GUIDE

Wi-Fi SoC and Module Selector Guide

Selecting the Right Wi-Fi Devices to Unleash the Potential of Smart Home and Smart Industrial Applications

SILICON LABS | Wi-Fi

Wi-Fi as a Catalyst for Growth in IoT

Wi-Fi is virtually ubiquitous. With high data rates and longer range, it's deployed to support more than 22 billion devices in a variety of residential and commercial environments worldwide. Wi-Fi also offers constant cloud connectivity, making gateways unnecessary. With these benefits, Wi-Fi has solidified its position as a trusted choice for embedded, energy-efficient, wireless IoT solutions and the Wi-Fi Alliance continues to expand Wi-Fi's use and availability to meet the needs of emerging technologies.

Today, there are two major factors fueling Wi-Fi's continued growth in IoT:

Adoption of Wi-Fi 6

802.11ax, better known as Wi-Fi 6, is the newest standard designed to support Wi-Fi's growing reputation as a core element of infrastructure. Its release comes with features to improve throughput, increase network efficiency, and extend battery life, particularly in over-saturated networks. With some already achieving Wi-Fi 6 certification today, most devices will support Wi-Fi 6 by 2025 or 2026.

Ultra-Low Power Wi-Fi

The low power features available in the latest Wi-Fi standards mean that a lot of today's IoT devices are "always-on" and connected, with extended battery life due to ultra-low power consumption.

This guide provides you with a quick overview of our Wi-Fi hardware, so you can make an informed decision when selecting the system-on-chips (SoCs) and modules for your next project.

Four Wi-Fi Hardware Highlights

Low-Power Wi-Fi 4 Solutions

The WF200 is a pre-certified SiP with low transmission and receive power. Coupled with the EFR32MG24, the WF200 also enables Matter.

Ultra-Low-Power Wi-Fi 6 + Bluetooth LE Wireless Solution

The SiWx917 is the lowest power Wi-Fi 6 SoC with Matter, Bluetooth LE for energy-efficient IoT devices and features Integrated AI/ML accelerator.

Ultra-Low-Power Wi-Fi 4 + Bluetooth Solutions

The RS9116 provides an ultra-low-power s multiprotocol solution. Coupled with the EFR32MG24 as a host, the RS9116 NCP also enables Matter over Wi-Fi.

Wi-Fi 6 + Bluetooth LE Wireless Solution

The SiWx915 SoC includes a Wi-Fi 6 plus Bluetooth LE wireless CPU and an integrated MCU application subsystem that includes security, memory, and peripherals all in a single 6×6 mm QFN package.

Wi-Fi SoC and Module Selector Guide

Silicon Labs offers a range of Wi-Fi wireless SoCs and modules to suit virtually every design requirement. To narrow down your selection, take a look at the product summaries below. Design requirements to consider include: low-power, always-on cloud connectivity, security, reliability, wireless range, throughput, MCU capabilities (computing power, memory, peripherals), and operating mode - hostless system on chip(SoC) with integrated application processor, hosted network coprocessor (NCP) with integrated TCP/IP stack, and hosted radio coprocessor (RCP) with host MCU running Linux OS.

After assessing Silicon Labs' Wi-Fi hardware against your top-level needs, consider how these detailed product specifications fit your design. A full breakdown of the Wi-Fi lineup is listed on the next page.

