

UNIGEN CORP. WIRELESS MODULE PRODUCTS**PART NUMBER FAMILY:
UGWR2US SERIES****JUNO-LPA WIRELESSUSB™ RADIO MODULE****USER MANUAL****FCC ID: R8KUGWR2USXXXX**

Issue Date: 8 June 2004

Revision: 0.911

Revision History

Rev. No.	History	Issue Date	Remarks
0.9	Draft Release	4 June 2004	Pending FCC Grant #
0.91	2 nd Draft	8 June 2004	Inclusion of FCC Grant
0911	3 rd Draft	8 June 2004	Change of FCC Grant

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ELIGIBILITY REQUIREMENTS FOR REGULATORY MODULE APPROVAL

The Unigen UGWR2US WirelessUSB™ module (the "UGWR2US") marketed under the name JUNO-LPA, is a device that transmits and receives radio signals in accordance with the spectrum regulations for the 2.4-GHz unlicensed frequency range. Regional regulatory agency approval may be required to operate UGWR2US throughout the world.

For purposes of ease of integration, time to market, and product surety, Unigen submitted UGWR2US to relevant agencies and obtained regulatory approvals for specific countries. UGWR2US was approved under the "Modular Approval (MA) Grant". This certification represents a significant cost savings to the OEM.

The radio certification portion of this grant is transferable to Digital Electronic Device manufacturers given adherence to specific implementation criteria noted herein. Any modification of the UGWR2US will void the manufacturer's warranty. Any alteration or deviation from the documented installation and/or use of the UGWR2US will void the MA Grant as it applies to the end-product.

In the event the Digital Electronic Device manufacturer alters the herein described and approved installation of the UGWR2US, the end-product may require a complete battery of regulatory agency certification test Digital Electronic Device manufacturer may be required to submit to a complete battery of tests, depending on the requirements noted in the region they wish to sell their product.

The MA Grant provides that Digital Electronic Device manufacturers who incorporate UGWR2US **as tested and approved**, and in conjunction with the tested and approved antennae and device interconnection scheme can be relieved from having to perform the Radio Regulatory certification portion of the respective agency certification.

The MA Grant is valid only in countries that recognize the MA Grant certification process. Countries currently accepting the MA Grant include; the USA, Canada, and many European countries as noted in the General User Guide Requirements Section of this document. Terms and conditions of regulatory approval for these countries is also described herein. However, this "grandfathered" radio certification does **not** relieve the Digital Electronic Device manufacturers from submitting their device for digital emissions certifications.

Electronic device manufacturers may disregard the requirements of this section provided they accept full responsibility for regulatory type-approval of the electronic device with an integrated UGWR2US wireless module.

User Guide Information

Electronic device manufacturers using Unigen's Modular Approval are required to place the below text in their product user's guide in accompaniment with other regulatory information. The text may be disbursed according to language or geographic regions if desired, but the *exact text* shown below must be maintained.

United States of America Requirements

The following text must be copied exactly into the products user's guide:

"This device complies with part 15 of the FCC rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Caution: Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment."

General User Guide Requirements

The following text must be copied exactly into the product's user's guide:

"This product contains a radio transmitter with USB Wireless technology which has been tested and found to be compliant with the applicable regulations governing a radio transmitter in the 2.400 GHz to 2.4835 GHz frequency range."

The following countries associated regulatory agencies recognizing the noted certifications for this product as authorized for sale and use are:

USA	Canada	Belgium
Denmark	France	Finland
Germany	Italy	Netherlands
Spain	Sweden	UK

This list will be updated to reflect additional grants obtained or needed in future revisions.

Note: As of the date of publication, Japan does not recognize the "Modular Approval" certification. Regulatory certification for Japan (TELEC) must be acquired through typical approval procedures. These approvals are the sole responsibility of the OEM. Unigen may recommend, upon request, TELEC certified laboratories capable of facilitating the appropriate test procedures for the UGWR2US.

Topics Not Covered

Topics that not covered in this manual include:

- Standard type approval for any country
- Japan's (TELEC) regulatory approvals

UNITED STATES REGULATORY APPROVAL FCC MODULAR APPROVAL (MA)

The requirements for FCC Modular Approval were released in June 2000 in the FCC's Public Notice: FCC Public Notice DA 00-1407, Part 15 Unlicensed Modular Transmitter Approvals.

