

Electromagnetic Emissions Test Report

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 Enginee



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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.

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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.

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SUMMARY OF RESULTS

FCC 15.247 / RSS 210 6.2.2(o) - 2400 - 2483.5 MHz Band

FUU 13.241 / KS	3 210 0.2.2(0) - <i>.</i>	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 all 500kH		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 1Watt, 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	53.7dBµV/m (484.2µV/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	31.0dBµV/m (35.5µV/m) @ 58.598MHz (-9.0dB)	Used more stringent limit of LP0002	Complies

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

FCC Part 15	RSS 210	5/25-5850 MHz Band	36 1771		D 1:
Section	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 1 Watt, 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	48.7dBμV/m (272.6μV/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	31.0dBμV/m (35.5μV/m) @ 58.598MHz (-9.0dB)	Used more stringent limit of LP0002	Complies

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FCC 15 F / RSS 2	10 6 2 2(a1) 515	0 - 5350 MHz Band	Report Date: A	April 25, 2005
FCC Part 15	RSS 210	U - 3330 WITZ BATTU		
Section Section	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 t	he 5.15 – 5.25 G	Hz 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
density of spuri	ous emissions in		31.1 MHz (802.11a)	
		O 4 4 B	60.8 MHz (turbo)	COMPLIES
15.407(a) (2) 15.407(a) (2))	6.2.2 q1 (ii) 6.2.2 q1 (ii)	Output Power Power Spectral Density	5250 - 5350: 15.6dm 5250 - 5350: 3.42dm/MHz	COMPLIES COMPLIES
Spurious Emis	sions	· •		•
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	31.0dBμV/m (35.5μV/m) @ 58.598MHz (-9.0dB)	COMPLIES
15.407(b) (2)	6.2.2 q1 (ii)	Radiated Spurious Emissions 1 - 40GHz	52.2dBμV/m (406.9μV/m) @ 15538.9MHz (-1.8dB)	COMPLIES
	7.3, Table 3	Receiver Radiated Spurious Emissions 1 – 18 GHz	31.0dBμV/m (35.5μV/m) @ 58.598MHz (-9.0dB)	COMPLIES

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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	40.3dBμV @ 0.479MHz (- 6.0dB)		Complies
	6.6	AC Conducted Emissions	41.5dBμV @ 0.479MHz (- 6.5dB)		Complies
15.247 (b) (5)		RF Exposure Requirements	Mobile device with separation distance >=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

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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	MAC:00904BD9C041	PPD-D1470U
adapter		

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:

- 4	<u> </u>	1	11 1	1	2
	Manufacturer	Model	Description	Serial Number	FCC ID
	IBM	Type 2386-5GU	Laptop	KV-00292	DoC
	D-Link	DGS-1005D	Router	DR1914B005832	DoC

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EUT INTERFACE PORTS

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

Port	Connected To	Cable(s)			
FOIL	Connected 10	Description	Shielded or Unshielded	Length(m)	
Laptop USB	inton USB EUT	Ferrite at PC	Shielded	1	
Euptop ODB	LOI	connector	Sincided	1	
Laptop ethernet	Router ethernet	Cat 5 UTP	Unshielded	1	

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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

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TEST SITE

GENERAL INFORMATION

Final test measurements were taken on April 6, April 8, April 11, April 12 and April 13, 2005at 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.

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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.

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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.

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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 nonconductive 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.

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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.

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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.

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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.

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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:

$$E = \frac{1000000 \sqrt{30 P}}{3}$$
 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.

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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.

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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).

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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.

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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 5.000 to 30.000	46.0 50.0	56.0 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

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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

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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:

$$F_d = 20*LOG_{10} (D_m/D_s)$$

where:

 F_d = Distance Factor in dB

 D_{m} = Measurement Distance in meters

 D_S = 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 = Receiver Reading in dBuV/m

 F_d = Distance Factor in dB

 R_c = Corrected Reading in dBuV/m

 L_S = Specification Limit in dBuV/m

M = Margin in dB Relative to Spec

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EXHIBIT 1: Test Equipment Calibration Data

1 Page

File: R59543 Page App. 1 of 1

Radiated Emissions, 30-Mar-05

<u>Manufacturer</u>	<u>Description</u>	Model #	Asset #	Cal Due
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

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g				
<u>Manufacturer</u>	<u>Description</u>	Model #	Asset #	Cal Due
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>	Model #	Asset #	Cal Due
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>	Model #	Asset #	Cal Due
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>	Model #	Asset # Cal Du	<u>ie</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

File: R59543 Page App. 2 of 2

Elliot	t	EM	C 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

Elliott	ЕМ	C 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

EUT INFORMATION

Environment:

n/a

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.

Immunity Spec: n/a

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.

Elliot	t	ЕМ	C 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

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)		
FOIL	Connected 10	Description	Shielded or Unshielded L	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.

Elliott .	EMC Test Data
Client: Atheros	Job Number: J59313
Model: D1470U	T-Log Number: T59339
Model. D14700	Account Manager: Joe Rohlfes
Contact: Michael Robinson	
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

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

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, <u>and</u> 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.

Elliott

EMC Test Data

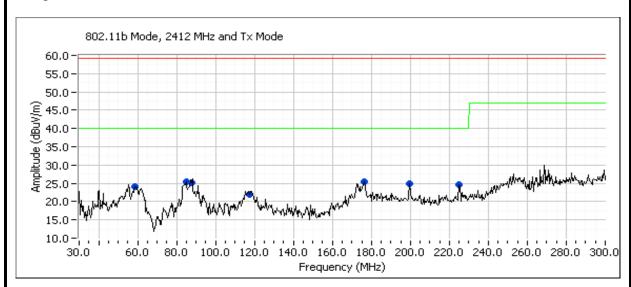
Client:	Atheros	Job Number:	J59313				
Model:	D1/7011	T-Log Number:	T59339				
	D14700	Account Manager:	Joe Rohlfes				
Contact:	Michael Robinson						
Spec:	FCC 15E,15.247;LP002;RSS 210	Class:	n/a				

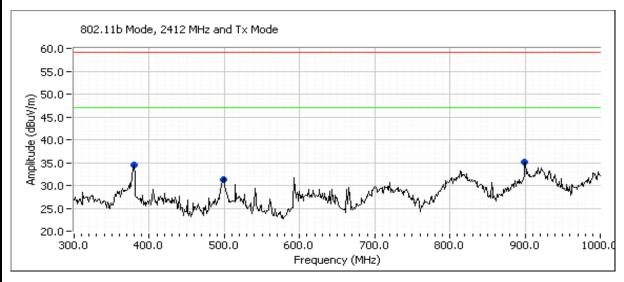
Run #1: Preliminary Radiated Emissions, 30-2000 MHz, Chamber Scans

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





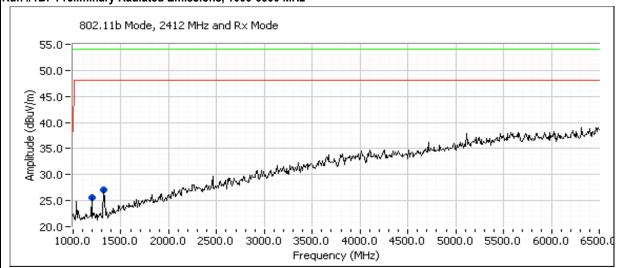
Elliott EMC Test Data Job Number: J59313 Client: Atheros T-Log Number: T59339 Model: D1470U Account Manager: Joe Rohlfes Contact: Michael Robinson Spec: FCC 15E,15.247;LP002;RSS 210 Class: n/a Run #1A: Preliminary Radiated Emissions, 30-1000 MHz (Data) Configuration: 802.11b Mode, 2412 MHz and Tx Mode Pol Height Frequency EN 55022 Class B1 Detector Azimuth Comments Level MHz $dB\mu V/m$ v/h Limit Margin Pk/QP/Avg degrees meters 58.598 24.2 -15.8 239 ٧ 40.0 Peak 1.7 85.003 40.0 25.5 ٧ -14.5 Peak 269 1.7 87.009 25.1 ٧ 40.0 -14.9 Peak 314 1.7 175.899 25.4 ٧ 40.0 -14.6 179 Peak 1.7 199.998 25.0 Н 40.0 -15.0 Peak 360 1.7 225.010 24.7 Н 40.0 -15.3 Peak 286 1.7 379.118 34.4 ٧ 47.0 -12.6 Peak 79 1.7 495.548 31.4 ٧ 47.0 -15.7 196 Peak 1.7 900.986 35.2 ٧ 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. Preliminary scans indicated that the radiated emission 30 -1000MHz is independent from mode (Tx/Rx) and Note 2: frequency (2412-5800).

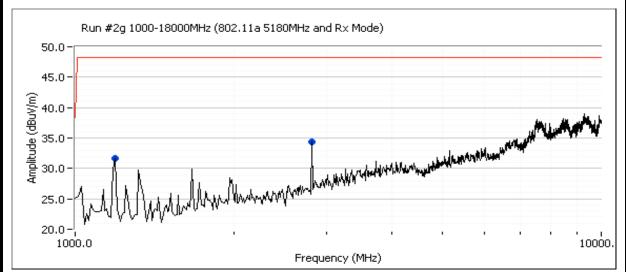
Elliott

EMC Test Data

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

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





Frequency	Level	Pol	RSS 210)/LP0002	Detector	Azimuth	Height	Comments
MHz	dBμV/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
1190.000	31.7	Η	54.0	-22.3	Peak	300	1.7	802.11a mode
2820.000	34.4	Η	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 FUT was scanned from 10-26GHz at 10cm from the FUT, no emissions were observed								

Elliott EMC Test Data Job Number: J59313 T-Log Number: T59339 Model: D1470U Account Manager: Joe Rohlfes Contact: Michael Robinson Class: n/a Spec: FCC 15E,15.247;LP002;RSS 210 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 Level Pol EN 55022 Class B¹ Frequency Detector Azimuth Height Comments MHz dBμV/m V/H Limit Margin Pk/QP/Avg meters degrees 58.598 20.5 ٧ 30.0 -9.5 QP 285 1.0 489.949 26.5 ٧ 37.0 -10.5 QΡ 222 1.0 ٧ 30.0 QΡ 360 85.003 18.9 -11.1 1.1 900.754 25.9 Н QP 345 2.5 37.0 -11.1 225.010 15.6 -14.4 QP 2.8 Η 30.0 0 900.754 22.0 ٧ 37.0 -15.0 QΡ 360 1.0 87.009 14.9 ٧ 30.0 -15.1 QΡ 314 1.0 Noise Floor 489.949 21.3 Н QP 85 2.8 37.0 -15.7Η QΡ 90 2.2 379.463 19.1 37.0 -17.9 379.463 16.2 ٧ 37.0 -20.8 QΡ 180 1.0 Preliminary scans indicated that the radiated emission 30 -1000MHz is independent from mode (Tx/Rx) and Note frequency (2412-5800). Above 1GHz limits of 15.109 were used. Run #2B: Maximized Readings From Run #2A Transmit mode Frequency Pol EN 55022 Class B1 Detector Azimuth Comments Level Height MHz $dB\mu V/m$ V/H Pk/QP/Ava Limit Margin degrees meters 58.598 20.5 ٧ 30.0 -9.5 1.0 QΡ 285 489.949 26.5 ٧ 37.0 -10.5 QP 222 1.0 85.003 18.9 ٧ 30.0 -11.1 QΡ 360 1.1 25.9 QP 2.5 900.754 Н 37.0 -11.1 345 225.010 -14.4 QΡ 15.6 Η 30.0 0 2.8 900.754 22.0 ٧ 37.0 -15.0 QP 360 1.0 Receive mode RSS 210/LP0002 Frequency Level Pol Detector Azimuth Height Comments dBμV/m MHz V/H Limit Margin Pk/QP/Avg degrees meters 58.598 31.0 40.0 -9.0 QΡ 285 1.0 ٧ 489.949 37.0 ٧ QP 46.0 -9.0 222 1.0 900.754 36.4 ٧ 46.0 -9.6 QΡ 360 1.1 29.4 QP 85.003 Н 40.0 -10.6 345 2.5 900.754 32.5 Η 46.0 -13.5 QP 0 2.8 46.0 QP 360 225.010 -19.9 1.0

1GHz in receive mode. LP0002 limit is more stringent.

Note

Measurements on the OATS at a test distance of 3m showed all emissions more than 20dB below the limit above

Elliott	EMC Test Data
Client: Atheros	Job Number: J59313
Model: D1470U	T-Log Number: T59339
Wiodel. D 14700	Account Manager: Joe Rohlfes
Contact: Michael Robinson	
Spec: FCC 15E,15.247;LP002;RSS 210	Class: n/a

Conducted Emissions - Power Ports

Test Specifics

C_T_11'

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 Config. Used: 2

Test Engineer: Mehran Birgani Config Change: None

Test Location: SVOATS #2 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

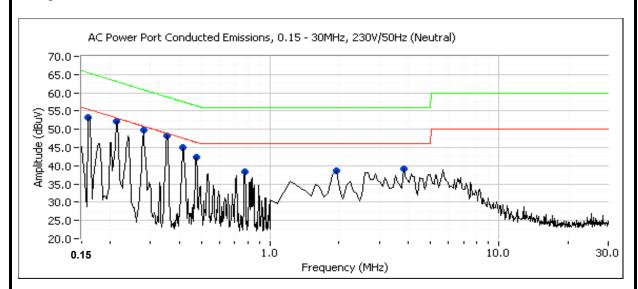
Deviations From The Standard

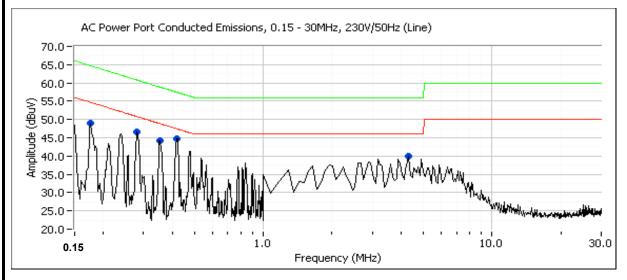
No deviations were made from the requirements of the standard.

EI	Elliott	EM	EMC Test Data		
Client:	Atheros	Job Number:	J59313		
Model:	D1470U	T-Log Number:	T59339		
		Account Manager:	Joe Rohlfes		
Contact:	Michael Robinson				
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





Elliott EMC Test Data Job Number: J59313 T-Log Number: T59339 Model: D1470U Account Manager: Joe Rohlfes Contact: Michael Robinson 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 AC EN55022 Class B Frequency Level Detector Comments MHz dΒμV Line Limit Margin QP/Ave 0.418 42.5 47.5 -5.0 Average Line 0.416 42.0 Neutral 47.5 -5.5 Average 0.475 39.8 Neutral 46.4 -6.6 Average -7.2 0.479 39.1 Line 46.3 Average 0.239 44.4 Line 52.1 -7.7 Average 0.280 -9.2 41.6 Neutral 50.8 Average 0.282 41.4 Line 50.8 -9.4 Average 0.354 39.5 48.9 -9.4 Neutral 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 -11.3 41.8 Line 53.1 Average 51.5 -11.6 0.213 Line 63.1 QΡ 1.903 -11.7 34.3 Neutral 46.0 Average 0.214 63.1 -11.9 51.2 Neutral QΡ 0.280 48.8 60.8 -12.0 QΡ Neutral 0.214 41.0 Neutral 53.1 -12.1 Average 0.418 45.1 Line 57.5 -12.4 QΡ 0.282 -13.4 QP 47.4 Line 60.8 0.416 43.4 -14.1 QP Neutral 57.5 0.354 43.8 58.9 -15.1 QΡ Neutral 4.290 46.0 -15.2 30.8 Line Average 0.475 40.8 Neutral 56.4 -15.6 QΡ 0.479 40.2 Line 56.3 -16.1 QΡ

0.239

0.773

1.903

0.180

3.859

4.290

45.3

38.1

37.6

45.8

37.3

35.1

Line

Neutral

Neutral

Neutral

Neutral

Line

62.1

56.0

56.0

64.5

56.0

56.0

-16.8

-17.9

-18.4

-18.7

-18.7

-20.9

QΡ

QΡ

QP QP

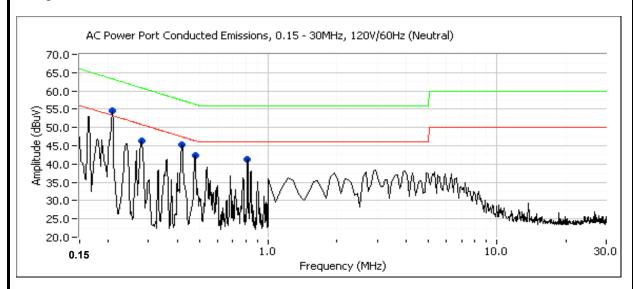
QΡ

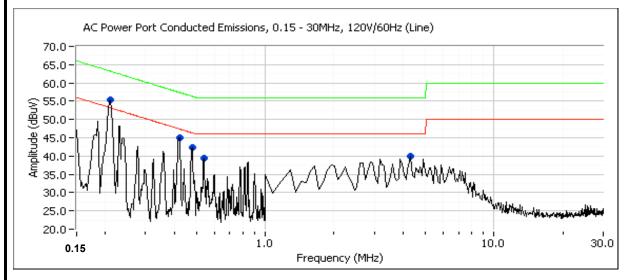
QP

EI	Elliott	EM	EMC Test Data			
Client:	Atheros	Job Number:	J59313			
Model	D1470U	T-Log Number:	T59339			
woder.		Account Manager:	Joe Rohlfes			
Contact:	Michael Robinson					
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





Elliott	EMC Test Data				
Client: Atheros	Job Number: J59313				
Model: D1470U	T-Log Number: T59339				
Wodel. D14700	Account Manager: Joe Rohlfes				
Contact: Michael Robinson					
Spec: FCC 15E,15.247;LP002;RSS 210	Class: n/a				
Spec: roo 13E,13.247,Lr002,R55 210	Class. Tiva				

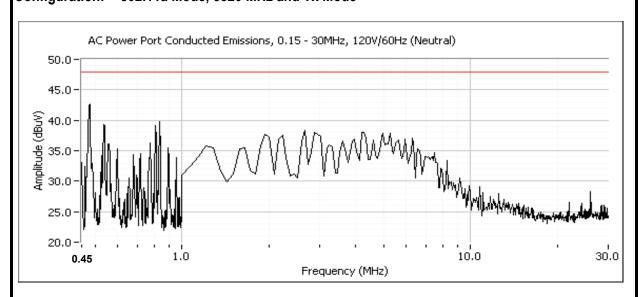
Run #2: AC Power Port Conducted Emissions, 0.15 - 30MHz, 120V/60Hz

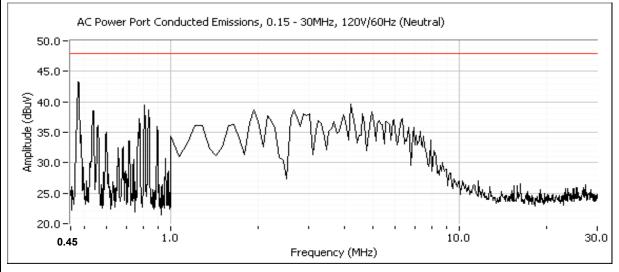
Configuration: 802.11a Mode, 5320 MHz and Tx Mode

Frequency	Level	AC	FN55022	EN55022 Class B		Comments
MHz	dBμV	Line	Limit	Margin	Detector QP/Ave	Comments
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	

EI	Elliott	EMC Test Data			
Client:	Atheros	Job Number:	J59313		
Model	D1470U	T-Log Number:	T59339		
iviodei.		Account Manager:	Joe Rohlfes		
Contact:	Michael Robinson				
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





Elliott EMC Test Data Job Number: J59313 Client: Atheros T-Log Number: T59339 Model: D1470U Account Manager: Joe Rohlfes Contact: Michael Robinson 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 Level AC **RSS 120** Detector Comments QP/Ave MHz $dB\mu V$ Line Limit Margin 0.479 41.5 Neutral 48.0 -6.5 QΡ 0.479 41.3 Line 48.0 -6.7 QΡ 4.183 39.0 Neutral 48.0 -9.0 QΡ 4.183 38.5 Line 48.0 -9.5 QΡ 0.539 37.8 Line 48.0 -10.2 QΡ QΡ 1.913 37.0 Neutral 48.0 -11.0

Elliott	EMC Test Data
Client: Atheros	Job Number: J59313
Model: D1470U	T-Log Number: T59339
Wiodel. D 147 00	Account Manager: Joe Rohlfes
Contact: Michael Robinson	
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

The objective of this test session is to perform final qualification testing of the EUT with respect to the

Objective: specification listed above.

