

**Electromagnetic Emissions Test Report
and
Application for Grant of Equipment Authorization
pursuant to
FCC Part 15, Subpart C (15.247) DTS Specifications,
FCC Part 15, Subpart E (UNII Devices) and
Industry Canada RSS 210 Issue 5 (LELEAN Devices)
on the Atheros Communications
Model: D1470U**

FCC ID: PPD-D1470U
UPN: 4104A-D1470U

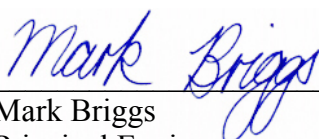
GRANTEE: Atheros Communications
529 Almanor
Sunnyvale, CA 94086

TEST SITE: Elliott Laboratories, Inc.
684 W. Maude Avenue
Sunnyvale, CA 94086

REPORT DATE: April 25, 2005

FINAL TEST DATE: April 6, April 8, April 11, April 12
and April 13, 2005

AUTHORIZED SIGNATORY:



Mark Briggs
Principal Engineer



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DECLARATIONS OF COMPLIANCE

Equipment Name and Model:
D1470U

Manufacturer:
Atheros Communications
529 Almanor
Sunnyvale, CA 94086

Tested to applicable standards:
RSS-210, Issue 5, November 2001 (Low Power License-Exempt Radiocommunication Devices)
FCC Part 15.247 (DTS)
FCC Part 15 Subpart E (UNII Devices)

Measurement Facility Description Filed With Department of Industry:

Departmental Acknowledgement Number: IC2845 **SV1** Dated July 30, 2001
Departmental Acknowledgement Number: IC2845 **SV3** Dated July 30, 2001

I declare that the testing was performed or supervised by me; that the test measurements were made in accordance with the above mentioned departmental standards (through the use of ANSI C63.4:2003 as detailed in section 5.3 of RSS-210, Issue 5); and that the equipment performed in accordance with the data submitted in this report.

Signature
Name
Title
Company
Address



Mark Briggs
Principal Engineer
Elliott Laboratories Inc.
684 W. Maude Ave
Sunnyvale, CA 94086
USA

Date: April 25, 2005

Maintenance of compliance with the above standards is the responsibility of the manufacturer. Any modification of the product which may result in increased emissions should be checked to ensure compliance has been maintained (i.e., printed circuit board layout changes, different line filter, different power supply, harnessing or I/O cable changes, etc.).

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SCOPE

An electromagnetic emissions test has been performed on the Atheros Communications model D1470U pursuant to Subparts C and E of Part 15 of FCC Rules for Unlicensed National Information Infrastructure (UNII) devices and RSS-210 Issue 5 for licence-exempt local area network (LELAN) devices. Conducted and radiated emissions data has been collected, reduced, and analyzed within this report in accordance with measurement guidelines set forth in ANSI C63.4:2003 as outlined in Elliott Laboratories test procedures.

The intentional radiator above has been tested in a simulated typical installation to demonstrate compliance with the relevant FCC performance and procedural standards.

Final system data was gathered in a mode that tended to maximize emissions by varying orientation of EUT, orientation of power and I/O cabling, antenna search height, and antenna polarization.

Every practical effort was made to perform an impartial test using appropriate test equipment of known calibration. All pertinent factors have been applied to reach the determination of compliance.

The test results recorded herein are based on a single type test of the Atheros Communications model D1470U and therefore apply only to the tested sample. The sample was selected and prepared by Michael Green of Atheros Communications

OBJECTIVE

The primary objective of the manufacturer is compliance with Subparts C and E of Part 15 of FCC Rules for the radiated and conducted emissions of intentional radiators. Certification of these devices is required as a prerequisite to marketing as defined in Part 2 the FCC Rules.

Certification is a procedure where the manufacturer or a contracted laboratory makes measurements and submits the test data and technical information to the FCC. The FCC issues a grant of equipment authorization upon successful completion of their review of the submitted documents. Once the equipment authorization has been obtained, the label indicating compliance must be attached to all identical units which are subsequently manufactured.

SUMMARY OF RESULTS**FCC 15.247 / RSS 210 6.2.2(o) – 2400 – 2483.5 MHz Band**

| FCC Part 15 Section | RSS 210 Section | Description | Measured Value | Comments | Result |
|---------------------|-----------------|--|--|---|----------|
| 15.247(a) | 6.2.2(o)(b) | Digital Modulation | Systems uses OFDM techniques | System must utilize a digital transmission technology | Complies |
| 15.247 (a) (2) | 6.2.2(o)(b) | 6dB Bandwidth | 802.11b: 12.1 MHz 802.11g: 16.7 MHz Turbo: 33.4 MHz | Minimum allowed is 500kHz | Complies |
| | RSP 100 | 99% Bandwidth | 802.11b: 15.8 MHz 802.11g: 16.7 MHz Turbo: 33.4 MHz | For information only | Complies |
| 15.247 (b) (3) | 6.2.2(o)(b) | Output Power, 2400 - 2483.5 MHz | 802.11b: 18.4 dBm 802.11g: 22.3 dBm Turbo: 22.3 dBm EIRP = 0.31 W | Multi-point applications: Maximum permitted is 1 Watt, with EIRP limited to 4 Watts. | Complies |
| 15.247(d) | 6.2.2(o)(b) | Power Spectral Density | 802.11b: -5dBm/3kHz 802.11g: -7.2dBm/3kHz Turbo: -3.8dBm/3kHz | Maximum permitted is 8dBm/3kHz | Complies |
| 15.247(c) | 6.2.2(o)(e1) | Antenna Port Spurious Emissions – 30MHz – 25 GHz | All spurious emissions < -20dBc | All spurious emissions < -20dBc. | Complies |
| 15.247(c) / 15.209 | | Radiated Spurious Emissions –30MHz – 25 GHz | 53.7dB μ V/m (484.2 μ V/m) @ 2390.0MHz (-0.3dB) | Emissions in restricted bands must meet the radiated emissions limits detailed in 15.207. All others must be < -20dBc | Complies |
| | 7.3, Table 3 | Receiver Spurious Emissions –30MHz – 7.5 GHz | 31.0dB μ V/m (35.5 μ V/m) @ 58.598MHz (-9.0dB) | Used more stringent limit of LP0002 | Complies |

FCC 15.247 / RSS 210 6.2.2(o) – 5725-5850 MHz Band

| FCC Part 15 Section | RSS 210 Section | Description | Measured Value | Comments | Result |
|-----------------------|-----------------|--|--|---|----------|
| 15.247(a) | 6.2.2(o)(b) | Digital Modulation | Systems uses OFDM techniques | System must utilize a digital transmission technology | Complies |
| 15.247 (a) (2) | 6.2.2(o)(b) | 6dB Bandwidth | 802.11a: 16.6 MHz Turbo: 33.2 MHz | Minimum allowed is 500kHz | Complies |
| | RSP 100 | 99% Bandwidth | 802.11a: 17.0 MHz Turbo: 33.2 MHz | For information only | Complies |
| 15.247 (b) (3) 15.247 | 6.2.2(o)(b) | Output Power, 5725 - 5850 MHz | 802.11a: 22.1dBm Turbo: 21.5dBm EIRP = 0.35 W | Multi-point applications: Maximum permitted is 1Watt, with EIRP limited to 4 Watts. | Complies |
| 15.247(d) | 6.2.2(o)(b) | Power Spectral Density | 802.11a: -7.3dBm/3kHz Turbo: -11.2dBm/3kHz | Maximum permitted is 8dBm/3kHz | Complies |
| 15.247(c) | 6.2.2(o)(e1) | Antenna Port Spurious Emissions – 30MHz – 40 GHz | All spurious emissions < -20dBc | All spurious emissions < -20dBc. | Complies |
| 15.247(c) / 15.209 | | Radiated Spurious Emissions –30MHz – 40 GHz | 48.7dB μ V/m (272.6 μ V/m) @ 17474.8MHz (-5.3dB) | Emissions in restricted bands subject to 15.207. All others must be < -20dBc | Complies |
| | 7.3, Table 3 | Receiver Spurious Emissions –30MHz – 18 GHz | 31.0dB μ V/m (35.5 μ V/m) @ 58.598MHz (-9.0dB) | Used more stringent limit of LP0002 | Complies |

FCC 15 E / RSS 210 6.2.2(q1) – 5150 - 5350 MHz Band

| FCC Part 15 Section | RSS 210 Section | Description | Comments | Result |
|--|-----------------|--|--|----------|
| 15.407(e) | | Indoor operation only | The device is not designed for outdoor use and the user is instructed that the device is for indoor use only | COMPLIES |
| | 6.2.2 q(iv)(b) | Peak Spectral Density | Peak power spectral density does not exceed the average by more than 6dB | COMPLIES |
| 15.407(a)(6) | | Peak Excursion Ratio | Peak to average excursion 12.75dB | COMPLIES |
| | 6.2.2 q(iv)(c) | Channel Selection | The device was tested on the following channels: 5180, 5240, 5260, 5280 and 5320 MHz in 802.11a mode and 5200 and 5290 MHz in turbo mode. These channels represent the highest, lowest and center channels for 802.11a mode (plus additional channels to cover LP0002 standard) and both available turbo channels. | N/A |
| 15.407 (c) | 6.2.2 q(iv)(d) | Automatic Discontinuation of Operation in the absence of information to transmit | Operation is discontinued in the absence of information to transmit refer to page 7 of the operational description. | COMPLIES |
| 15.407 (g) | 6.2.2 q(iv)(e) | Frequency Stability | Frequency stability is better than 20 ppm, refer to page 7 of the operational description. | COMPLIES |
| Operation in the 5.15 – 5.25 GHz Band | | | | |
| 15.407(a) (1) | 6.2.2 q1 (i) | Bandwidth | 31.1 MHz (802.11a) 60.8 MHz (turbo) | N/A |
| 15.407(a) (1) | 6.2.2 q1 (i) | Output Power | 5150 - 5250: 15.3dBm | COMPLIES |
| 15.407(a) (1) | 6.2.2 q1 (i) | Power Spectral Density | 5150 - 5250: 3.23dBm/MHz | COMPLIES |
| Operation in the 5.25 – 5.35 GHz Band Note: The device is restricted to indoor use only, therefore the spectral density of spurious emissions in the 5.15 – 5.25 GHz band were limited to the power spectral limits for intentional signals detailed in FCC 15.407(a)(1) and RSS 210 6.2.2 q1 (i) | | | | |
| 15.407(a) (2) | 6.2.2 q1 (ii) | Bandwidth | 31.1 MHz (802.11a) 60.8 MHz (turbo) | N/A |
| 15.407(a) (2) | 6.2.2 q1 (ii) | Output Power | 5250 - 5350: 15.6dm | COMPLIES |
| 15.407(a) (2)) | 6.2.2 q1 (ii) | Power Spectral Density | 5250 - 5350: 3.42dm/MHz | COMPLIES |
| Spurious Emissions | | | | |
| 15.407(b) (5) / 15.209 | 6.2.2 q1 (ii) | Antenna Port Spurious Emissions, 30MHz - 40GHz | -46.7dBm @ 7093.4MHz (-19.7dB) | COMPLIES |
| 15.407(b) (5) / 15.209 | 6.2.2 q1 (ii) | Radiated Spurious Emissions below 1GHz | 31.0dB μ V/m (35.5 μ V/m) @ 58.598MHz (-9.0dB) | COMPLIES |
| 15.407(b) (2) | 6.2.2 q1 (ii) | Radiated Spurious Emissions 1 - 40GHz | 52.2dB μ V/m (406.9 μ V/m) @ 15538.9MHz (-1.8dB) | COMPLIES |
| | 7.3, Table 3 | Receiver Radiated Spurious Emissions 1 – 18 GHz | 31.0dB μ V/m (35.5 μ V/m) @ 58.598MHz (-9.0dB) | COMPLIES |

FCC and RSS 210 Requirements Common To All Operating Bands

| FCC Part 15 Section | RSS 210 Section | Description | Measured Value | Comments | Result |
|---------------------|-----------------|--------------------------|---|--|----------|
| 15.207 | | AC Conducted Emissions | 40.3dB μ V @ 0.479MHz (-6.0dB) | | Complies |
| | 6.6 | AC Conducted Emissions | 41.5dB μ V @ 0.479MHz (-6.5dB) | | Complies |
| 15.247 (b) (5) | | RF Exposure Requirements | Mobile device with separation distance \geq 20cm stated in manual | Minimum separation distance of 20cm is sufficient | Complies |
| 15.203, 15.407 (d) | | RF Connector | Antenna is integrated onto the printed circuit board | As the device operates in the 5.15 – 5.25 GHz band the antenna must be integral to the device. | Complies |

MEASUREMENT UNCERTAINTIES

ISO Guide 17025 requires that an estimate of the measurement uncertainties associated with the emissions test results be included in the report. The measurement uncertainties given below are based on a 95% confidence level and were calculated in accordance with NAMAS document NIS 81.

| Measurement Type | Frequency Range (MHz) | Calculated Uncertainty (dB) |
|---------------------|-----------------------|-----------------------------|
| Conducted Emissions | 0.15 to 30 | ± 2.4 |
| Radiated Emissions | 30 to 1000 | ± 3.6 |

EQUIPMENT UNDER TEST (EUT) DETAILS**GENERAL**

The Atheros Communications model D1470U is a UNII radio which is a USB to 802.11a/b/g wireless adapter that is designed to connect to the USB port of a PC. Normally, the EUT would be placed on a tabletop during operation. The EUT was, therefore, treated as tabletop equipment during testing to simulate the end-user environment. The EUT is powered via the USB bus.

The sample was received on April 6, 2005 and tested on April 6, April 8, April 11, April 12 and April 13, 2005.

The EUT consisted of the following component(s):

| Manufacturer/Model/Description | Serial Number | Proposed FCC ID # |
|--|------------------|-------------------|
| Atheros/D1470U/ 802.11 abg/USB adapter | MAC:00904BD9C041 | PPD-D1470U |

OTHER EUT DETAILS

EUT with MAC address MAC:00904BD9C041 was used for FCC/IC/LP0002 tests.

ENCLOSURE

The EUT enclosure is constructed of plastic and is 0.65" x 2.30" x 3.80"

MODIFICATIONS

The EUT did not require modifications during testing in order to comply with the emission specifications.

SUPPORT EQUIPMENT

The following equipment was used as local support equipment for emissions testing:

| Manufacturer | Model | Description | Serial Number | FCC ID |
|--------------|---------------|-------------|---------------|--------|
| IBM | Type 2386-5GU | Laptop | KV-00292 | DoC |
| D-Link | DGS-1005D | Router | DR1914B005832 | DoC |

EUT INTERFACE PORTS

The I/O cabling configuration during emissions testing was as follows:

| Port | Connected To | Cable(s) | | |
|-----------------|-----------------|-------------------------|------------------------|-----------|
| | | Description | Shielded or Unshielded | Length(m) |
| Laptop USB | EUT | Ferrite at PC connector | Shielded | 1 |
| Laptop ethernet | Router ethernet | Cat 5 UTP | Unshielded | 1 |

The configuration above met the minimum system requirements detailed in ANSI C63.4.

EUT OPERATION DURING TESTING

During testing the ethernet hub and laptop were sending link pulses. The USB adapter (EUT) was in either a continuous transmit mode (TX100 mode) or in a receive mode on the specified channel. The USB interface was active via the ART software that was controlling the EUT.

ANTENNA

As the device is intended to operate in the 15.15 – 15.25 GHz band an integral antenna as detailed in 15.407 (d) and RSS-210 6.2.2(q1) (i) is required. The antennas for the device are built into the printed circuit board and, therefore, are integral to the device. The two different antennas connect to the rf input/output via a diversity switch and are used to provide spatial diversity. The maximum antenna gains in each band are:

2400 – 2483.5 MHz: 2.66dBi
 5150 – 5350 MHz: 4.19dBi
 5725 – 5850 MHz: 3.40dBi

TEST SITE

GENERAL INFORMATION

Final test measurements were taken on April 6, April 8, April 11, April 12 and April 13, 2005 at the Elliott Laboratories Open Area Test Site #1 & 3 located at 684 West Maude Avenue, Sunnyvale, California. The test site contains separate areas for radiated and conducted emissions testing. Pursuant to section 2.948 of the Rules, construction, calibration, and equipment data has been filed with the Federal Communications Commission. In accordance with Industry Canada rules detailed in RSS 210 Issue 5 and RSS-212, construction, calibration, and equipment data for the test sites have been filed with the Federal Communications Commission.

The FCC recommends that ambient noise at the test site be at least 6 dB below the allowable limits. Ambient levels are below this requirement with the exception of predictable local TV, radio, and mobile communications traffic. The test site contains separate areas for radiated and conducted emissions testing. Considerable engineering effort has been expended to ensure that the facilities conform to all pertinent FCC requirements.

CONDUCTED EMISSIONS CONSIDERATIONS

Conducted emissions testing is performed in conformance with ANSI C63.4:2003. Measurements are made with the EUT connected to the public power network through a nominal, standardized RF impedance, which is provided by a line impedance stabilization network, known as a LISN. A LISN is inserted in series with each current-carrying conductor in the EUT power cord.

RADIATED EMISSIONS CONSIDERATIONS

The FCC has determined that radiation measurements made in a shielded enclosure are not suitable for determining levels of radiated emissions. Radiated measurements are performed in an open field environment. The test site is maintained free of conductive objects within the CISPR defined elliptical area incorporated in ANSI C63.4:2003 guidelines.

MEASUREMENT INSTRUMENTATION**RECEIVER SYSTEM**

An EMI receiver as specified in CISPR 16-1 is used for emissions measurements. The receivers used can measure over the frequency range of 9 kHz up to 2000 MHz. These receivers allow both ease of measurement and high accuracy to be achieved. The receivers have Peak, Average, and CISPR (Quasi-peak) detectors built into their design so no external adapters are necessary. The receiver automatically sets the required bandwidth for the CISPR detector used during measurements.

For measurements above the frequency range of the receivers, a spectrum analyzer is utilized because it provides visibility of the entire spectrum along with the precision and versatility required to support engineering analysis. Average measurements above 1000MHz are performed on the spectrum analyzer using the linear-average method with a resolution bandwidth of 1 MHz and a video bandwidth of 10 Hz.

INSTRUMENT CONTROL COMPUTER

The receivers utilize either a Rohde and Schwarz EZM Spectrum Monitor/Controller or contain an internal Spectrum Monitor/Controller to view and convert the receiver measurements to the field strength at an antenna or voltage developed at the LISN measurement port, which is then compared directly with the appropriate specification limit. This provides faster, more accurate readings by performing the conversions described under Sample Calculations within the Test Procedures section of this report. Results are printed in a graphic and/or tabular format, as appropriate. A personal computer is used to record all measurements made with the receivers.

The Spectrum Monitor provides a visual display of the signal being measured. In addition, the controller or a personal computer run automated data collection programs which control the receivers. This provides added accuracy since all site correction factors, such as cable loss and antenna factors are added automatically.

LINE IMPEDANCE STABILIZATION NETWORK (LISN)

Line conducted measurements utilize a fifty microhenry Line Impedance Stabilization Network as the monitoring point. The LISN used also contains a 250 uH CISPR adapter. This network provides for calibrated radio frequency noise measurements by the design of the internal low pass and high pass filters on the EUT and measurement ports, respectively.

POWER METER

A power meter and **peak** power sensor are used for all direct output power measurements from transmitters as they provide a broadband indication of the power output.

FILTERS/ATTENUATORS

External filters and precision attenuators are often connected between the receiving antenna or LISN and the receiver. This eliminates saturation effects and non-linear operation due to high amplitude transient events.

ANTENNAS

A biconical antenna is used to cover the range from 30 MHz to 300 MHz and a log periodic antenna is utilized from 300 MHz to 1000 MHz. Narrowband tuned dipole antennas are used over the entire 30 to 1000 MHz range for precision measurements of field strength. Above 1000 MHz, a horn antenna is used. The antenna calibration factors are included in site factors programmed into the test receivers.

ANTENNA MAST AND EQUIPMENT TURNTABLE

The antennas used to measure the radiated electric field strength are mounted on a non-conductive antenna mast equipped with a motor-drive to vary the antenna height.

ANSI C63.4:2003 specifies that the test height above ground for table mounted devices shall be 80 centimeters. Floor mounted equipment shall be placed on the ground plane if the device is normally used on a conductive floor or separated from the ground plane by insulating material from 3 to 12 mm if the device is normally used on a non-conductive floor. During radiated measurements, the EUT is positioned on a motorized turntable in conformance with this requirement.

INSTRUMENT CALIBRATION

All test equipment is regularly checked to ensure that performance is maintained in accordance with the manufacturer's specifications. All antennas are calibrated at regular intervals with respect to tuned half-wave dipoles. An exhibit of this report contains the list of test equipment used and calibration information.

TEST PROCEDURES**EUT AND CABLE PLACEMENT**

The FCC requires that interconnecting cables be connected to the available ports of the unit and that the placement of the unit and the attached cables simulate the worst case orientation that can be expected from a typical installation, so far as practicable. To this end, the position of the unit and associated cabling is varied within the guidelines of ANSI C63.4:2003 , and the worst case orientation is used for final measurements.

CONDUCTED EMISSIONS

Conducted emissions are measured at the plug end of the power cord supplied with the EUT. Excess power cord length is wrapped in a bundle between 30 and 40 centimeters in length near the center of the cord. Preliminary measurements are made to determine the highest amplitude emission relative to the specification limit for all the modes of operation. Placement of system components and varying of cable positions are performed in each mode. A final peak mode scan is then performed in the position and mode for which the highest emission was noted on all current carrying conductors of the power cord.

RADIATED EMISSIONS

Radiated emissions measurements are performed in two phases as well. A preliminary scan of emissions is conducted in which all significant EUT frequencies are identified with the system in a nominal configuration. At least two scans are performed from 30 MHz up to the frequency required by the regulation specified on page 1. One or more of these is with the antenna polarized vertically while the one or more of these is with the antenna polarized horizontally. During the preliminary scans, the EUT is rotated through 360°, the antenna height is varied and cable positions are varied to determine the highest emission relative to the limit.

A speaker is provided in the receiver to aid in discriminating between EUT and ambient emissions. Other methods used during the preliminary scan for EUT emissions involve scanning with near field magnetic loops, monitoring I/O cables with RF current clamps, and cycling power to the EUT.

Final maximization is a phase in which the highest amplitude emissions identified in the spectral search are viewed while the EUT azimuth angle is varied from 0 to 360 degrees relative to the receiving antenna. The azimuth which results in the highest emission is then maintained while varying the antenna height from one to four meters. The result is the identification of the highest amplitude for each of the highest peaks. Each recorded level is corrected in the receiver using appropriate factors for cables, connectors, antennas, and preamplifier gain. Emissions which have values close to the specification limit may also be measured with a tuned dipole antenna to determine compliance.

CONDUCTED EMISSIONS FROM ANTENNA PORT

Direct measurements are performed with the antenna port of the EUT connected to either the power meter or spectrum analyzer via a suitable attenuator and/or filter. These are used to ensure that the front end of the measurement instrument is not overloaded by the fundamental transmission.

Measurement bandwidths (video and resolution) are set in accordance with FCC procedures for the type of radio being tested.

SPECIFICATION LIMITS AND SAMPLE CALCULATIONS

The limits for conducted emissions from the AC power port are given in units of microvolts, the limits for radiated electric field emissions are given in units of microvolts per meter at a specified test distance and the output power limits are given in terms of Watts, milliwatts or dBm. Data is measured in the logarithmic form of decibels relative to one microvolt, or dB microvolts (dBuV). For radiated emissions, the measured data is converted to the field strength at the antenna in dB microvolts per meter (dBuV/m). The results are then converted to the linear forms of uV and uV/m for comparison to published specifications.

Where the radiated electric field strength is expressed in terms of the equivalent isotropic radiated power (eirp) the following formula is used to determine the field strength limit in terms of microvolts per meter at a distance of 3m from the equipment under test:

$$E = \frac{1000000 \sqrt{30 P}}{3} \text{ microvolts per meter}$$

where P is the eirp (Watts)

For reference, converting the voltage and electric field strength specification limits from linear to decibel form is accomplished by taking the base ten logarithm, then multiplying by 20. Conversion of power specification limits from linear units (in milliwatts) to decibel form (in dBm) is accomplished by taking the base ten logarithm, then multiplying by 10.

FCC 15.407 (a) and RSS 210 (o) OUTPUT POWER LIMITS

The table below shows the limits for output power and output power density. Where the signal bandwidth is less than 20 MHz the maximum output power is reduced to the power spectral density limit plus 10 times the log of the bandwidth (in MHz).

| Operating Frequency (MHz) | Output Power | Power Spectral Density |
|---------------------------|------------------|------------------------|
| 902 – 928 | 1 Watts (30 dBm) | 8 dBm/3kHz |
| 2400 – 2483.5 | 1 Watts (30 dBm) | 8 dBm/3kHz |
| 5725 – 5850 | 1 Watts (30 dBm) | 8 dBm/3kHz |

The maximum permitted output power is reduced by 1dB for every dB the antenna gain exceeds 6dBi. Fixed point-to-point applications using the 5725 – 5850 MHz band are not subject to this restriction.

**FCC 15.407 (a)
OUTPUT POWER LIMITS**

The table below shows the limits for output power and output power density. Where the signal bandwidth is less than 20 MHz the maximum output power is reduced to the power spectral density limit plus 10 times the log of the bandwidth (in MHz).

| Operating Frequency (MHz) | Output Power | Power Spectral Density |
|---------------------------|------------------|------------------------|
| 5150 - 5250 | 50mW (17 dBm) | 4 dBm/MHz |
| 5250 - 5350 | 250 mW (24 dBm) | 11 dBm/MHz |
| 5725 – 5825 | 1 Watts (30 dBm) | 17 dBm/MHz |

For system using antennas with gains exceeding 6dBi, the output power and power spectral density limits are reduced by 1dB for every dB the antenna gain exceeds 6dBi. Fixed point-to-point applications using the 5725 – 5825 MHz band may use antennas with gains of up to 23dBi without this limitation. If the gain exceeds 23dBi then the output power limit of 1 Watt is reduced by 1dB for every dB the gain exceeds 23dBi.

RS-210 6.2.2(q1) OUTPUT POWER LIMITS

The table below shows the limits for output power and output power density. Where the signal bandwidth is less than 20 MHz the maximum output power is reduced to the power spectral density limit plus 10 times the log of the bandwidth (in MHz).

| Operating Frequency (MHz) | Output Power | Power Spectral Density |
|---------------------------|------------------|------------------------|
| 5150 - 5250 | 200mW (23 dBm) | 10 dBm/MHz |
| 5250 - 5350 | 250 mW (24 dBm) | 11 dBm/MHz |
| 5725 – 5825 | 1 Watts (30 dBm) | 17 dBm/MHz |

For system using antennas with gains exceeding 6dBi, the output power and power spectral density limits are reduced by 1dB for every dB the antenna gain exceeds 6dBi. Fixed point-to-point applications using the 5725 – 5825 MHz band may use antennas with gains of up to 23dBi without this limitation. If the gain exceeds 23dBi then the output power limit of 1 Watt is reduced by 1dB for every dB the gain exceeds 23dBi.

RSS 210 (o) AND FCC 15.247 TRANSMIT MODE SPURIOUS RADIATED EMISSIONS LIMITS

The limits for unwanted (spurious) emissions from the transmitter falling in the restricted bands detailed in Part 15.205 and for all spurious emissions from the receiver are:

| Frequency Range (MHz) | Limit (uV/m @ 3m) | Limit (dBuV/m @ 3m) |
|-----------------------|-------------------|---------------------|
| 30 to 88 | 100 | 40 |
| 88 to 216 | 150 | 43.5 |
| 216 to 960 | 200 | 46.0 |
| Above 960 | 500 | 54.0 |

All other unwanted (spurious) emissions shall be at least 20dB below the level of the highest in-band signal level (30dB if the power is measured using the sample detector/power averaging method).

RS 210 (q1) and FCC 15E TRANSMIT MODE SPURIOUS RADIATED EMISSIONS LIMITS

The table below shows the limits for unwanted (spurious) emissions falling in the restricted bands detailed in Part 15.205 and Industry Canada RSS-210 Table 2.

| Frequency Range (MHz) | Limit (uV/m @ 3m) | Limit (dBuV/m @ 3m) |
|-----------------------|-------------------|---------------------|
| 30 to 88 | 100 | 40 |
| 88 to 216 | 150 | 43.5 |
| 216 to 960 | 200 | 46.0 |
| Above 960 | 500 | 54.0 |

The table below shows the limits for unwanted (spurious) emissions outside of the restricted bands above 1GHz.

| Operating Frequency (MHz) | EIRP Limit (dBm) | Equivalent Field Strength At 3m (dBuV/m) |
|---------------------------|------------------|--|
| 5150 - 5250 | -27 dBm | 68.3 dBuV/m |
| 5250 - 5350 | -27 dBm (note 1) | 68.3 dBuV/m |
| 5725 - 5825 | -27 dBm (note 2) | 68.3 dBuV/m |
| | -17 dBm (note 3) | 78.3 dBuV/m |

Note 1: If operation is restricted to indoor use only then emissions in the band 5.15 – 5.25 GHz must meet the power spectral density limits for the intentional signals detailed in RSS 210 and FCC Subpart E for devices operating in the 5.15 – 5.25 GHz band.

Note 2: Applies to spurious signals separated by more than 10 MHz from the allocated band.

Note 3: Applies to spurious signals within 10 MHz of the allocated band.

RS 210 Table 3 RECEIVE MODE SPURIOUS RADIATED EMISSIONS LIMITS

The table below shows the limits for unwanted (spurious) emissions from the receiver as detailed in table 3 of RSS 210:

| Frequency Range (MHz) | Limit (uV/m @ 3m) | Limit (dBuV/m @ 3m) |
|-----------------------|-------------------|---------------------|
| 30 to 88 | 100 | 40 |
| 88 to 216 | 150 | 43.5 |
| 216 to 960 | 200 | 46.0 |
| 960 to 1610 | 500 | 54.0 |
| Above 1610 | 1000 | 60.0 |

FCC 15.205 AC POWER PORT CONDUCTED EMISSIONS LIMITS

The table below shows the limits for emissions on the AC power line as detailed in FCC Part 15.205.

| Frequency (MHz) | Average Limit (dBuV) | Quasi Peak Limit (dBuV) |
|-----------------|---|---|
| 0.150 to 0.500 | Linear decrease on logarithmic frequency axis between 56.0 and 46.0 | Linear decrease on logarithmic frequency axis between 66.0 and 56.0 |
| 0.500 to 5.000 | 46.0 | 56.0 |
| 5.000 to 30.000 | 50.0 | 60.0 |

RSS-210 SECTION 6.6 AC POWER PORT CONDUCTED EMISSIONS LIMITS

The table below shows the limits for emissions on the AC power line as detailed in Industry Canada RSS-210 section 6.6.

| Frequency Range (MHz) | Limit (uV) | Limit (dBuV) |
|-----------------------|------------|--------------|
| 0.450 to 30.000 | 250 | 48 |

SAMPLE CALCULATIONS - CONDUCTED EMISSIONS

Receiver readings are compared directly to the conducted emissions specification limit (decibel form) as follows:

$$R_r = C$$

and

$$C - S = M$$

where:

R_r = Receiver Reading in dBuV

C = Corrected Reading in dBuV

S = Specification Limit in dBuV

M = Margin to Specification in +/- dB

SAMPLE CALCULATIONS - RADIATED EMISSIONS

Receiver readings are compared directly to the specification limit (decibel form). The receiver internally corrects for cable loss, preamplifier gain, and antenna factor. The calculations are in the reverse direction of the actual signal flow, thus cable loss is added and the amplifier gain is subtracted. The Antenna Factor converts the voltage at the antenna coaxial connector to the field strength at the antenna elements. A distance factor, when used for electric field measurements, is calculated by using the following formula:

$$F_d = 20 * \text{LOG}_{10} (D_m/D_s)$$

where:

$$F_d = \text{Distance Factor in dB}$$

$$D_m = \text{Measurement Distance in meters}$$

$$D_s = \text{Specification Distance in meters}$$

Measurement Distance is the distance at which the measurements were taken and Specification Distance is the distance at which the specification limits are based. The antenna factor converts the voltage at the antenna coaxial connector to the field strength at the antenna elements.

The margin of a given emission peak relative to the limit is calculated as follows:

$$R_c = R_r + F_d$$

and

$$M = R_c - L_s$$

where:

$$R_r = \text{Receiver Reading in dBuV/m}$$

$$F_d = \text{Distance Factor in dB}$$

$$R_c = \text{Corrected Reading in dBuV/m}$$

$$L_s = \text{Specification Limit in dBuV/m}$$

$$M = \text{Margin in dB Relative to Spec}$$

EXHIBIT 1: Test Equipment Calibration Data

1 Page

Radiated Emissions, 30-Mar-05

Engineer: Mark Briggs

| <u>Manufacturer</u> | <u>Description</u> | <u>Model #</u> | <u>Asset #</u> | <u>Cal Due</u> |
|---------------------|---|----------------|----------------|----------------|
| EMCO | Horn Antenna, D. Ridge 1-18GHz | 3115 | 786 | 08-Nov-05 |
| Hewlett Packard | Microwave EMI test system (SA40, 30Hz - 40GHz), Sunnyvale | 84125C | 1149 | 11-Jun-05 |

Radiated Emissions, 30 - 65,000 MHz, 07-Apr-05

Engineer: Mehran Birgani

| <u>Manufacturer</u> | <u>Description</u> | <u>Model #</u> | <u>Asset #</u> | <u>Cal Due</u> |
|---------------------|-------------------------------------|----------------|----------------|----------------|
| EMCO | Horn Antenna, D. Ridge 1-18GHz | 3115 | 786 | 08-Nov-05 |
| Hewlett Packard | EMC Spectrum Analyzer 9kHz - 6.5GHz | 8595EM | 787 | 17-Dec-05 |
| EMCO | Biconical Antenna, 30-300 MHz | 3110B | 801 | 09-Jul-05 |
| Hewlett Packard | Microwave Preamplifier, 1-26.5GHz | 8449B | 870 | 13-Jan-06 |
| Filtek | High Pass Filter, 1GHz | HP12/1000-5BA | 957 | 26-Mar-06 |
| EMCO (ETS-Lindgren) | Log Periodic Antenna, 0.2-2 GHz | 3148 | 1595 | 01-Jun-05 |

Power, power density, out of band spurious emissions, 13-Apr-05

Engineer: Mark Briggs

| <u>Manufacturer</u> | <u>Description</u> | <u>Model #</u> | <u>Asset #</u> | <u>Cal Due</u> |
|---------------------|--|----------------|----------------|----------------|
| Hewlett Packard | EMC Spectrum Analyzer 30Hz - 40 GHz, Sunnyvale | 8564E (84125C) | 1148 | 09-Jun-05 |
| Rohde & Schwarz | Peak Power Sensor 100uW - 2 Watts | NRV-Z32 | 1423 | 01-Mar-06 |
| Rohde & Schwarz | Power Meter, Single Channel | NRVS | 1534 | 01-Mar-06 |

Conducted Emissions - AC Power Ports, 20-Apr-05

Engineer: Mehran Birgani

| <u>Manufacturer</u> | <u>Description</u> | <u>Model #</u> | <u>Asset #</u> | <u>Cal Due</u> |
|----------------------|-------------------------------|---------------------------|----------------|----------------|
| Elliott Laboratories | FCC / CISPR LISN | LISN-4, OATS | 362 | 01-Jul-05 |
| Solar Electronics | LISN | 8028-50-TS-24-BNC support | 904 | 10-Aug-05 |
| Rohde & Schwarz | Test Receiver, 0.009-2750 MHz | ESN | 1332 | 12-May-05 |
| Rohde & Schwarz | Pulse Limiter | ESH3 Z2 | 1398 | 11-Feb-06 |

Radiated Emissions, 30 - 1,000 MHz, 25-Apr-05

Engineer: Mehran Birgani

| <u>Manufacturer</u> | <u>Description</u> | <u>Model #</u> | <u>Asset #</u> | <u>Cal Due</u> |
|---------------------|---|----------------|----------------|----------------|
| Inmet Corporation | Attenuator, 20 dB, DC-18 GHz, 2W | 18N-20 | 859 | 24-Aug-05 |
| EMCO | Biconical Antenna, 30-300 MHz | 3110B | 1320 | 25-Aug-05 |
| EMCO | Log Periodic Antenna, 0.2-2 GHz | 3148 | 1321 | 30-Mar-07 |
| Rohde & Schwarz | Test Receiver, 0.009-2750 MHz | ESN | 1332 | 12-May-05 |
| Rohde & Schwarz | Power Meter, Single Channel | NRVS | 1534 | 01-Mar-06 |
| Rohde & Schwarz | Power Sensor, 1uW-100mW, DC-18 GHz, 50ohm | NRV-Z51 | 1535 | 22-Sep-05 |

EXHIBIT 2: Test Data Log Sheets

ELECTROMAGNETIC EMISSIONS

TEST LOG SHEETS

AND

MEASUREMENT DATA

T59339 92 Pages



EMC Test Data

| | | | |
|-----------------|------------------------------|------------------|-------------|
| Client: | Atheros | Job Number: | J59313 |
| Model: | D1470U | T-Log Number: | T59339 |
| | | Account Manager: | Joe Rohlfes |
| Contact: | Michael Robinson | | |
| Emissions Spec: | FCC 15E,15.247;LP002;RSS 210 | Class: | n/a |
| Immunity Spec: | n/a | Environment: | n/a |

EMC Test Data

For The

Atheros

Model

D1470U

Date of Last Test: 4/25/2005



EMC Test Data

| | | | |
|-----------------|------------------------------|------------------|-------------|
| Client: | Atheros | Job Number: | J59313 |
| Model: | D1470U | T-Log Number: | T59339 |
| Contact: | Michael Robinson | Account Manager: | Joe Rohlfes |
| Emissions Spec: | FCC 15E,15.247;LP002;RSS 210 | Class: | n/a |
| Immunity Spec: | n/a | Environment: | n/a |

EUT INFORMATION

General Description

The D1470U is a USB to 802.11a/b/g wireless adapter that is designed to connect to the USB port of a PC. Normally, the EUT would be placed on a tabletop during operation. The EUT was, therefore, treated as tabletop equipment during testing to simulate the end-user environment. The EUT is powered via the USB bus.

Equipment Under Test

| Manufacturer | Model | Description | Serial Number | FCC ID |
|--------------|-------------|------------------------|------------------|------------|
| Atheros | Dell D1470U | 802.11 abg/USB adapter | MAC:00904BD9C041 | PPD-D1470U |
| Atheros | Dell D1470U | 802.11 abg/USB adapter | MAC:00904BD9C054 | PPD-D1470U |

Other EUT Details

EUT with MAC address MAC:00904BD9C041 was used for FCC/IC/LP0002 tests.

EUT with MAC address MAC:00904BD9C054 Was used for EN 300 328, EN 301 893 and EN 301 489-17 tests.

EUT Antenna

The EUT contains two identical antennas that are integral to the device (printed circuit board antennas). The two antennas connect to the rf input/output via a diversity switch that is used to provide spatial diversity.

EUT Enclosure

The EUT enclosure is constructed of plastic and is 0.65" x 2.30" x 3.80"

Modification History

| Mod. # | Test | Date | Modification |
|--------|------|------|--------------|
| 1 | | | |

Modifications applied are assumed to be used on subsequent tests unless otherwise stated as a further modification.



EMC Test Data

| | | | |
|-----------------|------------------------------|------------------|-------------|
| Client: | Atheros | Job Number: | J59313 |
| Model: | D1470U | T-Log Number: | T59339 |
| Contact: | Michael Robinson | Account Manager: | Joe Rohlfes |
| Emissions Spec: | FCC 15E,15.247;LP002;RSS 210 | Class: | n/a |
| Immunity Spec: | n/a | Environment: | n/a |

Test Configuration #2

Local Support Equipment

| Manufacturer | Model | Description | Serial Number | FCC ID |
|--------------|---------------|-------------|---------------|--------|
| IBM | Type 2386-5GU | Laptop | KV-00292 | DoC |
| D-Link | DGS-1005D | Router | DR1914B005832 | DoC |

Interface Cabling and Ports

| Port | Connected To | Cable(s) | | |
|-----------------|-----------------|-------------------------|------------------------|-----------|
| | | Description | Shielded or Unshielded | Length(m) |
| Laptop USB | EUT | Ferrite at PC connector | Shielded | 1 |
| Laptop ethernet | Router ethernet | Cat 5 UTP | Unshielded | 1 |

The configuration above met the minimum system requirements detailed in ANSI C63.4.
The ferrite on the USB cable is molded onto the cable and the cable is provided with the EUT.

EUT Operation During Emissions Tests

During testing the ethernet hub and laptop were sending link pulses. The USB adapter (EUT) was in either a continuous transmit mode (TX100 mode) or in a receive mode on the specified channel. The USB interface was active via the ART software that was controlling the EUT.



EMC Test Data

| | | | |
|----------|------------------------------|------------------|-------------|
| Client: | Atheros | Job Number: | J59313 |
| Model: | D1470U | T-Log Number: | T59339 |
| Contact: | Michael Robinson | Account Manager: | Joe Rohlfes |
| Spec: | FCC 15E,15.247;LP002;RSS 210 | Class: | n/a |

Radiated Emissions

30 - 1000 MHz (Digital Device and transmitter spurious)
30 - 6500 MHz (Digital Device and 2.4GHz receive mode)
30 - 26,500 MHz (Digital Device and 5 GHz receive mode)

Test Specifics

Objective: The objective of this test session is to perform engineering evaluation testing of the EUT with respect to the specification listed above.

| | |
|---|-------------------------|
| Date of Test: 4/12/2005 | Config. Used: 2 |
| Test Engineer: Mehran Birgani | Config Change: None |
| Test Location: Chamber #2 and SVOATS #3 | EUT Voltage: 230V/ 50Hz |

General Test Configuration

The EUT and all local support equipment were located on the turntable for radiated emissions testing.

Note, **preliminary** testing indicates that the emissions were maximized by orientation of the EUT and elevation of the measurement antenna. **Maximized** testing indicated that the emissions were maximized by orientation of the EUT, elevation of the measurement antenna, and manipulation of the EUT's interface cables.

Note, for testing above 1 GHz, the FCC specifies the limit as an average measurement. In addition, the FCC states that the peak reading of any emission above 1 GHz, can not exceed the average limit by more than 20 dB.

| | | |
|----------------------------|----------------|-------|
| Ambient Conditions: | Temperature: | 14 °C |
| | Rel. Humidity: | 45 % |

Summary of Results

| Run # | Test Performed | Limit | Result | Margin |
|-------|---------------------------------------|-----------------------|--------|--|
| 2B | RE, 30 - 2000MHz, Maximized Emissions | EN55022 Class B | Pass | 20.5dBμV/m @ 58.598MHz (-9.5dB) |
| 2B | RE, 30 - 2000MHz, Maximized Emissions | LP0002 (Receive Mode) | Pass | 31.0dBμV/m (35.5μV/m) @ 58.598MHz (-9.0dB) |

Modifications Made During Testing:

No modifications were made to the EUT during testing

Deviations From The Standard

No deviations were made from the requirements of the standard.