Design Criteria for Modular Approval

General Conditions

The following conditions must be strictly adhered to for modular approval:

- 1. No modification to the module including the circuitry is permitted**
- 2. The design criteria including antennas, interconnects and transmission line**
- 3. Testing of the final device configuration for Digital Emissions Compliance**

The UGWR2US may not be altered or modified in any way by the OEM or other integrator(s). Additionally, no component(s) may be added which change the radio frequency (RF) characteristics. These include unintentional or spurious emissions, immunity, ESD characteristics, or other items commonly associated with RF devices. This includes all components; passive and active (such as RF filters, RF amplifiers, RF switches, etc). Additionally, no RF components may be placed between the RF output of the UGWR2US and the antenna(e) except the RF interconnect transmission line.

Antennae

The antennae listed in the UGWR2US datasheet have been qualified and approved for use under the Modular Approval certification. These antennae are designed to be compatible with the RF transmission line impedance and frequency range of the UGWR2US. These antennae may not be modified or altered in any way from the original design as represented in the antenna datasheets as supplied by the manufacturer.

The antennas selected have been specifically tested with the UGWR2US, and they are certified through the regulatory agencies in the US, Canada, and European Union for authorized use. Use of antennas in a platform other than the antennas selected by Unigen voids the MA grant for that platform.

Antenna Interconnect & Impedance

Unigen has pre-qualified antennas that integrate the connectors, transmission line and the antenna. UGWR2US requires the use of a ½ dipole, 2.4~2.5GHz frequency range, with a

VSWR no greater than 2.0 and having a maximum output no greater than +2dBi The transmission line must be designed to be 50-Ohm impedance.

Physical Implementation

The physical implementation of the RF transmission line must conform to the following guidelines:

- **Coaxial Cable:** A coaxial of varying length may be used providing the impedance measures 50 +/- 2 ohms and is non-radiating. Best practice RF engineering suggests the cable should be kept to the minimum length required to satisfy the application. Excessive cable and interconnect loss may adversely effect the effective transmission and reception range of the end product.

Emissions Compliance Testing

Notwithstanding the Modular Approval for the Radio Device with associated interconnect and antennae, the end product configuration must meet digital emissions compliance and must be tested in accordance with FCC Part 15 requirements confirming radiated emissions are within specified limits.

Applicable sections include:

- Part 15 Section 15.109 Sub-paragraph A, Class B Radiated Emission Limits

These emissions tests can be conducted by the manufacturer or by contacting an approved test facility equipped and certified accordingly. The results of these emissions tests are not required to be submitted to the FCC or Unigen, but should be kept on file by the OEM.

Co-location of Additional Transmitters

Digital Electronic Devices manufacturers using this MA grant should refer to Appendix B (FCC Grant #) for end-products using two or more co-located RF transmitters. This grant states:

“This modular transmitter is approved for use in Digital Electronic Devices and may operate in conjunction with other mobile and portable transmitters in the same device; provided, the other mobile and portable transmitters have satisfied the appropriate RF exposure requirements contained in the FCC rules. The grantee must also provide Digital Electronic Device integrators, or end users if marketed directly to end users, with installation and operating instructions for satisfying RF exposure requirements. The Grantee must inform second manufacturers/installers that in order for this module to be operated in any configuration other than that permitted in the preceding sentences, a separate FCC equipment authorization must be obtained for each device into which this module is installed.”

This modular approval is granted provided Digital Electronic Devices manufacturers assume responsibility for ensuring that other transmitters operating in conjunction with the UGWR2US comply with RF exposure requirements associated with their use. The use of one or more

additional RF transmitters will require review by the FCC and may require end-product re-certification, including the UGWR2US to ensure emissions compliance and RF safety. It is the sole responsibility of the Digital Electronic Device manufacturer to obtain end-product regulatory compliance for configurations including two or more RF transmitters.

Product Labeling Requirements

FCC product labeling requirements stipulate an FCC label, including specific text, be placed on the device containing the UGWR2US module. The product label must include the following text and must be affixed to the exterior of the OEM's product. The text should be located beneath the FCC compliance logo.

"Module FCC ID: R8KUGWR2USXXXX"

INDUSTRY CANADIAN REGULATORY APPROVAL

Industry Canada regulatory approval typically conforms to the FCC in terms of emission levels and other regulatory requirements. It is the position of the Industry Canada agency that the OEM primarily responsibility for ensuring end product compliance. Unigen as grantee and supplier of the module maintains responsibility for the Modular Approved design.

Design Criteria for Modular Approval

General Conditions

The following conditions must be strictly adhered to for modular approval:

- 1. No modification to the module including the circuitry is permitted**
- 2. The design criteria including antennas, interconnects and transmission line**
- 3. Testing of the final device configuration for Digital Emissions Compliance**

The UGWR2US may not be altered or modified in any way by the OEM or other integrator(s). Additionally, no component(s) may be added which change the radio frequency (RF) characteristics. These include unintentional or spurious emissions, immunity, ESD characteristics, or other items commonly associated with RF devices. This includes all components; passive and active (such as RF filters, RF amplifiers, RF switches, etc). Additionally, no RF components may be placed between the RF output of the UGWR2US and the antenna(e) except the RF interconnect transmission line.