Date of Test: 4/13/2005 Config. Used: #2

Test Engineer: Mark Briggs Config Change: None

Test Location: SVOATS #3 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 -	FCC Part 15.209 /	Pass	All emissions < -20dBc	
Ia	Spurious Emissions	15.247(c)	F a 5 5	All ellissions > -200DC	
1b	RE, 30 - 40000 MHz -	FCC Part 15.209 /	D	All emissions < -20dBc	
10	Spurious Emissions	15.247(c)	Pass	All emissions < -200bc	
	6dB Bandwidth			802.11b: 12.1 MHz	
2	2400-2483.5 MHz Band	15.247(a)	Pass	802.11g: 16.7 MHz	
				Turbo: 33.4 MHz	
2	6dB Bandwidth	15.247(a)	Pass	802.11a: 16.6 MHz	
	5725 - 5850MHz Band	13.247 (a)	F 033	Turbo: 33.2 MHz	
				802.11b: 18.4 dBm	
3	Output Power	15.247(b)	Pass	802.11g: 22.3 dBm	
				Turbo: 22.3 dBm	
3	Output Power	15.247(b)	Pass	802.11a: 22.1dBm	
3	Output i owei	13.247(0)	F 033	Turbo: 21.5dBm	
				802.11b:-5dBm/3kHz	
4	Power Spectral Density (PSD)	15.247(d)	Pass	802.11g:-7.2dBm/3kHz	
				Turbo:-3.8dBm/3kHz	
4	Power Spectral Density (PSD)	15.247(d)	Door	802.11a:-7.3dBm/3kHz	
4	r ower opecual Delisity (FOD)	13.247 (u)	Pass	Turbo:-11.2dBm/3kHz	

Elliott EMC Test Data Client: Atheros Job Number: J59313 Model: D1470U T-Log Number: T59339 Account Manager: Joe Rohlfes Contact: Michael Robinson Class: N/A

Modifications Made During Testing:

No modifications were made to the EUT during testing

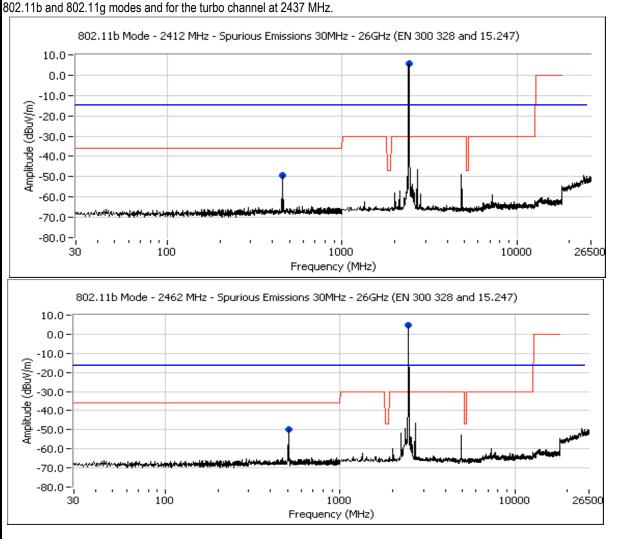
Deviations From The Standard

No deviations were made from the requirements of the standard.

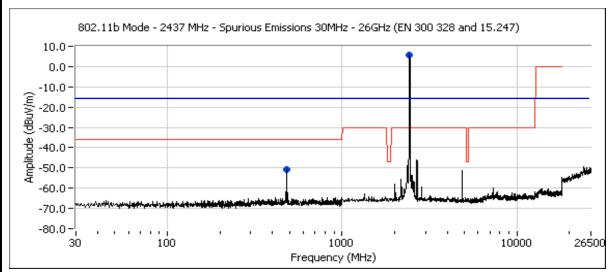
Run #1: Antenna Port Spurious Emissions

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.



Elliott EMC Test Data Client: Atheros Job Number: J59313 Model: D1470U T-Log Number: T59339 Account Manager: Joe Rohlfes Contact: Michael Robinson Class: N/A



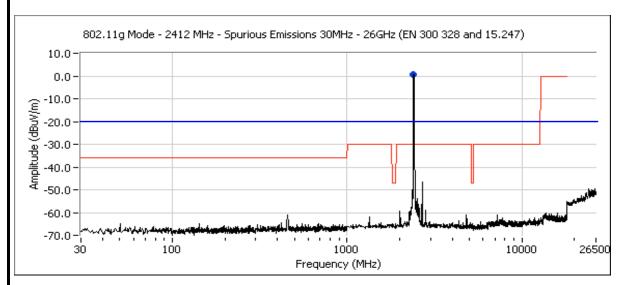
Frequency	Level	Pol	EN 30	00 328	Detector	Azimuth	Height	Comments
MHz	dBmV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
482.000	-50.7	RF Port	-36.0	-14.7	Peak	-	-	802.11b, 2412 MHz
456.333	-49.2	RF Port	-36.0	-13.2	Peak	-	-	802.11b, 2437 MHz
506.500	-49.7	RF Port	-36.0	-13.7	Peak	-	-	802.11b, 2462 MHz

Frequency	Level	Pol	Not	te 1	Detector	Azimuth	Height	Comments
MHz	dBmV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
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

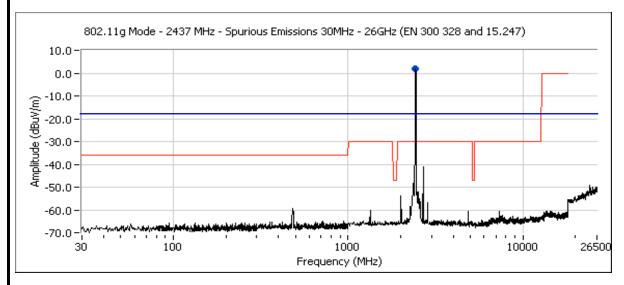
Note 1: Limit set at -20dBc in accordance with FCC 15.247, RSS 210 (o) and LP0002 section 3.10

Elliott EMC Test Data Client: Atheros Job Number: J59313 Model: D1470U T-Log Number: T59339 Account Manager: Joe Rohlfes Contact: Michael Robinson 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.

EMC Test Data Job Number: J59313 Client: Atheros T-Log Number: T59339 Model: D1470U Account Manager: Joe Rohlfes Contact: Michael Robinson Spec: FCC 15E,15.247;LP002;RSS 210 Class: N/A 802.11g Mode - 2462 MHz - Spurious Emissions 30MHz - 26GHz (EN 300 328 and 15.247) 10.0 0.0 -10.0 -20.0 -30.0 -40.0 · -50.0 -60.0 -70.0 -80.0 26500 30 100 1000 10000 Frequency (MHz) Pol EN 300 328 Frequency Level Detector Azimuth Height Comments dBmV/m Limit Margin Pk/QP/Avg MHz v/h degrees meters 2457.500 1.7 RF Port Peak Fundamental level -41.0 -11.0 2686.667 RF Port -30.0 Peak 802.11g, 2472 MHz Level Pol Note 1 Detector Azimuth Height Comments Frequency MHz dBmV/m v/h Limit Margin Pk/QP/Avg meters degrees 2686.667 -41.0 RF Port -18.3 -22.7802.11g, 2472 MHz Peak Note 1: Limit set at -20dBc in accordance with FCC 15.247, RSS 210 (o) and LP0002 section 3.10

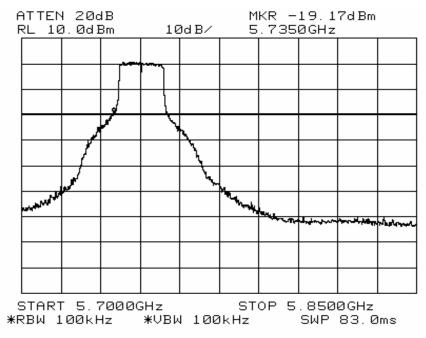
Elliott EMC Test Data Job Number: J59313 Client: Atheros T-Log Number: T59339 Model: D1470U Account Manager: Joe Rohlfes Contact: Michael Robinson Spec: FCC 15E,15.247;LP002;RSS 210 Class: N/A Turbo Mode Turbo Mode - 2437 MHz - Spurious Emissions 30MHz - 26GHz (EN 300 328 and 15.247) 10.0 0.0 -10.0 -10.0--20.0--30.0--40.0--60.0 -70.0 -80.0 -\ 100 1000 10000 26500 Frequency (MHz) Pol EN 300 328 Frequency Level 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 RF Port -30.0 -11.2 2686.667 -41.2 Peak Frequency Level Pol Note 1 Detector Azimuth Comments Height MHz dBmV/m v/h Margin Pk/QP/Avg Limit 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

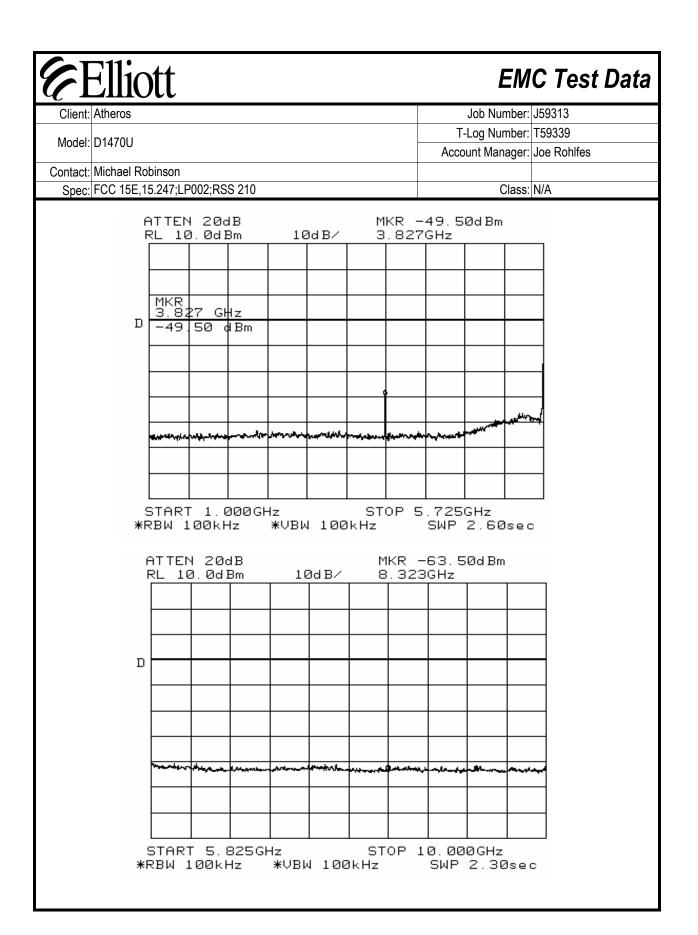
V			
Client:	Atheros	Job Number:	J59313
Model:	D147011	T-Log Number:	T59339
	D14700	Account Manager:	Joe Rohlfes
Contact:	Michael Robinson		
Spec:	FCC 15E,15.247;LP002;RSS 210	Class:	N/A

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.

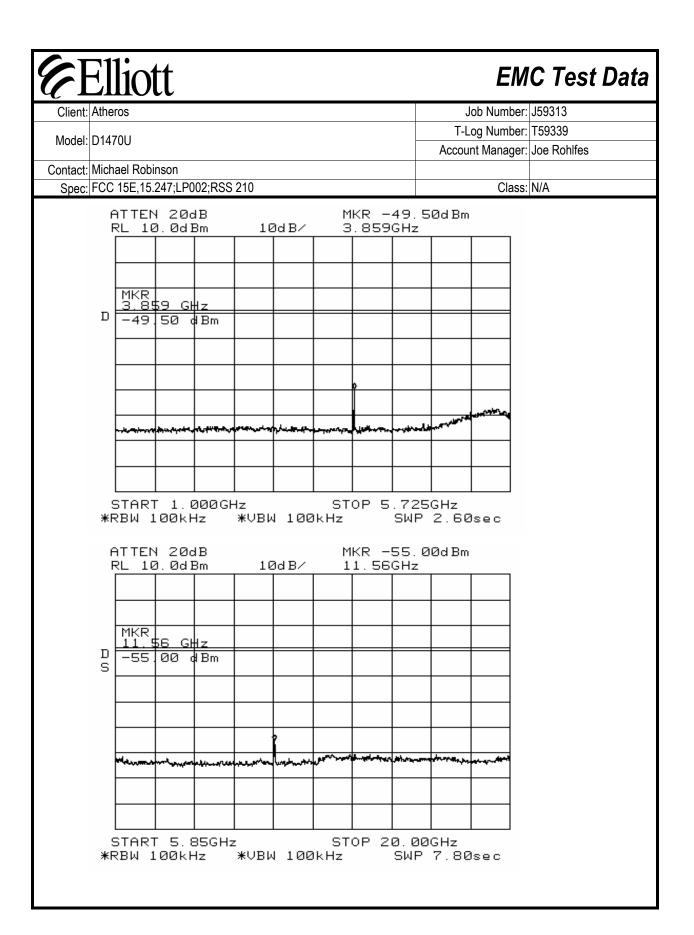
5745 MHz, 802.11a Mode



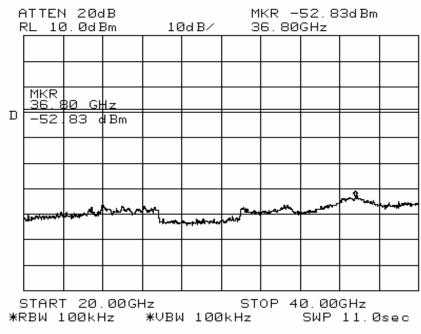


Elliott EMC Test Data Job Number: J59313 Client: Atheros T-Log Number: T59339 Model: D1470U Account Manager: Joe Rohlfes Contact: Michael Robinson Spec: FCC 15E,15.247;LP002;RSS 210 Class: N/A ATTEN 20dB RL 10.0dBm MKR -53.67dBm 10dB/ 11.48GHz START 10.00GHz STOP 20.00GHz *RBW 100kHz *VBW 100kHz SWP 5.50sec ATTEN 20dB MKR -59.00dBm RL 10.0dBm 10dB/ 31.48GHz D S STOP 40.00GHz START 30.00GHz

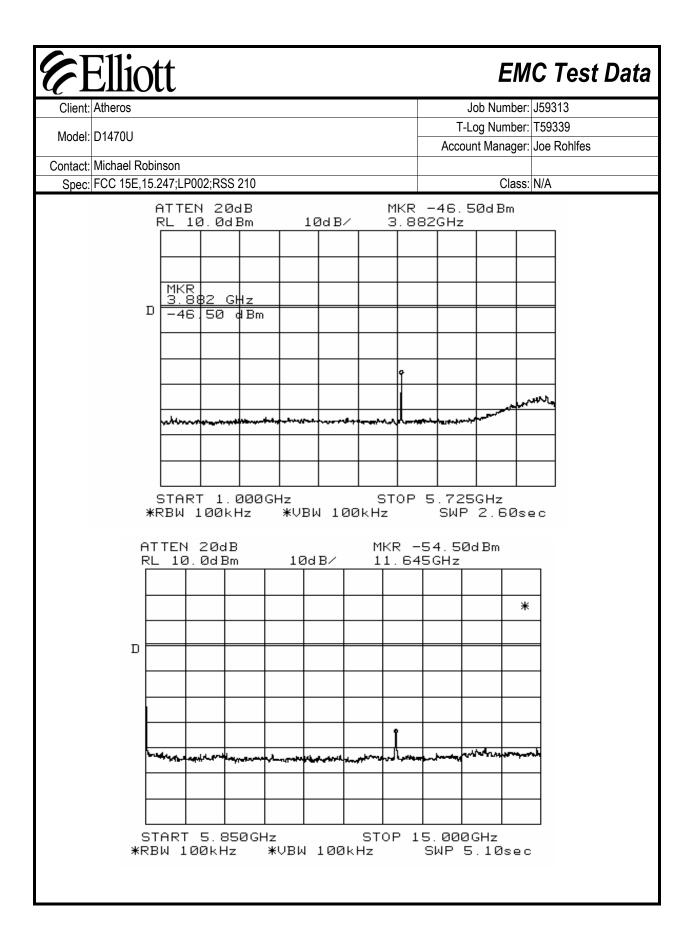
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		el Robin										
c:	FCC 1	15E,15.2	247;LP0	02;RSS 2	210						Class	: N/A
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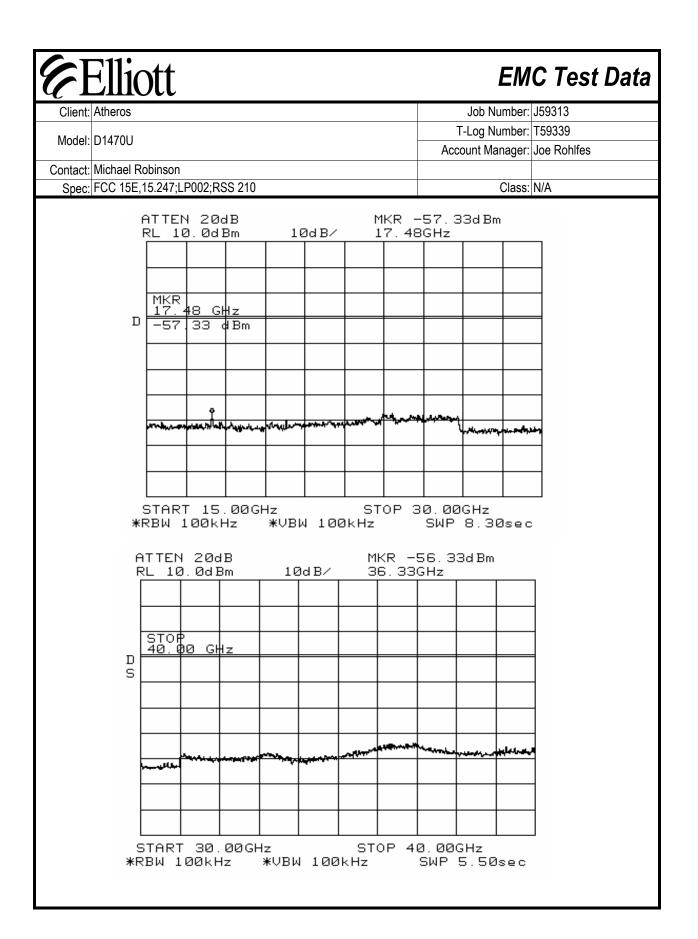


E	Elliott	EM	C Test Data		
Client:	Atheros			Job Number:	J59313
Model	D1470U			T-Log Number:	T59339
wodei.	D14700			Account Manager:	Joe Rohlfes
Contact:	Michael Robinson				
Spec:	FCC 15E,15.247;LP002;RSS 210			Class:	N/A
	ATTEN 20dB RL 10.0dBm	10dB/	MKR -52 36.80GH	2.83dBm Hz	



Elliott EMC Test Data Job Number: J59313 Client: Atheros T-Log Number: T59339 Model: D1470U Account Manager: Joe Rohlfes Contact: Michael Robinson Spec: FCC 15E,15.247;LP002;RSS 210 Class: N/A 5825 MHz, 802.11a Mode ATTEN 20dB MKR -41.67dBm RL 10.0dBm 10dB/ 5.8499GHz 499 -41.67 d Bm START 5.7000GHz STOP 5.8750GHz ATTEN 20dB MKR -64.00dBm RL 10.0dBm 10dB/ 696.1MHz МНг -64,00 dBm START 30.0MHz STOP 1.0000GHz *RBW 100kHz *VBW 100kHz SWP 540ms





EMC Test Data Job Number: J59313 Client: Atheros T-Log Number: T59339 Model: D1470U Account Manager: Joe Rohlfes Contact: Michael Robinson Spec: FCC 15E,15.247;LP002;RSS 210 Class: N/A 5760 MHz, Turbo Mode Turbo Mode - 5760 MHz - Spurious Emissions 30MHz - 40GHz 10.0-0.0 -10.0-Amplitude (dBuV/m) -20.0 -30.0 -40.0 -50.0 -60.0 -70.0 100 40000 1000 10000 Frequency (MHz) 5805 MHz, Turbo Mode Turbo Mode - 5805 MHz - Spurious Emissions 30MHz - 40GHz 0.0 -10.0 -20.05 -30.05 -40.06 -50.05 -60.0 -70.0 = j° 100 40000

1000

Frequency (MHz)

10000

Elliott	EMC Test Data
Client: Atheros	Job Number: J59313
Model: D1470U	T-Log Number: T59339
Wodel. D14700	Account Manager: Joe Rohlfes
Contact: Michael Robinson	
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	а	16.7	17.0
157	5785	а	16.7	16.9
165	5825	а	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.

