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
CONNECTED INTELLIGENCE | Wi-Fi

Wi-Fi as a Catalyst for Growth in IoT

Wi-Fi is virtually everywhere. It's deployed on tens of billions of devices in consumer and business applications worldwide. With its high data rates, long-range, and always-on cloud connectivity that makes gateways unnecessary, Wi-Fi has solidified its position as a trusted wireless platform for low-power embedded IoT solutions.

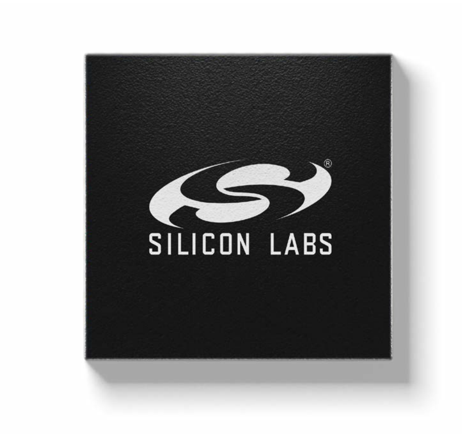
Today, there are two major factors fueling Wi-Fi's continued growth in IoT:

Wi-Fi 6

Wi-Fi standard evolves constantly to serve new emerging application areas. Wi-Fi 6 is the most deployed Wi-Fi standard today. It is packed with features to improve network and energy efficiency, extend battery life, and increase throughput, especially in environments with a high device density. Wi-Fi 6 was designed specifically for low-power IoT segments such as smart home, smart appliances, industrial IoT, building automation, asset tracking, and more.

IoT-optimized Wi-Fi

Silicon Labs is renowned as the global leader in ultra-low-power wireless IoT. Our Wi-Fi portfolio is focused on meeting the stringent requirements of the IoT world: extremely low energy consumption, long range, compact footprint, high computing, robust security, and more. What are your Wi-Fi requirements? This selector guide will help you navigate our IoT-optimized Wi-Fi portfolio and choose the best product and dev kit for your needs.



Our Wi-Fi Products for IoT – Portfolio Overview

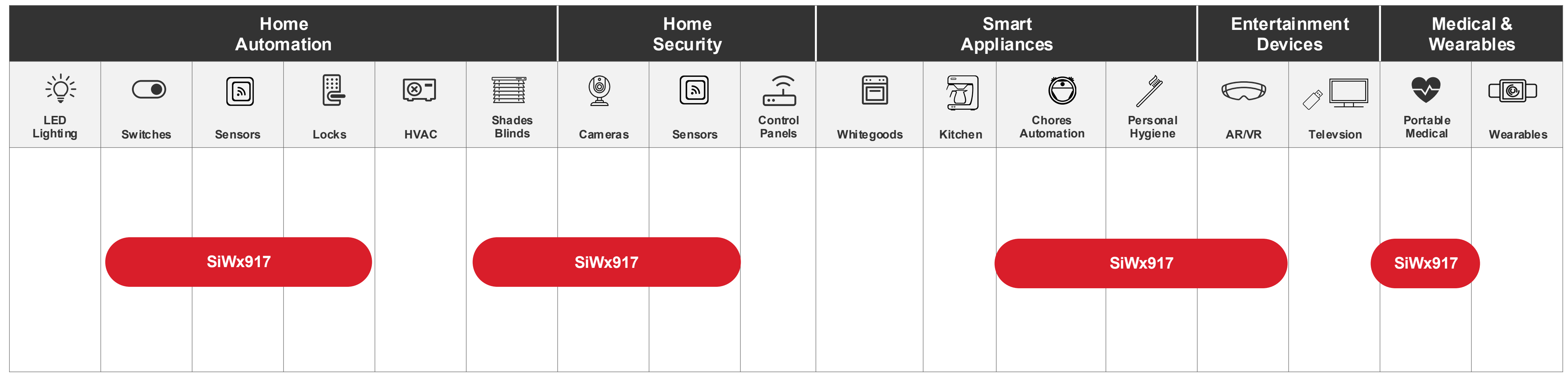
SiWx917 – Ultra-low-power Wi-Fi 6 and Bluetooth LE SoCs and modules

Ultra-low-power single-band Wi-Fi 6, Bluetooth LE, Matter, and IP networking for battery-powered IoT devices. A powerful integrated application processor, AI/ML accelerator, a rich set of peripherals, and high GPIO. A large memory with up to 8MB embedded Flash and PSRAM and external expansion. Supports all operational modes: SoC (i.e., wireless MCU) and network and radio co-processor modes (NCP/RCP). The product family includes compact SoC packages (7x7mm) and RF-certified PCB modules including an antenna or RF-pin.