Antennae

The antennae listed in the UGWR2US datasheet have been qualified and approved for use under the Modular Approval certification. These antennae are designed to be compatible with the RF transmission line impedance and frequency range of the UGWR2US. These antennae may not be modified or altered in any way from the original design as represented in the antenna datasheets as supplied by the manufacturer.

The antennas selected have been specifically tested with the UGWR2US, and they are certified through the regulatory agencies in the US, Canada, and European Union for authorized use. Use of antennas in a platform other than the antennas selected by Unigen voids the MA grant for that platform.

Antenna Interconnect & Impedance

Unigen has pre-qualified antennas that integrate the connectors, transmission line and the antenna. UGWR2US requires the use of a ½ dipole, 2.4~2.5GHz frequency range, with a VSWR no greater than 2.0 and having a maximum output no greater than +2dBi The transmission line must be designed to be 50-Ohm impedance.

Physical Implementation

The physical implementation of the RF transmission line must conform to the following guidelines:

- **Coaxial Cable:** A coaxial of varying length may be used providing the impedance measures 50 +/- 2 ohms and is non-radiating. Best practice RF engineering suggests the cable should be kept to the minimum length required to satisfy the application. Excessive cable and interconnect loss may adversely effect the effective transmission and reception range of the end product.

Emissions Compliance Testing

Notwithstanding the Modular Approval for the Radio Device with associated interconnect and antennae, the end product configuration must meet digital emissions compliance and must be tested in accordance with Industry Canada RSS-210 (Low Power License-Exempt Radio communication Devices) requirements confirming radiated emissions are within specified limits.

Applicable sections include:

- Part 15 Section 15.109 Sub-paragraph A, Class B Radiated Emission Limits

These emissions tests can be conducted by the manufacturer or by contacting an approved test facility equipped and certified accordingly. The results of these emissions tests are not required to be submitted to the FCC or Unigen, but should be kept on file by the OEM.

Note:

Industry Canada generally follows the guidelines of the FCC for emissions level requirements. FCC end-product compliance certification results may be used to satisfy Industry Canada requirements. Please consult the Industry Canada, RSS 210 specifications to confirm inter-agency compliance. If comparable FCC testing has not been performed or if the specifications are not cross compliant, RSS 210 testing will be required.

Product Labeling Requirements

Industry Canada product labeling requirements stipulate specific text be placed on the device containing the UGWR2US module. The product must include the following text and must be located on the exterior of the OEM's product. This same information must be included in the product user manual.

***"This product contains Unigen WirelessUSB module
Canadian Cert No IC: 5125A-UGWR2US"***

EUROPEAN UNION REGULATORY APPROVAL

The requirements for EU Regulatory Approval were released in April 2000 in the EU R&TTE Directive.

This directive supports self directed testing and certification for “harmonized” bands within OEM facilities or by third party. In the case of WirelessUSB, standards have become harmonized (although frequencies are not). The R&TTE directive no longer requires a Technical Construction File however, frequency notification to EU countries is still applicable.

Article 6 of the R&TTE directive states: “The manufacturer or the person responsible for placing the apparatus on the market provides information for the user on the intended use of the apparatus, together with the declaration of conformity to the essential requirements.”

Ensuring regulatory compliance of the end product is the sole responsibility of the OEM. Unigen maintains responsibility for conformance of the UGWR2US, the interconnect, and the antennae, as the manufacturer.

The R&TTE directive maintains that first level compliance be reviewed by a “Notified Body” prior to general product marketing. This is not mandatory, but reduces the risk of the product being challenged for non-compliance. Although not specifically stated in the R&TTE Directive, corrections of non-compliance issues are the responsibility of the end product manufacturer.

Design Criteria for Modular Approval

General Conditions

The following conditions must be strictly adhered to for modular approval:

- 1. No modification to the module including the circuitry is permitted**
- 2. The design criteria including antennas, interconnects and transmission line**
- 3. Testing of the final device configuration for Digital Emissions Compliance**

The UGWR2US may not be altered or modified in any way by the OEM or other integrator(s). Additionally, no component(s) may be added which change the radio frequency (RF) characteristics. These include unintentional or spurious emissions, immunity, ESD characteristics, or other items commonly associated with RF devices. This includes all components; passive and active (such as RF filters, RF amplifiers, RF switches, etc). Additionally, no RF components may be placed between the RF output of the UGWR2US and the antenna(e) except the RF interconnect transmission line.

