Data Sheet

Unigen Corp. Wireless Module Products

PART NUMBER FAMILY: JUNO-W WIRELESSUSB™ RADIO MODULES

UGWW2US SERIES MEDIUM RANGE MODULES

Issue Date: June 14, 2005

Revision: 1.10

Revision History

Rev. No.	History	Issue Date	Remarks
1.0	Final Release	13 June 2005	Final Release
1.1	Update	15 June 2005	Updated schematics

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REFERENCE DOCUMENTATION:

The Unigen JUNO-W (UGWW2US) WirelessUSB™ module adaptation of the Cypress Semiconductor CYWM6935 LR 2.4GHz DSSS Radio SOC is represented in this document. The detail provided is information for using JUNO-W in a digital electronic device and is only a "companion" document to Cypress Semiconductors' CYWUSB6935 documentation for the above noted part.

The CYWUSB6935 LR 2.4GHz DSSS Radio SOC 50-meter information and technical details (ex. register settings, timing, application interfaces, clocking and power management, etc.) may be obtained from the Cypress Semiconductor web site or contacting Cypress's authorized sales representatives.

The following is a list of required documents and locations known at the time of publication that accompany this datasheet.

 The CYWUSB6935 LR 2.4GHz DSSS Radio SOC Datasheet – CYWUSB6935.pdf http://www.cypress.com/cfuploads/img/products/cywusb6934.pdf



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INTRODUCTION:

Unigen JUNO-W WirelessUSB[™] 50 meter range module represents the convergence of emerging wireless connectivity solutions and the USB "Plug-N-Play" ease of operation. WirelessUSB, as created by Cypress Semiconductor, is a low-cost, 2.4GHz communication protocol designed for use in commercial, industrial, consumer, and computer product applications requiring highly reliable data connectivity.

JUNO-W module combine Cypress Semiconductor's wireless and USB expertise with Unigen's module design, manufacturing, and testing proficiency to create production ready, pre-certified modules that are easily integrated into existing, and new product designs.

JUNO-W module offer immediate, drop-in design solutions and use the native Operating System HID drivers to seamlessly enumerate and operate mouse, keyboard, and gaming devices, or other devices using the HID specification for communication with the host systems.



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FEATURES:

- CYWM6935 LR 2.4GHz DSSS Radio SOC
- Operates in the 2.4 to 2.483GHz, unlicensed frequency range (ISM – Industrial, Scientific and Medical)
- -95dBm receive sensitivity
- Up to 0dBm output power
- Range of 50 meters or more
- Data Rate of 62.5kbits/sec
- SPI interface (up to 2MHz data rate)
- Operating Voltage Requirement 2.7 – 3.6Vdc
- Multiple connection interfaces available
- Small PCBA Design: UGWW2US

0.95" x 0.95" x 0.212" (23.75mm x 23.75mm x 5.3mm)(LxWxH)

- Complete Radio Module Dual PCB Trace Antennas
- Agency Pre-Certification FCC/EU/Industry Canada

Module certified to FCC/EU compliance specifications limiting your agency compliance time and cost.

- Agency Pre-Certification
 Tested to comply with Analog and Digital immunity standards from around the world
- FCC Module Approval Grant
 Allows customers to adopt
 R8KUGWW2USHN33A FCC ID into their own products

DESCRIPTION:

JUNO-W WirelessUSB™ Modules are tightly integrated, low-cost, high-reliability 2.4GHz TX/RX communications modules for use with Human Interface Device (HID) class compliant products.

The JUNO-W 50-meter modules use the Cypress Semiconductor CYWUSB6935 LR 2.4GHz DSSS Radio SOC device.

JUNO-W modules are a complete radio solution requiring only integration into an existing, or new device.

JUNO-W modules are 100% tested for functional operation and are pre-screened for FCC Part 15 compliance. The modules are supplied with an integrated antenna. For applications where the integrated antenna is unsuitable, models are available that support using an external coaxial antenna. Unigen offers 2dBi gain antennae for customers requiring an external antenna.

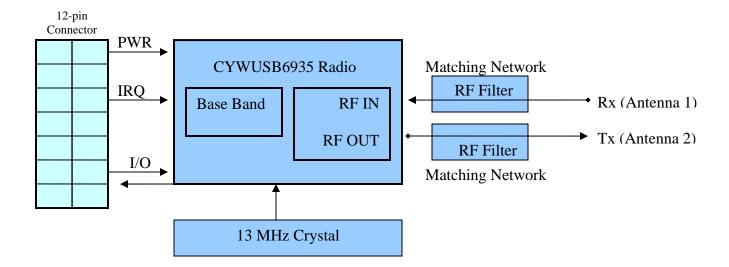
JUNO-W modules are intended for use in computer and consumer product/device applications and use the OS native HID class drivers to enable compliant devices. In most applications, no additional host drivers are required. The modules are suitable for use in embedded and/or industrial applications as well.

