Welcome!
Texas Instruments New Product Update

- This webinar will be recorded and available at www.ti.com/npu
- Phone lines are muted
- Please post questions in the chat or contact your TI sales contact or field applications engineer

PROVEN AND RELIABLE INDUSTRIAL WI-FI®

WL1801 / WL1831
Single-band Wi-Fi®, Bluetooth® and Bluetooth Low Energy Transceiver

New Product Update

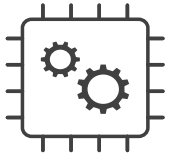
Saurabh Narang
Vihang Parmar

Agenda

- Portfolio overview of WiLink™8 Industrial Wi-Fi® and combo transceivers
  - WL1801
  - WL1831
- New Extended Temperature Range capabilities (-40˚C to +105˚C ambient)
  - Advantages and use-cases
  - Example Mission Profile
- Getting started

Please feel free to send questions via chat throughout this presentation to Saurabh Narang or Vihang Parmar

Wi-Fi | Enabling wireless connectivity for 20 years



Reliable, secure and low power radios for unlicensed bands

- Robust radios
- Up to 100Mbps
- Up to 5 years battery life

Driving innovation

- Seamless Wi-Fi and Bluetooth coexistence
- Star and mesh networks
- Wi-Fi up to 105C

World class security

- Address evolving IoT security needs
- WPA3 security
- FIPS validated

Scalability

- Transceivers, wireless MCU and modules
- Linux and RTOS based software solutions

Trusted Partner

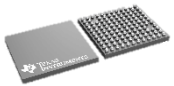
- Worldwide Interoperability
- Strong technical support
- Product longevity

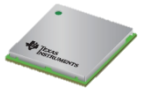
Wi-Fi Transceiver portfolio

Legend

- IC
- Regulatory certified module
- -40C to +105C; Extended operating temperature range

	4.6 x 4.9mm WSP package	13.3 x 13.4 mm MOC package	
Dual-band Wi-Fi & Bluetooth		**WL1837MOD** 2.4/5GHz, 2x2 MIMO/MRC, WPA3 Bluetooth 5.1	
Dual-band Wi-Fi		**WL1807MOD** 2.4/5GHz, 2x2 MIMO/MRC, WPA3	
Single-band Wi-Fi & Bluetooth	**WL1831** 2.4GHz, 1x1 SISO, WPA3 Bluetooth 5.1	**WL1831MOD** 2.4GHz, 1x1 SISO, WPA3 Bluetooth 5.1	**WL1835MOD** 2.4GHz, 2x2 MIMO/MRC, WPA3 Bluetooth 5.1
Single-band Wi-Fi	**WL1801** 2.4GHz, 1x1 SISO, WPA3	**WL1801MOD** 2.4GHz, 1x1 SISO, WPA3	**WL1805MOD** 2.4GHz, 2x2 MIMO/MRC, WPA3





WL1801 / WL1831

Single-Band Wi-Fi® and Bluetooth®/Bluetooth® Low Energy combo Transceivers

Features

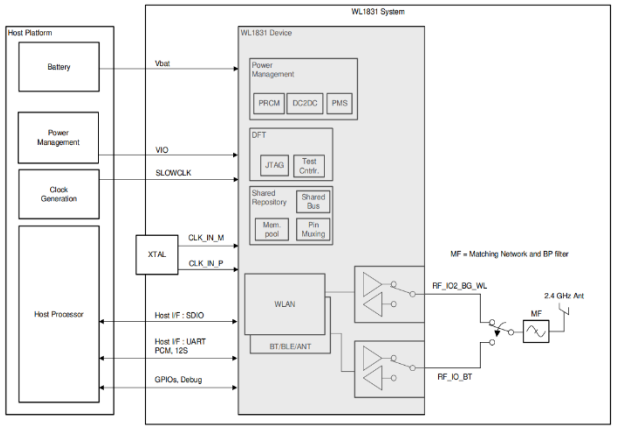
- **802.11 b/g/n (2.4GHz)** SISO Wi-Fi
- Bluetooth and **Bluetooth Low Energy v5.1** *[WL1831 only]*
- **-40°C to +105°C** operating temperature
- **Multi-role** (simultaneous AP and STA)
- **WPA3** security
- Mainline Linux software drivers
- 4.6mm x 4.9mm WSP package (130 pin, 0.4mm pitch)
- Up to +20dBm output power, integrated PA
- <800µA in connected idle mode, wake-on-WLAN support

Benefits

- Entry-level Wi-Fi transceivers with single-band, single-antenna for simplified hardware design
- Achieve reliable connectivity over long range due to excellent RF performance
- Maintain link even at high temperature (up to 105°C) with built-in thermal control mechanism
- Small footprint fits in space constrained applications
- Variety of provisioning options with Wi-Fi multi-role and simultaneous Bluetooth operation