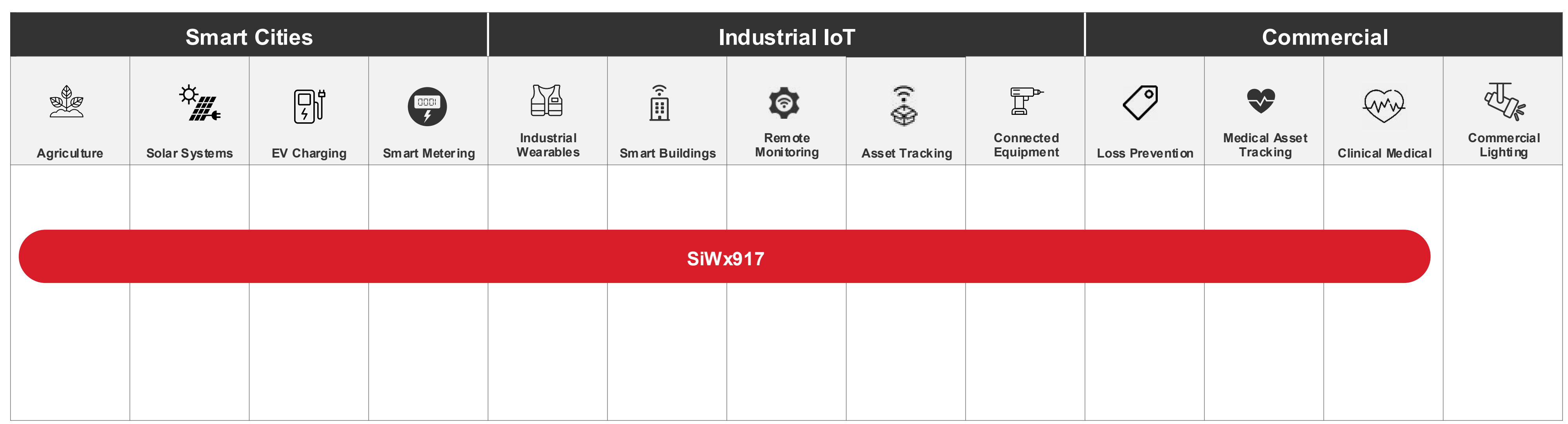
IoT Applications and Wi-Fi Products

The application map below roughly positions our Wi-Fi products for select IoT application segments. However, the application selection is not exhaustive. Our ultra-low-power Wi-Fi products feature high-performance wireless, robust security, powerful computing, and many other features, scaling across a wide range of IoT segments where efficiency in all aspects is critical. The listed IoT application segments allow room for variation in terms of maximum power consumption, features, security, clock speed, system integration, software architecture, and other capabilities. When you have narrowed your focus to fewer product candidates, the specifications sheet on the next page allows you to see more details and compare different options head-to-head.

Consumer IoT



Commercial & Industrial IoT



Wi-Fi SoC and Module Comparison Table

Silicon Labs offers a range of [Wi-Fi SoCs and modules](#) to suit virtually every IoT device maker's design requirement. This specification sheet provides a quick rundown of the main technical characteristics. For more information about each product family, please follow the links to study the entire product collateral. We welcome you to our website to learn more, contact our sales, and order a development kit to begin your journey in ultra-low-power Wi-Fi.

	SiWx917M IC	SiWx917Y Module
Wi-Fi Generation	Wi-Fi 6	Wi-Fi 6
Bluetooth	Bluetooth LE 5.4	Bluetooth LE 5.4
Matter	Yes (in SoC mode)	Yes (in SoC mode)
Modes of operation	RCP, NCP, SoC	RCP, NCP, SoC
Host Type	Hosted or Hostless	Hosted or Hostless
Application MCU	Yes (in SoC mode)	Yes (in SoC mode)
MCU Type	ARM® Cortex® M4 with FPU 180MHz	ARM® Cortex® M4 with FPU 180MHz
Wireless processor	Dedicated, multithread (160MHz)	Dedicated, multithread (160MHz)
Power Modes	Ultra-low-power	Ultra-low-power
AI/ML	Yes (in SoC mode)	Yes (in SoC mode)
RAM memory	672kB (application/wireless)	672kB (application/wireless)
Flash memory (Max)	In-package 8MB (external 16MB)	In-package 8MB (external 16MB)
PSRAM memory (Max)	In-package 8MB (external 16MB)	In-package 8MB (external 16MB)
Security	WPA2/WPA3, SSL/TSL 1.3, Secure Boot/OTA, PUF, TRNG, Secure Key Storage, Debug Lock, Anti Rollback, Encrypted XiP, Secure Attestation	WPA2/WPA3, SSL/TSL 1.3, Secure Boot/OTA, PUF, TRNG, Secure Key Storage, Debug Lock, Anti Rollback, Encrypted XiP, Secure Attestation
Temperature	-40 .. +85 °C	-40 .. +85 °C

*Contact Sales for Availability

[1] Matter runs on the host

2) Wi-Fi 6 TWT with auto-config feature enabled. TWT Rx latency 60s with 8ms wakeup duration. WLAN keep-alive every 60s. No TCP keepalive. 352kB SRAM retention. Does not include application MCU operation.