The JUNO-W is less than 1"sq and is available with a keyed shrouded header mounting directly to the matching receptacle on the PCB. The modules are available bare-board for application off board within the device.

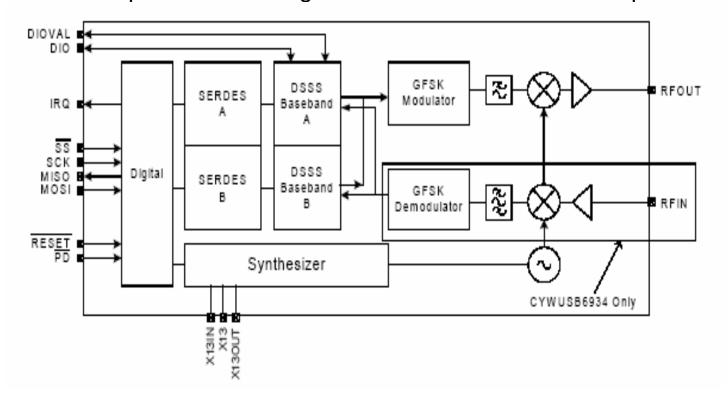
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FUNCTIONAL BLOCK DIAGRAMS:

Simplified Block Diagram JUNO-W



Simplified Block Diagram CYWUSB6935 Radio Chip



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ABSOLUTE MAXIMUM RATINGS:

Symbol	Definition	Min.	Max.	Unit
Vcc	Supply Voltage – Radio SOC	-0.3	3.9	V DC
Toc	Commercial Operating Temperature Range	-20	70	°C
Ts	Storage Temperature Range	-40	125	°C
VLI	VDC to Logic Inputs	-0.3	Vcc + 0.3	VDC
V O/Hi-Z	VDC to Outputs in Hi-Z state	-0.3	Vcc + 0.3	VDC
SDVD	Static Discharge Voltage Digital		>4000	VDC
SDVR	Static Discharge Voltage RF		>4000	VDC

These are stress ratings only. Exposure to stresses beyond these maximum ratings may cause permanent damage to, or affect the reliability of this module. Avoid using the module outside the recommended operating conditions defined below. This module is ESD sensitive and should be handled and/or used in accordance with proper ESD mitigation.

RECOMMENDED OPERATING CONDITIONS:

Cymphol	Description	Value				
Symbol	Description	Min.	Typ.*	Max.	Unit	
Vcc	Supply Voltage	2.7	3.0	3.6	VDC	
Toc	Commercial Operating Temperature Range	-20	25	70	°C	
GND	Ground Voltage		0		VDC	



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DC ELECTRICAL CHARACTERISTICS:

Cyroolool	Description	Condition(a)	Value				
Symbol	Description	Condition(s)	Min.	Typ.*	Max.	Unit	
Vcc	Supply Voltages		2.7	3.0	3.6	VDC	
VoH1	Voltage Output High 1	At Ioh = $-100.0 \mu A$	Vcc-0.1	Vcc		VDC	
VoH2	Voltage Output High 2	At Ioh = -2.0 mA	2.4	3.0		VDC	
Vol	Voltage Output Low	At $IOL = 2.0 \text{ mA}$		0.0	0.4	VDC	
VIH	Voltage Input High		2.0		Vcc	VDC	
VIL	Voltage Input Low		-0.3		0.8	VDC	
IIL	Input Leakage Current	0 < VIN < VCC	-1	0.30	+1	μΑ	
ISLEEP	Power-down current consumption	PD = Low		0.26	10	μΑ	
TX AVG Icc1	Mean transmitter current consumption ¹	no handshake		6.0		mA	
TX AVG Icc2	Mean transmitter current consumption ²	w/handshake		10.0		mA	
RX Icc (Peak)	Current consumption during receive			60.0		mA	
TX Icc (Peak)	Current consumption during transmit			71.4		mA	
MTBF		Calculated			>87,600	Hours	

Table 1 - Electrical Characteristics

^{*=} Measured with 3.0Vcc at 25°C

¹= Mean Icc when transmitting a 5-byte packet (3 data bytes + 2 bytes of protocol) every 10ms using the Wireless USB LS 1-way protocol.

²= Mean Icc when transmitting a 5-byte packet (3 data bytes + 2 bytes of protocol) every 10ms using the Wireless USB LS 2-way protocol.



