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FCC TEST REPORT (PART 27)

REPORT NO.: RF990721C08

MODEL NO.: WM553

FCC ID: T5U-WM553

RECEIVED: Jul. 21, 2010

TESTED: Jul. 21 ~ Aug. 02, 2010

ISSUED: Aug. 05, 2010

APPLICANT: Quanta Microsystems, Inc.

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1 CERTIFICATION

PRODUCT: IEEE802.16e WiMAX Full Size Mini Card

MODEL: WM553

BRAND: QMI

APPLICANT: Quanta Microsystems, Inc.

TESTED: Jul. 21 ~ Aug. 02, 2010

TEST SAMPLE: ENGINEERING SAMPLE

TEST STANDARDS: FCC Part 27, Subpart C & M

The above equipment (Model: WM553) has been tested by **Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch**, 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 : Andrea Hsia , **DATE** : Aug. 05, 2010
Andrea Hsia / Specialist

TECHNICAL ACCEPTANCE : Long Chen , **DATE** : Aug. 05, 2010
Responsible for RF Long Chen / Senior Engineer

APPROVED BY : Gary Chang , **DATE** : Aug. 05, 2010
Gary Chang / Assistant Manager



2 SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

| STANDARD SECTION | TEST TYPE AND LIMIT | RESULT | REMARK |
|--------------------------|--|--------|---|
| FCC Part 27 & Part 2 | | | |
| 2.1046 27.50(h)(2) | Maximum Peak Output Power Limit: max. 2 Watt. | PASS | Meet the requirement of limit. Minimum passing margin is 27.3dBm at 2687.5MHz. |
| 2.1055 27.54 | Frequency Stability Stay with the authorized bands of operation | PASS | Meet the requirement of limit. |
| 2.1049 27.53(m)(6) | Emission Bandwidth | PASS | Meet the requirement of limit. |
| 2.1051 27.53(m)(4)(6) | Band Edge Measurements | PASS | Meet the requirement of limit. |
| 2.1051 27.53(m)(4)(6) | Conducted Spurious Emissions | PASS | Meet the requirement of limit. |
| 2.1053 27.53(m)(4)(6) | Radiated Spurious Emissions | PASS | Meet the requirement of limit. Minimum passing margin is -5.8dB at 8062.5MHz. |

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 | 2.44 dB |
| Radiated emissions | 30MHz ~ 200MHz | 2.93 dB |
| | 200MHz ~ 1000MHz | 2.95 dB |
| | 1GHz ~ 18GHz | 2.26 dB |
| | 18GHz ~ 40GHz | 1.94 dB |

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 | IEEE802.16e WiMAX Full Size Mini Card |
| MODEL NO. | WM553 |
| FCC ID | T5U-WM553 |
| POWER SUPPLY | 3.3Vdc |
| MODULATION TYPE | UL: QPSK1/2, QPSK 3/4, 16QAM1/2, 16QAM 3/4 DL: QPSK1/2, QPSK 3/4, 16QAM1/2, 16QAM 3/4, 64QAM1/2, 64QAM2/4, 64QAM3/4, 64QAM5/6 |
| MODULATION TECHNOLOGY | OFDMA |
| DUPLEX METHOD | TDD |
| OPERATING RANGE | 2498.5MHz ~ 2687.5MHz |
| CHANNEL BANDWIDTH | 5MHz, 10MHz |
| MAX. EIRP POWER | 27.3dBm |
| ANTENNA TYPE | Dipole Antenna with 2.9dBi gain PIFA Antenna with 3.47dBi gain Printed Antenna with 5dBi gain |
| OPERATION TEMPERATURE RANGE | -20°C ~ 75°C |
| DATA CABLE | NA |
| I/O PORTS | Refer to user's manual |
| ACCESSORY DEVICES | NA |

NOTE:

1. The EUT has 2 different size of PCB. Two boards are electrically identical except other has extra empty PCB.

| | |
|---------------|-----------|
| Board1 | Full card |
| Board2 | Half card |

**After pre-tested and found board 2 was the worst, therefore chosen Board 2 for the final test.

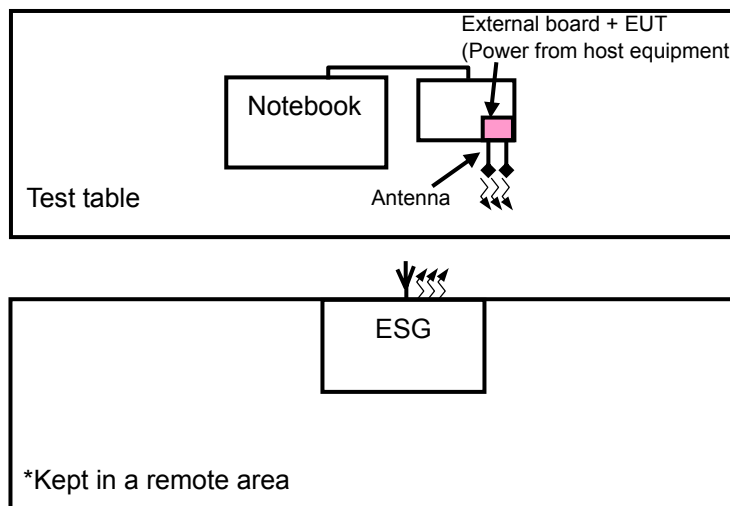
2. The EUT can supports different UL / DL ratio, max transmit ratio is up to 18 (UL): 29 (DL). After pretesting of output power and spurious emission, 18 (UL): 29 (DL) was found to be worst case and was selected for the final test configuration.
3. The above EUT information was declared by manufacturer 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 | CHANNEL BANDWIDTH: 10MHz |
|--------------------------------|-------------------------------|
| Low channel (L): 2498.5MHz. | Low channel (L): 2501MHz. |
| Middle channel (M): 2593.0MHz. | Middle channel (M): 2593 MHz. |
| High channel (H): 2687.5MHz. | High channel (H): 2685 MHz. |

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 | √ | √ | √ | √ | √ | √ | √ | EUT with Antenna 1 |
| B | √ | - | - | - | - | √ | √ | EUT with Antenna 2 |
| C | √ | - | - | - | - | √ | √ | EUT with Antenna 3 |

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 **NOTE**: “-” means no effect.

OUTPUT POWER MEASUREMENT:

- Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates, XYZ axis and antenna ports (if EUT with antenna diversity architecture).
- Following channel(s) was (were) selected for the final test as listed below.

| EUT CONFIGURE MODE | TESTED CHANNEL | MODULATION TECHNOLOGY | CHANNEL BANDWIDTH | MODULATION TYPE | CODING RATE | ANT. AXIS |
|--------------------|----------------|-----------------------|-------------------|-----------------|-------------|-----------|
| A | L, M, H | OFDMA | 5MHz | QPSK | 1/2 | X |
| B | L, M, H | OFDMA | 5MHz | QPSK | 1/2 | X |
| C | L, M, H | OFDMA | 5MHz | QPSK | 1/2 | Y |
| A | L, M, H | OFDMA | 10MHz | QPSK | 1/2 | X |
| B | L, M, H | OFDMA | 10MHz | QPSK | 1/2 | X |
| C | L, M, H | OFDMA | 10MHz | QPSK | 1/2 | Y |

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.

| EUT CONFIGURE MODE | TESTED CHANNEL | MODULATION TECHNOLOGY | CHANNEL BANDWIDTH | MODULATION TYPE | CODING RATE |
|--------------------|----------------|-----------------------|-------------------|-----------------|-------------|
| A | H | OFDMA | 5MHz | QPSK | 1/2 |
| A | H | OFDMA | 10MHz | 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.

| EUT CONFIGURE MODE | TESTED CHANNEL | MODULATION TECHNOLOGY | CHANNEL BANDWIDTH | MODULATION TYPE | CODING RATE |
|--------------------|----------------|-----------------------|-------------------|-----------------|-------------|
| A | L, M, H | OFDMA | 5MHz | QPSK | 1/2 |
| A | L, M, H | OFDMA | 10MHz | 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.

| EUT CONFIGURE MODE | TESTED CHANNEL | MODULATION TECHNOLOGY | CHANNEL BANDWIDTH | MODULATION TYPE | CODING RATE |
|--------------------|----------------|-----------------------|-------------------|-----------------|-------------|
| A | L, M, H | OFDMA | 5MHz | QPSK | 1/2 |
| A | L, M, H | OFDMA | 10MHz | 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.

| EUT CONFIGURE MODE | TESTED CHANNEL | MODULATION TECHNOLOGY | CHANNEL BANDWIDTH | MODULATION TYPE | CODING RATE |
|--------------------|----------------|-----------------------|-------------------|-----------------|-------------|
| A | L, M, H | OFDMA | 5MHz | QPSK | 1/2 |
| A | L, M, H | OFDMA | 10MHz | 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, data rates, XYZ axis and antenna ports (if EUT with antenna diversity architecture).
- Following channel(s) was (were) selected for the final test as listed below.

| EUT CONFIGURE MODE | TESTED CHANNEL | MODULATION TECHNOLOGY | CHANNEL BANDWIDTH | MODULATION TYPE | CODING RATE | ANT. AXIS |
|--------------------|----------------|-----------------------|-------------------|-----------------|-------------|-----------|
| A | L | OFDMA | 5MHz | QPSK | 1/2 | X |
| B | L | OFDMA | 5MHz | QPSK | 1/2 | X |
| C | L | OFDMA | 5MHz | QPSK | 1/2 | Y |
| A | L | OFDMA | 10MHz | QPSK | 1/2 | X |
| B | L | OFDMA | 10MHz | QPSK | 1/2 | X |
| C | L | OFDMA | 10MHz | QPSK | 1/2 | Y |

RADIATED EMISSION MEASUREMENT (ABOVE 1 GHz):

- Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates, XYZ axis and antenna ports (if EUT with antenna diversity architecture).
- Following channel(s) was (were) selected for the final test as listed below.

| EUT CONFIGURE MODE | TESTED CHANNEL | MODULATION TECHNOLOGY | CHANNEL BANDWIDTH | MODULATION TYPE | CODING RATE | ANT. AXIS |
|--------------------|----------------|-----------------------|-------------------|-----------------|-------------|-----------|
| A | L, M, H | OFDMA | 5MHz | QPSK | 1/2 | X |
| B | L, M, H | OFDMA | 5MHz | QPSK | 1/2 | X |
| C | L, M, H | OFDMA | 5MHz | QPSK | 1/2 | Y |
| A | L, M, H | OFDMA | 10MHz | QPSK | 1/2 | X |
| B | L, M, H | OFDMA | 10MHz | QPSK | 1/2 | X |
| C | L, M, H | OFDMA | 10MHz | QPSK | 1/2 | Y |



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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

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 | NA |
| 2 | EXTERNAL BOARD | NA | NA | NA | NA |
| 3 | SIGNAL GENERATOR | Agilent | E4438C | MY45092849 | NA |

| NO. | SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS |
|-----|---|
| 1 | NA |
| 2 | 1.8m USB cable without core |
| 3 | NA |

NOTE: 1. All power cords of the above support units are non shielded (1.8m).
2. Item 3 acted as a communication partner to transfer data.
3. Item 2 was supplied from client.



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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

CONDUCTED POWER MEASUREMENT:

| DESCRIPTION & MANUFACTURER | MODEL NO. | SERIAL NO. | DATE OF CALIBRATION | DUE DATE OF CALIBRATION |
|-----------------------------|-----------|------------|---------------------|-------------------------|
| High Speed Peak Power Meter | ML2495A | 0824012 | Aug. 10, 2009 | Aug. 10, 2010 |
| Power Sensor | MA2411B | 0738138 | Aug. 10, 2009 | Aug. 10, 2010 |

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. Measurement Bandwidth of ML2495A is 65MHz greater than 26dB bandwidth of emission.



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EIRP POWER MEASUREMENT:

| DESCRIPTION & MANUFACTURER | MODEL NO. | SERIAL NO. | DATE OF CALIBRATION | DUE DATE OF CALIBRATION |
|---|------------------------------|----------------------|---------------------|-------------------------|
| Test Receiver ROHDE & SCHWARZ | ESIB7 | 100188 | Dec. 21, 2009 | Dec. 20, 2010 |
| Spectrum Analyzer ROHDE & SCHWARZ | FSP40 | 100041 | Jul. 09, 2010 | Jul. 08, 2011 |
| BILOG Antenna SCHWARZBECK | VULB9168 | 9168-156 | Apr. 30, 2010 | Apr. 29, 2011 |
| HORN Antenna SCHWARZBECK | BBHA 9120 D | 9120D-563 | Aug. 10, 2009 | Aug. 09, 2010 |
| HORN Antenna SCHWARZBECK | BBHA 9170 | BBHA9170242 | Dec. 25, 2009 | Dec. 24, 2010 |
| Preamplifier Agilent | 8449B | 3008A01910 | Sep. 11, 2009 | Sep. 10, 2010 |
| Preamplifier Agilent | 8447D | 2944A10638 | Dec. 21, 2009 | Dec. 20, 2010 |
| RF signal cable HUBER+SUHNNER | SUCOFLEX 104 | 218190/4 231241/4 | May 14, 2010 | May 13, 2011 |
| RF signal cable Worken | 8D-FB | Cable-HYCH9-01 | Aug. 17, 2009 | Aug. 16, 2010 |
| Software | ADT_Radiated_ V7.6.15.9.2 | NA | NA | NA |
| Antenna Tower EMCO | 2070/2080 | 512.835.4684 | NA | NA |
| Turn Table EMCO | 2087-2.03 | NA | NA | NA |
| Antenna Tower & Turn Table Controller EMCO | 2090 | NA | 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 460141.
 5. The IC Site Registration No. is IC 7450F-4.



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4.1.3 TEST PROCEDURES

CONDUCTED POWER MEASUREMENT:

A power sensor was used on the output port of the EUT. A power meter was used to read the response of the power sensor. Record the power level.

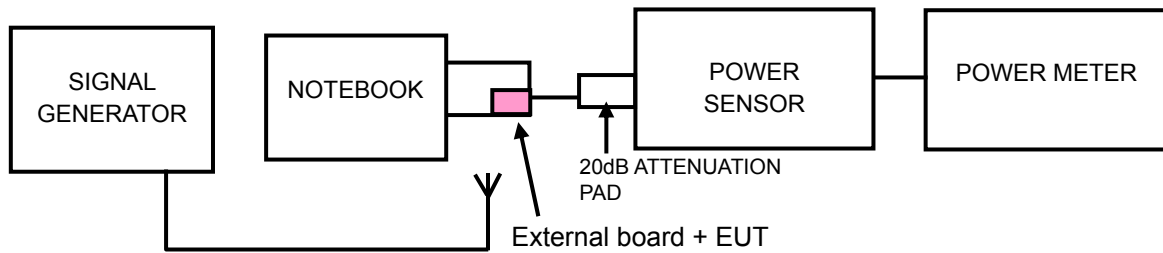
EIRP POWER MEASUREMENT:

- a. The power was measured with R&S Spectrum Analyzer. All measurements were done at 3 channels (low, middle and high operational frequency range.)
- b. The conducted peak output power used the power splitter via EUT RF power connector between simulation base station and spectrum analyzer. The path loss included the splitter loss, cable loss and 20dB pad loss. The spectrum set RB/VB 3MHz, then read peak power value and record to the test. (All transmitted path loss shall be considered in the test report data.)
- c. Substitution method is used for E.I.R.P measurement. In the semi-anechoic chamber, EUT placed on the 0.8m 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 and moved height from 1m to 4m to find the maximum polar radiated power. The “Read Value” is the spectrum reading the maximum power value.
- d. The substitution horn antenna is substituted for EUT at the same position and signals generator export the CW signal to the substitution antenna via a TX cable. Rotated the Turn Table and moved receiving antenna to find the maximum radiation power. Adjust output power level of S.G to get a Value of spectrum reading equal to “Read Value “ of step b. Record the power level of S.G
- e. $EIRP = \text{Output power level of S.G} - \text{TX cable loss} + \text{Antenna gain of substitution horn.}$

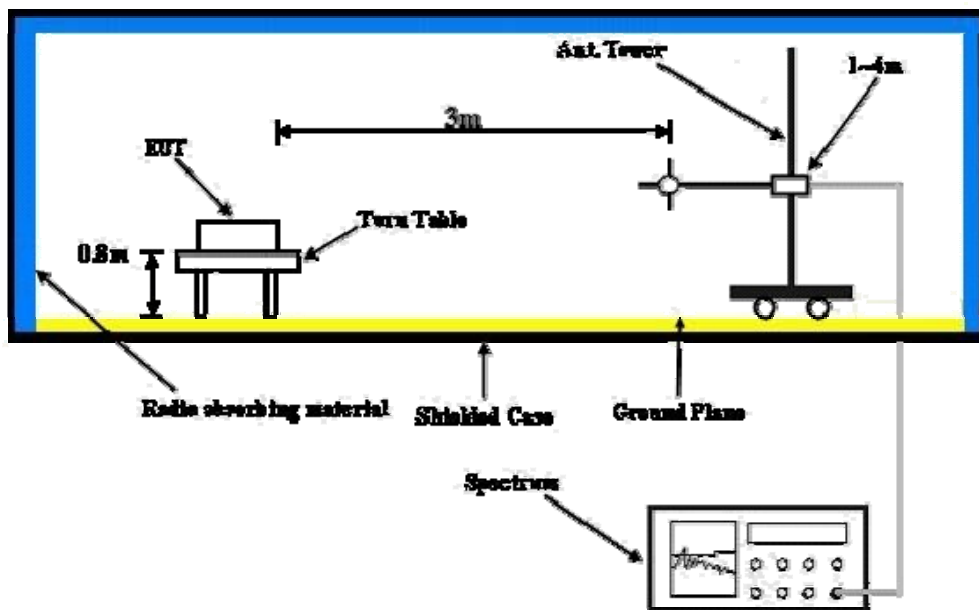
NOTE: The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 10MHz/10MHz.

4.1.4 TEST SETUP

CONDUCTED POWER MEASUREMENT:



EIRP POWER MEASUREMENT:



For the actual test configuration, please refer to the attached file (Test Setup Photo).

4.1.5 EUT OPERATING CONDITIONS

- Link up EUT with signal generator.
- The signal generator controlled EUT to export rated output power under transmission mode and specific channel frequency.