Elliott		ЕМ	C Test Data
Client: Atheros		Job Number:	J59313
Model: D1470U		T-Log Number:	T59339
		Account Manager:	Joe Rohlfes
Contact: Michael Robinson			
Spec: FCC 15E,15.247;LP002;F	RSS 210	Class:	N/A
2412 MHz, 802.11b mode 99% Bandwidth 15.8 MHz	*ATTEN_20dB	ΔMKR -	
6dB Bandwidth 12.1 MHz	RL 117.0dBμV 10d		Hz
OUD BUILDWIGHT 12.1 WII IZ	الفياليانيا ج	WW WWW &	
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2437 MHz, 802.11b mode 99% Bandwidth 15.8 MHz	*ATTEN 20dB RL 117.0dBμV 10d	100kHz *S	
6dB Bandwidth 12.1 MHz	الماليان الم	MAN HALLANDON	
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	TV TV		\(\sigma^{-1}\sigma^{\sigma}\)
			
	L L L L CENTER 2.43700GHz *RBW 100kHz *VBW		 N 35.00MHz WP 50.0ms
	TOOKITE AVEN	2001112	00.01110

Elliott		EMC Test Data
Client: Atheros		Job Number: J59313
Model: D1470U		T-Log Number: T59339
1VIOUGI. D 147 00		Account Manager: Joe Rohlfes
Contact: Michael Robinson		
Spec: FCC 15E,15.247;LP002;R	SS 210	Class: N/A
2462 MHz, 802.11b mode	*ATTEN 20dB	ΔMKR .16dB
99% Bandwidth 15.8 MHz 6dB Bandwidth 12.1 MHz		dB/ 12.13MHz
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	CENTER 2.46200GHz *RBW 100kHz *VBW	SPAN 35.00MHz 100kHz *SWP 50.0ms
2412 MHz, 802.11g mode	*ATTEN 20dB	ΔMKR .34dB
99% Bandwidth 16.8 MHz 6dB Bandwidth 16.8 MHz	RL 116.9dBμV 10d	HB∕ -16.83MHz
OUD Daliuwiutii 10.0 ivii 12	London Control	total please the sales and the
		
	D WWW.	
	CENTER 2.41200GHz	SPAN 23.00MHz
	*RBW 100kHz *VBW	100kHz

Ell	iott							EM	C '	Test	Data
Client: Athero	S						Jo	b Number:	J593	13	
Model: D1470	 []						T-Log Number: T59339				
							Account Manager: Joe Rohlfes				
Contact: Michael											
	5E,15.247;LP002;	RSS 210						Class:	N/A		
2437 MHz, 802.11 99% Bandwid	-		EN 200					MKR 1		dB	
6dB Bandwid		RL_	116.9	dΒμ V T T	10	dB∕ T	1	6.79MH	1z		
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2462 MHz, 802.11 99% Bandwid 6dB Bandwid	dth 16.7 MHz	*RBW *AT RL D V	NTER 2	Hz 2dB 2dBμ V	11 11 11 11 11 11 11 11 11 11 11 11 11	100		*S	WP 844 1Hz	22.98	MS MHz
			NTER 2 W 100H				ðkHz			22. 98 5Ø. (

Elliott EMC Test Data Job Number: J59313 T-Log Number: T59339 Model: D1470U Account Manager: Joe Rohlfes Contact: Michael Robinson Spec: FCC 15E,15.247;LP002;RSS 210 Class: N/A 2437 MHz, Turbo mode *ATTEN 20dB ∆MKR -1.00dB 99% Bandwidth 33.4 MHz RL 116.0dBμV 10dB/ 33.42MHz 6dB Bandwidth 33.4 MHz <u>anligikaldikikinininikilikakininini, partifisidanya bakda yanga a</u> D CENTER 2.43700GHz SPAN 50.00MHz *RBW 100kHz *VBW 100kHz *SWP 1.00sec 5745 MHz, 802.11a mode ATTEN 20dB ΔMKR -.50dB 99% Bandwidth RL 10.0dBm 10dB/ 16.67MHz 17.0 MHz 6dB Bandwidth 16.7 MHz ΔΜΚR 16.67 ΜΗz 50 dB. CENTER 5.74500GHz SPAN 50.00MHz *RBW 100kHz *VBW 100kHz SWP 50.0ms

Elliott EMC Test Data Job Number: J59313 Client: Atheros T-Log Number: T59339 Model: D1470U Account Manager: Joe Rohlfes Contact: Michael Robinson Spec: FCC 15E,15.247;LP002;RSS 210 Class: N/A 5785 MHz, 802.11a mode ΔMKR -.50dB ATTEN 20dB 99% Bandwidth 16.9 MHz RL 10.0dBm 10dB/ 16.67MHz 6dB Bandwidth 16.7 MHz ΔΜΚR 16.67 MHz D CENTER 5.78500GHz SPAN 50.00MHz *RBW 100kHz *VBW 100kHz SWP 50.0ms 5825 MHz, 802.11a mode ATTEN 20dB ΔMKR -.84dB 99% Bandwidth 16.9 MHz RL 10.0dBm 10dB/ 16.58MHz 6dB Bandwidth 16.6 MHz ΔΜΚ**R** 16.58 ΜΗΖ D dB. CENTER 5.82500GHz SPAN 50.00MHz SWP 50.0ms *RBW 100kHz *VBW 100kHz

Elliott EMC Test Data Job Number: J59313 T-Log Number: T59339 Model: D1470U Account Manager: Joe Rohlfes Contact: Michael Robinson Spec: FCC 15E,15.247;LP002;RSS 210 Class: N/A 5760 MHz, Turbo mode *ATTEN 20dB ΔMKR -1.83dB 99% Bandwidth 33.2 MHz 10dB/ 33.33MHz RL 115.0dBμV 6dB Bandwidth 33.3 MHz ₰┍<mark>┋╒╬╒┋╃</mark>╃╃╃<mark>╬╒╬╒╬╒╬╒╬╒╬</mark> D MANAGE CENTER 5.76000GHz SPAN 50.00MHz *RBW 100kHz *VBW 100kHz SWP 50.0ms 5805 MHz, Turbo mode ATTEN 20dB ∆MKR -1.50dB 99% Bandwidth 33.17MHz 33.2 MHz RL 10.0dBm 10dB/ 6dB Bandwidth 33.2 MHz and property appropriately processed property appropriately appropriately and the second processed and the second process ^AHMW CENTER 5.80500GHz SPAN 50.00MHz *RBW 100kHz *VBW 100kHz SWP 50.0ms

Elliott Clients Atheres

EMC Test Data

v			
Client:	Atheros	Job Number:	J59313
Model:	D147011	T-Log Number:	T59339
iviodei.	D14700	Account Manager:	Joe Rohlfes
Contact:	Michael Robinson		
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	а	21.9	0.155	0.34
157	5785	а	21.8	0.151	0.33
165	5825	а	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	а	-9.5
157	5785	а	-10.2
165	5825	а	-7.3
-	5760	turbo	-11.2
-	5805	turbo	-11.7

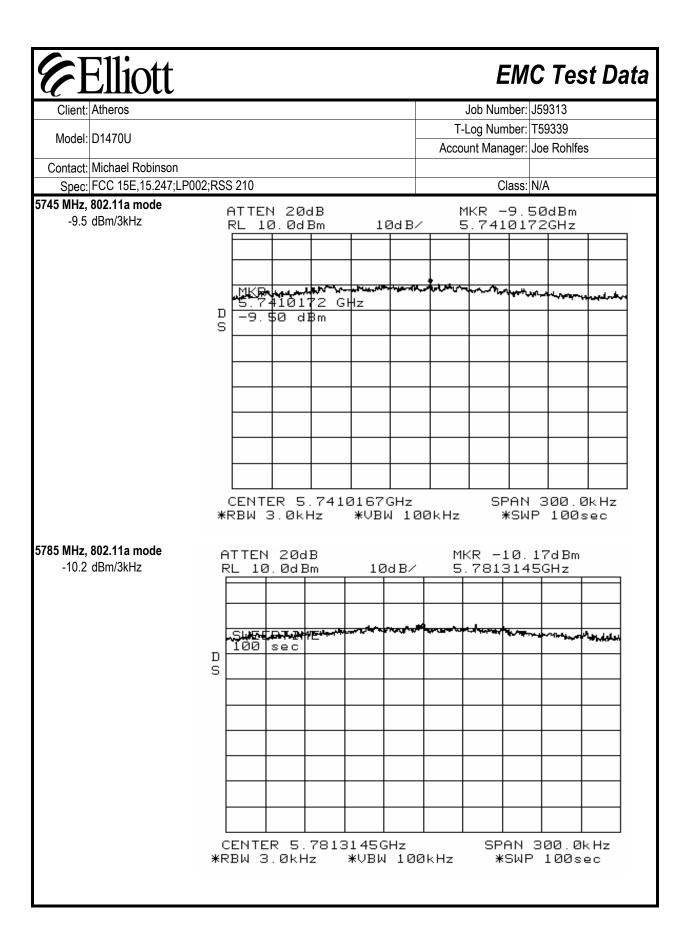
Elliott						T			EM(31 D
Client: Atheros							_			J59313	
Model: D1470U							T-Log Number: T59339 Account Manager: Joe Rohlfes				
Osstat Michael Debisson							Acc	ount Mai	nager:	Joe Ronif	es
Contact: Michael Robinson Spec: FCC 15E,15.247;L	P002-R9	35 210							Class:	N/Δ	
2412 MHz, 802.11b mode			N 20	4B			M			33d Bµ	П
-5.7 dBm/3kHz				dΒ _μ V	19	3d B∕	ż	2.411	167	5GHz	<u> </u>
							2	A principles	١		بير
		and and and	******	Li Japanese Pierre	A PARTY AND A		AND SELECTION AND SERVICE	Alley March of Servi			-
	D										
	S										
		1	1	1	1						
				. 411						300.0	
437 MHz, 802.11b mode -5.0 dBm/3kHz	*:	RBW :		Hz IB	*∪BI	GHz V 100	MI)	KSWP 32.0	1 00 0 ا با 1 0 0 0 0	sec
	*:	RBW :	3.0k 20a	Hz IB	*∪BI	1 100	MI) KR 1	KSWP 32.0	1 00 0 ا با 1 0 0 0 0	sec
	*:	RBW :	3.0k 20d	Hz IB IBμV	*VBI	d B/	MI 2) KR 1	KSWP 32.0	1 00 0 ا با 1 0 0 0 0	sec
	*:	RBW :	3.0k 20d	Hz IB	*VBI	d B/	MI 2	KR 10 . 437	KSWP 32.0	1 00 0 ا با 1 0 0 0 0	sec J
	*/ *F	RBW :	3.0k 20d	Hz IB IBμV	*VBI	d B/	MI 2	KR 10 . 437	KSWP 32.0	1 00 0 ا با 1 0 0 0 0	sec J
	*:	RBW :	3.0k 20d	Hz IB IBμV	*VBI	d B/	MI 2	KR 10 . 437	KSWP 32.0	1 00 0 ا با 1 0 0 0 0	sec J
	*/ *F	RBW :	3.0k 20d	Hz IB IBμV	*VBI	d B/	MI 2	KR 10 . 437	KSWP 32.0	1 00 0 ا با 1 0 0 0 0	sec J
	*/ *F	RBW :	3.0k 20d	Hz IB IBμV	*VBI	d B/	MI 2	KR 10 . 437	KSWP 32.0	1 00 0 ا با 1 0 0 0 0	sec J
	*/ *F	RBW :	3.0k 20d	Hz IB IBμV	*VBI	d B/	MI 2	KR 10 . 437	KSWP 32.0	1 00 0 ا با 1 0 0 0 0	sec J
	*/ *F	RBW :	3.0k 20d	Hz IB IBμV	*VBI	d B/	MI 2	KR 10 . 437	KSWP 32.0	1 00 0 ا با 1 0 0 0 0	sec J
	*/ *F	RBW :	3.0k 20d	Hz IB IBμV	*VBI	d B/	MI 2	KR 10 . 437	KSWP 32.0	1 00 0 ا با 1 0 0 0 0	sec J
2 437 MHz, 802.11b mode -5.0 dBm/3kHz	*/ *F	RBW :	3.0k 20d	Hz IB IBμV	*VBI	d B/	MI 2	KR 10 . 437	KSWP 32.0	1 00 0 ا با 1 0 0 0 0	sec J

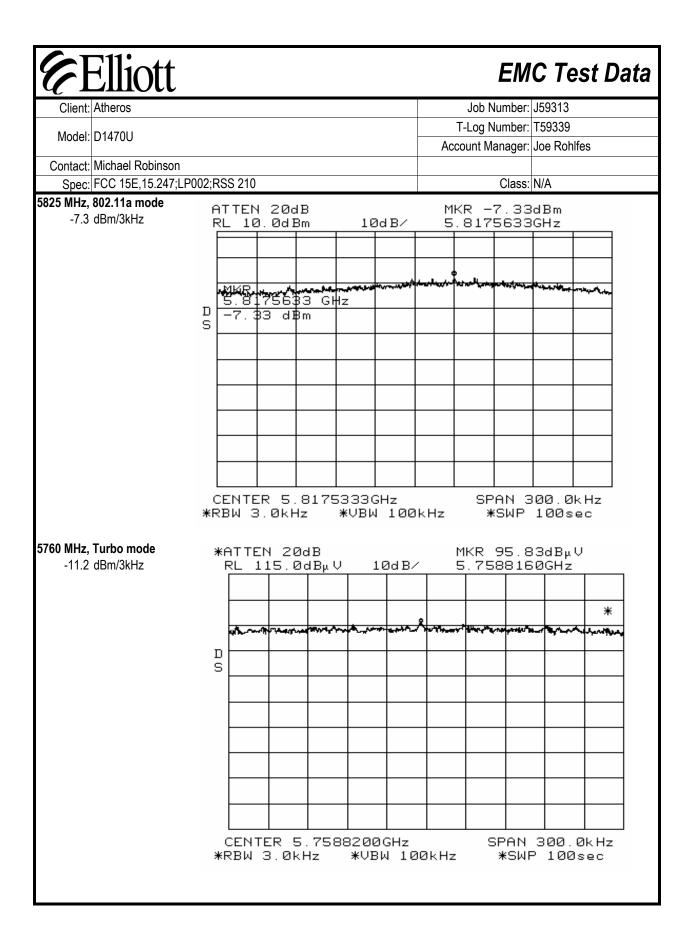
Page 40 of 92

Elliott		EMC Test Data
Client: Atheros		Job Number: J59313
M 1 1 D447011		T-Log Number: T59339
Model: D1470U		Account Manager: Joe Rohlfes
Contact: Michael Robinson		
Spec: FCC 15E,15.247;LP002;F	RSS 210	Class: N/A
2462 MHz, 802.11b mode -5.5 dBm/3kHz	*ATTEN 20dB RL 117.0dBμV 1	MKR 101.50dΒμV 10dΒ/ 2.4614498GHz
	MKR 2.4614498 GHz 101.50 dBμV CENTER 2.4614483 *RBW 3.0kHz *VE	
2412 MHz, 802.11g mode -8.4 dBm/3kHz	*ATTEN 20dB RL 116.9dBµV DS CENTER 2.4064083 *RBW 3.0kHz *VI	

EI	Elliott								EM	C T	est	Data
Client:	Atheros							Job	Number:	J59313	3	
Model:	D1470U							T-Log	Number:	T5933	9	
							P	Account N	/lanager:	Joe Ro	hlfes	
	Michael Robinson											
	FCC 15E,15.247;LP002;RS	SS 210							Class: N/A			
	802.11g mode dBm/3kHz	*ATTEN 20dB MKR 99. RL 116.9dBμV 10dB/ 2.43515								9.07 1553	'dΒμ BGHz	
								a	_			
				-	San Market	***		Part of the Part of	-		*************************************	- A.J.C.N.
		D		-								
		S										
												+
2462 MU-	902 44a mada	*F	RBW (ER 2 3.Økl	Ηz		GHz √ 100		*	SWP	300.0 100:	
	802.11g mode dBm/3kHz			20d 6.0d		10	dB/	МК 2.	(R 99 4614 T	0680 0680	∃BμV GHz	
		L										
					اعمالسالين			*****				*
		<u> </u>		Service Services	*-4-7-4-				7		~~~	- Alberton
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		-										
		L										
				R 2. .ØkH		Ø83G *∨BW		kHz			00.0 100s	

Client: Atheros Job Number: J59313
Model: D14/00 Account Manager: Joe Rohlfes
Account Manager: Joe Rohlfes
Contact: Michael Robinson Spec: FCC 15E,15.247;LP002;RSS 210 Class: N/A
2437 MHz, Turbo mode -3.8 dBm/3kHz *ATTEN 2ØdB RL 116. ØdBμ V 1ØdB/ 2. 437Ø317GHz ** ** ** ** ** ** ** ** **
-3.8 dBm/3kHz RL 116.0dBµ V 10dB/ 2.4370317GHz
-3.8 dBm/3kHz RL 116.0dBµ V 10dB/ 2.4370317GHz *
CENTER 2.4370317GHz SPAN 300.0kHz *RBW 3.0kHz *VBW 100kHz *SWP 100sec





EI	Elliott								E	МС	Tes	t Data
Client:	Atheros							Job Number: J59313				
Madal	D447011							T-l	T-Log Number: T59339			
Model:	D1470U							Account Manager: Joe Rohlfes				
	Michael Robinson											
	FCC 15E,15.247;LP002	7;LP002;RSS 210							С	lass: N/A	4	
	Turbo mode		ATTEN								7dBm	
-11.7	dBm/3kHz	F	RL 10	. Ød I	3m	10	3d B/	5	. 803	8000	GHz	
			PIS	Harry Va	-	Service Andread	Market Market	المدروب الرموال	water.	Population	Mary Andrew	-
		D	0.0	аьш								
		S						+				
								+				
			CENTE RBW 3					ØkHz			100.0	

	Elliott	EMC Test Data		
Client:	Atheros	Job Number:	J59313	
Madal	D1470U	T-Log Number:	T59339	
wodei.	D14700	Account Manager:	Joe Rohlfes	
Contact:	Michael Robinson			
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

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 Config. Used: 1

Test Engineer: Chris Byleckie Config Change: none

Test Location: SVOATS #1 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: 15.63dm
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: 3.42dm
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

v			
Client:	Atheros	Job Number:	J59313
Madal	D1470U	T-Log Number:	T59339
wodei.	D14700	Account Manager:	Joe Rohlfes
Contact:	Michael Robinson		
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

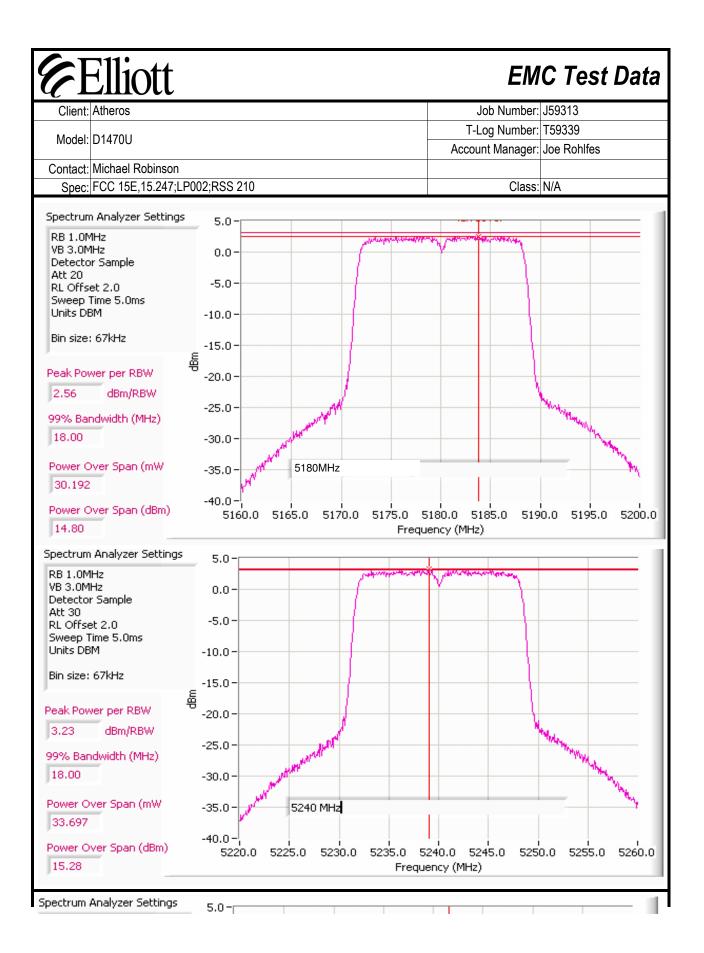
Antenna Gain: 4.0 dBi

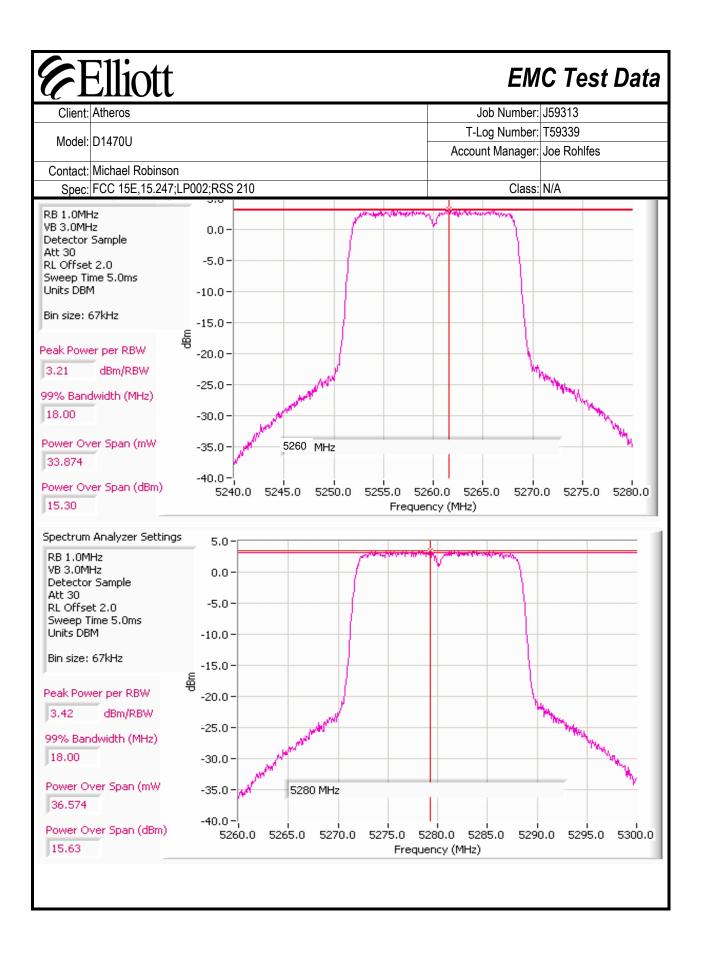
802.11a Mode					
Frequency	Band	dwidth (note	1) MHz		
(MHz)	20dB	20dB 26dB 99%			
5180	20.8	28.3	18.0		
5240	21.6	29.2	18.0		
5260	21.5	31.1	18.0		
5280	21.3	29.8	18.0		
5320	21.0	30.1	18.0		

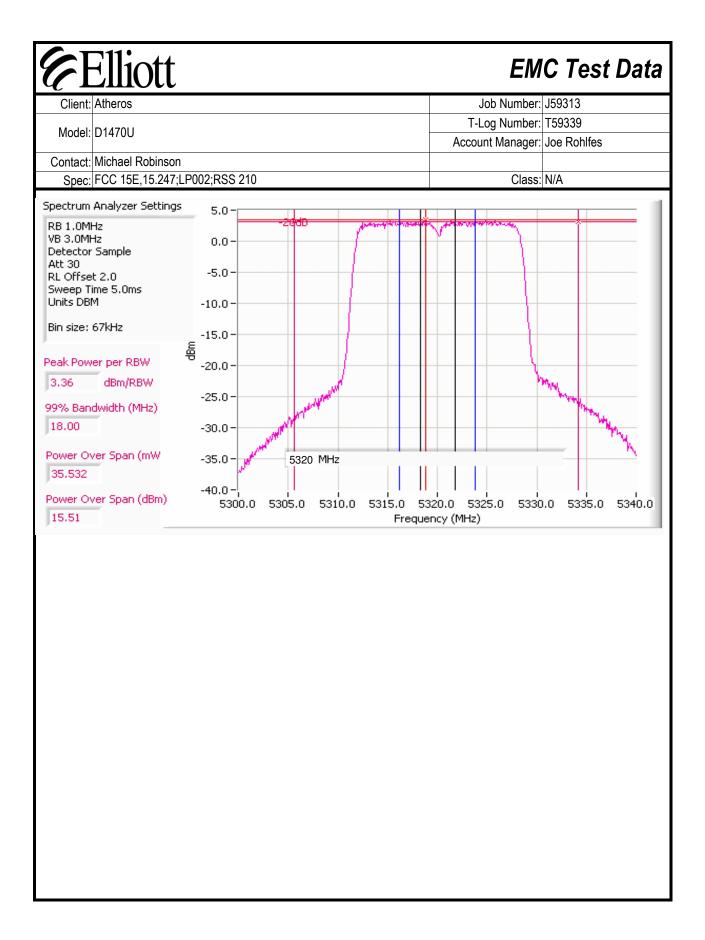
Turbo Mode					
Frequency Bandwidth (note 1) MHz					
(MHz)	z) 20dB 26dB 99%				
5200	42.5	58.3	34.0		
5290	43.8	60.8	34.0		

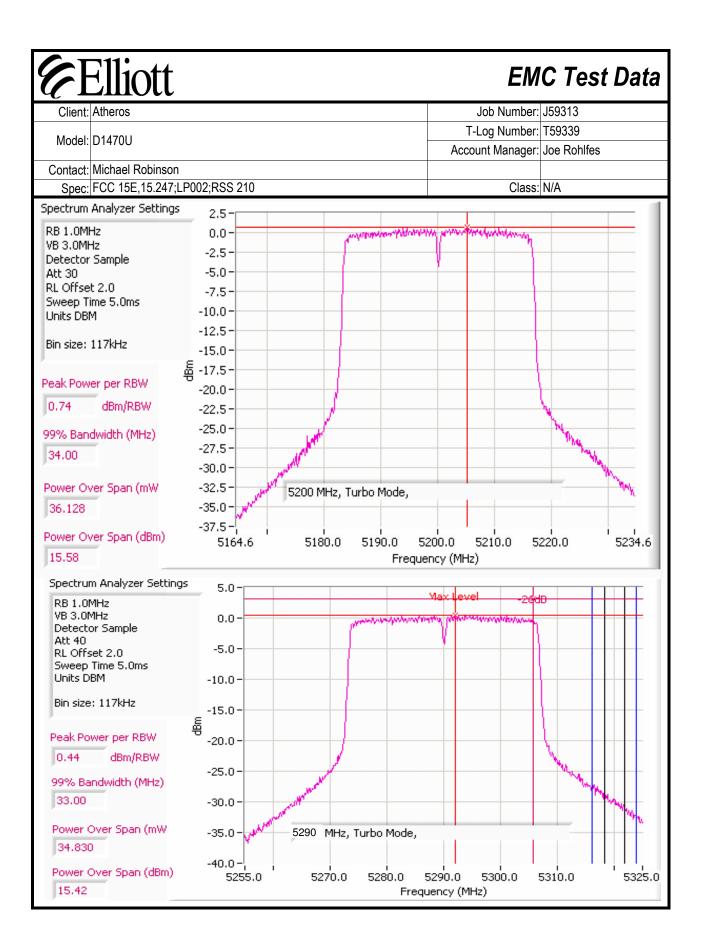
Note 1 Bandwidth measured using RBW = 300kHz.