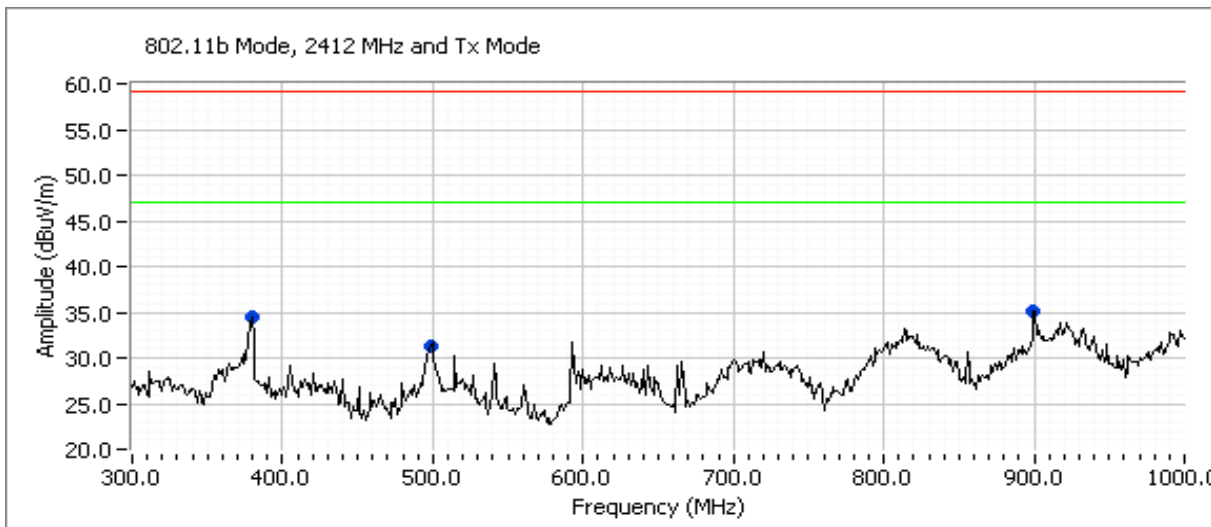
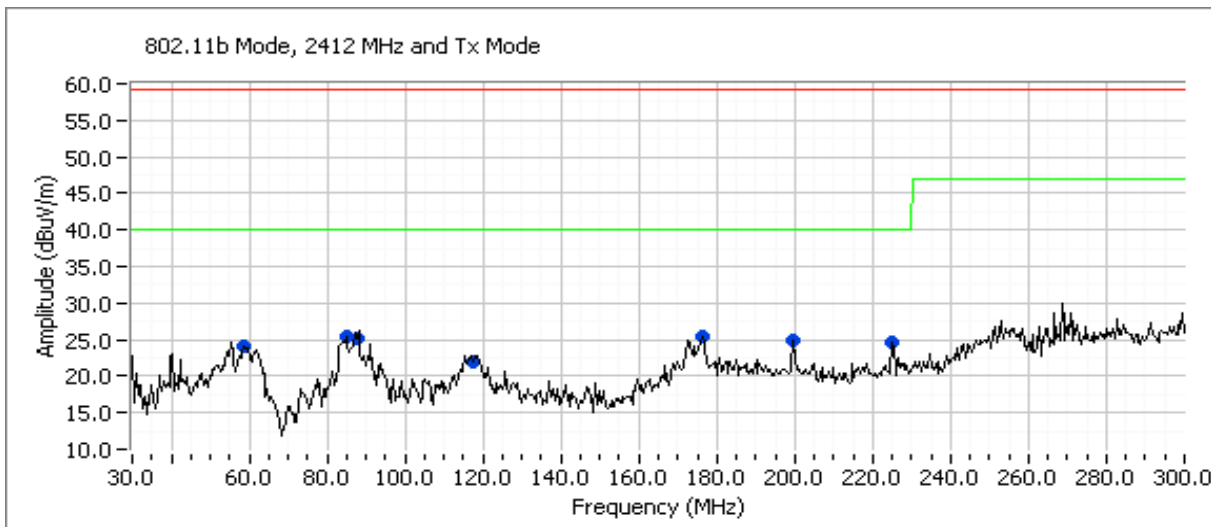
| | |
|------------------------------------|------------------------------|
| Client: Atheros | Job Number: J59313 |
| Model: D1470U | T-Log Number: T59339 |
| Contact: Michael Robinson | Account Manager: Joe Rohlfes |
| Spec: FCC 15E,15.247;LP002;RSS 210 | Class: n/a |

Run #1: Preliminary Radiated Emissions, 30-2000 MHz, Chamber Scans

Spurious emissions measured from 30 - 1000 MHz in transmit mode and 1000 - 18000 MHz in receive mode

Run #1A: Preliminary Radiated Emissions, 30-1000 MHz (Graph)

Configuration: 802.11b Mode, 2412 MHz and Tx Mode





EMC Test Data

| | | | |
|----------|------------------------------|------------------|-------------|
| Client: | Atheros | Job Number: | J59313 |
| Model: | D1470U | T-Log Number: | T59339 |
| Contact: | Michael Robinson | Account Manager: | Joe Rohlfes |
| Spec: | FCC 15E,15.247;LP002;RSS 210 | Class: | n/a |

Run #1A: Preliminary Radiated Emissions, 30-1000 MHz (Data)

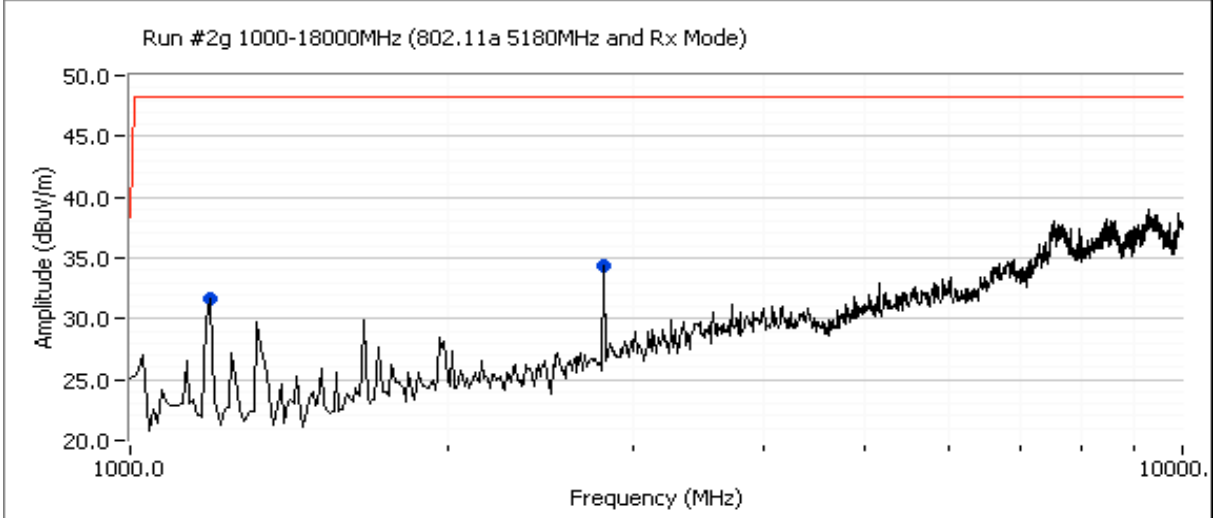
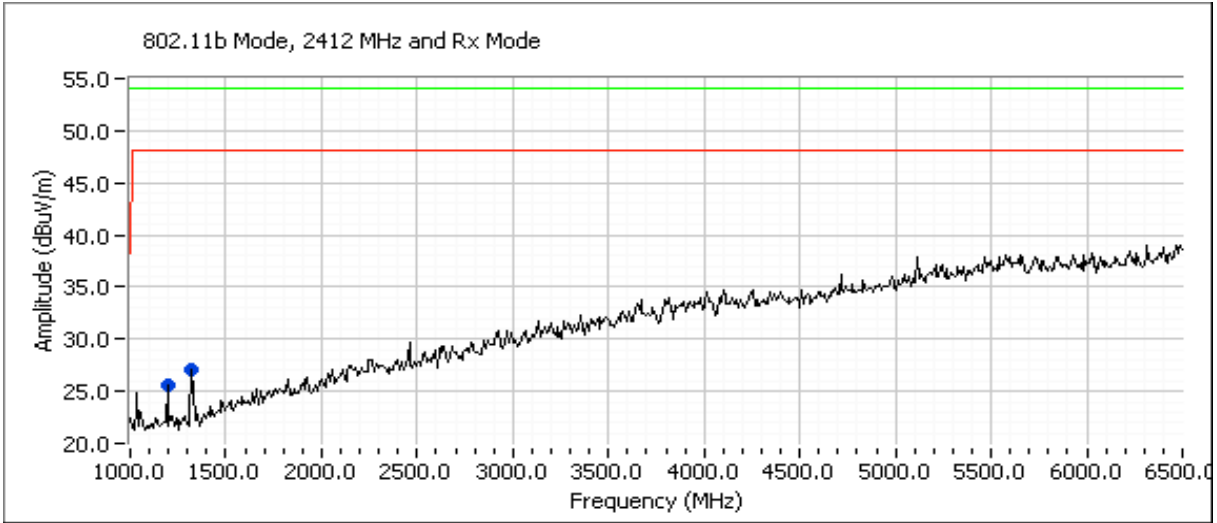
Configuration: 802.11b Mode, 2412 MHz and Tx Mode

| Frequency MHz | Level dB μ V/m | Pol v/h | EN 55022 Class B ¹ | | Detector Pk/QP/Avg | Azimuth degrees | Height meters | Comments |
|------------------|-----------------------|------------|-------------------------------|--------|-----------------------|--------------------|------------------|----------|
| | | | Limit | Margin | | | | |
| 58.598 | 24.2 | V | 40.0 | -15.8 | Peak | 239 | 1.7 | |
| 85.003 | 25.5 | V | 40.0 | -14.5 | Peak | 269 | 1.7 | |
| 87.009 | 25.1 | V | 40.0 | -14.9 | Peak | 314 | 1.7 | |
| 175.899 | 25.4 | V | 40.0 | -14.6 | Peak | 179 | 1.7 | |
| 199.998 | 25.0 | H | 40.0 | -15.0 | Peak | 360 | 1.7 | |
| 225.010 | 24.7 | H | 40.0 | -15.3 | Peak | 286 | 1.7 | |
| 379.118 | 34.4 | V | 47.0 | -12.6 | Peak | 79 | 1.7 | |
| 495.548 | 31.4 | V | 47.0 | -15.7 | Peak | 196 | 1.7 | |
| 900.986 | 35.2 | V | 47.0 | -11.8 | Peak | 145 | 1.7 | |

| | |
|---------|--|
| Note 1: | Class B limit extrapolated to 3m, upper limit on graph is EN 300 328 Tx mode limit. |
| Note 2: | Preliminary scans indicated that the radiated emission 30 -1000MHz is independent from mode (Tx/Rx) and frequency (2412-5800). |

| | |
|------------------------------------|------------------------------|
| Client: Atheros | Job Number: J59313 |
| Model: D1470U | T-Log Number: T59339 |
| Contact: Michael Robinson | Account Manager: Joe Rohlfes |
| Spec: FCC 15E,15.247;LP002;RSS 210 | Class: n/a |

Run #1B: Preliminary Radiated Emissions, 1000-6500 MHz



| Frequency MHz | Level dB μ V/m | Pol V/H | RSS 210/LP002 | | Detector Pk/QP/Avg | Azimuth degrees | Height meters | Comments |
|------------------|-----------------------|------------|---------------|--------|-----------------------|--------------------|------------------|--------------|
| | | | Limit | Margin | | | | |
| 1190.000 | 31.7 | H | 54.0 | -22.3 | Peak | 300 | 1.7 | 802.11a mode |
| 2820.000 | 34.4 | H | 54.0 | -19.6 | Peak | 109 | 1.7 | 802.11a mode |
| 1320.833 | 27.0 | V | 54.0 | -27.0 | Peak | 324 | 1.7 | 802.11b mode |
| 1192.500 | 25.6 | V | 54.0 | -28.4 | Peak | 113 | 1.7 | 802.11b mode |

Note: The EUT was scanned from 10-26GHz at 10cm from the EUT, no emissions were observed



EMC Test Data

| | | | |
|----------|------------------------------|------------------|-------------|
| Client: | Atheros | Job Number: | J59313 |
| Model: | D1470U | T-Log Number: | T59339 |
| Contact: | Michael Robinson | Account Manager: | Joe Rohlfes |
| Spec: | FCC 15E,15.247;LP002;RSS 210 | Class: | n/a |

Run #2: Final Measurements - Radiated Emissions, 30-2000 MHz, OATS

Run #2A: Preliminary Radiated Emissions, 30-26,000 MHz

Configuration: 802.11b Mode, 2412 MHz and Tx Mode for measurements below 1GHz

| Frequency | Level | Pol | EN 55022 Class B ¹ | | Detector | Azimuth | Height | Comments |
|-----------|--------------|-----|-------------------------------|--------|-----------|---------|--------|-------------|
| MHz | dB μ V/m | V/H | Limit | Margin | Pk/QP/Avg | degrees | meters | |
| 58.598 | 20.5 | V | 30.0 | -9.5 | QP | 285 | 1.0 | |
| 489.949 | 26.5 | V | 37.0 | -10.5 | QP | 222 | 1.0 | |
| 85.003 | 18.9 | V | 30.0 | -11.1 | QP | 360 | 1.1 | |
| 900.754 | 25.9 | H | 37.0 | -11.1 | QP | 345 | 2.5 | |
| 225.010 | 15.6 | H | 30.0 | -14.4 | QP | 0 | 2.8 | |
| 900.754 | 22.0 | V | 37.0 | -15.0 | QP | 360 | 1.0 | |
| 87.009 | 14.9 | V | 30.0 | -15.1 | QP | 314 | 1.0 | Noise Floor |
| 489.949 | 21.3 | H | 37.0 | -15.7 | QP | 85 | 2.8 | |
| 379.463 | 19.1 | H | 37.0 | -17.9 | QP | 90 | 2.2 | |
| 379.463 | 16.2 | V | 37.0 | -20.8 | QP | 180 | 1.0 | |

Note Preliminary scans indicated that the radiated emission 30 -1000MHz is independent from mode (Tx/Rx) and frequency (2412-5800). Above 1GHz limits of 15.109 were used.

Run #2B: Maximized Readings From Run #2A

Transmit mode

| Frequency | Level | Pol | EN 55022 Class B ¹ | | Detector | Azimuth | Height | Comments |
|-----------|--------------|-----|-------------------------------|--------|-----------|---------|--------|----------|
| MHz | dB μ V/m | V/H | Limit | Margin | Pk/QP/Avg | degrees | meters | |
| 58.598 | 20.5 | V | 30.0 | -9.5 | QP | 285 | 1.0 | |
| 489.949 | 26.5 | V | 37.0 | -10.5 | QP | 222 | 1.0 | |
| 85.003 | 18.9 | V | 30.0 | -11.1 | QP | 360 | 1.1 | |
| 900.754 | 25.9 | H | 37.0 | -11.1 | QP | 345 | 2.5 | |
| 225.010 | 15.6 | H | 30.0 | -14.4 | QP | 0 | 2.8 | |
| 900.754 | 22.0 | V | 37.0 | -15.0 | QP | 360 | 1.0 | |

Receive mode

| Frequency | Level | Pol | RSS 210/LP0002 | | Detector | Azimuth | Height | Comments |
|-----------|--------------|-----|----------------|--------|-----------|---------|--------|----------|
| MHz | dB μ V/m | V/H | Limit | Margin | Pk/QP/Avg | degrees | meters | |
| 58.598 | 31.0 | V | 40.0 | -9.0 | QP | 285 | 1.0 | |
| 489.949 | 37.0 | V | 46.0 | -9.0 | QP | 222 | 1.0 | |
| 900.754 | 36.4 | V | 46.0 | -9.6 | QP | 360 | 1.1 | |
| 85.003 | 29.4 | H | 40.0 | -10.6 | QP | 345 | 2.5 | |
| 900.754 | 32.5 | H | 46.0 | -13.5 | QP | 0 | 2.8 | |
| 225.010 | 26.1 | V | 46.0 | -19.9 | QP | 360 | 1.0 | |

Note Measurements on the OATS at a test distance of 3m showed all emissions more than 20dB below the limit above 1GHz in receive mode. LP0002 limit is more stringent.



EMC Test Data

| | | | |
|----------|------------------------------|------------------|-------------|
| Client: | Atheros | Job Number: | J59313 |
| Model: | D1470U | T-Log Number: | T59339 |
| Contact: | Michael Robinson | Account Manager: | Joe Rohlfes |
| Spec: | FCC 15E,15.247;LP002;RSS 210 | Class: | n/a |

Conducted Emissions - Power Ports

Test Specifics

Objective: The objective of this test session is to perform final qualification testing of the EUT with respect to the specification listed above.

Date of Test: 4/20/2005
 Test Engineer: Mehran Birgani
 Test Location: SVOATS #2

Config. Used: 2
 Config Change: None
 EUT Voltage: Host System

General Test Configuration

The EUT was located on a wooden table, 40 cm from a vertical coupling plane and 80cm from the LISN. A second LISN was used for all local support equipment.

Ambient Conditions: Temperature: 18 °C
 Rel. Humidity: 58 %

Summary of Results

| Run # | Test Performed | Limit | Result | Margin |
|-------|-------------------------|-----------------|--------|------------------------------|
| 1 | CE, AC Power, 230V/50Hz | EN55022 Class B | Pass | 42.5dBµV @ 0.418MHz (-5.0dB) |
| 2 | CE, AC Power, 120V/60Hz | EN55022 Class B | Pass | 40.3dBµV @ 0.479MHz (-6.0dB) |
| 3 | CE, AC Power, 120V/60Hz | RSS 210 | Pass | 41.5dBµV @ 0.479MHz (-6.5dB) |

AC conducted emissions were independent of operating frequency, therefore all final measurements made with the EUT operating at 5320 MHz.

Modifications Made During Testing:

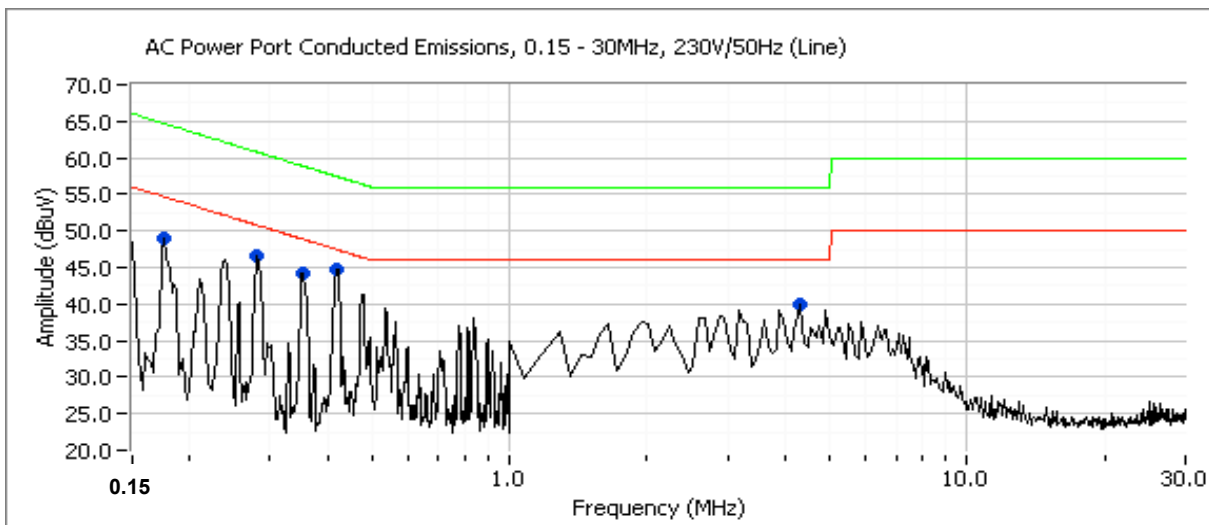
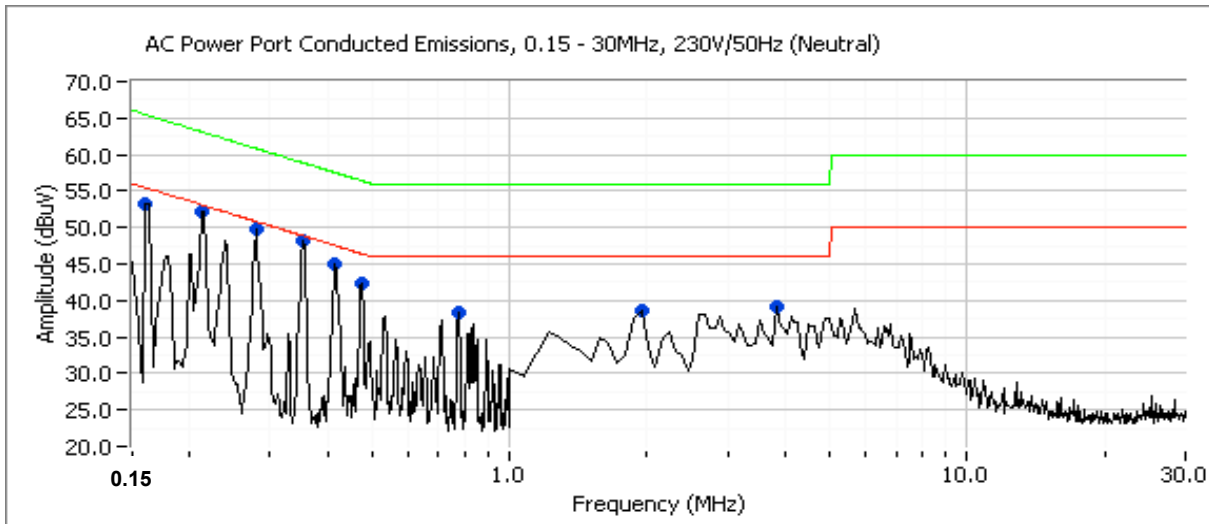
No modifications were made to the EUT during testing

Deviations From The Standard

No deviations were made from the requirements of the standard.

| | |
|------------------------------------|------------------------------|
| Client: Atheros | Job Number: J59313 |
| Model: D1470U | T-Log Number: T59339 |
| Contact: Michael Robinson | Account Manager: Joe Rohlfes |
| Spec: FCC 15E,15.247;LP002;RSS 210 | Class: n/a |

Run #1: AC Power Port Conducted Emissions, 0.15 - 30MHz, 230V/50Hz
Configuration: 802.11a Mode, 5320 MHz and Tx Mode





EMC Test Data

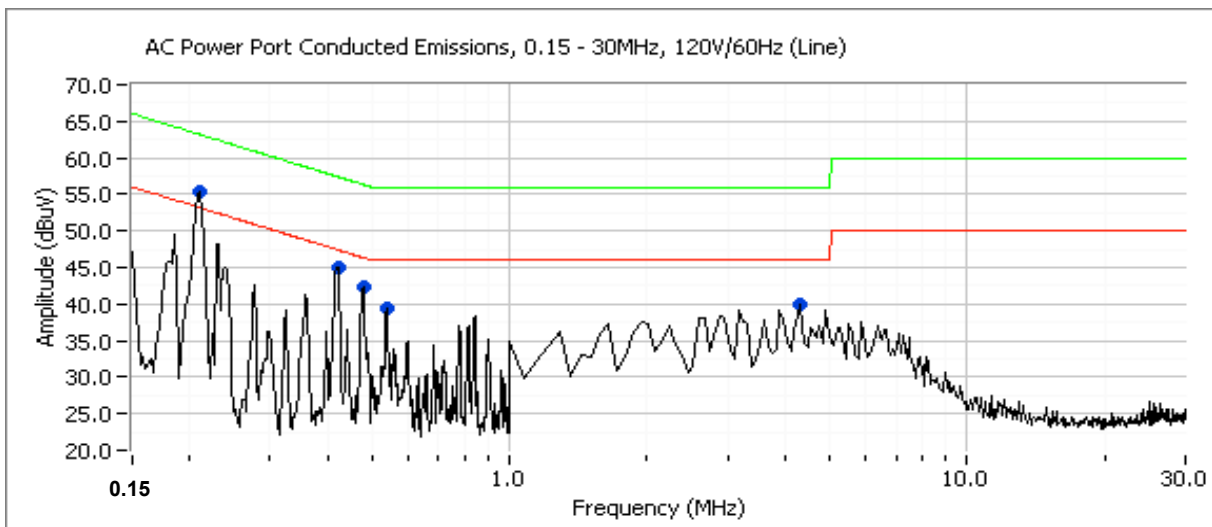
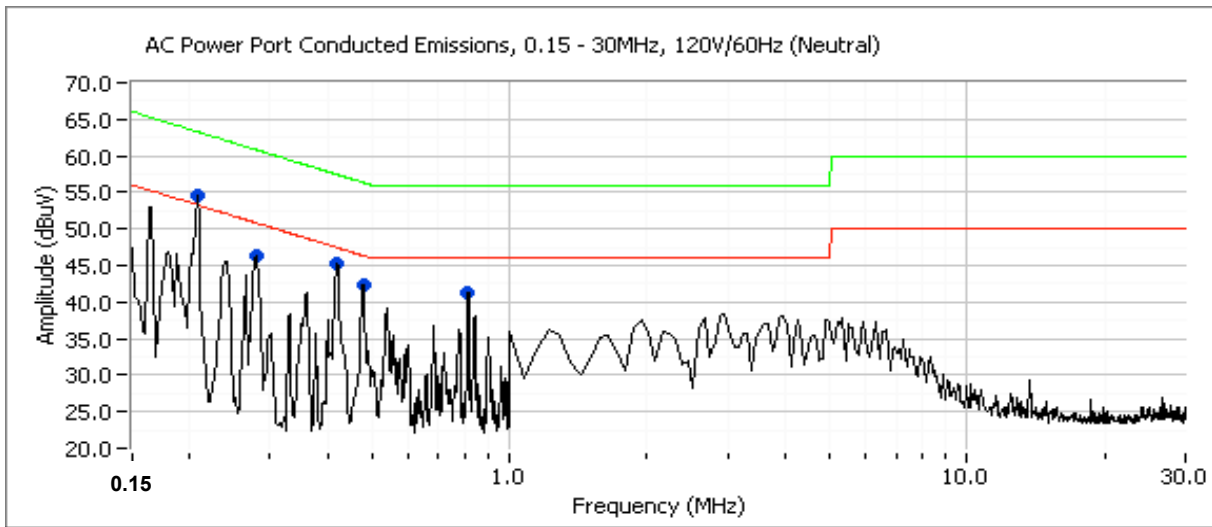
| | | | |
|----------|------------------------------|------------------|-------------|
| Client: | Atheros | Job Number: | J59313 |
| Model: | D1470U | T-Log Number: | T59339 |
| Contact: | Michael Robinson | Account Manager: | Joe Rohlfes |
| Spec: | FCC 15E,15.247;LP002;RSS 210 | Class: | n/a |

Run #1: AC Power Port Conducted Emissions, 0.15 - 30MHz, 230V/50Hz
Configuration: 802.11a Mode, 5320 MHz and Tx Mode

| Frequency MHz | Level dBµV | AC Line | EN55022 Class B | | Detector QP/Ave | Comments |
|------------------|---------------|------------|-----------------|--------|--------------------|----------|
| | | | Limit | Margin | | |
| 0.418 | 42.5 | Line | 47.5 | -5.0 | Average | |
| 0.416 | 42.0 | Neutral | 47.5 | -5.5 | Average | |
| 0.475 | 39.8 | Neutral | 46.4 | -6.6 | Average | |
| 0.479 | 39.1 | Line | 46.3 | -7.2 | Average | |
| 0.239 | 44.4 | Line | 52.1 | -7.7 | Average | |
| 0.280 | 41.6 | Neutral | 50.8 | -9.2 | Average | |
| 0.282 | 41.4 | Line | 50.8 | -9.4 | Average | |
| 0.354 | 39.5 | Neutral | 48.9 | -9.4 | Average | |
| 3.859 | 35.8 | Neutral | 46.0 | -10.2 | Average | |
| 0.773 | 34.8 | Neutral | 46.0 | -11.2 | Average | |
| 0.180 | 43.2 | Neutral | 54.5 | -11.3 | Average | |
| 0.213 | 41.8 | Line | 53.1 | -11.3 | Average | |
| 0.213 | 51.5 | Line | 63.1 | -11.6 | QP | |
| 1.903 | 34.3 | Neutral | 46.0 | -11.7 | Average | |
| 0.214 | 51.2 | Neutral | 63.1 | -11.9 | QP | |
| 0.280 | 48.8 | Neutral | 60.8 | -12.0 | QP | |
| 0.214 | 41.0 | Neutral | 53.1 | -12.1 | Average | |
| 0.418 | 45.1 | Line | 57.5 | -12.4 | QP | |
| 0.282 | 47.4 | Line | 60.8 | -13.4 | QP | |
| 0.416 | 43.4 | Neutral | 57.5 | -14.1 | QP | |
| 0.354 | 43.8 | Neutral | 58.9 | -15.1 | QP | |
| 4.290 | 30.8 | Line | 46.0 | -15.2 | Average | |
| 0.475 | 40.8 | Neutral | 56.4 | -15.6 | QP | |
| 0.479 | 40.2 | Line | 56.3 | -16.1 | QP | |
| 0.239 | 45.3 | Line | 62.1 | -16.8 | QP | |
| 0.773 | 38.1 | Neutral | 56.0 | -17.9 | QP | |
| 1.903 | 37.6 | Neutral | 56.0 | -18.4 | QP | |
| 0.180 | 45.8 | Neutral | 64.5 | -18.7 | QP | |
| 3.859 | 37.3 | Neutral | 56.0 | -18.7 | QP | |
| 4.290 | 35.1 | Line | 56.0 | -20.9 | QP | |

| | |
|------------------------------------|------------------------------|
| Client: Atheros | Job Number: J59313 |
| Model: D1470U | T-Log Number: T59339 |
| Contact: Michael Robinson | Account Manager: Joe Rohlfes |
| Spec: FCC 15E,15.247;LP002;RSS 210 | Class: n/a |

Run #2: AC Power Port Conducted Emissions, 0.15 - 30MHz, 120V/60Hz
Configuration: 802.11a Mode, 5320 MHz and Tx Mode





EMC Test Data

| | | | |
|----------|------------------------------|------------------|-------------|
| Client: | Atheros | Job Number: | J59313 |
| Model: | D1470U | T-Log Number: | T59339 |
| Contact: | Michael Robinson | Account Manager: | Joe Rohlfes |
| Spec: | FCC 15E,15.247;LP002;RSS 210 | Class: | n/a |

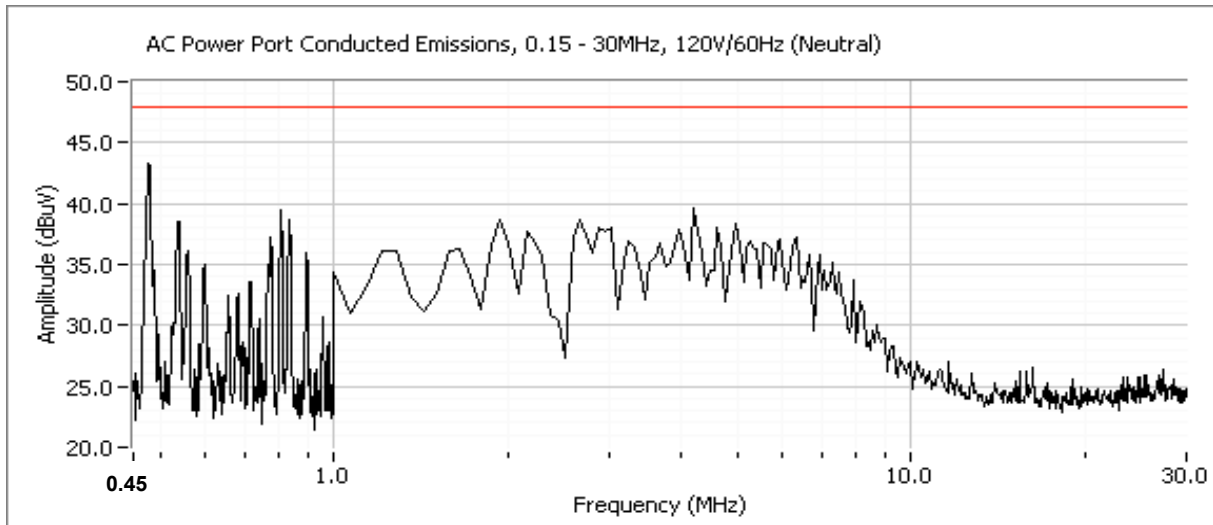
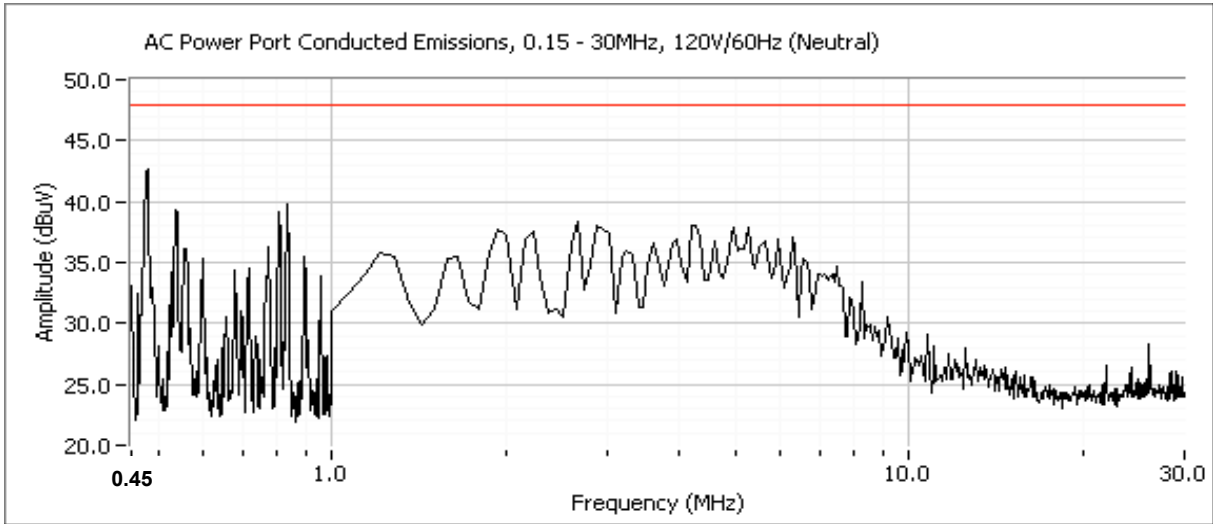
Run #2: AC Power Port Conducted Emissions, 0.15 - 30MHz, 120V/60Hz

Configuration: 802.11a Mode, 5320 MHz and Tx Mode

| Frequency MHz | Level dB μ V | AC Line | EN55022 Class B | | Detector QP/Ave | Comments |
|------------------|---------------------|------------|-----------------|--------|--------------------|----------|
| | | | Limit | Margin | | |
| 0.479 | 40.3 | Line | 46.3 | -6.0 | Average | |
| 0.479 | 40.3 | Neutral | 46.3 | -6.0 | Average | |
| 0.420 | 41.2 | Neutral | 47.5 | -6.3 | Average | |
| 0.210 | 54.5 | Line | 63.2 | -8.7 | QP | |
| 0.207 | 53.8 | Neutral | 63.3 | -9.5 | QP | |
| 0.539 | 36.1 | Line | 46.0 | -9.9 | Average | |
| 0.422 | 37.5 | Line | 47.4 | -9.9 | Average | |
| 0.210 | 43.3 | Line | 53.2 | -9.9 | Average | |
| 0.207 | 42.7 | Neutral | 53.3 | -10.6 | Average | |
| 0.420 | 43.9 | Neutral | 57.5 | -13.6 | QP | |
| 0.479 | 41.5 | Neutral | 56.3 | -14.8 | QP | |
| 0.479 | 41.3 | Line | 56.3 | -15.0 | QP | |
| 0.280 | 45.3 | Neutral | 60.8 | -15.5 | QP | |
| 0.280 | 34.9 | Neutral | 50.8 | -15.9 | Average | |
| 0.422 | 40.6 | Line | 57.4 | -16.8 | QP | |
| 0.539 | 37.8 | Line | 56.0 | -18.2 | QP | |

| | |
|------------------------------------|------------------------------|
| Client: Atheros | Job Number: J59313 |
| Model: D1470U | T-Log Number: T59339 |
| Contact: Michael Robinson | Account Manager: Joe Rohlfes |
| Spec: FCC 15E,15.247;LP002;RSS 210 | Class: n/a |

Run #3: AC Power Port Conducted Emissions, 0.45 - 30MHz, 120V/60Hz
Configuration: 802.11a Mode, 5320 MHz and Tx Mode





EMC Test Data

| | | | |
|----------|------------------------------|------------------|-------------|
| Client: | Atheros | Job Number: | J59313 |
| Model: | D1470U | T-Log Number: | T59339 |
| Contact: | Michael Robinson | Account Manager: | Joe Rohlfes |
| Spec: | FCC 15E,15.247;LP002;RSS 210 | Class: | n/a |

Run #3: AC Power Port Conducted Emissions, 0.15 - 30MHz, 120V/60Hz

Configuration: 802.11a Mode, 5320 MHz and Tx Mode

| Frequency MHz | Level dB μ V | AC Line | RSS 120 | | Detector QP/Ave | Comments |
|------------------|---------------------|------------|---------|--------|--------------------|----------|
| | | | Limit | Margin | | |
| 0.479 | 41.5 | Neutral | 48.0 | -6.5 | QP | |
| 0.479 | 41.3 | Line | 48.0 | -6.7 | QP | |
| 4.183 | 39.0 | Neutral | 48.0 | -9.0 | QP | |
| 4.183 | 38.5 | Line | 48.0 | -9.5 | QP | |
| 0.539 | 37.8 | Line | 48.0 | -10.2 | QP | |
| 1.913 | 37.0 | Neutral | 48.0 | -11.0 | QP | |



EMC Test Data

| | | | |
|----------|------------------------------|------------------|-------------|
| Client: | Atheros | Job Number: | J59313 |
| Model: | D1470U | T-Log Number: | T59339 |
| Contact: | Michael Robinson | Account Manager: | Joe Rohlfes |
| Spec: | FCC 15E,15.247;LP002;RSS 210 | Class: | N/A |

FCC 15.247 DTS - Power, Bandwidth and Spurious Emissions 2400 - 2483.5 MHz and 5725 - 5850 MHz Bands

Test Specifics

Objective: The objective of this test session is to perform final qualification testing of the EUT with respect to the specification listed above.

Date of Test: 4/13/2005
 Test Engineer: Mark Briggs
 Test Location: SVOATS #3

Config. Used: #2
 Config Change: None
 Host Unit Voltage 120V/60Hz

General Test Configuration

When measuring the conducted emissions from the EUT's antenna port, the antenna port of the EUT was connected to the spectrum analyzer or power meter via a suitable attenuator to prevent overloading the measurement system. All measurements are corrected to allow for the external attenuators used.

Summary of Results

| Run # | Test Performed | Limit | Pass / Fail | Result / Margin |
|-------|---|------------------------------|-------------|--|
| 1a | RE, 30 - 25000 MHz - Spurious Emissions | FCC Part 15.209 / 15.247 (c) | Pass | All emissions < -20dBc |
| 1b | RE, 30 - 40000 MHz - Spurious Emissions | FCC Part 15.209 / 15.247 (c) | Pass | All emissions < -20dBc |
| 2 | 6dB Bandwidth 2400-2483.5 MHz Band | 15.247(a) | Pass | 802.11b: 12.1 MHz 802.11g: 16.7 MHz Turbo: 33.4 MHz |
| 2 | 6dB Bandwidth 5725 - 5850MHz Band | 15.247(a) | Pass | 802.11a: 16.6 MHz Turbo: 33.2 MHz |
| 3 | Output Power | 15.247(b) | Pass | 802.11b: 18.4 dBm 802.11g: 22.3 dBm Turbo: 22.3 dBm |
| 3 | Output Power | 15.247(b) | Pass | 802.11a: 22.1dBm Turbo: 21.5dBm |
| 4 | Power Spectral Density (PSD) | 15.247(d) | Pass | 802.11b:-5dBm/3kHz 802.11g:-7.2dBm/3kHz Turbo:-3.8dBm/3kHz |
| 4 | Power Spectral Density (PSD) | 15.247(d) | Pass | 802.11a:-7.3dBm/3kHz Turbo:-11.2dBm/3kHz |

| | |
|------------------------------------|------------------------------|
| Client: Atheros | Job Number: J59313 |
| Model: D1470U | T-Log Number: T59339 |
| Contact: Michael Robinson | Account Manager: Joe Rohlfes |
| Spec: FCC 15E,15.247;LP002;RSS 210 | Class: N/A |

Modifications Made During Testing:

No modifications were made to the EUT during testing

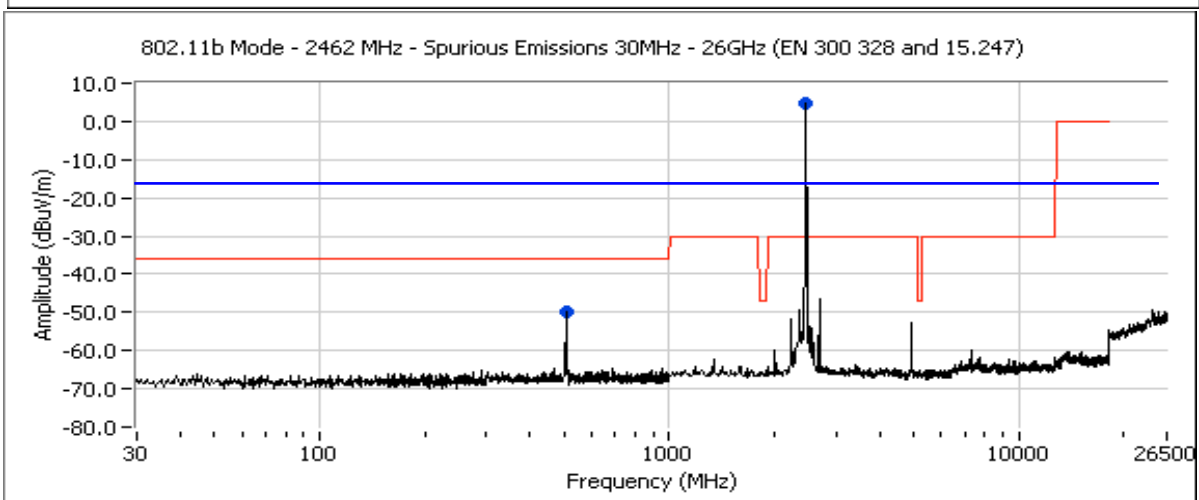
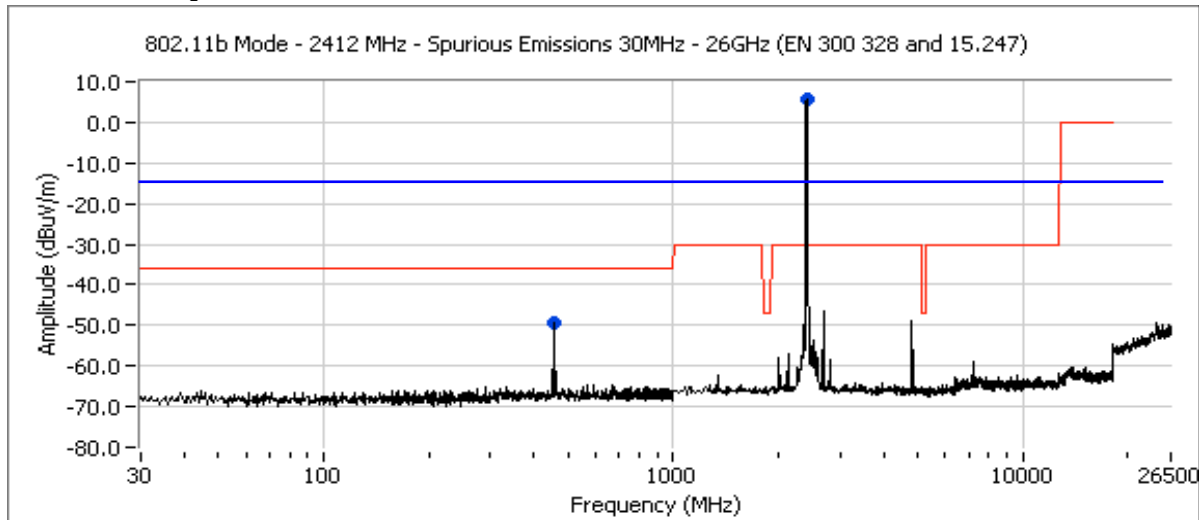
Deviations From The Standard

No deviations were made from the requirements of the standard.