3) Estimation

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

Wi-Fi SoC and Module Comparison Table

	SiWx917M IC	SiWx917Y Module
Operating voltage	2.97 .. 3.63V	2.97 .. 3.63V
GPIO supply voltage	1.71 .. 3.63V	
Package	7x7 mm IC QFN 84	21x16mm PCB Module LGA 71
Frequency Bands	2.4 GHz (Single-Band)	2.4 GHz (Single-Band)
Channel bandwidth	20MHz	20MHz
WLAN Max TX Power / RX Sensitivity (dBm)	20 / -97.5	16.5 / -94.5
WLAN associated mode current	~20μA [2]	~20μA [2]
Wi-Fi datarate	86 Mbps 802.11ax MCS0 to MCS7	86 Mbps 802.11ax MCS0 to MCS7
Bluetooth Tx power / Rx sensitivity (dBm)	19 / -106 dBm @ 125Kbps	16.5 / -105 dBm @ 125Kbps
Antenna	—	RF-certified antenna or RF-pin
GPIO (GPIO Multiplexer)	45	43
Networking stack	TCP/IP, HTTP/S, SSL/TLS1.3, DHCP, MQTT (offloaded for MCU)	TCP/IP, HTTP/S, SSL/TLS1.3, DHCP, MQTT (offloaded for MCU)
Peripherals	Sensor Hub|Highspeed Peripherals: SDIO, UART, (Q)SPI, I2C, I2S, PWM, RTC, Timers|Ultra Low Power Peripherals: RTC, BOD, UART, I2C, I2S, GPIO, Timers | Analog Peripherals: 12-bit ADC/DAC, Op-Amp, Comparator, and Temp Sensor	Sensor Hub|Highspeed Peripherals: SDIO, UART, (Q)SPI, I2C, I2S, PWM, RTC, Timers|Ultra Low Power Peripherals: RTC, BOD, UART, I2C, I2S, GPIO, Timers | Analog Peripherals: 12-bit ADC/DAC, Op-Amp, Comparator, and Temp Sensor
Learn More	Learn More	Learn More

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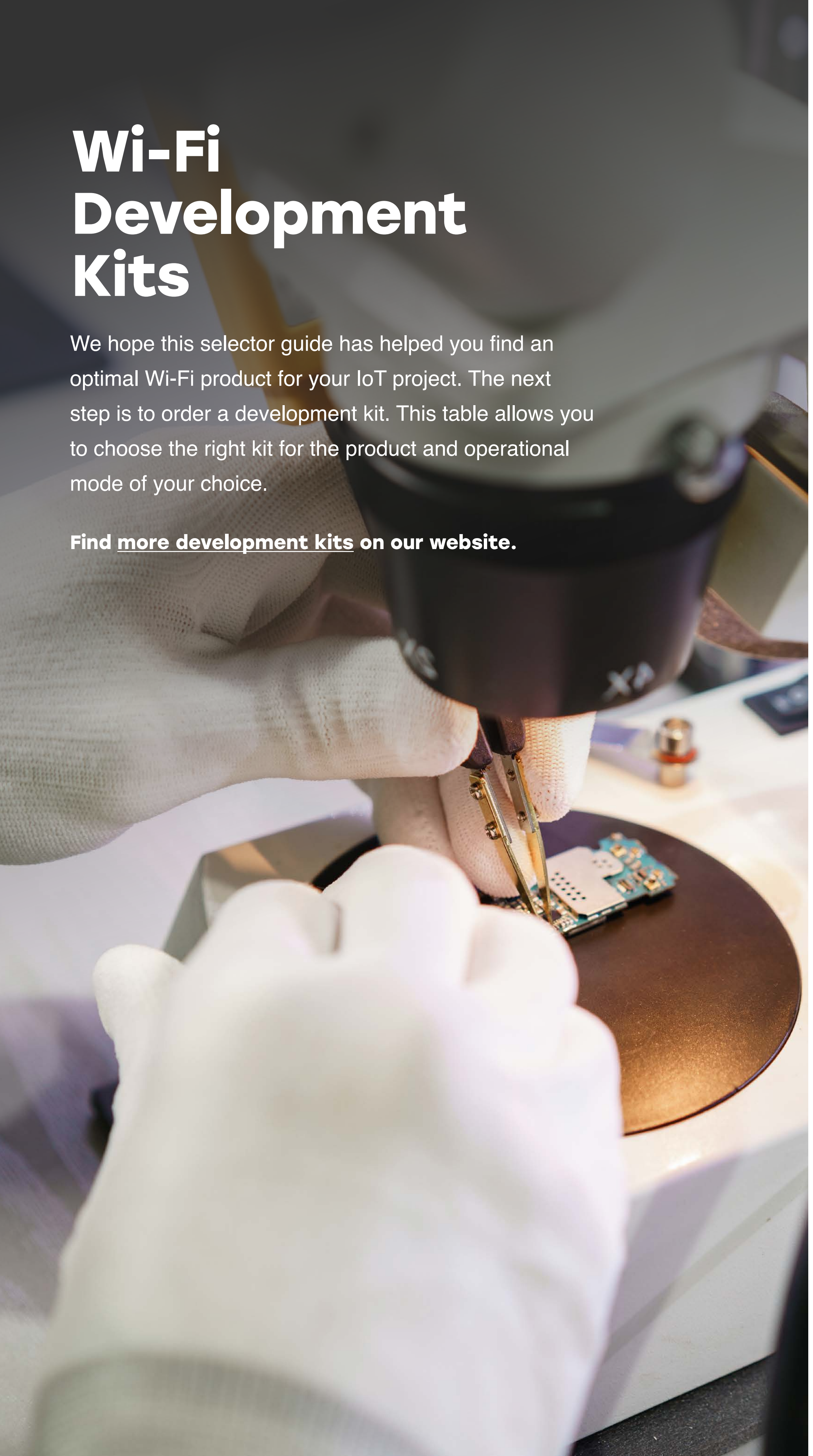


Wi-Fi Development Kits

We hope this selector guide has helped you find an optimal Wi-Fi product for your IoT project. The next step is to order a development kit. This table allows you to choose the right kit for the product and operational mode of your choice.

