Tech Talks LIVE Schedule – Presentation will begin shortly

Tuesday, October 12	**Develop Wi-Fi RS9116 within Simplicity Studio**
Tuesday, October 26	How Unify SDK helps manage Multiple Protocols
Tuesday, November 9	Walk through Silicon Labs' new support for Apple HomeKit
Tuesday, November 23	New Bluetooth Mesh Light & Sensor Models
Tuesday, December 7	Learn more about Matter Development for the Holidays
Tuesday, December 21	Secure IoT Products with Customer Programming Manufacturing Services (CPMS)

Respond to the poll to enter to win an RS9116 Evaluation Kit

Recording and slides will be posted to:
www.silabs.com/training

We will begin in: 0:00

SILICON LABS

tech talks

Develop Wi-Fi RS9116 within Simplicity Studio

Kyle Dando

The Leader in Short Range IoT Wireless Connectivity

60%
Revenue Based on IoT

Bluetooth · Multiprotocol · Proprietary 100s of Technologies · THREAD · Wi Fi · Wi SUN · zigbee · Z-WAVE
Breadth and Depth of Wireless IoT Protocols

#1
Share in Mesh

1st
To Market with Multiprotocol, BLE Mesh, BLE 5.1

Innovation
Performance, Power, CoEx, Xpress, Modules

ember	ENERGY micro	bluegiga	telegesis	Micrium	ZENTRI	Z-WAVE	REDPINE SIGNALS
2012	2013	2015	2015	2016	2017	2018	2020
Software ZigBee SoC	Low-power 32-bit MCUs	BT Smart Modules	ZigBee/Thread Modules	Software RTOS	Cloud Connected Wi-Fi	Smart Home Protocol	Ultra Low Power Wi-Fi

Why Wi-Fi?

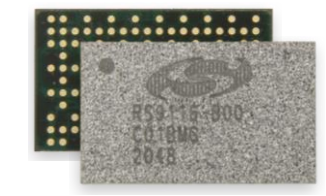
- **Wi-Fi is the ubiquitous wireless standard**
- **Connects wireless ‘things’ to the Internet**
- **Most effective cost basis**
- **Massive annual deployments**
  - 3-4Billion units per year (includes Smartphones etc.)
  - 800M are “things” (IoT type products)
  - 200M are battery powered
- **Designed to be scalable**
  - High bandwidth – streaming video
  - Low bandwidth – command/control & sensors
- **Compatible with all major ecosystems**
  - (Google, Amazon and others)
- **Supports all upcoming initiatives**
  - Project Matter (formerly CHIP)

Wi-Fi in IoT

- **Traditional Wi-Fi is not suited for IoT**
  - For infrastructure, high bandwidth or mains powered devices
  - With highly resourced hardware (memory, CPU)
- **IoT designs have unique challenges**
  - Wireless, networking stack integration
  - Cloud connectivity to multiple could providers
  - Security from online and physical attacks
  - Limited device resources (MCU, memory, etc.)
  - Battery powered applications require low power
  - Infrequent battery charging or replacements
  - Challenges from crowded RF spectrum
  - Limited easy-to-use user interface options
  - Cost constrained devices