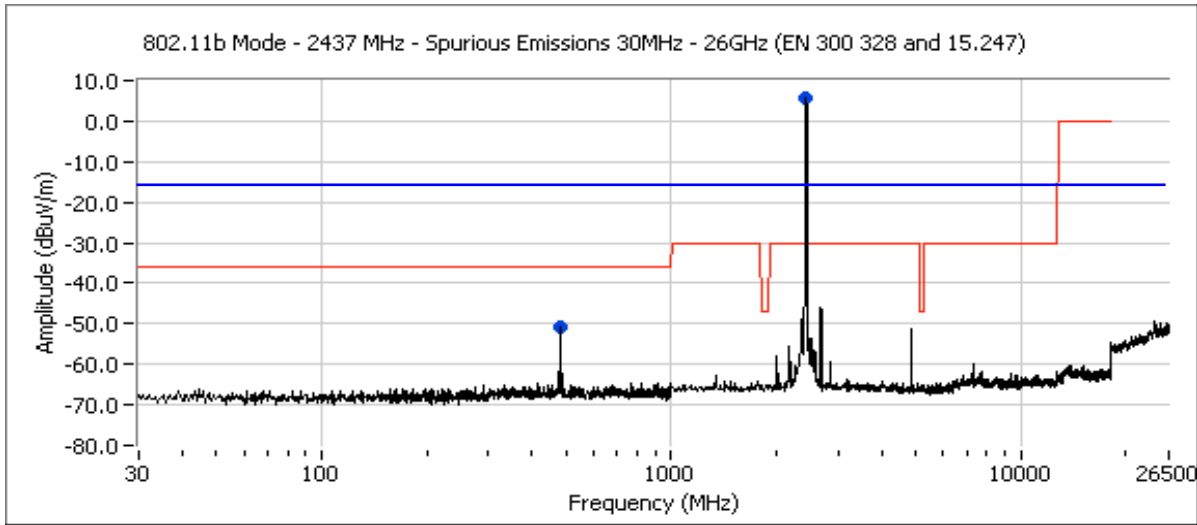
Run #1: Antenna Port Spurious Emissions

Run #1a: Antenna Conducted Spurious Emissions, 30MHz -25 GHz (EUT Operating in the 2400 MHz band)

Scans made using RBW=VB=100 KHz with the limit line set at 20dB below the highest in-band signal level. All emissions were below this limit. Band edge measurements are included in the radiated emissions test data for the top and bottom channels in 802.11b and 802.11g modes and for the turbo channel at 2437 MHz.



| | |
|------------------------------------|------------------------------|
| Client: Atheros | Job Number: J59313 |
| Model: D1470U | T-Log Number: T59339 |
| Contact: Michael Robinson | Account Manager: Joe Rohlfes |
| Spec: FCC 15E,15.247;LP002;RSS 210 | Class: N/A |



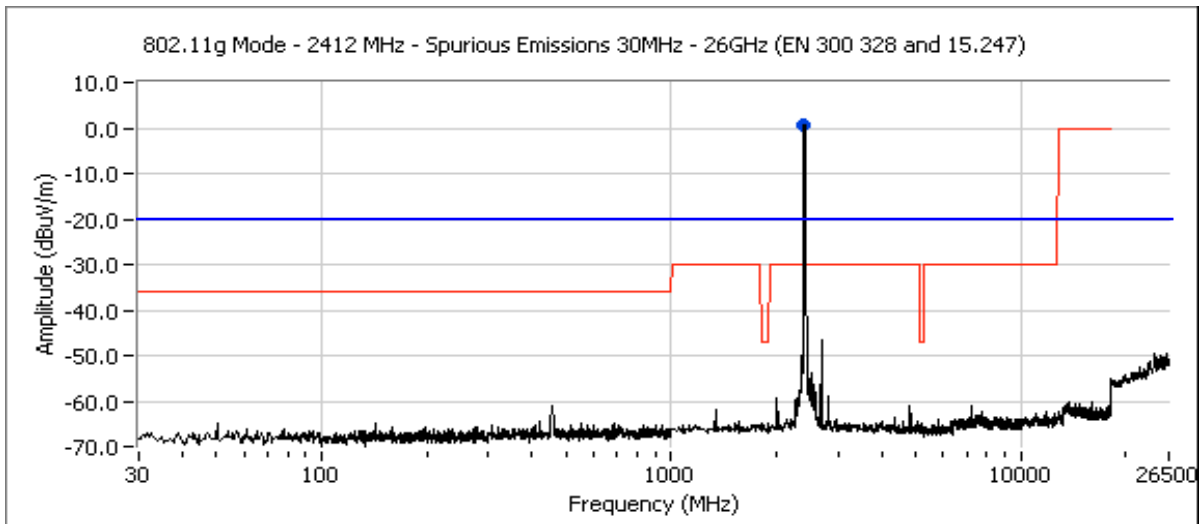
| Frequency MHz | Level dBmV/m | Pol v/h | EN 300 328 | | Detector Pk/QP/Avg | Azimuth degrees | Height meters | Comments |
|------------------|-----------------|------------|------------|--------|-----------------------|--------------------|------------------|-------------------|
| | | | Limit | Margin | | | | |
| 482.000 | -50.7 | RF Port | -36.0 | -14.7 | Peak | - | - | 802.11b, 2412 MHz |
| 456.333 | -49.2 | RF Port | -36.0 | -13.2 | Peak | - | - | 802.11b, 2437 MHz |
| 506.500 | -49.7 | RF Port | -36.0 | -13.7 | Peak | - | - | 802.11b, 2462 MHz |

| Frequency MHz | Level dBmV/m | Pol v/h | Note 1 | | Detector Pk/QP/Avg | Azimuth degrees | Height meters | Comments |
|------------------|-----------------|------------|--------|--------|-----------------------|--------------------|------------------|-------------------|
| | | | Limit | Margin | | | | |
| 482.000 | -50.7 | RF Port | -15.0 | -35.7 | Peak | - | - | 802.11b, 2412 MHz |
| 456.333 | -49.2 | RF Port | -15.0 | -34.2 | Peak | - | - | 802.11b, 2437 MHz |
| 506.500 | -49.7 | RF Port | -15.0 | -34.7 | Peak | - | - | 802.11b, 2462 MHz |

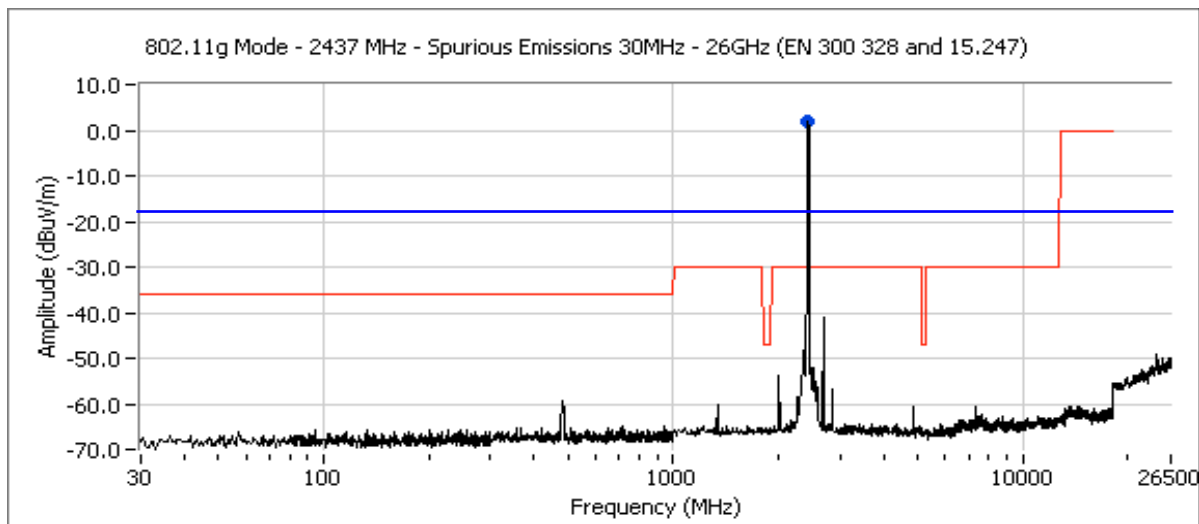
Note 1: Limit set at -20dBc in accordance with FCC 15.247, RSS 210 (o) and LP0002 section 3.10

| | |
|------------------------------------|------------------------------|
| Client: Atheros | Job Number: J59313 |
| Model: D1470U | T-Log Number: T59339 |
| Contact: Michael Robinson | Account Manager: Joe Rohlfes |
| Spec: FCC 15E,15.247;LP002;RSS 210 | Class: N/A |

802.11g Mode

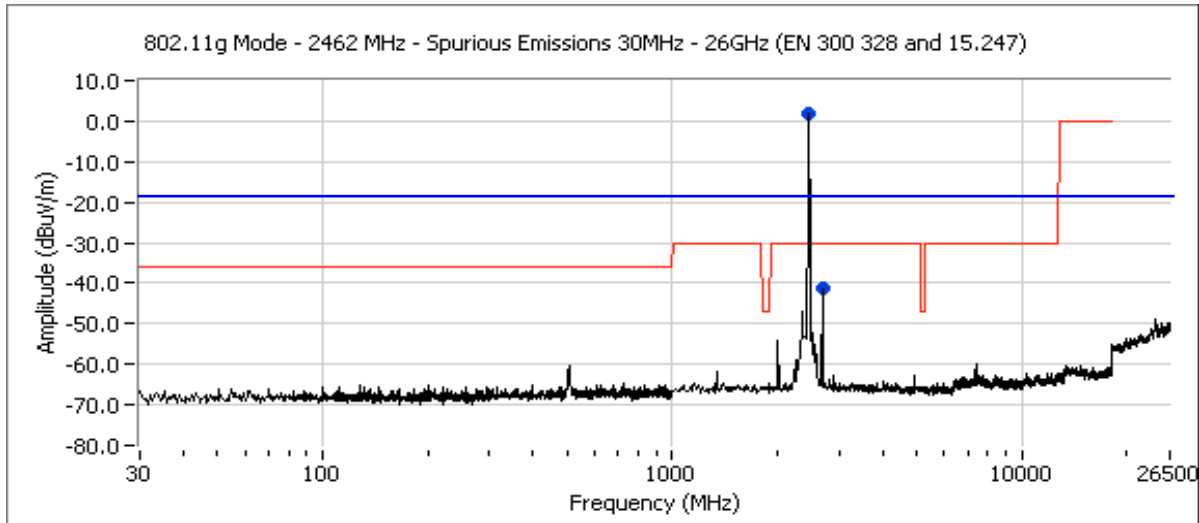


All signals 10dB or more below EN 300 328 limit and more than 20dB below fundamental signal level.



All signals 10dB or more below EN 300 328 limit and more than 20dB below fundamental signal level.

| | |
|------------------------------------|------------------------------|
| Client: Atheros | Job Number: J59313 |
| Model: D1470U | T-Log Number: T59339 |
| Contact: Michael Robinson | Account Manager: Joe Rohlfes |
| Spec: FCC 15E,15.247;LP002;RSS 210 | Class: N/A |



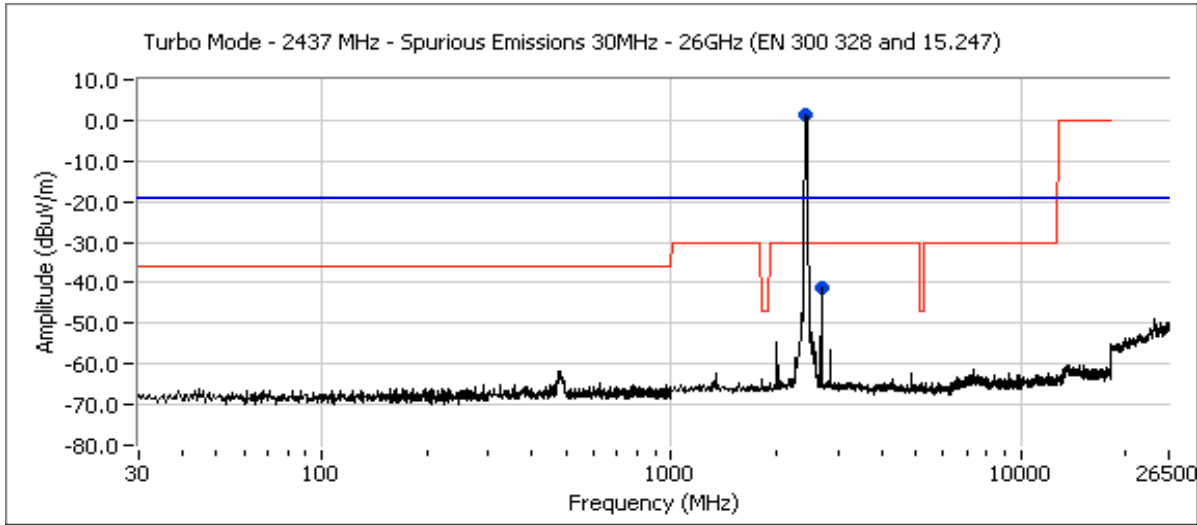
| Frequency | Level | Pol | EN 300 328 | | Detector | Azimuth | Height | Comments |
|-----------|--------|---------|------------|--------|-----------|---------|--------|-------------------|
| MHz | dBmV/m | v/h | Limit | Margin | Pk/QP/Avg | degrees | meters | |
| 2457.500 | 1.7 | RF Port | - | - | Peak | - | - | Fundamental level |
| 2686.667 | -41.0 | RF Port | -30.0 | -11.0 | Peak | - | - | 802.11g, 2472 MHz |

| Frequency | Level | Pol | Note 1 | | Detector | Azimuth | Height | Comments |
|-----------|--------|---------|--------|--------|-----------|---------|--------|-------------------|
| MHz | dBmV/m | v/h | Limit | Margin | Pk/QP/Avg | degrees | meters | |
| 2686.667 | -41.0 | RF Port | -18.3 | -22.7 | Peak | - | - | 802.11g, 2472 MHz |

Note 1: Limit set at -20dBc in accordance with FCC 15.247, RSS 210 (o) and LP0002 section 3.10

| | |
|------------------------------------|------------------------------|
| Client: Atheros | Job Number: J59313 |
| Model: D1470U | T-Log Number: T59339 |
| Contact: Michael Robinson | Account Manager: Joe Rohlfes |
| Spec: FCC 15E,15.247;LP002;RSS 210 | Class: N/A |

Turbo Mode



| Frequency | Level | Pol | EN 300 328 | | Detector | Azimuth | Height | Comments |
|-----------|--------|---------|------------|--------|-----------|---------|--------|-------------------|
| MHz | dBmV/m | v/h | Limit | Margin | Pk/QP/Avg | degrees | meters | |
| 2430.000 | 1.3 | RF Port | - | - | Peak | - | - | Fundamental level |
| 2686.667 | -41.2 | RF Port | -30.0 | -11.2 | Peak | - | - | |

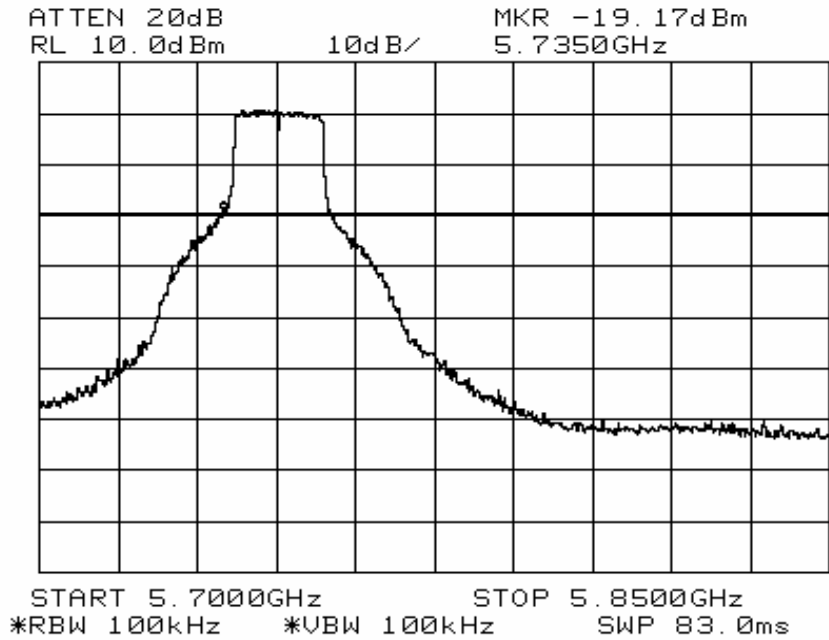
| Frequency | Level | Pol | Note 1 | | Detector | Azimuth | Height | Comments |
|-----------|--------|---------|--------|--------|-----------|---------|--------|----------------------|
| MHz | dBmV/m | v/h | Limit | Margin | Pk/QP/Avg | degrees | meters | |
| 2686.667 | -41.2 | RF Port | -18.7 | -22.5 | Peak | - | - | Turbo mode, 2437 MHz |

Note 1: Limit set at -20dBc in accordance with FCC 15.247, RSS 210 (o) and LP0002 section 3.10

| | |
|------------------------------------|------------------------------|
| Client: Atheros | Job Number: J59313 |
| Model: D1470U | T-Log Number: T59339 |
| Contact: Michael Robinson | Account Manager: Joe Rohlfes |
| Spec: FCC 15E,15.247;LP002;RSS 210 | Class: N/A |

Run #1b: Antenna Conducted Spurious Emissions, 30MHz -40 GHz (EUT Operating in the 5725 - 5850 MHz band)
 Scans made using RBW=VB=100 KHz with the limit line set at 20dB below the highest in-band signal level. All emissions were below this limit outside of the allocated band. Plots are included showing the signal levels more than -20dBc at the 5725 MHz and/or 5850 MHz band edges.

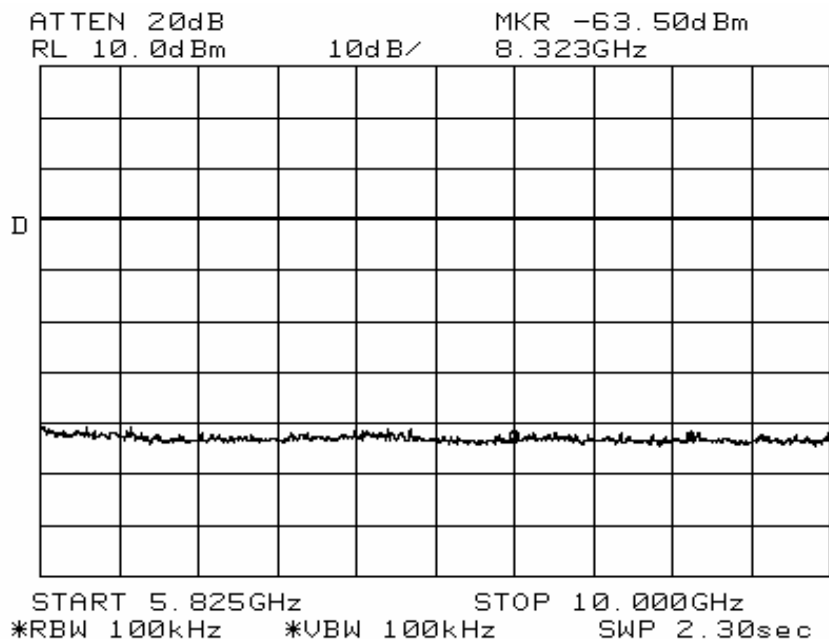
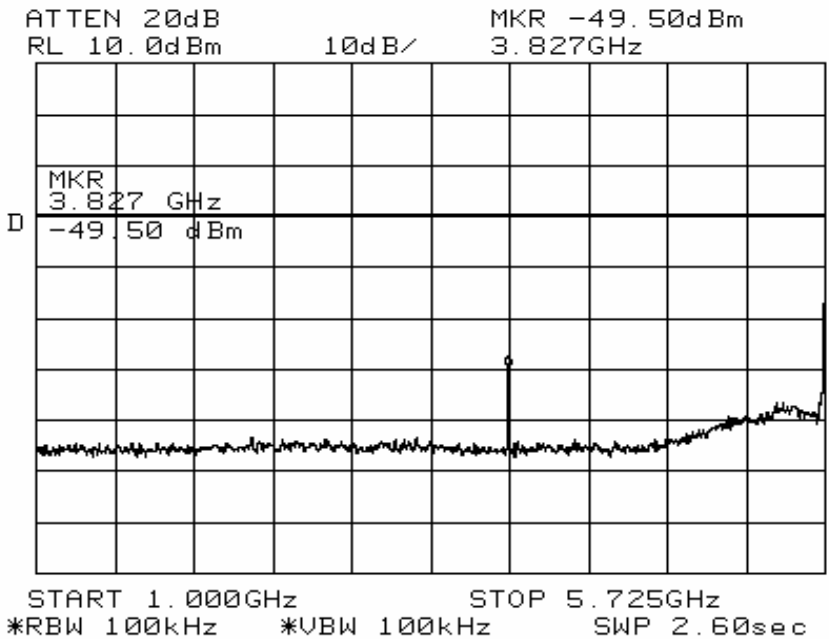
5745 MHz, 802.11a Mode





EMC Test Data

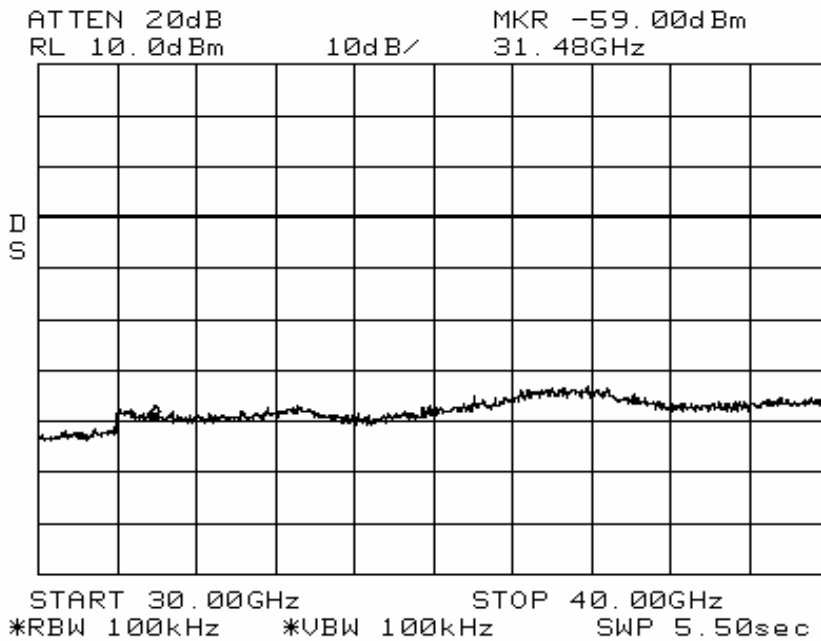
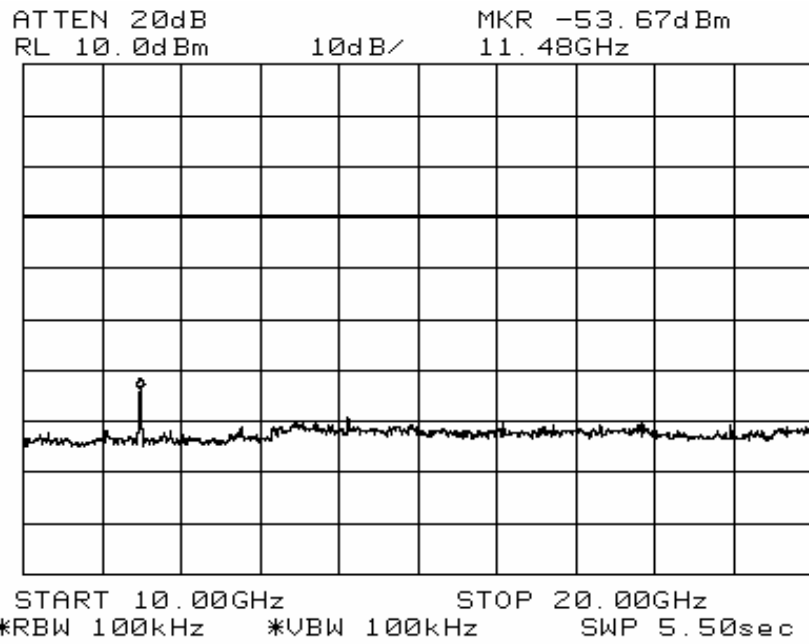
| | |
|------------------------------------|------------------------------|
| Client: Atheros | Job Number: J59313 |
| Model: D1470U | T-Log Number: T59339 |
| Contact: Michael Robinson | Account Manager: Joe Rohlfes |
| Spec: FCC 15E,15.247;LP002;RSS 210 | Class: N/A |





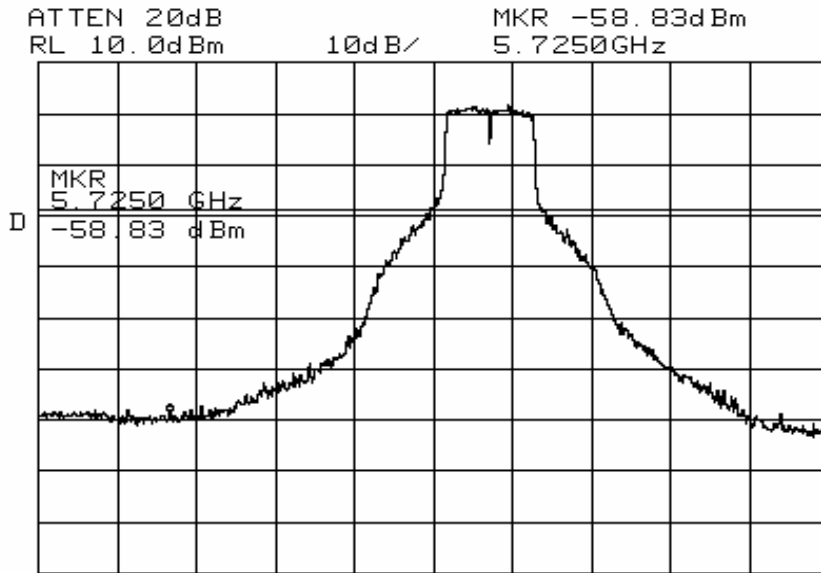
EMC Test Data

| | | | |
|----------|------------------------------|------------------|-------------|
| Client: | Atheros | Job Number: | J59313 |
| Model: | D1470U | T-Log Number: | T59339 |
| Contact: | Michael Robinson | Account Manager: | Joe Rohlfes |
| Spec: | FCC 15E,15.247;LP002;RSS 210 | Class: | N/A |

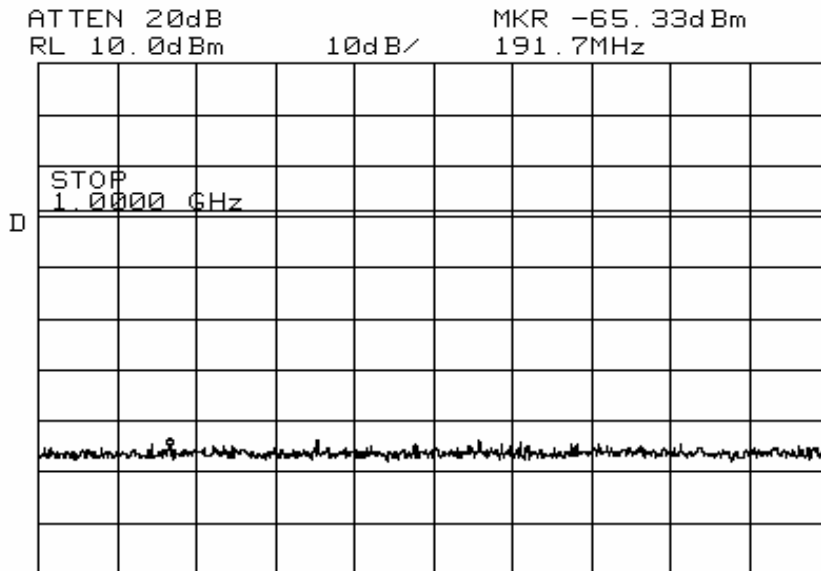


| | |
|------------------------------------|------------------------------|
| Client: Atheros | Job Number: J59313 |
| Model: D1470U | T-Log Number: T59339 |
| Contact: Michael Robinson | Account Manager: Joe Rohlfes |
| Spec: FCC 15E,15.247;LP002;RSS 210 | Class: N/A |

5785 MHz, 802.11a Mode



START 5.7000GHz STOP 5.8500GHz
*RBW 100kHz *UBW 100kHz SWP 83.0ms

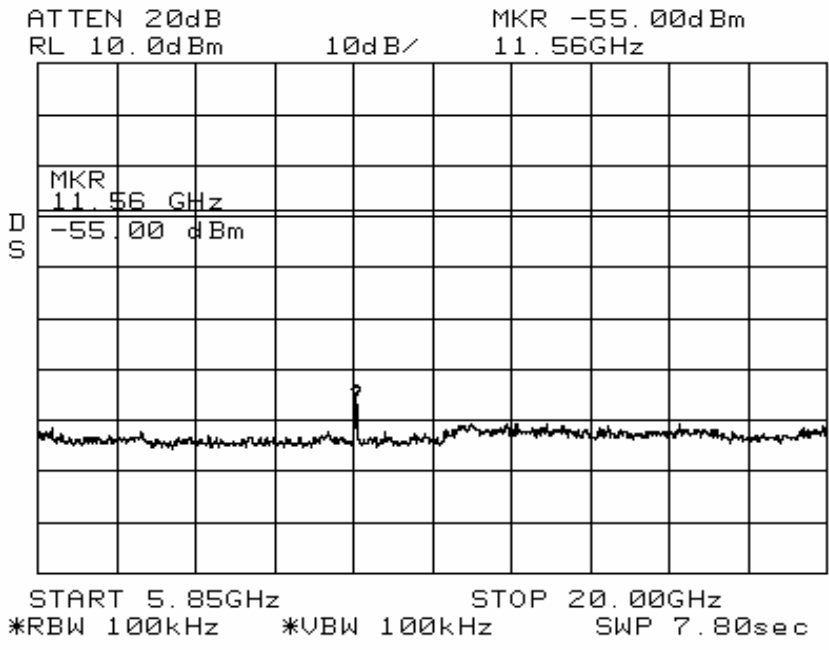
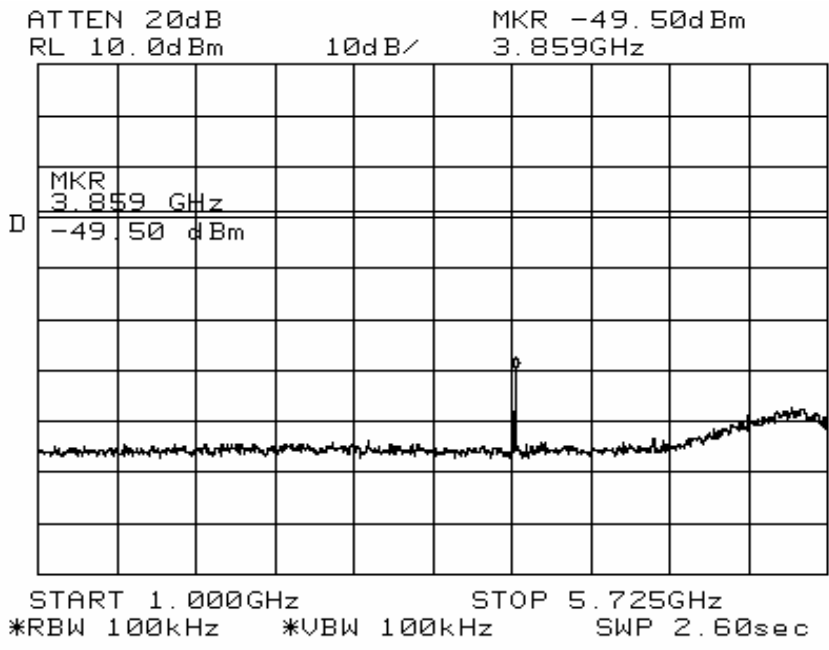


START 30.0MHz STOP 1.0000GHz
*RBW 100kHz *UBW 100kHz SWP 540ms

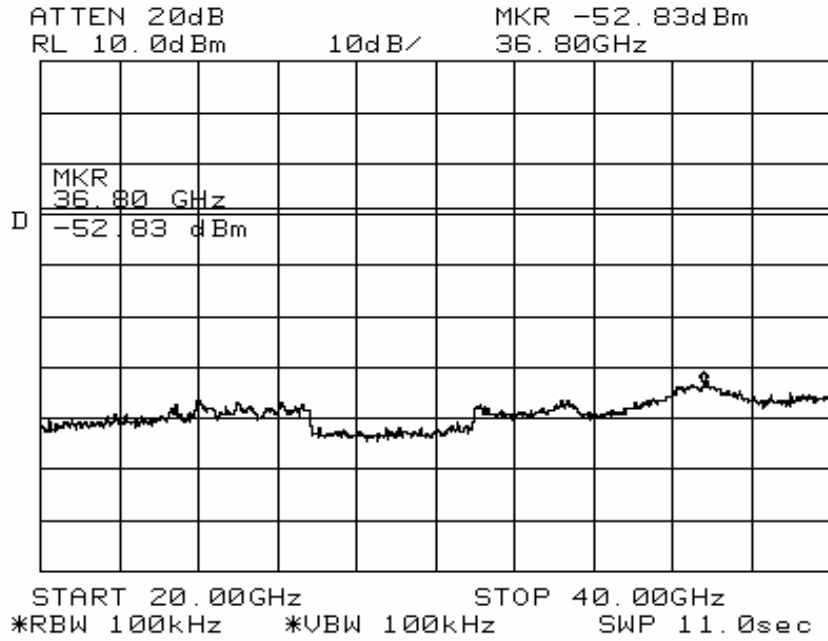


EMC Test Data

| | |
|------------------------------------|------------------------------|
| Client: Atheros | Job Number: J59313 |
| Model: D1470U | T-Log Number: T59339 |
| Contact: Michael Robinson | Account Manager: Joe Rohlfes |
| Spec: FCC 15E,15.247;LP002;RSS 210 | Class: N/A |

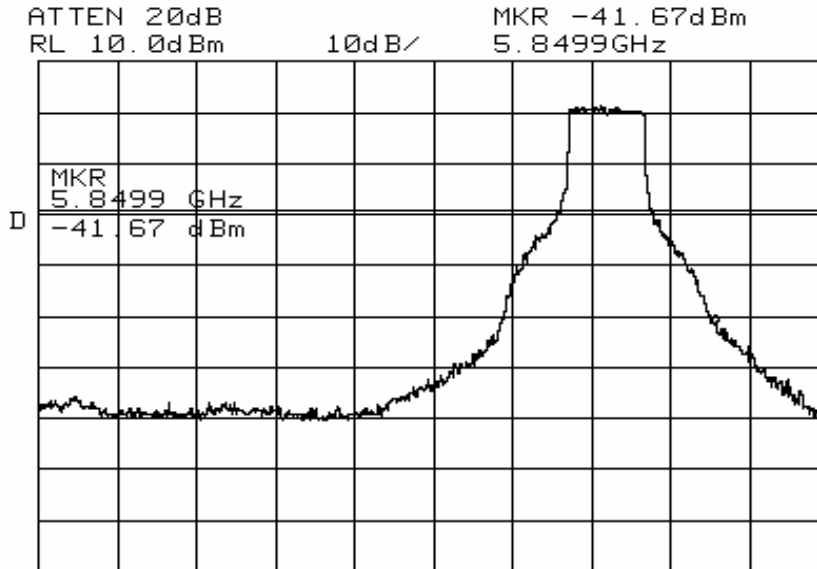


| | |
|------------------------------------|------------------------------|
| Client: Atheros | Job Number: J59313 |
| Model: D1470U | T-Log Number: T59339 |
| Contact: Michael Robinson | Account Manager: Joe Rohlfes |
| Spec: FCC 15E,15.247;LP002;RSS 210 | Class: N/A |

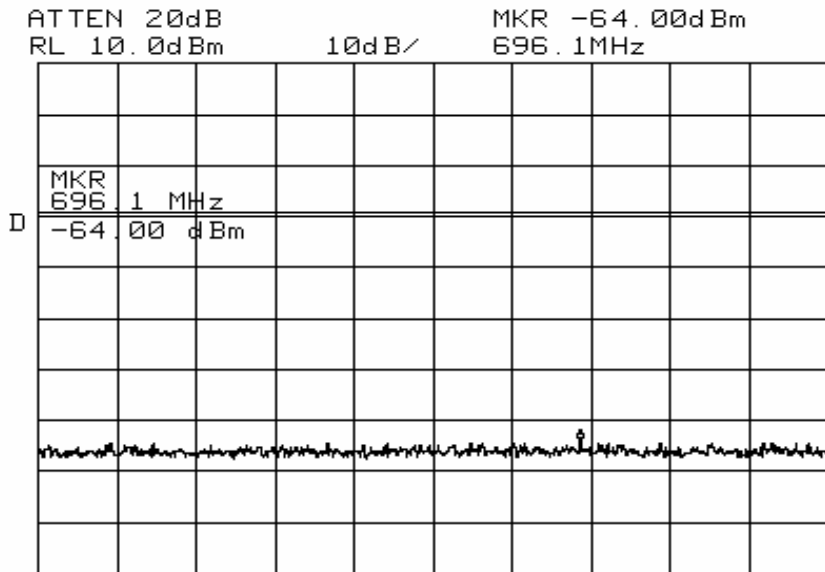


| | |
|------------------------------------|------------------------------|
| Client: Atheros | Job Number: J59313 |
| Model: D1470U | T-Log Number: T59339 |
| Contact: Michael Robinson | Account Manager: Joe Rohlfes |
| Spec: FCC 15E,15.247;LP002;RSS 210 | Class: N/A |

5825 MHz, 802.11a Mode



START 5.7000GHz STOP 5.8750GHz
 *RBW 100kHz *VBW 100kHz SWP 96.0ms

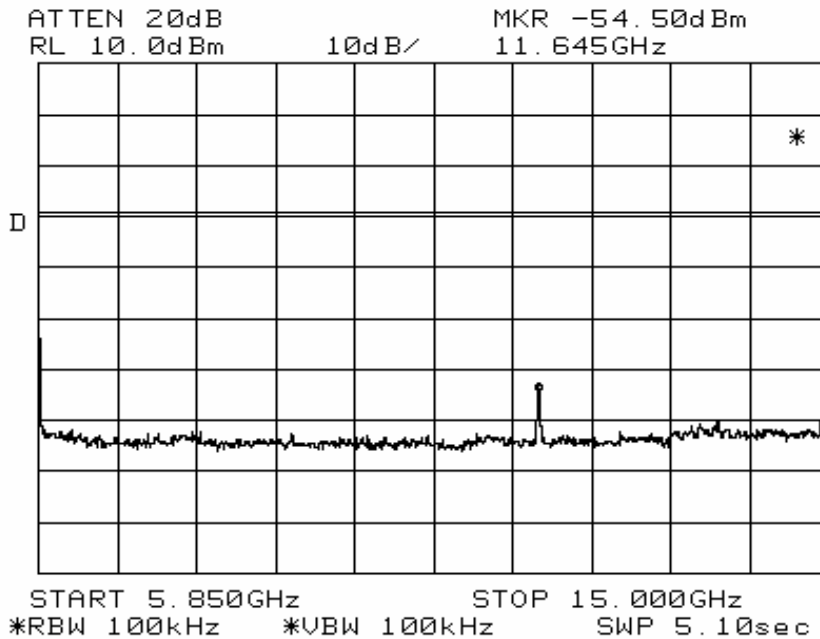
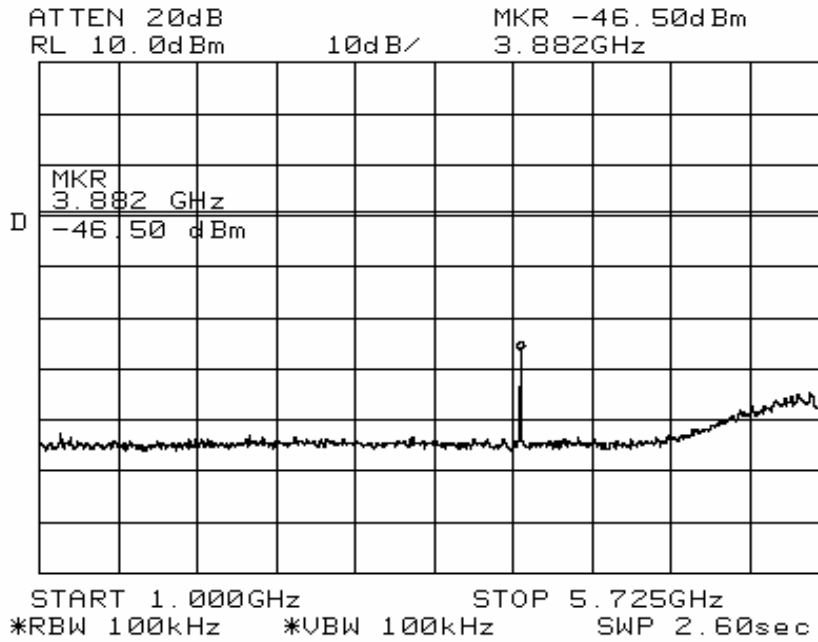