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RADIO PARAMETERS:

Rafice perceiver (T = 25°C, VcC = 3.3V, fosc = 13.000MHz, X130UT off, 64 chips/bit, Threshold Low = 8, Threshold High = 56, BER ≤ 10³ Sensitivity	Parameter Description	Condition	Min.	Тур.	Max	Unit
Sensitivity	RF Frequency Range		2.400		2.483	GHz
Maximum Received Signal -20 -10 dBm RSSI Value for PWR _k >-40dBm 28-31 RSSI Value for PWR _k >-40dBm 0-10	Radio Receiver (T = 25°C, Vcc = 3.3V, fosc = 13.000MHz, X130	OUT off, 64 chips/bit, Threshold Low = 8 ,	Thresho	ld High =	56, BER	≤10 ⁻³
RSSI Value for PWR _m >-40dBm 28-31 RSSI Value for PWR _m <-95dBm 0-10 Interference Performance Co-channel Interference rejection Carrier-to-Interference (C/I) C = −60 dBm 11 dB Adjacent (1 MHz) channel selectivity C/I 1 MHz C = −60 dBm 3 dB Adjacent (2 MHz) channel selectivity C/I 2 MHz C = −60 dBm -30 dB Adjacent (2 MHz) channel selectivity C/I 2 MHz C = −60 dBm -30 dB Adjacent (2 MHz) channel selectivity C/I 3 MHz C = −67 dBm -40 dB Image(22) Frequency Interference, C/I Image C = −67 dBm -20 dB Adjacent (1 MHz) interference to in-band image frequency, C/I C = −67 dBm -25 dB Image ±1 MHz Out-of-band Blocking Interference Signal Frequency Out-of-band Blocking Interference Signal Frequency	Sensitivity			-95		dBm
RSSI Value for PWR _s <-95dBm	Maximum Received Signal		-20	-10		dBm
Interference Performance Co-channel Interference rejection Carrier-to-Interference (C/I) C = −60 dBm 11 dB	RSSI Value for PWR _{in} >-40dBm			28-31		
Co-channel Interference rejection Carrier-to-Interference (C/I) C = −60 dBm 11 dB Adjacent (1 MHz) channel selectivity C/I 1 MHz C = −60 dBm 3 dB Adjacent (2 MHz) channel selectivity C/I 2 MHz C = −60 dBm -30 dB Adjacent (> 3 MHz) channel selectivity C/I > 3 MHz C = −67 dBm -40 dB Image[22] Frequency Interference, C/I Image C = −67 dBm -20 dB Adjacent (1 MHz) interference to in-band image frequency, C/I C = −67 dBm -20 dB image ±1 MHz Dut-of-band Blocking Interference Signal Frequency Signal Frequency 0 dBm -20 dBm Out-of-band Blocking Interference Signal Frequency OMHz = 2399MHz except (FO/N & FO*N ± 1MHz) C = −67 dBm -30 dBm 2498MHz = 12.75GHz, except (FO*N & FO*N ± 1MHz) C = −67 dBm -30 dBm SBM SBM -30 dBm SBM -30 dBm SBM SBM -30 dBm SBM -30 dBm SBM -30 dBm SBM SBM -30 dBm SBM -30 dBm B	RSSI Value for PWR _{in} <-95dBm			0-10		
Adjacent (1 MHz) channel selectivity C/1 1 MHz C = −60 dBm 3 dB Adjacent (2 MHz) channel selectivity C/1 ≥ MHz C = −60 dBm -30 dB Adjacent (2 MHz) channel selectivity C/1 ≥ 3 MHz C = −67 dBm -40 dB Image [22] Frequency Interference, C/I Image C = −67 dBm -20 dB Adjacent (1 MHz) interference to in-band image frequency, C/I C = −67 dBm -25 dB Image ±1 MHz Ut-of-band Blocking Interference Signal Frequency 30MHz - 2399MHz except (FO/N & FO/N± 1MHz) C = −67 dBm -30 dBm Jouring Experience Signal Frequency 30MHz - 12.75GHz, except (FO*N & FO*N±1MHz) C = −67 dBm -30 dBm Intermodulation C = −67 dBm -30 dBm -20 dBm Spurious Emission 30MHz - 16Hz -39 dBm -20 dBm 30MHz - 16Hz B - 55, 10MHz -57 dBm -67 dBm -77 dBm 4.8GHz - 5.0GHz B - 75 dBm -80 -37 dBm -80 -87 dBm -87 dBm -80 <td>Interference Performance</td> <td></td> <td></td> <td></td> <td></td> <td></td>	Interference Performance					
Adjacent (2 MHz) channel selectivity C/I 2 MHz C = −60 dBm -30 dB Adjacent (> 3 MHz) channel selectivity C/I > 3 MHz C = −67 dBm -40 dB Image(22) Frequency Interference, C/I Image C = −67 dBm -20 dB Adjacent (1 MHz) interference to in-band image frequency, C/I C = −67 dBm -25 dB Out-of-band Blocking Interference Signal Frequency 30MHz - 2399MHz except (FO/N & FO/N± 1MHz) C = −67 dBm -30 dBm 2498MHz - 12.75GHz, except (FO*N & FO*N±1MHz) C = −67 dBm -20 dBm Intermodulation C = −67 dBm -20 dBm Spurious Emission -39 dBm 30MHz - 1GHz -57 dBm -39 dBm 1GHz - 12.75GHz (except 4.8GHz - 5.0GHz) -57 dBm -57 dBm -47 dBm 4.8GHz - 5.0GHz -37 dBm -47 dBm -47 dBm -47 dBm -48 dBm -48 dBm -47 dBm -47 dBm -47 dBm -48 dBm -48 dBm -47 dBm -47 dBm -47 dBm -48 dBm -	Co-channel Interference rejection Carrier-to-Interference (C/I)	C = -60 dBm		11		dB
