

**FCC CFR47 PART 15 SUBPART E
CERTIFICATION**



TEST REPORT

FOR

PROXIM INC

802.11a WIRELESS LAN CARDBUS CARD

MODEL NUMBER: 8455

BRAND NAME: HARMONY OR SKYLINE 802.11a

FCC ID: IMK-8455

REPORT NUMBER: 02U1295

ISSUE DATE: MAY 15, 2002

Prepared for

PROXIM INC

510 DEGUIGNE DRIVE

SUNNYVALE, CA 94085

USA

Prepared by

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1. TEST RESULT CERTIFICATION

COMPANY NAME: PROXIM INC.
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SUNNYVALE, CA 94085 USA

CONTACT PERSON: QUINN KUNZ

TELEPHONE NO: 801-292-2909 EXT 10

EUT DESCRIPTION: 802.11a WIRELESS LAN CARDBUS CARD

MODEL NUMBER: 8455

DATE TESTED: MAY 7, 2002 – MAY 15, 2002

TYPE OF EQUIPMENT	INTENTIONAL RADIATOR
EQUIPMENT TYPE	5.15 – 5.35 GHz AND 5.725 – 5.850 GHz TRANSCEIVER
MEASUREMENT PROCEDURE	ANSI 63.4 / 1992, TIA/EIA 603
PROCEDURE	CERTIFICATION
FCC RULE	CFR 47 PART 15.E

Compliance Certification Services, Inc. tested the above equipment for compliance with the requirements set forth in CFR 47, PART 15, Subpart E. The equipment in the configuration described in this report, shows the measured emission levels emanating from the equipment do not exceed the specified limit.

Note: This document reports conditions under which testing was conducted and results of tests performed. This document may not be altered or revised in any way unless done so by Compliance Certification Services and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by Compliance Certification Services will constitute fraud and shall nullify the document.

Approved & Released For CCS By:

Tested By:



MIKE HECKROTTE
CHIEF ENGINEER
COMPLIANCE CERTIFICATION SERVICES

THU CHAN
SENIOR EMC ENGINEER
COMPLIANCE CERTIFICATION SERVICES

2. EUT DESCRIPTION

The Proxim 8455 is a high performance 802.11a-only WLAN client product intended for laptop applications. It operates in the 5.15 – 5.35 GHz and 5.275 – 5.850 GHz bands with a maximum average Tx output power of 100mW. The product uses two symmetric integral antennas for diversity operation. Each has a 1.5dBi gain.

The 8455 design is based on an Atheros two chip, AR5001A, solution implementing the IEEE 802.11a stand. The two chips include:

AR5211: Multiprotocol MAC/baseband processor, and CardBus/PCI bus interface.

AR5111 Radio-on-a-Chip (RoC): An all-CMOS single-chip radio transceiver that includes a power amplifier, and integrated dual conversion filters to convert signals from 5 GHz to the baseband range for use by the AR5211. The AR5111 offers fully integrated transmitter, receiver, and frequency synthesizer functions; eliminating the need for external voltage controlled oscillators (VCOs) and surface acoustic wave (SAW) filters.

3. TEST METHODOLOGY

Both conducted and radiated testing were performed according to the procedures documented on chapter 13 of ANSI C63.4 and FCC CFR 47 2.1046, 2.1047, 2.1049, 2.1051, 2.1053, 2.1055, 2.1057, and 15.407.







4. TEST FACILITY

The open area test sites and conducted measurement facilities used to collect the radiated data are located at 561F Monterey Road, Morgan Hill, California, USA. The sites are constructed in conformance with the requirements of ANSI C63.7, ANSI C63.4 and CISPR Publication 22.

5. ACCREDITATION AND LISTING

The test facilities used to perform radiated and conducted emissions tests are accredited by National Voluntary Laboratory Accreditation Program for the specific scope of accreditation under Lab Code: 200065-0 to perform Electromagnetic Interference tests according to FCC PART 15 AND CISPR 22 requirements. No part of this report may be used to claim or imply product endorsement by NVLAP or any agency of the US Government. In addition, the test facilities are listed with Federal Communications Commission (reference no: 31040/SIT (1300B3) and 31040/SIT (1300F2))