START 30.0MHz STOP 1.0000GHz
 *RBW 100kHz *VBW 100kHz SWP 540ms



EMC Test Data

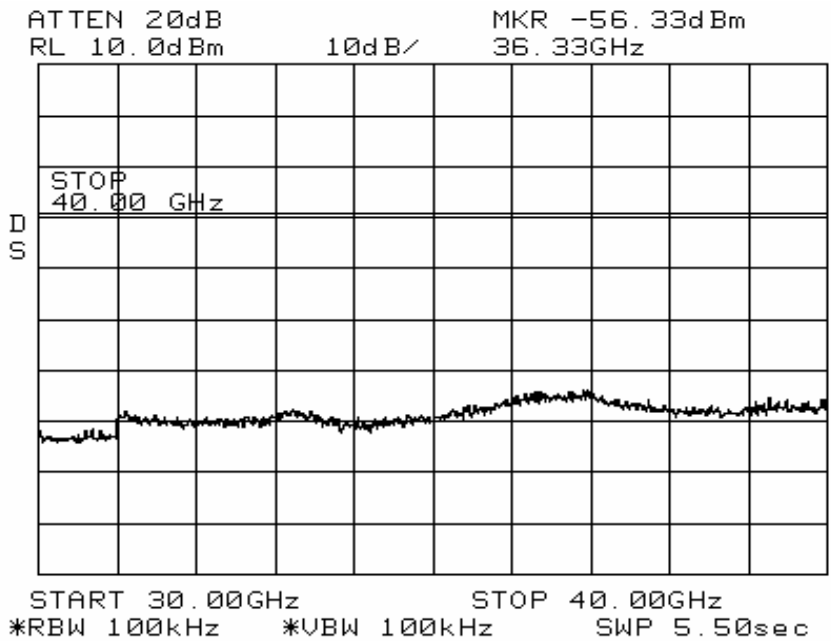
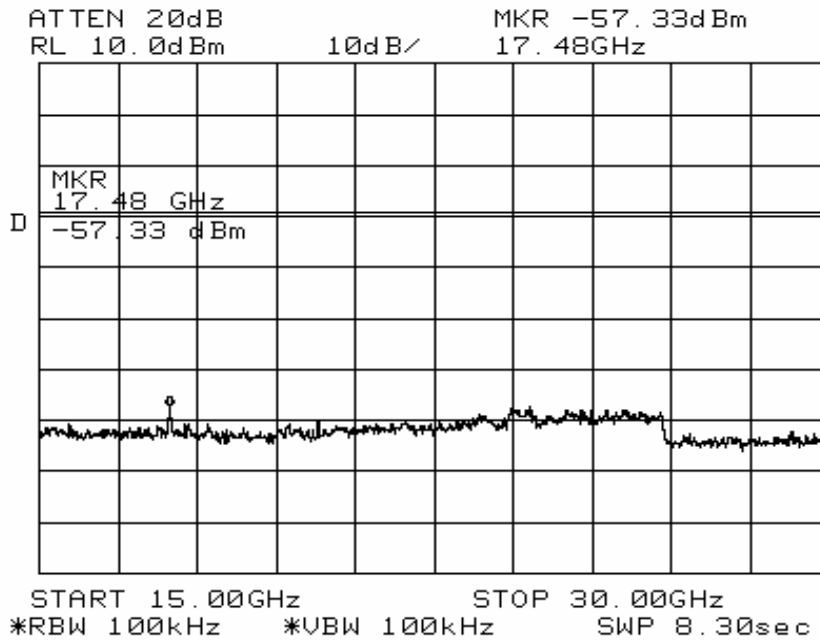
| | |
|------------------------------------|------------------------------|
| Client: Atheros | Job Number: J59313 |
| Model: D1470U | T-Log Number: T59339 |
| Contact: Michael Robinson | Account Manager: Joe Rohlfes |
| Spec: FCC 15E,15.247;LP002;RSS 210 | Class: N/A |





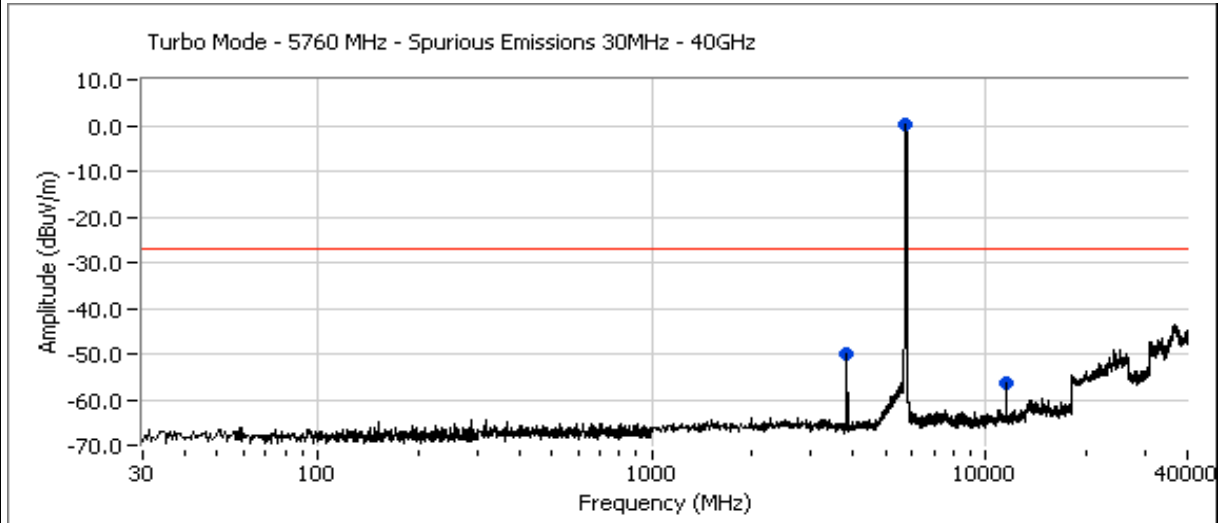
EMC Test Data

| | |
|------------------------------------|------------------------------|
| Client: Atheros | Job Number: J59313 |
| Model: D1470U | T-Log Number: T59339 |
| Contact: Michael Robinson | Account Manager: Joe Rohlfes |
| Spec: FCC 15E,15.247;LP002;RSS 210 | Class: N/A |

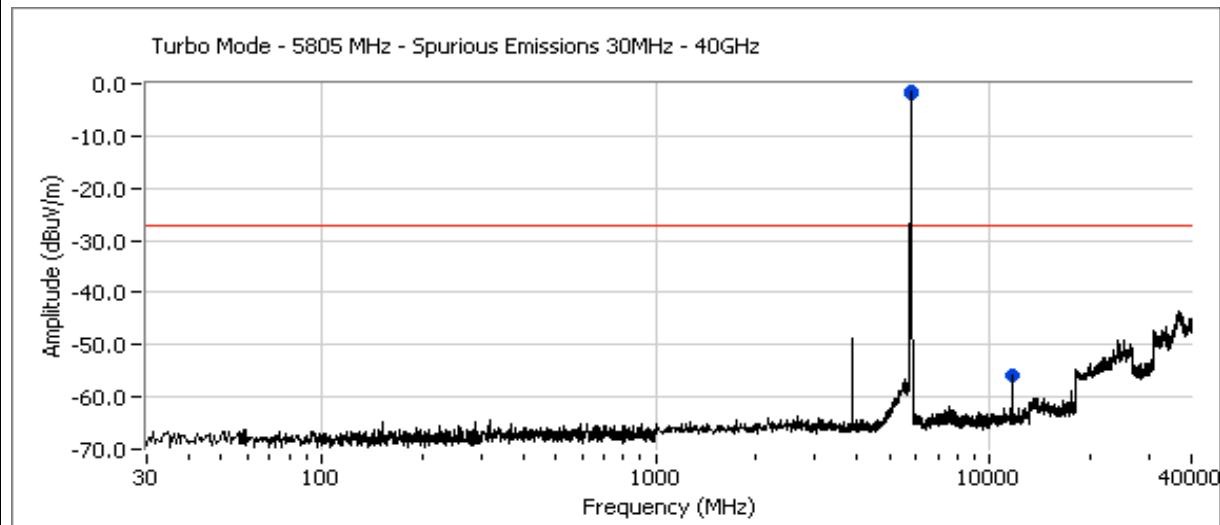


| | |
|------------------------------------|------------------------------|
| Client: Atheros | Job Number: J59313 |
| Model: D1470U | T-Log Number: T59339 |
| Contact: Michael Robinson | Account Manager: Joe Rohlfes |
| Spec: FCC 15E,15.247;LP002;RSS 210 | Class: N/A |

5760 MHz, Turbo Mode



5805 MHz, Turbo Mode





EMC Test Data

| | | | |
|----------|------------------------------|------------------|-------------|
| Client: | Atheros | Job Number: | J59313 |
| Model: | D1470U | T-Log Number: | T59339 |
| Contact: | Michael Robinson | Account Manager: | Joe Rohlfes |
| Spec: | FCC 15E,15.247;LP002;RSS 210 | Class: | N/A |

Run #2: Signal Bandwidth

| Channel | Frequency (MHz) | Mode | 6dB Signal Bandwidth (MHz) | 99% Signal Bandwidth (MHz) |
|---------|-----------------|-------|----------------------------|----------------------------|
| 1 | 2412 | b | 12.1 | 15.8 |
| 6 | 2437 | b | 12.1 | 15.8 |
| 11 | 2462 | b | 12.1 | 15.8 |
| 1 | 2412 | g | 16.8 | 16.8 |
| 6 | 2437 | g | 16.8 | 16.7 |
| 11 | 2462 | g | 16.7 | 16.7 |
| - | 2437 | turbo | 33.4 | 33.4 |
| 149 | 5745 | a | 16.7 | 17.0 |
| 157 | 5785 | a | 16.7 | 16.9 |
| 165 | 5825 | a | 16.6 | 16.9 |
| - | 5760 | turbo | 33.3 | 33.2 |
| - | 5805 | turbo | 33.2 | 33.2 |

Note 1: 6dB bandwidth measured with RB=100kHz. 99% bandwidth measured using analyzer occupied bandwidth function.

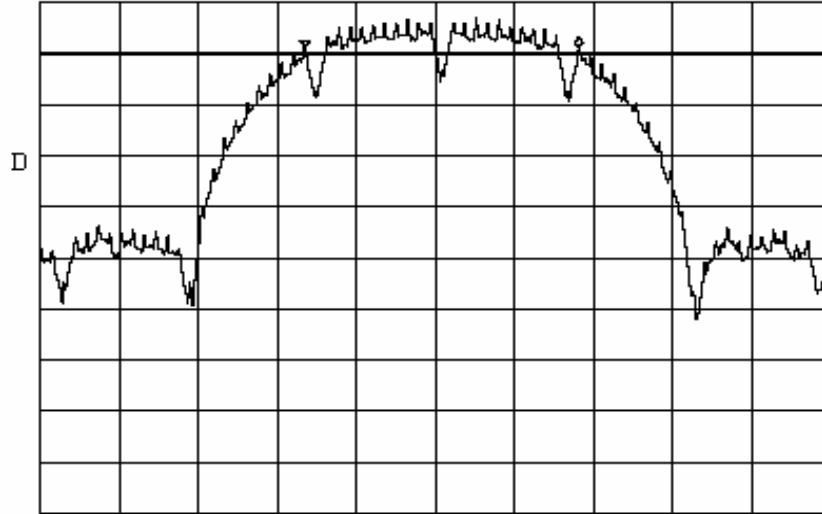


EMC Test Data

| | |
|------------------------------------|------------------------------|
| Client: Atheros | Job Number: J59313 |
| Model: D1470U | T-Log Number: T59339 |
| Contact: Michael Robinson | Account Manager: Joe Rohlfes |
| Spec: FCC 15E,15.247;LP002;RSS 210 | Class: N/A |

2412 MHz, 802.11b mode
99% Bandwidth 15.8 MHz
6dB Bandwidth 12.1 MHz

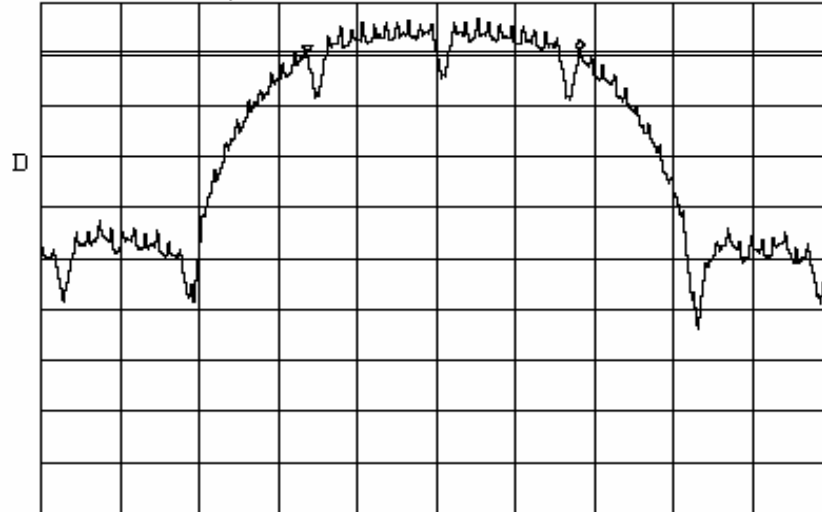
*ATTEN 20dB
RL 117.0dB μ V 10dB/ 12.13MHz
 Δ MKR -.16dB



CENTER 2.41200GHz SPAN 35.00MHz
*RBW 100kHz *VBW 100kHz *SWP 50.0ms

2437 MHz, 802.11b mode
99% Bandwidth 15.8 MHz
6dB Bandwidth 12.1 MHz

*ATTEN 20dB
RL 117.0dB μ V 10dB/ 12.08MHz
 Δ MKR .33dB



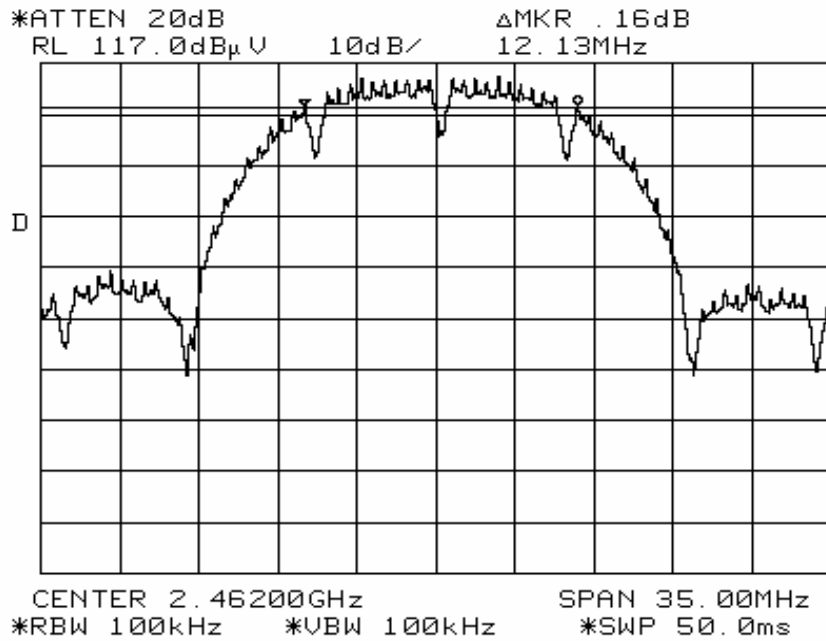
CENTER 2.43700GHz SPAN 35.00MHz
*RBW 100kHz *VBW 100kHz *SWP 50.0ms



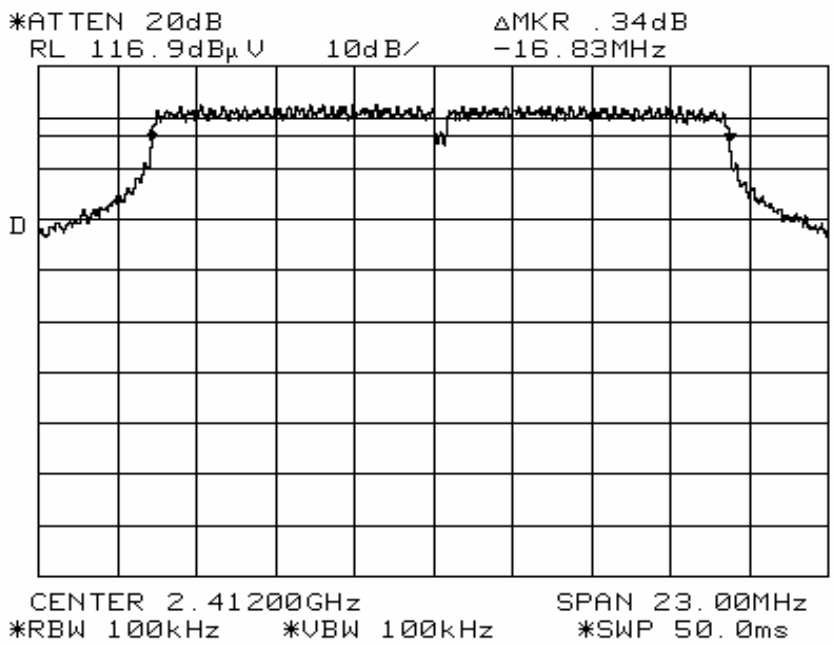
EMC Test Data

| | |
|------------------------------------|------------------------------|
| Client: Atheros | Job Number: J59313 |
| Model: D1470U | T-Log Number: T59339 |
| Contact: Michael Robinson | Account Manager: Joe Rohlfes |
| Spec: FCC 15E,15.247;LP002;RSS 210 | Class: N/A |

2462 MHz, 802.11b mode
99% Bandwidth 15.8 MHz
6dB Bandwidth 12.1 MHz



2412 MHz, 802.11g mode
99% Bandwidth 16.8 MHz
6dB Bandwidth 16.8 MHz

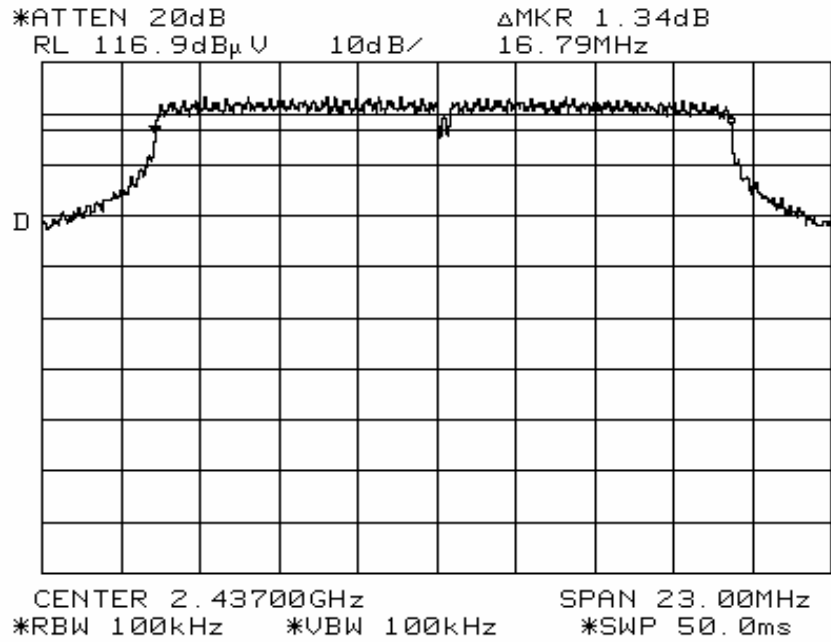




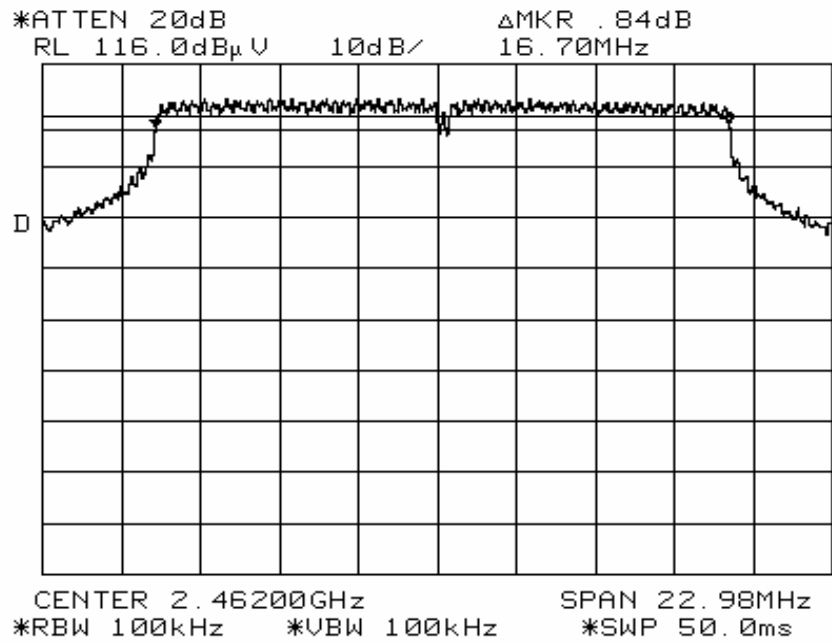
EMC Test Data

| | | | |
|----------|------------------------------|------------------|-------------|
| Client: | Atheros | Job Number: | J59313 |
| Model: | D1470U | T-Log Number: | T59339 |
| Contact: | Michael Robinson | Account Manager: | Joe Rohlfes |
| Spec: | FCC 15E,15.247;LP002;RSS 210 | Class: | N/A |

2437 MHz, 802.11g mode
 99% Bandwidth 16.7 MHz
 6dB Bandwidth 16.8 MHz



2462 MHz, 802.11g mode
 99% Bandwidth 16.7 MHz
 6dB Bandwidth 16.7 MHz





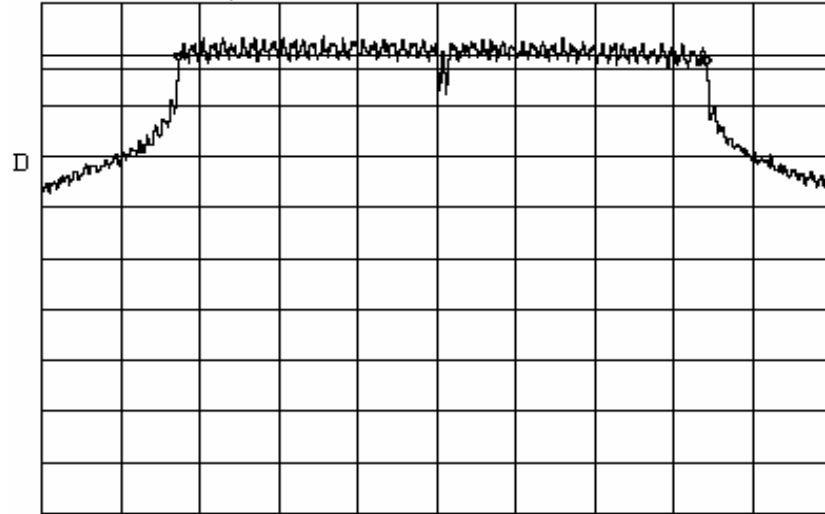
EMC Test Data

| | |
|------------------------------------|------------------------------|
| Client: Atheros | Job Number: J59313 |
| Model: D1470U | T-Log Number: T59339 |
| Contact: Michael Robinson | Account Manager: Joe Rohlfes |
| Spec: FCC 15E,15.247;LP002;RSS 210 | Class: N/A |

2437 MHz, Turbo mode

99% Bandwidth 33.4 MHz
6dB Bandwidth 33.4 MHz

*ATTEN 20dB ΔMKR -1.00dB
RL 116.0dBμV 10dB/ 33.42MHz



CENTER 2.43700GHz SPAN 50.00MHz
*RBW 100kHz *VBW 100kHz *SWP 1.00sec

5745 MHz, 802.11a mode

99% Bandwidth 17.0 MHz
6dB Bandwidth 16.7 MHz

ATTEN 20dB ΔMKR -.50dB
RL 10.0dBm 10dB/ 16.67MHz



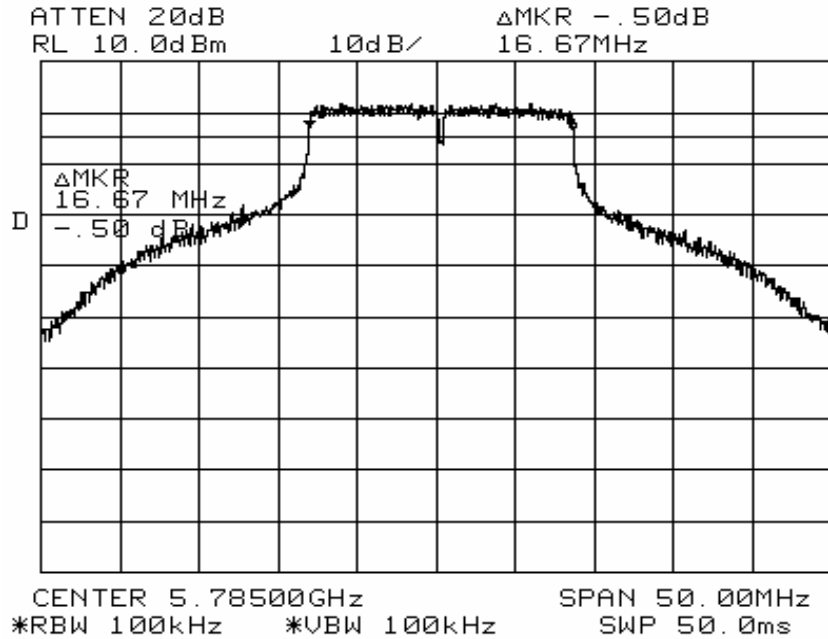
CENTER 5.74500GHz SPAN 50.00MHz
*RBW 100kHz *VBW 100kHz SWP 50.0ms



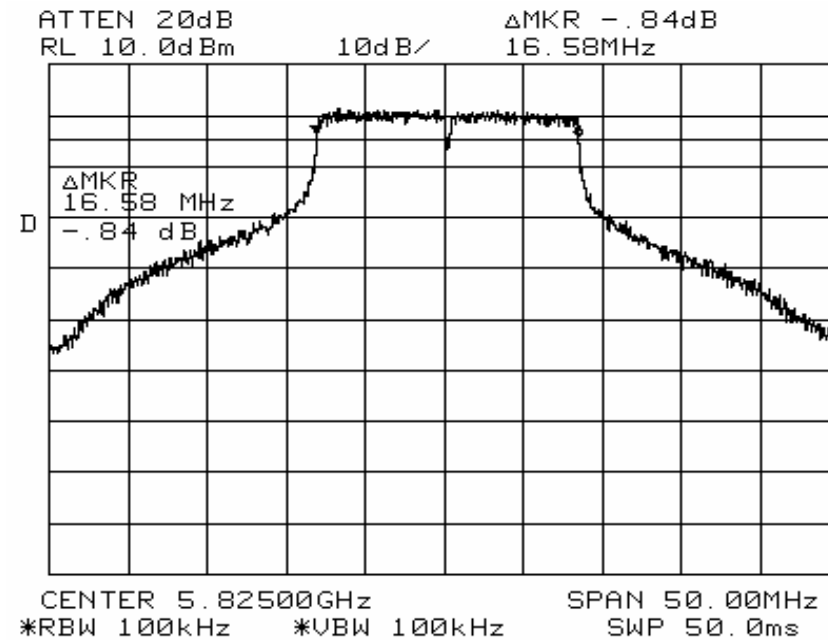
EMC Test Data

| | |
|------------------------------------|------------------------------|
| Client: Atheros | Job Number: J59313 |
| Model: D1470U | T-Log Number: T59339 |
| Contact: Michael Robinson | Account Manager: Joe Rohlfes |
| Spec: FCC 15E,15.247;LP002;RSS 210 | Class: N/A |

5785 MHz, 802.11a mode
99% Bandwidth 16.9 MHz
6dB Bandwidth 16.7 MHz



5825 MHz, 802.11a mode
99% Bandwidth 16.9 MHz
6dB Bandwidth 16.6 MHz





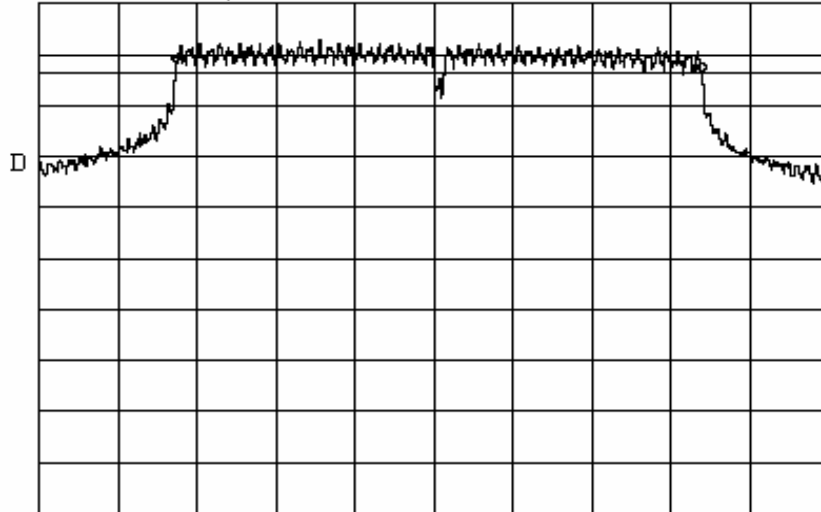
EMC Test Data

| | |
|------------------------------------|------------------------------|
| Client: Atheros | Job Number: J59313 |
| Model: D1470U | T-Log Number: T59339 |
| Contact: Michael Robinson | Account Manager: Joe Rohlfes |
| Spec: FCC 15E,15.247;LP002;RSS 210 | Class: N/A |

5760 MHz, Turbo mode

99% Bandwidth 33.2 MHz
6dB Bandwidth 33.3 MHz

*ATTEN 20dB
RL 115.0dBμV 10dB/ ΔMKR -1.83dB
33.33MHz

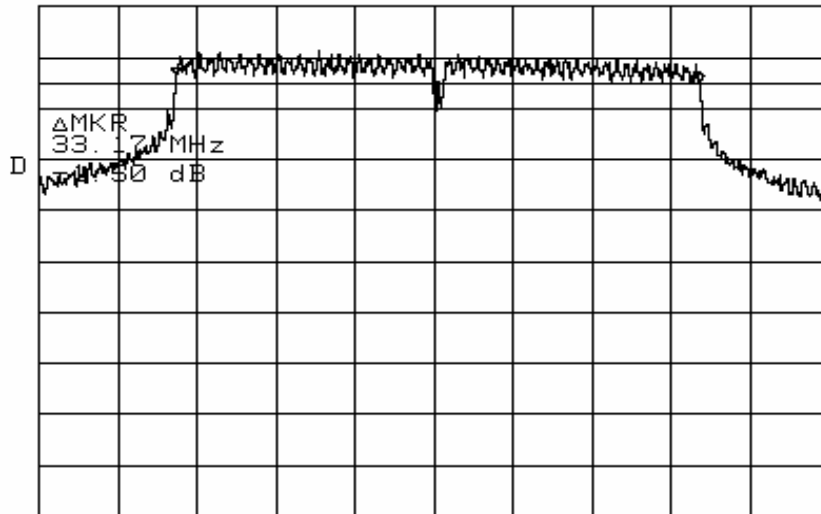


CENTER 5.76000GHz SPAN 50.00MHz
*RBW 100kHz *VBW 100kHz SWP 50.0ms

5805 MHz, Turbo mode

99% Bandwidth 33.2 MHz
6dB Bandwidth 33.2 MHz

ATTEN 20dB
RL 10.0dBm 10dB/ ΔMKR -1.50dB
33.17MHz



CENTER 5.80500GHz SPAN 50.00MHz
*RBW 100kHz *VBW 100kHz SWP 50.0ms



EMC Test Data

| | | | |
|----------|------------------------------|------------------|-------------|
| Client: | Atheros | Job Number: | J59313 |
| Model: | D1470U | T-Log Number: | T59339 |
| Contact: | Michael Robinson | Account Manager: | Joe Rohlfes |
| Spec: | FCC 15E,15.247;LP002;RSS 210 | Class: | N/A |

Run #3: Output Power

Maximum antenna gain: 2.66 dBi 2400 - 2483.5 MHz Band
 Maximum antenna gain: 3.4 dBi 5725 - 5850 MHz Band

| Channel | Frequency (MHz) | Mode | Output Power (dBm) | Output Power (W) | EIRP (W) |
|---------|-----------------|-------|--------------------|------------------|----------|
| 1 | 2412 | b | 17.6 | 0.058 | 0.11 |
| 6 | 2437 | b | 17.2 | 0.052 | 0.10 |
| 11 | 2462 | b | 18.4 | 0.069 | 0.13 |
| 1 | 2412 | g | 21.8 | 0.151 | 0.28 |
| 6 | 2437 | g | 22.3 | 0.170 | 0.31 |
| 11 | 2462 | g | 22.3 | 0.170 | 0.31 |
| - | 2437 | turbo | 22.3 | 0.170 | 0.31 |
| 149 | 5745 | a | 21.9 | 0.155 | 0.34 |
| 157 | 5785 | a | 21.8 | 0.151 | 0.33 |
| 165 | 5825 | a | 22.1 | 0.162 | 0.35 |
| - | 5760 | turbo | 21.5 | 0.141 | 0.31 |
| - | 5805 | turbo | 21.5 | 0.141 | 0.31 |

Note 1: Output power measured using a peak power meter

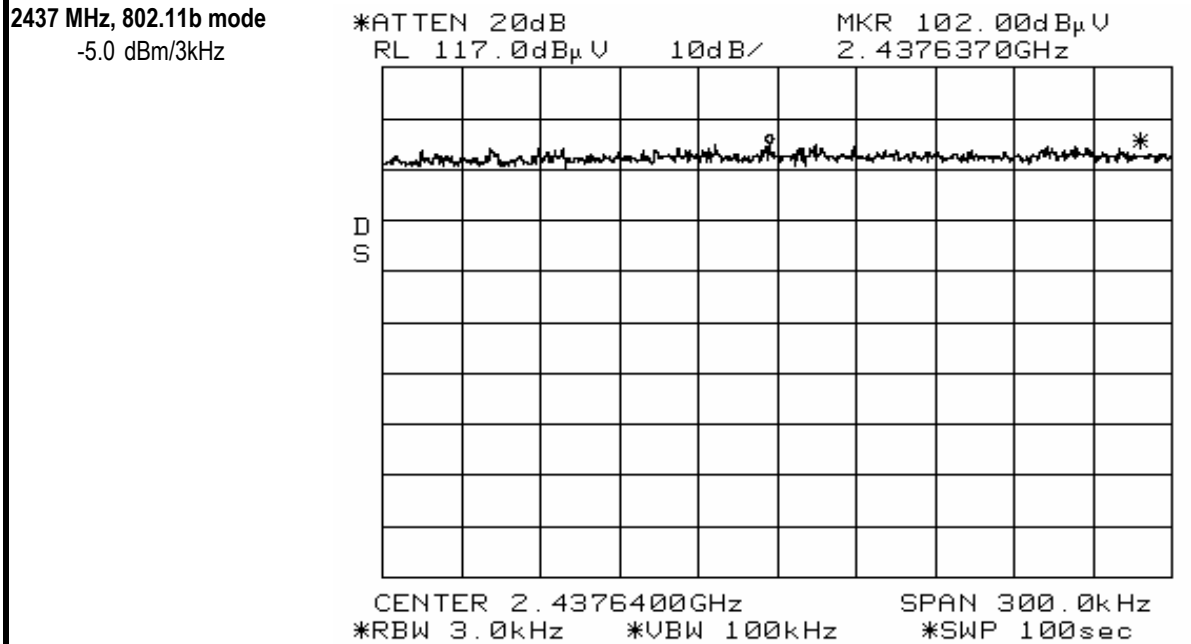
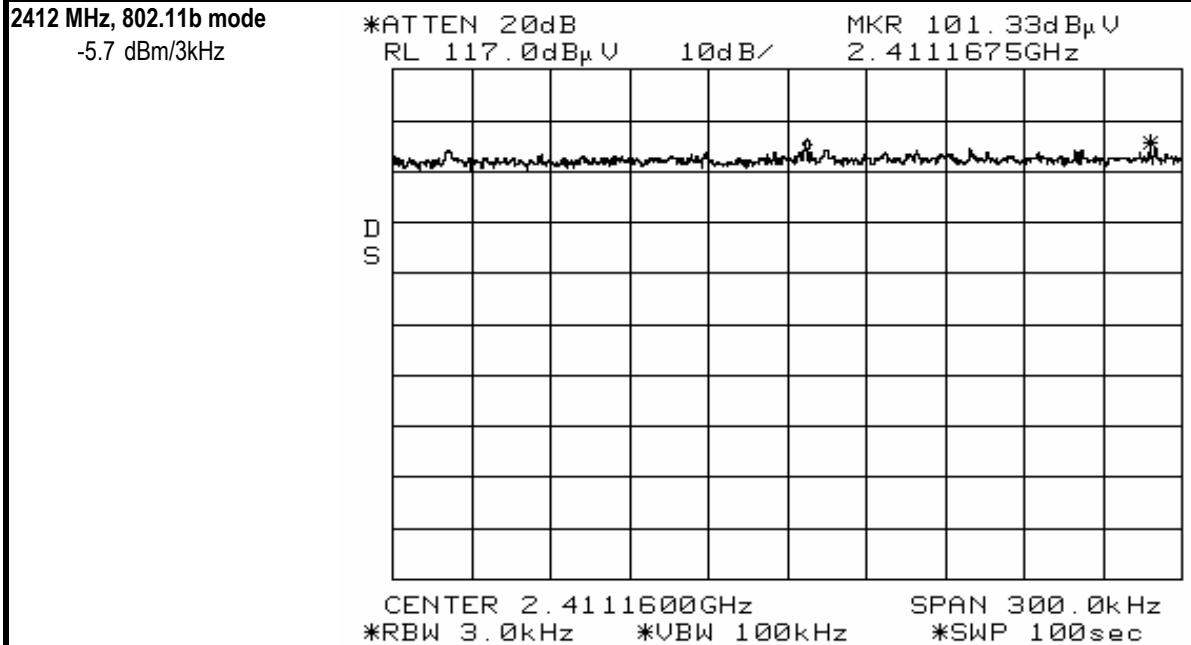
Run #4: Power Spectral Density

| Channel | Frequency (MHz) | Mode | PSD (peak over 1 second in a 3kHz bandwidth) dBm |
|---------|-----------------|-------|--|
| 1 | 2412 | b | -5.7 |
| 6 | 2437 | b | -5.0 |
| 11 | 2462 | b | -5.5 |
| 1 | 2412 | g | -8.4 |
| 6 | 2437 | g | -7.9 |
| 11 | 2462 | g | -7.2 |
| - | 2437 | turbo | -3.8 |
| 149 | 5745 | a | -9.5 |
| 157 | 5785 | a | -10.2 |
| 165 | 5825 | a | -7.3 |
| - | 5760 | turbo | -11.2 |
| - | 5805 | turbo | -11.7 |



EMC Test Data

| | |
|------------------------------------|------------------------------|
| Client: Atheros | Job Number: J59313 |
| Model: D1470U | T-Log Number: T59339 |
| Contact: Michael Robinson | Account Manager: Joe Rohlfes |
| Spec: FCC 15E,15.247;LP002;RSS 210 | Class: N/A |

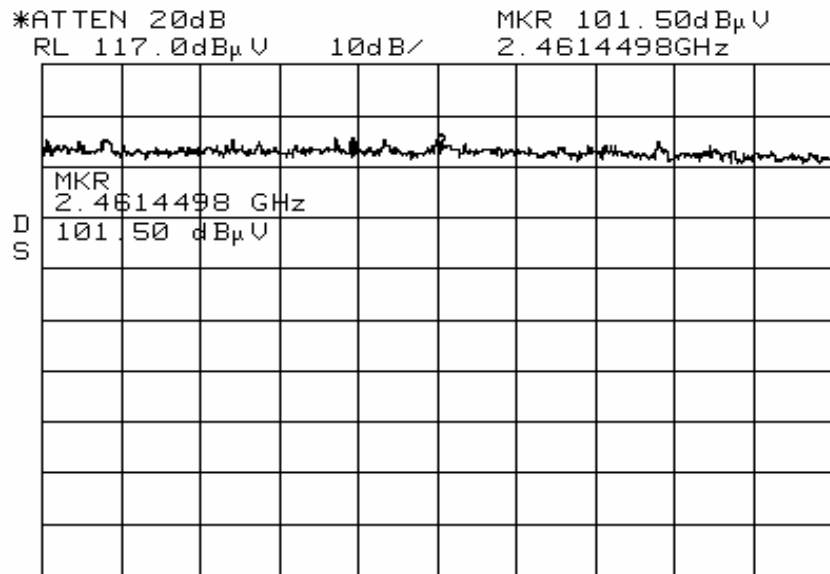




EMC Test Data

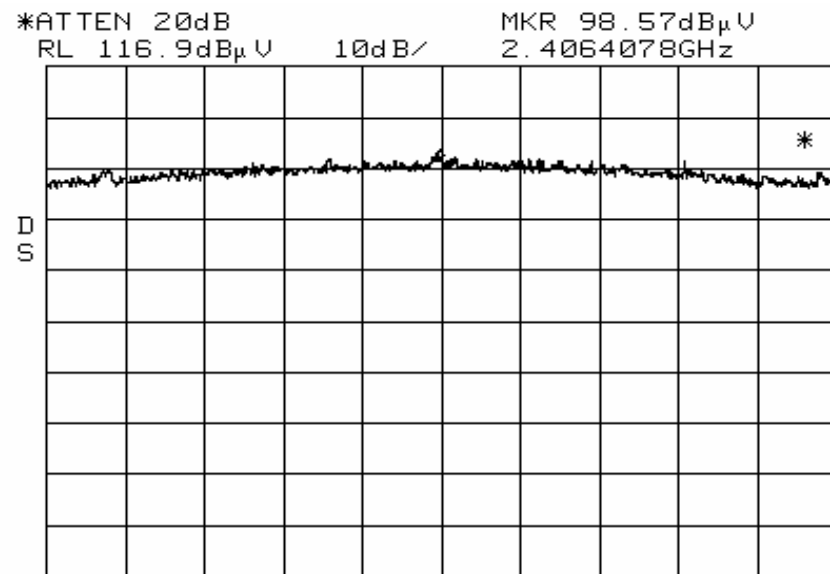
| | |
|------------------------------------|------------------------------|
| Client: Atheros | Job Number: J59313 |
| Model: D1470U | T-Log Number: T59339 |
| Contact: Michael Robinson | Account Manager: Joe Rohlfes |
| Spec: FCC 15E,15.247;LP002;RSS 210 | Class: N/A |

