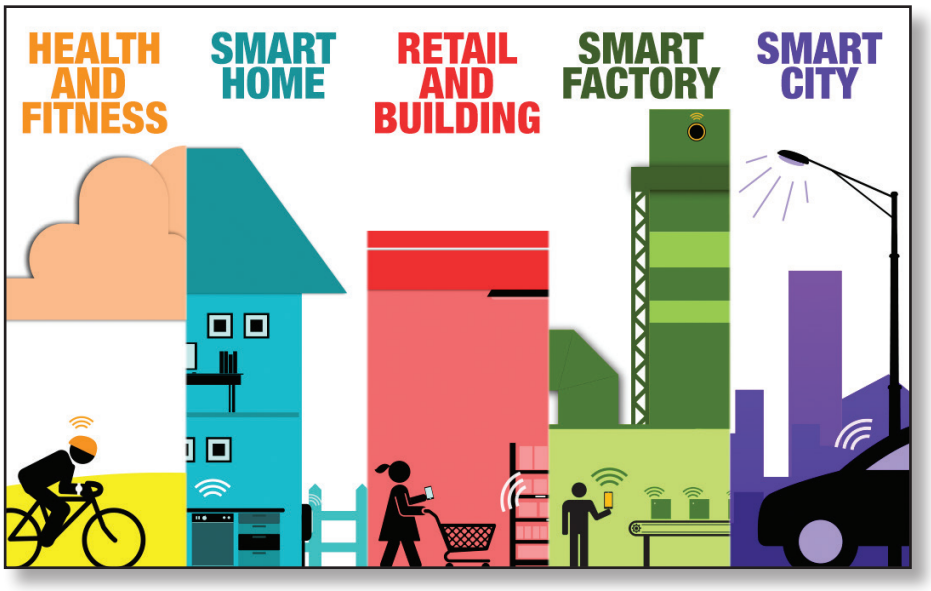
Wireless Connectivity Solutions



Texas Instruments

Today with more users, things and cloud services connecting to the Internet, the role of wireless connectivity is becoming increasingly important.

At Texas Instruments (TI), we are committed to delivering a broad portfolio of wireless connectivity solutions which consume the lowest power and are the easiest to use. With TI innovation supporting your designs, you can share, monitor and manage data wirelessly for applications in wearables, home and building automation, manufacturing, smart cities, healthcare and automotive.

Learn how you can be a part of the Internet of Things (IoT) as TI helps you connect more.

Broadest portfolio. Lowest power. Easiest to use.

www.ti.com/wirelessconnectivity

Broadest portfolio of technologies

With products and support for more than 14 technologies, standards and protocols you have the industry's broadest wireless connectivity portfolio to meet a variety of network sizes and topologies. Each solution is developed to help you add connectivity to any application through a range of **wireless MCUs**, **wireless network processors** and **smart RF transceivers**.

	SimpleLink™ Solutions Low-power offering of all technologies and system positioning			**WiLink™ Solutions** High-performance Wi-Fi® + *Bluetooth*® / Bluetooth low energy combo
Software system partitioning	Smart RF Transceivers	Wireless Network Processors (WNP)	Wireless MCUs	WiLink™ Combo Wi-Fi® + *Bluetooth*®/BLE
Application			●	
Wireless stack		●	●	
RF radio	●	●	●	●

Technologies supported by TI's wireless connectivity solutions

Bluetooth®

Bluetooth® wireless technology is one of the most prominent short-range / mid-range communications technologies with an installed base of over three billion units. Our solutions include:

- Bluetooth Smart
  - SimpleLink **CC2640** wireless MCU
  - **CC2540T** (up to 125°C)
  - **CC2540** (USB interface)
  - **CC2541** (I^2C interface)
- Classic and dual-mode Bluetooth
  - **CC2564** dual-mode Bluetooth
  - **CC2560** classic Bluetooth
  - **LMX9838** classic Bluetooth 2.0 plug and play module

Learn more at: **www.ti.com/bluetooth**

Wi-Fi®

Wi-Fi® is a key technology driving the IoT by enabling devices to connect directly to each other or to broader networks. We have a variety of options allowing customers to configure, connect and communicate across a variety of markets. Our solutions include:

- WiLink 8 Wi-Fi + dual-mode Bluetooth: High-performance combo connectivity for processors
- SimpleLink Wi-Fi: **CC3200** wireless MCU and **CC3100** wireless network processor (QFN and certified modules)

Learn more at: **www.ti.com/wifi**

Sub-1GHz

Within the Sub-1 GHz market, our smart RF transceivers and wireless MCUs offer high performance, best-in-class range and co-existence with leading low power consumption. Our solutions include:

- SimpleLink **CC1310** wireless MCU
- **CC12xx** RF transceivers (longest range)
- **CC112x** transceivers

Learn more at: **www.ti.com/sub1ghz**

6LoWPAN

6LoWPAN is a low-power wireless mesh network where every node has its own IPv6 address, allowing it to connect directly to the Internet using open standards. These solutions deliver the lowest power, most complete solution set with dual-band support for city-wide networks. Our solutions include:

- SimpleLink **CC2630** wireless MCU
- **CC2538** wireless MCU

Learn more at: **www.ti.com/6lowpan**

ZigBee®

ZigBee® is a standard for low-power mesh networks. TI offers low-power solutions with the ability to operate for multiple years with a small coin cell, the ability to connect 100s of nodes and easy-to-use kits and reference designs that allow you to start development quickly. Our solutions include:

- SimpleLink **CC2630** wireless MCU
- **CC2530** wireless MCU
- **CC2538** wireless MCU

Learn more at: **www.ti.com/zigbee**

NFC

Near Field Communication (NFC) enables short range bi-directional communication providing secure, low-power interaction between devices. TI provides one of the industry's largest, most differentiated NFC product portfolios enabling lower power solutions to meet a broad range of RF connectivity needs. Our solutions include:

- **RF430FRL15xH** sensor tags
- **RF430CL330H** dynamic tags
- Tag-it™ HF-I static tags
- **TRF7970A** transceivers
- **TRF796xA** reader/writer transceivers

Learn more at: **www.ti.com/nfc**

Low-power wireless connectivity

When we introduced the **SimpleLink™ ultra-low power wireless MCU platform**, TI set a new industry power consumption benchmark for ***Bluetooth*® Smart**, **Sub-1 GHz**, **ZigBee®**, **6LoWPAN** and **ZigBee RF4CE™** wireless MCUs. The **SimpleLink Wi-Fi® Internet-on-a-chip™ platform** also delivers a **low-power wireless MCU** for battery-operated products and systems.

Additionally, TI offers SimpleLink wireless network processors and smart RF transceivers as well as combo connectivity solutions through the **WiLink™** platform, allowing customers to add low-power connectivity to wearables, portable electronics, home/building automation applications, industrial and embedded automotive designs. For more information about TI's low-power wireless connectivity offerings visit: **www.ti.com/simplelink**

Driving the lowest power solutions

Wireless for battery-less to coin-cell-powered applications

SimpleLink ultra-low power CC26xx/CC13xx platform

Using the unique sensor controller, this solution can run on a coin cell battery for 5–10 years making it the most power-efficient Flash-based wireless microcontroller.

Wi-Fi for AA battery applications

SimpleLink Wi-Fi CC31xx/CC32xx platform

A low-power radio and advanced low-power modes enable this platform to run on two AA batteries for more than a year.

The IoT is pushing the boundaries of power consumption requirements for product and system designs. Energy harvesting, always-on coin cell or AA battery-operated sensor products can now operate optimally for several years and offer efficient processing.

Overall power consumption and battery life are very important in many applications. TI wireless connectivity solutions are created and optimized with battery life in mind, making sure that solution performance can be achieved.

Average power consumption is key:

- How quickly functions can execute so the system can go back to sleep – using more processing power can give a better system performance: TI has the lowest power wireless microcontroller with 61 µA/ MHz.
- Low power in sleep and hibernate modes and low Tx and Rx power consumption.
- Have system where sensor data can be detected in lowest power modes: TI has a unique sensor controller allowing the MCU to sleep while collecting sensor information while the main CPU can be continuously turned off.
- Including built in DC–DC for system power efficiency.
- Power efficiency of system – low-power modes and key use cases – See **ULPBench™**.

Our wireless connectivity portfolio is IoT-ready and enables easy-to-implement and robust wireless systems with unprecedented battery life through development of the lowest power wireless solutions in the industry.

Power Management Resources

- **SimpleLink Wi-Fi CC3100/CC3200 Internet-on-a-chip Sub-system Power Management**
- **SimpleLink Wi-Fi CC3100/CC3200 WLAN RF Transmit Power Peak and Average Measurements**
- **Taking power to a new low with the SimpleLink ULP wireless MCU platform**

Easy-to-use:

Embedded design and development is made easier through easy-to-use products and key information being ready online at any time: certified modules, low-cost tools, complete development kits, software platforms and technical documentation. For accelerated ramp to market, use the **TI Designs** library of reference designs, sample code and applications, online training, and **TI E2E™ Community** support. Cloud services that pair with TI solutions are available through the **TI IoT cloud ecosystem**. Additionally, customers can leverage proven design services and ecosystem support for embedded wireless connectivity solutions through members of the TI Design Network.

