

A World of Opportunities Made Possible in a Form-Factor the Size of a Dime

WiFi Bluetooth 4.0 RoHS Compliant

Audio / Video / Data
Low Cost
Small Form Factor

# WLS Series

Now Featuring Bluetooth Low Energy (BLE)

The WLS Series is ideal for OEMs wanting to quickly add Wi-Fi and / or Bluetooth standards-based connectivity within a broad range of products in audio, video, or data applications for the world-wide market.

Like all RFM's integrated short-range range products, the WLS Series of Wi-Fi and Wi-Fi + Bluetooth combination modules are optimized for RF performance and feature a high-level of integration all in a small form factor. The benefits to designers are low-cost, efficient design cycles, and fast time-to-market.

## KEY FEATURES & BENEFITS

Complies with IEEE 802.11a\*\*/b/g/n and Bluetooth BLE v4.0 + EDR Power Class 1.5\* to quickly add standards-based connectivity while making Wi-Fi and Bluetooth certification simple

802.11a\*\* compliant making WLS1273L modules ideal for healthcare applications

BLE opens up broader range of low-power applications that require longer battery life

Features high level of integration to fit into small spaces - including embedded ARM microprocessor

Supports SDIO host interfaces for WLAN

Linux and Android drivers for OMAP35xx processors, or driver source code is available that can be modified for other ARM Cortex A-series process to ease application development processes

Reference designs for SDIO and host interface available with eval kits to speed up development cycles

\*BLE available in WLS1271L and WLS1273L only

\*\*802.11a available in WLS1273L only

## Best-in-Class Wi-Fi and Wi-Fi + Bluetooth Combination Modules

Linux, Android and WinCE Drivers Available for Selected TI and Freescale Processors

The WLS-Series of products include Wi-Fi and Bluetooth technology in a single SoC and a high-efficiency RF front-end circuit plus a DC-DC converter. The modules are designed to fit into small spaces and are slightly smaller than a US dime. Minimal external circuitry is required to complete a radio design; add an antenna, power source, processor, and associated interface hardware and the radio hardware design is complete.

## Standards-Based Connectivity

Immediate access to information and ease of connectivity are the key drivers for Wi-Fi and Bluetooth becoming the communications protocol standards world-wide.

As a result, the RFM WLS-Series short-range radio modules are ideal for original equipment manufacturers (OEMs) wanting to quickly add Wi-Fi and / or Bluetooth connectivity within a broad range of products for the world-wide marketplace.

- |                       |   |                              |   |                    |
|-----------------------|---|------------------------------|---|--------------------|
| Medical / Healthcare  | • | Military / Homeland Security | • | Industrial Control |
| Asset Tracking / RFID | • | Smart Energy – AMI / AMR     | • | Handheld Devices   |
| Consumer Products     | • | Set-top Boxes                | • | Gaming Devices     |



See RFM's WLS-Series  
Application Notes  
available online at  
[www.RFM.com](http://www.RFM.com)

## WHY CHOOSE RFM WLS-SERIES?

Small size and low cost

High level of integration supports efficient  
design cycles for faster time-to-market

Best-in-Class Ti SoC provides reliability  
and customer assurance

Minimal external circuitry required to complete  
a radio design / minimize BOM costs

RFM design support provided at lower  
volumes (10K-200K units) vs. other  
vendors, getting customers through  
certifications and to market faster

Available only from RFM... specially designed TCXOs  
to provide years of frequency stability for medical  
/ healthcare and high speed data applications

## Reference Designs Available

Reference designs for the WLS-Series  
modules are made available to customers  
who purchase WLS-Series evaluation kits

## WI-FI AND WI-FI + BLUETOOTH w/BLE COMBINATION RADIO MODULES



RFM WLS-Series Modules provide a solution that is design-optimized for high RF performance and to be size-efficient. These products are manufactured in an automated, high volume environment to provide a high-quality, low-cost solution.