2462 MHz, 802.11b mode
-5.5 dBm/3kHz



CENTER 2.4614483GHz SPAN 300.0kHz
*RBW 3.0kHz *VBW 100kHz *SWP 100sec

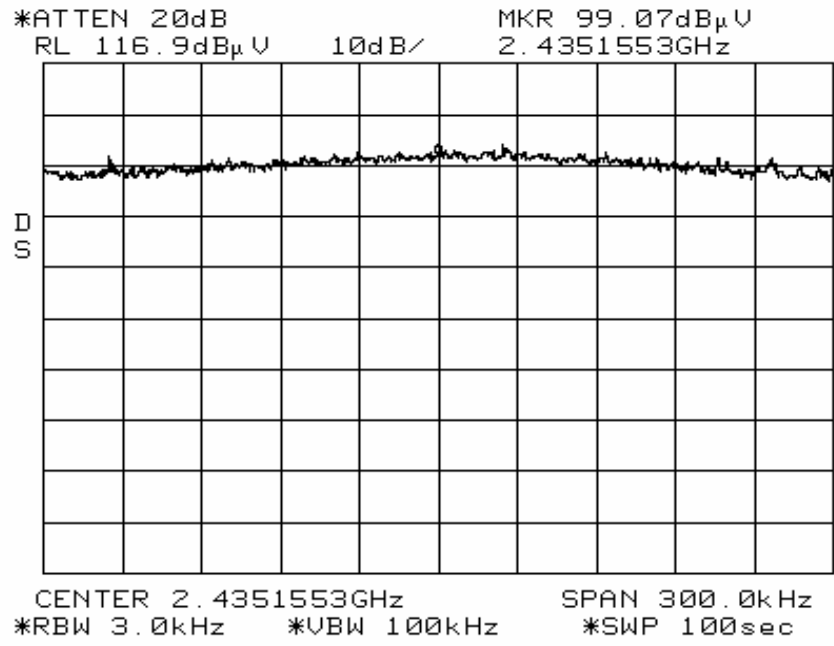
2412 MHz, 802.11g mode
-8.4 dBm/3kHz



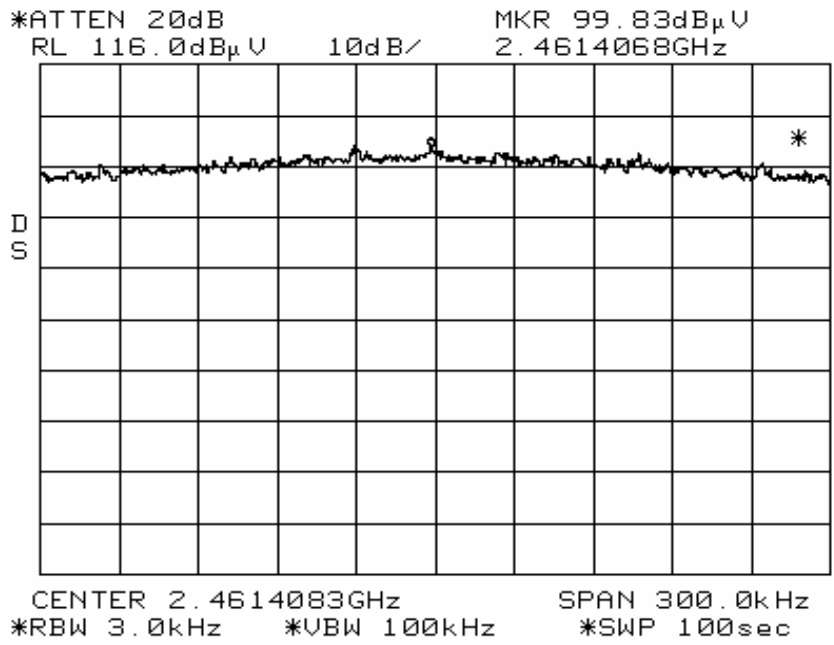
CENTER 2.4064083GHz SPAN 300.0kHz
*RBW 3.0kHz *VBW 100kHz *SWP 100sec

| | | | |
|----------|------------------------------|------------------|-------------|
| Client: | Atheros | Job Number: | J59313 |
| Model: | D1470U | T-Log Number: | T59339 |
| Contact: | Michael Robinson | Account Manager: | Joe Rohlfes |
| Spec: | FCC 15E,15.247;LP002;RSS 210 | Class: | N/A |

2437 MHz, 802.11g mode
-7.9 dBm/3kHz



2462 MHz, 802.11g mode
-7.2 dBm/3kHz



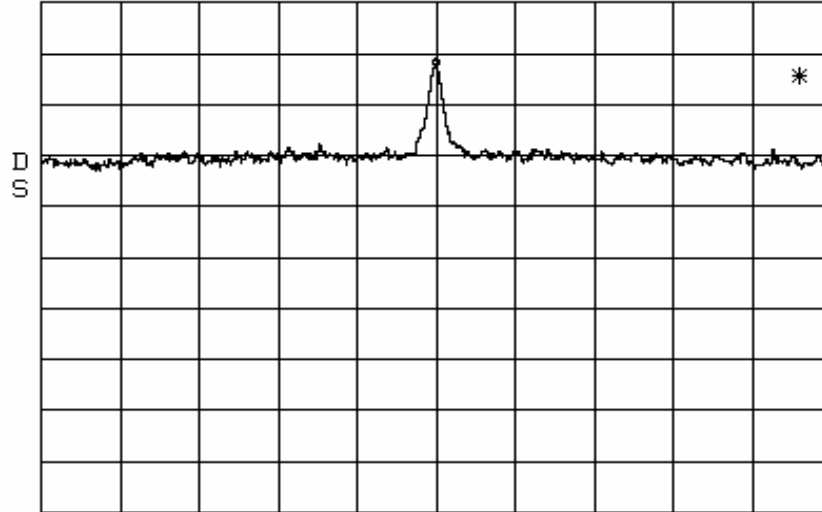


EMC Test Data

| | |
|------------------------------------|------------------------------|
| Client: Atheros | Job Number: J59313 |
| Model: D1470U | T-Log Number: T59339 |
| Contact: Michael Robinson | Account Manager: Joe Rohlfes |
| Spec: FCC 15E,15.247;LP002;RSS 210 | Class: N/A |

2437 MHz, Turbo mode
-3.8 dBm/3kHz

*ATTEN 20dB MKR 103.17dB μ V
RL 116.0dB μ V 10dB/ 2.4370317GHz



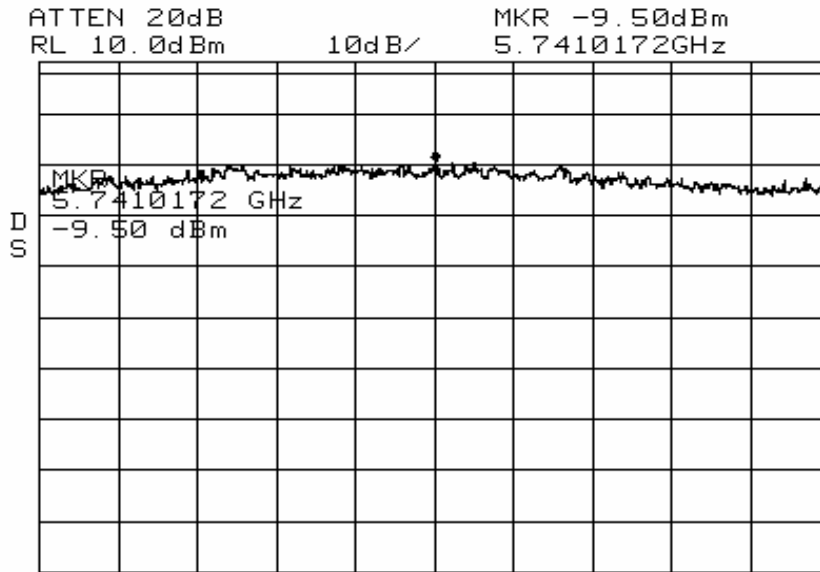
CENTER 2.4370317GHz SPAN 300.0kHz
*RBW 3.0kHz *VBW 100kHz *SWP 100sec



EMC Test Data

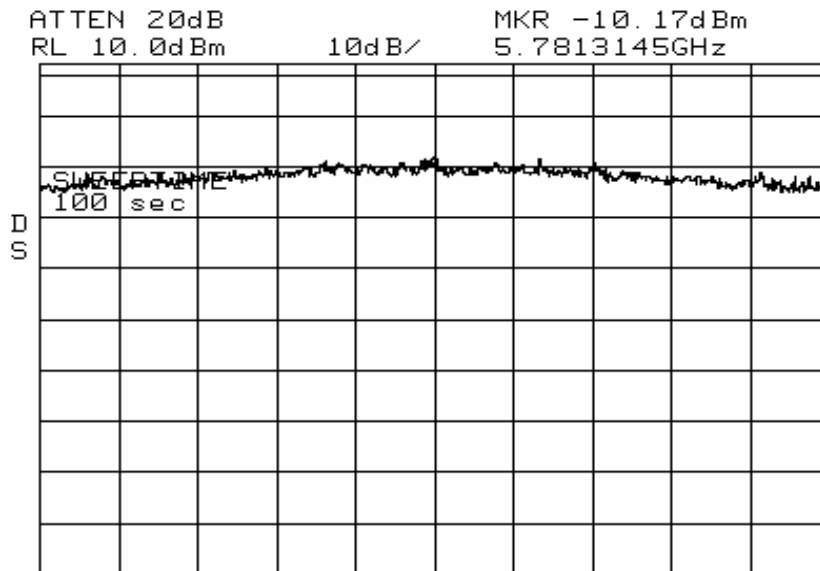
| | |
|------------------------------------|------------------------------|
| Client: Atheros | Job Number: J59313 |
| Model: D1470U | T-Log Number: T59339 |
| Contact: Michael Robinson | Account Manager: Joe Rohlfes |
| Spec: FCC 15E,15.247;LP002;RSS 210 | Class: N/A |

5745 MHz, 802.11a mode
-9.5 dBm/3kHz



CENTER 5.7410167GHz SPAN 300.0kHz
*RBW 3.0kHz *VBW 100kHz *SWP 100sec

5785 MHz, 802.11a mode
-10.2 dBm/3kHz



CENTER 5.7813145GHz SPAN 300.0kHz
*RBW 3.0kHz *VBW 100kHz *SWP 100sec

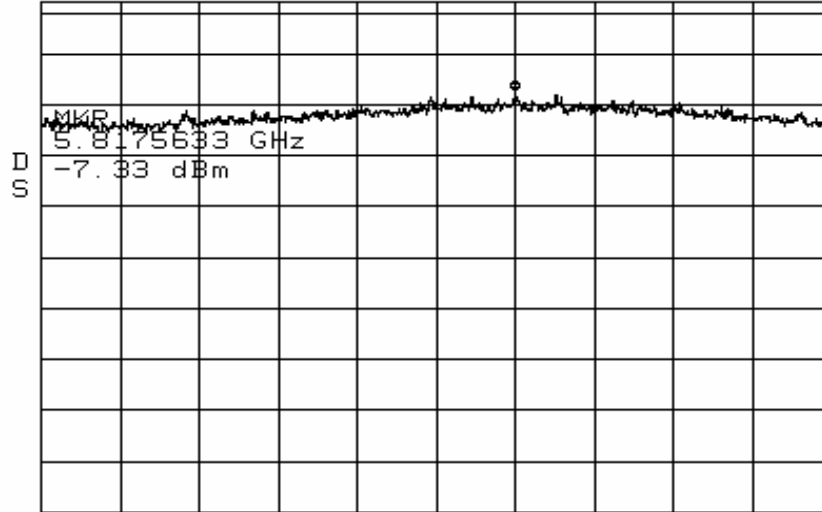


EMC Test Data

| | |
|------------------------------------|------------------------------|
| Client: Atheros | Job Number: J59313 |
| Model: D1470U | T-Log Number: T59339 |
| Contact: Michael Robinson | Account Manager: Joe Rohlfes |
| Spec: FCC 15E,15.247;LP002;RSS 210 | Class: N/A |

5825 MHz, 802.11a mode
-7.3 dBm/3kHz

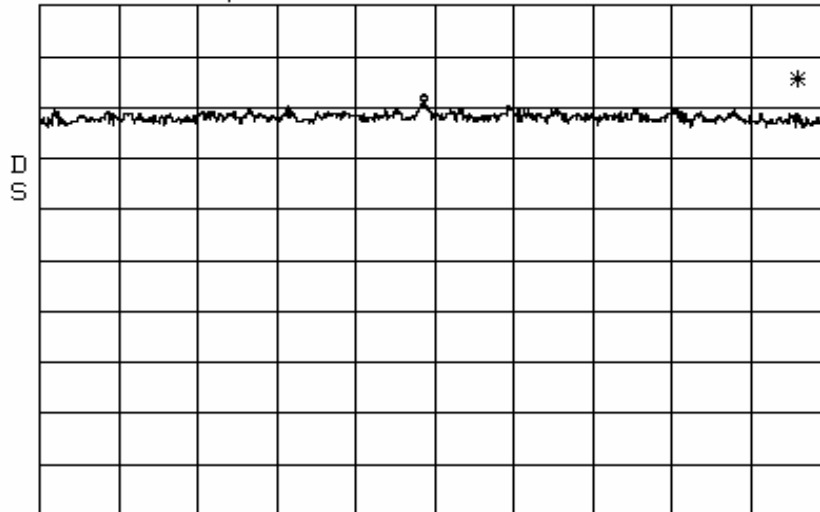
ATTEN 20dB MKR -7.33dBm
RL 10.0dBm 10dB/ 5.8175633GHz



CENTER 5.817533GHz SPAN 300.0kHz
*RBW 3.0kHz *VBW 100kHz *SWP 100sec

5760 MHz, Turbo mode
-11.2 dBm/3kHz

*ATTEN 20dB MKR 95.83dBμV
RL 115.0dBμV 10dB/ 5.7588160GHz



CENTER 5.7588200GHz SPAN 300.0kHz
*RBW 3.0kHz *VBW 100kHz *SWP 100sec



EMC Test Data

| | | | |
|----------|------------------------------|------------------|-------------|
| Client: | Atheros | Job Number: | J59313 |
| Model: | D1470U | T-Log Number: | T59339 |
| Contact: | Michael Robinson | Account Manager: | Joe Rohlfes |
| Spec: | FCC 15E,15.247;LP002;RSS 210 | Class: | N/A |

FCC Part 15 Subpart E; RSS 210 6.2.2(q1); LP0002 section 4.7 Antenna Port Direct Measurements

Test Specifics

Objective: The objective of this test session is to perform final qualification testing of the EUT with respect to the specification listed above.

Date of Test: 4/12/2005
 Test Engineer: Chris Byleckie
 Test Location: SVOATS #1

Config. Used: 1
 Config Change: none
 Host Unit Voltage 120V/60Hz

General Test Configuration

When measuring the conducted emissions from the EUT's antenna port, the antenna port of the EUT was connected to the spectrum analyzer or power meter via a suitable attenuator to prevent overloading the measurement system. All measurements are corrected to allow for the external attenuators and cables used.

Ambient Conditions: Temperature: 15 °C
 Rel. Humidity: 51 %

Summary of Results

| Run # | Test Performed | Limit | Pass / Fail | Result / Margin |
|-------|--|--|-------------|---|
| 1 | Output Power | 15.407(a) (1), (2) RSS210 6.2.2(q1) LP0002 4.7.2 (1) | Pass | 5150 - 5250: 15.3dBm 5250 - 5350: 15.63dBm |
| 1 | Power Spectral Density (PSD) | 15.407(a) (1), (2) RSS210 6.2.2(q1) LP0002 4.7.2 (1) | Pass | 5150 - 5250: 3.23dBm 5250 - 5350: 3.42dBm |
| 1 | 26dB Bandwidth | | - | 31.1 MHz (802.11a) 60.8 MHz (turbo) |
| 1 | 99% Bandwidth | | - | 18 MHz (802.11a) 34 MHz (turbo) |
| 1 | Peak Excursion Envelope | 15.407(a) (6) LP0002 4.7.2 (6) | Pass | Peak to average excursion 12.75dB |
| 3 | Antenna Conducted - Out of Band Spurious | 15.407(b) LP0002 4.7.3 (1) | Pass | -46.7dBm @ 7093.4MHz (-19.7dB) |

Modifications Made During Testing:

No modifications were made to the EUT during testing



EMC Test Data

| | | | |
|----------|------------------------------|------------------|-------------|
| Client: | Atheros | Job Number: | J59313 |
| Model: | D1470U | T-Log Number: | T59339 |
| Contact: | Michael Robinson | Account Manager: | Joe Rohlfes |
| Spec: | FCC 15E,15.247;LP002;RSS 210 | Class: | N/A |

Deviations From The Standard

No deviations were made from the requirements of the standard.

Run #1: Bandwidth, Output Power and Power Spectral Density

Run #1a: Bandwidth

Antenna Gain: 4.0 dBi

| 802.11a Mode | | | |
|-----------------|------------------------|------|------|
| Frequency (MHz) | Bandwidth (note 1) MHz | | |
| | 20dB | 26dB | 99% |
| 5180 | 20.8 | 28.3 | 18.0 |
| 5240 | 21.6 | 29.2 | 18.0 |
| 5260 | 21.5 | 31.1 | 18.0 |
| 5280 | 21.3 | 29.8 | 18.0 |
| 5320 | 21.0 | 30.1 | 18.0 |

| Turbo Mode | | | |
|-----------------|------------------------|------|------|
| Frequency (MHz) | Bandwidth (note 1) MHz | | |
| | 20dB | 26dB | 99% |
| 5200 | 42.5 | 58.3 | 34.0 |
| 5290 | 43.8 | 60.8 | 34.0 |

Note 1 | Bandwidth measured using RBW = 300kHz.



EMC Test Data

| | | | |
|----------|------------------------------|------------------|-------------|
| Client: | Atheros | Job Number: | J59313 |
| Model: | D1470U | T-Log Number: | T59339 |
| Contact: | Michael Robinson | Account Manager: | Joe Rohlfes |
| Spec: | FCC 15E,15.247;LP002;RSS 210 | Class: | N/A |

Run #1b: Output Power and Power Spectral Density

| Frequency (MHz) | Output Power (dBm) | | | | | PSD (dBm/MHz) | | Peak ⁵ Excursion | RSS 210 PSD ⁶ | Mode |
|--------------------|----------------------|-------------------|------------------|-------|--------|------------------|-------------------|--------------------------------|-----------------------------|------------|
| | Average ¹ | Peak ² | FCC ³ | Limit | Margin | FCC ³ | Peak ⁴ | | | |
| 5180 | 18.3 | 23.3 | 14.80 | 17.0 | -2.2 | 2.56 | 12.16 | 10.90 | 10.7 | 802.11a |
| 5240 | 17.3 | 23.1 | 15.28 | 17.0 | -1.7 | 3.23 | 12.5 | 11.05 | 10.5 | 802.11a |
| 5260 | 18.0 | 23.3 | 15.30 | 24.0 | -8.7 | 3.21 | 12.8 | 10.76 | 10.7 | 802.11a |
| 5280 | 18.4 | 23.7 | 15.63 | 24.0 | -8.3 | 3.42 | 13.33 | 11.07 | 11.1 | 802.11a |
| 5320 | 18.5 | 23.9 | 15.51 | 24.0 | -8.5 | 3.36 | 12.83 | 10.45 | 11.3 | 802.11a |
| 5200 | 18.2 | 23.2 | 15.58 | 17.0 | -1.4 | 0.74 | 9.34 | 12.75 | 7.9 | Turbo Mode |
| 5290 | 17.9 | 23.6 | 15.42 | 24.0 | -8.6 | 0.44 | 9.84 | 12.35 | 8.3 | Turbo Mode |

Note 1 Average power measured using average power meter - for information only

Note 2 Peak power measured using peak envelope power sensor - for information only

Note 3 Output power measured in accordance with DA-02-2138A1, method 1 with a spectrum analyzer set for: RBW=1MHz, VB=3MHz, power averaging over 100 sweeps, power integration over 30MHz. Power spectral density measured using same settings. EUT was transmitting continuously (verified with a diode detector and oscilloscope) so no precautions necessary to ensure averaging was performed only when the EUT was transmitting.

Note 4 Measurement of peak power spectral density was made using RBW = 1MHz, VBW = 3MHz. The value is taken from the peak excursion plots.

Note 5 Peak excursion - maximum difference between the trace used for the power measurement (RB=1MHz, VB=3MHz, sample detector, power average of 100 sweeps) and that for a peak power measurement (RB=1MHz, VB=3MHz).

Note 6 For RSS210 the measured value for peak PSD must not be average value (peak power divided by 99% bandwidth) by more than 6dB without reducing the limit for output power.

Note 7 Software setting of output power was 18 for all measurements. Data rate was 6Mb/s for all 802.11a measurements and 12Mb/s for turbo mode measurements.

| | |
|------------------------------------|------------------------------|
| Client: Atheros | Job Number: J59313 |
| Model: D1470U | T-Log Number: T59339 |
| Contact: Michael Robinson | Account Manager: Joe Rohlfes |
| Spec: FCC 15E,15.247;LP002;RSS 210 | Class: N/A |

Spectrum Analyzer Settings

RB 1.0MHz
 VB 3.0MHz
 Detector Sample
 Att 20
 RL Offset 2.0
 Sweep Time 5.0ms
 Units DBM

Bin size: 67kHz

Peak Power per RBW

2.56 dBm/RBW

99% Bandwidth (MHz)

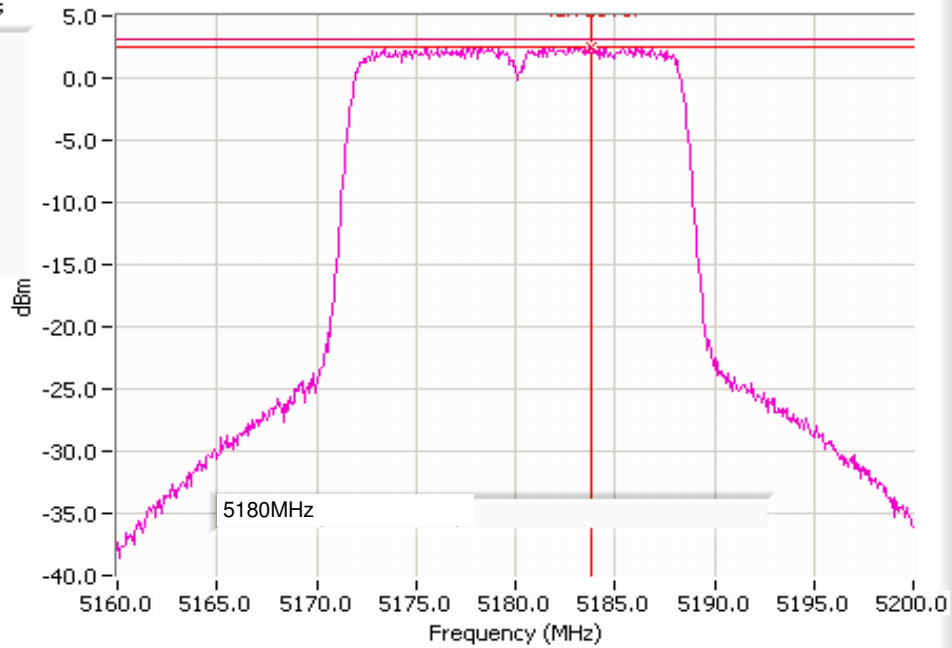
18.00

Power Over Span (mW)

30.192

Power Over Span (dBm)

14.80



Spectrum Analyzer Settings

RB 1.0MHz
 VB 3.0MHz
 Detector Sample
 Att 30
 RL Offset 2.0
 Sweep Time 5.0ms
 Units DBM

Bin size: 67kHz

Peak Power per RBW

3.23 dBm/RBW

99% Bandwidth (MHz)

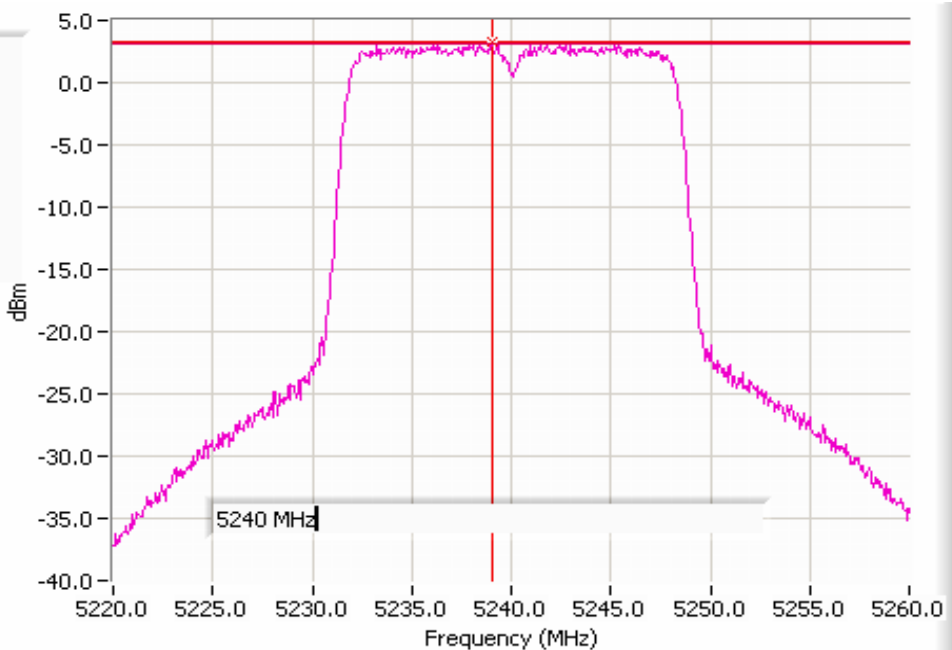
18.00

Power Over Span (mW)

33.697

Power Over Span (dBm)

15.28



Spectrum Analyzer Settings

5.0

| | |
|---------------------------------------|------------------------------|
| Client: Atheros | Job Number: J59313 |
| Model: D1470U | T-Log Number: T59339 |
| Contact: Michael Robinson | Account Manager: Joe Rohlfes |
| Spec: FCC 15E, 15.247; LP002; RSS 210 | Class: N/A |

RB 1.0MHz
 VB 3.0MHz
 Detector Sample
 Att 30
 RL Offset 2.0
 Sweep Time 5.0ms
 Units DBM

Bin size: 67kHz

Peak Power per RBW

3.21 dBm/RBW

99% Bandwidth (MHz)

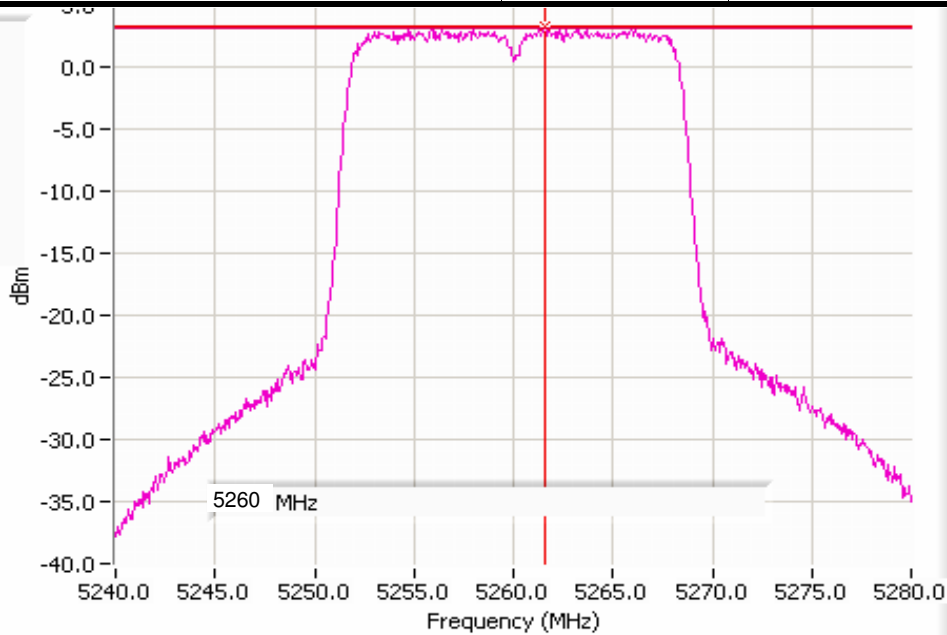
18.00

Power Over Span (mW)

33.874

Power Over Span (dBm)

15.30



Spectrum Analyzer Settings

RB 1.0MHz
 VB 3.0MHz
 Detector Sample
 Att 30
 RL Offset 2.0
 Sweep Time 5.0ms
 Units DBM

Bin size: 67kHz

Peak Power per RBW

3.42 dBm/RBW

99% Bandwidth (MHz)

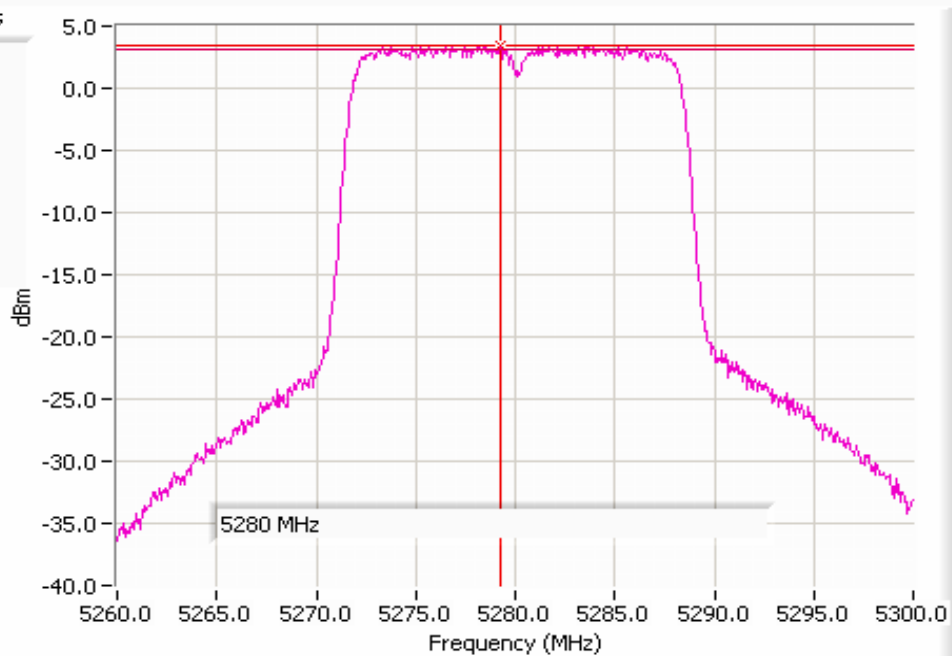
18.00

Power Over Span (mW)

36.574

Power Over Span (dBm)

15.63



| | |
|------------------------------------|------------------------------|
| Client: Atheros | Job Number: J59313 |
| Model: D1470U | T-Log Number: T59339 |
| Contact: Michael Robinson | Account Manager: Joe Rohlfes |
| Spec: FCC 15E,15.247;LP002;RSS 210 | Class: N/A |

Spectrum Analyzer Settings

RB 1.0MHz
 VB 3.0MHz
 Detector Sample
 Att 30
 RL Offset 2.0
 Sweep Time 5.0ms
 Units DBM

Bin size: 67kHz

Peak Power per RBW

3.36 dBm/RBW

99% Bandwidth (MHz)

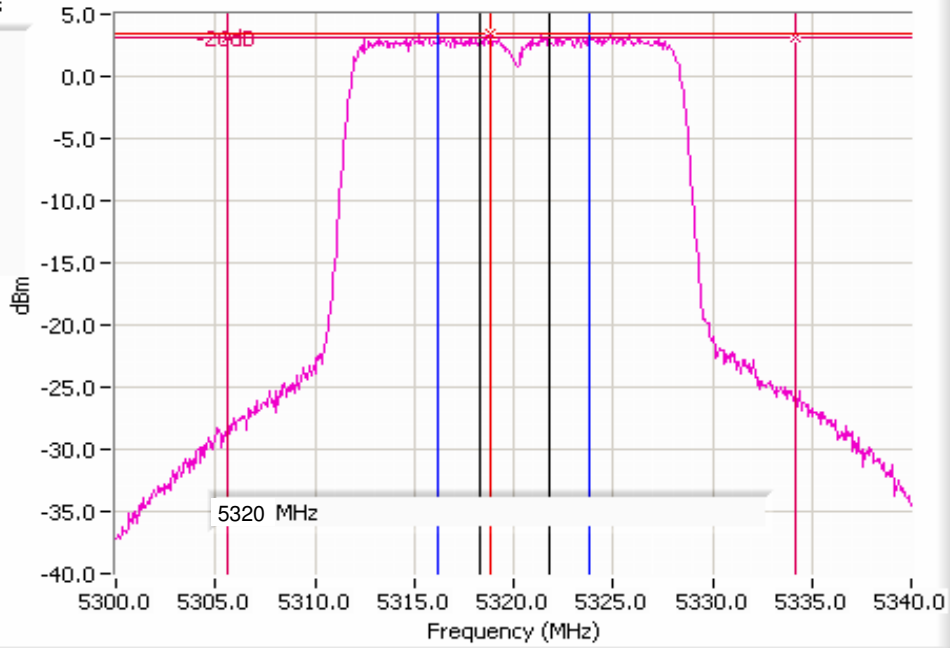
18.00

Power Over Span (mW)

35.532

Power Over Span (dBm)

15.51



| | |
|------------------------------------|------------------------------|
| Client: Atheros | Job Number: J59313 |
| Model: D1470U | T-Log Number: T59339 |
| Contact: Michael Robinson | Account Manager: Joe Rohlfes |
| Spec: FCC 15E,15.247;LP002;RSS 210 | Class: N/A |

Spectrum Analyzer Settings

RB 1.0MHz
 VB 3.0MHz
 Detector Sample
 Att 30
 RL Offset 2.0
 Sweep Time 5.0ms
 Units DBM
 Bin size: 117kHz

Peak Power per RBW

0.74 dBm/RBW

99% Bandwidth (MHz)

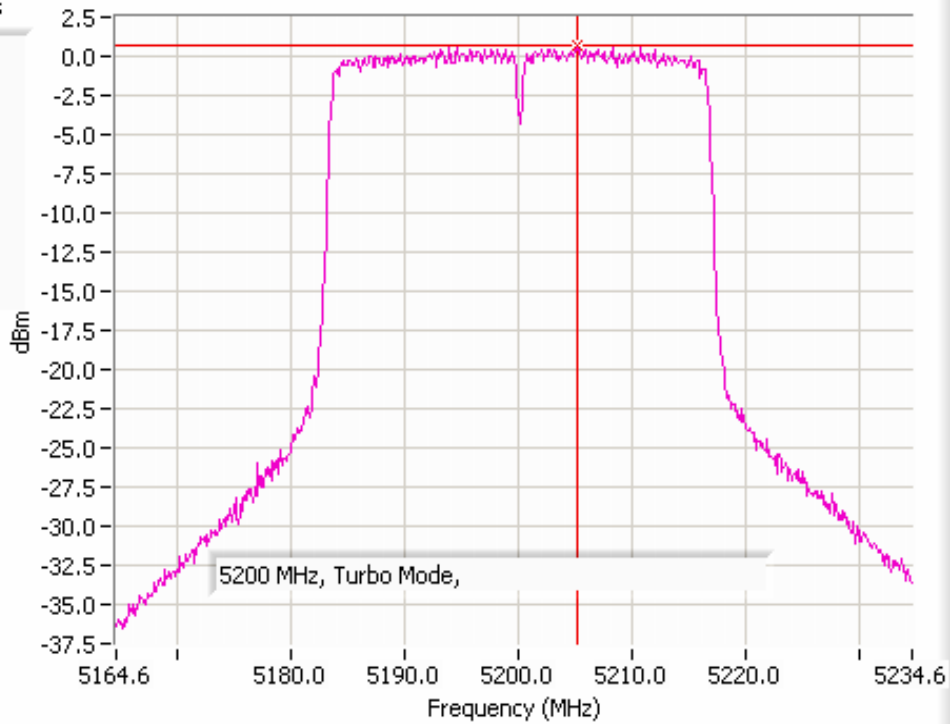
34.00

Power Over Span (mW)

36.128

Power Over Span (dBm)

15.58



Spectrum Analyzer Settings

RB 1.0MHz
 VB 3.0MHz
 Detector Sample
 Att 40
 RL Offset 2.0
 Sweep Time 5.0ms
 Units DBM
 Bin size: 117kHz

Peak Power per RBW

0.44 dBm/RBW

99% Bandwidth (MHz)

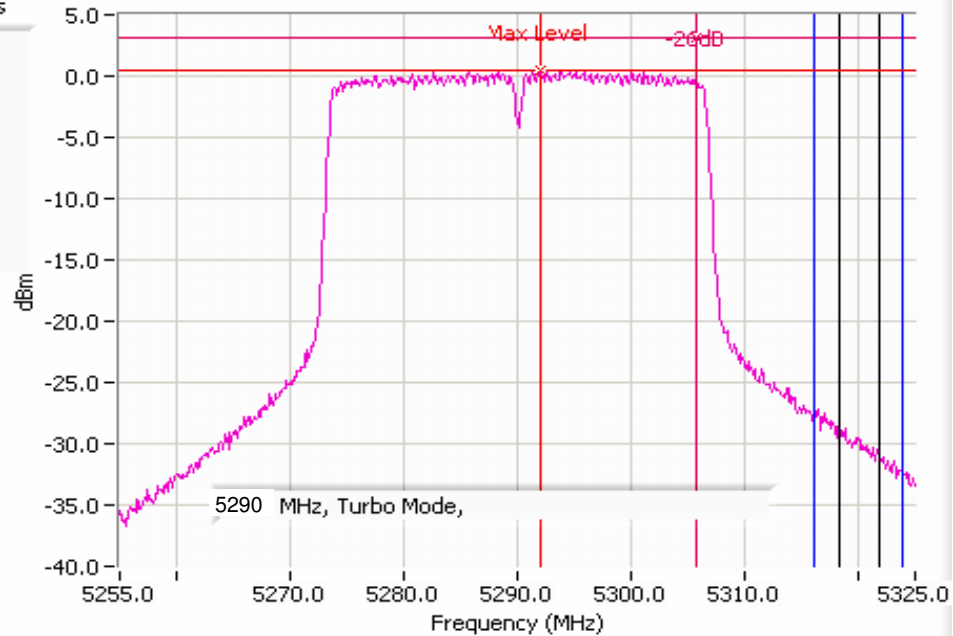
33.00

Power Over Span (mW)

34.830

Power Over Span (dBm)

15.42

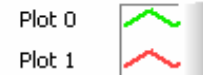
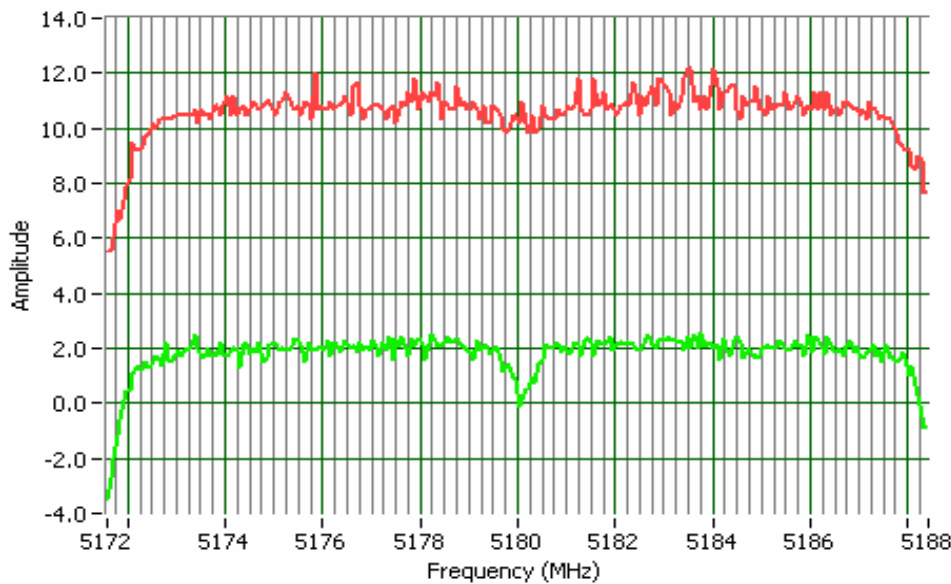


| | |
|------------------------------------|------------------------------|
| Client: Atheros | Job Number: J59313 |
| Model: D1470U | T-Log Number: T59339 |
| Contact: Michael Robinson | Account Manager: Joe Rohlfes |
| Spec: FCC 15E,15.247;LP002;RSS 210 | Class: N/A |

Run #2: Peak Excursion Measurement

Peak Excursion - 5180 MHz

Sampled (Power Averaged) and Peak Traces



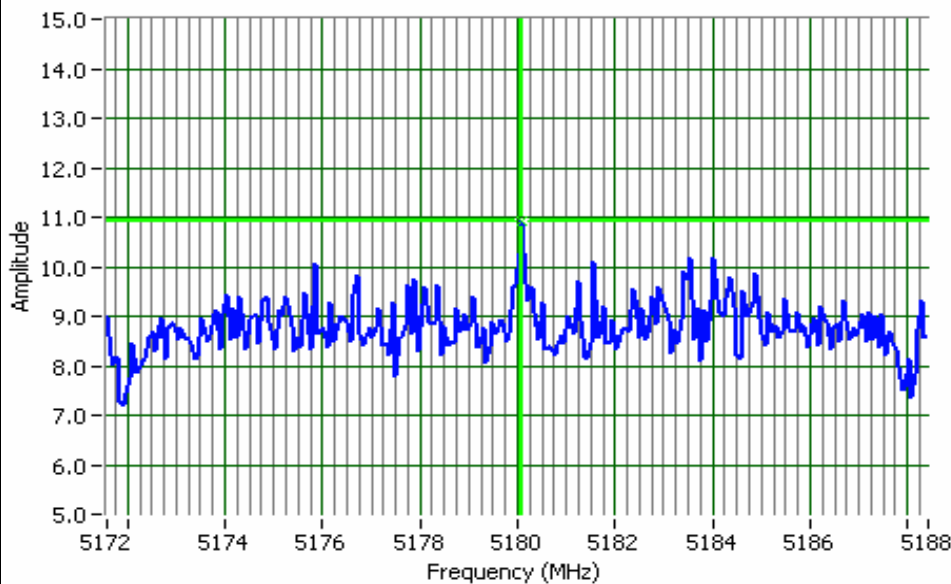
Settings for plot 0

RB 1.0MHz
 VB 3.0MHz
 Detector Sample
 Att 20
 RL Offset 2.0
 Sweep Time 5.0ms
 Units DBM

Settings for plot 1

RB 1.0MHz
 VB 3.0MHz
 Detector POS
 Att 30
 RL Offset 2.0
 Sweep Time 5.0ms
 Units DBM

Peak Excursion



Peak PSD (Plot 0)

2.56 dBm/1.0MHz

Peak PSD (Plot 1)

12.16 dBm/1.0MHz

Peak excursion
 (Plot 1 - Plot 0)