RS9116: Optimized Wi-Fi for the IOT

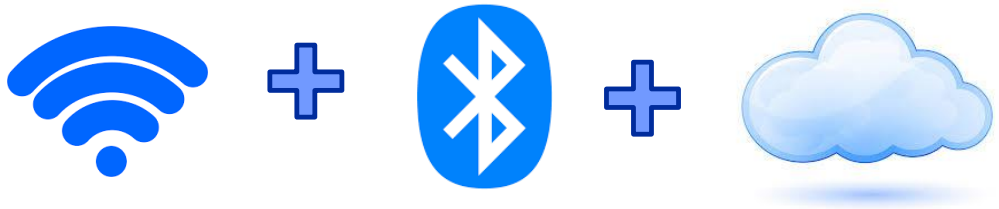
IoT End Nodes



Ultra-Low Power Wi-Fi + BT/BLE 5 for Always-on IoT Devices

- **Multi-protocol Support**
  - Wi-Fi 4 (2.4/5 GHz)
  - Bluetooth 2.1 + EDR
  - BLE 4.0/4.1/4.2/5.0
- **Ultra-Low Power**
  - 55 µA Standby Associated at 1s listen Interval
  - 1Mbps Listen current: 14 mA
  - Deep Sleep Current: <1 µA
  - <8mA TX in BT5 mode at 2Mbps
- **Wi-Fi Radio**
  - +20 dBm TX
  - -98 dBm RX
  - 20 MHz Bandwidth
  - 1Mbps to MCS7 data rates
- **BT/BLE Radio**
  - +20 dBm TX
  - -95 dBm RX (LE)
  - -106 dBm RX (LR)
  - Dual mode Bluetooth 5
  - 125 kbps to 2Mbps BLE rates
- **World Class Software**
  - Transceiver and Full NCP modes
  - Open-Source Linux driver for transceiver mode
  - Integrated Wi-Fi, BT/BLE stack
  - Integrated Networking stacks
  - Cloud connectivity
  - Support for Simplicity Studio
- **Compact Size**
  - 7x7 mm 2.4GHz QFN (QMS IC)
  - 4.63 x 7.9 mm 2.4GHz SiP
  - 9.1 x 9.8 mm 2.4/5GHz SiP
- **Security**
  - WPA/WPA2-Personal, WPA/WPA2 Enterprise for Client (WPA3 in roadmap)
- **Accelerators**
  - AES128/256 in Embedded Mode
- **Certifications**
  - FCC/IC/CE certified modules (TELEC, SSRC in roadmap)
  - BTSIG certification
  - Wi-Fi alliance certification (roadmap)

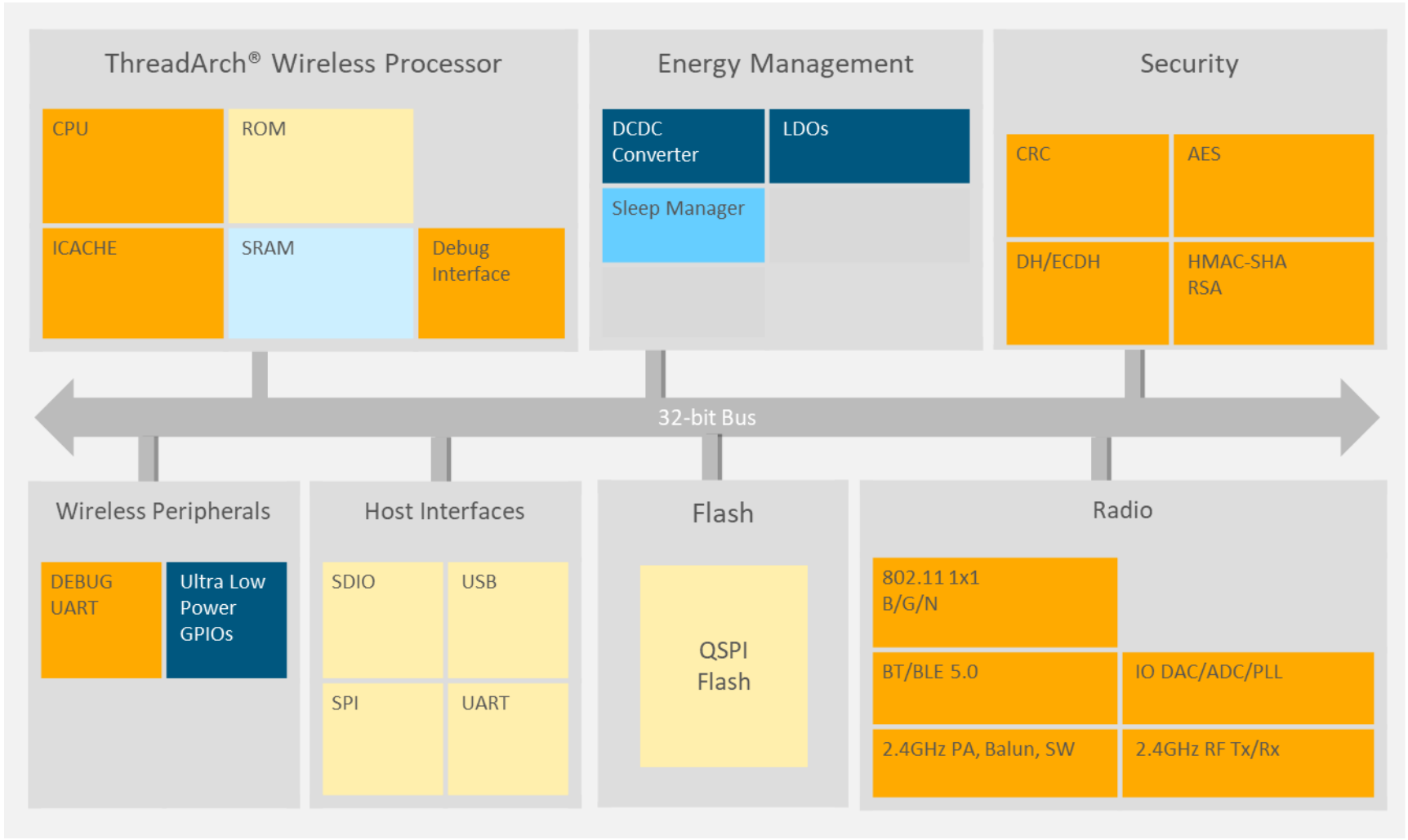
RS9116 Benefits



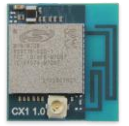
Ultra-Low Power Consumption for Battery Operated Devices

