# FCC TEST REPORT

# (PART 27)

**REPORT NO.:** RF970714L04

**MODEL NO.:** USBw25100

**RECEIVED:** Apr. 01, 2008

**TESTED:** Apr. 01 ~ Aug. 21, 2008

**ISSUED:** Aug. 25, 2008

**APPLICANT:** Motorola, Inc.

**ADDRESS:** 1475 W. Shure Drive, Arlington Heights, Il 60004
United States

**ISSUED BY:** Advance Data Technology Corporation

**LAB ADDRESS:** No. 47, 14th Ling, Chia Pau Tsuen, Lin Kou Hsiang, Taipei Hsien 244, Taiwan, R.O.C.

**TEST LOCATION:** No. 19, Hwa Ya 2nd Rd, Wen Hwa Tsuen, Kwei Shan Hsiang, Taoyuan Hsien 333, Taiwan, R.O.C.

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# 1 CERTIFICATION

**PRODUCT:** WiMAX Wave2 USB Adaptor
**MODEL:** USBw25100
**BRAND:** Motorola
**APPLICANT:** Motorola, Inc.
**TESTED:** Apr. 01 ~ Aug. 21, 2008
**TEST SAMPLE:** ENGINEERING SAMPLE
**TEST STANDARDS:** **FCC Part 27, Subpart C & M**

The above equipment (Model no.: USBw25100) has been tested by **Advance Data Technology Corporation**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's EMC characteristics under the conditions specified in this report.

**PREPARED BY** : Rennie Wang / Senior Specialist , **DATE:** Aug. 25, 2008

**TECHNICAL ACCEPTANCE** : Long Chen / Senior Engineer , **DATE:** Aug. 25, 2008
Responsible for RF

**APPROVED BY** : Gary Chang / Assistant Manager , **DATE:** Aug. 25, 2008

## 2 SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

| STANDARD SECTION<br>FCC Part 27 & Part 2 | TEST TYPE AND LIMIT | RESULT | REMARK |
|---|---|---|---|
| 2.1046<br>27.50(h)(2) | Maximum Peak Output Power<br>Limit: max. 2 watts | PASS | Meet the requirement of limit.<br>Minimum passing margin is 25.66dBm at 2587.00MHz. |
| 2.1055<br>27.54 | Frequency Stability<br>Stay with the authorized bands of operation | PASS | Meet the requirement of limit. |
| 2.1049<br>27.53(m)(6) | Emission Bandwidth | PASS | Meet the requirement of limit. |
| 2.1051<br>27.53(m)(4)(6) | Band Edge Measurements | PASS | Meet the requirement of limit. |
| 2.1051<br>27.53(m)(4)(6) | Conducted Spurious Emissions | PASS | Meet the requirement of limit. |
| 2.1053<br>27.53(m)(4)(6) | Radiated Spurious Emissions | PASS | Meet the requirement of limit.<br>Minimum passing margin is -7.85dB at 41.66MHz. |

## 2.1 MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

| MEASUREMENT | FREQUENCY | UNCERTAINTY |
|---|---|---|
| Conducted emissions | 9kHz ~ 30MHz | 2.44dB |
| Radiated emissions | 30MHz ~ 200MHz | 2.93dB |
| | 200MHz ~1000MHz | 2.95dB |
| | 1GHz ~ 18GHz | 2.26dB |
| | 18GHz ~ 40GHz | 1.94dB |

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k = 2.

# 3 GENERAL INFORMATION

## 3.1 GENERAL DESCRIPTION OF EUT

| | |
|---|---|
| **PRODUCT** | WiMAX Wave2 USB Adaptor |
| **MODEL NO.** | USBw25100 |
| **FCC ID** | VYO-USBW25100 |
| **POWER SUPPLY** | 5.0Vdc from host equipment |
| **MODULATION TYPE** | QPSK, 16QAM, 64QAM (refer to NOTE 1 for more details) |
| **CODING RATE** | 1/2, 2/3, 3/4 (refer to NOTE 1 for more details) |
| **MODULATION TECHNOLOGY** | OFDMA |
| **DUPLEX METHOD** | TDD |
| **FREQUENCY RANGE** | 2496MHz ~ 2690MHz |
| **CHANNEL BANDWIDTH** | 5MHz, 10MHz |
| **MAX. E.I.R.P. POWER** | 25.66dBm |
| **ANTENNA TYPE** | Printed antenna with 2.8dBi gain |
| **OPERATION TEMPERATURE RANGE** | $0^{o}$C ~ $45^{o}$C |
| **DATA CABLE** | NA |
| **I/O PORTS** | USB |
| **ACCESSORY DEVICES** | Convertible USB connecter |

**NOTE:**

1. For the EUT with modulation type and coding rate:

| DOWN LINK | | UP LINK | |
|---|---|---|---|
| **MODULATION** | **CODING RATE** | **MODULATION** | **CODING RATE** |
| QPSK | 1/2 | QPSK | 1/2 |
| | 3/4 | | 3/4 |
| 16QAM | 1/2 | 16QAM | 1/2 |
| | 3/4 | | 3/4 |
| 64QAM | 1/2 | | |
| | 2/3 | | |
| | 3/4 | | |

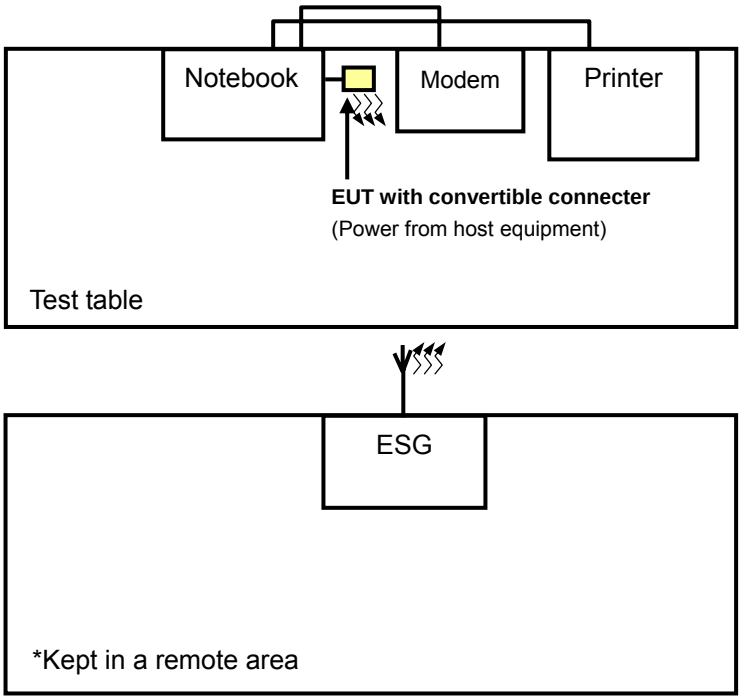
2. The above EUT information was declared by manufacturer and for more detailed features description, please refers to the manufacturer's specifications or User's Manual.

## 3.2 DESCRIPTION OF TEST MODES

Three channels had been tested for each channel bandwidth.

| |
|---|
| **CHANNEL BANDWIDTH: 5MHz** |
| **Low channel (L)**: 2498.5MHz. |
| **Middle channel (M)**: 2587.0MHz. |
| **High channel (H)**: 2687.5MHz. |
| **CHANNEL BANDWIDTH: 10MHz** |
| **Low channel (L)**: 2501.0MHz. |
| **Middle channel (M)**: 2587.0MHz. |
| **High channel (H)**: 2685.0MHz. |

### 3.2.1 CONFIGURATION OF SYSTEM UNDER TEST



## 3.2.2 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL

| EUT CONFIGURE MODE | APPLICABLE TO | | | | | | | DESCRIPTION |
|---|---|---|---|---|---|---|---|---|
| | OP | FS | EB | CE | CSE | RE<1G | RE≥1G | |
| A | √ | √ | √ | √ | √ | √ | √ | Channel bandwidth: 5MHz |
| B | √ | √ | √ | √ | √ | √ | √ | Channel bandwidth: 10MHz |

Where **OP:** Output power **FS:** Frequency stability
**EB:** Emission bandwidth **CE: Channel** edge
**CSE**: Conducted spurious emissions **RE<1G:** Radiated emission below 1GHz
**RE≥1G:** Radiated emission above 1GHz

**OUTPUT POWER MEASUREMENT:**

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, coding rate, XYZ axis and antenna ports (if EUT with antenna diversity architecture).

☒ Following channel(s) was (were) selected for the final test as listed below.

| CONFIGURE MODE | TESTED CHANNEL | MODULATION TECHNOLOGY | MODULATION TYPE | CODING RATE | AXIS |
|---|---|---|---|---|---|
| A | L, M, H | OFDMA | QPSK | 1/2 | X |
| B | L, M, H | OFDMA | QPSK | 1/2 | X |

**FREQUENCY STABILITY MEASUREMENT:**

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, coding rate, and antenna ports (if EUT with antenna diversity architecture).

☒ Following channel(s) was (were) selected for the final test as listed below.

| CONFIGURE MODE | TESTED CHANNEL | MODULATION TECHNOLOGY | MODULATION TYPE | CODING RATE |
|---|---|---|---|---|
| A | L | OFDMA | QPSK | 1/2 |
| B | L | OFDMA | QPSK | 1/2 |

**EMISSION BANDWIDTH MEASUREMENT:**

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, coding rate, and antenna ports (if EUT with antenna diversity architecture).

☒ Following channel(s) was (were) selected for the final test as listed below.

| CONFIGURE MODE | TESTED CHANNEL | MODULATION TECHNOLOGY | MODULATION TYPE | CODING RATE |
|---|---|---|---|---|
| A | L, M, H | OFDMA | QPSK | 1/2 |
| B | L, M, H | OFDMA | QPSK | 1/2 |

**CHANNEL EDGE MEASUREMENT:**

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, coding rate, and antenna ports (if EUT with antenna diversity architecture).

☒ Following channel(s) was (were) selected for the final test as listed below.

| CONFIGURE MODE | TESTED CHANNEL | MODULATION TECHNOLOGY | MODULATION TYPE | CODING RATE |
|---|---|---|---|---|
| A | L, M, H | OFDMA | QPSK | 1/2 |
| B | L, M, H | OFDMA | QPSK | 1/2 |

**CONDUCTED SPURIOUS EMISSIONS MEASUREMENT:**

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, coding rate, and antenna ports (if EUT with antenna diversity architecture).

☒ Following channel(s) was (were) selected for the final test as listed below.

| CONFIGURE MODE | TESTED CHANNEL | MODULATION TECHNOLOGY | MODULATION TYPE | CODING RATE |
|---|---|---|---|---|
| A | L, M, H | OFDMA | QPSK | 1/2 |
| B | L, M, H | OFDMA | QPSK | 1/2 |

**RADIATED EMISSION MEASUREMENT (BELOW 1 GHz):**

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, coding rate, XYZ axis and antenna ports (if EUT with antenna diversity architecture).

☒ Following channel(s) was (were) selected for the final test as listed below.

| CONFIGURE MODE | TESTED CHANNEL | MODULATION TECHNOLOGY | MODULATION TYPE | CODING RATE | AXIS |
|---|---|---|---|---|---|
| A | M | OFDMA | QPSK | 1/2 | X |
| B | M | OFDMA | QPSK | 1/2 | x |

**RADIATED EMISSION MEASUREMENT (ABOVE 1 GHz):**

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, coding rate, XYZ axis and antenna ports (if EUT with antenna diversity architecture).

☒ Following channel(s) was (were) selected for the final test as listed below.

| CONFIGURE MODE | TESTED CHANNEL | MODULATION TECHNOLOGY | MODULATION TYPE | CODING RATE | AXIS |
|---|---|---|---|---|---|
| A | L, M, H | OFDMA | QPSK | 1/2 | X |
| B | L, M, H | OFDMA | QPSK | 1/2 | x |

## 3.3 GENERAL DESCRIPTION OF APPLIED STANDARDS

The EUT is a RF product. According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

**FCC 47 CFR Part 2**

**FCC 47 CFR Part 27**

**ANSI/TIA/EIA-603-C-2004**

**NOTE:** All test items have been performed and recorded as per the above standards.

## 3.4 DESCRIPTION OF SUPPORT UNITS

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

| NO. | PRODUCT | BRAND | MODEL NO. | SERIAL NO. | FCC ID |
|---|---|---|---|---|---|
| 1 | NOTEBOOK | DELL | D820 | 21498926752 | FCC DoC Approved |
| 2 | PRINTER | hp | hp-1015 | Q2462A -CNFG149502 | NA |
| 3 | MODEM | ACEEX | 1414V/3 | 0401008253 | IFAXDM1414 |
| 4 | SIGNAL GENERATOR | Agilent | E4438C | MY45092849 | NA |

| NO. | SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS |
|---|---|
| 1 | NA |
| 2 | 1.2m shielded cable |
| 3 | 1.2m braid shielded wire , DB25 & DB9 connector , w/o core. |
| 4 | NA |

**NOTE:** All power cords of the above support units are non shielded (1.8m).

# 4 TEST TYPES AND RESULTS

## 4.1 OUTPUT POWER MEASUREMENT

### 4.1.1 LIMITS OF OUTPUT POWER MEASUREMENT

The radiated peak output power shall be according to the specific rule Part 27.50(h)(2) that “User stations are limited to 2 watts” and 27.50(i) specific that “Peak transmit power must be measure over any interval of continuous transmission using instrumentation calibration in terms of rms-equivalent voltage.”

## 4.1.2 TEST INSTRUMENTS

| DESCRIPTION & MANUFACTURER | MODEL NO. | SERIAL NO. | CALIBRATED UNTIL |
|---|---|---|---|
| Test Receiver<br>ROHDE & SCHWARZ | ESIB7 | 100212 | May 27, 2009 |
| Spectrum Analyzer<br>ROHDE & SCHWARZ | FSP40 | 100269 | Aug. 07, 2009 |
| BILOG Antenna<br>SCHWARZBECK | VULB9168 | 9168-156 | Apr. 24, 2009 |
| HORN Antenna<br>SCHWARZBECK | BBHA 9120 D | 9120D-563 | Aug. 05, 2009 |
| HORN Antenna<br>SCHWARZBECK | BBHA 9170 | BBHA9170242 | Jan. 06, 2009 |
| Preamplifier<br>Agilent | 8449B | 3008A01911 | Sep. 10, 2008 |
| Preamplifier<br>Agilent | 8447D | 2944A10634 | Dec. 12, 2008 |
| RF signal cable<br>HUBER+SUHNNER | SUCOFLEX 104 | 274039/223650 | Nov. 07, 2008 |
| RF signal cable<br>Worken | 8D-FB | Cable-HYCH9-01 | Jun. 05, 2009 |
| Software | ADT_Radiated_V7.6 | NA | NA |
| Antenna Tower<br>EMCO | 2070/2080 | 512.835.4684 | NA |
| Turn Table<br>EMCO | 2087-2.03 | NA | NA |
| Antenna Tower &Turn Table Controller<br>EMCO | 2090 | NA | NA |

**NOTE:** 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

2. The test was performed in HwaYa Chamber 9.

3. The horn antenna and HP preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.

4. The FCC Site Registration No. is 215374.

5. The IC Site Registration No. is IC3789B-9.

### 4.1.3 TEST PROCEDURES

a. The EUT was set up for the rated power with signal generator. The power was measured with Spectrum Analyzer. All measurements were done at 3 channels: low, middle and high operational frequency range.

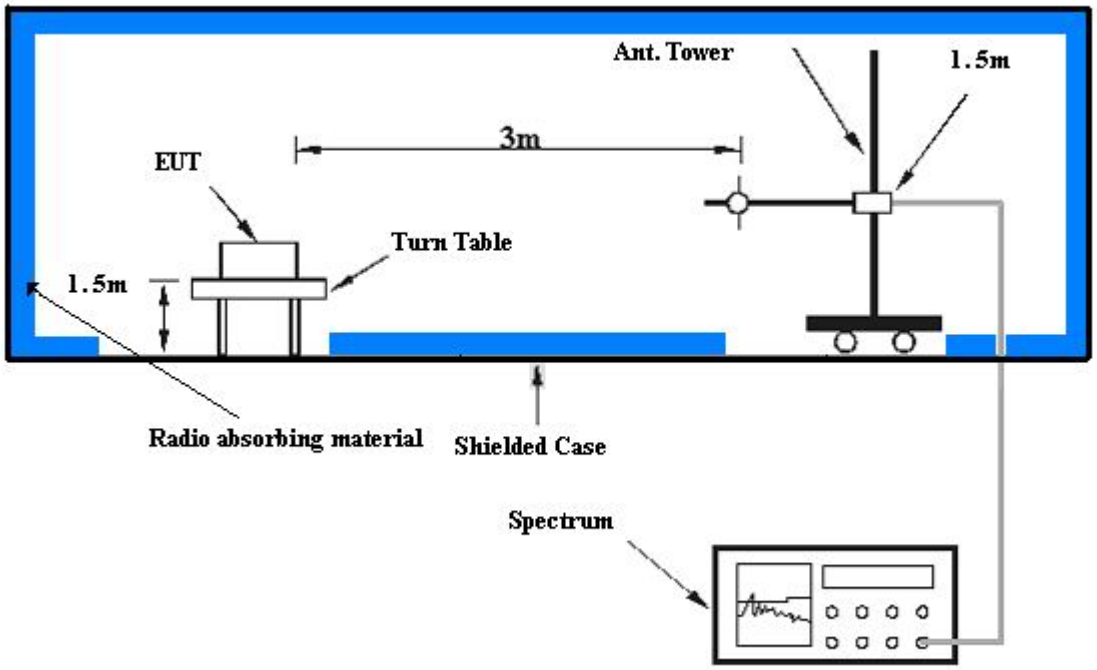
b. E.I.R.P power measurement. In the semi anechoic chamber, EUT placed on the 1.5m height of Turn Table, rotated the table around 360 degrees to search the maximum radiation power and receiver antenna shall be rotated vertical and horizontal polarization to find the maximum polar radiated power. The “Read Value” is the spectrum reading the maximum power value.

c. The substitution horn antenna is substituted for EUT at the same position and signal generator export the CW signal to the calibration antenna. Rotated the Turn Table to find the maximum radiation power. “Raw” is the spectrum reading value, “SG” is signal generator export power, “TX Gain” is calibration antenna isotropic gain value, “TX cable” is the transmitted cable loss between the calibration antenna and signal generator. The “Factor” means that the transmission path loss is equal to “SG” - “TX cable” + “TX Gain” – “Raw”.

d. Actually the real E.I.R.P peak power is equal to “Read Value” + “Factor”.

## 4.1.4 TEST SETUP

**EIRP POWER MEASUREMENT:**




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

## 4.1.5 EUT OPERATING CONDITIONS

a. Link up EUT with signal generator.

b. The signal generator controlled EUT to export rated output power under transmission mode and specific channel frequency.