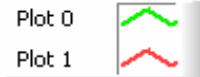
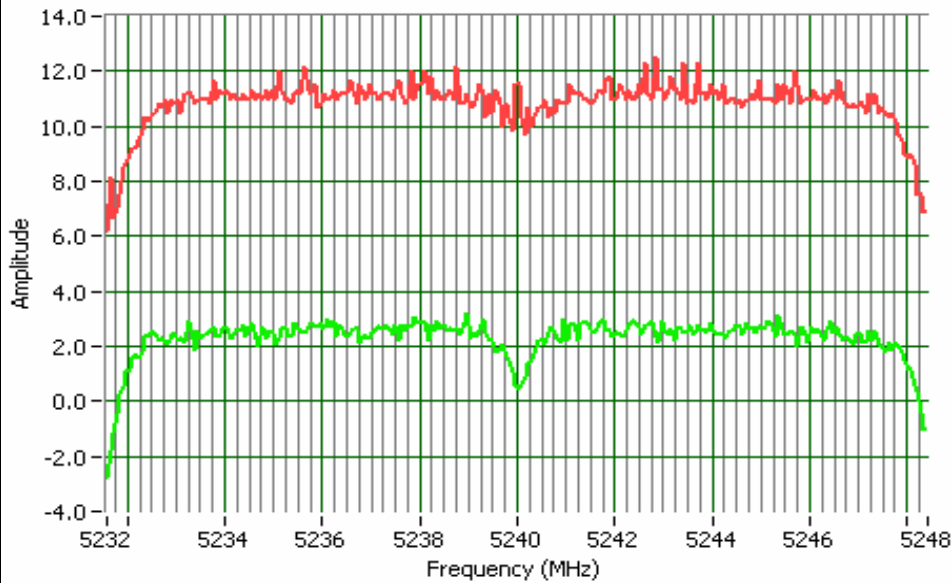
Maximum Peak
 Excursion (dB)

10.90

| | |
|------------------------------------|------------------------------|
| Client: Atheros | Job Number: J59313 |
| Model: D1470U | T-Log Number: T59339 |
| Contact: Michael Robinson | Account Manager: Joe Rohlfes |
| Spec: FCC 15E,15.247;LP002;RSS 210 | Class: N/A |

Peak Excursion - 5240 MHz

Sampled (Power Averaged) and Peak Traces



Settings for plot 0

RB 1.0MHz
 VB 3.0MHz
 Detector Sample
 Att 30
 RL Offset 2.0
 Sweep Time 5.0ms
 Units DBM

Settings for plot 1

RB 1.0MHz
 VB 3.0MHz
 Detector POS
 Att 30
 RL Offset 2.0
 Sweep Time 5.0ms
 Units DBM

Peak PSD (Plot 0)

3.23 dBm/1.0MHz

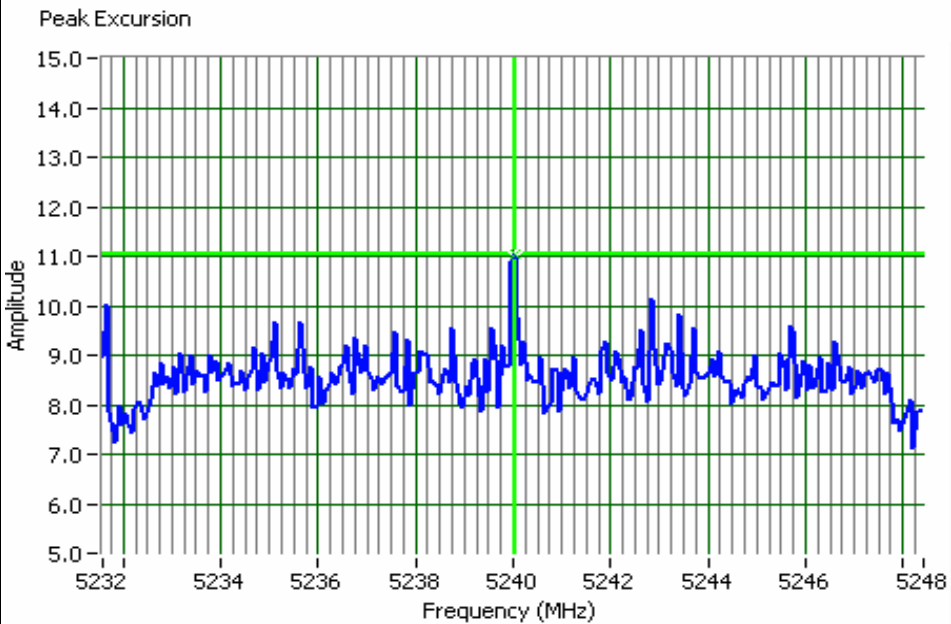
Peak PSD (Plot 1)

12.50 dBm/1.0MHz

Peak excursion
 (Plot 1 - Plot 0)

Maximum Peak
 Excursion (dB)

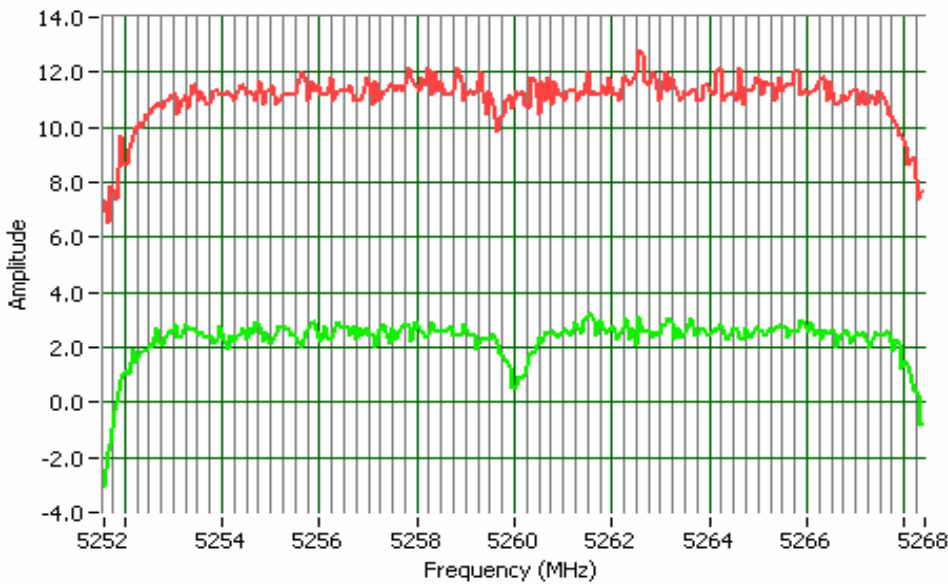
11.05



| | |
|------------------------------------|------------------------------|
| Client: Atheros | Job Number: J59313 |
| Model: D1470U | T-Log Number: T59339 |
| Contact: Michael Robinson | Account Manager: Joe Rohlfes |
| Spec: FCC 15E,15.247;LP002;RSS 210 | Class: N/A |

Peak Excursion - 5260 MHz

Sampled (Power Averaged) and Peak Traces



Plot 0

Plot 1

Settings for plot 0

RB 1.0MHz
 VB 3.0MHz
 Detector Sample
 Att 30
 RL Offset 2.0
 Sweep Time 5.0ms
 Units DBM

Settings for plot 1

RB 1.0MHz
 VB 3.0MHz
 Detector POS
 Att 30
 RL Offset 2.0
 Sweep Time 5.0ms
 Units DBM

Peak PSD (Plot 0)

3.21 dBm/1.0MHz

Peak PSD (Plot 1)

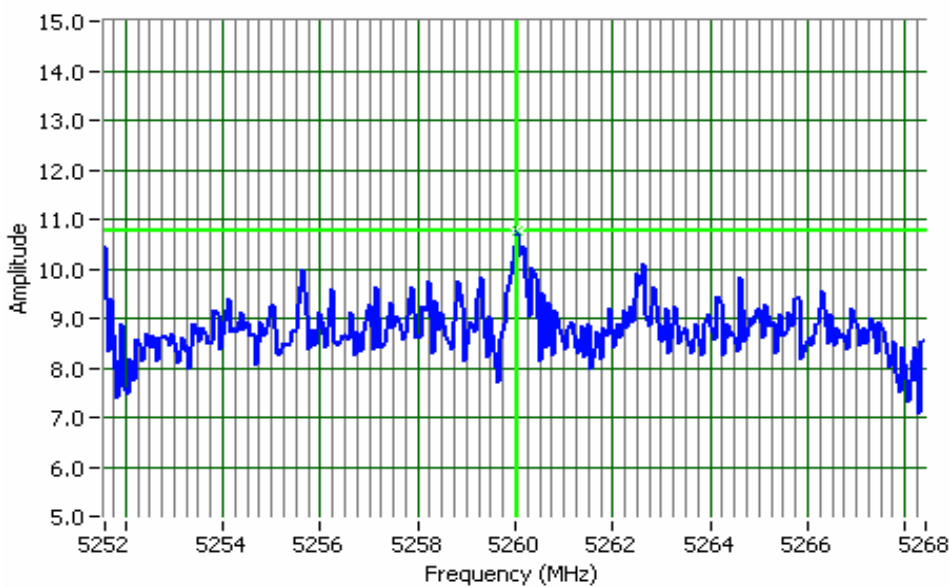
12.83 dBm/1.0MHz

Peak excursion
 (Plot 1 - Plot 0)

Maximum Peak
 Excursion (dB)

10.76

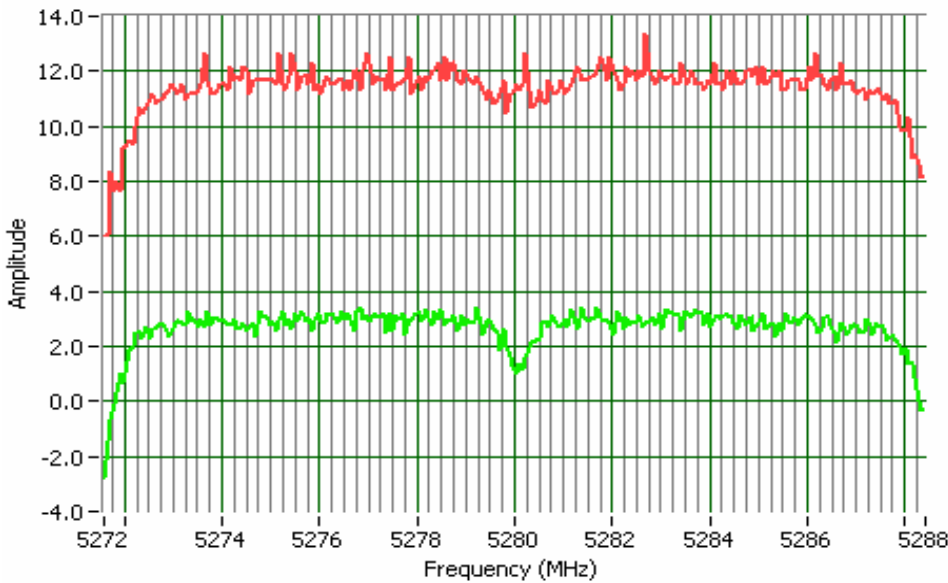
Peak Excursion



| | |
|------------------------------------|------------------------------|
| Client: Atheros | Job Number: J59313 |
| Model: D1470U | T-Log Number: T59339 |
| Contact: Michael Robinson | Account Manager: Joe Rohlfes |
| Spec: FCC 15E,15.247;LP002;RSS 210 | Class: N/A |

Peak Excursion - 5280 MHz

Sampled (Power Averaged) and Peak Traces



Settings for plot 0

RB 1.0MHz
 VB 3.0MHz
 Detector Sample
 Att 30
 RL Offset 2.0
 Sweep Time 5.0ms
 Units DBM

Settings for plot 1

RB 1.0MHz
 VB 3.0MHz
 Detector POS
 Att 30
 RL Offset 2.0
 Sweep Time 5.0ms
 Units DBM

Peak PSD (Plot 0)

3.42 dBm/1.0MHz

Peak PSD (Plot 1)

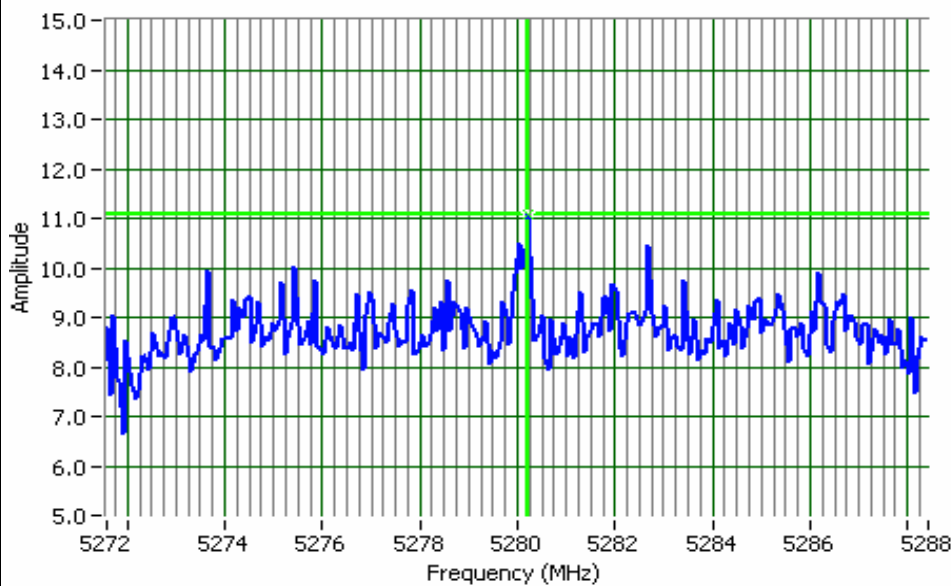
13.33 dBm/1.0MHz

Peak excursion
 (Plot 1 - Plot 0)

Maximum Peak
 Excursion (dB)

11.07

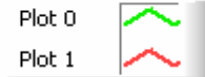
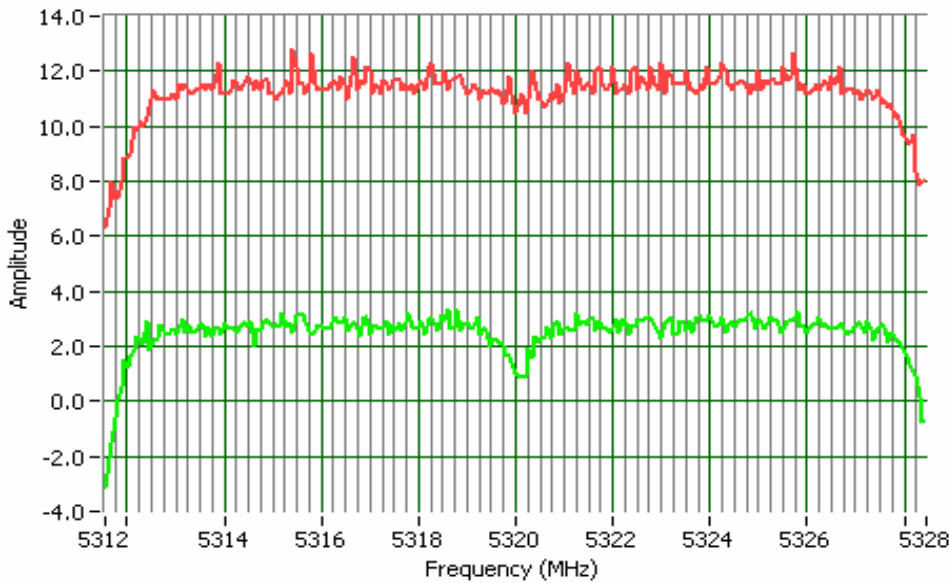
Peak Excursion



| | |
|------------------------------------|------------------------------|
| Client: Atheros | Job Number: J59313 |
| Model: D1470U | T-Log Number: T59339 |
| Contact: Michael Robinson | Account Manager: Joe Rohlfes |
| Spec: FCC 15E,15.247;LP002;RSS 210 | Class: N/A |

Peak Excursion - 5320 MHz

Sampled (Power Averaged) and Peak Traces



Settings for plot 0

RB 1.0MHz
 VB 3.0MHz
 Detector Sample
 Att 30
 RL Offset 2.0
 Sweep Time 5.0ms
 Units DBM

Settings for plot 1

RB 1.0MHz
 VB 3.0MHz
 Detector POS
 Att 30
 RL Offset 2.0
 Sweep Time 5.0ms
 Units DBM

Peak PSD (Plot 0)

3.36 dBm/1.0MHz

Peak PSD (Plot 1)

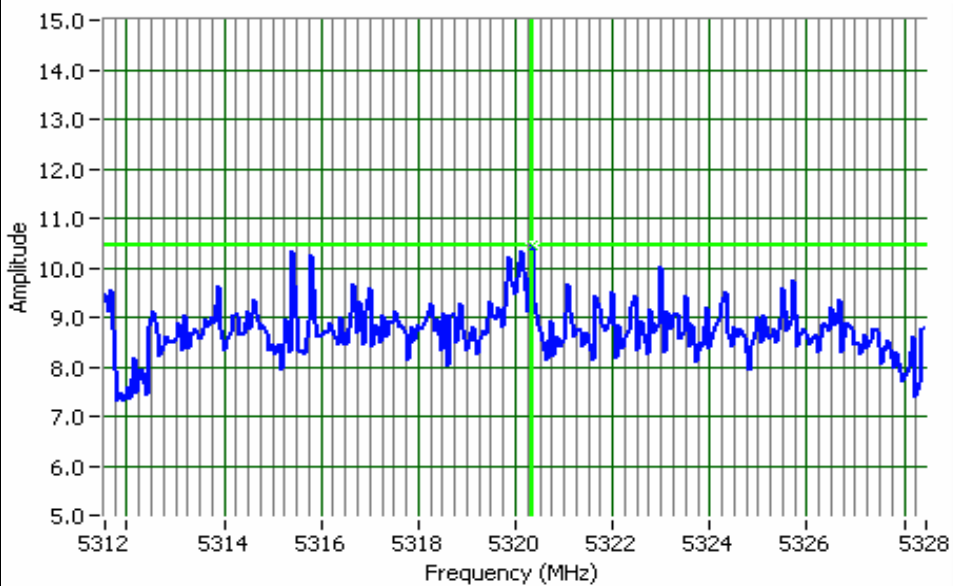
12.83 dBm/1.0MHz

Peak excursion
 (Plot 1 - Plot 0)

Maximum Peak
 Excursion (dB)

10.45

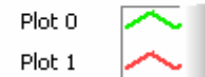
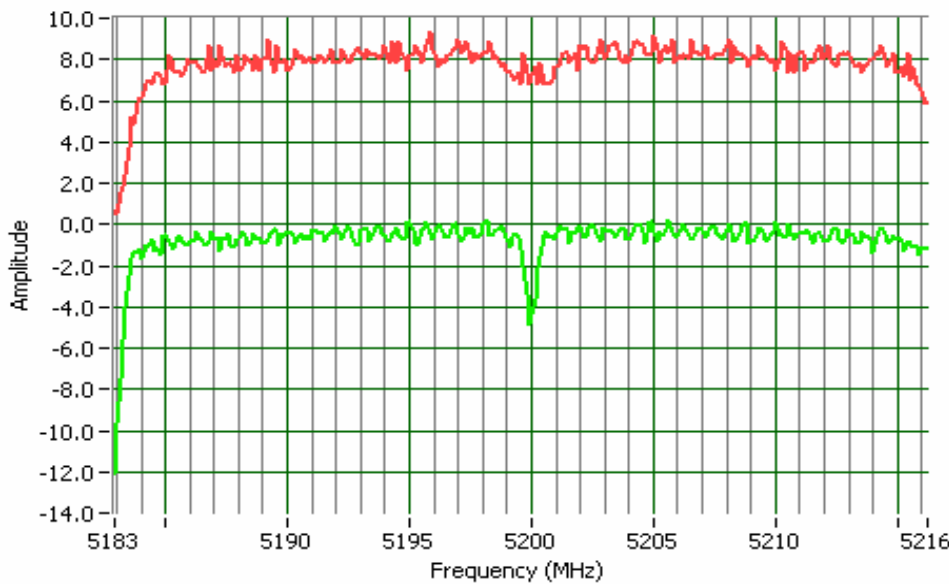
Peak Excursion



| | |
|------------------------------------|------------------------------|
| Client: Atheros | Job Number: J59313 |
| Model: D1470U | T-Log Number: T59339 |
| Contact: Michael Robinson | Account Manager: Joe Rohlfes |
| Spec: FCC 15E,15.247;LP002;RSS 210 | Class: N/A |

Peak Excursion - 5200 MHz Turbo mode

Sampled (Power Averaged) and Peak Traces



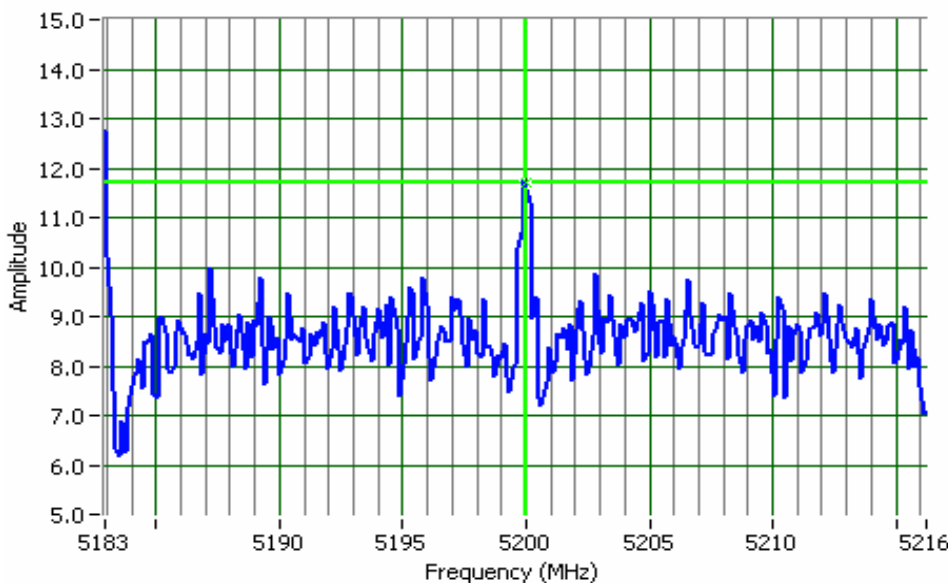
Settings for plot 0

RB 1.0MHz
 VB 3.0MHz
 Detector Sample
 Att 40
 RL Offset 2.0
 Sweep Time 5.0ms
 Units DBM

Settings for plot 1

RB 1.0MHz
 VB 3.0MHz
 Detector POS
 Att 40
 RL Offset 2.0
 Sweep Time 5.0ms
 Units DBM

Peak Excursion



Peak PSD (Plot 0)

0.18 dBm/1.0MHz

Peak PSD (Plot 1)

9.34 dBm/1.0MHz

Peak excursion
 (Plot 1 - Plot 0)

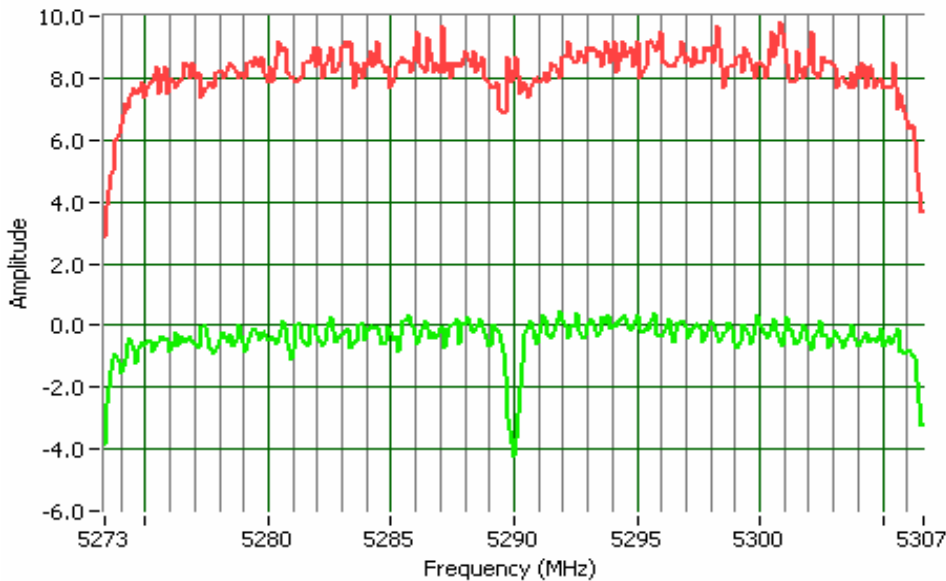
Maximum Peak
 Excursion (dB)



12.75

| | |
|------------------------------------|------------------------------|
| Client: Atheros | Job Number: J59313 |
| Model: D1470U | T-Log Number: T59339 |
| Contact: Michael Robinson | Account Manager: Joe Rohlfes |
| Spec: FCC 15E,15.247;LP002;RSS 210 | Class: N/A |

Peak Excursion - 5290 MHz Turbo mode

Sampled (Power Averaged) and Peak Traces



Plot 0 
 Plot 1 

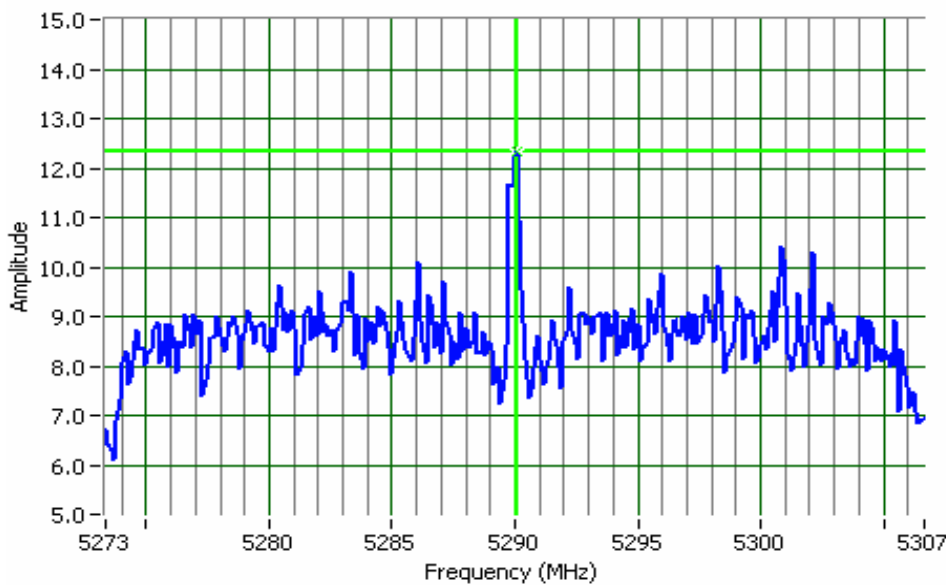
Settings for plot 0

RB 1.0MHz
 VB 3.0MHz
 Detector Sample
 Att 40
 RL Offset 2.0
 Sweep Time 5.0ms
 Units DBM

Settings for plot 1

RB 1.0MHz
 VB 3.0MHz
 Detector POS
 Att 40
 RL Offset 2.0
 Sweep Time 5.0ms
 Units DBM

Peak Excursion



Peak PSD (Plot 0)

0.44 dBm/1.0MHz

Peak PSD (Plot 1)

9.84 dBm/1.0MHz

Peak excursion
 (Plot 1 - Plot 0)

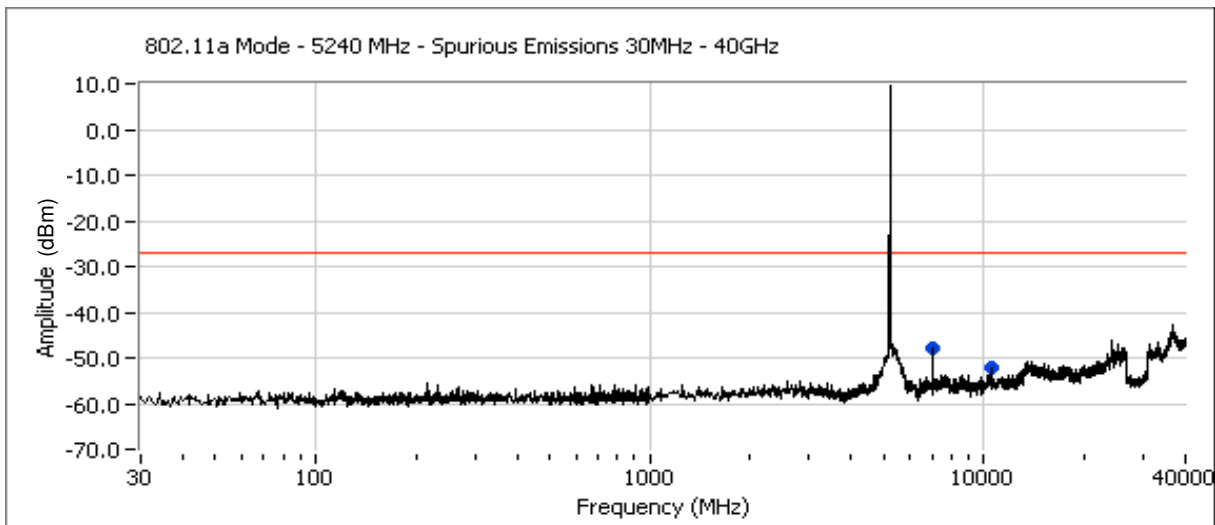
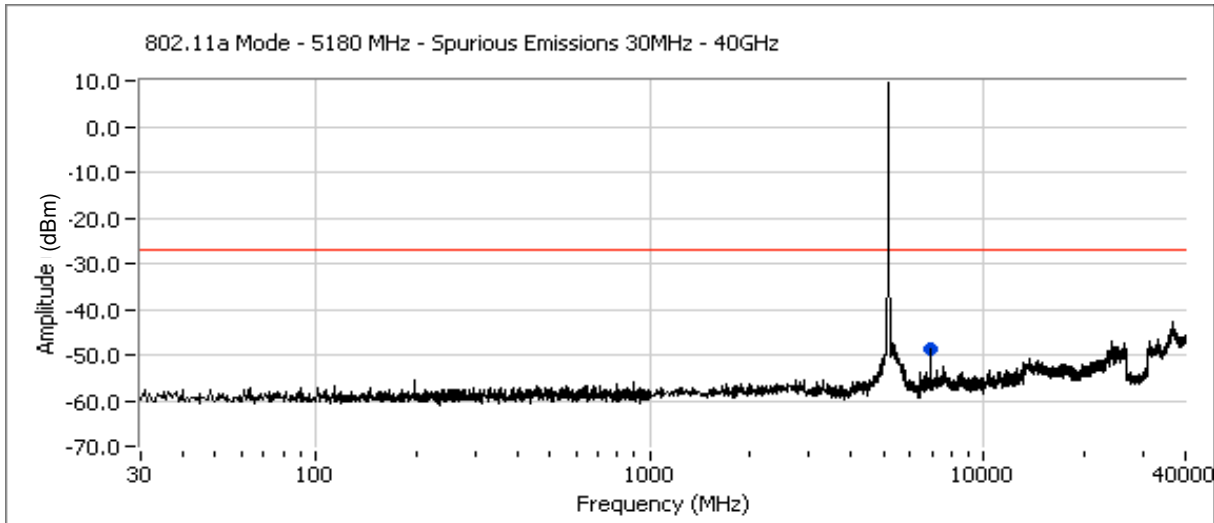
Maximum Peak
 Excursion (dB)

12.35

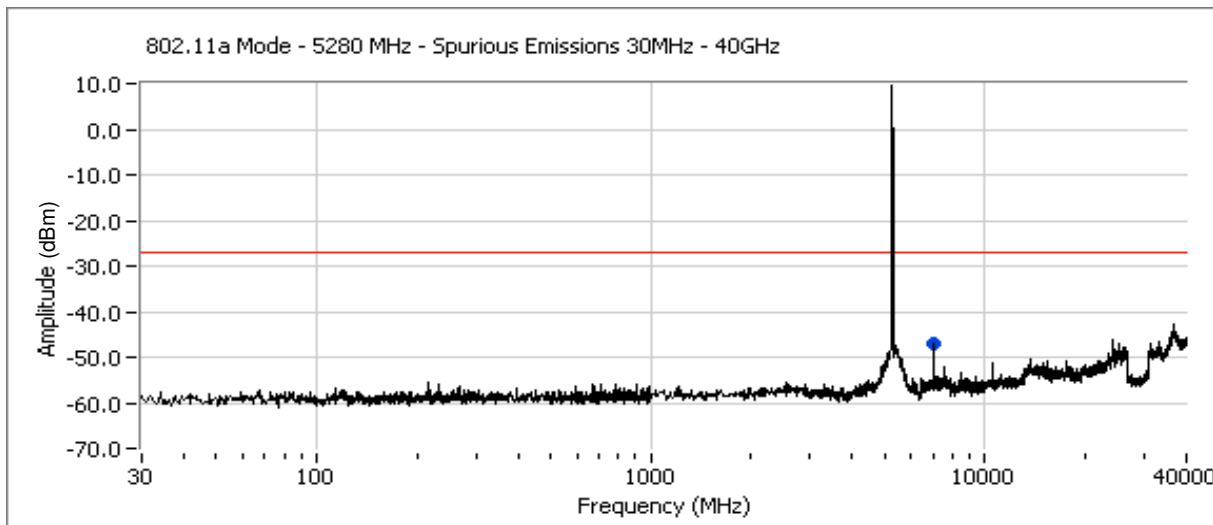
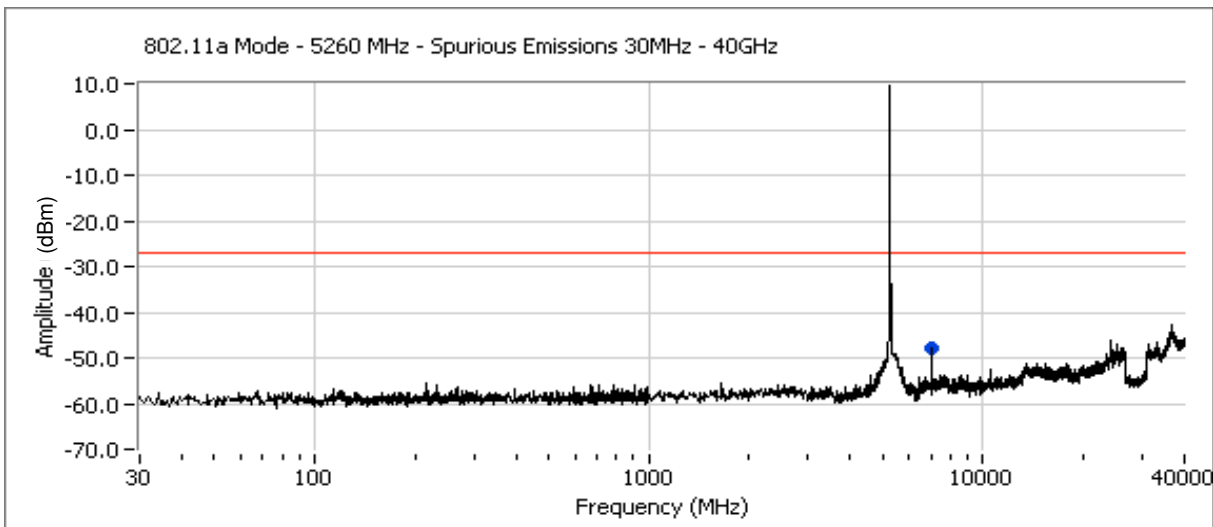
| | |
|------------------------------------|------------------------------|
| Client: Atheros | Job Number: J59313 |
| Model: D1470U | T-Log Number: T59339 |
| Contact: Michael Robinson | Account Manager: Joe Rohlfes |
| Spec: FCC 15E,15.247;LP002;RSS 210 | Class: N/A |

Run #3: Out Of Band Spurious Emissions - Antenna Conducted

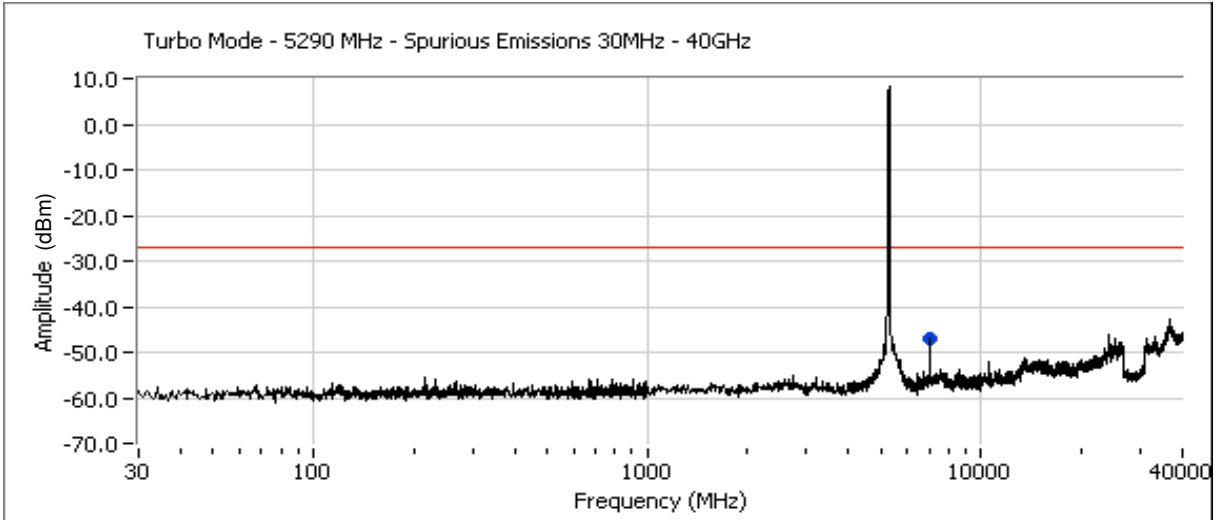
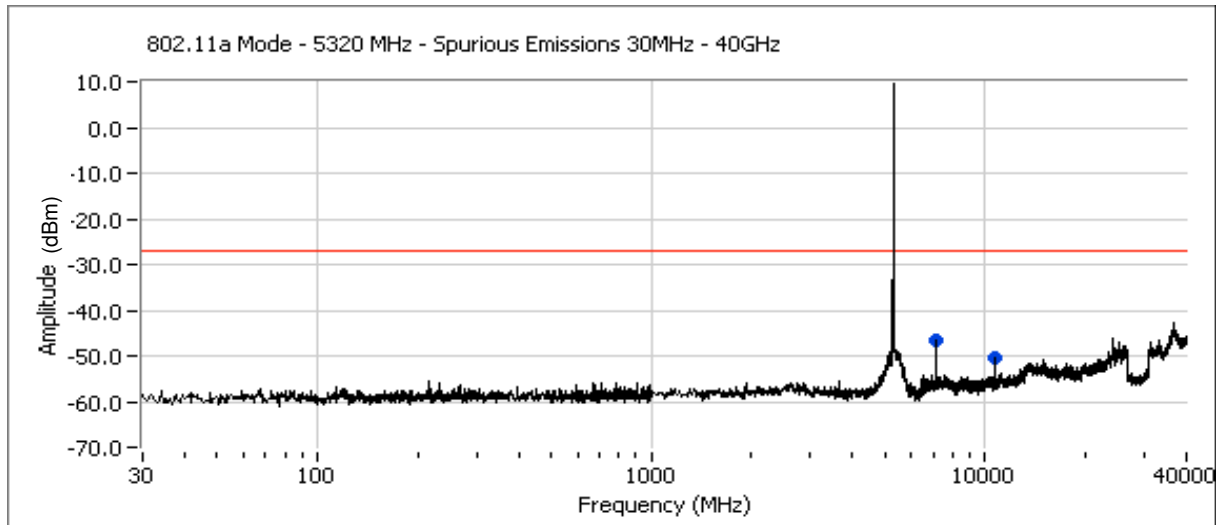
Plots Showing Out-Of-Band Emissions (RBW=VBW=1MHz)



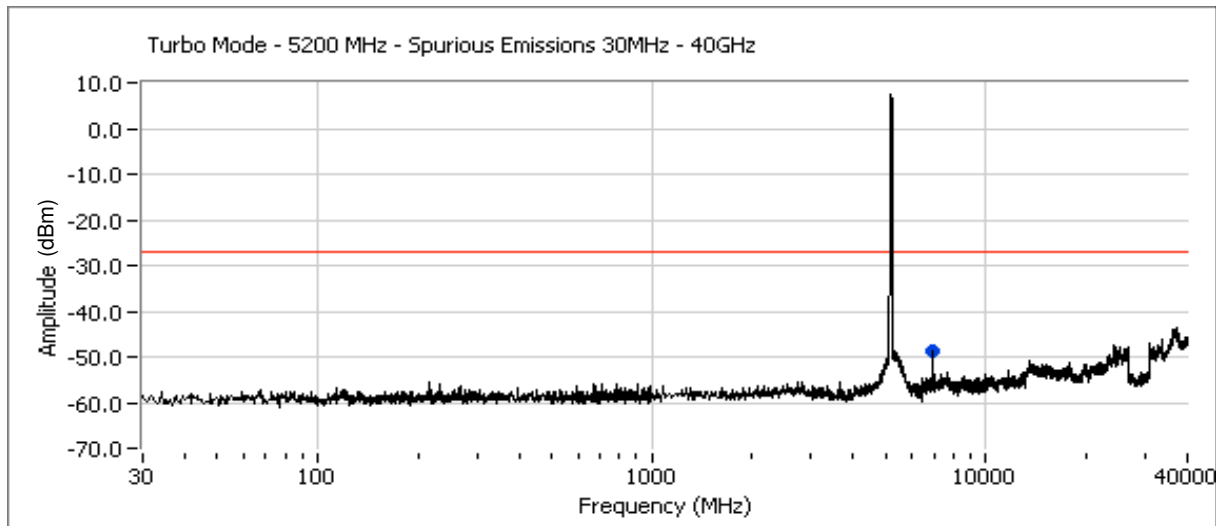
| | |
|------------------------------------|------------------------------|
| Client: Atheros | Job Number: J59313 |
| Model: D1470U | T-Log Number: T59339 |
| Contact: Michael Robinson | Account Manager: Joe Rohlfes |
| Spec: FCC 15E,15.247;LP002;RSS 210 | Class: N/A |



| | |
|------------------------------------|------------------------------|
| Client: Atheros | Job Number: J59313 |
| Model: D1470U | T-Log Number: T59339 |
| Contact: Michael Robinson | Account Manager: Joe Rohlfes |
| Spec: FCC 15E,15.247;LP002;RSS 210 | Class: N/A |



| | |
|---------------------------------------|------------------------------|
| Client: Atheros | Job Number: J59313 |
| Model: D1470U | T-Log Number: T59339 |
| Contact: Michael Robinson | Account Manager: Joe Rohlfes |
| Spec: FCC 15E, 15.247; LP002; RSS 210 | Class: N/A |



Highest spurious emissions from plots:

| Frequency | Level | Pol | 15.209 / 15E | | Detector | |
|-----------|-------|---------|--------------|--------|-----------|--------------------------|
| MHz | dBm | v/h | Limit | Margin | Pk/QP/Avg | |
| 7093.44 | -46.7 | RF Port | -27.0 | -19.7 | Peak | Tx @ 5320 MHz |
| 7053.44 | -46.8 | RF Port | -27.0 | -19.8 | Peak | Tx @ 5290 MHz Turbo Mode |
| 7013.42 | -47.0 | RF Port | -27.0 | -20.0 | Peak | Tx @ 5260 MHz |
| 7040.09 | -47.2 | RF Port | -27.0 | -20.2 | Peak | Tx @ 5280 MHz |
| 6986.77 | -47.7 | RF Port | -27.0 | -20.7 | Peak | Tx @ 5240 MHz |
| 6906.67 | -48.7 | RF Port | -27.0 | -21.7 | Peak | Tx @ 5180 MHz |
| 6933.44 | -48.8 | RF Port | -27.0 | -21.8 | Peak | Tx @ 5200 MHz Turbo Mode |
| 10639.22 | -50.3 | RF Port | -27.0 | -23.3 | Peak | Tx @ 5320 MHz |
| 10480.95 | -52.7 | RF Port | -27.0 | -25.7 | Peak | Tx @ 5240 MHz |

The data in the above table assumes an antenna gain of 0dBm eirp at the frequencies noted. As the margins are all greater than 15dB, and all radiated spurious emissions measurements showed all spurious emissions below the limit the device meets the out of band spurious emissions requirements of FCC Part 15, RSS 210 and LP0002



EMC Test Data

| | | | |
|----------|------------------------------|------------------|-------------|
| Client: | Atheros | Job Number: | J59313 |
| Model: | D1470U | T-Log Number: | T59339 |
| Contact: | Michael Robinson | Account Manager: | Joe Rohlfes |
| Spec: | FCC 15E/15.247;LP002;RSS 210 | Class: | N/A |

Radiated Emissions 1 - 40GHz (Transmit Mode) 5150 - 5250, 5250 - 5350 and 5725 - 5850 MHz Bands FCC 15.247 / FCC 15 E / RSS210 / LP0002

Test Specifics

Objective: The objective of this test session is to perform engineering evaluation testing of the EUT with respect to the specification listed above.