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4.1.6 TEST RESULTS

CHANNEL BANDWIDTH: 5MHz

| | | | |
|---------------------------------|--------------------------|------------------|---------|
| ENVIRONMENTAL CONDITIONS | 23degoC, 62%RH 991hPa | TESTED BY | Brad Wu |
|---------------------------------|--------------------------|------------------|---------|

| CONDUCTED POWER (RMS) | | | | | |
|-----------------------|-----------------|----------|---------------------------|-------------|-----------|
| CHANNEL | FREQUENCY (MHz) | C.F (dB) | POWER METER READING (dBm) | POWER (dBm) | POWER (W) |
| Low | 2498.5 | 21.0 | 2.1 | 23.08 | 0.2032 |
| Middle | 2593.0 | 21.0 | 2.1 | 23.10 | 0.2042 |
| High | 2687.5 | 21.0 | 2.1 | 23.06 | 0.2023 |

NOTE: C.F = attenuator + cable loss



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| | | | |
|---------------------------------|--------------------------|------------------|---------|
| ENVIRONMENTAL CONDITIONS | 23degoC, 62%RH 991hPa | TESTED BY | Brad Wu |
|---------------------------------|--------------------------|------------------|---------|

TEST MODE A

| EIRP POWER (RMS) | | | | | |
|------------------|-----------------|----------|------------------|-------------------|-----------------|
| CHANNEL | FREQUENCY (MHz) | C.F (dB) | S.G. LEVEL (dBm) | TOTAL POWER (dBm) | TOTAL POWER (W) |
| Low | 2498.5 | 8.3 | 18.8 | 27.1 | 0.5129 |
| Middle | 2593.0 | 8.5 | 18.3 | 26.8 | 0.4786 |
| High | 2687.5 | 8.5 | 18.8 | 27.3 | 0.5370 |

NOTE: C.F = Substitution antenna gain + cable loss

TEST MODE B

| EIRP POWER (RMS) | | | | | |
|------------------|-----------------|----------|------------------|-------------------|-----------------|
| CHANNEL | FREQUENCY (MHz) | C.F (dB) | S.G. LEVEL (dBm) | TOTAL POWER (dBm) | TOTAL POWER (W) |
| Low | 2498.5 | 8.3 | 19.2 | 27.5 | 0.5623 |
| Middle | 2593.0 | 8.5 | 18.7 | 27.2 | 0.5248 |
| High | 2687.5 | 8.5 | 16.7 | 25.2 | 0.3311 |

NOTE: C.F = Substitution antenna gain + cable loss

TEST MODE C

| EIRP POWER (RMS) | | | | | |
|------------------|-----------------|----------|------------------|-------------------|-----------------|
| CHANNEL | FREQUENCY (MHz) | C.F (dB) | S.G. LEVEL (dBm) | TOTAL POWER (dBm) | TOTAL POWER (W) |
| Low | 2498.5 | 8.3 | 18.8 | 27.1 | 0.5129 |
| Middle | 2593.0 | 8.5 | 17.7 | 26.2 | 0.4169 |
| High | 2687.5 | 8.5 | 18.1 | 26.6 | 0.4571 |

NOTE: C.F = Substitution antenna gain + cable loss



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CHANNEL BANDWIDTH: 10MHz

| | | | |
|---------------------------------|--------------------------|------------------|---------|
| ENVIRONMENTAL CONDITIONS | 23degoC, 62%RH 991hPa | TESTED BY | Brad Wu |
|---------------------------------|--------------------------|------------------|---------|

| CONDUCTED POWER (RMS) | | | | | |
|------------------------------|------------------------|-----------------|----------------------------------|--------------------|------------------|
| CHANNEL | FREQUENCY (MHz) | C.F (dB) | POWER METER READING (dBm) | POWER (dBm) | POWER (W) |
| Low | 2501 | 21.0 | 2.1 | 23.07 | 0.2028 |
| Middle | 2593 | 21.0 | 2.1 | 23.05 | 0.2018 |
| High | 2685 | 21.0 | 2.1 | 23.08 | 0.2032 |

NOTE: C.F = attenuator + cable loss



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| | | | |
|---------------------------------|--------------------------|------------------|---------|
| ENVIRONMENTAL CONDITIONS | 23degoC, 62%RH 991hPa | TESTED BY | Brad Wu |
|---------------------------------|--------------------------|------------------|---------|

TEST MODE A

| EIRP POWER (RMS) | | | | | |
|------------------|-----------------|----------|------------------|-------------------|-----------------|
| CHANNEL | FREQUENCY (MHz) | C.F (dB) | S.G. LEVEL (dBm) | TOTAL POWER (dBm) | TOTAL POWER (W) |
| Low | 2501 | 8.3 | 17.9 | 26.2 | 0.4169 |
| Middle | 2593 | 8.5 | 18.1 | 26.6 | 0.4571 |
| High | 2685 | 8.5 | 18.7 | 27.2 | 0.5248 |

NOTE: C.F = Substitution antenna gain + cable loss

TEST MODE B

| EIRP POWER (RMS) | | | | | |
|------------------|-----------------|----------|------------------|-------------------|-----------------|
| CHANNEL | FREQUENCY (MHz) | C.F (dB) | S.G. LEVEL (dBm) | TOTAL POWER (dBm) | TOTAL POWER (W) |
| Low | 2501 | 8.3 | 18.1 | 26.4 | 0.4365 |
| Middle | 2593 | 8.5 | 17.8 | 26.3 | 0.4266 |
| High | 2685 | 8.5 | 17.4 | 25.9 | 0.3890 |

NOTE: C.F = Substitution antenna gain + cable loss

TEST MODE C

| EIRP POWER (RMS) | | | | | |
|------------------|-----------------|----------|------------------|-------------------|-----------------|
| CHANNEL | FREQUENCY (MHz) | C.F (dB) | S.G. LEVEL (dBm) | TOTAL POWER (dBm) | TOTAL POWER (W) |
| Low | 2501 | 8.3 | 19.0 | 27.3 | 0.5370 |
| Middle | 2593 | 8.5 | 18.6 | 27.1 | 0.5129 |
| High | 2685 | 8.5 | 18.3 | 26.8 | 0.4786 |

NOTE: C.F = Substitution antenna gain + cable loss



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4.2 FREQUENCY STABILITY MEASUREMENT

4.2.1 LIMITS OF FREQUENCY STABILITY 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 $-20^{\circ}\text{C} \sim 75^{\circ}\text{C}$.

4.2.2 TEST INSTRUMENTS

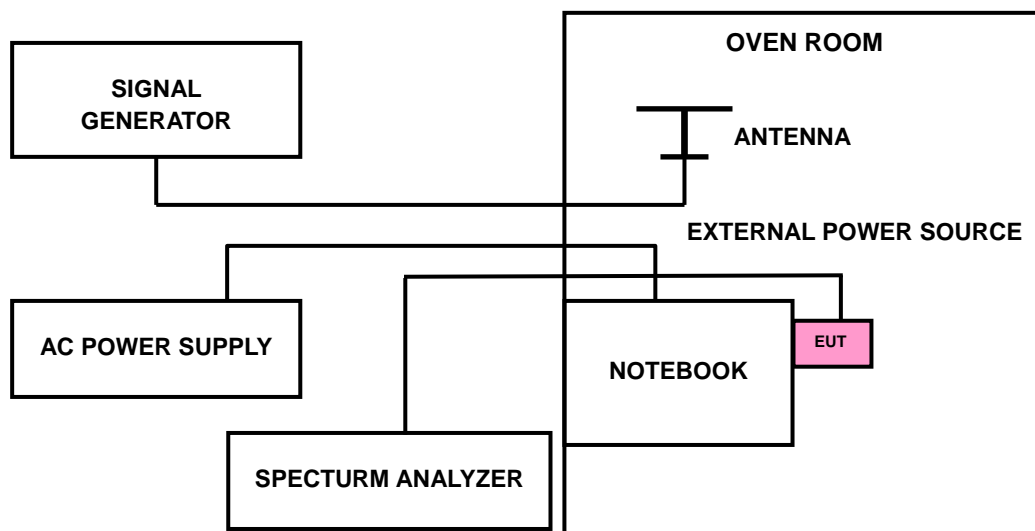
| DESCRIPTION & MANUFACTURER | MODEL NO. | SERIAL NO. | DATE OF CALIBRATION | DUE DATE OF CALIBRATION |
|---|-----------------|------------|---------------------|-------------------------|
| Spectrum Analyzer Agilent | E4446A | MY44360124 | Feb. 05, 2010 | Feb. 04, 2011 |
| RF cable | SUCOFLEX 104 | 257029 | Sep. 12, 2009 | Sep. 11, 2010 |
| WIT Standard Temperature & Humidity Chamber | MHU-225AU | 920409 | May 06, 2010 | May 05, 2011 |

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

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 $\pm 0.5^{\circ}\text{C}$ 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

Same as 4.1.5



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4.2.6 TEST RESULTS

| | | | |
|--------------------------|--------------|---------------------------------|--------------------------|
| MODE | High channel | ENVIRONMENTAL CONDITIONS | 23degoC, 62%RH 991hPa |
| CHANNEL BANDWIDTH | 5MHz | TESTED BY | Brad Wu |

| AFC FREQUENCY ERROR VS. VOLTAGE | | | |
|--|-------------------|------------------------|------------------------------|
| VOLTAGE (Volts) | TEMP. (°C) | FREQUENCY (MHz) | FREQUENCY ERROR (ppm) |
| 93.5 | 20 | 2498.500784 | 0.314 |
| 110.0 | 20 | 2498.500652 | 0.261 |
| 126.5 | 20 | 2498.501243 | 0.497 |

| AFC FREQUENCY ERROR VS. TEMP. | | | |
|--------------------------------------|-------------------|------------------------|------------------------------|
| VOLTAGE (Volts) | TEMP. (°C) | FREQUENCY (MHz) | FREQUENCY ERROR (ppm) |
| 110.0 | 75 | 2498.500703 | 0.281 |
| 110.0 | 70 | 2498.501016 | 0.407 |
| 110.0 | 60 | 2498.500688 | 0.275 |
| 110.0 | 50 | 2498.500743 | 0.297 |
| 110.0 | 40 | 2498.501595 | 0.638 |
| 110.0 | 30 | 2498.500609 | 0.244 |
| 110.0 | 20 | 2498.500488 | 0.195 |
| 110.0 | 10 | 2498.500728 | 0.291 |
| 110.0 | 0 | 2498.501027 | 0.411 |
| 110.0 | -10 | 2498.500853 | 0.341 |
| 110.0 | -20 | 2498.500770 | 0.308 |
| 110.0 | -30 | 2498.500279 | 0.112 |



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| | | | |
|--------------------------|--------------|---------------------------------|--------------------------|
| MODE | High channel | ENVIRONMENTAL CONDITIONS | 23degoC, 62%RH 991hPa |
| CHANNEL BANDWIDTH | 10MHz | TESTED BY | Brad Wu |

| AFC FREQUENCY ERROR VS. VOLTAGE | | | |
|--|-------------------|------------------------|------------------------------|
| VOLTAGE (Volts) | TEMP. (°C) | FREQUENCY (MHz) | FREQUENCY ERROR (ppm) |
| 93.5 | 20 | 2685.002033 | 0.757 |
| 110.0 | 20 | 2685.000903 | 0.336 |
| 126.5 | 20 | 2685.001607 | 0.599 |

| AFC FREQUENCY ERROR VS. TEMP. | | | |
|--------------------------------------|-------------------|------------------------|------------------------------|
| VOLTAGE (Volts) | TEMP. (°C) | FREQUENCY (MHz) | FREQUENCY ERROR (ppm) |
| 110.0 | 75 | 2685.000996 | 0.371 |
| 110.0 | 70 | 2685.000732 | 0.273 |
| 110.0 | 60 | 2685.000508 | 0.189 |
| 110.0 | 50 | 2685.001107 | 0.412 |
| 110.0 | 40 | 2685.000563 | 0.210 |
| 110.0 | 30 | 2685.001042 | 0.388 |
| 110.0 | 20 | 2685.000903 | 0.336 |
| 110.0 | 10 | 2685.000708 | 0.264 |
| 110.0 | 0 | 2685.001286 | 0.479 |
| 110.0 | -10 | 2685.000870 | 0.324 |
| 110.0 | -20 | 2685.000602 | 0.224 |
| 110.0 | -30 | 2685.000884 | 0.329 |

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

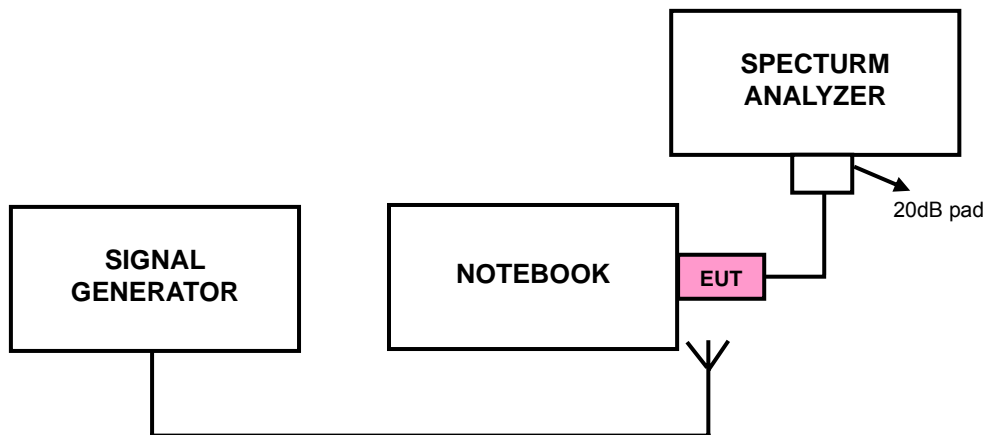
| DESCRIPTION & MANUFACTURER | MODEL NO. | SERIAL NO. | DATE OF CALIBRATION | DUE DATE OF CALIBRATION |
|---|-----------------|------------|---------------------|-------------------------|
| Spectrum Analyzer Agilent | E4446A | MY44360124 | Feb. 05, 2010 | Feb. 04, 2011 |
| RF cable | SUCOFLEX 104 | 257029 | Sep. 12, 2009 | Sep. 11, 2010 |
| WIT Standard Temperature & Humidity Chamber | MHU-225AU | 920409 | May 06, 2010 | May 05, 2011 |

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

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. 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

Same as 4.1.5



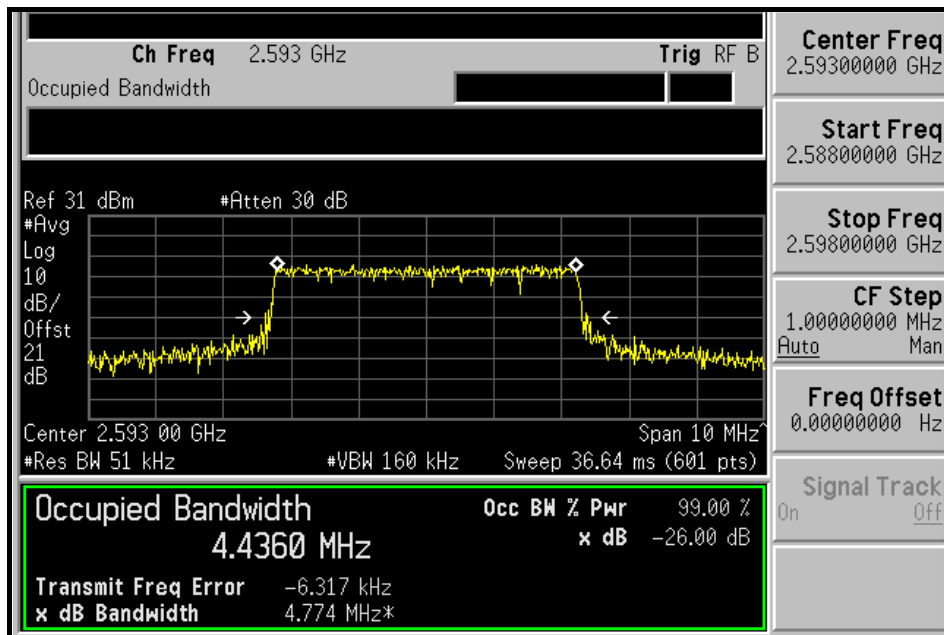
A D T

4.3.6 TEST RESULTS

CHANNEL BANDWIDTH: 5MHz

| CHANNEL | -26dBc BANDWIDTH (MHz) |
|---------|------------------------|
| Low | 4.765 |
| Middle | 4.774 |
| High | 4.766 |

MIDDLE CHANNEL



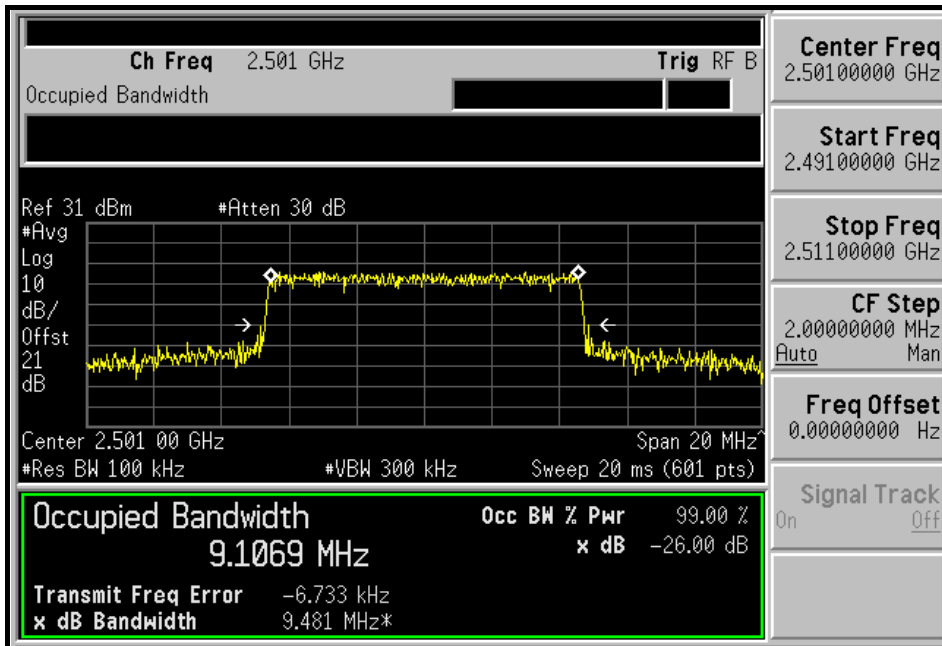


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CHANNEL BANDWIDTH: 10MHz

| CHANNEL | -26dBc BANDWIDTH (MHz) |
|---------|------------------------|
| Low | 9.481 |
| Middle | 9.476 |
| High | 9.478 |

LOW 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. | DATE OF CALIBRATION | DUE DATE OF CALIBRATION |
|---|--------------|------------|---------------------|-------------------------|
| Spectrum Analyzer Agilent | E4446A | MY44360124 | Feb. 05, 2010 | Feb. 04, 2011 |
| RF cable | SUCOFLEX 104 | 257029 | Sep. 12, 2009 | Sep. 11, 2010 |
| WIT Standard Temperature & Humidity Chamber | MHU-225AU | 920409 | May 06, 2010 | May 05, 2011 |

- 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 4.3.4



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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 (Channel Bandwidth: 5MHz) / 30MHz (Channel Bandwidth: 10MHz). RBW of the spectrum is 51kHz (Channel Bandwidth: 5MHz) / 100kHz (Channel Bandwidth: 10MHz).
- c. Record the max trace plot into the test report.

