



Test Report

Product Name : Dual-band Wireless USB Adapter
Model No. : USB-N53
FCC ID. : MSQ-USBN53

Applicant : ASUSTeK COMPUTER INC.

Address : No. 15, Li-Te Rd., Peitou, Taipei 112, Taiwan R.O.C.

Date of Receipt : 2011/05/11
Issued Date : 2011/06/29
Report No. : 115250R-RFUSP46V01
Report Version : V1.0

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.

Test Report Certification

Issued Date : 2011/06/29

Report No. : 115250R-RFUSP46V01



Product Name : Dual-band Wireless USB Adapter
 Applicant : ASUSTeK COMPUTER INC.
 Address : No. 15, Li-Te Rd., Peitou, Taipei 112, Taiwan R.O.C.
 Manufacturer : Askey Technology (Jiangsu) LTD.
 Model No. : USB-N53
 FCC ID. : MSQ-USBN53
 EUT Voltage : DC 5V (Power by PC)
 Trade Name : ASUS
 Applicable Standard : FCC CFR Title 47 Part 15 Subpart C Section 15.407:2010
 ANSI C63.4: 2009
 Test Result : Complied

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.

Documented By : Sandy Chuang
 (Sandy Chuang / Adm. Specialist)

Reviewed By : Ben Huang
 (Ben Huang / Engineer)

Approved By : Roy Wang
 (Roy Wang / Manager)

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1. General Information

1.1. EUT Description

| | |
|---|--|
| Product Name | Dual-band Wireless USB Adapter |
| Product Type | WLAN (2TX, 2RX) |
| Trade Name | ASUS |
| Model No. | MSQ-USBN53 |
| Frequency Range -IEEE 802.11a & IEEE 802.11n (20MHz) | 5180~5240MHz |
| Frequency Range- IEEE 802.11n (40MHz) | 5190~5230MHz |
| Channel Number - IEEE 802.11a & IEEE 802.11n (20MHz)) | 4 |
| Channel Number- IEEE 802.11n (40MHz) | 2 |
| Type of Modulation (IEEE 802.11a/n) | Orthogonal Frequency Division Multiplexing (OFDM) |
| Data Speed (IEEE 802.11a) | 6Mbps,9Mbps,12Mbps,18Mbps,24Mbps,36Mbps,48Mbps,54Mbps |
| Data Speed (IEEE 802.11n) | Support a subset of the combination of GI, MCS 0~MCS 15 and bandwidth defined in 802.11n |
| Antenna Gain | 3.17dBi |
| Channel Control | Manual |
| Antenna Type | PIFA antenna |

| | |
|-----------|---------------------|
| Component | |
| LAN Cable | Non-Shielded, 0.15m |

ANT-TX / Rx & Bandwidth

| ANT-TX / RX | SINGLE-TX | | TWO-TX | | RX | |
|-------------------------|-----------|-------|--------|-------|-------|-------|
| Mode/ Channel Bandwidth | 20MHz | 40MHz | 20MHz | 40MHz | 20MHz | 40MHz |
| IEEE802.11a | ✓ | | | | ✓ | |
| IEEE802.11n | | | ✓ | ✓ | ✓ | ✓ |

IEEE 802.11n

| MCS Index | Modulation | R | N _{BPSCS} | N _{CBPS} | | N _{DBPS} | | Data Rate(Mb/s) | | | |
|-----------|------------|-----|--------------------|-------------------|-------|-------------------|-------|-----------------|-------|------------------|-------|
| | | | | 20MHz | 40MHz | 20MHz | 40MHz | 800ns GI | | 400ns GI (Note1) | |
| | | | | | | | | 20MHz | 40MHz | 20MHz | 40MHz |
| 0 | BPSK | 1/2 | 1 | 52 | 108 | 26 | 54 | 6.5 | 13.5 | 7.2 | 15.0 |
| 1 | QPSK | 1/2 | 2 | 104 | 216 | 52 | 108 | 13.0 | 27.0 | 14.4 | 30.0 |
| 2 | QPSK | 3/4 | 2 | 104 | 216 | 78 | 162 | 19.5 | 40.5 | 21.7 | 45.0 |
| 3 | 16-QAM | 1/2 | 4 | 208 | 432 | 104 | 216 | 26.0 | 54.0 | 28.9 | 60.0 |
| 4 | 16-QAM | 3/4 | 4 | 208 | 432 | 156 | 324 | 39.0 | 81.0 | 43.3 | 90.0 |
| 5 | 64-QAM | 2/3 | 6 | 312 | 648 | 208 | 432 | 52.0 | 108.0 | 57.8 | 120.0 |
| 6 | 64-QAM | 3/4 | 6 | 312 | 648 | 234 | 486 | 58.5 | 121.5 | 65.0 | 135.0 |
| 7 | 64-QAM | 5/6 | 6 | 312 | 648 | 260 | 540 | 65.0 | 135.0 | 72.2 | 150.0 |

Note 1: Support of 400ns GI is optional on transmit and receive.

Table 1 – MCS parameters for TX Antenna number = 1

| MCS Index | Modulation | R | N _{BPSCS} | N _{CBPS} | | N _{DBPS} | | Data Rate(Mb/s) | | | |
|-----------|------------|-----|--------------------|-------------------|-------|-------------------|-------|-----------------|-------|------------------|-------|
| | | | | 20MHz | 40MHz | 20MHz | 40MHz | 800ns GI | | 400ns GI (Note1) | |
| | | | | | | | | 20MHz | 40MHz | 20MHz | 40MHz |
| 8 | BPSK | 1/2 | 1 | 104 | 216 | 52 | 108 | 13.0 | 27.0 | 14.4 | 30.0 |
| 9 | QPSK | 1/2 | 2 | 208 | 432 | 104 | 216 | 26.0 | 54.0 | 28.9 | 60.0 |
| 10 | QPSK | 3/4 | 2 | 208 | 432 | 156 | 324 | 39.0 | 81.0 | 43.3 | 90.0 |
| 11 | 16-QAM | 1/2 | 4 | 416 | 864 | 208 | 432 | 52.0 | 108.0 | 57.8 | 120.0 |
| 12 | 16-QAM | 3/4 | 4 | 416 | 864 | 312 | 648 | 78.0 | 162.0 | 86.7 | 180.0 |
| 13 | 64-QAM | 2/3 | 6 | 624 | 1296 | 416 | 864 | 104.0 | 216.0 | 115.6 | 240.0 |
| 14 | 64-QAM | 3/4 | 6 | 624 | 1296 | 468 | 972 | 117.0 | 243.0 | 130.0 | 270.0 |
| 15 | 64-QAM | 5/6 | 6 | 624 | 1296 | 520 | 1080 | 130.0 | 270.0 | 144.4 | 300.0 |

Note 1: Support of 400ns GI is optional on transmit and receive.

Table 2 – MCS parameters for TX Antenna number = 2

| Symbol | Explanation |
|-------------------|---|
| R | Code rate |
| N _{BPSC} | Number of coded bits per single carrier |
| N _{CBPS} | Number of coded bits per symbol |
| N _{DBPS} | Number of data bits per symbol |
| GI | guard interval |

IEEE 802.11a & IEEE 802.11n (20MHz)

| Working Frequency of Each Channel | | | | | | | |
|-----------------------------------|-----------|---------|-----------|---------|-----------|---------|-----------|
| Channel | Frequency | Channel | Frequency | Channel | Frequency | Channel | Frequency |
| 36 | 5180MHz | 40 | 5200MHz | 44 | 5220MHz | 48 | 5240MHz |

IEEE 802.11n (40MHz)

| Working Frequency of Each Channel | | | |
|-----------------------------------|-----------|---------|-----------|
| Channel | Frequency | Channel | Frequency |
| 38 | 5190MHz | 46 | 5230MHz |

Note:

1. This device is a Dual-band Wireless USB Adapter including 2.4GHz b/g/n and 5GHz a/n (2x2) transmitting and receiving function.
2. These test results on a sample of the device are for the purpose of demonstrating Compliance with Part 15 Subpart C Paragraph 15.407.
3. Regards to the frequency band operation; the lowest , middle and highest frequency of channel were selected to perform the test, and then shown on this report.
4. The function of the 2.4GHz & 5.8GHz transmitting is measured and makes a test report of the report number: 115250R-RFUSP42V01.
5. This device is a composite device in accordance with Part 15 regulations. The receiving function receiving was tested and its test report number is 115250R-RFUSP37V02 under Declaration of Conformity.

1.3. Test Mode

Quietek has verified the construction and function in typical operation. The preliminary tests were performed in different data rate, and to find the worst condition, which was shown in this test report. The following table is the final test mode.

| | |
|----|------------------|
| TX | Mode 1: Transmit |
|----|------------------|

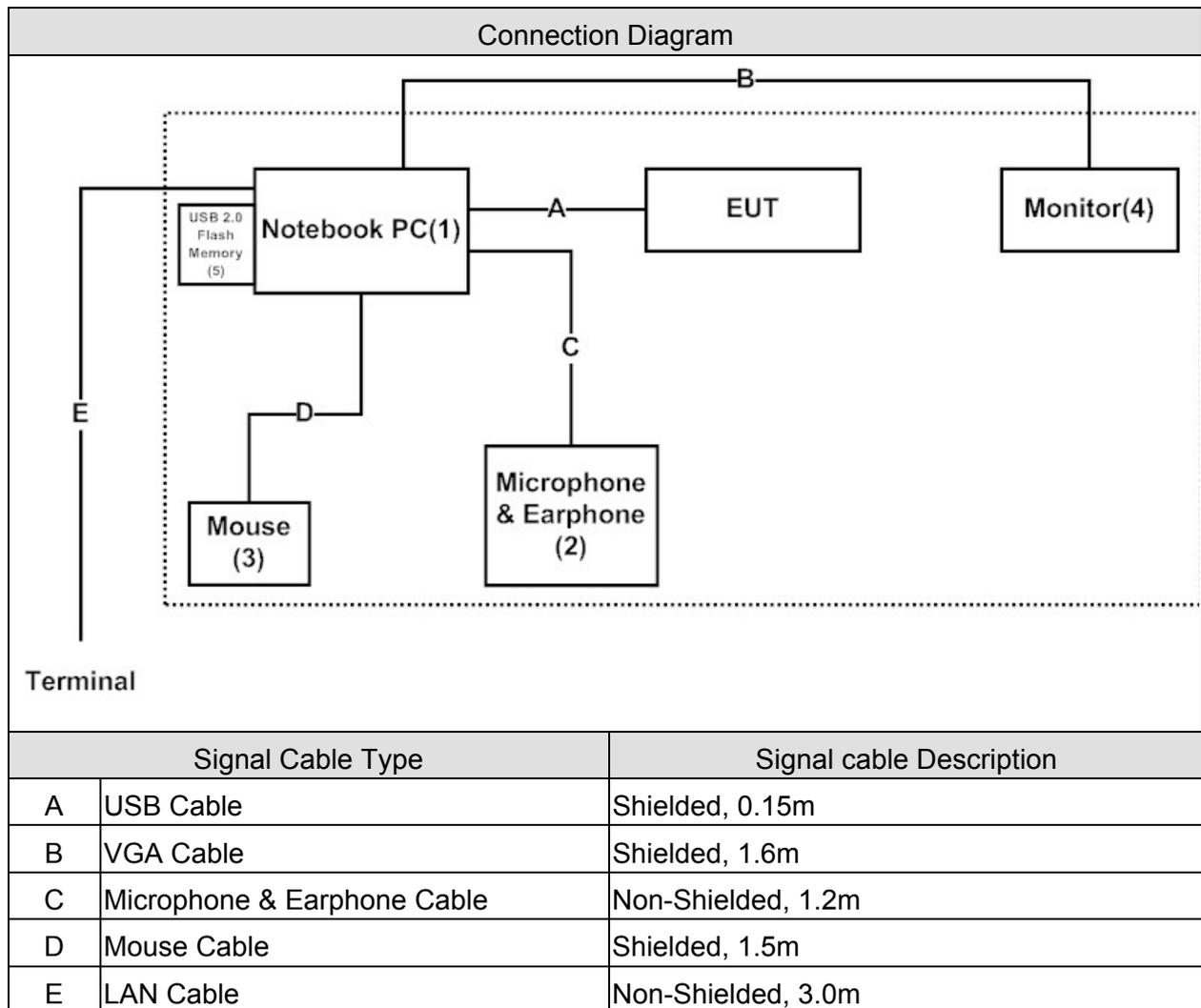
| Test Items | Mode1 | Channel | Antenna | Result |
|-----------------------------|------------|----------|---------|----------|
| Conducted Emission | 11n(40MHz) | 38 | A+B | Complies |
| 99 % & 26dB Bandwidth | a | 36/44/48 | A | Complies |
| | 11n(20MHz) | 36/44/48 | A/B | Complies |
| | 11n(40MHz) | 38/46 | A/B | Complies |
| Peak Transmit Power | a | 36/44/48 | A | Complies |
| | 11n(20MHz) | 36/44/48 | A+B | Complies |
| | 11n(40MHz) | 38/46 | A+B | Complies |
| Peak Power Spectrum Density | a | 36/44/48 | A | Complies |
| | 11n(20MHz) | 36/44/48 | A+B | Complies |
| | 11n(40MHz) | 38/46 | A+B | Complies |
| Power Excursion | a | 36/44/48 | A | Complies |
| | 11n(20MHz) | 36/44/48 | A/B | Complies |
| | 11n(40MHz) | 38/46 | A/B | Complies |
| Radiated Emission | a | 36/44/48 | A | Complies |
| | 11n(20MHz) | 36/44/48 | A+B | Complies |
| | 11n(40MHz) | 38/46 | A+B | Complies |
| Band Edge | a | 36 | A | Complies |
| | 11n(20MHz) | 36 | A+B | Complies |
| | 11n(40MHz) | 38 | A+B | Complies |
| Frequency Stability | a | 36/48 | A | Complies |
| | 11n(20MHz) | 36/48 | A/B | Complies |
| | 11n(40MHz) | 38/46 | A/B | Complies |