- Industry leader in Low power Wi-Fi + BT/BLE 5
  - 55uA stand-by associated current at DTIM10
- Industry leader in small form-factor design (4.63mm x 7.90mm)
- Integrated wireless stacks, networking stacks, cloud connectivity and security
- Integration with Silicon Labs' MCU/Wireless solutions, Simplicity Studio v5 (SSv5)

RS9116 SoC Block Diagram

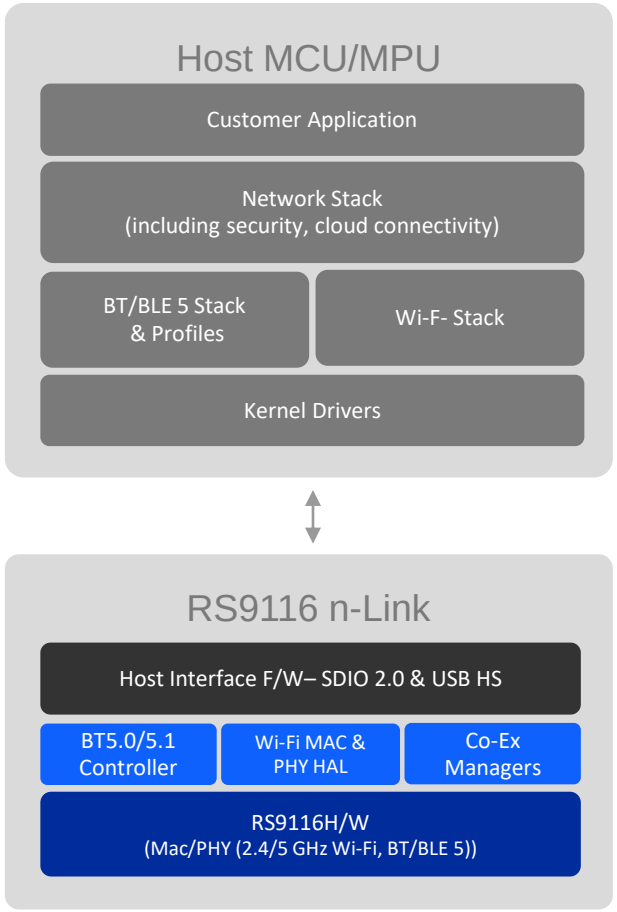


Supported Chip and Module Packages

	 QMS IC	 B00 Module	 CC0 Module	 CC1 Module
Package	QFN 84 pin	LGA 126	LGA 173	LGA 107
Size	7 x 7 x 0.85 mm	4.63 x 7.9 x 0.9 mm	9.1 x 9.8 x 1.2 mm	15 x 15 .7 x 2.2 mm
Format	SoC	SiP	SIP	PCB Module
Focus Market	Home, Industrial	Wearables	Industrial, Medical, Home	Industrial, Medical, Home
Wi-Fi Support	B/G/N	B/G/N	A/B/G/N	A/B/G/N
Bluetooth Support	5.0 (BT + BLE)	5.0 (BT + BLE)	5.0 (BT + BLE)	5.0 (BT + BLE)
Antenna	No	No	No	Yes (PCB & u.FL)
Temperature Range	-40 °C to +85 °C	-40 °C to +85 °C	-40 °C to +85 °C	-40 °C to +85 °C
Regulatory Certifications*	N/A	FCC, IC, CE	FCC, IC, CE	FCC, IC, CE
Compliance Certifications	BTSIG	BTSIG	BTSIG	BTSIG
	Single Band (2.4GHz)		Dual Band (2.4/5GHz)	

