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How Matter is Unifying the Smart Home

Agenda

Smart Home Dilemma – Connected Lock Example

Zigbee **Z-Wave** **Bluetooth** **Wi-Fi**

- **Smart Home Dilemma**
  - Multiple wireless technologies available
  - Devices often tied to one Ecosystem
  - Requires different products, apps and hubs
- **Manufacturers**
  - Manufacturers are forced to pick ecosystem(s)
  - Need to ship multiple SKUs for connectivity standards
  - Need to learn different IoT technologies and ecosystems
- **Retailers**
  - Leads to duplicate products on the shelf
  - Difficult to provide expert advice to consumer questions
  - High return rates due to interoperability or incompatibility
- **Consumers**
  - Purchasing confusion
  - Hard to mix and match the products they want
  - Difficult to change Ecosystems

Matter — Simplifying the Smart Home

Matter — Simplifying the Smart Home

DEVELOPER/MANUFACTURER

Single SKU

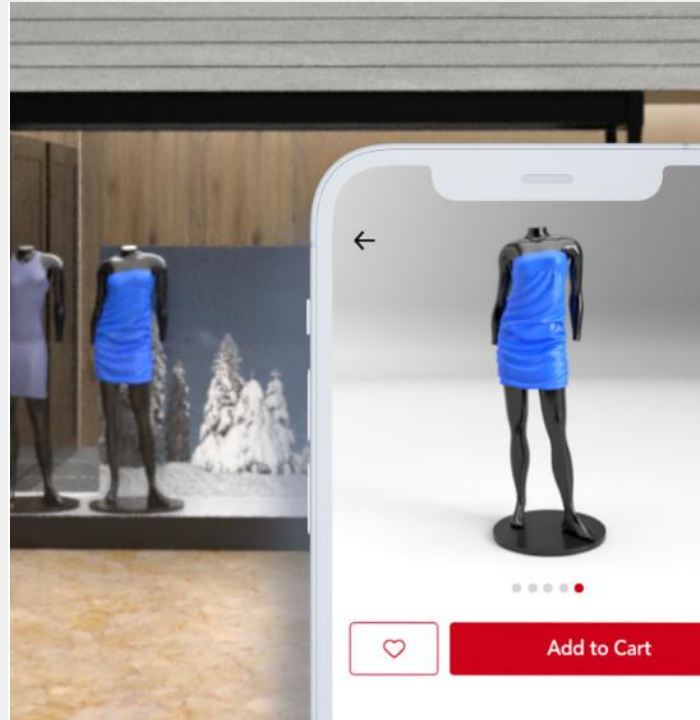**Lower development & operational cost**

More time for innovation

Matter — Simplifying the Smart Home

DEVELOPER/MANUFACTURER

Single SKU

Lower development & operational cost

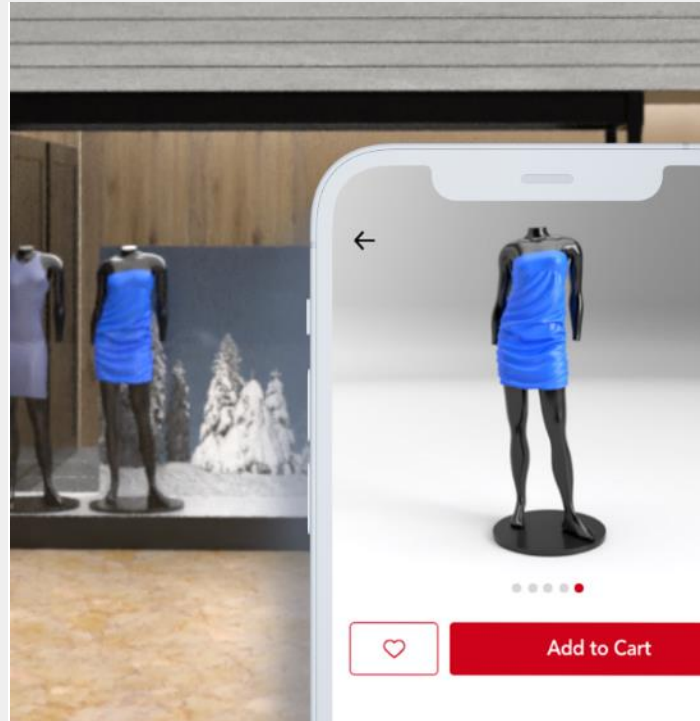**More time for innovation**

RETAILER

Requires less shelf space

Lowers inventory cost

Minimizes returns

Matter — Simplifying the Smart Home

DEVELOPER/MANUFACTURER

Single SKU

**Lower development &
operational cost**

More time for innovation

RETAILER

Requires less shelf space

Lowers inventory cost

Minimizes returns

CONSUMER

Works with multiple ecosystems

Simplifies purchasing experience

Provides better user experience

What is Matter

What is Matter?