## 4.1.6 TEST RESULTS

| | | | |
|---|---|---|---|
| **INPUT POWER** | 120Vac, 60Hz | **DETECTOR FUNCTION** | RMS |
| **ENVIRONMENTAL CONDITIONS** | 25deg°C, 63%RH 991hPa | **TESTED BY** | Dean Wang |
| **TEST MODE** | **A** | | |

| **EIRP POWER** | | | | | |
|---|---|---|---|---|---|
| **CHANNEL** | **FREQUENCY (MHz)** | **C.F (dB)** | **POWER OUTPUT (dBm)** | **TOTAL POWER (dBm)** | **TOTAL POWER (mW)** |
| Low | 2498.50 | 46.20 | -21.42 | 24.78 | 300.61 |
| **Middle** | **2587.00** | **46.60** | **-20.94** | **25.66** | **368.13** |
| High | 2687.50 | 47.10 | -21.56 | 25.54 | 358.10 |

**NOTE:** C.F = space loss + antenna factor + cable loss

| **CONDUCTED POWER** | | | | | |
|---|---|---|---|---|---|
| **CHANNEL** | **FREQUENCY (MHz)** | **C.F (dB)** | **POWER OUTPUT (dBm)** | **TOTAL POWER (dBm)** | **TOTAL POWER (mW)** |
| Low | 2498.50 | 21.00 | 1.06 | 22.06 | 160.69 |
| Middle | 2587.00 | 21.00 | 1.85 | 22.85 | 192.75 |
| High | 2687.50 | 21.00 | 1.78 | 22.78 | 189.67 |

**NOTE:** C.F = attenuator + cable loss

| | | | |
|---|---|---|---|
| **INPUT POWER** | 120Vac, 60Hz | **DETECTOR FUNCTION** | RMS |
| **ENVIRONMENTAL CONDITIONS** | 25deg°C, 63%RH 991hPa | **TESTED BY** | Dean Wang |
| **TEST MODE** | **B** | | |

| EIRP POWER | | | | | |
|---|---|---|---|---|---|
| **CHANNEL** | **FREQUENCY (MHz)** | **C.F (dB)** | **POWER OUTPUT (dBm)** | **TOTAL POWER (dBm)** | **TOTAL POWER (mW)** |
| Low | 2501.00 | 46.20 | -21.51 | 24.69 | 294.44 |
| Middle | 2587.00 | 46.60 | -21.45 | 25.15 | 327.34 |
| High | 2685.00 | 47.10 | -21.99 | 25.11 | 324.34 |

**NOTE:** C.F = space loss + antenna factor + cable loss

| CONDUCTED POWER | | | | | |
|---|---|---|---|---|---|
| **CHANNEL** | **FREQUENCY (MHz)** | **C.F (dB)** | **POWER OUTPUT (dBm)** | **TOTAL POWER (dBm)** | **TOTAL POWER (mW)** |
| Low | 2501.00 | 21.00 | 1.06 | 22.06 | 160.69 |
| Middle | 2587.00 | 21.00 | 1.45 | 22.45 | 175.79 |
| High | 2685.00 | 21.00 | 1.43 | 22.43 | 174.98 |

**NOTE:** C.F = attenuator + cable loss

## 4.2 FREQUENCY STABILITY MEASUREMENT

### 4.2.1 LIMITS OF FREQUENCY STABILIITY MEASUREMENT

According to the FCC part 2.1055 shall be tested the frequency stability. The rule is defined that" The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block." The test extreme voltage is according to the 2.1055(d)(1) Vary primary supply voltage from 85 to 115 percent of the nominal value for other than hand carried battery equipment and the extreme temperature rule is comply with specification of EUT 0℃ ~ 45℃.

### 4.2.2 TEST INSTRUMENTS

| DESCRIPTION & MANUFACTURER | MODEL NO. | SERIAL NO. | CALIBRATED UNTIL |
|---|---|---|---|
| Spectrum Analyzer<br>Agilent | E4446A | MY44360128 | Dec. 06, 2008 |
| * Hewlett Packard RF cable | 8120-6192 | 01428251 | NA |
| * Suhner RF cable | Sucoflex104 | 204850/4 | NA |
| * WIT<br>Standard Temperature & Humidity Chamber | TH-4S-C | W981030 | Jun. 25, 2009 |

**NOTE:** 1. The calibration interval of the above test instruments is 12 months. And the calibrations are traceable to NML/ROC and NIST/USA.

2. "*" = These equipments are used for the final measurement.

3. The test was performed in ADT RF OVEN room.

### 4.2.3 TEST PROCEDURE

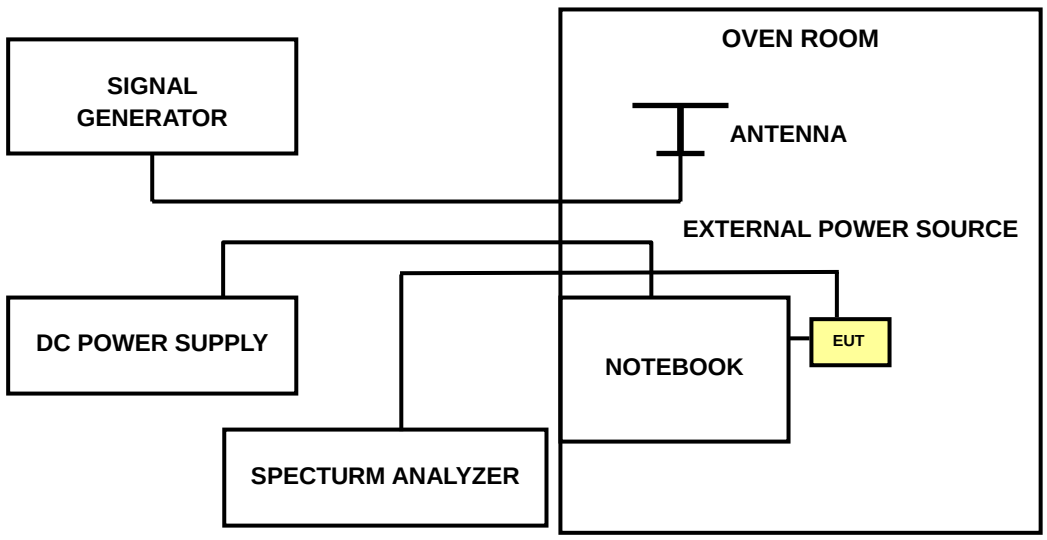
a. Power must be removed when changing from one temperature to another or one voltage to another voltage. Power warm up is at least 15 min and power applied should perform before recording frequency error.

b. EUT is connected the external power supply to control the AC input power. The various Volts from the minimum 93.5 Volts to 126.5 Volts. Each step shall be record the frequency error rate.

c. The temperature range step is 10 degrees in this test items. All temperature levels shall be hold the ±0.5℃ during the measurement testing.

d. The each temperature step shall be at least 0.5 hours, consider the EUT could be test under the stability condition.

### 4.2.4 TEST SETUP




### 4.2.5 EUT OPERATING CONDITIONS

The EUT connected to the notebook. Use software to control the EUT channel and transmit a single tone.

## 4.2.6 TEST RESULTS

| | | | |
|---|---|---|---|
| **MODE** | Low channel | **INPUT POWER** | 120Vac, 60Hz |
| **ENVIRONMENTAL CONDITIONS** | 25deg°C, 63%RH 991hPa | **TESTED BY** | Dean Wang |
| **TEST MODE** | **A** | | |

| **AFC FREQUENCY ERROR VS. VOLTAGE** | | |
|---|---|---|
| **VOLTAGE (Volts)** | **FREQUENCY (MHz)** | **FREQUENCY ERROR (ppm)** |
| 126.5 | 2498.495662 | -1.7362417 |
| 110.0 | 2498.495966 | -1.6145687 |
| 93.5 | 2498.495814 | -1.6754052 |

| **AFC FREQUENCY ERROR VS. TEMP.** | | |
|---|---|---|
| **TEMP. (℃)** | **FREQUENCY (MHz)** | **FREQUENCY ERROR (ppm)** |
| 45 | 2498.495762 | -1.6962177 |
| 40 | 2498.495611 | -1.7566540 |
| 30 | 2498.495611 | -1.7566540 |
| 20 | 2498.495966 | -1.6145687 |
| 10 | 2498.495569 | -1.7734641 |
| 0 | 2498.495560 | -1.7770662 |

| | | | |
|---|---|---|---|
| **MODE** | Low channel | **INPUT POWER** | 120Vac, 60Hz |
| **ENVIRONMENTAL CONDITIONS** | 25deg°C, 63%RH<br>991hPa | **TESTED BY** | Dean Wang |
| **TEST MODE** | **B** | | |

| **AFC FREQUENCY ERROR VS. VOLTAGE** | | |
|---|---|---|
| **VOLTAGE (Volts)** | **FREQUENCY (MHz)** | **FREQUENCY ERROR (ppm)** |
| 126.5 | 2500.995667 | -1.7325070 |
| 110.0 | 2500.995719 | -1.7117153 |
| 93.5 | 2500.995315 | -1.8732507 |

| **AFC FREQUENCY ERROR VS. TEMP.** | | |
|---|---|---|
| **TEMP. (℃)** | **FREQUENCY (MHz)** | **FREQUENCY ERROR (ppm)** |
| 45 | 2500.995101 | -1.9588165 |
| 40 | 2500.995435 | -1.8252699 |
| 30 | 2500.995586 | -1.7648940 |
| 20 | 2500.995719 | -1.7117153 |
| 10 | 2500.995674 | -1.7297081 |
| 0 | 2500.995679 | -1.7277089 |

## 4.3 EMISSION BANDWIDTH MEASUREMENT

### 4.3.1 LIMITS OF EMISSION BANDWIDTH MEASUREMENT

According to FCC 27.53(m)(6) specified that emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26dB below the transmitter power.

### 4.3.2 TEST INSTRUMENTS

| DESCRIPTION & MANUFACTURER | MODEL NO. | SERIAL NO. | CALIBRATED UNTIL |
|---|---|---|---|
| Spectrum Analyzer<br>Agilent | E4446A | MY44360128 | Dec. 06, 2008 |
| * Hewlett Packard RF cable | 8120-6192 | 01428251 | NA |
| * JFW 20dB attenuation | 50HF-010-SMA | NA | NA |
| * Suhner RF cable | Sucoflex104 | 204850/4 | NA |

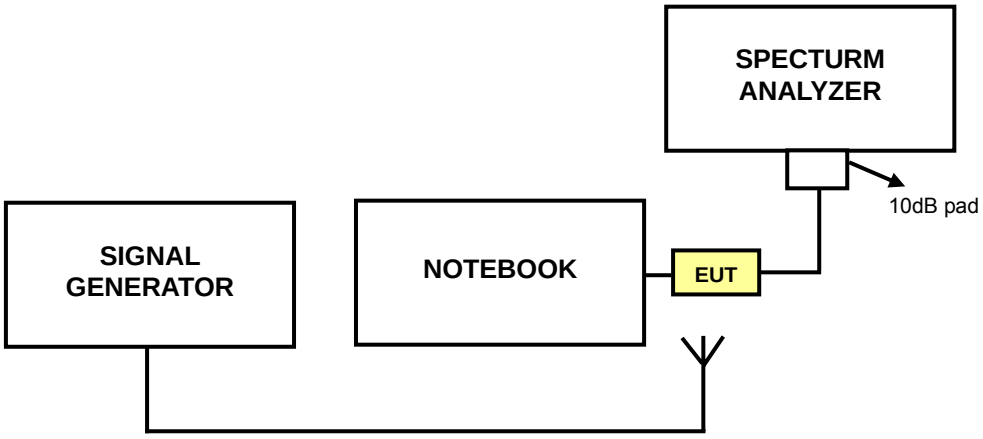
**NOTE:** 1. The calibration interval of the above test instruments is 12 months. And the calibrations are traceable to NML/ROC and NIST/USA.

2. "*" = These equipments are used for the final measurement.

### 4.3.3 TEST PROCEDURE

The transmitter output was connected to the spectrum analyzer through an attenuator. The bandwidth of the fundamental frequency was measured by spectrum analyzer with RBW = 51kHz, VBW = 160kHz (for test mode A), RBW = 100kHz, VBW = 300kHz (for test mode B). The 26dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 26dB.

### 4.3.4 TEST SETUP




### 4.3.5 EUT OPERATING CONDITIONS

a. Link up EUT with signal generator.

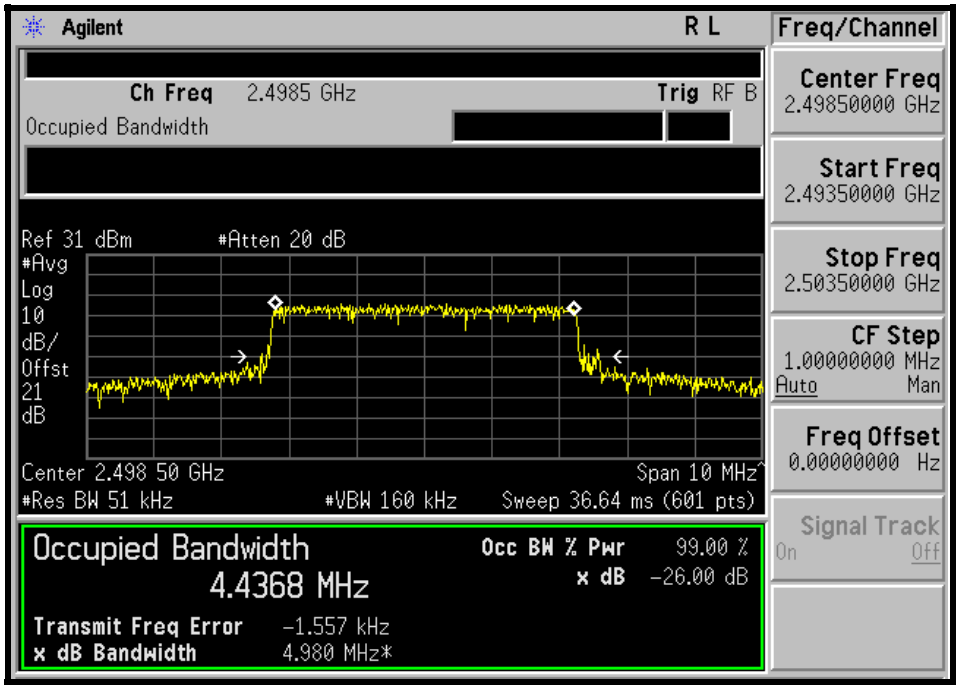
b. The signal generator controlled EUT to export rated output power under transmission mode and specific channel frequency. FCC 27.53(l)(6) required a measurement bandwidth is the fundamental emission below 26dB bandwidth.

## 4.3.6 TEST RESULTS

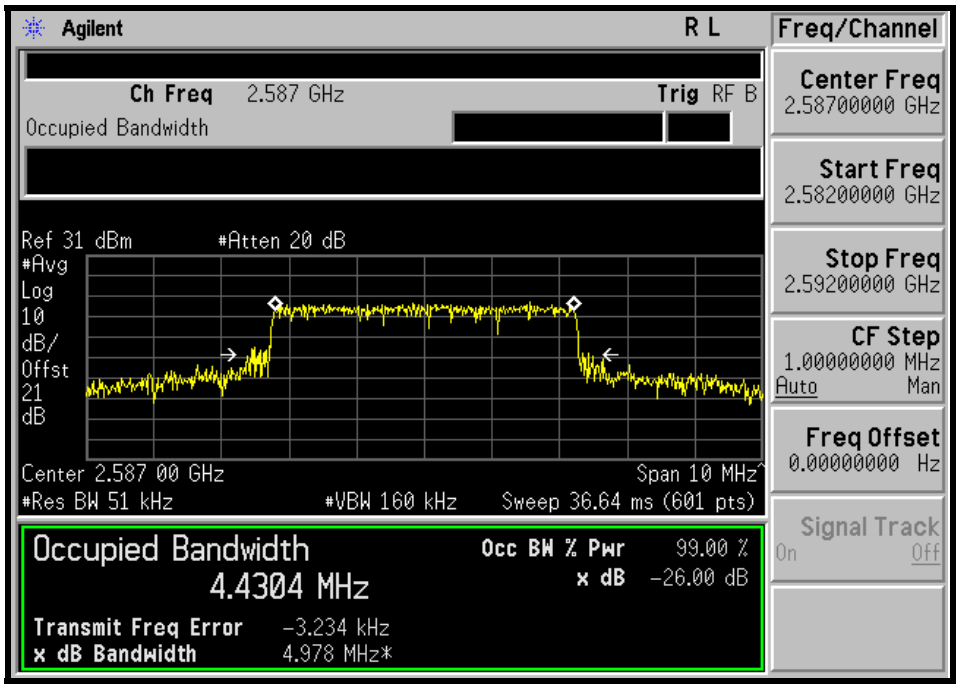
**TEST MODE A**

| CHANNEL | -26dBc BANDWIDTH (MHz) |
|---|---|
| Low | 4.980 |
| Middle | 4.978 |
| High | 4.977 |