1.4. Tested System Details

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

| Product | Manufacturer | Model No. | Serial No. | FCC ID | Power Cord |
|-------------------------|--------------|-----------|----------------------------|--------|--------------------|
| 1 Notebook PC | ACER | PAV70 | LUSEW0D0371105 FE221601 | DoC | Non-Shielded, 2.5m |
| 2 Microphone & Earphone | Fujiei | SBZ-38 | N/A | DoC | -- |
| 3 Mouse | Logitech | M-SBF83 | HCA52200185 | DoC | -- |
| 4 Monitor | CHI MEI | A170E1-09 | 3UC120955SA1250 | DoC | Non-Shielded, 1.8m |
| 5 USB 2.0 Flash Memory | Sony | USM2GJX | N/A | DoC | -- |

1.5. Configuration of tested System



1.6. EUT Exercise Software

| | |
|---|---|
| 1 | Setup the EUT as shown in Section 1.5 |
| 2 | Execute the RT3x7xQA.exe on the EUT |
| 3 | Configure the test mode, the test channel, and the data rate. |
| 4 | Press "Start TX" to start the continuous transmitting. |
| 5 | Verify that the EUT works properly. |

1.7. Test Facility

Ambient conditions in the laboratory:

| Items | Test Item | Required (IEC 68-1) | Actual |
|----------------------------|---|---------------------|----------|
| Temperature (°C) | FCC PART 15 C 15.407 Conducted Emission | 15 - 35 | 20 |
| Humidity (%RH) | | 25 - 75 | 50 |
| Barometric pressure (mbar) | | 860 - 1060 | 950-1000 |
| Temperature (°C) | FCC PART 15 C 15.407 99 % & 26dB Bandwidth | 15 - 35 | 25 |
| Humidity (%RH) | | 25 - 75 | 48 |
| Barometric pressure (mbar) | | 860 - 1060 | 950-1000 |
| Temperature (°C) | FCC PART 15 C 15.407 Peak Transmit Power | 15 - 35 | 25 |
| Humidity (%RH) | | 25 - 75 | 65 |
| Barometric pressure (mbar) | | 860 - 1060 | 950-1000 |
| Temperature (°C) | FCC PART 15 C 15.407 Peak Power Spectrum | 15 - 35 | 24 |
| Humidity (%RH) | | 25 - 75 | 49 |
| Barometric pressure (mbar) | | 860 - 1060 | 950-1000 |
| Temperature (°C) | FCC PART 15 C 15.407 Density | 15 - 35 | 25 |
| Humidity (%RH) | | 25 - 75 | 48 |
| Barometric pressure (mbar) | | 860 - 1060 | 950-1000 |
| Temperature (°C) | FCC PART 15 C 15.407 Power Excursion | 15 - 35 | 25 |
| Humidity (%RH) | | 25 - 75 | 48 |
| Barometric pressure (mbar) | | 860 - 1060 | 950-1000 |
| Temperature (°C) | FCC PART 15 C 15.407 Radiated Emission | 15 - 35 | 25 |
| Humidity (%RH) | | 25 - 75 | 48 |
| Barometric pressure (mbar) | | 860 - 1060 | 950-1000 |
| Temperature (°C) | FCC PART 15 C 15.407 Band Edge | 15 - 35 | 25 |
| Humidity (%RH) | | 25 - 75 | 48 |
| Barometric pressure (mbar) | | 860 - 1060 | 950-1000 |
| Temperature (°C) | FCC PART 15 C 15.407 Frequency Stability | 15 - 35 | 25 |
| Humidity (%RH) | | 25 - 75 | 48 |
| Barometric pressure (mbar) | | 860 - 1060 | 950-1000 |

Site Description: September 27, 2010 File on
Federal Communications Commission
Laboratory Division
7435 Oakland Mills Road
Columbia, MD 21046
Registration Number: 365520
Accredited by TAF
Accreditation Number: 1313
Effective through: December 27, 2013



Accredited by NVLAP
NVLAP Lab Code: 200347-0
Effective through: September 30, 2011



Site Name: Quietek Corporation

Site Address: No.75-2, 3rd Lin, Wang Ye keng, Yonghxing Tsuen,
Qionglin Shiang, Hsinchu County 307, Taiwan
TEL : 886-3-592-8858 / FAX : 886-3-592-8859
E-Mail : service@quietek.com

2. Conducted Emission

2.1. Test Equipment

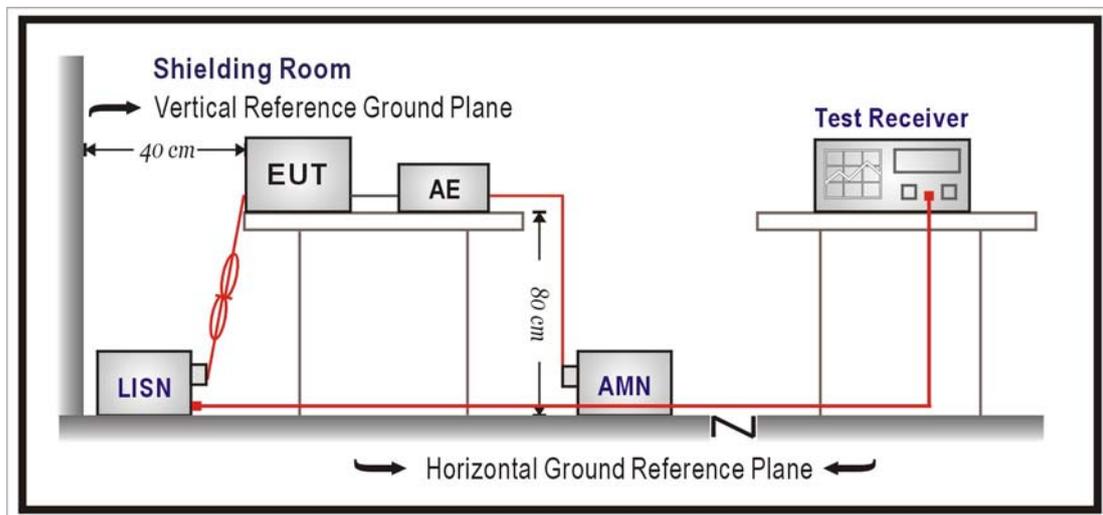
The following test equipments are used during the test:

Conducted Emission / SR3

| Instrument | Manufacturer | Model No. | Serial No | Next Cal. Date |
|---------------|--------------|-----------|------------|----------------|
| LISN | R&S | ENV216 | 100096 | 2011/09/20 |
| LISN | R&S | ESH3-Z5 | 836679/022 | 2012/02/10 |
| Test Receiver | R&S | ESCS 30 | 825442/017 | 2012/01/16 |

Note: 1. All equipments that need to calibrate are with calibration period of 1 year.

2.2. Test Setup



2.3. Limits

| FCC Part 15 Subpart C Paragraph 15.207 Limits (dBuV) | | |
|---|-------|-------|
| Frequency MHz | 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 was setup according to ANSI C63.4: 2009 and tested according to DTS test procedure of Oct 2002 KDB558074 for compliance to FCC 47CFR 15.247 requirements. The EUT was placed on a platform of nominal size, 1 m by 1.5 m, raised 80 cm above the conducting ground plane. The vertical conducting plane was located 40 cm to the rear of the EUT. All other surfaces of EUT were at least 80 cm from any other grounded conducting surface. The EUT and simulators are connected to the main power through a line impedance stabilization network (LISN). The LISN provides a 50 ohm /50uH coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN. (Please refer to the block diagram of the test setup and photographs.) Each current-carrying conductor of the EUT power cord, except the ground (safety) conductor, was individually connected through a LISN to the input power source. The excess length of the power cord between the EUT and the LISN receptacle were folded back and forth at the center of the lead to form a bundle not exceeding 40 cm in length. Conducted emissions were investigated over the frequency range from 0.15MHz to 30MHz using a receiver bandwidth of 9 kHz.

2.5. Test Specification

According to FCC Part 15 Subpart C Paragraph 15.207:2010

2.6. Uncertainty

The measurement uncertainty is defined as ± 2.26 dB.

2.7. Test Result

| | |
|--------------------------------------|--|
| Site : SR3 | Time : 2011/05/26 - 13:43 |
| Limit : CISPR_B_00M_QP | Margin : 6 |
| Probe : SR3_LISN(16A) - Line1 | Power : DC 5V (Power by PC) |
| EUT : Dual-band Wireless USB Adapter | Note : Mode 1: Transmit-5190MHz,802.11n(40M) |

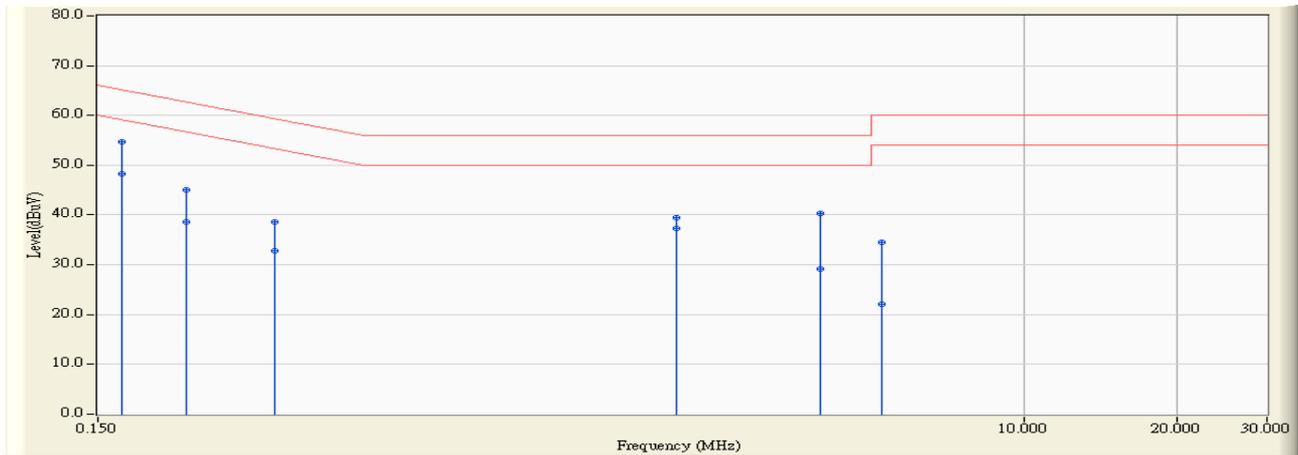


| | Frequency (MHz) | Correct Factor (dB) | Reading Level (dBuV) | Measure Level (dBuV) | Margin (dB) | Limit (dBuV) | Detector Type |
|----|-----------------|---------------------|----------------------|----------------------|-------------|--------------|---------------|
| 1 | 0.170 | 9.606 | 43.070 | 52.676 | -12.307 | 64.983 | QUASPEAK |
| 2 | 0.170 | 9.606 | 36.770 | 46.376 | -8.607 | 54.983 | AVERAGE |
| 3 | 0.224 | 9.595 | 36.530 | 46.125 | -16.536 | 62.661 | QUASPEAK |
| 4 | 0.224 | 9.595 | 29.560 | 39.155 | -13.506 | 52.661 | AVERAGE |
| 5 | 0.338 | 9.587 | 28.990 | 38.577 | -20.687 | 59.265 | QUASPEAK |
| 6 | 0.338 | 9.587 | 22.770 | 32.357 | -16.907 | 49.265 | AVERAGE |
| 7 | 3.802 | 10.011 | 37.670 | 47.681 | -8.319 | 56.000 | QUASPEAK |
| 8 | 3.802 | 10.011 | 24.000 | 34.011 | -11.989 | 46.000 | AVERAGE |
| 9 | * 4.025 | 10.025 | 38.710 | 48.736 | -7.264 | 56.000 | QUASPEAK |
| 10 | 4.025 | 10.025 | 24.830 | 34.856 | -11.144 | 46.000 | AVERAGE |
| 11 | 5.205 | 10.056 | 23.910 | 33.966 | -26.034 | 60.000 | QUASPEAK |
| 12 | 5.205 | 10.056 | 12.230 | 22.286 | -27.714 | 50.000 | AVERAGE |

Note:

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

| | |
|--------------------------------------|--|
| Site : SR3 | Time : 2011/05/26 - 13:52 |
| Limit : CISPR_B_00M_QP | Margin : 6 |
| Probe : SR3_LISN(16A) - Line2 | Power : DC 5V (Power by PC) |
| EUT : Dual-band Wireless USB Adapter | Note : Mode 1: Transmit-5190MHz,802.11n(40M) |



| | Frequency (MHz) | Correct Factor (dB) | Reading Level (dBuV) | Measure Level (dBuV) | Margin (dB) | Limit (dBuV) | Detector Type |
|----|-----------------|---------------------|----------------------|----------------------|-------------|--------------|---------------|
| 1 | 0.167 | 9.628 | 45.080 | 54.708 | -10.399 | 65.107 | QUASPEAK |
| 2 | * 0.167 | 9.628 | 38.610 | 48.238 | -6.869 | 55.107 | AVERAGE |
| 3 | 0.224 | 9.620 | 35.510 | 45.130 | -17.531 | 62.661 | QUASPEAK |
| 4 | 0.224 | 9.620 | 29.050 | 38.670 | -13.991 | 52.661 | AVERAGE |
| 5 | 0.334 | 9.610 | 28.930 | 38.540 | -20.821 | 59.361 | QUASPEAK |
| 6 | 0.334 | 9.610 | 23.190 | 32.800 | -16.561 | 49.361 | AVERAGE |
| 7 | 2.064 | 9.897 | 29.570 | 39.467 | -16.533 | 56.000 | QUASPEAK |
| 8 | 2.064 | 9.897 | 27.510 | 37.407 | -8.593 | 46.000 | AVERAGE |
| 9 | 3.966 | 10.041 | 30.280 | 40.321 | -15.679 | 56.000 | QUASPEAK |
| 10 | 3.966 | 10.041 | 19.040 | 29.081 | -16.919 | 46.000 | AVERAGE |
| 11 | 5.252 | 10.081 | 24.440 | 34.521 | -25.479 | 60.000 | QUASPEAK |
| 12 | 5.252 | 10.081 | 12.100 | 22.181 | -27.819 | 50.000 | AVERAGE |

Note:

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

3. 99% & 26dB Bandwidth

3.1. Test Equipment

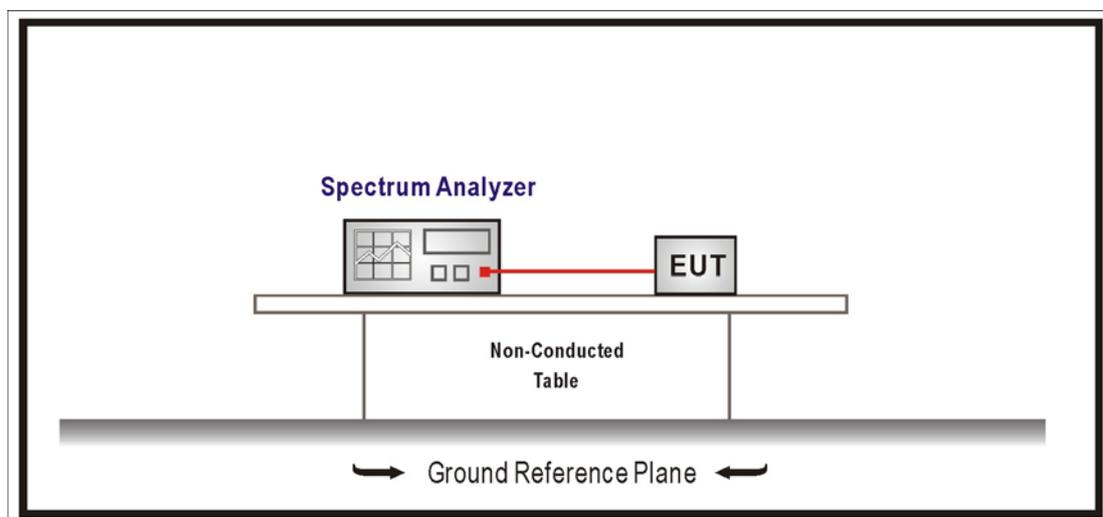
The following test equipments are used during the radiated emission tests:

99% & 26dB Bandwidth / SR7

| Instrument | Manufacturer | Model No. | Serial No | Next Cal. Date |
|-------------------|--------------|-----------|-----------|----------------|
| Spectrum Analyzer | R&S | FSP | 100561 | 2012/01/16 |

Note: 1. All equipments that need to calibrate are with calibration period of 1 year.