Antennae

The antennae listed in the UGWR2US datasheet have been qualified and approved for use under the Modular Approval certification. These antennae are designed to be compatible with the RF transmission line impedance and frequency range of the UGWR2US. These antennae

may not be modified or altered in any way from the original design as represented in the antenna datasheets as supplied by the manufacturer.

The antennas selected have been specifically tested with the UGWR2US, and they are certified through the regulatory agencies in the US, Canada, and European Union for authorized use. Use of antennas in a platform other than the antennas selected by Unigen voids the MA grant for that platform.

Antenna Interconnect & Impedance

Unigen has pre-qualified antennas that integrate the connectors, transmission line and the antenna. Unigen's UGWR2US requires the use of a 1/2 dipole, 2.4~2.5GHz frequency range, with a VSWR no greater than 2.0 and having a maximum output no greater than +2dBi. The transmission line must be designed to be 50-Ohm impedance. Physical Implementation

The physical implementation of the RF transmission line must conform to the following guidelines:

- **Coaxial Cable:** A coaxial of varying length may be used providing the impedance measures 50 +/- 2 ohms and is non-radiating. Best practice RF engineering suggests the cable should be kept to the minimum length required to satisfy the application. Excessive cable and interconnect loss may adversely effect the effective transmission and reception range of the end product.

Emissions Compliance Testing

The end-product configuration must meet digital emissions compliance and must be tested in accordance with the European Union standards ETSI 300 328 (European Telecommunications Standard for 2.4 GHz ISM band Emissions) and ETSI 300 826 (Electromagnetic Compatibility). Detailed European Union documents may be obtained from the web location:

<http://europa.eu.int/comm/enterprise/rtte/infor.htm>

These emissions tests can be conducted by the manufacturer or by contacting an approved test facility equipped and certified accordingly. The results of these emissions tests are not required to be submitted to the FCC or Unigen, but should be kept on file by the OEM.

Note:

The European Union generally follows the guidelines of the FCC for emissions level requirements. FCC end-product compliance certification results, if available, may be used to satisfy EU requirements (Substitution Method). Please consult the ETSI 300 328 specifications to confirm inter-agency compliance. If comparable FCC testing has not been performed or if the specifications are not cross compliant, ETSI 300 328 testing will be required. Additionally, testing to the ETSI 301 489-17 (immunity testing) is strongly recommended. Unigen assumes no responsibility for compliance of the end-product configuration.

Exterior Labeling Requirements

European Union product labeling requirements stipulate specific text be placed on the device containing the UGWR2US module. The product must include the following text and must be located on the exterior of the OEM's product. This same information may be included in the product user manual, however is not mandatory. Packaging and user documentation must indicate the use restrictions of the end-product (i.e. countries disallowing the operating frequencies of the UGWR2US).

CE 0122 !

Note:

The end-product must be labeled "CE" and an exclamation mark to the right of the CE mark should have; '!' with a circle around it. The exclamation mark designates a non-harmonized frequency band.

UNITED STATES AND INTERNATIONAL TYPE APPROVAL (STANDARD REGULATORY EQUIPMENT CERTIFICATION)

OEMs may need to obtain standard equipment regulatory agency certification as previously noted herein, and for end-product deployment in countries where Modular Approval is not recognized, or for implementations using non-certified antennae or interconnections.

The details of standard equipment regulatory compliance are beyond the scope of this document. OEMs needing standard equipment regulatory testing or who need council for determining regional requirement should contact approved certification and test service providers accordingly.

The following test houses have been identified by Unigen to assist in both US and International approval processes. This list is by no means complete or preferential:

1. Elliot Labs
2. Hyper Corp

Filing with certification facilities typically requires the submission of technical information (ie block diagrams, schematics, etc.) pertinent to the radio portions of the UGWR2US. Unigen will provide assistance in obtaining such documents when required by the OEM.

CONTACT INFORMATION

Outside of the United States of America:

To locate in-country Unigen distributors of the UGWR2US, please refer to the Unigen Website www.unigen.com. These distributor(s) represent local contacts for this product.