5.1. Laboratory Accreditations and Listings

Country	Agency	Scope of Accreditation	Logo
USA	FCC	3/10 meter Open Area Test Sites to perform FCC Part 15/18 measurements	 1300
Japan	VCCI	CISPR 22 Two OATS and one conducted Site	 R-1014, R-619, C-640
Norway	NEMKO	EN50081-1, EN50081-2, EN50082-1, EN50082-2, IEC61000-6-1, IEC61000-6-2, EN50083-2, EN50091-2, EN50130-4, EN55011, EN55013, EN55014-1, EN55104, EN55015, EN61547, EN55022, EN55024, EN61000-3-2, EN61000-3-3, EN60945, EN61326-1	 ELA 117
Norway	NEMKO	EN60601-1-2 and IEC 60601-1-2, the Collateral Standards for Electro-Medical Products. MDD, 93/42/EEC, AIMD 90/385/EEC	 ELA-171
Taiwan	BSMI	CNS 13438	 SL2-IN-E-1012
Canada	Industry Canada	RSS210 Low Power Transmitter and Receiver	 IC2324 A,B,C, and F

6. MEASURING INSTRUMENT CALIBRATION

The measuring equipment, which was utilized in performing the tests documented herein, has been calibrated in accordance with the manufacturer's recommendations for utilizing calibration equipment, which is traceable to recognized national standards.

6.1. Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

Radiated Emission	
30MHz – 200 MHz	+/- 3.3dB
200MHz – 1000MHz	+4.5/-2.9dB
1000MHz – 2000MHz	+4.6/-2.2dB
Power Line Conducted Emission	
150kHz – 30MHz	+/-2.9

Any results falling within the above values are deemed to be marginal.

7. SUPPORT EQUIPMENT / TEST DIAGRAM

Support Equipment

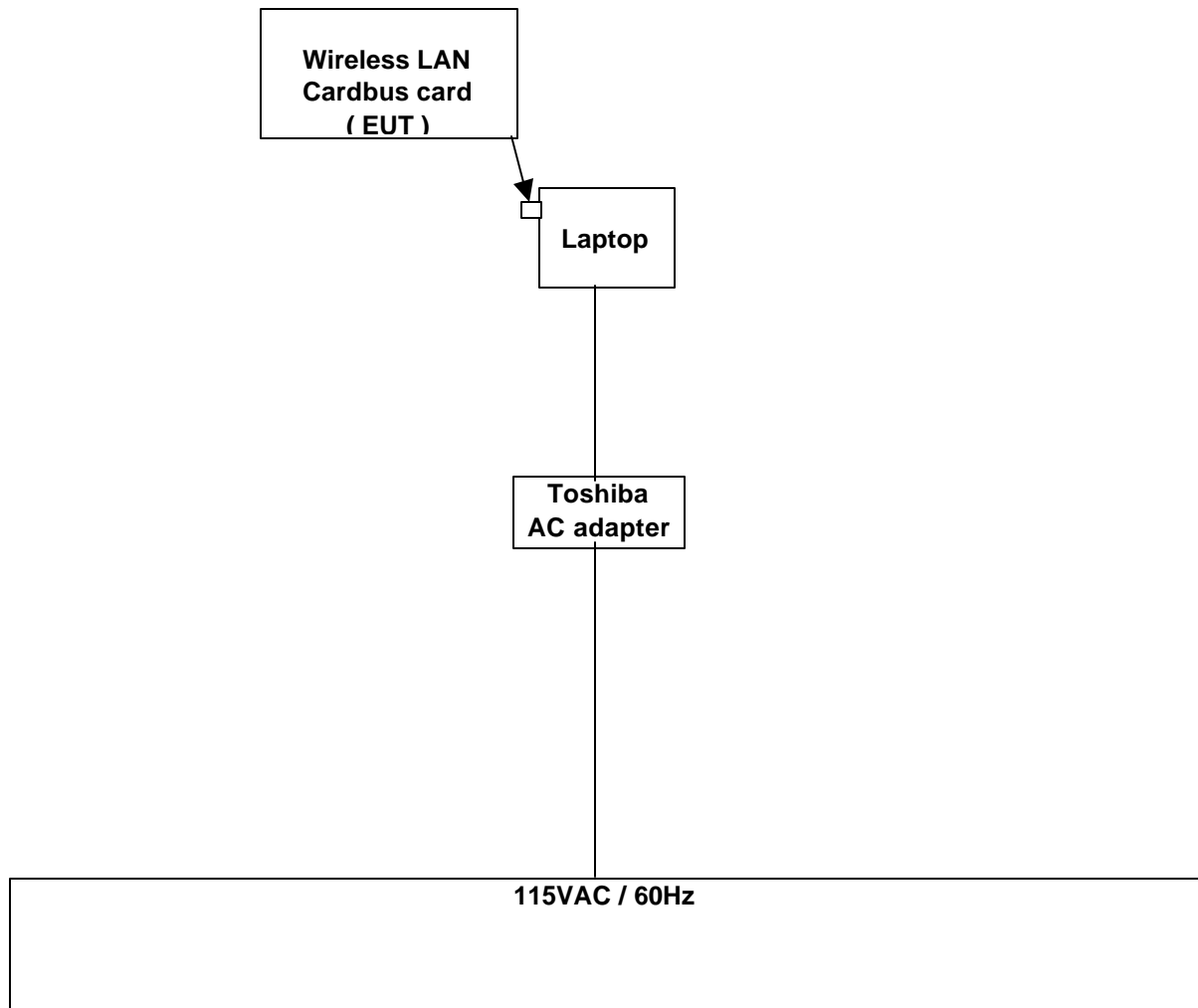
The EUT LAN card was inserted into a laptop computer only during the test.