1.1 NOW AVAILABLE

Driving the Matter Standard

"Members represented are a small sample of the companies supporting Matter."

- **Developed by over 300 industry-leading companies**
  - Represents value chain from Semiconductor to Ecosystem

- **Simple**
  - Easy to setup and control devices with multiple Ecosystems

- **Interoperable**
  - Devices with the Matter logo are interoperable by design

- **Reliable**
  - Reliable local connectivity works even if internet is down

- **Secure**
  - Authentication before joining and encrypted data transfer

- **Open**
  - The specification is open source and Based on IP connectivity

How does Matter connect devices?

WiFi

THREAD

Bluetooth

How does Matter connect devices?

Wi-Fi

Universal wireless networking technology connecting many devices in the home today.

High Bandwidth & Real-Time: Wi-Fi supports applications such as streaming video and audio, in addition to traditional smart home categories like light bulbs and thermostats.

THREAD

Bluetooth

How does Matter connect devices?

Universal wireless networking technology connecting many devices in the home today.

High Bandwidth & Real-Time: Wi-Fi supports applications such as streaming video and audio, in addition to traditional smart home categories like light bulbs and thermostats.

An energy-efficient wireless mesh network that enables smart home devices such as door locks, lighting, and sensors to securely, reliably, and simply integrate into the smart home.

- Reliable: Thread is dependable.

- Instant Control: Thread is fast.

- Extended Range: Thread is well connected.

- Years of Battery Life: Thread is efficient.

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Ubiquitous wireless technology used in mobile phones.

Used for commissioning of Matter devices securely onto the network

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Matter Devices

Matter Devices

Devices supported by Matter today

HVAC CONTROLS

SAFETY & SECURITY SENSORS

DOOR LOCKS

LIGHTING & ELECTRICAL

MEDIA DEVICES

WINDOW COVERINGS & SHADES

CONTROLLERS

BRIDGES

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Matter Devices

Devices supported by Matter today

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MEDIA DEVICES

WINDOW COVERINGS & SHADES

CONTROLLERS

BRIDGES

Device types & category support in development

CAMERAS

WHITE GOODS (APPLIANCES)

ROBOT VACUUMS

ENERGY MANAGEMENT

AIR QUALITY CONTROL

SMOKE & CO DETECTION

AMBIENT PRESENCE SENSING

ACCESS POINTS

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Matter & The Ecosystems – Past, Present, and Future

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Fragmentation

amazon
works with | alexa
WORKS WITH ring

WiFi
Z-WAVE
Bluetooth®
zigbee

(Apple)
Works with Apple Home

WiFi
Bluetooth®
THREAD

(Google)
works with nest
WEAVE

WiFi
Bluetooth®
THREAD

COMCAST
works with XFINITY Home

zigbee

SmartThings
Works with SmartThings

WiFi
Z-WAVE
zigbee

Device Transition

Software updates to devices in millions of homes, let people use Matter with many devices they already have. Hundreds of devices have been certified!

Other devices won't get left behind — Matter supports bridging to technologies like Zigbee and Z-Wave, and major ecosystems will support existing integrations.