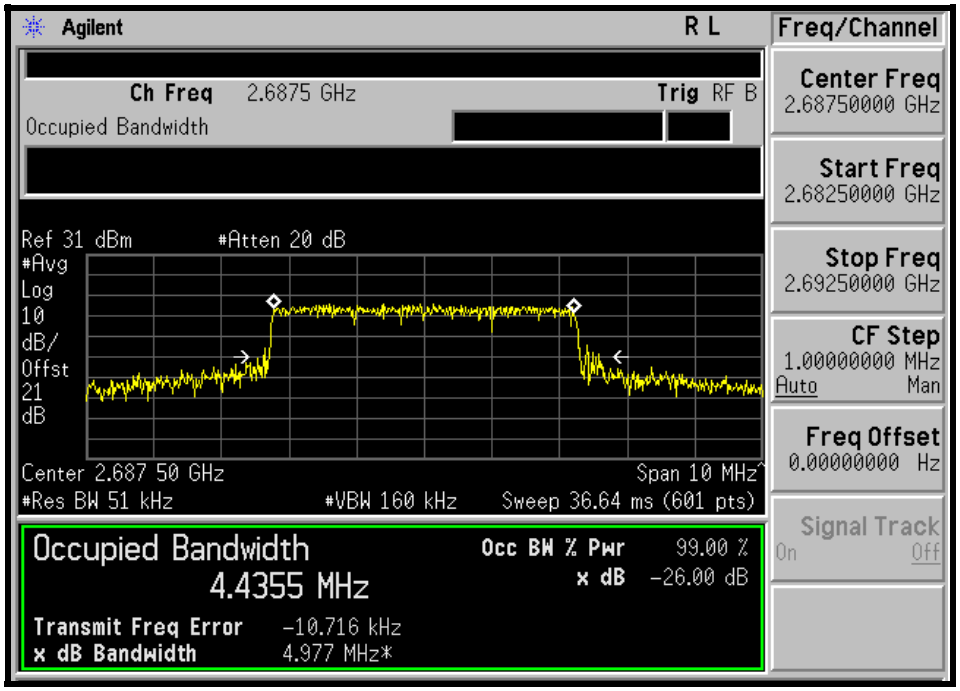
**LOW CHANNEL**



**MIDDLE CHANNEL**



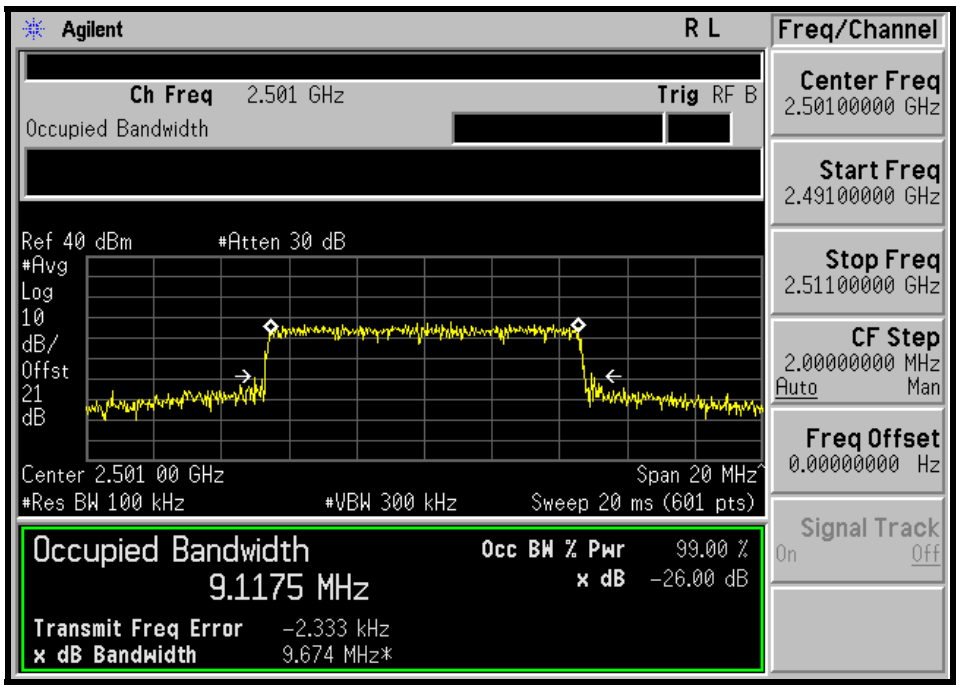

**HIGH CHANNEL**



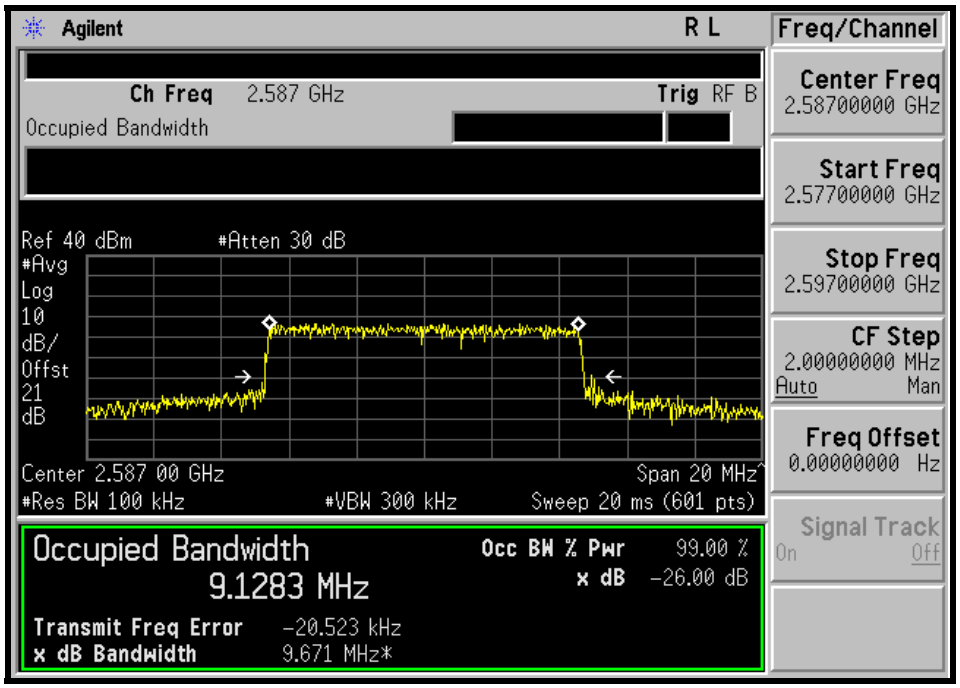
## TEST MODE B

| CHANNEL | -26dBc BANDWIDTH (MHz) |
|---|---|
| Low | 9.674 |
| Middle | 9.671 |
| High | 9.653 |

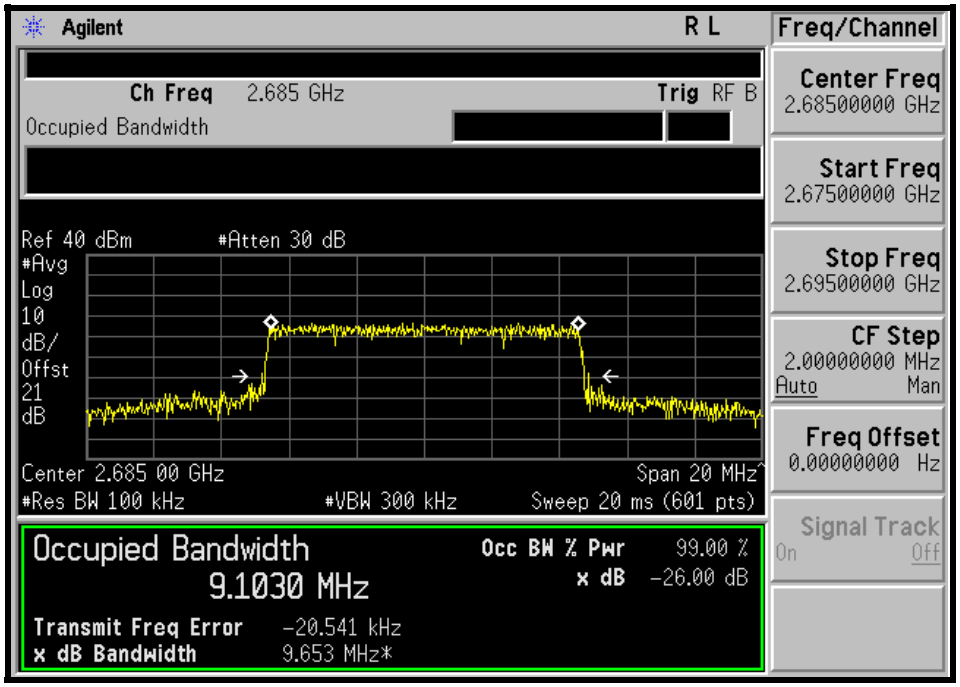
### LOW CHANNEL



**MIDDLE CHANNEL**




**HIGH CHANNEL**



## 4.4 CHANNEL EDGE MEASUREMENT

### 4.4.1 LIMITS OF CHANNEL EDGE MEASUREMENT

According to FCC 27.53(m)(4) specified that power of any emission outside of the channel edge must be attenuated below the transmitting power (P) by a factor shall be not less than 43 + 10 log (P) dB at the channel edge, the limit of emission equal to –13dBm. And 55 + 10 log (P) dB at 5.5 MHz from the channel edges, the limit of emission equal to –25dBm.In the 1MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed.

### 4.4.2 TEST INSTRUMENTS

| DESCRIPTION & MANUFACTURER | MODEL NO. | SERIAL NO. | CALIBRATED UNTIL |
|---|---|---|---|
| Spectrum Analyzer<br>Agilent | E4446A | MY44360128 | Dec. 06, 2008 |
| * JFW 10dB attenuation | 50HF-010-SMA | NA | NA |
| * Suhner RF cable | Sucoflex104 | 204850/4 | NA |

**NOTE:** 1. The calibration interval of the above test instruments is 12 months. And the calibrations are traceable to NML/ROC and NIST/USA.

2. "*" = These equipments are used for the final measurement.

### 4.4.3 TEST SETUP

Same as Item 4.3.3

### 4.4.4 TEST PROCEDURES

a. The EUT was set up for the rated peak power. The power was measured with Spectrum Analyzer. All measurements were done at 3 channels: low, middle and high operational frequency range.

b. The center frequency of spectrum is the band edge frequency and span is 20MHz (Test mode A) / 30MHz (Test mode B). RBW of the spectrum is 51kHz (Test mode A) / 100kHz (Test mode B).

c. Record the max trace plot into the test report.

### 4.4.5 EUT OPERATING CONDITION

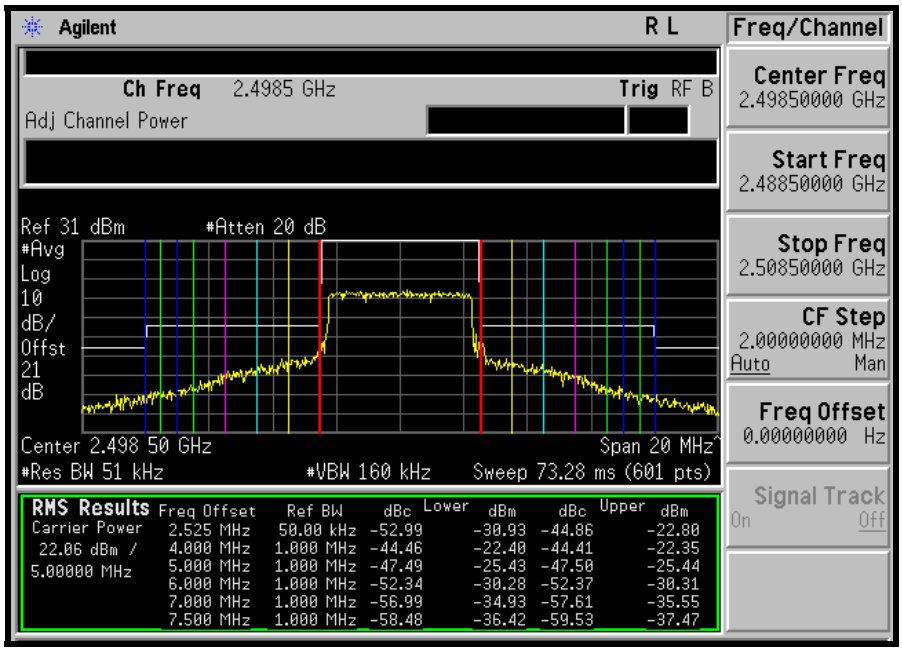
a. Link up EUT with signal generator.

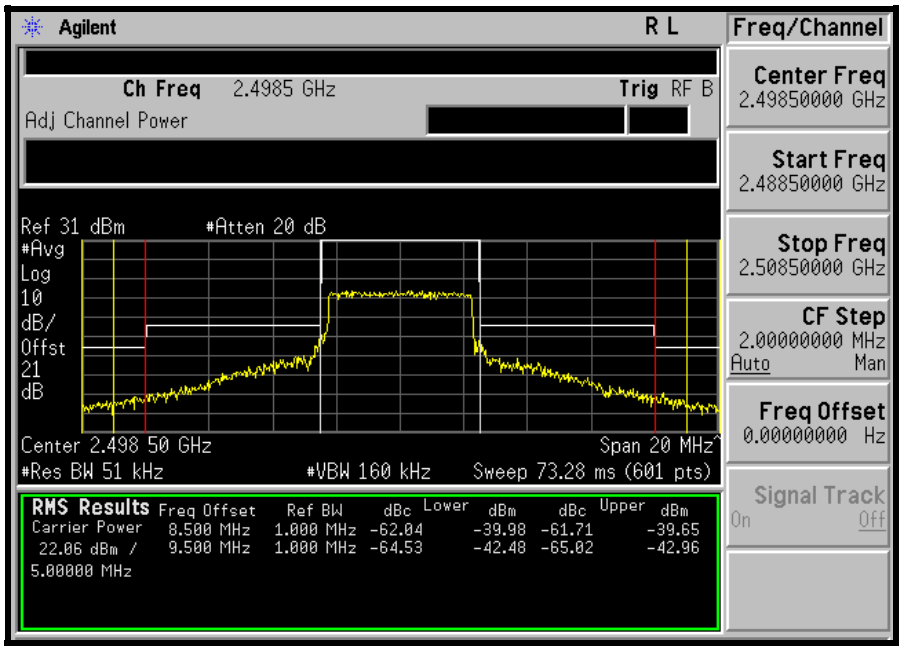
b. The signal generator controlled EUT to export rated output power under transmission mode and specific channel frequency.