3.2. Test Setup



3.3. Limits

No Required

3.4. Test Procedure

The EUT was tested according to FCC Public Notice DA 02-2138, AUGUST 2002. Set RBW 1% of the emission bandwidth, VBW equal to 3 times the RBW.

3.5. Uncertainty

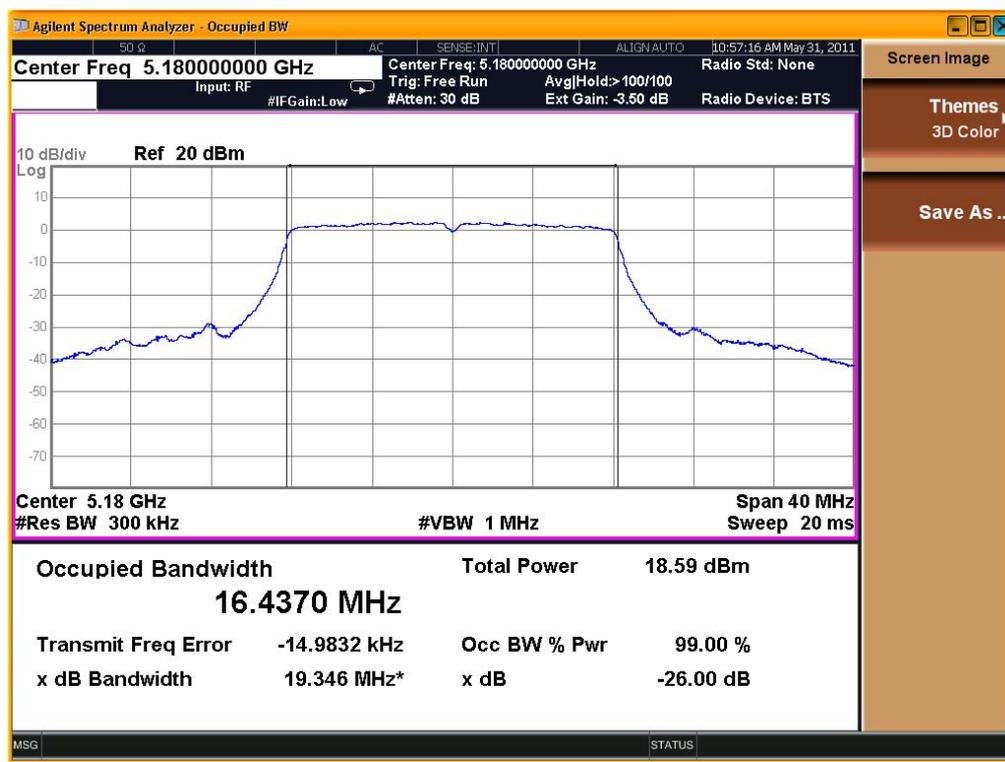
The measurement uncertainty is defined as $\pm 150\text{Hz}$

3.6. Test Result

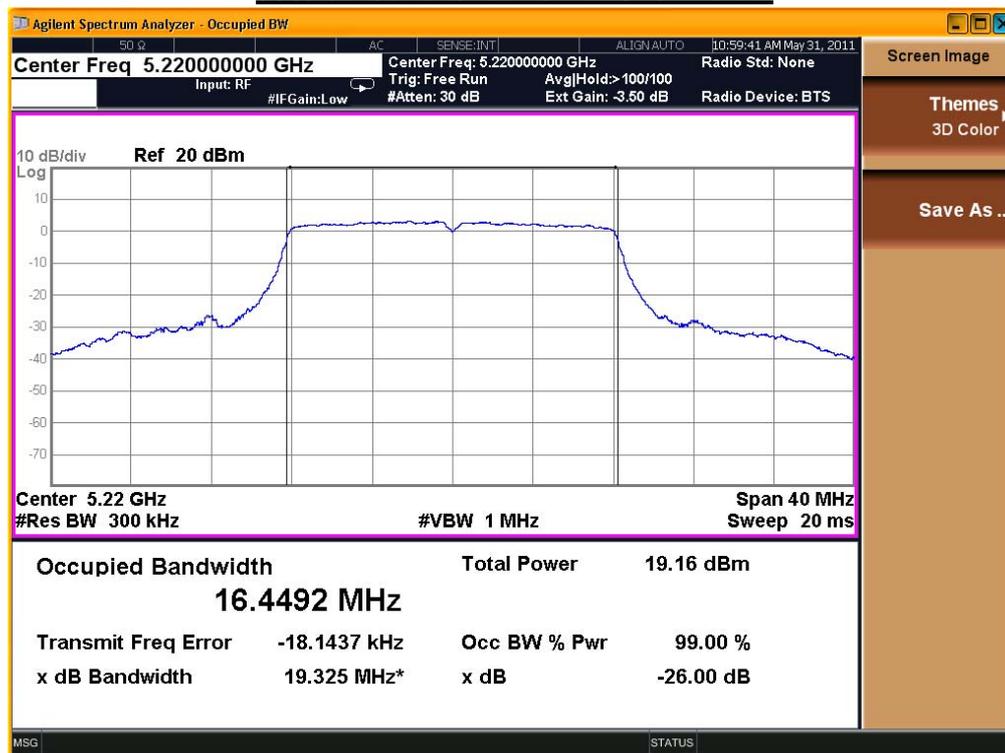
| | | | |
|--------------|--------------------------------|-----------|-----|
| Product | Dual-band Wireless USB Adapter | | |
| Test Item | 99% & 26dB Bandwidth | | |
| Test Mode | Mode 1: Transmit | | |
| Date of Test | 2011/06/15 | Test Site | SR7 |

| 802.11a | | | | | |
|-------------|-----------------|----------------|---------------|----------------------|--------|
| Channel No. | Frequency (MHz) | 99 % OBW (MHz) | 26dB BW (MHz) | Required Limit (MHz) | Result |
| 36 | 5180 | 16.437 | 19.346 | -- | NA |
| 44 | 5220 | 16.449 | 19.325 | -- | NA |
| 48 | 5240 | 16.439 | 19.318 | -- | NA |

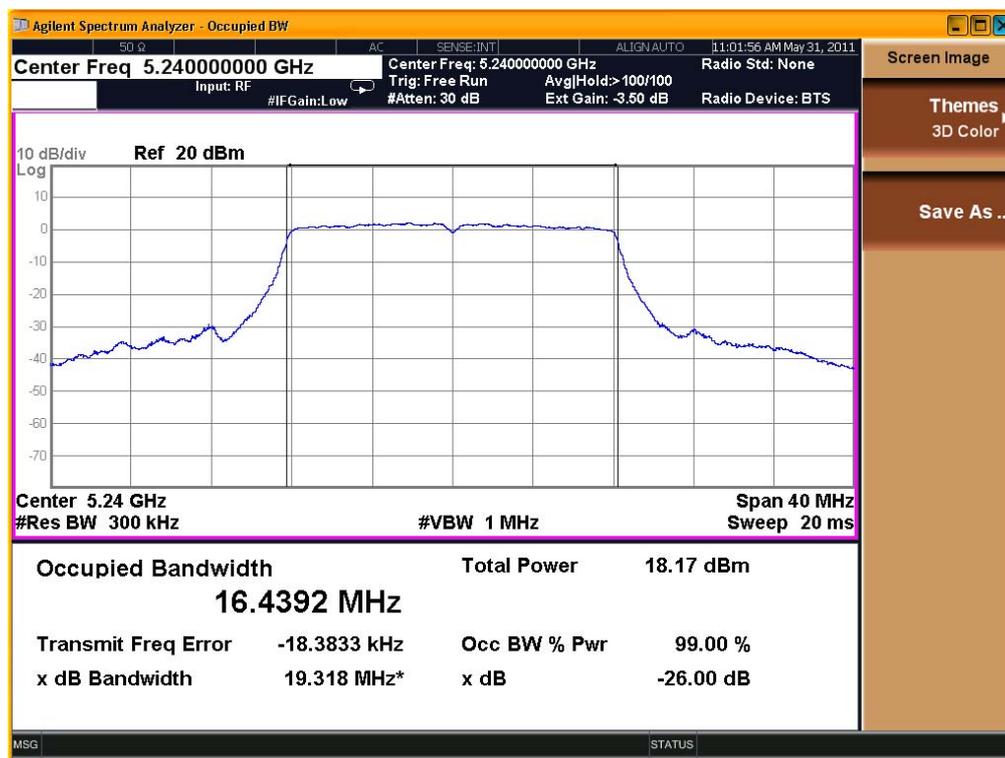
99% & 26dB Bandwidth – Channel 36



99% & 26dB Bandwidth – Channel 44



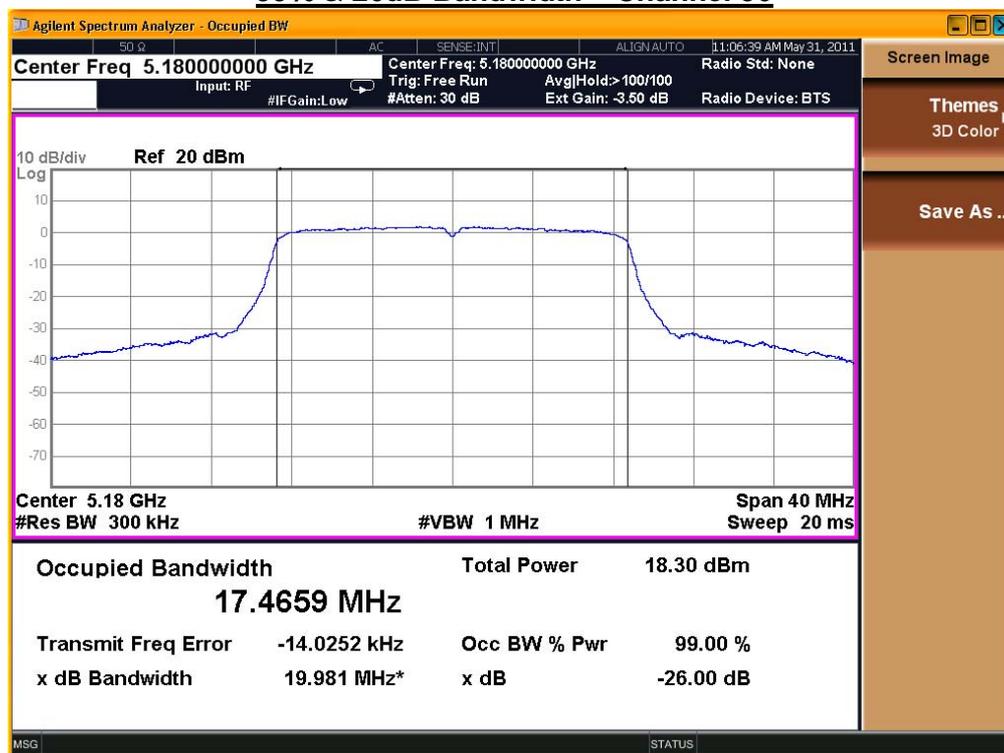
99% & 26dB Bandwidth – Channel 48



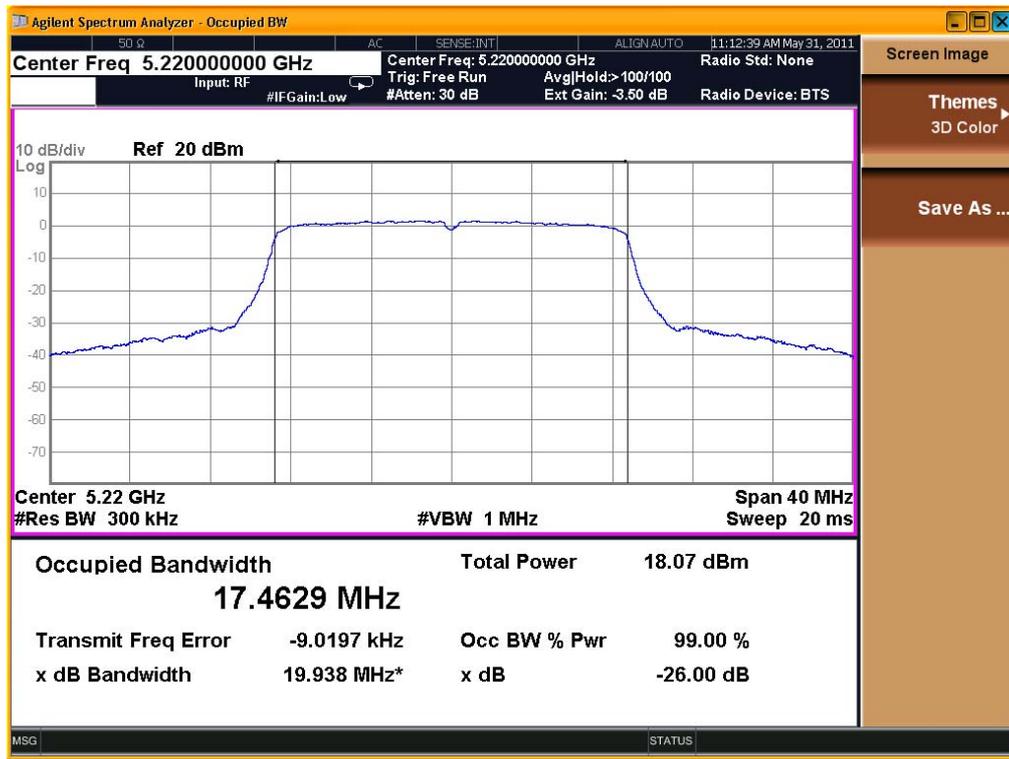
| | | | |
|--------------|--------------------------------|-----------|-----|
| Product | Dual-band Wireless USB Adapter | | |
| Test Item | 99% & 26dB Bandwidth | | |
| Test Mode | Mode 1: Transmit | | |
| Date of Test | 2011/06/15 | Test Site | SR7 |

| 802.11n_20M(ANT A) | | | | | |
|--------------------|-----------------|----------------|---------------|----------------------|--------|
| Channel No. | Frequency (MHz) | 99 % OBW (MHz) | 26dB BW (MHz) | Required Limit (MHz) | Result |
| 36 | 5180 | 17.466 | 19.981 | -- | NA |
| 44 | 5220 | 17.463 | 19.938 | -- | NA |
| 48 | 5240 | 17.461 | 19.993 | -- | NA |

