# ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT

## INTENTIONAL RADIATOR CERTIFICATION TO FCC PART 15 SUBPART C REQUIREMENT

*OF*

| | |
|---|---|
| **Product Name:** | **TITAN 5** |
| **Brand Name:** | **AMobile** |
| **Marketing Name:** | **TITAN 5** |
| **Model No.:** | **T551BA, T55XXXX (X=0~9, A~Z)** |
| **Model Difference:** | **Please refer to page 7** |
| **FCC ID:** | **2ACC5-T55** |
| **Report No.:** | **EH/2014/10023** |
| **Issue Date:** | **Jul. 09, 2014** |
| **FCC Rule Part:** | **§15.247, Cat: DTS** |
| **Prepared for:** | **AMobile Intelligent Corp**<br>**18F-1, No.150, Jian 1st Rd., Zhong He dist., New Taipei City, 235, Taiwan** |
| **Prepared by:** | **SGS Taiwan Ltd.**<br>**Electronics & Communication Laboratory**<br>**No.134, Wu Kung Road, New Taipei Industrial Park, Wuku District, New Taipei City, Taiwan 24803** |

Testing Laboratory
0513

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# VERIFICATION OF COMPLIANCE

| | |
|---|---|
| **Applicant:** | AMobile Intelligent Corp<br>18F-1, No.150, Jian 1st Rd., Zhong He dist., New Taipei City, 235, Taiwan |
| **Product Name:** | TITAN 5 |
| **Brand Name:** | AMobile |
| **Marketing Name:** | TITAN 5 |
| **Model No.:** | T551BA, T55XXXX (X=0~9, A~Z) |
| **Model Difference:** | Please refer to page 7 |
| **File Number:** | EH/2014/10023 |
| **FCC ID:** | 2ACC5-T55 |
| **Date of test:** | Jan. 29, 2014 ~ May. 09, 2014 |
| **Date of EUT Received:** | Jan. 22, 2014 |

## We hereby certify that:

The above equipment was tested by SGS Taiwan Ltd. Electronics & Communication Laboratory The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.4:2009 the energy emitted by the sample EUT tested as described in this report is in compliance with conducted and radiated emission limits of FCC Rules Part 15.247.

The test results of this report relate only to the tested sample identified in this report.

| | | | |
|---|---|---|---|
| ***Test By:*** | Marcus Tseng | ***Date*** | Jul. 09, 2014 |
| | ***Marcus Tseng / Engineer*** | | |
| ***Prepared By:*** | Tiffany Kao | ***Date*** | Jul. 09, 2014 |
| | ***Tiffany Kao / Clerk*** | | |
| ***Approved By:*** | Jim Chang | ***Date*** | Jul. 09, 2014 |
| | ***Jim Chang / Supervisor*** | | |

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# Version

| Version No. | Date | Description |
|---|---|---|
| 00 | May. 21, 2014 | Initial creation of document |
| 01 | Jul. 09, 2014 | Modified USB Cable Model No., Supplier and EUT Photos |
| | | |

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# 1 GENERAL INFORMATION

## 1.1 Product description

General:

| | | |
|---|---|---|
| Product Name: | TITAN 5 | |
| Brand Name: | AMobile | |
| Marketing Name: | TITAN 5 | |
| Model No.: | T551BA, T55XXXX (X=0~9, A~Z) | |
| Model difference: | Please refer to page 7 | |
| Hardware Version: | V02 | |
| Software Version: | AMobile_G0550_V08 | |
| Data Cable (USB): | Model No.: YXT-64-MK5P-1M, Supplier: THIN STRIP OF SKY | |
| Simple Hands-Free: | Model No.: LTX-12654319-B003, Supplier: Sanmu | |
| Power Supply: | 3.7Vdc Rechargeable Li-ion Battery or 5Vdc from AC/DC Adapter | |
| | Battery: | Model: G0550B01, Supplier: Japone |
| | Adapter: | Model No.: BSYB050150U USB, Supplier: BSY |

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WLAN 2.4GHz:

| Wi-Fi | Frequency Range | Channels | Rated Power (Peak) | Modulation Technology |
|---|---|---|---|---|
| 11b/g | 2412-2462 | 11 | b: 17.29dBm<br>g: 17.19dBm | DSSS<br>OFDM |
| 11n (2.4GHz) | HT20 2412-2462 | 11 | n: 17.02dBm | OFDM |
| 11n (2.4GHz) | HT40 2422-2452 | 7 | n: 17.06dBm | OFDM |
| Antenna Designation: | | | FPC Antenna, Peak Gain: -0.23dBi. | |
| Modulation type | | | CCK, DQPSK, DBPSK for DSSS<br>64QAM, 16QAM, QPSK, BPSK for OFDM | |
| Transition Rate: | | | 802.11 b: 1/2/5.5/11 Mbps;<br>802.11 g: 6/9/12/18/24/36/48/54 Mbps<br>802.11 n_20MHz: 6.5 – 65Mbps<br>802.11 n_40MHz: 13.5 – 135Mbps | |

This report applies for WLAN, and complies with FCC rule part 15C.

Model Difference:

| **T55XXXX** | **55** | **X** | **X** | **XX** |
|---|---|---|---|---|
| **Model** | **Panel Size** | **Barcode Type** | **Color** | **Location** |
| T | 55: 5.5” | 0:No Barcode Scanner<br>1:Honey 1D Scanner<br>3:Marson 1D Scanner | B:Black<br>W:White | where X may be A-Z or blank for marketing purpose |

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IEEE 802.11n Spec:

| MCS Index | Nss | Modulation | R | NBPSC | NCBPS | | NDBPS | | Datarate(Mbps) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | 800nsGI | | 400nsGI | |
| | | | | | 20MHz | 40MHz | 20MHz | 40MHz | 20MHz | 40MHz | 20MHz | 40MHz |
| 0 | 1 | BPSK | 1/2 | 1 | 52 | 108 | 26 | 54 | 6.5 | 13.5 | 7.200 | 15 |
| 1 | 1 | QPSK | 1/2 | 2 | 104 | 216 | 52 | 108 | 13.0 | 27.0 | 14.400 | 30 |
| 2 | 1 | QPSK | 3/4 | 2 | 104 | 216 | 78 | 162 | 19.5 | 40.5 | 21.700 | 45 |
| 3 | 1 | 16-QAM | 1/2 | 4 | 208 | 432 | 104 | 216 | 26.0 | 54.0 | 28.900 | 60 |
| 4 | 1 | 16-QAM | 3/4 | 4 | 208 | 432 | 156 | 324 | 39.0 | 81.0 | 43.300 | 90 |
| 5 | 1 | 64-QAM | 2/3 | 6 | 312 | 648 | 208 | 432 | 52.0 | 108.0 | 57.800 | 120 |
| 6 | 1 | 64-QAM | 3/4 | 6 | 312 | 648 | 234 | 486 | 58.5 | 121.5 | 65.000 | 135 |
| 7 | 1 | 64-QAM | 5/6 | 6 | 312 | 648 | 260 | 540 | 65.0 | 135.0 | 72.200 | 150 |

| Symbol | Explanation |
|---|---|
| NSS | Number of spatial streams |
| R | Code rate |
| NBPSC | Number of coded bite per single carrier |
| NCBPS | Number of coded bite per symbol |
| NDBPS | Number of data bite per symbol |
| GI | Guard interval |

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| MCS Index | Modulation | $R$ | $N_{BPSCS}(i_{SS})$ | $N_{SD}$ | $N_{SP}$ | $N_{CBPS}$ | $N_{DBPS}$ | Data rate (Mb/s) | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | 800 ns GI | 400 ns GI (see NOTE) |
| 8 | BPSK | 1/2 | 1 | 52 | 4 | 104 | 52 | 13.0 | 14.4 |
| 9 | QPSK | 1/2 | 2 | 52 | 4 | 208 | 104 | 26.0 | 28.9 |
| 10 | QPSK | 3/4 | 2 | 52 | 4 | 208 | 156 | 39.0 | 43.3 |
| 11 | 16-QAM | 1/2 | 4 | 52 | 4 | 416 | 208 | 52.0 | 57.8 |
| 12 | 16-QAM | 3/4 | 4 | 52 | 4 | 416 | 312 | 78.0 | 86.7 |
| 13 | 64-QAM | 2/3 | 6 | 52 | 4 | 624 | 416 | 104.0 | 115.6 |
| 14 | 64-QAM | 3/4 | 6 | 52 | 4 | 624 | 468 | 117.0 | 130.0 |
| 15 | 64-QAM | 5/6 | 6 | 52 | 4 | 624 | 520 | 130.0 | 144.4 |
| NOTE—The 400 ns GI rate values are rounded to 1 decimal place. | | | | | | | | | |

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| MCS Index | Modulation | $R$ | $N_{BPSCS}(i_{SS})$ | $N_{SD}$ | $N_{SP}$ | $N_{CBPS}$ | $N_{DBPS}$ | Data rate (Mb/s) | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | 800 ns GI | 400 ns GI |
| 8 | BPSK | 1/2 | 1 | 108 | 6 | 216 | 108 | 27.0 | 30.0 |
| 9 | QPSK | 1/2 | 2 | 108 | 6 | 432 | 216 | 54.0 | 60.0 |
| 10 | QPSK | 3/4 | 2 | 108 | 6 | 432 | 324 | 81.0 | 90.0 |
| 11 | 16-QAM | 1/2 | 4 | 108 | 6 | 864 | 432 | 108.0 | 120.0 |
| 12 | 16-QAM | 3/4 | 4 | 108 | 6 | 864 | 648 | 162.0 | 180.0 |
| 13 | 64-QAM | 2/3 | 6 | 108 | 6 | 1296 | 864 | 216.0 | 240.0 |
| 14 | 64-QAM | 3/4 | 6 | 108 | 6 | 1296 | 972 | 243.0 | 270.0 |
| 15 | 64-QAM | 5/6 | 6 | 108 | 6 | 1296 | 1080 | 270.0 | 300.0 |

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## 1.2 Related Submittal(s) / Grant (s)

This submittal(s) (test report) is intended for **FCC ID: 2ACC5-T55** filing to comply with Section 15.247 of the FCC Part 15, Subpart C Rules. The composite system (digital device) is compliance with Subpart B under the DoC procedure.

## 1.3 Test Methodology

Both conducted and radiated testing was performed according to the procedures in ANSI C63.4:2009. Radiated testing was performed at an antenna to EUT distance 3 meters.

Tested in accordance with Apr 2013 KDB558074 D01 V03 for compliance to FCC 47CFR 15.247 requirements.

## 1.4 Test Facility

The measurement facilities used to collect the 3m Radiated Emission and AC power line conducted data are located on the address of SGS Taiwan Ltd. Electronics & Communication Laboratory No.134, Wu Kung Road, Wuku Industrial Zone, Taipei County, Taiwan which are constructed and calibrated to meet the FCC requirements in documents ANSI C63.4:2009. FCC Registration Number is: 990257. Canada Registration Number: 4620A-4.

The 10 m Open Area Test Sites located on the address of SGS Taiwan Ltd. Electronics & Communication Laboratory No.2, Keji 1st Rd., Guishan Township, Taoyuan County, Taiwan, which is constructed and calibrated to meet the CISPR 22/EN 55022 requirements. SGS Site No. 1(3 &10 meters) and FCC Registration Number: 455997.

## 1.5 Special Accessories

There are no special accessories used while test was conducted.

## 1.6 Equipment Modifications

There was no modification incorporated into the EUT.

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# 2 SYSTEM TEST CONFIGURATION

## 2.1 EUT Configuration

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner which intends to maximize its emission characteristics in a continuous normal application.

## 2.2 EUT Exercise

An engineering test mode (software/firmware) that applicant provided was utilized to manipulate the EUT into transmit, selection of the test channel, and modulation scheme.

## 2.3 Test Procedure

### 2.3.1 Conducted Emissions

The EUT is a placed on as turn table which is 0.8 m above ground plane. According to the general criterion in Section 7.1 of ANSI C63.4:2009.Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz, and the measurement procedure 7.3 in ANSI 63.4:2009 is followed to carry out the test. The CISPR Quasi-Peak and Average detector mode is employed according to §15.107

### 2.3.2 Radiated Emissions

The EUT is a placed on as turn table which is 0.8 m above ground plane. The turn table shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3m away from the receiving antenna which varied from 1m to 4m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the max. emission, the relative positions of this hand-held transmitter (EUT) was rotated through three orthogonal axes and measurement procedures for electric field radiated emissions above 1 GHz the EUT measurement is to be made “while keeping the antenna in the ‘cone of radiation’ from that area and pointed at the area both in azimuth and elevation, with polarization oriented for maximum response.” is still within the 3dB illumination BW of the measurement antenna. according to the requirements in Section 8 and 13 and of ANSI C63.4:2009,

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## 2.4 Configuration of Tested System

**Fig. 2-1 Radiated Emission & Conducted (Antenna Port) Configuration**

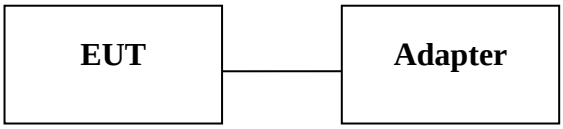


**Fig. 2-2 AC Power Line Conducted Emission**

**Table 2-1 Equipment Used in Tested System**

| Item | Equipment | Mfr/Brand | Model/Type No. | Series No. | Data Cable | Power Cord |
|---|---|---|---|---|---|---|
| 1. | WLAN Test Software | N/A | N/A | N/A | N/A | N/A |

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# 3 SUMMARY OF TEST RESULTS

| FCC | Description Of Test | Result |
|---|---|---|
| §15.207(a) | AC Power Line Conducted Emission | Compliant |
| §15.247(b) (3) | Peak Output Power | Compliant |
| §15.247(a)(2) | 6dB Bandwidth | Compliant |
| §15.247(d) | 100 KHz Bandwidth Of Frequency Band Edges | Compliant |
| §15.247(d) | Spurious Emission | Compliant |
| §15.247(e) | Peak Power Density | Compliant |
| §15.203 | Antenna Requirement | Compliant |

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# 4 DESCRIPTION OF TEST MODES

The EUT has been tested under operating condition.
Test program used to control the EUT for staying in continuous transmitting and receiving mode is programmed.

802.11 b mode: Channel low (2412MHz)、mid (2437MHz) and high (2462MHz) with 1Mbps lowest data rate are chosen for full testing.

802.11 g mode: Channel low (2412MHz)、mid (2437MHz) and high (2462MHz) with 6Mbps lowest data rate are chosen for full testing.

802.11 n_20MHz mode: Channel low (2412MHz)、mid (2437MHz) and high (2462MHz) with 6.5Mbps lowest data rate are chosen for full testing.

802.11 n_40MHz mode: Channel low (2422MHz)、mid (2437MHz) and high (2452MHz) with 13.5Mbps lowest data rate are chosen for full testing.

The worst case is determined by the output power that generates the highest emission. As examined in the section of output power measurement, the section 7.5, the lowest data rate at b/g/n resulted the highest level of fundamental emission, and therefore, the lowest data rate is chosen as the worst-case to conduct the remaining of other mandatory test cases.

The field strength of radiation emission was measured as EUT stand-up position (H mode) and lie down position (E1, E2 mode) for 802.11b/g/n WLAN Transmitter for channel Low, Mid and High, the worst case H position was tested as resulted in pre-scanned measurement with respect to 2.4GHz.

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# 5 MEASUREMENT UNCERTAINTY

| Test Items | Uncertainty |
|---|---|
| AC Power Line Conducted Emission | +/- 2.586 dB |
| Peak Output Power | +/- 1.55dB (for Spectrum)<br>+/- 1.42 dB (for Power Meter) |
| 6dB Bandwidth | +/- 123.36 Hz |
| 100 KHz Bandwidth Of Frequency Band Edges | +/- 1.55 dB |
| Peak Power Density | +/- 1.55 dB |
| Temperature | +/- 0.8 °C |
| Humidity | +/- 4.7 % |
| DC / AC Power Source | DC= +/- 1%, AC=+/- 0.2% |

Radiated Spurious Emission:

| | |
|---|---|
| Measurement uncertainty (Polarization : **Vertical**) | 30MHz - 180MHz: +/- 3.37dB |
| | 180MHz -417MHz: +/- 3.19dB |
| | 0.417GHz-1GHz: +/- 3.19dB |
| | 1GHz - 18GHz: +/- 4.04dB |
| | 18GHz - 40GHz: +/- 4.04dB |

| | |
|---|---|
| Measurement uncertainty (Polarization : **Horizontal**) | 30MHz - 167MHz: +/- 4.22dB |
| | 167MHz -500MHz: +/- 3.44dB |
| | 0.5GHz-1GHz: +/- 3.39dB |
| | 1GHz - 18GHz: +/- 4.08dB |
| | 18GHz - 40GHz: +/- 4.08dB |

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

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# 6 CONDUCTED EMISSION TEST

## 6.1 Standard Applicable:

According to §15.207, frequency range within 150KHz to 30MHz shall not exceed the Limit table as below.

| Frequency range MHz | Limits dB(uV) | |
|---|---|---|
| | Quasi-peak | Average |
| 0.15 to 0.50 | 66 to 56 | 56 to 46 |
| 0.50 to 5 | 56 | 46 |
| 5 to 30 | 60 | 50 |

Note
1.The lower limit shall apply at the transition frequencies
2.The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz.

## 6.2 Measurement Equipment Used:

| Conducted Emission Test Site | | | | | |
|---|---|---|---|---|---|
| **EQUIPMENT TYPE** | **MFR** | **MODEL NUMBER** | **SERIAL NUMBER** | **LAST CAL.** | **CAL DUE.** |
| EMI Test Receiver | R&S | ESCI7 | 100760 | 05/27/2013 | 05/26/2014 |
| LISN | Rolf-Heine | NNB-2/16Z | 99012 | 03/26/2014 | 03/25/2015 |
| LISN | FCC | FCC-LISN-50/250-25-2-01 | 04034 | 03/19/2014 | 03/18/2015 |
| Coaxial Cables | N/A | WK CE Cable | N/A | 11/26/2013 | 11/25/2014 |

## 6.3 EUT Setup:

1. The conducted emission tests were performed in the test site, using the setup in accordance with the ANSI C63.4:2009.
2. The AC/DC Power adaptor of EUT was plug-in LISN. The EUT was placed flushed with the rear of the table.
3. The LISN was connected with 120Vac/60Hz power source.

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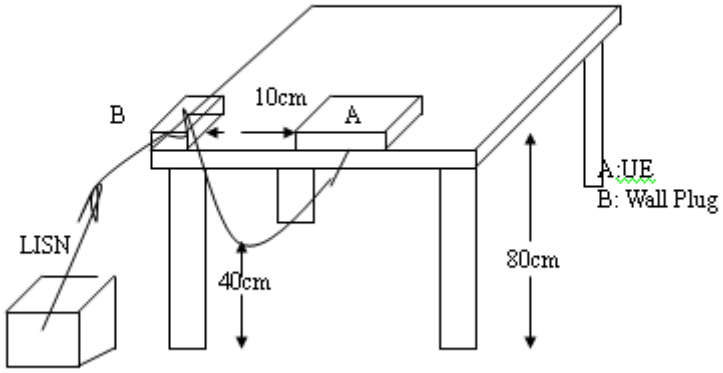
## 6.4 Test SET-UP (Block Diagram of Configuration)




## 6.5 Measurement Procedure:

1. The EUT was placed on a table which is 0.8m above ground plane.
2. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
3. Repeat above procedures until all phases of power being supplied by given UE are completed

## 6.6 Measurement Result:

Note: Refer to next page for measurement data and plots.

Note2: The * reveals the worst-case results that closet to the limit

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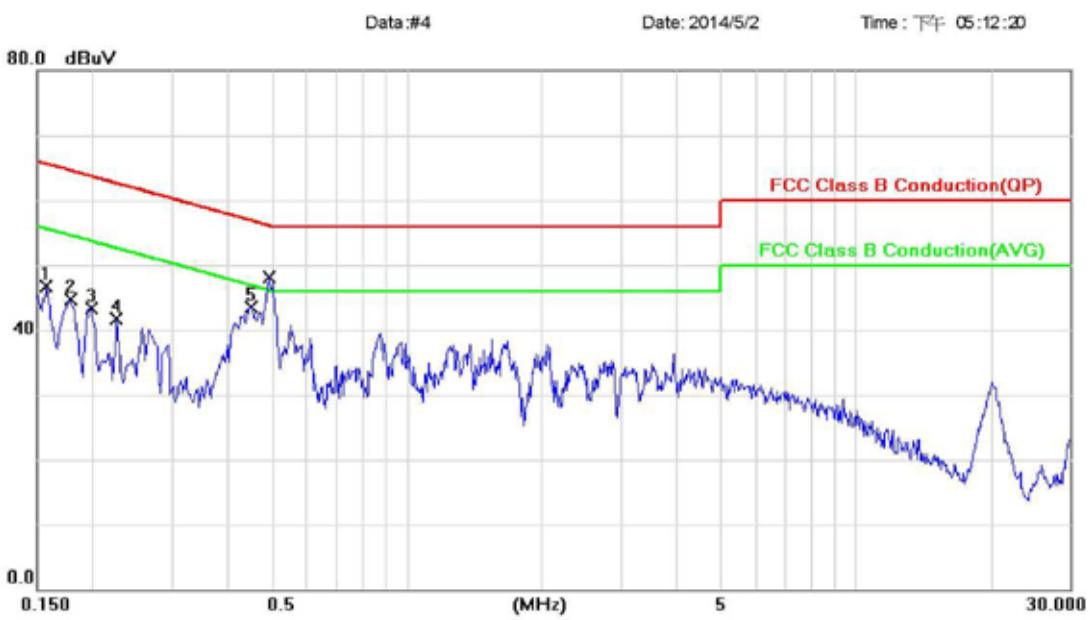
# AC POWER LINE CONDUCTED EMISSION TEST DATA

| | | | | | |
|---|---|---|---|---|---|
| Operation Mode: | Operation Mode | | | Test Date: | May. 02, 2014 |
| Temperature: | 26 ℃ | Humidity: | 60 % | Test By: | Nick |

Site ConductionRoom
Limit: FCC Class B Conduction(QP)
Mode: OperationMode
Note:

Phase: L1
Power: AC 120V/60Hz

Temperature: 26 ℃
Humidity: 60%




| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Over | | |
|---|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dB | dBuV | dBuV | dB | Detector | Comment |
| 1 | | 0.1580 | 46.61 | 0.16 | 46.77 | 65.57 | -18.80 | peak | |
| 2 | | 0.1780 | 44.50 | 0.16 | 44.66 | 64.58 | -19.92 | peak | |
| 3 | | 0.1980 | 43.21 | 0.16 | 43.37 | 63.69 | -20.32 | peak | |
| 4 | | 0.2260 | 41.49 | 0.16 | 41.65 | 62.60 | -20.95 | peak | |
| 5 | | 0.4500 | 43.37 | 0.16 | 43.53 | 56.88 | -13.35 | peak | |
| 6 | * | 0.4940 | 47.00 | 0.16 | 47.16 | 56.10 | -8.94 | QP | |
| 7 | | 0.4940 | 37.00 | 0.16 | 37.16 | 46.10 | -8.94 | AVG | |

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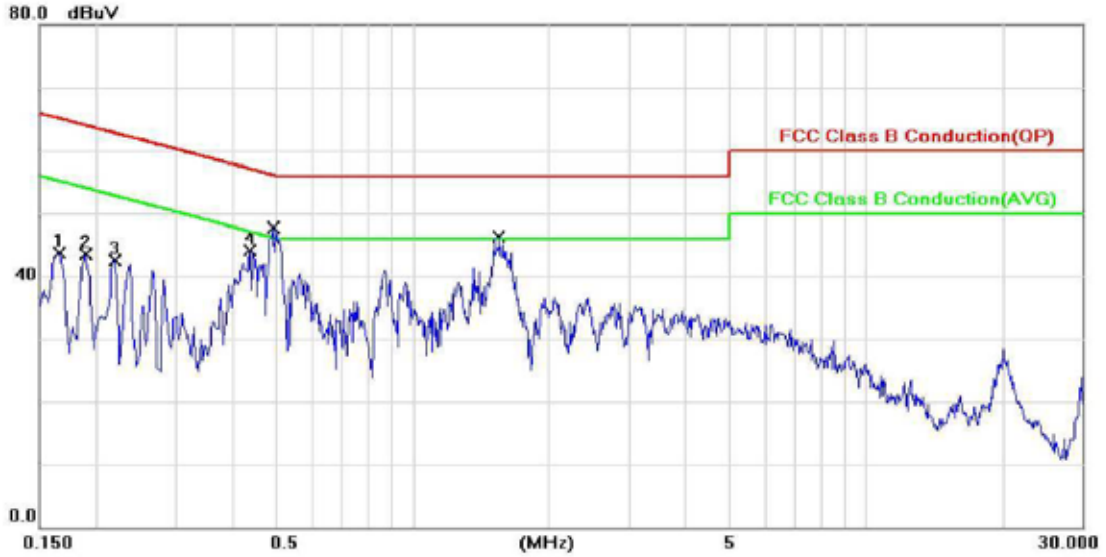
| | | | | | |
|---|---|---|---|---|---|
| Site | ConductionRoom | Phase: | N | Temperature: | 26 ℃ |
| Limit: | FCC Class B Conduction(QP) | Power: | AC 120V/60Hz | Humidity: | 60% |
| Mode: | OperationMode | | | | |
| Note: | | | | | |

## ConductedEmission

Data:#3 Date: 2014/5/2 Time : 下午 05:06:35




| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Over | | |
|---|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dB | dBuV | dBuV | dB | Detector | Comment |
| 1 | | 0.1660 | 43.43 | 0.18 | 43.61 | 65.16 | -21.55 | peak | |
| 2 | | 0.1900 | 43.33 | 0.19 | 43.52 | 64.04 | -20.52 | peak | |
| 3 | | 0.2220 | 42.28 | 0.19 | 42.47 | 62.74 | -20.27 | peak | |
| 4 | | 0.4380 | 43.90 | 0.19 | 44.09 | 57.10 | -13.01 | peak | |
| 5 | * | 0.4940 | 46.10 | 0.19 | 46.29 | 56.10 | -9.81 | QP | |
| 6 | | 0.4940 | 33.00 | 0.19 | 33.19 | 46.10 | -12.91 | AVG | |
| 7 | | 1.5580 | 41.30 | 0.23 | 41.53 | 56.00 | -14.47 | QP | |
| 8 | | 1.5580 | 29.50 | 0.23 | 29.73 | 46.00 | -16.27 | AVG | |

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# 7 PEAK OUTPUT POWER MEASUREMENT

## 7.1 Standard Applicable:

According to §15.247 (b)

(3) For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt. As an alternative to a peak power measurement, compliance with the one Watt limit can be based on a measurement of the maximum conducted output power. Maximum Conducted Output Power is defined as the total transmit power delivered to all antennas and antenna elements averaged across all symbols in the signaling alphabet when the transmitter is operating at its maximum power control level. Power must be summed across all antennas and antenna elements. The average must not include any time intervals during which the transmitter is off or is transmitting at a reduced power level. If multiple modes of operation are possible (e.g., alternative modulation methods), the maximum conducted output power is the highest total transmit power occurring in any mode.

(4) The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

## 7.2 Measurement Equipment Used:

| Conducted Emission Test Site | | | | | |
|---|---|---|---|---|---|
| EQUIPMENT TYPE | MFR | MODEL NUMBER | SERIAL NUMBER | LAST CAL. | CAL DUE. |
| Power Meter | Anritsu | ML2495A | 1005007 | 01/13/2014 | 01/12/2015 |
| Power Sensor | Anritsu | MA2411B | 917032 | 01/13/2014 | 01/12/2015 |
| Spectrum Analyzer | Agilent | E4446A | MY51100003 | 05/30/2013 | 05/29/2014 |
| Spectrum Analyzer | Agilent | E4440A | MY45304525 | 03/08/2014 | 03/07/2015 |
| DC Block | Mini-Circuits | BLK-18-S+ | 1 | 02/27/2014 | 02/26/2015 |
| Low Loss Cable | HUBER+SUHNER | SUCOFLEX 104PEA | N/A | 01/03/2014 | 01/02/2015 |
| Attenuator | Mini-Circuit | BW-S10W2+ | 002 | 02/27/2014 | 02/26/2015 |
| Splitter | Agilent | 11636B | N/A | 02/27/2014 | 02/26/2015 |

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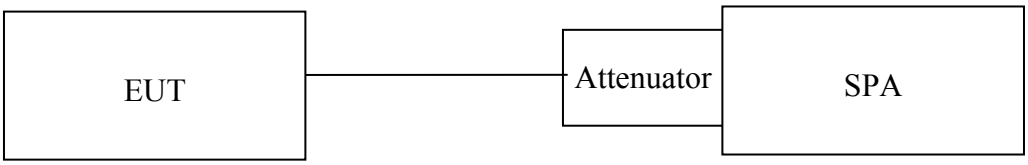
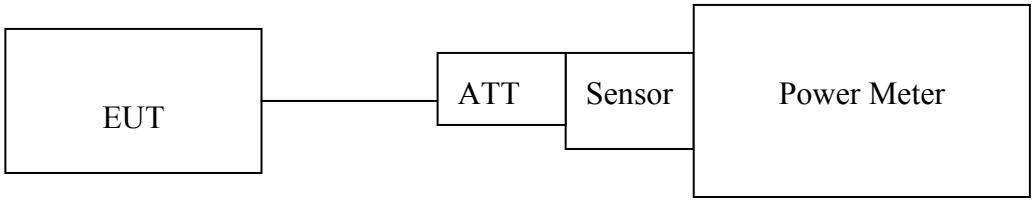
## 7.3 Test Set-up:

Spectrum:




Power Meter:

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## 7.4 Measurement Procedure:

1. Place the EUT on the table and set it in transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the power meter or spectrum. (**Peak power setting on Spectrum:** Channel power function, RBW = 1MHz, VBW = 3MHz, Span: 30/60MHz, Detector =peak, Sweep = Auto. Setting on spectrum is adjusted based on the mandatory procedure in 9.1.2 of the KDB558074). Power Meter is used as the auxiliary test equipment to conduct the output power measurement. 9.1.3 in KDB558074 is followed.
   (**Avg. power setting on Spectrum:** Channel power function, RBW = 1MHz, VBW = 3MHz, Span: 30/60MHz, Detector =Avg., Trace avg =100, Sweep = Auto, Setting on spectrum is adjusted based on the mandatory procedure in 9.2.2.4 of the KDB558074). Power Meter is used as the auxiliary test equipment to conduct the output power measurement. 9.2.3, option 3 in KDB558074 is followed.
3. Record the max. Reading as observed from Spectrum or Power Meter.
4. Repeat above procedures until all frequency of interest measured was complete.

***Formula:***

*Duty Cycle = Ton / (Ton+Toff)*

***Test Procedure:***

*Set span = 0, RBW = 8MHz, VBW = 8MHz, Detector = Peak*

*Duty Cycle:*

| | Duty Cycle | Duty Factor (dBm) |
|---|---|---|
| 802.11b | 0.988 | 0.05 |
| 802.11g | 0.922 | 0.35 |
| 802.11n_20 (2.4G) | 0.915 | 0.39 |
| 802.11n_40 (2.4G) | 0.811 | 0.91 |

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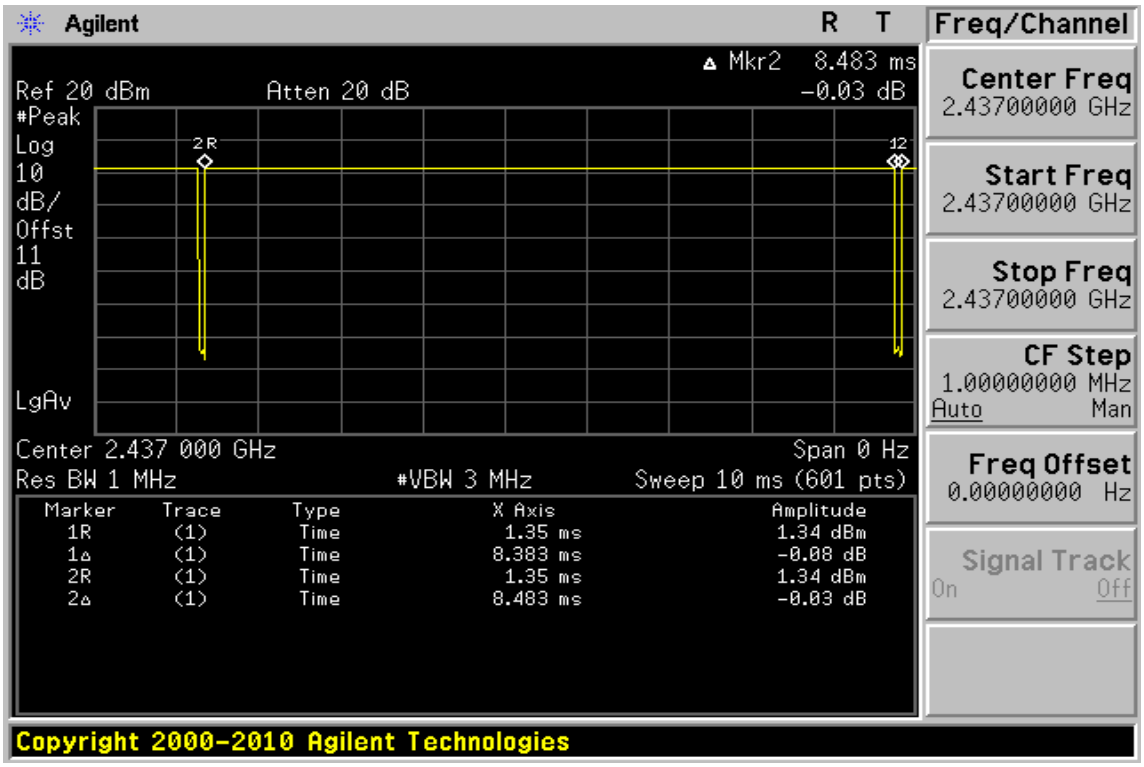
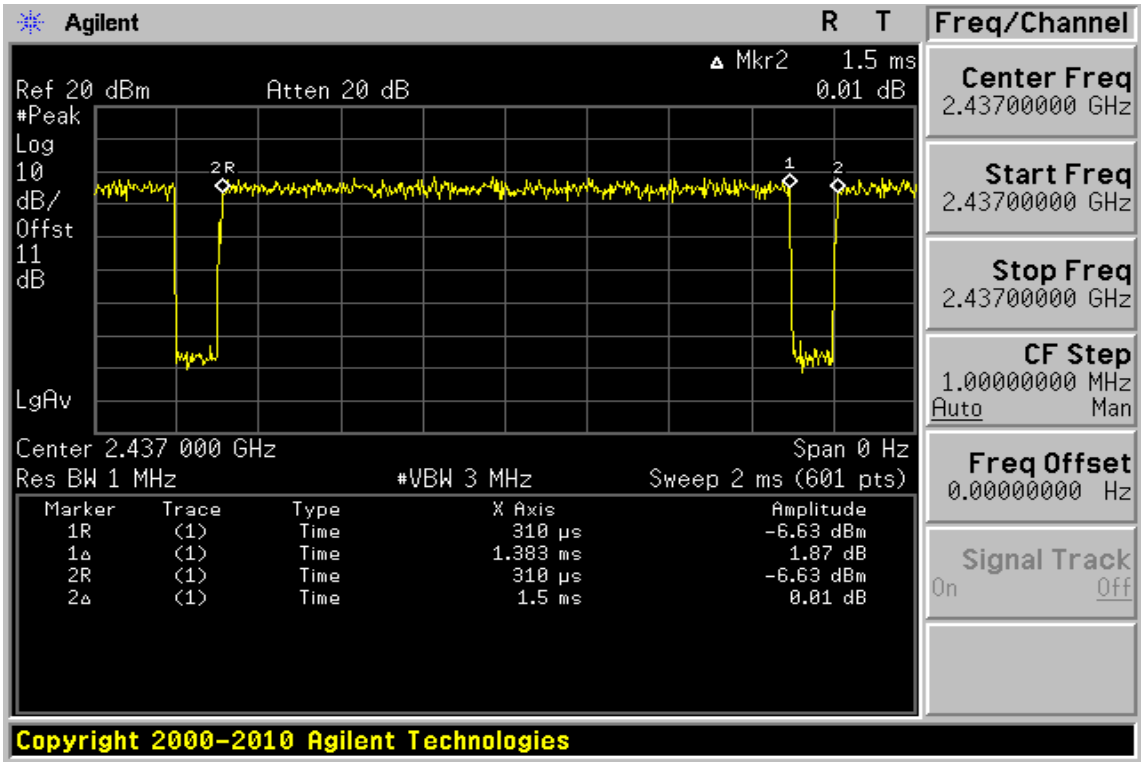
## Duty Factor:

### 802.11 b




### 802.11 g

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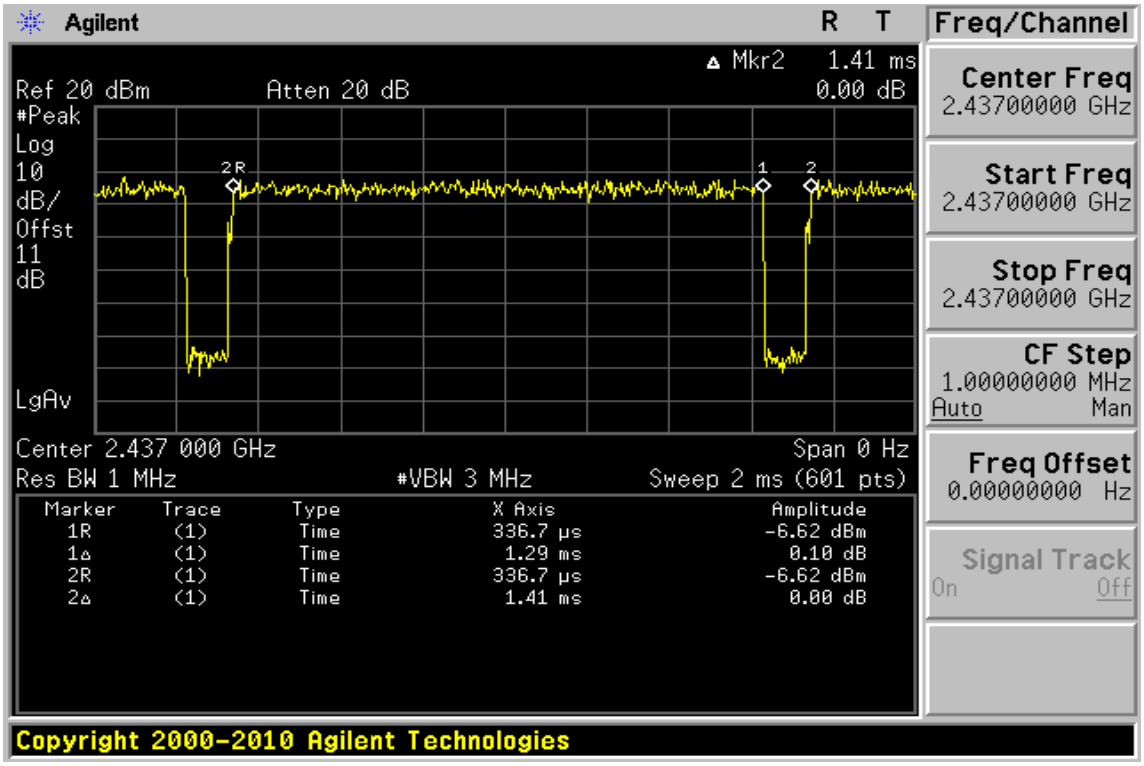
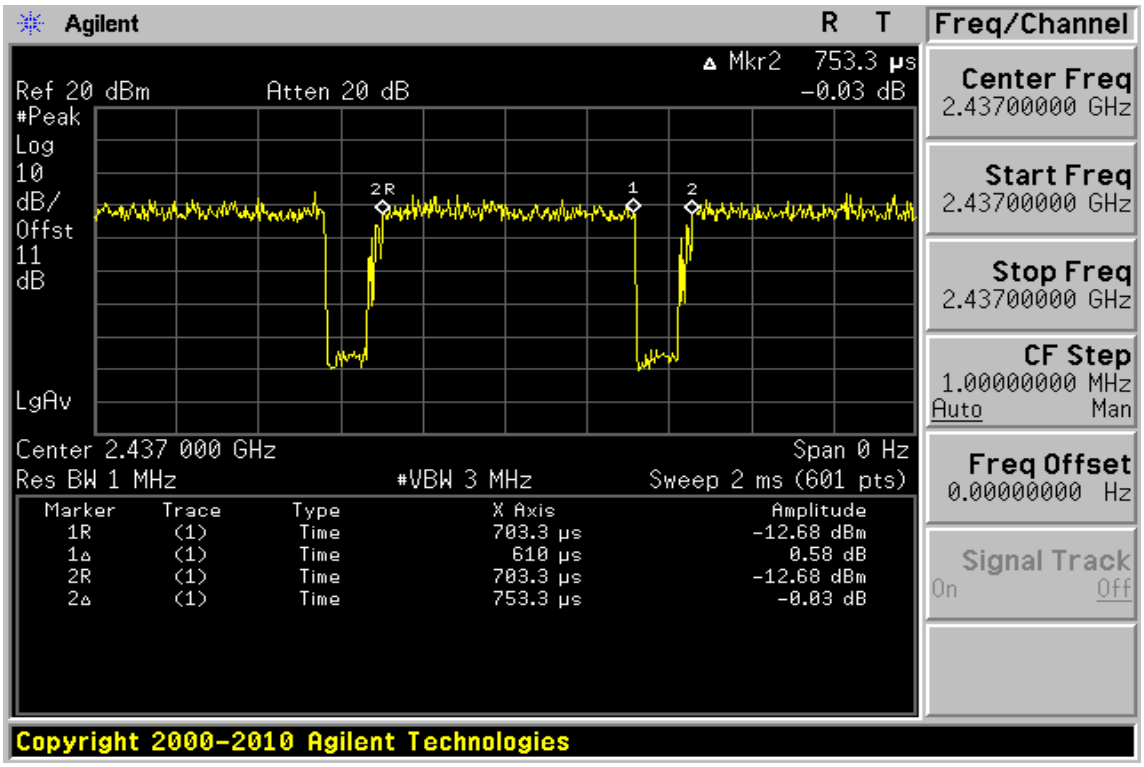
## 802.11 n_20 MHz




## 802.11 n_40 MHz

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## 7.5 Measurement Result:

### 802.11b

| | | Peak Power Output (dBm) | | | | |
|---|---|---|---|---|---|---|
| CH | Frequency (MHz) | Data Rate | | | | Required Limit |
| | | 1 | 2 | 5.5 | 11 | |
| 1 | 2412 | 16.57 | 16.54 | 16.52 | 16.41 | 1 Watt = 30 dBm |
| 6 | 2437 | **17.29** | 17.24 | 17.13 | 17.04 | 1 Watt = 30 dBm |
| 11 | 2462 | 12.48 | 12.44 | 12.43 | 12.40 | 1 Watt = 30 dBm |

| | | Average Power Output (dBm) | | | | |
|---|---|---|---|---|---|---|
| CH | Frequency (MHz) | Data Rate | | | | Required Limit |
| | | 1 | 2 | 5.5 | 11 | |
| 1 | 2412 | 15.35 | 15.25 | 15.17 | 15.04 | 1 Watt = 30 dBm |
| 6 | 2437 | **16.16** | 16.10 | 16.05 | 15.94 | 1 Watt = 30 dBm |
| 11 | 2462 | 9.14 | 9.11 | 8.98 | 8.91 | 1 Watt = 30 dBm |

### 802.11g

| | | Peak Power Output(dBm) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| CH | Frequency (MHz) | Data Rate | | | | | | | | Required Limit |
| | | 6 | 9 | 12 | 18 | 24 | 36 | 48 | 54 | |
| 1 | 2412 | 16.58 | 16.52 | 16.47 | 16.40 | 16.35 | 16.28 | 16.26 | 16.20 | 1 Watt = 30 dBm |
| 6 | 2437 | **17.19** | 17.07 | 17.06 | 16.99 | 16.93 | 16.91 | 16.89 | 16.75 | 1 Watt = 30 dBm |
| 11 | 2462 | 15.41 | 15.31 | 15.29 | 15.21 | 15.15 | 15.02 | 14.90 | 14.87 | 1 Watt = 30 dBm |

| | | Average Power Output(dBm) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| CH | Frequency (MHz) | Data Rate | | | | | | | | Required Limit |
| | | 6 | 9 | 12 | 18 | 24 | 36 | 48 | 54 | |
| 1 | 2412 | 11.54 | 11.51 | 11.38 | 11.26 | 11.15 | 11.01 | 10.90 | 10.85 | 1 Watt = 30 dBm |
| 6 | 2437 | **12.46** | 12.32 | 12.30 | 12.21 | 12.16 | 12.16 | 12.02 | 11.92 | 1 Watt = 30 dBm |
| 11 | 2462 | 7.56 | 7.45 | 7.34 | 7.29 | 7.25 | 7.18 | 7.17 | 7.16 | 1 Watt = 30 dBm |

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**802.11n_20M**

| | | Peak Power Output(dBm) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| CH | Frequency (MHz) | Data Rate | | | | | | | | Required Limit |
| | | MCS0 | MCS1 | MCS2 | MCS3 | MCS4 | MCS5 | MCS6 | MCS7 | |
| 1 | 2412 | 16.49 | 16.44 | 16.43 | 16.30 | 16.30 | 16.22 | 16.12 | 16.01 | 1 Watt = 30 dBm |
| 6 | 2437 | **17.02** | 16.99 | 16.91 | 16.84 | 16.76 | 16.72 | 16.68 | 16.64 | 1 Watt = 30 dBm |
| 11 | 2462 | 15.20 | 15.11 | 15.02 | 14.89 | 14.83 | 14.69 | 14.62 | 14.60 | 1 Watt = 30 dBm |

| | | Average Power Output(dBm) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| CH | Frequency (MHz) | Data Rate | | | | | | | | Required Limit |
| | | MCS0 | MCS1 | MCS2 | MCS3 | MCS4 | MCS5 | MCS6 | MCS7 | |
| 1 | 2412 | 10.51 | 10.41 | 10.34 | 10.30 | 10.23 | 10.14 | 10.14 | 10.00 | 1 Watt = 30 dBm |
| 6 | 2437 | **12.32** | 12.28 | 12.28 | 12.15 | 12.10 | 12.00 | 11.99 | 11.97 | 1 Watt = 30 dBm |
| 11 | 2462 | 5.45 | 5.34 | 5.27 | 5.27 | 5.23 | 5.09 | 5.04 | 4.95 | 1 Watt = 30 dBm |

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**802.11n_40M**

| | | Peak Power Output(dBm) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| CH | Frequency (MHz) | Data Rate | | | | | | | | Required Limit |
| | | MCS8 | MCS9 | MCS10 | MCS11 | MCS12 | MCS13 | MCS14 | MCS15 | |
| 1 | 2422 | 16.53 | 16.41 | 16.41 | 16.38 | 16.33 | 16.31 | 16.26 | 16.20 | 1 Watt = 30 dBm |
| 6 | 2437 | **17.06** | 16.94 | 16.83 | 16.81 | 16.67 | 16.61 | 16.49 | 16.48 | 1 Watt = 30 dBm |
| 11 | 2452 | 15.48 | 15.41 | 15.27 | 15.18 | 15.08 | 15.00 | 14.91 | 14.89 | 1 Watt = 30 dBm |

| | | Peak Power Output(dBm) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| CH | Frequency (MHz) | Data Rate | | | | | | | | Required Limit |
| | | MCS8 | MCS9 | MCS10 | MCS11 | MCS12 | MCS13 | MCS14 | MCS15 | |
| 1 | 2422 | 7.53 | 7.47 | 7.33 | 7.31 | 7.17 | 7.07 | 7.01 | 6.90 | 1 Watt = 30 dBm |
| 6 | 2437 | **12.03** | 11.92 | 11.83 | 11.71 | 11.71 | 11.69 | 11.65 | 11.65 | 1 Watt = 30 dBm |
| 11 | 2452 | 4.50 | 4.39 | 4.26 | 4.17 | 4.13 | 4.02 | 3.91 | 3.86 | 1 Watt = 30 dBm |

**** Note: The duty cycle factor is compensated back to obtain the maximum value of the measurement in average.***

**** Note: Offset 11dB for 2.4G 802.11b/g/n_20/n_40***

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# 8 6dB BANDWIDTH

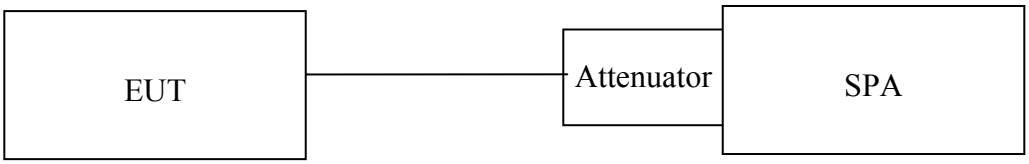
## 8.1 Standard Applicable:

According to §15.247(a)(2), Systems using digital modulation techniques may operate in the 902 - 928 MHz,2400 - 2483.5 MHz, and 5725 - 5850 MHz bands. The minimum 6 dB bandwidth shall be at least 500kHz.

## 8.2 Measurement Equipment Used:

| Conducted Emission Test Site | | | | | |
|---|---|---|---|---|---|
| EQUIPMENT TYPE | MFR | MODEL NUMBER | SERIAL NUMBER | LAST CAL. | CAL DUE. |
| Power Meter | Anritsu | ML2495A | 1005007 | 01/13/2014 | 01/12/2015 |
| Power Sensor | Anritsu | MA2411B | 917032 | 01/13/2014 | 01/12/2015 |
| Spectrum Analyzer | Agilent | E4446A | MY51100003 | 05/30/2013 | 05/29/2014 |
| Spectrum Analyzer | Agilent | E4440A | MY45304525 | 03/08/2014 | 03/07/2015 |
| DC Block | Mini-Circuits | BLK-18-S+ | 1 | 02/27/2014 | 02/26/2015 |
| Low Loss Cable | HUBER+SUHNER | SUCOFLEX 104PEA | N/A | 01/03/2014 | 01/02/2015 |
| Attenuator | Mini-Circuit | BW-S10W2+ | 002 | 02/27/2014 | 02/26/2015 |
| Splitter | Agilent | 11636B | N/A | 02/27/2014 | 02/26/2015 |

## 8.3 Test Set-up:




## 8.4 Measurement Procedure:

1. Place the EUT on the table and set it in transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
3. Set the spectrum analyzer as RBW = 100 kHz, VBW = 3*RBW, Span = 30M/50MHz, Detector=Peak, Sweep=auto, the setting on spectrum is adjusted based on the procedure as guide in 8.1 option 1 of KDB558074.
4. Mark the peak frequency and –6dB (upper and lower) frequency.
5. Repeat above procedures until all frequency of interest measured was complete.

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## 8.5 Measurement Result:

**802.11b**

| Frequency (MHz) | Bandwidth (kHz) | Limit (kHz) | Result |
|---|---|---|---|
| 2412 | 9139 | > 500 | PASS |
| 2437 | 8644 | > 500 | PASS |
| 2462 | 9107 | > 500 | PASS |

**802.11g**

| Frequency (MHz) | Bandwidth (kHz) | Limit (kHz) | Result |
|---|---|---|---|
| 2412 | 16409 | > 500 | PASS |
| 2437 | 16402 | > 500 | PASS |
| 2462 | 16431 | > 500 | PASS |

**802.11n_20M**

| Frequency (MHz) | Bandwidth (kHz) | Limit (kHz) | Result |
|---|---|---|---|
| 2412 | 17667 | > 500 | PASS |
| 2437 | 17675 | > 500 | PASS |
| 2462 | 17663 | > 500 | PASS |

**802.11n_40M**

| Frequency (MHz) | Bandwidth (kHz) | Limit (kHz) | Result |
|---|---|---|---|
| 2422 | 35375 | > 500 | PASS |
| 2437 | 35224 | > 500 | PASS |
| 2452 | 35438 | > 500 | PASS |

** Note: Offset 11dB for 2.4G 802.11b/g/n_20/n_40, and the diamond reveals X decibel level*

**Refer to next page for plots*

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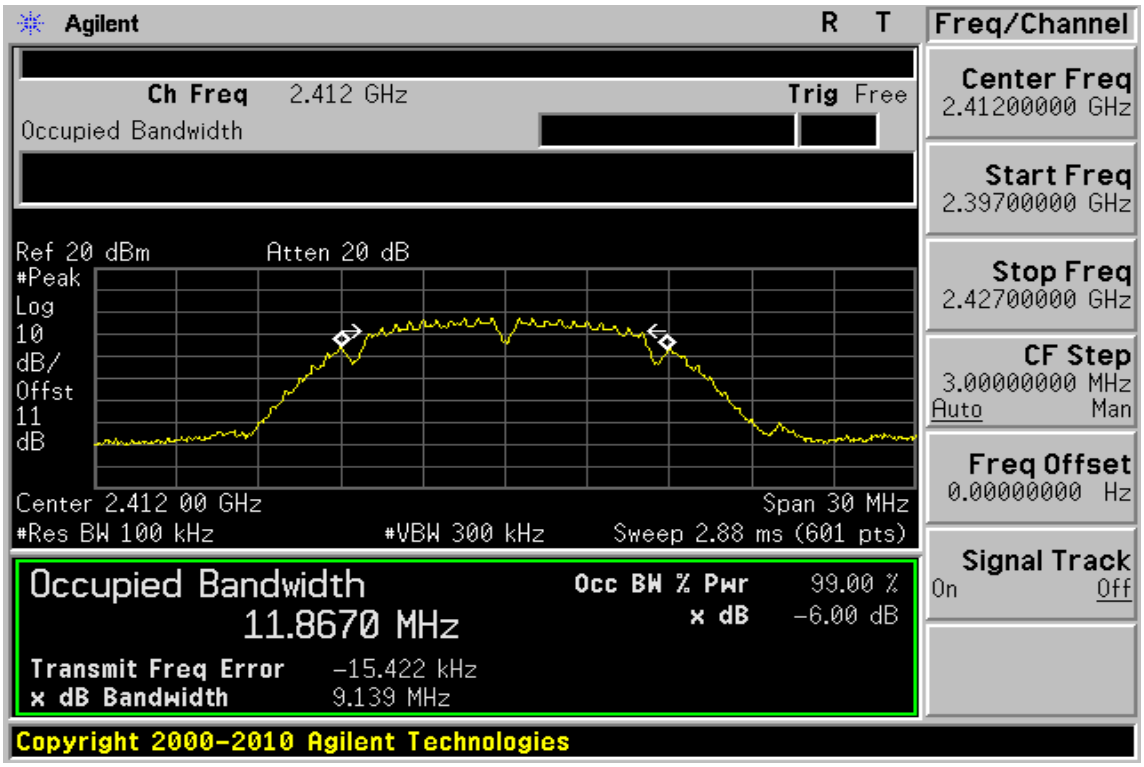
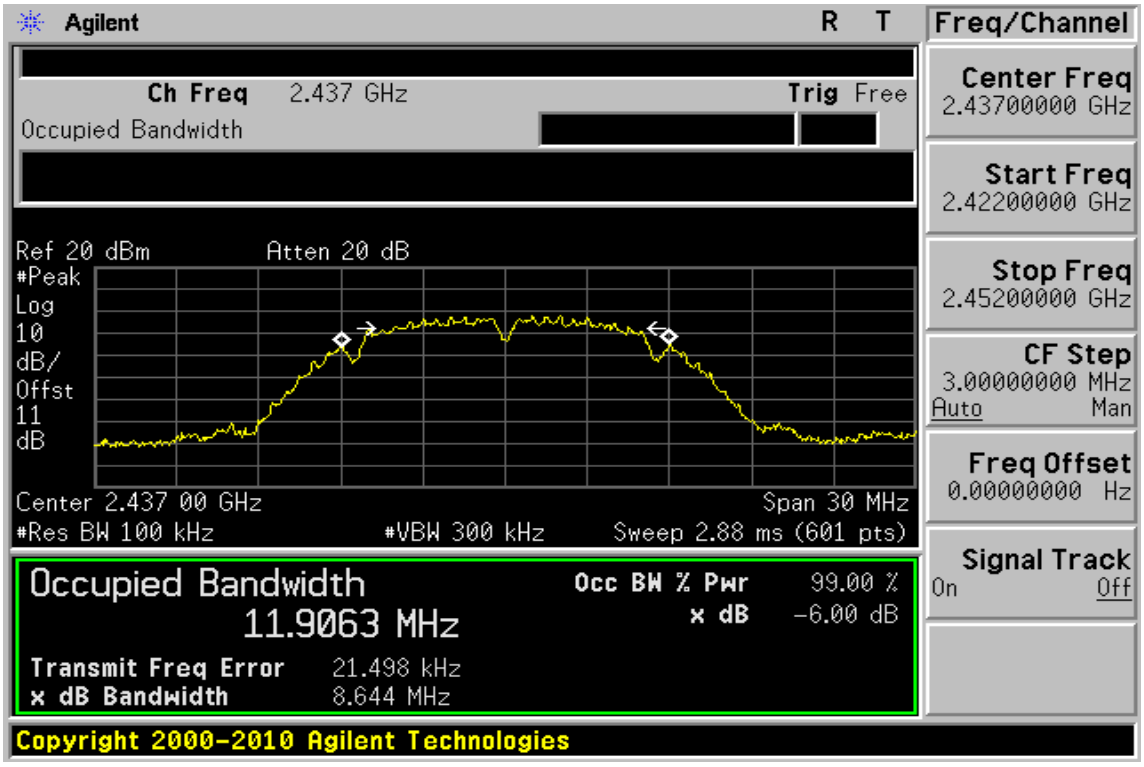
# 802.11b

## 6dB Band Width Test Data CH-Low




## 6dB Band Width Test Data CH-Mid

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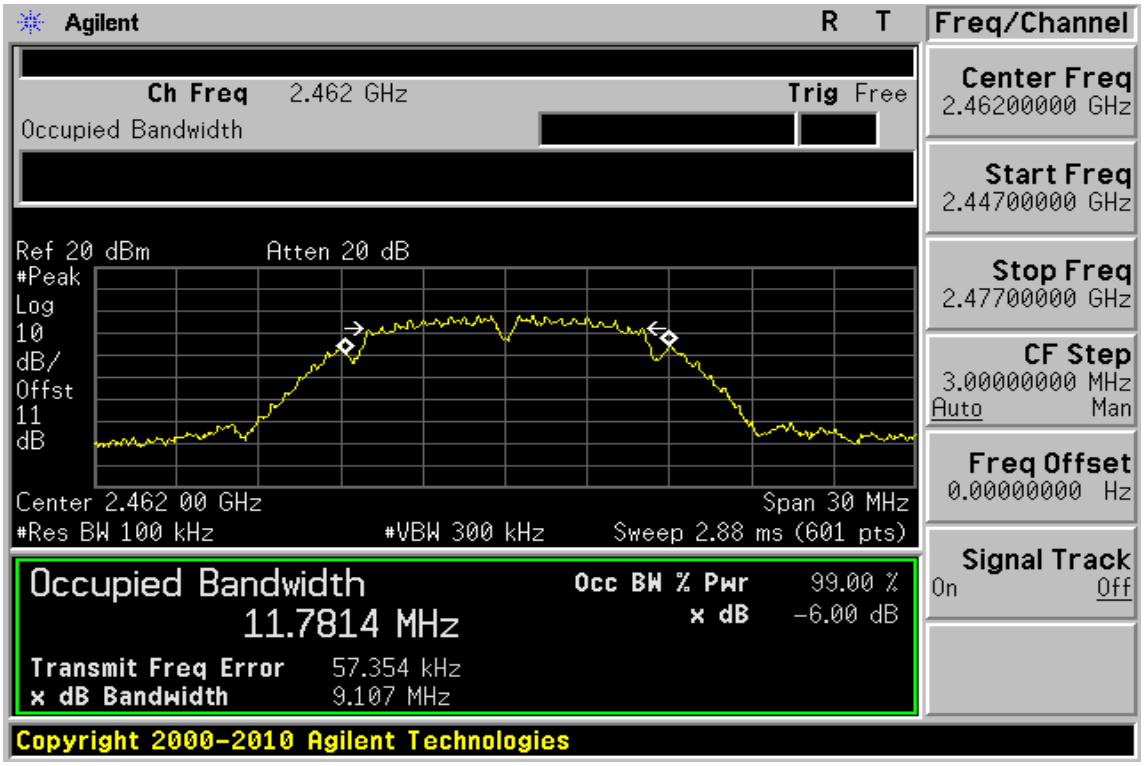
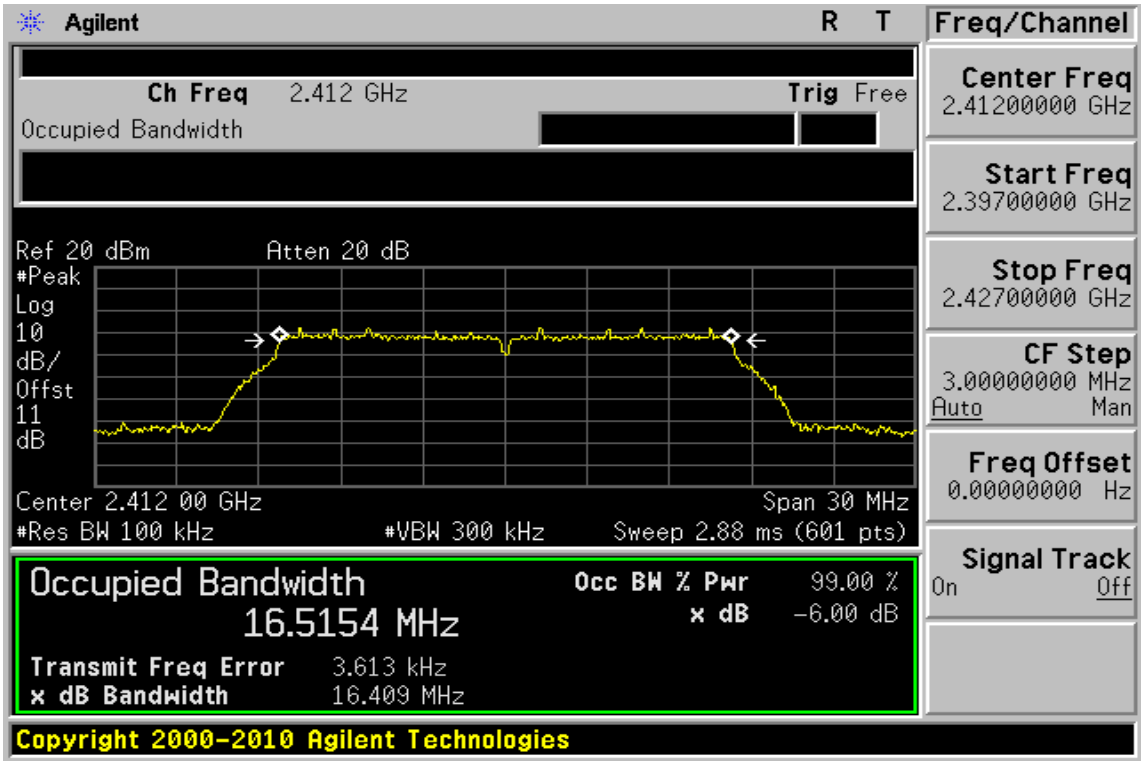
## 6dB Band Width Test Data CH-High




## 802.11g

## 6dB Band Width Test Data CH-Low

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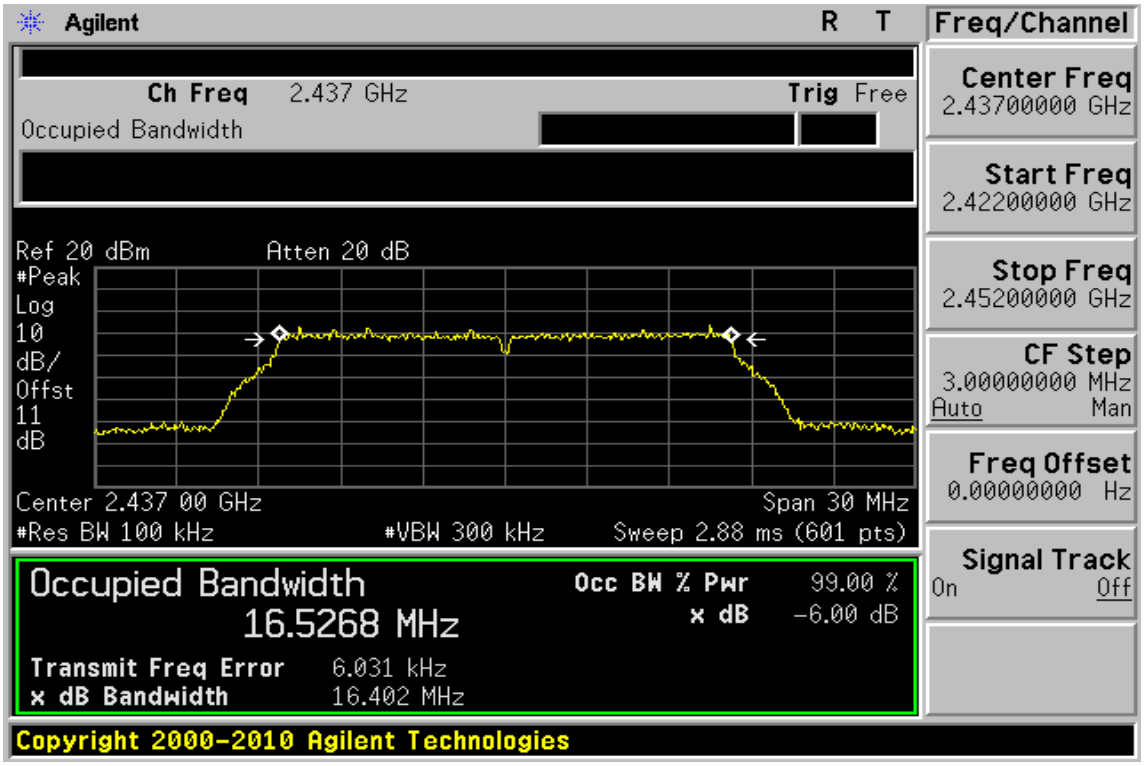
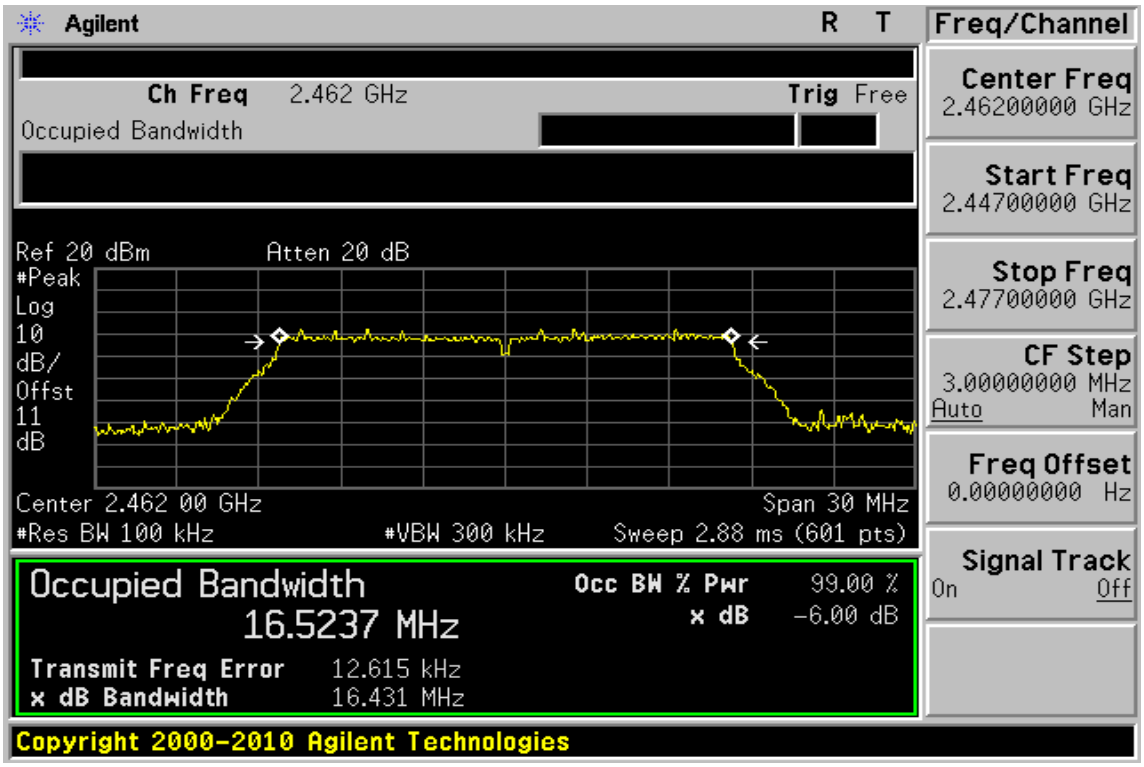
## 6dB Band Width Test Data CH-Mid




## 6dB Band Width Test Data CH-High

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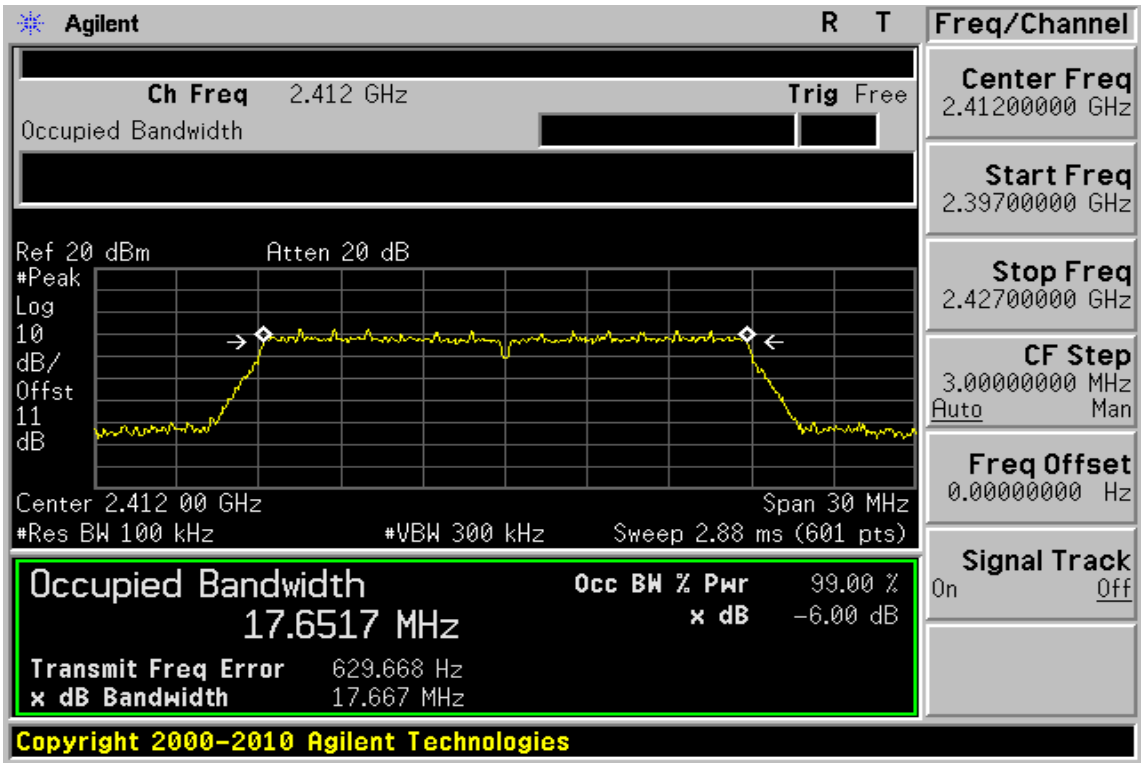
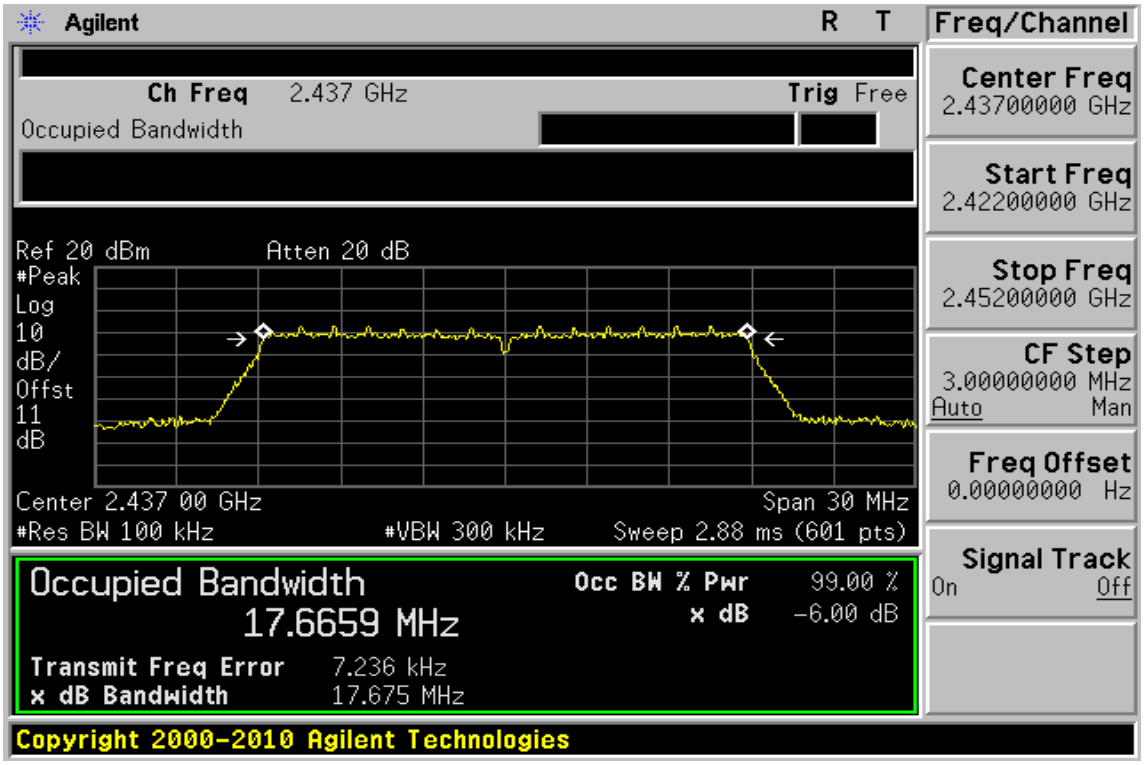
## 802.11n_20M