Easy-to-use: Software, support and more

Software

Common software

Across all SimpleLink™ products

- TI-RTOS operating system
- Code Composer Studio™ Integrated Development Environment
- IAR Embedded Workbench for ARM®

Royalty-free network stacks

Robust, certified and proven stacks

- *Bluetooth*® and BLE-Stack with OTA support
- Z-Stack™ supporting various ZigBee® applications
- Sub-1 GHz wM-Bus software stack

Support

Comprehensive

Development documentation, guides and wikis available online

E2E support

Online community – answers at your fingertips from engineers

Training

Online videos and other resources to learn more about the parts and tools

And more ...

TIDesigns

TI reference designs online

TI IoT cloud ecosystem

TI store

Silicon & kit sales & samples on TI Store

TI Designs for the IoT

Connected home network reference design	UART-to-*Bluetooth*® low energy (BLE) bridge reference design	SimpleLink™ Wi-Fi® CC3200 smart plug reference design
Sub-1GHz	Bluetooth®	Wi Fi™
Shows how to create a Sub-1 GHz star network for security and sensor applications.	Implement a UART-to-BLE bridge to communicate serial data wirelessly and bi-directionally between a wired UART and a device supporting BLE protocol.	A full system solution which integrates within a single microcontroller (MCU) the metrology and data computation, as well as handling all Wi-Fi communication.

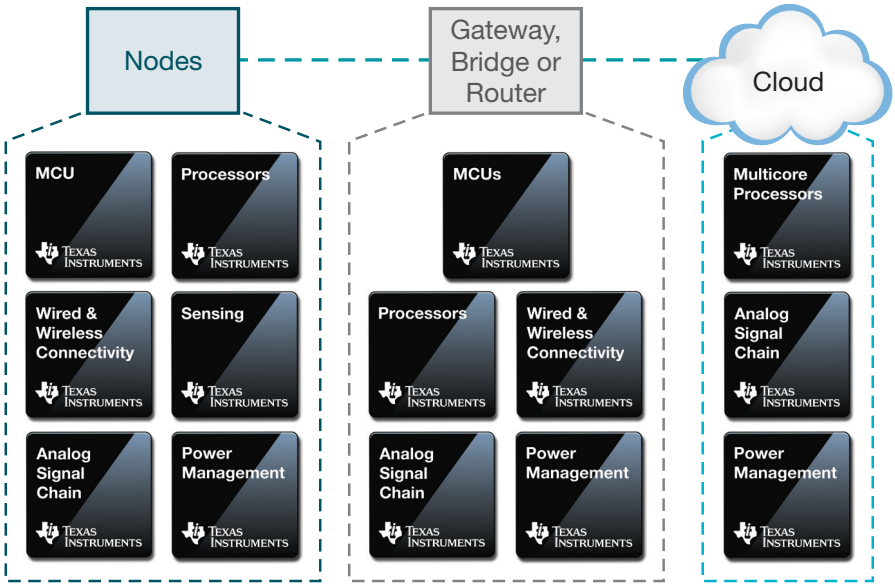
More designs are available at **www.ti.com/tidesigns**

The Internet of Things

With the potential of having billions of devices connected to the cloud in the next decade, the Internet of Things (IoT) will be part of every aspect of our lives. TI is the only semiconductor company with all of the building blocks to enable the IoT. This includes wireless connectivity solutions as well as MCUs, processors, sensing technologies, power management and analog signal chain solutions to help customers develop an optimized IoT system. These solutions support application spanning sensor nodes, gateways and cloud service partners.

Only TI has all the IoT building blocks

From building and home automation to wearables, the IoT touches every facet of our lives. Simplify the process of connecting to the cloud when you use integrated solutions beginning with hardware and software plus get the support to connect anything. With the industry's broadest portfolio of analog signal chain, power management, sensing, microcontrollers, processors and wireless connectivity solutions, TI can support your IoT design with innovative, low-power and easy-to-use solutions.



End-to-end cloud-ready partners

IBM · Arrayent · Exosite · intamac · Keen IO · Micrium · octoblu · PTC · PubNub · Temboo · 2lemetry · Tessel · thingsquare · Weaved · xively · Parse · Sierra Wireless

Cloud partners enable easy adoption

Manufacturers need proven hardware, software and an easy way to connect to the cloud to manage services and capitalize on the growing IoT market. In order to provide a vetted solution, TI established an ecosystem of cloud providers who support our connected devices and allow engineers to quickly and easily connect to the cloud. Today, there are 18 announced cloud providers in our IoT ecosystem including IBM, PTC (formerly Axeda), Exosite, Arrayent and Xively with more being added regularly.