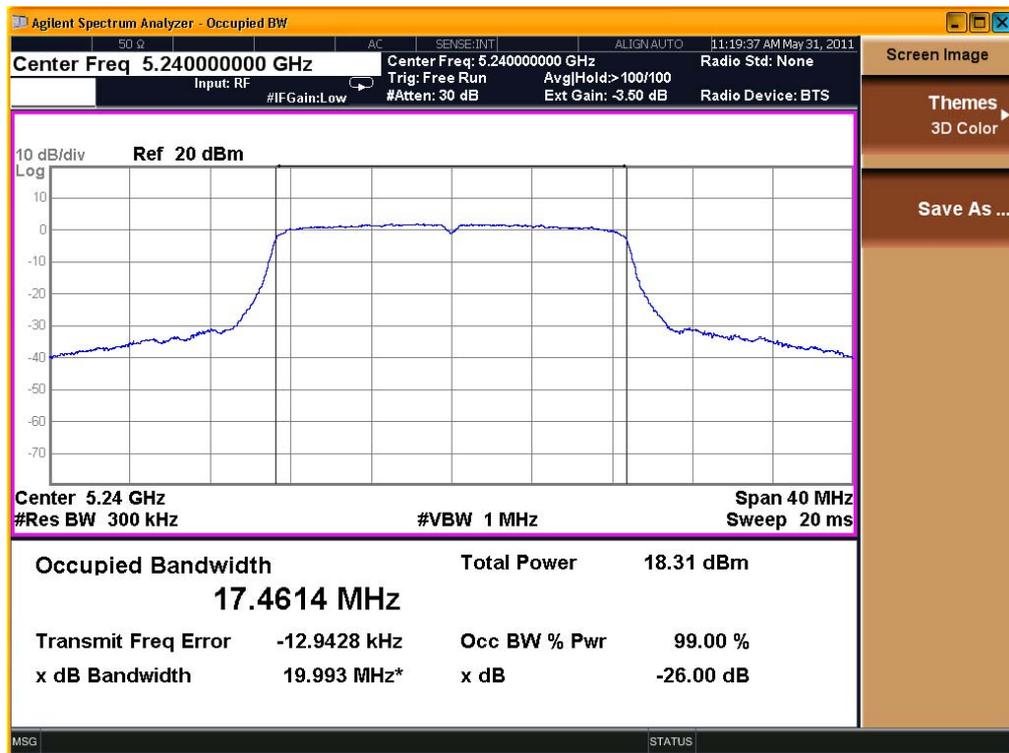
99% & 26dB Bandwidth – Channel 36



99% & 26dB Bandwidth – Channel 44



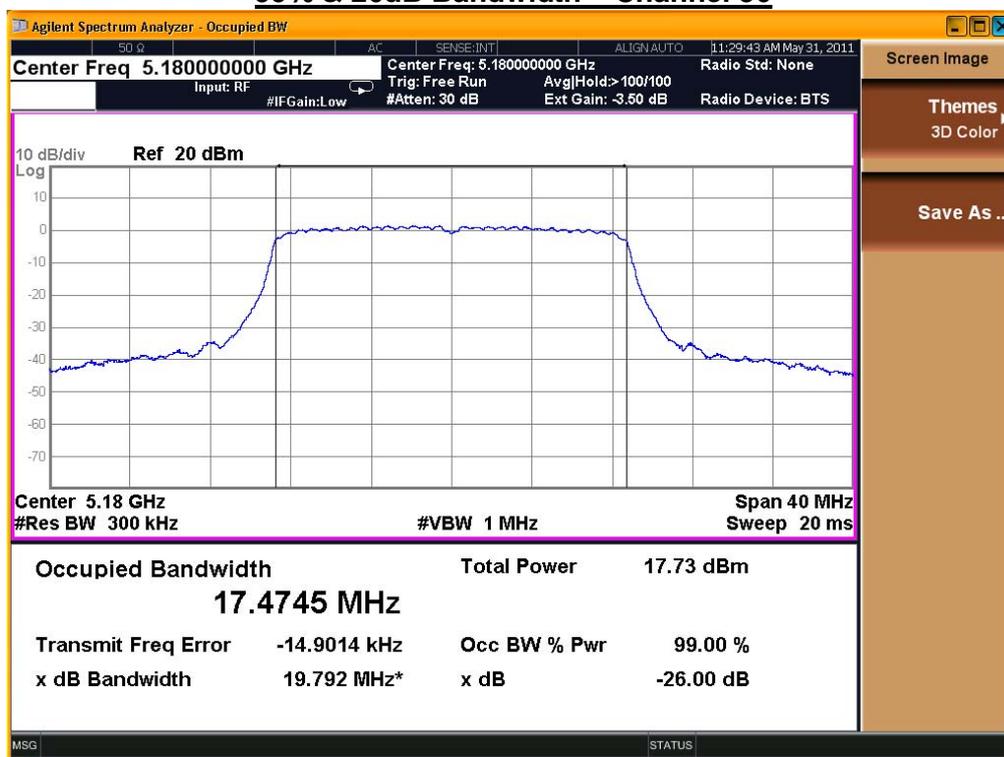
99% & 26dB Bandwidth – Channel 48



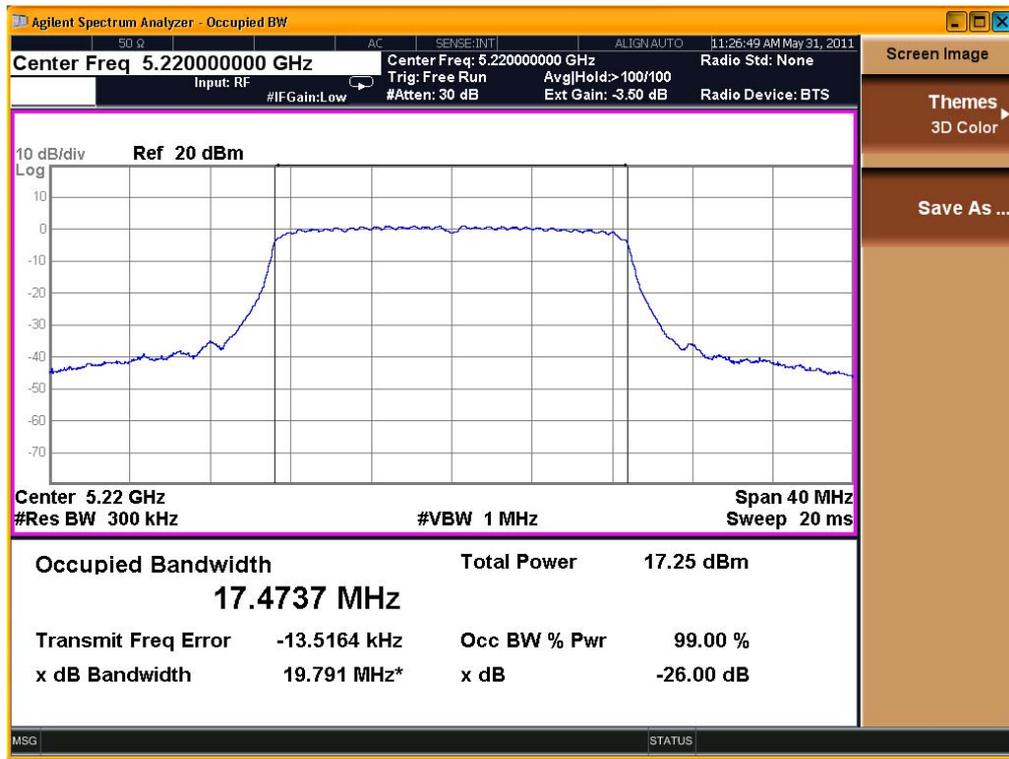
| | | | |
|--------------|--------------------------------|-----------|-----|
| Product | Dual-band Wireless USB Adapter | | |
| Test Item | 99% & 26dB Bandwidth | | |
| Test Mode | Mode 1: Transmit | | |
| Date of Test | 2011/06/15 | Test Site | SR7 |

| 802.11n_20M(ANT B) | | | | | |
|--------------------|-----------------|----------------|---------------|----------------------|--------|
| Channel No. | Frequency (MHz) | 99 % OBW (MHz) | 26dB BW (MHz) | Required Limit (MHz) | Result |
| 36 | 5180 | 17.475 | 19.792 | -- | NA |
| 44 | 5220 | 17.474 | 19.791 | -- | NA |
| 48 | 5240 | 17.473 | 19.820 | -- | NA |

