# Test Report

| | |
|---|---|
| Product Name | Notebook P.C. |
| Model No | UX30 |
| FCC ID | MSQUX30INTEL512H |

| | |
|---|---|
| Applicant | ASUSTek COMPUTER INC. |
| Address | 4FL., No. 15, Li-Te Rd., Peitou, Taipei, Taiwan, R.O.C. |

| | |
|---|---|
| Date of Receipt | June 06, 2009 |
| Issued Date | June 26, 2009 |
| Report No. | 096116R-RFUSP08V01 |
| Report Version | V1.0 |

# Test Report Certification

Issued Date: June 26, 2009

Report No.: 096116R-RFUSP08V01

QTK QuieTek Corporation

| | |
|---|---|
| Product Name | Notebook P.C. |
| Applicant | ASUSTek COMPUTER INC. |
| Address | 4FL., No. 15, Li-Te Rd., Peitou, Taipei, Taiwan, R.O.C. |
| Manufacturer | 1.PEGATRON CORPORATION Taoyuan Mfg<br>2.Protek (Shanghai) Limited.<br>3.NorthTec Asia (Shanghai) Limited. |
| Model No. | UX30 |
| FCC ID. | MSQUX30INTEL512H |
| Rated Voltage | AC 120V/60Hz |
| Working Voltage | AC 100-240V, 50-60Hz |
| Trade Name | ASUS |
| Applicable Standard | FCC CFR Title 47 Part 15 Subpart E: 2008<br>ANSI C63.4: 2003 |
| Test Result | Complied |

NVLAP Lab Code: 200533-0

The Test Results relate only to the samples tested.
The test report shall not be reproduced except in full without the written approval of QuieTek Corporation.
This report must not be used to claim product endorsement by NVLAP any agency of the U.S. Government

Documented By : Rita Huang

(Engineering Adm. Specialist / Rita Huang)

Tested By : Dino Chen

( Engineer / Dino Chen )

Approved By :

( Manager / Vincent Lin)

Testing Laboratory
0914

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# 1. GENERAL INFORMATION

## 1.1. EUT Description

| | |
|---|---|
| Product Name | Notebook P.C. |
| Trade Name | ASUS |
| FCC ID. | MSQUX30INTEL512H |
| Model No. | UX30 |
| Frequency Range | 5180-5320MHz |
| Number of Channels | 802.11a/n-20MHz: 8; 802.11n-40MHz: 4 |
| Data Rate | 802.11a: 6 - 54Mbps<br>802.11n(20BW): 13.5-144Mbps, 802.11n(40BW): 27-300Mbps |
| Channel Control | Auto |
| Type of Modulation | 802.11a/n:OFDM<br>BPSK, QPSK, 16QAM, 64QAM |
| Antenna type | PIFA Antenna |
| Antenna Gain | Refer to the table “Antenna List” |
| Power Adapter | MFR: PIE(ASUS), M/N: AD6630<br>Input: AC 100-240V, 50-60Hz, 1.0A<br>Output: DC 19V, 2.1A<br>Cable Out: Shielded, 1.8m, with one ferrite core bonded. |

**Antenna List**

| No. | Manufacturer | Part No. | Peak Gain |
|---|---|---|---|
| 1 | INPAQ | WA-P-LB-02-007 (Tx1)<br>WA-P-LB-01-002 (Tx2) (or Rx2 for 512 family) | 2.5dBi in 2.4 GHz<br>1.73dBi in 5GHz |
| 2 | ACON | AMP6P-700064 (Tx1)<br>AMP6P-700065 (Tx2) (or Rx2 for 512 family) | 1.34dBi in 2.4 GHz<br>2.38dBi in 5GHz |

802.11a/n-20MHz Center Working Frequency of Each Channel:

| Channel | Frequency | Channel | Frequency | Channel | Frequency | Channel | Frequency |
|---|---|---|---|---|---|---|---|
| Channel 36: | 5180 MHz | Channel 40: | 5200 MHz | Channel 44: | 5220 MHz | Channel 48: | 5240 MHz |
| Channel 52: | 5260 MHz | Channel 56: | 5280 MHz | Channel 60: | 5300 MHz | Channel 64: | 5320 MHz |

802.11n-40MHz Center Working Frequency of Each Channel:

| Channel | Frequency | Channel | Frequency | Channel | Frequency | Channel | Frequency |
|---|---|---|---|---|---|---|---|
| Channel 38: | 5190 MHz | Channel 46: | 5230 MHz | Channel 54: | 5270 MHz | Channel 62: | 5310 MHz |

Note:

1. This device is a Notebook P.C. with a built-in WLAN transceiver.
2. Regarding to the operation frequency, the lowest, middle and highest frequency are selected to perform the test. Lowest and highest data rates are tested in each mode. Only worst case is shown in the report. (802.11a is 6Mbps, 802.11n-20BW is 13.5Mbps and 802.11n-40BW are 27Mbps)
3. These tests were conducted on a sample of the equipment for the purpose of demonstrating compliance with Part 15 Subpart E for Unlicensed National Information Infrastructure devices.

## 1.2. Operational Description

The EUT is a Notebook P.C. with a built-in 2.4GHz and 5GHz WLAN card. This device provided four kinds of transmitting speed 1, 2, 5.5 and 11Mbps and the device of RF carrier is DBPSK, DQPSK and CCK (IEEE 802.11b). The device provided of eight kinds of transmitting speed 6, 9, 12, 18, 24, 36, 48 and 54Mbps the device of RF carrier is BPSK, QPSK, 16QAM and 64QAM (IEEE 802.11a/g).

The device provided of eight kinds of transmitting speed 13.5,26,39,52,78,104,117 and 130Mbps in 802.11n(20BW) mode and 27,54,81,108,162,216,243 and 270Mbps(40BW) the device of RF carrier is BPSK, QPSK, 16QAM and 64QAM (IEEE 802.11n), the IEEE 802.11n is Multiple In, Multiple Out" (MIMO) technology.

The device adapts direct sequence spread spectrum modulation. The antenna provides diversity function to improve the receiving function and the antennas to support 1(Transmit) × 2 (Receive) MISO technology.

This Notebook P.C. , compliant with IEEE 802.11b and IEEE 802.11a/g/n, is a high-efficiency Wireless LAN adapter. It allows your computer to connect to a wireless network and to share resources, such as files or printers without being bound to the network wires. Operation in 2.4GHz Direst Sequence Spread Spectrum (DSSS) radio transmission, the Notebook P.C. Wired Equivalent Protection (WEP) algorithm is used. In addition, its standard compliance ensures that it can communicate with any IEEE 802.11b and IEEE 802.11a/g/n network.

Another information please refer to users manual.

| | |
|---|---|
| Test Mode | Mode 1: Transmitter (802.11a-6Mbps)-Antenna 2<br>Mode 2: Transmitter (802.11n-20BW 13.5Mbps)-Antenna 2<br>Mode 3: Transmitter (802.11n-40BW 27Mbps)-Antenna 2 |

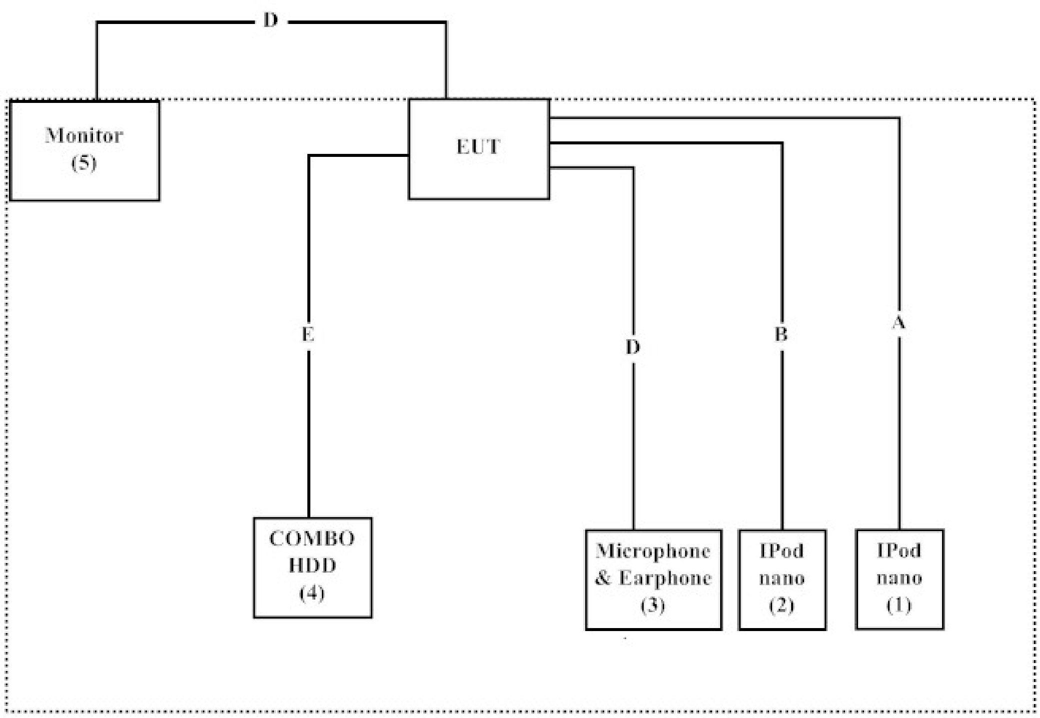
## 1.3. Tested System Datails

The types for all equipment, plus descriptions of all cables used in the tested system (including inserted cards) are:

| Product | | Manufacturer | Model No. | Serial No. | Power Cord |
|---|---|---|---|---|---|
| (1) | IPod nano | Apple | A1236 | 7K818WQLY0P | N/A |
| (2) | IPod nano | Apple | A1236 | YM827ERSY0P | N/A |
| (3) | Microphone & Earphone | PCHOME | N/A | N/A | N/A |
| (4) | COMBO HDD | TeraSys | F12-UF | A0100215-63m0031 | Non-Shielded 1.8m |
| (5) | Monitor | Dell | 2407WFPb | CN-0FC255-46633-67T-04HS | Non-Shielded, 1.8m |

| Signal Cable Type | | Signal cable Description |
|---|---|---|
| A. | USB Cable | Shielded, 1.2m |
| B. | USB Cable | Shielded, 1.2m |
| C. | Earphone Cable | Non-Shielded, 1.2m |
| D. | VGA Cable | Non-Shielded, 1.8m |
| E. | USB Cable | Shielded, 1.2m |

## 1.4. Configuration of tested System



## 1.5. EUT Exercise Software

(1) Setup the EUT as shown in Section 1.4
(2) Execute CRTU (Version 5.0.48.0000) on the EUT.
(3) Configure the test mode, the test channel, and the data rate.
(4) Press “OK” to start the continuous transmission.
(5) Verify that the EUT works properly.

## 1.6. Test Facility

Ambient conditions in the laboratory:

| Items | Required (IEC 68-1) | Actual |
|---|---|---|
| Temperature (°C) | 15-35 | 20-35 |
| Humidity (%RH) | 25-75 | 50-65 |
| Barometric pressure (mbar) | 860-1060 | 950-1000 |

The related certificate for our laboratories about the test site and management system can be downloaded from QuieTek Corporation's Web Site : http://tw.quietek.com/modules/myalbum/

The address and introduction of QuieTek Corporation's laboratories can be founded in our Web site : http://www.quietek.com/

Site Description: File on
Federal Communications Commission
FCC Engineering Laboratory
7435 Oakland Mills Road
Columbia, MD 21046
Registration Number: 92195

Accreditation on NVLAP
NVLAP Lab Code: 200533-0

NVLAP Lab Code: 200533-0

Site Name: Quietek Corporation
Site Address: No. 5-22, Ruei-Shu Valley, Ruei-Ping Tsuen,
Lin-Kou Shiang, Taipei,
Taiwan, R.O.C.
TEL: 886-2-8601-3788 / FAX : 886-2-8601-3789
E-Mail : service@quietek.com

FCC Accreditation Number: TW1014

Testing Laboratory
0914

# 2. Conducted Emission

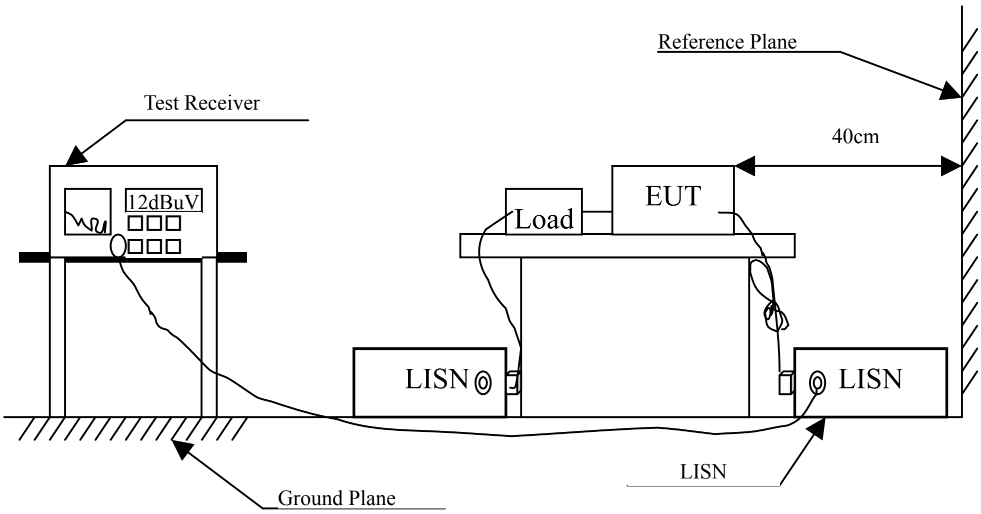
## 2.1. Test Equipment

The following test equipment are used during the conducted emission test:

| Item | Instrument | Manufacturer | Type No./Serial No | Last Cal. | Remark |
|---|---|---|---|---|---|
| 1 | Test Receiver | R & S | ESCS 30/825442/17 | May, 2009 | |
| 2 | L.I.S.N. | R & S | ESH3-Z5/825016/6 | May, 2009 | EUT |
| 3 | L.I.S.N. | Kyoritsu | KNW-407/8-1420-3 | May, 2009 | Peripherals |
| 4 | Pulse Limiter | R & S | ESH3-Z2 | May, 2009 | |
| 5 | No.1 Shielded Room | | | N/A | |

Note: All equipments are calibrated every one year.