TEST PERIPHERALS				
Device Type	Manufacturer	Model Number	Serial Number	FCC ID
AC Power Adapter Laptop	Toshiba	PA3048U-1ACA	NA	DoC
	Toshiba	Tecra 8200	NA	DoC

Test Equipment

TEST EQUIPMENTS LIST				
Name of Equipment	Manufacturer	Model No.	Serial No.	Due Date
Spectrum Analyzer	HP	8593E	3710A00205	6/20/02
Spectrum Analyzer	HP	E4404B	US40240772	3/25/03
Spectrum Analyzer	HP100Hz - 22GHz	8566B	3140A06685	6/28/02
Spectrum Display	HP	85662A	2152A03066	5/10/02
Quasi-Peak Detector	HP9K - 1GHz	85650A	3145A01654	6/28/02
Pre-Amplifier, 25 dB	HP 0.1 - 1300MHz	8447D (P_8)	2944A06589	8/10/02
Antenna, BiLog	Chase 30 - 2000MHz	CBL6112B	2586	3/30/03
Line Filter	Lindgren 10k - 10GHz	LMF-3489	497	N.C.R.
LISN	Fisher Cus. Comm.	LISN-50/250-25-2	2023	4/23/3
EMI Test Receiver	Rohde & Schwarz	ESHS 20	827129/006	4/17/03
Pre-amplifier, (1 - 26.5GHz)	Miteq	NSP2600-44	646456	4/26/03
Microwave Amplifier (2 - 8 GHz)	HP	11975A	2517A01067	8/23/02
Horn Antenna (1-18GHz)	EMCO	3115	6739	1/31/03
Horn Antenna,(18 - 26GHz)	Antenna Research Associate	MWH 1826/B	1013	7/26/02
Harmonic Mixer (26.5-40GHz)	HP	11970A	3003A04190	9/23/02
Horn Antenna(26.5 - 40GHz)	Dico	1149	2	9/22/02
High Pass Filter(7.6GHz)	FSY Microwave	7600-9SS	1	N.C.R.
6 dB Attenuator	Mini-Circuits	MCL BW-S6W2	0021	In House Cal
10 dB Attenuator	Mini-Circuits	MCL BW-S10W2	0026	In House Cal
20 dB Attenuator	Mini-Circuits	MCL BW-S20W2	0025	In House Cal

Test Diagram



I/O Cables

TEST I / O CABLES								
Cable No	I/O Port	# of I/O Port	Connector Type	Type of Cable	Cable Length	Data Traffic	Bundled	Remark
1	AC	1	US115	Un-shielded	2m	No	No	

8. APPLICABLE RULES AND BRIEF TEST RESULT

§15.403- EMISSION BANDWIDTH

(c) Emission bandwidth. For purposes of this subpart the emission bandwidth shall be determined by measuring the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, that are 26 dB down relative to the maximum level of the modulated carrier. Determination of the emissions bandwidth is based on the use of measurement instrumentation employing a peak detector function with an instrument resolutions bandwidth approximately equal to 1.0 percent of the emission bandwidth of the device under measurement.