Find more development kits on our website.

Choosing a development kit for the SiWx917M ICs

SiWG917M ICs (SoC operational mode)	**SiWx917 Wi-Fi 6 and Bluetooth LE SoC Dev Kit** For experimenting and prototyping on the SiWG917M ICs in the SoC mode, choose this kit (complete single-board package).	**SiWx917-DK2605A**
	SiWx917 Wi-Fi 6 and Bluetooth LE SoC Pro Kit For advanced development and performance evaluation on the SiWG917M ICs in the SoC mode, choose this Pro Kit. The package contains Si-MB4002A main board and SiWx917-RB4338A SoC Radio Board.	**SiWx917-PK6031A**
	If you already have an Si-MB4002A main board, you can order the SiWx917-RB4338A SoC Radio Board.	**SiWx917-RB4338A**

SiWN917M IC (NCP operational mode)	**SiWx917 Wi-Fi 6 and Bluetooth LE Co-Processor Radio Board** This is the Radio Board you need for developing in NCP mode. Next, choose Adapter Board A or C based on your host microprocessor. Si-EB8045A	**Adapter Board A for Silicon Labs EFR32 hosts** If your host microprocessor will be Silicon Labs EFR32, order the Adapter Board A to connect the SiWx917-RB4346A to your EFR32 host.	**SiWx917-RB4346A**
		Shield Adapter Board C for STM32 Nucleo-64 hosts If your host processor will be STM32 Nucleo-64, order the Adapter Board C to connect the SiWx917-RB4346A to your STM32 Nucleo-64 host via Shield.	**Si-EB8045A**
SiWT917M IC (RCP operational mode)	**SiWx917 Wi-Fi 6 and Bluetooth LE Co-Processor Radio Board** This is the Radio Board for developing in RCP mode. Next, choose Adapter Board A or B based on your host microprocessor. SiWx917-RB4346A	**Adapter Board A for Linux x86 and Linux Arm hosts** If your host processor will be Linux x86 or Linux Arm, order the Adapter Board A to connect the SiWx917-RB4346A to your Linux host via SDIO.	**Si-EB8045A**
		Adapter Board B for Raspberry Pi 4 HAT If your host processor will be Raspberry Pi 4, order the Adapter Board B to connect the SiWx917-RB4346A to your Raspberry Pi host.	**Si-EB8045B**

Wi-Fi Development Kits

Find more development kits on our website.

Choosing a development kit for the SiWx917Y Modules

SiWG917Y Modules (SoC operational mode)

SiWx917 Wi-Fi 6 and Bluetooth LE SoC Module Radio Board
This is the Radio Board for developing on the SiWG917Y modules in the SoC mode. You will need a Si-MB4002A main board also.

SiWx917-RB4343A
COMING SOON

Main board Si-MB4002A
Order the Si-MB4002A main board, if you don't have one yet.

Si-MB4002A

SiWN917Y Module (NCP operational mode)

SiWx917 Wi-Fi 6 and Bluetooth LE Module Co-Processor Radio Board
This is the Radio Board you need for developing in NCP mode. Next, choose Adapter Board A or C based on your host microprocessor.

SiWx917-RB4357A
COMING SOON

Adapter Board A for Silicon Labs EFR32 hosts
If your host processor will be Silicon Labs EFR32, order the Adapter Board A to connect the SiWx917-RB4357A to your EFR32 host.

Si-EB8045C

Shield Adapter Board C for STM32 Nucleo-64 hosts
If your host processor will be STM32 Nucleo-64, order the Adapter Board C to connect the SiWx917-RB4357A to your STM32 Nucleo-64 host via Shield.

Si-EB8045C

SiWT917Y Module (RCP operational mode)

SiWx917 Wi-Fi 6 and Bluetooth LE Module Co-Processor Radio Board
This is the Radio Board for developing in RCP mode. Next, choose Adapter Board A or B based on your host microprocessor.