Unification

works with alexa
works with Google Home
Works with Apple Home

WORKS WITH ring
works with XFINITY Home
Works with SmartThings

matter

THREAD
WiFi

Bluetooth®

Ecosystem Support to Date (June 2023)

Ecosystem	Matter / Thread		Matter / Wi-Fi		Additional Info
	Supported Devices	**Mobile App Support**	**Supported Devices**	**Mobile App Support**	
amazon	Echo Gen 4 eero 6 eero Pro eero Beacon	Android iOS	Echo Gen 4 Echo Dot 3/4/5th gen Echo Studio Echo Show 5/8/10/15 Echo Flex and Plus Eero 5	Android iOS	Amazon Link
Apple	HomePod Mini Apple TV 4K HomePod (Gen 2)	iOS	HomePod Mini Apple TV 4K HomePod (Gen 1 & 2)	iOS	Apple Link
Google	Nest Hub (2nd Gen and Max) Nest WiFi Nest Wi-Fi Pro	Android iOS	Google Mini Nest Mini & Audio Nest Hub (1st Gen, 2nd Gen, and Max) Nest WiFi	Android iOS	Google Link
SmartThings	Aeotec SmartThings Hub Hub Everywhere Samsung branded: ▪ TVs ▪ Charging hubs ▪ Refrigerators	Android iOS	Aeotec SmartThings Hub Hub Everywhere Samsung branded: ▪ TVs ▪ Charging hubs ▪ Refrigerators	Android iOS	Samsung Link

How do devices communicate over Matter?

Network Protocol and Topology

- **Based on Internet Protocol v6**

- **Native support for Wi-Fi and Thread**

- **Thread devices require border routers**

- **Devices use Bluetooth for commissioning**

- **Bridges can link to other protocols**
  - Zigbee and Z-Wave
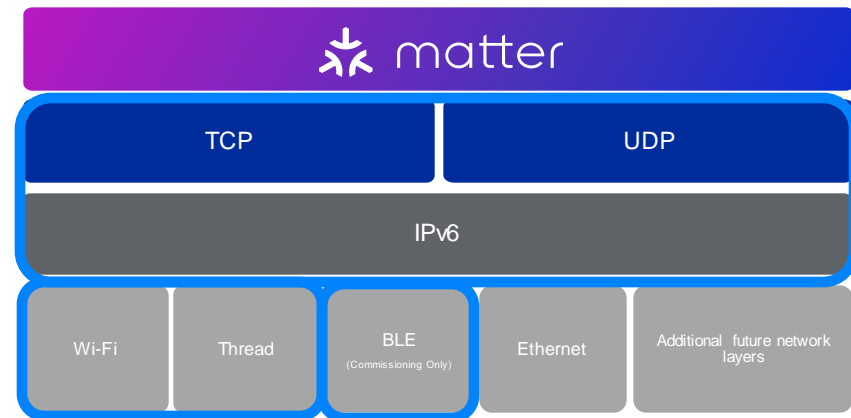
Matter Fabric and Multi-Admin