Date of Test: April 6&11/2005
Test Engineer: M. Briggs/M. Birgani
Test Location: SVOATS #1

Config. Used: #1
Config Change: EUT: MAC:00904BD9C041
Host Unit Voltage 120V/60Hz

General Test Configuration

The EUT and host laptop were located on the turntable for radiated spurious emissions testing. The EUT was controlled via ART software that set the EUT to transmit continuously at target power of 17mW 1Mb/s for 802.11b mode and 6Mb/s for 802.11a and 802.11g modes.

For radiated emissions testing the measurement antenna was located 3 meters from the EUT unless stated otherwise.

Ambient Conditions: Temperature: 15 - 22 °C
Rel. Humidity: 35 - 45 %

Summary of Results

| Run # | Test Performed | Limit | Pass / Fail | Result / Margin |
|---------------------------------|---|---|-------------|--|
| 1a - d (5180/ 5260/ 5280/ 5320) | 802.11a (5150 - 5350 MHz) Radiated Spurious Emissions 1 - 40 GHz | FCC Part 15.209 / 15E / RSS 210 | Pass | 52.2dBµV/m (406.9µV/m) @ 15538.9MHz (-1.8dB) |
| 1c/ 1d (5280/ 5320) | 802.11a (5250 - 5350 MHz) Radiated Spurious Emissions 1 - 40 GHz | LP002 section 4.7.3 / 2.7 / 2.8 | Pass | 45.3dBµV/m (184.7µV/m) @ 15959.3MHz (-8.7dB) |
| 2a/ b (5200/ 5290) | Turbo Mode (5150 - 5350 MHz) Radiated Spurious Emissions 1 - 40 GHz | FCC Part 15.209 / 15E / RSS 210 | Pass | 51.3dBµV/m (367.7µV/m) @ 15599.1MHz (-2.7dB) |
| 3a/ 3b/ 3c (5745/ 5785/ 5825) | 802.11a (5725 - 5850 MHz) Radiated Spurious Emissions 1 - 40 GHz | FCC Part 15.209 / 15.247/ RSS 210 / LP0002 3.10 | Pass | 48.7dBµV/m (272.6µV/m) @ 17474.8MHz (-5.3dB) |



EMC Test Data

| | | | |
|----------|------------------------------|------------------|-------------|
| Client: | Atheros | Job Number: | J59313 |
| Model: | D1470U | T-Log Number: | T59339 |
| Contact: | Michael Robinson | Account Manager: | Joe Rohlfes |
| Spec: | FCC 15E115.247;LP002;RSS 210 | Class: | N/A |

Modifications Made During Testing:

No modifications were made to the EUT during testing

Deviations From The Standard

No deviations were made from the standard:

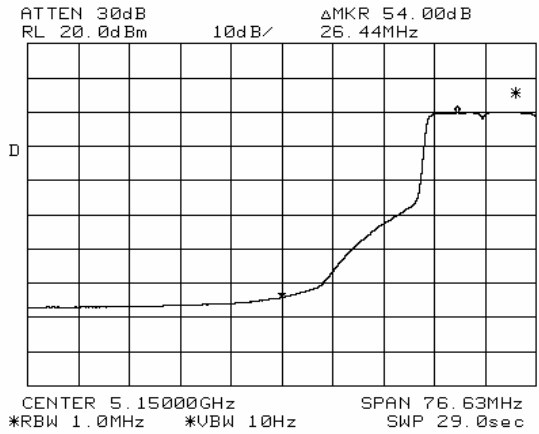
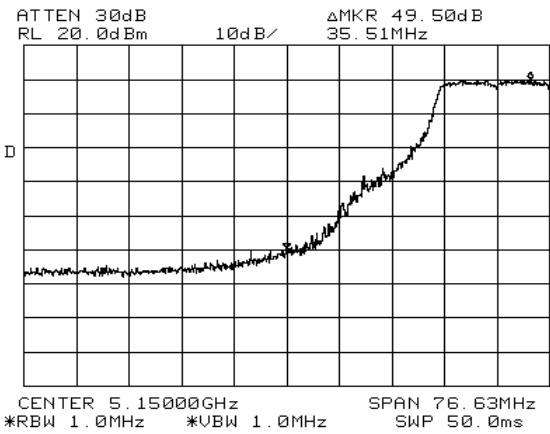


EMC Test Data

| | |
|-----------------------------------|------------------------------|
| Client: Atheros | Job Number: J59313 |
| Model: D1470U | T-Log Number: T59339 |
| Contact: Michael Robinson | Account Manager: Joe Rohlfes |
| Spec: FCC 15E15.247;LP002;RSS 210 | Class: N/A |

Run #1: 802.11a Mode, 5150 - 5350 MHz
Run #1a: Radiated Spurious Emissions. Low Channel @ 5180 MHz
Fundamental Signal, power level setting = 18 (target power in ART)

| Frequency | Level | Pol | 15.209 / 15E | | Detector | Azimuth | Height | Comments |
|-----------|--------|-----|--------------|--------|-----------|---------|--------|----------|
| MHz | dBμV/m | v/h | Limit | Margin | Pk/QP/Avg | degrees | meters | |
| 5175.070 | 110.7 | V | - | - | PK | 175 | 1.2 | Ant b |
| 5175.382 | 108.3 | H | - | - | PK | 148 | 1.8 | Ant b |
| 5174.844 | 107.9 | V | - | - | PK | 0 | 1.7 | Ant A |
| 5172.974 | 104.9 | H | - | - | PK | 180 | 1.2 | Ant A |
| 5175.070 | 101.1 | V | - | - | AVG | 175 | 1.2 | Ant b |
| 5175.382 | 99.3 | H | - | - | AVG | 148 | 1.8 | Ant b |
| 5174.844 | 98.7 | V | - | - | AVG | 0 | 1.7 | Ant A |
| 5172.974 | 97.1 | H | - | - | AVG | 180 | 1.2 | Ant A |



Method 1, band edge marker delta

| | | |
|------------------------|----------|-------------------|
| Delta Marker - Peak | 49.5 dB | RB = VB= 1MHz |
| Delta Marker - Average | 54.00 dB | RB=1MHz VB = 10Hz |

Band Edge Signal Radiated Field Strength

| Frequency | Level | Pol | 15.209 / 15E | | Detector | Azimuth | Height | Comments |
|-----------|--------|-----|--------------|--------|-----------|---------|--------|---------------------------------|
| MHz | dBμV/m | v/h | Limit | Margin | Pk/QP/Avg | degrees | meters | |
| 5150.000 | 47.1 | v | 54.0 | -6.9 | Avg | 175 | 1.2 | Ant B Note 2 (factor =-54.02dB) |
| 5150.000 | 61.2 | v | 74.0 | -12.8 | Pk | 175 | 1.2 | Ant B Note 2 (factor =-49.5dB) |



EMC Test Data

| | | | |
|----------|------------------------------|------------------|-------------|
| Client: | Atheros | Job Number: | J59313 |
| Model: | D1470U | T-Log Number: | T59339 |
| Contact: | Michael Robinson | Account Manager: | Joe Rohlfes |
| Spec: | FCC 15E 15.247;LP002;RSS 210 | Class: | N/A |

Other Spurious Radiated Emissions:

| Frequency MHz | Level dB μ V/m | Pol v/h | 15.209 / 15E | | Detector Pk/QP/Avg | Azimuth degrees | Height meters | Comments |
|------------------|-----------------------|------------|--------------|--------|-----------------------|--------------------|------------------|----------|
| | | | Limit | Margin | | | | |
| 15538.880 | 52.2 | V | 54.0 | -1.8 | AVG | 221 | 1.3 | Ant B |
| 15537.750 | 52.2 | V | 54.0 | -1.9 | AVG | 216 | 1.3 | Ant A |
| 15539.060 | 48.7 | H | 54.0 | -5.3 | AVG | 227 | 1.3 | Ant A |
| 15540.885 | 48.0 | H | 54.0 | -6.1 | AVG | 219 | 1.4 | Ant B |
| 15538.880 | 65.0 | V | 74.0 | -9.0 | PK | 221 | 1.3 | Ant B |
| 15537.750 | 64.9 | V | 74.0 | -9.1 | PK | 216 | 1.3 | Ant A |
| 15540.885 | 61.0 | H | 74.0 | -13.0 | PK | 219 | 1.4 | Ant B |
| 15539.060 | 60.9 | H | 74.0 | -13.1 | PK | 227 | 1.3 | Ant A |
| 10360.0 | - | - | - | - | - | - | - | Note 3 |

- Note 1: For emissions in restricted bands the limit of 15.209 was used. For all other emissions the limit was set to -27dBm/MHz (~68dBuV/m).
- Note 2: Band-edge measurement calculated from the fundamental field strength (peak or average) minus the band edge delta marker measurement.
- Note 3: Not in a restricted band signal more than 20dB below the limit of 68dBuV/m.

Run #1b: Radiated Emissions. EUT @ 5260 MHz

Spurious Emissions

| Frequency MHz | Level dB μ V/m | Pol v/h | 15.209 / 15E | | Detector Pk/QP/Avg | Azimuth degrees | Height meters | Comments |
|------------------|-----------------------|------------|--------------|--------|-----------------------|--------------------|------------------|---------------------|
| | | | Limit | Margin | | | | |
| 15774.75 | 48.4 | V | 54.0 | -5.6 | AVG | 217 | 1.0 | Ant B 3rd Harmonics |
| 15777.20 | 47.1 | H | 54.0 | -6.9 | AVG | 175 | 1.3 | Ant B 3rd Harmonics |
| 15778.60 | 44.5 | V | 54.0 | -9.5 | AVG | 214 | 1.2 | Ant A 3rd Harmonics |
| 15779.38 | 43.0 | H | 54.0 | -11.0 | AVG | 176 | 1.3 | Ant A 3rd Harmonics |
| 15774.75 | 61.8 | V | 74.0 | -12.3 | PK | 217 | 1.0 | Ant B 3rd Harmonics |
| 15777.20 | 60.2 | H | 74.0 | -13.8 | PK | 175 | 1.3 | Ant B 3rd Harmonics |
| 15778.60 | 57.9 | V | 74.0 | -16.1 | PK | 214 | 1.2 | Ant A 3rd Harmonics |
| 15779.38 | 55.1 | H | 74.0 | -18.9 | PK | 176 | 1.3 | Ant A 3rd Harmonics |

- Note 1: For emissions in restricted bands the limit of 15.209 was used. For all other emissions the limit was set to -27dBm/MHz (~68dBuV/m).
- Note 4: Emission was below the noise floor with the EUT operating into either antenna A or antenna B and with the measurement antenna either Horizontal or Vertical. Actual measurement is the noise floor with EUT on ANT A measurement antenna vertical.

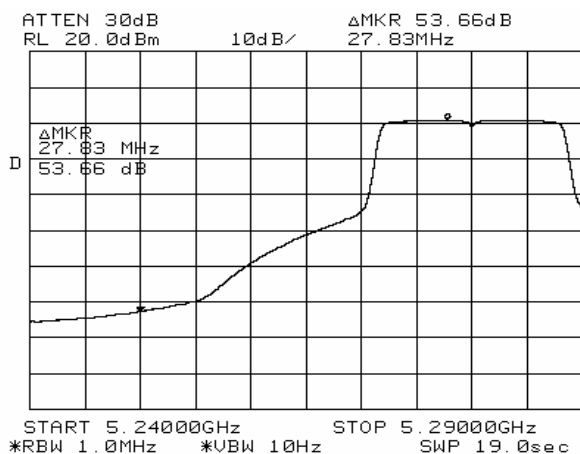
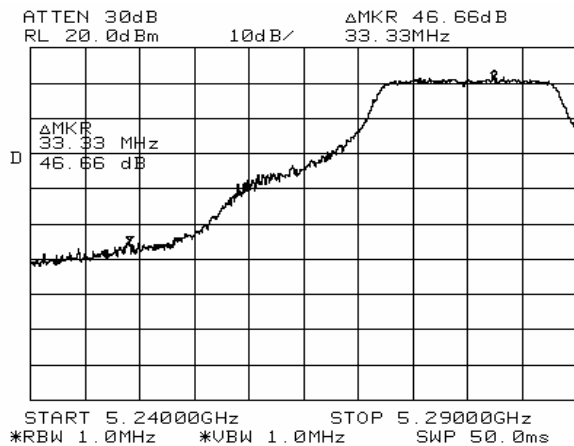


EMC Test Data

| | |
|-----------------------------------|------------------------------|
| Client: Atheros | Job Number: J59313 |
| Model: D1470U | T-Log Number: T59339 |
| Contact: Michael Robinson | Account Manager: Joe Rohlfes |
| Spec: FCC 15E15.247;LP002;RSS 210 | Class: N/A |

Run #1c: Radiated Emissions. EUT @ 5280 MHz
Fundamental Signal, power level setting = 18 (target power in ART)

| Frequency MHz | Level dBμV/m | Pol v/h | 15.209 / 15E | | Detector Pk/QP/Avg | Azimuth degrees | Height meters | Comments |
|------------------|-----------------|------------|--------------|--------|-----------------------|--------------------|------------------|----------|
| | | | Limit | Margin | | | | |
| 5281.040 | 109.5 | V | - | - | PK | 215 | 1.2 | Ant B |
| 5281.500 | 108.7 | V | - | - | PK | 198 | 1.0 | Ant A |
| 5278.535 | 108.5 | H | - | - | PK | 166 | 1.6 | Ant B |
| 5284.817 | 107.0 | H | - | - | PK | 245 | 1.0 | Ant A |
| 5281.040 | 100.4 | V | - | - | AVG | 215 | 1.2 | Ant B |
| 5278.535 | 100.0 | H | - | - | AVG | 166 | 1.6 | Ant B |
| 5281.500 | 99.2 | V | - | - | AVG | 198 | 1.0 | Ant A |
| 5284.817 | 97.8 | H | - | - | AVG | 245 | 1.0 | Ant A |



Method 1, band edge marker delta

| | | |
|------------------------|---------|-------------------|
| Delta Marker - Peak | 46.7 dB | RB = VB= 1MHz |
| Delta Marker - Average | 53.7 dB | RB=1MHz VB = 10Hz |

Band Edge Signal Radiated Field Strength

| Frequency MHz | Level dBμV/m | Pol v/h | LP002 | | Detector Pk/QP/Avg | Azimuth degrees | Height meters | Comments |
|------------------|-----------------|------------|-------|--------|-----------------------|--------------------|------------------|--------------------------------|
| | | | Limit | Margin | | | | |
| 5250.000 | 46.7 | v | 54.0 | -7.3 | Avg | 215 | 1.2 | Ant B Note 2 (factor =-53.7dB) |
| 5250.000 | 62.8 | v | 74.0 | -11.2 | PK | 215 | 1.2 | Ant B Note 2 (factor =-46.7dB) |

Note 2: Band-edge measurement calculated from the fundamental field strength (peak or average) minus the band edge delta marker measurement.



EMC Test Data

| | | | |
|----------|------------------------------|------------------|-------------|
| Client: | Atheros | Job Number: | J59313 |
| Model: | D1470U | T-Log Number: | T59339 |
| Contact: | Michael Robinson | Account Manager: | Joe Rohlfes |
| Spec: | FCC 15E 15.247;LP002;RSS 210 | Class: | N/A |

Spurious Emissions

| Frequency MHz | Level dB μ V/m | Pol v/h | 15.209 / 15E | | Detector Pk/QP/Avg | Azimuth degrees | Height meters | Comments |
|------------------|-----------------------|------------|--------------|--------|-----------------------|--------------------|------------------|---------------------|
| | | | Limit | Margin | | | | |
| 15840.3994 | 44.6 | V | 54.0 | -9.4 | AVG | 217 | 1.1 | Ant B 3rd Harmonics |
| 15840.3994 | 56.6 | V | 74.0 | -17.4 | PK | 217 | 1.1 | Ant B 3rd Harmonics |
| 15840.2900 | 41.3 | V | 54.0 | -12.7 | AVG | 214 | 1.2 | Ant A 3rd Harmonics |
| 15840.2900 | 54.2 | V | 74.0 | -19.8 | PK | 214 | 1.2 | Ant A 3rd Harmonics |
| 15840.4648 | 39.2 | H | 54.0 | -14.8 | AVG | 174 | 1.2 | Ant A 3rd Harmonics |
| 15840.4648 | 51.4 | H | 74.0 | -22.6 | PK | 174 | 1.2 | Ant A 3rd Harmonics |
| 15841.2148 | 43.6 | H | 54.0 | -10.4 | AVG | 176 | 1.3 | Ant B 3rd Harmonics |
| 15841.2148 | 56.5 | H | 74.0 | -17.5 | PK | 176 | 1.3 | Ant B 3rd Harmonics |

Note 1: For emissions in restricted bands the limit of 15.209 was used. For all other emissions the limit was set to -27dBm/MHz (~68dBuV/m).

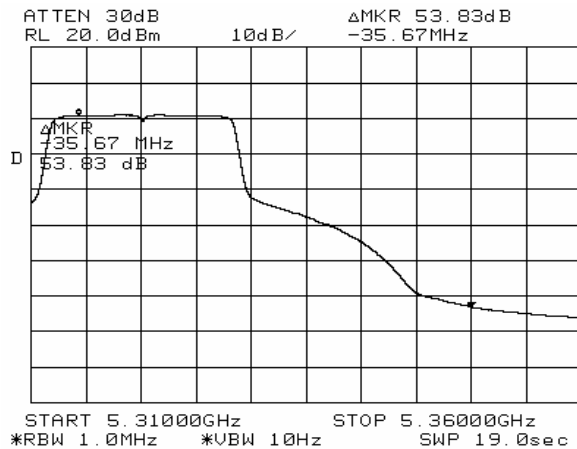
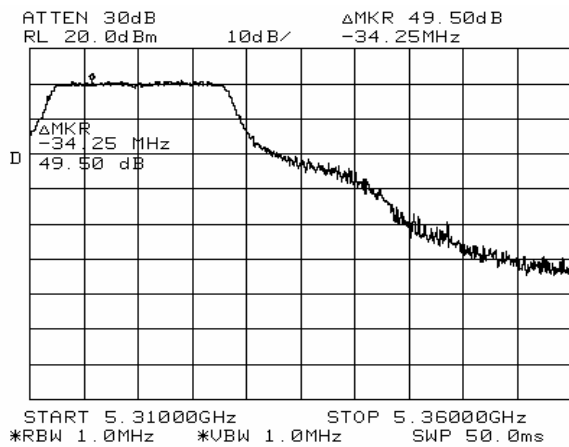


EMC Test Data

| | |
|-----------------------------------|------------------------------|
| Client: Atheros | Job Number: J59313 |
| Model: D1470U | T-Log Number: T59339 |
| Contact: Michael Robinson | Account Manager: Joe Rohlfes |
| Spec: FCC 15E15.247;LP002;RSS 210 | Class: N/A |

Run #1d: Radiated Spurious Emissions. High Channel @ 5320 MHz
Fundamental Signal, power level setting = 18 (target power in ART)

| Frequency MHz | Level dBμV/m | Pol v/h | 15.209 / 15E | | Detector Pk/QP/Avg | Azimuth degrees | Height meters | Comments |
|------------------|-----------------|------------|--------------|--------|-----------------------|--------------------|------------------|----------|
| | | | Limit | Margin | | | | |
| 5317.365 | 98.2 | H | - | - | AVG | 147 | 1.5 | Ant B |
| 5318.595 | 99.3 | V | - | - | AVG | 211 | 1.0 | Ant B |
| 5320.780 | 99.7 | H | - | - | AVG | 227 | 1.3 | Ant A |
| 5318.697 | 99.9 | V | - | - | AVG | 210 | 1.0 | Ant A |
| 5317.365 | 107.1 | H | - | - | PK | 147 | 1.5 | Ant B |
| 5318.595 | 108.0 | V | - | - | PK | 211 | 1.0 | Ant B |
| 5320.780 | 108.5 | H | - | - | PK | 227 | 1.3 | Ant A |
| 5318.697 | 108.6 | V | - | - | PK | 210 | 1.0 | Ant A |



Method 1, band edge marker delta

| | | |
|------------------------|----------|-------------------|
| Delta Marker - Peak | 49.5 dB | RB = VB= 1MHz |
| Delta Marker - Average | 53.83 dB | RB=1MHz VB = 10Hz |

Band Edge Signal Radiated Field Strength

| Frequency MHz | Level dBμV/m | Pol v/h | 15.209 / 15E | | Detector Pk/QP/Avg | Azimuth degrees | Height meters | Comments |
|------------------|-----------------|------------|--------------|--------|-----------------------|--------------------|------------------|--------------------------------|
| | | | Limit | Margin | | | | |
| 5350.000 | 45.3 | v | 54.0 | -8.7 | Avg | 210 | 1.0 | Ant A Note 2 (factor =-53.8dB) |
| 5350.000 | 59.1 | v | 74.0 | -14.9 | Pk | 210 | 1.0 | Ant A Note 2 (factor =-49.5dB) |

Note 2: Band-edge measurement calculated from the fundamental field strength (peak or average) minus the band edge delta marker measurement.



EMC Test Data

| | | | |
|----------|-----------------------------|------------------|-------------|
| Client: | Atheros | Job Number: | J59313 |
| Model: | D1470U | T-Log Number: | T59339 |
| Contact: | Michael Robinson | Account Manager: | Joe Rohlfes |
| Spec: | FCC 15E15.247;LP002;RSS 210 | Class: | N/A |

Other Spurious Radiated Emissions:

| Frequency MHz | Level dB μ V/m | Pol v/h | 15.209 / 15.247 | | Detector Pk/QP/Avg | Azimuth degrees | Height meters | Comments |
|------------------|-----------------------|------------|-----------------|--------|-----------------------|--------------------|------------------|----------|
| | | | Limit | Margin | | | | |
| 15959.260 | 45.3 | V | 54.0 | -8.7 | AVG | 229 | 1.2 | Ant B |
| 15958.765 | 44.4 | H | 54.0 | -9.6 | AVG | 217 | 1.1 | Ant B |
| 15961.240 | 43.3 | H | 54.0 | -10.7 | AVG | 202 | 1.2 | Ant A |
| 15961.080 | 43.1 | V | 54.0 | -10.9 | AVG | 225 | 1.2 | Ant A |
| 10638.565 | 42.2 | V | 54.0 | -11.8 | AVG | 219 | 1.6 | Ant B |
| 10639.890 | 41.2 | H | 54.0 | -12.8 | AVG | 212 | 1.2 | Ant B |
| 10639.745 | 41.0 | H | 54.0 | -13.0 | AVG | 200 | 1.6 | Ant A |
| 10640.365 | 41.0 | V | 54.0 | -13.0 | AVG | 220 | 1.4 | Ant A |
| 15959.260 | 57.8 | V | 74.0 | -16.2 | PK | 229 | 1.2 | Ant B |
| 15958.765 | 56.9 | H | 74.0 | -17.1 | PK | 217 | 1.1 | Ant B |
| 15961.080 | 55.7 | V | 74.0 | -18.3 | PK | 225 | 1.2 | Ant A |
| 15961.240 | 55.3 | H | 74.0 | -18.7 | PK | 202 | 1.2 | Ant A |
| 10638.565 | 53.6 | V | 74.0 | -20.4 | PK | 219 | 1.6 | Ant B |
| 10639.890 | 52.5 | H | 74.0 | -21.5 | PK | 212 | 1.2 | Ant B |
| 10639.745 | 52.5 | H | 74.0 | -21.6 | PK | 200 | 1.6 | Ant A |
| 10640.365 | 52.3 | V | 74.0 | -21.7 | PK | 220 | 1.4 | Ant A |

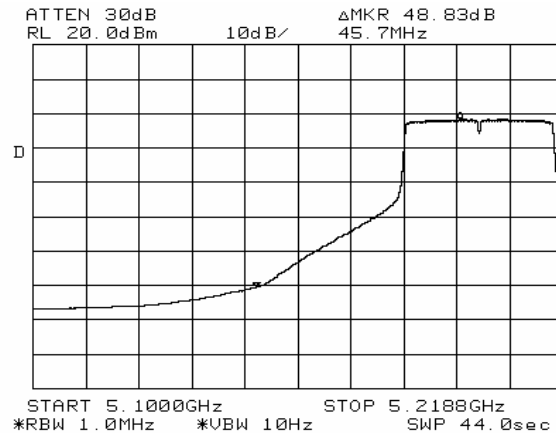
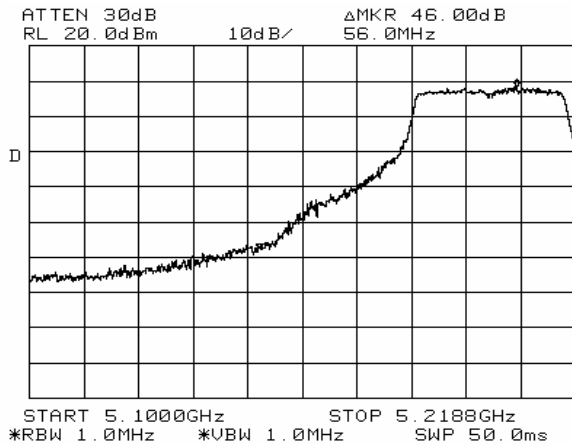


EMC Test Data

| | |
|-----------------------------------|------------------------------|
| Client: Atheros | Job Number: J59313 |
| Model: D1470U | T-Log Number: T59339 |
| Contact: Michael Robinson | Account Manager: Joe Rohlfes |
| Spec: FCC 15E15.247;LP002;RSS 210 | Class: N/A |

Run #2: Turbo Mode, 5150 - 5350 MHz
Run #2a: Radiated Spurious Emissions. Turbo Channel @ 5200 MHz
Fundamental Signal, power level setting = 18 (target power in ART)

| Frequency | Level | Pol | 15.209 / 15E | | Detector | Azimuth | Height | Comments |
|-----------|--------|-----|--------------|--------|-----------|---------|--------|----------|
| MHz | dBμV/m | v/h | Limit | Margin | Pk/QP/Avg | degrees | meters | |
| 5211.250 | 105.6 | V | - | - | PK | 155 | 1.0 | Ant B |
| 5189.500 | 104.1 | V | - | - | PK | 180 | 1.0 | Ant A |
| 5190.725 | 104.0 | H | - | - | PK | 148 | 1.5 | Ant B |
| 5213.267 | 102.9 | H | - | - | PK | 224 | 1.2 | Ant A |
| 5211.250 | 96.7 | V | - | - | AVG | 155 | 1.0 | Ant B |
| 5190.725 | 95.7 | H | - | - | AVG | 148 | 1.5 | Ant B |
| 5189.500 | 95.7 | V | - | - | AVG | 180 | 1.0 | Ant A |
| 5213.267 | 94.7 | H | - | - | AVG | 224 | 1.2 | Ant A |



Method 1, band edge marker delta

| | | |
|------------------------|---------|---------------------|
| Delta Marker - Peak | 46.0 dB | RB = VB = 1MHz |
| Delta Marker - Average | 48.8 dB | RB=1MHz VB = 10Hz |

Band Edge Signal Radiated Field Strength

| Frequency | Level | Pol | 15.209 / 15E | | Detector | Azimuth | Height | Comments |
|-----------|--------|-----|--------------|--------|-----------|---------|--------|-----------------------------------|
| MHz | dBμV/m | v/h | Limit | Margin | Pk/QP/Avg | degrees | meters | |
| 5150.000 | 47.9 | v | 54.0 | -6.1 | Avg | | | Ant B Note 2 (factor = -48.8dB) |
| 5150.000 | 59.6 | v | 74.0 | -14.4 | Pk | | | Ant B Note 2 (factor = -46.0dB) |

Note 2: Band-edge measurement calculated from the fundamental field strength (peak or average) minus the band edge delta marker measurement.



EMC Test Data

| | | | |
|----------|------------------------------|------------------|-------------|
| Client: | Atheros | Job Number: | J59313 |
| Model: | D1470U | T-Log Number: | T59339 |
| Contact: | Michael Robinson | Account Manager: | Joe Rohlfes |
| Spec: | FCC 15E115.247;LP002;RSS 210 | Class: | N/A |

Spurious Emissions

| Frequency MHz | Level dBμV/m | Pol v/h | 15.209 / 15E | | Detector Pk/QP/Avg | Azimuth degrees | Height meters | Comments |
|------------------|-----------------|------------|--------------|--------|-----------------------|--------------------|------------------|----------|
| | | | Limit | Margin | | | | |
| 15599.055 | 51.3 | V | 54.0 | -2.7 | AVG | 220 | 1.4 | Ant B |
| 15599.085 | 50.1 | V | 54.0 | -3.9 | AVG | 218 | 1.3 | Ant A |
| 15599.460 | 47.6 | H | 54.0 | -6.4 | AVG | 216 | 1.2 | Ant B |
| 15600.165 | 47.1 | H | 54.0 | -6.9 | AVG | 217 | 1.3 | Ant A |
| 15599.055 | 63.4 | V | 74.0 | -10.6 | PK | 220 | 1.4 | Ant B |
| 15599.085 | 63.0 | V | 74.0 | -11.0 | PK | 218 | 1.3 | Ant A |
| 15600.165 | 60.3 | H | 74.0 | -13.7 | PK | 217 | 1.3 | Ant A |
| 15599.460 | 60.3 | H | 74.0 | -13.7 | PK | 216 | 1.2 | Ant B |

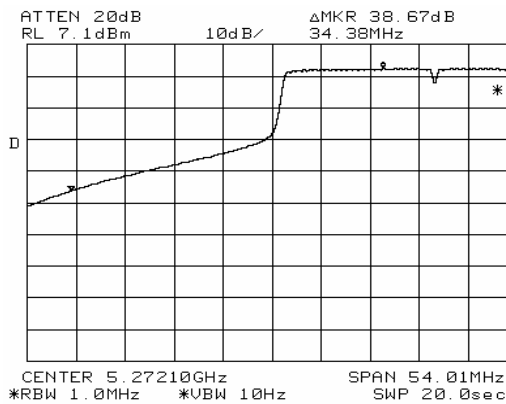
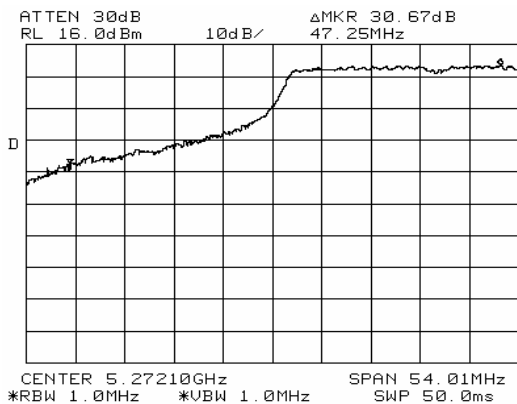


EMC Test Data

| | |
|-----------------------------------|------------------------------|
| Client: Atheros | Job Number: J59313 |
| Model: D1470U | T-Log Number: T59339 |
| Contact: Michael Robinson | Account Manager: Joe Rohlfes |
| Spec: FCC 15E15.247;LP002;RSS 210 | Class: N/A |

Run #2b: Radiated Spurious Emissions. Turbo Channel @ 5290 MHz
Fundamental Signal, power level setting = 18 (target power in ART)

| Frequency MHz | Level dBμV/m | Pol v/h | 15.209 / 15E | | Detector Pk/QP/Avg | Azimuth degrees | Height meters | Comments |
|------------------|-----------------|------------|--------------|--------|-----------------------|--------------------|------------------|----------|
| | | | Limit | Margin | | | | |
| 5288.955 | 106.4 | H | - | - | PK | 237 | 1.4 | Ant A |
| 5291.315 | 105.8 | V | - | - | PK | 197 | 1.1 | Ant A |
| 5291.390 | 105.5 | V | - | - | PK | 237 | 1.0 | Ant B |
| 5288.780 | 103.9 | H | - | - | PK | 166 | 1.7 | Ant B |
| 5288.955 | 98.1 | H | - | - | AVG | 237 | 1.4 | Ant A |
| 5291.315 | 97.4 | V | - | - | AVG | 197 | 1.1 | Ant A |
| 5291.390 | 97.2 | V | - | - | AVG | 237 | 1.0 | Ant B |
| 5288.780 | 95.9 | H | - | - | AVG | 166 | 1.7 | Ant B |



Method 1, band edge marker delta (5250 MHz band edge)

| | | |
|------------------------|----------|-------------------|
| Delta Marker - Peak | 30.67 dB | RB = VB= 1MHz |
| Delta Marker - Average | 38.67 dB | RB=1MHz VB = 10Hz |

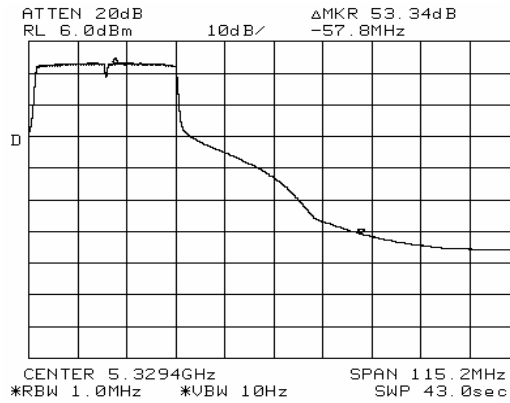
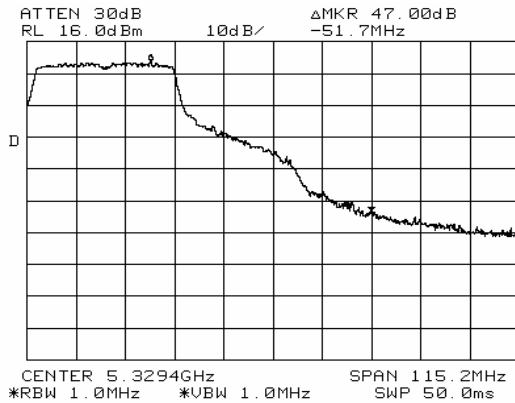
Band Edge Signal Radiated Field Strength - 5250 MHz

| Frequency MHz | Level dBμV/m | Pol v/h | LP002 | | Detector Pk/QP/Avg | Azimuth degrees | Height meters | Comments |
|------------------|-----------------|------------|-------|------------|-----------------------|--------------------|------------------|------------------|
| | | | Limit | Margin | | | | |
| 5250.000 | 59.4 | v | 54.0 | 5.4 | Avg | 237 | 1.4 | Ant A LP002 only |
| 5250.000 | 75.7 | v | 74.0 | 1.7 | Pk | 237 | 1.4 | Ant A LP002 only |



EMC Test Data

| | |
|-----------------------------------|------------------------------|
| Client: Atheros | Job Number: J59313 |
| Model: D1470U | T-Log Number: T59339 |
| Contact: Michael Robinson | Account Manager: Joe Rohlfes |
| Spec: FCC 15E15.247;LP002;RSS 210 | Class: N/A |



Method 1, band edge marker delta (5350 MHz band edge)

| | | |
|------------------------|----------|-------------------|
| Delta Marker - Peak | 47.00 dB | RB = VB = 1MHz |
| Delta Marker - Average | 53.34 dB | RB=1MHz VB = 10Hz |

Band Edge Signal Radiated Field Strength - 5350 MHz

| Frequency | Level | Pol | 15.209 / 15E / LP002 | | Detector | Azimuth | Height | Comments |
|-----------|--------|-----|----------------------|--------|-----------|---------|--------|--------------------------------|
| MHz | dBμV/m | v/h | Limit | Margin | Pk/QP/Avg | degrees | meters | |
| 5350.000 | 44.8 | V | 54.0 | -9.2 | Avg | 237 | 1.4 | Ant A Note 2 (factor =-53.3dB) |
| 5350.000 | 59.4 | V | 74.0 | -14.6 | Pk | 237 | 1.4 | Ant A Note 2 (factor =-47.0dB) |

Spurious Emissions. Turbo Channel @ 5290 MHz

| Frequency | Level | Pol | 15.209 / 15E | | Detector | Azimuth | Height | Comments |
|-----------|--------|-----|--------------|--------|-----------|---------|--------|----------|
| MHz | dBμV/m | v/h | Limit | Margin | Pk/QP/Avg | degrees | meters | |
| 15869.745 | 44.8 | V | 54.0 | -9.2 | AVG | 202 | 1.3 | Ant B |
| 15870.240 | 43.8 | H | 54.0 | -10.2 | AVG | 215 | 1.4 | Ant B |
| 15868.990 | 42.4 | V | 54.0 | -11.6 | AVG | 218 | 1.4 | Ant A |
| 15874.634 | 40.7 | H | 54.0 | -13.3 | AVG | 212 | 1.0 | Ant A |
| 15869.745 | 56.8 | V | 74.0 | -17.2 | PK | 202 | 1.3 | Ant B |
| 15870.240 | 55.3 | H | 74.0 | -18.7 | PK | 215 | 1.4 | Ant B |
| 15868.990 | 54.0 | V | 74.0 | -20.1 | PK | 218 | 1.4 | Ant A |
| 15874.634 | 53.0 | H | 74.0 | -21.1 | PK | 212 | 1.0 | Ant A |

Note 2: Band-edge measurement calculated from the fundamental field strength (peak or average) minus the band edge delta marker measurement.



EMC Test Data

| | | | |
|----------|-----------------------------|------------------|-------------|
| Client: | Atheros | Job Number: | J59313 |
| Model: | D1470U | T-Log Number: | T59339 |
| Contact: | Michael Robinson | Account Manager: | Joe Rohlfes |
| Spec: | FCC 15E15.247;LP002;RSS 210 | Class: | N/A |

Run #3: 802.11a Mode, 5725 - 5850 MHz

Run #3a: Radiated Spurious Emissions. Channel @ 5745 MHz

| Frequency | Level | Pol | 15.209 / 15.247 | | Detector | Azimuth | Height | Comments |
|-----------|--------------|-----|-----------------|--------|-----------|---------|--------|-----------------------------------|
| MHz | dB μ V/m | v/h | Limit | Margin | Pk/QP/Avg | degrees | meters | |
| 11490.600 | 40.3 | V | 54.0 | -13.8 | AVG | 142 | 1.0 | Ant B 2nd Harmonics |
| 11488.050 | 38.8 | H | 54.0 | -15.2 | AVG | 231 | 1.4 | Ant B 2nd Harmonics |
| 11490.068 | 35.0 | V | 54.0 | -19.0 | AVG | 175 | 1.1 | Ant A 2nd Harmonics |
| 11487.000 | 34.5 | H | 54.0 | -19.5 | AVG | 232 | 1.5 | Ant A 2nd Harmonics (Noise Floor) |
| 11490.600 | 52.3 | V | 74.0 | -21.7 | PK | 142 | 1.0 | Ant B 2nd Harmonics |
| 11488.050 | 49.7 | H | 74.0 | -24.3 | PK | 231 | 1.4 | Ant B 2nd Harmonics |
| 11490.068 | 46.0 | V | 74.0 | -28.0 | PK | 175 | 1.1 | Ant A 2nd Harmonics |
| 11487.000 | 45.0 | H | 74.0 | -29.0 | PK | 232 | 1.5 | Ant A 2nd Harmonics (Noise Floor) |

Note 1: For emissions in restricted bands the limit of 15.209 was used. All other emissions were more than 20dB below the limit of -20dBc.

Note 4: Emission was below the noise floor.

Run #3b: Radiated Spurious Emissions. Channel @ 5785 MHz

| Frequency | Level | Pol | 15.209 / 15.247 | | Detector | Azimuth | Height | Comments |
|-----------|--------------|-----|-----------------|--------|-----------|---------|--------|-----------------------------------|
| MHz | dB μ V/m | v/h | Limit | Margin | Pk/QP/Avg | degrees | meters | |
| 11569.300 | 48.0 | V | 54.0 | -6.0 | AVG | 246 | 1.3 | Ant B 2nd Harmonics |
| 11569.350 | 44.8 | H | 54.0 | -9.3 | AVG | 225 | 1.4 | Ant B 2nd Harmonics |
| 11570.050 | 41.2 | V | 54.0 | -12.8 | AVG | 174 | 1.0 | Ant A 2nd Harmonics |
| 11569.300 | 59.6 | V | 74.0 | -14.5 | PK | 246 | 1.3 | Ant B 2nd Harmonics |
| 11574.600 | 38.4 | H | 54.0 | -15.7 | AVG | 180 | 1.0 | Ant A 2nd Harmonics (Noise Floor) |
| 11569.350 | 56.2 | H | 74.0 | -17.8 | PK | 225 | 1.4 | Ant B 2nd Harmonics |
| 11570.050 | 53.2 | V | 74.0 | -20.8 | PK | 174 | 1.0 | Ant A 2nd Harmonics |
| 11574.600 | 49.5 | H | 74.0 | -24.5 | PK | 180 | 1.0 | Ant A 2nd Harmonics (Noise Floor) |

Note 1: For emissions in restricted bands the limit of 15.209 was used. All other emissions were more than 20dB below the limit of -20dBc.

Note 4: At a distance of 30cm from the EUT the signal level was still below the limit of 54dB μ V/m. Measurement at 3m is the noise floor.