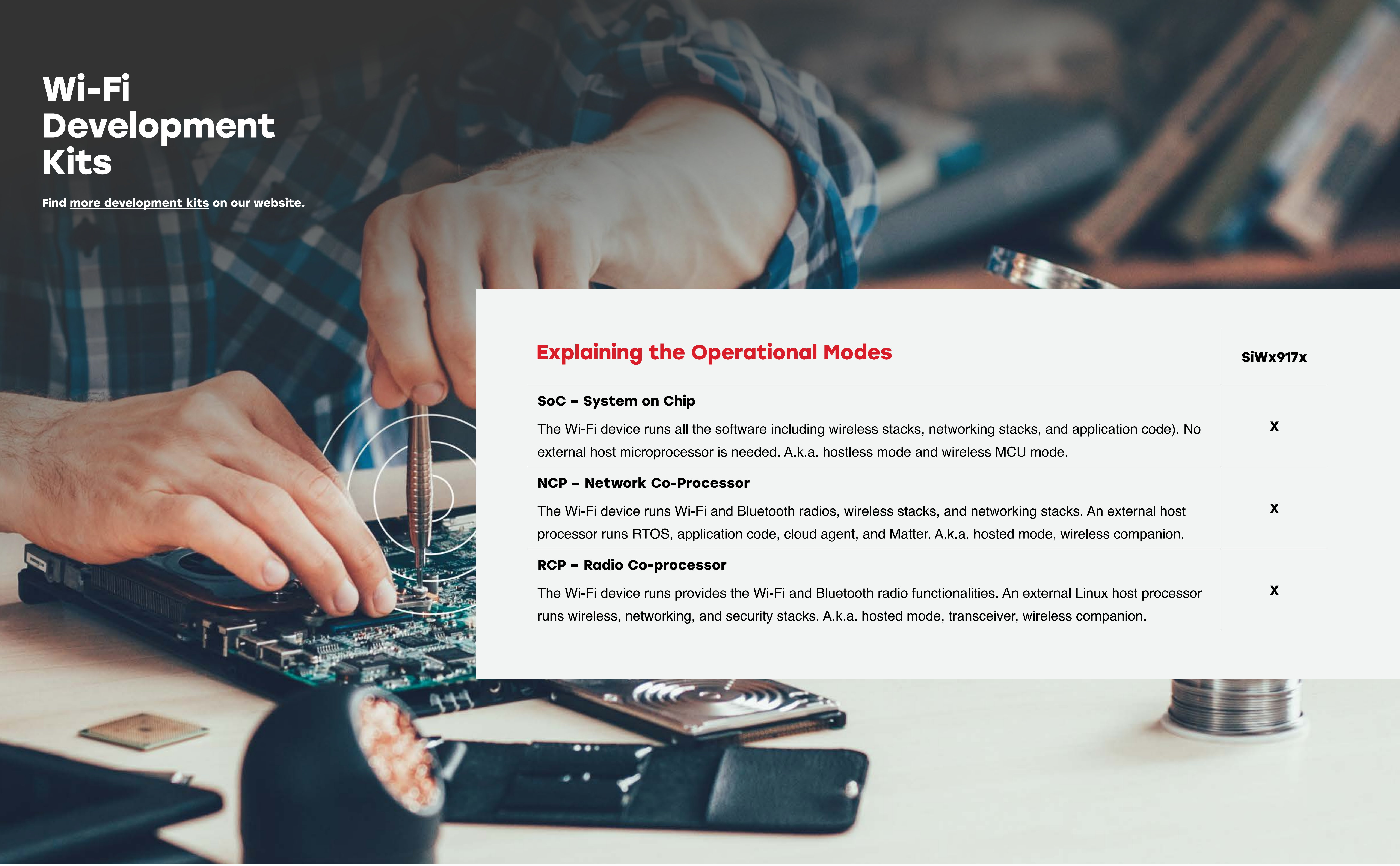
SiWx917-RB4357A
COMING SOON

Adapter Board A for Linux x86 and Linux Arm hosts
If your host processor will be Linux x86 or Linux Arm, order the Adapter Board A to connect the SiWx917-RB4357A to your Linux host via SDIO.

Si-EB8045A

Adapter Board B for Raspberry Pi 4 HAT
If your target host processor runs a Arm core we recommend the Raspberry Pi 4 with the Adapter Board B to connect the SiWx917-RB4357A to the Raspberry Pi host.

Si-EB8045B



Wi-Fi Development Kits

Find more development kits on our website.

Explaining the Operational Modes

Explaining the Operational Modes	SiWx917x
SoC – System on Chip The Wi-Fi device runs all the software including wireless stacks, networking stacks, and application code). No external host microprocessor is needed. A.k.a. hostless mode and wireless MCU mode.	X
NCP – Network Co-Processor The Wi-Fi device runs Wi-Fi and Bluetooth radios, wireless stacks, and networking stacks. An external host processor runs RTOS, application code, cloud agent, and Matter. A.k.a. hosted mode, wireless companion.	X
RCP – Radio Co-processor The Wi-Fi device runs provides the Wi-Fi and Bluetooth radio functionalities. An external Linux host processor runs wireless, networking, and security stacks. A.k.a. hosted mode, transceiver, wireless companion.	X

Why Choose Silicon Labs Wi-Fi SoCs and Modules

Silicon Labs is the global technology leader in ultra-low-power wireless IoT. With our Wi-Fi portfolio, we are bringing our signature ultra-low-power performance into the Wi-Fi space, delivering years of battery life for always-on cloud-connected IoT devices without compromising performance. Our Wi-Fi Developer Journey, online Community, and global support team are geared to simplify life for the designers and developers, enabling a smooth development process and timely product launch.

Ultra-Low Power:
Designed for IoT with extremely low power consumption and superior wireless performance. SiWx917 offers the lowest-power Wi-Fi 6, delivering years of battery life for always-on cloud-connected IoT devices.

Fast Time to Market:
Our Wi-Fi modules, equipped with a state-of-the-art antenna, worldwide RF regulatory certifications, and many other integrated components, can radically reduce your time to market, sourcing risks, and development costs.

Robust Security:
Silicon Labs Wi-Fi solutions feature a dedicated security engine that runs a broad set of security features to protect the cloud connection, device, and user.