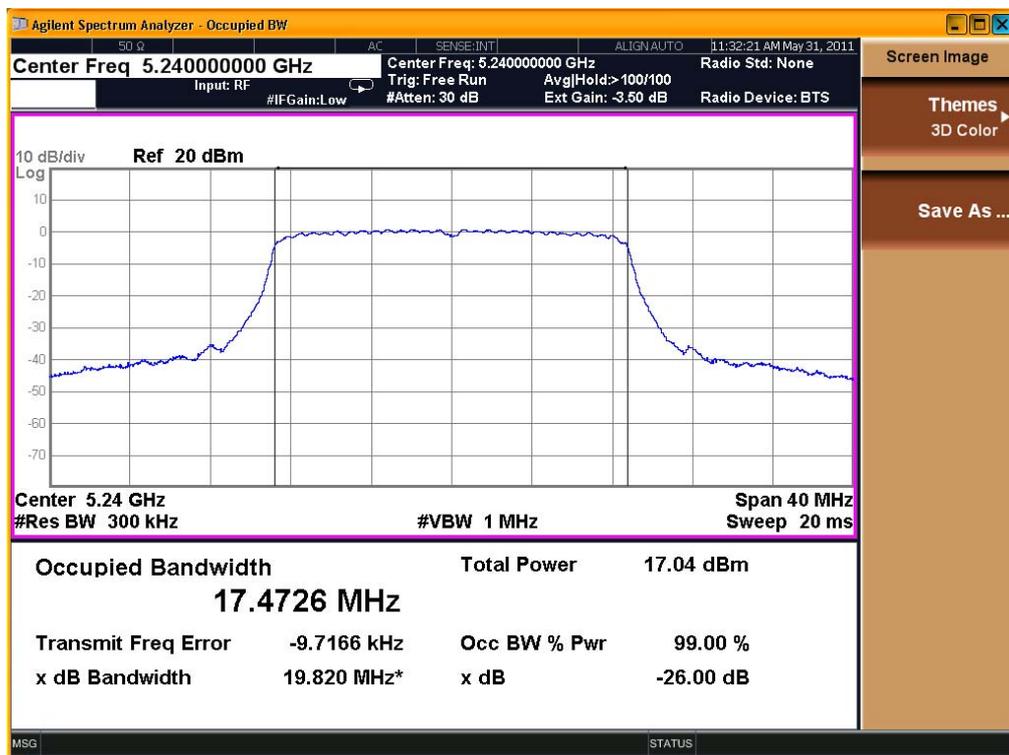
99% & 26dB Bandwidth – Channel 36



99% & 26dB Bandwidth – Channel 44



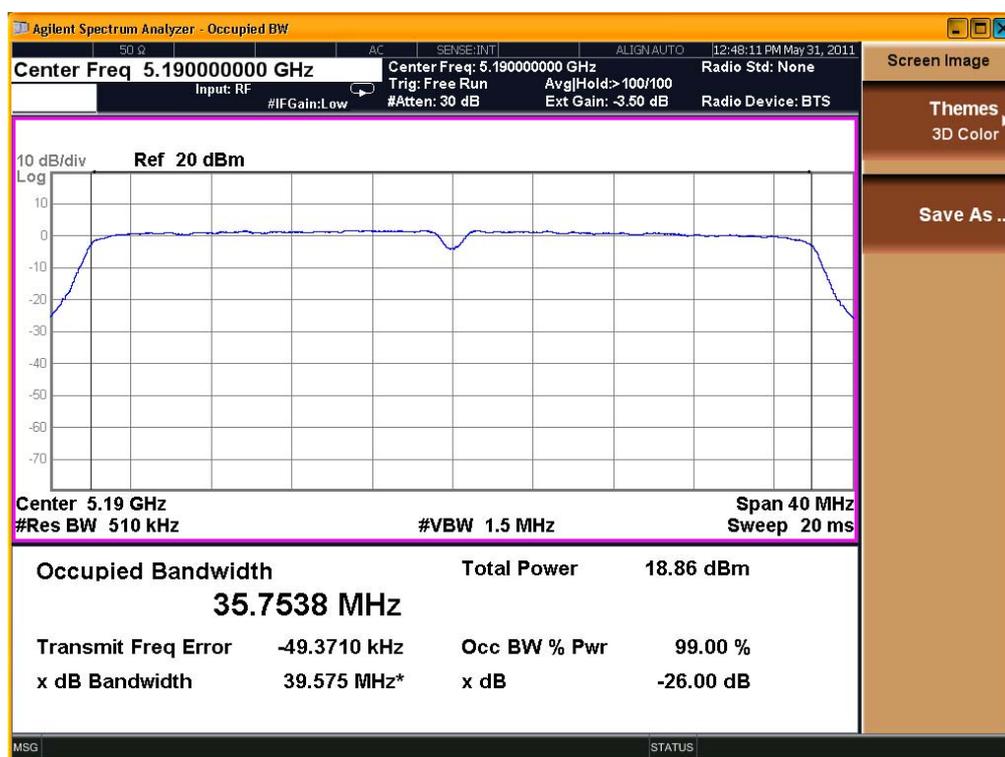
99% & 26dB Bandwidth – Channel 48



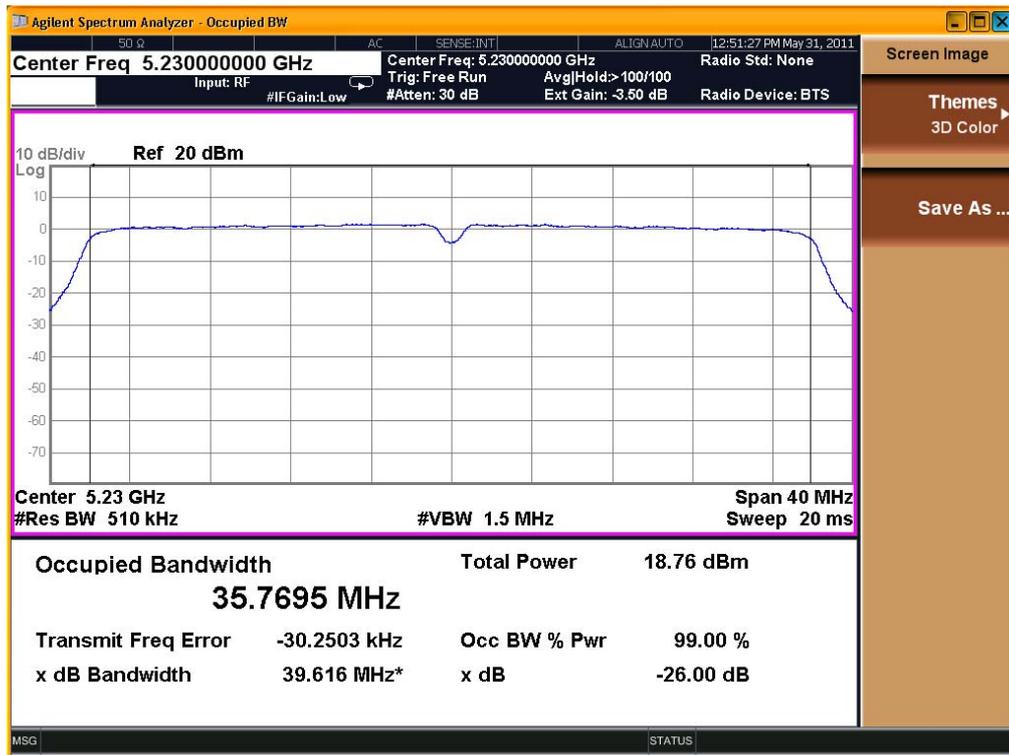
| | | | |
|--------------|--------------------------------|-----------|-----|
| Product | Dual-band Wireless USB Adapter | | |
| Test Item | 99% & 26dB Bandwidth | | |
| Test Mode | Mode 1: Transmit | | |
| Date of Test | 2011/06/15 | Test Site | SR7 |

| 802.11n_40M(ANT A) | | | | | |
|--------------------|-----------------|----------------|---------------|----------------------|--------|
| Channel No. | Frequency (MHz) | 99 % OBW (MHz) | 26dB BW (MHz) | Required Limit (MHz) | Result |
| 38 | 5190 | 35.754 | 39.575 | -- | NA |
| 46 | 5230 | 35.770 | 39.616 | -- | NA |

99% & 26dB Bandwidth – Channel 38



99% & 26dB Bandwidth – Channel 46

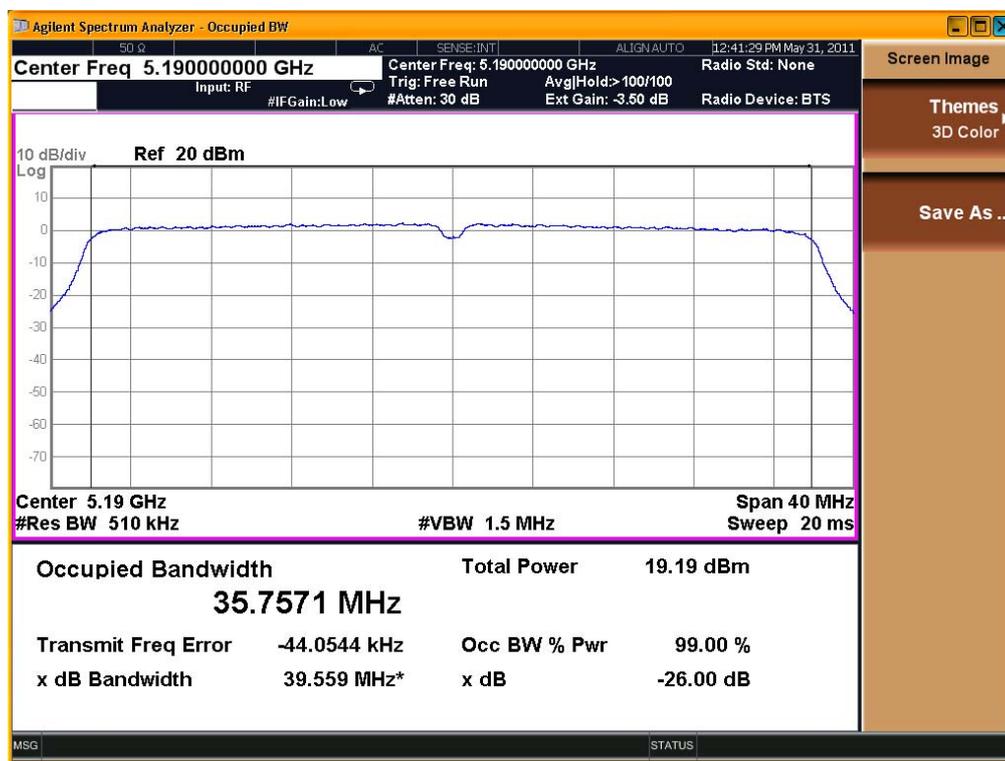


| | | | |
|--------------|--------------------------------|-----------|-----|
| Product | Dual-band Wireless USB Adapter | | |
| Test Item | 99% & 26dB Bandwidth | | |
| Test Mode | Mode 1: Transmit | | |
| Date of Test | 2011/06/15 | Test Site | SR7 |

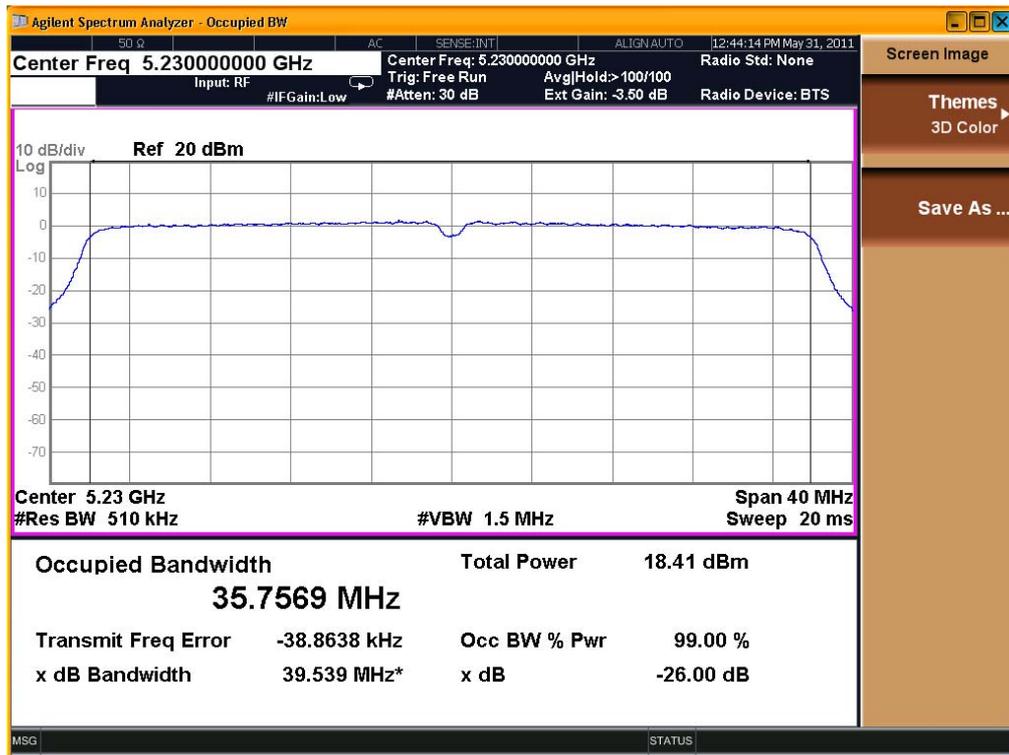
802.11n_40M(Ant B)

| Channel No. | Frequency (MHz) | 99 % OBW (MHz) | 26dB BW (MHz) | Required Limit (MHz) | Result |
|-------------|-----------------|----------------|---------------|----------------------|--------|
| 38 | 5190 | 35.757 | 39.959 | -- | NA |
| 46 | 5230 | 35.757 | 39.539 | -- | NA |

99% & 26dB Bandwidth – Channel 38



99% & 26dB Bandwidth – Channel 46



4. Peak Transmit Output

4.1. Test Equipment

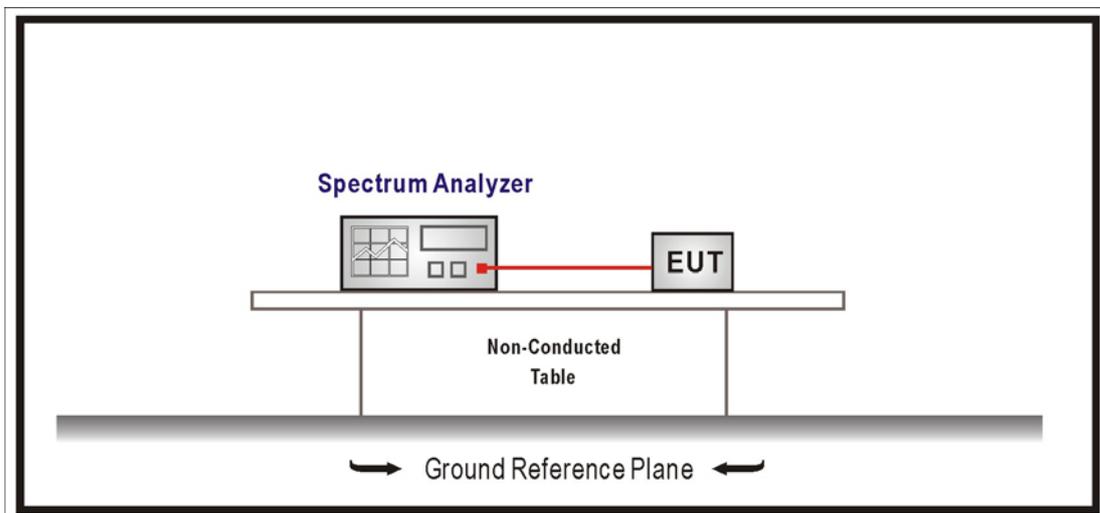
The following test equipments are used during the radiated emission tests:

Peak Transmit Output / SR7

| Instrument | Manufacturer | Model No. | Serial No | Next Cal. Date |
|-------------------|--------------|-----------|-----------|----------------|
| Spectrum Analyzer | R&S | FSP | 100561 | 2012/01/16 |

Note: 1. All equipments that need to calibrate are with calibration period of 1 year.

4.2. Test Setup



4.3. 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 $4 \text{ dBm} + 10\log B$, where B is the 26dB 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 $11 \text{ dBm} + 10\log B$, where B is the 26dB 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 $17 \text{ dBm} + 10\log B$, where B is the 26dB 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.

4.4. Test Procedure

The EUT was setup to ANSI C63.4, 2009; tested to DTS test procedure of Aug 2002 DA 02-2138 for compliance to FCC 47CFR Subpart E requirements. The Method #1 of the Peak conducted transmit output power was used.

Set RBW=1MHz, VBW=3MHz with sample detector and trace average 100 traces in power averaging mode. Set span to encompass the entire emission bandwidth (EBW) of the signal. Compute power by integrating the spectrum across the 26 dB EBW of the signal.