## 2.2. Test Setup




## 2.3. Limits

| FCC Part 15 Subpart C Paragraph 15.207 (dBuV) Limit | | |
|---|---|---|
| Frequency MHz | Limits | |
| | QP | AV |
| 0.15 - 0.50 | 66-56 | 56-46 |
| 0.50-5.0 | 56 | 46 |
| 5.0 - 30 | 60 | 50 |

Remarks : In the above table, the tighter limit applies at the band edges.

## 2.4. Test Procedure

The EUT and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a 50 ohm /50uH coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm /50uH coupling impedance with 50ohm termination. (Please refers to the block diagram of the test setup and photographs.)
Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.4: 2003 on conducted measurement.
Conducted emissions were invested over the frequency range from 0.15MHz to 30MHz using a receiver bandwidth of 9kHz.
The EUT was setup to ANSI C63.4, 2003; tested to DTS test procedure of Aug 2002 DA 02-2138 for compliance to FCC 47CFR Subpart E requirements.

## 2.5. Uncertainty

± 2.26 dB

## 2.6. Test Result of Conducted Emission

| | | |
|---|---|---|
| Product | : | Notebook P.C. |
| Test Item | : | Conducted Emission Test |
| Power Line | : | Line 1 |
| Test Mode | : | Mode 2: Transmitter (802.11n-20BW 13.5Mbps)-Antenna 2 (5180MHz) |

| Frequency | Correct Factor | Reading Level | Measurement Level | Margin | Limit |
|---|---|---|---|---|---|
| MHz | dB | dBuV | dBuV | dB | dBuV |
| **LINE 1** | | | | | |
| **Quasi-Peak** | | | | | |
| 0.185 | 9.719 | 37.680 | 47.399 | -17.601 | 65.000 |
| 0.248 | 9.677 | 29.180 | 38.857 | -24.343 | 63.200 |
| 0.298 | 9.650 | 24.070 | 33.720 | -28.051 | 61.771 |
| 0.400 | 9.650 | 13.400 | 23.050 | -35.807 | 58.857 |
| 0.588 | 9.637 | 18.480 | 28.117 | -27.883 | 56.000 |
| 1.205 | 9.670 | 13.180 | 22.850 | -33.150 | 56.000 |
| **Average** | | | | | |
| 0.185 | 9.719 | 21.100 | 30.819 | -24.181 | 55.000 |
| 0.248 | 9.677 | 12.360 | 22.037 | -31.163 | 53.200 |
| 0.298 | 9.650 | 8.080 | 17.730 | -34.041 | 51.771 |
| 0.400 | 9.650 | 0.120 | 9.770 | -39.087 | 48.857 |
| 0.588 | 9.637 | 8.080 | 17.717 | -28.283 | 46.000 |
| 1.205 | 9.670 | 5.240 | 14.910 | -31.090 | 46.000 |

Note:

1. All Reading Levels are Quasi-Peak and average value.
2. "      " means the worst emission level.
3. Measurement Level = Reading Level + Correct Factor

Product : Notebook P.C.
Test Item : Conducted Emission Test
Power Line : Line 2
Test Mode : Mode 2: Transmitter (802.11n-20BW 13.5Mbps)-Antenna 2 (5180MHz)

| Frequency | Correct Factor | Reading Level | Measurement Level | Margin | Limit |
|---|---|---|---|---|---|
| MHz | dB | dBuV | dBuV | dB | dBuV |
| **LINE 2** | | | | | |
| **Quasi-Peak** | | | | | |
| 0.170 | 9.743 | 37.550 | 47.293 | -18.136 | 65.429 |
| 0.244 | 9.689 | 29.780 | 39.469 | -23.845 | 63.314 |
| 0.353 | 9.655 | 19.040 | 28.695 | -31.505 | 60.200 |
| 0.353 | 9.655 | 19.080 | 28.735 | -31.465 | 60.200 |
| 0.427 | 9.650 | 13.620 | 23.270 | -34.816 | 58.086 |
| 0.560 | 9.640 | 18.990 | 28.630 | -27.370 | 56.000 |
| **Average** | | | | | |
| 0.170 | 9.743 | 17.120 | 26.863 | -28.566 | 55.429 |
| 0.244 | 9.689 | 13.320 | 23.009 | -30.305 | 53.314 |
| 0.353 | 9.655 | 3.840 | 13.495 | -36.705 | 50.200 |
| 0.427 | 9.650 | 3.040 | 12.690 | -35.396 | 48.086 |
| 0.560 | 9.640 | 6.900 | 16.540 | -29.460 | 46.000 |
| 1.552 | 9.680 | 5.890 | 15.570 | -30.430 | 46.000 |

Note:

1. All Reading Levels are Quasi-Peak and average value.
2. "     " means the worst emission level.
3. Measurement Level = Reading Level + Correct Factor

Product : Notebook P.C.
Test Item : Conducted Emission Test
Power Line : Line 1
Test Mode : Mode 2: Transmitter (802.11n-20BW 13.5Mbps)-Antenna 2 (5260MHz)

| Frequency | Correct Factor | Reading Level | Measurement Level | Margin | Limit |
|---|---|---|---|---|---|
| MHz | dB | dBuV | dBuV | dB | dBuV |
| **LINE 1** | | | | | |
| **Quasi-Peak** | | | | | |
| 0.177 | 9.730 | 39.130 | 48.859 | -16.370 | 65.229 |
| 0.236 | 9.682 | 30.670 | 40.352 | -23.191 | 63.543 |
| 0.291 | 9.653 | 24.440 | 34.093 | -27.878 | 61.971 |
| 0.380 | 9.650 | 13.960 | 23.610 | -35.819 | 59.429 |
| 0.548 | 9.640 | 17.020 | 26.660 | -29.340 | 56.000 |
| 1.455 | 9.670 | 13.580 | 23.250 | -32.750 | 56.000 |
| **Average** | | | | | |
| 0.177 | 9.730 | 23.060 | 32.789 | -22.440 | 55.229 |
| 0.236 | 9.682 | 14.420 | 24.102 | -29.441 | 53.543 |
| 0.291 | 9.653 | 8.290 | 17.943 | -34.028 | 51.971 |
| 0.380 | 9.650 | -0.260 | 9.390 | -40.039 | 49.429 |
| 0.548 | 9.640 | 5.260 | 14.900 | -31.100 | 46.000 |
| 1.455 | 9.670 | 5.560 | 15.230 | -30.770 | 46.000 |

Note:

1. All Reading Levels are Quasi-Peak and average value.
2. "　　" means the worst emission level.
3. Measurement Level = Reading Level + Correct Factor

Product : Notebook P.C.
Test Item : Conducted Emission Test
Power Line : Line 2
Test Mode : Mode 2: Transmitter (802.11n-20BW 13.5Mbps)-Antenna 2 (5260MHz)

| Frequency<br>MHz | Correct Factor<br>dB | Reading Level<br>dBuV | Measurement Level<br>dBuV | Margin<br>dB | Limit<br>dBuV |
|---|---|---|---|---|---|
| **LINE 2** | | | | | |
| **Quasi-Peak** | | | | | |
| 0.181 | 9.732 | 38.650 | 48.382 | -16.732 | 65.114 |
| 0.228 | 9.698 | 30.390 | 40.088 | -23.683 | 63.771 |
| 0.302 | 9.660 | 23.840 | 33.500 | -28.157 | 61.657 |
| 0.365 | 9.651 | 17.810 | 27.461 | -32.396 | 59.857 |
| 0.619 | 9.650 | 15.760 | 25.410 | -30.590 | 56.000 |
| 1.283 | 9.670 | 12.860 | 22.530 | -33.470 | 56.000 |
| **Average** | | | | | |
| 0.181 | 9.732 | 22.750 | 32.482 | -22.632 | 55.114 |
| 0.228 | 9.698 | 11.100 | 20.798 | -32.973 | 53.771 |
| 0.302 | 9.660 | 7.750 | 17.410 | -34.247 | 51.657 |
| 0.365 | 9.651 | 3.400 | 13.051 | -36.806 | 49.857 |
| 0.619 | 9.650 | 4.780 | 14.430 | -31.570 | 46.000 |
| 1.283 | 9.670 | 4.010 | 13.680 | -32.320 | 46.000 |

Note:

1. All Reading Levels are Quasi-Peak and average value.
2. "      " means the worst emission level.
3. Measurement Level = Reading Level + Correct Factor

Product : Notebook P.C.
Test Item : Conducted Emission Test
Power Line : Line 1
Test Mode : Mode 3: Transmitter (802.11n-40BW 27Mbps)-Antenna 2 (5190MHz)

| Frequency<br>MHz | Correct Factor<br>dB | Reading Level<br>dBuV | Measurement Level<br>dBuV | Margin<br>dB | Limit<br>dBuV |
|---|---|---|---|---|---|
| **LINE 1** | | | | | |
| **Quasi-Peak** | | | | | |
| 0.177 | 9.730 | 39.170 | 48.899 | -16.330 | 65.229 |
| 0.224 | 9.690 | 26.200 | 35.890 | -27.996 | 63.886 |
| 0.255 | 9.673 | 25.100 | 34.772 | -28.228 | 63.000 |
| 0.365 | 9.650 | 18.070 | 27.720 | -32.137 | 59.857 |
| 0.584 | 9.638 | 19.060 | 28.698 | -27.302 | 56.000 |
| 0.755 | 9.643 | 13.560 | 23.203 | -32.797 | 56.000 |
| **Average** | | | | | |
| 0.177 | 9.730 | 23.300 | 33.029 | -22.200 | 55.229 |
| 0.224 | 9.690 | 5.190 | 14.880 | -39.006 | 53.886 |
| 0.255 | 9.673 | 4.460 | 14.132 | -38.868 | 53.000 |
| 0.365 | 9.650 | 3.510 | 13.160 | -36.697 | 49.857 |
| 0.584 | 9.638 | 7.610 | 17.248 | -28.752 | 46.000 |
| 0.755 | 9.643 | 6.150 | 15.793 | -30.207 | 46.000 |

Note:

1. All Reading Levels are Quasi-Peak and average value.
2. “ “ means the worst emission level.
3. Measurement Level = Reading Level + Correct Factor

Product : Notebook P.C.
Test Item : Conducted Emission Test
Power Line : Line 2
Test Mode : Mode 3: Transmitter (802.11n-40BW 27Mbps)-Antenna 2 (5190MHz)

| Frequency | Correct Factor | Reading Level | Measurement Level | Margin | Limit |
|---|---|---|---|---|---|
| MHz | dB | dBuV | dBuV | dB | dBuV |
| **LINE 2** | | | | | |
| **Quasi-Peak** | | | | | |
| 0.189 | 9.724 | 36.430 | 46.154 | -18.732 | 64.886 |
| 0.248 | 9.687 | 29.500 | 39.187 | -24.013 | 63.200 |
| 0.295 | 9.662 | 24.660 | 34.322 | -27.535 | 61.857 |
| 0.357 | 9.654 | 19.100 | 28.754 | -31.332 | 60.086 |
| 0.568 | 9.640 | 18.880 | 28.520 | -27.480 | 56.000 |
| 1.380 | 9.670 | 13.010 | 22.680 | -33.320 | 56.000 |
| **Average** | | | | | |
| 0.189 | 9.724 | 17.530 | 27.254 | -27.632 | 54.886 |
| 0.248 | 9.687 | 12.520 | 22.207 | -30.993 | 53.200 |
| 0.295 | 9.662 | 8.720 | 18.382 | -33.475 | 51.857 |
| 0.357 | 9.654 | 4.050 | 13.704 | -36.382 | 50.086 |
| 0.568 | 9.640 | 7.250 | 16.890 | -29.110 | 46.000 |
| 1.380 | 9.670 | 5.650 | 15.320 | -30.680 | 46.000 |