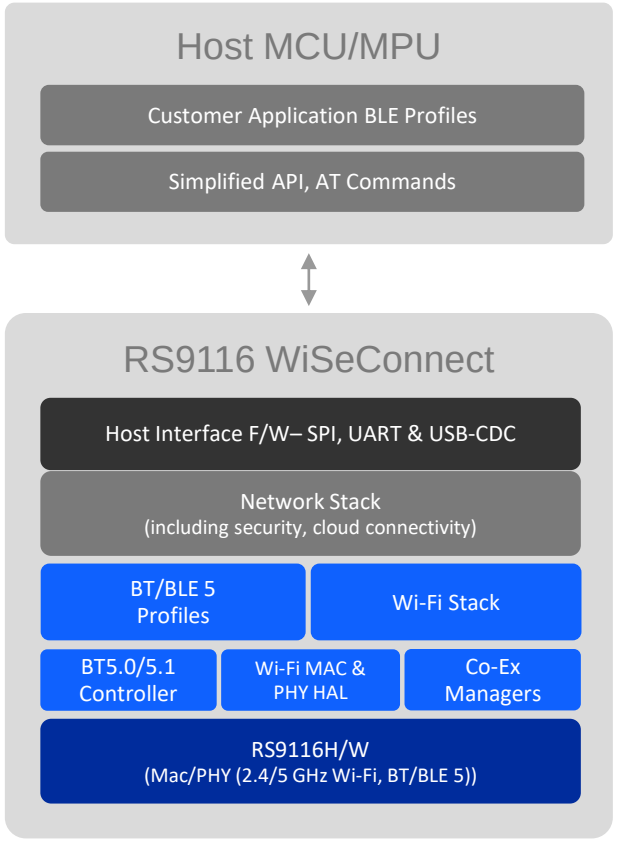
(*)Note: TELEC and SRRC for modules are in roadmap

RS9116 n-Link (Transceiver) Overview



- **Linux OS; SDIO 2.0 and USB HS host interfaces**
- **Operating Modes**
  - Wi-Fi Station, Wi-Fi Access Point, BT/BLE 5
  - Wi-Fi Station + BLE 5, Wi-Fi Station + BT, Wi-Fi Station + BT + BLE5
  - Provisioning using Wi-Fi AP or BLE modes
- **Multiple power modes for reducing system power**
- **2.4 and 5 GHz Wi-Fi Support**
  - Personal and enterprise security
  - Enterprise security with TLS 1.2, TTLS, PEAP
  - WPA/WPA2 are supported; WPA3 and WPA2 enhancements in roadmap
- **Interfaces with Bluetooth stack using HCI interface**
  - BT EDR 2.1, BLE 4.0/4.1/4.2, BLE 5
  - Support for BLE long range, data rates up to 2 Mbps
  - BLE dual role (central and peripheral) support
  - Support for BT dual-mode (BT + BLE simultaneously)