Adjacent (> 3 MHz) channel selectivity C/I > 3 MHz C = −67 dBm -40 dB Image[22] Frequency Interference, C/I Image C = −67 dBm -20 dB Adjacent (1 MHz) interference to in-band image frequency, C/I image ±1 MHz C = −67 dBm -25 dB Out-of-band Blocking Interference Signal Frequency 30MHz - 2399MHz except (FO/N & FO/N± 1MHz) C = −67 dBm -30 dBm 2498MHz - 12.75GHz, except (FO/N & FO/N± 1MHz) C = −67 dBm -20 dBm 1ntermodulation C = −67 dBm -30 dBm Spurious Emission -30 dBm 30MHz - 1GHz -57 dBm 1GHz - 12.75GHz (except 4.8GHz - 5.0GHz) -57 dBm 4.8GHz - 5.0GHz -57 dBm 4.8GHz - 5.0GHz -37 dBm Radio Transmitter (T = 25°C, Vcc = 3.3V, fosc = 13.000MHz) -37 dBm Maximum RF Transmit Power PA = 7 0 dBm RF Power Control Range Seven steps, monotonic 4.3 dB Frequency Deviation PN Code Pattern 10101010 270 kHz Frequency Deviation PN Code Pattern 11110000 <	Adjacent (1 MHz) channel selectivity C/I 1 MHz	C = -60 dBm		3		dB
Image[22] Frequency Interference, C/I Image	Adjacent (2 MHz) channel selectivity C/I 2 MHz	C = -60 dBm		-30		dB
Adjacent (1 MHz) interference to in-band image frequency, C/I image ±1 MHz C = −67 dBm -25 dB Out-of-band Blocking Interference Signal Frequency 30MHz − 2399MHz except (FO/N & FO/N± 1MHz) C = −67 dBm -30 dBm 2498MHz − 12.75GHz, except (FO/N & FO/N± 1MHz) C = −67 dBm -20 dBm 1ntermodulation C = −67 dBm, Δf = 5, 10MHz -39 dBm Spurious Emission 30MHz − 1GHz -37 dBm 1GHz − 12.75GHz (except 4.8GHz − 5.0GHz) -47 dBm 4.8GHz − 5.0GHz -37 dBm Radio Transmitter (T = 25°C, Vcc = 3.3V, fosc = 13.000MHz) Naximum RF Transmit Power PA = 7 0 dBm RF Power Range Control Step Size Seven steps, monotonic 4.3 dB Frequency Deviation PN Code Pattern 10101010 270 kHz Zero Crossing Error 91 Code Pattern 11110000 320 kHz In-Band Spurious Second Channel Power (≥3 MHz) -30 dBm ≥ Third Channel Power (≥3 MHz) -30 dBm Non-Harmonically Related Spurs -57 dBm 30MHz − 12.75GHz -57 dBm Third Chan	Adjacent (> 3 MHz) channel selectivity C/I > 3 MHz	C = -67 dBm		-40		dB
Image ±1 MHz	Image[22] Frequency Interference, C/I Image	C = -67 dBm		-20		dB
Out-of-band Blocking Interference Signal Frequency 30MHz - 2399MHz except (FO/N & FO/N± 1MHz) C = -67 dBm -30 dBm 2498MHz - 12.75GHz, except (FO*N & FO*N±1MHz) C = -67 dBm -20 dBm Intermodulation C = -67 dBm -39 dBm Spurious Emission 30MHz - 1GHz -39 dBm 1GHz - 12.75GHz (except 4.8GHz - 5.0GHz) -47 dBm 4.8GHz - 5.0GHz -37 dBm Radio Transmitter (T = 25°C, Vcc = 3.3V, fosc = 13.000MHz) -37 dBm Raximum RF Transmit Power PA = 7 0 dBm RF Power Control Range 30 dB dB Frequency Deviation PN Code Pattern 10101010 270 kHz Frequency Deviation PN Code Pattern 11110000 320 kHz Zero Crossing Error 100-kHz resolution bandwidth, -6dBc 500 kHz Initial Frequency Offset 100-kHz resolution bandwidth, -6dBc 500 kHz In-Band Spurious -30 dBm Second Channel Power (±2 MHz) -57 dBm <tr< td=""><td>Adjacent (1 MHz) interference to in-band image frequency, C/I</td><td>C = -67 dBm</td><td></td><td>-25</td><td></td><td>dB</td></tr<>	Adjacent (1 MHz) interference to in-band image frequency, C/I	C = -67 dBm		-25		dB