- **Multiple transports**
  - Matter can work on top of multiple wireless or wired technologies to transport the IP packets
- **Fabric**
  - A collection of Matter devices sharing a trusted root
  - A fabric is identified by a **fabric ID** which is a **64-bit number**
- **Node**
  - In a Matter fabric, each physical device is called a node
  - Each node is identified by a **node ID** which is a **64-bit number**
- **Multi-Admin**
  - Provides a means for multiple Matter Fabrics and their administrators to manage devices
  - Each Matter Fabric can have unique root authority
  - Devices must support multiple Matter Admins
  - Matter admins dictate the access control lists for their Matter fabric, and thus the devices can access the device
  - Example:
    - Matter Admin 1 can grant control privileges to Controllers on Fabric A
    - Matter Admin 2 can grant control privileges to Controllers on Fabric B
  - Access Control is separate for both fabrics
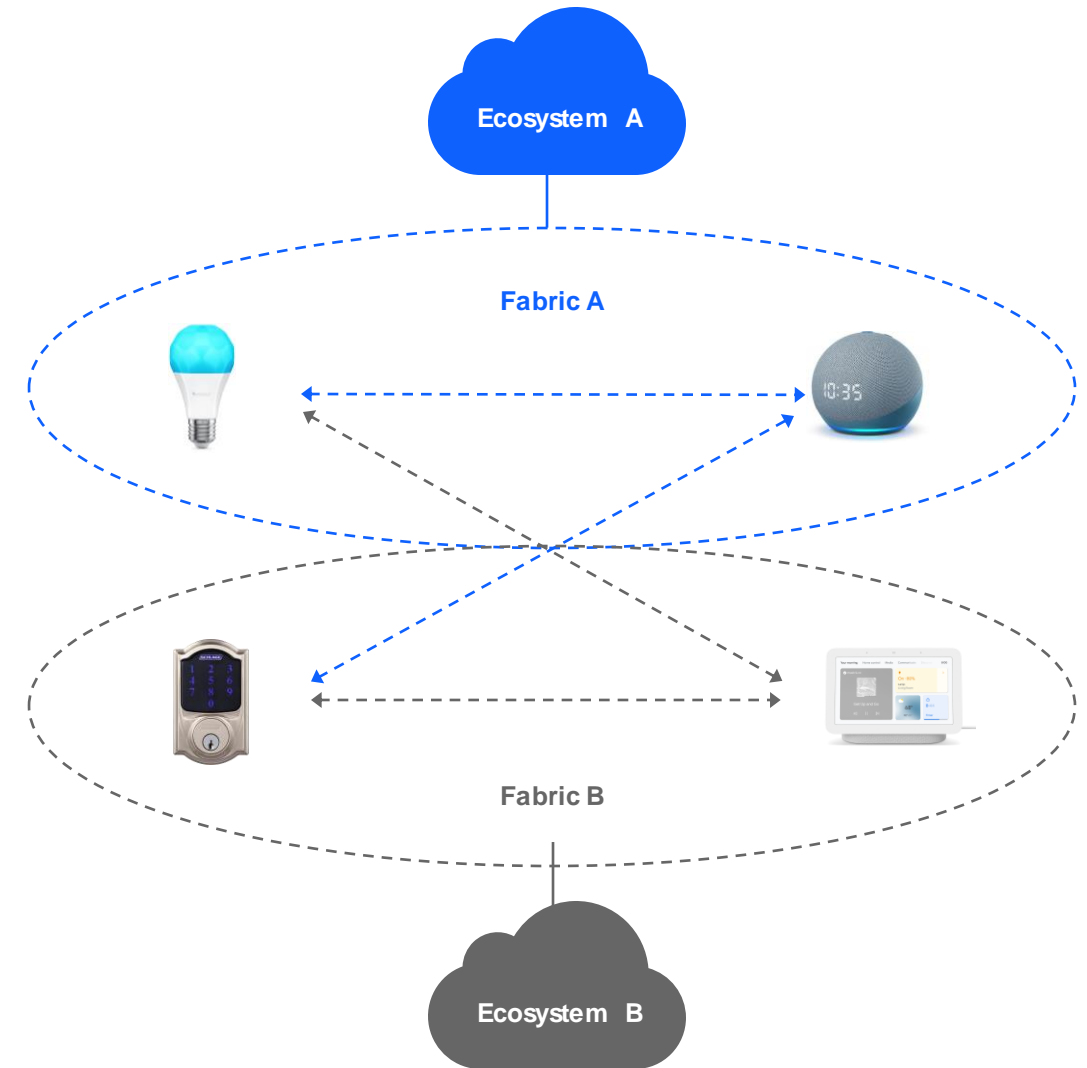
Matter Raises the Bar for IoT Security & Privacy