RS9116 WiSeConnect (Full NCP) Overview

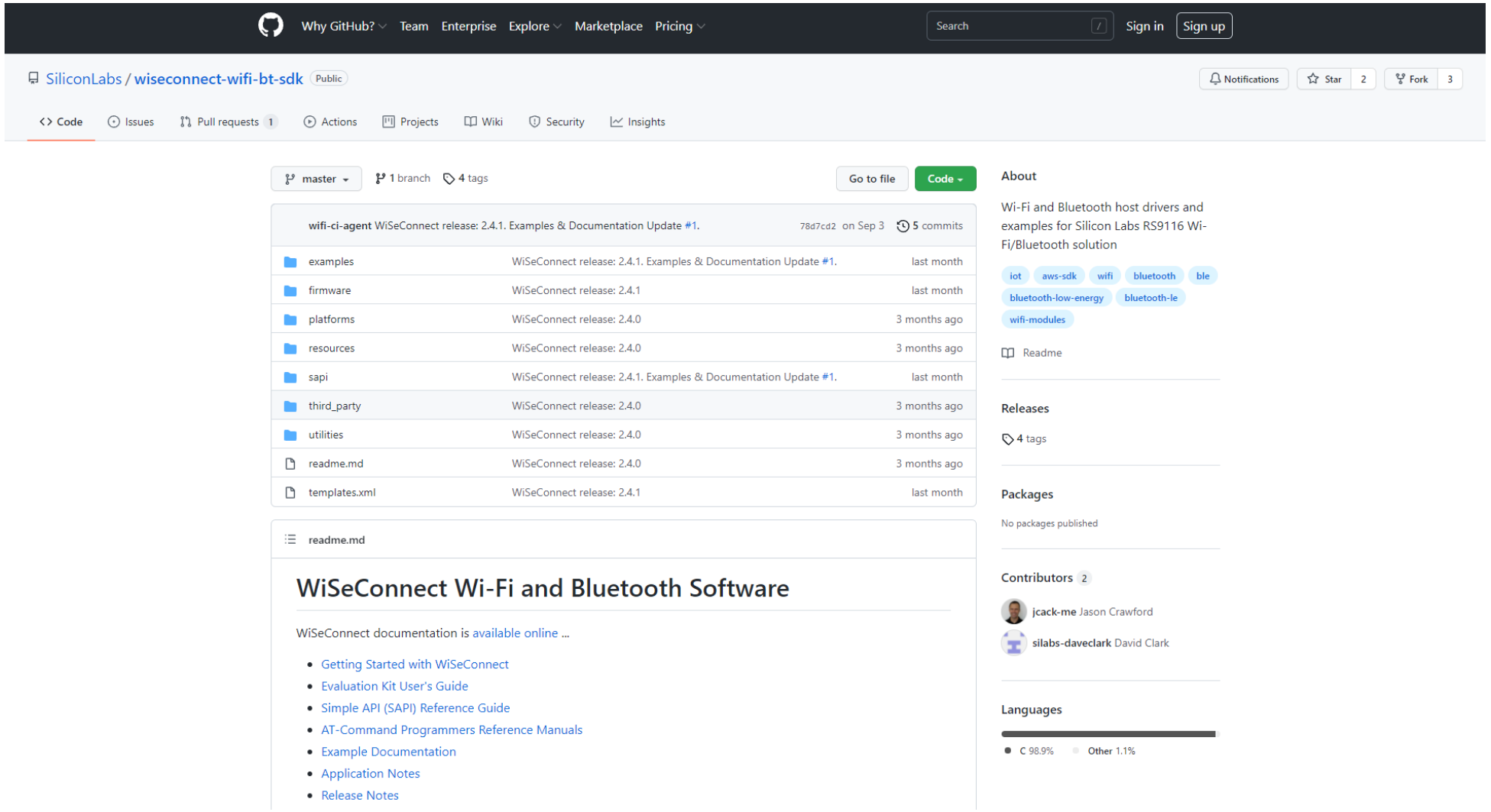


- **Integrated stacks and profiles**
  - Wi-Fi stack, BT/BLE stack and profiles
  - TCP/IP (IP v4) Networking stack with SSL 3.0/TLS 1.2, HTTP/HTTPS, Websockets, DHCP, MQTT Client; TCP/IP bypass mode (networking stack runs on host)
  - SPI, UART, USB-CDC host interfaces
- **Operating Modes**
  - Wi-Fi Station, Wi-Fi Access Point, BT/BLE 5
  - Wi-Fi Concurrent Station and Access Point
  - Wi-Fi Station + BLE 5, Wi-Fi Station + BT, Wi-Fi Station + BT + BLE5
  - Provisioning using Wi-Fi AP or BLE modes
- **Multiple power modes for reducing system power**
- **2.4 and 5 GHz Wi-Fi Support**
  - Personal and enterprise security
  - Enterprise security with TLS 1.0, TTLS, PEAP
  - WPA/WPA2; WPA2 enhancements and WPA3 in roadmap
- **Bluetooth and BLE Support**
  - BT EDR 2.1, BLE 4.0/4.1/4.2, BLE 5
  - Support for BLE long range, data rates up to 2 Mbps
  - BLE dual role (central and peripheral) support
  - BT Profiles: GAP, SDP, SPP, RFCOMM, L2CAP
  - BLE Profiles: GATT, GAP, PXP
  - Support for BT dual-mode (BT + BLE simultaneously)