4.4.5 EUT OPERATING CONDITION

Same as 4.1.5

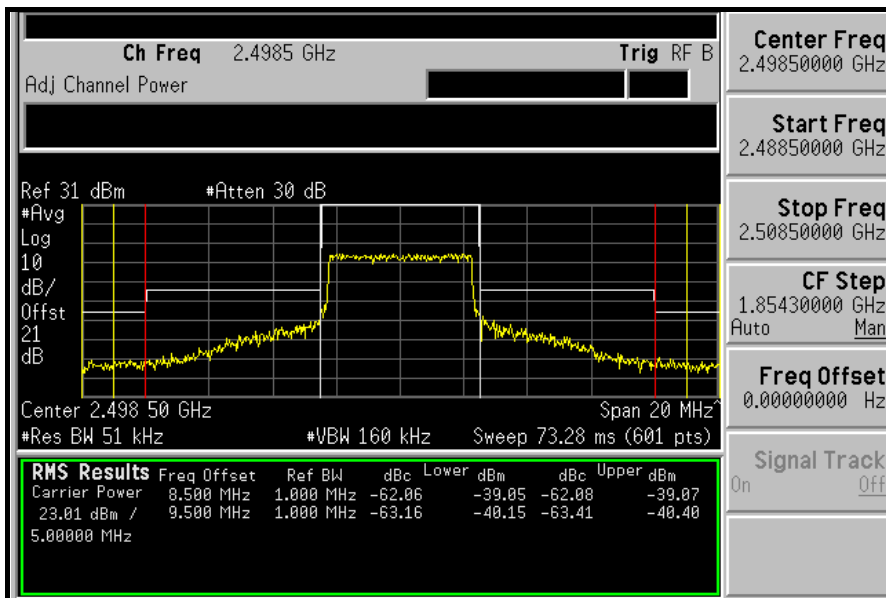
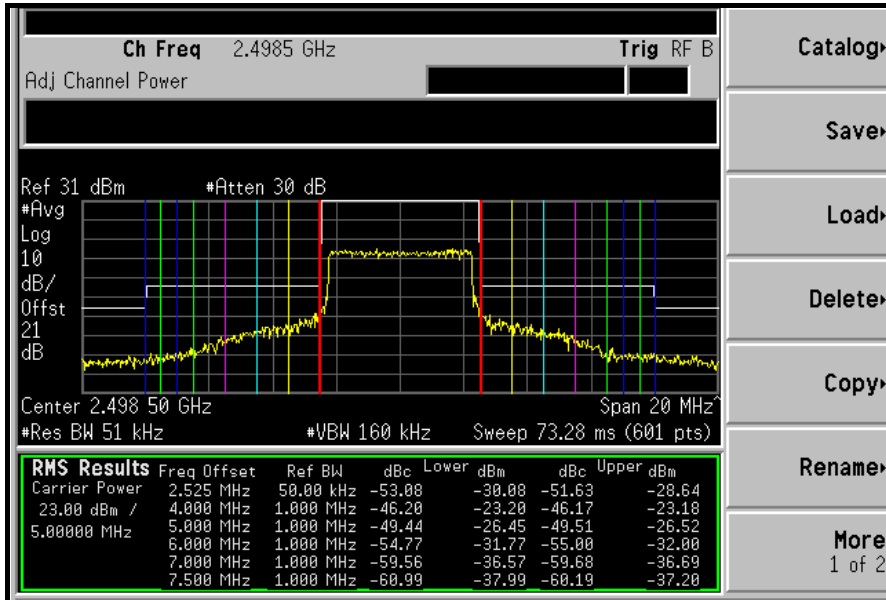


A D T

4.4.6 TEST RESULTS

CHANNEL BANDWIDTH: 5MHz

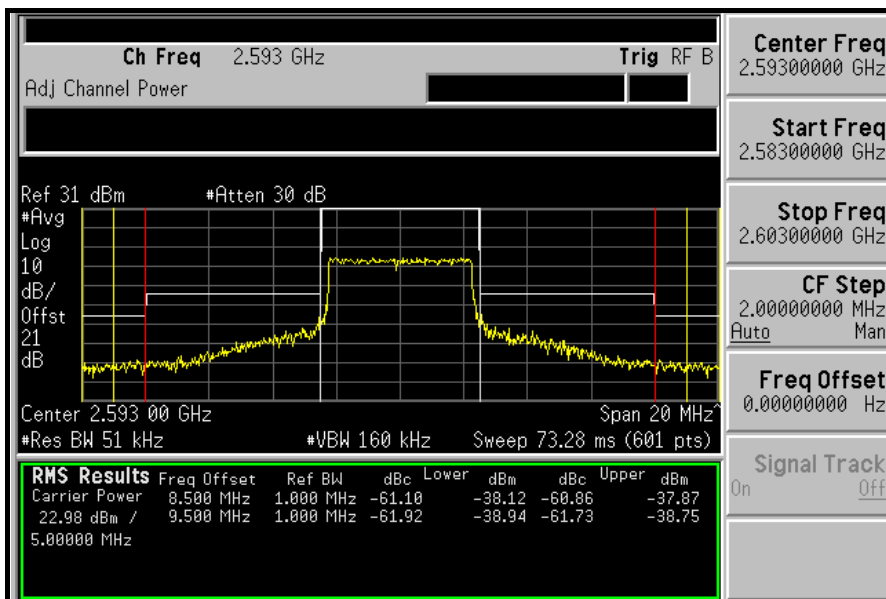
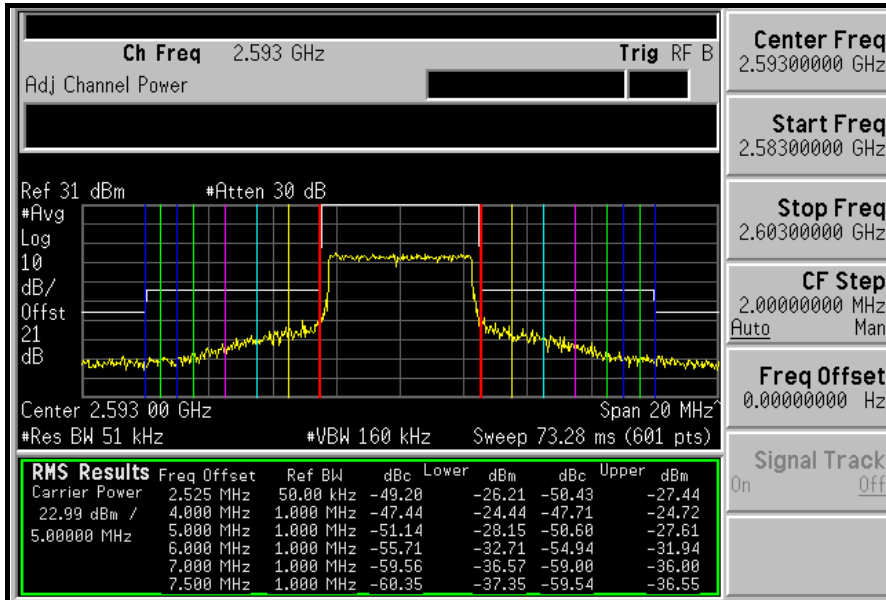
LOW CHANNEL





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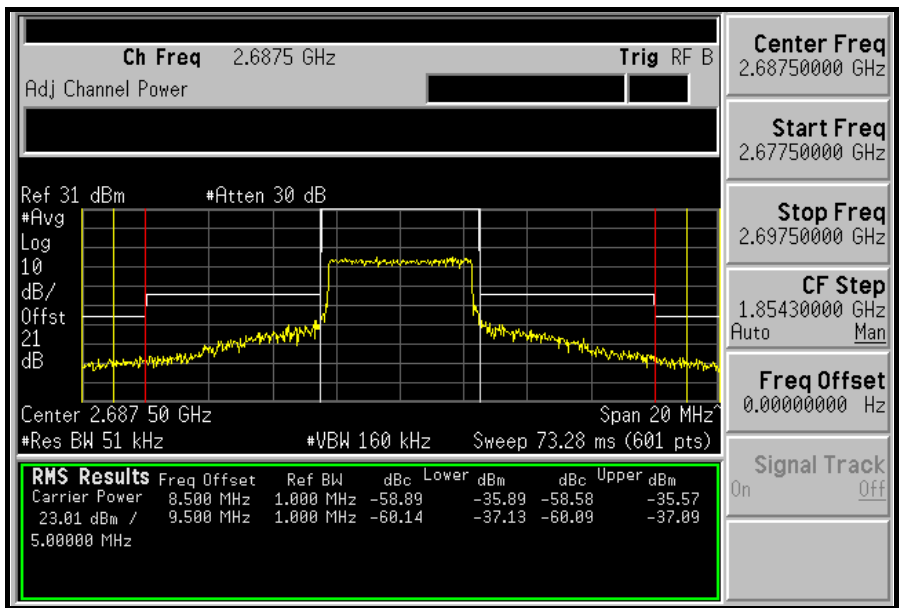
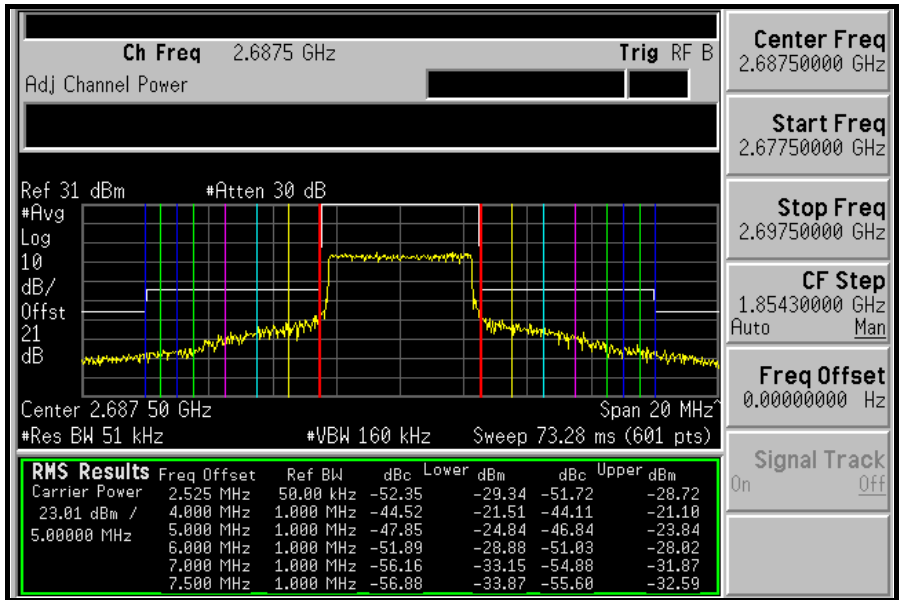
MIDDLE CHANNEL





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HIGH CHANNEL

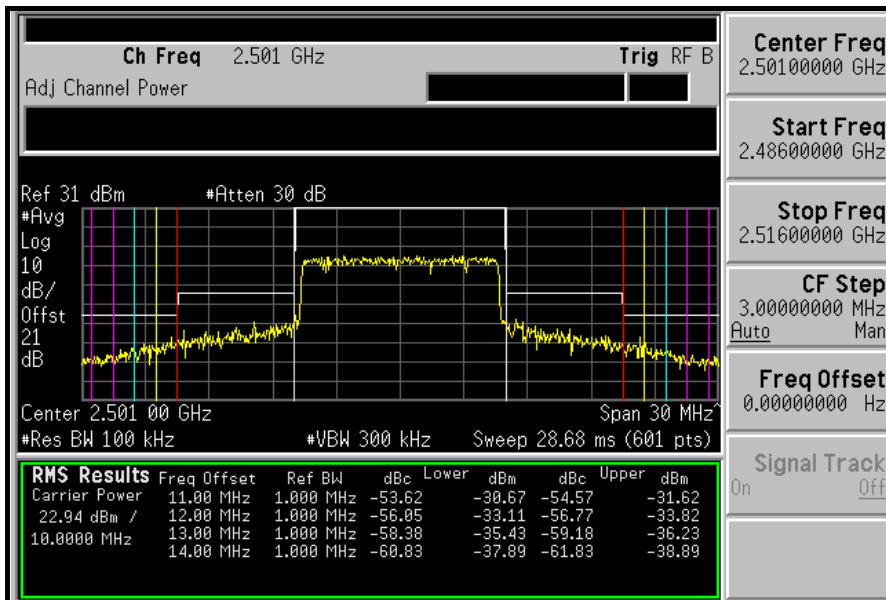
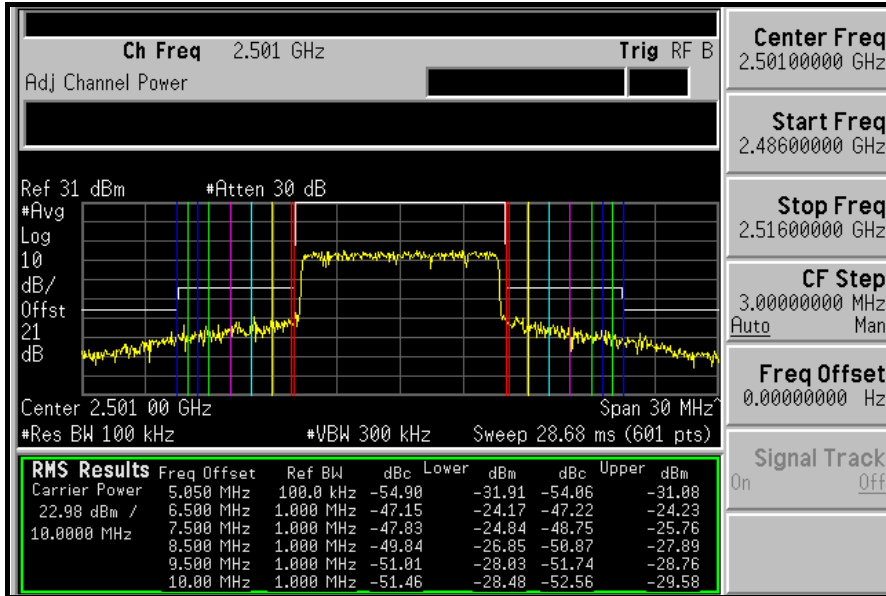




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CHANNEL BANDWIDTH: 10MHz

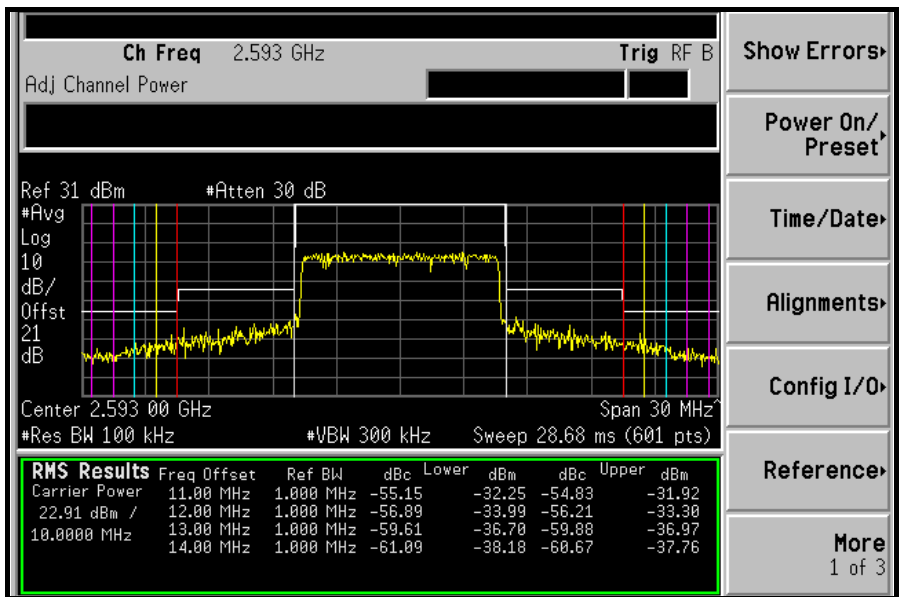
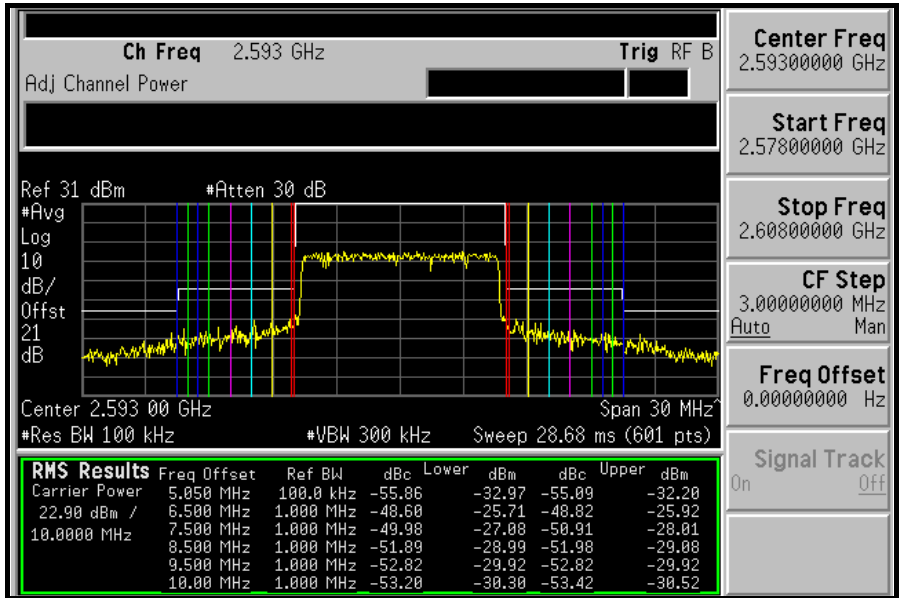
LOW CHANNEL