	SILICON LABS WF200	SILICON LABS RS9116	SILICON LABS SiWx917	SILICON LABS SiWx915 NEW
Wi-Fi Generation	Wi-Fi 4	Wi-Fi 4	Wi-Fi 6	Wi-Fi 6
Modes of Operation	RCP	RCP, NCP	RCP, NCP, SoC	RCP, NCP, SoC
Host Type	Hosted	Hosted	Hosted or Hostless	Hosted or Hostless
Integrated Apps MCU	—	—	Yes	Yes
Bluetooth Support	—	Bluetooth LE, Bluetooth Classic	Bluetooth LE	Bluetooth LE
Matter Support	Yes	Yes	Yes	Yes
Power Modes	Low Power	Ultra Low Power	Ultra Low Power	Low Power
Wireless and MCU Security	WPA2/WPA3	WPA2/WPA3, SSL/TLS 1.2	WPA2/WPA3, SSL/TLS 1.3, PSA-L2 Certifiable, TRNG, PUF, Secure Boot, Secure OTA, Secure Zone (TEE), Secure XIP (AES-XTS), Advanced Crypto	WPA2/WPA3, SSL/TLS 1.3, PSA-L2 Certifiable, TRNG, PUF, Secure Boot, Secure OTA, Secure Zone (TEE), Secure XIP (AES-XTS), Advanced Crypto
AI/ML Accelerator	—	—	Yes	—
Temperature Range (deg C)	-40 to 105	-40 to 85	-40 to 105	-40 to 85
Package	4x4, QFN32, SiP Modules	7x7 QFN84, SiP and PCB Modules	7x7 QFN84, PCB Modules	6x6 QFN52, PCB Modules
Target Applications	Cameras, Motion Detectors, Sensors, Smart Metering	Speakers, Door Locks, HVAC, Portable Medical Wearables, Power Tools, Asset Monitoring, Fleet Management, Health Care and Clinical Medical	Door Locks, HVAC, Portable Medical, Sensors, Camerais, Switches, Power Tools, Asset Monitoring, Fleet Management, Health Care and Clinical Medical, Metering	Smart Appliances, Smart switches, HVAC, Cameras, Power Tools, Asset Monitoring, Fleet Management, Clinical / Medical, Metering

*Contact Sales for Availability

Wi-Fi Lineup - SoC, NCP, RCP

	SiWx915 Wi-Fi SoC	SiWx915 Wi-Fi RCP	SiWx915 Wi-Fi NCP	SiWx917 Wi-Fi SoC	SiWx917 Wi-Fi RCP	SiWx917 Wi-Fi NCP	RS9116 Wi-Fi NCP	RS9116 Wi-Fi RCP	WF200 Series 2 Wi-Fi Transceiver
Solution Type	IC, Modules	IC, Modules	IC, Modules	IC, Modules	IC, Modules	IC, Modules	IC, Modules	IC, Modules	IC, Modules
Package	QFN52, PCB	QFN52, PCB	QFN52, PCB	QFN84, PCB	QFN84, PCB	QFN84, PCB	QFN84, SiP, LGA	QFN84, SiP, LGA	QFN32, SiP
Frequency Bands	Single Band (2.4GHz)	Single Band (2.4GHz)	Single Band (2.4GHz)	Single Band (2.4GHz)	Single Band (2.4GHz)	Single Band (2.4GHz)	Dual Band (2.4/5) and Single Band (2.4)Modules	Dual Band (2.4/5) and Single Band (2.4)Modules	Single Band (2.4)
WLAN Max TX Power / Rx Sens (dBm)	21 / -97.5	21 / -97.5	21 / -97.5	21 / -97.5	21 / -97.5	21 / -97.5	20 / -99	20 / -99	17 / -96.3
Matter Support	Yes	Yes[1]	Yes[1]	Yes	Yes[1]	Yes[1]	Yes[1]	Yes[1]	Yes[1]
Bluetooth Support	Bluetooth LE 5.4	Bluetooth LE 5.4	Bluetooth LE 5.4	Bluetooth LE 5.4	Bluetooth LE 5.4	Bluetooth LE 5.4	Bluetooth, Bluetooth LE 5.0	Bluetooth, Bluetooth LE 5.0	—
3-Wire PTA Support	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Antenna Option (Modules)	*Built-in or RF pins	*Built-in or RF pins	*Built-in or RF pins	*Built-in or RF pins	*Built-in or RF pins	*Built-in or RF pins	RF Pins, built-in or u.FL connector	RF Pins, built-in or u.FL connector	RF Pins, or built-in
IC Compliance Certifications*	BTSIG, WFA	BTSIG, WFA	BTSIG, WFA	BTSIG, WFA	BTSIG, WFA	BTSIG, WFA	BTSIG, WFA	WFA	WFA
Module Certifications*	—	—	—	—	—	—	FCC, IC, CE/ETSI, UKCA TELEC	FCC, IC, CE/ETSI, UKCA TELEC	FCC, IC, CE/ETSI, UKCA TELEC, KC
Application MCU	Yes	—	—	YES	—	—	NO	NO	NO
MCU Type / Speed (MHz)	ARM® Cortex M4F	—	—	ARM® Cortex M4F	—	—	—	—	—
Onboard TCP/ IP Support	Yes	—	YES	YES	—	YES	NO	NO	NO
PSRAM Support	—	—	—	YES	—	—	—	—	—
AI/ML Support	—	—	—	YES	—	—	—	—	—
Key Peripherals/Host Interface	SDIO, USART, UART, SPI, I2C, I2S, SIO, PWM, QEI, ADC/DAC, OpAMP	SDIO, UART, SPI	SDIO, UART, SPI	SDIO, 1x USART, 2x UART, 4x SPI, 3x I2C, 2x I2S, SIO, PWM, QEI, ADC/DAC, CAP, OpAMP	SDIO, UART, SPI	SDIO, UART, SPI	UART, SPI, SDIO, USB CDC	SDIO, USB HS	SDIO/SPI
Max GPIO (GPIO Multiplexer)	22	—	—	46	—	—	—	—	—
Flash	4M / 8M	—	4M	4M / 8M	—	4M	4M	—	—
RAM	672KB	672KB	672KB	672KB	672KB	672KB	—	—	—