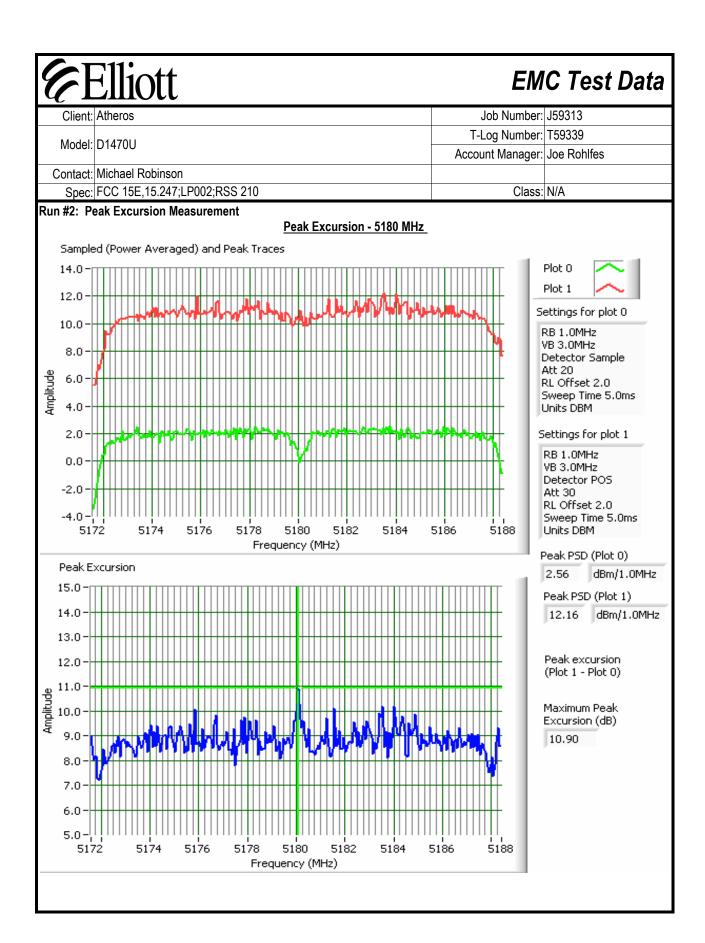
Client:	Atheros							lob Number:	J59313	
Model:	D1470U						T-Log Number: T59339			
							Accou	nt Manager:	Joe Rohlfes	
	Michael Rol									
Spec:	FCC 15E,15	5.247;LP(002;RSS 21	0				Class:	N/A	-
	output Powe		·							_
Frequency		Ou	tput Power (dBm)	_	PSD (dE	Bm/MHz)	Peak ⁵	RSS 210	Mode
(MHz)	Average ¹	Peak ²	FCC ³	Limit	Margin	FCC ³	Peak ⁴	Excursion	PSD^6	
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 Mod
5290	17.9	23.6	15.42	24.0	-8.6	0.44	9.84	12.35	8.3	Turbo Mod
	Α									
						for informatio				
Note 2						or - for inform	•			
						BA1, method		•		
NIOTO 3						tegration over		•	•	
		•		•	• (ied with a dic			scope) so no	precautions
	•			•	•	n the EUT wa		-	Tt	() () () () () ()
Note /I		•		ectral densit	y was made	using RBW =	= TMHZ, VB	VV = 3IVIHZ.	The value is	taken from
	the peak ex	cursion p	IOTS. vimum diffoi	onco hotwo	on the trace	used for the	nower mea	surament (E	D-1MH- \/D	2-3MH2
Note 5						it for a peak p	•	,		
						t he average				
Note 6	more than 6			•		-	value (pear	C power divid	ied by 33 /0 b	andwidth) t
						ments. Data	rate was 6N	/lh/s for all 8	02 11a meas	urements
Nota /	and 12Mb/s	•			ali ilicasulci	ments. Data	rate was or	ibis ioi ali o	02.114 111643	urements

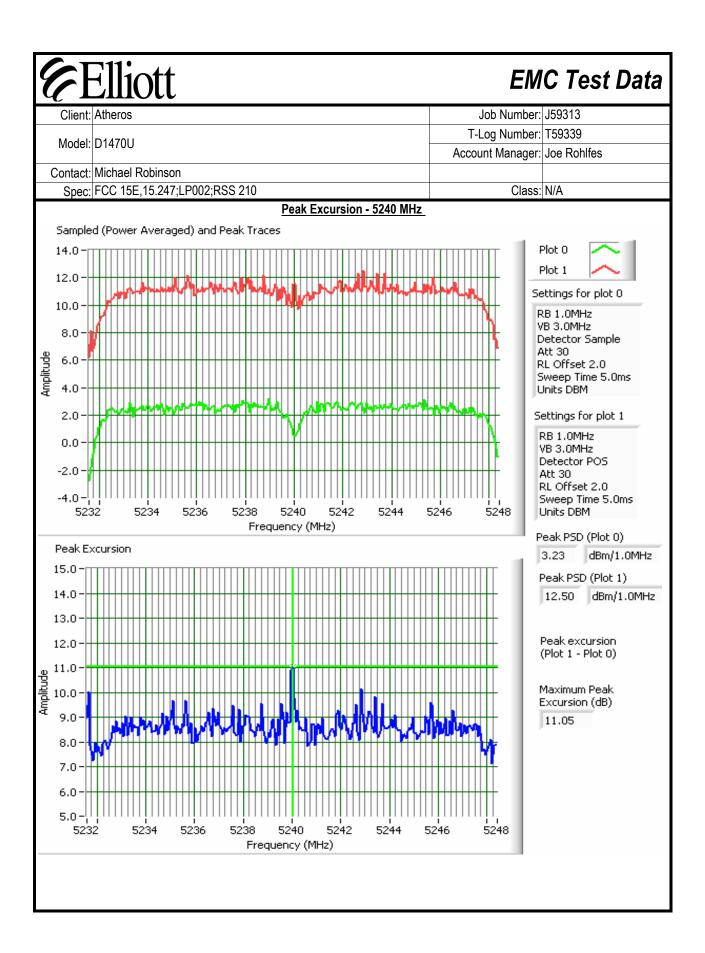


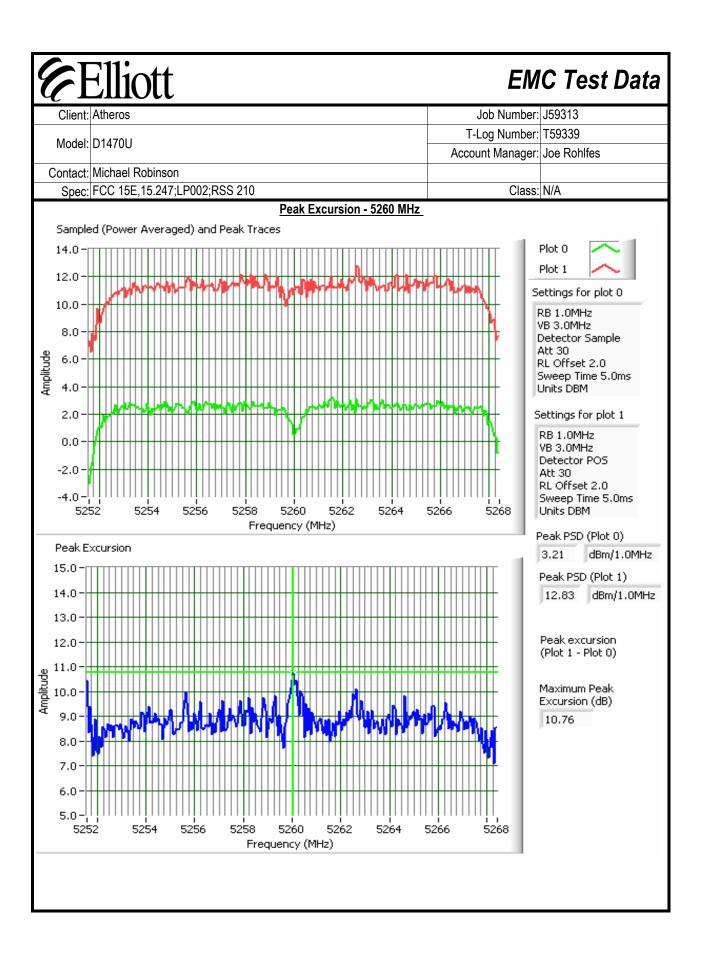


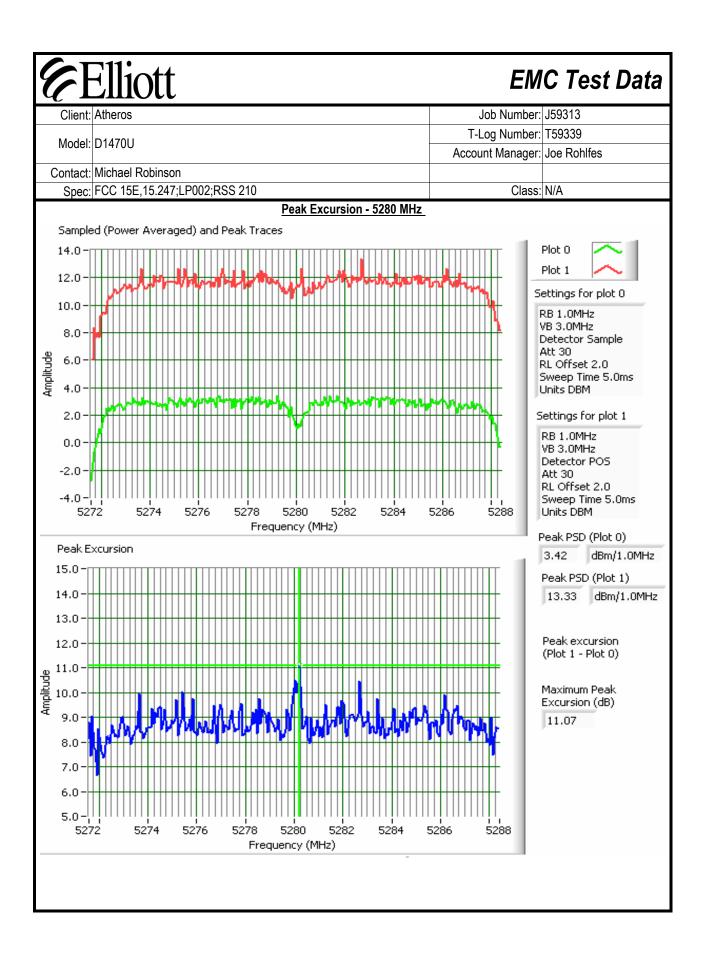


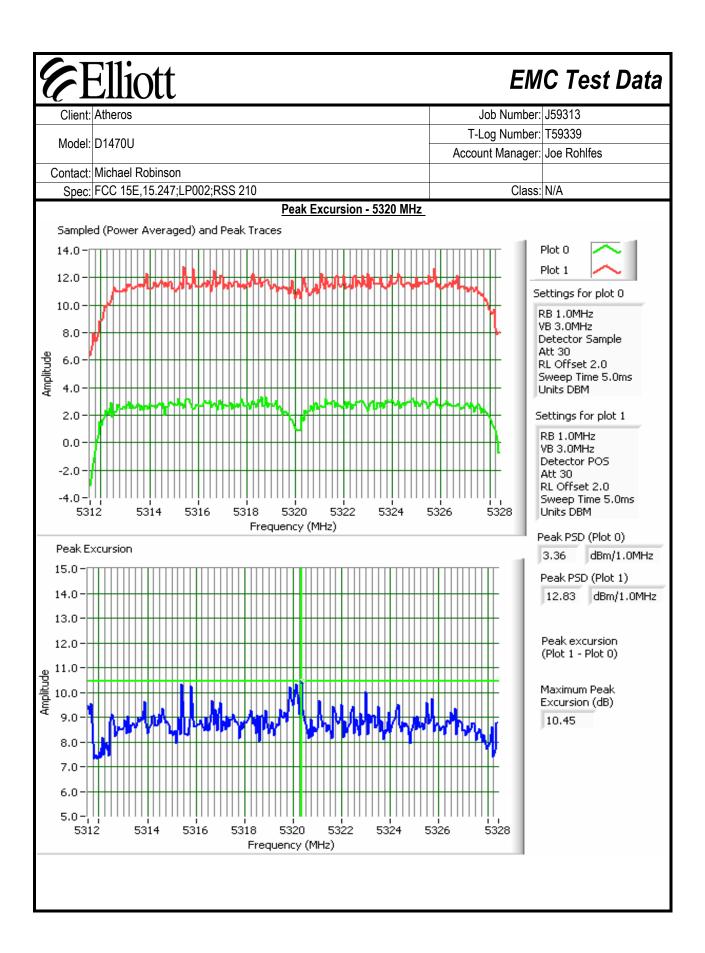


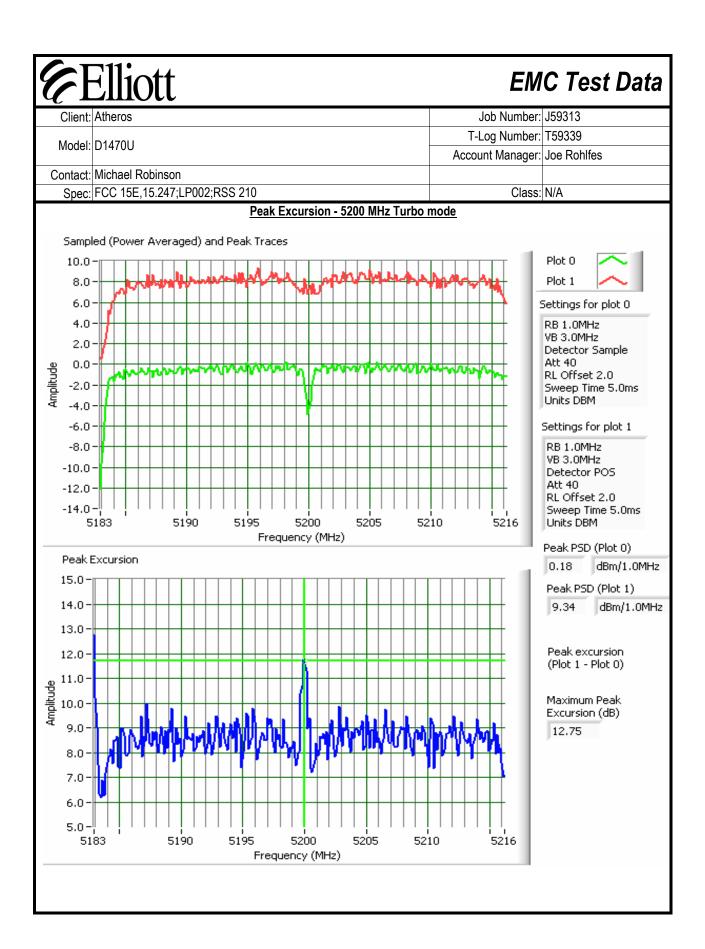


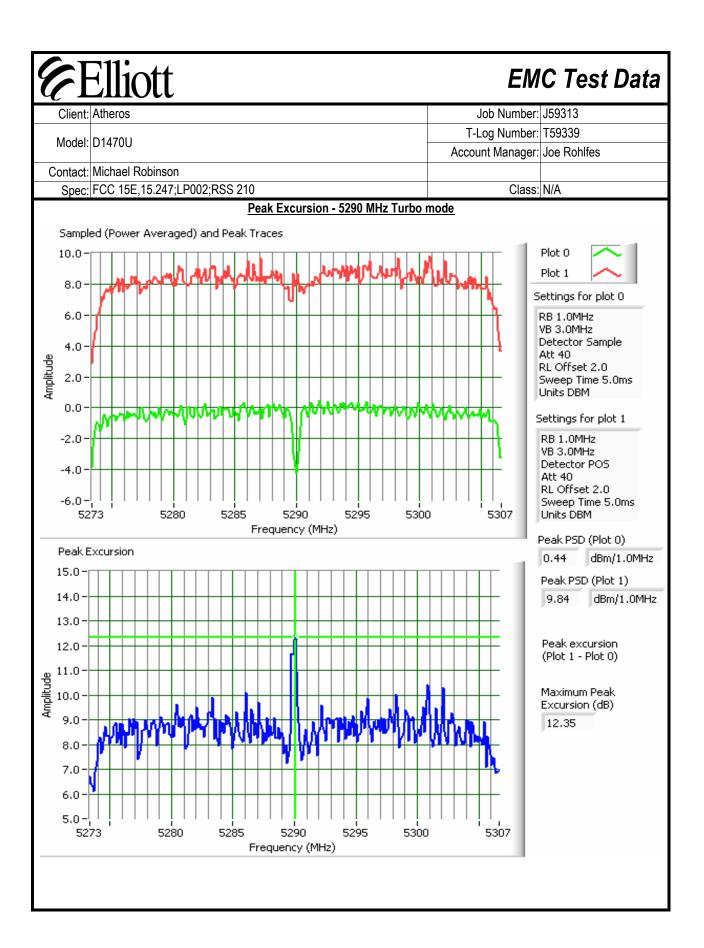












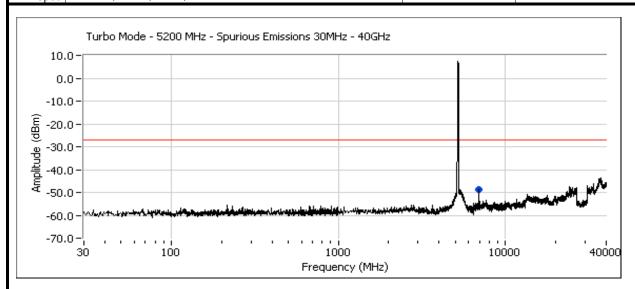
EMC Test Data Job Number: J59313 Client: Atheros T-Log Number: T59339 Model: D1470U Account Manager: Joe Rohlfes Contact: Michael Robinson Spec: FCC 15E,15.247;LP002;RSS 210 Class: N/A Run #3: Out Of Band Spurious Emissions - Antenna Conducted Plots Showing Out-Of-Band Emissions (RBW=VBW=1MHz) 802.11a Mode - 5180 MHz - Spurious Emissions 30MHz - 40GHz 10.0 0.0 -10.0 (dBm) -20.0 -30.0· -40.0· -50.0· -70.0 10000 40000 100 1000 Frequency (MHz) 802.11a Mode - 5240 MHz - Spurious Emissions 30MHz - 40GHz 10.0 0.0 -10.0 -20.0 -30.0 -40.0 -50.0 -50.0 -60.0 -70.0 40000 10000 100 1000 Frequency (MHz)

EMC Test Data Client: Atheros Job Number: J59313 T-Log Number: T59339 Model: D1470U Account Manager: Joe Rohlfes Contact: Michael Robinson Spec: FCC 15E,15.247;LP002;RSS 210 Class: N/A 802.11a Mode - 5260 MHz - Spurious Emissions 30MHz - 40GHz 10.0 0.0 -10.0 Amplitude (dBm) -20.0 -30.0 -40.0 -50.0 -60.0 -70.0 -40000 100 10000 1000 Frequency (MHz) 802.11a Mode - 5280 MHz - Spurious Emissions 30MHz - 40GHz 10.0 0.0 -10.0 -20.0 --30.0 --40.0 --50.0 --60.0 -70.0 - ¦ 100 10000 40000 1000 Frequency (MHz)

