Factor<br>( dB ) | Cable<br>Loss<br>( dB ) | Preamp<br>Factor<br>( dB ) | Ant<br>Pos<br>( cm ) | Table<br>Pos<br>( deg ) | Remark  |
|----------------------|---------------------|-------------------------|-----------------------------|-------------------------|-----------------------------|-------------------------|----------------------------|----------------------|-------------------------|---------|
| 30                   | 22.12               | -17.88                  | 40                          | 33.54                   | 19.51                       | 0.53                    | 31.46                      | -                    | -                       | Peak    |
| 149.61               | 28.03               | -15.47                  | 43.5                        | 47.13                   | 11.25                       | 1.21                    | 31.56                      | -                    | -                       | Peak    |
| 208.74               | 24.49               | -19.01                  | 43.5                        | 45.66                   | 8.95                        | 1.35                    | 31.47                      | -                    | -                       | Peak    |
| 307                  | 30.35               | -15.65                  | 46                          | 46.22                   | 13.67                       | 1.79                    | 31.33                      | -                    | -                       | Peak    |
| 405                  | 31.34               | -14.66                  | 46                          | 44.12                   | 16.23                       | 2.16                    | 31.17                      | 116                  | 301                     | Peak    |
| 478.5                | 28.51               | -17.49                  | 46                          | 39.48                   | 17.72                       | 2.37                    | 31.06                      | -                    | -                       | Peak    |
| 2366                 | 47.81               | -26.19                  | 74                          | 44.39                   | 32.08                       | 5.49                    | 34.15                      | 109                  | 3                       | Peak    |
| 2366                 | 35.53               | -18.47                  | 54                          | 32.11                   | 32.08                       | 5.49                    | 34.15                      | 109                  | 3                       | Average |
| 2462                 | 103.93              | -                       | -                           | 100.47                  | 32.24                       | 5.4                     | 34.18                      | 109                  | 3                       | Peak    |
| 2462                 | 94.2                | -                       | -                           | 90.74                   | 32.24                       | 5.4                     | 34.18                      | 109                  | 3                       | Average |
| 2483.5               | 60.31               | -13.69                  | 74                          | 56.85                   | 32.27                       | 5.38                    | 34.19                      | 109                  | 3                       | Peak    |
| 2483.5               | 43.47               | -10.53                  | 54                          | 40.01                   | 32.27                       | 5.38                    | 34.19                      | 109                  | 3                       | Average |
| 8325                 | 54.68               | -19.32                  | 74                          | 43.72                   | 36                          | 10.06                   | 35.1                       | 100                  | 236                     | Peak    |
| 8325                 | 43.43               | -10.57                  | 54                          | 32.47                   | 36                          | 10.06                   | 35.1                       | 100                  | 236                     | Average |



|                        |                                                       |                            |          |
|------------------------|-------------------------------------------------------|----------------------------|----------|
| <b>Test Mode :</b>     | Mode 7                                                | <b>Temperature :</b>       | 22~24℃   |
| <b>Test Channel :</b>  | 11                                                    | <b>Relative Humidity :</b> | 48~49%   |
| <b>Test Engineer :</b> | Ivan Jiang                                            | <b>Polarization :</b>      | Vertical |
| <b>Remark :</b>        | 2462 MHz is Fundamental Signals which can be ignored. |                            |          |

| Frequency<br>( MHz ) | Level<br>( dBuV/m ) | Over<br>Limit<br>( dB ) | Limit<br>Line<br>( dBuV/m ) | Read<br>Level<br>(dBuV) | Antenna<br>Factor<br>( dB ) | Cable<br>Loss<br>( dB ) | Preamp<br>Factor<br>( dB ) | Ant<br>Pos<br>( cm ) | Table<br>Pos<br>( deg ) | Remark  |
|----------------------|---------------------|-------------------------|-----------------------------|-------------------------|-----------------------------|-------------------------|----------------------------|----------------------|-------------------------|---------|
| 30                   | 26.69               | -13.31                  | 40                          | 38.11                   | 19.51                       | 0.53                    | 31.46                      | -                    | -                       | Peak    |
| 91.02                | 24.47               | -19.03                  | 43.5                        | 46.01                   | 9.03                        | 0.95                    | 31.52                      | -                    | -                       | Peak    |
| 147.45               | 25.16               | -18.34                  | 43.5                        | 44.17                   | 11.34                       | 1.21                    | 31.56                      | -                    | -                       | Peak    |
| 576.5                | 36.52               | -9.48                   | 46                          | 45.24                   | 19.61                       | 2.62                    | 30.95                      | 139                  | 110                     | Peak    |
| 601.7                | 34.98               | -11.02                  | 46                          | 43.13                   | 20.08                       | 2.69                    | 30.92                      | -                    | -                       | Peak    |
| 626.2                | 35.38               | -10.62                  | 46                          | 43.23                   | 20.27                       | 2.77                    | 30.89                      | -                    | -                       | Peak    |
| 2350                 | 47.65               | -26.35                  | 74                          | 44.24                   | 32.05                       | 5.5                     | 34.14                      | 100                  | 173                     | Peak    |
| 2350                 | 34.11               | -19.89                  | 54                          | 30.7                    | 32.05                       | 5.5                     | 34.14                      | 100                  | 173                     | Average |
| 2462                 | 100.29              | -                       | -                           | 96.83                   | 32.24                       | 5.4                     | 34.18                      | 100                  | 173                     | Peak    |
| 2462                 | 90.37               | -                       | -                           | 86.91                   | 32.24                       | 5.4                     | 34.18                      | 100                  | 173                     | Average |
| 2483.5               | 56                  | -18                     | 74                          | 52.54                   | 32.27                       | 5.38                    | 34.19                      | 100                  | 173                     | Peak    |
| 2483.5               | 40.2                | -13.8                   | 54                          | 36.74                   | 32.27                       | 5.38                    | 34.19                      | 100                  | 173                     | Average |
| 8445                 | 55.33               | -18.67                  | 74                          | 44.29                   | 36                          | 10.14                   | 35.1                       | 100                  | 211                     | Peak    |
| 8445                 | 44.81               | -9.19                   | 54                          | 33.77                   | 36                          | 10.14                   | 35.1                       | 100                  | 211                     | Average |