A D T

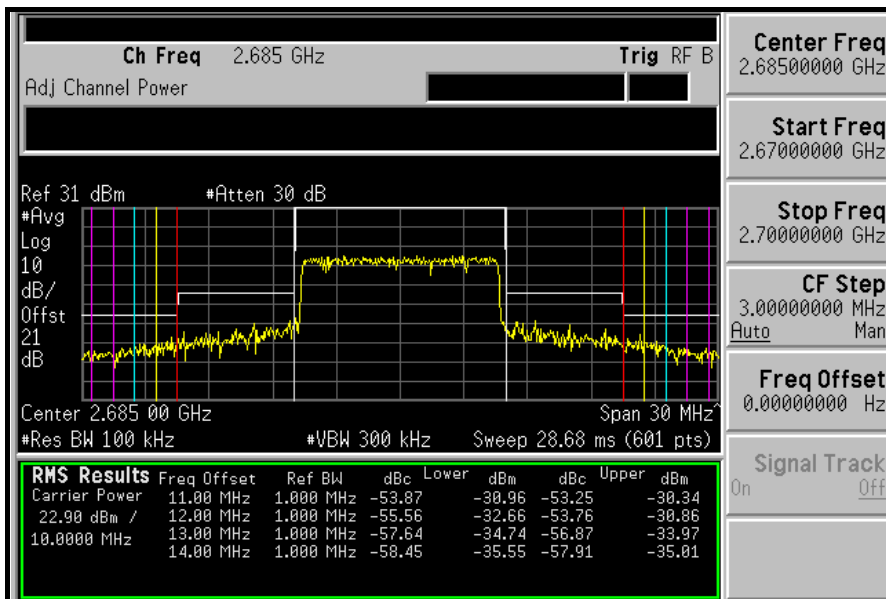
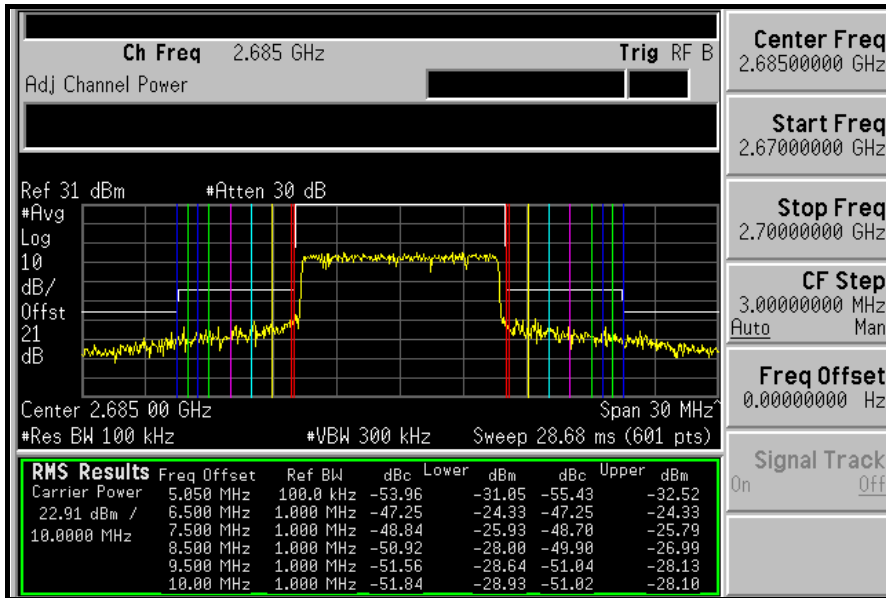
MIDDLE CHANNEL





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HIGH CHANNEL





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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 -25 dBm.

4.5.2 TEST INSTRUMENTS

| DESCRIPTION & MANUFACTURER | MODEL NO. | SERIAL NO. | DATE OF CALIBRATION | DUE DATE OF CALIBRATION |
|--|---------------------|------------|---------------------|-------------------------|
| Spectrum Analyzer Agilent | E4446A | MY44360128 | Feb. 23, 2010 | Feb. 22, 2011 |
| Wainwright Instruments High Pass Filter | WHK3.1/18G-10 SS | ZZ-010096 | May. 25, 2010 | Mar. 24, 2011 |
| JFW 20dB attenuation | 50HF-020-SMA | NA | NA | NA |
| RF cable | SUCOFLEX 104 | 257029 | Sep. 12, 2009 | Sep. 11, 2010 |

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



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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 27GHz, it shall be connected to the 20dB pad attenuated the carried frequency. The spectrum set $RB = 1\text{MHz}$, $VB = 3\text{MHz}$.

4.5.4 TEST SETUP

Same as 4.3.4

4.5.5 EUT OPERATING CONDITIONS

Same as 4.1.5

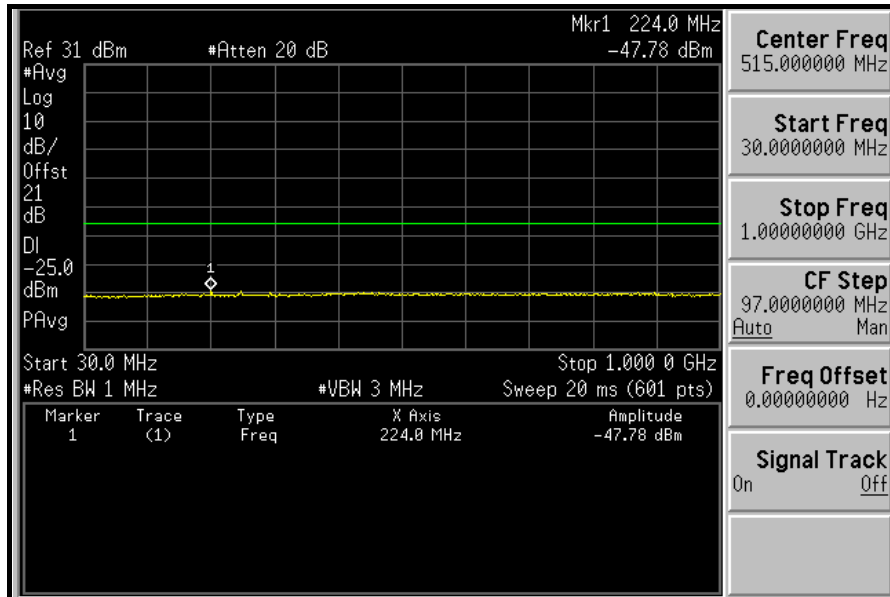


A D T

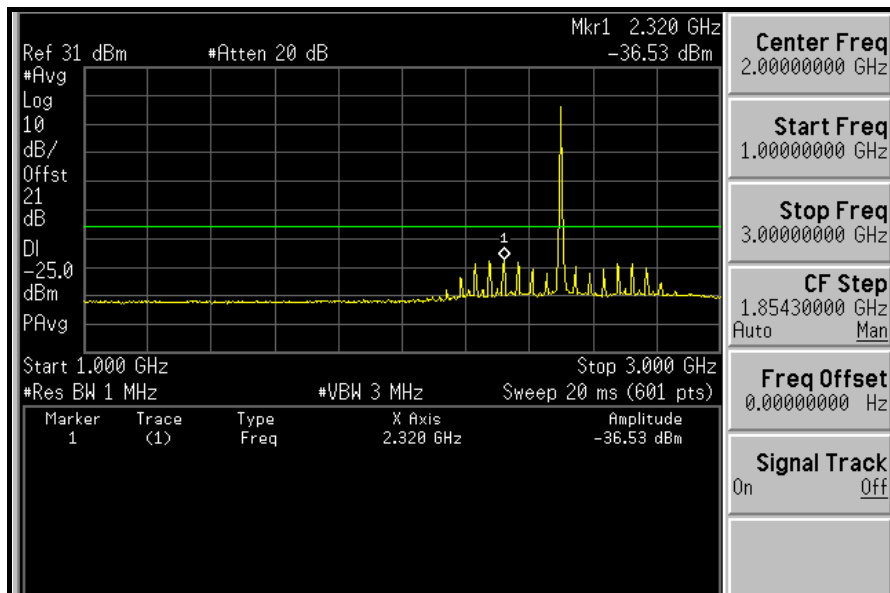
4.5.6 TEST RESULTS

CHANNEL BANDWIDTH: 5MHz

LOW CHANNEL: 30MHz ~ 1GHz:



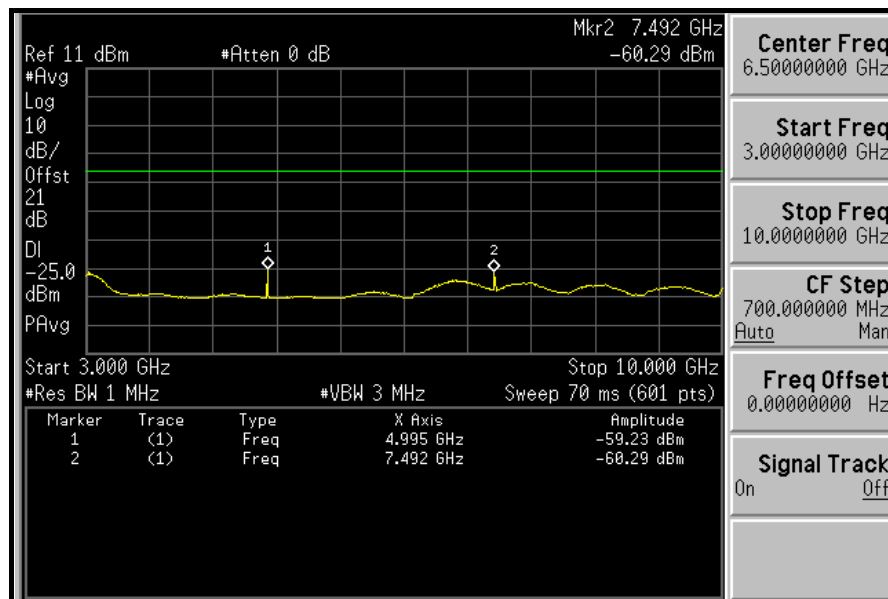
1GHz ~ 3GHz:



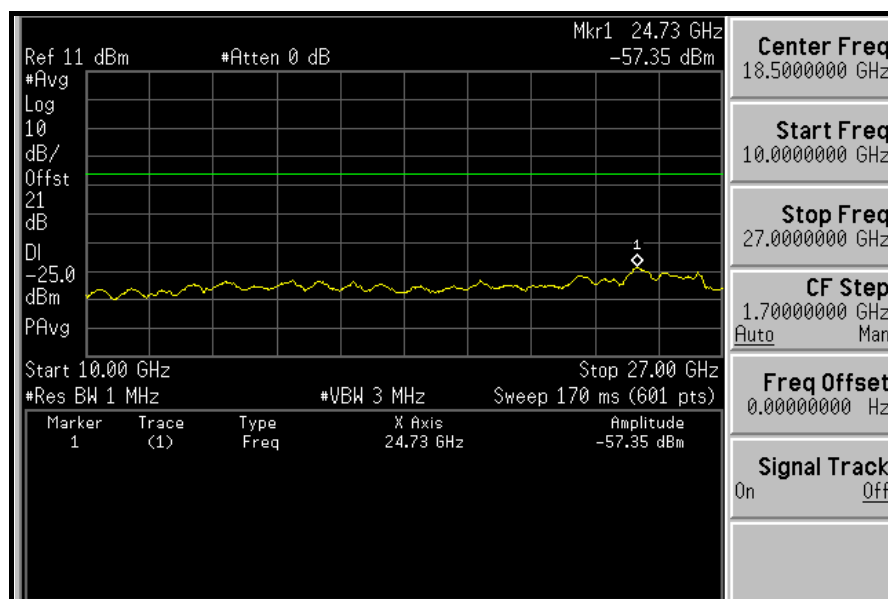


A D T

3GHz ~ 10GHz:



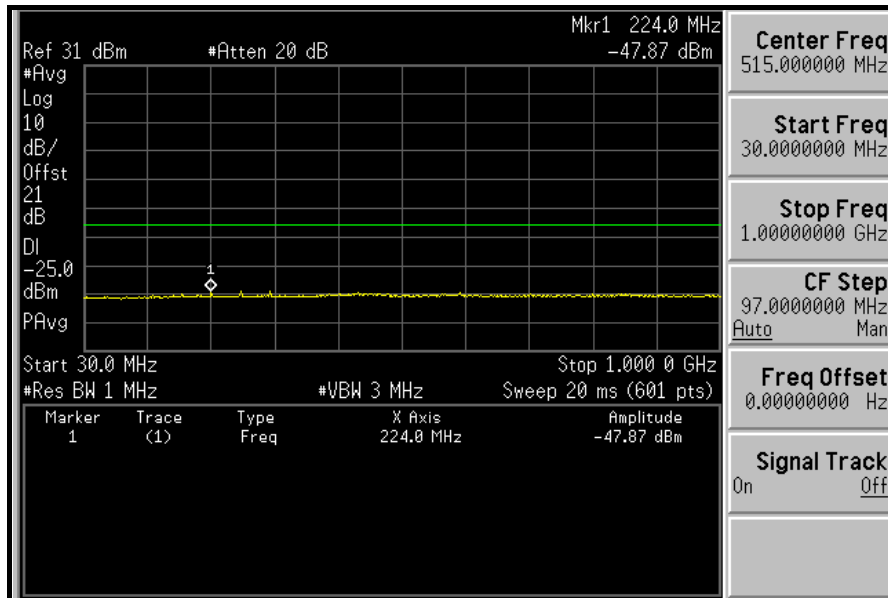
10GHz ~ 27GHz:



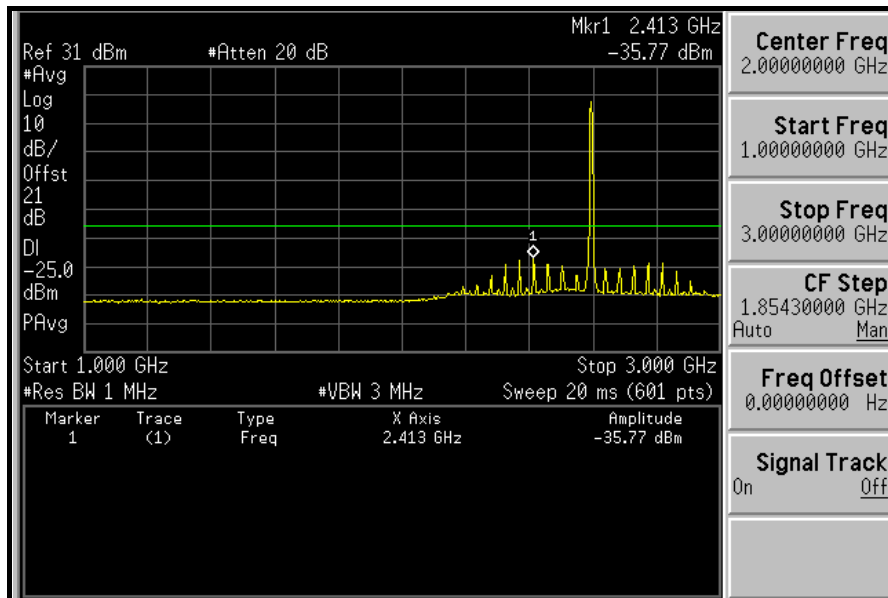


A D T

MIDDLE CHANNEL: 30MHz ~ 1GHz:



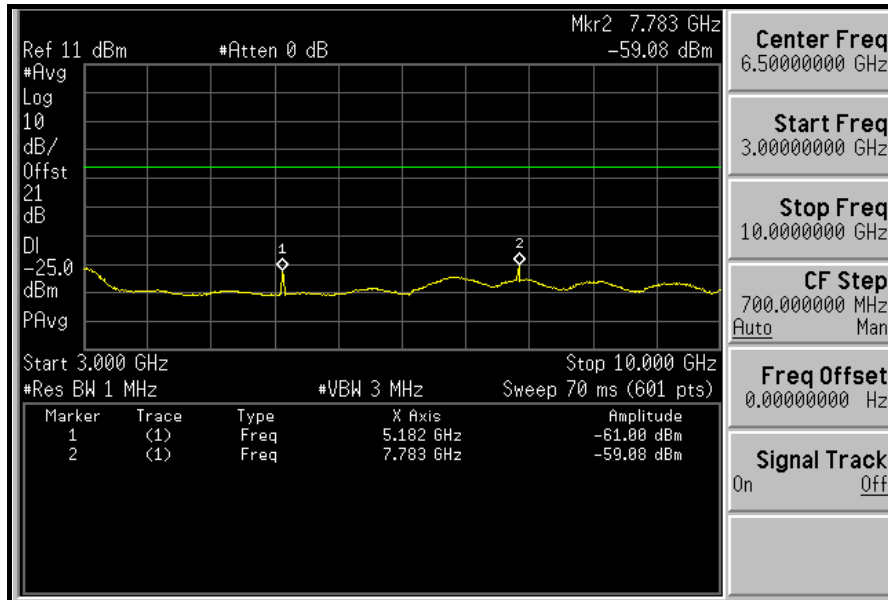
1GHz ~ 3GHz:



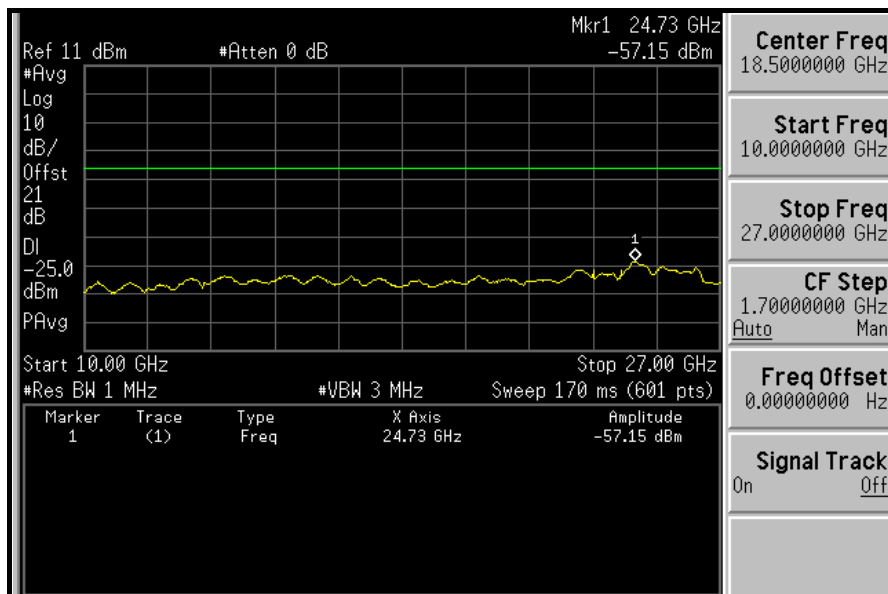


A D T

3GHz ~ 10GHz:



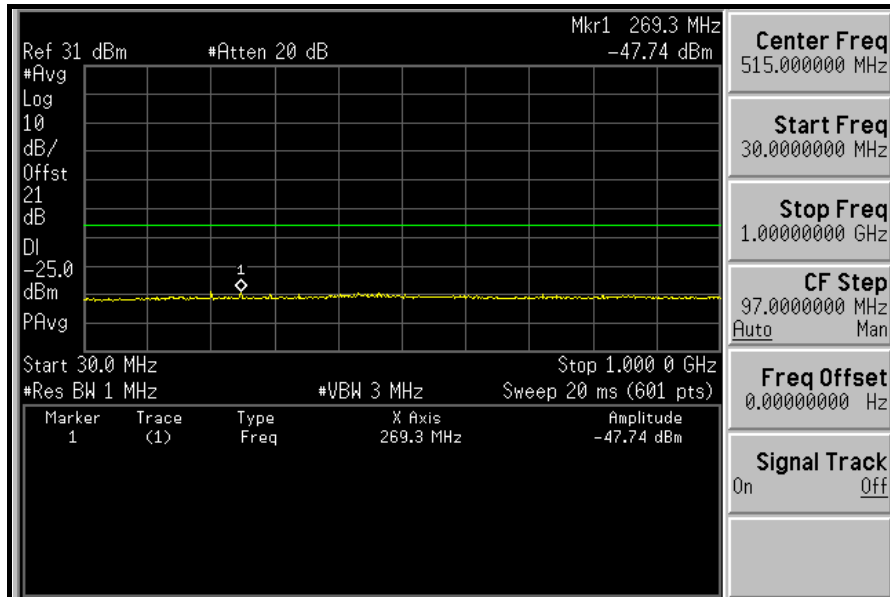
10GHz ~ 27GHz:



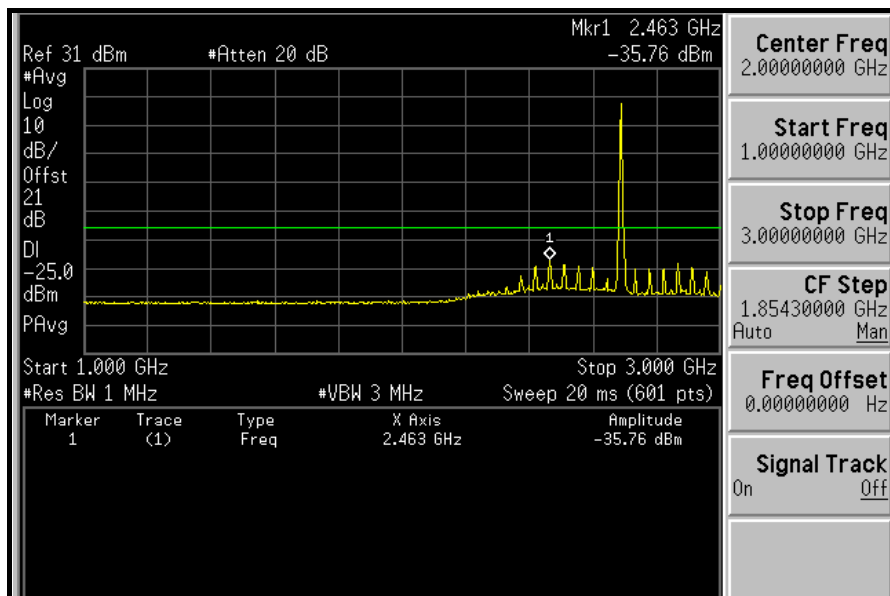


A D T

HIGH CHANNEL: 30MHz ~ 1GHz:



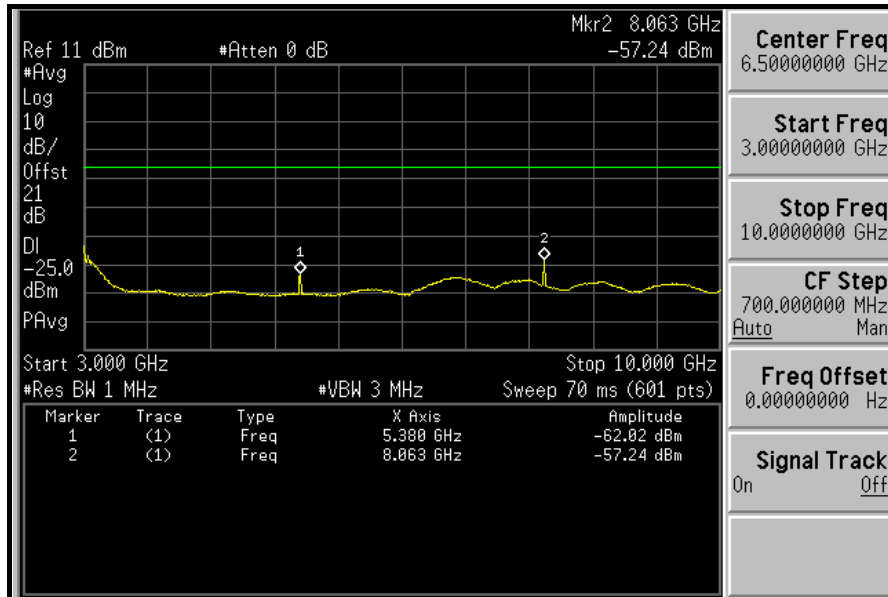
1GHz ~ 3GHz:



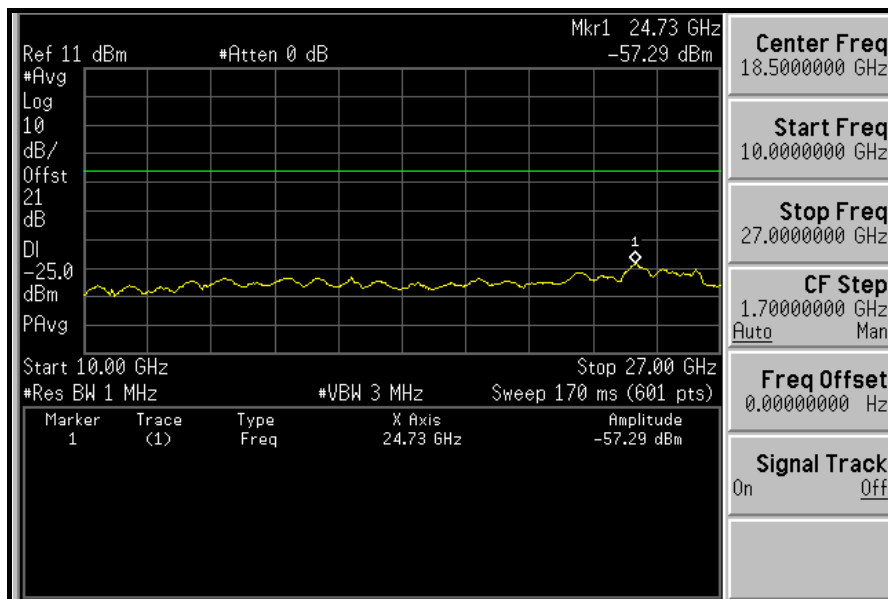


A D T

3GHz ~ 10GHz:



10GHz ~ 27GHz:

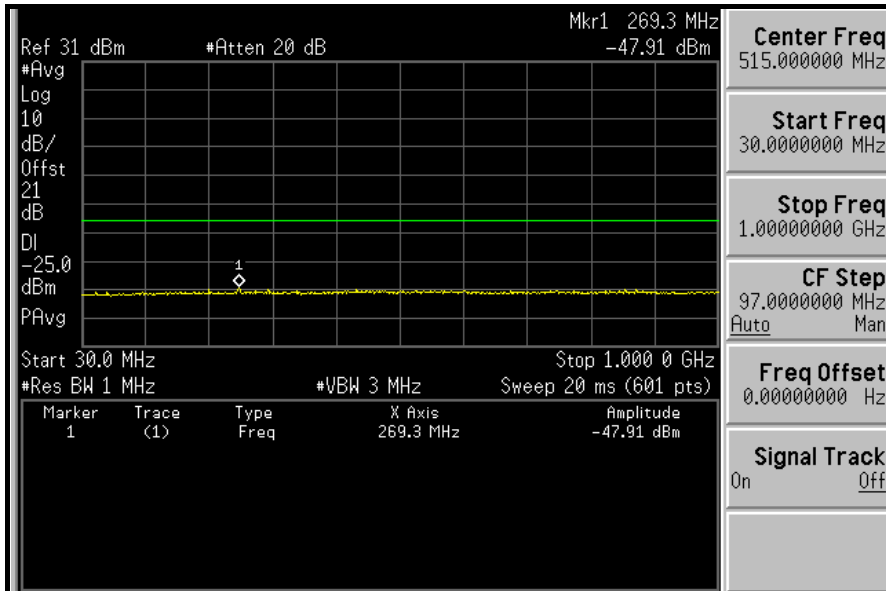




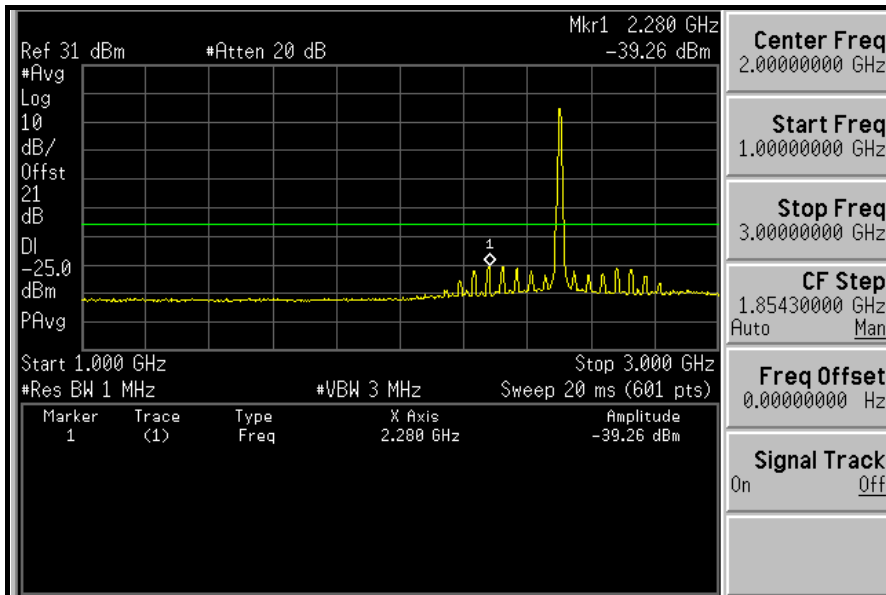
A D T

CHANNEL BANDWIDTH: 10MHz

LOW CHANNEL: 30MHz ~ 1GHz:



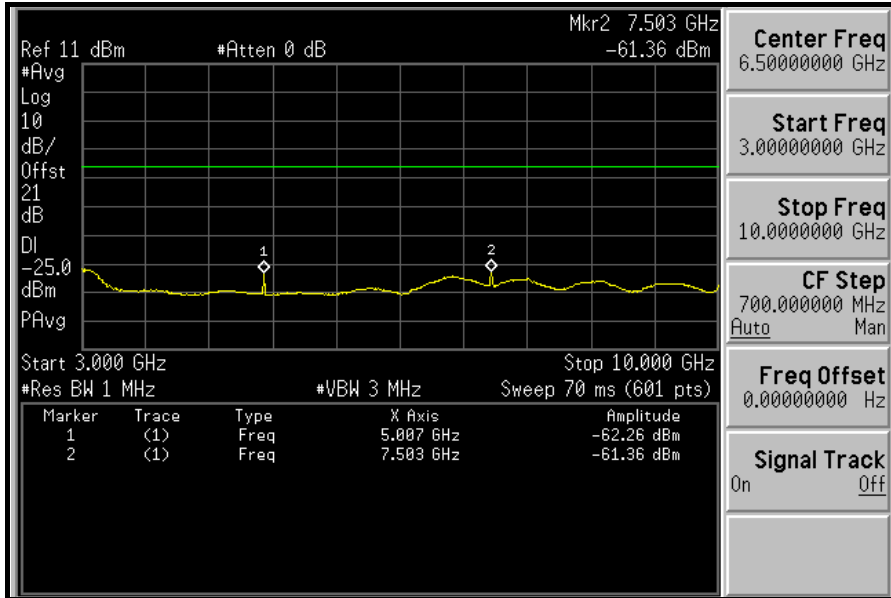
1GHz ~ 3GHz:



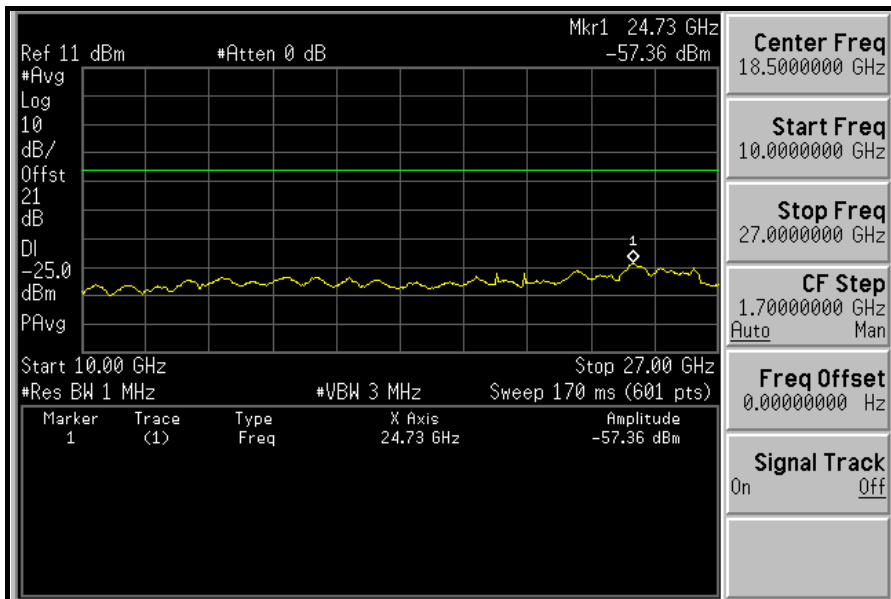


A D T

3GHz ~ 10GHz:



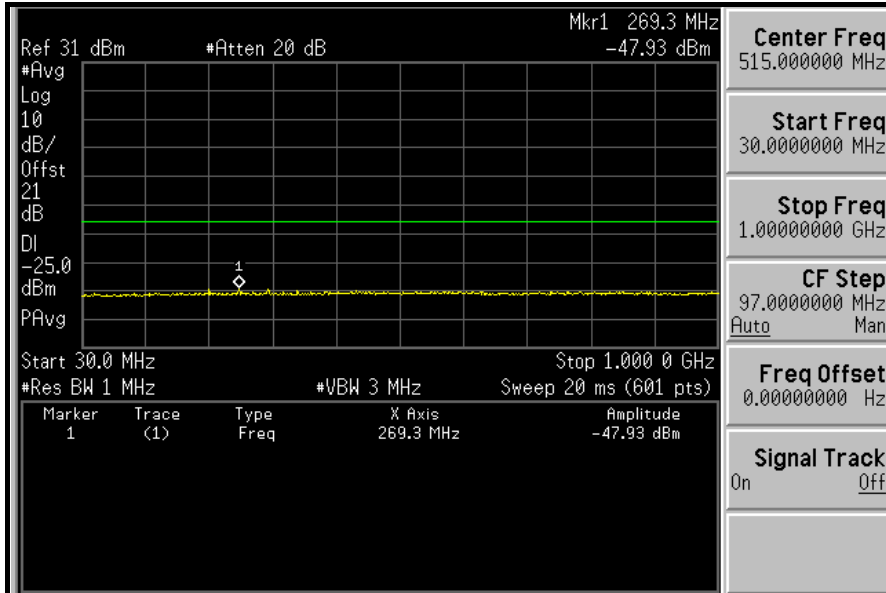
10GHz ~ 27GHz:



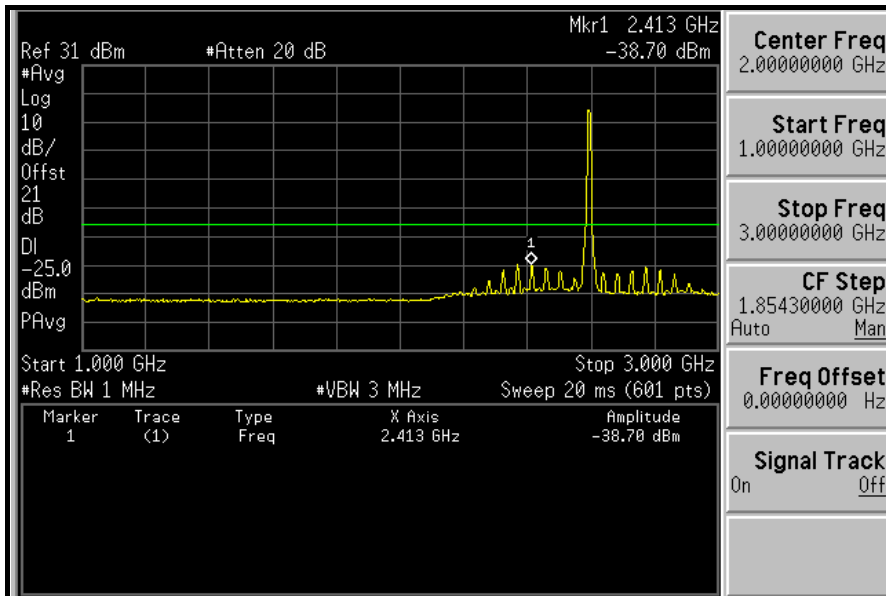


A D T

MIDDLE CHANNEL: 30MHz ~ 1GHz:



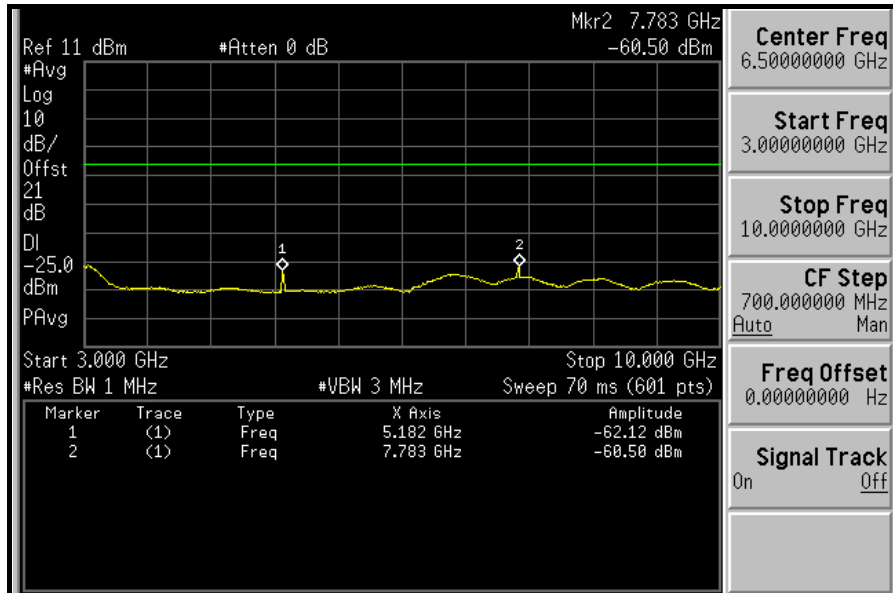
1GHz ~ 3GHz:



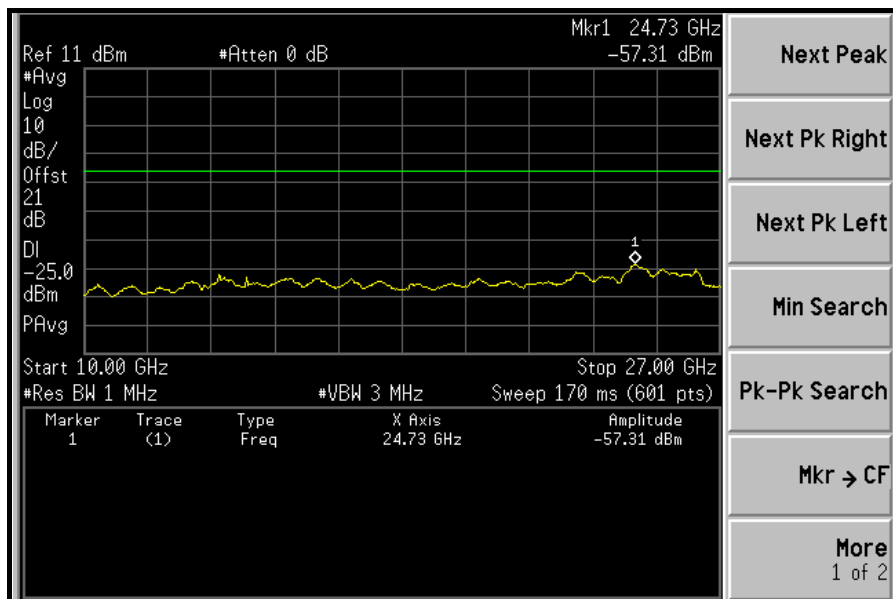


A D T

3GHz ~ 10GHz:



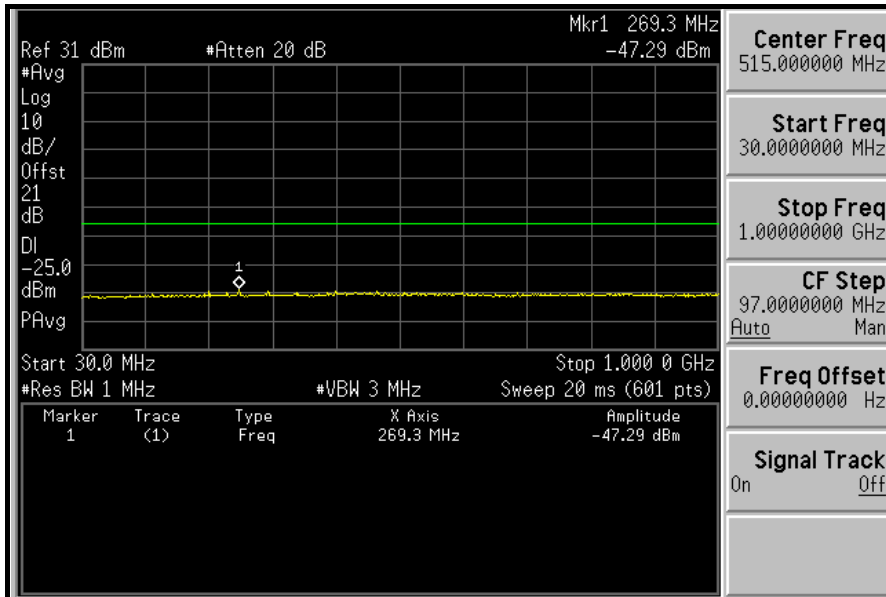
10GHz ~ 27GHz:



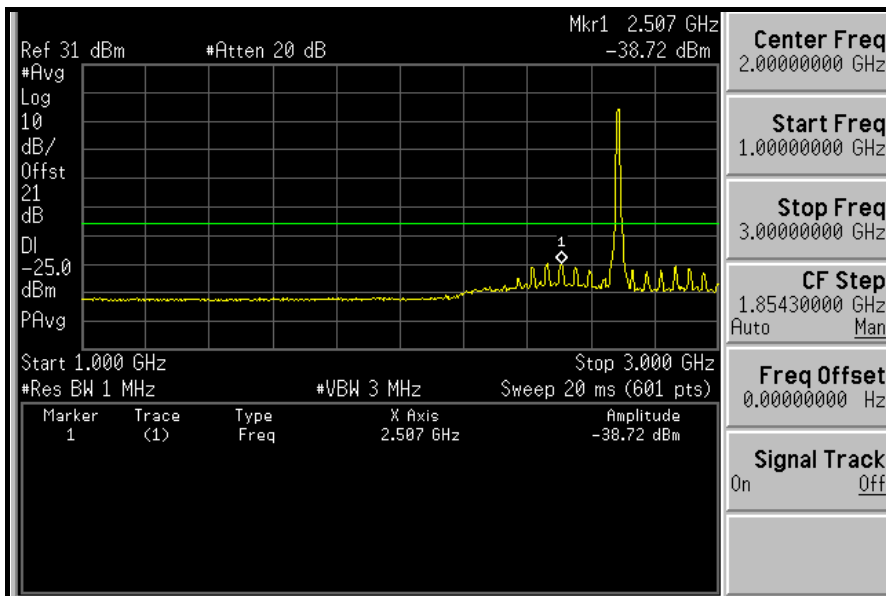


A D T

HIGH CHANNEL: 30MHz ~ 1GHz:



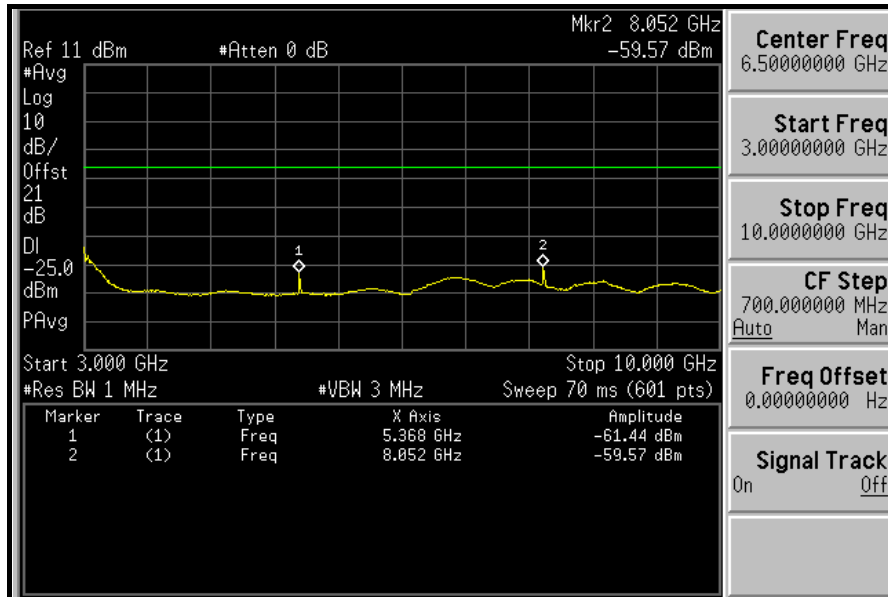
1GHz ~ 3GHz:



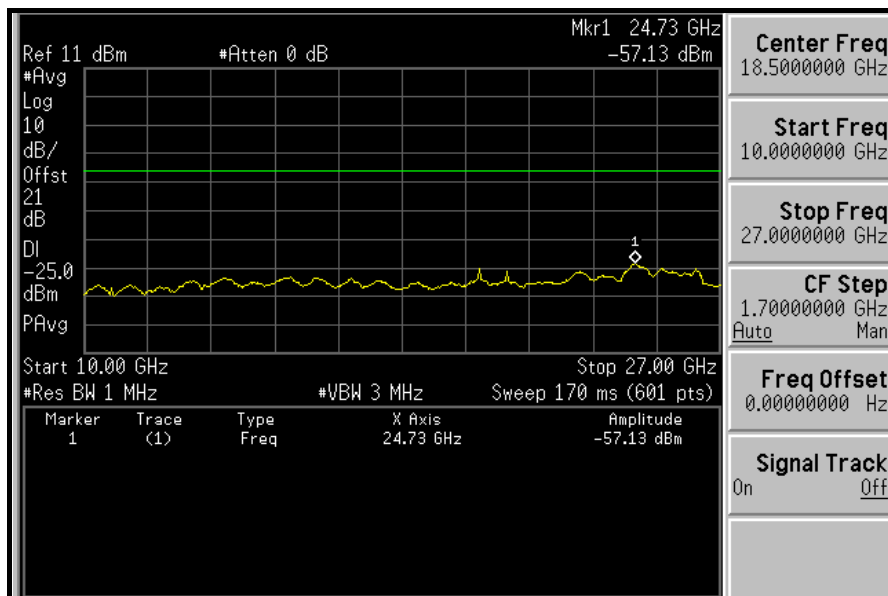


A D T

3GHz ~ 10GHz:



10GHz ~ 27GHz:





A D T

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 -25 dBm.



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4.6.2 TEST INSTRUMENTS

| DESCRIPTION & MANUFACTURER | MODEL NO. | SERIAL NO. | DATE OF CALIBRATION | DUE DATE OF CALIBRATION |
|---|------------------------------|----------------------|---------------------|-------------------------|
| Test Receiver ROHDE & SCHWARZ | ESIB7 | 100188 | Dec. 21, 2009 | Dec. 20, 2010 |
| Spectrum Analyzer ROHDE & SCHWARZ | FSP40 | 100041 | Jul. 09, 2010 | Jul. 08, 2011 |
| BILOG Antenna SCHWARZBECK | VULB9168 | 9168-156 | Apr. 30, 2010 | Apr. 29, 2011 |
| HORN Antenna SCHWARZBECK | BBHA 9120 D | 9120D-563 | Aug. 10, 2009 | Aug. 09, 2010 |
| HORN Antenna SCHWARZBECK | BBHA 9170 | BBHA9170242 | Dec. 25, 2009 | Dec. 24, 2010 |
| Preamplifier Agilent | 8449B | 3008A01910 | Sep. 11, 2009 | Sep. 10, 2010 |
| Preamplifier Agilent | 8447D | 2944A10638 | Dec. 21, 2009 | Dec. 20, 2010 |
| RF signal cable HUBER+SUHNER | SUCOFLEX 104 | 218190/4 231241/4 | May 14, 2010 | May 13, 2011 |
| RF signal cable Worken | 8D-FB | Cable-HYCH9-01 | Aug. 17, 2009 | Aug. 16, 2010 |
| Software | ADT_Radiated_ V7.6.15.9.2 | NA | NA | NA |
| Antenna Tower EMCO | 2070/2080 | 512.835.4684 | NA | NA |
| Turn Table EMCO | 2087-2.03 | NA | NA | NA |
| Antenna Tower & Turn Table Controller EMCO | 2090 | NA | 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 460141.
 5. The IC Site Registration No. is IC 7450F-4.



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4.6.3 TEST PROCEDURES

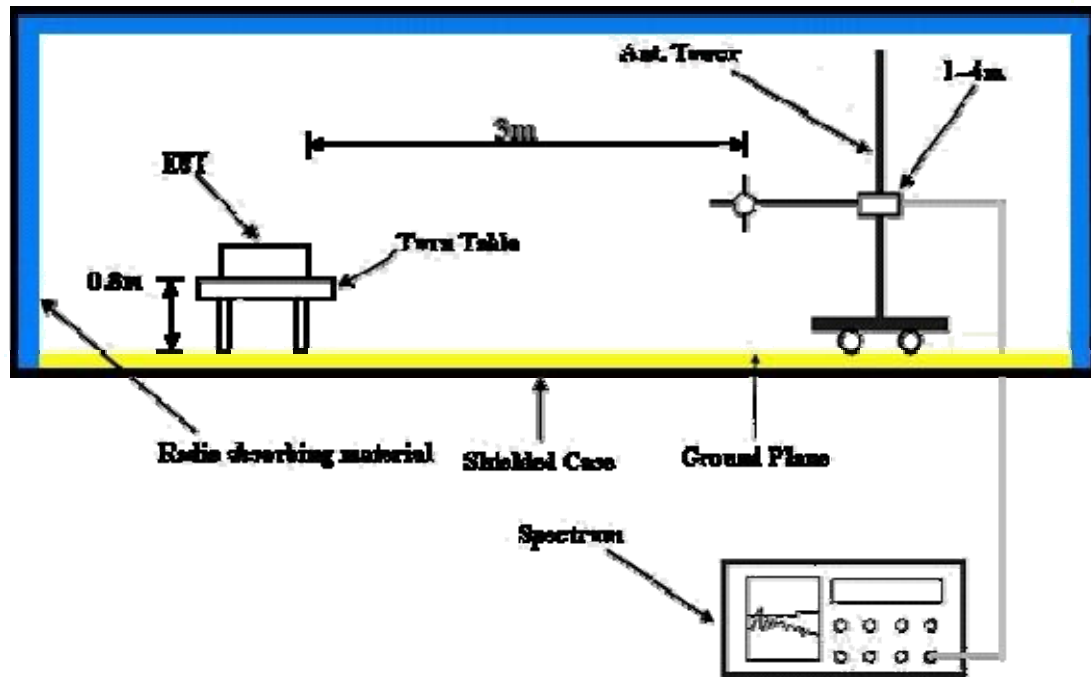
- a. The power was measured with R&S Spectrum Analyzer. All measurements were done at 3 channels (low, middle and high channel of operational frequency range.)
- b. Substitution method is used for E.I.R.P measurement. In the semi-anechoic chamber, EUT placed on the 0.8m height of Turn Table, rotated the table around 360 degrees to search the maximum radiation power and receiver antenna shall be rotated vertical and horizontal polarization and moved height from 1m to 4m to find the maximum polar radiated power. The “Read Value” is the spectrum reading the maximum power value.
- c. The substitution antenna is substituted for EUT at the same position and signals generator export the CW signal to the substitution antenna via a TX cable. Rotated the Turn Table and moved receiving antenna to find the maximum radiation power. Adjust output power level of S.G to get a Value of spectrum reading equal to “Read Value “ of step b. Record the power level of S.G
- d. $EIRP = \text{Output power level of S.G} - \text{TX cable loss} + \text{Antenna gain of substitution antenna.}$

NOTE: The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1MHz/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

Same as 4.1.5



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4.6.7 TEST RESULTS

| | | | |
|--------------------------|--------------|---------------------------------|--------------------------|
| MODE | Mid. channel | FREQUENCY RANGE | Below 1000MHz |
| INPUT POWER | 120Vac, 60Hz | ENVIRONMENTAL CONDITIONS | 23degoC, 62%RH 991hPa |
| CHANNEL BANDWIDTH | 5MHz | TEST MODE | A |
| TESTED BY | Brad Wu | | |

| 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 | 129.14 | 44.1 | -25.0 | -42.2 | -7.7 | -49.9 |
| 2 | 263.27 | 44.6 | -25.0 | -42.0 | -7.7 | -49.7 |
| 3 | 444.05 | 45.7 | -25.0 | -40.8 | -7.8 | -48.6 |
| 4 | 566.51 | 44.0 | -25.0 | -42.6 | -7.8 | -50.4 |
| 5 | 597.62 | 45.7 | -25.0 | -41.2 | -7.8 | -49.0 |
| 6 | 830.88 | 47.5 | -25.0 | -39.4 | -7.9 | -47.3 |
| 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 | 109.70 | 43.0 | -25.0 | -43.7 | -7.7 | -51.4 |
| 2 | 265.21 | 51.3 | -25.0 | -35.0 | -7.7 | -42.7 |
| 3 | 432.38 | 42.2 | -25.0 | -44.8 | -7.8 | -52.6 |
| 4 | 582.06 | 43.2 | -25.0 | -43.6 | -7.8 | -51.4 |
| 5 | 667.60 | 47.0 | -25.0 | -39.4 | -7.8 | -47.2 |
| 6 | 819.22 | 49.6 | -25.0 | -36.7 | -7.9 | -44.6 |

NOTE 1: Power Value (dBum) = S.G Power Value (dBm) + Correction Factor (dB).

NOTE 2: Correction Factor = Antenna gain of substitution antenna- TX cable loss



A D T

| | | | |
|--------------------------|--------------|---------------------------------|--------------------------|
| MODE | Mid. channel | FREQUENCY RANGE | Below 1000MHz |
| INPUT POWER | 120Vac, 60Hz | ENVIRONMENTAL CONDITIONS | 23degoC, 62%RH 991hPa |
| CHANNEL BANDWIDTH | 5MHz | TEST MODE | B |
| TESTED BY | Brad Wu | | |

| 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 | 144.69 | 55.0 | -25.0 | -31.7 | -7.7 | -39.4 |
| 2 | 220.50 | 51.3 | -25.0 | -34.8 | -7.7 | -42.5 |
| 3 | 288.54 | 52.9 | -25.0 | -34.1 | -7.7 | -41.8 |
| 4 | 444.05 | 56.7 | -25.0 | -30.0 | -7.8 | -37.8 |
| 5 | 488.76 | 52.6 | -25.0 | -34.1 | -7.8 | -41.9 |
| 6 | 834.77 | 48.1 | -25.0 | -38.8 | -7.9 | -46.7 |
| 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 | 45.55 | 49.8 | -25.0 | -37.2 | -7.7 | -44.9 |
| 2 | 86.37 | 50.3 | -25.0 | -36.7 | -7.7 | -44.4 |
| 3 | 401.28 | 50.9 | -25.0 | -35.6 | -7.8 | -43.4 |
| 4 | 444.05 | 53.2 | -25.0 | -33.4 | -7.8 | -41.2 |
| 5 | 834.77 | 54.5 | -25.0 | -32.2 | -7.9 | -40.1 |
| 6 | 900.86 | 56.3 | -25.0 | -30.6 | -7.9 | -38.5 |

NOTE 1: Power Value (dBm) = S.G Power Value (dBm) + Correction Factor (dB).