4.5. Uncertainty

The measurement uncertainty is defined as $\pm 1.27 \text{ dB}$

4.6. Test Result

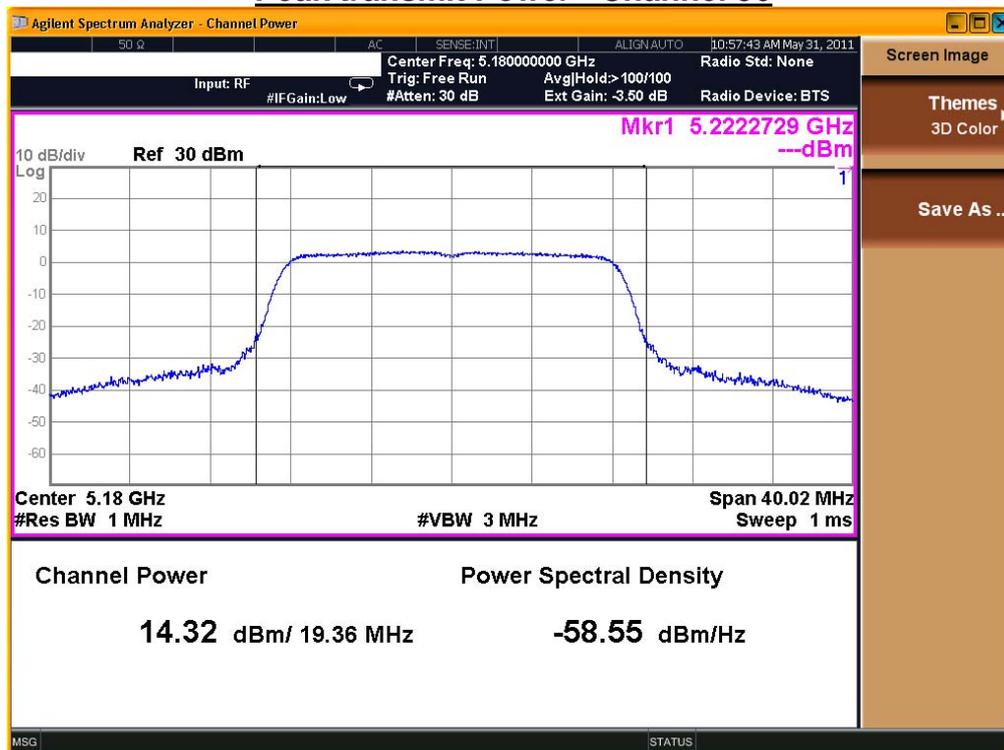
| | | | |
|--------------|--------------------------------|-----------|-----|
| Product | Dual-band Wireless USB Adapter | | |
| Test Item | Peak Transmit Output | | |
| Test Mode | Mode 1: Transmit | | |
| Date of Test | 2011/06/15 | Test Site | SR7 |

| 802.11a | | | | | | |
|-------------|-----------------|----------------------|--------------------|-------------------|----------------------|--------|
| Channel No. | Frequency (MHz) | 26dB Bandwidth (MHz) | Output Power (dBm) | Required Limit | | Result |
| | | | | Fixed Limit (dBm) | 4+10logB Limit (dBm) | |
| 36 | 5180 | 19.346 | 14.32 | ≤ 17 | ≤16.87 | Pass |
| 44 | 5220 | 19.325 | 14.70 | ≤ 17 | ≤16.86 | Pass |
| 48 | 5240 | 19.318 | 14.80 | ≤ 17 | ≤16.86 | Pass |

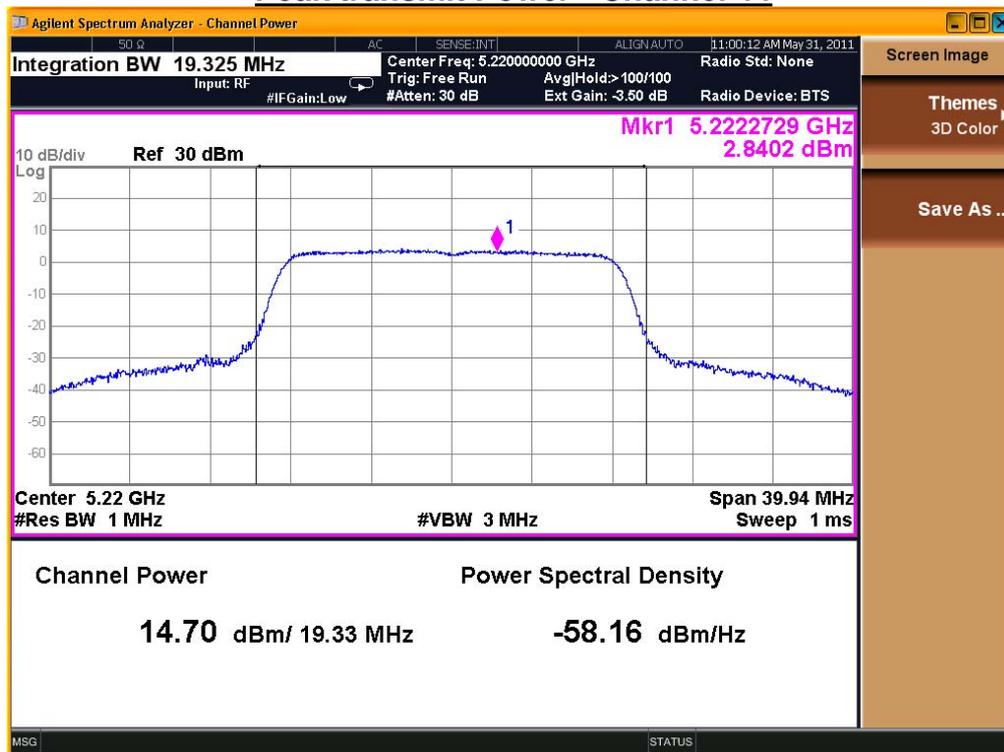
The worst emission of data rate is 6 Mbps.

| Peak Power Output (dBm) | | | | | | | | | |
|-------------------------|-----------------|-----------|-------|------|-------|-------|-------|-------|-------------------------|
| Channel No | Frequency (MHz) | Data Rate | | | | | | | Required Limit |
| | | 6 | 12 | 18 | 24 | 36 | 48 | 54 | |
| 36 | 5180 | 14.32 | -- | -- | -- | -- | -- | -- | 17dBm or 4dBm+10logB |
| 44 | 5220 | 14.70 | 14.67 | 14.6 | 14.45 | 14.66 | 14.55 | 14.46 | |
| 48 | 5240 | 14.80 | -- | -- | -- | -- | -- | -- | |

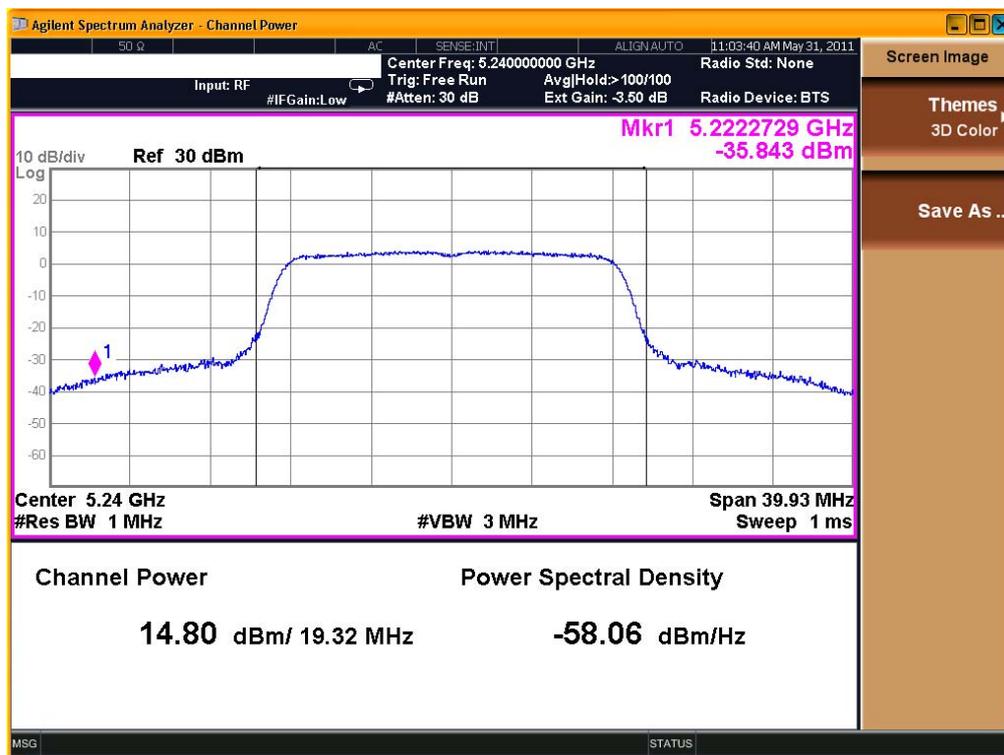
Peak transmit Power - Channel 36



Peak transmit Power - Channel 44



Peak transmit Power - Channel 48



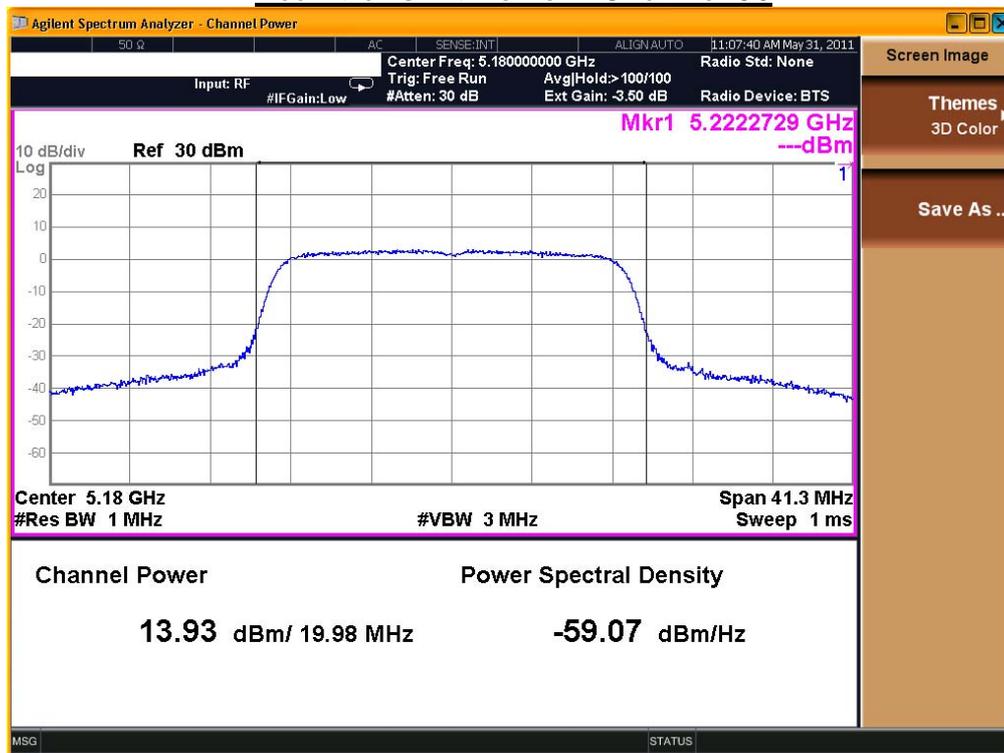
| | | | |
|--------------|--------------------------------|-----------|-----|
| Product | Dual-band Wireless USB Adapter | | |
| Test Item | Peak Mode 1: Transmit Output | | |
| Test Mode | Mode 1: Transmit | | |
| Date of Test | 2011/06/15 | Test Site | SR7 |

| IEEE 802.11n(20MHz)_ANT A | | | | | | |
|---------------------------|-----------------|----------------------|--------------------|-------------------|----------------------|--------|
| Channel No. | Frequency (MHz) | 26dB Bandwidth (MHz) | Output Power (dBm) | Required Limit | | Result |
| | | | | Fixed Limit (dBm) | 4+10logB Limit (dBm) | |
| 36 | 5180 | 19.981 | 13.93 | ≤ 17 | ≤17.01 | Pass |
| 44 | 5220 | 19.938 | 13.79 | ≤ 17 | ≤17.00 | Pass |
| 48 | 5240 | 19.993 | 13.49 | ≤ 17 | ≤17.01 | Pass |

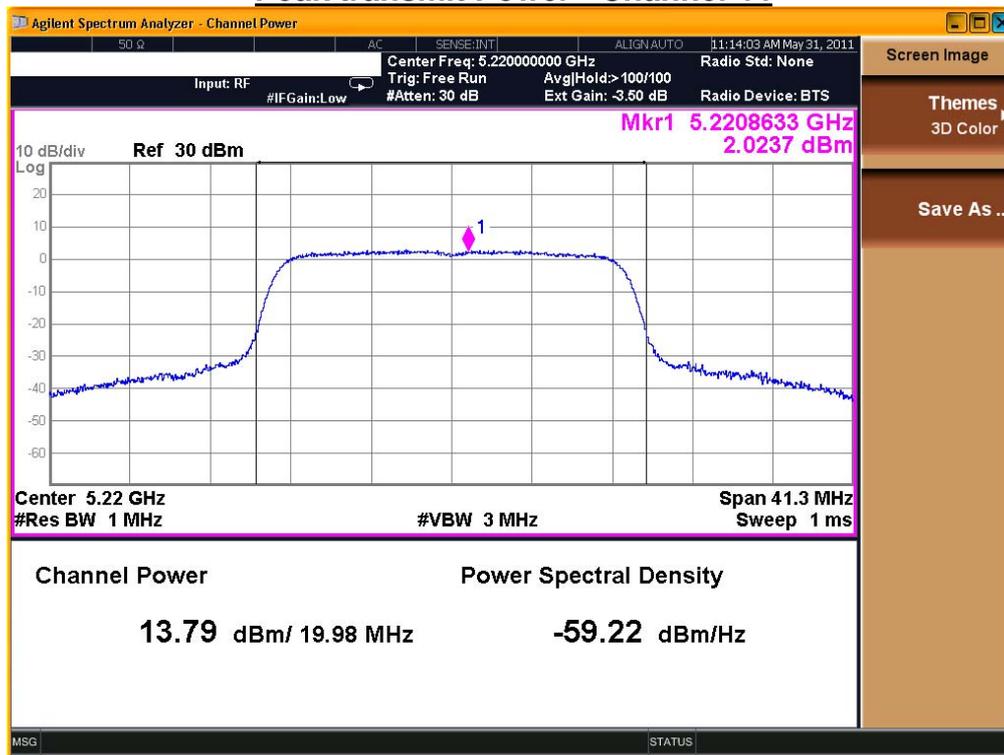
The worst emission of data rate is 13Mbps.

| Peak Power Output (dBm) | | | | | | | | | | |
|-------------------------|-----------------|-----------|-------|-------|-------|-------|-------|-------|-------|----------------|
| MCS Index | | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | Required Limit |
| Channel No | Frequency (MHz) | Data Rate | | | | | | | | |
| | | 13 | 26 | 39 | 52 | 78 | 104 | 117 | 130 | |
| 36 | 5180 | 13.93 | -- | -- | -- | -- | -- | -- | -- | 1Watt=17dBm |
| 44 | 5220 | 13.79 | 13.77 | 13.81 | 13.72 | 13.69 | 13.74 | 13.76 | 13.78 | 1Watt=17dBm |
| 48 | 5240 | 13.49 | -- | -- | -- | -- | -- | -- | -- | 1Watt=17dBm |