30MHz - 2399MHz except (FO/N & FO/N± 1MHz) C = -67 dBm -30 dBm 2498MHz - 12.75GHz, except (FO*N & FO*N±1MHz) C = -67 dBm -20 dBm Intermodulation C = -67 dBm, Δf = 5, 10MHz -39 dBm Spurious Emission 30MHz - 1GHz -57 dBm 1GHz - 12.75GHz (except 4.8GHz - 5.0GHz) -47 dBm 4.8GHz - 5.0GHz -37 dBm Radio Transmitter (T = 25°C, Vcc = 3.3V, fosc = 13.000MHz) Maximum RF Transmit Power PA = 7 0 dBm RF Power Control Range 30 dBm Frequency Deviation PN Code Pattern 10101010 270 kHz Frequency Deviation PN Code Pattern 11110000 320 kHz Initial Frequency Offset 100-kHz resolution bandwidth, -6dBc 500 kHz In-Band Spurious -30 dBm Non-Harmonic Spurs -57 dBm Non-Harmonic -20 dBm Third Harmonic -20 dBm Third Harmonic -20 dBm Third Harmonic -30 dBm Third Harmonic -30 dBm Toda Bm -30 dBm Third Harmonic -20 dBm Third Harmonic -30 dBm	image ±1 MHz					
2498MHz − 12.75GHz, except (FO*N & FO*N±1MHz) C = −67 dBm -20 dBm Intermodulation C = −67 dBm, Δf = 5, 10MHz -39 dBm Spurious Emission 30MHz − 1GHz −57 dBm 1GHz − 12.75GHz (except 4.8GHz − 5.0GHz) −47 dBm 4.8GHz − 5.0GHz −37 dBm Radio Transmitter (T = 25°C, Vcc = 3.3V, fosc = 13.000MHz) Maximum RF Transmit Power PA = 7 0 dBm RF Power Control Range 30 dB						
Intermodulation	30MHz – 2399MHz except (FO/N & FO/N± 1MHz)	C = -67 dBm		-30		dBm
Spurious Emission 30MHz - 1GHz 5.75 dBm 1GHz - 12.75GHz (except 4.8GHz - 5.0GHz) -47 dBm 4.8GHz - 5.0GHz -47 dBm -37 dBm 4.8GHz - 5.0GHz -37 dBm	2498MHz – 12.75GHz, except (FO*N & FO*N±1MHz)			-20		dBm
30MHz - 1GHz	Intermodulation	$C = -67 \text{ dBm}, \Delta f = 5, 10 \text{MHz}$		-39		dBm
1GHz − 12.75GHz (except 4.8GHz − 5.0GHz) -47 dBm 4.8GHz − 5.0GHz -37 dBm Radio Transmitter (T = 25°C, Vcc = 3.3V, fosc = 13.000MHz) Maximum RF Transmit Power PA = 7 0 dBm RF Power Control Range 30 dB dB RF Power Range Control Step Size Seven steps, monotonic 4.3 dB Frequency Deviation PN Code Pattern 10101010 270 kHz Frequency Deviation PN Code Pattern 11110000 320 kHz Zero Crossing Error ±125 ns Occupied Bandwidth 100-kHz resolution bandwidth, -6dBc 500 kHz In-Band Spurious ±75 kHz Second Channel Power (±=2MHz) -30 dBm ≥ Third Channel Power (≥3 MHz) -40 dBm Non-Harmonically Related Spurs -57 dBm 30MHz - 12.75GHz -57 dBm Harmonic Spurs -20 dBm Second Harmonic -20 dBm Third Harmonic -30 dBm	Spurious Emission					
4.8GHz - 5.0GHz					-57	dBm
Radio Transmitter (T = 25°C, Vcc = 3.3V, fosc = 13.000MHz) Maximum RF Transmit Power PA = 7 0 dBm RF Power Control Range 30 dB RF Power Range Control Step Size Seven steps, monotonic 4.3 dB Frequency Deviation PN Code Pattern 10101010 270 kHz Frequency Deviation PN Code Pattern 11110000 320 kHz Zero Crossing Error ±125 ns Occupied Bandwidth 100-kHz resolution bandwidth, -6dBc 500 kHz In-Band Spurious ±75 kHz Second Channel Power (±=2MHz) ±75 kHz In-Band Spurious -30 dBm Non-Harmonically Related Spurs -30 dBm 30MHz − 12.75GHz -57 dBm Harmonic Spurs -50 dBm Second Harmonic -20 dBm Third Harmonic -30 dBm	1GHz – 12.75GHz (except 4.8GHz – 5.0GHz)				-47	dBm
Maximum RF Transmit Power PA = 7 0 dBm RF Power Control Range 30 dB RF Power Range Control Step Size Seven steps, monotonic 4.3 dB Frequency Deviation PN Code Pattern 10101010 270 kHz Frequency Deviation PN Code Pattern 11110000 320 kHz Zero Crossing Error ±125 ns Occupied Bandwidth 100-kHz resolution bandwidth, -6dBc 500 kHz Initial Frequency Offset ±75 kHz In-Band Spurious Second Channel Power (±=2MHz) -30 dBm ≥ Third Channel Power (≥3 MHz) -40 dBm Non-Harmonically Related Spurs -57 dBm 30MHz - 12.75GHz -57 dBm Harmonic Spurs Second Harmonic -20 dBm Third Harmonic -30 dBm					-37	dBm
RF Power Control Range 30 dB RF Power Range Control Step Size Seven steps, monotonic 4.3 dB Frequency Deviation PN Code Pattern 10101010 270 kHz Frequency Deviation PN Code Pattern 11110000 320 kHz Zero Crossing Error ±125 ns Occupied Bandwidth 100-kHz resolution bandwidth, -6dBc 500 kHz Initial Frequency Offset ±75 kHz In-Band Spurious second Channel Power (±=2MHz) -30 dBm ≥ Third Channel Power (≥3 MHz) -40 dBm Non-Harmonically Related Spurs -57 dBm Harmonic Spurs second Harmonic -20 dBm Third Harmonic -30 dBm						