### 6dB Band Width Test Data CH-Low




### 6dB Band Width Test Data CH-Mid

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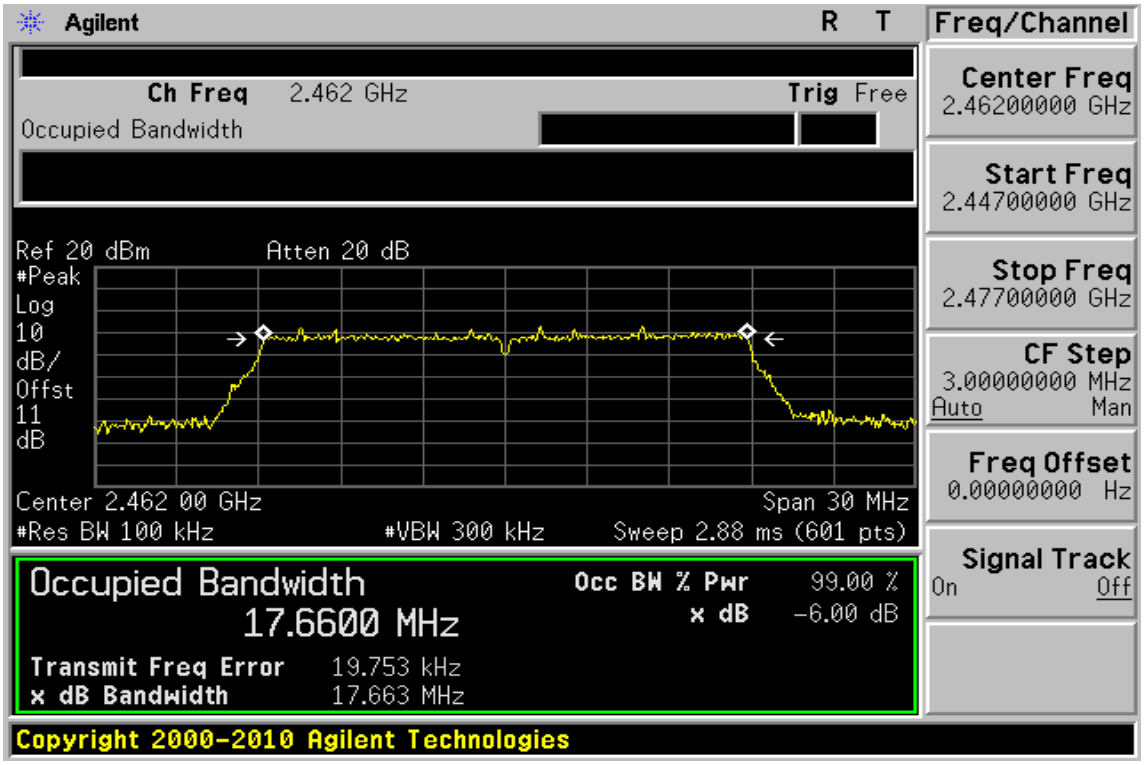
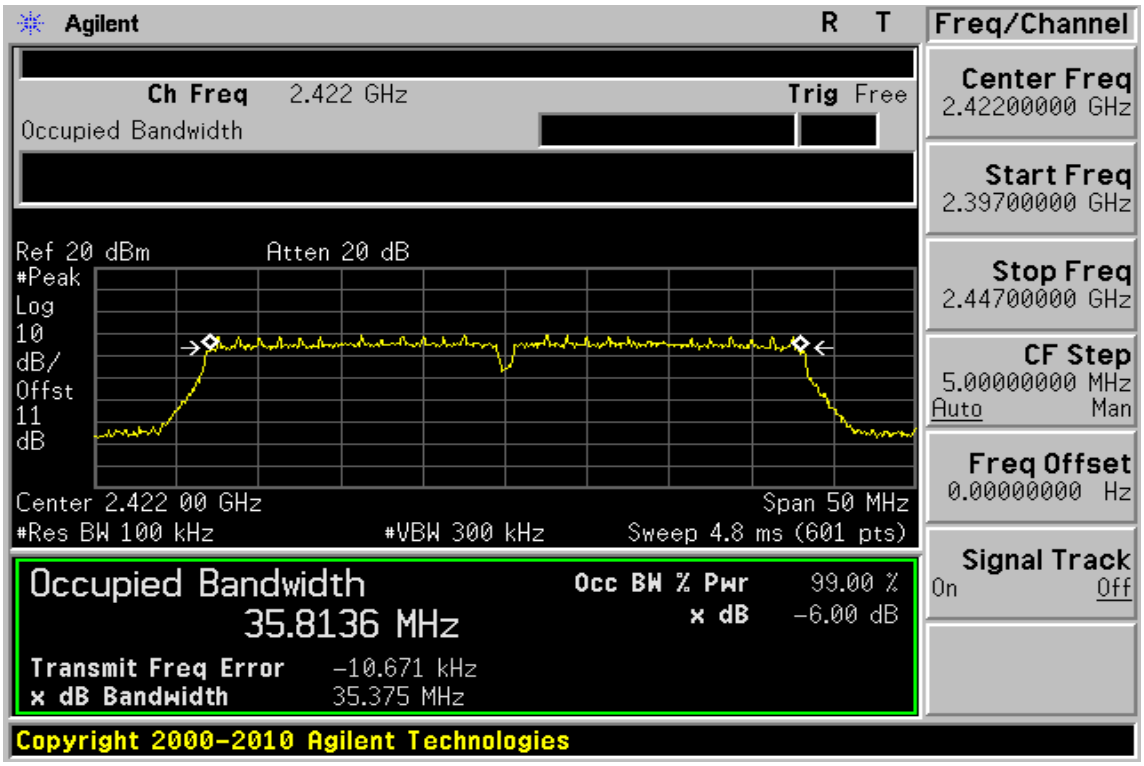
## 6dB Band Width Test Data CH-High




## 802.11n_40M

## 6dB Band Width Test Data CH-Low

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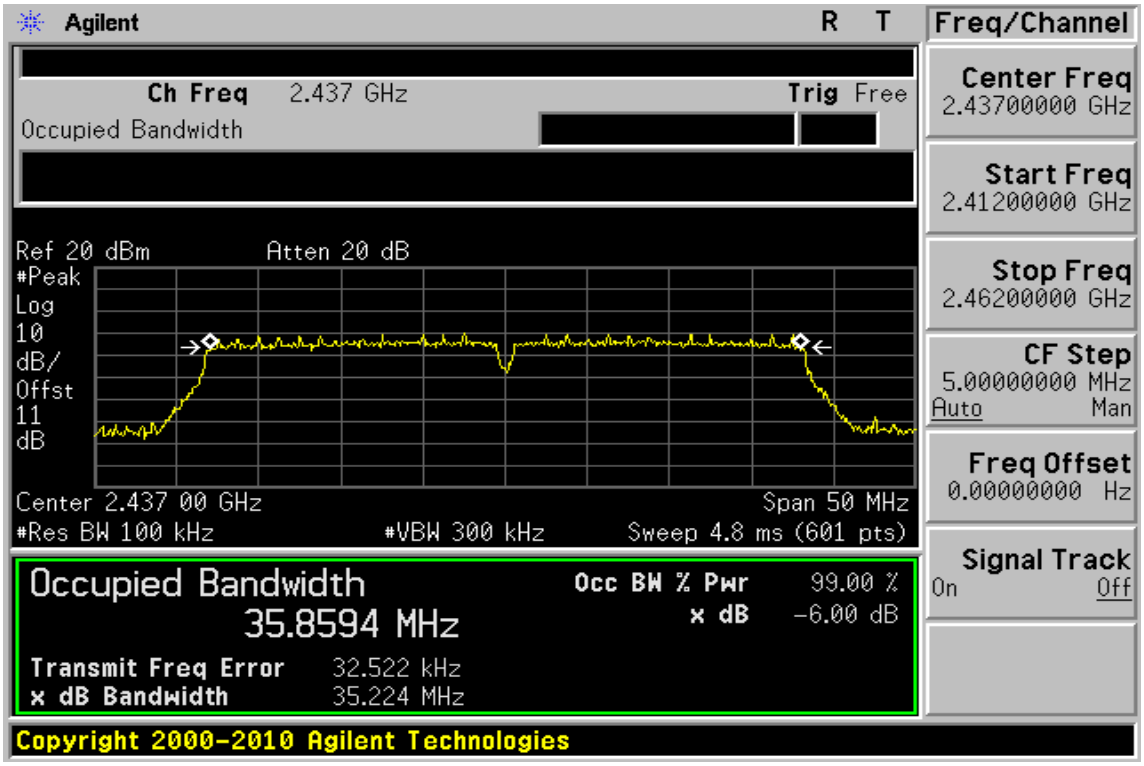
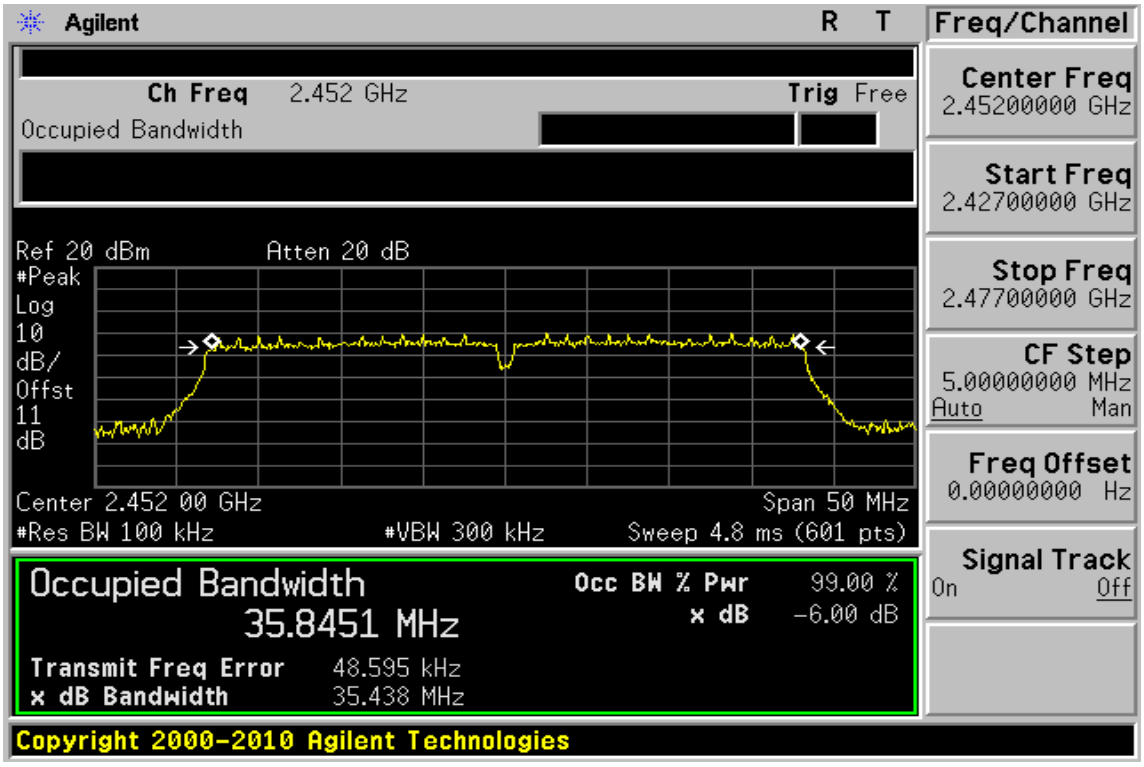
## 6dB Band Width Test Data CH-Mid




## 6dB Band Width Test Data CH-High

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# 9 BAND EDGES MEASUREMENT

## 9.1 Standard Applicable:

According to §15.247(d), in any 100 kHz bandwidth outside the frequency bands in which the spread spectrum intentional radiator in operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in15.209(a).

## 9.2 Measurement Equipment Used:

### 9.2.1 Conducted Emission at antenna port:

Refer to section 7.2 for details.

### 9.2.2 Radiated emission:

| 966 Chamber | | | | | |
|---|---|---|---|---|---|
| EQUIPMENT TYPE | MFR | MODEL NUMBER | SERIAL NUMBER | LAST CAL. | CAL DUE. |
| EMI Test Receiver | R&S | ESCI7 | 100760 | 05/27/2013 | 05/26/2014 |
| Spectrum Analyzer | Agilent | E4446A | MY51100003 | 05/30/2013 | 05/29/2014 |
| EXA Spectrum Analyzer | Agilent | N9010A | MY50420195 | 01/20/2014 | 01/19/2015 |
| Spectrum Analyzer | R&S | FSV-30 | 101398 | 10/22/2013 | 10/21/2014 |
| Loop Antenna | ETS.LINDGREN | 6502 | 00148045 | 07/05/2013 | 07/04/2014 |
| Bilog Antenna | SCHWAZBECK | VULB9168 | 378 | 01/02/2014 | 01/01/2015 |
| Horn antenna | ETS.LINDGREN | 3117 | 123995 | 05/31/2013 | 05/30/2014 |
| Horn Antenna | Schwarzbeck | BBHA9170 | 184 | 01/23/2014 | 01/22/2015 |
| Pre-Amplifier | Agilent | 8447D | 2944A07676 | 01/03/2014 | 01/02/2015 |
| Pre-Amplifier | Agilent | 8449B | 3008A00578 | 01/03/2014 | 01/02/2015 |
| Pre-Amplifier | EMC Instruments Corp. | EMC184045 | 980135 | 01/24/2014 | 01/23/2015 |
| Filter 2400-2483.5 MHz | EWT | EWT-14-0166 | M2 | 02/27/2014 | 02/26/2015 |
| Attenuator | Mini-Circuit | BW-S10W2+ | 004 | 02/27/2014 | 02/26/2015 |
| Turn Table | HD | DT420 | N/A | N.C.R | N.C.R |
| Antenna Tower | HD | MA240-N | 240/657 | N.C.R | N.C.R |
| Controller | HD | HD100 | N/A | N.C.R | N.C.R |
| Low Loss Cable | Huber Suhner | 966_Rx | 9 | 01/03/2014 | 01/02/2015 |
| 3m Site NSA | SGS | 966 chamber | N/A | 07/15/2013 | 07/14/2014 |

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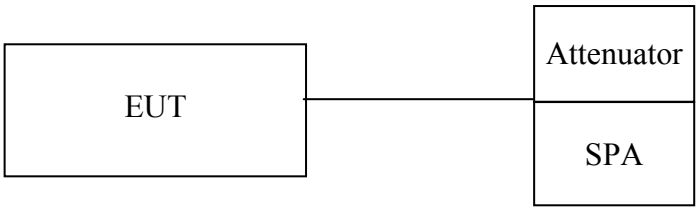
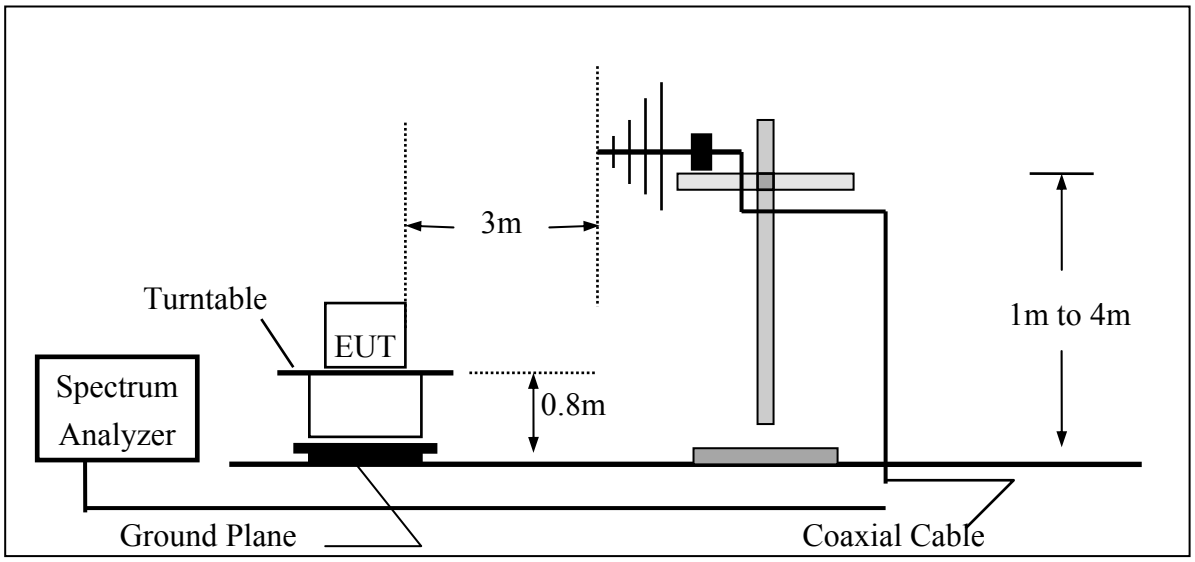
## 9.3 Test SET-UP:

### 9.3.1 Conducted Emission at antenna port:

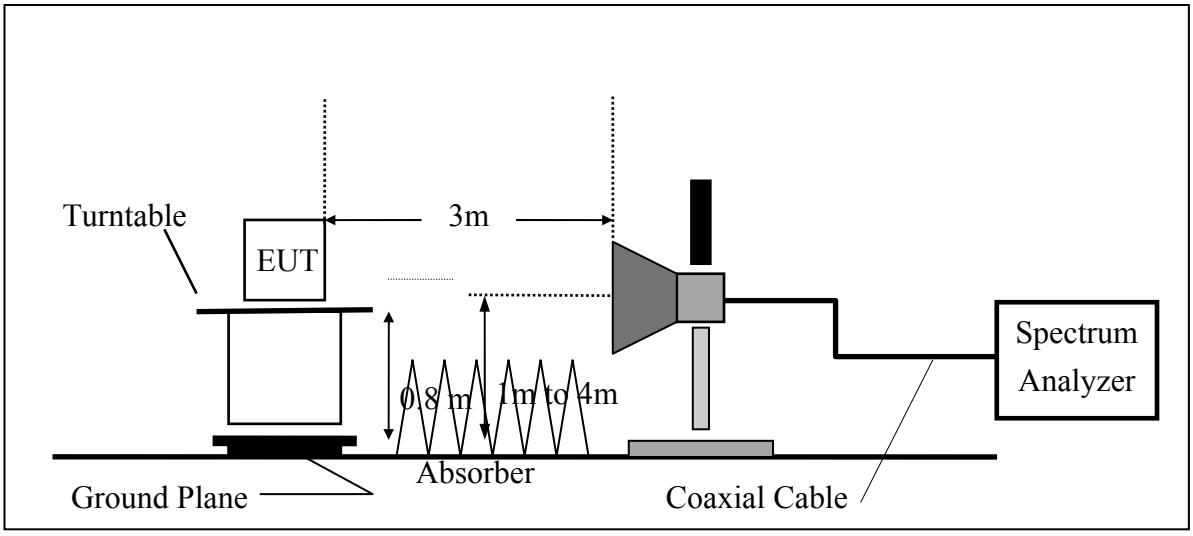



### 9.3.2 Radiated emission:

(A) Radiated Emission Test Set-Up, Frequency Below 1000MHz




(B) Radiated Emission Test Set-UP Frequency Over 1 GHz

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## 9.4 Measurement Procedure:

Unwanted Emissions into Non-Restricted Frequency Bands, Measurement Procedure followed by 11.1 of KDB558074 D01

1. Place the EUT on the table and set it in transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
3. Set start to edge frequency, and stop frequency of spectrum analyzer so as to encompass the spectrum to be examined.
4. Set the spectrum analyzer as RBW, VBW=300KHz, Detector = Peak, Sweep = auto
5. Mark the highest reading of the emission as the reference level measurement.
6. Set DL as the limit = reading on marker 1 – 20dBm
7. Marker on frequency, 2.3999GHz and 2.4836GHz, and examine shall 100 KHz immediately outside the authorized (2400~2483.5) be attenuated by 20dB at least relative to the maximum emission of power.
8. Repeat above procedures until all default test channel (low, middle, and high) was complete.

Unwanted Emission falling into Restricted Frequency Bands, Measurement Procedure followed by 12.1 of KDB558074 D01

1. The EUT was placed on a turn table which is 0.8m above ground plane.
2. The turn table shall rotate 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna which varied from 1m to 4m to find out the highest emissions.
4. When measurement procedures for electric field radiated emissions above 1 GHz the EUT measurement is to be made "while keeping the antenna in the 'cone of radiation' from that area and pointed at the area both in azimuth and elevation, with polarization oriented for maximum response." is still within the 3dB illumination BW of the measurement antenna.
5. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
6. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
7. On spectrum, following 8.1.2, and RBW = 1MHz, VBW = 3MHz, & Marker 2390MHz, and 2483.5MHz (Peak Measurement). Average Measurement: following 8.2 with the modification span to 1MHz, &RBW = 1MHz, VBW = 3MHz and peak marker function to obtain the highest reading on 2390, and 2483.5MHz.
8. Repeat above procedures until all default test channel (low, middle, and high) was complete

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## 9.5 Field Strength Calculation:

The field strength is calculated by adding the Antenna Factor and Cable Factor and subtracting the Amplifier Gain and Duty Cycle Correction Factor (if any) from the measured reading. The basic equation with a sample calculation is as follows:

**FS = RA + AF + CL - AG**

| | | |
|---|---|---|
| Where | FS = Field Strength | CL = Cable Attenuation Factor (Cable Loss) |
| | RA = Reading Amplitude | AG = Amplifier Gain |
| | AF = Antenna Factor | |

## 9.6 Measurement Result:

Note: Refer to next page spectrum analyzer data chart and tabular data sheets.

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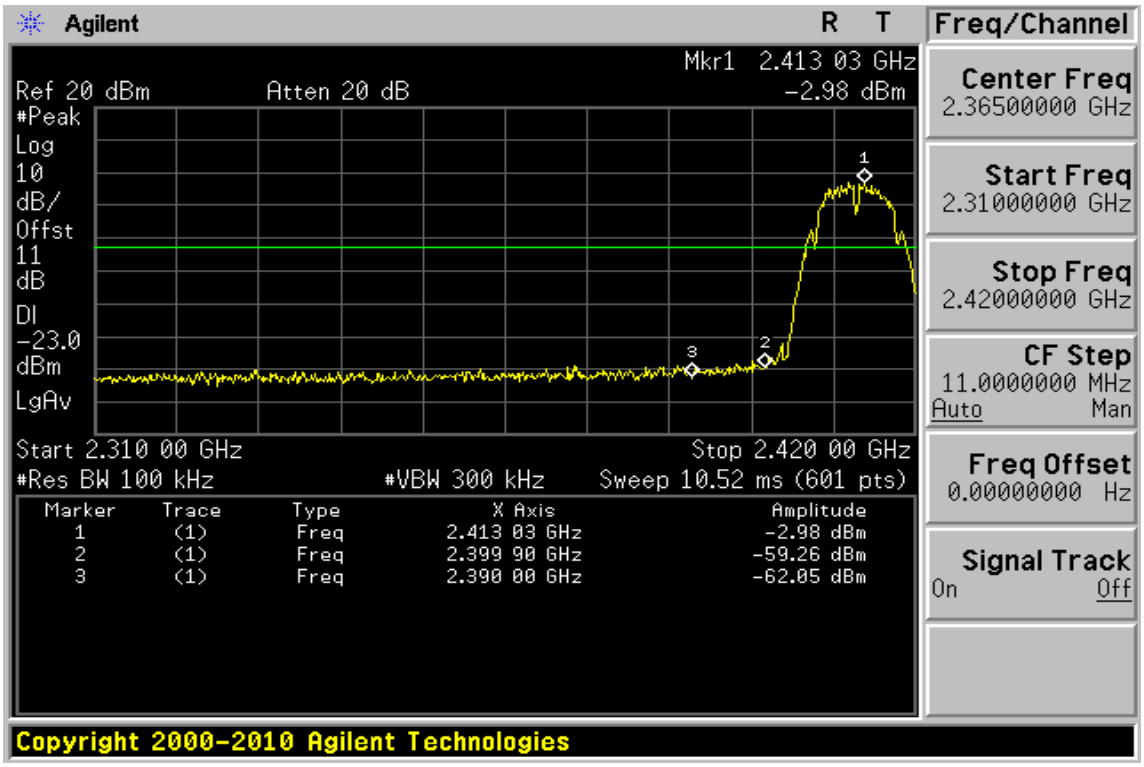
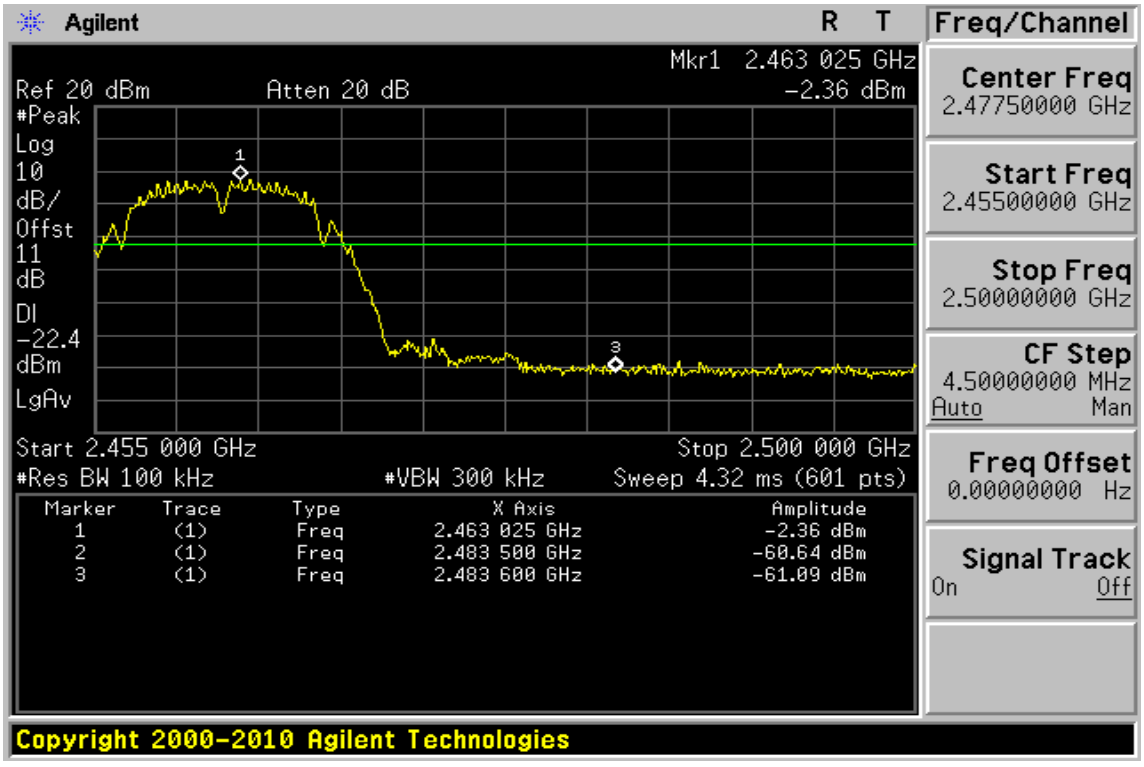
# 802.11b - Unwanted Emissions into Non-Restricted Frequency Bands

## Band Edges Test Data CH-Low




## Band Edges Test Data CH-High

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**Radiated Emission:**

(Unwanted Emissions into Restricted Frequency Bands): 802.11 b mode

| | | | |
|---|---|---|---|
| Operation Band | :802.11 b | Test Date | :2014-05-06 |
| Fundamental Frequency | :2412 MHz | Temp./Humi. | :22deg_C/57RH |
| Operation Mode | :Band Edge LOW | Engineer | :Curry |
| EUT Pol. | :H Plane | Measurement Antenna Pol. | :VERTICAL |

Actual FS(dBμV / m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV / m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

Note : "F" : denotes Fundamental Frequency. ; "H" : denotes Harmonic Frequency.

"E" : denotes Band Edge Frequency. ; "S" : denotes Spurious Frequency.

The trace on RE(radiation emission) plot is as colored blue, and the detection manner we've employed is peak detector.

| Freq. | Note | Detector Mode | Spectrum Reading Level | Factor | Actual FS | Limit @3m | Margin |
|---|---|---|---|---|---|---|---|
| MHz | F/H/E/S | PK/QP/AV | dBμV | dB | dBμV / m | dBμV / m | dB |
| 2390.00 | E | Average | 46.19 | 2.42 | 48.61 | 54.00 | -5.39 |
| 2390.00 | E | Peak | 51.31 | 2.42 | 53.73 | 74.00 | -20.27 |

| | | | |
|---|---|---|---|
| Operation Band | :802.11 b | Test Date | :2014-05-06 |
| Fundamental Frequency | :2412 MHz | Temp./Humi. | :22deg_C/57RH |
| Operation Mode | :Band Edge LOW | Engineer | :Curry |
| EUT Pol. | :H Plane | Measurement Antenna Pol. | :HORIZONTAL |

Actual FS(dBμV / m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV / m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

Note : "F" : denotes Fundamental Frequency. ; "H" : denotes Harmonic Frequency.

"E" : denotes Band Edge Frequency. ; "S" : denotes Spurious Frequency.

The trace on RE(radiation emission) plot is as colored blue, and the detection manner we've employed is peak detector.

| Freq. | Note | Detector Mode | Spectrum Reading Level | Factor | Actual FS | Limit @3m | Margin |
|---|---|---|---|---|---|---|---|
| MHz | F/H/E/S | PK/QP/AV | dBμV | dB | dBμV / m | dBμV / m | dB |
| 2390.00 | E | Average | 50.52 | 2.42 | 52.94 | 54.00 | -1.06 |
| 2390.00 | E | Peak | 54.96 | 2.42 | 57.38 | 74.00 | -16.62 |

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| | | | |
|---|---|---|---|
| Operation Band | :802.11 b | Test Date | :2014-05-06 |
| Fundamental Frequency | :2462 MHz | Temp./Humi. | :22deg_C/57RH |
| Operation Mode | :Band Edge HIGH | Engineer | :Curry |
| EUT Pol. | :H Plane | Measurement Antenna Pol. | :VERTICAL |

Actual FS(dBμV / m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV / m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

Note : "F" : denotes Fundamental Frequency. ; "H" : denotes Harmonic Frequency.

"E" : denotes Band Edge Frequency. ; "S" : denotes Spurious Frequency.

The trace on RE(radiation emission) plot is as colored blue, and the detection manner we've employed is peak detector.

| Freq. | Note | Detector Mode | Spectrum Reading Level | Factor | Actual FS | Limit @3m | Margin |
|---|---|---|---|---|---|---|---|
| MHz | F/H/E/S | PK/QP/AV | dBμV | dB | dBμV / m | dBμV / m | dB |
| 2483.50 | E | Average | 47.22 | 2.74 | 49.96 | 54.00 | -4.04 |
| 2483.50 | E | Peak | 52.66 | 2.74 | 55.40 | 74.00 | -18.60 |

| | | | |
|---|---|---|---|
| Operation Band | :802.11 b | Test Date | :2014-05-06 |
| Fundamental Frequency | :2462 MHz | Temp./Humi. | :22deg_C/57RH |
| Operation Mode | :Band Edge HIGH | Engineer | :Curry |
| EUT Pol. | :H Plane | Measurement Antenna Pol. | :HORIZONTAL |

Actual FS(dBμV / m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV / m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

Note : "F" : denotes Fundamental Frequency. ; "H" : denotes Harmonic Frequency.

"E" : denotes Band Edge Frequency. ; "S" : denotes Spurious Frequency.

The trace on RE(radiation emission) plot is as colored blue, and the detection manner we've employed is peak detector.

| Freq. | Note | Detector Mode | Spectrum Reading Level | Factor | Actual FS | Limit @3m | Margin |
|---|---|---|---|---|---|---|---|
| MHz | F/H/E/S | PK/QP/AV | dBμV | dB | dBμV / m | dBμV / m | dB |
| 2483.50 | E | Average | 50.23 | 2.74 | 52.97 | 54.00 | -1.03 |
| 2483.50 | E | Peak | 54.61 | 2.74 | 57.35 | 74.00 | -16.65 |

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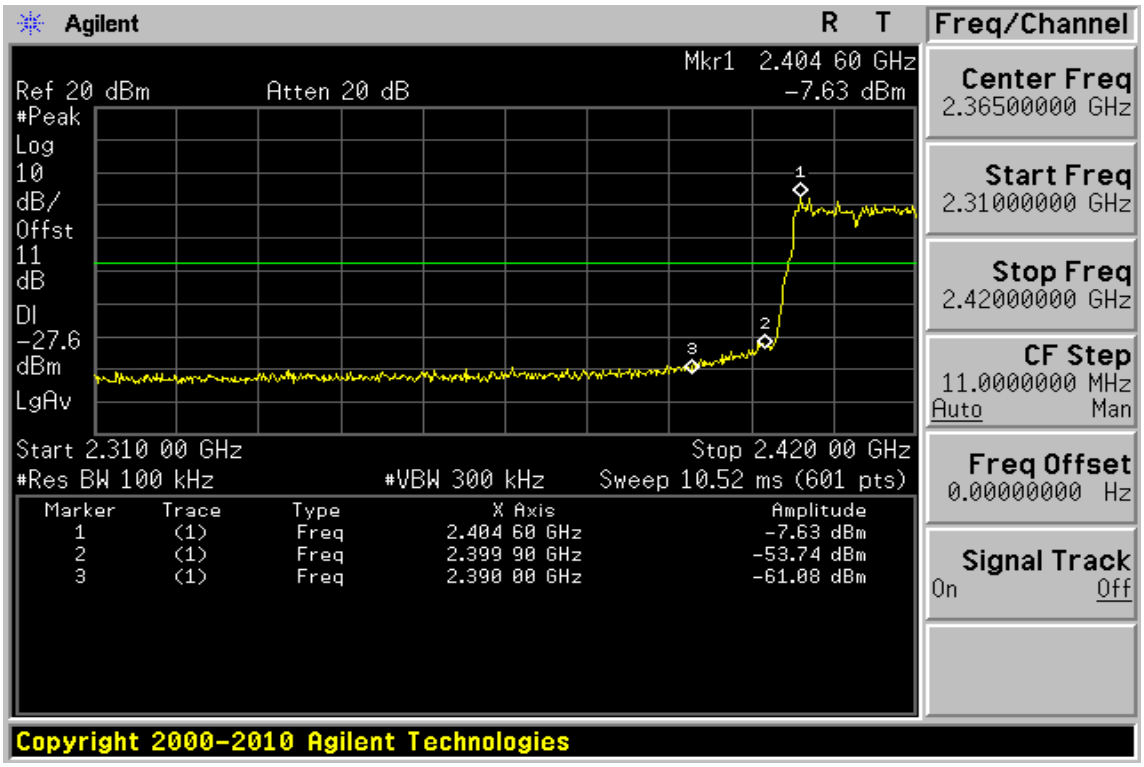
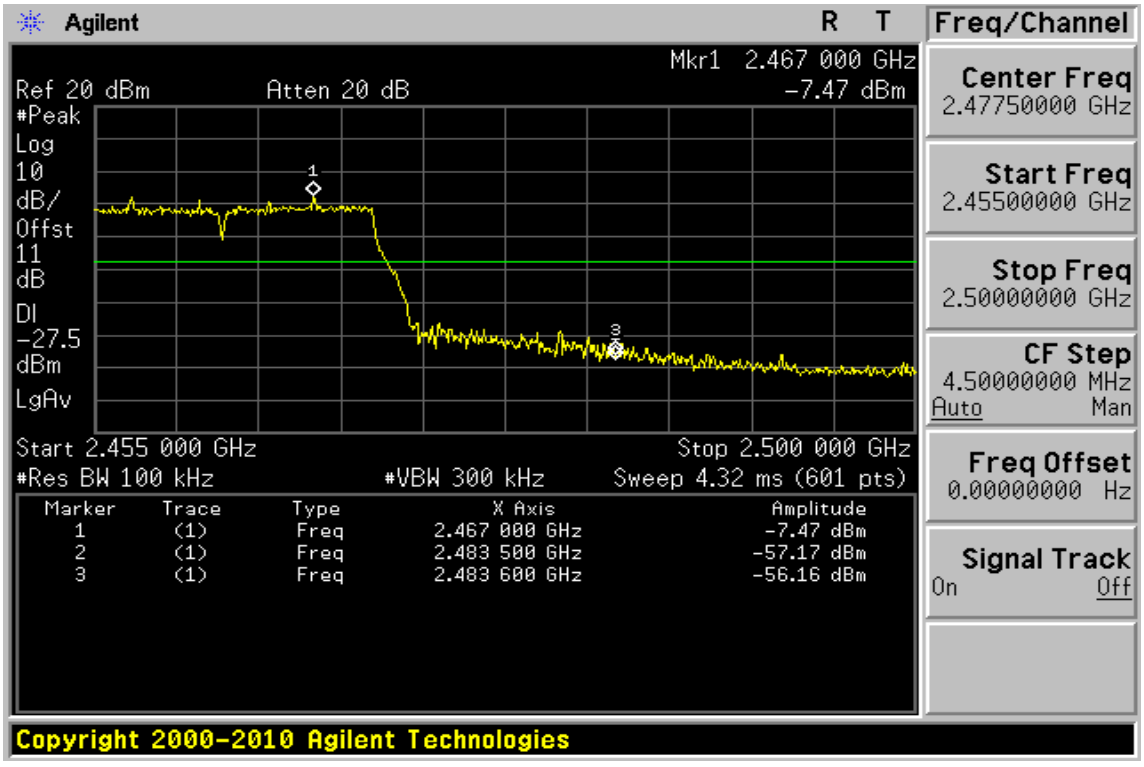
# 802.11g - Unwanted Emissions into Non-Restricted Frequency Bands

## Band Edges Test Data CH-Low




## Band Edges Test Data CH-High

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**Radiated Emission:**

(Unwanted Emissions into Restricted Frequency Bands): 802.11 g mode

| | | | |
|---|---|---|---|
| Operation Band | :802.11 g | Test Date | :2014-05-06 |
| Fundamental Frequency | :2412 MHz | Temp./Humi. | :22deg_C/57RH |
| Operation Mode | :Band Edge LOW | Engineer | :Curry |
| EUT Pol. | :H Plane | Measurement Antenna Pol. | :VERTICAL |

Actual FS(dBμV / m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV / m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

Note : "F" : denotes Fundamental Frequency. ; "H" : denotes Harmonic Frequency.