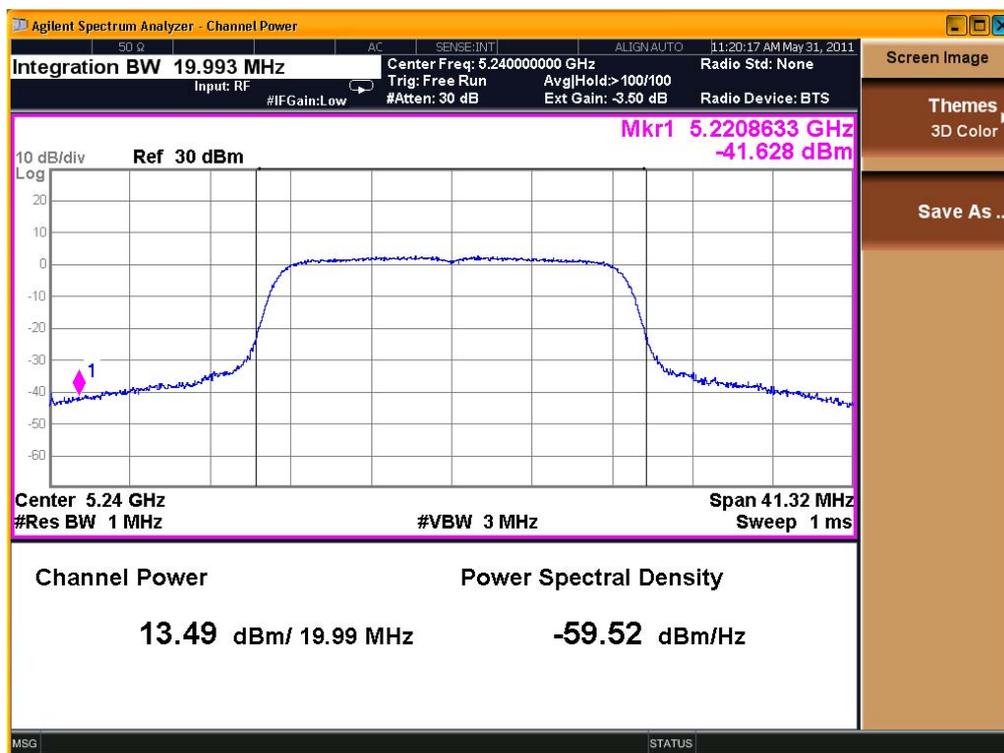
Peak transmit Power - Channel 36



Peak transmit Power - Channel 44



Peak transmit Power - Channel 48



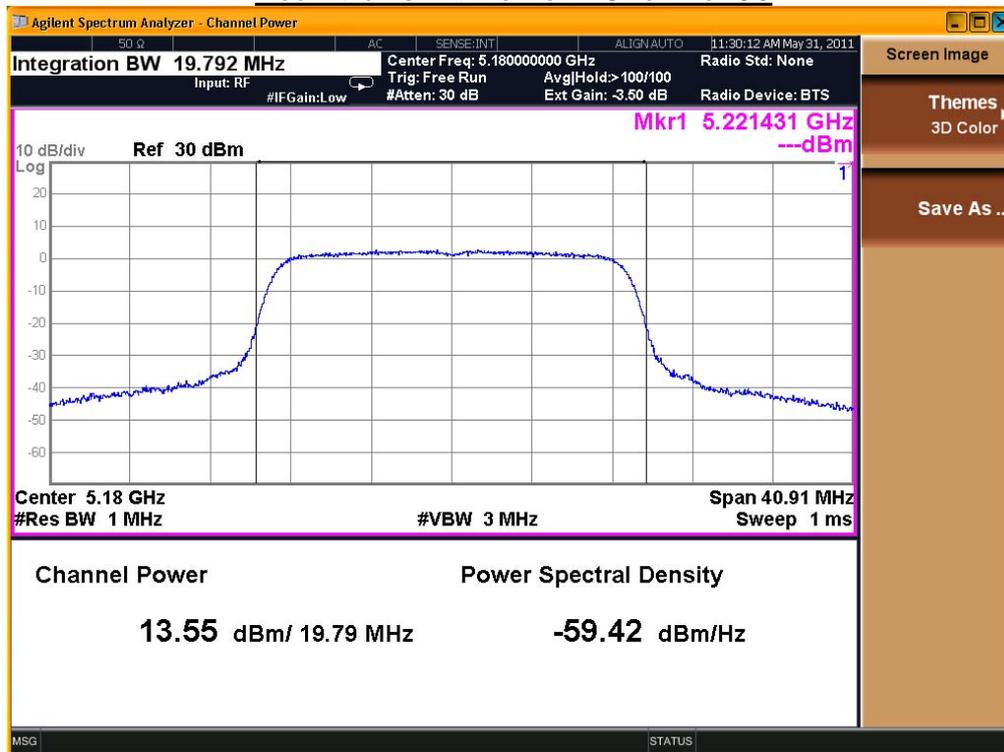
| | | | |
|--------------|--------------------------------|-----------|-----|
| Product | Dual-band Wireless USB Adapter | | |
| Test Item | Peak Mode 1: Transmit Output | | |
| Test Mode | Mode 1: Transmit | | |
| Date of Test | 2011/06/15 | Test Site | SR7 |

| IEEE 802.11n(20MHz)_ANT B | | | | | | |
|---------------------------|-----------------|----------------------|--------------------|-------------------|----------------------|--------|
| Channel No. | Frequency (MHz) | 26dB Bandwidth (MHz) | Output Power (dBm) | Required Limit | | Result |
| | | | | Fixed Limit (dBm) | 4+10logB Limit (dBm) | |
| 36 | 5180 | 19.792 | 13.55 | ≤ 17 | ≤16.96 | Pass |
| 44 | 5220 | 19.791 | 13.03 | ≤ 17 | ≤16.96 | Pass |
| 48 | 5240 | 19.820 | 13.81 | ≤ 17 | ≤16.97 | Pass |

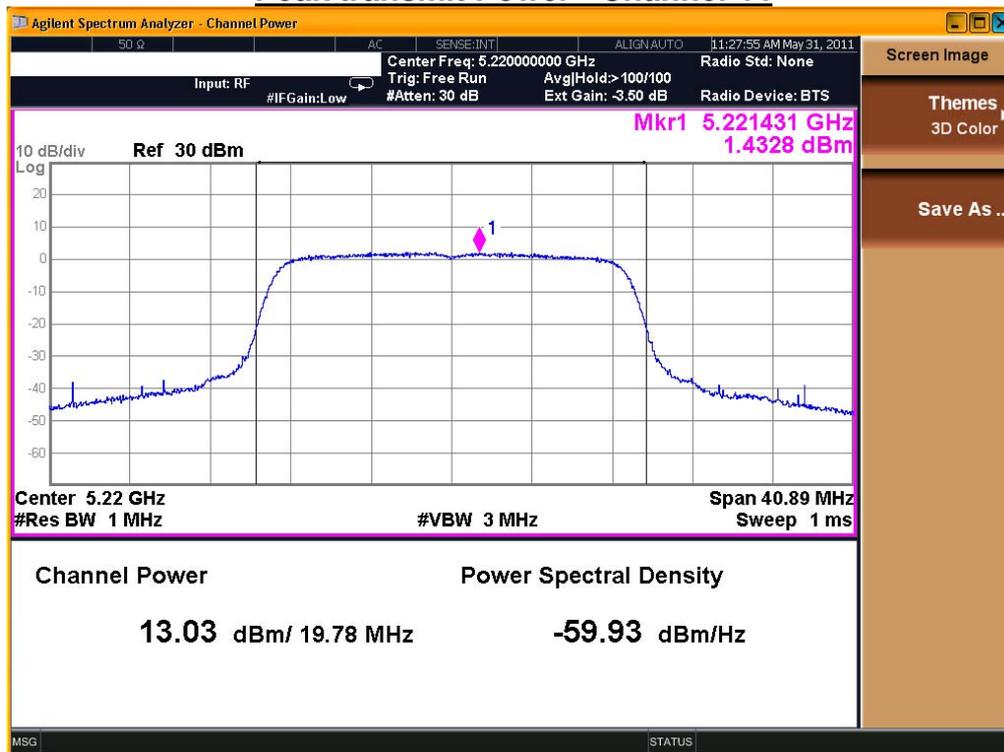
The worst emission of data rate is 13Mbps.

| Peak Power Output (dBm) | | | | | | | | | | |
|-------------------------|-----------------|-----------|-------|-------|-------|-------|-------|-------|-------|----------------|
| MCS Index | | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | Required Limit |
| Channel No | Frequency (MHz) | Data Rate | | | | | | | | |
| | | 13 | 26 | 39 | 52 | 78 | 104 | 117 | 130 | |
| 36 | 5180 | 13.55 | -- | -- | -- | -- | -- | -- | -- | 1Watt=16.96dBm |
| 44 | 5220 | 13.03 | 13.02 | 12.98 | 12.97 | 13.01 | 12.96 | 12.98 | 13.01 | 1Watt=16.96dBm |
| 48 | 5240 | 13.81 | -- | -- | -- | -- | -- | -- | -- | 1Watt=16.96dBm |

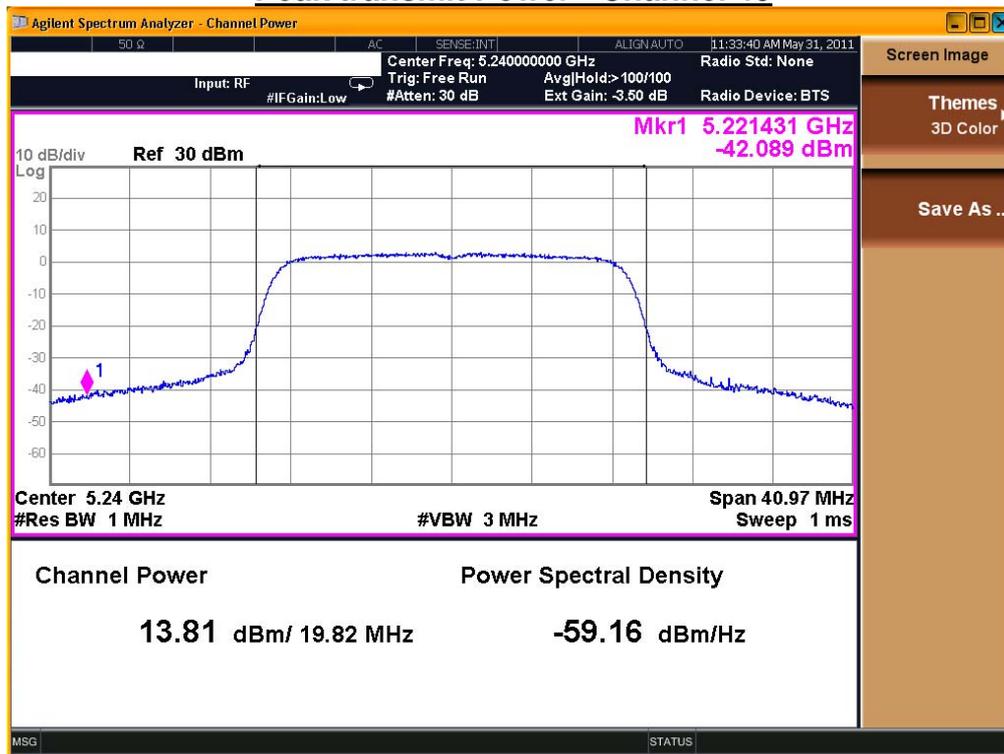
Peak transmit Power - Channel 36



Peak transmit Power - Channel 44



Peak transmit Power - Channel 48



| | | | |
|--------------|--------------------------------|-----------|-----|
| Product | Dual-band Wireless USB Adapter | | |
| Test Item | Peak Mode 1: Transmit Output | | |
| Test Mode | Mode 1: Transmit | | |
| Date of Test | 2011/06/15 | Test Site | SR7 |

| IEEE 802.11n(20MHz)_ANT A+B | | | | | |
|-----------------------------|-----------------|--------------------|-------|----------------------|--------|
| Channel No. | Frequency (MHz) | Total Output Power | | Required Limit (dBm) | Result |
| | | (dBm) | (mW) | | |
| 36 | 5180 | 16.76 | 47.37 | ≤ 16.96 dBm | Pass |
| 44 | 5220 | 16.44 | 44.02 | ≤ 16.96 dBm | Pass |
| 48 | 5240 | 16.66 | 46.38 | ≤ 16.97 dBm | Pass |

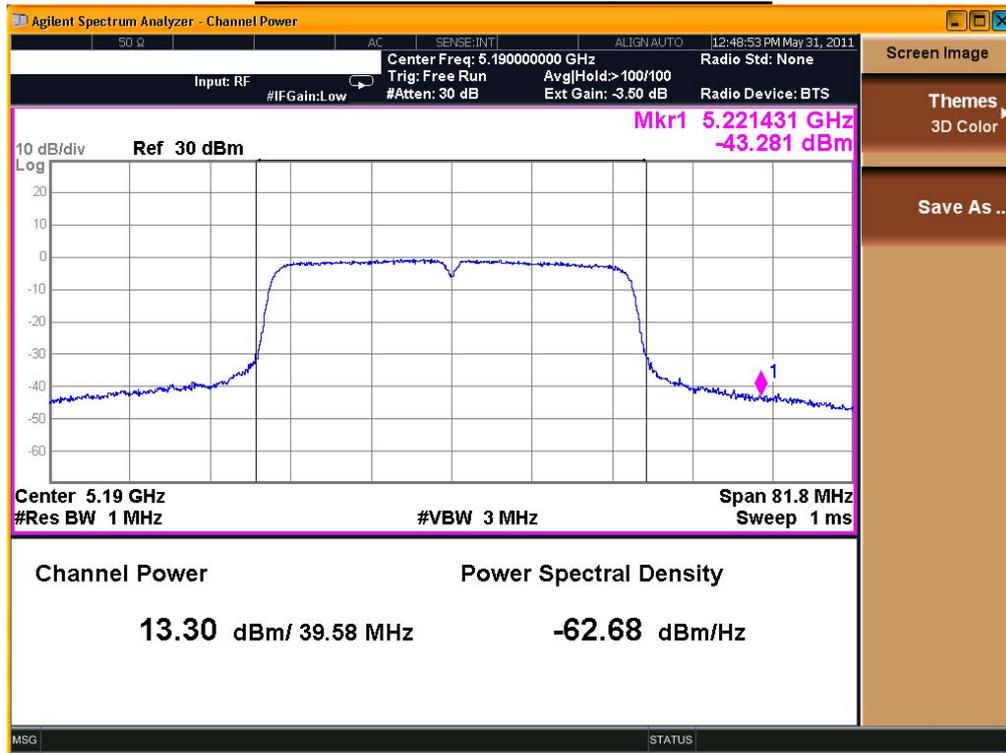
| | | | |
|--------------|--------------------------------|-----------|-----|
| Product | Dual-band Wireless USB Adapter | | |
| Test Item | Peak Mode 1: Transmit Output | | |
| Test Mode | Mode 1: Transmit | | |
| Date of Test | 2011/06/15 | Test Site | SR7 |

| IEEE 802.11n(40MHz)_ANT A | | | | | | |
|---------------------------|-----------------|----------------------|--------------------|-------------------|----------------------|--------|
| Channel No. | Frequency (MHz) | 26dB Bandwidth (MHz) | Output Power (dBm) | Required Limit | | Result |
| | | | | Fixed Limit (dBm) | 4+10logB Limit (dBm) | |
| 38 | 5190 | 39.575 | 13.30 | ≤ 17 | ≤19.97 | Pass |
| 46 | 5230 | 39.616 | 13.52 | ≤ 17 | ≤19.98 | Pass |