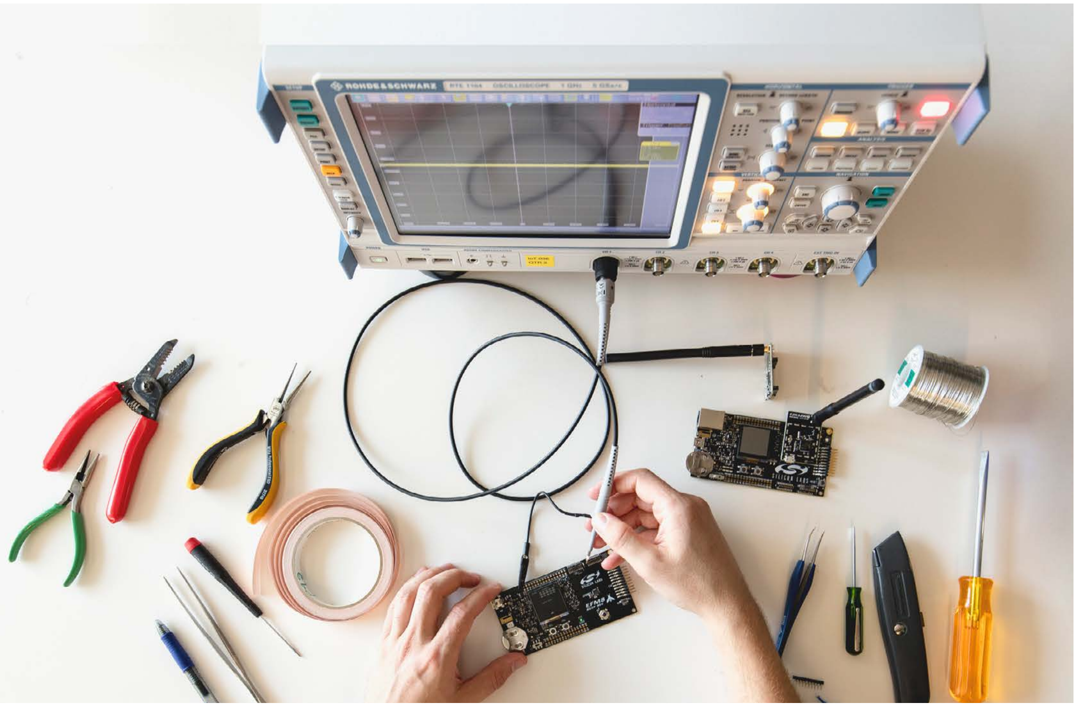
Fully Integrated Solutions:
Our fully integrated Wi-Fi solutions enable cost-efficient single-chip IoT device designs: Wi-Fi, Bluetooth, Matter, IP networking, powerful application processor, security, a rich set of peripherals, high GPIO count, large memory, and much more.

Access-Point Compatibility:
Our Wi-Fi products are independently tested (Novus Labs) against 100+ Wi-Fi access point models to maximize interoperability across worldwide markets, improving user experience and reducing your support costs.

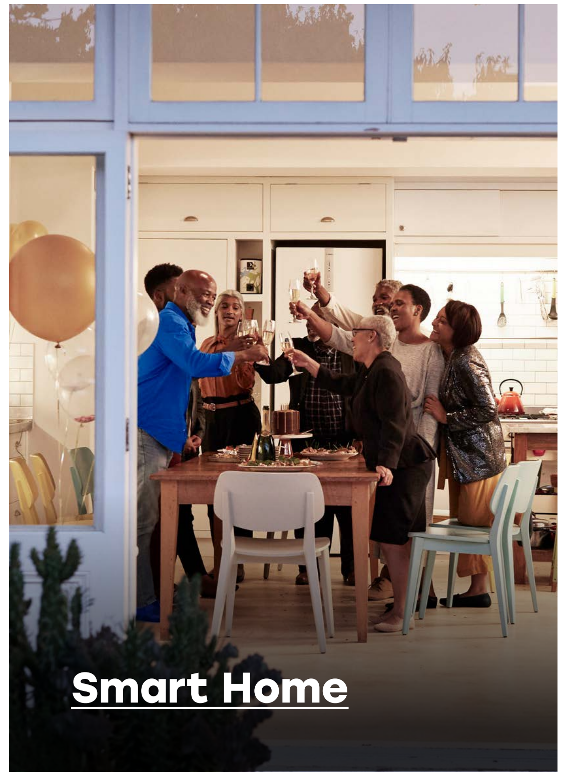
Secure Programming:
Our Custom Part Manufacturing Service (CPMS) allows you to order customized SiWx917 SoC and modules from the Silicon Labs fab, including flash programming, unique part numbering, and custom package markings to reduce manufacturing risks (counterfeiting, IP theft, unauthorized production).