EMC Test Data Job Number: J59313 Client: Atheros T-Log Number: T59339 Model: D1470U Account Manager: Joe Rohlfes Contact: Michael Robinson Spec: FCC 15E,15.247;LP002;RSS 210 Class: N/A 802.11a Mode - 5320 MHz - Spurious Emissions 30MHz - 40GHz 10.0-0.0 -10.0 Amplitude (dBm) -20.0 -30.0 -40.0 · -50.0 · 100 40000 10000 1000 Frequency (MHz) Turbo Mode - 5290 MHz - Spurious Emissions 30MHz - 40GHz 10.0-0.0 -10.0 Amplitude (dBm) -20.0 -30.0 -40.0 -50.0 -70.0 -¦ 40000 1000 10000 Frequency (MHz)

EMC Test Data

)			
Client:	Atheros	Job Number:	J59313
Model	D1470U	T-Log Number:	T59339
wodei.	D14700	Account Manager:	Joe Rohlfes
Contact:	Michael Robinson		
Spec:	FCC 15E,15.247;LP002;RSS 210	Class:	N/A



Highest spurious emissions from plots:

Frequency	Level	Pol	15.209	9 / 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

Elliott	EM	C Test Data
Client: Atheros	Job Number:	J59313
Model: D1470U	Job Number: J59313 T-Log Number: T59339 Account Manager: Joe Roblins	
Wiodel. D 14700	Account Manager:	Joe Rohlfes
Contact: Michael Robinson		
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

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

Date of Test: April 6&11 2005 Config. Used: #1

Test Engineer: M. Briggs/M. Birgani Config Change: EUT: MAC:00904BD9C041

Test Location: SVOATS #1 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 17 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
15 4 (5190 5260	802.11a (5150 - 5350 MHz)	FCC Part 15.209 / 15E /		52.2dBµV/m
1a - d (5180 5260	Radiated Spurious Emissions	RSS 210	Pass	(406.9µV/m) @
5280 5320)	1 - 40 GHz	K33 2 10		15538.9MHz (-1.8dB)
	802.11a (5250 - 5350 MHz)	LP002 section 4.7.3 /		45.3dBµV/m
1c 1d (5280 5320)	Radiated Spurious Emissions	2.7 / 2.8	Pass	(184.7µV/m) @
	1 - 40 GHz	2.1 / 2.0		15959.3MHz (-8.7dB)
	Turbo Mode (5150 - 5350	FCC Part 15.209 / 15E /		51.3dBµV/m
2a b (5200 5290)	MHz) Radiated Spurious	RSS 210	Pass	(367.7µV/m) @
	Emissions 1 - 40 GHz	NOO 2 10		15599.1MHz (-2.7dB)
3a 3b 3c (5745	802.11a (5725 - 5850 MHz)	FCC Part 15.209 /		48.7dBµV/m
5785 5825)	Radiated Spurious Emissions	15.247/ RSS 210 /	Pass	(272.6µV/m) @
3703 3023)	1 - 40 GHz	LP0002 3.10		17474.8MHz (-5.3dB)

6	Elliott	EMC	Test Data
	Atheros	Job Number: J593	13
		T-Log Number: T593	
Model:	D1470U	Account Manager: Joe	
	Michael Robinson		
	FCC 15E 15.247;LP002;RSS 210	Class: N/A	
	tions Made During Testing: ations were made to the EUT during testing		
	ns From The Standard ns were made from the standard:		

EMC Test Data

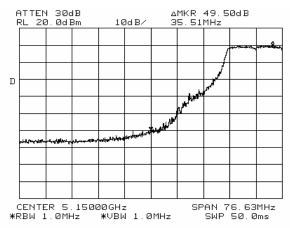
Client:	Atheros	Job Number:	J59313
Model	D1470U	T-Log Number: T59339	
wodei.	D14700	Account Manager:	Joe Rohlfes
Contact:	Michael Robinson		
Spec:	FCC 15E 15.247;LP002;RSS 210	Class:	N/A

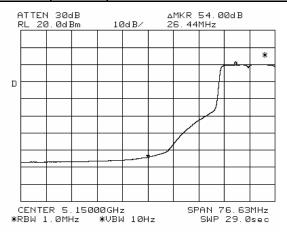
Run #1: 802.11a Mode, 5150 - 5350 MHz

Run #1a: Radiated Spurious Emissions. Low Channel @ 5180 MHz

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

i diladilicii	tai Oigilai	, power	icver setting	g io (laig	ct power in	AIXI)		
Frequency	Level	Pol	15.209	9 / 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	Η	-	-	PK	148	1.8	Ant b
5174.844	107.9	V	-	-	PK	0	1.7	Ant A
5172.974	104.9	Ι	-	-	PK	180	1.2	Ant A
5175.070	101.1	V	-	-	AVG	175	1.2	Ant b
5175.382	99.3	Н	-	-	AVG	148	1.8	Ant b
5174.844	98.7	V	-	-	AVG	0	1.7	Ant A
5172.974	97.1	Н	-	-	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

Frequency	Level	Pol	15.209	9 / 15E	Detector	Azimuth	Height	Comments
MHz	dBμV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5150.000	47.1	٧	54.0	-6.9	Avg	175	1.2	Ant B Note 2 (factor =-54.02dB)
5150.000	61.2	٧	74.0	-12.8	Pk	175	1.2	Ant B Note 2 (factor =-49.5dB)

Cliant.	Elli(-						lob Number:	150313
Ollerit.	Autoros							.og Number:	
Model:	D1470U							Joe Rohlfes	
Contact:	Michael R	obinson				710000	nt managor.	000 1 (0111100	
			P002;RSS	210				Class:	N/A
	rious Radi							0.0.00.	,, .
Frequency		Pol		9 / 15E	Detector	Azimuth	Height	Comments	
MHz	dBμV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters		
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	Н	54.0	-5.3	AVG	227	1.3	Ant A	
15540.885	48.0	Н	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	Н.	74.0	-13.1	PK	227	1.3	Ant A	
10360.0	00.9		-	-10.1	F IX	- 221	- 1.0	Note 3	
10000.0								·	
Note 1:				nds the limi	it of 15.209 w	as used. Fo	r all other e	missions the	e limit was set to -
	27dBm/MHz (~68dBuV/m).								
	Band-edge	e measu	rement calc	ulated from	the fundame	ntal field stre	ngth (peak	or average)	minus the band edge
Note 2:	Band-edge delta mark	e measu ker meas	rement calc urement.		the fundame		- "	or average)	minus the band edge
Note 2:	Band-edge delta mark	e measu ker meas	rement calc urement.				- "	or average)	minus the band edge
Note 2:	Band-edge delta mark	e measu ker meas	rement calc urement.				- "	or average)	minus the band edge
Note 2: Note 3:	Band-edgo delta mark Not in a re	e measur ker meas estricted l	rement calc urement. band signa	l more than			- "	or average)	minus the band edge
Note 2: Note 3: Run #1b:	Band-edga delta mark Not in a re	e measur ker meas estricted l	rement calc urement.	l more than			- "	or average)	minus the band edge
Note 2: Note 3: Run #1b: Spurious I	Band-edge delta mark Not in a re Radiated E missions	e measurer meas estricted l	rement calc urement. band signa	I more than	20dB below	the limit of 6	8dBuV/m.		
Note 2: Note 3: Run #1b: Spurious E	Band-edge delta mark Not in a re Radiated E missions	e measurer m	rement calc urement. band signa ns. EUT @	1 more than 5260 MHz	20dB below Detector	the limit of 68	BdBuV/m. Height	or average)	
Note 2: Note 3: Run #1b: Spurious I Frequency MHz	Band-edge delta mark Not in a re Radiated E missions Level dBμV/m	e measu ker meas sstricted l	rement calcurement. band signa ns. EUT @ 15.209 Limit	5260 MHz 9 / 15E Margin	20dB below Detector Pk/QP/Avg	the limit of 68 Azimuth degrees	BdBuV/m. Height meters	Comments	
Note 2: Note 3: Run #1b: Spurious I Frequency MHz 15774.75	Band-edge delta mark Not in a re Radiated E Emissions Level dBμV/m 48.4	e measu ker meas sstricted l Emissior Pol v/h	rement calcurement. band signa ns. EUT @ 15.209 Limit 54.0	5260 MHz 9 / 15E Margin -5.6	20dB below Detector Pk/QP/Avg AVG	Azimuth degrees 217	Height meters	Comments Ant B 3rd I	Harmonics
Note 2: Note 3: Run #1b: Spurious I Frequency MHz 15774.75 15777.20	Band-edge delta mark Not in a re Radiated E Emissions Level dBμV/m 48.4 47.1	e measu ker meas sstricted l Emissior Pol V/h V	rement calcurement. band signa ns. EUT @ 15.209 Limit 54.0 54.0	5260 MHz 9 / 15E Margin -5.6 -6.9	20dB below Detector Pk/QP/Avg AVG AVG	Azimuth degrees 217 175	Height meters 1.0 1.3	Comments Ant B 3rd I Ant B 3rd I	Harmonics Harmonics
Note 2: Note 3: Run #1b: Spurious E Frequency MHz 15774.75 15777.20 15778.60	Band-edge delta mark Not in a re Radiated E Emissions Level dBμV/m 48.4 47.1 44.5	e measu ker meas stricted Emissior Pol V/h V	rement calcurement. band signa ns. EUT @ 15.200 Limit 54.0 54.0 54.0	5260 MHz 9 / 15E Margin -5.6 -6.9 -9.5	20dB below Detector Pk/QP/Avg AVG AVG AVG	Azimuth degrees 217 175 214	Height meters 1.0 1.3 1.2	Comments Ant B 3rd I Ant B 3rd I Ant A 3rd I	Harmonics Harmonics Harmonics
Note 2: Note 3: Run #1b: Spurious E Frequency MHz 15774.75 15777.20 15778.60 15779.38	Band-edge delta mark Not in a research Radiated Emissions Level dBμV/m 48.4 47.1 44.5 43.0	e measu eer meas sstricted Emission Pol v/h V H	rement calcurement. band signa ns. EUT @ 15.209 Limit 54.0 54.0 54.0 54.0	5260 MHz 9 / 15E Margin -5.6 -6.9 -9.5 -11.0	Detector Pk/QP/Avg AVG AVG AVG AVG	Azimuth degrees 217 175 214 176	Height meters 1.0 1.3 1.2 1.3	Comments Ant B 3rd I Ant B 3rd I Ant A 3rd I Ant A 3rd I	Harmonics Harmonics Harmonics Harmonics
Note 2: Note 3: Run #1b: Spurious I Frequency MHz 15774.75 15777.20 15778.60 15779.38 15774.75	Radiated Emissions Level dBµV/m 48.4 47.1 44.5 43.0 61.8	e measu er meas ser meas estricted Pol V/h V H V	rement calcurement. band signa ns. EUT @ 15.209 Limit 54.0 54.0 54.0 74.0	5260 MHz 9 / 15E Margin -5.6 -6.9 -9.5 -11.0 -12.3	Detector Pk/QP/Avg AVG AVG AVG AVG AVG PK	Azimuth degrees 217 175 214 176 217	Height meters 1.0 1.3 1.2 1.3 1.0	Comments Ant B 3rd I Ant B 3rd I Ant A 3rd I Ant A 3rd I Ant B 3rd I	Harmonics Harmonics Harmonics Harmonics Harmonics
Note 2: Note 3: Run #1b: Spurious I Frequency MHz 15774.75 15777.20 15778.60 15779.38 15774.75 15777.20	Radiated Emissions Level 48.4 47.1 44.5 43.0 61.8 60.2	e measu ker meas stricted Emissior Pol V/h V H V H	rement calcurement. band signa 15.209 Limit 54.0 54.0 54.0 74.0 74.0	5260 MHz 9 / 15E Margin -5.6 -6.9 -9.5 -11.0 -12.3 -13.8	Detector Pk/QP/Avg AVG AVG AVG AVG PK PK	Azimuth degrees 217 175 214 176 217 175	Height meters 1.0 1.3 1.2 1.3 1.0 1.3	Comments Ant B 3rd I Ant B 3rd I Ant A 3rd I Ant A 3rd I Ant B 3rd I Ant B 3rd I	Harmonics Harmonics Harmonics Harmonics Harmonics Harmonics
Note 2: Note 3: Run #1b: Spurious I Frequency MHz 15774.75 15777.20 15778.60 15777.20 15777.20 15778.60	Radiated Emissions Level dBµV/m 48.4 47.1 44.5 43.0 61.8 60.2 57.9	e measure meas	rement calcurement. band signa 15.209 Limit 54.0 54.0 54.0 74.0 74.0 74.0	5260 MHz 9 / 15E Margin -5.6 -6.9 -9.5 -11.0 -12.3 -13.8 -16.1	Detector Pk/QP/Avg AVG AVG AVG AVG PK PK PK	Azimuth degrees 217 175 214 176 217 175 214	Height meters 1.0 1.3 1.2 1.3 1.0 1.3	Comments Ant B 3rd I Ant B 3rd I Ant A 3rd I Ant A 3rd I Ant B 3rd I Ant B 3rd I Ant A 3rd I	Harmonics Harmonics Harmonics Harmonics Harmonics Harmonics Harmonics
Note 2: Note 3: Run #1b: Spurious I Frequency MHz 15774.75 15777.20 15778.60 15779.38 15774.75 15777.20	Radiated Emissions Level 48.4 47.1 44.5 43.0 61.8 60.2	e measu ker meas stricted Emissior Pol V/h V H V H	rement calcurement. band signa 15.209 Limit 54.0 54.0 54.0 74.0 74.0	5260 MHz 9 / 15E Margin -5.6 -6.9 -9.5 -11.0 -12.3 -13.8	Detector Pk/QP/Avg AVG AVG AVG AVG PK PK	Azimuth degrees 217 175 214 176 217 175	Height meters 1.0 1.3 1.2 1.3 1.0 1.3	Comments Ant B 3rd I Ant B 3rd I Ant A 3rd I Ant A 3rd I Ant B 3rd I Ant B 3rd I	Harmonics Harmonics Harmonics Harmonics Harmonics Harmonics Harmonics
Note 2: Note 3: Run #1b: Spurious I Frequency MHz 15774.75 15777.20 15778.60 15779.38 15777.20 15778.60 15779.38	Radiated Emissions Level dBμV/m 48.4 47.1 44.5 43.0 61.8 60.2 57.9 55.1	e measurer meas stricted before the measurer mea	rement calcurement. band signa ns. EUT @ 15.209 Limit 54.0 54.0 54.0 74.0 74.0 74.0 74.0	5260 MHz 9 / 15E Margin -5.6 -6.9 -9.5 -11.0 -12.3 -13.8 -16.1 -18.9	Detector Pk/QP/Avg AVG AVG AVG AVG PK PK PK PK	Azimuth degrees 217 175 214 176 217 175 214 176	Height meters 1.0 1.3 1.2 1.3 1.0 1.3 1.2 1.3	Comments Ant B 3rd I Ant B 3rd I Ant A 3rd I Ant B 3rd I Ant B 3rd I Ant B 3rd I Ant A 3rd I Ant A 3rd I	Harmonics Harmonics Harmonics Harmonics Harmonics Harmonics Harmonics Harmonics
Note 2: Note 3: Run #1b: Spurious I Frequency MHz 15774.75 15777.20 15778.60 15779.38 15777.20 15778.60 15779.38	Radiated Emissions Level dBµV/m 48.4 47.1 44.5 43.0 61.8 60.2 57.9 55.1	e measurer meas estricted between the measurer m	rement calcurement. band signa ns. EUT @ 15.200 Limit 54.0 54.0 54.0 74.0 74.0 74.0 restricted bar	5260 MHz 9 / 15E Margin -5.6 -6.9 -9.5 -11.0 -12.3 -13.8 -16.1 -18.9	Detector Pk/QP/Avg AVG AVG AVG AVG PK PK PK PK	Azimuth degrees 217 175 214 176 217 175 214 176	Height meters 1.0 1.3 1.2 1.3 1.0 1.3 1.2 1.3	Comments Ant B 3rd I Ant B 3rd I Ant A 3rd I Ant B 3rd I Ant B 3rd I Ant B 3rd I Ant A 3rd I Ant A 3rd I	Harmonics Harmonics Harmonics Harmonics Harmonics Harmonics Harmonics Harmonics
Note 2: Note 3: Run #1b: Spurious I Frequency MHz 15774.75 15777.20 15778.60 15779.38 15777.20 15778.60 15779.38	Radiated Emissions Level dBµV/m 48.4 47.1 44.5 43.0 61.8 60.2 57.9 55.1 For emissions	e measuser meas stricted le measuser meas stricted le measure	rement calcurement. band signa ns. EUT @ 15.209 Limit 54.0 54.0 74.0 74.0 74.0 74.0 estricted bar BuV/m).	5260 MHz 9 / 15E Margin -5.6 -6.9 -9.5 -11.0 -12.3 -13.8 -16.1 -18.9 mds the limit	Detector Pk/QP/Avg AVG AVG AVG AVG PK PK PK PK PK	Azimuth degrees 217 175 214 176 217 175 214 176 217 175 214 176 as used. Fo	Height meters 1.0 1.3 1.2 1.3 1.0 1.3 1.1.2 1.3 1.1.2 1.3 1.1.2 1.3	Comments Ant B 3rd I Ant B 3rd I Ant A 3rd I Ant B 3rd I Ant B 3rd I Ant B 3rd I Ant A 3rd I Ant A 3rd I Ant A 3rd I Ant A 3rd I	Harmonics
Note 2: Note 3: Note 3: Run #1b: Spurious I Frequency MHz 15774.75 15777.20 15778.60 15777.20 15778.60	Band-edge delta mark Not in a research Radiated Emissions Level dBμV/m 48.4 47.1 44.5 43.0 61.8 60.2 57.9 55.1 For emission Value of the Port of the	e measuser meas stricted be measuser measurer me	rement calcurement. band signal ns. EUT @ 15.200 Limit 54.0 54.0 74.0 74.0 74.0 74.0 74.0 setricted ban BuV/m). w the noise	5260 MHz 9 / 15E Margin -5.6 -6.9 -9.5 -11.0 -12.3 -13.8 -16.1 -18.9 floor with t	Detector Pk/QP/Avg AVG AVG AVG AVG PK PK PK PK PK PK PK OF 15.209 whee EUT operations.	Azimuth degrees 217 175 214 176 217 175 214 176 as used. Fo	Height meters 1.0 1.3 1.2 1.3 1.0 1.3 1.2 1.3 r all other e	Comments Ant B 3rd I Ant A 3rd I Ant B 3rd I Ant B 3rd I Ant B 3rd I Ant B 3rd I Ant A 3rd I	Harmonics Harmonics Harmonics Harmonics Harmonics Harmonics Harmonics Harmonics

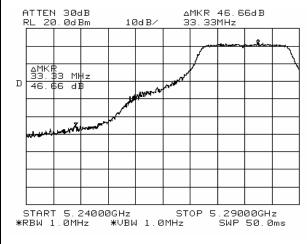
EMC Test Data

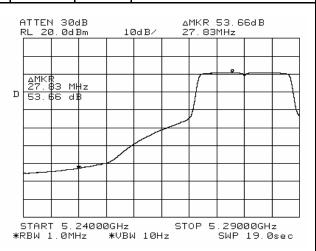
Client:	Atheros	Job Number:	J59313
Model	D1470U	T-Log Number:	T59339
wodei.	D14700	Account Manager:	Joe Rohlfes
Contact:	Michael Robinson		
Spec:	FCC 15E 15.247;LP002;RSS 210	Class:	N/A

Run #1c: Radiated Emissions. EUT @ 5280 MHz

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

· amaamon	tai Oigiiai	, po	10101 0011111	9 .0 (64.9	ot pomor in	,,		
Frequency	Level	Pol	15.209	9 / 15E	Detector	Azimuth	Height	Comments
MHz	dBμV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
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	Н	-	-	PK	166	1.6	Ant B
5284.817	107.0	Н	-	-	PK	245	1.0	Ant A
5281.040	100.4	V	-	-	AVG	215	1.2	Ant B
5278.535	100.0	Н	-	-	AVG	166	1.6	Ant B
5281.500	99.2	V	-	-	AVG	198	1.0	Ant A
5284.817	97.8	Н	-	-	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	Level	Pol	LP	002	Detector	Azimuth	Height	Comments
MHz	dBμV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5250.000	46.7	٧	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.