Note:

1. All Reading Levels are Quasi-Peak and average value.
2. “ “ means the worst emission level.
3. Measurement Level = Reading Level + Correct Factor

Product : Notebook P.C.
Test Item : Conducted Emission Test
Power Line : Line 1
Test Mode : Mode 3: Transmitter (802.11n-40BW 27Mbps)-Antenna 2 (5270MHz)

| Frequency | Correct Factor | Reading Level | Measurement Level | Margin | Limit |
|---|---|---|---|---|---|
| MHz | dB | dBuV | dBuV | dB | dBuV |
| **LINE 1** | | | | | |
| **Quasi-Peak** | | | | | |
| 0.173 | 9.734 | 39.430 | 49.165 | -16.178 | 65.343 |
| 0.236 | 9.682 | 30.880 | 40.562 | -22.981 | 63.543 |
| 0.295 | 9.652 | 24.660 | 34.312 | -27.545 | 61.857 |
| 0.341 | 9.650 | 17.710 | 27.360 | -33.183 | 60.543 |
| 0.580 | 9.640 | 19.040 | 28.680 | -27.320 | 56.000 |
| 1.275 | 9.670 | 14.050 | 23.720 | -32.280 | 56.000 |
| **Average** | | | | | |
| 0.173 | 9.734 | 22.110 | 31.845 | -23.498 | 55.343 |
| 0.236 | 9.682 | 14.830 | 24.512 | -29.031 | 53.543 |
| 0.295 | 9.652 | 8.780 | 18.432 | -33.425 | 51.857 |
| 0.341 | 9.650 | 1.020 | 10.670 | -39.873 | 50.543 |
| 0.580 | 9.640 | 8.340 | 17.980 | -28.020 | 46.000 |
| 1.275 | 9.670 | 5.110 | 14.780 | -31.220 | 46.000 |

Note:

1. All Reading Levels are Quasi-Peak and average value.
2. "　" means the worst emission level.
3. Measurement Level = Reading Level + Correct Factor

Product : Notebook P.C.

Test Item : Conducted Emission Test

Power Line : Line 2

Test Mode : Mode 3: Transmitter (802.11n-40BW 27Mbps)-Antenna 2 (5270MHz)

| Frequency | Correct Factor | Reading Level | Measurement Level | Margin | Limit |
|---|---|---|---|---|---|
| MHz | dB | dBuV | dBuV | dB | dBuV |
| **LINE 2** | | | | | |
| **Quasi-Peak** | | | | | |
| 0.166 | 9.748 | 30.350 | 40.097 | -25.446 | 65.543 |
| 0.185 | 9.727 | 37.780 | 47.508 | -17.492 | 65.000 |
| 0.228 | 9.698 | 30.490 | 40.188 | -23.583 | 63.771 |
| 0.291 | 9.663 | 24.870 | 34.533 | -27.438 | 61.971 |
| 0.353 | 9.655 | 19.320 | 28.975 | -31.225 | 60.200 |
| 0.584 | 9.642 | 19.260 | 28.902 | -27.098 | 56.000 |
| **Average** | | | | | |
| 0.166 | 9.748 | 9.330 | 19.077 | -36.466 | 55.543 |
| 0.185 | 9.727 | 21.280 | 31.008 | -23.992 | 55.000 |
| 0.228 | 9.698 | 11.410 | 21.108 | -32.663 | 53.771 |
| 0.291 | 9.663 | 8.790 | 18.453 | -33.518 | 51.971 |
| 0.353 | 9.655 | 4.100 | 13.755 | -36.445 | 50.200 |
| 0.584 | 9.642 | 7.750 | 17.392 | -28.608 | 46.000 |

Note:

1. All Reading Levels are Quasi-Peak and average value.
2. “ “ means the worst emission level.
3. Measurement Level = Reading Level + Correct Factor

# 3. Peak Transmit Power

## 3.1. Test Equipment

The following test equipments are used during the radiated emission tests:

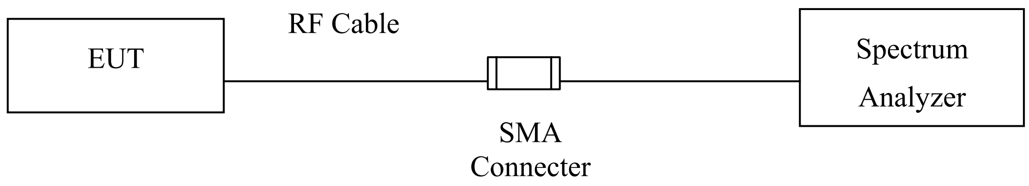
| | Equipment | Manufacturer | Model No./Serial No. | Last Cal. |
|---|---|---|---|---|
| X | Power Meter | Anritsu | ML2495A/6K00003357 | May, 2009 |
| X | Power Sensor | Anritsu | MA2491A/034457 | May, 2009 |

Note: 1. All equipments are calibrated every one year.

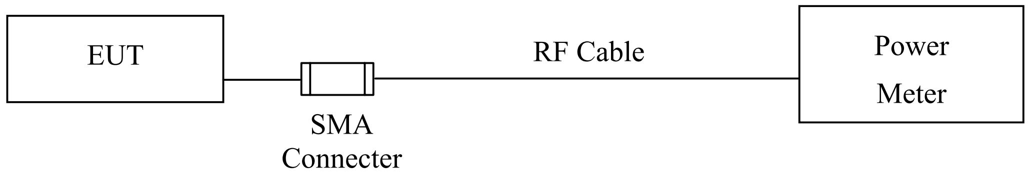
2. The test instruments marked by "X" are used to measure the final test results.

## 3.2. Test Setup

**26dBc Occupied Bandwidth**




**Conduction Power Measurement**



### 3.3. Limits

(1) For the band 5.15-5.25 GHz, the peak transmit power over the frequency band of operation shall not exceed the lesser of 50 mW or 4 dBm + 10log B, where B is the 26-dB emission bandwidth in MHz. If transmitting antenna of directional gain greater than 6 dBi are used, the peak transmit power shall be reduced by the amount in dB that directional gain of the antenna exceeds 6 dBi.

(2) For the band 5.25-5.35 GHz, the peak transmit power over the frequency band of operation shall not exceed the lesser of 250 mW or 11 dBm + 10log B, where B is the 26-dB emission bandwidth in MHz. If transmitting antenna of directional gain greater than 6 dBi are used, the peak transmit power shall be reduced by the amount in dB that directional gain of the antenna exceeds 6 dBi.

(3) For the band 5.725-5.825 GHz, the peak transmit power over the frequency band of operation shall not exceed the lesser of 1W or 17 dBm + 10log B, where B is the 26-dB emission bandwidth in MHz. If transmitting antenna of directional gain greater than 6 dBi are used, the peak transmit power shall be reduced by the amount in dB that directional gain of the antenna exceeds 6 dBi.

### 3.4. Test Procedur

As an alternative to DA 02-2138, the EUT peak power was measured with a peak power meter employing a video bandwidth greater than 6dB BW of the emission under test. Peak output power was read directly from the meter across all data rates, and across three channels within each sub-band. Special care was used to make sure that the EUT was transmitting in continuous mode. This method exceeds the limitations of DA 02-2138, and provides more accurate measurements.

### 3.5. Uncertainty

± 1.27 dB

### 3.6. Test Result of Peak Transmit Power

Product : Notebook P.C.
Test Item : Peak Transmit Power
Test Site : No.3 OATS
Test Mode : Mode 1: Transmitter (802.11a-6Mbps)-Antenna 2

| Cable loss=1dB | | Peak Power Output | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Channel No. | Frequency (MHz) | Data Rate | | | | | | | | Required Limit |
| | | 6 | 9 | 12 | 18 | 24 | 36 | 48 | 54 | |
| 36 | 5180 | 16.9 | -- | -- | -- | -- | -- | -- | -- | <17dBm |
| 44 | 5220 | 16.95 | -- | -- | -- | -- | -- | -- | -- | <17dBm |
| 48 | 5240 | 16.78 | -- | -- | -- | -- | -- | -- | -- | <17dBm |
| 52 | 5260 | 16.31 | 16.2 | 16.02 | 15.35 | 15.88 | 15.49 | 15.55 | 16.1 | <24dBm |
| 60 | 5300 | 16.3 | -- | -- | -- | -- | -- | -- | -- | <24dBm |
| 64 | 5320 | 16.33 | -- | -- | -- | -- | -- | -- | -- | <24dBm |

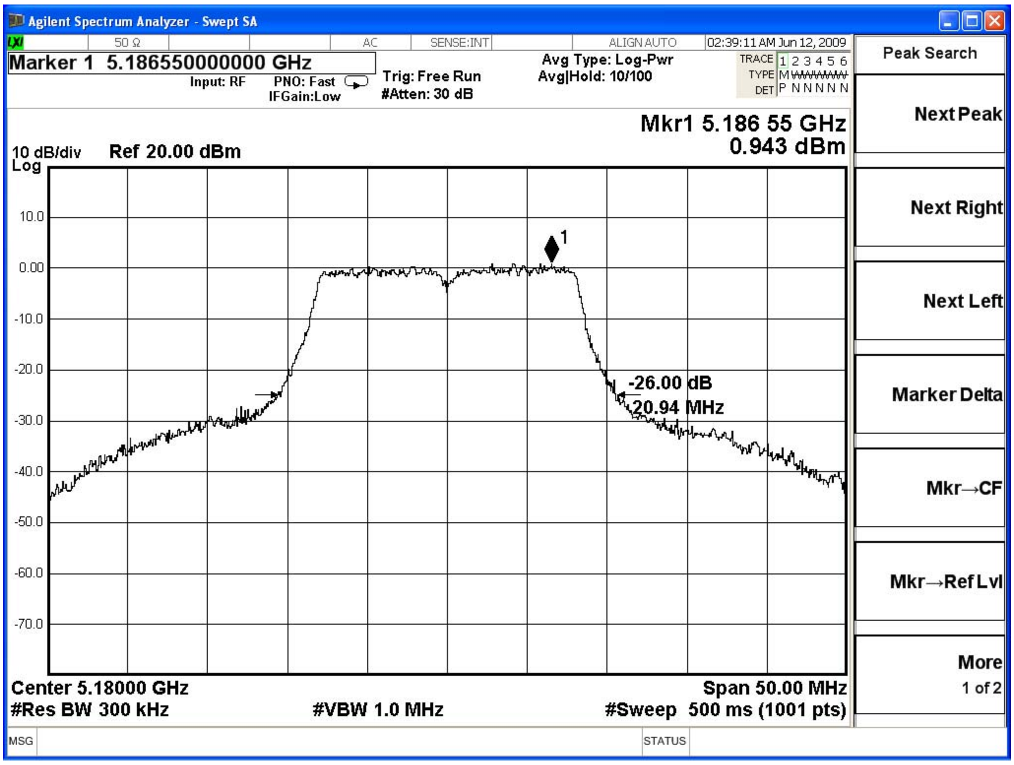
Note: Peak Power Output Value =Reading value on peak power meter + cable loss

**Peak Transmit Power Measurement:**

| Channel No | Frequency Range (MHz) | 26dB Bandwidth (MHz) | Output Power (dBm) | Output Power Limit | | Result |
|---|---|---|---|---|---|---|
| | | | | (dBm) | dBm+10log(BW) | |
| 36 | 5180 | 20.94 | 16.9 | 17 | 17.21 | Pass |