The WLS-Series modules represent best-in-class WLAN and Bluetooth coexistence technology on a single-chip and include high-efficiency RF front-end circuits plus a DC-DC converter. The module is designed to fit into small spaces, with minimal external circuitry required to complete a radio design. These attributes result in a solution that is cost-effective and reduces the product design cycle.

Wi-Fi and Bluetooth Compliant. To ease Wi-Fi and Bluetooth certifications, all three modules comply with IEEE 802.11b/g/n and WLS1273L complies with 11a/b/g/n, while the WLS1271L and WLS1273L modules comply with Bluetooth v 4.0 plus EDR, Power Class 1.5 + BLE.

FCC / ETSI Certifiable. Like all RFM Short-Range Radio products, the WLS-Series Modules are FCC and / or ETSI certifiable.

Standard Order Increments. WLS-Series products are shipped in tape and reel with standard order increment of 1,000 on 13" reels.

WLS-Series Wi-Fi / Bluetooth Combo Short-Range Radio Module					
RFM Part	Frequency	IEEE 802.11	Bluetooth	Description	Case
<b>WLS1270</b>	2.412-2.485 GHz	b/g/n compliant	n/a	802.11b/g/n Radio Module	9.2 mm x 8.4 mm x 1.35 mm
<b>WLS1271L</b>	2.412-2.485 GHz	b/g/n compliant	4.0+EDR, Power Class 1.5+BLE	802.11b/g/n + Bluetooth Combo Radio Module	9.2 mm x 8.4 mm x 1.35 mm
<b>WLS1273L</b>	2.412 to 2.485 GHz 4.920 to 5.824 GHz	a/b/g/n compliant	4.0+EDR, Power Class 1.5+BLE	802.11a/b/g/n + Bluetooth Combo Radio Module	11.4 mm x 9.4 mm x 1.4 mm

IEEE 802.11 SPECIFICATION HIGHLIGHTS			
IEEE 802.11	WLS1270	WLS1271L	WLS1273L
	b/g/n compliant	b/g/n compliant	a/b/g/n compliant
Operating Frequency Range	2.412 to 2.485 GHz		2.412 to 2.485 GHz 4.920 to 5.824 GHz
Power Output	Up to 16 dBm		Up to 18 dBm
Supply Current (11/g)	Transmit 180 mA / Receive 100 mA		
Size	9.2 mm x 8.4 mm x 1.35 mm		11.4 mm x 9.4 mm x 1.4 mm
Microprocessor	Embedded ARM Microprocessor		
Operating Temp. Range	-40 °C to +85 °C		
Other	Supports SDIO host interface for WLAN		

BLUETOOTH SPECIFICATION HIGHLIGHTS		
Bluetooth	WLS1271L	WLS1273L
	4.0 plus EDR, Power Class 1.5 +BLE	
Operating Frequency Range	2.4000 to 2.4835 GHz	
Power Output	Up to 8 dBm	
Supply Current	35 mA	
Data Rate	Up to 3 Mb/s	



## WLS SERIES EVALUATION KITS & DESIGN SUPPORT

### Fast-Track Your Designs with Evaluation Kits

RFM Part	Use eval kit to test:	DR-WLS1270-EV / DR-WLS1271L-EV	Evaluation Kit Contains:
<b>DR-WLS1270-EV</b>	<ul style="list-style-type: none"> <li>• Wi-Fi RF performance</li> <li>• Bluetooth RF performance</li> </ul>		<ul style="list-style-type: none"> <li>• (1) Evaluation Board</li> <li>• CD with GUI</li> <li>• USB Cable</li> <li>• (1) Antenna in the WLS1270/71L Kits</li> </ul>
<b>DR-WLS1271L-EV</b>	<ul style="list-style-type: none"> <li>• SDIO interface</li> <li>• Hi Speed USB interface</li> </ul>		<ul style="list-style-type: none"> <li>• (2) Antennas in the WLS1273L Kit</li> </ul>
<b>DR-WLS1273L-EV</b>	<ul style="list-style-type: none"> <li>• Host Interface</li> <li>• and more...</li> </ul>		