T-Log Number: T59339 Account Manager: Joe Rohlfe	Cileni	Elli(,	Job Number:	J59313
Account Manager: Joe Rohlfe Joe Rohlf								T-I	og Number:	T59339
Class: N/A Cl	Model	: D1470U								
rious Emissions uency Level Pol 15.209 / 15E Detector Azimuth Height Comments HZ dBμV/m v/h Limit Margin Pk/QP/Avg degrees meters 0.3994 44.6 V 54.0 -9.4 AVG 217 1.1 Ant B 3rd Harmonics 0.3994 56.6 V 74.0 -17.4 PK 217 1.1 Ant B 3rd Harmonics 0.2900 41.3 V 54.0 -12.7 AVG 214 1.2 Ant A 3rd Harmonics 0.2900 54.2 V 74.0 -19.8 PK 214 1.2 Ant A 3rd Harmonics 0.4648 39.2 H 54.0 -14.8 AVG 174 1.2 Ant A 3rd Harmonics 0.4648 51.4 H 74.0 -22.6 PK 174 1.2 Ant A 3rd Harmonics 1.2148 43.6 H 54.0 -10.4 AVG 176 1.3	Contact: Michael Robinson									
uency Level Pol 15.209 / 15E Detector Azimuth Height Comments Hz dBμV/m v/h Limit Margin Pk/QP/Avg degrees meters 0.3994 44.6 V 54.0 -9.4 AVG 217 1.1 Ant B 3rd Harmonics 0.3994 56.6 V 74.0 -17.4 PK 217 1.1 Ant B 3rd Harmonics 0.2900 41.3 V 54.0 -12.7 AVG 214 1.2 Ant A 3rd Harmonics 0.2900 54.2 V 74.0 -19.8 PK 214 1.2 Ant A 3rd Harmonics 0.4648 39.2 H 54.0 -14.8 AVG 174 1.2 Ant A 3rd Harmonics 0.4648 51.4 H 74.0 -22.6 PK 174 1.2 Ant A 3rd Harmonics 1.2148 43.6 H 54.0 -10.4 AVG 176 1.3 Ant B 3rd Harmonics <td< td=""><th>Spec</th><td>: FCC 15E</td><td>15.247;Ll</td><td>P002;RSS</td><td>210</td><td></td><td></td><td></td><td>Class:</td><td>N/A</td></td<>	Spec	: FCC 15E	15.247;Ll	P002;RSS	210				Class:	N/A
Hz dBμV/m v/h Limit Margin Pk/QP/Avg degrees meters 0.3994 44.6 V 54.0 -9.4 AVG 217 1.1 Ant B 3rd Harmonics 0.3994 56.6 V 74.0 -17.4 PK 217 1.1 Ant B 3rd Harmonics 0.2900 41.3 V 54.0 -12.7 AVG 214 1.2 Ant A 3rd Harmonics 0.2900 54.2 V 74.0 -19.8 PK 214 1.2 Ant A 3rd Harmonics 0.4648 39.2 H 54.0 -14.8 AVG 174 1.2 Ant A 3rd Harmonics 0.4648 51.4 H 74.0 -22.6 PK 174 1.2 Ant A 3rd Harmonics 1.2148 43.6 H 54.0 -10.4 AVG 176 1.3 Ant B 3rd Harmonics 1.2148 56.5 H 74.0 -17.5 PK 176 1.3 Ant B 3rd Harmonics	rious	Emissions								
0.3994 44.6 V 54.0 -9.4 AVG 217 1.1 Ant B 3rd Harmonics 0.3994 56.6 V 74.0 -17.4 PK 217 1.1 Ant B 3rd Harmonics 0.2900 41.3 V 54.0 -12.7 AVG 214 1.2 Ant A 3rd Harmonics 0.2900 54.2 V 74.0 -19.8 PK 214 1.2 Ant A 3rd Harmonics 0.4648 39.2 H 54.0 -14.8 AVG 174 1.2 Ant A 3rd Harmonics 0.4648 51.4 H 74.0 -22.6 PK 174 1.2 Ant A 3rd Harmonics 1.2148 43.6 H 54.0 -10.4 AVG 176 1.3 Ant B 3rd Harmonics 1.2148 56.5 H 74.0 -17.5 PK 176 1.3 Ant B 3rd Harmonics	quency								Comments	
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0.4648 39.2 H 54.0 -14.8 AVG 174 1.2 Ant A 3rd Harmonics 0.4648 51.4 H 74.0 -22.6 PK 174 1.2 Ant A 3rd Harmonics .2148 43.6 H 54.0 -10.4 AVG 176 1.3 Ant B 3rd Harmonics .2148 56.5 H 74.0 -17.5 PK 176 1.3 Ant B 3rd Harmonics For emissions in restricted bands the limit of 15.209 was used. For all other emissions the limit was a second of the control of the contr										
.4648 51.4 H 74.0 -22.6 PK 174 1.2 Ant A 3rd Harmonics .2148 43.6 H 54.0 -10.4 AVG 176 1.3 Ant B 3rd Harmonics .2148 56.5 H 74.0 -17.5 PK 176 1.3 Ant B 3rd Harmonics 1. For emissions in restricted bands the limit of 15.209 was used. For all other emissions the limit was a second of the color of the col										
1.2148 43.6 H 54.0 -10.4 AVG 176 1.3 Ant B 3rd Harmonics 1.2148 56.5 H 74.0 -17.5 PK 176 1.3 Ant B 3rd Harmonics 1. For emissions in restricted bands the limit of 15.209 was used. For all other emissions the limit was an experience of the limit of 15.209 was used.										
1.2148 56.5 H 74.0 -17.5 PK 176 1.3 Ant B 3rd Harmonics 1.2148 For emissions in restricted bands the limit of 15.209 was used. For all other emissions the limit was a						_				
For emissions in restricted bands the limit of 15.209 was used. For all other emissions the limit was						_				

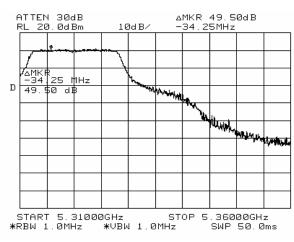
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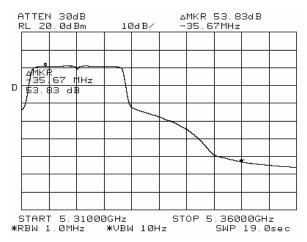
EMC Test Data

Client:	Atheros	Job Number:	J59313
Model	D1470U	T-Log Number:	T59339
wodei.	D14700	Account Manager:	Joe Rohlfes
Contact:	Michael Robinson		
Spec:	FCC 15E 15.247;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)

i anaamen	itai Oigiiai	, power	icver setting	g io (taig	ct power in	AIXI		
Frequency	Level	Pol	15.209	9 / 15E	Detector	Azimuth	Height	Comments
MHz	dBμV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5317.365	98.2	Н	-	-	AVG	147	1.5	Ant B
5318.595	99.3	V	-	-	AVG	211	1.0	Ant B
5320.780	99.7	Н	-	-	AVG	227	1.3	Ant A
5318.697	99.9	V	-	-	AVG	210	1.0	Ant A
5317.365	107.1	Н	-	-	PK	147	1.5	Ant B
5318.595	108.0	V	-	-	PK	211	1.0	Ant B
5320.780	108.5	Н	-	-	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	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBμV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5350.000	45.3	٧	54.0	-8.7	Avg	210	1.0	Ant A Note 2 (factor =-53.8dB)
5350.000	59.1	٧	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.

Client:	Elli(Job Number:	J59313
								og Number:	
Model:	D1470U							-	Joe Rohlfes
Contact:	Michael R	obinson							
Spec:	FCC 15E	15.247;L	P002;RSS	210		Class:	N/A		
Other Spu	rious Radi	ated En							
Frequency		Pol		/ 15.247	Detector	Azimuth	Height	Comments	
MHz	dBμV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters		
15959.260	45.3	V	54.0	-8.7	AVG	229	1.2	Ant B	
15958.765	44.4	Н	54.0	-9.6	AVG	217	1.1	Ant B	
15961.240	43.3	Н	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	Н	54.0	-12.8	AVG	212	1.2	Ant B	
10639.745	41.0	Н	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	Н	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	Н	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	Н	74.0	-21.5	PK	212	1.2	Ant B	
10639.745	52.5	Н	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

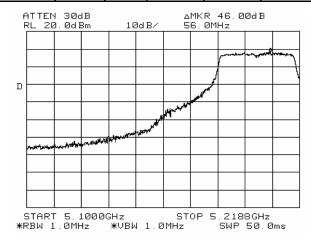
Client:	Atheros	Job Number:	J59313
Model	D1470U	T-Log Number:	T59339
iviodei.	D14700	Account Manager:	Joe Rohlfes
Contact:	Michael Robinson		
Spec:	FCC 15E 15.247;LP002;RSS 210	Class:	N/A

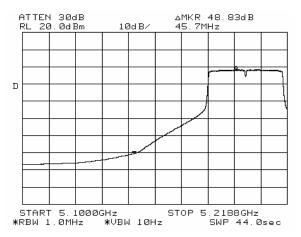
Run #2: Turbo Mode, 5150 - 5350 MHz

Run #2a: Radiated Spurious Emissions. Turbo Channel @ 5200 MHz

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

i anaamon	andamental eighti, pewer level estaing to (target pewer in 7111)									
Frequency	Level	Pol	15.209	9 / 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	Η	-	-	PK	148	1.5	Ant B		
5213.267	102.9	Η	-	-	PK	224	1.2	Ant A		
5211.250	96.7	V	-	-	AVG	155	1.0	Ant B		
5190.725	95.7	Η	-	-	AVG	148	1.5	Ant B		
5189.500	95.7	V	-	-	AVG	180	1.0	Ant A		
5213.267	94.7	Н	-	-	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

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	٧	54.0	-6.1	Avg			Ant B Note 2 (factor =-48.8dB)
5150.000	59.6	٧	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
Note 2:	delta marker measurement.

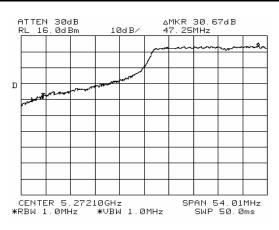
EMC Test Data													
	Atheros					J	ob Number:	J59313					
Madali	D447011						T-L	og Number:	T59339				
woder.	D1470U						Accou	nt Manager:	Joe Rohlfes				
Contact:	Michael R	obinson											
Spec:	FCC 15E	15.247;L	.P002;RSS 2	210				Class:	N/A				
Spurious E	missions												
Frequency	Level	Pol	15.209	9 / 15E	Detector	Azimuth	Height	Comments					
MHz	$dB\mu V/m$	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters						
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	Н	54.0	-6.4	AVG	216	1.2	Ant B					
15600.165	47.1	Н	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	Н	74.0	-13.7	PK	217	1.3	Ant A					
15599.460	60.3	Н	74.0	-13.7	PK	216	1.2	Ant B					

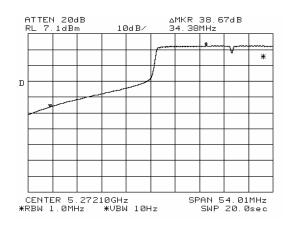
EMC Test Data

Client:	Atheros	Job Number:	J59313							
Madal	D1470U	T-Log Number:	T59339							
wodei.	D14700	Account Manager:	Joe Rohlfes							
Contact:	Michael Robinson									
Spec:	FCC 15E 15.247;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)

		<i>,</i> ,		, ,				
Frequency	Level	Pol	15.209	9 / 15E	Detector	Azimuth	Height	Comments
MHz	dBμV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5288.955	106.4	Н	-	-	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	Н	-	-	PK	166	1.7	Ant B
5288.955	98.1	Н	-	-	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	Н	-	-	AVG	166	1.7	Ant B





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

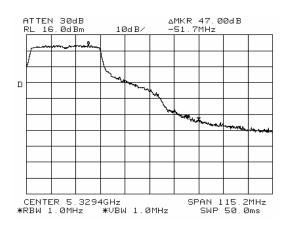
Delta Marken, Deals	20.07 JD	DD - \/D- 4MH-
Delta Marker - Peak	30.67 dB	RB = VB= 1MHz
Delta Marker - Average	38.67 dB	RB=1MHz VB = 10Hz

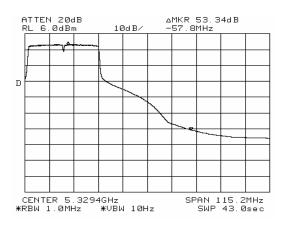
Band Edge Signal Radiated Field Strength - 5250 MHz

Dallu Luge	ballu Luge Signal Nadiated Field Streligtif - 3230 Miliz											
Frequency	Level	Pol	LP002		Detector	Azimuth	Height	Comments				
MHz	dBμV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters					
5250.000	59.4	٧	54.0	5.4	Avg	237	1.4	Ant A	LP002 only			
5250 000	75.7	V	74 0	1.7	Pk	237	14	Ant A	I P002 only			

EMC Test Data

Client:	Atheros	Job Number:	J59313
Model	D1470U	T-Log Number:	T59339
wodei.	D14700	Account Manager:	Joe Rohlfes
Contact:	Michael Robinson		
Spec:	FCC 15E 15.247;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

$dB\mu V/m$	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
44.8	V	54.0	-9.2	Avg	237	1.4	Ant A Note 2 (factor =-53.3dB)
59.4	V	74.0	-14.6	Pk	237	1.4	Ant A Note 2 (factor =-47.0dB)
missions	. Turbo	Channel @	5290 MHz				
Level	Pol	15.209	9 / 15E	Detector	Azimuth	Height	Comments
$dB\mu V/m$	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
44.8	V	54.0	-9.2	AVG	202	1.3	Ant B
43.8	Н	54.0	-10.2	AVG	215	1.4	Ant B
42.4	V	54.0	-11.6	AVG	218	1.4	Ant A
40.7	Н	54.0	-13.3	AVG	212	1.0	Ant A
56.8	V	74.0	-17.2	PK	202	1.3	Ant B
55.3	Н	74.0	-18.7	PK	215	1.4	Ant B
54.0	V	74.0	-20.1	PK	218	1.4	Ant A
53.0	Н	74.0	-21.1	PK	212	1.0	Ant A
	44.8 59.4 Emissions Level dBμV/m 44.8 43.8 42.4 40.7 56.8 55.3 54.0	44.8 V 59.4 V Emissions. Turbo Level Pol dBμV/m v/h 44.8 V 43.8 H 42.4 V 40.7 H 56.8 V 55.3 H 54.0 V	44.8 V 54.0 59.4 V 74.0 Emissions. Turbo Channel @ Level Pol 15.209 dBμV/m v/h Limit Limit 44.8 V 54.0 43.8 H 54.0 42.4 V 54.0 40.7 H 54.0 54.0 56.8 V 74.0 55.3 H 74.0 74.0 54.0 V 74.0	44.8 V 54.0 -9.2 59.4 V 74.0 -14.6 Emissions. Turbo Channel @ 5290 MHz Level Pol 15.209 / 15E dBμV/m v/h Limit Margin 44.8 V 54.0 -9.2 43.8 H 54.0 -10.2 42.4 V 54.0 -11.6 40.7 H 54.0 -13.3 56.8 V 74.0 -17.2 55.3 H 74.0 -18.7 54.0 V 74.0 -20.1	44.8 V 54.0 -9.2 Avg 59.4 V 74.0 -14.6 Pk Emissions. Turbo Channel @ 5290 MHz Level Pol 15.209 / 15E Detector dBμV/m v/h Limit Margin Pk/QP/Avg 44.8 V 54.0 -9.2 AVG 43.8 H 54.0 -10.2 AVG 42.4 V 54.0 -11.6 AVG 40.7 H 54.0 -13.3 AVG 56.8 V 74.0 -17.2 PK 55.3 H 74.0 -18.7 PK 54.0 V 74.0 -20.1 PK	44.8 V 54.0 -9.2 Avg 237 59.4 V 74.0 -14.6 Pk 237 Emissions. Turbo Channel @ 5290 MHz Level Pol 15.209 / 15E Detector Azimuth dBμV/m v/h Limit Margin Pk/QP/Avg degrees 44.8 V 54.0 -9.2 AVG 202 43.8 H 54.0 -10.2 AVG 215 42.4 V 54.0 -11.6 AVG 218 40.7 H 54.0 -13.3 AVG 212 56.8 V 74.0 -17.2 PK 202 55.3 H 74.0 -18.7 PK 215 54.0 V 74.0 -20.1 PK 218	44.8 V 54.0 -9.2 Avg 237 1.4 59.4 V 74.0 -14.6 Pk 237 1.4 Emissions. Turbo Channel @ 5290 MHz Level Pol 15.209 / 15E Detector Azimuth Height dBμV/m v/h Limit Margin Pk/QP/Avg degrees meters 44.8 V 54.0 -9.2 AVG 202 1.3 43.8 H 54.0 -10.2 AVG 215 1.4 42.4 V 54.0 -11.6 AVG 218 1.4 40.7 H 54.0 -13.3 AVG 212 1.0 56.8 V 74.0 -17.2 PK 202 1.3 55.3 H 74.0 -18.7 PK 215 1.4 54.0 V 74.0 -20.1 PK 218 1.4

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

Client:	Atheros							Job Number: J59313
								_og Number: T59339
Model:	D1470U							ınt Manager: Joe Rohlfes
Contact:	Michael R	obinson						
			.P002;RSS	210				Class: N/A
			5725 - 58					<u> </u>
		•			@ 5745 MH	z		
requency	Level	Pol		/ 15.247	Detector	Azimuth	Height	Comments
MHz	dBμV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
1490.600	40.3	V	54.0	-13.8	AVG	142	1.0	Ant B 2nd Harmonics
1488.050	38.8	Н	54.0	-15.2	AVG	231	1.4	Ant B 2nd Harmonics
1490.068	35.0	V	54.0	-19.0	AVG	175	1.1	Ant A 2nd Harmonics
1487.000	34.5	Н	54.0	-19.5	AVG	232	1.5	Ant A 2nd Harmonics (Noise Floor
1490.600	52.3	V	74.0	-21.7	PK	142	1.0	Ant B 2nd Harmonics
1488.050	49.7	Н	74.0	-24.3	PK	231	1.4	Ant B 2nd Harmonics
1490.068	46.0	V	74.0	-28.0	PK	175	1.1	Ant A 2nd Harmonics
		_	740	-29.0	PK	232	1.5	Ant A 2nd Harmonics (Noise Floor
11487.000 lote 1:	limit of -20 Emission	dBc. was belo	w the noise	nds the limi	t of 15.209 w	as used. All		sions were more than 20dB below th
11487.000 lote 1: lote 4:	For emissi limit of -20 Emission v	ons in re ldBc. was belo Spurious	estricted bar w the noise s Emission	nds the limi floor. s. Channe	t of 15.209 w	as used. All	other emiss	sions were more than 20dB below th
11487.000 lote 1: lote 4: Run #3b: I	For emissi limit of -20 Emission v Radiated S Level	ions in reddBc. was belo purious	estricted bar ow the noise s Emission 15.209	floor. S. Channel / 15.247	t of 15.209 w	ras used. All z Azimuth	other emiss	,
lote 1: lote 4: lun #3b: I	For emissi limit of -20 Emission v Radiated S Level dBµV/m	ions in readBc. was belo purious Pol v/h	estricted bar w the noise s Emission 15.209 Limit	floor. s. Channel / 15.247 Margin	t of 15.209 w © 5785 MH Detector Pk/QP/Avg	z Azimuth degrees	other emis: Height meters	sions were more than 20dB below the
lote 1: lote 4: lote 5: lote 6: lote 6	For emissilimit of -20 Emission v Radiated S Level dBµV/m 48.0	ions in reladec. was belo Spurious Pol v/h V	estricted bar w the noise s Emission 15.209 Limit 54.0	floor. S. Channel / 15.247 Margin -6.0	t of 15.209 w © 5785 MH Detector Pk/QP/Avg AVG	z Azimuth degrees 246	Other emiss Height meters 1.3	sions were more than 20dB below the Comments Ant B 2nd Harmonics
ote 1: ote 4: un #3b: I requency MHz 1569.300	For emissi limit of -20 Emission v Radiated S Level dBµV/m 48.0 44.8	ons in reddBc. was belovated by the below the	estricted bar w the noise s Emission 15.209 Limit 54.0 54.0	floor. s. Channel / 15.247 Margin -6.0 -9.3	t of 15.209 w © 5785 MH Detector Pk/QP/Avg AVG AVG	Azimuth degrees 246 225	Height meters 1.3 1.4	sions were more than 20dB below the Comments Ant B 2nd Harmonics Ant B 2nd Harmonics
lote 1: lote 4: lote 5: lote 5: lote 6: lote 6	For emissi limit of -20 Emission v Radiated S Level dBµV/m 48.0 44.8 41.2	ons in reddBc. was below Spurious Pol V/h V H	estricted bar w the noise s Emission 15.209 Limit 54.0 54.0 54.0	floor. s. Channel / 15.247 Margin -6.0 -9.3 -12.8	t of 15.209 w © 5785 MH Detector Pk/QP/Avg AVG AVG AVG	z Azimuth degrees 246 225 174	Height meters 1.3 1.4 1.0	Comments Ant B 2nd Harmonics Ant A 2nd Harmonics
lote 1: lote 4: lote 5: lote 5: lote 6: lote 6	For emissi limit of -20 Emission v Radiated S Level dBµV/m 48.0 44.8 41.2 59.6	ions in reidBc. was belov Spurious Pol V/h V H V	s Emission 15.209 Limit 54.0 54.0 74.0	floor. s. Channel / 15.247 Margin -6.0 -9.3 -12.8 -14.5	t of 15.209 w © 5785 MH Detector Pk/QP/Avg AVG AVG AVG PK	z Azimuth degrees 246 225 174 246	Height meters 1.3 1.4 1.0 1.3	Comments Ant B 2nd Harmonics Ant B 2nd Harmonics Ant A 2nd Harmonics Ant B 2nd Harmonics
ote 1: ote 4: un #3b: If requency MHz 1569.300 1570.050 1569.300 1574.600	For emissilimit of -20 Emission version versio	ons in reddBc. was beloved by the second of	estricted bar w the noise s Emission 15.209 Limit 54.0 54.0 74.0 54.0	floor. s. Channel / 15.247 Margin -6.0 -9.3 -12.8 -14.5 -15.7	t of 15.209 w To a state of 1	Azimuth degrees 246 225 174 246 180	Height meters 1.3 1.4 1.0 1.3 1.0	Sions were more than 20dB below the Comments Ant B 2nd Harmonics Ant B 2nd Harmonics Ant A 2nd Harmonics Ant B 2nd Harmonics
lote 1: lote 4: lote 4: lote 4: requency MHz 11569.300 11570.050 11569.300 11574.600 11569.350	For emissilimit of -20 Emission value Bmission valu	ions in reidBc. was belov Spurious Pol V/h V H V	stricted bar w the noise s Emission 15.209 Limit 54.0 54.0 74.0 54.0 74.0	floor. s. Channel / 15.247 Margin -6.0 -9.3 -12.8 -14.5 -15.7 -17.8	t of 15.209 w © 5785 MH Detector Pk/QP/Avg AVG AVG AVG PK	z Azimuth degrees 246 225 174 246	Height meters 1.3 1.4 1.0 1.3	comments Ant B 2nd Harmonics Ant B 2nd Harmonics Ant A 2nd Harmonics Ant B 2nd Harmonics
lote 1: lote 4: lote 5: lote 4: lote 5: lote 6: lote 6	For emissilimit of -20 Emission version versio	ons in reddBc. was belov Spurious Pol V/h V H V H H H	estricted bar w the noise s Emission 15.209 Limit 54.0 54.0 74.0 54.0	floor. s. Channel / 15.247 Margin -6.0 -9.3 -12.8 -14.5 -15.7	t of 15.209 w © 5785 MH Detector Pk/QP/Avg AVG AVG AVG PK AVG PK AVG	Azimuth degrees 246 225 174 246 180 225	Height meters 1.3 1.4 1.0 1.3 1.0 1.4	Comments Ant B 2nd Harmonics Ant B 2nd Harmonics Ant A 2nd Harmonics Ant B 2nd Harmonics Ant A 2nd Harmonics Ant B 2nd Harmonics Ant B 2nd Harmonics Ant B 2nd Harmonics