10 Security Tenants Promoted by CSA

1. Easy, secure, and flexible device commissioning

2. Validation that each device is authentic and certified

3. Up-to-date info via Distributed Compliance Ledger

4. Strong device identity so only your devices can join

5. Secured communications protecting confidentiality, etc.

6. Even group communications secured

7. Multiple administrators and controllers, maximizing choice

8. Verified access controls to prevent unauthorized actions

9. Secured, standard software updates

10. Remote monitoring of software integrity
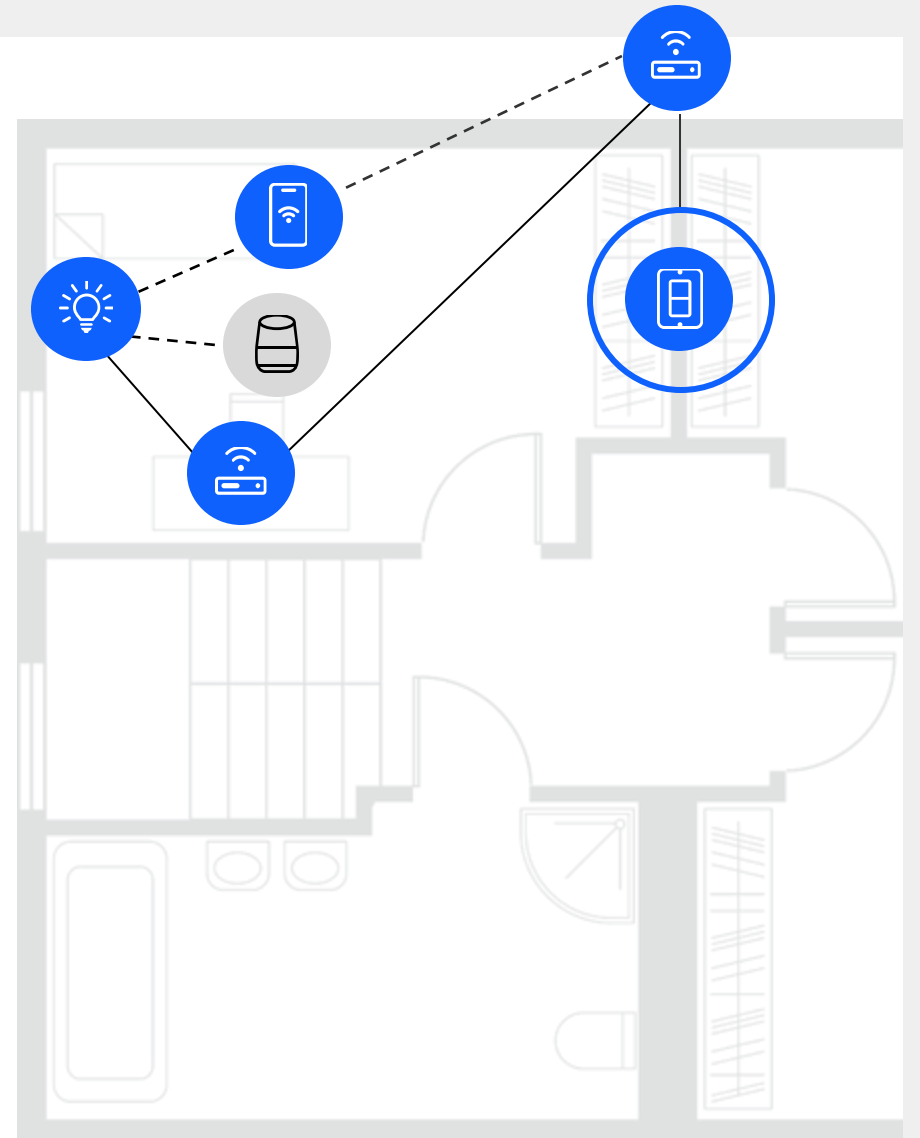
Matter Security as Specified by CSA
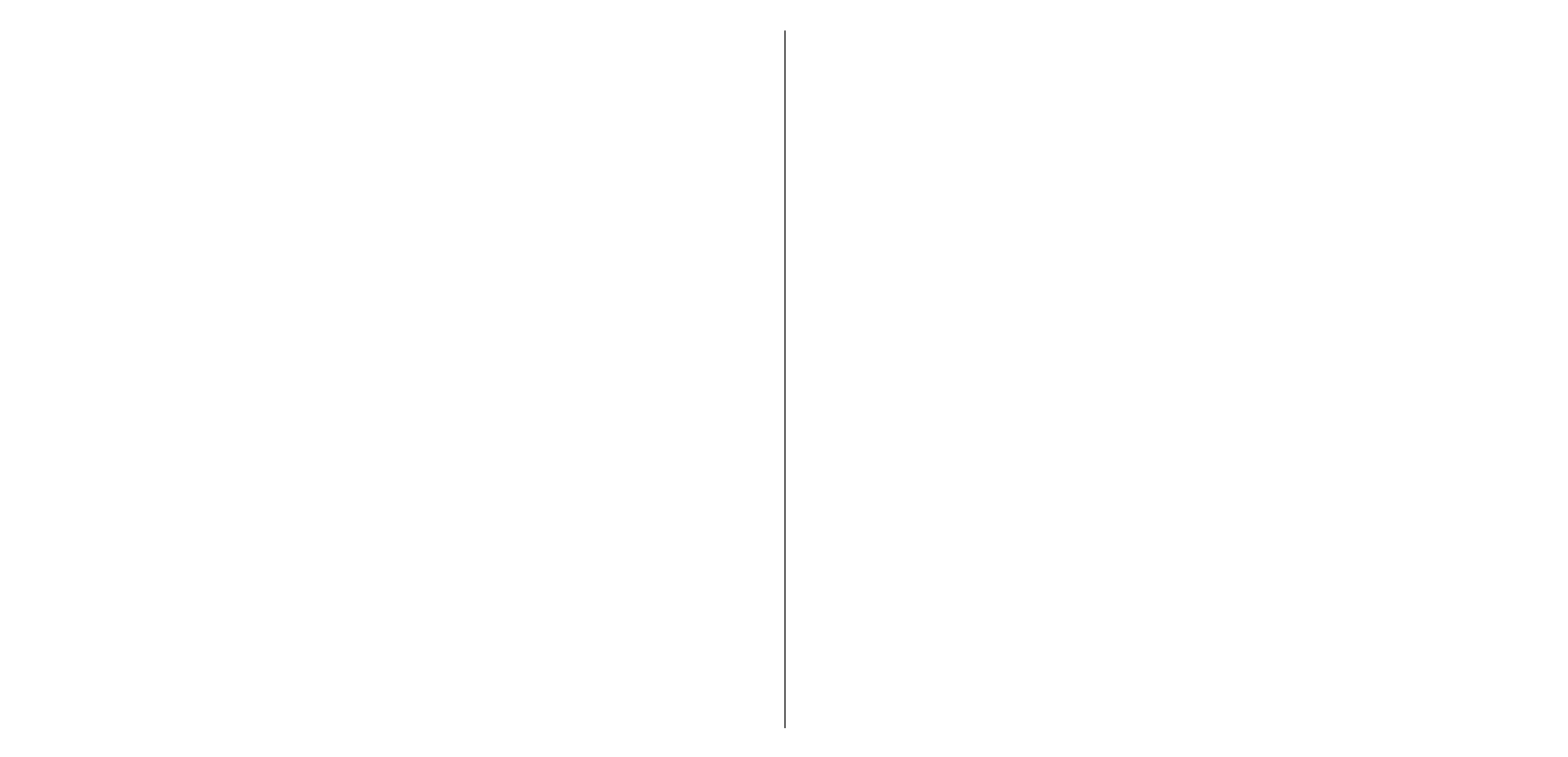
Matter Security as Specified by CSA