*Contact Sales for Availability

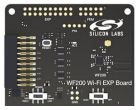
[1] Matter runs on the host

Frequency band and feature support may vary with packages; Refer to website for more details

Wi-Fi Development Kits

Silicon Labs helps you keep your products ahead of the competition by continually developing our Wi-Fi development kits.

SiWx917 Kits, please contact sales for availability.

	**SLEXP8022A**	WF200 Wi-Fi Expansion Kit - Silicon Labs	Buy Now
	**RS9116X-DB-EVK1**	RS9116X Dual Band Wi-Fi + Bluetooth Development Kit (CC1 Module)	Buy Now
	**RS9116X-SB-EVK1**	RS9116X EVK1 Wi-Fi + Bluetooth Dev Kit - Silicon Labs	Buy Now
	**RS9116X-SB-EVK2**	RS9116X EVK2 Wi-Fi + Bluetooth Dev Kit - Silicon Labs	Buy Now

IoT Wi-Fi Technology Leader

The broad range of Wi-Fi SoCs and modules Silicon Labs offers means there's an optimal solution for every IoT use-case. With our renowned hardware, designs have the benefit of superior RF performance for the best possible connectivity, reliability, and user-experience. Further, thanks to our hardware-agnostic stacks, you can reuse Wi-Fi application software, APIs, and integrated development environment across our entire hardware portfolio, minimizing migration efforts when developing new Wi-Fi-enabled products.

Ultra-Low Power:
Designed specifically for IoT, where RF performance, low power consumption, and fast time-to-market are critical, Silicon Labs offers scalable Wi-Fi solutions that are designed to coexist other protocols

Superior Range:
For IoT applications requiring extreme range, Silicon Labs hardware drives transmit power of up to +21 dBm.