Each member of the ecosystem has demonstrated its cloud service offering on one or more of TI's wireless connectivity, MCU and processor solutions. Visit **www.ti.com/IoT** to learn more about the IoT cloud ecosystem members and their offerings as well as the variety of tools and support TI offers.

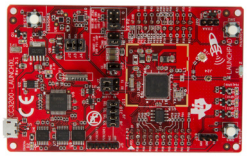
Development boards

Immediately start evaluating and developing with an optimized development kit. We have invested in a number of options to meet your specific development needs including:

SimpleLink™ multi-standard SensorTag
CC2650STK
U.S. $29.00

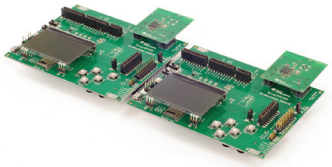
SensorTag
Get sensor data connected to the cloud in three minutes. Supports *Bluetooth*® Smart, 6LoWPAN and ZigBee® technologies.
Expandable with DevPacks to customize your IoT application including a Debug DevPack. Powered by the SimpleLink multi-standard CC2650 wireless MCU and 10 low-power sensors.

SimpleLink Wi-Fi® CC3200 LaunchPad
CC3200-LAUNCHXL
U.S. $29.99



LaunchPad
Development platform for the SimpleLink Wi-Fi CC3200 wireless microcontroller, the industry's first single-chip programmable MCU with built-in Wi-Fi connectivity.

SimpleLink multi-standard CC2650 Development Kit
CC2650DK
U.S. $299.00

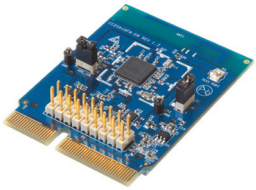


Development kit
Complete hardware, software and RF development platform to evaluate the SimpleLink Bluetooth Smart CC2640 and 6LoWPAN/ZigBee CC2630 wireless MCUs.

Long range development kit
CC1120DK for 868MHz and 915MHz
U.S. $299.00

Development kit
The development kit for the Sub-1 GHz perfomance line comes with a pre-programmed packet error rate test. RF range and robustness can be tested with different RF settings, and power consumption can be measured easily. The kit includes the SmartRF™ Transceiver Evaluation Board (TrxEB) for development of prototype software, as well as USB connectivity making it possible to connect the board to a PC and control the radio from SmartRF Studio.

CC256x Bluetooth / Dual-Mode Evaluation Module
CC256XQFNEM
U.S. $59.00



Evaluation kit
This evaluation module board is based on the TI CC256x device with QFN package and can support Dual-Mode Bluetooth (Bluetooth/Bluetooth low energy).

WiLink™ 8 Module 2.4-GHz COM8 Evaluation Module
WL1835MODCOM8B
U.S. $39.79

Evaluation kit
The 2.4-GHz WL1835-based evaluation board is compatible with the Sitara™ AM335x and AM437x EVMs as well as several other TI EVMs and reference designs for Wi-Fi and Bluetooth/Bluetooth low energy development. More board interfaces are available to connect to any Linux® processor via SDIO.

The complete portfolio of tools is available at **www.ti.com/wireless**

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No TI components are authorized for use in FDA Class III (or similar life-critical medical equipment) unless authorized officers of the parties have executed a special agreement specifically governing such use.

Only those TI components which TI has specifically designated as military grade or “enhanced plastic” are designed and intended for use in military/aerospace applications or environments. Buyer acknowledges and agrees that any military or aerospace use of TI components which have ***not*** been so designated is solely at the Buyer's risk, and that Buyer is solely responsible for compliance with all legal and regulatory requirements in connection with such use.

TI has specifically designated certain components as meeting ISO/TS16949 requirements, mainly for automotive use. In any case of use of non-designated products, TI will not be responsible for any failure to meet ISO/TS16949.

Products		**Applications**	
Audio	www.ti.com/audio	Automotive and Transportation	www.ti.com/automotive
Amplifiers	amplifier.ti.com	Communications and Telecom	www.ti.com/communications
Data Converters	dataconverter.ti.com	Computers and Peripherals	www.ti.com/computers
DLP® Products	www.dlp.com	Consumer Electronics	www.ti.com/consumer-apps
DSP	dsp.ti.com	Energy and Lighting	www.ti.com/energy
Clocks and Timers	www.ti.com/clocks	Industrial	www.ti.com/industrial
Interface	interface.ti.com	Medical	www.ti.com/medical
Logic	logic.ti.com	Security	www.ti.com/security
Power Mgmt	power.ti.com	Space, Avionics and Defense	www.ti.com/space-avionics-defense
Microcontrollers	microcontroller.ti.com	Video and Imaging	www.ti.com/video
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Mailing Address: Texas Instruments, Post Office Box 655303, Dallas, Texas 75265