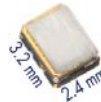
**BUY YOUR  
EVAL KIT NOW**

### Small Quantities Available for Purchase

RFM Part	Small quantities are available for design support. The "-S" P/Ns have been established to support small quantity procurement of WLS product for design activities. A high performance TCXO may be ordered for the WLS1271L-S and the WLS1273L-S (see table below). Contact your local RFM authorized sales representative or distributor for more information.
<b>WLS1270-S</b>	
<b>WLS1271L-S</b>	
<b>WLS1273L-S</b>	

### High Performance TCXO for Healthcare and High Speed Data Applications

RFM Part	Freq	Tol / Spec	Case (mm)	Packaging
<b>XTC7006-2</b>	26 MHz	3.0V, $\pm 0.5$ ppm, -30 °C to +80 °C	3.2 mm x 2.5 mm	Surface Mount Packages shipped in tape and reel either in: 7" in QTY of 1,000 or 13" in QTY of 3,000
<b>XTC7012</b>	38.4 MHz	1.8V, $\pm 5.0$ ppm, -40 °C to +85 °C		



The RFM XTC7006-2 and XTC7012 TCXOs are designed specifically for the WLS-Series modules, particularly for the WLS1273L module as it is 802.11a and 11n compliant. These TCXOs will provide frequency stability to the WLS1273L for years and years of healthcare and high speed data applications. See the complete portfolio of RFM Crystal and SAW RF Components that includes a broad line of high-performance crystal frequency control products used in most wireless and digital applications (resonators, filters, oscillators, TCXO, VCXO, OCXO, and VCTCXO).

### Design Support

**DRIVER SUPPORT.** The majority of applications today are being developed in a combination with either Linux or Android operating systems due to their fast through-put capabilities in Wi-Fi / Bluetooth applications. RFM has available for designers Linux and Android drivers for OMAP processors, or driver source code is available that can be modified for other ARM Cortex A-Series processors.

Platform	OS	Components
OMAP3 / OMAP4 / AM18x / AM37x (OMAP™3 / OMAP™4 are trademarks of TI)	Linux 2.6	Mac Firmware / BT Scripts
	Android	
	WinCE 6	
i.Mx53 / i.Mx53QSB	Linux 2.6.35	Source / Drivers / Image
	Android Gingerbread	



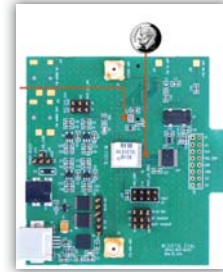
- The above Platforms and OS are the quickest time to market and require the least amount of Driver support.
- Only hardware design is needed for both Wi-Fi and Bluetooth.
- Other platforms or OS's require driver design or slight modification.

**REFERENCE DESIGNS.** RFM's reference designs for SDIO and host interface are available with RFM evaluation kits. These are valuable tools designers may use to speed up development cycles.

**SALES & SUPPORT.** Hundreds of individuals are available to serve customers' needs via the worldwide network of RFM authorized sales representatives, distributors, and stocking representatives / distributors. To locate a sales rep or distributor nearest you, go to the following URL <http://www.rfm.com/contact.php/map.php>

## WLS1273L Wi-Fi + Bluetooth Combo Module Smaller than a Dime

RFM TCXO  
XTC7012  
Placed on  
Eval Board



WLS1273L  
Module Installed on  
DR-WLS1273L-EV  
Evaluation Board

## TOP MARKETS

Medical / Healthcare / Pharmaceutical  
Military / Homeland Security  
Utilities Industries (Power, Gas and Water)  
Consumer  
Warehousing  
Manufacturing Industries

## TOP APPLICATIONS

Patient Monitoring Devices\*  
In-home Smart-Health Devices\*  
Healthcare Data Management / Tracking Apps\*  
Security Systems  
Smart Energy - AMI / AMR  
Consumer Products / White Goods  
Set-Top Boxes  
Gaming Devices  
Smart Home Devices  
Handheld Devices  
Asset Tracking / RFIC  
Industrial Control or Automation

*\*WLS1273L featuring 802.11a is particularly well-suited for Health / Wellness, Medical, and Sport / Fitness applications.*

# Bluetooth v4.0 with low energy (BLE) technology paves the way for Bluetooth Smart™ devices

BLE enables new Bluetooth Smart devices that can operate for months or even years on tiny, coin-cell batteries. BLE includes a low energy feature that is the basis for Bluetooth Smart devices.