EMC Test Data

| | | | |
|----------|------------------------------|------------------|-------------|
| Client: | Atheros | Job Number: | J59313 |
| Model: | D1470U | T-Log Number: | T59339 |
| Contact: | Michael Robinson | Account Manager: | Joe Rohlfes |
| Spec: | FCC 15E115.247;LP002;RSS 210 | Class: | N/A |

Run #3c: Radiated Spurious Emissions. High Channel @ 5825 MHz

| Frequency MHz | Level dB μ V/m | Pol v/h | 15.209 / 15.247 | | Detector Pk/QP/Avg | Azimuth degrees | Height meters | Comments |
|------------------|-----------------------|------------|-----------------|--------|-----------------------|--------------------|------------------|------------------------------------|
| | | | Limit | Margin | | | | |
| 17474.826 | 48.7 | H | 54.0 | -5.3 | AVG | 175 | 1.3 | Ant B1 3rd Harmonics |
| 11649.700 | 48.6 | V | 54.0 | -5.4 | AVG | 176 | 1.0 | Ant B1 2nd Harmonics |
| 11649.175 | 43.9 | H | 54.0 | -10.1 | AVG | 148 | 1.3 | Ant B1 2nd Harmonics |
| 17473.951 | 41.7 | V | 54.0 | -12.3 | AVG | 175 | 1.0 | Ant B1 3rd Harmonics |
| 11648.300 | 41.6 | V | 54.0 | -12.4 | AVG | 141 | 1.1 | Ant A1 2nd Harmonics |
| 17474.826 | 61.0 | H | 74.0 | -13.0 | PK | 175 | 1.3 | Ant B1 3rd Harmonics |
| 17475.400 | 41.0 | H | 54.0 | -13.0 | AVG | 256 | 1.4 | Ant A1 3rd Harmonics |
| 11649.700 | 60.2 | V | 74.0 | -13.8 | PK | 176 | 1.0 | Ant B1 2nd Harmonics |
| 17471.725 | 38.7 | V | 54.0 | -15.3 | AVG | 126 | 1.0 | Ant A1 3rd Harmonics (Noise Floor) |
| 11643.400 | 38.0 | H | 54.0 | -16.0 | AVG | 227 | 1.1 | Ant A1 2nd Harmonics |
| 11649.175 | 55.7 | H | 74.0 | -18.3 | PK | 148 | 1.3 | Ant B1 2nd Harmonics |
| 17473.951 | 53.7 | V | 74.0 | -20.4 | PK | 175 | 1.0 | Ant B1 3rd Harmonics |
| 17475.400 | 53.2 | H | 74.0 | -20.8 | PK | 256 | 1.4 | Ant A1 3rd Harmonics |
| 11648.300 | 52.6 | V | 74.0 | -21.4 | PK | 141 | 1.1 | Ant A1 2nd Harmonics |
| 17471.725 | 49.5 | V | 74.0 | -24.5 | PK | 126 | 1.0 | Ant A1 3rd Harmonics (Noise Floor) |
| 11643.400 | 49.5 | H | 74.0 | -24.5 | PK | 227 | 1.1 | Ant A1 2nd Harmonics |

Note 1: For emissions in restricted bands the limit of 15.209 was used. All other emissions were more than 20dB below the limit of -20dBc.

Note 4: At a distance of 30cm from the EUT the signal level was still below the limit of 54dB μ V/m. Measurement at 3m is the noise floor.



EMC Test Data

| | | | |
|----------|-----------------------------|------------------|-------------|
| Client: | Atheros | Job Number: | J59313 |
| Model: | D1470U | T-Log Number: | T59339 |
| Contact: | Michael Robinson | Account Manager: | Joe Rohlfes |
| Spec: | FCC 15E15.247;LP002;RSS 210 | Class: | N/A |

Radiated Emissions 1 - 26 GHz (Transmit Mode) EUT Operating in the 2.4GHz Band FCC 15.247/RSS210/LP0002

Test Specifics

Objective: The objective of this test session is to perform engineering evaluation testing of the EUT with respect to the specification listed above.

Date of Test: 4/6/2005
 Test Engineer: M. Briggs/M. Birgani
 Test Location: SVOATS #1

Config. Used: #1
 Config Change: EUT: MAC:00904BD9C041
 Host Unit Voltage 120V/60Hz

General Test Configuration

The EUT and host laptop were located on the turntable for radiated spurious emissions testing. The EUT was controlled via ART software that set the EUT to transmit continuously at target power of 17mW 1Mb/s for 802.11b mode and 6Mb/s for 802.11a and 802.11g modes.

For radiated emissions testing the measurement antenna was located 3 meters from the EUT unless stated otherwise.

Ambient Conditions:
 Temperature: 12 - 19 °C
 Rel. Humidity: 30 - 52 %

Summary of Results

| Run # | Test Performed | Limit | Pass / Fail | Result / Margin |
|-----------------------------------|---|------------------------------|-------------|--|
| 1a - c (EUT @ 2412mW 2437mW 2462) | 802.11b Fundamental and Spurious Emissions 1 - 26 GHz | FCC Part 15.209 / 15.247(c) | Pass | 50.7dBµV/m (342.4µV/m) @ 4924.0MHz (-3.3dB) |
| 2a - c (EUT @ 2412mW 2437mW 2462) | 802.11g Fundamental and Spurious Emissions 1 - 26 GHz | FCC Part 15.209 / 15.247(c) | Pass | 53.5dBµV/m (473.2µV/m) @ 2483.6MHz (-0.5dB) |
| 3 | Other spurious emissions (signals present in transmit mode but independent of operating frequency/mode) | FCC Part 15.209 / 15.247(c) | Pass | 40.4dBµV/m (104.5µV/m) @ 2688.0MHz (-13.6dB) |
| 4 | Turbo Mode Fundamental and band edges | FCC Part 15.209 / 15.247(c) | Pass | 53.7dBµV/m (484.2µV/m) @ 2390.0MHz (-0.3dB) |



EMC Test Data

| | | | |
|----------|------------------------------|------------------|-------------|
| Client: | Atheros | Job Number: | J59313 |
| Model: | D1470U | T-Log Number: | T59339 |
| Contact: | Michael Robinson | Account Manager: | Joe Rohlfes |
| Spec: | FCC 15E115.247;LP002;RSS 210 | Class: | N/A |

Modifications Made During Testing:

No modifications were made to the EUT during testing

Deviations From The Standard

No deviations were made from the standard.



EMC Test Data

| | | | |
|----------|------------------------------|------------------|-------------|
| Client: | Atheros | Job Number: | J59313 |
| Model: | D1470U | T-Log Number: | T59339 |
| Contact: | Michael Robinson | Account Manager: | Joe Rohlfes |
| Spec: | FCC 15E 15.247;LP002;RSS 210 | Class: | N/A |

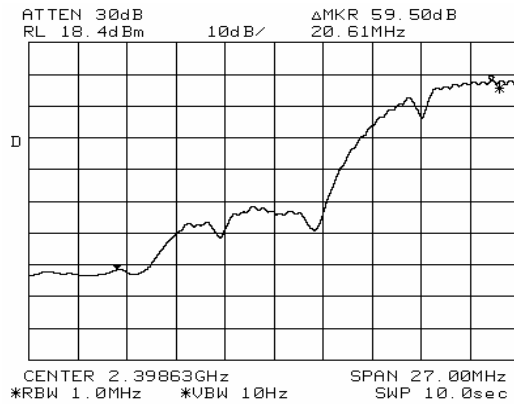
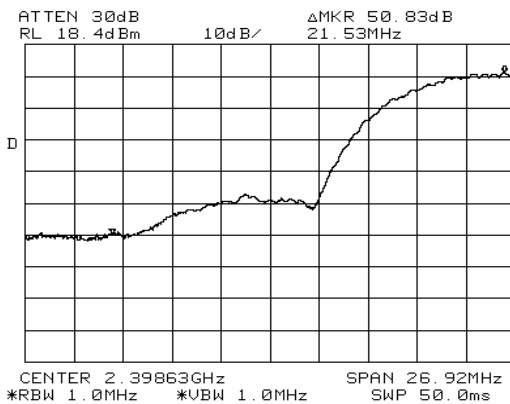
Run #1: 802.11b Mode

Date of Test: 4/6/2005
 Test Engineer: M. Briggs/M. Birgani
 Test Location: SVOATS #1

Config. Used: #1
 Config Change: EUT: MAC:00904BD9C041
 Host Unit Voltage 120V/60Hz

Run #1a: Radiated Spurious Emissions. Low Channel @ 2412 MHz 802.11b (1Mb/s)

| Frequency MHz | Level dB μ V/m | Pol v/h | 15.209 / 15E | | Detector Pk/QP/Avg | Azimuth degrees | Height meters | Comments |
|------------------|-----------------------|------------|--------------|--------|-----------------------|--------------------|------------------|----------|
| | | | Limit | Margin | | | | |
| 2411.445 | 108.0 | V | - | - | PK | 235 | 1.1 | Ant B |
| 2410.242 | 107.9 | H | - | - | PK | 145 | 1.0 | Ant B |
| 2411.425 | 106.0 | V | - | - | PK | 250 | 1.1 | Ant A |
| 2410.300 | 104.4 | H | - | - | PK | 160 | 1.0 | Ant A |
| 2411.445 | 105.1 | V | - | - | AVG | 235 | 1.1 | Ant B |
| 2410.242 | 104.8 | H | - | - | AVG | 145 | 1.0 | Ant B |
| 2412.635 | 103.1 | V | - | - | AVG | 250 | 1.1 | Ant A |
| 2410.300 | 101.6 | H | - | - | AVG | 160 | 1.0 | Ant A |



Method 1, band edge marker delta

| | | |
|------------------------|----------|-------------------|
| Delta Marker - Peak | 50.83 dB | RB = VB= 1MHz |
| Delta Marker - Average | 59.50 dB | RB=1MHz VB = 10Hz |

Band Edge Signal Radiated Field Strength

| Frequency MHz | Level dB μ V/m | Pol v/h | 15.209 / 15E | | Detector Pk/QP/Avg | Azimuth degrees | Height meters | Comments |
|------------------|-----------------------|------------|--------------|--------|-----------------------|--------------------|------------------|------------------------------------|
| | | | Limit | Margin | | | | |
| 2390.000 | 45.6 | V | 54.0 | -8.4 | Avg | 235 | 1.1 | Ant A Note 2: correction = -59.2dB |
| 2390.000 | 57.2 | V | 74.0 | -16.8 | Pk | 235 | 1.1 | Ant A Note 2: correction = -50.3dB |



EMC Test Data

| | | | |
|----------|------------------------------|------------------|-------------|
| Client: | Atheros | Job Number: | J59313 |
| Model: | D1470U | T-Log Number: | T59339 |
| Contact: | Michael Robinson | Account Manager: | Joe Rohlfes |
| Spec: | FCC 15E 15.247;LP002;RSS 210 | Class: | N/A |

Other Spurious Radiated Emissions:

| Frequency MHz | Level dB μ V/m | Pol v/h | 15.209 / 15E | | Detector Pk/QP/Avg | Azimuth degrees | Height meters | Comments |
|------------------|-----------------------|------------|--------------|--------|-----------------------|--------------------|------------------|--------------------|
| | | | Limit | Margin | | | | |
| 4824.125 | 48.6 | V | 54.0 | -5.4 | AVG | 193 | 1.1 | Ant B |
| 4824.045 | 48.1 | V | 54.0 | -5.9 | AVG | 177 | 1.0 | Ant A |
| 4824.045 | 47.9 | H | 54.0 | -6.1 | AVG | 197 | 1.2 | Ant A |
| 2136.022 | 47.3 | H | 54.0 | -6.7 | AVG | 200 | 1.0 | Ant A |
| 4824.060 | 44.2 | H | 54.0 | -9.8 | AVG | 225 | 1.5 | Ant B |
| 2136.022 | 57.4 | H | 74.0 | -16.6 | PK | 200 | 1.0 | Ant A |
| 7311.870 | 37.3 | H | 54.0 | -16.7 | AVG | 203 | 1.1 | Ant A 3rd Harmonic |
| 4824.125 | 52.0 | V | 74.0 | -22.0 | PK | 193 | 1.1 | Ant B |
| 4824.045 | 51.8 | V | 74.0 | -22.2 | PK | 177 | 1.0 | Ant A |
| 4824.045 | 51.7 | H | 74.0 | -22.3 | PK | 197 | 1.2 | Ant A |
| 4824.060 | 49.7 | H | 74.0 | -24.3 | PK | 225 | 1.5 | Ant B |
| 7311.870 | 48.3 | H | 74.0 | -25.7 | PK | 203 | 1.1 | Ant A 3rd Harmonic |

Note 1: For emissions in restricted bands the limit of 15.209 was used.

Note 2: Band-edge measurement calculated from the fundamental field strength (peak or average) minus the band edge delta marker measurement.

Run #1b: Radiated Spurious Emissions. Center Channel @ 2437 MHz, 802.11b

Power level setting = 18 (target power in ART)

| Frequency MHz | Level dB μ V/m | Pol v/h | 15.209 / 15E | | Detector Pk/QP/Avg | Azimuth degrees | Height meters | Comments |
|------------------|-----------------------|------------|--------------|--------|-----------------------|--------------------|------------------|------------------------------|
| | | | Limit | Margin | | | | |
| 4874.070 | 48.4 | H | 54.0 | -5.6 | AVG | 185 | 1.2 | Ant A |
| 2186.397 | 48.0 | V | 54.0 | -6.0 | AVG | 210 | 1.2 | Ant A |
| 4874.065 | 47.3 | V | 54.0 | -6.7 | AVG | 208 | 1.2 | Ant B |
| 4874.045 | 46.5 | V | 54.0 | -7.5 | AVG | 179 | 1.0 | Ant A |
| 4874.005 | 44.8 | H | 54.0 | -9.3 | AVG | 235 | 1.2 | Ant B |
| 2186.397 | 57.9 | V | 74.0 | -16.1 | PK | 210 | 1.2 | Ant A |
| 7311.870 | 37.3 | H | 54.0 | -16.7 | AVG | 203 | 1.1 | 3rd Harmonics of 2437 of 11b |
| 4874.070 | 52.1 | H | 74.0 | -21.9 | PK | 185 | 1.2 | Ant A |
| 4874.065 | 51.3 | V | 74.0 | -22.7 | PK | 208 | 1.2 | Ant B |
| 4874.045 | 51.2 | V | 74.0 | -22.8 | PK | 179 | 1.0 | Ant A |
| 4874.005 | 49.4 | H | 74.0 | -24.6 | PK | 235 | 1.2 | Ant B |
| 7311.870 | 48.3 | H | 74.0 | -25.7 | PK | 203 | 1.1 | 3rd Harmonics of 2437 of 11b |

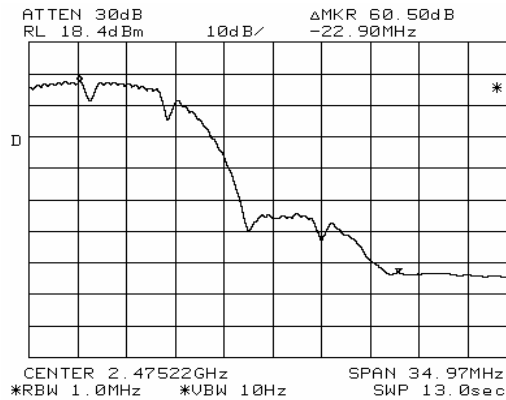
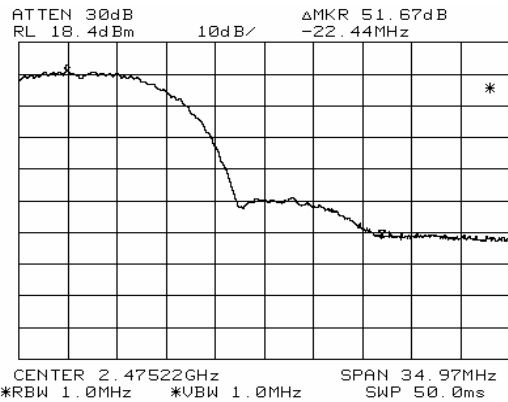


EMC Test Data

| | |
|-----------------------------------|------------------------------|
| Client: Atheros | Job Number: J59313 |
| Model: D1470U | T-Log Number: T59339 |
| Contact: Michael Robinson | Account Manager: Joe Rohlfes |
| Spec: FCC 15E15.247;LP002;RSS 210 | Class: N/A |

Run #1c: Radiated Spurious Emissions. High Channel @ 2462 MHz 802.11b (1Mb/s)
Fundamental Signal, power level setting = 18 (target power in ART)

| Frequency MHz | Level dB μ V/m | Pol v/h | 15.209 / 15E | | Detector Pk/QP/Avg | Azimuth degrees | Height meters | Comments |
|------------------|-----------------------|------------|--------------|--------|-----------------------|--------------------|------------------|----------|
| | | | Limit | Margin | | | | |
| 2463.175 | 108.0 | H | - | - | PK | 200 | 1.1 | Ant A |
| 2461.515 | 106.6 | H | - | - | PK | 170 | 1.2 | Ant B |
| 2462.710 | 104.4 | V | - | - | PK | 210 | 1.1 | Ant A |
| 2463.175 | 104.9 | H | - | - | AVG | 200 | 1.1 | Ant A |
| 2461.515 | 103.4 | H | - | - | AVG | 170 | 1.2 | Ant B |
| 2462.710 | 101.2 | V | - | - | AVG | 210 | 1.1 | Ant A |



Method 1, band edge marker delta

| | | |
|------------------------|----------|-------------------|
| Delta Marker - Peak | 51.67 dB | RB = VB= 1MHz |
| Delta Marker - Average | 60.50 dB | RB=1MHz VB = 10Hz |

Band Edge Signal Radiated Field Strength

| Frequency MHz | Level dB μ V/m | Pol v/h | 15.209 / 15E | | Detector Pk/QP/Avg | Azimuth degrees | Height meters | Comments |
|------------------|-----------------------|------------|--------------|--------|-----------------------|--------------------|------------------|-------------------------------------|
| | | | Limit | Margin | | | | |
| 2484.250 | 44.4 | H | 54.0 | -9.6 | Avg | 200 | 1.1 | Ant A; Note 2: correction = -59.0dB |
| 2484.250 | 56.3 | H | 74.0 | -17.7 | Pk | 200 | 1.1 | Ant A; Note 2: correction = -50.7dB |



EMC Test Data

| | | | |
|----------|------------------------------|------------------|-------------|
| Client: | Atheros | Job Number: | J59313 |
| Model: | D1470U | T-Log Number: | T59339 |
| Contact: | Michael Robinson | Account Manager: | Joe Rohlfes |
| Spec: | FCC 15E115.247;LP002;RSS 210 | Class: | N/A |

Other Spurious Radiated Emissions:

| Frequency MHz | Level dB μ V/m | Pol v/h | 15.209 / 15E | | Detector Pk/QP/Avg | Azimuth degrees | Height meters | Comments |
|------------------|-----------------------|------------|--------------|--------|-----------------------|--------------------|------------------|----------|
| | | | Limit | Margin | | | | |
| 4924.035 | 50.7 | V | 54.0 | -3.3 | AVG | 214 | 1.2 | Ant B |
| 4924.040 | 48.8 | V | 54.0 | -5.2 | AVG | 229 | 1.1 | Ant A |
| 4924.080 | 48.6 | H | 54.0 | -5.5 | AVG | 202 | 1.5 | Ant A |
| 4924.000 | 48.5 | H | 54.0 | -5.5 | AVG | 236 | 1.5 | Ant B |
| 2247.234 | 45.5 | V | 54.0 | -8.5 | AVG | 180 | 1.0 | Ant A |
| 2247.234 | 57.7 | V | 74.0 | -16.3 | PK | 180 | 1.0 | Ant A |
| 4924.035 | 53.5 | V | 74.0 | -20.5 | PK | 214 | 1.2 | Ant B |
| 4924.040 | 52.5 | V | 74.0 | -21.5 | PK | 229 | 1.1 | Ant A |
| 4924.080 | 52.3 | H | 74.0 | -21.7 | PK | 202 | 1.5 | Ant A |
| 4924.000 | 51.7 | H | 74.0 | -22.3 | PK | 236 | 1.5 | Ant B |

- Note 1: For emissions in restricted bands the limit of 15.209 was used. No signal at third harmonic.
- Note 2: Band-edge measurement calculated from the fundamental field strength (peak or average) minus the band edge delta marker measurement.



EMC Test Data

| | | | |
|----------|------------------------------|------------------|-------------|
| Client: | Atheros | Job Number: | J59313 |
| Model: | D1470U | T-Log Number: | T59339 |
| Contact: | Michael Robinson | Account Manager: | Joe Rohlfes |
| Spec: | FCC 15E 15.247;LP002;RSS 210 | Class: | N/A |

Run #2: 802.11a Mode

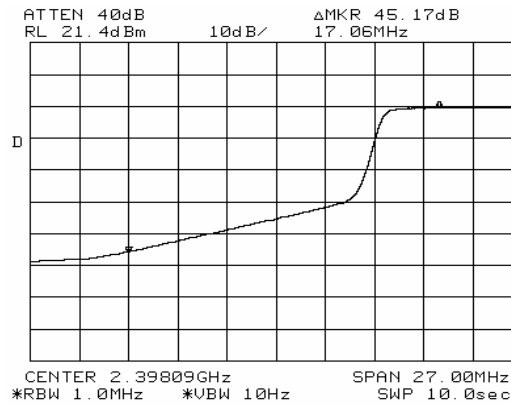
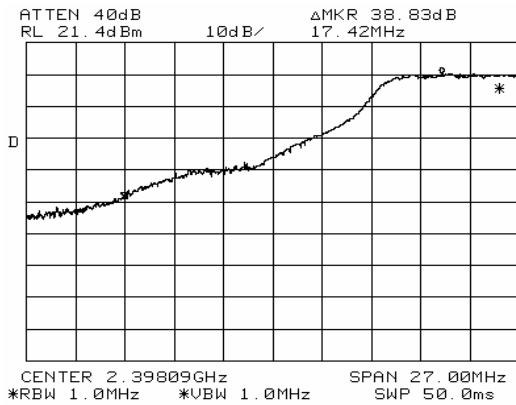
Date of Test: 4/6/2005
 Test Engineer: M. Briggs/M. Birgani
 Test Location: SVOATS #1

Config. Used: #1
 Config Change: EUT: MAC:00904BD9C041
 Host Unit Voltage 120V/60Hz

Run #2a: Radiated Spurious Emissions. Low Channel @ 2412 MHz 802.11g (6Mb/s)

Fundamental Signal, power level setting = 18 (target power in ART)

| Frequency | Level | Pol | 15.209 / 15E | | Detector | Azimuth | Height | Comments |
|-----------|--------------|-----|--------------|--------|-----------|---------|--------|--------------|
| MHz | dB μ V/m | v/h | Limit | Margin | Pk/QP/Avg | degrees | meters | |
| 2408.533 | 112.6 | H | - | - | PK | 210 | 1.1 | ANT A |
| 2413.533 | 111.1 | H | - | - | PK | 190 | 1.1 | ANT B |
| 2409.467 | 110.5 | V | - | - | PK | 235 | 1.0 | ANT B |
| 2409.933 | 107.8 | V | - | - | PK | 240 | 1.1 | ANT A |
| 2410.367 | 107.1 | H | - | - | PK | 210 | 1.0 | Ant A Note 4 |
| 2408.533 | 103.9 | H | - | - | AVG | 210 | 1.1 | ANT A |
| 2413.533 | 102.0 | H | - | - | AVG | 190 | 1.1 | ANT B |
| 2409.467 | 101.4 | V | - | - | AVG | 235 | 1.0 | ANT B |
| 2409.933 | 98.8 | V | - | - | AVG | 240 | 1.1 | ANT A |
| 2410.367 | 98.0 | H | - | - | AVG | 210 | 1.0 | Ant A Note 4 |



Method 1, band edge marker delta

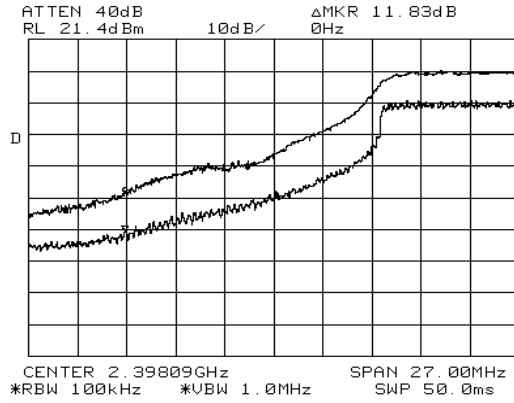
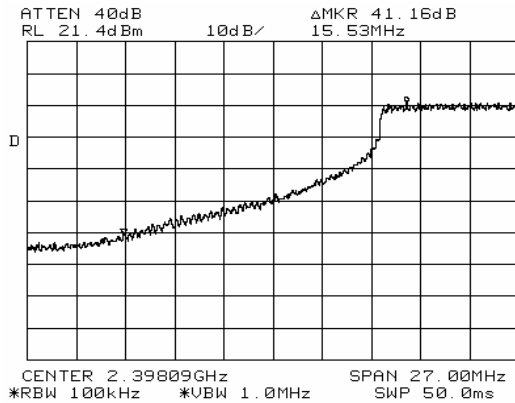
| | | |
|------------------------|----------|-------------------|
| Delta Marker - Peak | 38.83 dB | RB = VB = 1MHz |
| Delta Marker - Average | 45.17 dB | RB=1MHz VB = 10Hz |

Highest restricted band signal was at 2390 MHz method 2 used



EMC Test Data

| | | | |
|----------|-----------------------------|------------------|-------------|
| Client: | Atheros | Job Number: | J59313 |
| Model: | D1470U | T-Log Number: | T59339 |
| Contact: | Michael Robinson | Account Manager: | Joe Rohlfes |
| Spec: | FCC 15E15.247;LP002;RSS 210 | Class: | N/A |



Method 2, band edge marker delta (for signals within 2 RBs of band edge)

| | | |
|---|---------|---|
| Delta marker @ band edge to fundamental | 41.2 dB | Measured in 100kHz 100k to 1 MHz This factor used @ highest out of band @ band edge |
| Bandwidth delta marker at band edge | 11.8 dB | |
| Correction factor | 53.0 dB | |

Band Edge Signal Radiated Field Strength, 100kHz delta method

| Frequency | Level | Pol | 15.209 / 15E | | Detector | Azimuth | Height | Comments |
|-----------|--------|-----|--------------|--------|-----------|---------|--------|------------------------------------|
| MHz | dBμV/m | v/h | Limit | Margin | Pk/QP/Avg | degrees | meters | |
| 2390.000 | 50.9 | H | 54.0 | -3.1 | Avg | 210 | 1.1 | Note 2 (correction factor of 53dB) |
| 2390.000 | 59.6 | H | 74.0 | -14.4 | Pk | 210 | 1.1 | Note 2 (correction factor of 53dB) |

Band Edge Signal Radiated Field Strength

| Frequency | Level | Pol | 15.209 / 15E | | Detector | Azimuth | Height | Comments |
|-----------|--------|-----|--------------|--------|-----------|---------|--------|---------------|
| MHz | dBμV/m | v/h | Limit | Margin | Pk/QP/Avg | degrees | meters | |
| 2389.973 | 51.8 | H | 54.0 | -2.2 | AVG | 210 | 1.0 | Ant A; Note 4 |
| 2389.973 | 68.0 | H | 74.0 | -6.0 | PK | 210 | 1.0 | Ant A; Note 4 |

Note 1: 802.11b mode generated the highest spurious emissions - refer to run 1a (802.11b mode on the low channel) for spurious emissions measurements

Note 2: Band-edge measurement calculated from the fundamental field strength (peak or average) minus the band edge delta marker measurement.

Note 4: Direct field strength measurement at 1.5m @ extrapolated to 3m (-6dB correction)



EMC Test Data

| | | | |
|----------|------------------------------|------------------|-------------|
| Client: | Atheros | Job Number: | J59313 |
| Model: | D1470U | T-Log Number: | T59339 |
| Contact: | Michael Robinson | Account Manager: | Joe Rohlfes |
| Spec: | FCC 15E 15.247;LP002;RSS 210 | Class: | N/A |

Run #2b: Radiated Spurious Emissions. Center Channel @ 2437 MHz 802.11g (6Mb/s)

Power level setting = 18 (target power in ART)

Other Spurious Emissions

| Frequency MHz | Level dBμV/m | Pol v/h | 15.209 / 15E | | Detector Pk/QP/Avg | Azimuth degrees | Height meters | Comments |
|------------------|-----------------|------------|--------------|--------|-----------------------|--------------------|------------------|------------------------------|
| | | | Limit | Margin | | | | |
| 4874.667 | 37.7 | H | 54.0 | -16.3 | AVG | 195 | 1.0 | 2nd Harmonics of 2437 of 11g |
| 4874.667 | 55.7 | H | 74.0 | -18.3 | PK | 195 | 1.0 | 3rd Harmonics of 2437 of 11g |
| 7308.547 | 35.6 | H | 54.0 | -18.4 | AVG | 197 | 1.0 | 3rd Harmonics of 2437 of 11g |
| 7308.547 | 46.9 | H | 74.0 | -27.1 | PK | 197 | 1.0 | 4th Harmonics of 2437 of 11g |

Note 1: All other emissions more than 20dB below the limit.

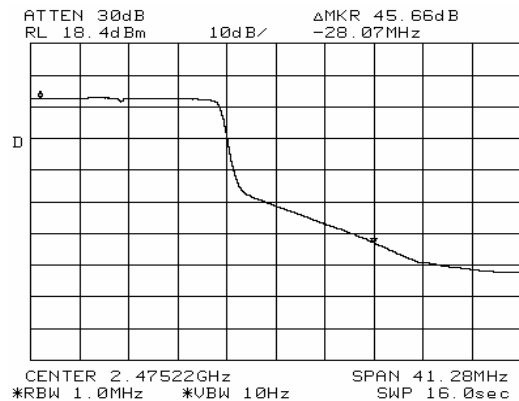
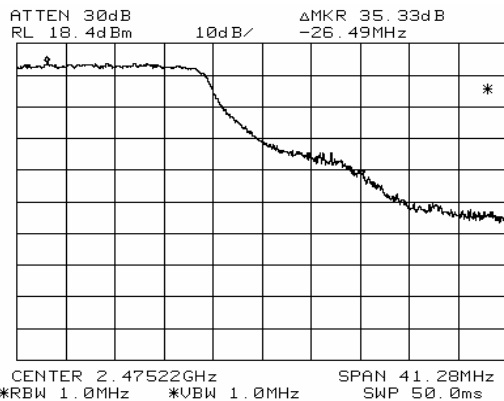


EMC Test Data

| | | | |
|----------|-----------------------------|------------------|-------------|
| Client: | Atheros | Job Number: | J59313 |
| Model: | D1470U | T-Log Number: | T59339 |
| Contact: | Michael Robinson | Account Manager: | Joe Rohlfes |
| Spec: | FCC 15E15.247;LP002;RSS 210 | Class: | N/A |

**Run #2c: Radiated Spurious Emissions. Highest Channel @ 2462 MHz 802.11g (6Mb/s)
Fundamental Signal, power level setting = 18 (target power in ART)**

| Frequency MHz | Level dBμV/m | Pol v/h | 15.209 / 15E | | Detector Pk/QP/Avg | Azimuth degrees | Height meters | Comments |
|------------------|-----------------|------------|--------------|--------|-----------------------|--------------------|------------------|--------------|
| | | | Limit | Margin | | | | |
| 2469.334 | 110.0 | H | - | - | PK | 225 | 1.1 | Ant A |
| 2467.367 | 109.9 | H | - | - | PK | 154 | 1.1 | Ant B |
| 2456.167 | 108.5 | V | - | - | PK | 255 | 1.0 | Ant A |
| 2454.900 | 106.2 | H | - | - | PK | 223 | 1.0 | Ant A Note 4 |
| 2456.792 | 106.0 | V | - | - | PK | 255 | 1.1 | Ant B |
| 2469.334 | 101.5 | H | - | - | AVG | 225 | 1.1 | Ant A |
| 2467.367 | 101.0 | H | - | - | AVG | 154 | 1.1 | Ant B |
| 2456.167 | 99.7 | V | - | - | AVG | 255 | 1.0 | Ant A |
| 2454.900 | 97.2 | H | - | - | AVG | 223 | 1.0 | Ant A Note 4 |
| 2456.792 | 96.9 | V | - | - | AVG | 255 | 1.1 | Ant B |



Method 1, band edge marker delta

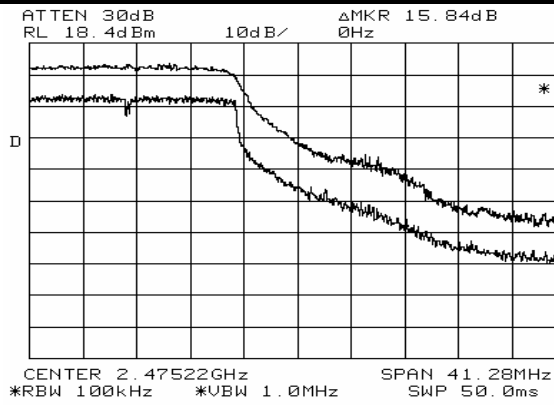
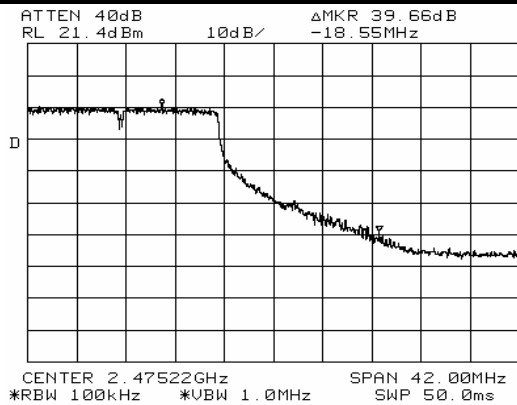
Highest restricted band signal was at 2483.5 MHz (at the band edge)

| | | |
|------------------------|----------|-------------------|
| Delta Marker - Peak | 35.33 dB | RB = VB= 1MHz |
| Delta Marker - Average | 45.66 dB | RB=1MHz VB = 10Hz |



EMC Test Data

| | |
|-----------------------------------|------------------------------|
| Client: Atheros | Job Number: J59313 |
| Model: D1470U | T-Log Number: T59339 |
| Contact: Michael Robinson | Account Manager: Joe Rohlfes |
| Spec: FCC 15E15.247;LP002;RSS 210 | Class: N/A |



Method 2, band edge marker delta (for signals within 2 RBs of band edge)

| | | |
|---------------------------------------|----------|---|
| Delta marker band edge to fundamental | 39.66 dB | Measured in 100kHz 100k to 1 MHz This factor used highest out of band @ band edge |
| Bandwidth delta marker at band edge | 15.84 dB | |
| Correction factor | 55.50 dB | |

Band Edge Signal Radiated Field Strength, 100kHz delta method

| Frequency | Level | Pol | 15.209 / 15E | | Detector | Azimuth | Height | Comments |
|-----------|--------|-----|--------------|--------|-----------|---------|--------|--------------------------------|
| MHz | dBμV/m | v/h | Limit | Margin | Pk/QP/Avg | degrees | meters | |
| 2483.500 | 46.0 | H | 54.0 | -8.0 | Avg | 225 | 1.1 | Ant A Note 2 (factor =-55.5dB) |
| 2483.500 | 54.5 | H | 74.0 | -19.5 | Pk | 225 | 1.1 | Ant A Note 2 (factor =-55.5dB) |

Band Edge Signal Radiated Field Strength, Radiated Measurements done @ 1.5m and corrected to 3.0m

| Frequency | Level | Pol | 15.209 / 15E | | Detector | Azimuth | Height | Comments |
|-----------|--------|-----|--------------|--------|-----------|---------|--------|--------------|
| MHz | dBμV/m | v/h | Limit | Margin | Pk/QP/Avg | degrees | meters | |
| 2483.600 | 53.5 | H | 54.0 | -0.5 | AVG | 223 | 1.0 | Ant A Note 4 |
| 2483.600 | 72.7 | H | 74.0 | -1.3 | PK | 223 | 1.0 | Ant A Note 4 |

- Note 1: For emissions in restricted bands the limit of 15.209 was used.
- Note 2: Band-edge measurement calculated from the fundamental field strength (peak or average) minus the band edge delta marker measurement.
- Note 4: Direct field strength measurement at 1.5m extrapolated to 3m (-6dB correction)
- Note 5: Noise floor



EMC Test Data

| | | | |
|----------|--------------------------------|------------------|-------------|
| Client: | Atheros | Job Number: | J59313 |
| Model: | D1470U | T-Log Number: | T59339 |
| Contact: | Michael Robinson | Account Manager: | Joe Rohlfes |
| Spec: | FCC 15E 15.247; LP002; RSS 210 | Class: | N/A |

Run #3: Radiated Spurious Emissions

Date of Test: 4/6/2005
 Test Engineer: M. Briggs/M. Birgani
 Test Location: SVOATS #1

Config. Used: #1
 Config Change: EUT: MAC:00904BD9C041
 Host Unit Voltage 120V/60Hz

The following signals were present in transmit mode - the frequencies/levels were independent of operating frequency/mode.
 In receive mode no signals were within 20dB of the limit from 1GHz - 7 GHz.

| Frequency MHz | Level dBµV/m | Pol v/h | 15.209 / 15E | | Detector Pk/QP/Avg | Azimuth degrees | Height meters | Comments |
|------------------|-----------------|------------|--------------|--------|-----------------------|--------------------|------------------|----------------------------|
| | | | Limit | Margin | | | | |
| 2688.030 | 40.4 | V | 54.0 | -13.6 | Pk | 160 | 1.0 | Peak reading average limit |
| 2016.022 | 38.1 | V | 54.0 | -15.9 | Pk | 200 | 1.1 | Peak reading average limit |



EMC Test Data

| | | | |
|----------|-----------------------------|------------------|-------------|
| Client: | Atheros | Job Number: | J59313 |
| Model: | D1470U | T-Log Number: | T59339 |
| Contact: | Michael Robinson | Account Manager: | Joe Rohlfes |
| Spec: | FCC 15E15.247;LP002;RSS 210 | Class: | N/A |

Run #4: Turbo Mode

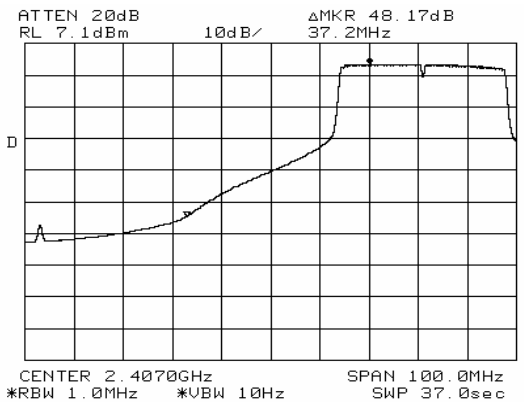
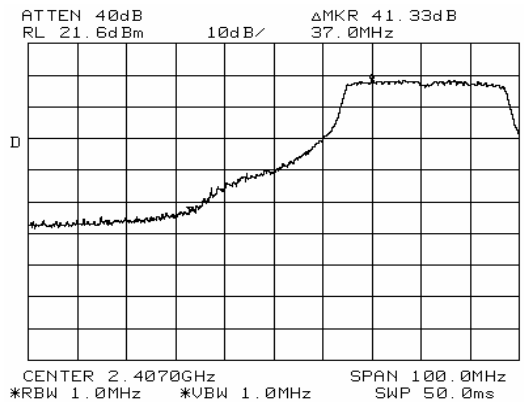
Date of Test: 4/11/2005
 Test Engineer: M. Briggs
 Test Location: SVOATS #3

Config. Used: #1
 Config Change: EUT: MAC:00904BD9C041
 Host Unit Voltage 120V/60Hz

Radiated Spurious Emissions. Turbo Channel @ 2437 MHz (12Mb/s)

Fundamental Signal

| Frequency | Level | Pol | 15.209 / 15E | | Detector | Azimuth | Height | Comments |
|-----------|--------------|-----|--------------|--------|-----------|---------|--------|----------|
| MHz | dB μ V/m | v/h | Limit | Margin | Pk/QP/Avg | degrees | meters | |
| 2434.008 | 109.4 | H | - | - | PK | 200 | 1.0 | Ant A |
| 2434.100 | 107.1 | V | - | - | PK | 140 | 1.0 | Ant A |
| 2431.625 | 106.6 | H | - | - | PK | 130 | 1.1 | Ant B |
| 2434.692 | 105.4 | V | - | - | PK | 240 | 1.2 | Ant B |
| 2434.008 | 101.0 | H | - | - | AVG | 200 | 1.0 | Ant A |
| 2434.100 | 98.5 | V | - | - | AVG | 140 | 1.0 | Ant A |
| 2431.625 | 98.2 | H | - | - | AVG | 130 | 1.1 | Ant B |
| 2434.692 | 97.3 | V | - | - | AVG | 240 | 1.2 | Ant B |



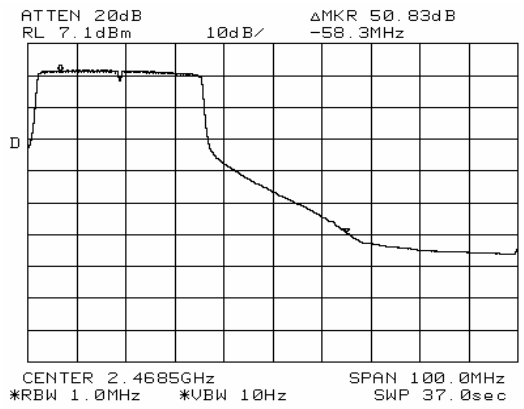
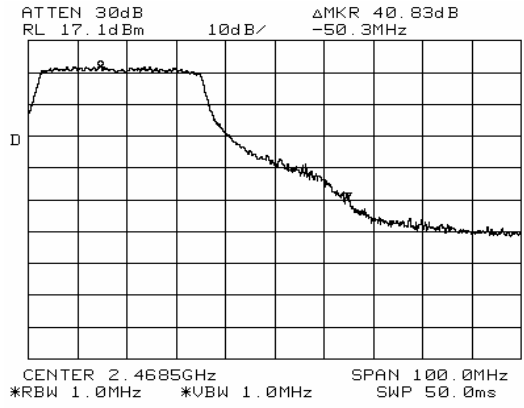
Method 1, band edge marker delta - 2390 MHz

| | | |
|------------------------|---------|-------------------|
| Delta Marker - Peak | 41.3 dB | RB = VB= 1MHz |
| Delta Marker - Average | 48.2 dB | RB=1MHz VB = 10Hz |



EMC Test Data

| | |
|-----------------------------------|------------------------------|
| Client: Atheros | Job Number: J59313 |
| Model: D1470U | T-Log Number: T59339 |
| Contact: Michael Robinson | Account Manager: Joe Rohlfes |
| Spec: FCC 15E15.247;LP002;RSS 210 | Class: N/A |



Method 1, band edge marker delta - 2483.5 MHz

| | | |
|------------------------|---------|-------------------|
| Delta Marker - Peak | 40.8 dB | RB = VB= 1MHz |
| Delta Marker - Average | 50.8 dB | RB=1MHz VB = 10Hz |

Band Edge Signal Radiated Field Strength

| Frequency | Level | Pol | 15.209 / 15E | | Detector | Azimuth | Height | Comments |
|-----------|--------|-----|--------------|--------|-----------|---------|--------|--------------------------------|
| MHz | dBμV/m | v/h | Limit | Margin | Pk/QP/Avg | degrees | meters | |
| 2390.000 | 52.8 | V | 54.0 | -1.2 | Avg | 200 | 1.0 | Ant A Note 2 (factor =-48.2dB) |
| 2390.000 | 68.1 | V | 74.0 | -5.9 | Pk | 200 | 1.0 | Ant A Note 2 (factor =-41.3dB) |
| 2483.500 | 50.2 | V | 54.0 | -3.8 | Avg | 200 | 1.0 | Ant A Note 2 (factor =-50.8dB) |
| 2483.500 | 68.6 | V | 74.0 | -5.4 | Pk | 200 | 1.0 | Ant A Note 2 (factor =-40.8dB) |

Note 2: Band-edge measurement calculated from the fundamental field strength (peak or average) minus the band edge delta marker measurement.