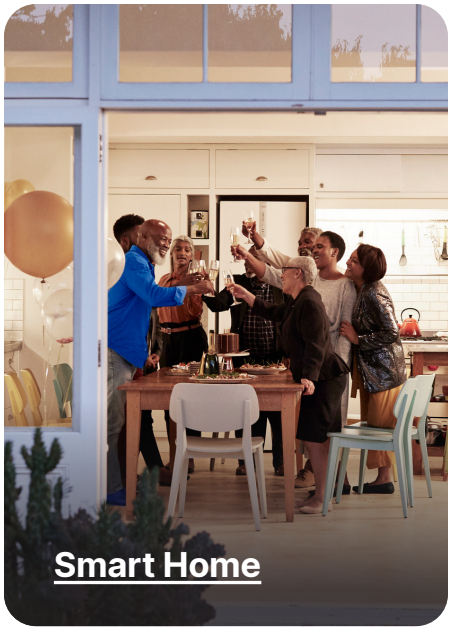
Best-in-Class Security:
Silicon Labs Wi-Fi products feature the most robust security in the low-power Wi-Fi market, compatible with PSA Level 2

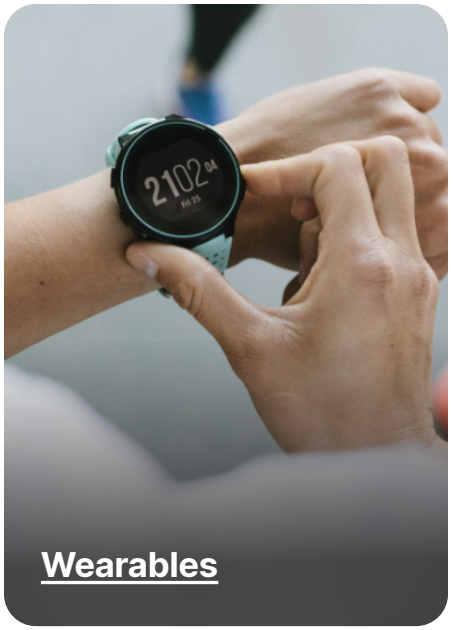
Access Point Interoperability:
Our Wi-Fi products are independently tested against hundreds of Wi-Fi router models to maximize interoperability

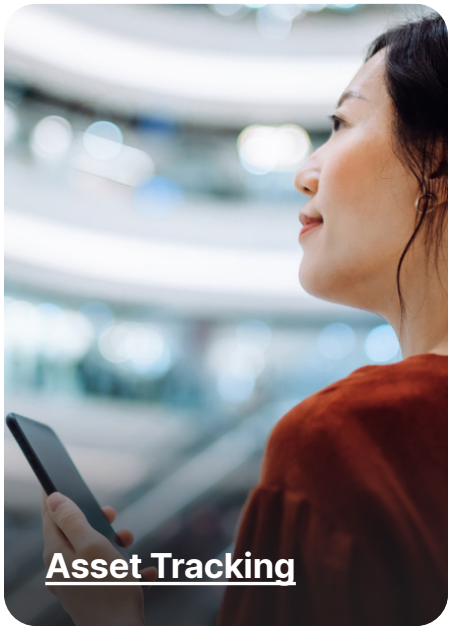
Efficient Development:
Cut your development time and costs radically with our pre-certified Wi-Fi modules with a state-of-the-art antenna and worldwide RF certifications.

AI/ML Edge Processing:
Supports AI/ML edge processing for a high-performance, fully integrated solution for a wide range of applications.