11643.400 38.0 H 54.0 -16.0 AVG 227 1.1 Ant A 2nd Harmonics 11649.175 55.7 H 74.0 -18.3 PK 148 1.3 Ant B 2nd Harmonics 17473.951 53.7 V 74.0 -20.4 PK 175 1.0 Ant B 3rd Harmonics 17475.400 53.2 H 74.0 -20.8 PK 256 1.4 Ant A 3rd Harmonics 11648.300 52.6 V 74.0 -21.4 PK 141 1.1 Ant A 2nd Harmonics (Noise Floth 1643.400 49.5 V 74.0 -24.5 PK 126 1.0 Ant A 3rd Harmonics (Noise Floth 1643.400 49.5 H 74.0 -24.5 PK 227 1.1 Ant A 2nd Harmonics Note 1: For emissions in restricted bands the limit of 15.209 was used. All other emissions were more than 20dB below limit of -20dBc. At a distance of 30cm from the EUT the signal level was still below the limit of 54dBuV/m. Measurement at 3m in the signal level was still below the limit of 54dBuV/m.	Account Manager: Account Manager: Joe Rohlfes	Contact: Spec: Sun #3c: F									
Contact: Michael Robinson Class: N/A	Contact Michael Robinson Spec: FCC 15E 15.247;LP002;RSS 210 Class: N/A	Contact: Spec: Sun #3c: F							T-l	og Number: T59339	
Class N/A	Spec: FCC 15E 15.247;LP002;RSS 210 Class: N/A Run #3c: Radiated Spurious Emissions. High Channel @ 5825 MHz Frequency Level Pol 15.209 / 15.247 Detector Azimuth Height Comments MHz dBµV/m v/h Limit Margin Pk/QP/Avg degrees meters 17474.826 48.7 H 54.0 -5.3 AVG 175 1.3 Ant B 3rd Harmonics 11649.070 48.6 V 54.0 -5.4 AVG 176 1.0 Ant B 2nd Harmonics 11649.175 43.9 H 54.0 -10.1 AVG 148 1.3 Ant B 2nd Harmonics 17473.951 41.7 V 54.0 -12.3 AVG 175 1.0 Ant B 3rd Harmonics 17474.826 61.0 H 74.0 -13.0 PK 175 1.3 Ant B 3rd Harmonics 17475.400 41.0 H 54.0 -13.0 PK 175 1.3 Ant B 3rd Harmonics	Spec:	Michael R						Accou	nt Manager: Joe Rol	nlfes
Run #3c: Radiated Spurious Emissions. High Channel @ 5825 MHz	Run#3c: Radiated Spurious Emissions. High Channel @ 5825 MHz Frequency Level Pol 15.209 / 15.247 Detector Azimuth Height Height Comments MHz dBμV/m v/h Limit Margin Pk/QP/Avg degrees meters 17474.826 48.7 H 54.0 -5.3 AVG 175 1.3 Ant B 3rd Harmonics 11649.700 48.6 V 54.0 -5.4 AVG 176 1.0 Ant B 2nd Harmonics 11649.175 43.9 H 54.0 -10.1 AVG 148 1.3 Ant B 2nd Harmonics 11648.300 41.6 V 54.0 -12.4 AVG 141 1.1 Ant A 2nd Harmonics 17475.400 41.0 H 74.0 -13.0 PK 175 1.3 Ant B 3rd Harmonics 11649.700 60.2 V 74.0 -13.0 PK 176 1.0 Ant A 3rd Harmonics 11643.400 38.0 H 54.0	un #3c: F		obinson							
Pol 15.209 / 15.247 Detector Azimuth Height Comments	Pol 15.209 / 15.247 Detector Azimuth Height Comments		FCC 15E	15.247;L	.P002;RSS 2	210				Class: N/A	
MHz dBµV/m v/h Limit Margin Pk/QP/Avg degrees meters 17474.826 48.7 H 54.0 -5.3 AVG 175 1.3 Ant B 3rd Harmonics 11649.700 48.6 V 54.0 -5.4 AVG 176 1.0 Ant B 2nd Harmonics 11649.175 43.9 H 54.0 -10.1 AVG 148 1.3 Ant B 2nd Harmonics 17473.951 41.7 V 54.0 -12.3 AVG 175 1.0 Ant B 3rd Harmonics 11648.300 41.6 V 54.0 -12.4 AVG 141 1.1 Ant A 2nd Harmonics 17474.826 61.0 H 74.0 -13.0 PK 175 1.3 Ant B 3rd Harmonics 17475.400 41.0 H 54.0 -13.0 AVG 256 1.4 Ant A 3rd Harmonics 17471.725 38.7 V 54.0 -15.3 AVG 126 1.0 Ant A 3rd Harmonic	MHz dBµV/m v/h Limit Margin Pk/QP/Avg degrees meters 17474.826 48.7 H 54.0 -5.3 AVG 175 1.3 Ant B 3rd Harmonics 11649.700 48.6 V 54.0 -5.4 AVG 176 1.0 Ant B 2nd Harmonics 11649.175 43.9 H 54.0 -10.1 AVG 148 1.3 Ant B 3rd Harmonics 17473.951 41.7 V 54.0 -12.3 AVG 175 1.0 Ant B 3rd Harmonics 11648.300 41.6 V 54.0 -12.4 AVG 141 1.1 Ant A 2nd Harmonics 17474.826 61.0 H 74.0 -13.0 PK 175 1.3 Ant B 3rd Harmonics 17475.400 41.0 H 54.0 -13.0 AVG 256 1.4 Ant A 3rd Harmonics 17471.725 38.7 V 54.0 -15.3 AVG 126 1.0 Ant A 3rd Harmonic	requency	Radiated S				annel @ 582				
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limit of -20dBc. At a distance of 30cm from the EUT the signal level was still below the limit of 54dBuV/m. Measurement at 3m i	limit of -20dBc. At a distance of 30cm from the EUT the signal level was still below the limit of 54dBuV/m. Measurement at 3m is t	11643.400	49.5	Н	74.0	-24.5	PK	227	1.1	Ant A 2nd Harmon	ics
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noise noor.					cm from the	EUITHES	ignai ievei wa	is still delow	the limit of	o4dBuV/m. Measure	ement at 3m is th

E!	Elliott	EM	C Test Data
Client:	Atheros	Job Number:	J59313
Model	D1470U	T-Log Number:	T59339
wodei.	D14700	Account Manager:	Joe Rohlfes
Contact:	Michael Robinson		
Spec:	FCC 15E 15.247;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

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

Date of Test: 4/6/2005 Config. Used: #1

Test Engineer: M. Briggs/M. Birgani Config Change: EUT: MAC:00904BD9C041

Test Location: SVOATS #1 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 17 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 @ 2412 2437 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 @ 2412 2437 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)

Elliott	ЕМ	C Test Data
Client: Atheros	Job Number:	J59313
	T-Log Number:	
Model: D1470U	Account Manager:	
Contact: Michael Robinson		
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 standard.		

EMC Test Data

Client:	Atheros	Job Number:	J59313
Model	D1470U	T-Log Number:	T59339
wodei.	D14700	Account Manager:	Joe Rohlfes
Contact:	Michael Robinson		
Spec:	FCC 15E 15.247;LP002;RSS 210	Class:	N/A

Run #1: 802.11b Mode

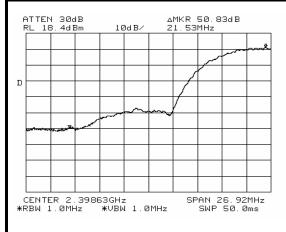
Date of Test: 4/6/2005 Config. Used: #1

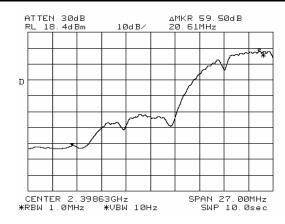
Test Engineer: M. Briggs/M. Birgani Config Change: EUT: MAC:00904BD9C041

Test Location: SVOATS #1 Host Unit Voltage 120V/60Hz

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

Frequency	Level	Pol	15.209	9 / 15E	Detector	Azimuth	Height	Comments
MHz	dBμV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2411.445	108.0	V	-	-	PK	235	1.1	Ant B
2410.242	107.9	Н	-	-	PK	145	1.0	Ant B
2411.425	106.0	V	-	-	PK	250	1.1	Ant A
2410.300	104.4	Н	-	-	PK	160	1.0	Ant A
2411.445	105.1	V	-	-	AVG	235	1.1	Ant B
2410.242	104.8	Н	-	-	AVG	145	1.0	Ant B
2412.635	103.1	V	-	-	AVG	250	1.1	Ant A
2410.300	101.6	Н	-	-	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

Frequency	Level	Pol	15.209) / 15E	Detector	Azimuth	Height	Comments
MHz	dBμV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
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

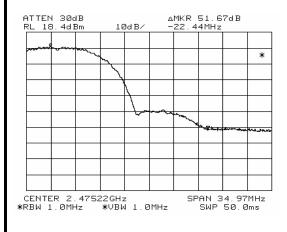
Client:	Elli(Job Number: J59313
								og Number: T59339
Model:	D1470U							int Manager: Joe Rohlfes
Contact:	Michael R	obinson						
Spec:	FCC 15E	15.247;L	.P002;RSS	210				Class: N/A
Other Spu	rious Radi							
requency		Pol		9 / 15E	Detector	Azimuth	Height	Comments
MHz	dBμV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
4824.125	48.6	V	54.0	-5.4	AVG	193	1.1	Ant B
1824.045	48.1	V	54.0	-5.9	AVG	177	1.0	Ant A
1824.045	47.9	Н	54.0	-6.1	AVG	197	1.2	Ant A
2136.022	47.3	Н	54.0	-6.7	AVG	200	1.0	Ant A
1824.060	44.2	Н	54.0	-9.8	AVG	225	1.5	Ant B
2136.022	57.4	Н	74.0	-16.6	PK	200	1.0	Ant A
7311.870	37.3	Н	54.0	-16.7	AVG	203	1.1	Ant A 3rd Harmonic
1824.125	52.0	V	74.0	-22.0	PK	193	1.1	Ant B
1824.045	51.8	V	74.0	-22.2	PK	177	1.0	Ant A
1824.045	51.7	Н	74.0	-22.3	PK	197	1.2	Ant A
1824.060	49.7	Н	74.0	-24.3	PK	225	1.5	Ant B
7211 070	48.3	_	1	-	DI	222	4 4	A . (A . O . I I I
ote 1:	For emiss				t of 15.209 w		1.1 ength (peak	Ant A 3rd Harmonic or average) minus the band edge
7311.870 Note 1: Note 2: Run #1b:	For emiss Band-edg delta mark	ions in re e measu ker meas	estricted bar rement calc surement.	nds the limi ulated from	t of 15.209 w the fundame	ras used. ental field stre	ength (peak	
lote 1: lote 2:	For emiss Band-edg delta mark	ions in re e measu ker meas	estricted bar rement calc surement.	nds the limi ulated from	t of 15.209 w the fundame	as used.	ength (peak	
lote 1: lote 2:	For emiss Band-edg delta mark	ions in re e measu ker meas	estricted bar rement calc surement. s Emissions get power i	nds the limi ulated from	t of 15.209 w the fundame	ras used. ental field stre	ength (peak	
lote 1: lote 2: lote 2: lower lever lever lever MHz	For emiss Band-edg delta mark Radiated \$ el setting =	ions in ree measurer	estricted bar rement calc surement. s Emissions get power i	nds the limi ulated from s. Center (n ART)	t of 15.209 w the fundame	ras used. ental field stre 437 MHz, 80 Azimuth degrees	ength (peak 2.11b Height meters	or average) minus the band edge
ote 1: ote 2: un #1b: ower lever requency MHz 1874.070	For emiss Band-edg delta mark Radiated Sel setting = Level dBµV/m 48.4	ions in ree measurer	estricted bar rement calc surement. s Emissions get power i 15.209 Limit 54.0	nds the limi ulated from s. Center (n ART) 9 / 15E Margin -5.6	t of 15.209 w the fundame Channel @ 2 Detector Pk/QP/Avg AVG	vas used. ental field stre 437 MHz, 80 Azimuth degrees 185	ength (peak 2.11b Height meters 1.2	or average) minus the band edge Comments Ant A
ote 1: ote 2: un #1b: ower lever requency MHz 1874.070 2186.397	For emiss Band-edg delta mark Radiated Sel setting = Level dBµV/m 48.4 48.0	Spurious 18 Pol v/h H V	estricted bar rement calc surement. s Emissions get power i 15.209 Limit 54.0 54.0	nds the limi ulated from s. Center (n ART) 0 / 15E Margin -5.6 -6.0	t of 15.209 w the fundame Channel @ 2 Detector Pk/QP/Avg AVG AVG	vas used. ental field stre 437 MHz, 80 Azimuth degrees 185 210	2.11b Height meters 1.2 1.2	or average) minus the band edg Comments Ant A Ant A
ote 1: ote 2: un #1b: ower lever requency MHz 1874.070 2186.397	For emiss Band-edg delta mark Radiated Sel setting = Level dBµV/m 48.4 48.0 47.3	Spurious = 18 (tary Pol V/h H V	estricted bar rement calc surement. s Emissions get power i 15.209 Limit 54.0 54.0	s. Center (n ART) 9 / 15E Margin -5.6 -6.0 -6.7	t of 15.209 w the fundame Channel @ 2 Detector Pk/QP/Avg AVG AVG AVG	Azimuth degrees 210 208	2.11b Height meters 1.2 1.2 1.2	or average) minus the band edg Comments Ant A
ote 1: lote 2: lote 2: lower level requency MHz 4874.070 2186.397 4874.065	For emiss Band-edg delta mark Radiated Sel setting = Level dBµV/m 48.4 48.0 47.3 46.5	Spurious = 18 (tary Pol v/h H V	estricted barrement calcurement. s Emissions get power i	s. Center (n ART) 9 / 15E Margin -5.6 -6.0 -6.7 -7.5	t of 15.209 w the fundame Channel @ 2 Detector Pk/QP/Avg AVG AVG AVG AVG	Azimuth degrees 185 210 208 179	2.11b Height meters 1.2 1.2 1.0	Comments Ant A Ant B Ant A Ant A
ote 1: ote 2: un #1b: ower lever requency MHz 1874.070 2186.397 1874.065 1874.045	For emiss Band-edg delta mark Radiated Sel setting = Level dBμV/m 48.4 48.0 47.3 46.5 44.8	Spurious 18 (tary 19 V 19 V 19 H	estricted bar rement calc surement. s Emissions get power in 15.203 Limit 54.0 54.0 54.0 54.0 54.0	s. Center (n ART) 9 / 15E Margin -5.6 -6.0 -6.7 -7.5 -9.3	t of 15.209 w the fundame Channel @ 2 Detector Pk/QP/Avg AVG AVG AVG AVG AVG	Azimuth degrees 210 208 179 235	2.11b Height meters 1.2 1.2 1.0 1.2	or average) minus the band edg Comments Ant A Ant B
ote 1: ote 2: ower lever frequency MHz 4874.070 2186.397 4874.065 4874.005 2186.397	For emiss Band-edg delta mark Radiated Sel setting = Level dBμV/m 48.4 48.0 47.3 46.5 44.8 57.9	Spurious 18 Hay	estricted bar rement calc surement. s Emissions get power i 15.209 Limit 54.0 54.0 54.0 54.0 54.0 74.0	nds the limi ulated from s. Center (n ART) 9 / 15E Margin -5.6 -6.0 -6.7 -7.5 -9.3 -16.1	t of 15.209 w the fundame Channel @ 2 Detector Pk/QP/Avg AVG AVG AVG AVG AVG AVG PK	Azimuth degrees 185 210 208 179 235 210	2.11b Height meters 1.2 1.2 1.0 1.2 1.2	Comments Ant A Ant A Ant B Ant A Ant B Ant A Ant B Ant B Ant A
ote 1: ote 2: un #1b: ower lever requency MHz 1874.070 2186.397 1874.065 1874.005 2186.397	For emiss Band-edg delta mark Radiated Sel setting = Level dBμV/m 48.4 48.0 47.3 46.5 44.8 57.9 37.3	Spurious = 18 (tary V) V V H V H	estricted barrement calcurement. s Emissions get power i	s. Center (n ART) 9 / 15E Margin -5.6 -6.0 -6.7 -7.5 -9.3	t of 15.209 w the fundame Channel @ 2 Detector Pk/QP/Avg AVG AVG AVG AVG AVG AVG AVG AVG AVG	Azimuth degrees 185 210 208 179 235 210 203	2.11b Height meters 1.2 1.2 1.0 1.2 1.2 1.1	Comments Ant A Ant B Ant B Ant B Ant B
ote 1: ote 2: un #1b: ower leverequency MHz 1874.070 186.397 1874.065 1874.005 186.397 1311.870	For emiss Band-edg delta mark Radiated Sel setting = Level dBμV/m 48.4 48.0 47.3 46.5 44.8 57.9	Spurious = 18 (tary V) V V V H H H	estricted bar rement calc surement. s Emissions get power i 15.209 Limit 54.0 54.0 54.0 54.0 54.0 74.0	nds the limi ulated from s. Center (n ART) 9 / 15E Margin -5.6 -6.0 -6.7 -7.5 -9.3 -16.1	t of 15.209 w the fundame Channel @ 2 Detector Pk/QP/Avg AVG AVG AVG AVG AVG AVG PK	Azimuth degrees 185 210 208 179 235 210	2.11b Height meters 1.2 1.2 1.0 1.2 1.2	Comments Ant A Ant A Ant B Ant A Ant B Ant A Ant B Ant B Ant A
ote 1: ote 2: un #1b: ower leverequency MHz 874.070 2186.397 874.065 1874.005 2186.397 7311.870 1874.070 1874.070	For emiss Band-edg delta mark Radiated Sel setting = Level dBμV/m 48.4 48.0 47.3 46.5 44.8 57.9 37.3 52.1 51.3	Spurious 18 (tary Poly V) H V H H V	estricted bar rement calc surement. S Emissions get power i 15.209 Limit 54.0 54.0 54.0 54.0 74.0 74.0 74.0 74.0	nds the limi ulated from s. Center (n ART) 9 / 15E Margin -5.6 -6.0 -6.7 -7.5 -9.3 -16.1 -16.7	Detector Pk/QP/Avg AVG	Azimuth degrees 185 210 208 179 235 210 203 185 208	2.11b Height meters 1.2 1.2 1.0 1.2 1.2 1.1	Comments Ant A Ant A Ant B
ote 1: lote 2: lote 2: lote 2: lote 2: lote 2: lote 2: lote 3: lote 1: lote 3: lote 3:	For emiss Band-edg delta mark Radiated Sel setting = Level dBμV/m 48.4 48.0 47.3 46.5 44.8 57.9 37.3 52.1	Spurious = 18 (tary Pol V/h H V V H H H V V V V V V V V V V V V V	estricted bar rement calc surement. s Emissions get power i 15.209 Limit 54.0 54.0 54.0 54.0 74.0 54.0 74.0	nds the limi ulated from s. Center (n ART) 9 / 15E Margin -5.6 -6.0 -6.7 -7.5 -9.3 -16.1 -16.7 -21.9	t of 15.209 w the fundame Channel @ 2 Detector Pk/QP/Avg AVG AVG AVG AVG AVG AVG AVG AVG AVG AVG	Azimuth degrees 185 210 208 179 203 185 208 179	2.11b Height meters 1.2 1.2 1.0 1.2 1.1 1.2 1.1 1.2 1.1 1.2 1.0 1.2 1.1	Comments Ant A Ant B
lote 1: lote 2: lower lever requency	For emiss Band-edg delta mark Radiated Sel setting = Level dBμV/m 48.4 48.0 47.3 46.5 44.8 57.9 37.3 52.1 51.3	Spurious 18 (tary Poly V) H V H H V	estricted bar rement calc surement. S Emissions get power i 15.209 Limit 54.0 54.0 54.0 54.0 74.0 74.0 74.0 74.0	nds the limiulated from s. Center (n ART) 9 / 15E Margin -5.6 -6.0 -6.7 -7.5 -9.3 -16.1 -16.7 -21.9 -22.7	Detector Pk/QP/Avg AVG	Azimuth degrees 185 210 208 179 235 210 203 185 208	2.11b Height meters 1.2 1.2 1.0 1.2 1.1 1.2 1.1 1.2 1.1	Comments Ant A Ant B

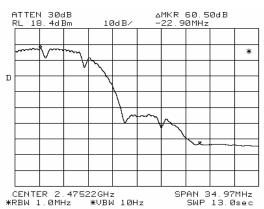
EMC Test Data

Client:	Atheros	Job Number:	J59313
Madali	D1470U	T-Log Number:	T59339
iviodei.	D14700	Account Manager:	Joe Rohlfes
Contact:	Michael Robinson		
Spec:	FCC 15E 15.247;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	Level	Pol	15.209	9 / 15E	Detector	Azimuth	Height	Comments
MHz	dBμV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2463.175	108.0	Н	-	-	PK	200	1.1	Ant A
2461.515	106.6	Η	-	-	PK	170	1.2	Ant B
2462.710	104.4	V	-	-	PK	210	1.1	Ant A
2463.175	104.9	Η	-	-	AVG	200	1.1	Ant A
2461.515	103.4	Η	-	-	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