Applications

- Electricity Meter
- Solar Inverter
- EV Chargers (EVSE)
- Thermostat
- Factory automation and control
- Electronic Point of Sale (EPOS)
- Motor Drives



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Wi-Fi connectivity at High Temperature

TYPICAL INDUSTRIAL GRADE Wi-Fi CHIP

When internal temperature rises

<85°C

Normal Operation

≥85°C

Unreliable Link
Compromised Range
Reduced Product Lifetime

Chip Operating Temperature

-40°C

+85°C

+105°C

Wi-Fi connectivity at High Temperature

WL1801 / WL1831 WITH EXTENDED TEMPERATURE RANGE

NEW **Built-in Thermal Control Mechanism**

- ✓ Prioritized Link Stability
- ✓ Negligible Impact on Range at high temperature (past +85°C)
- ✓ >10 years of Product Lifetime*

Chip Operating Temperature

-40°C +85°C +105°C

* Lifetime dependent on specific mission-profile and other operating conditions

Example WiLink8 Mission Profile

- End products : **Solar Inverters, Utility Meters etc.**
- Target Mission Profile defined for ~12 years. Tx is 1%, Rx is 9% and Sleep/standby is 90% of product lifetime

Modes	Ambient Temp = 105C		Ambient Temp = 40C		Total POH	Percentage
	Duration	Junction Temperature at PA	Duration	Junction Temperature at PA		
TX	262 hrs (25%)	125C	788 hrs (75%)	105C	1050 hours	**1%**
RX	2365 hrs (25%)	115C	7095 hrs (75%)	50C	9460 hours	**9%**
Standby / Deep-sleep	23650 hrs (25%)	105C	70960 hrs (75%)	40C	94610 hours	**90**%
Total					105120 hours (12 years)	**100%**

* Calculation includes Tx overhead assumptions

Mission Profile Explained with Wi-Fi Traffic

Example: Wi-Fi Device Transmits 1KB Payload per minute @OFDM6

- Transmit Time for each 1KB Payload including preamble is 1389.33 µs
- To account for Tx overhead , multiply Transmit time by 4 . Tx Time with overhead for each packet is 5557.33µs . Assuming 1KB packet is sent each minute , Tx % is 0.0093%
- Over the course of 12 years, Wi-Fi device will Transmit for a total of **9.7 hours** (**vs 1050 Tx hours** shown in Mission Profile)
- This is **only 0.92%** of the Mission Profile explained in the previous slide

Payload 1KB (in bits)	Preamble	Tx Time (in µs) @OFDM6	Tx overhead (Multiplying factor)	Tx time for packet (in µs)	% of time in Tx	12 years in hours	Total Tx Hours	Tx Hours @105C (25%)	% of the Mission Profile
8192	24	1389.33	4	5557.33	.0093	105120	**9.7**	2.4	**0.92**

How to integrate 105C Feature ?

- Download latest WiLink8 firmware binary (8.9.0.0.89 or later) from https://git.ti.com/cgit/wilink8-wlan/wl18xx_fw/tree/

- Download latest INI files and script from https://git.ti.com/cgit/wilink8-wlan/18xx-ti-utils/ and run updated configure-device.sh

```
Please provide the following information.

Are you using a TI module? [y/n] : n
What is the chip flavor? [1801/1805/1807/1831/1835/1837 or 0 for unknown] : 1801
Does COB Design support RF switch with 105C range ( default is 85C ) ? [y/n] : y
Reduce Tx Power at Higher Temperature ( default is n ) ? [y/n] : n
[  162.792736] wlcore: down

------------------------------------------------------------

The device has been successfully configured.
TI Module: n
Chip Flavor: 1801
Base INI file used: /usr/sbin/wlconf/official_inis/WL8_COB_INI.ini
Number of 2.4GHz Antennas Fitted: 1
Number of 5GHz Antennas Fitted: 0
Diversity Support: n
SISO40 Support: n
Japanese Standards Applied: n
105C Support: y

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Getting started

You can start evaluating this device leveraging the following:

Content type	Content title	Link to content or more details
Product folder	WL1801 WL1831	www.ti.com/product/WL1801 www.ti.com/product/WL1831
Reference design	WL18X1-DESIGN	Link to mySecure resources
Customer training	Connect: WPA3 Wi-Fi® security WiLink8 Advanced Features TI Wi-Fi Test Strategy Overview	training.ti.com/connect-wpa3-wi-fi-security www.ti.com/lit/swru576 www.ti.com/lit/swra686
Selection and design tools and models	WiLinkTM 8 Getting started guide	www.ti.com/lit/swru570
Development tool or evaluation kit	SK-AM64 Video: Out-of-box Wi-fi with SK-AM64 starter kit	www.ti.com/tool/SK-AM64 training.ti.com/sitara-sk-am64-out-box-demo

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