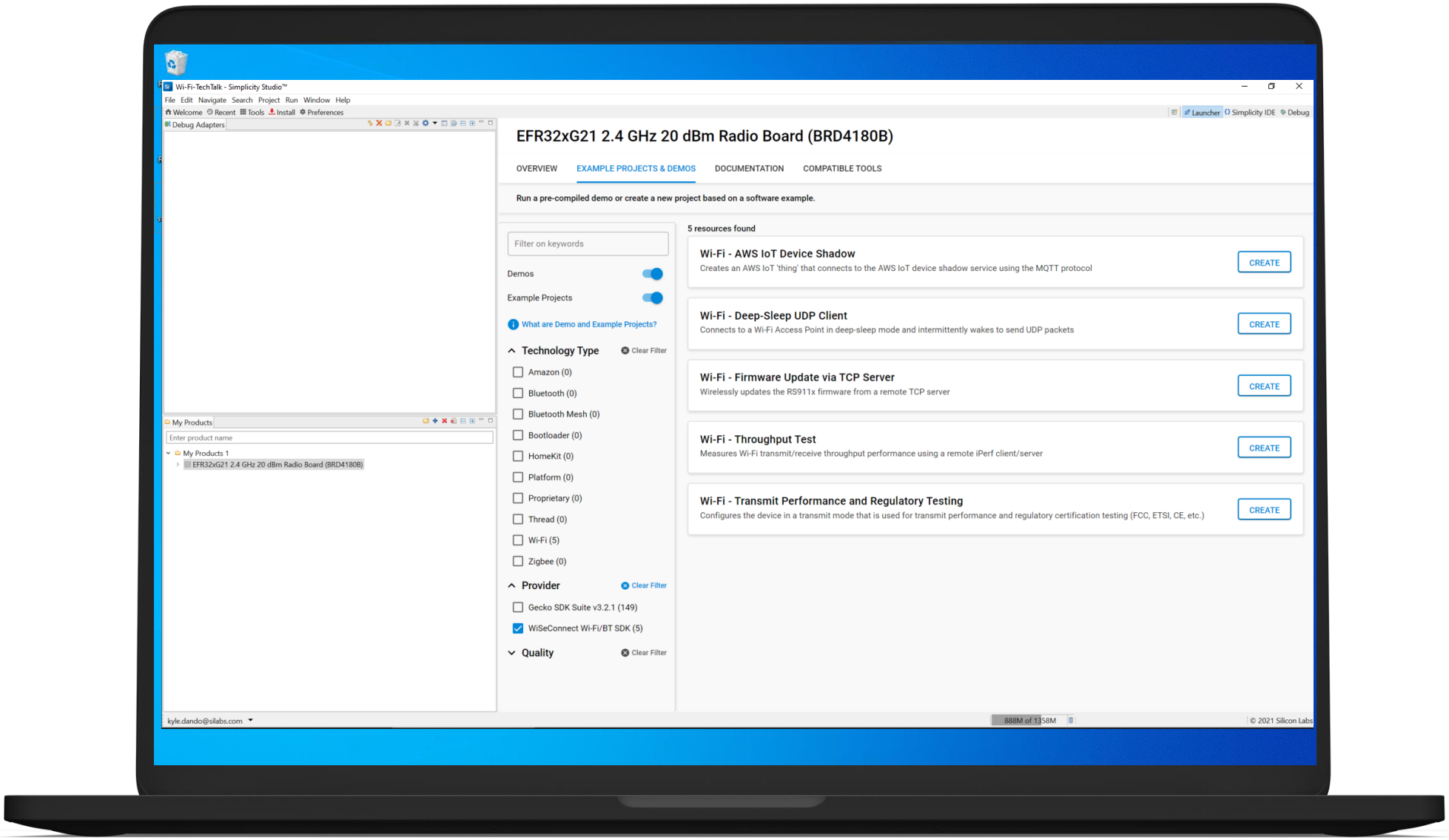
Development: Evaluation Kits

- **Same EVK for Transceiver and Full NCP**
- **All accessories and software included**
  - Sample examples for reference
- **Adaptor card for interfacing with EFx boards and SSv5**
- **OPNs for Single and Dual Band EVKs**
  - Single Band (QMS): RS9116X-SB-EVK1
  - Single Band (B00): RS9116X-SB-EVK2
  - Dual Band (CC1) RS9116X-DB-EVK1