RF Power Range Control Step Size Frequency Deviation PN Code Pattern 10101010 270 kHz Frequency Deviation PN Code Pattern 11110000 320 kHz Zero Crossing Error Occupied Bandwidth 100-kHz resolution bandwidth, -6dBc Initial Frequency Offset In-Band Spurious Second Channel Power (±=2MHz) ≥ Third Channel Power (≥3 MHz) Non-Harmonically Related Spurs 30MHz − 12.75GHz Harmonic Spurs Second Harmonic Second Harmonic Feven steps, monotonic 4.3 dB HHz HHz 10101010 270 kHz HHz 100-kHz resolution bandwidth, -6dBc 500 kHz ±75 kHz 100-kHz resolution bandwidth, -6dBc 100-kHz resolut	Maximum RF Transmit Power	PA = 7				dBm
Frequency Deviation PN Code Pattern 10101010 270 kHz Frequency Deviation PN Code Pattern 11110000 320 kHz Zero Crossing Error ±125 ns Occupied Bandwidth 100-kHz resolution bandwidth, -6dBc 500 kHz Initial Frequency Offset ±75 kHz In-Band Spurious Second Channel Power (±=2MHz) -30 dBm ≥ Third Channel Power (≥3 MHz) -40 dBm Non-Harmonically Related Spurs 30MHz - 12.75GHz -57 dBm Harmonic Spurs Second Harmonic -20 dBm Third Harmonic -30 dBm						dB
Frequency Deviation PN Code Pattern 11110000 320 kHz Zero Crossing Error ±125 ns Occupied Bandwidth 100-kHz resolution bandwidth, -6dBc 500 kHz Initial Frequency Offset ±75 kHz In-Band Spurious Second Channel Power (±=2MHz) -30 dBm ≥ Third Channel Power (≥3 MHz) -40 dBm Non-Harmonically Related Spurs 30MHz - 12.75GHz -57 dBm Harmonic Spurs Second Harmonic -20 dBm Third Harmonic -30 dBm		Seven steps, monotonic		4.3		dB
Zero Crossing Error ±125 ns Occupied Bandwidth 100-kHz resolution bandwidth, -6dBc 500 kHz Initial Frequency Offset ±75 kHz In-Band Spurious second Channel Power (±=2MHz) -30 dBm ≥ Third Channel Power (≥3 MHz) -40 dBm Non-Harmonically Related Spurs soMHz - 12.75GHz -57 dBm Harmonic Spurs second Harmonic -20 dBm Third Harmonic -30 dBm	Frequency Deviation	PN Code Pattern 10101010		270		kHz
Occupied Bandwidth 100-kHz resolution bandwidth, -6dBc 500 kHz Initial Frequency Offset ±75 kHz In-Band Spurious second Channel Power (±=2MHz) -30 dBm ≥ Third Channel Power (≥3 MHz) -40 dBm Non-Harmonically Related Spurs 30MHz - 12.75GHz -57 dBm Harmonic Spurs Second Harmonic -20 dBm Third Harmonic -30 dBm	Frequency Deviation	PN Code Pattern 11110000		320		kHz
Initial Frequency Offset ±75 kHz In-Band Spurious Second Channel Power (±=2MHz) -30 dBm ≥ Third Channel Power (≥3 MHz) -40 dBm Non-Harmonically Related Spurs 30MHz - 12.75GHz -57 dBm Harmonic Spurs Second Harmonic -20 dBm Third Harmonic -30 dBm				±125		ns
In-Band Spurious Second Channel Power (±=2MHz) -30 dBm ≥ Third Channel Power (≥3 MHz) -40 dBm Non-Harmonically Related Spurs 30MHz - 12.75GHz -57 dBm Harmonic Spurs Second Harmonic -20 dBm Third Harmonic -30 dBm		100-kHz resolution bandwidth, -6dBc	500			kHz
Second Channel Power (±=2MHz) -30 dBm ≥ Third Channel Power (≥3 MHz) -40 dBm Non-Harmonically Related Spurs -57 dBm 30MHz - 12.75GHz -57 dBm Harmonic Spurs -20 dBm Third Harmonic -30 dBm	Initial Frequency Offset			±75		kHz
≥ Third Channel Power (≥3 MHz) -40 dBm Non-Harmonically Related Spurs 30MHz - 12.75GHz 30MHz - 12.75GHz -57 dBm Harmonic Spurs -20 dBm Third Harmonic -30 dBm	In-Band Spurious					
Non-Harmonically Related Spurs 30MHz – 12.75GHz -57 dBm Harmonic Spurs -20 dBm Second Harmonic -30 dBm Third Harmonic -30 dBm					-30	dBm
30MHz – 12.75GHz -57 dBm Harmonic Spurs Second Harmonic -20 dBm Third Harmonic -30 dBm	≥ Third Channel Power (≥3 MHz)				-40	dBm
Harmonic Spurs Second Harmonic -20 dBm Third Harmonic -30 dBm						
Second Harmonic -20 dBm Third Harmonic -30 dBm					-57	dBm
Third Harmonic -30 dBm						
Fourth and Greater Harmonics -47 dBm						
	Fourth and Greater Harmonics				-47	dBm