Test result:

Operating in the 5.15 – 5.35 GHz Band (Normal Mode)		
<i>Channel</i>	<i>Frequency (MHz)</i>	<i>BW 26dBc (MHz)</i>
<i>Low</i>	<i>5180</i>	<i>27.50</i>
<i>Middle</i>	<i>5260</i>	<i>42.00</i>
<i>High</i>	<i>5320</i>	<i>27.13</i>
Operating in the 5.15 – 5.35 GHz Band (Turbo Mode)		
<i>Channel</i>	<i>Frequency (MHz)</i>	<i>BW 26dBc (MHz)</i>
<i>Low</i>	<i>5210</i>	<i>51.40</i>
<i>Middle</i>	<i>5250</i>	<i>51.00</i>
<i>High</i>	<i>5290</i>	<i>71.40</i>
Operating in the 5.725 – 5.850 GHz Band (Normal Mode)		
<i>Channel</i>	<i>Frequency (MHz)</i>	<i>BW 26dBc (MHz)</i>
<i>Low</i>	<i>5745</i>	<i>41.13</i>
<i>Middle</i>	<i>5785</i>	<i>40.00</i>
<i>High</i>	<i>5825</i>	<i>40.25</i>
Operating in the 5.725 – 5.850 GHz Band (Turbo Mode)		
<i>Channel</i>	<i>Frequency (MHz)</i>	<i>BW 26dBc (MHz)</i>
<i>Low</i>	<i>5760</i>	<i>76.30</i>
<i>Middle</i>	<i>N/A</i>	<i>N/A</i>
<i>High</i>	<i>5800</i>	<i>76.50</i>

§15.407(a)- POWER LIMIT

(1) For the band 5.15-5.25 GHz, the peak transmit power over the frequency band of operation shall not exceed the lesser of 50mW (17dBm) or $4\text{dBm} + 10\log B$, where B is the 26-dB emission bandwidth in MHz. In addition, the peak power spectral density shall not exceed 4dBm in any 1-MHz band. If transmitting antennas of directional gain greater than 6dBi are used, both the peak transmit power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

(2) For the band 5.25-5.35 GHz, the peak transmit power over the frequency band of operation shall not exceed the lesser of 250mW (24dBm) or $11\text{dBm} + 10\log B$, where B is the 26-dB emission bandwidth in MHz. In addition, the peak power spectral density shall not exceed 11dBm in any 1-MHz band. If transmitting antennas of directional gain greater than 6dBi are used, both the peak transmit power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

OLD RULE:

(3) For the band 5.725-5.825 GHz, the peak transmit power over the frequency band of operation shall not exceed the lesser of 1 W (30dBm) or $17\text{dBm} + 10\log B$, where B is the 26-dB emission bandwidth in MHz. In addition, the peak power spectral density shall not exceed 17dBm in any 1-MHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the peak transmit power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

ET Docket No. 99-231;

(26): Consistent with Wi-LAN's application for equipment certification, we will require that any devices granted prior to the adoption of new rules pursuant to the provisions comply with a maximum peak output power limit of 100mW (20dBm).

Appendix B, Proposed Rule Changes: (a)(2): System using direct sequence spread spectrum and digital modulation techniques may operate in the 5725 – 5850 MHz bands.

Note: In this report, results are compared to ET 99-231 limits.

Spec limit: As specified above

Operating in the 5.15 – 5.35 GHz Band (Normal Mode)		
<i>Channel</i>	<i>Frequency (MHz)</i>	<i>Power Limit</i>
<i>Low</i>	<i>5180</i>	<i>50mW (17dBm)</i>
<i>Middle</i>	<i>5260</i>	<i>250mW (24dBm)</i>
<i>High</i>	<i>5320</i>	<i>250mW (24dBm)</i>
Operating in the 5.15 – 5.35 GHz Band (Turbo Mode)		
<i>Channel</i>	<i>Frequency (MHz)</i>	<i>Power Limit</i>
<i>Low</i>	<i>5210</i>	<i>50mW (17dBm)</i>
<i>Middle</i>	<i>5250</i>	<i>50mW (17dBm)</i>
<i>High</i>	<i>5290</i>	<i>250mW (24dBm)</i>
Operating in the 5.725 – 5.850 GHz Band (Normal Mode)		
<i>Channel</i>	<i>Frequency (MHz)</i>	<i>Power Limit</i>
<i>Low</i>	<i>5745</i>	<i>100mW (20dBm)</i>
<i>Middle</i>	<i>5785</i>	<i>100mW (20dBm)</i>
<i>High</i>	<i>5825</i>	<i>100mW (20dBm)</i>
Operating in the 5.725 – 5.850 GHz Band (Turbo Mode)		
<i>Channel</i>	<i>Frequency (MHz)</i>	<i>Power Limit</i>
<i>Low</i>	<i>5760</i>	<i>100mW (20dBm)</i>
<i>Middle</i>	<i>N/A</i>	<i>N/A</i>
<i>High</i>	<i>5800</i>	<i>100mW (20dBm)</i>

Test result: No non-compliance noted.