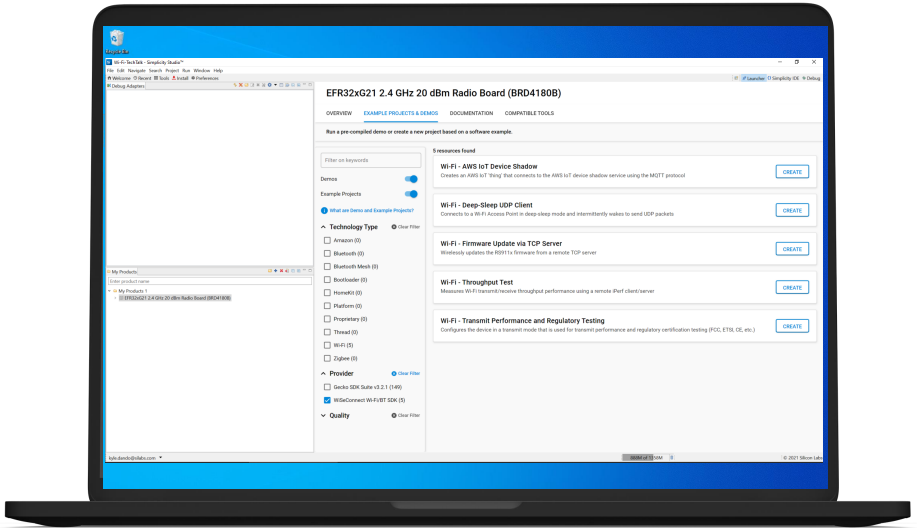
Development: GitHub Repo

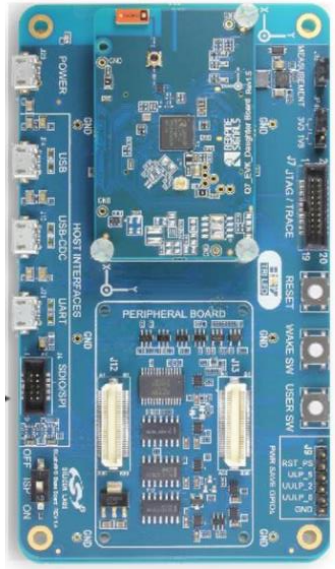


Development: Simplicity Studio IDE



Develop Wi-Fi RS9116 within Simplicity Studio





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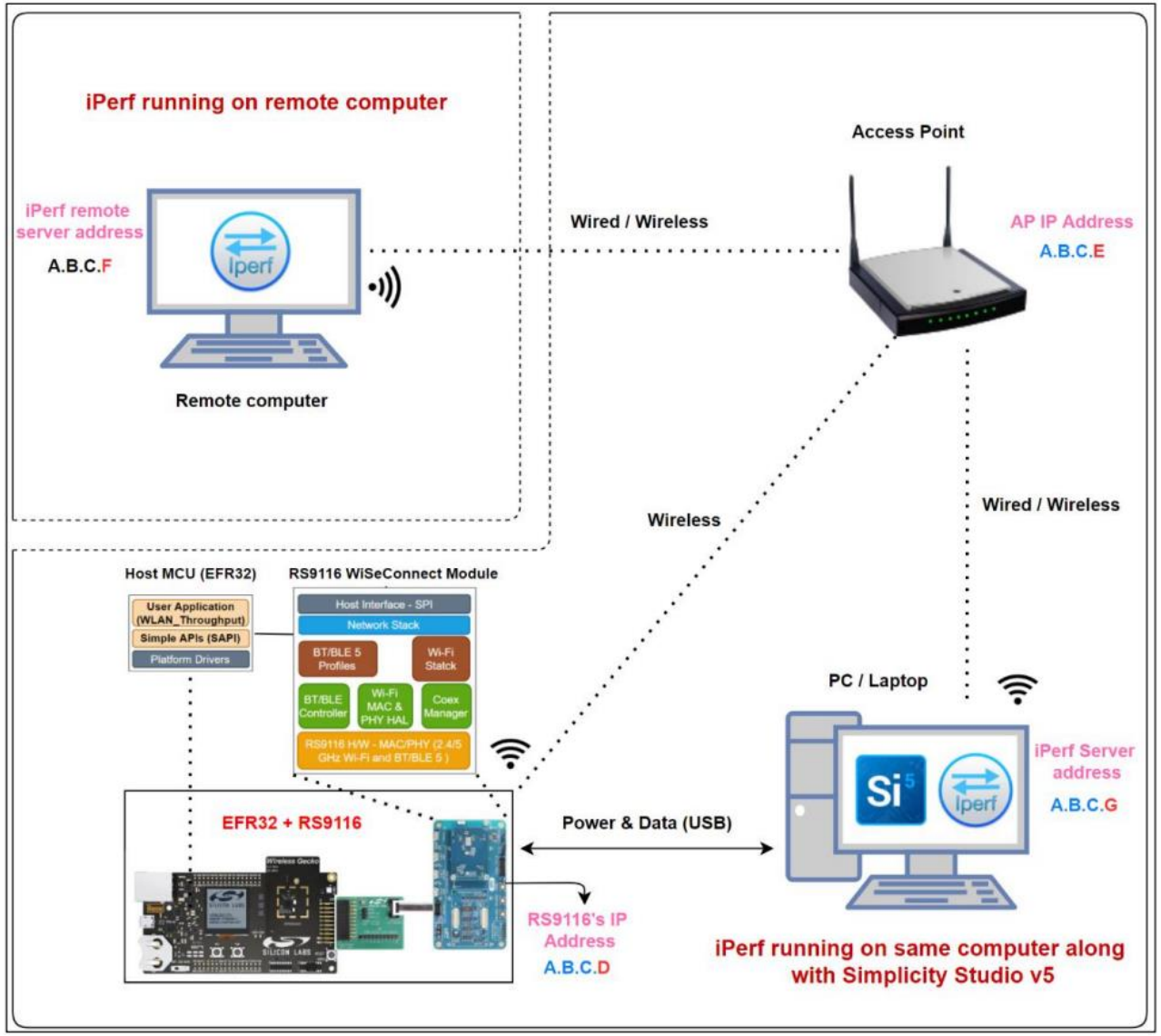
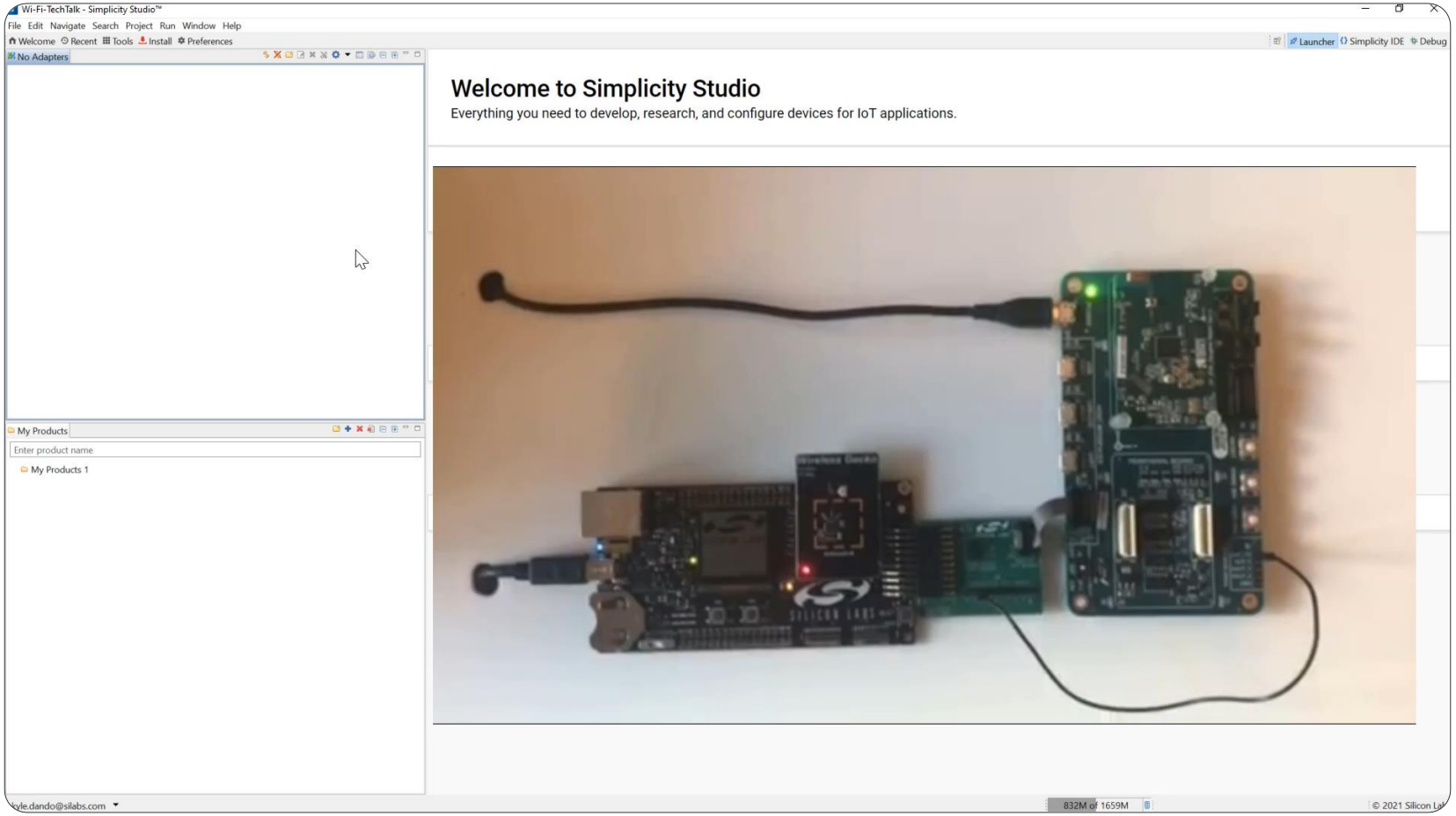
Development Demo: RS9116 Throughput