## 4.4.6 TEST RESULTS

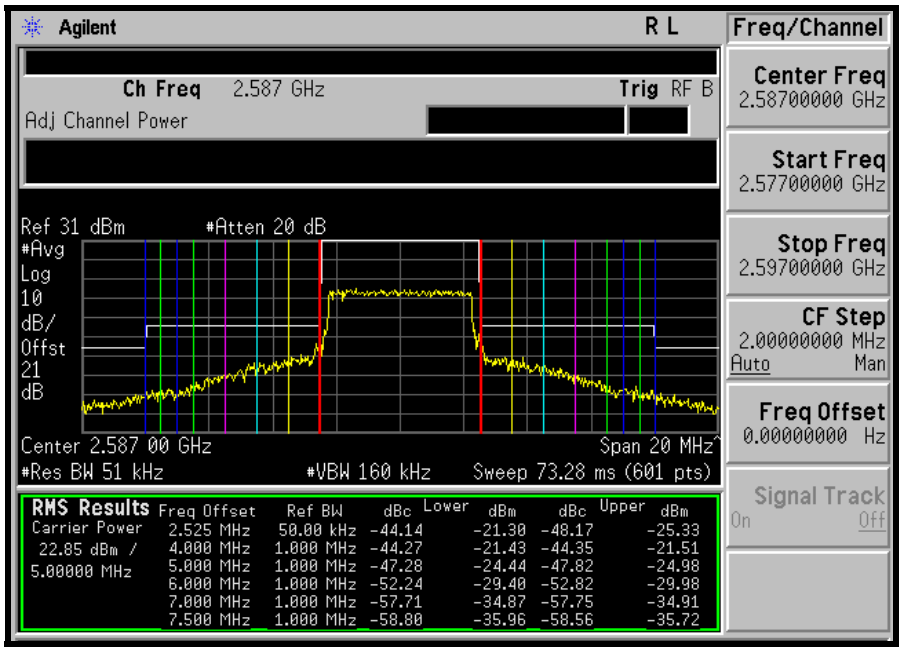
### TEST MODE A

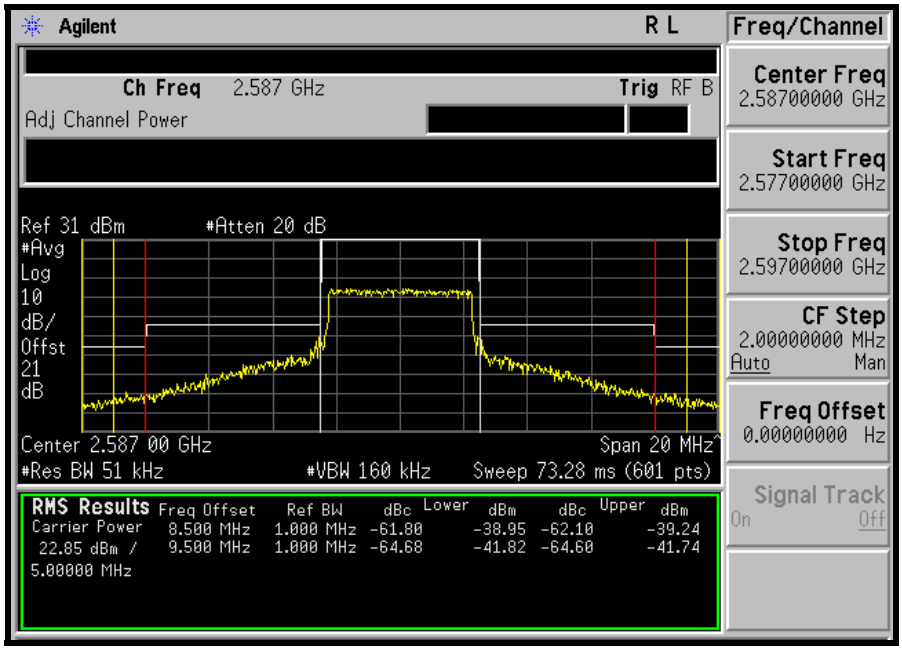
**LOW CHANNEL**



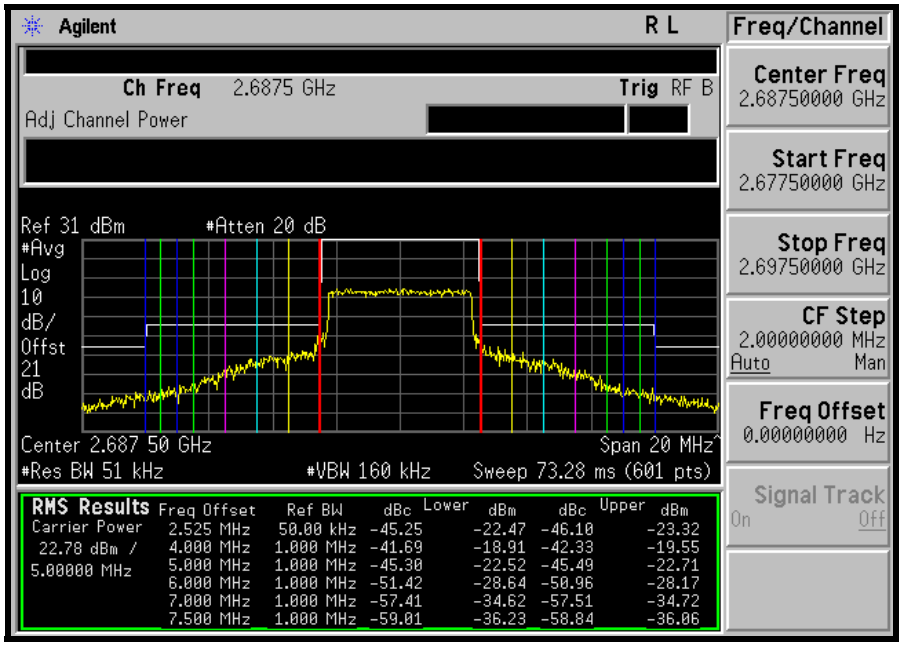



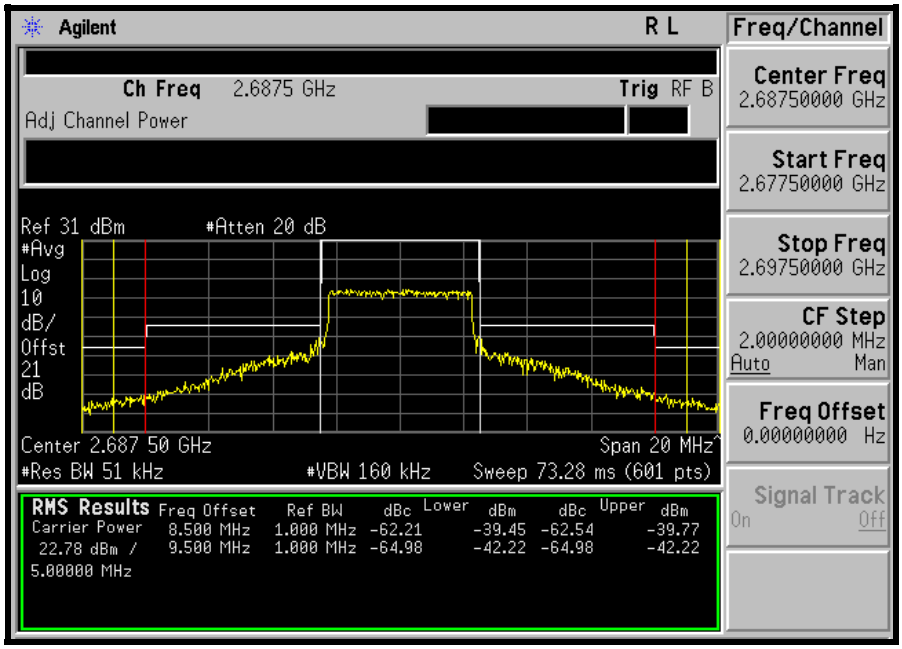
**MIDDLE CHANNEL**



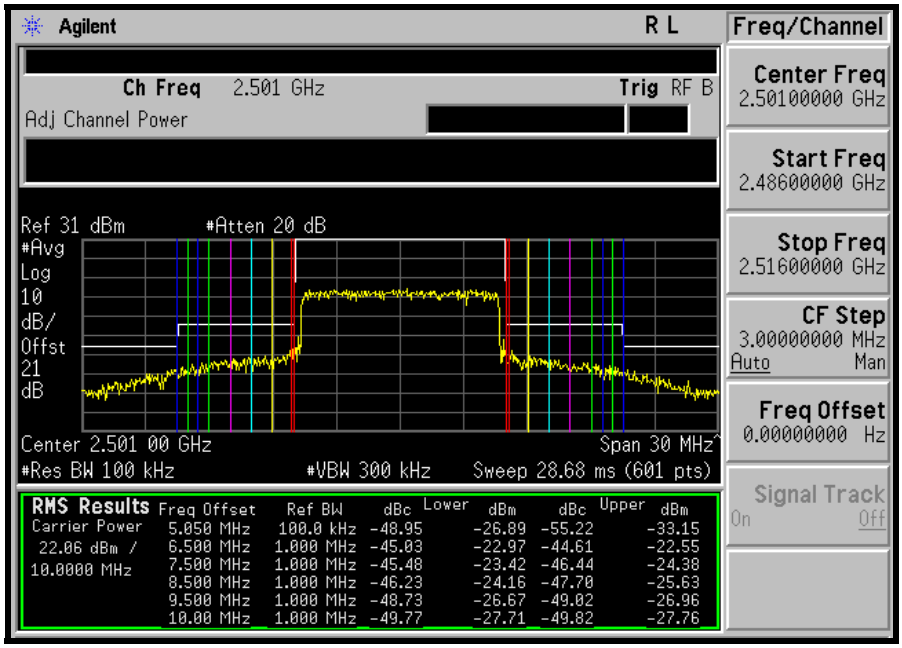
## HIGH CHANNEL

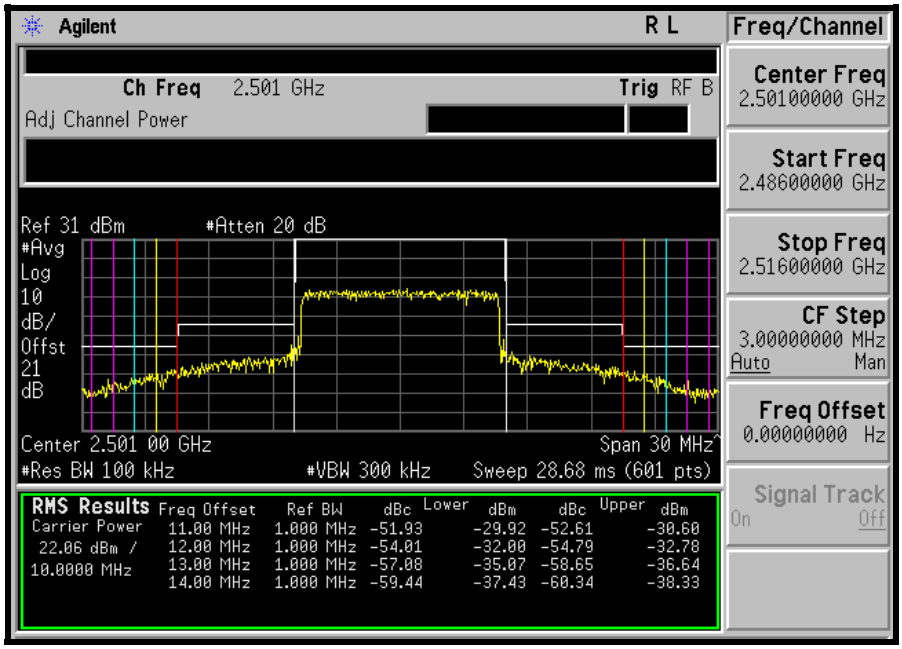


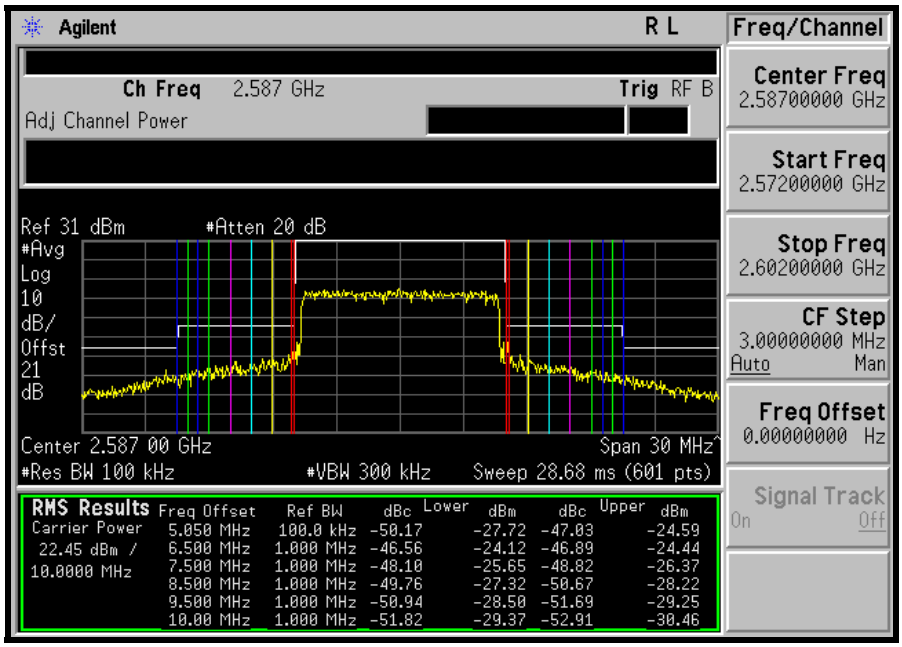
## TEST MODE B

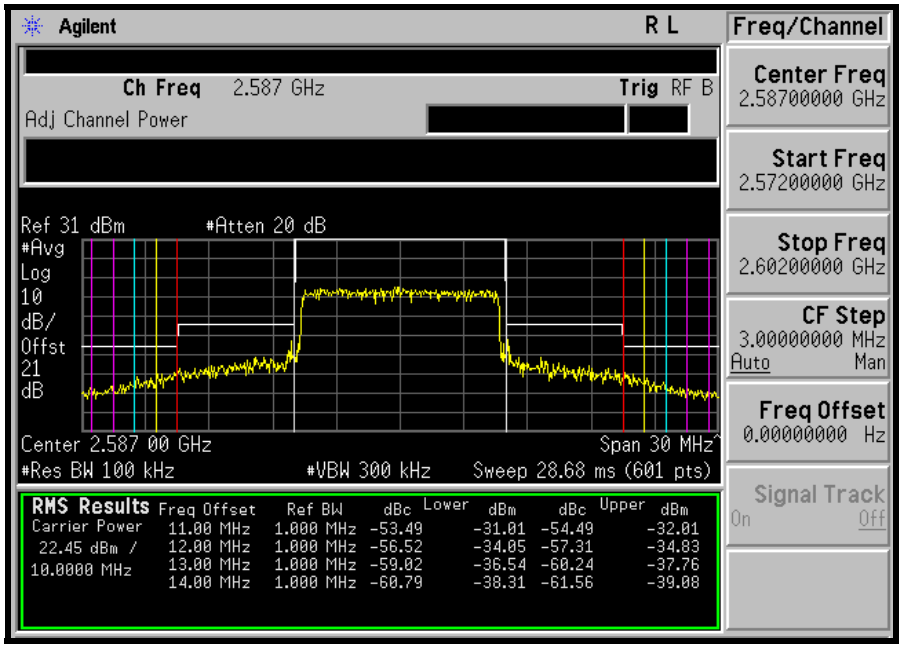
### LOW CHANNEL



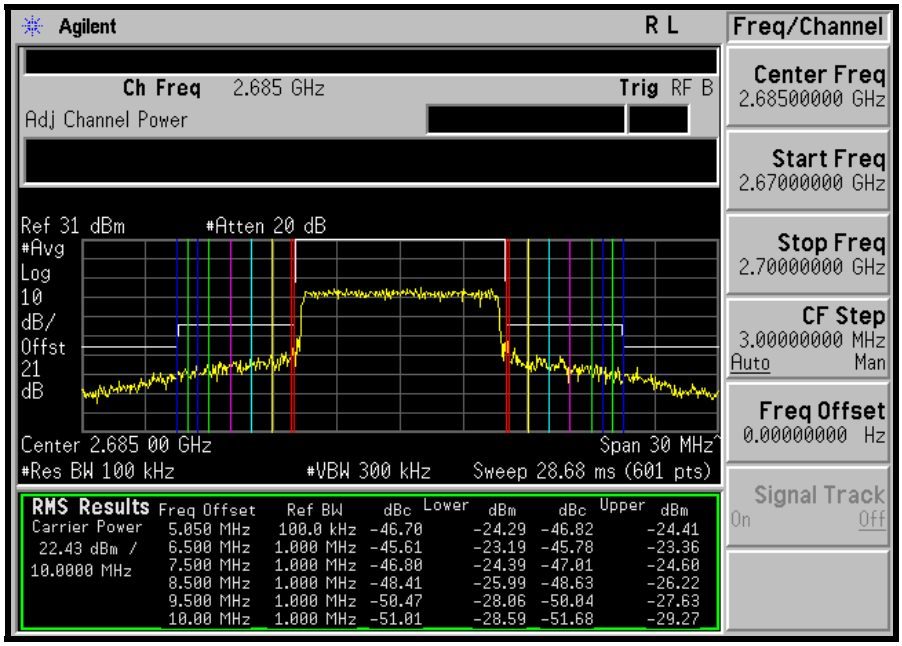



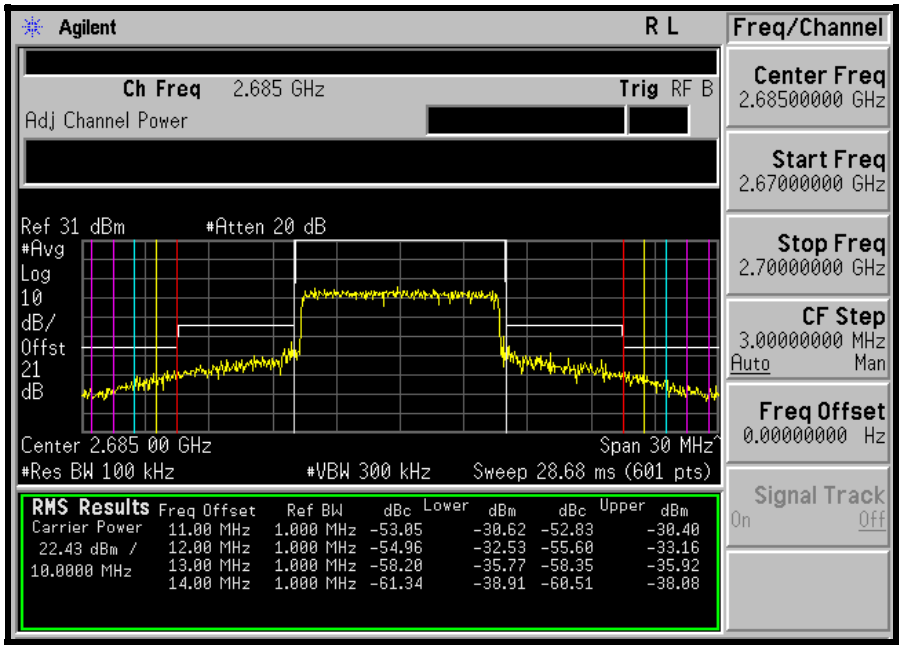
**MIDDLE CHANNEL**



**HIGH CHANNEL**



## 4.5 CONDUCTED SPURIOUS EMISSIONS

### 4.5.1 LIMITS OF CONDUCTED SPURIOUS EMISSIONS MEASUREMENT

In the FCC 27.53(m)(4), On any frequency outside a licensee's frequency block, the power of any emission shall be attenuated below the transmitter power (P) by at least 55 +10 log (P)dB. The limit of emission equal to –25dBm.

### 4.5.2 TEST INSTRUMENTS

| DESCRIPTION & MANUFACTURER | MODEL NO. | SERIAL NO. | CALIBRATED UNTIL |
|---|---|---|---|
| Spectrum Analyzer Agilent | E4446A | MY44360128 | Dec. 06, 2008 |
| * Wainwright Instruments High Pass Filter | WHK3.1/18G-10SS | ZZ-010091 | NA |
| * JFW 10dB attenuation | 50HF-010-SMA | NA | NA |
| * Suhner RF cable | Sucoflex104 | 204850/4 | NA |

**NOTE:** 1. The calibration interval of the above test instruments is 12 months. And the calibrations are traceable to NML/ROC and NIST/USA.

2. "*" = These equipments are used for the final measurement.

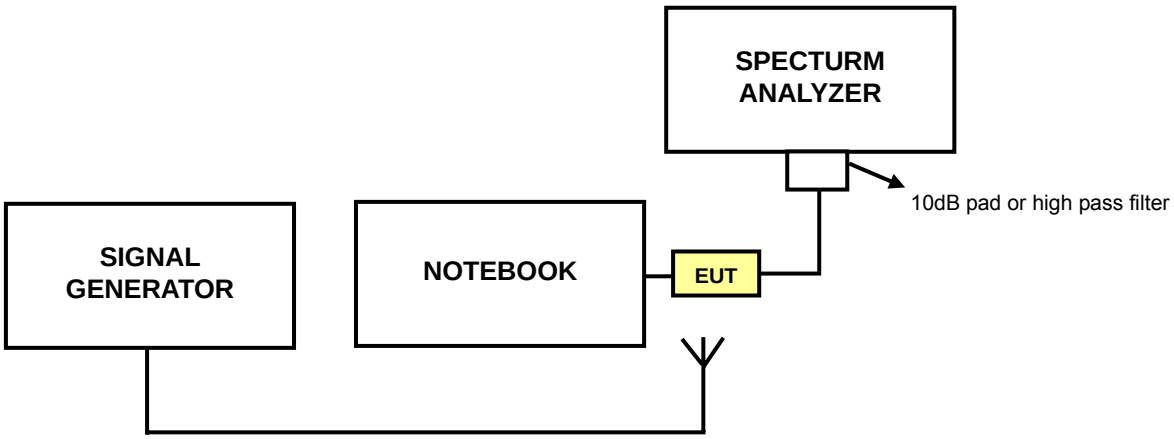
### 4.5.3 TEST PROCEDURE

a. All measurements were done at 3 channels: low, middle and high operational frequency range.

b. When the spectrum scanned from 30MHz to 3GHz, it shall be connected to the 20dB pad attenuated the carried frequency. The spectrum set RB = 1MHz, VB = 3MHz.

c. When the spectrum scanned from 3GHz to 27GHz, it shall be connected to the high pass filter attenuated the carried frequency. The spectrum set RB = 1MHz, VB = 3MHz.

### 4.5.4 TEST SETUP




### 4.5.5 EUT OPERATING CONDITIONS

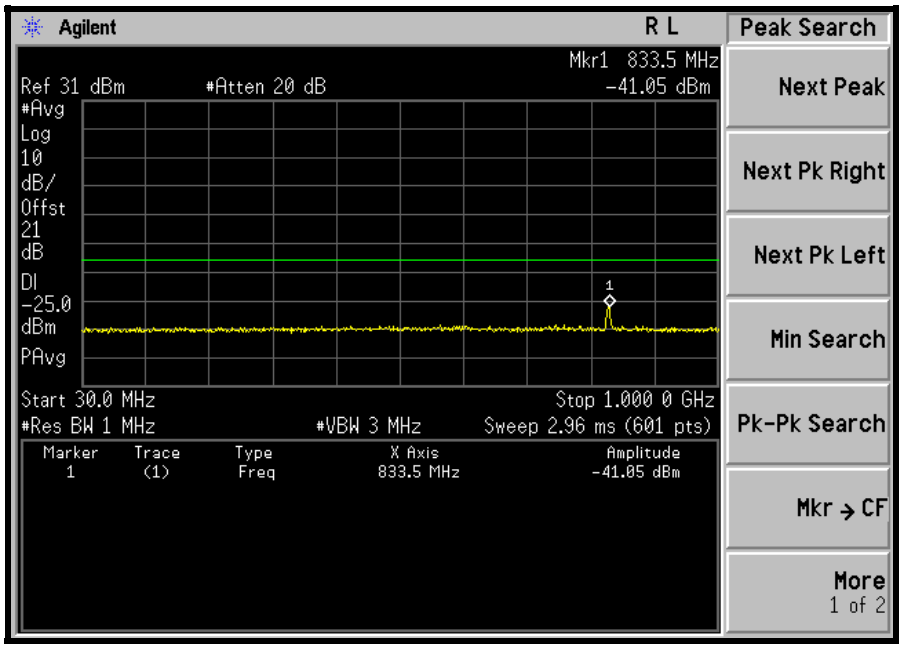
a. Link up EUT with signal generator.

b. The signal generator controlled EUT to export rated output power under transmission mode and specific channel frequency.