NOTE 2: Correction Factor = Antenna gain of substitution antenna- TX cable loss



A D T

| | | | |
|--------------------------|--------------|---------------------------------|--------------------------|
| MODE | Mid. channel | FREQUENCY RANGE | Below 1000MHz |
| INPUT POWER | 120Vac, 60Hz | ENVIRONMENTAL CONDITIONS | 23degoC, 62%RH 991hPa |
| CHANNEL BANDWIDTH | 5MHz | TEST MODE | C |
| TESTED BY | Brad Wu | | |

| 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 | 150.52 | 49.2 | -25.0 | -37.7 | -7.7 | -45.4 |
| 2 | 354.63 | 50.3 | -25.0 | -36.5 | -7.8 | -44.3 |
| 3 | 465.43 | 42.8 | -25.0 | -44.2 | -7.8 | -52.0 |
| 4 | 578.18 | 50.2 | -25.0 | -36.7 | -7.8 | -44.5 |
| 5 | 832.83 | 45.5 | -25.0 | -41.3 | -7.9 | -49.2 |
| 6 | 963.07 | 45.6 | -25.0 | -40.6 | -7.9 | -48.5 |

| 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 | 113.59 | 49.4 | -25.0 | -36.8 | -7.7 | -44.5 |
| 2 | 397.39 | 43.3 | -25.0 | -43.6 | -7.8 | -51.4 |
| 3 | 527.64 | 44.3 | -25.0 | -42.2 | -7.8 | -50.0 |
| 4 | 599.56 | 43.6 | -25.0 | -43.3 | -7.8 | -51.1 |
| 5 | 731.74 | 45.1 | -25.0 | -42.1 | -7.9 | -50.0 |
| 6 | 830.88 | 49.0 | -25.0 | -37.2 | -7.9 | -45.1 |

NOTE 1: Power Value (dBum) = S.G Power Value (dBm) + Correction Factor (dB).

NOTE 2: Correction Factor = Antenna gain of substitution antenna- TX cable loss



A D T

| | | | |
|--------------------------|--------------|---------------------------------|--------------------------|
| MODE | Mid. channel | FREQUENCY RANGE | Below 1000MHz |
| INPUT POWER | 120Vac, 60Hz | ENVIRONMENTAL CONDITIONS | 23degoC, 62%RH 991hPa |
| CHANNEL BANDWIDTH | 10MHz | TEST MODE | A |
| TESTED BY | Brad Wu | | |

| 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 | 144.69 | 43.9 | -25.0 | -42.8 | -7.7 | -50.5 |
| 2 | 222.44 | 46.7 | -25.0 | -40.3 | -7.7 | -48.0 |
| 3 | 265.21 | 46.1 | -25.0 | -40.3 | -7.7 | -48.0 |
| 4 | 445.99 | 42.9 | -25.0 | -43.3 | -7.8 | -51.1 |
| 5 | 599.56 | 46.6 | -25.0 | -40.4 | -7.8 | -48.2 |
| 6 | 828.94 | 44.5 | -25.0 | -42.1 | -7.9 | -50.0 |

| 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 | 105.81 | 42.6 | -25.0 | -43.9 | -7.7 | -51.6 |
| 2 | 259.38 | 47.1 | -25.0 | -39.7 | -7.7 | -47.4 |
| 3 | 445.99 | 41.7 | -25.0 | -45.1 | -7.8 | -52.9 |
| 4 | 566.51 | 44.3 | -25.0 | -42.1 | -7.8 | -49.9 |
| 5 | 667.60 | 46.3 | -25.0 | -40.5 | -7.8 | -48.3 |
| 6 | 830.88 | 54.2 | -25.0 | -32.0 | -7.9 | -39.9 |

NOTE 1: Power Value (dBum) = S.G Power Value (dBm) + Correction Factor (dB).

NOTE 2: Correction Factor = Antenna gain of substitution antenna- TX cable loss



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| | | | |
|--------------------------|--------------|---------------------------------|--------------------------|
| MODE | Mid. channel | FREQUENCY RANGE | Below 1000MHz |
| INPUT POWER | 120Vac, 60Hz | ENVIRONMENTAL CONDITIONS | 23degoC, 62%RH 991hPa |
| CHANNEL BANDWIDTH | 10MHz | TEST MODE | B |
| TESTED BY | Brad Wu | | |

| 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 | 96.09 | 48.3 | -25.0 | -38.8 | -7.7 | -46.5 |
| 2 | 146.63 | 56.4 | -25.0 | -30.3 | -7.7 | -38.0 |
| 3 | 220.50 | 44.1 | -25.0 | -42.5 | -7.7 | -50.2 |
| 4 | 465.43 | 43.0 | -25.0 | -43.4 | -7.8 | -51.2 |
| 5 | 599.56 | 50.9 | -25.0 | -35.8 | -7.8 | -43.6 |
| 6 | 834.77 | 47.8 | -25.0 | -38.6 | -7.9 | -46.5 |
| 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 | 96.09 | 45.8 | -25.0 | -41.3 | -7.7 | -49.0 |
| 2 | 144.69 | 47.1 | -25.0 | -39.6 | -7.7 | -47.3 |
| 3 | 244.39 | 41.7 | -25.0 | -45.1 | -7.7 | -52.8 |
| 4 | 430.44 | 41.1 | -25.0 | -45.4 | -7.8 | -53.2 |
| 5 | 554.85 | 43.7 | -25.0 | -42.9 | -7.8 | -50.7 |
| 6 | 817.27 | 51.1 | -25.0 | -35.5 | -7.9 | -43.4 |

NOTE 1: Power Value (dBm) = S.G Power Value (dBm) + Correction Factor (dB).

NOTE 2: Correction Factor = Antenna gain of substitution antenna- TX cable loss



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| | | | |
|--------------------------|--------------|---------------------------------|--------------------------|
| MODE | Mid. channel | FREQUENCY RANGE | Below 1000MHz |
| INPUT POWER | 120Vac, 60Hz | ENVIRONMENTAL CONDITIONS | 23degoC, 62%RH 991hPa |
| CHANNEL BANDWIDTH | 10MHz | TEST MODE | C |
| TESTED BY | Brad Wu | | |

| 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 | 88.32 | 54.9 | -25.0 | -31.8 | -7.7 | -39.5 |
| 2 | 150.52 | 51.8 | -25.0 | -34.8 | -7.7 | -42.5 |
| 3 | 286.59 | 53.5 | -25.0 | -33.0 | -7.7 | -40.7 |
| 4 | 442.10 | 54.9 | -25.0 | -32.1 | -7.8 | -39.9 |
| 5 | 578.18 | 50.5 | -25.0 | -36.0 | -7.8 | -43.8 |
| 6 | 830.88 | 50.2 | -25.0 | -36.3 | -7.9 | -44.2 |
| 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 | 61.10 | 53.4 | -25.0 | -33.6 | -7.7 | -41.3 |
| 2 | 88.32 | 58.0 | -25.0 | -29.0 | -7.7 | -36.7 |
| 3 | 267.15 | 46.2 | -25.0 | -40.6 | -7.7 | -48.3 |
| 4 | 444.05 | 50.3 | -25.0 | -36.2 | -7.8 | -44.0 |
| 5 | 667.60 | 42.1 | -25.0 | -44.9 | -7.8 | -52.7 |
| 6 | 815.33 | 50.2 | -25.0 | -36.7 | -7.9 | -44.6 |

NOTE 1: Power Value (dBum) = S.G Power Value (dBm) + Correction Factor (dB).

NOTE 2: Correction Factor = Antenna gain of substitution antenna- TX cable loss



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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 -25 dBm.



4.7.2 TEST INSTRUMENTS

| DESCRIPTION & MANUFACTURER | MODEL NO. | SERIAL NO. | DATE OF CALIBRATION | DUE DATE OF CALIBRATION |
|---|------------------------------|----------------------|---------------------|-------------------------|
| Test Receiver ROHDE & SCHWARZ | ESIB7 | 100188 | Dec. 21, 2009 | Dec. 20, 2010 |
| Spectrum Analyzer ROHDE & SCHWARZ | FSP40 | 100041 | Jul. 09, 2010 | Jul. 08, 2011 |
| BILOG Antenna SCHWARZBECK | VULB9168 | 9168-156 | Apr. 30, 2010 | Apr. 29, 2011 |
| HORN Antenna SCHWARZBECK | BBHA 9120 D | 9120D-563 | Aug. 10, 2009 | Aug. 09, 2010 |
| HORN Antenna SCHWARZBECK | BBHA 9170 | BBHA9170242 | Dec. 25, 2009 | Dec. 24, 2010 |
| Preamplifier Agilent | 8449B | 3008A01910 | Sep. 11, 2009 | Sep. 10, 2010 |
| Preamplifier Agilent | 8447D | 2944A10638 | Dec. 21, 2009 | Dec. 20, 2010 |
| RF signal cable HUBER+SUHNNER | SUCOFLEX 104 | 218190/4 231241/4 | May 14, 2010 | May 13, 2011 |
| RF signal cable Worken | 8D-FB | Cable-HYCH9-01 | Aug. 17, 2009 | Aug. 16, 2010 |
| Software | ADT_Radiated_ V7.6.15.9.2 | NA | NA | NA |
| Antenna Tower EMCO | 2070/2080 | 512.835.4684 | NA | NA |
| Turn Table EMCO | 2087-2.03 | NA | NA | NA |
| Antenna Tower & Turn Table Controller EMCO | 2090 | NA | 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 460141.
 5. The IC Site Registration No. is IC 7450F-4.



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4.7.3 TEST PROCEDURES

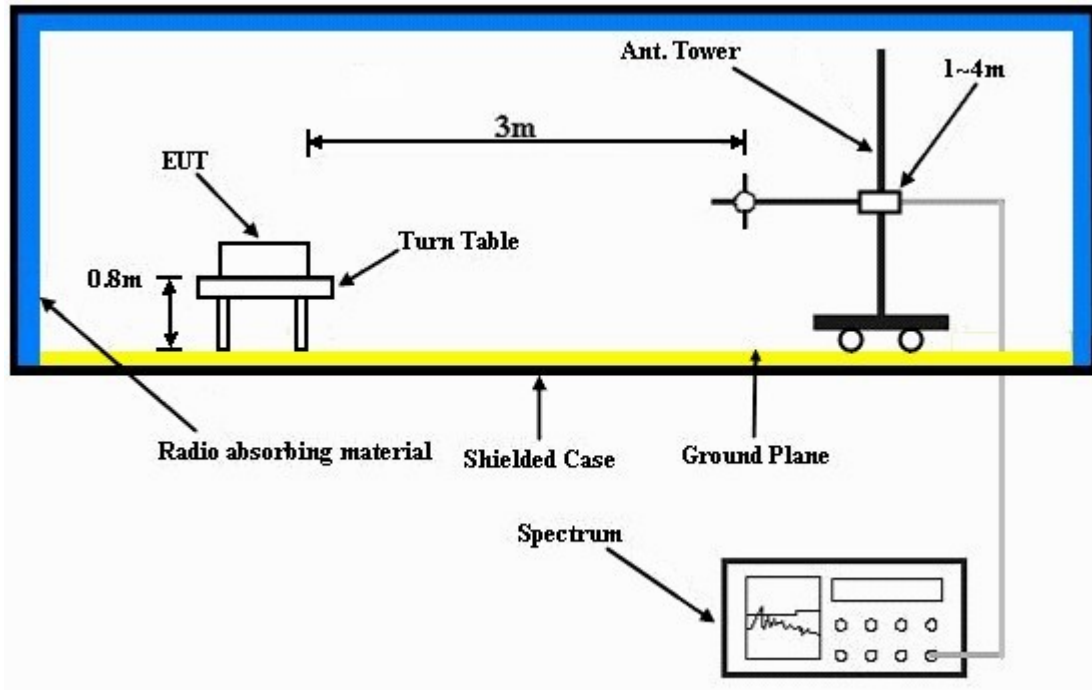
- a. The power was measured with R&S Spectrum Analyzer. All measurements were done at 3 channels (low, middle and high channel of operational frequency range.)
- b. Substitution method is used for E.I.R.P measurement. In the semi-anechoic chamber, EUT placed on the 0.8m height of Turn Table, rotated the table around 360 degrees to search the maximum radiation power and receiver antenna shall be rotated vertical and horizontal polarization and moved height from 1m to 4m to find the maximum polar radiated power. The “Read Value” is the spectrum reading the maximum power value.
- c. The substitution antenna is substituted for EUT at the same position and signals generator export the CW signal to the substitution antenna via a TX cable. Rotated the Turn Table and moved receiving antenna to find the maximum radiation power. Adjust output power level of S.G to get a Value of spectrum reading equal to “Read Value “ of step b. Record the power level of S.G
- d. $EIRP = \text{Output power level of S.G} - \text{TX cable loss} + \text{Antenna gain of substitution antenna.}$

NOTE: The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1MHz/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

Same as 4.6.6.



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4.7.7 TEST RESULTS

| | | | |
|--------------------------|--------------|---------------------------------|--------------------------|
| MODE | Low channel | FREQUENCY RANGE | Above 1000MHz |
| INPUT POWER | 120Vac, 60Hz | ENVIRONMENTAL CONDITIONS | 25degoC, 67%RH 991hPa |
| CHANNEL BANDWIDTH | 5MHz | TEST MODE | A |
| TESTED BY | Brad Wu | | |

| 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 | 4997.0 | 43.5 | -25.0 | -60.3 | 9.5 | -50.8 |
| 2 | 7495.5 | 60.6 | -25.0 | -41.7 | 7.8 | -33.9 |

| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3m | | | | | | |
|--|-------------|-----------------------|-------------|-----------------------|------------------------|-------------------|
| NO. | FREQ. (MHz) | EMISSION LEVEL (dBuV) | LIMIT (dBm) | S.G POWER VALUE (dBm) | CORRECTION FACTOR (dB) | POWER VALUE (dBm) |
| 1 | 4997.0 | 47.1 | -25.0 | -57.2 | 9.5 | -47.7 |
| 2 | 7495.5 | 61.2 | -25.0 | -41.0 | 7.8 | -33.2 |

NOTE 1: Power Value (dBum) = S.G Power Value (dBm) + Correction Factor (dB).

NOTE 2: Correction Factor = Antenna gain of substitution antenna- tx cable loss



A D T

| | | | |
|--------------------------|----------------|---------------------------------|--------------------------|
| MODE | Middle channel | FREQUENCY RANGE | Above 1000MHz |
| INPUT POWER | 120Vac, 60Hz | ENVIRONMENTAL CONDITIONS | 25degoC, 67%RH 991hPa |
| CHANNEL BANDWIDTH | 5MHz | TEST MODE | A |
| TESTED BY | Brad Wu | | |

| 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 | 5186.0 | 43.0 | -25.0 | -60.6 | 9.7 | -50.9 |
| 2 | 7779.0 | 59.8 | -25.0 | -42.8 | 7.8 | -35.0 |
| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3m | | | | | | |
| NO. | FREQ. (MHz) | EMISSION LEVEL (dBuV) | LIMIT (dBm) | S.G POWER VALUE (dBm) | CORRECTION FACTOR (dB) | POWER VALUE (dBm) |
| 1 | 5186.0 | 47.9 | -25.0 | -56.5 | 9.7 | -46.8 |
| 2 | 7779.0 | 60.5 | -25.0 | -41.6 | 7.8 | -33.8 |

NOTE 1: Power Value (dBum) = S.G Power Value (dBm) + Correction Factor (dB).

NOTE 2: Correction Factor = Antenna gain of substitution antenna- tx cable loss



A D T

| | | | |
|--------------------------|--------------|---------------------------------|--------------------------|
| MODE | High channel | FREQUENCY RANGE | Above 1000MHz |
| INPUT POWER | 120Vac, 60Hz | ENVIRONMENTAL CONDITIONS | 25degoC, 67%RH 991hPa |
| CHANNEL BANDWIDTH | 5MHz | TEST MODE | A |
| TESTED BY | Brad Wu | | |

| 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 | 5375.0 | 43.4 | -25.0 | -60.3 | 9.7 | -50.6 |
| 2 | 8062.5 | 60.4 | -25.0 | -42.2 | 7.8 | -34.4 |
| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3m | | | | | | |
| NO. | FREQ. (MHz) | EMISSION LEVEL (dBuV) | LIMIT (dBm) | S.G POWER VALUE (dBm) | CORRECTION FACTOR (dB) | POWER VALUE (dBm) |
| 1 | 5375.0 | 48.2 | -25.0 | -56.1 | 9.7 | -46.4 |
| 2 | 8062.5 | 61.6 | -25.0 | -40.2 | 7.8 | -32.4 |

NOTE 1: Power Value (dBum) = S.G Power Value (dBm) + Correction Factor (dB).

NOTE 2: Correction Factor = Antenna gain of substitution antenna- tx cable loss



A D T

| | | | |
|--------------------------|--------------|---------------------------------|--------------------------|
| MODE | Low channel | FREQUENCY RANGE | Above 1000MHz |
| INPUT POWER | 120Vac, 60Hz | ENVIRONMENTAL CONDITIONS | 25degoC, 67%RH 991hPa |
| CHANNEL BANDWIDTH | 5MHz | TEST MODE | B |
| TESTED BY | Brad Wu | | |

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 | 4997.0 | 42.2 | -25.0 | -61.6 | 9.5 | -52.1 |
| 2 | 7495.5 | 59.4 | -25.0 | -42.9 | 7.8 | -35.1 |

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3m

| NO. | FREQ. (MHz) | EMISSION LEVEL (dBuV) | LIMIT (dBm) | S.G POWER VALUE (dBm) | CORRECTION FACTOR (dB) | POWER VALUE (dBm) |
|-----|-------------|-----------------------|-------------|-----------------------|------------------------|-------------------|
| 1 | 4997.0 | 45.6 | -25.0 | -58.7 | 9.5 | -49.2 |
| 2 | 7495.5 | 60.2 | -25.0 | -42.0 | 7.8 | -34.2 |

NOTE 1: Power Value (dBum) = S.G Power Value (dBm) + Correction Factor (dB).