**26dBc Occupied Bandwidth:**

**Channel 36**

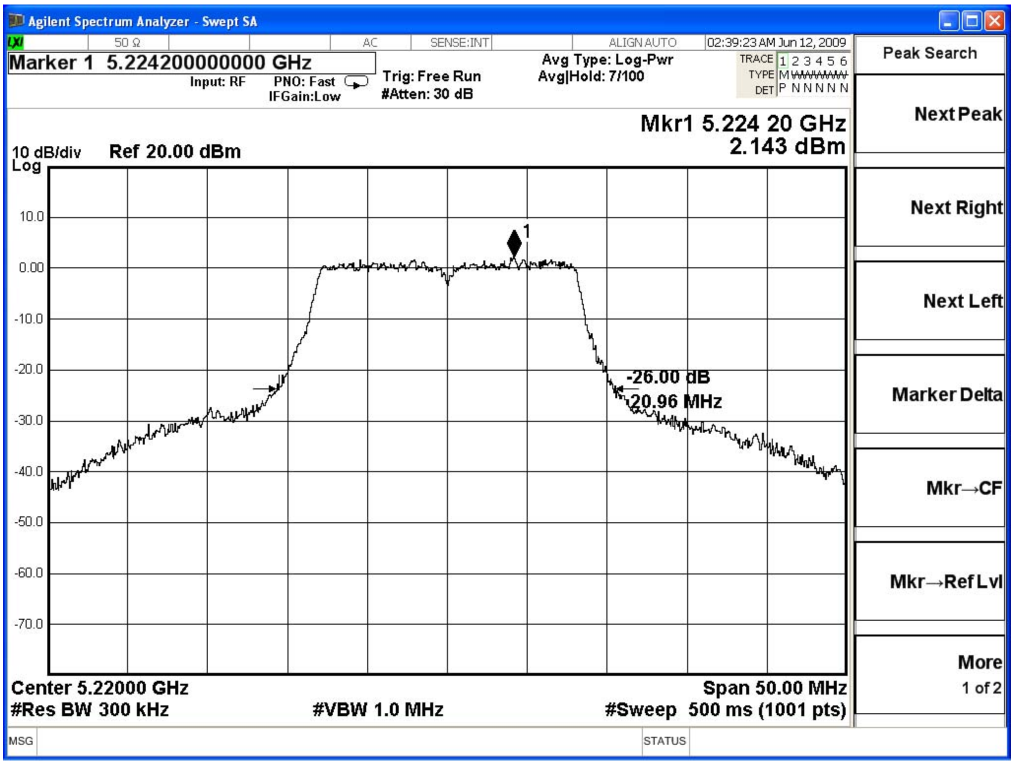


**Peak Transmit Power Measurement:**

| Channel No | Frequency Range (MHz) | 26dB Bandwidth (MHz) | Output Power (dBm) | Output Power Limit (dBm) | Output Power Limit dBm+10log(BW) | Result |
|---|---|---|---|---|---|---|
| 44 | 5220 | 20.96 | 16.95 | 17 | 17.21 | Pass |

**26dBc Occupied Bandwidth:**

**Channel 40**

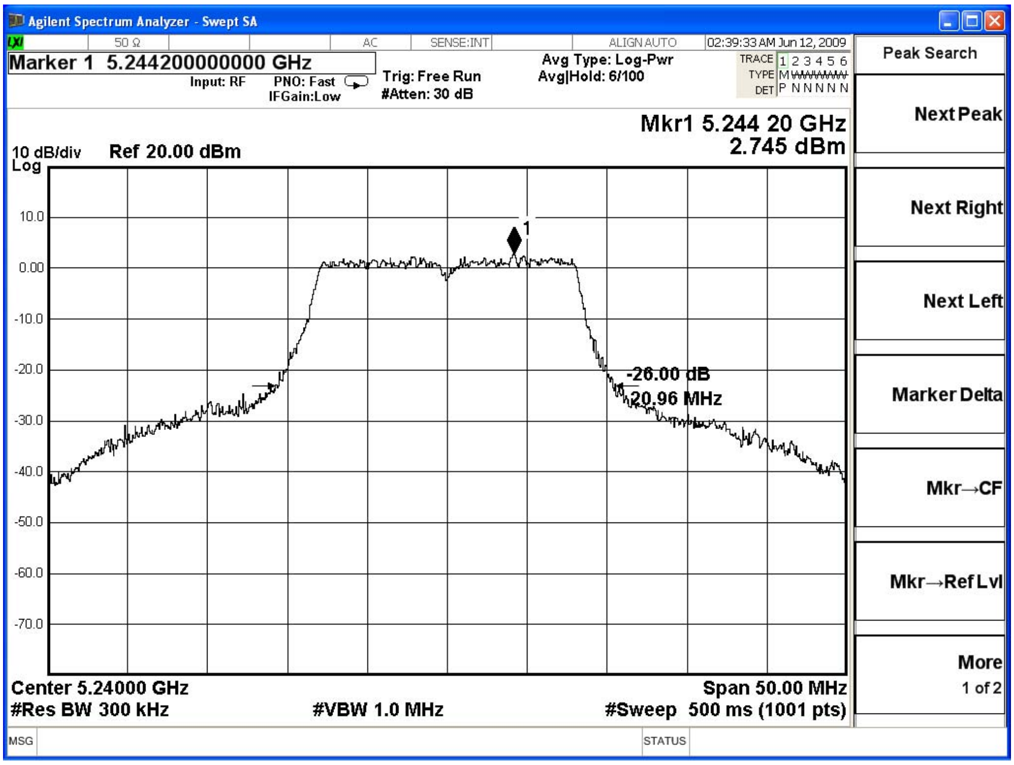


**Peak Transmit Power Measurement:**

| Channel No | Frequency Range (MHz) | 26dB Bandwidth (MHz) | Output Power (dBm) | Output Power Limit (dBm) | Output Power Limit dBm+10log(BW) | Result |
|---|---|---|---|---|---|---|
| 48 | 5240 | 20.96 | 16.78 | 17 | 17.21 | Pass |

**26dBc Occupied Bandwidth:**

**Channel 48**

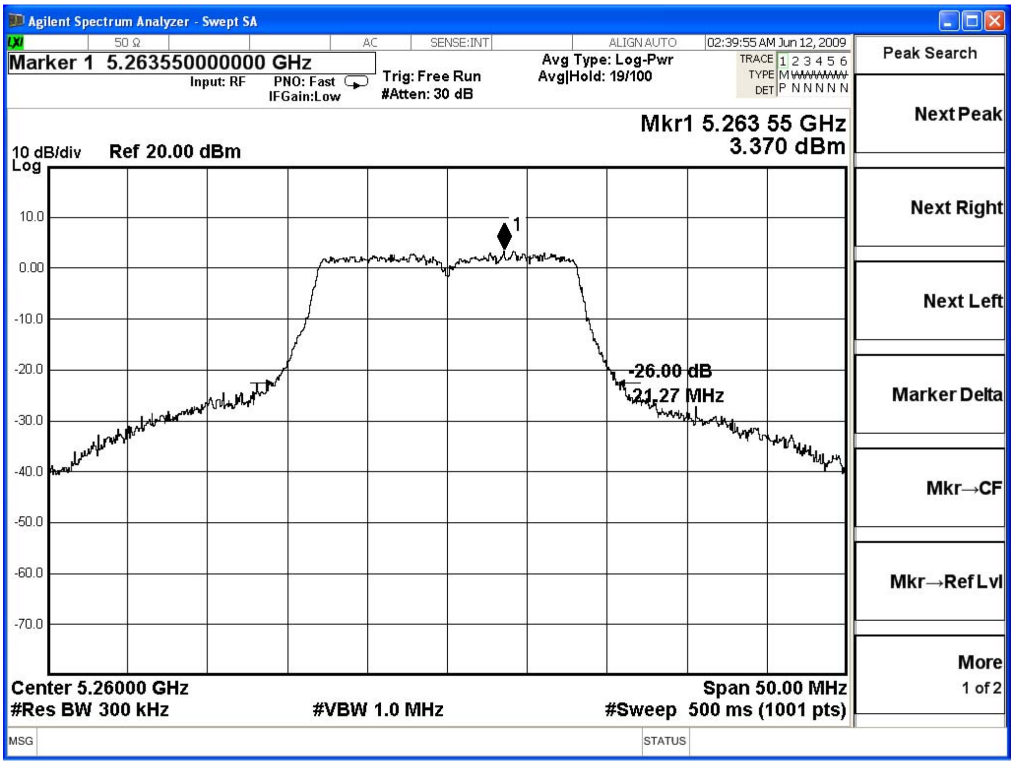


**Peak Transmit Power Measurement:**

| Channel No | Frequency Range (MHz) | 26dB Bandwidth (MHz) | Output Power (dBm) | Output Power Limit | | Result |
|---|---|---|---|---|---|---|
| | | | | (dBm) | dBm+10log(BW) | |
| 52 | 5260 | 21.27 | 16.31 | 24 | 24.28 | Pass |

**26dBc Occupied Bandwidth:**

**Channel 52**

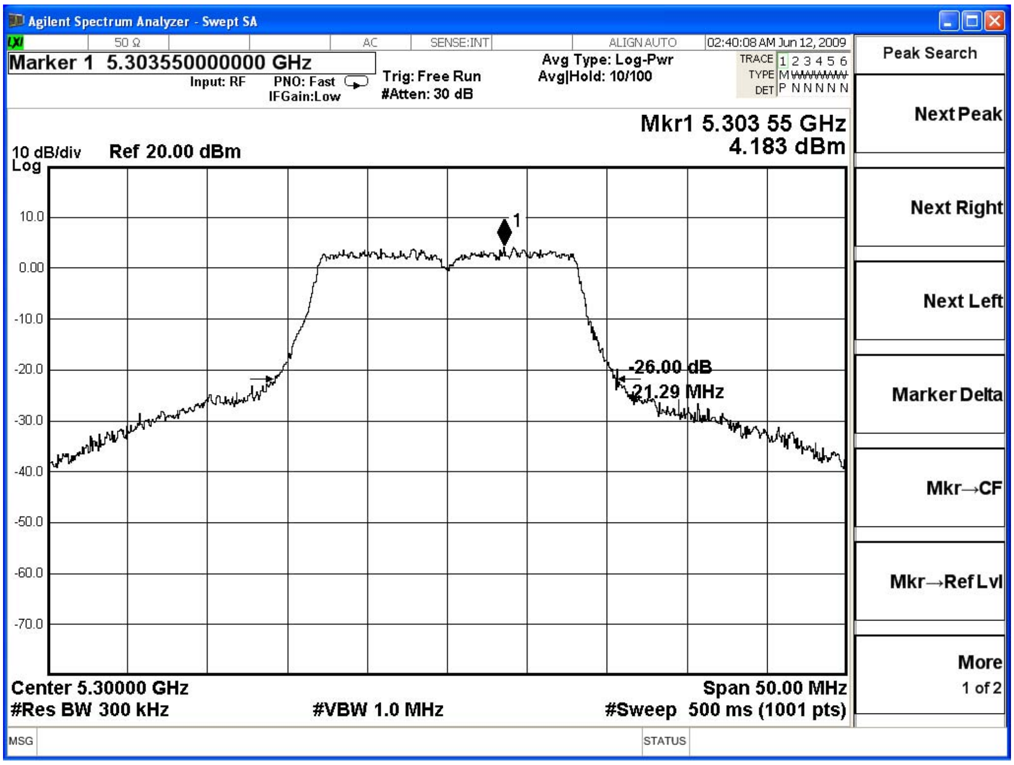


**Peak Transmit Power Measurement:**

| Channel No | Frequency Range (MHz) | 26dB Bandwidth (MHz) | Output Power (dBm) | Output Power Limit | | Result |
|---|---|---|---|---|---|---|
| | | | | (dBm) | dBm+10log(BW) | |
| 60 | 5300 | 21.29 | 16.3 | 24 | 24.28 | Pass |

**26dBc Occupied Bandwidth:**

**Channel 60**

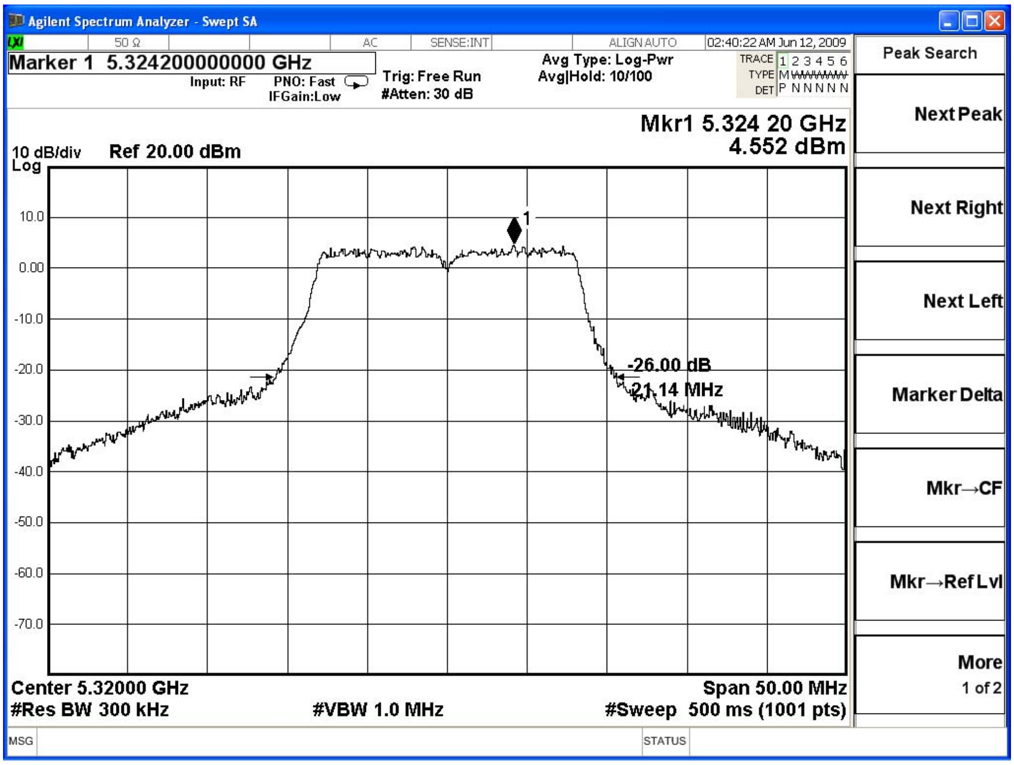


**Peak Transmit Power Measurement:**

| Channel No | Frequency Range (MHz) | 26dB Bandwidth (MHz) | Output Power (dBm) | Output Power Limit (dBm) | Output Power Limit dBm+10log(BW) | Result |
|---|---|---|---|---|---|---|
| 64 | 5320 | 21.14 | 16.33 | 24 | 24.25 | Pass |