## **3.8 Antenna Requirements**

### **3.8.1 Standard Applicable**

If directional gain of transmitting antennas is greater than 6dBi, the power shall be reduced by the same level in dB comparing to gain minus 6dBi. For the fixed point-to-point operation, the power shall be reduced by one dB for every 3 dB that the directional gain of the antenna exceeds 6 dBi. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the FCC rule.

### **3.8.2 Antenna Connected Construction**

The antennas type used in this product is PIFA Antenna without connector and it is considered to meet antenna requirement.

### **3.8.3 Antenna Gain**

The antenna peak gain of EUT is less than 6 dBi. Therefore, it is not necessary to reduce maximum peak output power limit.

## 4 List of Measuring Equipment

| Instrument                | Manufacturer | Model No. | Serial No.  | Characteristics       | Calibration Date | Due Date      | Remark                |
|---------------------------|--------------|-----------|-------------|-----------------------|------------------|---------------|-----------------------|
| Spectrum Analyzer         | R&S          | FSP40     | 100055      | 9kHz~40GHz            | Jun. 23, 2009    | Jun. 22, 2010 | Conducted (TH02-HY)   |
| Power Meter               | Anritsu      | ML2495A   | 0932001     | N/A                   | Sep. 17, 2009    | Sep. 16, 2010 | Conducted (TH02-HY)   |
| Power Sensor              | Anritsu      | MA2411B   | 0846202     | N/A                   | Sep. 10, 2009    | Sep. 09, 2010 | Conducted (TH02-HY)   |
| EMI Test Receive          | R&S          | ESCS 30   | 100356      | 9KHz ~ 2.75GHz        | Aug. 05, 2009    | Aug. 04, 2010 | Conduction (CO05-HY)  |
| Two-LISN                  | R&S          | ENV216    | 11-100081   | 9kHz~30MHz            | Nov. 30, 2009    | Nov. 29, 2010 | Conduction (CO05-HY)  |
| Two-LISN                  | R&S          | ENV216    | 11-100080   | 9kHz~30MHz            | Nov. 23, 2009    | Nov. 22, 2010 | Conduction (CO05-HY)  |
| AC Power Source           | APC          | APC-1000W | N/A         | N/A                   | N/A              | N/A           | Conduction (CO05-HY)  |
| System Simulator          | R&S          | CMU200    | 105934      | N/A                   | Nov. 11, 2008    | Nov. 10, 2010 | Conduction (CO05-HY)  |
| GPS Station               | T&E          | GS-50     | N/A         | N/A                   | N/A              | N/A           | Conduction (CO05-HY)  |
| Bilog Antenna             | SCHAFFNER    | CBL6111C  | 2726        | 30MHz ~ 1GHz          | Oct. 31, 2009    | Oct. 30, 2010 | Radiation (03CH07-HY) |
| Spectrum Analyzer         | R&S          | FSP       | 101067      | 9KHz ~ 30GHz          | Dec. 04, 2009    | Dec. 03, 2010 | Radiation (03CH07-HY) |
| Double Ridge Horn Antenna | ESCO         | 3117      | 00075962    | 1GHz ~ 18GHz          | Aug. 20, 2009    | Aug. 19, 2010 | Radiation (03CH07-HY) |
| SHF-EHF Horn Antenna      | SCHWARZBECK  | BBHA 9170 | BBHA9170251 | 15GHz- 40GHz          | Oct. 14, 2009    | Oct. 13, 2010 | Radiation (03CH07-HY) |
| Pre Amplifier             | Agilent      | 8449B     | 3008A02362  | 1GHz~ 26.5GHz         | Dec.09,2009      | Dec. 08, 2010 | Radiation (03CH07-HY) |
| Pre Amplifier             | COM-POWER    | PA-103A   | 161241      | 10-1000MHz.32 dB.GAIN | Mar. 27, 2010    | Mar. 26, 2011 | Radiation (03CH07-HY) |
| Loop Antenna              | R&S          | HFH2-Z2   | 860004/001  | 9 KHz~30 MHz          | May 22, 2008     | May 21, 2010  | Radiation (03CH07-HY) |