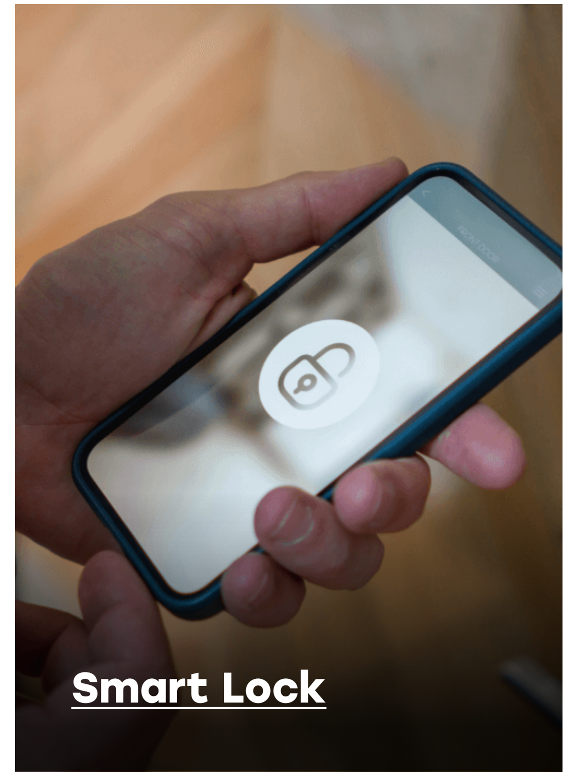
Wi-Fi Developer Journey

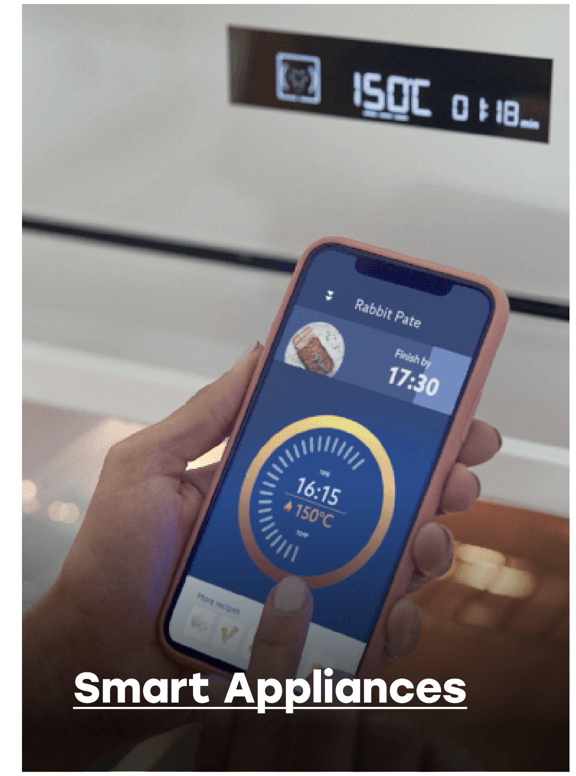
Developing ultra-low-power Wi-Fi devices that deliver world-class wireless performance for users will not be easy. Our Wi-Fi developer journey will guide you through the entire process – from docking your kit and setting up the tools to developing, debugging, testing, and preparing your product for the official certifications. With the Wi-Fi developer journey, you can avoid common mistakes, plan your schedule and resources wisely, and make the product launch date as promised!