Table 3 - Radio Characteristics

Solutions for a Real Time World

WirelessUSB™ - UGWW2US

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PIN ASSIGNMENTS:

Function	UGWM1US Pin #	1/0	Description
GND	1	-	Module Ground
Vcc	2	-	Module Input Power
IRQ	3	0	Interrupt Signal from Radio to the MCU
RSTn	4	I	Active low reset signal from MCU to Radio Module
MOSI	5	I	Master Out, slave in SPI signal from MCU to Radio Module
SSn	6	I	Active low slave select signal from MCU to Radio Module
SCK	7	I	SPI Clock from MCU to Radio Module
MISO	8	0	Master in, slave out SPI signal from Radio Module to MCU
GND	9	-	Module Ground
PDn	10	I	Active low power down signal from MCU to Radio Module
N/C	11	-	No Connect – leave open
N/C	12	-	No Connect – leave open

Table 4 - Pin Assignments

UGWW2US HEADER PIN-OUT:

	12-	pin 2	mm i	Header
GND		1	2	Vcc
IRQ		3	4	RSTn
MOSI		5	6	SSn
SCK		7	8	MISO
GND		9	10	PDn
N/C		11	12	N/C



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PIN FUNCTIONS:

MOSI: SPI Input from MCU

Receives commands/data from the device microcontroller.

MISO: SPI Output to MCU

Transmits requests/data to the device microcontroller.