**26dBc Occupied Bandwidth:**

**Channel 64**



Product : Notebook P.C.
Test Item : Peak Transmit Power
Test Site : No.3 OATS
Test Mode : Mode 2: Transmitter (802.11n-20BW 13.5Mbps)-Antenna 2

| Cable loss=1dB | | Peak Power Output | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Channel No. | Frequency (MHz) | Data Rate(MCS) | | | | | | | | Required Limit |
| | | 6 | 9 | 12 | 18 | 24 | 36 | 48 | 54 | |
| 36 | 5180 | 16.72 | -- | -- | -- | -- | -- | -- | -- | <17dBm |
| 44 | 5220 | 16.69 | -- | -- | -- | -- | -- | -- | -- | <17dBm |
| 48 | 5240 | 16.79 | -- | -- | -- | -- | -- | -- | -- | <17dBm |
| 52 | 5260 | 16.10 | 15.36 | 15.37 | 15.38 | 15.39 | 15.4 | 15.41 | 15.42 | <24dBm |
| 60 | 5300 | 16.18 | -- | -- | -- | -- | -- | -- | -- | <24dBm |
| 64 | 5320 | 16.62 | -- | -- | -- | -- | -- | -- | -- | <24dBm |

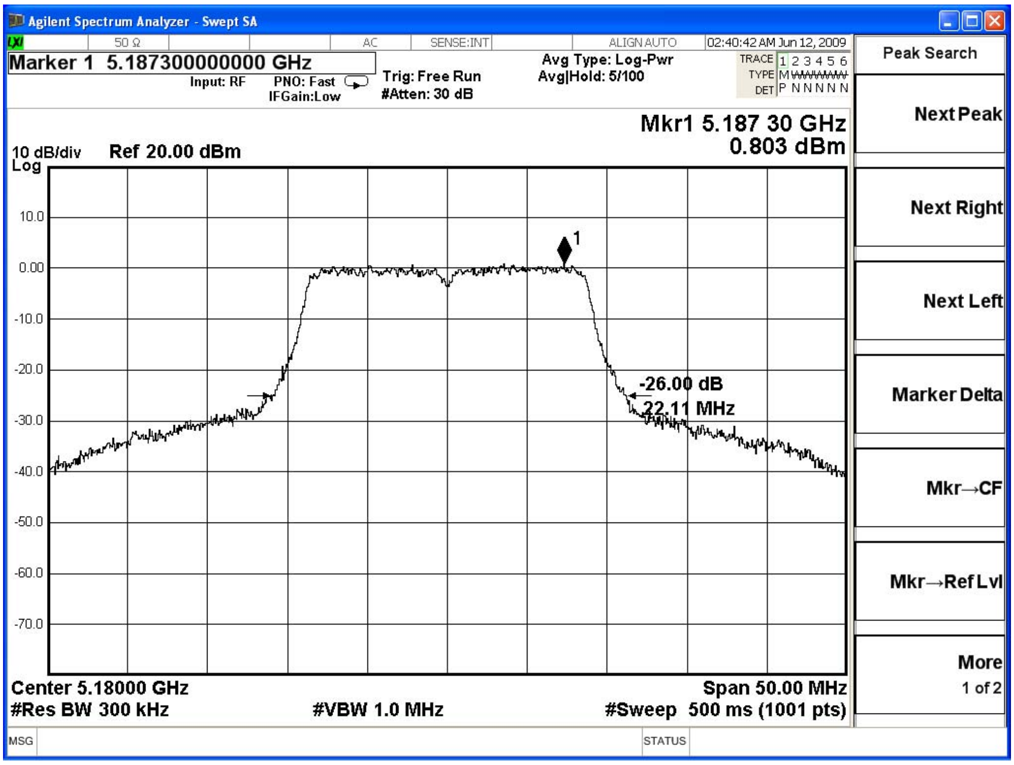
Note: Peak Power Output Value =Reading value on peak power meter + cable loss

**Peak Transmit Power Measurement:**

| Channel No | Frequency Range (MHz) | 26dB Bandwidth (MHz) | Output Power (dBm) | Output Power Limit | | Result |
|---|---|---|---|---|---|---|
| | | | | (dBm) | dBm+10log(BW) | |
| 36 | 5180 | 22.11 | 16.72 | 17 | 17.45 | Pass |

**26dBc Occupied Bandwidth:**

**Channel 36**

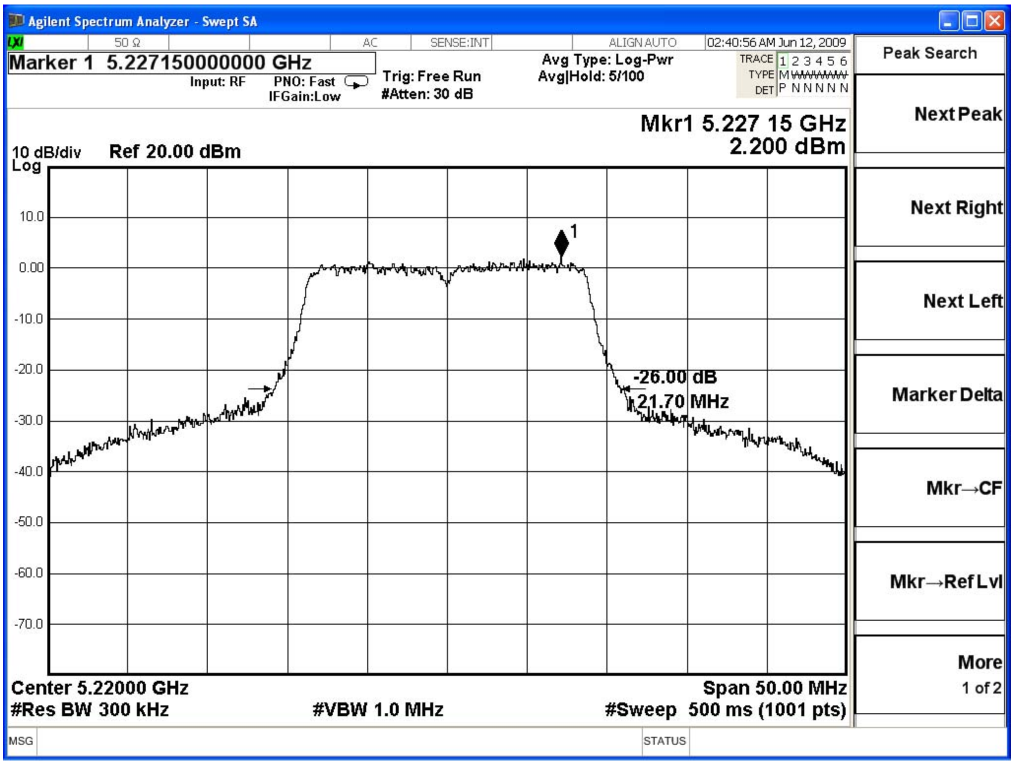


**Peak Transmit Power Measurement:**

| Channel No | Frequency Range (MHz) | 26dB Bandwidth (MHz) | Output Power (dBm) | Output Power Limit (dBm) | Output Power Limit dBm+10log(BW) | Result |
|---|---|---|---|---|---|---|
| 44 | 5220 | 21.7 | 16.69 | 17 | 17.36 | Pass |

**26dBc Occupied Bandwidth:**

**Channel 44**

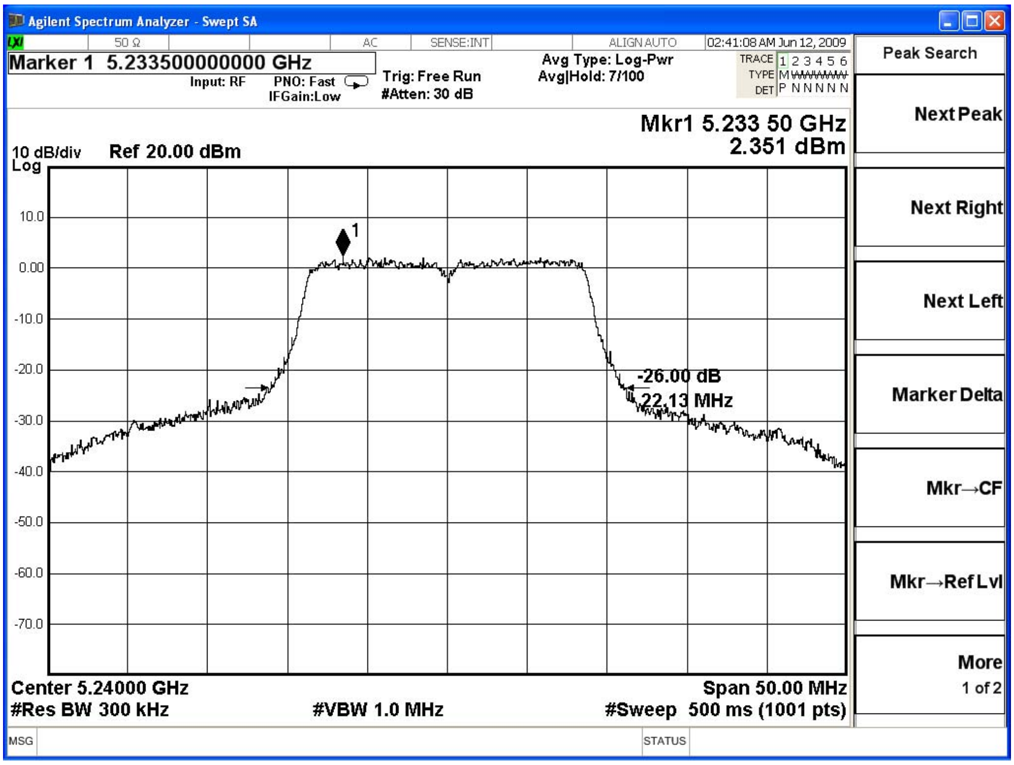


**Peak Transmit Power Measurement:**

| Channel No | Frequency Range (MHz) | 26dB Bandwidth (MHz) | Output Power (dBm) | Output Power Limit (dBm) | Output Power Limit dBm+10log(BW) | Result |
|---|---|---|---|---|---|---|
| 48 | 5240 | 22.23 | 16.79 | 17 | 17.47 | Pass |

**26dBc Occupied Bandwidth:**

**Channel 48**

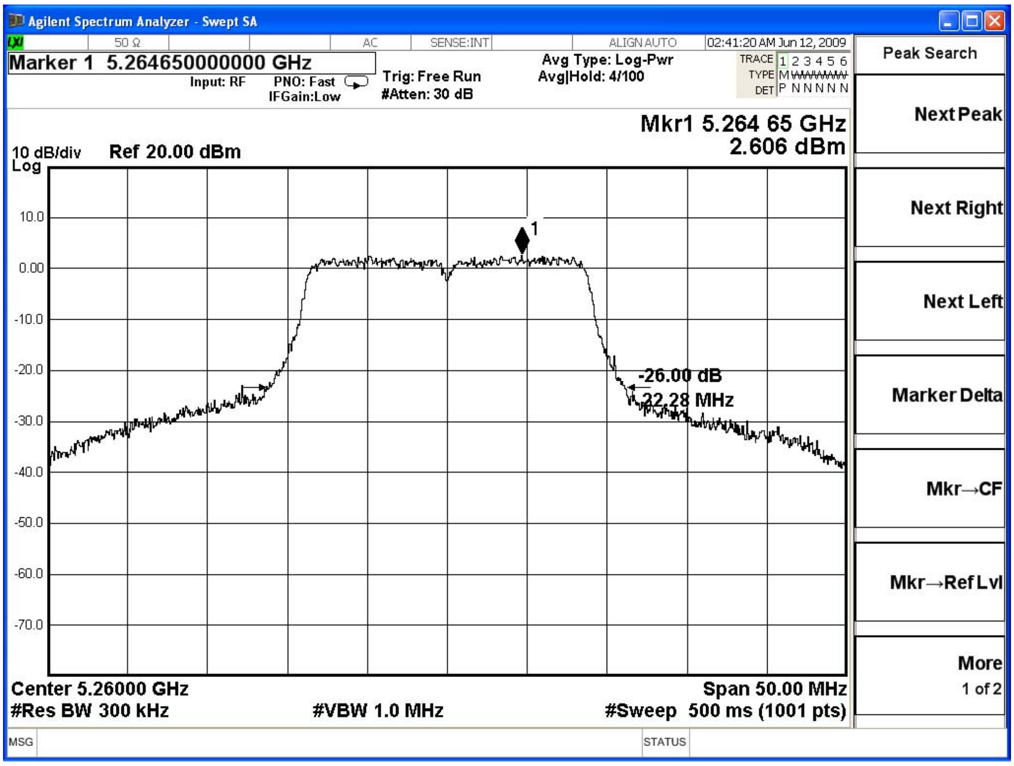


**Peak Transmit Power Measurement:**

| Channel No | Frequency Range (MHz) | 26dB Bandwidth (MHz) | Output Power (dBm) | Output Power Limit | | Result |
|---|---|---|---|---|---|---|
| | | | | (dBm) | dBm+10log(BW) | |
| 52 | 5260 | 22.28 | 16.1 | 24 | 24.48 | Pass |