"E" : denotes Band Edge Frequency. ; "S" : denotes Spurious Frequency.

The trace on RE(radiation emission) plot is as colored blue, and the detection manner we've employed is peak detector.

| Freq. | Note | Detector Mode | Spectrum Reading Level | Factor | Actual FS | Limit @3m | Margin |
|---|---|---|---|---|---|---|---|
| MHz | F/H/E/S | PK/QP/AV | dBμV | dB | dBμV / m | dBμV / m | dB |
| 2390.00 | E | Average | 45.67 | 2.42 | 48.09 | 54.00 | -5.91 |
| 2390.00 | E | Peak | 62.81 | 2.42 | 65.23 | 74.00 | -8.77 |

| | | | |
|---|---|---|---|
| Operation Band | :802.11 g | Test Date | :2014-05-06 |
| Fundamental Frequency | :2412 MHz | Temp./Humi. | :22deg_C/57RH |
| Operation Mode | :Band Edge LOW | Engineer | :Curry |
| EUT Pol. | :H Plane | Measurement Antenna Pol. | :HORIZONTAL |

Actual FS(dBμV / m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV / m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

Note : "F" : denotes Fundamental Frequency. ; "H" : denotes Harmonic Frequency.

"E" : denotes Band Edge Frequency. ; "S" : denotes Spurious Frequency.

The trace on RE(radiation emission) plot is as colored blue, and the detection manner we've employed is peak detector.

| Freq. | Note | Detector Mode | Spectrum Reading Level | Factor | Actual FS | Limit @3m | Margin |
|---|---|---|---|---|---|---|---|
| MHz | F/H/E/S | PK/QP/AV | dBμV | dB | dBμV / m | dBμV / m | dB |
| 2390.00 | E | Average | 49.07 | 2.42 | 51.49 | 54.00 | -2.51 |
| 2390.00 | E | Peak | 66.14 | 2.42 | 68.56 | 74.00 | -5.44 |

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| | | | |
|---|---|---|---|
| Operation Band | :802.11 g | Test Date | :2014-05-06 |
| Fundamental Frequency | :2462 MHz | Temp./Humi. | :22deg_C/57RH |
| Operation Mode | :Band Edge HIGH | Engineer | :Curry |
| EUT Pol. | :H Plane | Measurement Antenna Pol. | :VERTICAL |

Actual FS(dBμV / m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV / m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

Note : "F" : denotes Fundamental Frequency. ; "H" : denotes Harmonic Frequency.

"E" : denotes Band Edge Frequency. ; "S" : denotes Spurious Frequency.

The trace on RE(radiation emission) plot is as colored blue, and the detection manner we've employed is peak detector.

| Freq. | Note | Detector Mode | Spectrum Reading Level | Factor | Actual FS | Limit @3m | Margin |
|---|---|---|---|---|---|---|---|
| MHz | F/H/E/S | PK/QP/AV | dBμV | dB | dBμV / m | dBμV / m | dB |
| 2483.50 | E | Average | 46.18 | 2.74 | 48.92 | 54.00 | -5.08 |
| 2483.50 | E | Peak | 62.97 | 2.74 | 65.71 | 74.00 | -8.29 |

| | | | |
|---|---|---|---|
| Operation Band | :802.11 g | Test Date | :2014-05-06 |
| Fundamental Frequency | :2462 MHz | Temp./Humi. | :22deg_C/57RH |
| Operation Mode | :Band Edge HIGH | Engineer | :Curry |
| EUT Pol. | :H Plane | Measurement Antenna Pol. | :HORIZONTAL |

Actual FS(dBμV / m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV / m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

Note : "F" : denotes Fundamental Frequency. ; "H" : denotes Harmonic Frequency.

"E" : denotes Band Edge Frequency. ; "S" : denotes Spurious Frequency.

The trace on RE(radiation emission) plot is as colored blue, and the detection manner we've employed is peak detector.

| Freq. | Note | Detector Mode | Spectrum Reading Level | Factor | Actual FS | Limit @3m | Margin |
|---|---|---|---|---|---|---|---|
| MHz | F/H/E/S | PK/QP/AV | dBμV | dB | dBμV / m | dBμV / m | dB |
| 2483.50 | E | Average | 49.22 | 2.74 | 51.96 | 54.00 | -2.04 |
| 2483.50 | E | Peak | 65.54 | 2.74 | 68.28 | 74.00 | -5.72 |

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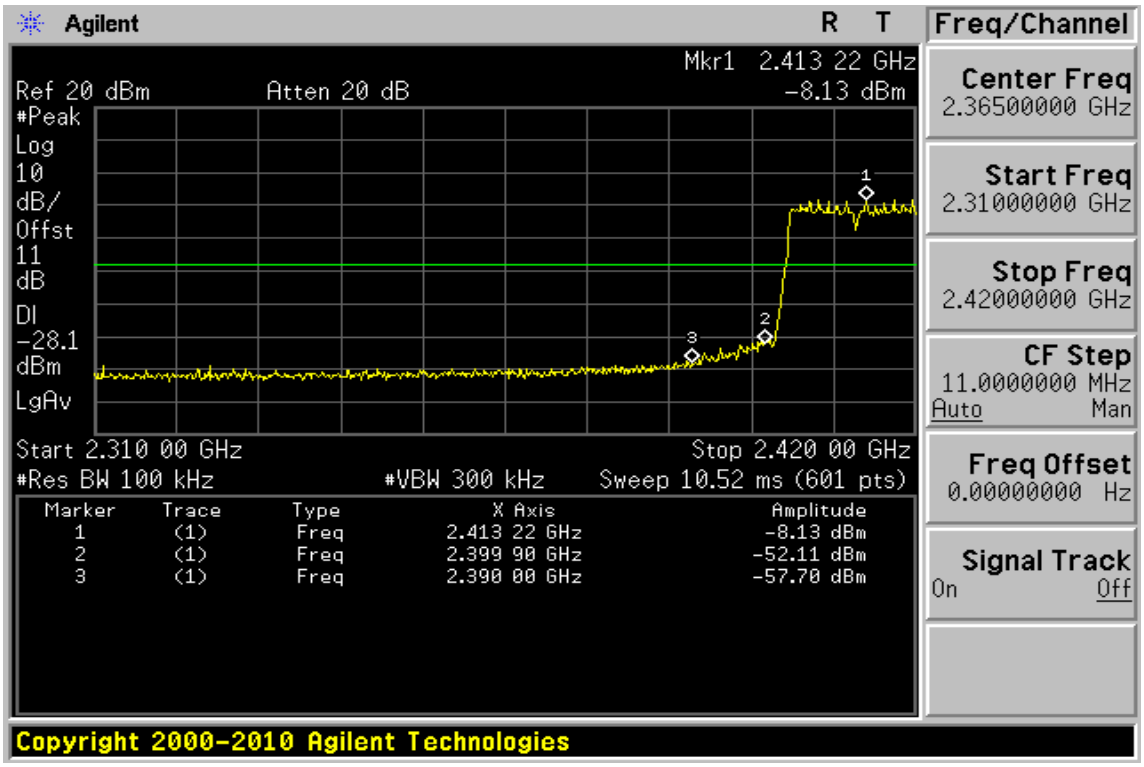
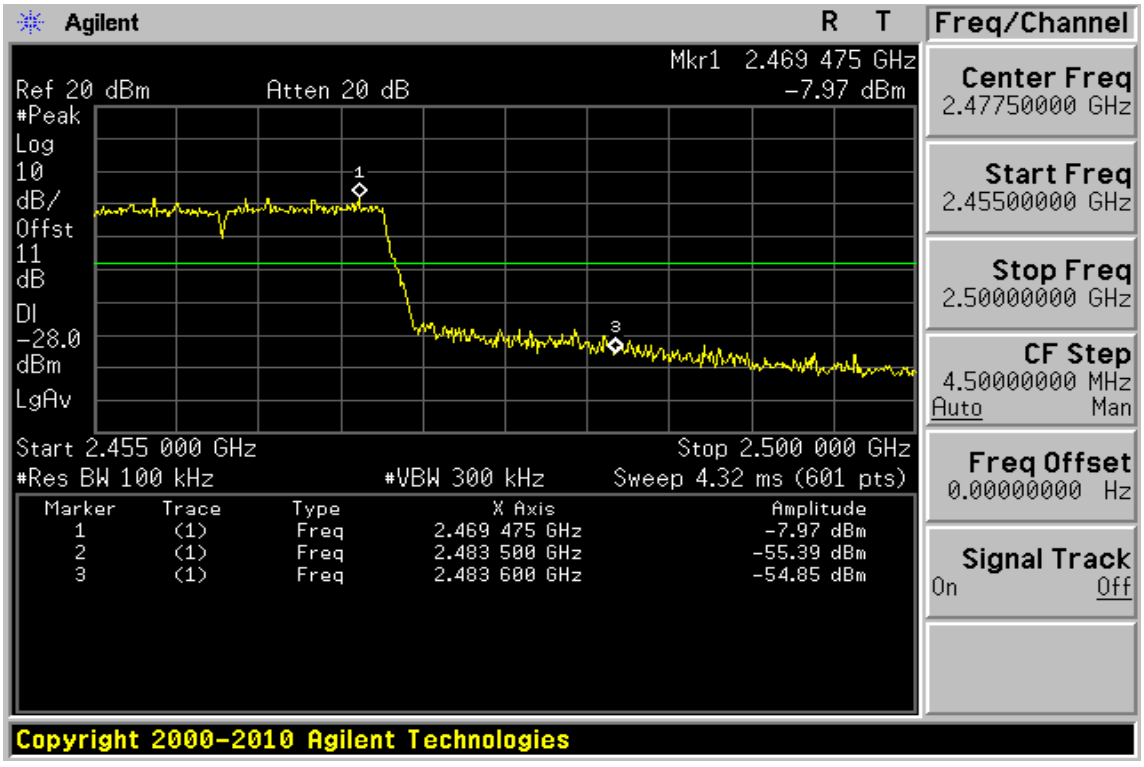
# 802.11n_20M- Unwanted Emissions into Non-Restricted Frequency Bands

## Band Edges Test Data CH-Low




## Band Edges Test Data CH-High

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**Radiated Emission:**

(Unwanted Emissions into Restricted Frequency Bands): 802.11 n_20M mode

| | | | |
|---|---|---|---|
| Operation Band | :802.11 n20M | Test Date | :2014-05-06 |
| Fundamental Frequency | :2412 MHz | Temp./Humi. | :22deg_C/57RH |
| Operation Mode | :Band Edge LOW | Engineer | :Curry |
| EUT Pol. | :H Plane | Measurement Antenna Pol. | :VERTICAL |

Actual FS(dBμV / m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV / m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

Note : "F" : denotes Fundamental Frequency. ; "H" : denotes Harmonic Frequency.

"E" : denotes Band Edge Frequency. ; "S" : denotes Spurious Frequency.

The trace on RE(radiation emission) plot is as colored blue, and the detection manner we've employed is peak detector.

| Freq. | Note | Detector Mode | Spectrum Reading Level | Factor | Actual FS | Limit @3m | Margin |
|---|---|---|---|---|---|---|---|
| MHz | F/H/E/S | PK/QP/AV | dBμV | dB | dBμV / m | dBμV / m | dB |
| 2390.00 | E | Average | 45.14 | 2.42 | 47.56 | 54.00 | -6.44 |
| 2390.00 | E | Peak | 67.29 | 2.42 | 69.71 | 74.00 | -4.29 |

| | | | |
|---|---|---|---|
| Operation Band | :802.11 n20M | Test Date | :2014-05-06 |
| Fundamental Frequency | :2412 MHz | Temp./Humi. | :22deg_C/57RH |
| Operation Mode | :Band Edge LOW | Engineer | :Curry |
| EUT Pol. | :H Plane | Measurement Antenna Pol. | :HORIZONTAL |

Actual FS(dBμV / m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV / m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

Note : "F" : denotes Fundamental Frequency. ; "H" : denotes Harmonic Frequency.

"E" : denotes Band Edge Frequency. ; "S" : denotes Spurious Frequency.

The trace on RE(radiation emission) plot is as colored blue, and the detection manner we've employed is peak detector.

| Freq. | Note | Detector Mode | Spectrum Reading Level | Factor | Actual FS | Limit @3m | Margin |
|---|---|---|---|---|---|---|---|
| MHz | F/H/E/S | PK/QP/AV | dBμV | dB | dBμV / m | dBμV / m | dB |
| 2390.00 | E | Average | 48.29 | 2.42 | 50.71 | 54.00 | -3.29 |
| 2390.00 | E | Peak | 70.52 | 2.42 | 72.94 | 74.00 | -1.06 |

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| | | | |
|---|---|---|---|
| Operation Band | :802.11 n20M | Test Date | :2014-05-06 |
| Fundamental Frequency | :2462 MHz | Temp./Humi. | :22deg_C/57RH |
| Operation Mode | :Band Edge HIGH | Engineer | :Curry |
| EUT Pol. | :H Plane | Measurement Antenna Pol. | :VERTICAL |

Actual FS(dBμV / m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV / m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

Note : "F" : denotes Fundamental Frequency. ; "H" : denotes Harmonic Frequency.

"E" : denotes Band Edge Frequency. ; "S" : denotes Spurious Frequency.

The trace on RE(radiation emission) plot is as colored blue, and the detection manner we've employed is peak detector.

| Freq. | Note | Detector Mode | Spectrum Reading Level | Factor | Actual FS | Limit @3m | Margin |
|---|---|---|---|---|---|---|---|
| MHz | F/H/E/S | PK/QP/AV | dBμV | dB | dBμV / m | dBμV / m | dB |
| 2483.50 | E | Average | 47.85 | 2.74 | 50.59 | 54.00 | -3.41 |
| 2483.50 | E | Peak | 66.90 | 2.74 | 69.64 | 74.00 | -4.36 |

| | | | |
|---|---|---|---|
| Operation Band | :802.11 n20M | Test Date | :2014-05-06 |
| Fundamental Frequency | :2462 MHz | Temp./Humi. | :22deg_C/57RH |
| Operation Mode | :Band Edge HIGH | Engineer | :Curry |
| EUT Pol. | :H Plane | Measurement Antenna Pol. | :HORIZONTAL |

Actual FS(dBμV / m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV / m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

Note : "F" : denotes Fundamental Frequency. ; "H" : denotes Harmonic Frequency.

"E" : denotes Band Edge Frequency. ; "S" : denotes Spurious Frequency.

The trace on RE(radiation emission) plot is as colored blue, and the detection manner we've employed is peak detector.

| Freq. | Note | Detector Mode | Spectrum Reading Level | Factor | Actual FS | Limit @3m | Margin |
|---|---|---|---|---|---|---|---|
| MHz | F/H/E/S | PK/QP/AV | dBμV | dB | dBμV / m | dBμV / m | dB |
| 2483.50 | E | Average | 49.26 | 2.74 | 52.00 | 54.00 | -2.00 |
| 2483.50 | E | Peak | 69.13 | 2.74 | 71.87 | 74.00 | -2.13 |

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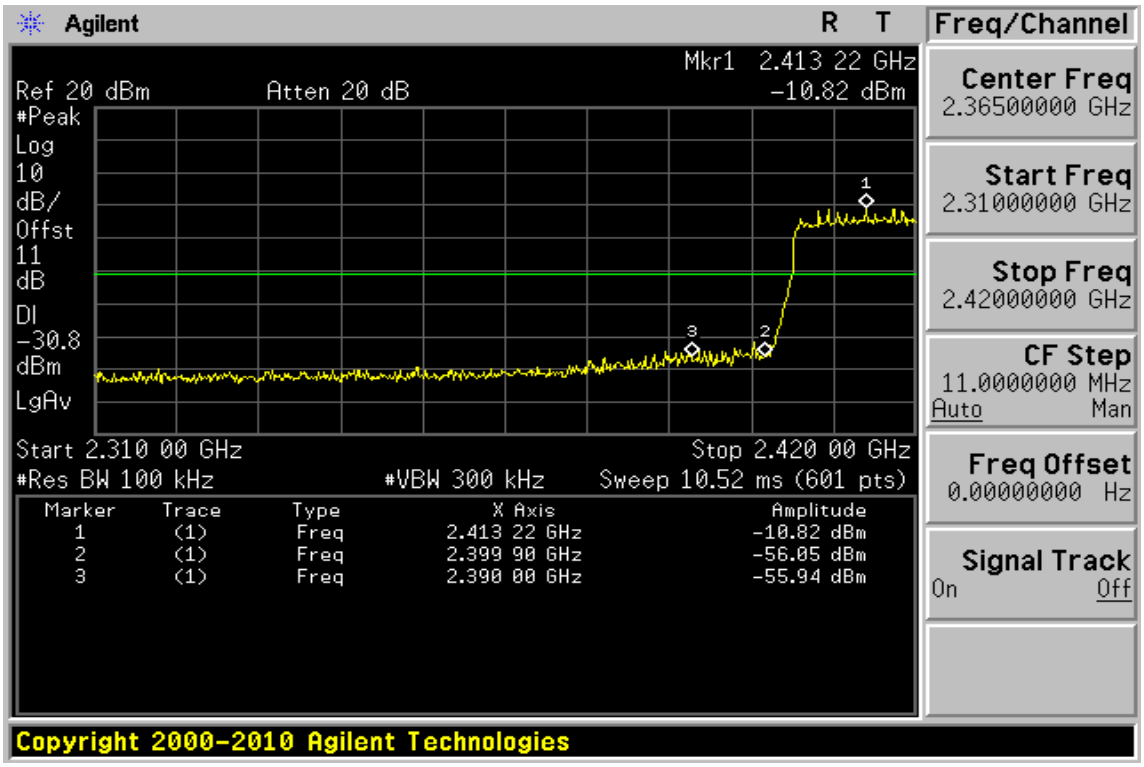
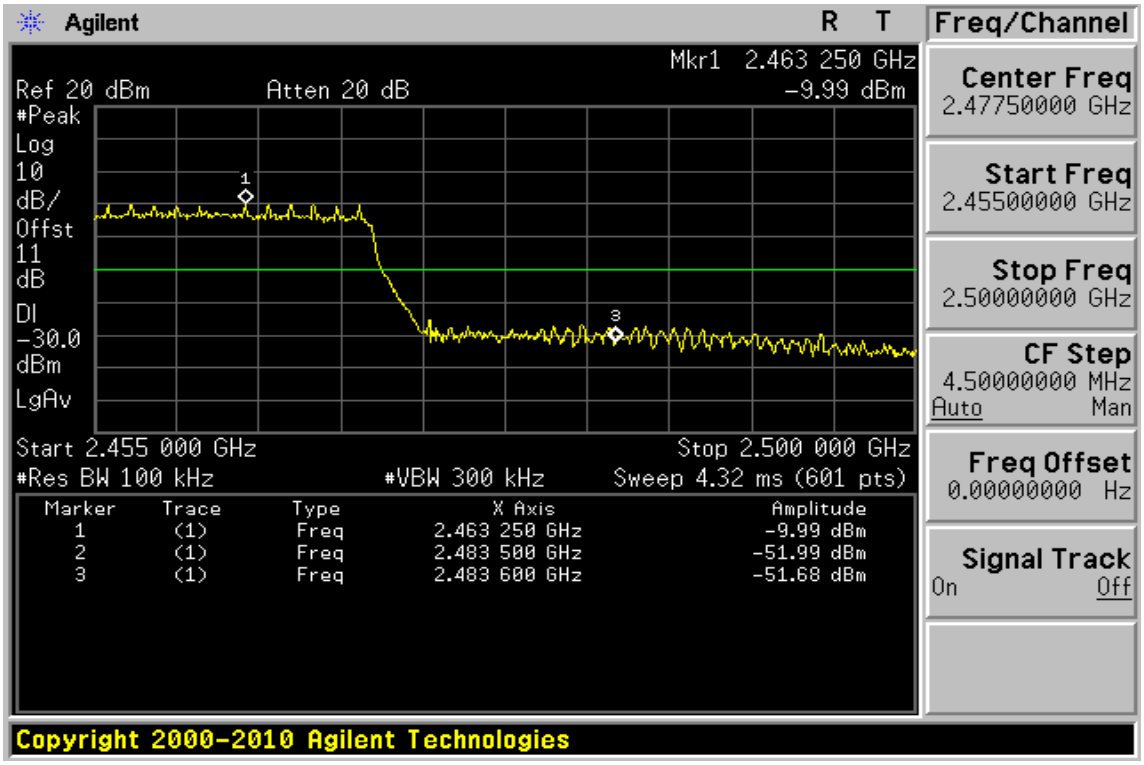
# 802.11n_40M- Unwanted Emissions into Non-Restricted Frequency Bands

## Band Edges Test Data CH-Low




## Band Edges Test Data CH-High

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**Radiated Emission:**

(Unwanted Emissions into Restricted Frequency Bands): 802.11 n_40M mode

| | | | |
|---|---|---|---|
| Operation Band | :802.11 n40M | Test Date | :2014-05-06 |
| Fundamental Frequency | :2422 MHz | Temp./Humi. | :22deg_C/57RH |
| Operation Mode | :Band Edge LOW | Engineer | :Curry |
| EUT Pol. | :H Plane | Measurement Antenna Pol. | :VERTICAL |

Actual FS(dBμV / m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV / m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

Note : "F" : denotes Fundamental Frequency. ; "H" : denotes Harmonic Frequency.

"E" : denotes Band Edge Frequency. ; "S" : denotes Spurious Frequency.

The trace on RE(radiation emission) plot is as colored blue, and the detection manner we've employed is peak detector.

| Freq. | Note | Detector Mode | Spectrum Reading Level | Factor | Actual FS | Limit @3m | Margin |
|---|---|---|---|---|---|---|---|
| MHz | F/H/E/S | PK/QP/AV | dBμV | dB | dBμV / m | dBμV / m | dB |
| 2390.00 | E | Average | 43.48 | 2.42 | 45.90 | 54.00 | -8.10 |
| 2390.00 | E | Peak | 61.32 | 2.42 | 63.74 | 74.00 | -10.26 |

| | | | |
|---|---|---|---|
| Operation Band | :802.11 n40M | Test Date | :2014-05-06 |
| Fundamental Frequency | :2422 MHz | Temp./Humi. | :22deg_C/57RH |
| Operation Mode | :Band Edge LOW | Engineer | :Curry |
| EUT Pol. | :H Plane | Measurement Antenna Pol. | :HORIZONTAL |

Actual FS(dBμV / m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV / m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

Note : "F" : denotes Fundamental Frequency. ; "H" : denotes Harmonic Frequency.

"E" : denotes Band Edge Frequency. ; "S" : denotes Spurious Frequency.

The trace on RE(radiation emission) plot is as colored blue, and the detection manner we've employed is peak detector.

| Freq. | Note | Detector Mode | Spectrum Reading Level | Factor | Actual FS | Limit @3m | Margin |
|---|---|---|---|---|---|---|---|
| MHz | F/H/E/S | PK/QP/AV | dBμV | dB | dBμV / m | dBμV / m | dB |
| 2390.00 | E | Average | 49.37 | 2.42 | 51.79 | 54.00 | -2.21 |
| 2390.00 | E | Peak | 67.54 | 2.42 | 69.96 | 74.00 | -4.04 |

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| | | | |
|---|---|---|---|
| Operation Band | :802.11 n40M | Test Date | :2014-05-06 |
| Fundamental Frequency | :2452 MHz | Temp./Humi. | :22deg_C/57RH |
| Operation Mode | :Band Edge HIGH | Engineer | :Curry |
| EUT Pol. | :H Plane | Measurement Antenna Pol. | :VERTICAL |

Actual FS(dBμV / m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV / m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

Note : "F" : denotes Fundamental Frequency. ; "H" : denotes Harmonic Frequency.

"E" : denotes Band Edge Frequency. ; "S" : denotes Spurious Frequency.

The trace on RE(radiation emission) plot is as colored blue, and the detection manner we've employed is peak detector.

| Freq. | Note | Detector Mode | Spectrum Reading Level | Factor | Actual FS | Limit @3m | Margin |
|---|---|---|---|---|---|---|---|
| MHz | F/H/E/S | PK/QP/AV | dBμV | dB | dBμV / m | dBμV / m | dB |
| 2483.50 | E | Average | 45.55 | 2.74 | 48.29 | 54.00 | -5.71 |
| 2483.50 | E | Peak | 61.23 | 2.74 | 63.97 | 74.00 | -10.03 |

| | | | |
|---|---|---|---|
| Operation Band | :802.11 n40M | Test Date | :2014-05-06 |
| Fundamental Frequency | :2452 MHz | Temp./Humi. | :22deg_C/57RH |
| Operation Mode | :Band Edge HIGH | Engineer | :Curry |
| EUT Pol. | :H Plane | Measurement Antenna Pol. | :HORIZONTAL |

Actual FS(dBμV / m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV / m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

Note : "F" : denotes Fundamental Frequency. ; "H" : denotes Harmonic Frequency.

"E" : denotes Band Edge Frequency. ; "S" : denotes Spurious Frequency.

The trace on RE(radiation emission) plot is as colored blue, and the detection manner we've employed is peak detector.

| Freq. | Note | Detector Mode | Spectrum Reading Level | Factor | Actual FS | Limit @3m | Margin |
|---|---|---|---|---|---|---|---|
| MHz | F/H/E/S | PK/QP/AV | dBμV | dB | dBμV / m | dBμV / m | dB |
| 2483.50 | E | Average | 49.28 | 2.74 | 52.02 | 54.00 | -1.98 |
| 2483.50 | E | Peak | 64.93 | 2.74 | 67.67 | 74.00 | -6.33 |

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# 10 SPURIOUS EMISSION TEST

## 10.1 Standard Applicable

According to §15.247(d),

Emission at antenna port:

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB.

Radiated Spurious Emission

Attenuation below the general limits specified in § 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in § 15.205(a), must also comply with the radiated emission limits specified in § 15.209(a) (see § 15.205(c)).

And according to §15.33(a) (1), for an intentional radiator operates below 10GHz, the frequency range of measurements: to the tenth harmonic of the highest fundamental frequency or to 40GHz, whichever is lower.

## 10.2 Measurement Equipment Used:

### 10.2.1 Conducted Emission at antenna port:

Refer to section 7.2 for details.

### 10.2.2 Radiated emission:

Refer to section 9.2.2 for details.

## 10.3 Test SET-UP:

### 10.3.1 Conducted Emission at antenna port:

Refer to section 7.3 for details.

### 10.3.2 Radiated emission:

Refer to section 9.3.2 for details.

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## 10.4 Measurement Procedure:

**Radiated Emission:**

1. The EUT was placed on a turn table which is 0.8m above ground plane.
2. The turn table shall rotate 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna which varied from 1m to 4m to find out the highest emissions.
4. When measurement procedures for electric field radiated emissions above 1 GHz the EUT measurement is to be made "while keeping the antenna in the 'cone of radiation' from that area and pointed at the area both in azimuth and elevation, with polarization oriented for maximum response." is still within the 3dB illumination BW of the measurement antenna.
5. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
6. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. On spectrum, change spectrum mode in linear display mode, and reduce VBW = 10Hz if average reading is measured.
7. Repeat above procedures until all default test channel measured were complete.

**Conducted Emission:**

1. To connect Antenna Port of EUT to Spectrum.
2. Set RBW = 100K & VBW = 300K on Spectrum.
3. Sweep the frequency to determine spurious emission as seen on spectrum from span of 30 to 3G, 3G to 8G, 8G to 13G, 13G to 18G and 18G to 26.5GHz, 18G to 40GHz (applicable if operation mode is 5GHz)
4. Via Software, combine 5 spans of frequency range into one plot
5. Repeat above procedures until all default test channel measured were complete.

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## 10.5 Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor and subtracting the Amplifier Gain and Duty Cycle Correction Factor (if any) from the measured reading. The basic equation with a sample calculation is as follows:

**FS = RA + AF + CL - AG**

| | | |
|---|---|---|
| Where | FS = Field Strength | CL = Cable Attenuation Factor (Cable Loss) |
| | RA = Reading Amplitude | AG = Amplifier Gain |
| | AF = Antenna Factor | |

## 10.6 Measurement Result:

Note: Refer to next page spectrum analyzer data chart and tabular data sheets.

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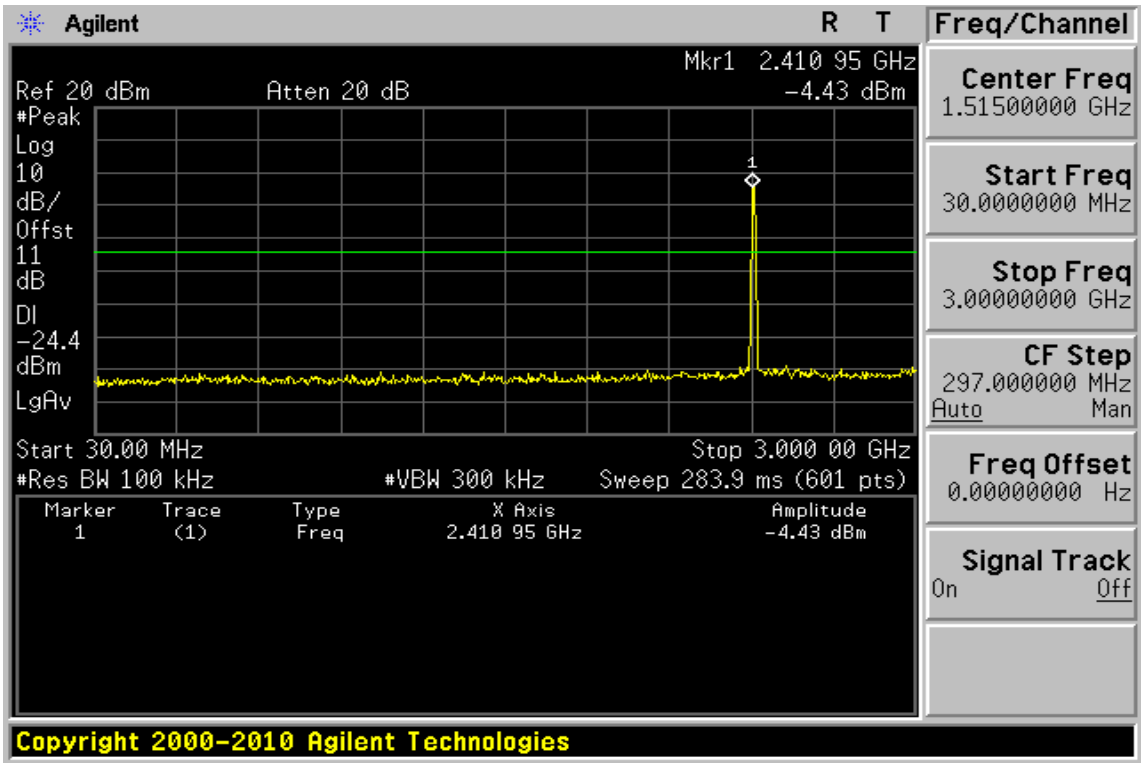
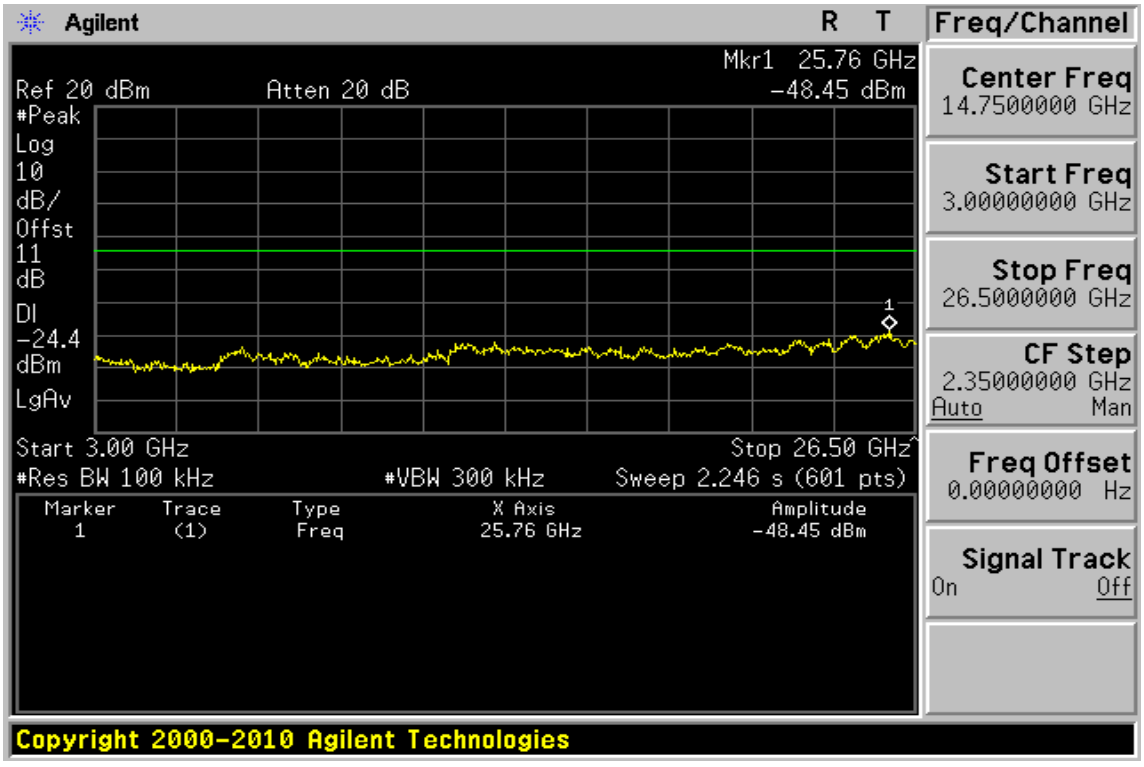
# Conducted Spurious Emission Measurement Result (802.11b)