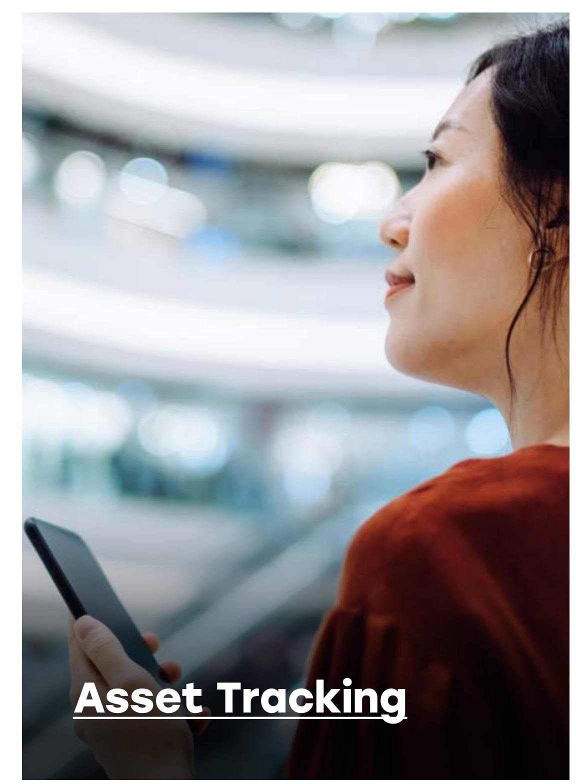


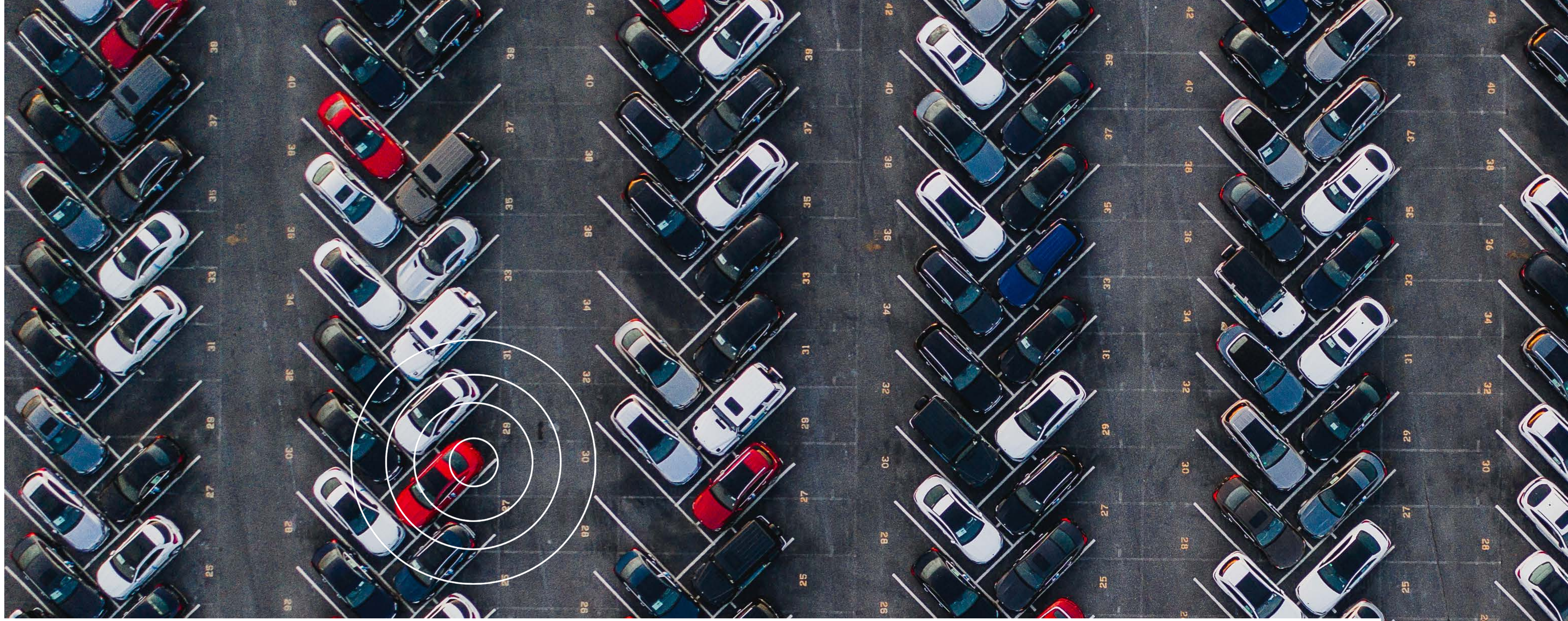
Wi-Fi Applications











Wi-Fi Application Examples

Kudelski Security

The Challenge:

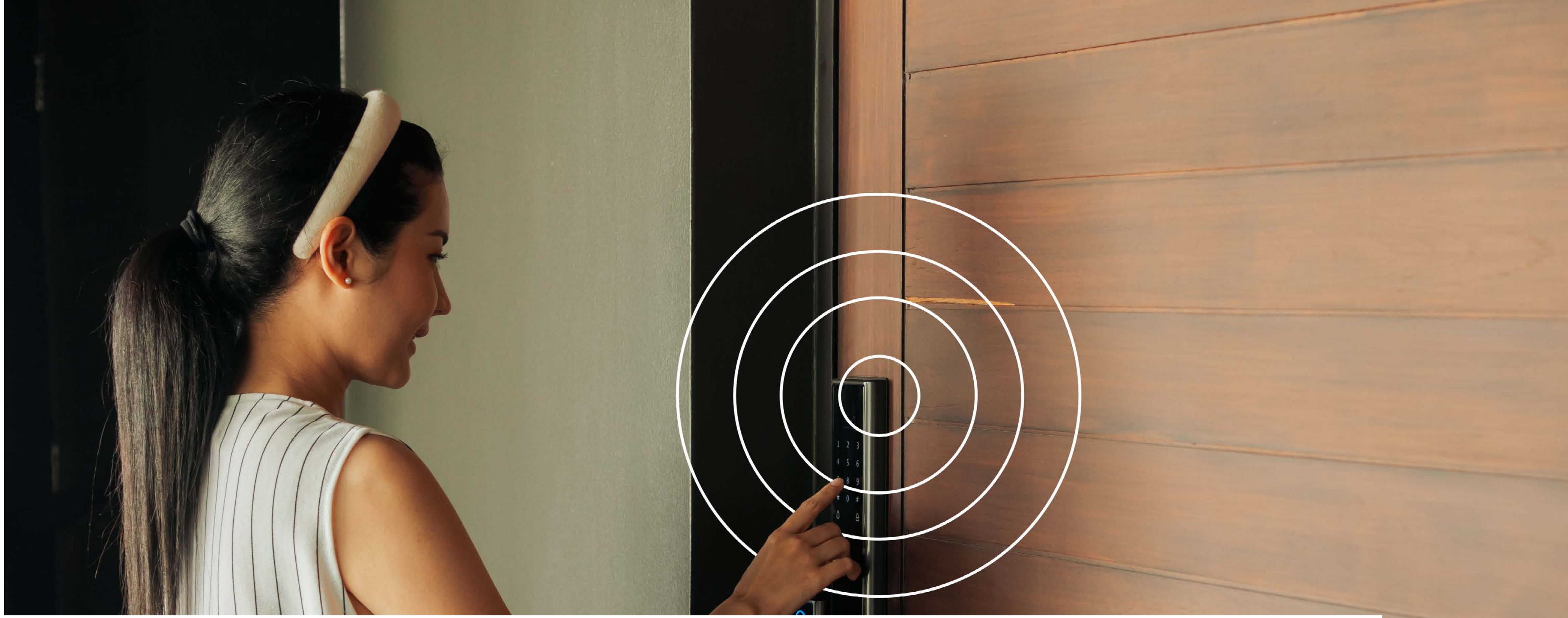
To build a low-power, [wireless vehicle locator] device that integrates Wi-Fi, Bluetooth and the highest level of security while maintaining a low-cost design.

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 transceiver 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:
Easier access and more control improve user confidence in home security, 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 IoT applications, from medical devices to smart lighting to building automation, and much more.

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