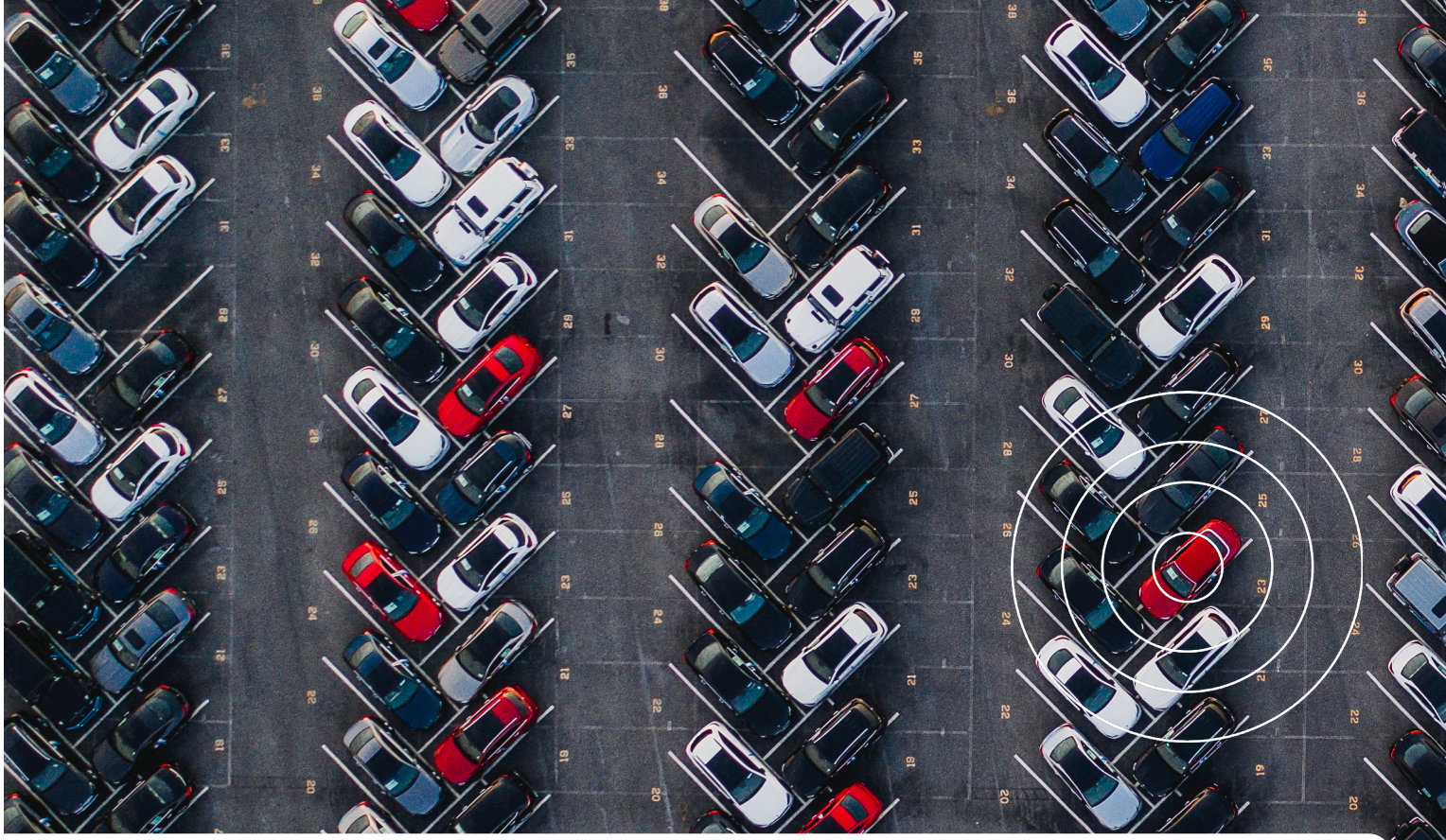
Wi-Fi Applications







Wi-Fi Application Examples



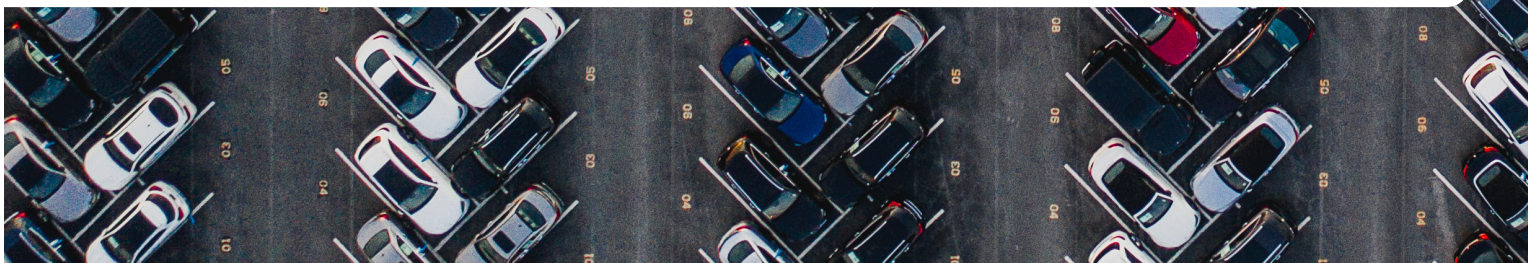
KUDELSKI SECURITY

Kudelski Security

The Challenge:
To build a low-power, wireless vehicle locator device that integrates Wi-Fi, Bluetooth and the highest level of security while maintaining a low-cost design.

The Solution:
The RS9116 Connectivity Module offered Kudelski high throughput and extended range with power-optimized performance to meet its design requirements, creating a B2B2C product that's easy to use every step of the way and has no upfront cost to the dealer.

The Result:
RecovR, a low-power GPS locator, with multi-year battery life, is deployed at car dealerships through a unique two-in-one business model: it simplifies lot management for car dealerships while providing consumers with the most reliable theft recovery solution.



Wi-Fi Application Examples

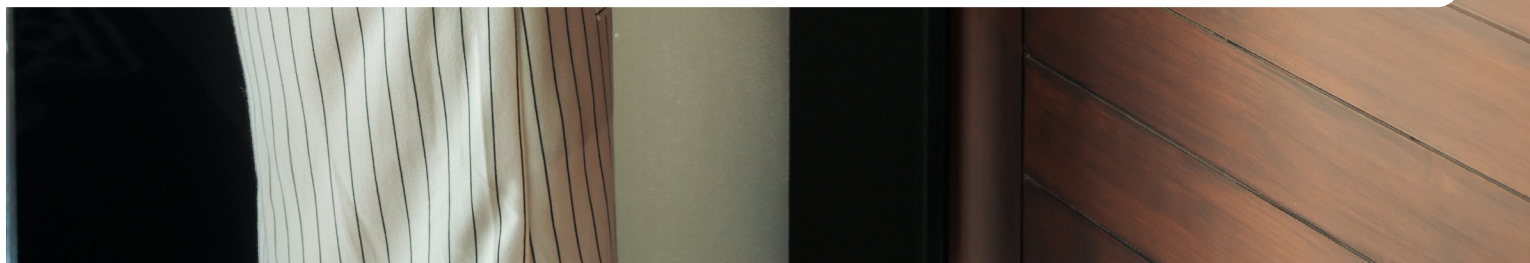
Array By Hampton®

Hampton

The Challenge:
To create a small, attractive, and very secure smart lock that works seamlessly with home Wi-Fi routers to deliver a wide range of remote-control features for deadbolts via any authorized smart phone or tablet.

The Solution:
Utilizing the RS9116 Wi-Fi Connectivity module to develop a low-power, Wi-Fi-enabled line of smart locks that allows you to check the status of your deadbolt, access logs, open automatically via geofencing, and create unique temporary access codes, all within a single smart device app.

The Result:
Array developers were able to dramatically increase battery life, more than doubling what was previously available. Easier access and more control also improved user confidence, with 24-hour insight into what's happening at their properties, regardless of where they might be.



About Silicon Labs

Silicon Labs is the leading provider of silicon, software, and solutions for a smarter, more connected world. Our industry-leading wireless solutions feature a high level of functional integration. Multiple complex mixed-signal functions are integrated into a single IC or system-on-chip (SoC) device, saving valued space, minimizing overall power consumption requirements, and improving products' reliability. We are the trusted partner for the world-leading consumer and industrial brands. Our customers develop solutions for wide range of applications, from medical devices to smart lighting to building automation, and much more.