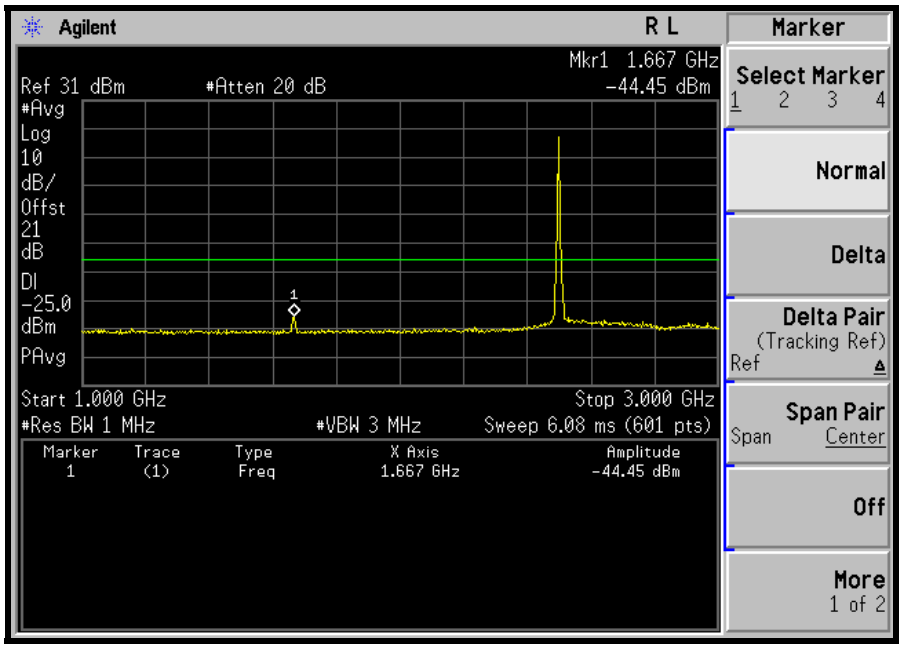
## 4.5.6 TEST RESULTS

### TEST MODE A

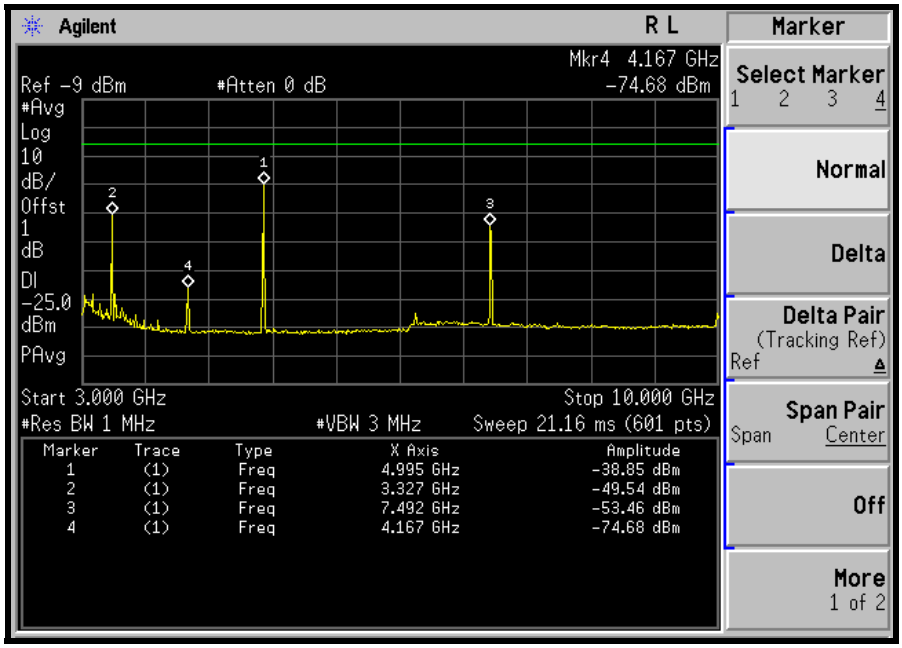
**LOW CHANNEL:** 30MHz ~ 1GHz:



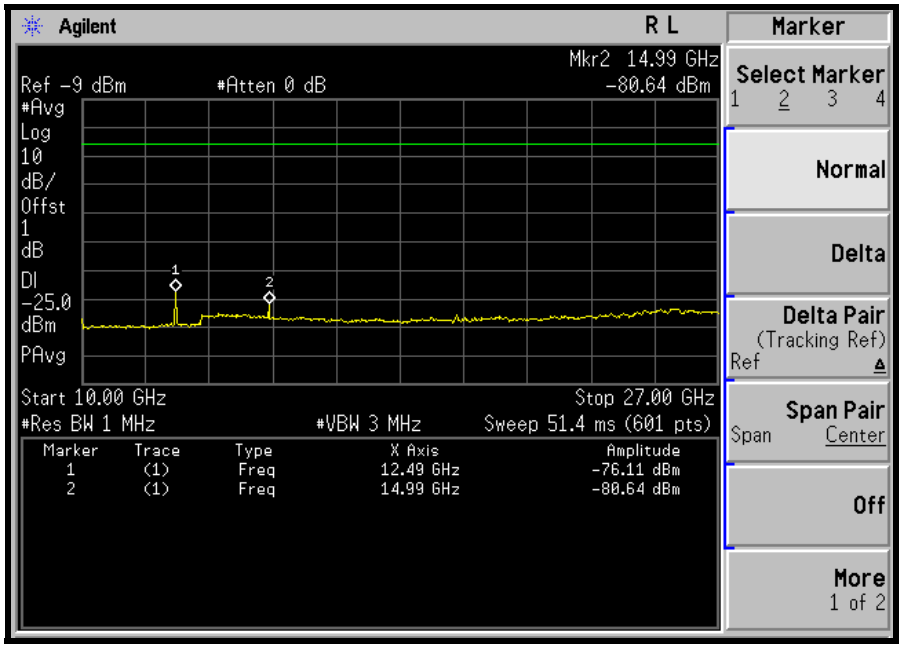

1GHz ~ 3GHz:



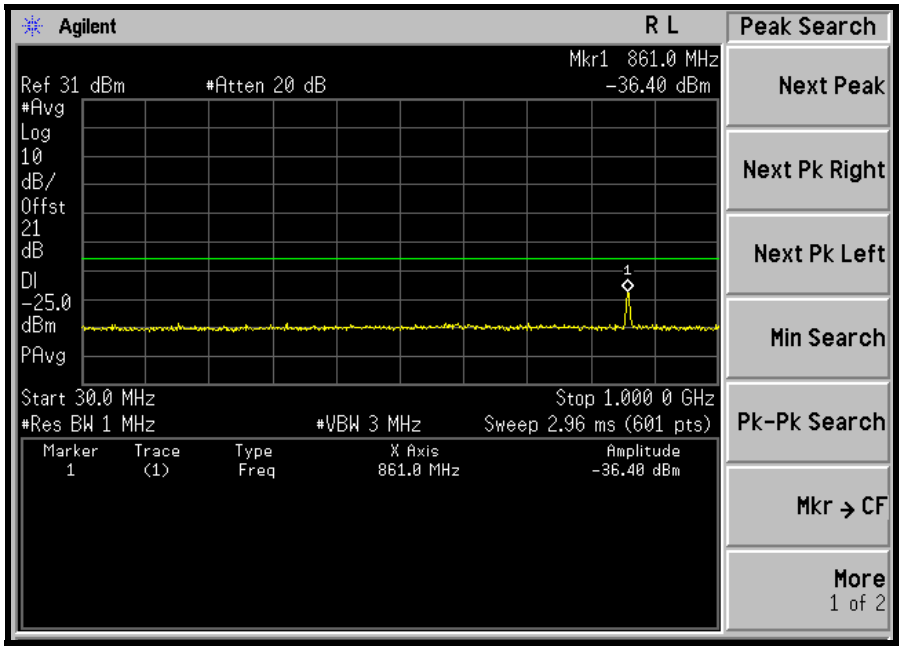
3GHz ~ 10GHz:



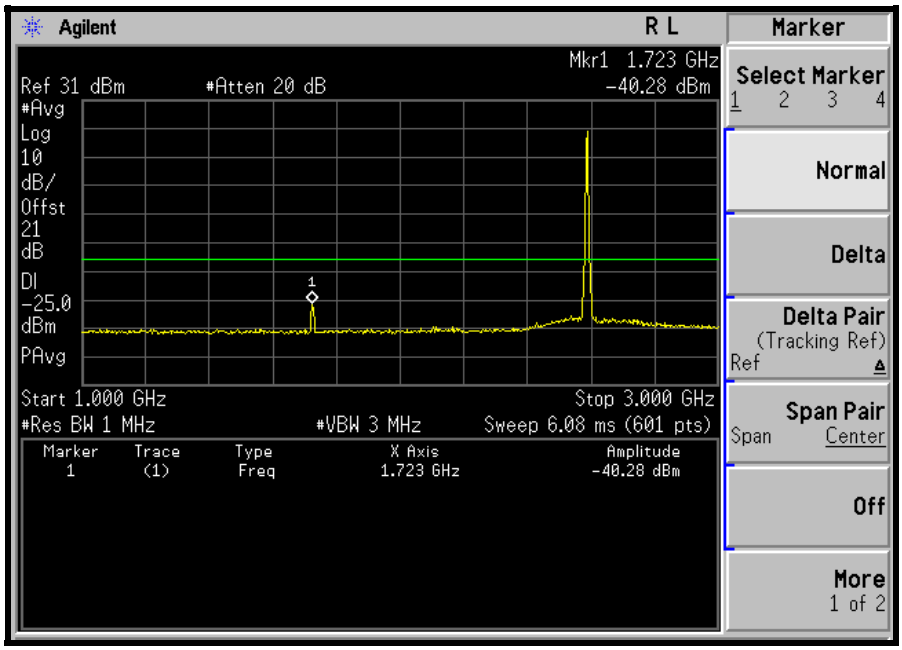

10GHz ~ 27GHz:



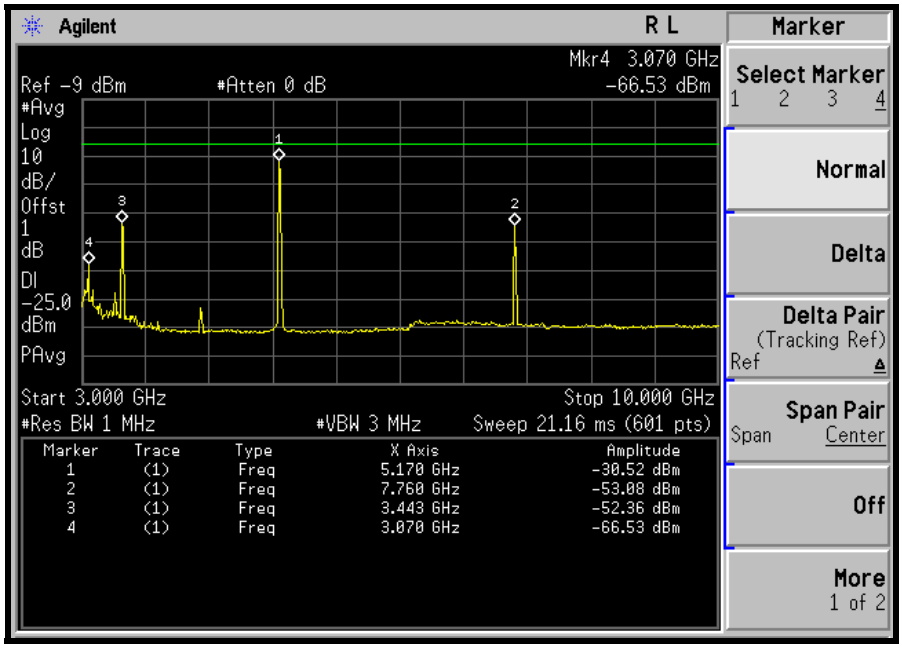
**MIDDLE CHANNEL:** 30MHz ~ 1GHz:



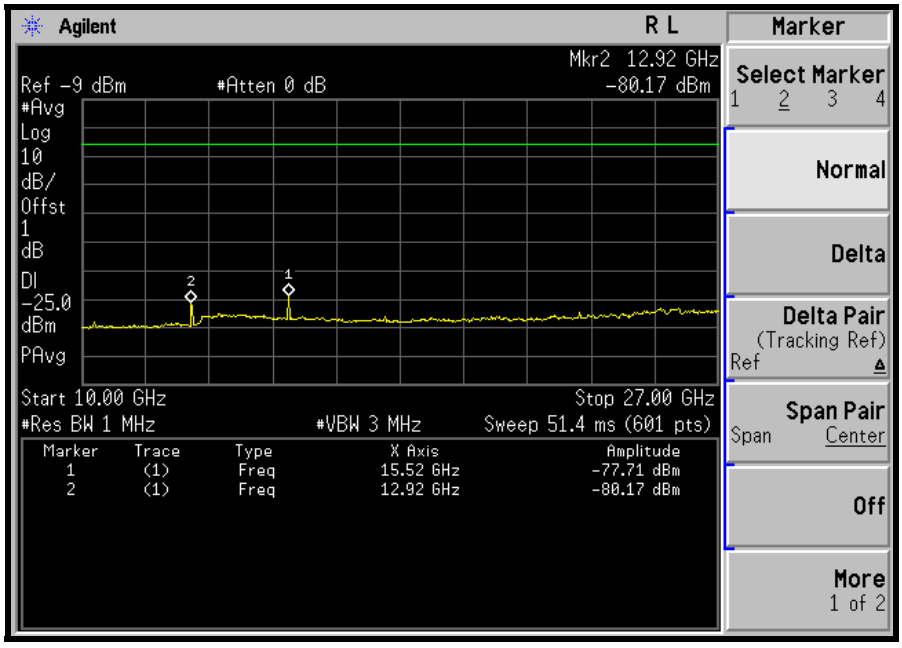

1GHz ~ 3GHz:



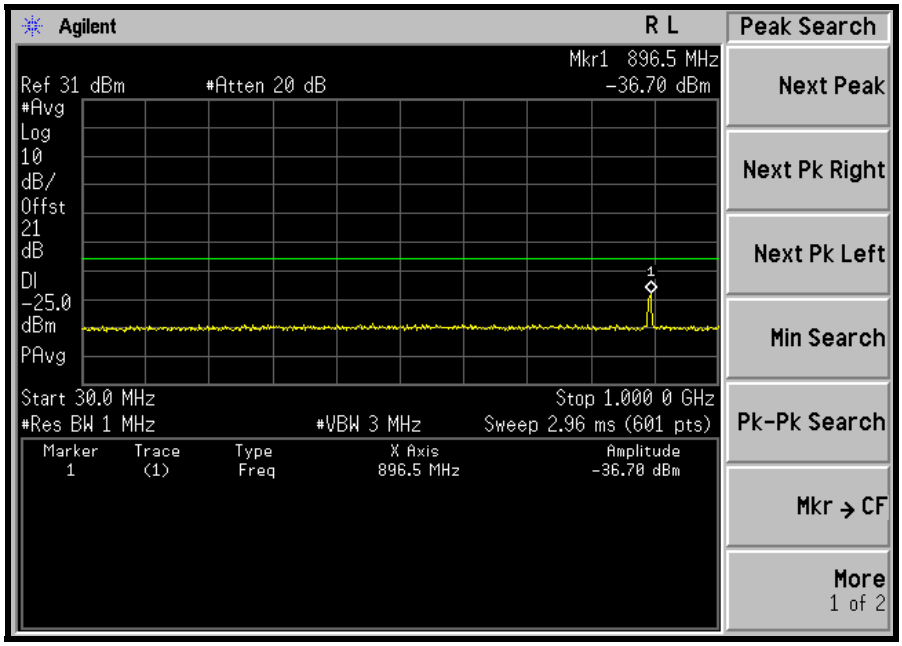
3GHz ~ 10GHz:



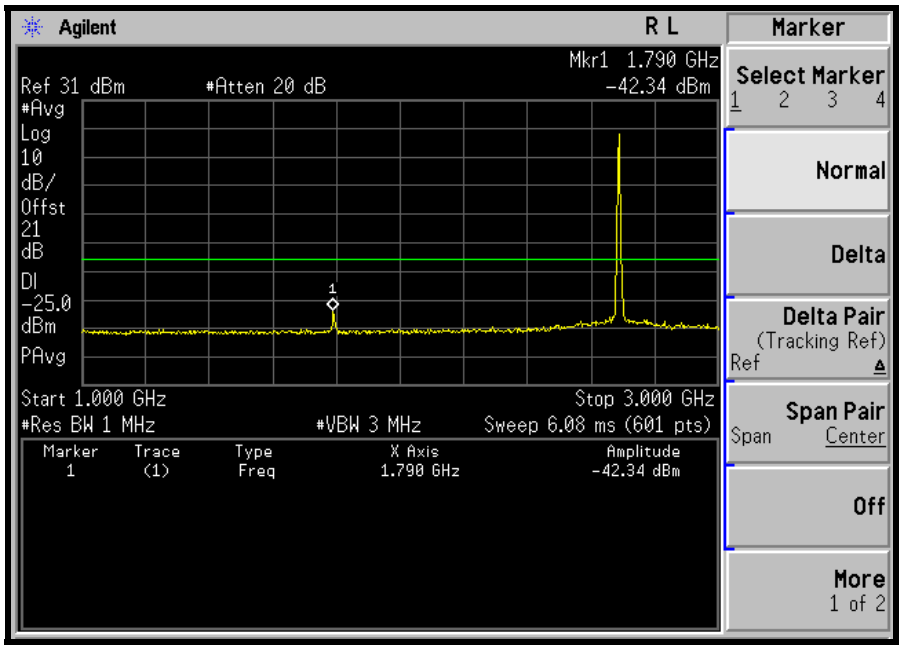

10GHz ~ 27GHz:



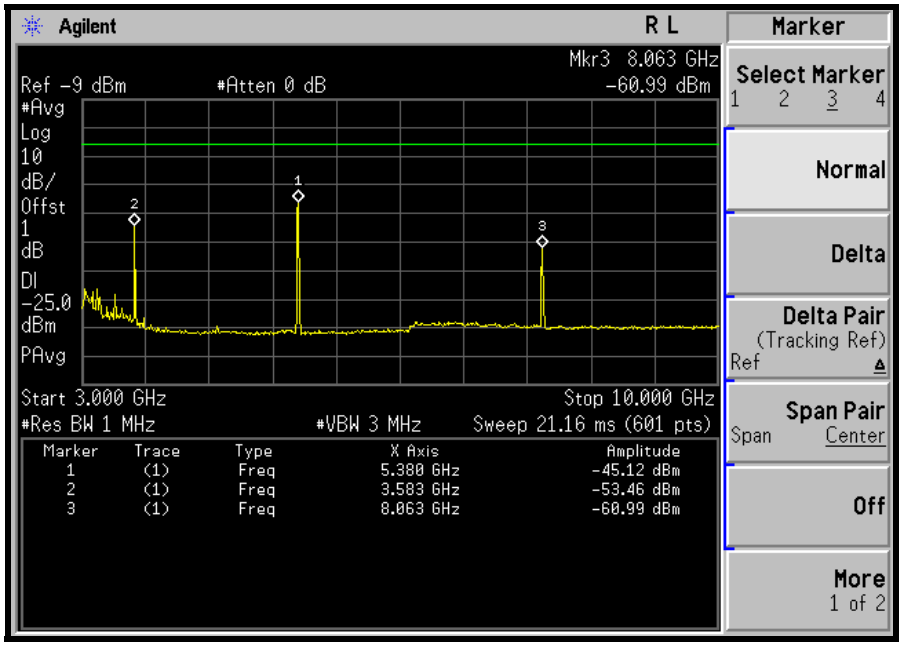
**HIGH CHANNEL:** 30MHz ~ 1GHz:



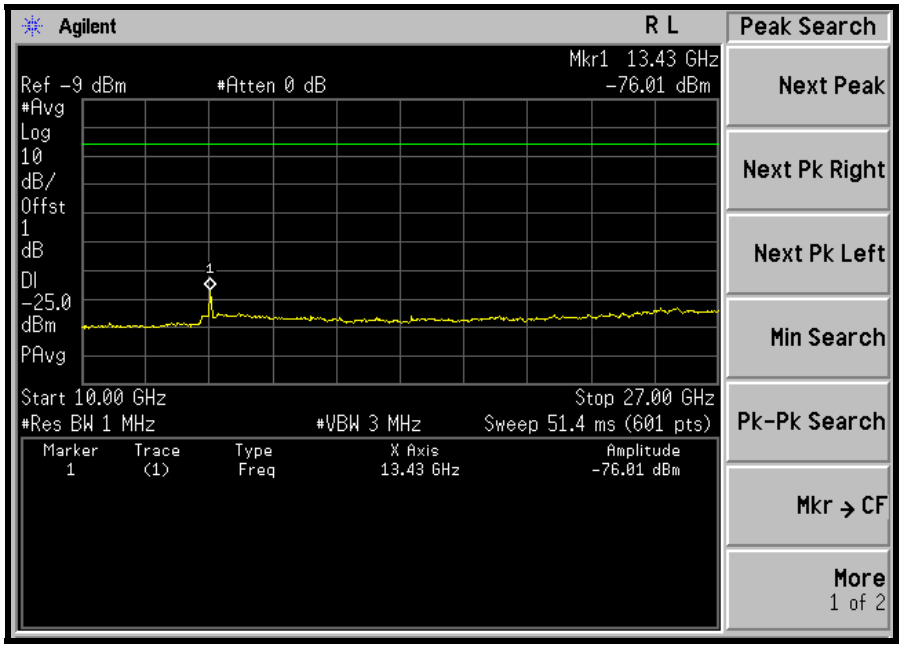

1GHz ~ 3GHz:



3GHz ~ 10GHz:

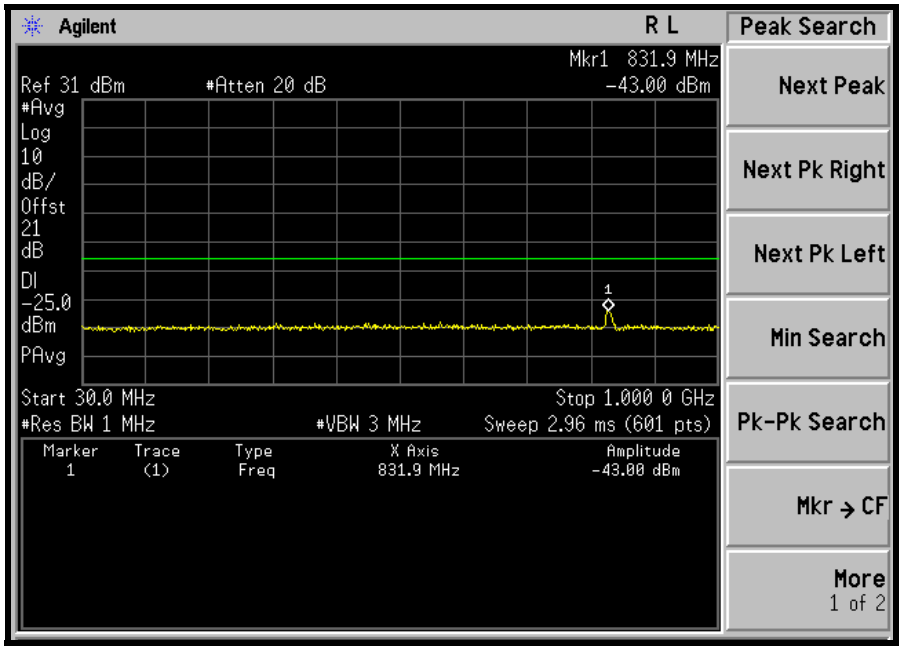



10GHz ~ 27GHz:

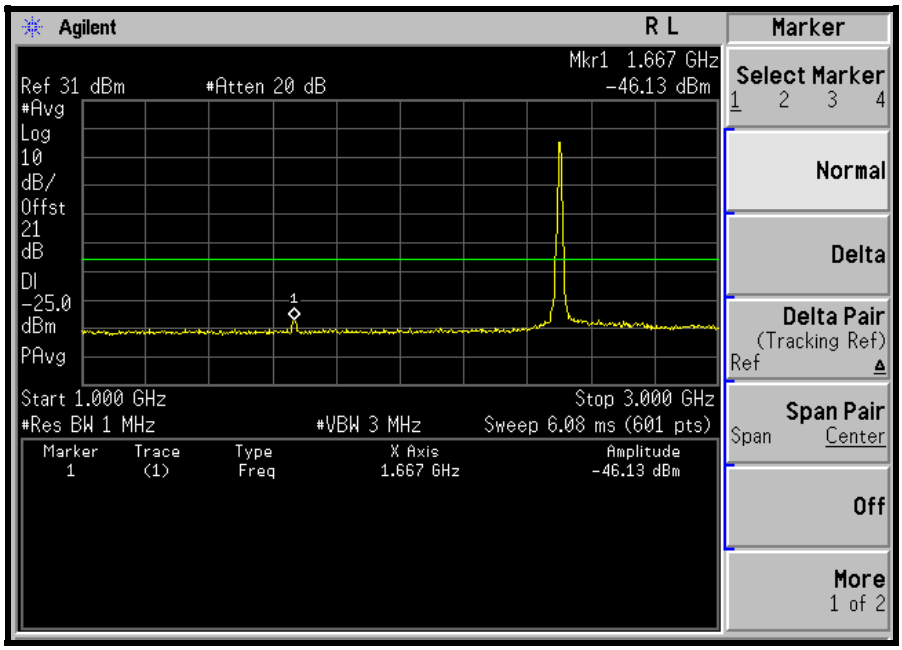


## TEST MODE B

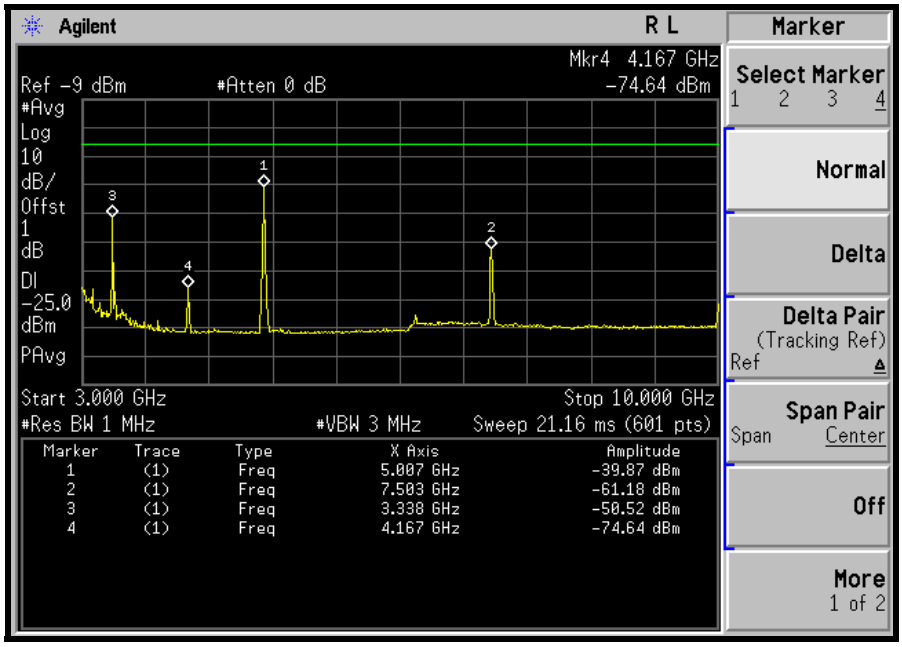
**LOW CHANNEL:** 30MHz ~ 1GHz:



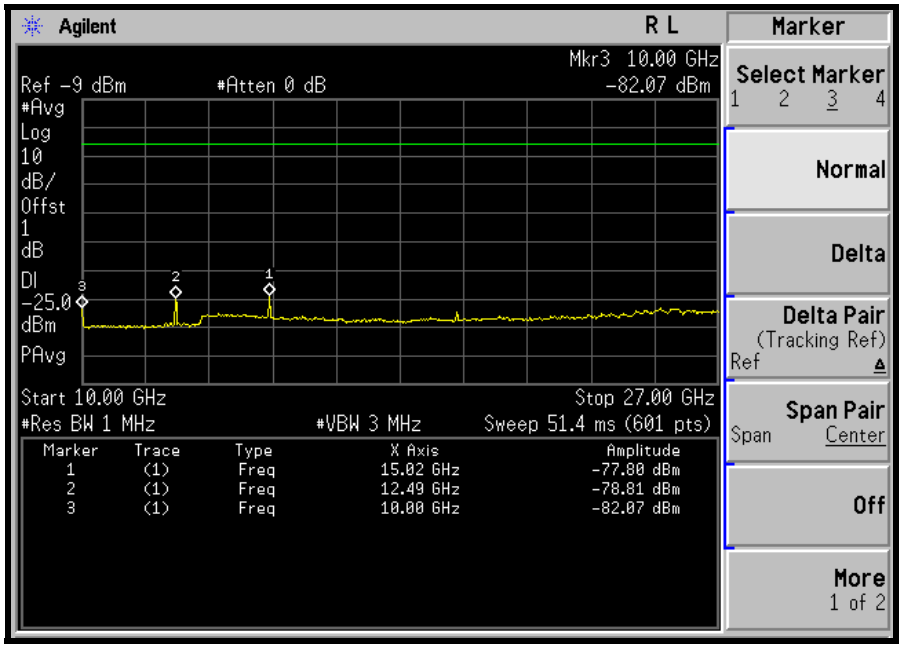

1GHz ~ 3GHz:



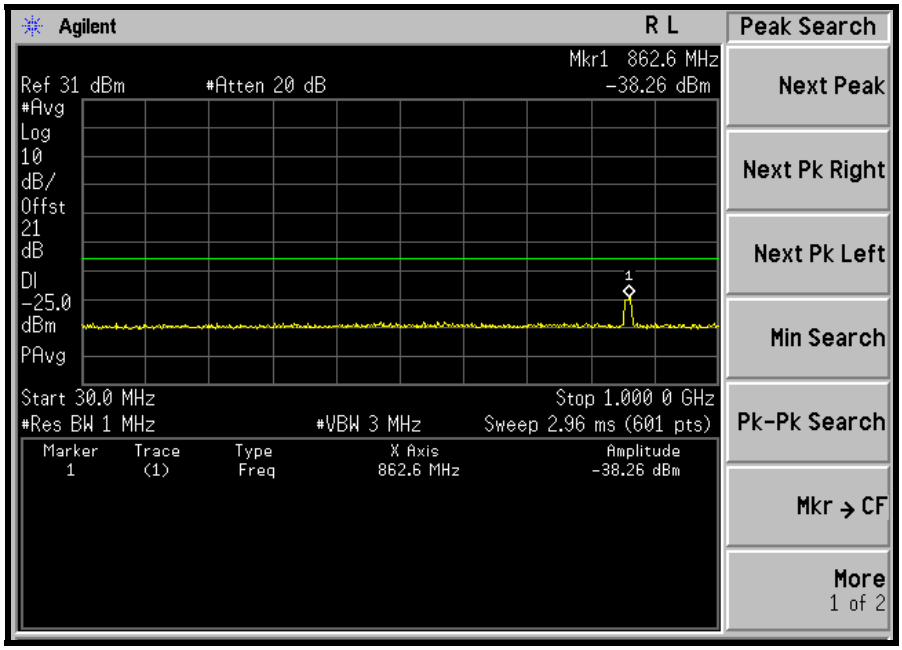
3GHz ~ 10GHz:



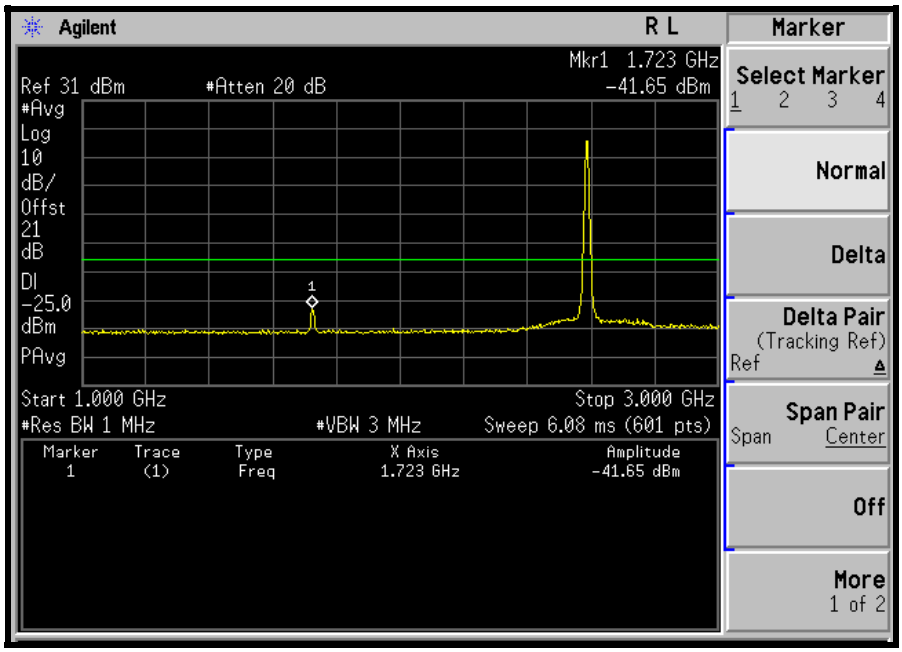

10GHz ~ 27GHz:



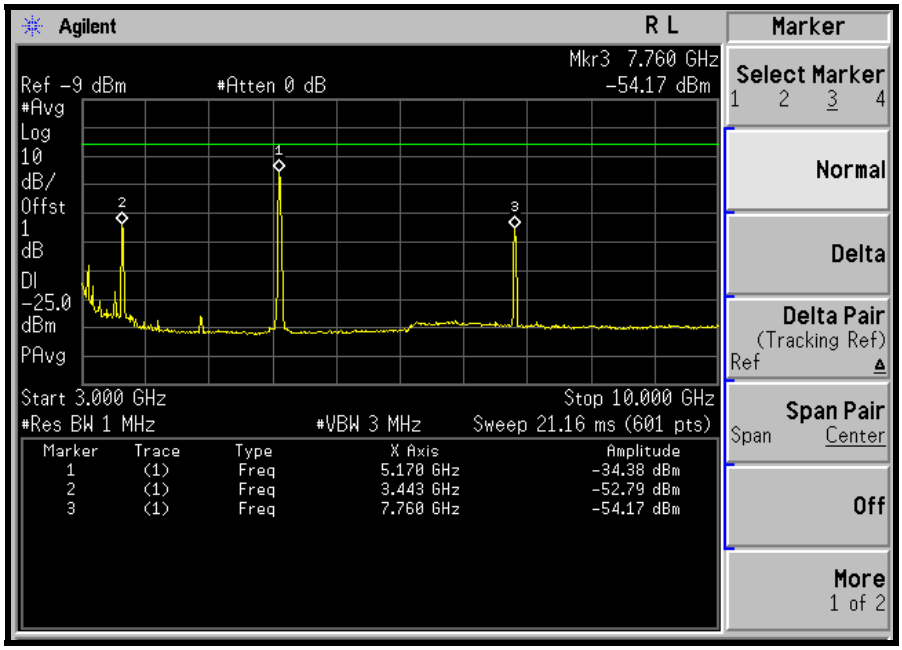
**MIDDLE CHANNEL:** 30MHz ~ 1GHz:



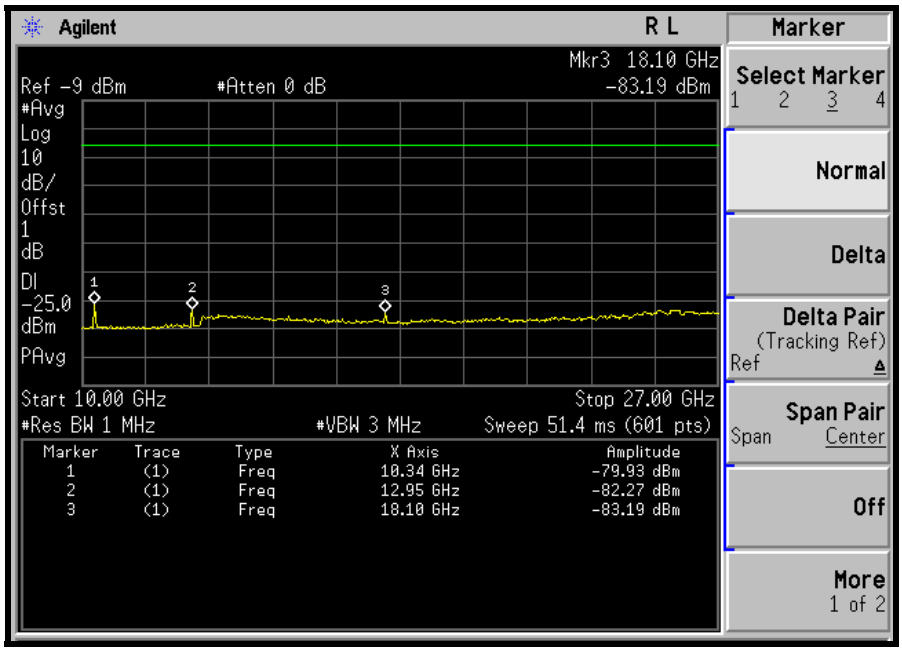

1GHz ~ 3GHz:



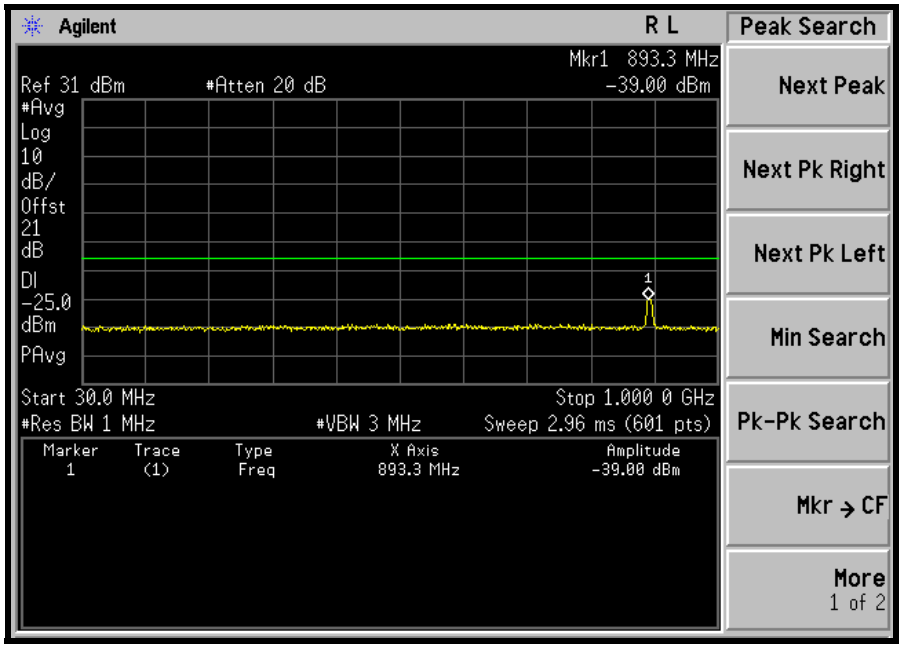
3GHz ~ 10GHz:



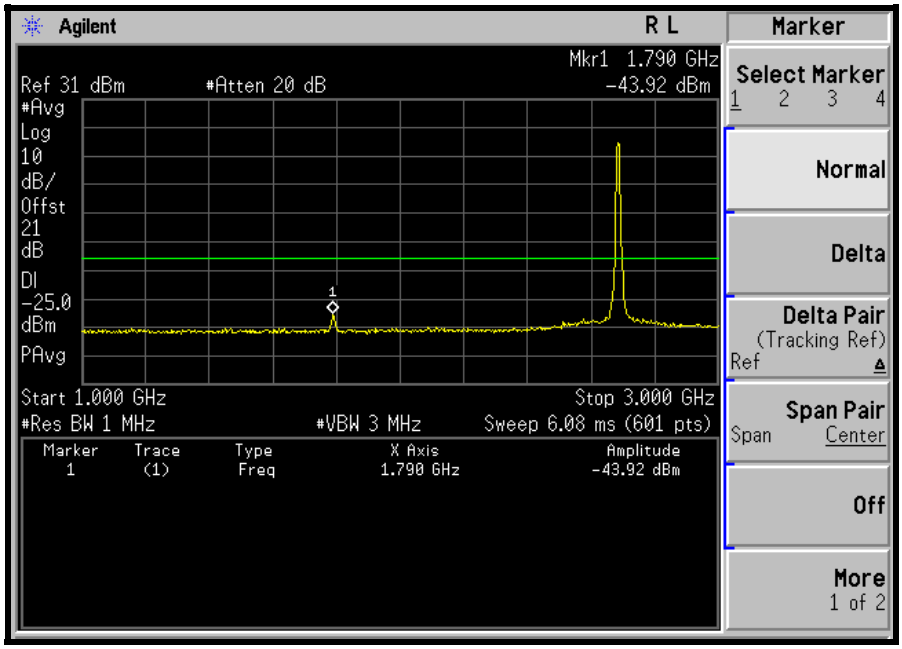

10GHz ~ 27GHz:



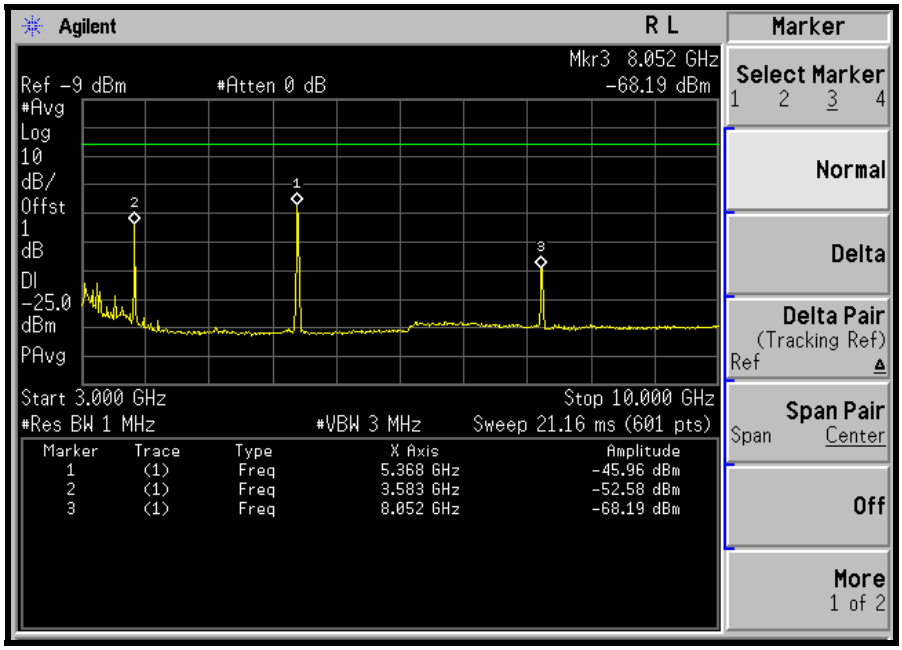
**HIGH CHANNEL:** 30MHz ~ 1GHz:



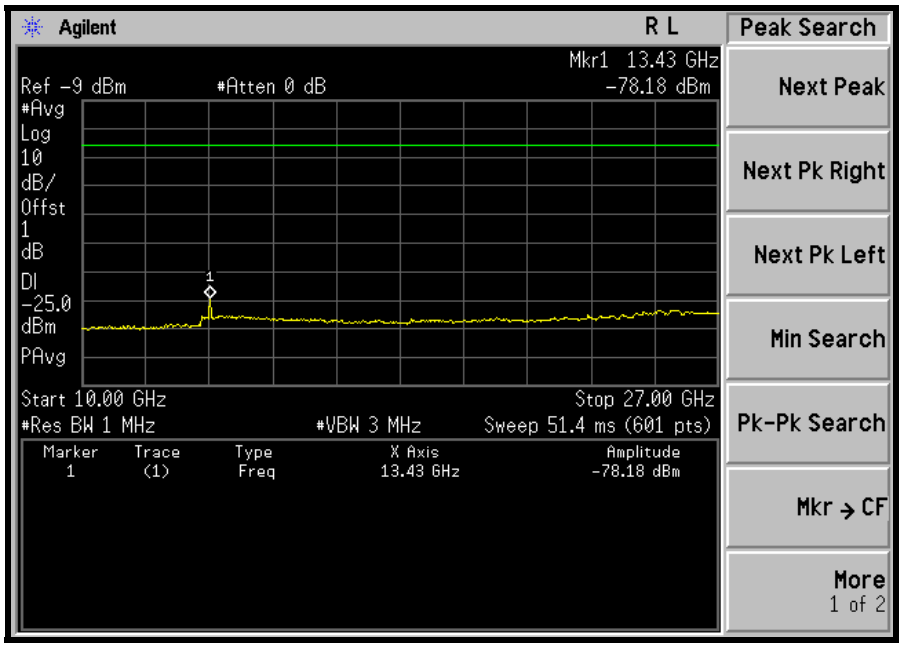

1GHz ~ 3GHz:



3GHz ~ 10GHz:




10GHz ~ 27GHz:



## 4.6 RADIATED EMISSION MEASUREMENT (BELOW 1GHz)

### 4.6.1 LIMITS OF RADIATED EMISSION MEASUREMENT

In the FCC 27.53(m) (4), On any frequency outside a licensee's frequency block the power of any emission shall be attenuated below the transmitter power (P) by at least 55 +10 log (P)dB. The limit of emission equal to –25dBm.

## 4.6.2 TEST INSTRUMENTS

| DESCRIPTION & MANUFACTURER | MODEL NO. | SERIAL NO. | CALIBRATED UNTIL |
|---|---|---|---|
| Test Receiver<br>ROHDE & SCHWARZ | ESIB7 | 100212 | May 27, 2009 |
| Spectrum Analyzer<br>ROHDE & SCHWARZ | FSP40 | 100269 | Aug. 07, 2009 |
| BILOG Antenna<br>SCHWARZBECK | VULB9168 | 9168-156 | Apr. 24, 2009 |
| HORN Antenna<br>SCHWARZBECK | BBHA 9120 D | 9120D-563 | Aug. 05, 2009 |
| HORN Antenna<br>SCHWARZBECK | BBHA 9170 | BBHA9170242 | Jan. 06, 2009 |
| Preamplifier<br>Agilent | 8449B | 3008A01911 | Sep. 10, 2008 |
| Preamplifier<br>Agilent | 8447D | 2944A10634 | Dec. 12, 2008 |
| RF signal cable<br>HUBER+SUHNNER | SUCOFLEX 104 | 274039/223650 | Nov. 07, 2008 |
| RF signal cable<br>Worken | 8D-FB | Cable-HYCH9-01 | Jun. 05, 2009 |
| Software | ADT_Radiated_V7.6 | NA | NA |
| Antenna Tower<br>EMCO | 2070/2080 | 512.835.4684 | NA |
| Turn Table<br>EMCO | 2087-2.03 | NA | NA |
| Antenna Tower &Turn Table Controller<br>EMCO | 2090 | NA | NA |

**NOTE:** 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

2. The test was performed in HwaYa Chamber 9.

3. The horn antenna and HP preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.

4. The FCC Site Registration No. is 215374.

5. The IC Site Registration No. is IC3789B-9.

### 4.6.3 TEST PROCEDURES

a. The EUT was placed on the top of a rotating table 0.8 meters above the ground. The table was rotated 360 degrees to determine the position of the highest radiation.

b. The EUT was set 3 meters away from the receiving antenna, which was mounted on antenna tower and its position at 0.8 m above the ground.

c. For each suspected emission, the EUT was arranged to its worst case and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading and recorded the value.

d. The EUT is replaced by a Bi_Log antenna connected to a signal generator tuned to the frequency of emission.

e. The signal generator level has to be adjusted to have the same emission nature.

f. The radiated power can be calculated via the factor and antenna gain.

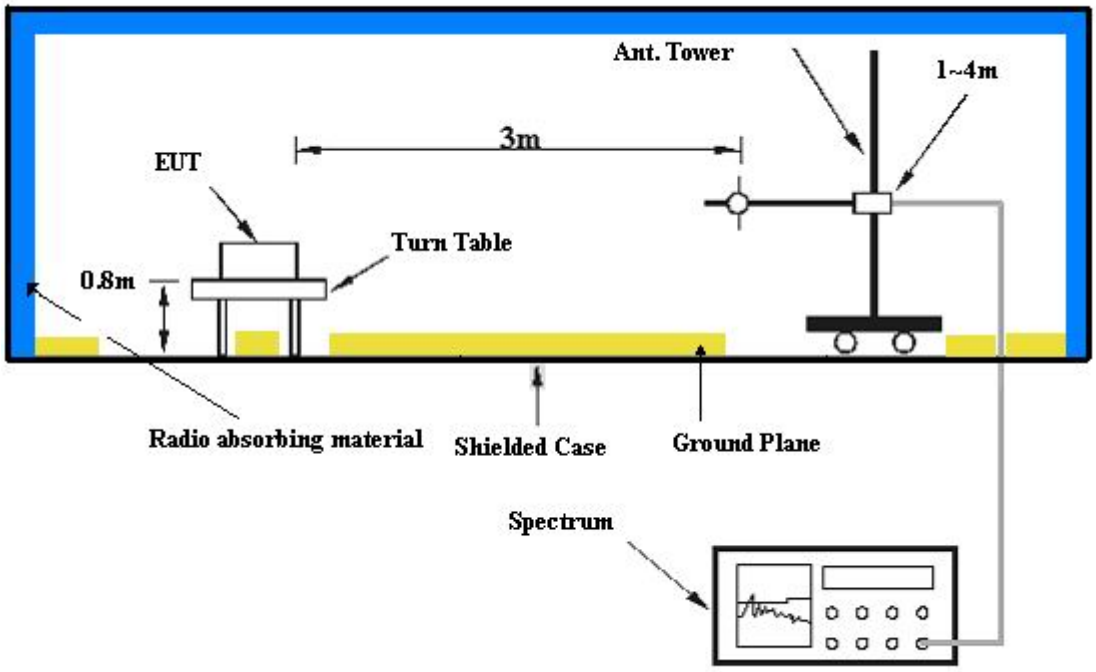
g. Repeat step a ~ f for horizontal polarization.

**NOTE:** The resolution bandwidth of spectrum analyzer is 1MHz and the video bandwidth is 3MHz.

### 4.6.4 DEVIATION FROM TEST STANDARD

No deviation

### 4.6.5 TEST SETUP




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

### 4.6.6 EUT OPERATING CONDITIONS

a. Link up EUT with signal generator.

b. The signal generator controlled EUT to export rated output power under transmission mode and specific channel frequency.

## 4.6.7 TEST RESULTS

| MODE | Middle channel | FREQUENCY RANGE | Below 1000MHz |
|---|---|---|---|
| INPUT POWER | 120Vac, 60Hz | ENVIRONMENTAL CONDITIONS | 25deg°C, 63%RH 991hPa |
| TEST MODE | A | TESTED BY | Dean Wang |

| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3m | | | | | | |
|---|---|---|---|---|---|---|
| NO. | FREQ. (MHz) | EMISSION LEVEL (dBuV) | LIMIT (dBm) | S.G POWER VALUE (dBm) | CORRECTION FACTOR (dB) | POWER VALUE (dBm) |
| **1** | **41.66** | **62.10** | **-25.00** | **-40.15** | **7.30** | **-32.85** |
| 2 | 253.55 | 43.57 | -25.00 | -58.73 | 7.50 | -51.23 |
| 3 | 261.32 | 41.63 | -25.00 | -60.71 | 7.50 | -53.21 |
| 4 | 479.04 | 40.86 | -25.00 | -61.51 | 7.40 | -54.11 |
| 5 | 718.14 | 40.34 | -25.00 | -61.56 | 7.30 | -54.26 |
| 6 | 928.08 | 41.55 | -25.00 | -60.82 | 7.40 | -53.42 |
| 7 | 949.46 | 48.27 | -25.00 | -54.04 | 7.50 | -46.54 |
| 8 | 996.11 | 61.49 | -25.00 | -40.86 | 7.50 | -33.36 |

| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3m | | | | | | |
|---|---|---|---|---|---|---|
| NO. | FREQ. (MHz) | EMISSION LEVEL (dBuV/m) | LIMIT (dBm) | S.G POWER VALUE (dBm) | CORRECTION FACTOR (dB) | POWER VALUE (dBm) |
| 1 | 245.77 | 45.74 | -25.00 | -56.61 | 7.50 | -49.11 |
| 2 | 319.64 | 48.92 | -25.00 | -53.41 | 7.40 | -46.01 |
| 3 | 399.34 | 44.69 | -25.00 | -57.51 | 7.30 | -50.21 |
| 4 | 479.04 | 45.16 | -25.00 | -56.78 | 7.40 | -49.38 |
| 5 | 716.19 | 44.68 | -25.00 | -57.28 | 7.30 | -49.98 |
| 6 | 725.91 | 45.16 | -25.00 | -56.53 | 7.30 | -49.23 |
| 7 | 948.16 | 45.38 | -25.00 | -57.02 | 7.40 | -49.62 |
| 8 | 1000.00 | 54.42 | -25.00 | -47.81 | 7.50 | -40.31 |

**NOTE:** Power Value (dBum) = S.G Power Value (dBm) + Correction Factor (dB).

| | | | |
|---|---|---|---|
| **MODE** | Middle channel | **FREQUENCY RANGE** | Below 1000MHz |
| **INPUT POWER** | 120Vac, 60Hz | **ENVIRONMENTAL CONDITIONS** | 25deg°C, 63%RH 991hPa |
| **TEST MODE** | **B** | **TESTED BY** | Dean Wang |

| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3m | | | | | | |
|---|---|---|---|---|---|---|
| **NO.** | **FREQ. (MHz)** | **EMISSION LEVEL (dBuV)** | **LIMIT (dBm)** | **S.G POWER VALUE (dBm)** | **CORRECTION FACTOR (dB)** | **POWER VALUE (dBm)** |
| 1 | 42.62 | 46.11 | -25.00 | -56.11 | 7.30 | -48.81 |
| 2 | 256.45 | 44.48 | -25.00 | -57.86 | 7.50 | -50.36 |
| 3 | 260.88 | 42.59 | -25.00 | -59.83 | 7.50 | -52.33 |
| 4 | 480.48 | 41.48 | -25.00 | -60.81 | 7.40 | -53.41 |
| 5 | 720.16 | 41.69 | -25.00 | -60.63 | 7.30 | -53.33 |
| 6 | 950.26 | 50.61 | -25.00 | -51.56 | 7.40 | -44.16 |
| 7 | 1000.00 | 60.79 | -25.00 | -41.63 | 7.50 | -34.13 |

| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3m | | | | | | |
|---|---|---|---|---|---|---|
| **NO.** | **FREQ. (MHz)** | **EMISSION LEVEL (dBuV/m)** | **LIMIT (dBm)** | **S.G POWER VALUE (dBm)** | **CORRECTION FACTOR (dB)** | **POWER VALUE (dBm)** |
| 1 | 323.49 | 49.54 | -25.00 | -52.75 | 7.40 | -45.35 |
| 2 | 400.95 | 44.03 | -25.00 | -58.14 | 7.30 | -50.84 |
| 3 | 480.65 | 46.92 | -25.00 | -55.41 | 7.40 | -48.01 |
| 4 | 715.26 | 44.97 | -25.00 | -56.89 | 7.30 | -49.59 |
| 5 | 948.16 | 46.11 | -25.00 | -56.14 | 7.40 | -48.74 |
| 6 | 1000.00 | 51.75 | -25.00 | -50.56 | 7.50 | -43.06 |

**NOTE:** Power Value (dBum) = S.G Power Value (dBm) + Correction Factor (dB).

## 4.7 RADIATED EMISSION MEASUREMENT (ABOVE 1GHz)

### 4.7.1 LIMITS OF RADIATED EMISSION MEASUREMENT

In the FCC 27.53(m) (4), On any frequency outside a licensee's frequency block, the power of any emission shall be attenuated below the transmitter power (P) by at least 55 +10 log (P)dB. The limit of emission equal to –25dBm.