Operating in the 5.15 – 5.35 GHz Band (Normal Mode)		
<i>Channel</i>	<i>Frequency (MHz)</i>	<i>Channel Power Measured (dBm)</i>
<i>Low</i>	<i>5180</i>	<i>16.41</i>
<i>Middle</i>	<i>5260</i>	<i>21.77</i>
<i>High</i>	<i>5320</i>	<i>17.58</i>
Operating in the 5.15 – 5.35 GHz Band (Turbo Mode)		
<i>Channel</i>	<i>Frequency (MHz)</i>	<i>Channel Power Measured (dBm)</i>
<i>Low</i>	<i>5210</i>	<i>16.61</i>
<i>Middle</i>	<i>5250</i>	<i>16.54</i>
<i>High</i>	<i>5290</i>	<i>19.13</i>
Operating in the 5.725 – 5.850 GHz Band (Normal Mode)		
<i>Channel</i>	<i>Frequency (MHz)</i>	<i>Channel Power Measured (dBm)</i>
<i>Low</i>	<i>5745</i>	<i>19.86</i>
<i>Middle</i>	<i>5785</i>	<i>19.73</i>
<i>High</i>	<i>5825</i>	<i>19.76</i>
Operating in the 5.725 – 5.850 GHz Band (Turbo Mode)		
<i>Channel</i>	<i>Frequency (MHz)</i>	<i>Channel Power Measured (dBm)</i>
<i>Low</i>	<i>5760</i>	<i>19.59</i>
<i>Middle</i>	<i>N/A</i>	<i>N/A</i>
<i>High</i>	<i>5800</i>	<i>19.50</i>

§15.407(a)- PEAK POWER SPECTRAL DENSITY

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

(2) For the band 5.25-5.35 GHz, the peak transmit power over the frequency band of operation shall not exceed the lesser of 250 mW or $11 \text{ dBm} + 10\log B$, where B is the 26-dB emission bandwidth in MHz. In addition, the peak power spectral density shall not exceed **11 dBm** in any 1-MHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the peak transmit power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

OLD RULE:

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

ET Docket No. 99-231, Appendix B; Proposed Rule Changes; System operating in the 5725 – 5850 MHz band:

(5)(d): For direct sequence spread spectrum and digitally modulated systems, the peak power spectrum density conducted from the intentional radiator to the antenna shall not be greater than 8dBm in any 3KHz band during any time interval of continuous transmission.

Note: In this report, results are compared to ET 99-231 limits.

Test result: No non-compliance noted.

Operating in the 5.15 – 5.35 GHz Band (Normal Mode)			
<i>Channel</i>	<i>Frequency (MHz)</i>	<i>Results (dBm)</i>	<i>Limit (dBm)</i>
<i>Low</i>	<i>5180</i>	<i>1.55</i>	<i>4</i>
<i>Middle</i>	<i>5260</i>	<i>5.07</i>	<i>11</i>
<i>High</i>	<i>5320</i>	<i>1.74</i>	<i>11</i>
Operating in the 5.15 – 5.35 GHz Band (Turbo Mode)			
<i>Channel</i>	<i>Frequency (MHz)</i>	<i>Results (dBm)</i>	<i>Limit (dBm)</i>
<i>Low</i>	<i>5210</i>	<i>-1.46</i>	<i>4</i>
<i>Middle</i>	<i>5250</i>	<i>-1.50</i>	<i>4</i>
<i>High</i>	<i>5290</i>	<i>-0.56</i>	<i>11</i>

Using RBW=VBW=3KHz, and set sweep time = span / 3KHz method.

Operating in the 5.725 – 5.850 GHz Band (Normal Mode)			
<i>Channel</i>	<i>Frequency (MHz)</i>	<i>Results (dBm)</i>	<i>Limit (dBm)</i>
<i>Low</i>	<i>5745</i>	<i>-6.79</i>	<i>8</i>
<i>Middle</i>	<i>5785</i>	<i>-6.65</i>	<i>8</i>
<i>High</i>	<i>5825</i>	<i>-6.83</i>	<i>8</i>
Operating in the 5.725 – 5.850 GHz Band (Turbo Mode)			
<i>Channel</i>	<i>Frequency (MHz)</i>	<i>Results (dBm)</i>	<i>Limit (dBm)</i>
<i>Low</i>	<i>5760</i>	<i>-10.15</i>	<i>8</i>
<i>Middle</i>	<i>N/A</i>	<i>N/A</i>	<i>8</i>
<i>High</i>	<i>5800</i>	<i>-9.09</i>	<i>8</i>

§15.407(a)- PEAK EXCURSION

(6) The ratio of the peak excursion of the modulation envelope (measured using a peak hold function) to the peak transmit power (measured as specified above) shall not exceed 13 dB across any 1 MHz bandwidth or the emission bandwidth whichever is less.