## Ch Low 30MHz – 3GHz




## Ch Low 3GHz – 26.5GHz

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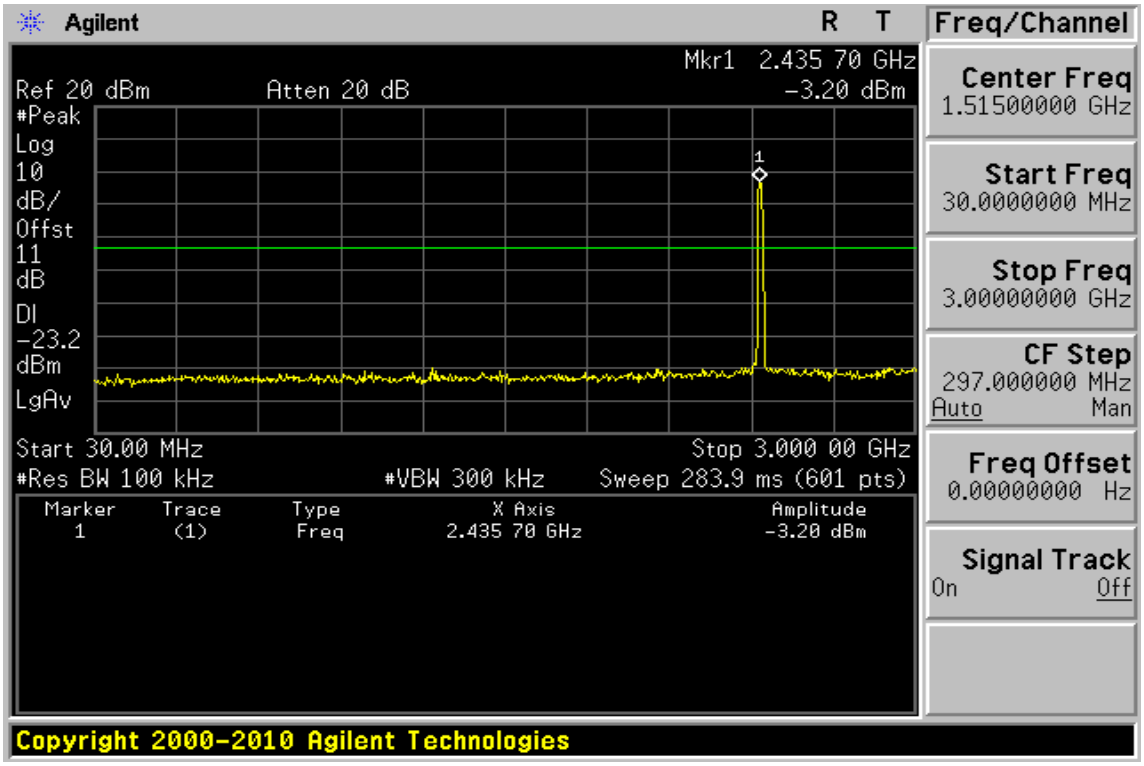
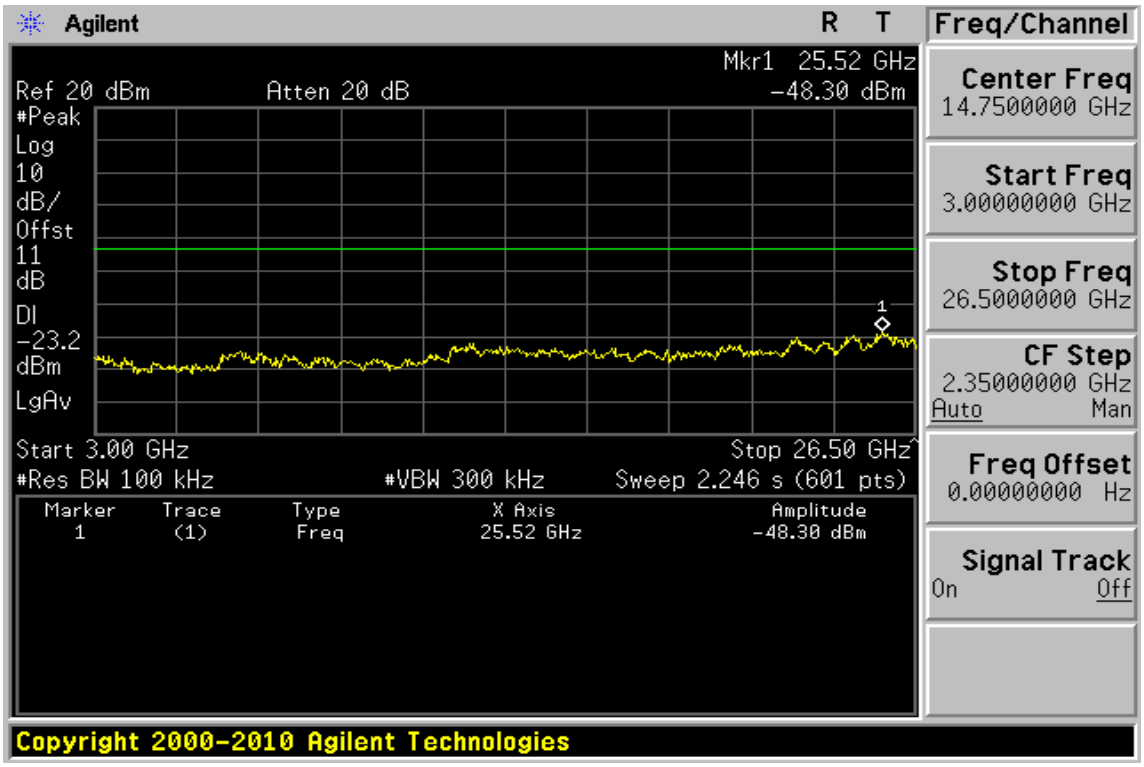
## Ch Mid 30MHz – 3GHz




## Ch Mid 3GHz – 26.5GHz

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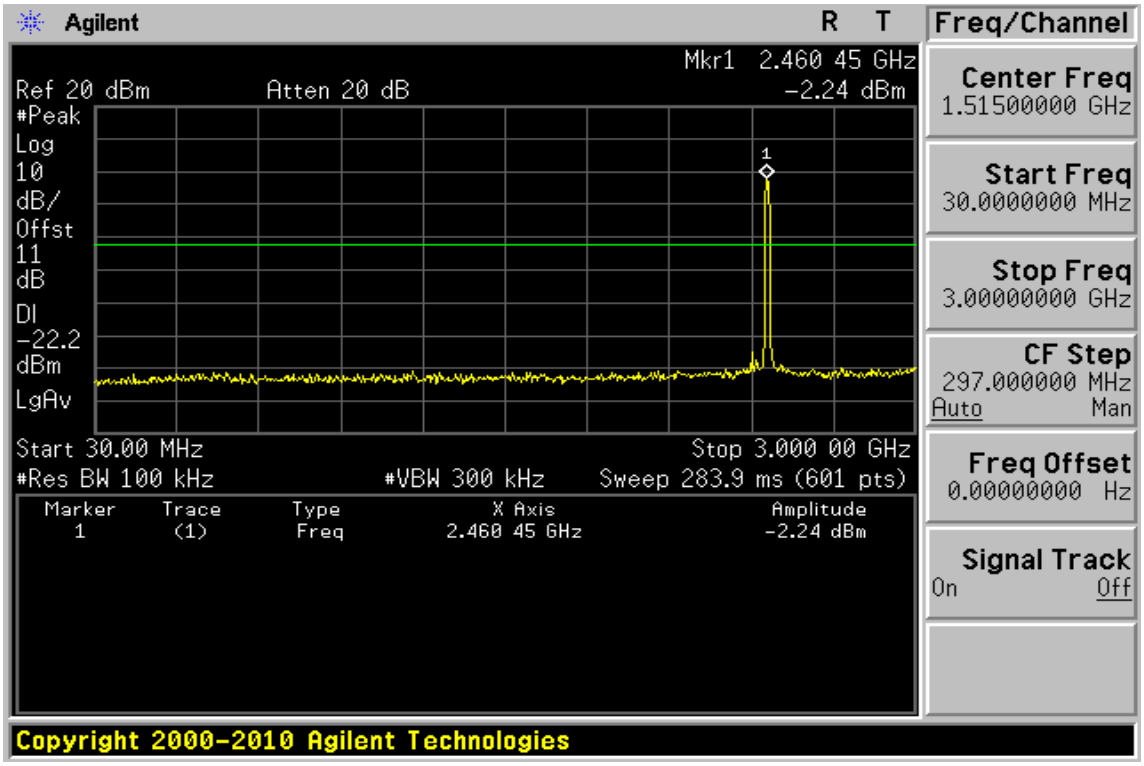
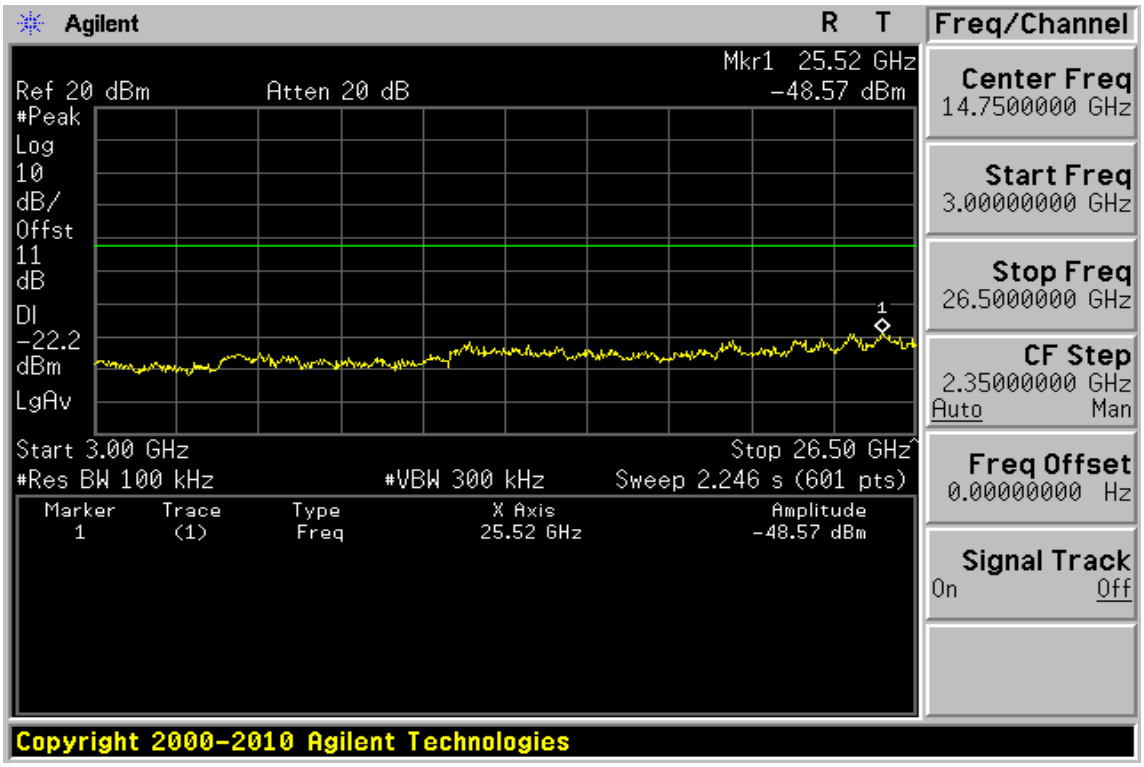
## Ch High 30MHz – 3GHz




## Ch High 3GHz – 26.5GHz

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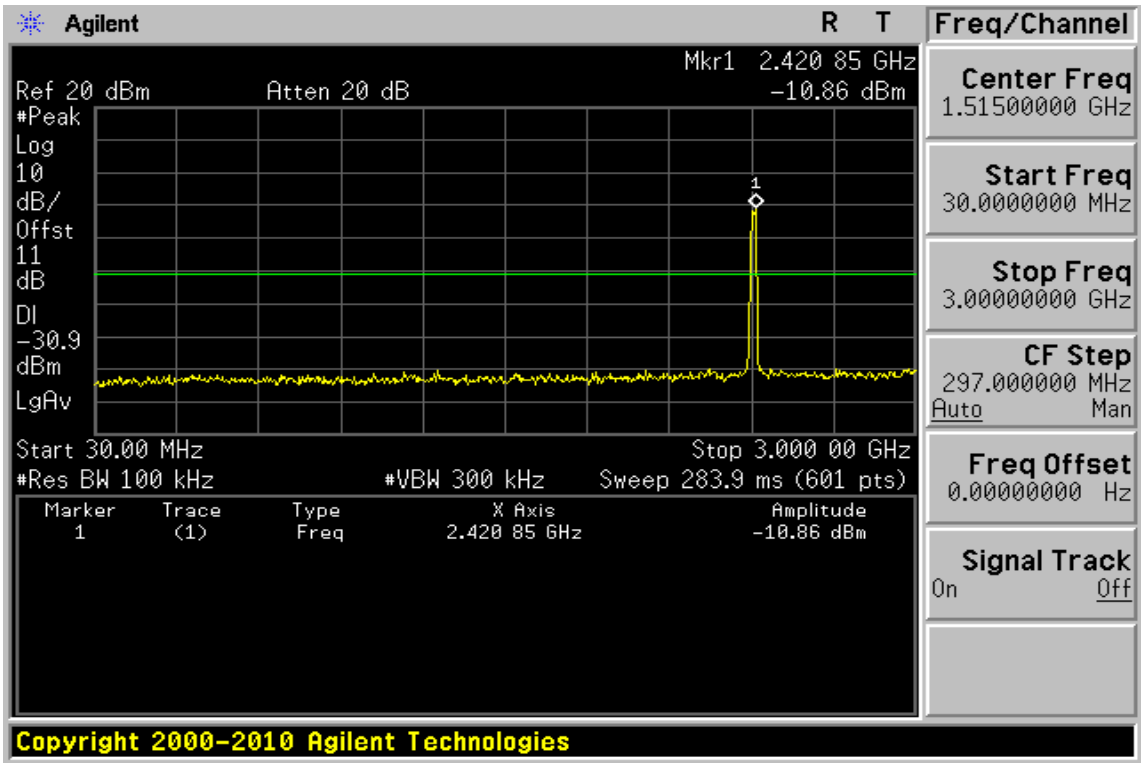
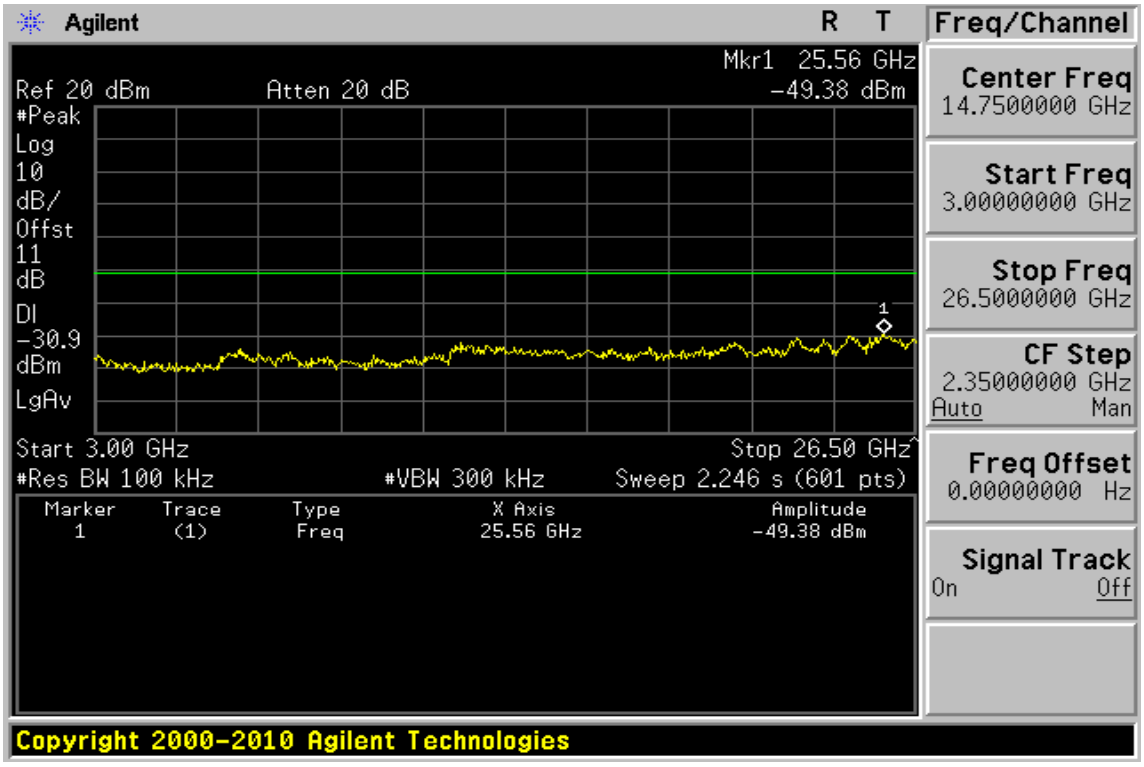
# Conducted Spurious Emission Measurement Result (802.11g)

## Ch Low 30MHz – 3GHz




## Ch Low 3GHz – 26.5GHz

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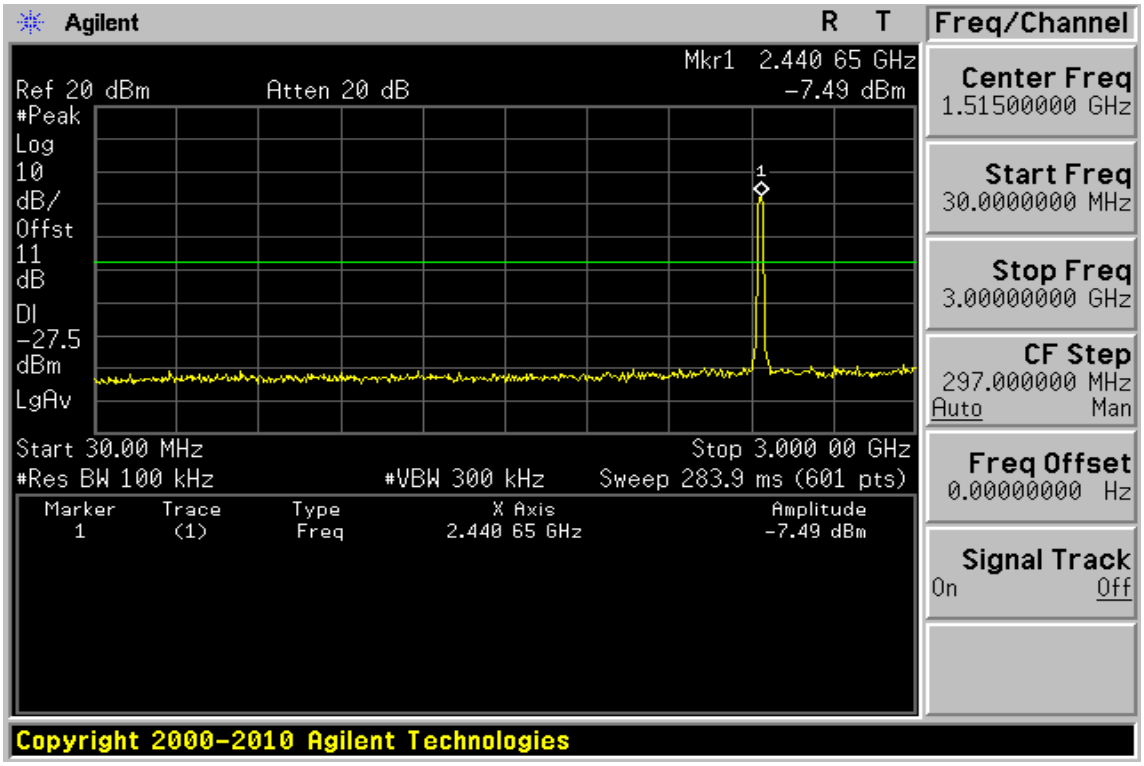
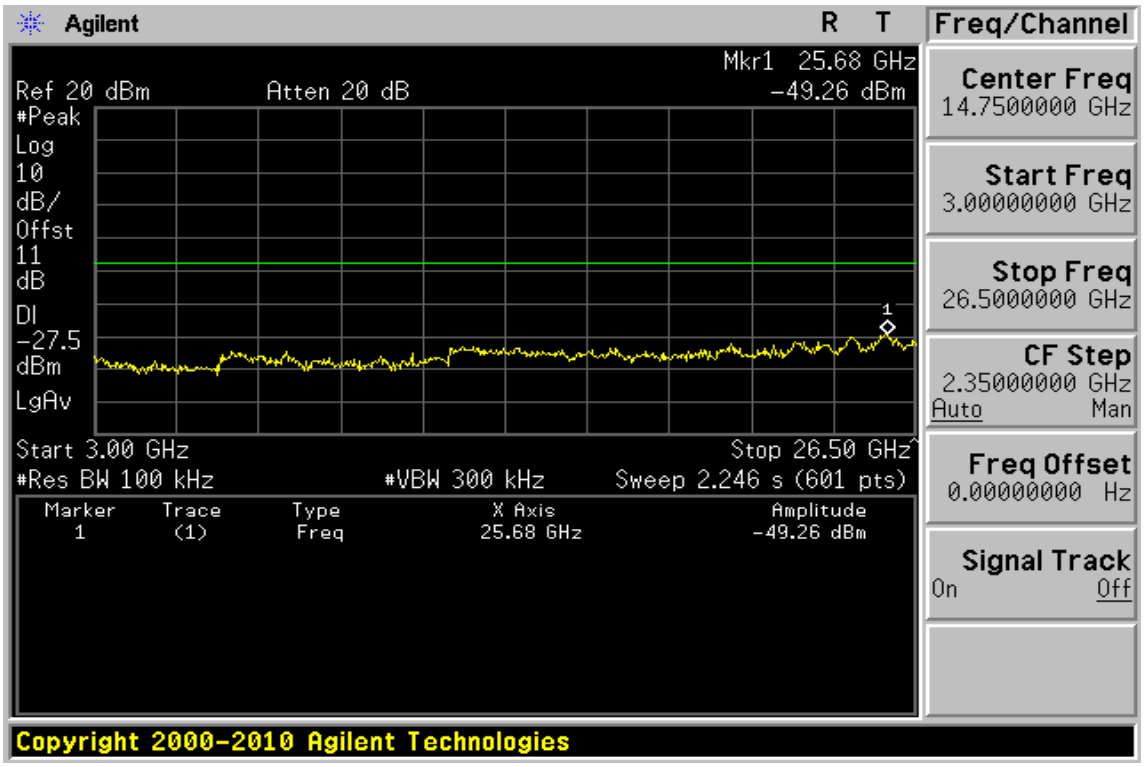
## Ch Mid 30MHz – 3GHz




## Ch Mid 3GHz – 26.5GHz

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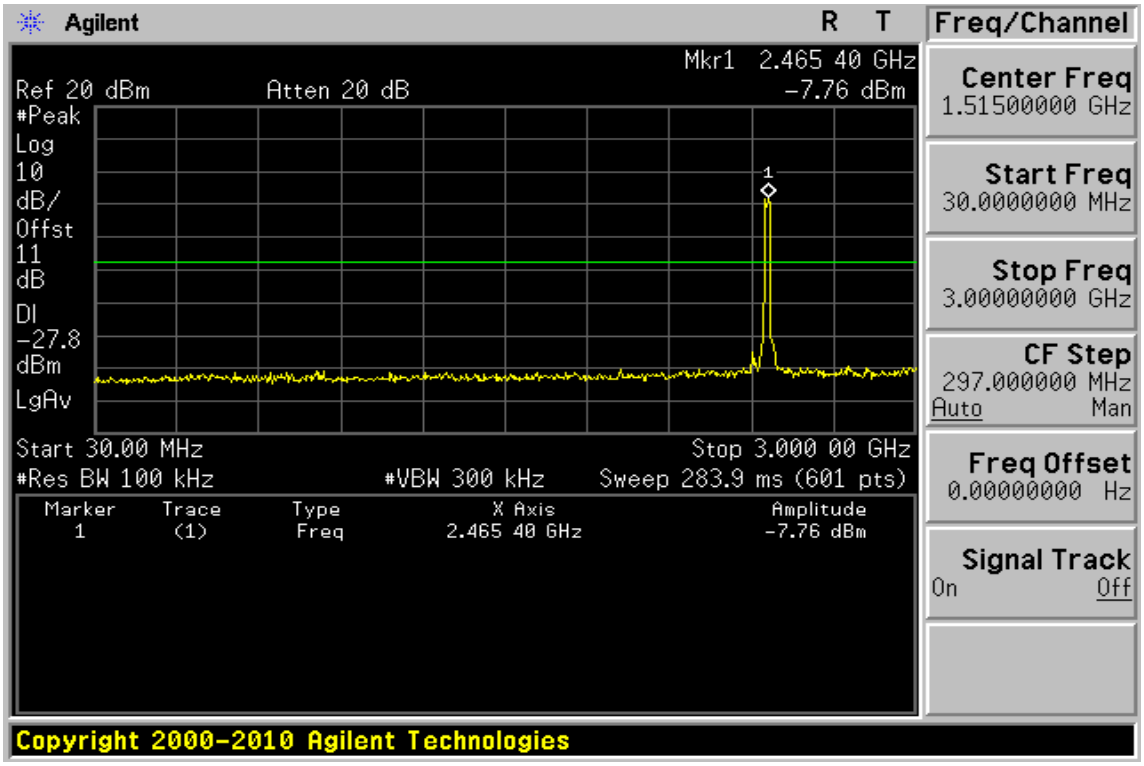
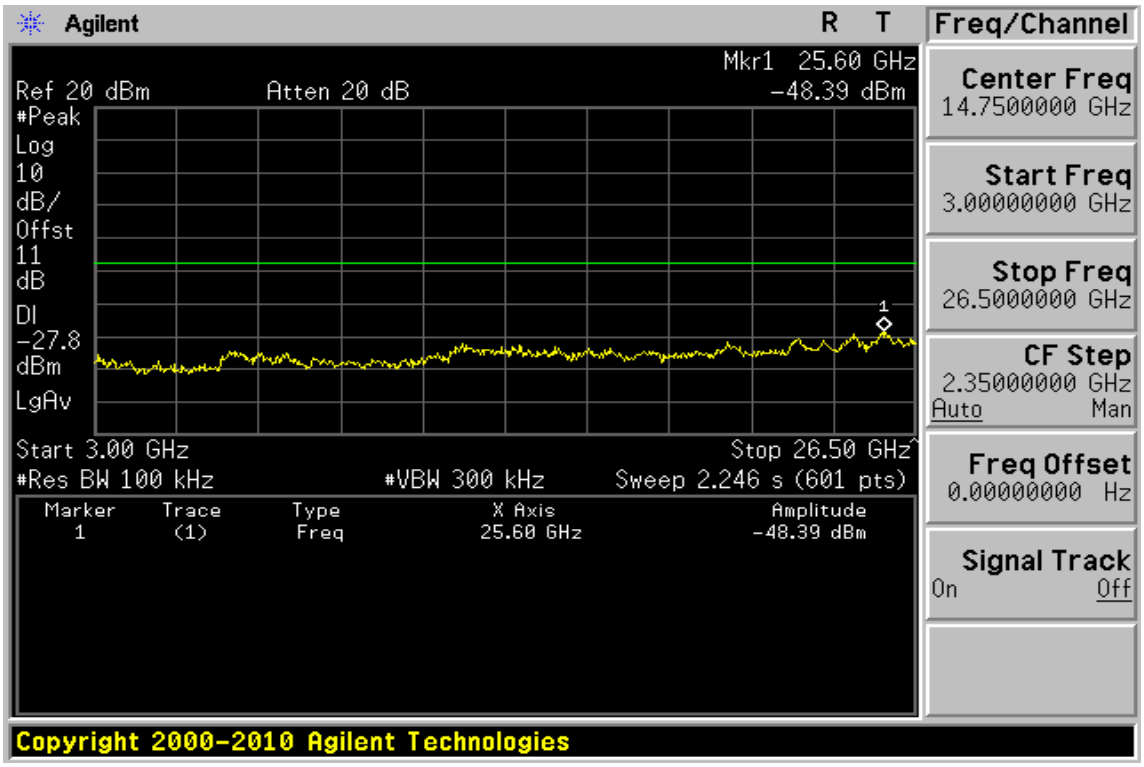
## Ch High 30MHz – 3GHz




## Ch High 3GHz – 26.5GHz

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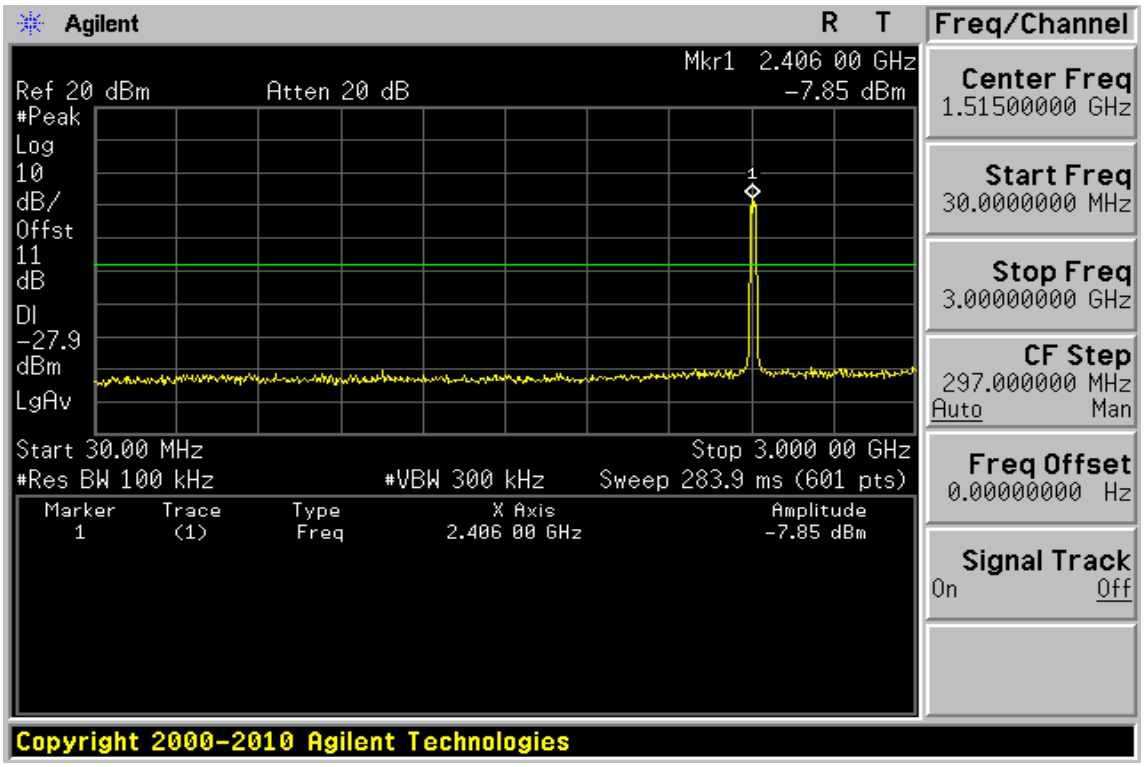
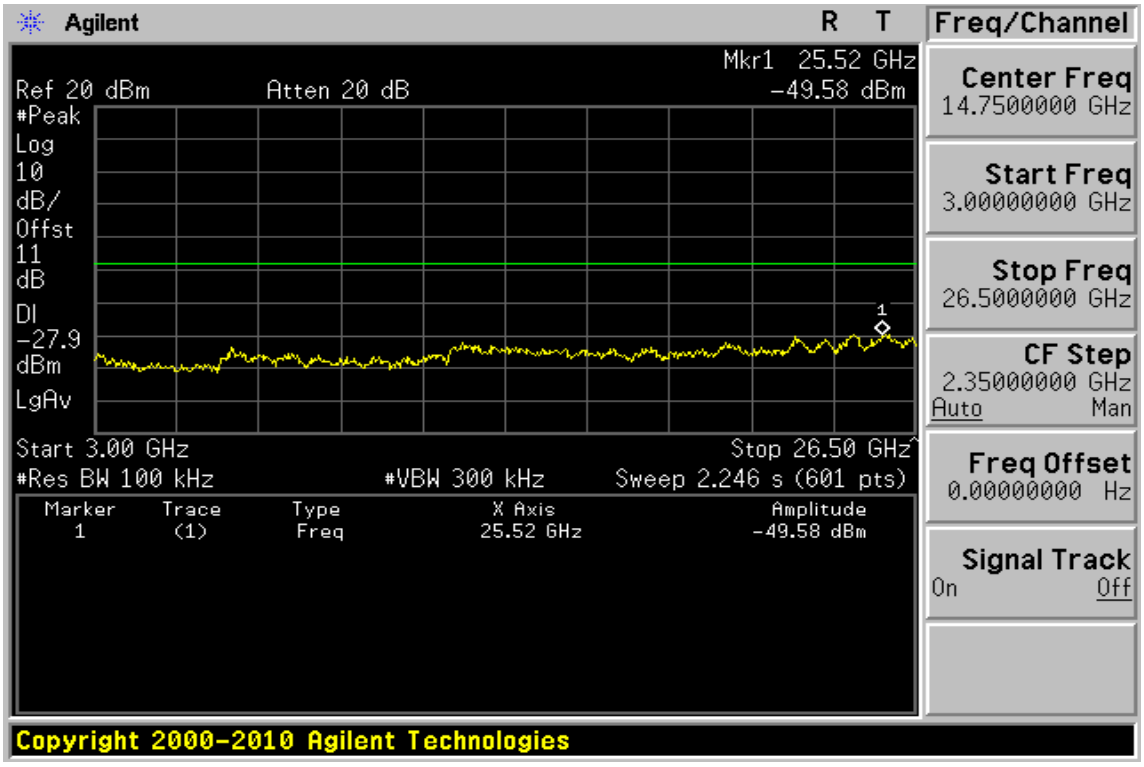
# Conducted Spurious Emission Measurement Result (802.11n_20M)

## Ch Low 30MHz – 3GHz




## Ch Low 3GHz – 26.5GHz

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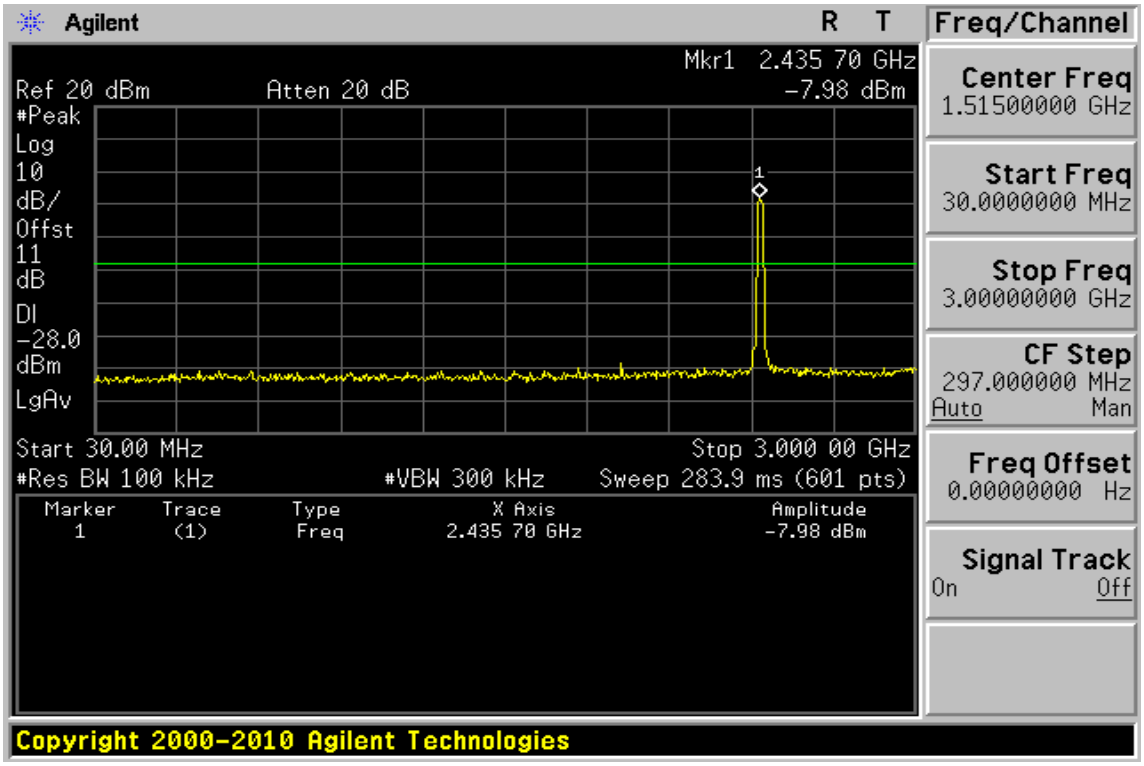
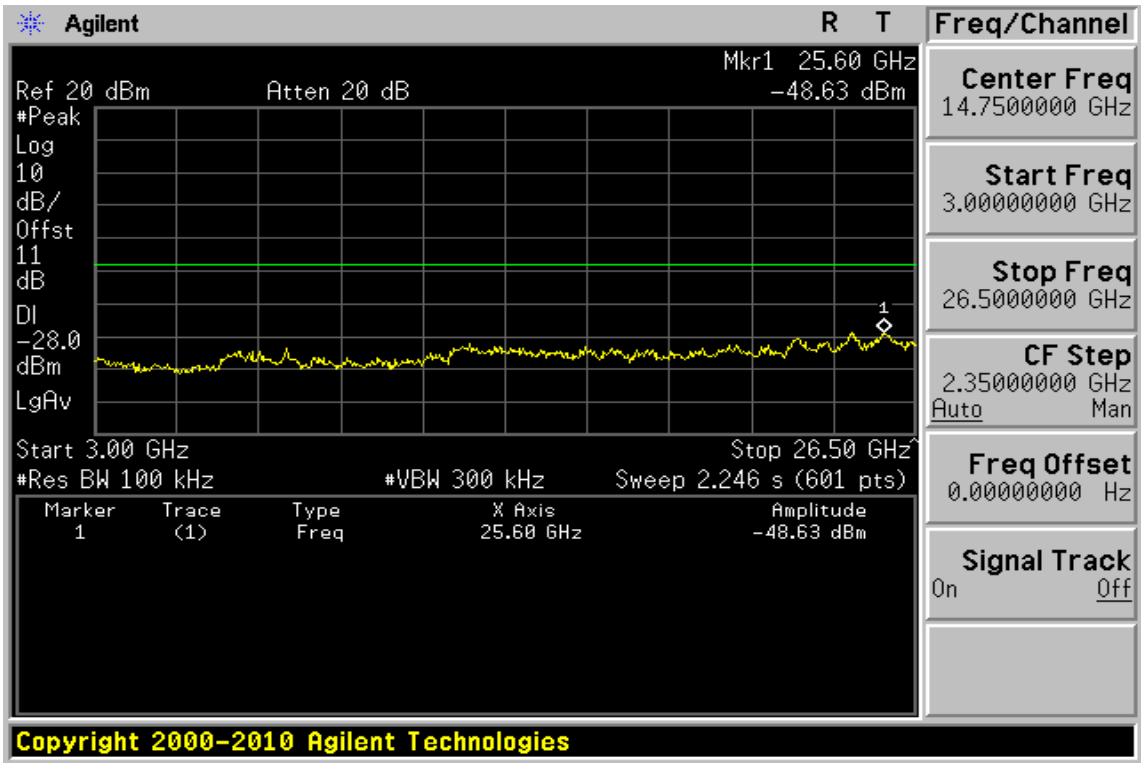
## Ch Mid 30MHz – 3GHz