**26dBc Occupied Bandwidth:**

**Channel 52**

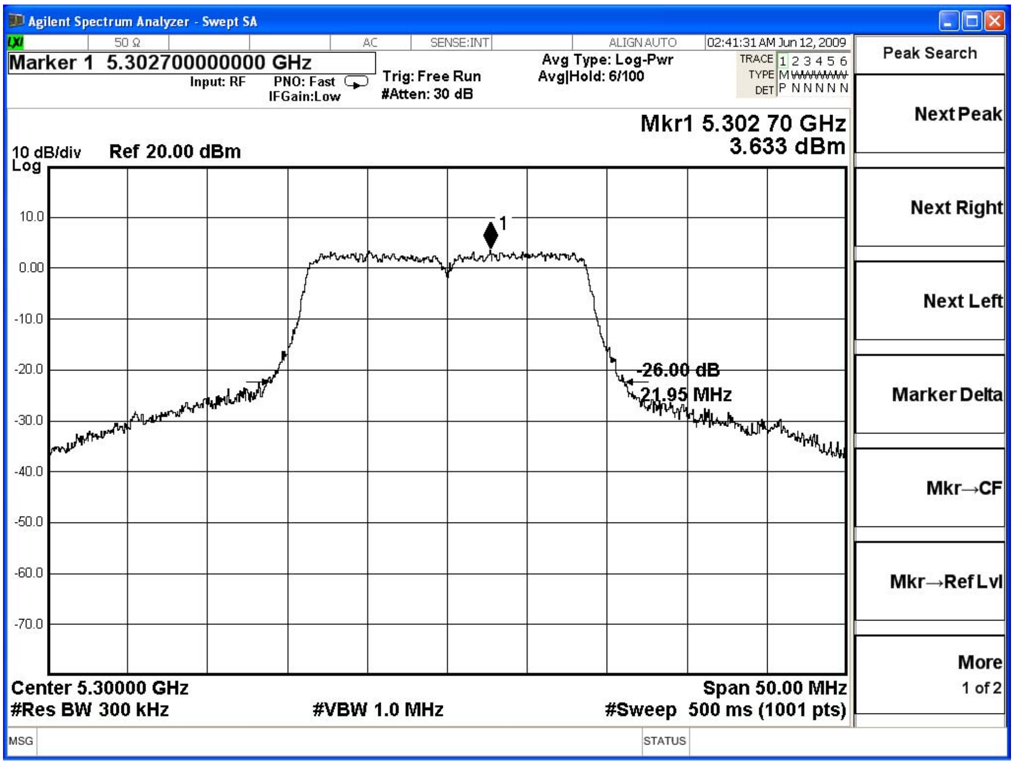


**Peak Transmit Power Measurement:**

| Channel No | Frequency Range (MHz) | 26dB Bandwidth (MHz) | Output Power (dBm) | Output Power Limit (dBm) | Output Power Limit dBm+10log(BW) | Result |
|---|---|---|---|---|---|---|
| 60 | 5300 | 21.95 | 16.18 | 24 | 24.41 | Pass |

**26dBc Occupied Bandwidth:**

**Channel 60**

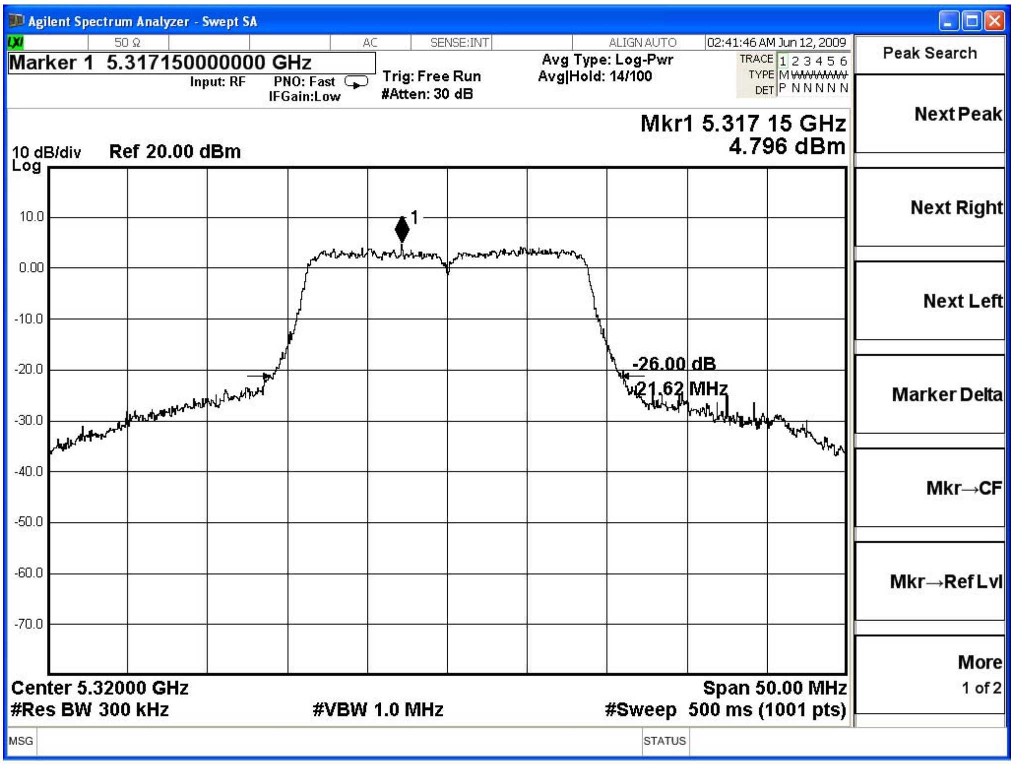


**Peak Transmit Power Measurement:**

| Channel No | Frequency Range (MHz) | 26dB Bandwidth (MHz) | Output Power (dBm) | Output Power Limit | | Result |
|---|---|---|---|---|---|---|
| | | | | (dBm) | dBm+10log(BW) | |
| 64 | 5320 | 21.62 | 16.62 | 24 | 24.35 | Pass |

**26dBc Occupied Bandwidth:**

**Channel 64**



Product : Notebook P.C.
Test Item : Peak Transmit Power
Test Site : No.3 OATS
Test Mode : Mode 3: Transmitter (802.11n-40BW 27Mbps)-Antenna 2

| Cable loss=1dB | | Peak Power Output | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Channel No. | Frequency (MHz) | Data Rate(MCS) | | | | | | | | Required Limit |
| | | 6 | 9 | 12 | 18 | 24 | 36 | 48 | 54 | |
| 38 | 5190 | 16.19 | -- | -- | -- | -- | -- | -- | -- | <17dBm |
| 46 | 5230 | 16.89 | -- | -- | -- | -- | -- | -- | -- | <17dBm |
| 54 | 5270 | 16.68 | 16.55 | 16.32 | 16.15 | 15.85 | 16.22 | 16.33 | 16.25 | <24dBm |
| 62 | 5310 | 16.87 | -- | -- | -- | -- | -- | -- | -- | <24dBm |

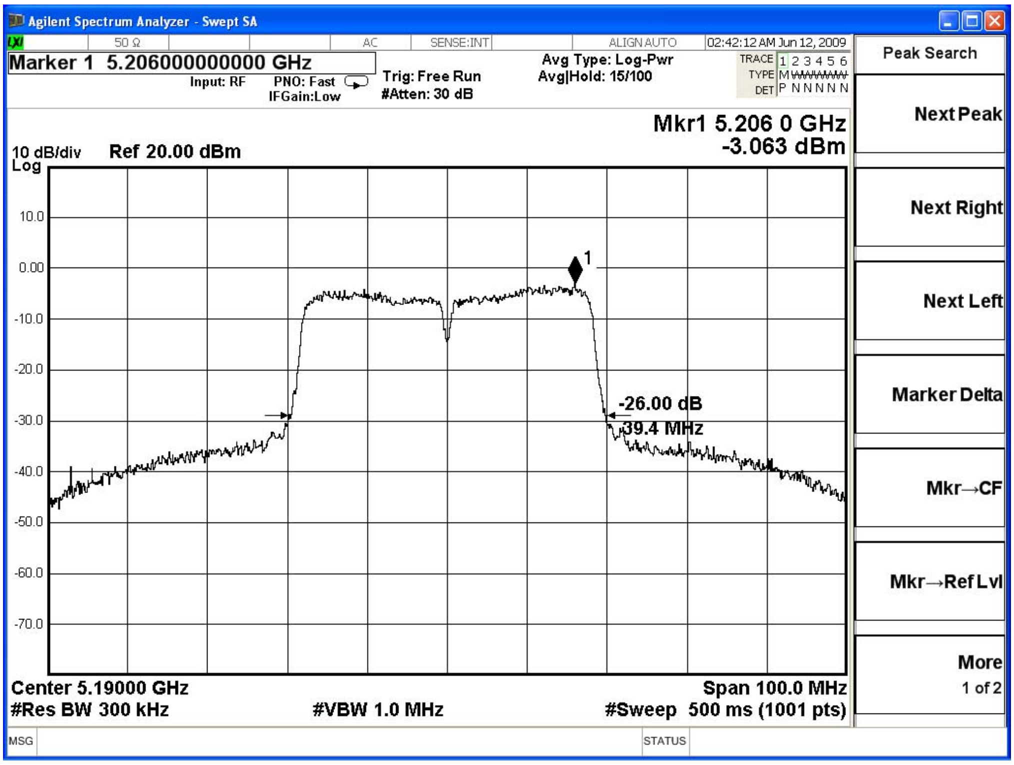
Note: Peak Power Output Value =Reading value on peak power meter + cable loss

**Peak Transmit Power Measurement:**

| Channel No | Frequency Range (MHz) | 26dB Bandwidth (MHz) | Output Power (dBm) | Output Power Limit | | Result |
|---|---|---|---|---|---|---|
| | | | | (dBm) | dBm+10log(BW) | |
| 38 | 5190 | 39.4 | 16.19 | 17 | 19.95 | Pass |

**26dBc Occupied Bandwidth:**

**Channel 38**

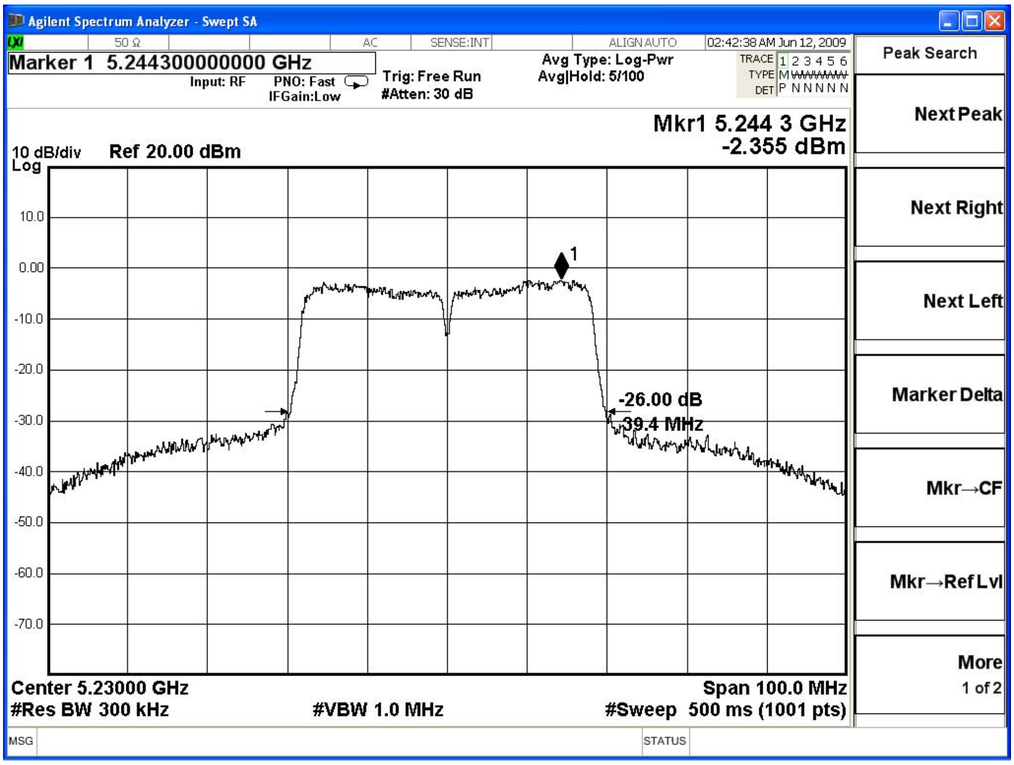


**Peak Transmit Power Measurement:**

| Channel No | Frequency Range (MHz) | 26dB Bandwidth (MHz) | Output Power (dBm) | Output Power Limit | | Result |
|---|---|---|---|---|---|---|
| | | | | (dBm) | dBm+10log(BW) | |
| 46 | 5230 | 39.4 | 16.89 | 17 | 19.95 | Pass |