Spec limit: < = 13 dB

Test result: No non-compliance noted.

Operating in the 5.15 – 5.35 GHz Band (Normal Mode)		
<i>Channel</i>	<i>Frequency (MHz)</i>	<i>Results (dBm)</i>
<i>Low</i>	<i>5180</i>	<i>5.77</i>
<i>Middle</i>	<i>5260</i>	<i>5.17</i>
<i>High</i>	<i>5320</i>	<i>7.70</i>
Operating in the 5.15 – 5.35 GHz Band (Turbo Mode)		
<i>Channel</i>	<i>Frequency (MHz)</i>	<i>Results (dBm)</i>
<i>Low</i>	<i>5210</i>	<i>7.88</i>
<i>Middle</i>	<i>5250</i>	<i>6.30</i>
<i>High</i>	<i>5290</i>	<i>7.43</i>
Operating in the 5.725 – 5.850 GHz Band (Normal Mode)		
<i>Channel</i>	<i>Frequency (MHz)</i>	<i>Results (dBm)</i>
<i>Low</i>	<i>5745</i>	<i>5.74</i>
<i>Middle</i>	<i>5785</i>	<i>4.86</i>
<i>High</i>	<i>5825</i>	<i>5.34</i>
Operating in the 5.725 – 5.850 GHz Band (Turbo Mode)		
<i>Channel</i>	<i>Frequency (MHz)</i>	<i>Results (dBm)</i>
<i>Low</i>	<i>5760</i>	<i>5.22</i>
<i>Middle</i>	<i>N/A</i>	<i>N/A</i>
<i>High</i>	<i>5800</i>	<i>5.43</i>

§15.407(b)- UNDESIRABLE EMISSION – BAND EDGE

(1 & 2) For transmitters operating in the 5.15-5.35 GHz band: all emissions outside of the 5.15-5.35 GHz band shall not exceed an EIRP of -27dBm / MHz.

(6) The provisions of 15.205 apply to intention radiators operating under this section (-21dBm (for peak) and -41dBm (for average) EIRP in restricted band).

Note: The restricted band limits in (6) are more stringent than the band edge limits in (1&2), given a resolution bandwidth of 1MHz, therefore in this report, test results at 5.15 and 5.35 GHz are compared to the 15.205 / 15.209 restricted limits.

OLD RULE:

(3) For transmitters operating in the 5.725-5.825 GHz band: all emissions within frequency range from the band edge to 10 MHz above or below the band edge shall not exceed an EIRP of -17dBm / MHz; for frequencies 10 MHz or greater above or below the band edge, emissions shall not exceed an EIRP of -27dBm / MHz.

ET Docket No. 99-231, Appendix B; Proposed Rule Changes; System operating in the 5725 – 5850 MHz band:

(5) (c): In any 100KHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100KHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. Attenuation below the general limits specified in 15.209(a) is not required. In addition, radiated emissions which fall in restricted bands, as defined in 15.205(a), must also comply with the radiated emission limits specified in 15.209 (a).

Note: In this report, at 5.725 and 5.850GHz test results are compared to ET 99-231 limits.

Test result: No non-compliance noted.