## Ch Mid 3GHz – 26.5GHz

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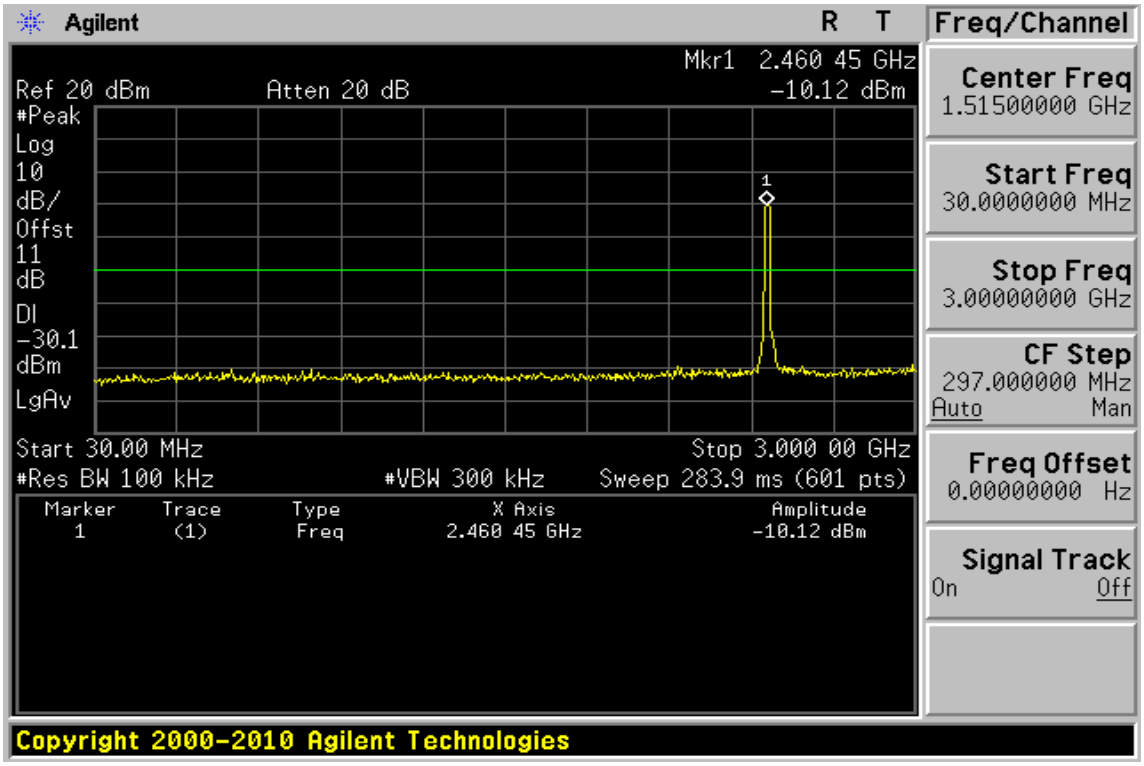
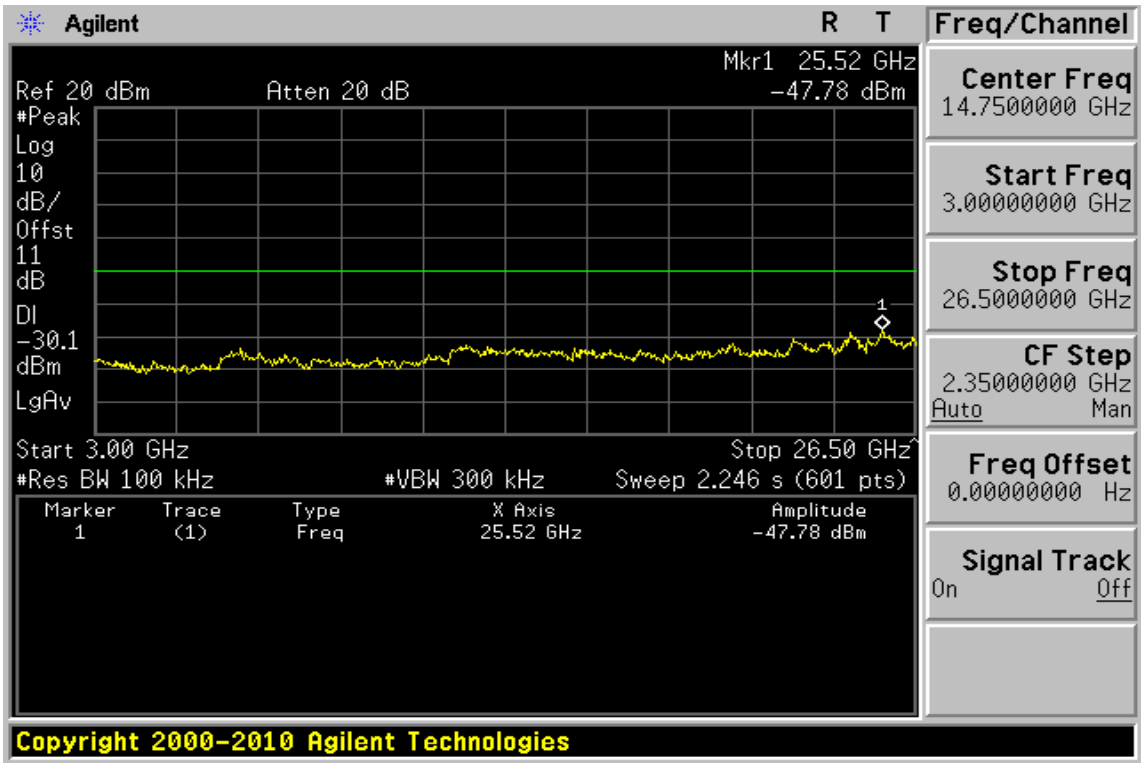
## Ch High 30MHz – 3GHz




## Ch High 3GHz – 26.5GHz

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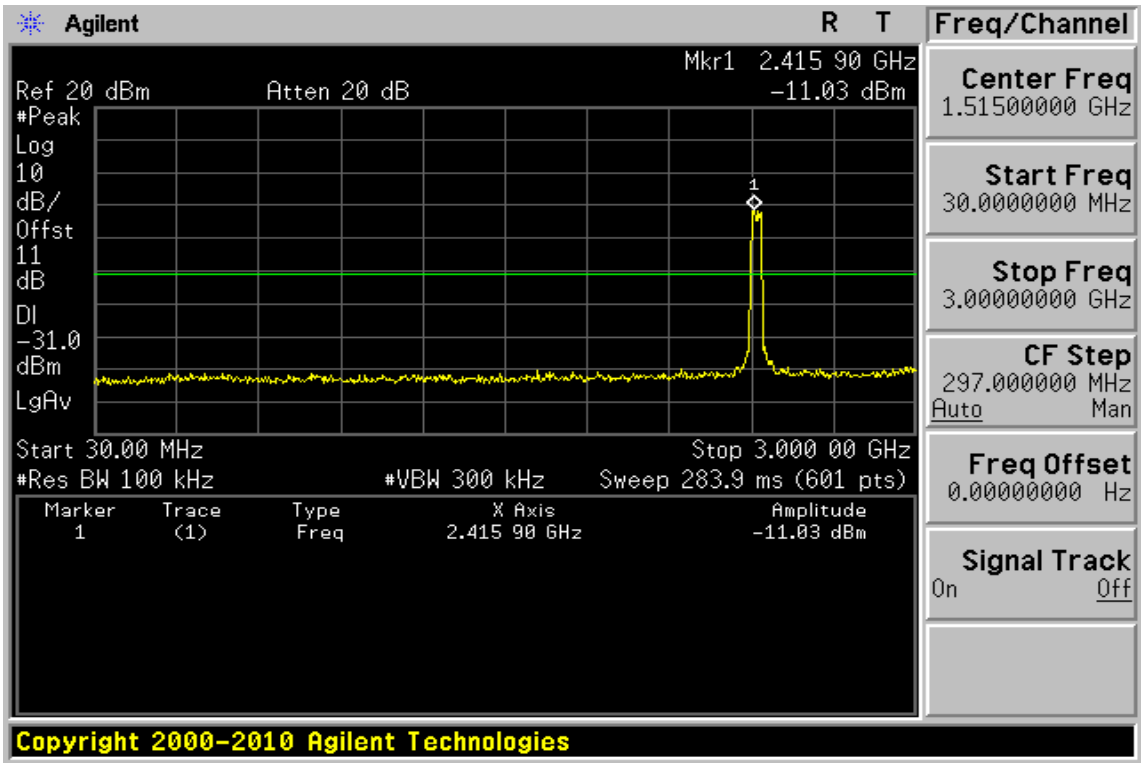
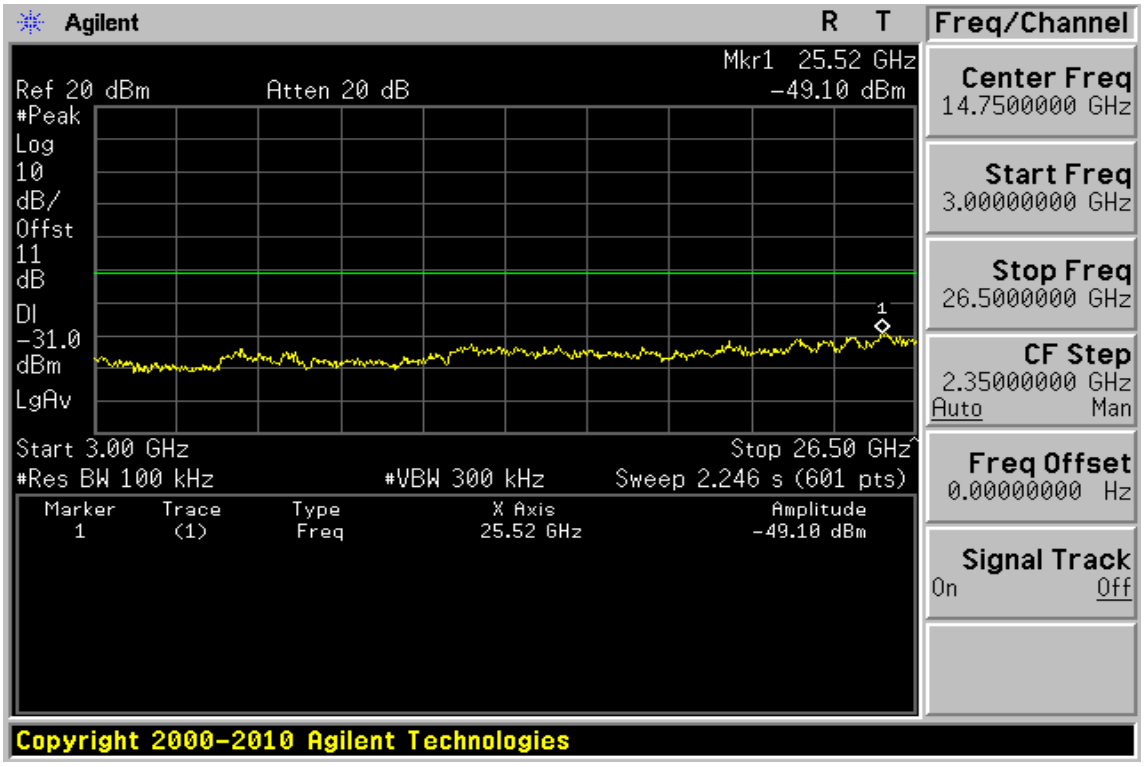
# Conducted Spurious Emission Measurement Result (802.11n_40M)

## Ch Low 30MHz – 3GHz




## Ch Low 3GHz – 26.5GHz

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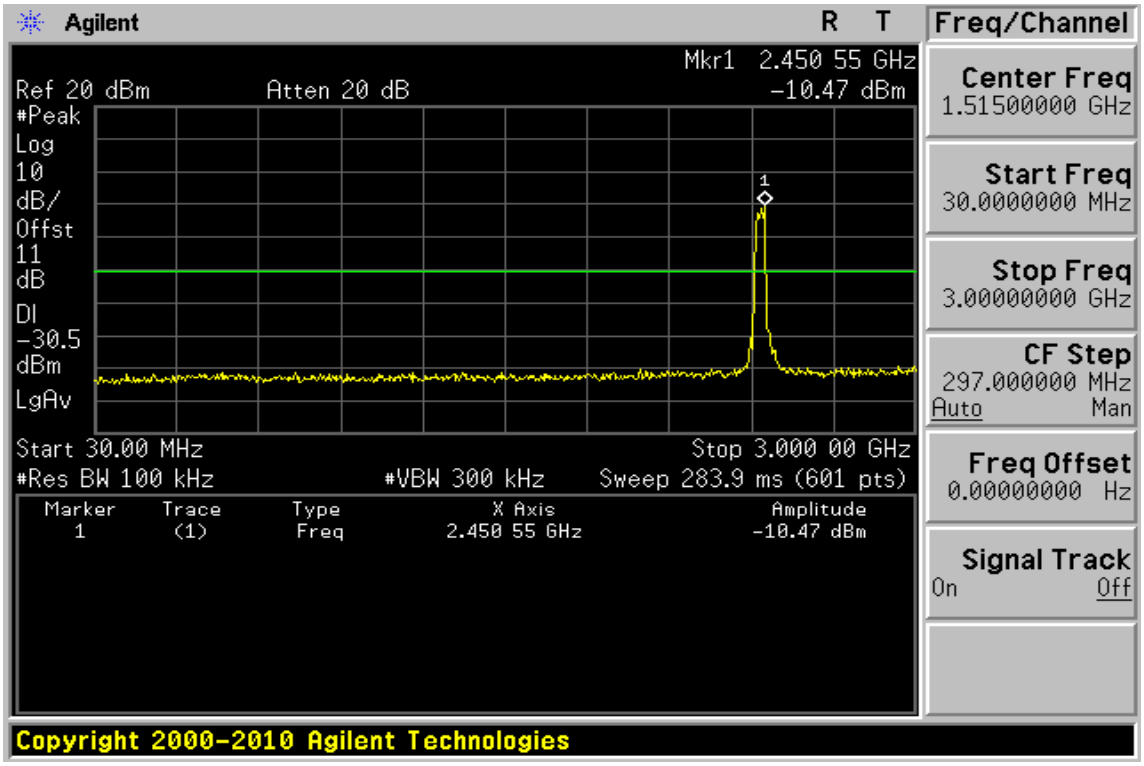
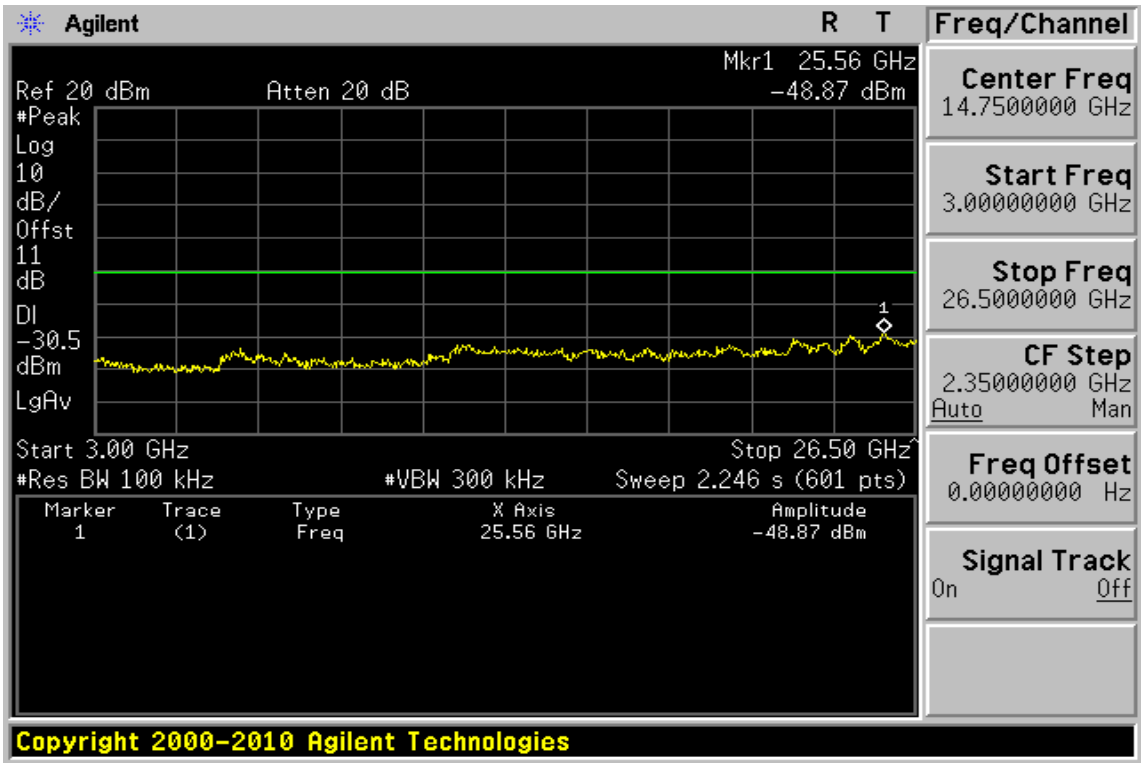
## Ch Mid 30MHz – 3GHz




## Ch Mid 3GHz – 26.5GHz

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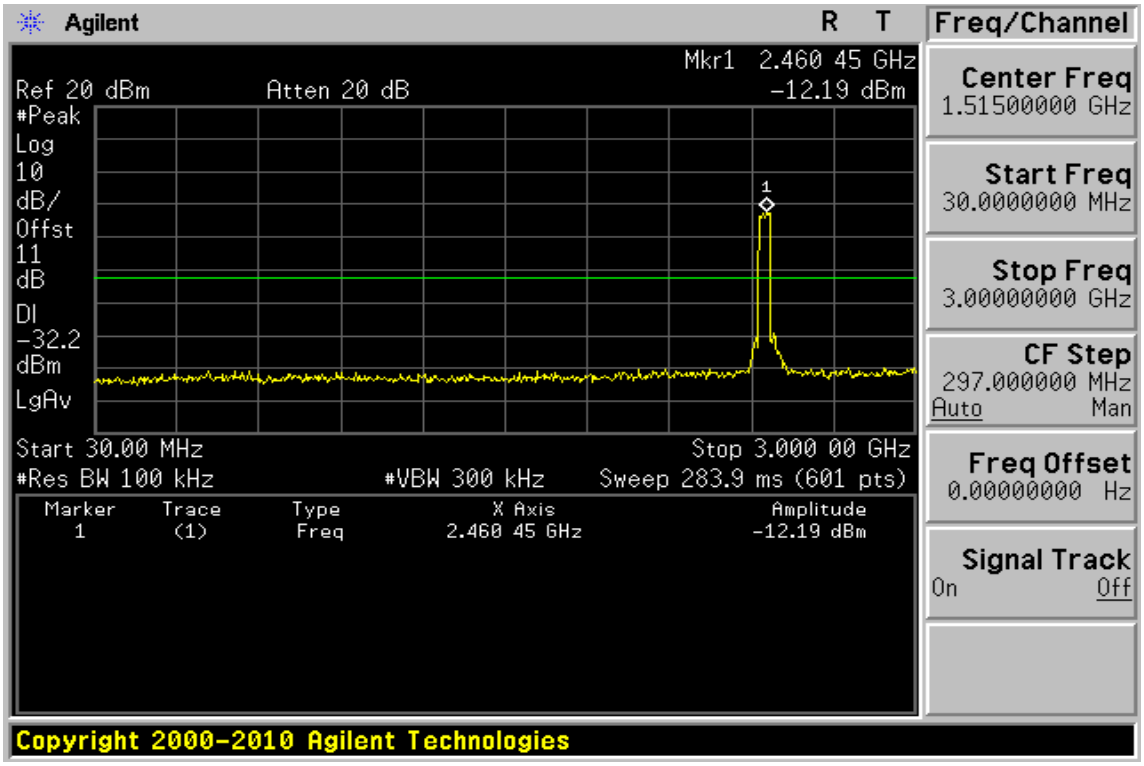
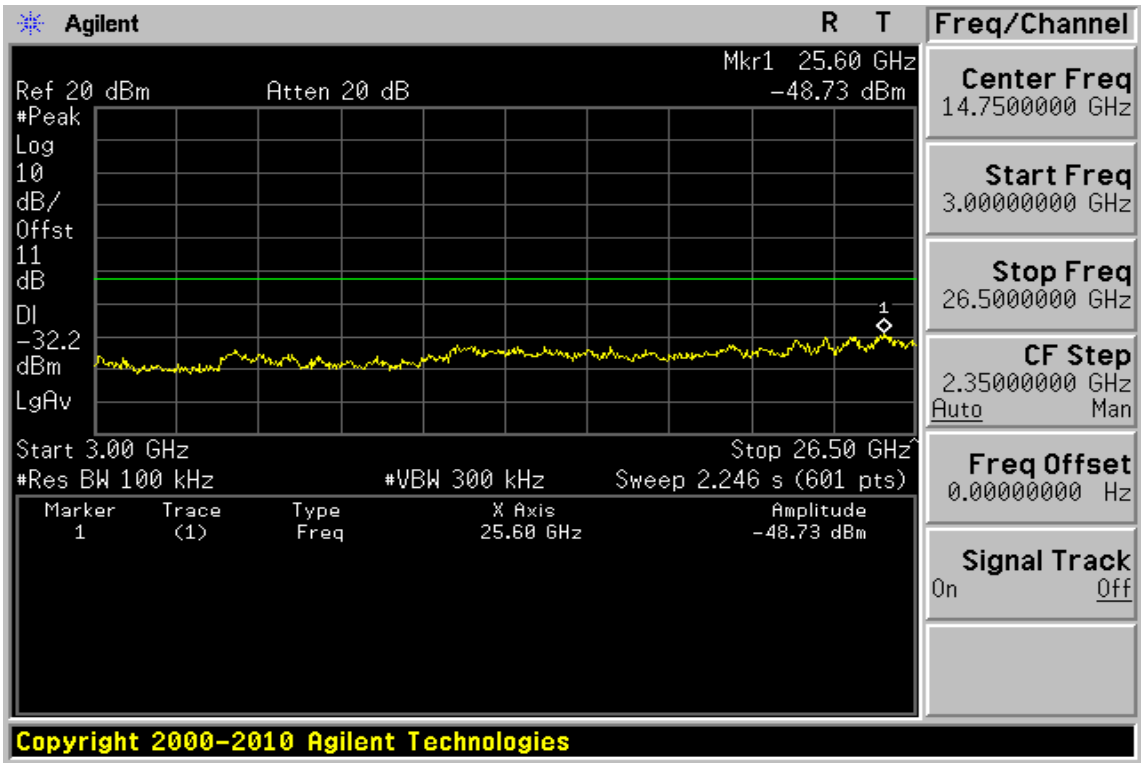
## Ch High 30MHz – 3GHz




## Ch High 3GHz – 26.5GHz

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## Radiated Spurious Emission Measurement Result (802.11b)

| | | | |
|---|---|---|---|
| Operation Band | :802.11 b | Test Date | :2014-05-06 |
| Fundamental Frequency | :2412 MHz | Temp./Humi. | :22deg_C/57RH |
| Operation Mode | :TX LOW | Engineer | :Curry |
| EUT Pol. | :H Plane | Measurement Antenna Pol. | :VERTICAL |

Actual FS(dBμV / m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV / m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

Note : "F" : denotes Fundamental Frequency. ; "H" : denotes Harmonic Frequency.

"E" : denotes Band Edge Frequency. ; "S" : denotes Spurious Frequency.

"---" : denotes Noise Floor.

| Freq. MHz | Note F/H/E/S | Detector Mode PK/QP/AV | Spectrum Reading Level dBμV | Factor dB | Actual FS dBμV / m | Limit @3m dBμV / m | Margin dB |
|---|---|---|---|---|---|---|---|
| 30.97 | S | Peak | 30.10 | -14.03 | 16.07 | 40.00 | -23.93 |
| 99.84 | S | Peak | 33.64 | -17.86 | 15.78 | 43.50 | -27.72 |
| 439.34 | S | Peak | 28.70 | -8.83 | 19.87 | 46.00 | -26.13 |
| 495.60 | S | Peak | 29.44 | -7.60 | 21.84 | 46.00 | -24.16 |
| 636.25 | S | Peak | 28.51 | -5.24 | 23.27 | 46.00 | -22.73 |
| 774.96 | S | Peak | 28.87 | -2.82 | 26.05 | 46.00 | -19.95 |
| 4824.00 | H | Average | 28.29 | 6.89 | 35.18 | 54.00 | -18.82 |
| 4824.00 | H | Peak | 37.53 | 6.89 | 44.42 | 74.00 | -29.58 |
| 7236.00 | H | --- | | | | | |
| 9648.00 | H | --- | | | | | |
| 12060.00 | H | --- | | | | | |
| 14472.00 | H | --- | | | | | |
| 16884.00 | H | --- | | | | | |
| 19296.00 | H | --- | | | | | |
| 21708.00 | H | --- | | | | | |
| 24120.00 | H | --- | | | | | |

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| | | | |
|---|---|---|---|
| Operation Band | :802.11 b | Test Date | :2014-05-06 |
| Fundamental Frequency | :2412 MHz | Temp./Humi. | :22deg_C/57RH |
| Operation Mode | :TX LOW | Engineer | :Curry |
| EUT Pol. | :H Plane | Measurement Antenna Pol. | :HORIZONTAL |

Actual FS(dBμV / m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV / m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

Note : "F" : denotes Fundamental Frequency. ; "H" : denotes Harmonic Frequency.

"E" : denotes Band Edge Frequency. ; "S" : denotes Spurious Frequency.

"---" : denotes Noise Floor.

| Freq. MHz | Note F/H/E/S | Detector Mode PK/QP/AV | Spectrum Reading Level dBμV | Factor dB | Actual FS dBμV / m | Limit @3m dBμV / m | Margin dB |
|---|---|---|---|---|---|---|---|
| 392.78 | S | Peak | 27.72 | -9.33 | 18.39 | 46.00 | -27.61 |
| 438.37 | S | Peak | 28.08 | -8.84 | 19.24 | 46.00 | -26.76 |
| 596.48 | S | Peak | 29.02 | -5.36 | 23.66 | 46.00 | -22.34 |
| 641.10 | S | Peak | 28.83 | -4.98 | 23.85 | 46.00 | -22.15 |
| 678.93 | S | Peak | 28.73 | -3.70 | 25.03 | 46.00 | -20.97 |
| 755.56 | S | Peak | 27.92 | -2.69 | 25.23 | 46.00 | -20.77 |
| 4824.00 | H | Average | 26.64 | 6.89 | 33.53 | 54.00 | -20.47 |
| 4824.00 | H | Peak | 37.34 | 6.89 | 44.23 | 74.00 | -29.77 |
| 7236.00 | H | --- | | | | | |
| 9648.00 | H | --- | | | | | |
| 12060.00 | H | --- | | | | | |
| 14472.00 | H | --- | | | | | |
| 16884.00 | H | --- | | | | | |
| 19296.00 | H | --- | | | | | |
| 21708.00 | H | --- | | | | | |
| 24120.00 | H | --- | | | | | |

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| | | | |
|---|---|---|---|
| Operation Band | :802.11 b | Test Date | :2014-05-06 |
| Fundamental Frequency | :2437 MHz | Temp./Humi. | :22deg_C/57RH |
| Operation Mode | :TX MID | Engineer | :Curry |
| EUT Pol. | :H Plane | Measurement Antenna Pol. | :VERTICAL |

Actual FS(dBμV / m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV / m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

Note : "F" : denotes Fundamental Frequency. ; "H" : denotes Harmonic Frequency.

"E" : denotes Band Edge Frequency. ; "S" : denotes Spurious Frequency.

"---" : denotes Noise Floor.

| Freq. MHz | Note F/H/E/S | Detector Mode PK/QP/AV | Spectrum Reading Level dBμV | Factor dB | Actual FS dBμV / m | Limit @3m dBμV / m | Margin dB |
|---|---|---|---|---|---|---|---|
| 30.97 | S | Peak | 30.98 | -14.03 | 16.95 | 40.00 | -23.05 |
| 410.24 | S | Peak | 27.60 | -8.90 | 18.70 | 46.00 | -27.30 |
| 459.71 | S | Peak | 27.42 | -8.11 | 19.31 | 46.00 | -26.69 |
| 591.63 | S | Peak | 29.05 | -5.16 | 23.89 | 46.00 | -22.11 |
| 683.78 | S | Peak | 27.95 | -3.67 | 24.28 | 46.00 | -21.72 |
| 744.89 | S | Peak | 29.39 | -2.92 | 26.47 | 46.00 | -19.53 |
| 4874.00 | H | Average | 26.34 | 6.96 | 33.30 | 54.00 | -20.70 |
| 4874.00 | H | Peak | 37.22 | 6.96 | 44.18 | 74.00 | -29.82 |
| 7311.00 | H | --- | | | | | |
| 9748.00 | H | --- | | | | | |
| 12185.00 | H | --- | | | | | |
| 14622.00 | H | --- | | | | | |
| 17059.00 | H | --- | | | | | |
| 19496.00 | H | --- | | | | | |
| 21933.00 | H | --- | | | | | |
| 24370.00 | H | --- | | | | | |

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| | | | |
|---|---|---|---|
| Operation Band | :802.11 b | Test Date | :2014-05-06 |
| Fundamental Frequency | :2437 MHz | Temp./Humi. | :22deg_C/57RH |
| Operation Mode | :TX MID | Engineer | :Curry |
| EUT Pol. | :H Plane | Measurement Antenna Pol. | :HORIZONTAL |

Actual FS(dBμV / m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV / m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

Note : "F" : denotes Fundamental Frequency. ; "H" : denotes Harmonic Frequency.

"E" : denotes Band Edge Frequency. ; "S" : denotes Spurious Frequency.

"---" : denotes Noise Floor.

| Freq. | Note | Detector Mode | Spectrum Reading Level | Factor | Actual FS | Limit @3m | Margin |
|---|---|---|---|---|---|---|---|
| MHz | F/H/E/S | PK/QP/AV | dBμV | dB | dBμV / m | dBμV / m | dB |
| 482.02 | S | Peak | 27.77 | -7.74 | 20.03 | 46.00 | -25.97 |
| 566.41 | S | Peak | 28.10 | -6.17 | 21.93 | 46.00 | -24.07 |
| 582.90 | S | Peak | 28.28 | -5.20 | 23.08 | 46.00 | -22.92 |
| 684.75 | S | Peak | 28.12 | -3.67 | 24.45 | 46.00 | -21.55 |
| 746.83 | S | Peak | 27.61 | -2.83 | 24.78 | 46.00 | -21.22 |
| 760.41 | S | Peak | 27.82 | -2.70 | 25.12 | 46.00 | -20.88 |
| 4874.00 | H | Average | 26.67 | 6.96 | 33.63 | 54.00 | -20.37 |
| 4874.00 | H | Peak | 36.88 | 6.96 | 43.84 | 74.00 | -30.16 |
| 7311.00 | H | --- | | | | | |
| 9748.00 | H | --- | | | | | |
| 12185.00 | H | --- | | | | | |
| 14622.00 | H | --- | | | | | |
| 17059.00 | H | --- | | | | | |
| 19496.00 | H | --- | | | | | |
| 21933.00 | H | --- | | | | | |
| 24370.00 | H | --- | | | | | |

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| | | | |
|---|---|---|---|
| Operation Band | :802.11 b | Test Date | :2014-05-06 |
| Fundamental Frequency | :2462 MHz | Temp./Humi. | :22deg_C/57RH |
| Operation Mode | :TX HIGH | Engineer | :Curry |
| EUT Pol. | :H Plane | Measurement Antenna Pol. | :VERTICAL |

Actual FS(dBμV / m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV / m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

Note : "F" : denotes Fundamental Frequency. ; "H" : denotes Harmonic Frequency.

"E" : denotes Band Edge Frequency. ; "S" : denotes Spurious Frequency.

"---" : denotes Noise Floor.

| Freq. MHz | Note F/H/E/S | Detector Mode PK/QP/AV | Spectrum Reading Level dBμV | Factor dB | Actual FS dBμV / m | Limit @3m dBμV / m | Margin dB |
|---|---|---|---|---|---|---|---|
| 30.97 | S | Peak | 31.47 | -14.03 | 17.44 | 40.00 | -22.56 |
| 436.43 | S | Peak | 28.21 | -8.89 | 19.32 | 46.00 | -26.68 |
| 467.47 | S | Peak | 28.02 | -7.93 | 20.09 | 46.00 | -25.91 |
| 581.93 | S | Peak | 27.41 | -5.21 | 22.20 | 46.00 | -23.80 |
| 678.93 | S | Peak | 27.58 | -3.70 | 23.88 | 46.00 | -22.12 |
| 745.86 | S | Peak | 28.27 | -2.87 | 25.40 | 46.00 | -20.60 |
| 4924.00 | H | Average | 26.60 | 7.01 | 33.61 | 54.00 | -20.39 |
| 4924.00 | H | Peak | 37.59 | 7.01 | 44.60 | 74.00 | -29.40 |
| 7386.00 | H | --- | | | | | |
| 9848.00 | H | --- | | | | | |
| 12310.00 | H | --- | | | | | |
| 14772.00 | H | --- | | | | | |
| 17234.00 | H | --- | | | | | |
| 19696.00 | H | --- | | | | | |
| 22158.00 | H | --- | | | | | |
| 24620.00 | H | --- | | | | | |

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| | | | |
|---|---|---|---|
| Operation Band | :802.11 b | Test Date | :2014-05-06 |
| Fundamental Frequency | :2462 MHz | Temp./Humi. | :22deg_C/57RH |
| Operation Mode | :TX HIGH | Engineer | :Curry |
| EUT Pol. | :H Plane | Measurement Antenna Pol. | :HORIZONTAL |

Actual FS(dBμV / m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV / m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

Note : "F" : denotes Fundamental Frequency. ; "H" : denotes Harmonic Frequency.

"E" : denotes Band Edge Frequency. ; "S" : denotes Spurious Frequency.

"---" : denotes Noise Floor.

| Freq. | Note | Detector Mode | Spectrum Reading Level | Factor | Actual FS | Limit @3m | Margin |
|---|---|---|---|---|---|---|---|
| MHz | F/H/E/S | PK/QP/AV | dBμV | dB | dBμV / m | dBμV / m | dB |
| 162.89 | S | Peak | 29.04 | -12.72 | 16.32 | 43.50 | -27.18 |
| 390.84 | S | Peak | 27.63 | -9.38 | 18.25 | 46.00 | -27.75 |
| 465.53 | S | Peak | 28.39 | -7.97 | 20.42 | 46.00 | -25.58 |
| 588.72 | S | Peak | 27.69 | -5.12 | 22.57 | 46.00 | -23.43 |
| 679.90 | S | Peak | 28.19 | -3.67 | 24.52 | 46.00 | -21.48 |
| 759.44 | S | Peak | 28.28 | -2.70 | 25.58 | 46.00 | -20.42 |
| 4924.00 | H | Average | 26.75 | 7.01 | 33.76 | 54.00 | -20.24 |
| 4924.00 | H | Peak | 37.26 | 7.01 | 44.27 | 74.00 | -29.73 |
| 7386.00 | H | --- | | | | | |
| 9848.00 | H | --- | | | | | |
| 12310.00 | H | --- | | | | | |
| 14772.00 | H | --- | | | | | |
| 17234.00 | H | --- | | | | | |
| 19696.00 | H | --- | | | | | |
| 22158.00 | H | --- | | | | | |
| 24620.00 | H | --- | | | | | |

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## Radiated Spurious Emission Measurement Result (802.11g)

| | | | |
|---|---|---|---|
| Operation Band | :802.11 g | Test Date | :2014-05-06 |
| Fundamental Frequency | :2412 MHz | Temp./Humi. | :22deg_C/57RH |
| Operation Mode | :TX LOW | Engineer | :Curry |
| EUT Pol. | :H Plane | Measurement Antenna Pol. | :VERTICAL |

Actual FS(dBμV / m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV / m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

Note : "F" : denotes Fundamental Frequency. ; "H" : denotes Harmonic Frequency.

"E" : denotes Band Edge Frequency. ; "S" : denotes Spurious Frequency.

"---" : denotes Noise Floor.