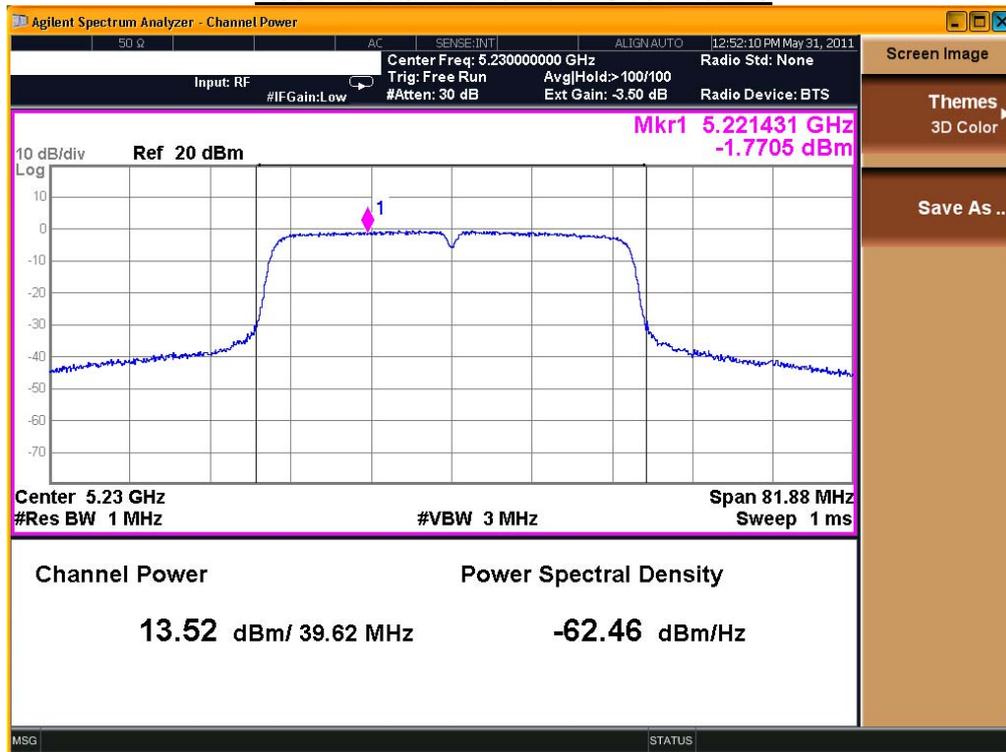
The worst emission of data rate is 27 Mbps

| Peak Power Output (dBm) | | | | | | | | | | |
|-------------------------|-----------------|-----------|-------|-------|-------|-------|-------|-------|-------|----------------|
| MCS Index | | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | Required Limit |
| Channel No | Frequency (MHz) | Data Rate | | | | | | | | |
| | | 27 | 54 | 81 | 108 | 162 | 216 | 243 | 270 | |
| 38 | 5190 | 13.30 | 12.27 | 13.29 | 12.21 | 13.18 | 13.11 | 13.17 | 13.21 | 1Watt=17dBm |
| 46 | 5230 | 13.52 | 13.48 | 13.41 | 13.5 | 13.39 | 13.31 | 13.28 | 13.32 | 1Watt=17dBm |

Peak transmit Power - Channel 38



Peak transmit Power - Channel 46



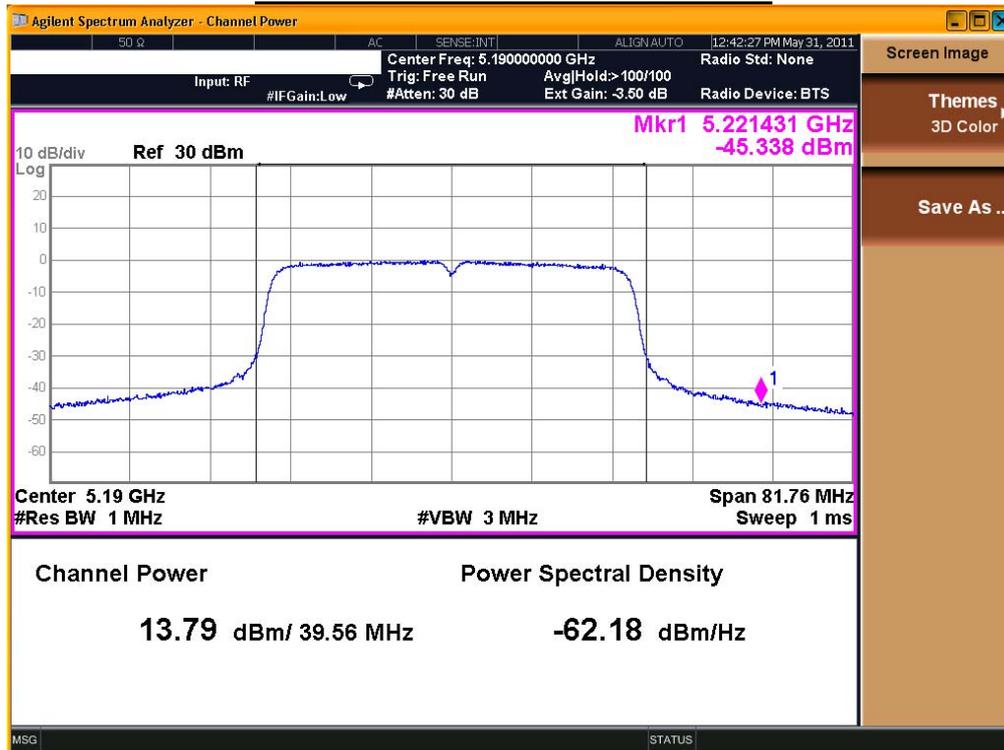
| | | | |
|--------------|--------------------------------|-----------|-----|
| Product | Dual-band Wireless USB Adapter | | |
| Test Item | Peak Mode 1: Transmit Output | | |
| Test Mode | Mode 1: Transmit | | |
| Date of Test | 2011/06/15 | Test Site | SR7 |

| IEEE 802.11n(40MHz)_ANT B | | | | | | |
|---------------------------|-----------------|----------------------|--------------------|-------------------|----------------------|--------|
| Channel No. | Frequency (MHz) | 26dB Bandwidth (MHz) | Output Power (dBm) | Required Limit | | Result |
| | | | | Fixed Limit (dBm) | 4+10logB Limit (dBm) | |
| 38 | 5190 | 39.959 | 13.79 | ≤17 | ≤20.02 | Pass |
| 46 | 5230 | 39.539 | 13.19 | ≤ 17 | ≤19.97 | Pass |

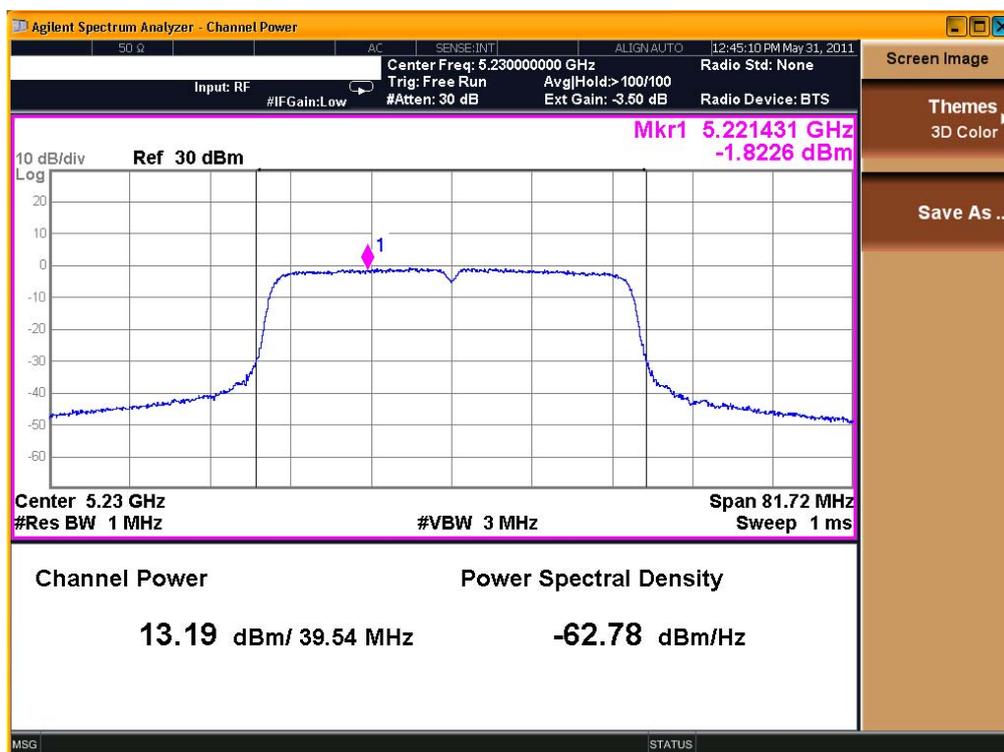
The worst emission of data rate is 27 Mbps

| Peak Power Output (dBm) | | | | | | | | | | |
|-------------------------|-----------------|-----------|-------|-------|-------|-------|-------|-------|-------|----------------|
| MCS Index | | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | Required Limit |
| Channel No | Frequency (MHz) | Data Rate | | | | | | | | |
| | | 27 | 54 | 81 | 108 | 162 | 216 | 243 | 270 | |
| 38 | 5190 | 13.79 | 13.71 | 13.68 | 13.58 | 13.48 | 13.59 | 13.68 | 13.74 | 1Watt=17dBm |
| 46 | 5230 | 13.19 | 13.16 | 13.14 | 13.13 | 13.10 | 13.14 | 13.17 | 13.18 | 1Watt=17dBm |

Peak transmit Power - Channel 38



Peak transmit Power - Channel 46



| | | | |
|--------------|--------------------------------|-----------|-----|
| Product | Dual-band Wireless USB Adapter | | |
| Test Item | Peak Mode 1: Transmit Output | | |
| Test Mode | Mode 1: Transmit | | |
| Date of Test | 2011/06/15 | Test Site | SR7 |

| IEEE 802.11n(40MHz)_ANT A+B | | | | | |
|-----------------------------|-----------------|--------------------|-------|----------------------|--------|
| Channel No. | Frequency (MHz) | Total Output Power | | Required Limit (dBm) | Result |
| | | (dBm) | (mW) | | |
| 38 | 5190 | 16.56 | 45.31 | 1Watt=17dBm | Pass |
| 46 | 5230 | 16.37 | 43.33 | 1Watt=17dBm | Pass |

5. Peak Power Spectrum Density

5.1. Test Equipment

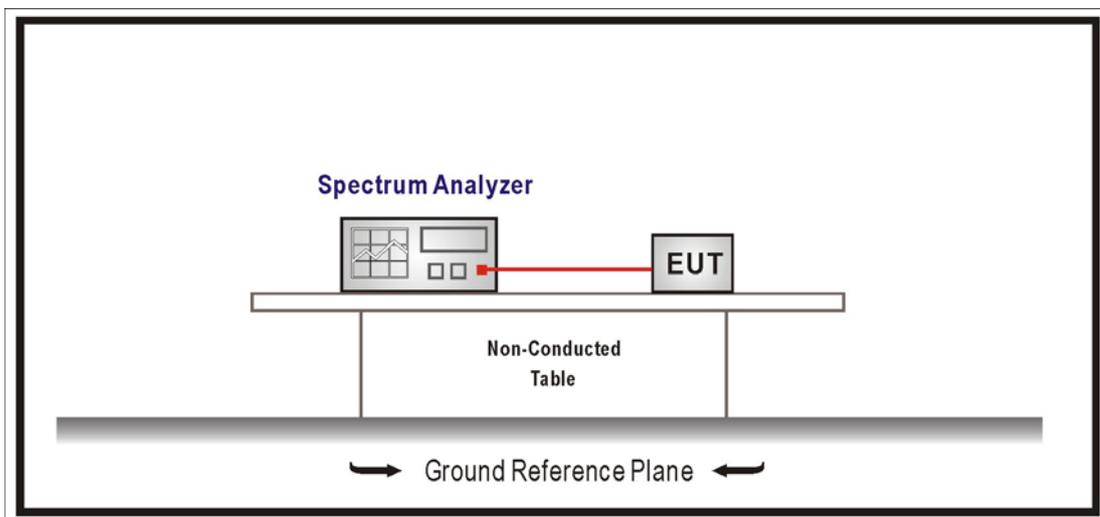
The following test equipments are used during the radiated emission tests:

Peak Power Spectrum Density / SR7

| Instrument | Manufacturer | Model No. | Serial No | Next Cal. Date |
|-------------------|--------------|-----------|-----------|----------------|
| Spectrum Analyzer | R&S | FSP | 100561 | 2012/01/16 |

Note: 1. All equipments that need to calibrate are with calibration period of 1 year.

5.2. Test Setup



5.3. Limits

1. 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.
2. 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.
3. 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.

5.4. Test Procedure

The EUT was setup to ANSI C63.4, 2009; tested to DTS test procedure of Aug 2002 DA 02-2138 for compliance to FCC 47CFR Subpart E requirements. The Method #2 of the Peak power spectral density (PPSD) was used.

Set RBW=1MHz, VBW=3MHz with sample detector. The PPSD is the highest level found across the emission in any 1-MHz band after 100 sweeps of averaging.

5.5. Uncertainty

The measurement uncertainty is defined as ± 1.27 dB