## 4.7.2 TEST INSTRUMENTS

| DESCRIPTION & MANUFACTURER | MODEL NO. | SERIAL NO. | CALIBRATED UNTIL |
|---|---|---|---|
| Test Receiver<br>ROHDE & SCHWARZ | ESIB7 | 100212 | May 27, 2009 |
| Spectrum Analyzer<br>ROHDE & SCHWARZ | FSP40 | 100269 | Aug. 07, 2009 |
| BILOG Antenna<br>SCHWARZBECK | VULB9168 | 9168-156 | Apr. 24, 2009 |
| HORN Antenna<br>SCHWARZBECK | BBHA 9120 D | 9120D-563 | Aug. 05, 2009 |
| HORN Antenna<br>SCHWARZBECK | BBHA 9170 | BBHA9170242 | Jan. 06, 2009 |
| Preamplifier<br>Agilent | 8449B | 3008A01911 | Sep. 10, 2008 |
| Preamplifier<br>Agilent | 8447D | 2944A10634 | Dec. 12, 2008 |
| RF signal cable<br>HUBER+SUHNNER | SUCOFLEX 104 | 274039/223650 | Nov. 07, 2008 |
| RF signal cable<br>Worken | 8D-FB | Cable-HYCH9-01 | Jun. 05, 2009 |
| Software | ADT_Radiated_V7.6 | NA | NA |
| Antenna Tower<br>EMCO | 2070/2080 | 512.835.4684 | NA |
| Turn Table<br>EMCO | 2087-2.03 | NA | NA |
| Antenna Tower &Turn Table Controller<br>EMCO | 2090 | NA | NA |

**NOTE:** 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

2. The test was performed in HwaYa Chamber 9.

3. The horn antenna and HP preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.

4. The FCC Site Registration No. is 215374.

5. The IC Site Registration No. is IC3789B-9.

### 4.7.3 TEST PROCEDURES

a. The EUT was placed on the top of a rotating table 0.8 meters above the ground. The table was rotated 360 degrees to determine the position of the highest radiation.

b. The EUT was set 3 meters away from the receiving antenna, which was mounted on antenna tower and its position at 0.8 m above the ground.

c. For each suspected emission, the EUT was arranged to its worst case and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading and recorded the value.

d. The EUT is replaced by a horn antenna connected to a signal generator tuned to the frequency of emission.

e. The signal generator level has to be adjusted to have the same emission nature.

f. The radiated power can be calculated via the factor and antenna gain.

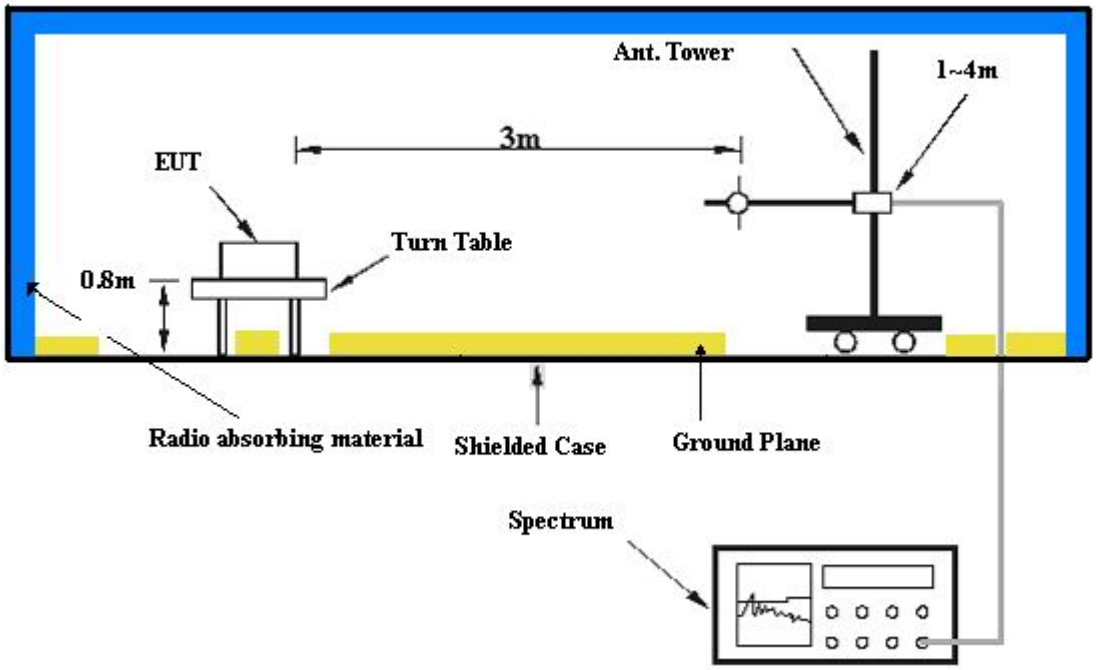
g. Repeat step a ~ f for horizontal polarization.

**NOTE:** The resolution bandwidth of spectrum analyzer is 1MHz and the video bandwidth is 3MHz.

### 4.7.4 DEVIATION FROM TEST STANDARD

No deviation

### 4.7.5 TEST SETUP




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

### 4.7.6 EUT OPERATING CONDITIONS

a. Link up EUT with signal generator.

b. The signal generator controlled EUT to export rated output power under transmission mode and specific channel frequency.

## 4.7.7 TEST RESULTS

| MODE | Low channel | FREQUENCY RANGE | Above 1000MHz |
|---|---|---|---|
| INPUT POWER | 120Vac, 60Hz | ENVIRONMENTAL CONDITIONS | 25deg°C, 63%RH 991hPa |
| TEST MODE | A | TESTED BY | Dean Wang |

| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3m | | | | | | |
|---|---|---|---|---|---|---|
| NO. | FREQ. (MHz) | EMISSION LEVEL (dBuV) | LIMIT (dBm) | S.G POWER VALUE (dBm) | CORRECTION FACTOR (dB) | POWER VALUE (dBm) |
| 1 | 1666.00 | 54.18 | -25.00 | -47.33 | 7.48 | -39.85 |
| 2 | 3331.00 | 43.26 | -25.00 | -61.49 | 9.86 | -51.63 |
| 3 | 4997.00 | 50.82 | -25.00 | -53.51 | 9.49 | -44.02 |
| 4 | 7495.50 | 53.75 | -25.00 | -48.97 | 7.83 | -41.14 |

| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3m | | | | | | |
|---|---|---|---|---|---|---|
| NO. | FREQ. (MHz) | EMISSION LEVEL (dBuV/m) | LIMIT (dBm) | S.G POWER VALUE (dBm) | CORRECTION FACTOR (dB) | POWER VALUE (dBm) |
| 1 | 1666.00 | 55.26 | -25.00 | -47.02 | 7.48 | -39.54 |
| 2 | 3331.00 | 44.25 | -25.00 | -60.39 | 9.86 | -50.53 |
| 3 | 4997.00 | 50.84 | -25.00 | -53.61 | 9.49 | -44.12 |
| 4 | 7495.50 | 53.42 | -25.00 | -49.21 | 7.83 | -41.38 |

**NOTE:** Power Value (dBum) = S.G Power Value (dBm) + Correction Factor (dB).

| | | | |
|---|---|---|---|
| **MODE** | Middle channel | **FREQUENCY RANGE** | Above 1000MHz |
| **INPUT POWER** | 120Vac, 60Hz | **ENVIRONMENTAL CONDITIONS** | 25deg°C, 63%RH 991hPa |
| **TEST MODE** | **A** | **TESTED BY** | Dean Wang |

| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3m | | | | | | |
|---|---|---|---|---|---|---|
| **NO.** | **FREQ. (MHz)** | **EMISSION LEVEL (dBuV)** | **LIMIT (dBm)** | **S.G POWER VALUE (dBm)** | **CORRECTION FACTOR (dB)** | **POWER VALUE (dBm)** |
| 1 | 1725.00 | 55.04 | -25.00 | -47.71 | 7.89 | -39.82 |
| 2 | 3449.00 | 42.23 | -25.00 | -62.33 | 9.96 | -52.37 |
| 3 | 5174.00 | 46.36 | -25.00 | -58.25 | 9.74 | -48.51 |
| 4 | 7761.00 | 53.26 | -25.00 | -49.31 | 7.76 | -41.55 |

| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3m | | | | | | |
|---|---|---|---|---|---|---|
| **NO.** | **FREQ. (MHz)** | **EMISSION LEVEL (dBuV/m)** | **LIMIT (dBm)** | **S.G POWER VALUE (dBm)** | **CORRECTION FACTOR (dB)** | **POWER VALUE (dBm)** |
| 1 | 1725.00 | 53.95 | -25.00 | -48.90 | 7.89 | -41.01 |
| 2 | 3449.00 | 45.65 | -25.00 | -59.10 | 9.96 | -49.14 |
| 3 | 5174.00 | 51.26 | -25.00 | -53.39 | 9.74 | -43.65 |
| 4 | 7761.00 | 53.29 | -25.00 | -49.21 | 7.76 | -41.45 |

**NOTE:** Power Value (dBum) = S.G Power Value (dBm) + Correction Factor (dB).

| | | | |
|---|---|---|---|
| **MODE** | High channel | **FREQUENCY RANGE** | Above 1000MHz |
| **INPUT POWER** | 120Vac, 60Hz | **ENVIRONMENTAL CONDITIONS** | 25deg°C, 63%RH 991hPa |
| **TEST MODE** | **A** | **TESTED BY** | Dean Wang |

| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3m | | | | | | |
|---|---|---|---|---|---|---|
| **NO.** | **FREQ. (MHz)** | **EMISSION LEVEL (dBuV)** | **LIMIT (dBm)** | **S.G POWER VALUE (dBm)** | **CORRECTION FACTOR (dB)** | **POWER VALUE (dBm)** |
| 1 | 1792.00 | 52.49 | -25.00 | -50.84 | 8.48 | -42.36 |
| 2 | 3583.00 | 42.59 | -25.00 | -62.25 | 9.94 | -52.31 |
| 3 | 5375.00 | 47.43 | -25.00 | -57.10 | 9.72 | -47.38 |
| 4 | 8062.50 | 55.21 | -25.00 | -47.34 | 7.82 | -39.52 |

| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3m | | | | | | |
|---|---|---|---|---|---|---|
| **NO.** | **FREQ. (MHz)** | **EMISSION LEVEL (dBuV/m)** | **LIMIT (dBm)** | **S.G POWER VALUE (dBm)** | **CORRECTION FACTOR (dB)** | **POWER VALUE (dBm)** |
| 1 | 1792.00 | 53.04 | -25.00 | -50.16 | 8.48 | -41.68 |
| 2 | 3583.00 | 43.66 | -25.00 | -61.07 | 9.94 | -51.13 |
| 3 | 5375.00 | 47.48 | -25.00 | -57.17 | 9.72 | -47.45 |
| 4 | 8062.50 | 54.87 | -25.00 | -47.84 | 7.82 | -40.02 |

**NOTE:** Power Value (dBum) = S.G Power Value (dBm) + Correction Factor (dB).

| | | | |
|---|---|---|---|
| **MODE** | Low channel | **FREQUENCY RANGE** | Above 1000MHz |
| **INPUT POWER** | 120Vac, 60Hz | **ENVIRONMENTAL CONDITIONS** | 25deg°C, 63%RH 991hPa |
| **TEST MODE** | **B** | **TESTED BY** | Dean Wang |

| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3m | | | | | | |
|---|---|---|---|---|---|---|
| **NO.** | **FREQ. (MHz)** | **EMISSION LEVEL (dBuV)** | **LIMIT (dBm)** | **S.G POWER VALUE (dBm)** | **CORRECTION FACTOR (dB)** | **POWER VALUE (dBm)** |
| 1 | 1667.00 | 55.81 | -25.00 | -46.33 | 7.48 | -38.85 |
| 2 | 3334.00 | 42.45 | -25.00 | -62.22 | 9.86 | -52.36 |
| 3 | 5002.00 | 49.66 | -25.00 | -54.71 | 9.49 | -45.22 |
| 4 | 7503.00 | 52.95 | -25.00 | -52.84 | 7.83 | -45.01 |

| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3m | | | | | | |
|---|---|---|---|---|---|---|
| **NO.** | **FREQ. (MHz)** | **EMISSION LEVEL (dBuV/m)** | **LIMIT (dBm)** | **S.G POWER VALUE (dBm)** | **CORRECTION FACTOR (dB)** | **POWER VALUE (dBm)** |
| 1 | 1667.00 | 56.24 | -25.00 | -45.96 | 7.48 | -38.48 |
| 2 | 3334.00 | 42.54 | -25.00 | -62.07 | 9.86 | -52.21 |
| 3 | 5002.00 | 51.14 | -25.00 | -53.30 | 9.49 | -43.81 |
| 4 | 7503.00 | 53.35 | -25.00 | -49.29 | 7.83 | -41.46 |

**NOTE:** Power Value (dBum) = S.G Power Value (dBm) + Correction Factor (dB).

| | | | |
|---|---|---|---|
| **MODE** | Middle channel | **FREQUENCY RANGE** | Above 1000MHz |
| **INPUT POWER** | 120Vac, 60Hz | **ENVIRONMENTAL CONDITIONS** | 25deg°C, 63%RH 991hPa |
| **TEST MODE** | **B** | **TESTED BY** | Dean Wang |

| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3m | | | | | | |
|---|---|---|---|---|---|---|
| **NO.** | **FREQ. (MHz)** | **EMISSION LEVEL (dBuV)** | **LIMIT (dBm)** | **S.G POWER VALUE (dBm)** | **CORRECTION FACTOR (dB)** | **POWER VALUE (dBm)** |
| 1 | 1725.00 | 51.74 | -25.00 | -51.00 | 7.89 | -43.11 |
| 2 | 3449.00 | 45.33 | -25.00 | -59.41 | 9.96 | -49.45 |
| 3 | 5174.00 | 49.86 | -25.00 | -54.76 | 9.74 | -45.02 |
| 4 | 7761.00 | 52.14 | -25.00 | -50.49 | 7.76 | -42.73 |

| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3m | | | | | | |
|---|---|---|---|---|---|---|
| **NO.** | **FREQ. (MHz)** | **EMISSION LEVEL (dBuV/m)** | **LIMIT (dBm)** | **S.G POWER VALUE (dBm)** | **CORRECTION FACTOR (dB)** | **POWER VALUE (dBm)** |
| 1 | 1725.00 | 53.06 | -25.00 | -49.73 | 7.89 | -41.84 |
| 2 | 3449.00 | 45.61 | -25.00 | -59.17 | 9.96 | -49.21 |
| 3 | 5174.00 | 51.26 | -25.00 | -53.10 | 9.74 | -43.36 |
| 4 | 7761.00 | 53.36 | -25.00 | -48.99 | 7.76 | -41.23 |

**NOTE:** Power Value (dBum) = S.G Power Value (dBm) + Correction Factor (dB).

| | | | |
|---|---|---|---|
| **MODE** | High channel | **FREQUENCY RANGE** | Above 1000MHz |
| **INPUT POWER** | 120Vac, 60Hz | **ENVIRONMENTAL CONDITIONS** | 25deg°C, 63%RH 991hPa |
| **TEST MODE** | **B** | **TESTED BY** | Dean Wang |

| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3m | | | | | | |
|---|---|---|---|---|---|---|
| **NO.** | **FREQ. (MHz)** | **EMISSION LEVEL (dBuV)** | **LIMIT (dBm)** | **S.G POWER VALUE (dBm)** | **CORRECTION FACTOR (dB)** | **POWER VALUE (dBm)** |
| 1 | 1790.00 | 51.81 | -25.00 | -51.50 | 8.48 | -43.02 |
| 2 | 3580.00 | 42.03 | -25.00 | -62.77 | 9.94 | -52.83 |
| 3 | 5370.00 | 45.74 | -25.00 | -58.93 | 9.72 | -49.21 |
| 4 | 8055.00 | 52.04 | -25.00 | -50.66 | 7.82 | -42.84 |

| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3m | | | | | | |
|---|---|---|---|---|---|---|
| **NO.** | **FREQ. (MHz)** | **EMISSION LEVEL (dBuV/m)** | **LIMIT (dBm)** | **S.G POWER VALUE (dBm)** | **CORRECTION FACTOR (dB)** | **POWER VALUE (dBm)** |
| 1 | 1790.00 | 52.68 | -25.00 | -50.59 | 8.48 | -42.11 |
| 2 | 3580.00 | 42.56 | -25.00 | -62.07 | 9.94 | -52.13 |
| 3 | 5370.00 | 45.82 | -25.00 | -58.59 | 9.72 | -48.87 |
| 4 | 8055.00 | 53.44 | -25.00 | -49.05 | 7.82 | -41.23 |

**NOTE:** Power Value (dBum) = S.G Power Value (dBm) + Correction Factor (dB).

# 5 PHOTOGRAPHS OF THE TEST CONFIGURATION

Please refer to the attached file (Test Setup Photo).

# 6 INFORMATION ON THE TESTING LABORATORIES

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

| | |
|---|---|
| **USA** | FCC, UL |
| **GERMANY** | TUV Rheinland |
| **JAPAN** | VCCI |
| **NORWAY** | NEMKO |
| **CANADA** | INDUSTRY CANADA , CSA |
| **R.O.C.** | TAF, BSMI, NCC |
| **NETHERLANDS** | Telefication |
| **SINGAPORE** | GOST-ASIA (MOU) |
| **RUSSIA** | CERTIS (MOU) |

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


**Linko EMC/RF Lab**:
Tel: 886-2-26052180
Fax: 886-2-26051924

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

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

**Web Site**: www.adt.com.tw


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

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