NOTE 2: Correction Factor = Antenna gain of substitution antenna- tx cable loss



A D T

| | | | |
|--------------------------|----------------|---------------------------------|--------------------------|
| MODE | Middle channel | FREQUENCY RANGE | Above 1000MHz |
| INPUT POWER | 120Vac, 60Hz | ENVIRONMENTAL CONDITIONS | 25degoC, 67%RH 991hPa |
| CHANNEL BANDWIDTH | 5MHz | TEST MODE | B |
| TESTED BY | Brad Wu | | |

| 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 | 5186.0 | 41.7 | -25.0 | -61.9 | 9.7 | -52.2 |
| 2 | 7779.0 | 58.4 | -25.0 | -44.2 | 7.8 | -36.4 |
| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3m | | | | | | |
| NO. | FREQ. (MHz) | EMISSION LEVEL (dBuV) | LIMIT (dBm) | S.G POWER VALUE (dBm) | CORRECTION FACTOR (dB) | POWER VALUE (dBm) |
| 1 | 5186.0 | 46.8 | -25.0 | -57.6 | 9.7 | -47.9 |
| 2 | 7779.0 | 59.2 | -25.0 | -42.9 | 7.8 | -35.1 |

NOTE 1: Power Value (dBum) = S.G Power Value (dBm) + Correction Factor (dB).

NOTE 2: Correction Factor = Antenna gain of substitution antenna- tx cable loss



A D T

| | | | |
|--------------------------|--------------|---------------------------------|--------------------------|
| MODE | High channel | FREQUENCY RANGE | Above 1000MHz |
| INPUT POWER | 120Vac, 60Hz | ENVIRONMENTAL CONDITIONS | 25degoC, 67%RH 991hPa |
| CHANNEL BANDWIDTH | 5MHz | TEST MODE | B |
| TESTED BY | Brad Wu | | |

| 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 | 5375.0 | 42.3 | -25.0 | -61.4 | 9.7 | -51.7 |
| 2 | 8062.5 | 59.1 | -25.0 | -43.5 | 7.8 | -35.7 |
| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3m | | | | | | |
| NO. | FREQ. (MHz) | EMISSION LEVEL (dBuV) | LIMIT (dBm) | S.G POWER VALUE (dBm) | CORRECTION FACTOR (dB) | POWER VALUE (dBm) |
| 1 | 5375.0 | 47.0 | -25.0 | -57.3 | 9.7 | -47.6 |
| 2 | 8062.5 | 60.0 | -25.0 | -41.8 | 7.8 | -34.0 |

NOTE 1: Power Value (dBum) = S.G Power Value (dBm) + Correction Factor (dB).

NOTE 2: Correction Factor = Antenna gain of substitution antenna- tx cable loss



A D T

| | | | |
|--------------------------|--------------|---------------------------------|--------------------------|
| MODE | Low channel | FREQUENCY RANGE | Above 1000MHz |
| INPUT POWER | 120Vac, 60Hz | ENVIRONMENTAL CONDITIONS | 25degoC, 67%RH 991hPa |
| CHANNEL BANDWIDTH | 5MHz | TEST MODE | C |
| TESTED BY | Brad Wu | | |

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 | 4997.0 | 44.6 | -25.0 | -59.2 | 9.5 | -49.7 |
| 2 | 7495.5 | 62.0 | -25.0 | -40.3 | 7.8 | -32.5 |

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3m

| NO. | FREQ. (MHz) | EMISSION LEVEL (dBuV) | LIMIT (dBm) | S.G POWER VALUE (dBm) | CORRECTION FACTOR (dB) | POWER VALUE (dBm) |
|-----|-------------|-----------------------|-------------|-----------------------|------------------------|-------------------|
| 1 | 4997.0 | 48.2 | -25.0 | -56.1 | 9.5 | -46.6 |
| 2 | 7495.5 | 62.5 | -25.0 | -39.7 | 7.8 | -31.9 |

NOTE 1: Power Value (dBum) = S.G Power Value (dBm) + Correction Factor (dB).

NOTE 2: Correction Factor = Antenna gain of substitution antenna- tx cable loss



A D T

| | | | |
|--------------------------|----------------|---------------------------------|--------------------------|
| MODE | Middle channel | FREQUENCY RANGE | Above 1000MHz |
| INPUT POWER | 120Vac, 60Hz | ENVIRONMENTAL CONDITIONS | 25degoC, 67%RH 991hPa |
| CHANNEL BANDWIDTH | 5MHz | TEST MODE | C |
| TESTED BY | Brad Wu | | |

| 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 | 5186.0 | 44.4 | -25.0 | -59.2 | 9.7 | -49.5 |
| 2 | 7779.0 | 61.5 | -25.0 | -41.1 | 7.8 | -33.3 |
| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3m | | | | | | |
| NO. | FREQ. (MHz) | EMISSION LEVEL (dBuV) | LIMIT (dBm) | S.G POWER VALUE (dBm) | CORRECTION FACTOR (dB) | POWER VALUE (dBm) |
| 1 | 5186.0 | 49.6 | -25.0 | -54.8 | 9.7 | -45.1 |
| 2 | 7779.0 | 62.2 | -25.0 | -39.9 | 7.8 | -32.1 |

NOTE 1: Power Value (dBum) = S.G Power Value (dBm) + Correction Factor (dB).

NOTE 2: Correction Factor = Antenna gain of substitution antenna- tx cable loss



A D T

| | | | |
|--------------------------|--------------|---------------------------------|--------------------------|
| MODE | High channel | FREQUENCY RANGE | Above 1000MHz |
| INPUT POWER | 120Vac, 60Hz | ENVIRONMENTAL CONDITIONS | 25degoC, 67%RH 991hPa |
| CHANNEL BANDWIDTH | 5MHz | TEST MODE | C |
| TESTED BY | Brad Wu | | |

| 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 | 5375.0 | 44.8 | -25.0 | -58.9 | 9.7 | -49.2 |
| 2 | 8062.5 | 61.7 | -25.0 | -40.9 | 7.8 | -33.1 |
| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3m | | | | | | |
| NO. | FREQ. (MHz) | EMISSION LEVEL (dBuV) | LIMIT (dBm) | S.G POWER VALUE (dBm) | CORRECTION FACTOR (dB) | POWER VALUE (dBm) |
| 1 | 5375.0 | 49.7 | -25.0 | -54.6 | 9.7 | -44.9 |
| 2 | 8062.5 | 63.2 | -25.0 | -38.6 | 7.8 | -30.8 |

NOTE 1: Power Value (dBum) = S.G Power Value (dBm) + Correction Factor (dB).

NOTE 2: Correction Factor = Antenna gain of substitution antenna- tx cable loss



A D T

| | | | |
|--------------------------|--------------|---------------------------------|--------------------------|
| MODE | Low channel | FREQUENCY RANGE | Above 1000MHz |
| INPUT POWER | 120Vac, 60Hz | ENVIRONMENTAL CONDITIONS | 25degoC, 67%RH 991hPa |
| CHANNEL BANDWIDTH | 10MHz | TEST MODE | A |
| TESTED BY | Brad Wu | | |

| 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 | 5002.0 | 43.4 | -25.0 | -60.2 | 9.5 | -50.7 |
| 2 | 7503.0 | 56.8 | -25.0 | -45.4 | 7.8 | -37.6 |
| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3m | | | | | | |
| NO. | FREQ. (MHz) | EMISSION LEVEL (dBuV) | LIMIT (dBm) | S.G POWER VALUE (dBm) | CORRECTION FACTOR (dB) | POWER VALUE (dBm) |
| 1 | 5002.0 | 44.8 | -25.0 | -59.4 | 9.5 | -49.9 |
| 2 | 7503.0 | 57.4 | -25.0 | -44.6 | 7.8 | -36.8 |

NOTE 1: Power Value (dBum) = S.G Power Value (dBm) + Correction Factor (dB).

NOTE 2: Correction Factor = Antenna gain of substitution antenna- tx cable loss



A D T

| | | | |
|--------------------------|----------------|---------------------------------|--------------------------|
| MODE | Middle channel | FREQUENCY RANGE | Above 1000MHz |
| INPUT POWER | 120Vac, 60Hz | ENVIRONMENTAL CONDITIONS | 25degoC, 67%RH 991hPa |
| CHANNEL BANDWIDTH | 10MHz | TEST MODE | A |
| TESTED BY | Brad Wu | | |

| 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 | 5186.0 | 47.6 | -25.0 | -56.8 | 9.7 | -47.1 |
| 2 | 7779.0 | 53.2 | -25.0 | -49.2 | 7.8 | -41.4 |
| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3m | | | | | | |
| NO. | FREQ. (MHz) | EMISSION LEVEL (dBuV) | LIMIT (dBm) | S.G POWER VALUE (dBm) | CORRECTION FACTOR (dB) | POWER VALUE (dBm) |
| 1 | 5186.0 | 48.5 | -25.0 | -55.1 | 9.7 | -45.4 |
| 2 | 7779.0 | 58.8 | -25.0 | -43.3 | 7.8 | -35.5 |

NOTE 1: Power Value (dBum) = S.G Power Value (dBm) + Correction Factor (dB).

NOTE 2: Correction Factor = Antenna gain of substitution antenna- tx cable loss



A D T

| | | | |
|--------------------------|--------------|---------------------------------|--------------------------|
| MODE | High channel | FREQUENCY RANGE | Above 1000MHz |
| INPUT POWER | 120Vac, 60Hz | ENVIRONMENTAL CONDITIONS | 25degoC, 67%RH 991hPa |
| CHANNEL BANDWIDTH | 10MHz | TEST MODE | A |
| TESTED BY | Brad Wu | | |

| 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 | 5370.0 | 48.6 | -25.0 | -55.8 | 9.7 | -46.1 |
| 2 | 8055.0 | 53.9 | -25.0 | -48.5 | 7.8 | -40.7 |
| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3m | | | | | | |
| NO. | FREQ. (MHz) | EMISSION LEVEL (dBuV) | LIMIT (dBm) | S.G POWER VALUE (dBm) | CORRECTION FACTOR (dB) | POWER VALUE (dBm) |
| 1 | 5370.0 | 48.6 | -25.0 | -55.8 | 9.7 | -46.1 |
| 2 | 8055.0 | 58.5 | -25.0 | -43.6 | 7.8 | -35.8 |

NOTE 1: Power Value (dBum) = S.G Power Value (dBm) + Correction Factor (dB).

NOTE 2: Correction Factor = Antenna gain of substitution antenna- tx cable loss



A D T

| | | | |
|--------------------------|--------------|---------------------------------|--------------------------|
| MODE | Low channel | FREQUENCY RANGE | Above 1000MHz |
| INPUT POWER | 120Vac, 60Hz | ENVIRONMENTAL CONDITIONS | 25degoC, 67%RH 991hPa |
| CHANNEL BANDWIDTH | 10MHz | TEST MODE | B |
| TESTED BY | Brad Wu | | |

| 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 | 5002.0 | 42.2 | -25.0 | -61.4 | 9.5 | -51.9 |
| 2 | 7503.0 | 55.5 | -25.0 | -46.7 | 7.8 | -38.9 |
| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3m | | | | | | |
| NO. | FREQ. (MHz) | EMISSION LEVEL (dBuV) | LIMIT (dBm) | S.G POWER VALUE (dBm) | CORRECTION FACTOR (dB) | POWER VALUE (dBm) |
| 1 | 5002.0 | 43.4 | -25.0 | -60.8 | 9.5 | -51.3 |
| 2 | 7503.0 | 55.8 | -25.0 | -46.2 | 7.8 | -38.4 |

NOTE 1: Power Value (dBum) = S.G Power Value (dBm) + Correction Factor (dB).

NOTE 2: Correction Factor = Antenna gain of substitution antenna- tx cable loss



A D T

| | | | |
|--------------------------|----------------|---------------------------------|--------------------------|
| MODE | Middle channel | FREQUENCY RANGE | Above 1000MHz |
| INPUT POWER | 120Vac, 60Hz | ENVIRONMENTAL CONDITIONS | 25degoC, 67%RH 991hPa |
| CHANNEL BANDWIDTH | 10MHz | TEST MODE | B |
| TESTED BY | Brad Wu | | |

| 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 | 5186.0 | 46.0 | -25.0 | -58.4 | 9.7 | -48.7 |
| 2 | 7779.0 | 51.8 | -25.0 | -50.6 | 7.8 | -42.8 |
| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3m | | | | | | |
| NO. | FREQ. (MHz) | EMISSION LEVEL (dBuV) | LIMIT (dBm) | S.G POWER VALUE (dBm) | CORRECTION FACTOR (dB) | POWER VALUE (dBm) |
| 1 | 5186.0 | 47.3 | -25.0 | -56.3 | 9.7 | -46.6 |
| 2 | 7779.0 | 57.7 | -25.0 | -44.4 | 7.8 | -36.6 |

NOTE 1: Power Value (dBm) = S.G Power Value (dBm) + Correction Factor (dB).

NOTE 2: Correction Factor = Antenna gain of substitution antenna- tx cable loss



A D T

| | | | |
|--------------------------|--------------|---------------------------------|--------------------------|
| MODE | High channel | FREQUENCY RANGE | Above 1000MHz |
| INPUT POWER | 120Vac, 60Hz | ENVIRONMENTAL CONDITIONS | 25degoC, 67%RH 991hPa |
| CHANNEL BANDWIDTH | 10MHz | TEST MODE | B |
| TESTED BY | Brad Wu | | |

| 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 | 5370.0 | 47.4 | -25.0 | -57.0 | 9.7 | -47.3 |
| 2 | 8055.0 | 52.5 | -25.0 | -49.9 | 7.8 | -42.1 |
| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3m | | | | | | |
| NO. | FREQ. (MHz) | EMISSION LEVEL (dBuV) | LIMIT (dBm) | S.G POWER VALUE (dBm) | CORRECTION FACTOR (dB) | POWER VALUE (dBm) |
| 1 | 5370.0 | 47.3 | -25.0 | -57.1 | 9.7 | -47.4 |
| 2 | 8055.0 | 57.4 | -25.0 | -44.7 | 7.8 | -36.9 |

NOTE 1: Power Value (dBum) = S.G Power Value (dBm) + Correction Factor (dB).

NOTE 2: Correction Factor = Antenna gain of substitution antenna- tx cable loss



A D T

| | | | |
|--------------------------|--------------|---------------------------------|--------------------------|
| MODE | Low channel | FREQUENCY RANGE | Above 1000MHz |
| INPUT POWER | 120Vac, 60Hz | ENVIRONMENTAL CONDITIONS | 25degoC, 67%RH 991hPa |
| CHANNEL BANDWIDTH | 10MHz | TEST MODE | C |
| TESTED BY | Brad Wu | | |

| 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 | 5002.0 | 44.5 | -25.0 | -59.1 | 9.5 | -49.6 |
| 2 | 7503.0 | 58.3 | -25.0 | -43.9 | 7.8 | -36.1 |
| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3m | | | | | | |
| NO. | FREQ. (MHz) | EMISSION LEVEL (dBuV) | LIMIT (dBm) | S.G POWER VALUE (dBm) | CORRECTION FACTOR (dB) | POWER VALUE (dBm) |
| 1 | 5002.0 | 45.9 | -25.0 | -58.3 | 9.5 | -48.8 |
| 2 | 7503.0 | 58.6 | -25.0 | -43.4 | 7.8 | -35.6 |

NOTE 1: Power Value (dBum) = S.G Power Value (dBm) + Correction Factor (dB).

NOTE 2: Correction Factor = Antenna gain of substitution antenna- tx cable loss



A D T

| | | | |
|--------------------------|----------------|---------------------------------|--------------------------|
| MODE | Middle channel | FREQUENCY RANGE | Above 1000MHz |
| INPUT POWER | 120Vac, 60Hz | ENVIRONMENTAL CONDITIONS | 25degoC, 67%RH 991hPa |
| CHANNEL BANDWIDTH | 10MHz | TEST MODE | C |
| TESTED BY | Brad Wu | | |

| 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 | 5186.0 | 49.3 | -25.0 | -55.1 | 9.7 | -45.4 |
| 2 | 7779.0 | 55.7 | -25.0 | -46.7 | 7.8 | -38.9 |
| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3m | | | | | | |
| NO. | FREQ. (MHz) | EMISSION LEVEL (dBuV) | LIMIT (dBm) | S.G POWER VALUE (dBm) | CORRECTION FACTOR (dB) | POWER VALUE (dBm) |
| 1 | 5186.0 | 49.6 | -25.0 | -54.0 | 9.7 | -44.3 |
| 2 | 7779.0 | 59.9 | -25.0 | -42.2 | 7.8 | -34.4 |

NOTE 1: Power Value (dBum) = S.G Power Value (dBm) + Correction Factor (dB).

NOTE 2: Correction Factor = Antenna gain of substitution antenna- tx cable loss



A D T

| | | | |
|--------------------------|--------------|---------------------------------|--------------------------|
| MODE | High channel | FREQUENCY RANGE | Above 1000MHz |
| INPUT POWER | 120Vac, 60Hz | ENVIRONMENTAL CONDITIONS | 25degoC, 67%RH 991hPa |
| CHANNEL BANDWIDTH | 10MHz | TEST MODE | C |
| TESTED BY | Brad Wu | | |

| 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 | 5370.0 | 50.3 | -25.0 | -54.1 | 9.7 | -44.4 |
| 2 | 8055.0 | 55.5 | -25.0 | -46.9 | 7.8 | -39.1 |
| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3m | | | | | | |
| NO. | FREQ. (MHz) | EMISSION LEVEL (dBuV) | LIMIT (dBm) | S.G POWER VALUE (dBm) | CORRECTION FACTOR (dB) | POWER VALUE (dBm) |
| 1 | 5370.0 | 50.3 | -25.0 | -54.1 | 9.7 | -44.4 |
| 2 | 8055.0 | 60.1 | -25.0 | -42.0 | 7.8 | -34.2 |

NOTE 1: Power Value (dBum) = S.G Power Value (dBm) + Correction Factor (dB).

NOTE 2: Correction Factor = Antenna gain of substitution antenna- tx cable loss



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5 PHOTOGRAPHS OF THE TEST CONFIGURATION

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



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6 INFORMATION ON THE TESTING LABORATORIES

We, Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch, were founded in 1988 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are accredited and approved according to ISO/IEC 17025.

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: Web Site: www.adt.com.tw

Tel: 886-3-3183232

Fax: 886-3-3185050

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

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