Dallu Luge	Danu Luge Signal Radiated Field Strength									
Frequency	Level	Pol	15.209	9 / 15E	Detector	Azimuth	Height	Comments		
MHz	dBμV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters			
2484.250	44.4	Η	54.0	-9.6	Avg	200	1.1	Ant A Note 2: correction = -59.0dB		
2484.250	56.3	Н	74.0	-17.7	Pk	200	1.1	Ant A Note 2: correction = -50.7dB		

124.080 52.3 H 74.0 -21.7 PK 202 1.5 Ant A 124.000 51.7 H 74.0 -22.3 PK 236 1.5 Ant B 124.000 For emissions in restricted bands, the limit of 15.209 was used. No signal at third harmonic. Band-edge measurement calculated from the fundamental field strength (neak or average) minus the band edge.		Ellic	JU					T		C Test Dat
Account Manager: Joe Rohlfes	Client:	Atheros								
Contact: Michael Robinson Spec: FCC 15E 15.247;LP002;RSS 210 Class: N/A ner Spurious Radiated Emissions: guency Level Pol 15.209 / 15E Detector Azimuth Height Comments MHz dBμV/m v/h Limit Margin Pk/QP/Avg degrees meters 124.035 50.7 V 54.0 -3.3 AVG 214 1.2 Ant B 124.040 48.8 V 54.0 -5.2 AVG 229 1.1 Ant A 124.080 48.6 H 54.0 -5.5 AVG 202 1.5 Ant B 124.000 48.5 H 54.0 -5.5 AVG 236 1.5 Ant B 124.034 57.7 V 74.0 -16.3 PK 180 1.0 Ant A 124.035 53.5 V 74.0 -20.5 PK 214 1.2 Ant B 124.040 52.5 V 74.0 -21.5 PK 229 1.1 Ant A	Model:	D1470U								
Spec: FCC 15E 15.247;LP002;RSS 210 Class: N/A ner Spurious Radiated Emissions: Equency Level Pol 15.209 / 15E Detector Azimuth Height Comments MHz dBμV/m v/h Limit Margin Pk/QP/Avg degrees meters i24.035 50.7 V 54.0 -3.3 AVG 214 1.2 Ant B i24.040 48.8 V 54.0 -5.2 AVG 229 1.1 Ant A i24.080 48.6 H 54.0 -5.5 AVG 202 1.5 Ant B i24.000 48.5 H 54.0 -5.5 AVG 236 1.5 Ant B i47.234 45.5 V 54.0 -8.5 AVG 180 1.0 Ant A i47.234 57.7 V 74.0 -16.3 PK 180 1.0 Ant A i24.040 52.5 V 74.0 -20.5	0 ((MishaalD	- la !					Accou	ınt Manager:	Joe Rohlfes
Detector Azimuth Height Comments				DUUJ-DGG	210				Class	NI/Λ
equency Level Pol 15.209 / 15E Detector Azimuth Height Comments MHz dBμV/m v/h Limit Margin Pk/QP/Avg degrees meters 124.035 50.7 V 54.0 -3.3 AVG 214 1.2 Ant B 124.040 48.8 V 54.0 -5.2 AVG 229 1.1 Ant A 124.080 48.6 H 54.0 -5.5 AVG 202 1.5 Ant A 124.000 48.5 H 54.0 -5.5 AVG 236 1.5 Ant B 147.234 45.5 V 54.0 -8.5 AVG 180 1.0 Ant A 147.234 57.7 V 74.0 -16.3 PK 180 1.0 Ant A 124.035 53.5 V 74.0 -20.5 PK 214 1.2 Ant B 124.040 52.5 V 74.0 -2					210				Class.	IN/A
MHz dBμV/m v/h Limit Margin Pk/QP/Avg degrees meters i24.035 50.7 V 54.0 -3.3 AVG 214 1.2 Ant B i24.040 48.8 V 54.0 -5.2 AVG 229 1.1 Ant A i24.080 48.6 H 54.0 -5.5 AVG 202 1.5 Ant A i24.000 48.5 H 54.0 -5.5 AVG 236 1.5 Ant B i47.234 45.5 V 54.0 -8.5 AVG 180 1.0 Ant A i47.234 57.7 V 74.0 -16.3 PK 180 1.0 Ant A i24.035 53.5 V 74.0 -20.5 PK 214 1.2 Ant B i24.040 52.5 V 74.0 -21.5 PK 229 1.1 Ant A i24.080 52.3 H 74.0 -22.3<					9 / 15F	Detector	Azimuth	Height	Comments	
124.035 50.7 V 54.0 -3.3 AVG 214 1.2 Ant B 124.040 48.8 V 54.0 -5.2 AVG 229 1.1 Ant A 124.080 48.6 H 54.0 -5.5 AVG 202 1.5 Ant A 124.000 48.5 H 54.0 -5.5 AVG 236 1.5 Ant B 147.234 45.5 V 54.0 -8.5 AVG 180 1.0 Ant A 147.234 57.7 V 74.0 -16.3 PK 180 1.0 Ant A 124.035 53.5 V 74.0 -20.5 PK 214 1.2 Ant B 124.040 52.5 V 74.0 -21.5 PK 229 1.1 Ant A 124.080 52.3 H 74.0 -21.7 PK 202 1.5 Ant B 14a.00 51.7 H 74.0 -						+			Comments	
424.040 48.8 V 54.0 -5.2 AVG 229 1.1 Ant A 424.080 48.6 H 54.0 -5.5 AVG 202 1.5 Ant A 424.000 48.5 H 54.0 -5.5 AVG 236 1.5 Ant B 447.234 45.5 V 54.0 -8.5 AVG 180 1.0 Ant A 447.234 57.7 V 74.0 -16.3 PK 180 1.0 Ant A 424.035 53.5 V 74.0 -20.5 PK 214 1.2 Ant B 424.040 52.5 V 74.0 -21.5 PK 229 1.1 Ant A 424.080 52.3 H 74.0 -21.7 PK 202 1.5 Ant A 424.000 51.7 H 74.0 -22.3 PK 236 1.5 Ant B Ten emissions in restricted bands the limit of 15.209 was used. No signal at third harmonic. Band-edge measurement calculated from the fundamental field strength (peak or average) minus the band edge					_				Ant B	
24.080 48.6 H 54.0 -5.5 AVG 202 1.5 Ant A 24.000 48.5 H 54.0 -5.5 AVG 236 1.5 Ant B 47.234 45.5 V 54.0 -8.5 AVG 180 1.0 Ant A 47.234 57.7 V 74.0 -16.3 PK 180 1.0 Ant A 24.035 53.5 V 74.0 -20.5 PK 214 1.2 Ant B 24.040 52.5 V 74.0 -21.5 PK 229 1.1 Ant A 24.080 52.3 H 74.0 -21.7 PK 202 1.5 Ant A 24.000 51.7 H 74.0 -22.3 PK 236 1.5 Ant B The analogue measurement calculated from the fundamental field strength (peak or average) minus the band edge of the band edge of the fundamental field strength (peak or average) minus the band edge of the fundamental field strength (peak or average) minus the band edge of the fundamental field strength (peak or average) minus the band edge of the fundamental field strength (peak or average) minus the band edge of the fundamental field stren										
47.234 45.5 V 54.0 -8.5 AVG 180 1.0 Ant A 47.234 57.7 V 74.0 -16.3 PK 180 1.0 Ant A 24.035 53.5 V 74.0 -20.5 PK 214 1.2 Ant B 24.040 52.5 V 74.0 -21.5 PK 229 1.1 Ant A 24.080 52.3 H 74.0 -21.7 PK 202 1.5 Ant A 24.000 51.7 H 74.0 -22.3 PK 236 1.5 Ant B Test of the properties of			Н				202			
47.234 45.5 V 54.0 -8.5 AVG 180 1.0 Ant A 47.234 57.7 V 74.0 -16.3 PK 180 1.0 Ant A 24.035 53.5 V 74.0 -20.5 PK 214 1.2 Ant B 24.040 52.5 V 74.0 -21.5 PK 229 1.1 Ant A 24.080 52.3 H 74.0 -21.7 PK 202 1.5 Ant A 24.000 51.7 H 74.0 -22.3 PK 236 1.5 Ant B Ten emissions in restricted bands the limit of 15.209 was used. No signal at third harmonic. Band-edge measurement calculated from the fundamental field strength (peak or average) minus the band edge	24.000	48.5	Н	54.0	-5.5	AVG	236	1.5	Ant B	
24.035 53.5 V 74.0 -20.5 PK 214 1.2 Ant B 24.040 52.5 V 74.0 -21.5 PK 229 1.1 Ant A 24.080 52.3 H 74.0 -21.7 PK 202 1.5 Ant A 24.000 51.7 H 74.0 -22.3 PK 236 1.5 Ant B te 1: For emissions in restricted bands the limit of 15.209 was used. No signal at third harmonic. Band-edge measurement calculated from the fundamental field strength (peak or average) minus the band edge		45.5	V	54.0	-8.5	AVG	180	1.0	Ant A	
24.040 52.5 V 74.0 -21.5 PK 229 1.1 Ant A 24.080 52.3 H 74.0 -21.7 PK 202 1.5 Ant A 24.000 51.7 H 74.0 -22.3 PK 236 1.5 Ant B te 1: For emissions in restricted bands the limit of 15.209 was used. No signal at third harmonic. Band-edge measurement calculated from the fundamental field strength (peak or average) minus the band edge	47.234	57.7	V	74.0	-16.3	PK	180	1.0	Ant A	
24.080 52.3 H 74.0 -21.7 PK 202 1.5 Ant A 24.000 51.7 H 74.0 -22.3 PK 236 1.5 Ant B te 1: For emissions in restricted bands the limit of 15.209 was used. No signal at third harmonic. Band-edge measurement calculated from the fundamental field strength (peak or average) minus the band edge	24.035	53.5	V	74.0	-20.5	PK	214	1.2	Ant B	
te 1: For emissions in restricted bands the limit of 15.209 was used. No signal at third harmonic. Band-edge measurement calculated from the fundamental field strength (peak or average) minus the band edge	24.040	52.5	V	74.0	-21.5	PK	229	1.1	Ant A	
te 1: For emissions in restricted bands the limit of 15.209 was used. No signal at third harmonic. Band-edge measurement calculated from the fundamental field strength (peak or average) minus the band edge	24.080	52.3	Н	74.0	-21.7	PK	202	1.5	Ant A	
Band-edge measurement calculated from the fundamental field strength (peak or average) minus the band edge		[1]			00.0	DV I	336	1 5	Ant D	
	324.000 te 1: te 2:	For emiss Band-edg	ions in re e measu	estricted bar rement calc	nds the lim	it of 15.209 w	as used. No	signal at th	nird harmonic	

EMC Test Data

	100		
Client:	Atheros	Job Number:	J59313
Madalı	D1470U	T-Log Number:	T59339
woder.	D14700	Account Manager:	Joe Rohlfes
Contact:	Michael Robinson		
Spec:	FCC 15E 15.247;LP002;RSS 210	Class:	N/A

Run #2: 802.11a Mode

Date of Test: 4/6/2005 Config. Used: #1

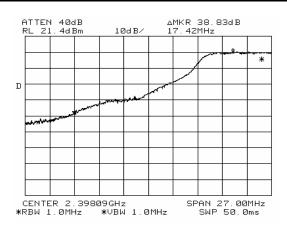
Test Engineer: M. Briggs/M. Birgani Config Change: EUT: MAC:00904BD9C041

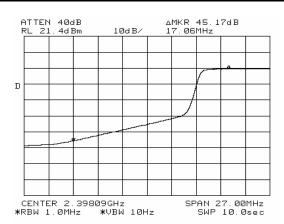
Test Location: SVOATS #1 Host Unit Voltage 120V/60Hz

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

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

i ullualli c li	itai Siyiiai	, power	ievei settiii	y - 10 (laig	et bower in	ANI		
Frequency	Level	Pol	15.209	9 / 15E	Detector	Azimuth	Height	Comments
MHz	dBμV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2408.533	112.6	Н	-	-	PK	210	1.1	ANT A
2413.533	111.1	Н	-	-	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	Н	-	-	PK	210	1.0	Ant A Note 4
2408.533	103.9	Н	-	-	AVG	210	1.1	ANT A
2413.533	102.0	Н	-	-	AVG	190	1.1	ANT B
2409.467	101.4	٧	-	-	AVG	235	1.0	ANT B
2409.933	98.8	V	-	-	AVG	240	1.1	ANT A
2410.367	98.0	Н	-	-	AVG	210	1.0	Ant A Note 4





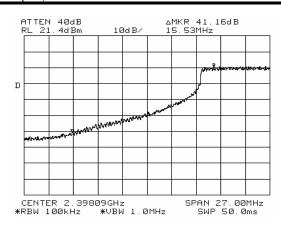
Method 1, band edge marker delta

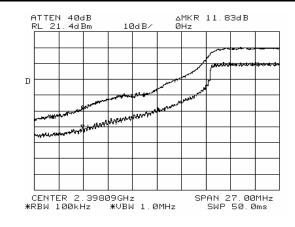
Delta Marker - Peak	38.83 dB	RB = VB= 1MHz
Delta Marker - Average	45.17 dB	RB=1MHz VB = 10Hz

Highest restricted band signal was at 2390 MHz method 2 used

EMC Test Data

Client:	Atheros	Job Number:	J59313
Ollotti.	7.11.101.00		
Model:	D1470U	T-Log Number:	
iiiodoi.	511100	Account Manager:	Joe Rohlfes
Contact:	Michael Robinson		
Spec:	FCC 15E 15.247;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
Bandwidth delta marker at band edge	11.8 dB	100k to 1 MHz
Correction factor	53.0 dB	This factor used highest out of band @ band edge

Band Edge Signal Radiated Field Strength, 100kHz delta method

Balla Eage Olghai Radiatea i lela Otteligili, 100ki 12 della illetiloa								
Frequency	Level	Pol	15.209	9 / 15E	Detector	Azimuth	Height	Comments
MHz	dBμV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2390.000	50.9	Η	54.0	-3.1	Avg	210	1.1	Note 2 (correction factor of 53dB)
2390.000	59.6	Η	74.0	-14.4	Pk	210	1.1	Note 2 (correction factor of 53dB)

5	9			J				
Frequency	Level	Pol	15.209	9 / 15E	Detector	Azimuth	Height	Comments
MHz	$dB\mu V/m$	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2389.973	51.8	Н	54.0	-2.2	AVG	210	1.0	Ant A Note 4
2389.973	68.0	Н	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
NOLE 1.	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)

Elliott Client: Atheros

EMC Test Data

Client:	Atheros	Job Number:	J59313
Model:	D147011	T-Log Number:	T59339
	D14700	Account Manager:	Joe Rohlfes
Contact:	Michael Robinson		
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	Level	Pol	15.209) / 15E	Detector	Azimuth	Height	Comments
MHz	dBμV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
4874.667	37.7	Н	54.0	-16.3	AVG	195	1.0	2nd Harmonics of 2437 of 11g
4874.667	55.7	Н	74.0	-18.3	PK	195	1.0	3rd Harmonics of 2437 of 11g
7308.547	35.6	Н	54.0	-18.4	AVG	197	1.0	3rd Harmonics of 2437 of 11g
7308.547	46.9	Н	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.

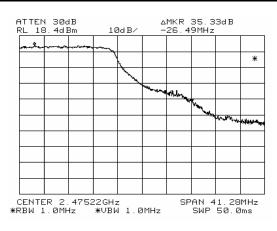
EMC Test Data

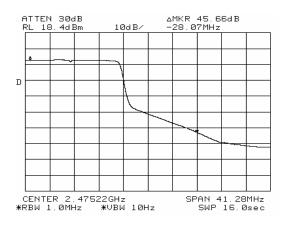
Client:	Atheros	Job Number:	J59313
Model:	D147011	T-Log Number:	T59339
	D14700	Account Manager:	Joe Rohlfes
Contact:	Michael Robinson		
Spec:	FCC 15E 15.247;LP002;RSS 210	Class:	N/A

Run #2c: Radiated Spurious Emissions. Highest Channel @ 2462 MHz 802.11g (6Mb/s)

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

i diladilicii	undamental digital, power level setting 10 (target power in Art)								
Frequency	Level	Pol	15.209	9 / 15E	Detector	Azimuth	Height	Comments	
MHz	dBμV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters		
2469.334	110.0	Н	-	-	PK	225	1.1	Ant A	
2467.367	109.9	Н	-	-	PK	154	1.1	Ant B	
2456.167	108.5	V	-	-	PK	255	1.0	Ant A	
2454.900	106.2	Н	-	-	PK	223	1.0	Ant A Note 4	
2456.792	106.0	V	-	-	PK	255	1.1	Ant B	
2469.334	101.5	Н	-	-	AVG	225	1.1	Ant A	
2467.367	101.0	Н	-	-	AVG	154	1.1	Ant B	
2456.167	99.7	V	-	-	AVG	255	1.0	Ant A	
2454.900	97.2	Н	-	-	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

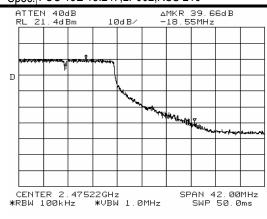
EMC Test Data

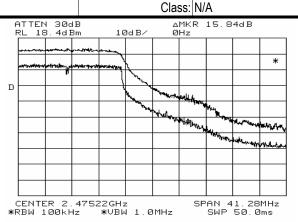
 Client:
 Atheros
 J59313

 Model:
 D1470U
 T-Log Number:
 T59339

 Account Manager:
 Joe Rohlfes

Spec: FCC 15E 15.247;LP002;RSS 210





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
Bandwidth delta marker at band edge	15.84 dB	100k to 1 MHz
Correction factor	55.50 dB	This factor used highest out of band @ band edge

Band Edge Signal Radiated Field Strength, 100kHz delta method

	- and - ago organic reasonate riors or origin, room - acts motion									
Fr	equency	Level	Pol	15.209	9 / 15E	Detector	Azimuth	Height	Comments	
	MHz	dBμV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters		
24	483.500	46.0	Н	54.0	-8.0	Avg	225	1.1	Ant A Note 2 (factor =-55.5dB)	
24	483.500	54.5	Н	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

				J · · · · ·			<u> </u>	
Frequency	Level	Pol	15.209	9 / 15E	Detector	Azimuth	Height	Comments
MHz	dBμV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2483.600	53.5	Н	54.0	-0.5	AVG	223	1.0	Ant A Note 4
2483.600	72.7	Н	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:	D147011	T-Log Number:	T59339
	D14700	Account Manager:	Joe Rohlfes
Contact:	Michael Robinson		
Spec:	FCC 15E 15.247;LP002;RSS 210	Class:	N/A

Run #3: Radiated Spurious Emissions

Date of Test: 4/6/2005 Config. Used: #1

Test Engineer: M. Briggs/M. Birgani Config Change: EUT: MAC:00904BD9C041

Test Location: SVOATS #1 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.

	The state of the s									
Frequency	Level	Pol	15.209	9 / 15E	Detector	Azimuth	Height	Comments		
MHz	dBμV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters			
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:	D147011	T-Log Number:	T59339
	D14700	Account Manager:	Joe Rohlfes
Contact:	Michael Robinson		
Spec:	FCC 15E 15.247;LP002;RSS 210	Class:	N/A

Run #4: Turbo Mode

Date of Test: 4/11/2005 Config. Used: #1

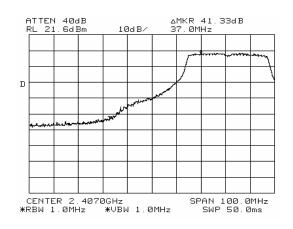
Test Engineer: M. Briggs Config Change: EUT: MAC:00904BD9C041

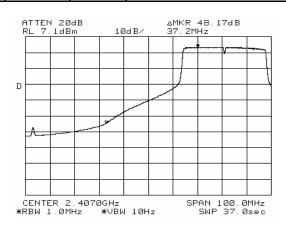
Test Location: SVOATS #3 Host Unit Voltage 120V/60Hz

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

Fundamental Signal

· arranin ordin								
Frequency	Level	Pol	15.209	9 / 15E	Detector	Azimuth	Height	Comments
MHz	dBμV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2434.008	109.4	Н	-	-	PK	200	1.0	Ant A
2434.100	107.1	V	-	-	PK	140	1.0	Ant A
2431.625	106.6	Н	-	-	PK	130	1.1	Ant B
2434.692	105.4	V	-	-	PK	240	1.2	Ant B
2434.008	101.0	Н	-	-	AVG	200	1.0	Ant A
2434.100	98.5	V	-	-	AVG	140	1.0	Ant A
2431.625	98.2	Η	-	-	AVG	130	1.1	Ant B
2434.692	97.3	V	-	-	AVG	240	1.2	Ant B



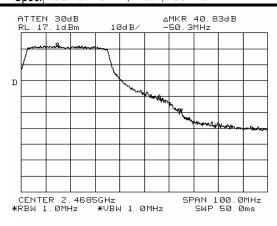


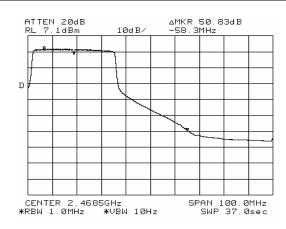
Method 1, band edge marker delta - 2390 MHz

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:	D147011	T-Log Number:	T59339
	D14700	Account Manager:	Joe Rohlfes
Contact:	Michael Robinson		
Spec:	FCC 15E 15.247;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

Balla Lage Signal Radiated Fleid Strength								
Frequency	Level	Pol	15.209	9 / 15E	Detector	Azimuth	Height	Comments
MHz	$dB\mu V/m$	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.