## 5 Uncertainty of Evaluation

### Uncertainty of Conducted Emission Measurement (150 kHz ~ 30 MHz)

| Contribution                                                                             | Uncertainty of $X_i$ |                          | $u(X_i)$ |
|------------------------------------------------------------------------------------------|----------------------|--------------------------|----------|
|                                                                                          | dB                   | Probability Distribution |          |
| Receiver Reading                                                                         | 0.10                 | Normal (k=2)             | 0.05     |
| Cable Loss                                                                               | 0.10                 | Normal (k=2)             | 0.05     |
| AMN Insertion Loss                                                                       | 2.50                 | Rectangular              | 0.63     |
| Receiver Specification                                                                   | 1.50                 | Rectangular              | 0.43     |
| Site Imperfection                                                                        | 1.39                 | Rectangular              | 0.80     |
| Mismatch                                                                                 | +0.34 / -0.35        | U-Shape                  | 0.24     |
| <b>Combined Standard Uncertainty <math>U_c(y)</math></b>                                 | <b>1.13</b>          |                          |          |
| <b>Measuring Uncertainty for a Level of Confidence of 95% (<math>U = 2U_c(y)</math>)</b> | <b>2.26</b>          |                          |          |

### Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

| Contribution                                                                             | Uncertainty of $X_i$ |                          | $u(X_i)$ |
|------------------------------------------------------------------------------------------|----------------------|--------------------------|----------|
|                                                                                          | dB                   | Probability Distribution |          |
| Receiver Reading                                                                         | 0.41                 | Normal (k=2)             | 0.21     |
| Antenna Factor Calibration                                                               | 0.83                 | Normal (k=2)             | 0.42     |
| Cable Loss Calibration                                                                   | 0.25                 | Normal (k=2)             | 0.13     |
| Pre-Amplifier Gain Calibration                                                           | 0.27                 | Normal (k=2)             | 0.14     |
| RCV/SPA Specification                                                                    | 2.50                 | Rectangular              | 0.72     |
| Antenna Factor Interpolation for Frequency                                               | 1.00                 | Rectangular              | 0.29     |
| Site Imperfection                                                                        | 1.43                 | Rectangular              | 0.83     |
| Mismatch                                                                                 | +0.39 / -0.41        | U-Shape                  | 0.28     |
| <b>Combined Standard Uncertainty <math>U_c(y)</math></b>                                 | <b>1.27</b>          |                          |          |
| <b>Measuring Uncertainty for a Level of Confidence of 95% (<math>U = 2U_c(y)</math>)</b> | <b>2.54</b>          |                          |          |

**Uncertainty of Radiated Emission Measurement (1 GHz ~ 40 GHz)**

| Contribution                                                                                                                         | Uncertainty of $X_i$ |                          | $u(X_i)$ | $C_i$ | $C_i * u(X_i)$ |
|--------------------------------------------------------------------------------------------------------------------------------------|----------------------|--------------------------|----------|-------|----------------|
|                                                                                                                                      | dB                   | Probability Distribution |          |       |                |
| Receiver Reading                                                                                                                     | $\pm 0.10$           | Normal (k=2)             | 0.10     | 1     | 0.10           |
| Antenna Factor Calibration                                                                                                           | $\pm 1.70$           | Normal (k=2)             | 0.85     | 1     | 0.85           |
| Cable Loss Calibration                                                                                                               | $\pm 0.50$           | Normal (k=2)             | 0.25     | 1     | 0.25           |
| Receiver Correction                                                                                                                  | $\pm 2.00$           | Rectangular              | 1.15     | 1     | 1.15           |
| Antenna Factor Directional                                                                                                           | $\pm 1.50$           | Rectangular              | 0.87     | 1     | 0.87           |
| Site Imperfection                                                                                                                    | $\pm 2.80$           | Triangular               | 1.14     | 1     | 1.14           |
| Mismatch<br>Receiver VSWR $\Gamma_1 = 0.197$<br>Antenna VSWR $\Gamma_2 = 0.194$<br>Uncertainty = $20\text{Log}(1-\Gamma_1*\Gamma_2)$ | +0.34 / -0.35        | U-Shape                  | 0.244    | 1     | 0.244          |
| <b>Combined Standard Uncertainty<br/><math>U_c(y)</math></b>                                                                         | <b>2.36</b>          |                          |          |       |                |
| <b>Measuring Uncertainty for a<br/>Level of Confidence of 95%<br/>(<math>U = 2U_c(y)</math>)</b>                                     | <b>4.72</b>          |                          |          |       |                |



## **Appendix A. Photographs of EUT**

Please refer to Sporton report number EP041004 as below.