Development Demo: RS9116 Throughput



Wrap Up: Resources

- www.silabs.com/wi-fi
  - Introduction to Products, Kits, and Software
- docs.silabs.com/RS9116/
  - Software documentation
  - Quick Start Guides (i.e. Getting Started with EFx32 Host / STM32 Host)
- community.silabs.com
  - Wi-Fi community forum for questions, articles, projects
- www.github.com/SiliconLabs
  - wiseconnect-wifi-bt-sdk : Host drivers and examples for RS9116 Wi-Fi/Bluetooth solution
- workswith.silabs.com
  - WFI-101: Future of Wi-Fi in Low Power IoT Devices
  - WFI-201: Optimizing Battery Lifetime in Wi-Fi Applications
- Prior Tech Talks
  - Overview of Silicon Labs Wi-Fi Solutions

Summary

- Industry leader in Low power Wi-Fi + BT/BLE 5
  - 55µA stand-by associated current at DTIM10
- Industry leader in small form-factor design (4.63mm x 7.90mm)
- Integrated wireless stacks, networking stacks, cloud connectivity and security
- Integration with Silicon Labs' MCU/Wireless solutions, Simplicity Studio v5

Bluetooth Proprietary THREAD Wi Fi zigbee Z-WAVE

Join our next Tech Talk

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Q&A

tech talks

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THANK YOU