The trace on RE(radiation emission) plot is as colored blue, and the detection manner we've employed is peak detector.

| Freq. MHz | Note F/H/E/S | Detector Mode PK/QP/AV | Spectrum Reading Level dBμV | Factor dB | Actual FS dBμV / m | Limit @3m dBμV / m | Margin dB |
|---|---|---|---|---|---|---|---|
| 520.82 | S | Peak | 28.18 | -7.44 | 20.74 | 46.00 | -25.26 |
| 595.51 | S | Peak | 28.62 | -5.32 | 23.30 | 46.00 | -22.70 |
| 658.56 | S | Peak | 27.84 | -4.35 | 23.49 | 46.00 | -22.51 |
| 678.93 | S | Peak | 28.53 | -3.70 | 24.83 | 46.00 | -21.17 |
| 755.56 | S | Peak | 28.04 | -2.69 | 25.35 | 46.00 | -20.65 |
| 802.12 | S | Peak | 27.65 | -2.26 | 25.39 | 46.00 | -20.61 |
| 4824.00 | H | Average | 24.60 | 6.89 | 31.49 | 54.00 | -22.51 |
| 4824.00 | H | Peak | 36.38 | 6.89 | 43.27 | 74.00 | -30.73 |
| 7236.00 | H | --- | | | | | |
| 9648.00 | H | --- | | | | | |
| 12060.00 | H | --- | | | | | |
| 14472.00 | H | --- | | | | | |
| 16884.00 | H | --- | | | | | |
| 19296.00 | H | --- | | | | | |
| 21708.00 | H | --- | | | | | |
| 24120.00 | H | --- | | | | | |

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| | | | |
|---|---|---|---|
| Operation Band | :802.11 g | Test Date | :2014-05-06 |
| Fundamental Frequency | :2412 MHz | Temp./Humi. | :22deg_C/57RH |
| Operation Mode | :TX LOW | Engineer | :Curry |
| EUT Pol. | :H Plane | Measurement Antenna Pol. | :HORIZONTAL |

Actual FS(dBμV / m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV / m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

Note : "F" : denotes Fundamental Frequency. ; "H" : denotes Harmonic Frequency.

"E" : denotes Band Edge Frequency. ; "S" : denotes Spurious Frequency.

"---" : denotes Noise Floor.

The trace on RE(radiation emission) plot is as colored blue, and the detection manner we've employed is peak detector.

| Freq. | Note | Detector Mode | Spectrum Reading Level | Factor | Actual FS | Limit @3m | Margin |
|---|---|---|---|---|---|---|---|
| MHz | F/H/E/S | PK/QP/AV | dBμV | dB | dBμV / m | dBμV / m | dB |
| 590.66 | S | Peak | 28.42 | -5.14 | 23.28 | 46.00 | -22.72 |
| 597.45 | S | Peak | 28.85 | -5.40 | 23.45 | 46.00 | -22.55 |
| 644.98 | S | Peak | 28.54 | -4.83 | 23.71 | 46.00 | -22.29 |
| 725.49 | S | Peak | 28.74 | -4.00 | 24.74 | 46.00 | -21.26 |
| 768.17 | S | Peak | 28.16 | -2.81 | 25.35 | 46.00 | -20.65 |
| 782.72 | S | Peak | 28.84 | -2.72 | 26.12 | 46.00 | -19.88 |
| 4824.00 | H | Average | 24.77 | 6.89 | 31.66 | 54.00 | -22.34 |
| 4824.00 | H | Peak | 37.49 | 6.89 | 44.38 | 74.00 | -29.62 |
| 7236.00 | H | --- | | | | | |
| 9648.00 | H | --- | | | | | |
| 12060.00 | H | --- | | | | | |
| 14472.00 | H | --- | | | | | |
| 16884.00 | H | --- | | | | | |
| 19296.00 | H | --- | | | | | |
| 21708.00 | H | --- | | | | | |
| 24120.00 | H | --- | | | | | |

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| | | | |
|---|---|---|---|
| Operation Band | :802.11 g | Test Date | :2014-05-06 |
| Fundamental Frequency | :2437 MHz | Temp./Humi. | :22deg_C/57RH |
| Operation Mode | :TX MID | Engineer | :Curry |
| EUT Pol. | :H Plane | Measurement Antenna Pol. | :VERTICAL |

Actual FS(dBμV / m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV / m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

Note : "F" : denotes Fundamental Frequency. ; "H" : denotes Harmonic Frequency.

"E" : denotes Band Edge Frequency. ; "S" : denotes Spurious Frequency.

"---" : denotes Noise Floor.

The trace on RE(radiation emission) plot is as colored blue, and the detection manner we've employed is peak detector.

| Freq. | Note | Detector Mode | Spectrum Reading Level | Factor | Actual FS | Limit @3m | Margin |
|---|---|---|---|---|---|---|---|
| MHz | F/H/E/S | PK/QP/AV | dBμV | dB | dBμV / m | dBμV / m | dB |
| 482.99 | S | Peak | 28.12 | -7.73 | 20.39 | 46.00 | -25.61 |
| 526.64 | S | Peak | 28.84 | -7.50 | 21.34 | 46.00 | -24.66 |
| 580.96 | S | Peak | 28.04 | -5.21 | 22.83 | 46.00 | -23.17 |
| 643.04 | S | Peak | 28.49 | -4.91 | 23.58 | 46.00 | -22.42 |
| 681.84 | S | Peak | 28.23 | -3.66 | 24.57 | 46.00 | -21.43 |
| 741.98 | S | Peak | 28.15 | -3.05 | 25.10 | 46.00 | -20.90 |
| 4874.00 | H | Average | 24.68 | 6.96 | 31.64 | 54.00 | -22.36 |
| 4874.00 | H | Peak | 37.93 | 6.96 | 44.89 | 74.00 | -29.11 |
| 7311.00 | H | --- | | | | | |
| 9748.00 | H | --- | | | | | |
| 12185.00 | H | --- | | | | | |
| 14622.00 | H | --- | | | | | |
| 17059.00 | H | --- | | | | | |
| 19496.00 | H | --- | | | | | |
| 21933.00 | H | --- | | | | | |
| 24370.00 | H | --- | | | | | |

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| | | | |
|---|---|---|---|
| Operation Band | :802.11 g | Test Date | :2014-05-06 |
| Fundamental Frequency | :2437 MHz | Temp./Humi. | :22deg_C/57RH |
| Operation Mode | :TX MID | Engineer | :Curry |
| EUT Pol. | :H Plane | Measurement Antenna Pol. | :HORIZONTAL |

Actual FS(dBμV / m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV / m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

Note : "F" : denotes Fundamental Frequency. ; "H" : denotes Harmonic Frequency.

"E" : denotes Band Edge Frequency. ; "S" : denotes Spurious Frequency.

"---" : denotes Noise Floor.

The trace on RE(radiation emission) plot is as colored blue, and the detection manner we've employed is peak detector.

| Freq. | Note | Detector Mode | Spectrum Reading Level | Factor | Actual FS | Limit @3m | Margin |
|---|---|---|---|---|---|---|---|
| MHz | F/H/E/S | PK/QP/AV | dBμV | dB | dBμV / m | dBμV / m | dB |
| 508.21 | S | Peak | 28.10 | -7.46 | 20.64 | 46.00 | -25.36 |
| 564.47 | S | Peak | 29.07 | -6.34 | 22.73 | 46.00 | -23.27 |
| 633.34 | S | Peak | 29.44 | -5.42 | 24.02 | 46.00 | -21.98 |
| 689.60 | S | Peak | 28.23 | -3.70 | 24.53 | 46.00 | -21.47 |
| 727.43 | S | Peak | 28.76 | -3.91 | 24.85 | 46.00 | -21.15 |
| 769.14 | S | Peak | 28.70 | -2.83 | 25.87 | 46.00 | -20.13 |
| 4874.00 | H | Average | 24.77 | 6.96 | 31.73 | 54.00 | -22.27 |
| 4874.00 | H | Peak | 37.27 | 6.96 | 44.23 | 74.00 | -29.77 |
| 7311.00 | H | --- | | | | | |
| 9748.00 | H | --- | | | | | |
| 12185.00 | H | --- | | | | | |
| 14622.00 | H | --- | | | | | |
| 17059.00 | H | --- | | | | | |
| 19496.00 | H | --- | | | | | |
| 21933.00 | H | --- | | | | | |
| 24370.00 | H | --- | | | | | |

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| | | | |
|---|---|---|---|
| Operation Band | :802.11 g | Test Date | :2014-05-06 |
| Fundamental Frequency | :2462 MHz | Temp./Humi. | :22deg_C/57RH |
| Operation Mode | :TX HIGH | Engineer | :Curry |
| EUT Pol. | :H Plane | Measurement Antenna Pol. | :VERTICAL |

Actual FS(dBμV / m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV / m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

Note : "F" : denotes Fundamental Frequency. ; "H" : denotes Harmonic Frequency.

"E" : denotes Band Edge Frequency. ; "S" : denotes Spurious Frequency.

"---" : denotes Noise Floor.

The trace on RE(radiation emission) plot is as colored blue, and the detection manner we've employed is peak detector.

| Freq. | Note | Detector Mode | Spectrum Reading Level | Factor | Actual FS | Limit @3m | Margin |
|---|---|---|---|---|---|---|---|
| MHz | F/H/E/S | PK/QP/AV | dBμV | dB | dBμV / m | dBμV / m | dB |
| 482.02 | S | Peak | 29.44 | -7.74 | 21.70 | 46.00 | -24.30 |
| 571.26 | S | Peak | 28.13 | -5.82 | 22.31 | 46.00 | -23.69 |
| 590.66 | S | Peak | 28.65 | -5.14 | 23.51 | 46.00 | -22.49 |
| 640.13 | S | Peak | 28.56 | -5.03 | 23.53 | 46.00 | -22.47 |
| 686.69 | S | Peak | 28.62 | -3.69 | 24.93 | 46.00 | -21.07 |
| 770.11 | S | Peak | 28.96 | -2.85 | 26.11 | 46.00 | -19.89 |
| 4924.00 | H | Average | 24.00 | 7.01 | 31.01 | 54.00 | -22.99 |
| 4924.00 | H | Peak | 36.59 | 7.01 | 43.60 | 74.00 | -30.40 |
| 7386.00 | H | --- | | | | | |
| 9848.00 | H | --- | | | | | |
| 12310.00 | H | --- | | | | | |
| 14772.00 | H | --- | | | | | |
| 17234.00 | H | --- | | | | | |
| 19696.00 | H | --- | | | | | |
| 22158.00 | H | --- | | | | | |
| 24620.00 | H | --- | | | | | |

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| | | | |
|---|---|---|---|
| Operation Band | :802.11 g | Test Date | :2014-05-06 |
| Fundamental Frequency | :2462 MHz | Temp./Humi. | :22deg_C/57RH |
| Operation Mode | :TX HIGH | Engineer | :Curry |
| EUT Pol. | :H Plane | Measurement Antenna Pol. | :HORIZONTAL |

Actual FS(dBμV / m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV / m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

Note : "F" : denotes Fundamental Frequency. ; "H" : denotes Harmonic Frequency.

"E" : denotes Band Edge Frequency. ; "S" : denotes Spurious Frequency.

"---" : denotes Noise Floor.

The trace on RE(radiation emission) plot is as colored blue, and the detection manner we've employed is peak detector.

| Freq. | Note | Detector Mode | Spectrum Reading Level | Factor | Actual FS | Limit @3m | Margin |
|---|---|---|---|---|---|---|---|
| MHz | F/H/E/S | PK/QP/AV | dBμV | dB | dBμV / m | dBμV / m | dB |
| 576.11 | S | Peak | 27.87 | -5.49 | 22.38 | 46.00 | -23.62 |
| 592.60 | S | Peak | 27.92 | -5.21 | 22.71 | 46.00 | -23.29 |
| 639.16 | S | Peak | 28.10 | -5.08 | 23.02 | 46.00 | -22.98 |
| 674.08 | S | Peak | 28.16 | -3.87 | 24.29 | 46.00 | -21.71 |
| 688.63 | S | Peak | 28.05 | -3.70 | 24.35 | 46.00 | -21.65 |
| 742.95 | S | Peak | 28.67 | -3.00 | 25.67 | 46.00 | -20.33 |
| 4924.00 | H | Average | 24.03 | 7.01 | 31.04 | 54.00 | -22.96 |
| 4924.00 | H | Peak | 37.03 | 7.01 | 44.04 | 74.00 | -29.96 |
| 7386.00 | H | --- | | | | | |
| 9848.00 | H | --- | | | | | |
| 12310.00 | H | --- | | | | | |
| 14772.00 | H | --- | | | | | |
| 17234.00 | H | --- | | | | | |
| 19696.00 | H | --- | | | | | |
| 22158.00 | H | --- | | | | | |
| 24620.00 | H | --- | | | | | |

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## Radiated Spurious Emission Measurement Result (802.11n_20M)

| | | | |
|---|---|---|---|
| Operation Band | :802.11 n20M | Test Date | :2014-05-06 |
| Fundamental Frequency | :2412 MHz | Temp./Humi. | :22deg_C/57RH |
| Operation Mode | :TX LOW | Engineer | :Curry |
| EUT Pol. | :H Plane | Measurement Antenna Pol. | :VERTICAL |

Actual FS(dBμV / m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV / m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

Note : "F" : denotes Fundamental Frequency. ; "H" : denotes Harmonic Frequency.

"E" : denotes Band Edge Frequency. ; "S" : denotes Spurious Frequency.

"---" : denotes Noise Floor.

| Freq. MHz | Note F/H/E/S | Detector Mode PK/QP/AV | Spectrum Reading Level dBμV | Factor dB | Actual FS dBμV / m | Limit @3m dBμV / m | Margin dB |
|---|---|---|---|---|---|---|---|
| 544.10 | S | Peak | 28.89 | -7.53 | 21.36 | 46.00 | -24.64 |
| 578.05 | S | Peak | 27.34 | -5.36 | 21.98 | 46.00 | -24.02 |
| 604.24 | S | Peak | 28.25 | -5.67 | 22.58 | 46.00 | -23.42 |
| 669.23 | S | Peak | 28.30 | -4.05 | 24.25 | 46.00 | -21.75 |
| 726.46 | S | Peak | 28.63 | -3.96 | 24.67 | 46.00 | -21.33 |
| 761.38 | S | Peak | 27.69 | -2.71 | 24.98 | 46.00 | -21.02 |
| 4824.00 | H | Average | 31.52 | 6.89 | 38.41 | 54.00 | -15.59 |
| 4824.00 | H | Peak | 39.83 | 6.89 | 46.72 | 74.00 | -27.28 |
| 7236.00 | H | --- | | | | | |
| 9648.00 | H | --- | | | | | |
| 12060.00 | H | --- | | | | | |
| 14472.00 | H | --- | | | | | |
| 16884.00 | H | --- | | | | | |
| 19296.00 | H | --- | | | | | |
| 21708.00 | H | --- | | | | | |
| 24120.00 | H | --- | | | | | |

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| | | | |
|---|---|---|---|
| Operation Band | :802.11 n20M | Test Date | :2014-05-06 |
| Fundamental Frequency | :2412 MHz | Temp./Humi. | :22deg_C/57RH |
| Operation Mode | :TX LOW | Engineer | :Curry |
| EUT Pol. | :H Plane | Measurement Antenna Pol. | :HORIZONTAL |

Actual FS(dBμV / m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV / m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

Note : "F" : denotes Fundamental Frequency. ; "H" : denotes Harmonic Frequency.

"E" : denotes Band Edge Frequency. ; "S" : denotes Spurious Frequency.

"---" : denotes Noise Floor.

| Freq. MHz | Note F/H/E/S | Detector Mode PK/QP/AV | Spectrum Reading Level dBμV | Factor dB | Actual FS dBμV / m | Limit @3m dBμV / m | Margin dB |
|---|---|---|---|---|---|---|---|
| 524.70 | S | Peak | 28.47 | -7.49 | 20.98 | 46.00 | -25.02 |
| 594.54 | S | Peak | 28.25 | -5.29 | 22.96 | 46.00 | -23.04 |
| 655.65 | S | Peak | 28.22 | -4.45 | 23.77 | 46.00 | -22.23 |
| 680.87 | S | Peak | 27.88 | -3.66 | 24.22 | 46.00 | -21.78 |
| 735.19 | S | Peak | 28.02 | -3.45 | 24.57 | 46.00 | -21.43 |
| 749.74 | S | Peak | 28.05 | -2.69 | 25.36 | 46.00 | -20.64 |
| 4824.00 | H | Average | 25.83 | 6.89 | 32.72 | 54.00 | -21.28 |
| 4824.00 | H | Peak | 37.83 | 6.89 | 44.72 | 74.00 | -29.28 |
| 7236.00 | H | --- | | | | | |
| 9648.00 | H | --- | | | | | |
| 12060.00 | H | --- | | | | | |
| 14472.00 | H | --- | | | | | |
| 16884.00 | H | --- | | | | | |
| 19296.00 | H | --- | | | | | |
| 21708.00 | H | --- | | | | | |
| 24120.00 | H | --- | | | | | |

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| | | | |
|---|---|---|---|
| Operation Band | :802.11 n20M | Test Date | :2014-05-06 |
| Fundamental Frequency | :2437 MHz | Temp./Humi. | :22deg_C/57RH |
| Operation Mode | :TX MID | Engineer | :Curry |
| EUT Pol. | :H Plane | Measurement Antenna Pol. | :VERTICAL |

Actual FS(dBμV / m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV / m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

Note : "F" : denotes Fundamental Frequency. ; "H" : denotes Harmonic Frequency.

"E" : denotes Band Edge Frequency. ; "S" : denotes Spurious Frequency.

"---" : denotes Noise Floor.

| Freq. MHz | Note F/H/E/S | Detector Mode PK/QP/AV | Spectrum Reading Level dBμV | Factor dB | Actual FS dBμV / m | Limit @3m dBμV / m | Margin dB |
|---|---|---|---|---|---|---|---|
| 460.68 | S | Peak | 29.83 | -8.09 | 21.74 | 46.00 | -24.26 |
| 581.93 | S | Peak | 28.10 | -5.21 | 22.89 | 46.00 | -23.11 |
| 664.38 | S | Peak | 28.00 | -4.19 | 23.81 | 46.00 | -22.19 |
| 689.60 | S | Peak | 28.14 | -3.70 | 24.44 | 46.00 | -21.56 |
| 738.10 | S | Peak | 27.85 | -3.26 | 24.59 | 46.00 | -21.41 |
| 768.17 | S | Peak | 28.76 | -2.81 | 25.95 | 46.00 | -20.05 |
| 4874.00 | H | Average | 28.38 | 6.96 | 35.34 | 54.00 | -18.66 |
| 4874.00 | H | Peak | 37.44 | 6.96 | 44.40 | 74.00 | -29.60 |
| 7311.00 | H | --- | | | | | |
| 9748.00 | H | --- | | | | | |
| 12185.00 | H | --- | | | | | |
| 14622.00 | H | --- | | | | | |
| 17059.00 | H | --- | | | | | |
| 19496.00 | H | --- | | | | | |
| 21933.00 | H | --- | | | | | |
| 24370.00 | H | --- | | | | | |

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| | | | |
|---|---|---|---|
| Operation Band | :802.11 n20M | Test Date | :2014-05-06 |
| Fundamental Frequency | :2437 MHz | Temp./Humi. | :22deg_C/57RH |
| Operation Mode | :TX MID | Engineer | :Curry |
| EUT Pol. | :H Plane | Measurement Antenna Pol. | :HORIZONTAL |

Actual FS(dBμV / m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV / m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

Note : "F" : denotes Fundamental Frequency. ; "H" : denotes Harmonic Frequency.

"E" : denotes Band Edge Frequency. ; "S" : denotes Spurious Frequency.

"---" : denotes Noise Floor.

| Freq. MHz | Note F/H/E/S | Detector Mode PK/QP/AV | Spectrum Reading Level dBμV | Factor dB | Actual FS dBμV / m | Limit @3m dBμV / m | Margin dB |
|---|---|---|---|---|---|---|---|
| 470.38 | S | Peak | 28.33 | -7.87 | 20.46 | 46.00 | -25.54 |
| 522.76 | S | Peak | 28.94 | -7.46 | 21.48 | 46.00 | -24.52 |
| 587.75 | S | Peak | 27.95 | -5.13 | 22.82 | 46.00 | -23.18 |
| 651.77 | S | Peak | 27.92 | -4.57 | 23.35 | 46.00 | -22.65 |
| 687.66 | S | Peak | 27.38 | -3.69 | 23.69 | 46.00 | -22.31 |
| 745.86 | S | Peak | 28.45 | -2.87 | 25.58 | 46.00 | -20.42 |
| 4874.00 | H | Average | 28.65 | 6.96 | 35.61 | 54.00 | -18.39 |
| 4874.00 | H | Peak | 37.70 | 6.96 | 44.66 | 74.00 | -29.34 |
| 7311.00 | H | --- | | | | | |
| 9748.00 | H | --- | | | | | |
| 12185.00 | H | --- | | | | | |
| 14622.00 | H | --- | | | | | |
| 17059.00 | H | --- | | | | | |
| 19496.00 | H | --- | | | | | |
| 21933.00 | H | --- | | | | | |
| 24370.00 | H | --- | | | | | |

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| | | | |
|---|---|---|---|
| Operation Band | :802.11 n20M | Test Date | :2014-05-06 |
| Fundamental Frequency | :2462 MHz | Temp./Humi. | :22deg_C/57RH |
| Operation Mode | :TX HIGH | Engineer | :Curry |
| EUT Pol. | :H Plane | Measurement Antenna Pol. | :VERTICAL |

Actual FS(dBμV / m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV / m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

Note : "F" : denotes Fundamental Frequency. ; "H" : denotes Harmonic Frequency.

"E" : denotes Band Edge Frequency. ; "S" : denotes Spurious Frequency.

"---" : denotes Noise Floor.

| Freq. MHz | Note F/H/E/S | Detector Mode PK/QP/AV | Spectrum Reading Level dBμV | Factor dB | Actual FS dBμV / m | Limit @3m dBμV / m | Margin dB |
|---|---|---|---|---|---|---|---|
| 557.68 | S | Peak | 28.49 | -6.84 | 21.65 | 46.00 | -24.35 |
| 587.75 | S | Peak | 28.45 | -5.13 | 23.32 | 46.00 | -22.68 |
| 642.07 | S | Peak | 28.94 | -4.95 | 23.99 | 46.00 | -22.01 |
| 747.80 | S | Peak | 27.79 | -2.79 | 25.00 | 46.00 | -21.00 |
| 769.14 | S | Peak | 28.63 | -2.83 | 25.80 | 46.00 | -20.20 |
| 778.84 | S | Peak | 29.27 | -2.80 | 26.47 | 46.00 | -19.53 |
| 4924.00 | H | Average | 30.27 | 7.01 | 37.28 | 54.00 | -16.72 |
| 4924.00 | H | Peak | 37.53 | 7.01 | 44.54 | 74.00 | -29.46 |
| 7386.00 | H | --- | | | | | |
| 9848.00 | H | --- | | | | | |
| 12310.00 | H | --- | | | | | |
| 14772.00 | H | --- | | | | | |
| 17234.00 | H | --- | | | | | |
| 19696.00 | H | --- | | | | | |
| 22158.00 | H | --- | | | | | |
| 24620.00 | H | --- | | | | | |

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| | | | |
|---|---|---|---|
| Operation Band | :802.11 n20M | Test Date | :2014-05-06 |
| Fundamental Frequency | :2462 MHz | Temp./Humi. | :22deg_C/57RH |
| Operation Mode | :TX HIGH | Engineer | :Curry |
| EUT Pol. | :H Plane | Measurement Antenna Pol. | :HORIZONTAL |

Actual FS(dBμV / m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV / m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

Note : "F" : denotes Fundamental Frequency. ; "H" : denotes Harmonic Frequency.

"E" : denotes Band Edge Frequency. ; "S" : denotes Spurious Frequency.

"---" : denotes Noise Floor.

| Freq. | Note | Detector Mode | Spectrum Reading Level | Factor | Actual FS | Limit @3m | Margin |
|---|---|---|---|---|---|---|---|
| MHz | F/H/E/S | PK/QP/AV | dBμV | dB | dBμV / m | dBμV / m | dB |
| 510.15 | S | Peak | 28.67 | -7.44 | 21.23 | 46.00 | -24.77 |
| 558.65 | S | Peak | 28.63 | -6.78 | 21.85 | 46.00 | -24.15 |
| 598.42 | S | Peak | 27.87 | -5.44 | 22.43 | 46.00 | -23.57 |
| 630.43 | S | Peak | 28.12 | -5.58 | 22.54 | 46.00 | -23.46 |
| 685.72 | S | Peak | 28.43 | -3.69 | 24.74 | 46.00 | -21.26 |
| 752.65 | S | Peak | 27.93 | -2.68 | 25.25 | 46.00 | -20.75 |
| 4924.00 | H | Average | 30.69 | 7.01 | 37.70 | 54.00 | -16.30 |
| 4924.00 | H | Peak | 38.42 | 7.01 | 45.43 | 74.00 | -28.57 |
| 7386.00 | H | --- | | | | | |
| 9848.00 | H | --- | | | | | |
| 12310.00 | H | --- | | | | | |
| 14772.00 | H | --- | | | | | |
| 17234.00 | H | --- | | | | | |
| 19696.00 | H | --- | | | | | |
| 22158.00 | H | --- | | | | | |
| 24620.00 | H | --- | | | | | |

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## Radiated Spurious Emission Measurement Result (802.11n_40M)

| | | | |
|---|---|---|---|
| Operation Band | :802.11 n40M | Test Date | :2014-05-06 |
| Fundamental Frequency | :2422 MHz | Temp./Humi. | :22deg_C/57RH |
| Operation Mode | :TX LOW | Engineer | :Curry |
| EUT Pol. | :H Plane | Measurement Antenna Pol. | :VERTICAL |

Actual FS(dBμV / m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV / m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

Note : "F" : denotes Fundamental Frequency. ; "H" : denotes Harmonic Frequency.

"E" : denotes Band Edge Frequency. ; "S" : denotes Spurious Frequency.

"---" : denotes Noise Floor.

| Freq. MHz | Note F/H/E/S | Detector Mode PK/QP/AV | Spectrum Reading Level dBμV | Factor dB | Actual FS dBμV / m | Limit @3m dBμV / m | Margin dB |
|---|---|---|---|---|---|---|---|
| 509.18 | S | Peak | 28.30 | -7.45 | 20.85 | 46.00 | -25.15 |
| 570.29 | S | Peak | 28.60 | -5.87 | 22.73 | 46.00 | -23.27 |
| 640.13 | S | Peak | 28.92 | -5.03 | 23.89 | 46.00 | -22.11 |
| 669.23 | S | Peak | 28.65 | -4.05 | 24.60 | 46.00 | -21.40 |
| 768.17 | S | Peak | 28.11 | -2.81 | 25.30 | 46.00 | -20.70 |
| 797.27 | S | Peak | 28.80 | -2.35 | 26.45 | 46.00 | -19.55 |
| 4844.00 | H | Average | 27.41 | 6.95 | 34.36 | 54.00 | -19.64 |
| 4844.00 | H | Peak | 37.46 | 6.95 | 44.41 | 74.00 | -29.59 |
| 7266.00 | H | --- | | | | | |
| 9688.00 | H | --- | | | | | |
| 12110.00 | H | --- | | | | | |
| 14532.00 | H | --- | | | | | |
| 16954.00 | H | --- | | | | | |
| 19376.00 | H | --- | | | | | |
| 21798.00 | H | --- | | | | | |
| 24220.00 | H | --- | | | | | |

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| | | | |
|---|---|---|---|
| Operation Band | :802.11 n40M | Test Date | :2014-05-06 |
| Fundamental Frequency | :2422 MHz | Temp./Humi. | :22deg_C/57RH |
| Operation Mode | :TX LOW | Engineer | :Curry |
| EUT Pol. | :H Plane | Measurement Antenna Pol. | :HORIZONTAL |

Actual FS(dBμV / m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV / m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

Note : "F" : denotes Fundamental Frequency. ; "H" : denotes Harmonic Frequency.

"E" : denotes Band Edge Frequency. ; "S" : denotes Spurious Frequency.

"---" : denotes Noise Floor.

| Freq. | Note | Detector Mode | Spectrum Reading Level | Factor | Actual FS | Limit @3m | Margin |
|---|---|---|---|---|---|---|---|
| MHz | F/H/E/S | PK/QP/AV | dBμV | dB | dBμV / m | dBμV / m | dB |
| 504.33 | S | Peak | 28.52 | -7.49 | 21.03 | 46.00 | -24.97 |
| 557.68 | S | Peak | 28.81 | -6.84 | 21.97 | 46.00 | -24.03 |
| 580.96 | S | Peak | 28.18 | -5.21 | 22.97 | 46.00 | -23.03 |
| 679.90 | S | Peak | 27.62 | -3.67 | 23.95 | 46.00 | -22.05 |
| 740.04 | S | Peak | 28.65 | -3.13 | 25.52 | 46.00 | -20.48 |
| 791.45 | S | Peak | 28.34 | -2.47 | 25.87 | 46.00 | -20.13 |
| 4844.00 | H | Average | 27.52 | 6.95 | 34.47 | 54.00 | -19.53 |
| 4844.00 | H | Peak | 38.67 | 6.95 | 45.62 | 74.00 | -28.38 |
| 7266.00 | H | --- | | | | | |
| 9688.00 | H | --- | | | | | |
| 12110.00 | H | --- | | | | | |
| 14532.00 | H | --- | | | | | |
| 16954.00 | H | --- | | | | | |
| 19376.00 | H | --- | | | | | |
| 21798.00 | H | --- | | | | | |
| 24220.00 | H | --- | | | | | |

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| | | | |
|---|---|---|---|
| Operation Band | :802.11 n40M | Test Date | :2014-05-06 |
| Fundamental Frequency | :2437 MHz | Temp./Humi. | :22deg_C/57RH |
| Operation Mode | :TX MID | Engineer | :Curry |
| EUT Pol. | :H Plane | Measurement Antenna Pol. | :VERTICAL |

Actual FS(dBμV / m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV / m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

Note : "F" : denotes Fundamental Frequency. ; "H" : denotes Harmonic Frequency.

"E" : denotes Band Edge Frequency. ; "S" : denotes Spurious Frequency.

"---" : denotes Noise Floor.

| Freq. MHz | Note F/H/E/S | Detector Mode PK/QP/AV | Spectrum Reading Level dBμV | Factor dB | Actual FS dBμV / m | Limit @3m dBμV / m | Margin dB |
|---|---|---|---|---|---|---|---|
| 512.09 | S | Peak | 28.51 | -7.43 | 21.08 | 46.00 | -24.92 |
| 583.87 | S | Peak | 27.63 | -5.19 | 22.44 | 46.00 | -23.56 |
| 592.60 | S | Peak | 28.80 | -5.21 | 23.59 | 46.00 | -22.41 |
| 683.78 | S | Peak | 27.81 | -3.67 | 24.14 | 46.00 | -21.86 |
| 737.13 | S | Peak | 27.58 | -3.33 | 24.25 | 46.00 | -21.75 |
| 773.02 | S | Peak | 28.47 | -2.84 | 25.63 | 46.00 | -20.37 |
| 4874.00 | H | Average | 27.76 | 6.96 | 34.72 | 54.00 | -19.28 |
| 4874.00 | H | Peak | 37.25 | 6.96 | 44.21 | 74.00 | -29.79 |
| 7311.00 | H | --- | | | | | |
| 9748.00 | H | --- | | | | | |
| 12185.00 | H | --- | | | | | |
| 14622.00 | H | --- | | | | | |
| 17059.00 | H | --- | | | | | |
| 19496.00 | H | --- | | | | | |
| 21933.00 | H | --- | | | | | |
| 24370.00 | H | --- | | | | | |

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| | | | |
|---|---|---|---|
| Operation Band | :802.11 n40M | Test Date | :2014-05-06 |
| Fundamental Frequency | :2437 MHz | Temp./Humi. | :22deg_C/57RH |
| Operation Mode | :TX MID | Engineer | :Curry |
| EUT Pol. | :H Plane | Measurement Antenna Pol. | :HORIZONTAL |

Actual FS(dBμV / m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV / m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

Note : "F" : denotes Fundamental Frequency. ; "H" : denotes Harmonic Frequency.

"E" : denotes Band Edge Frequency. ; "S" : denotes Spurious Frequency.

"---" : denotes Noise Floor.

| Freq. MHz | Note F/H/E/S | Detector Mode PK/QP/AV | Spectrum Reading Level dBμV | Factor dB | Actual FS dBμV / m | Limit @3m dBμV / m | Margin dB |
|---|---|---|---|---|---|---|---|
| 636.25 | S | Peak | 27.79 | -5.24 | 22.55 | 46.00 | -23.45 |
| 654.68 | S | Peak | 27.69 | -4.47 | 23.22 | 46.00 | -22.78 |
| 687.66 | S | Peak | 28.07 | -3.69 | 24.38 | 46.00 | -21.62 |
| 754.59 | S | Peak | 27.28 | -2.68 | 24.60 | 46.00 | -21.40 |
| 766.23 | S | Peak | 27.85 | -2.79 | 25.06 | 46.00 | -20.94 |
| 797.27 | S | Peak | 27.69 | -2.35 | 25.34 | 46.00 | -20.66 |
| 4874.00 | H | Average | 28.32 | 6.96 | 35.28 | 54.00 | -18.72 |
| 4874.00 | H | Peak | 38.32 | 6.96 | 45.28 | 74.00 | -28.72 |
| 7311.00 | H | --- | | | | | |
| 9748.00 | H | --- | | | | | |
| 12185.00 | H | --- | | | | | |
| 14622.00 | H | --- | | | | | |
| 17059.00 | H | --- | | | | | |
| 19496.00 | H | --- | | | | | |
| 21933.00 | H | --- | | | | | |
| 24370.00 | H | --- | | | | | |

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| | | | |
|---|---|---|---|
| Operation Band | :802.11 n40M | Test Date | :2014-05-06 |
| Fundamental Frequency | :2452 MHz | Temp./Humi. | :22deg_C/57RH |
| Operation Mode | :TX HIGH | Engineer | :Curry |
| EUT Pol. | :H Plane | Measurement Antenna Pol. | :VERTICAL |

Actual FS(dBμV / m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV / m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

Note : "F" : denotes Fundamental Frequency. ; "H" : denotes Harmonic Frequency.

"E" : denotes Band Edge Frequency. ; "S" : denotes Spurious Frequency.

"---" : denotes Noise Floor.

| Freq. | Note | Detector Mode | Spectrum Reading Level | Factor | Actual FS | Limit @3m | Margin |
|---|---|---|---|---|---|---|---|
| MHz | F/H/E/S | PK/QP/AV | dBμV | dB | dBμV / m | dBμV / m | dB |
| 576.11 | S | Peak | 27.71 | -5.49 | 22.22 | 46.00 | -23.78 |
| 589.69 | S | Peak | 27.41 | -5.12 | 22.29 | 46.00 | -23.71 |
| 600.36 | S | Peak | 27.83 | -5.51 | 22.32 | 46.00 | -23.68 |
| 644.98 | S | Peak | 28.64 | -4.83 | 23.81 | 46.00 | -22.19 |
| 662.44 | S | Peak | 29.08 | -4.25 | 24.83 | 46.00 | -21.17 |
| 761.38 | S | Peak | 28.14 | -2.71 | 25.43 | 46.00 | -20.57 |
| 4904.00 | H | Average | 29.21 | 6.96 | 36.17 | 54.00 | -17.83 |
| 4904.00 | H | Peak | 37.76 | 6.96 | 44.72 | 74.00 | -29.28 |
| 7356.00 | H | --- | | | | | |
| 9808.00 | H | --- | | | | | |
| 12260.00 | H | --- | | | | | |
| 14712.00 | H | --- | | | | | |
| 17164.00 | H | --- | | | | | |
| 19616.00 | H | --- | | | | | |
| 22068.00 | H | --- | | | | | |
| 24520.00 | H | --- | | | | | |

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| | | | |
|---|---|---|---|
| Operation Band | :802.11 n40M | Test Date | :2014-05-06 |
| Fundamental Frequency | :2452 MHz | Temp./Humi. | :22deg_C/57RH |
| Operation Mode | :TX HIGH | Engineer | :Curry |
| EUT Pol. | :H Plane | Measurement Antenna Pol. | :HORIZONTAL |

Actual FS(dBμV / m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV / m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

Note : "F" : denotes Fundamental Frequency. ; "H" : denotes Harmonic Frequency.

"E" : denotes Band Edge Frequency. ; "S" : denotes Spurious Frequency.

"---" : denotes Noise Floor.

| Freq. MHz | Note F/H/E/S | Detector Mode PK/QP/AV | Spectrum Reading Level dBμV | Factor dB | Actual FS dBμV / m | Limit @3m dBμV / m | Margin dB |
|---|---|---|---|---|---|---|---|
| 601.33 | S | Peak | 28.66 | -5.56 | 23.10 | 46.00 | -22.90 |
| 659.53 | S | Peak | 27.62 | -4.33 | 23.29 | 46.00 | -22.71 |
| 686.69 | S | Peak | 28.20 | -3.69 | 24.51 | 46.00 | -21.49 |
| 734.22 | S | Peak | 28.25 | -3.52 | 24.73 | 46.00 | -21.27 |
| 761.38 | S | Peak | 28.46 | -2.71 | 25.75 | 46.00 | -20.25 |
| 773.02 | S | Peak | 28.68 | -2.84 | 25.84 | 46.00 | -20.16 |
| 4904.00 | H | Average | 29.23 | 6.96 | 36.19 | 54.00 | -17.81 |
| 4904.00 | H | Peak | 37.52 | 6.96 | 44.48 | 74.00 | -29.52 |
| 7356.00 | H | --- | | | | | |
| 9808.00 | H | --- | | | | | |
| 12260.00 | H | --- | | | | | |
| 14712.00 | H | --- | | | | | |
| 17164.00 | H | --- | | | | | |
| 19616.00 | H | --- | | | | | |
| 22068.00 | H | --- | | | | | |
| 24520.00 | H | --- | | | | | |

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# 11 PEAK POWER SPECTRAL DENSITY

## 11.1 Standard Applicable:

According to §15.247(e) For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8dBm in any 3 kHz band during any time interval of continuous transmission. This power spectral density shall be determined in accordance with the provisions of paragraph (b) of this section. The same method of determining the conducted output power shall be used to determine the power spectral density.