Key BLE features:

Ultra-low peak, average, and idle mode power consumption

Ability to run for years on standard, coin-cell batteries

Low cost

Multi-vendor interoperability

Enhanced range



RFM is a subsidiary of Murata Electronics North America, Inc.

RFM products are sold through a world-wide network of manufacturer's reps and distributors.

Go to the RFM website and visit the "How to Buy" section to locate a sales / distribution partner near you.

**INFORMATION SUBJECT TO CHANGE:** The specifications and availability of the components described in this publication are subject to change without notice. Every effort has been made to ensure the accuracy of this publication. However, RFM does not assume responsibility for inaccuracies or changes.

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Published August, 2012  
Printed in the USA

**WLS-Series Wi-Fi and Wi-Fi + Bluetooth Combination Short-Range Radios:** The WLS Series modules are designed to fit into small spaces, with minimal external circuitry required to complete a radio design. Software is available for Linux and Android operating systems. For high-performance frequency control, RFM recommends its TCXOs XTC7006-2 (operating at 26 MHz) or XTC7012 (operating at 38.4 MHz) for all WLS modules.

## WLS1270 FEATURES

- IEEE 802.11b/g and 11n compliant
- IEEE 802.11d,e,h,i,k,r,s compliant
- Chipset: Texas Instruments WL1270
- Size: 9.2 x 8.4 x 1.35 mm maximum
- Embedded ARM microprocessor
- Supports SDIO host interface for WLAN
- Lead free and RoHS compliant

### WLS1270 WLAN Highlights

Data Rates:

- 802.11n: 65, 58.5, 52, 39, 26, 19.5, 13, 6.5 Mb/s
- 802.11g: 54, 48, 36, 24, 18, 12, 9, 6 Mb/s
- 802.11b: 11, 5.5, 2, 1 Mb/s

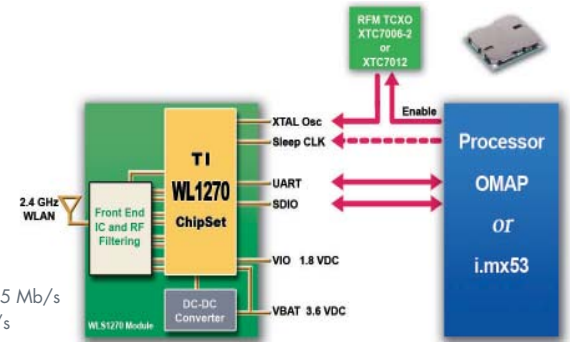
Operating Frequency Range: 2.412 to 2.484 GHz

Output Power: up to 16 dBm

Supply Current: 11/g Transmit 180 mA / Receive 100 mA

Operating Temperature Range: -40 to 85 °C

Relative Humidity: 5 to 95%, non-condensing



## WLS1271L FEATURES

- IEEE 802.11b/g and 11n compliant
- IEEE 802.11d,e,h,i,k,r,s compliant
- Bluetooth Version 4.0 plus EDR, Power Class 1.5 +BLE
- The firmware running on the microprocessor includes the lower layers of the Bluetooth Protocol up to HCI available (Link Controller, Link Manager, HCI and HCI Transport Layer)
- Chipset: Texas Instruments WL1271L
- Size: 9.2 x 8.4 x 1.35 mm maximum
- Embedded ARM microprocessor
- Supports SDIO host interface for WLAN
- Lead free and RoHS compliant
- Supports H4 or H5 (UART) host interfaces and PCM audio interfaces for Bluetooth