**CORPORATE HEADQUARTERS:
Unigen Corporation
45388 Warm Springs Boulevard
Fremont, CA 94539, USA**

Mark Morrissey: 1.510.688.2088 X2087
Fax: 1.510.661.2767
Email: mmorrissey@unigen.com
Web: www.unigen.com

APPENDIX A:

Agency Certifications:

Agency	Test Performed	Type	Limit	Result	Margin
EU	Radiated Spurious Emissions	30-12.75MHz Transmit Mode	EN 300 328	PASS	-4.6dB @ 4804MHz
		30-12.75MHz Transmit Mode	EN 300 328	PASS	-4.9 @ 177.01MHz
FCC 15.247	Radiated Emissions	30 25,000 Spurious Emissions	FCC Part 15.209/15.247 (c)	PASS	Results on File
		6dB Bandwidth	15.247(a)	PASS	960kHz
		99% Bandwidth	IC RSS-210	PASS	1.175MHz
		Output Power	15.247(b)	PASS	7.2dBm
		Power Spectral Density (PSD)	15.247(d)	PASS	3.06dBm
		Bandedge	FCC Part 15.209 /15.247(c)	PASS	Results on File
		Out of band	15.247(c)	PASS	Results on File
EU	Radio Performance Test	Output Power, Power spectral density at normal conditions	EN 300 328-1	PASS	Results on File
		Frequency Range at normal conditions	EN 300 328-1	PASS	Results on File
		Output Power over extreme conditions	EN 300 328-1	TBT	
		Frequency Range over extreme conditions	EN 300 328-1	TBT	
		Conducted spurious emissions, 30MHz - 12750MHz, transmit mode	EN 300 328-1	PASS	Results on File
		Conducted spurious emissions, 30MHz - 12750MHz, receive/stand-by mode	EN 300 328-1	PASS	Results on File
	Radiated Spurious Emissions	30 - 12,750 MHz -Spurious Emissions Transmit Mode	EN 300 328 V1.2.1	PASS	Results on File
		30 - 12,750 MHz -Spurious Emissions Receive Mode	EN 300 328 V1.2.1	PASS	Results on File

Table 5 – Regulatory Agency Certifications

Regulatory Compliance Statement:

The module has been tested against the relevant requirements of standards: EN 300 328, EN 301 489-17, FCC part 15 and Industry Canada RSS-210. The module is certified by the regulatory authorities in the USA and Canada and complies with the applicable essential requirements of the Radio & Telecommunication Terminal Equipment (R&TTE) directive in the EU. The module can thus be incorporated into products sold worldwide with little or no additional testing of the module itself. The end product must meet the appropriate technical requirements that apply to that product type but re-certification of the radio module is not required in the USA and Canada. In the EU, the integrator is responsible for evaluating their product type per the essential performance requirements of the R&TTE directive (except those associated with the module), declaring compliance and then notifying the member states prior to marketing the product (because the module uses a frequency band that is not harmonized in the EU). It is the responsibility of the module integrator to obtain the necessary approvals to sell products incorporating this module in other countries outside of North America and the EU. The report of measurements performed on the module in compliance with the FCC rules and EN standards can be used in these submittals (as the requirements in many other markets around the world are based in part or in whole on the standards prevalent in North America and the EU)

EUROPEAN UNION "DECLARATION OF CONFORMITY"

DECLARATION OF CONFORMITY

Unigen Corporation
45388 Warm Springs Blvd.
Fremont, CA 94538
USA

declare under our sole responsibility that the product(s)

WirelessUSB™ - UGWR2US

to which this declaration relate(s) is in conformance with the following standards:

EN 300-328 v1.3.1
EN 301 489-17
EN 55022 limits B

following the provisions of the 73/23/EEC and 89/336/EEC Directives.

Unigen Corporation, Fremont CA - Mark Morrissey, Director of Business Development 

MECHANICAL CHARACTERISTICS:

Item	Description	Specification
1	PCB Material	FR-4
2	PCB Layers	2
3	Connector Type	Straight thru-hole or header, mirrored through hole or header, bare. Please see Table 4 for pin assignments
4	PCB Number	1
5	Flammability Rating	UL94 V-0
6	UGWR2US Dimensions	1.29" x 1.30" x 0.54" (32.76 mm x 33.02mm x 13.72mm)
8	User Serviceable Parts	None

APPENDIX B:FCC Grant# - R8KUGWR2USXXXX

The modular transmitter is approved for use in Digital Electronic Devices and may operate in conjunction with other mobile and portable transmitters in the same device; provided, the other mobile and portable transmitters have satisfied the appropriate RF exposure requirements contained in the FCC rules. The grantee must also provide Digital Electronic Device integrators, or end users if marketed directly to end users, with installation and operating instructions for satisfying RF exposure requirements. The Grantee must inform second manufacturers/installers that in order for this module to be operated in any configuration other than that permitted in the preceding sentences; a separate FCC equipment authorization must be obtained for each device into which this module is installed.