SSn: SPI Slave Select Enable Input

SPI enable

IRQ: Interrupt Request

The Interrupt Request Pin Select bits are used to determine the drive

method of the IRQ pin

GND: Module Ground

RSTn: Module Reset

Active LOW reset switch

SCK: SPI Input Clock

PDn: Power Down

Driving signal LOW will put the module in SUSPEND MODE (X13OUT =

0 when PDn is LOW)

Vcc: Module Input Power

Vcc range 2.7 to 3.6Vdc

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AGENCY CERTIFICATIONS (PRE-SCAN):

Agency	Test Performed	Туре	Limit	Result	Margin
EU	Radiated Spurious	30-12.75MHz Transmit Mode	EN 300 328	PASS	-4.6dB @ 4804MHz
Emissions		30-12.75MHz Transmit Mode	EN 300 328	PASS	-4.9 @ 177.01MHz
		30 25,000 Spurious Emissions	FCC Part	PASS	Results on File
			15.209/15.247 (c)		
		6dB Bandwidth	15.247(a)	PASS	960kHz
FCC		99% Bandwidth	IC RSS-210	PASS	1.175MHz
15.247	Radiated Emissions	Output Power	15.247(b)	PASS	7.2dBm
13.247		Power Spectral Density (PSD)	15.247(d)	PASS	3.06dBm
		Bandedge	FCC Part 15.209	PASS	Results on File
			/15.247(c)		
		Out of band	15.247(c)	PASS	Results on File
		Output Power, Power spectral density	EN 300 328-1	PASS	Results on File
		at normal conditions			
		Frequency Range at normal	EN 300 328-1	PASS	Results on File
		conditions			
		Output Power over extreme	EN 300 328-1	TBT	
	Radio Performance Test	conditions			
		Frequency Range over extreme	EN 300 328-1	TBT	
EU		conditions			
		Conducted spurious emissions, 30MHz	EN 300 328-1	PASS	Results on File
		- 12750MHz, transmit mode	EN 200 220 1	2466	
		Conducted spurious emissions, 30MHz	EN 300 328-1	PASS	Results on File
ļ		- 12750MHz, receive/stand-by mode	EN 200 220 1/1 2 1	DAGG	D 11 E11
	Dadiated Carriers	30 - 12,750 MHz -Spurious Emissions	EN 300 328 V1.2.1	PASS	Results on File
	Radiated Spurious Emissions	Transmit Mode	EN 200 220 1/1 2 1	DACC	Dogulto on File
	EIIIISSIOLIS	30 - 12,750 MHz -Spurious Emissions	EN 300 328 V1.2.1	PASS	Results on File
]	Receive Mode			<u> </u>

Table 5 - Regulatory Agency Certifications

Regulatory Compliance Statement:

The module has been pre-scanned 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).



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MECHANICAL CHARACTERISTICS:

Item	Description	Specification
1	PCB Material	FR-4
2	PCB Layers	2
3	Connector Type	Straight thru-hole or header; Please see Table 4 for pin assignments
4	PCB Number	1
5	Flammability Rating	UL94 V-0
6	UGWW2US Dimensions	0.950" x 0950" x 0.375" (23.75mm x 23.75mm x 5.3mm) ±.01%
8	Antenna	Antenna Diversity Double Wiggle Trace
9	User Serviceable Parts	None

Table 6 - Mechanical Description

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MECHANICAL DRAWINGS & PHYSICAL DIMENSIONS:

Figure 1 - JUNO-W Dimensions (Top View)

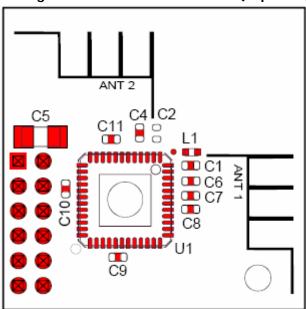
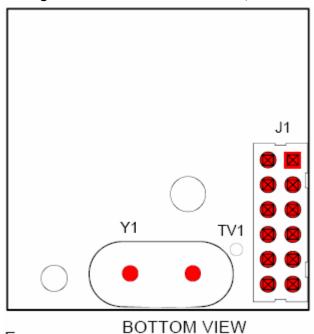


Figure 2 – JUNO-W Dimensions (Bottom View)





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ORDERING INFORMATION:*

Typical Applications

UNIGEN PRODUCT GROUP – WIRELESS -	FORM FACTOR	WIRELESSUSB TECH	CONNECTION	CONNECTOR TYPE	VOLTAGE	ANTENNA
ugw	w	2US (50M)	HN	MIRRORED 2X6 HEADER	33 =3.3VDC	A=INTEG. CHIP

^{*}Module based on the Cypress Semiconductor CYWUSB6935 WirelessUSB™ LR 2.4GHz DSSS Radio SoC device.

Contact your Unigen Sales Representative for additional information or visit the Nexus™ Wireless Products section of our web site (www.unigen.com).



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