### WLS1271L WLAN Highlights

Data Rates:

- 802.11n: 65, 58.5, 52, 39, 26, 19.5, 13, 6.5 Mb/s
- 802.11g: 54, 48, 36, 24, 18, 12, 9, 6 Mb/s
- 802.11b: 11, 5.5, 2, 1 Mb/s

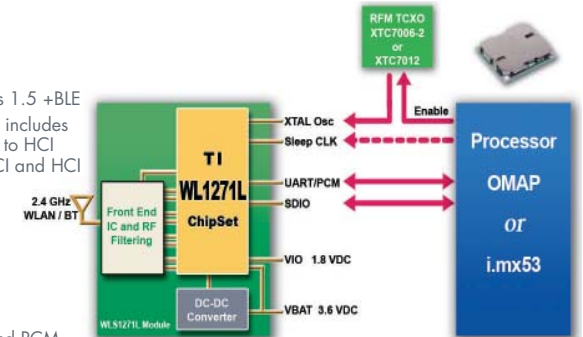
Operating Frequency Range: 2.412 to 2.484 GHz

Output Power: up to 18 dBm

Supply Current: 11/g Transmit 180 mA / Receive 100 mA

Operating Temperature Range: -40 to 85 °C

Relative Humidity: 5 to 95%, non-condensing



### WLS1271L Bluetooth Highlights

Data Rates: up to 3 Mb/s

Operating Frequency Range: 2.4000 to 2.4835 GHz

Output Power: up to 8 dBm

Supply Current: 35 mA typical (DH1)

## WLS1273L FEATURES

- IEEE 802.11a/b/g and 11n compliant
- IEEE 802.11d,e,h,i,k,r,s compliant
- Bluetooth Version 4.0 plus EDR, Power Class 1.5 +BLE
- The firmware running on the microprocessor includes the lower layers of the Bluetooth Protocol up to HCI available (Link Controller, Link Manager, HCI and HCI Transport Layer)
- Chipset: Texas Instruments WL1273L
- Size: 11.2 x 9.4 x 1.35 mm maximum
- Embedded ARM microprocessor
- Supports SDIO host interface for WLAN
- Lead free and RoHS compliant
- Supports H4 or H5 (UART) host interfaces and PCM audio interfaces for Bluetooth

### WLS1273L WLAN Highlights

Data Rates:

- 802.11a: 6, 9, 12, 24, 36, 48, 54 Mb/s
- 802.11n: 65, 58.5, 52, 39, 26, 19.5, 13, 6.5 Mb/s
- 802.11g: 54, 48, 36, 24, 18, 12, 9, 6 Mb/s
- 802.11b: 11, 5.5, 2, 1 Mb/s

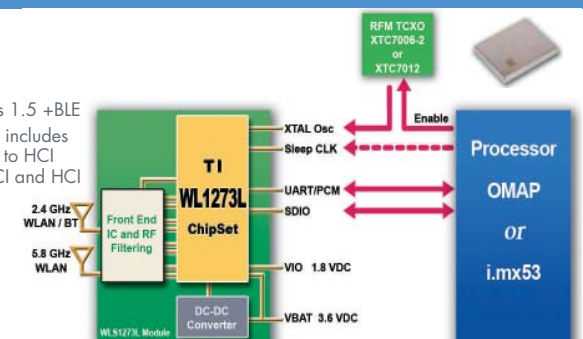
Operating Frequency Range: 2.412 to 2.484 GHz and 4.920 to 5.825 GHz

Output Power: up to 18 dBm

Supply Current: 11/g Transmit 180 mA / Receive 100 mA

Operating Temperature Range: -40 to 85 °C

Relative Humidity: 5 to 95%, non-condensing



### WLS1273L Bluetooth Highlights

Data Rates: up to 3 Mb/s

Operating Frequency Range: 2.4000 to 2.4835 GHz

Output Power: up to 8 dBm

Supply Current: 35 mA typical (DH1)