**26dBc Occupied Bandwidth:**

**Channel 46**

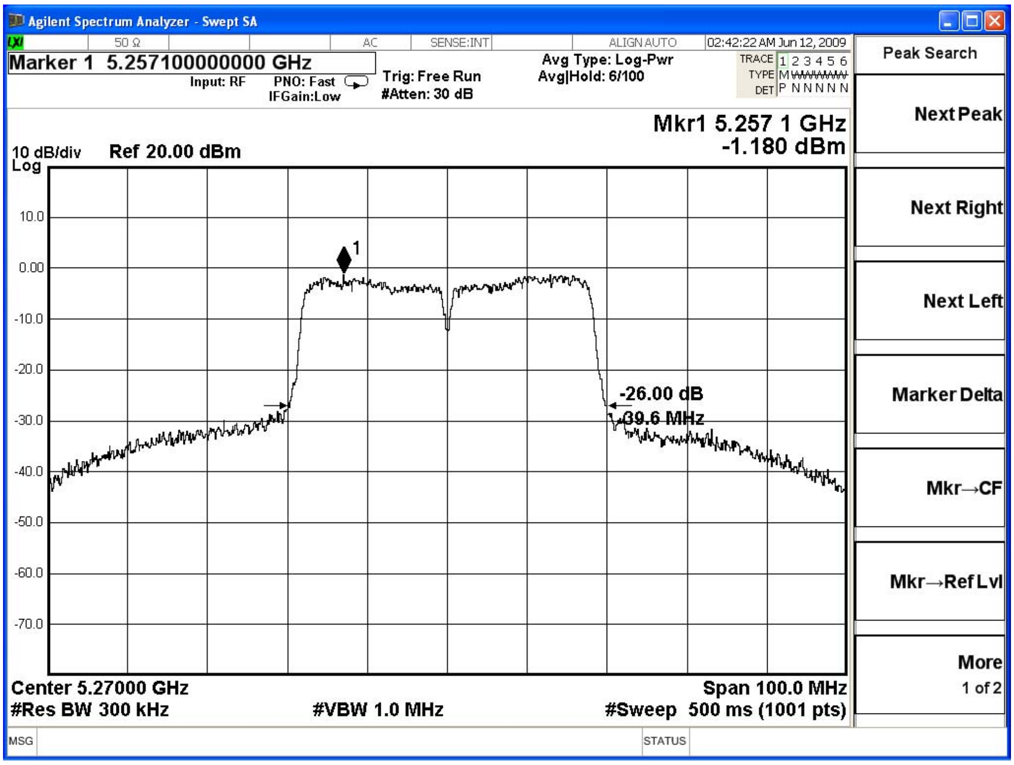


**Peak Transmit Power Measurement:**

| Channel No | Frequency Range (MHz) | 26dB Bandwidth (MHz) | Output Power (dBm) | Output Power Limit (dBm) | Output Power Limit dBm+10log(BW) | Result |
|---|---|---|---|---|---|---|
| 54 | 5270 | 39.6 | 16.68 | 24 | 26.98 | Pass |

**26dBc Occupied Bandwidth:**

**Channel 54**

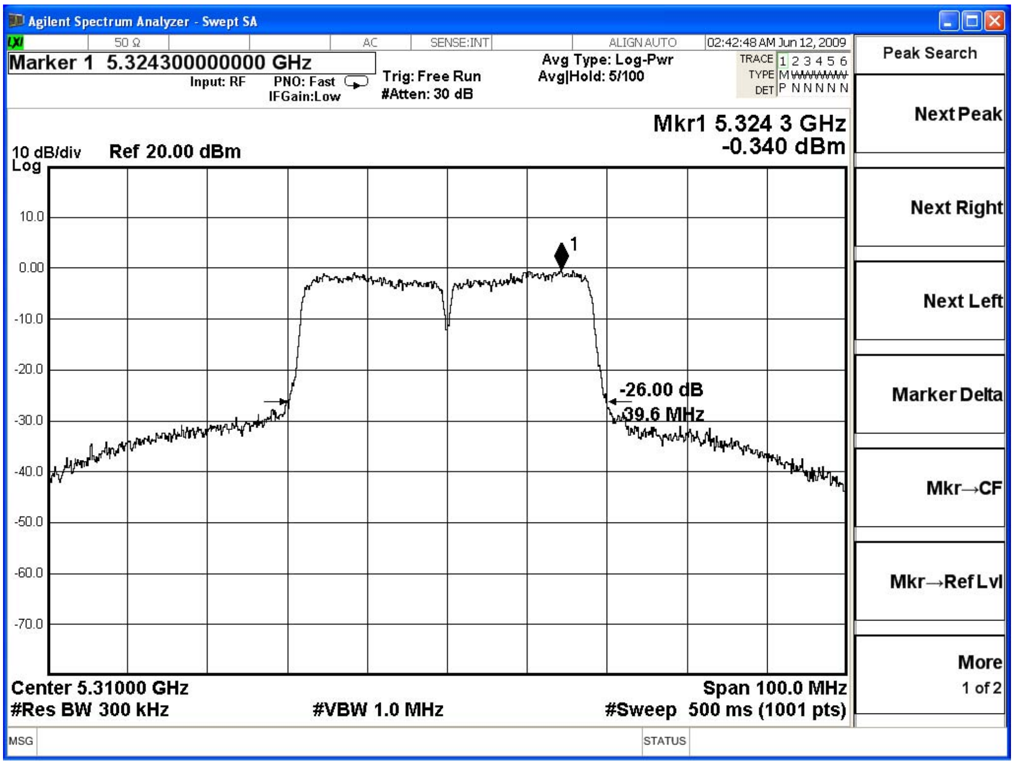


**Peak Transmit Power Measurement:**

| Channel No | Frequency Range (MHz) | 26dB Bandwidth (MHz) | Output Power (dBm) | Output Power Limit | | Result |
|---|---|---|---|---|---|---|
| | | | | (dBm) | dBm+10log(BW) | |
| 62 | 5310 | 39.6 | 16.87 | 24 | 26.98 | Pass |

**26dBc Occupied Bandwidth:**

**Channel 62**



# 4. Peak Power Spectral Density

## 4.1. Test Equipment

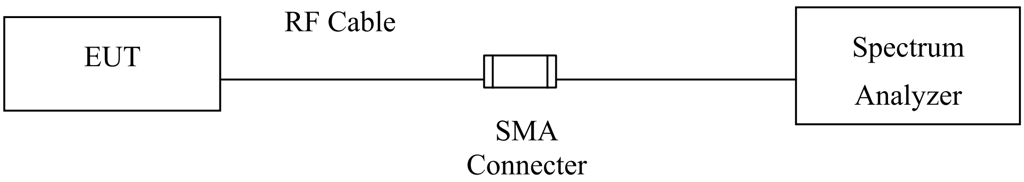
The following test equipments are used during the radiated emission tests:

| | Equipment | Manufacturer | Model No./Serial No. | Last Cal. |
|---|---|---|---|---|
| X | Spectrum Analyzer | Agilent | E4407B / US39440758 | May, 2009 |

Note: 1. All equipments are calibrated every one year.

2. The test instruments marked by “X” are used to measure the final test results.

## 4.2. Test Setup




## 4.3. Limits

(4) For the band 5.15-5.25 GHz, the peak power spectral density shall not exceed 4 dBm in any 1-MHz band. If transmitting antenna of directional gain greater than 6 dBi are used, the peak power spectral density shall be reduced by the amount in dB that directional gain of the antenna exceeds 6 dBi.

(5) For the band 5.25-5.35 GHz, the peak power spectral density shall not exceed 11 dBm in any 1-MHz band. If transmitting antenna of directional gain greater than 6 dBi are used, the peak power spectral density shall be reduced by the amount in dB that directional gain of the antenna exceeds 6 dBi.

(6) For the band 5.725-5.825 GHz, the peak power spectral density shall not exceed 17 dBm in any 1-MHz band. If transmitting antenna of directional gain greater than 6 dBi are used, the peak power spectral density shall be reduced by the amount in dB that directional gain of the antenna exceeds 6 dBi.

## 4.4. Test Procedure

The EUT was setup to ANSI C63.4, 2003; tested to DTS test procedure of Aug 2002 DA 02-2138 for compliance to FCC 47CFR Subpart E requirements.

## 4.5. Uncertainty

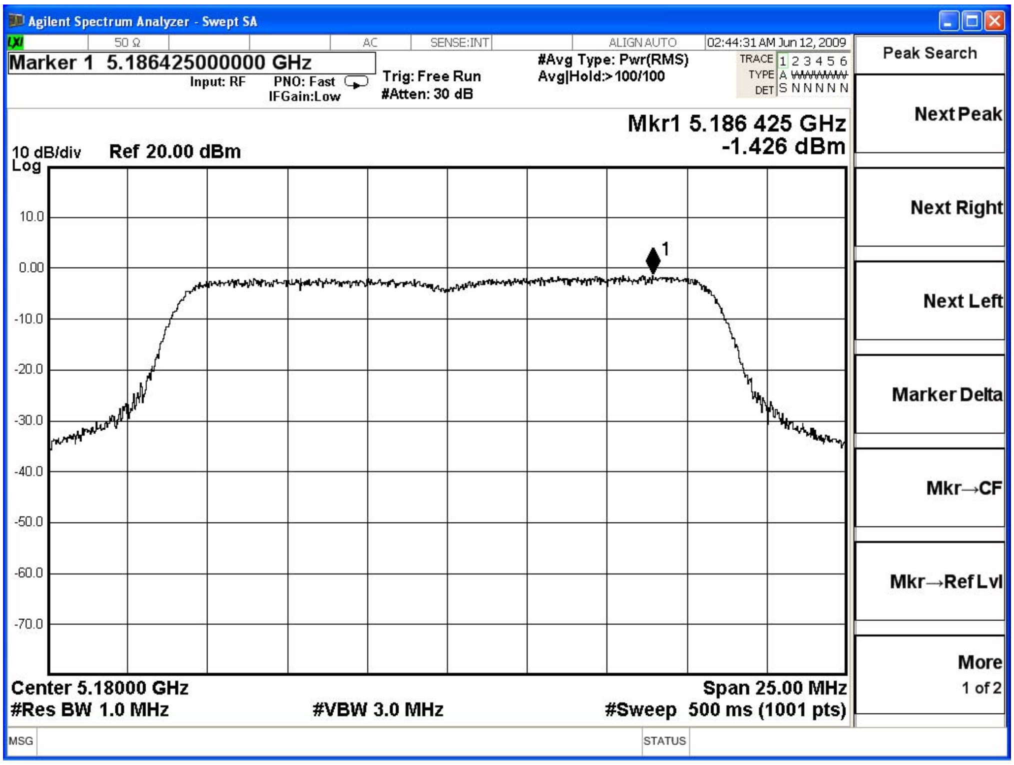
± 1.27 dB

## 4.6. Test Result of Peak Power Spectral Density

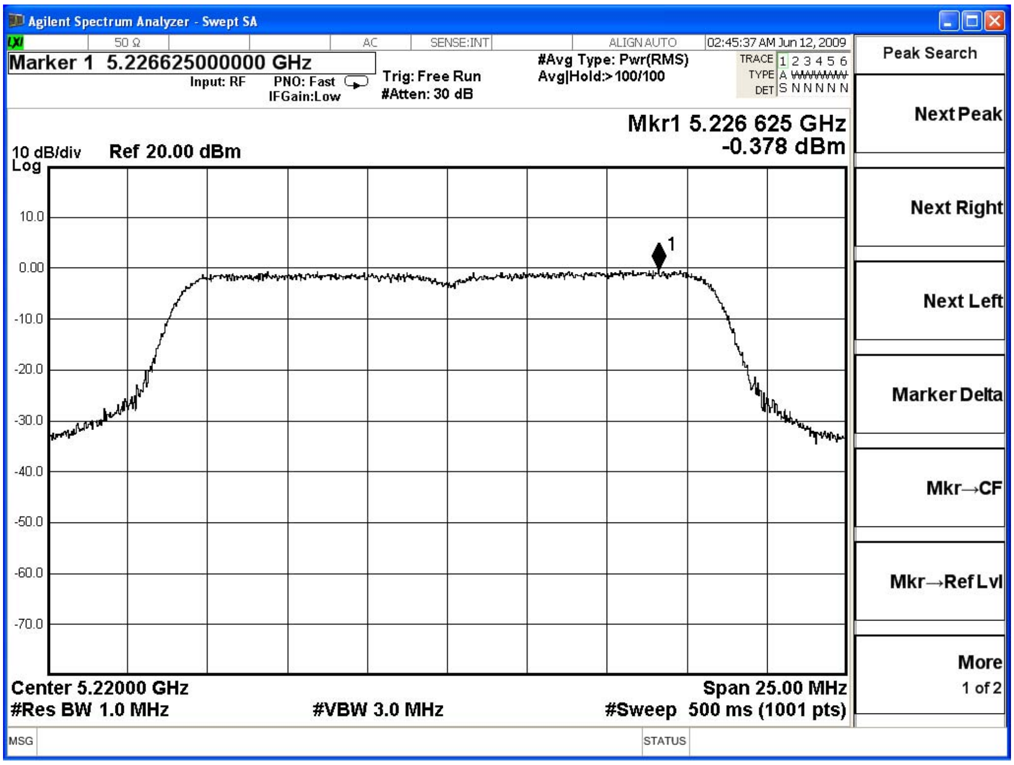
| | | |
|---|---|---|
| Product | : | Notebook P.C. |
| Test Item | : | Peak Power Spectral Density |
| Test Site | : | No.3 OATS |
| Test Mode | : | Mode 1: Transmitter (802.11a-6Mbps)-Antenna 2 |