Operating in the 5.15 – 5.35 GHz Band (Normal Mode)										
<i>Band Edge</i>	<i>Frequency (MHz)</i>	<i>Reading (dBm)</i>		<i>Ant Gain (dBi)</i>	<i>Results EIRP (dBm)</i>		<i>15.209 Limit (dBm)</i>		<i>Margin (dB)</i>	
		<i>Peak</i>	<i>Ave</i>		<i>Peak</i>	<i>Ave</i>	<i>Peak</i>	<i>Ave</i>	<i>Peak</i>	<i>Ave</i>
<i>Low</i>	<i>5150</i>	<i>-26.18</i>	<i>-45.78</i>	<i>1.5</i>	<i>-24.68</i>	<i>-44.28</i>	<i>-21</i>	<i>-41</i>	<i>-3.68</i>	<i>-3.28</i>
<i>High</i>	<i>5350</i>	<i>-29.63</i>	<i>-46.36</i>	<i>1.5</i>	<i>-28.13</i>	<i>-44.86</i>	<i>-21</i>	<i>-41</i>	<i>-7.13</i>	<i>-3.86</i>
<i>High</i>	<i>5351</i>	<i>N/A</i>	<i>-44.87</i>	<i>1.5</i>	<i>N/A</i>	<i>-43.37</i>	<i>N/A</i>	<i>-41</i>	<i>N/A</i>	<i>-2.37</i>
Operating in the 5.15 – 5.35 GHz Band (Turbo Mode)										
<i>Band Edge</i>	<i>Frequency (MHz)</i>	<i>Reading (dBm)</i>		<i>Ant Gain (dBi)</i>	<i>Results EIRP (dBm)</i>		<i>15.209 Limit (dBm)</i>		<i>Margin (dB)</i>	
		<i>Peak</i>	<i>Ave</i>		<i>Peak</i>	<i>Ave</i>	<i>Peak</i>	<i>Ave</i>	<i>Peak</i>	<i>Ave</i>
<i>Low</i>	<i>5150</i>	<i>-35.73</i>	<i>-47.51</i>	<i>1.5</i>	<i>-34.22</i>	<i>-46.01</i>	<i>-21</i>	<i>-41</i>	<i>-13.2</i>	<i>-5.01</i>
<i>Low</i>	<i>5087</i>	<i>N/A</i>	<i>-49.95</i>	<i>1.5</i>	<i>N/A</i>	<i>-48.45</i>	<i>N/A</i>	<i>-41</i>	<i>N/A</i>	<i>-7.45</i>
<i>High</i>	<i>5350</i>	<i>-30.73</i>	<i>-45.10</i>	<i>1.5</i>	<i>-29.23</i>	<i>-43.60</i>	<i>-21</i>	<i>-41</i>	<i>-8.23</i>	<i>-2.60</i>

ET 99-231 Limit = -20dBc

Operating in the 5.725 – 5.850 GHz Band (Normal Mode)										
<i>Band Edge</i>	<i>Frequency (MHz)</i>	<i>In-Band Power (dBm)</i>		<i>Out-Of-Band Power (dBm)</i>		<i>Delta (dBc)</i>		<i>Margin (dB)</i>		
		<i>Peak</i>	<i>Ave</i>	<i>Peak</i>	<i>Ave</i>	<i>Peak</i>	<i>Peak</i>	<i>Peak</i>	<i>Ave</i>	
<i>Low</i>	<i>5725</i>	<i>4.6</i>	<i>-3.3</i>	<i>-23.52</i>	<i>-32.67</i>	<i>-28.12</i>	<i>-29.37</i>	<i>-8.12</i>	<i>-9.37</i>	
<i>High</i>	<i>5850</i>	<i>5.4</i>	<i>-3.5</i>	<i>-29.90</i>	<i>-42.39</i>	<i>-35.30</i>	<i>-38.89</i>	<i>-15.3</i>	<i>-18.8</i>	
Operating in the 5.725 – 5.850 GHz Band (Turbo Mode)										
<i>Band Edge</i>	<i>Frequency (MHz)</i>	<i>In-Band Power (dBm)</i>		<i>Out-Of-Band Power (dBm)</i>		<i>Delta (dBc)</i>		<i>Margin (dB)</i>		
		<i>Peak</i>	<i>Ave</i>	<i>Peak</i>	<i>Ave</i>	<i>Peak</i>	<i>Ave</i>	<i>Peak</i>	<i>Ave</i>	
<i>Low</i>	<i>5725</i>	<i>6.3</i>	<i>-6.2</i>	<i>-20.25</i>	<i>-32.69</i>	<i>-26.55</i>	<i>-26.49</i>	<i>-6.55</i>	<i>-6.49</i>	
<i>High</i>	<i>5850</i>	<i>6.6</i>	<i>-6.2</i>	<i>-30.46</i>	<i>-43.32</i>	<i>-37.06</i>	<i>-37.02</i>	<i>-17.1</i>	<i>-17.0</i>	

§15.407(g)- FREQUENCY STABILITY

Manufacturers of U-NII devices are responsible for ensuring frequency stability such that an emission is maintained within the band of operation under all conditions of normal operation as specified in the users manual.

Spec limit: Frequency stability is +/- 20 ppm refer to the “Theory of Operations” for a detail analysis.

Test result: No non-compliance noted.