## 11.2 Measurement Equipment Used:

Refer to section 7.2 for details.

## 11.3 Test Set-up:

Refer to section 7.3 for details. (Spectrum Option)

## 11.4 Measurement Procedure (following the measurement procedure 10.2 of KDB558074):

1. Set analyzer center frequency to DTS channel center frequency.
2. Set the span to 1.5 times the DTS channel bandwidth.
3. Set the RBW ≥ 3 kHz.
4. Set the VBW ≥ 3 x RBW.
5. Detector = peak.
6. Sweep time = auto couple.
7. Trace mode = max hold.
8. Allow trace to fully stabilize.
9. Use the peak marker function to determine the maximum amplitude level.
10. If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

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## 11.5 Measurement Result:

### 802.11b

| Frequency MHz | RF Power Density Reading (dBm) | Maximum Limit (dBm) |
|---|---|---|
| 2412 | -17.28 | 8 |
| 2437 | -16.25 | 8 |
| 2462 | -15.06 | 8 |

### 802.11g

| Frequency MHz | RF Power Density Reading (dBm) | Maximum Limit (dBm) |
|---|---|---|
| 2412 | -21.74 | 8 |
| 2437 | -21.33 | 8 |
| 2462 | -21.51 | 8 |

### 802.11n_20M

| Frequency MHz | RF Power Density Reading (dBm) | Maximum Limit (dBm) |
|---|---|---|
| 2412 | -22.84 | 8 |
| 2437 | -21.49 | 8 |
| 2462 | -20.72 | 8 |

### 802.11n_40M

| Frequency MHz | RF Power Density Reading (dBm) | Maximum Limit (dBm) |
|---|---|---|
| 2422 | -25.21 | 8 |
| 2437 | -24.54 | 8 |
| 2452 | -22.76 | 8 |

** Note: Offset 11dB for 2.4G 802.11b/g/n_20/n_40*

**Refer to next page for plots*

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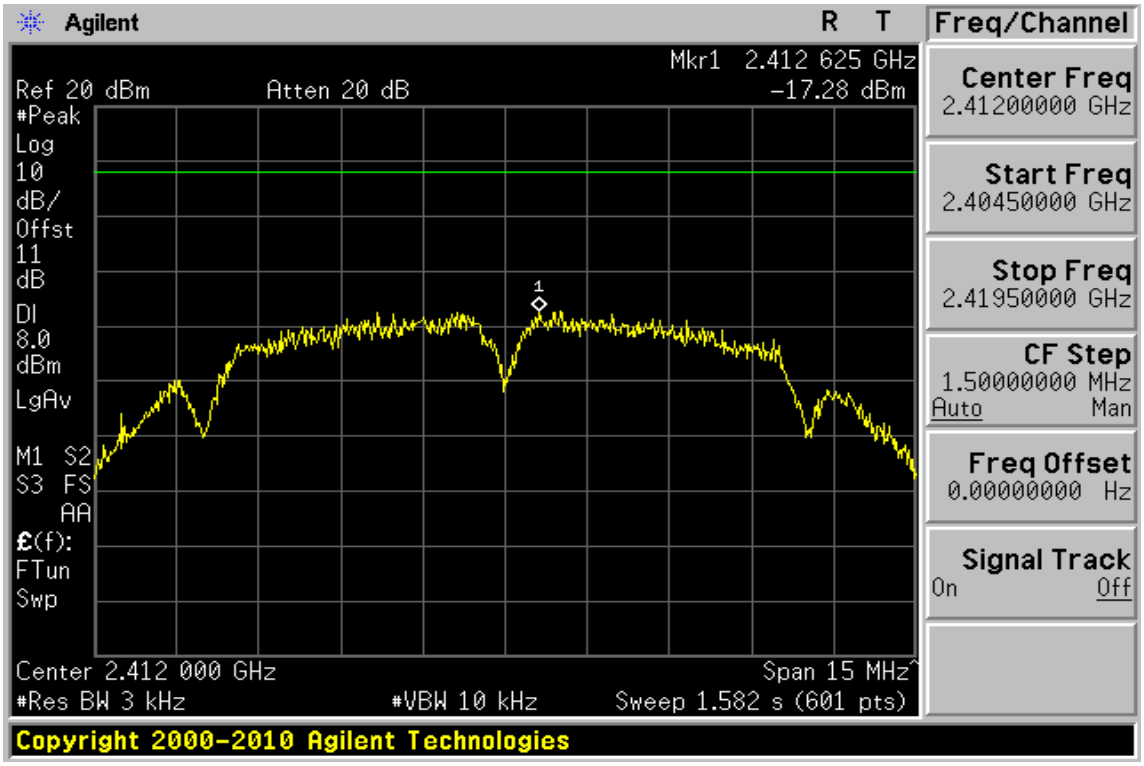
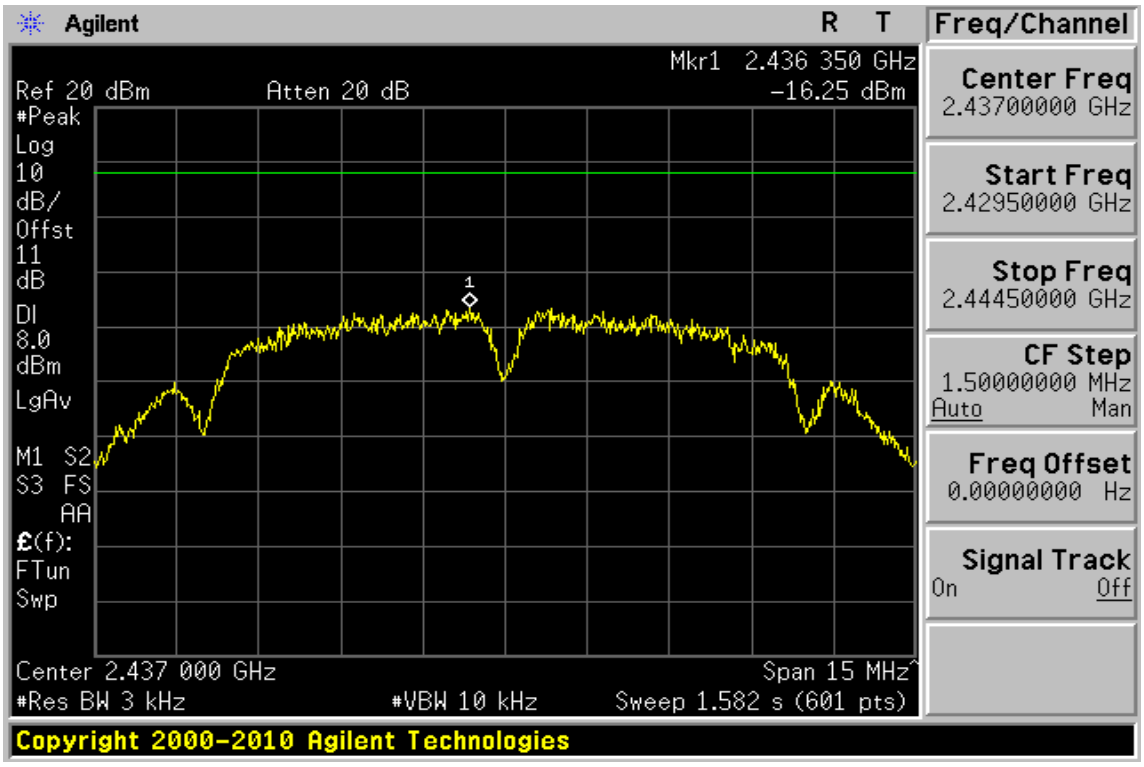
## 802.11b

## Power Spectral Density Test Plot (CH-Low)




## Power Spectral Density Test Plot (CH-Mid)

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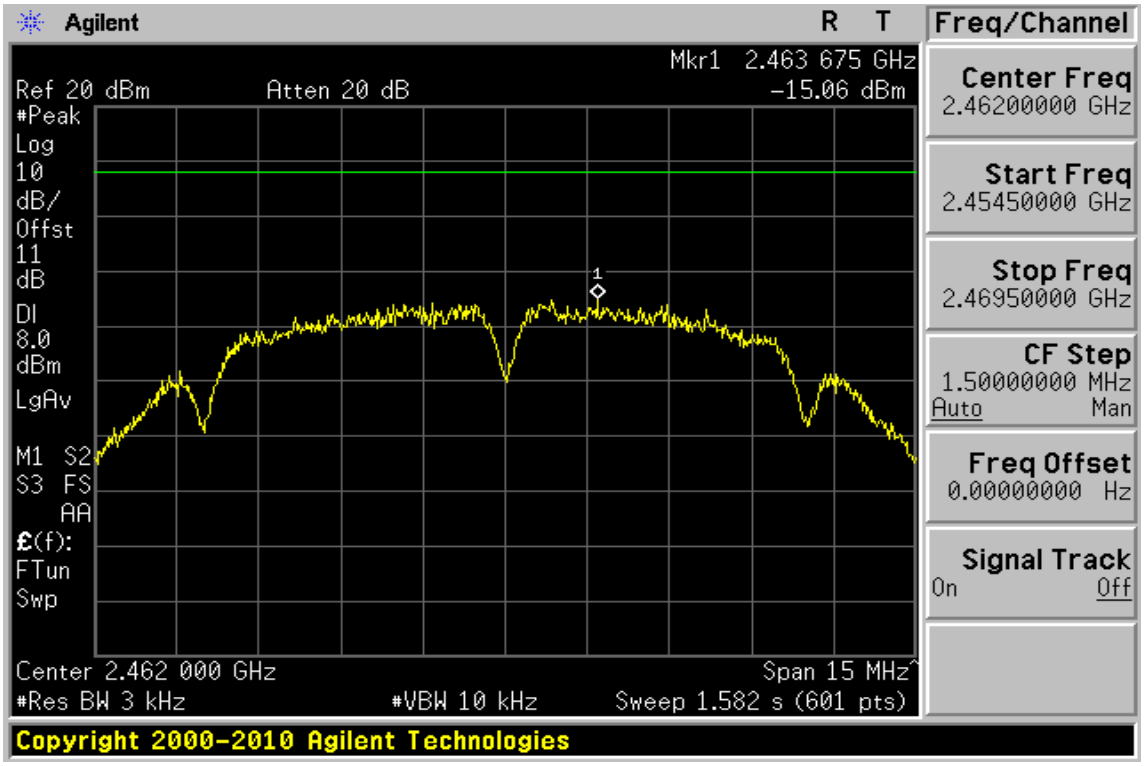
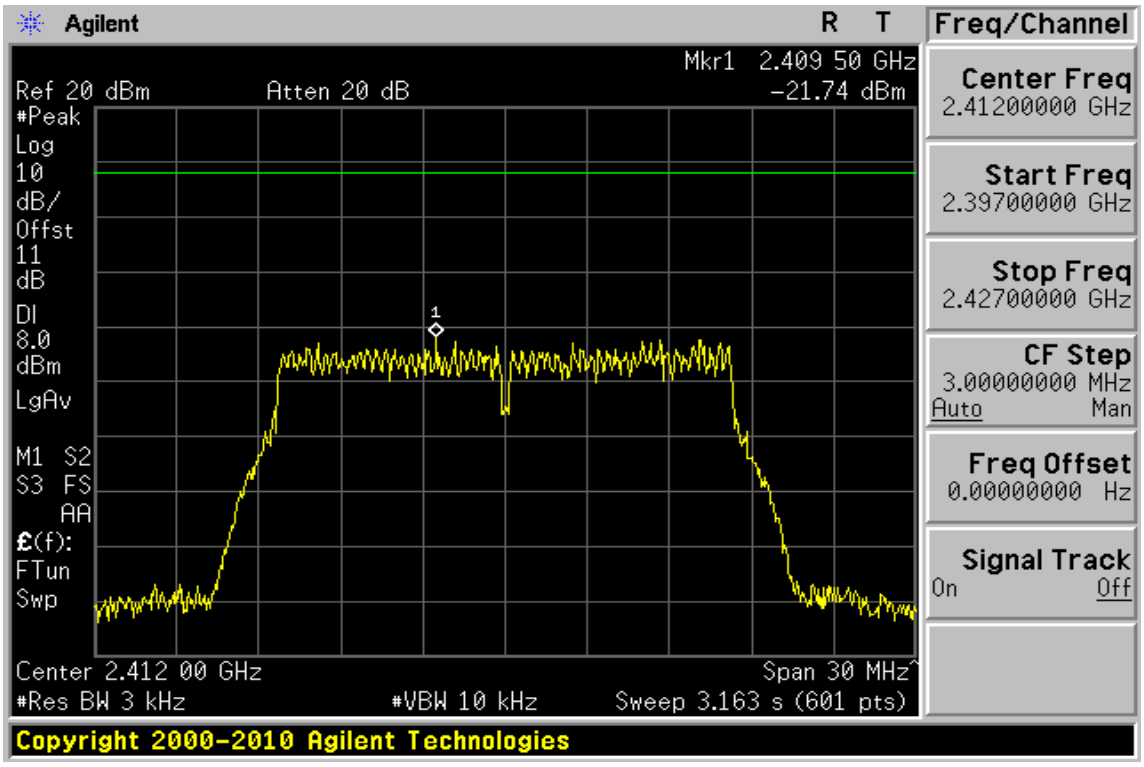
## Power Spectral Density Test Plot (CH-High)




## 802.11g

## Power Spectral Density Test Plot (CH-Low)

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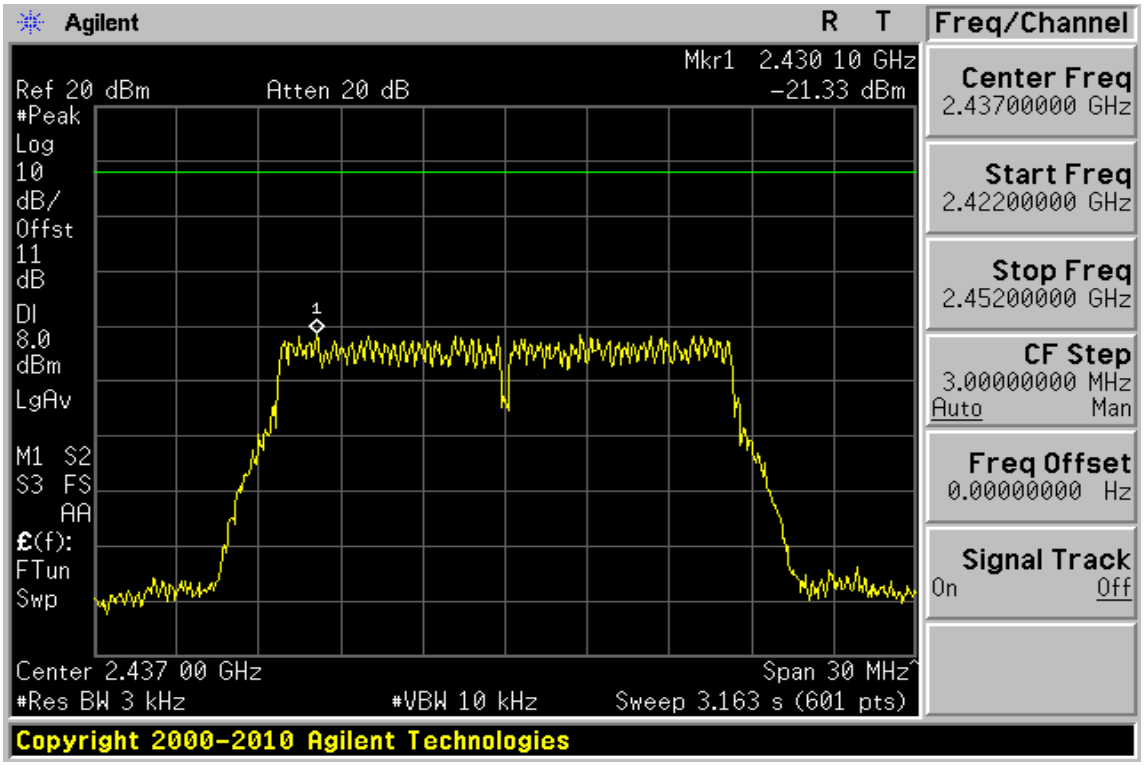
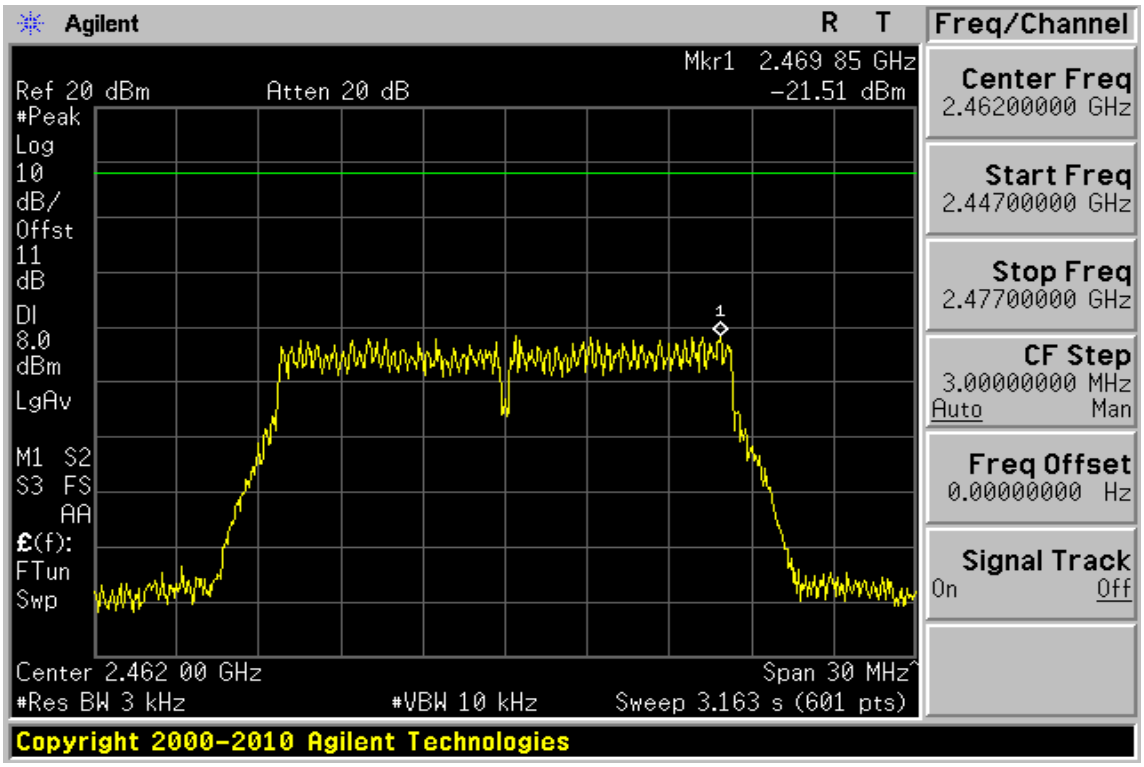
## Power Spectral Density Test Plot (CH-Mid)




## Power Spectral Density Test Plot (CH-High)

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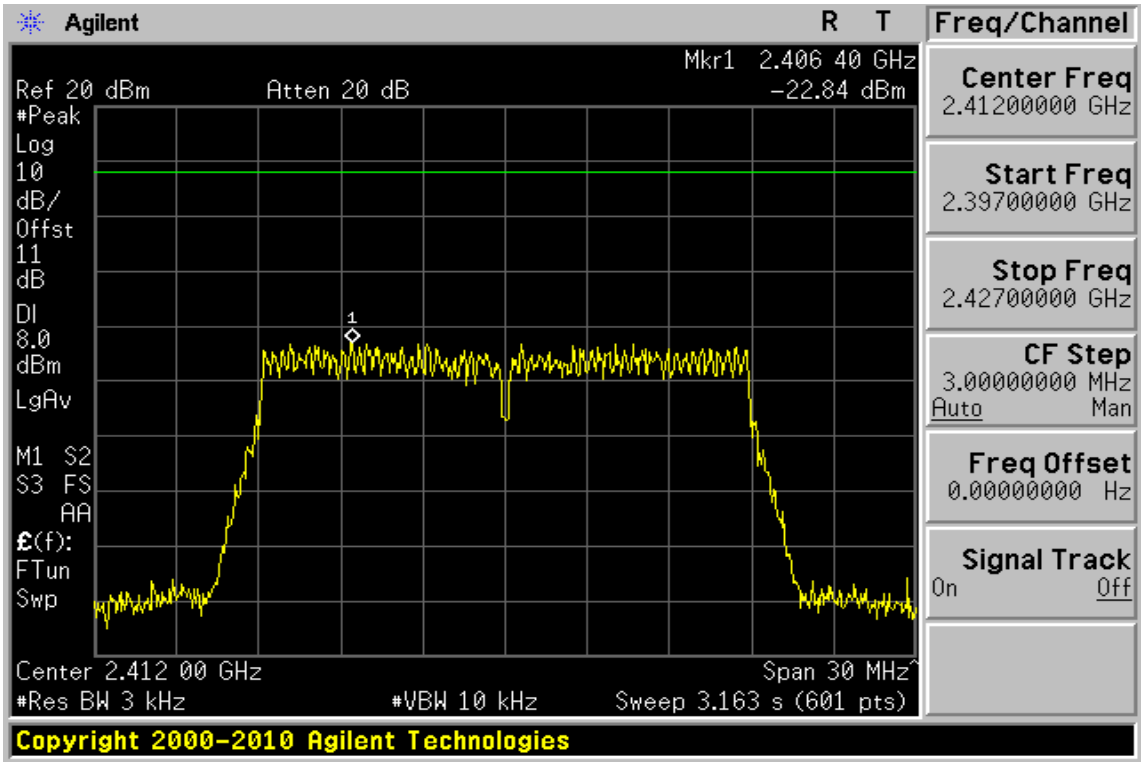
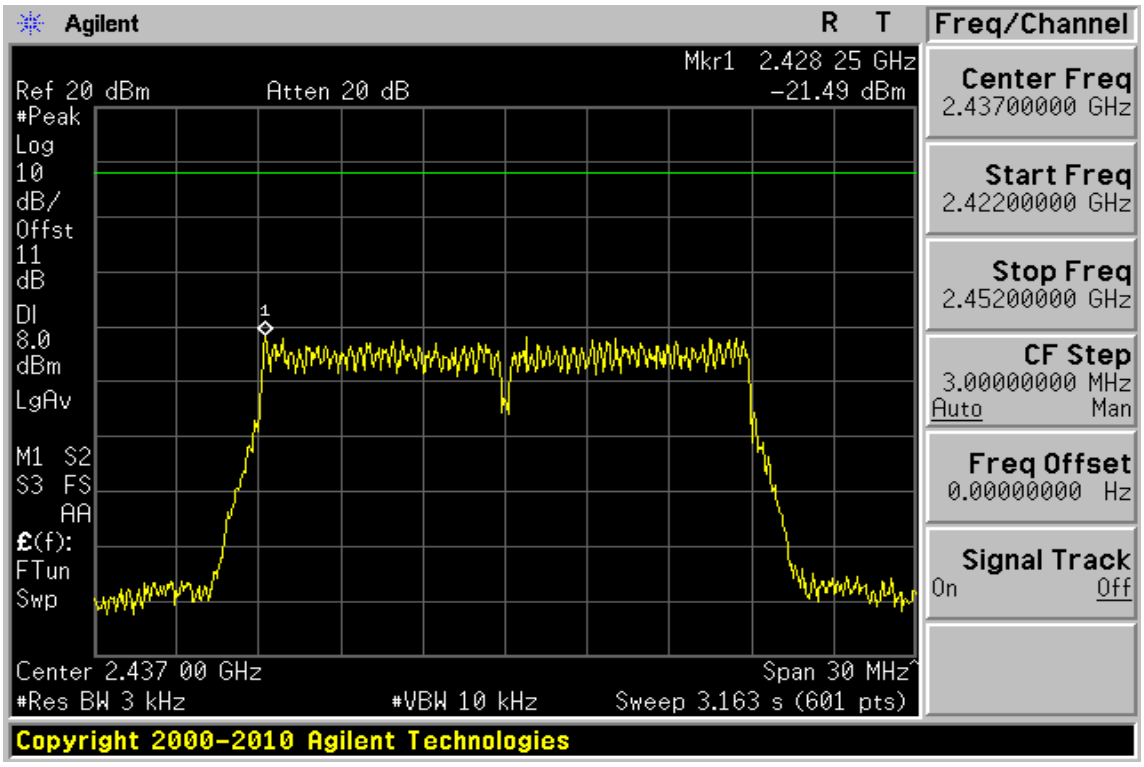
## 802.11n_20M

## Power Spectral Density Test Plot (CH-Low)




## Power Spectral Density Test Plot (CH-Mid)

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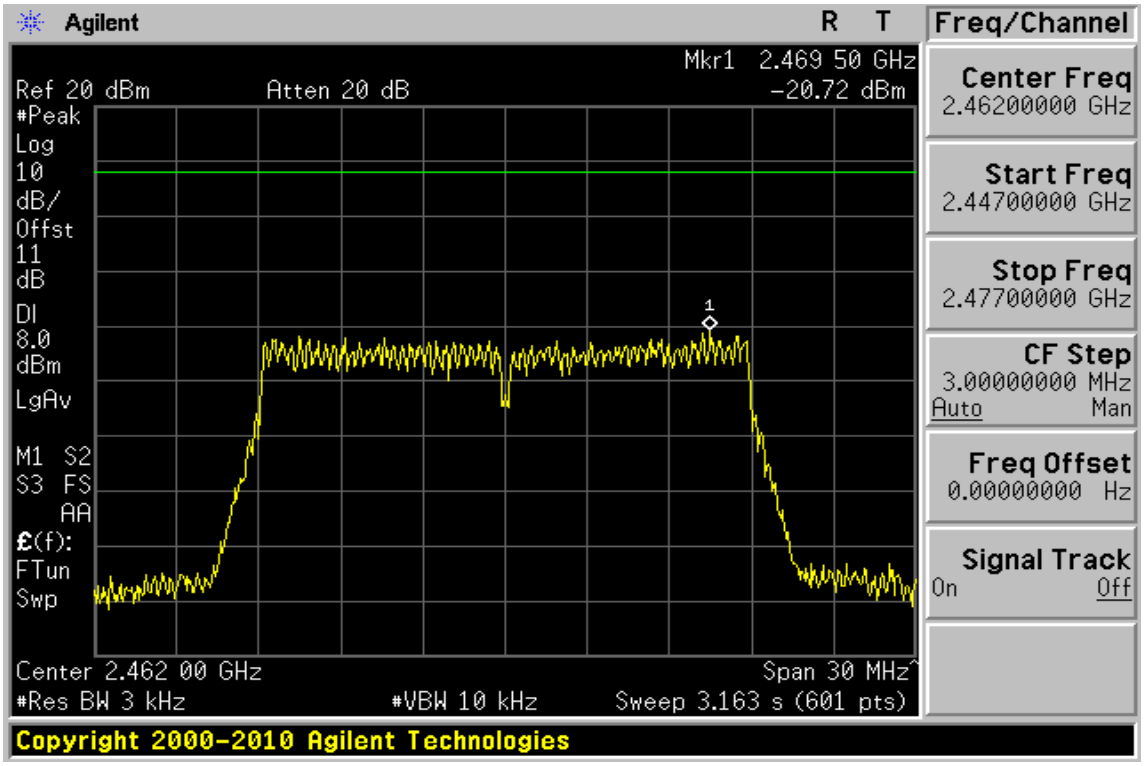
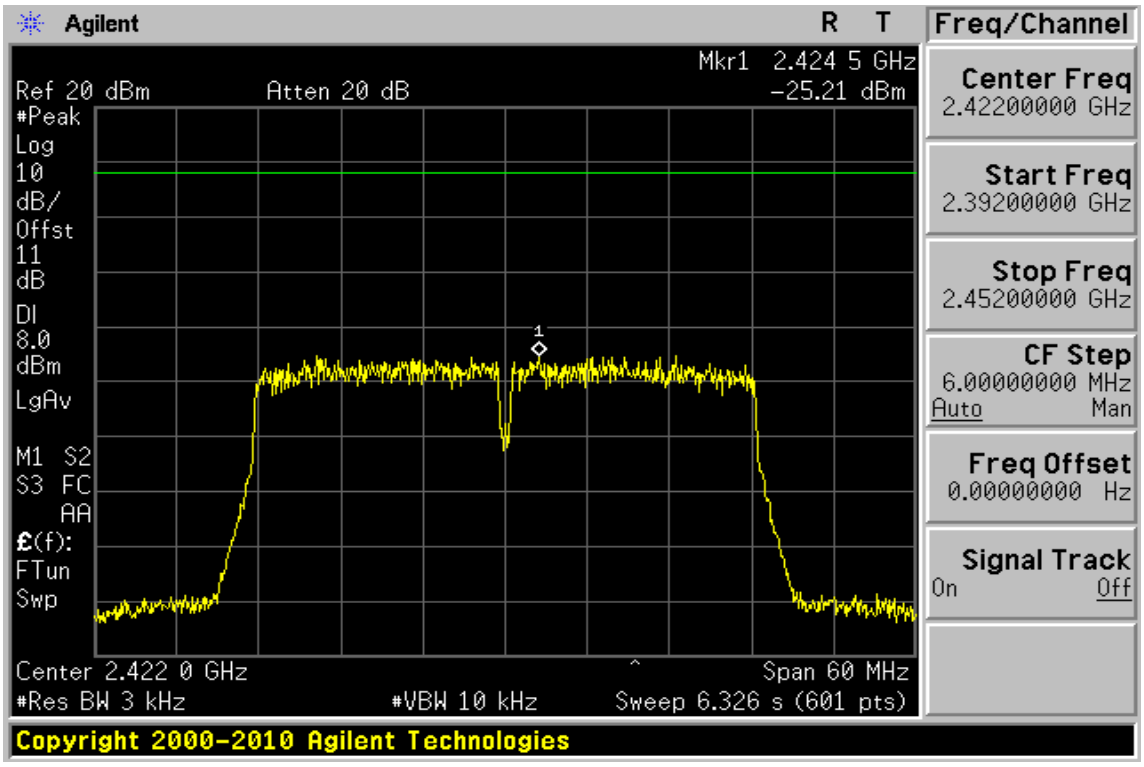
## Power Spectral Density Test Plot (CH-High)




## 802.11n_40M

## Power Spectral Density Test Plot (CH-Low)

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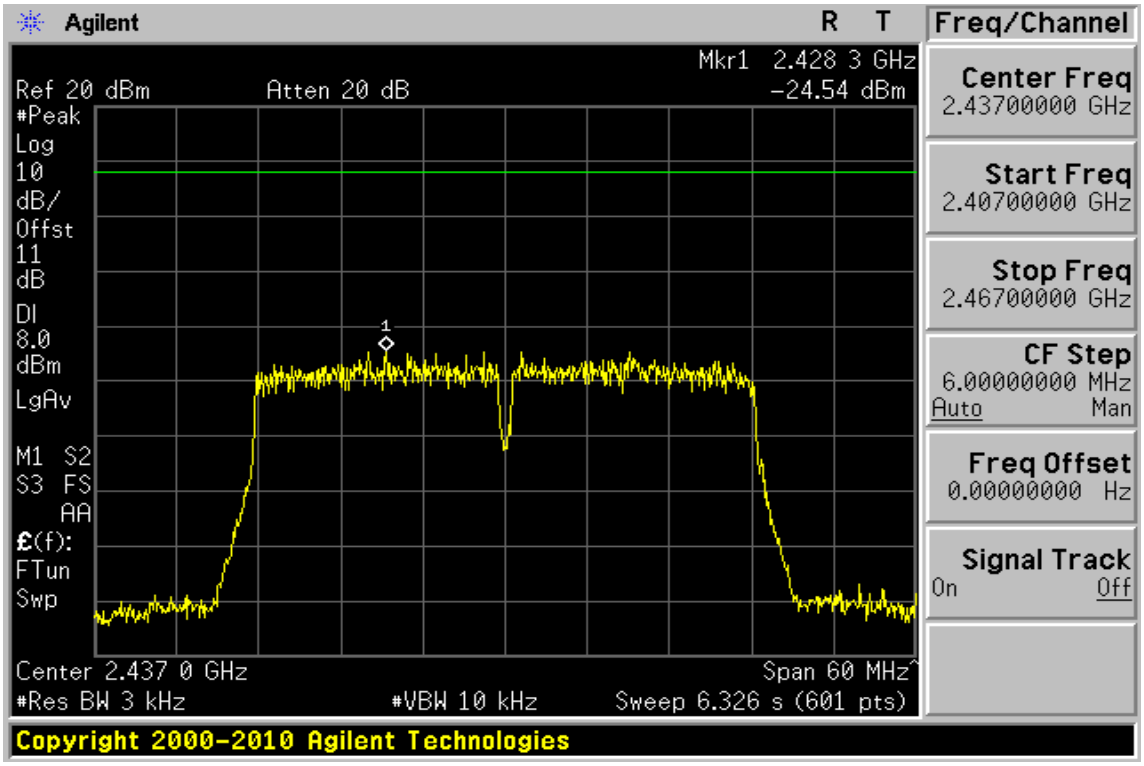
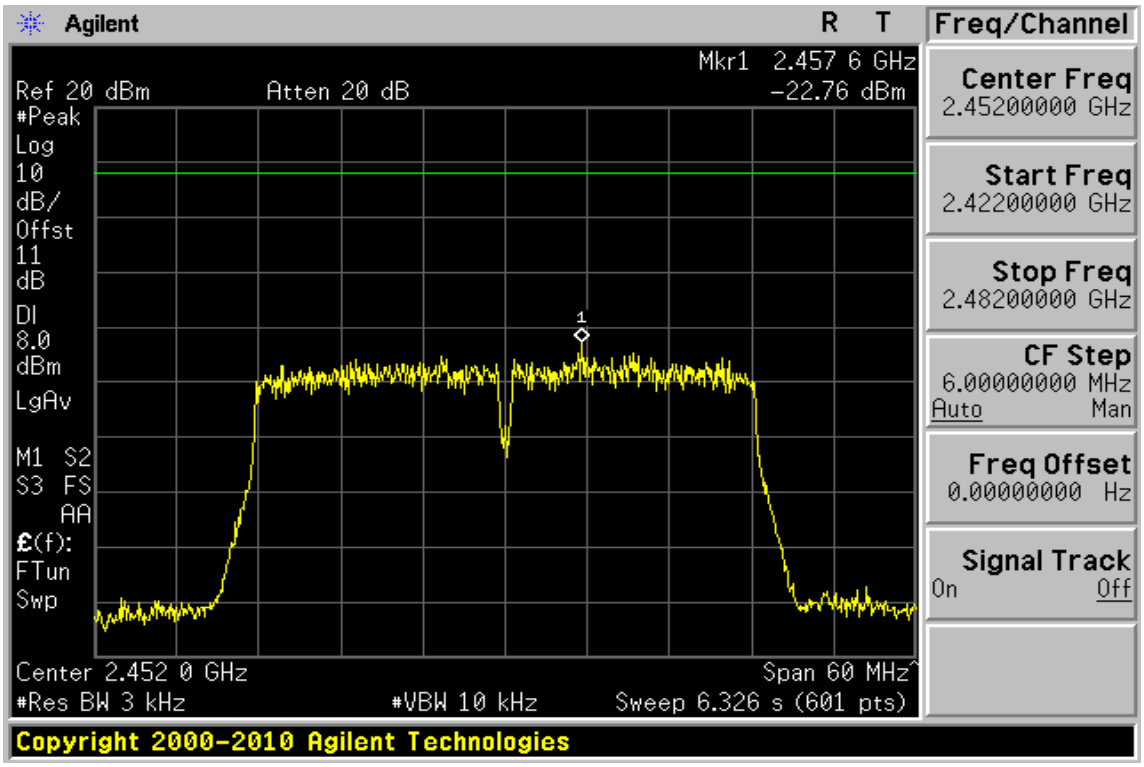
## Power Spectral Density Test Plot (CH-Mid)




## Power Spectral Density Test Plot (CH-High)

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# 12 ANTENNA REQUIREMENT

## 12.1 Standard Applicable:

For intentional device, according to §15.203, an intentional radiator shall be designed to ensure that no antenna other than furnished by the responsible party shall be used with the device.

## 12.2 Antenna Connected Construction:

The directional gains of antenna used for transmitting is -0.23dBi. In addition, the antenna connector is designed with unique type RF connector and no consideration of replacement. Please see EUT photo and antenna spec. for details.

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