| Channel No. | Frequency (MHz) | Measurement Level (dBm) | Required Limit (dBm) | Result |
|---|---|---|---|---|
| 36 | 5180 | -1.43 | <4 | Pass |
| 44 | 5220 | -0.38 | <4 | Pass |
| 48 | 5240 | 0.30 | <4 | Pass |
| 52 | 5260 | 0.77 | <11 | Pass |
| 60 | 5300 | 1.29 | <11 | Pass |
| 64 | 5320 | 1.94 | <11 | Pass |

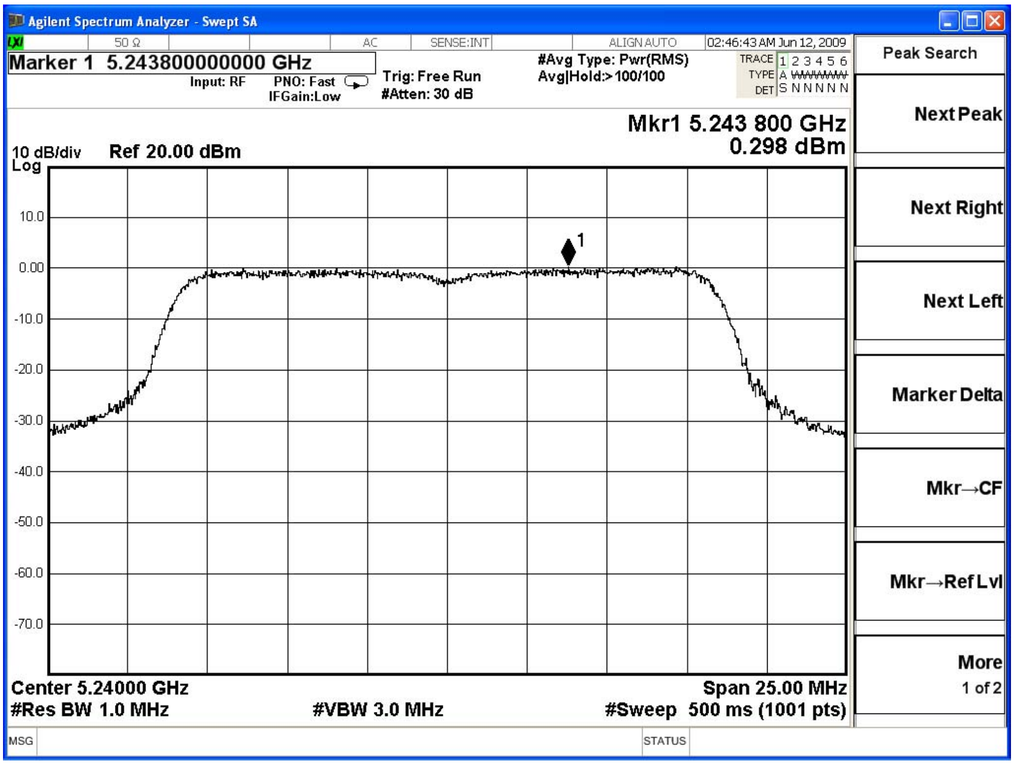
**Channel 36:**



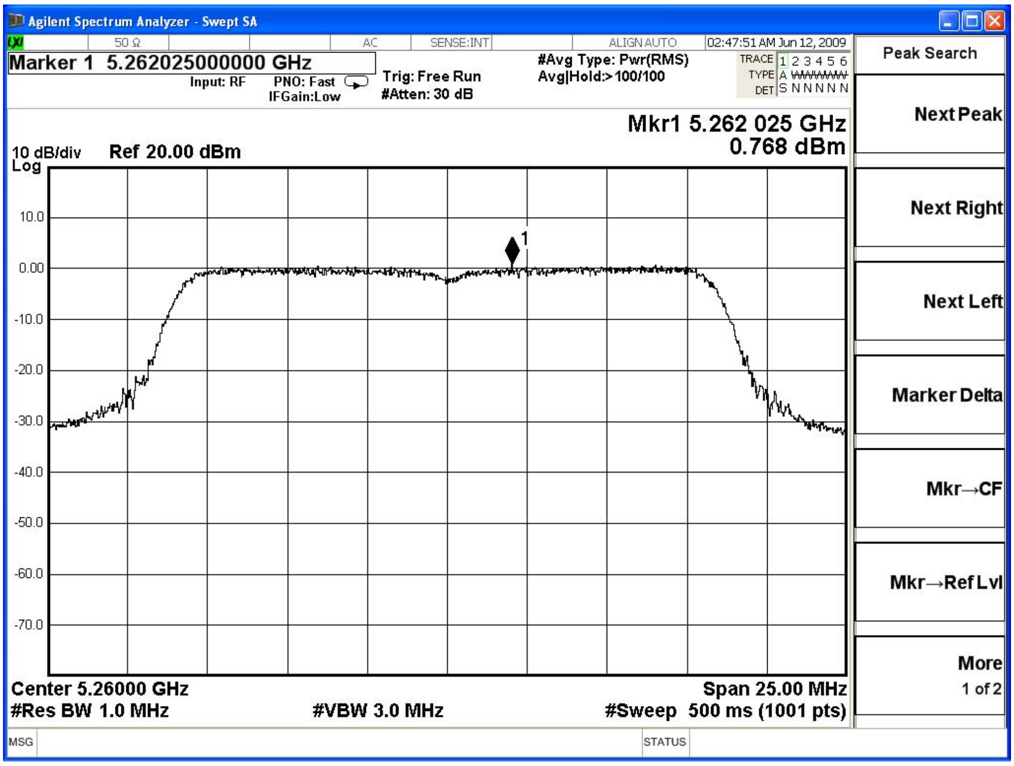
**Channel 44:**



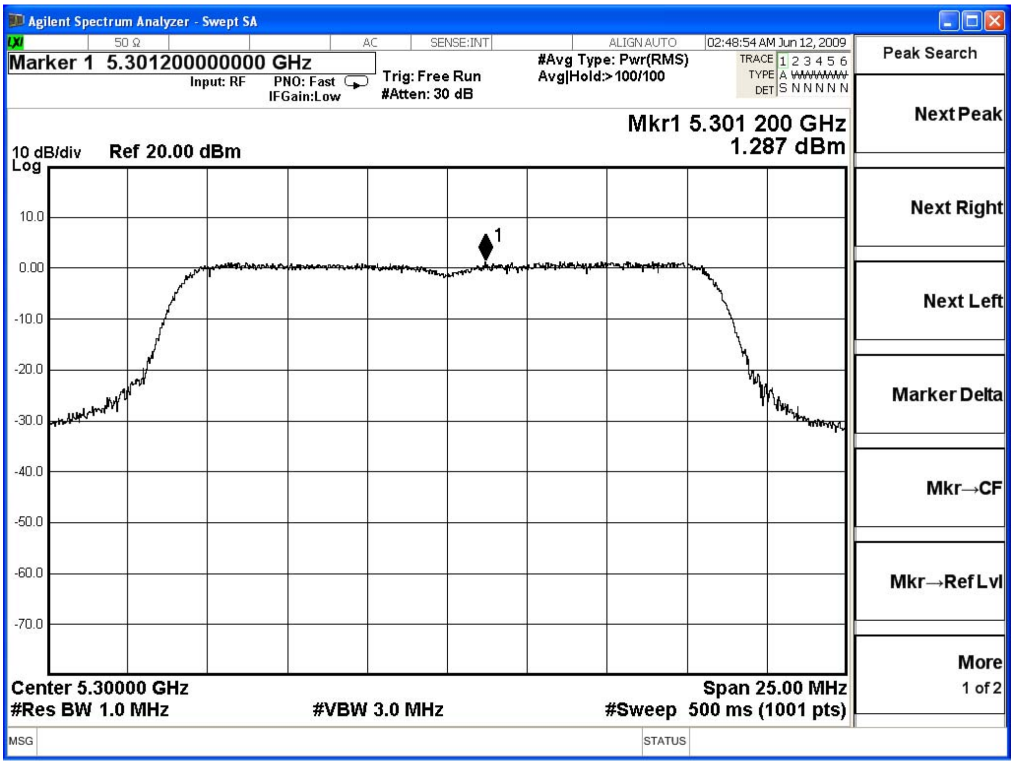

**Channel 48:**



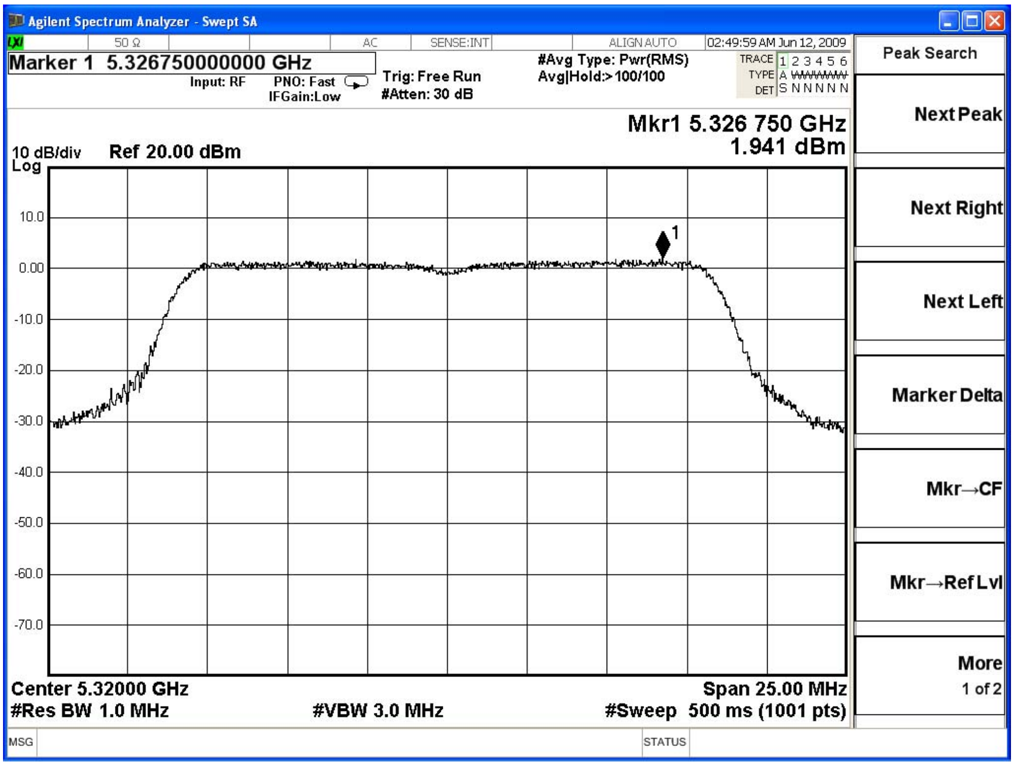
**Channel 52:**




**Channel 60:**



**Channel 64:**


Agilent Spectrum Analyzer - Swept SA
Marker 1 5.326750000000 GHz
Input: RF
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 30 dB
#Avg Type: Pwr(RMS)
Avg|Hold:>100/100
02:49:59 AM Jun 12, 2009
Peak Search
Mkr1 5.326 750 GHz
1.941 dBm
10 dB/div
Log
Ref 20.00 dBm
Next Peak
Next Right
Next Left
Marker Delta
Mkr→CF
Mkr→Ref Lvl
More
1 of 2
Center 5.32000 GHz
#Res BW 1.0 MHz
#VBW 3.0 MHz
Span 25.00 MHz
#Sweep 500 ms (1001 pts)
MSG
STATUS