§15.205- RESTRICTED BANDS OF OPERATIONS

(a) Except as shown in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
¹ 0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108 - 121.94	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 - 156.52525	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.7 - 156.9	2655 - 2900	22.01 - 23.12
8.41425 - 8.41475	162.0125 - 167.17	3260 - 3267	23.6 - 24.0
12.29 - 12.293	167.72 - 173.2	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	240 - 285	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	322 - 335.4	3600 - 4400	(²)
13.36 - 13.41			

¹ Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz.

² Above 38.6

(b) Except as provided in paragraphs (d) and (e), the field strength of emissions appearing within these frequency bands shall not exceed the limits shown in Section 15.209. At frequencies equal to or less than 1000 MHz, compliance with the limits in Section 15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000 MHz, compliance with the emission limits in Section 15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in Section 15.35 apply to these measurements.

Spec limit: As specified above,.

Test result: No non-compliance noted.

§15.207- CONDUCTED LIMITS

(a) For an intentional radiator which is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 450 kHz to 30 MHz shall not exceed 250 microvolts. Compliance with this provision shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminals.

FCC PART 15.207

FREQUENCY RANGE	FIELD STRENGTH (Microvolts)	FIELD STRENGTH (dBuV)/QP
450kHz-30MHz	250	48

Spec limit: As specified above.

Test result: No non-compliance noted.

§15.209- RADIATED EMISSION LIMITS; GENERAL REQUIREMENTS

(a) Except as provided elsewhere in this Subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Frequency (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
30 - 88	100 **	3
88 - 216	150 **	3
216 - 960	200 **	3
Above 960	500	3

** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g., Sections 15.231 and 15.241.

(b) In the emission table above, the tighter limit applies at the band edges.

FCC PART 15.209

MEASURING DISTANCE OF 3 METER		
FREQUENCY RANGE (MHz)	FIELD STRENGTH (Microvolts/m)	FIELD STRENGTH (dBuV/m)
30-88	100	40
88-216	150	43.5
216-960	200	46
Above 960	500	54

Spec limit: As specified above.

Test result: No non-compliance noted.

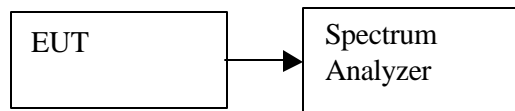
9. TEST SETUP, PROCEDURE AND RESULT

9.1. EMISSION BANDWIDTH

Detector Function Setting of Test Receiver

Frequency Range (MHz)	Detector Function	Resolution Bandwidth	Video Bandwidth
Above 1000	<input checked="" type="checkbox"/> Peak <input type="checkbox"/> Average	<input type="checkbox"/> 300 kHz <input checked="" type="checkbox"/> 1 MHz	<input type="checkbox"/> 300 kHz <input checked="" type="checkbox"/> 1 MHz

TEST SETUP



TEST PROCEDURE

The transmitter output is connected to the spectrum analyzer. The resolution bandwidth is set to approximately 1% of the emission bandwidth. The 26 dB bandwidth is defined as the total spectrum over which the power is higher than the peak power minus 26 dB.

RESULT

Operating in the 5.15 – 5.35 GHz Band (Normal Mode)		
<i>Channel</i>	<i>Frequency (MHz)</i>	<i>BW -26dBc (MHz)</i>
<i>Low</i>	<i>5180</i>	<i>27.50</i>
<i>Middle</i>	<i>5260</i>	<i>42.00</i>
<i>High</i>	<i>5320</i>	<i>27.13</i>
Operating in the 5.15 – 5.35 GHz Band (Turbo Mode)		
<i>Channel</i>	<i>Frequency (MHz)</i>	<i>BW -26dBc (MHz)</i>
<i>Low</i>	<i>5210</i>	<i>51.40</i>
<i>Middle</i>	<i>5250</i>	<i>51.00</i>
<i>High</i>	<i>5290</i>	<i>71.40</i>
Operating in the 5.725 – 5.850 GHz Band (Normal Mode)		
<i>Channel</i>	<i>Frequency (MHz)</i>	<i>BW -26dBc (MHz)</i>
<i>Low</i>	<i>5745</i>	<i>41.13</i>
<i>Middle</i>	<i>5785</i>	<i>40.00</i>
<i>High</i>	<i>5825</i>	<i>40.25</i>
Operating in the 5.725 – 5.850 GHz Band (Turbo Mode)		
<i>Channel</i>	<i>Frequency (MHz)</i>	<i>BW 26dBc (MHz)</i>
<i>Low</i>	<i>5760</i>	<i>76.30</i>
<i>Middle</i>	<i>N/A</i>	<i>N/A</i>
<i>High</i>	<i>5800</i>	<i>76.50</i>