MANUFACTURING

Matter devices must be injected with a unique DAC certificate/ private key, Onboarding Payload (QR code delivered), Certification Declaration (CD), and other static/ dynamic data during manufacturing. **(Mandatory)**

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COMMISSIONING

DAC with VID/PID must be checked against the DCL and CD verified to ensure only authentic and certified Matter devices are commissioned. **(Mandatory)**

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DEVICE COMMUNICATION

Communication between Matter devices must be secured and encrypted using cryptographic keys and PBKDF. **(Mandatory)**

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SOFTWARE UPDATES

Devices must support OTA firmware updates to allow vulnerabilities to be patched **(Mandatory)**

Other Security Specifications

- Authentication and encryption keys must be generated by a "Deterministic Random Bit Generator" Seeded by NIST 800-90B TRNG **(Mandatory)**

- Debug interfaces and access to secure boot trust anchors should be disabled to only allow authorized access (fusing) **(Recommended)**

- DACs and operational private key confidentiality should be protected from remote attacks **(Recommended)**

- Vendors should have a public policy & mechanism to identify and rectify security vulnerabilities in a timely manner **(Recommended)**

- The software should be encrypted at rest to prevent unauthorized access to core IP **(Optional)**

- Some devices should be protected against physical attacks to prevent tampering, side-channel, or debug glitching attacks. **(Optional)**

Silicon Lab Secure Vault Mid & High supports all Matter security functionalities now (Shall, Should and May)

Different Certification Paths

- **Normal (Full Testing) Path for single product**
  - Full testing either at SVE and/or ATL
  - Intended for new design products

- **Product Family Certification (PFC) Path**
  - Intended for certification of variants of the SAME product (same SW including Device ID, except regional differences)
  - First "Parent" product needs full testing either at SVE or ATL
  - Other "Family" products are certified without the need for testing

- **Certification by Similarity (CbS) Path**
  - Intended for certification of a SIMILAR product (same Matter SW)
    - SIMILAR product must be certified by either Normal or Product Family Certification
  - Product is certified without the need for testing

Matter Certification Summary

Area	Certification Body	Testing Requirement	Certification Requirements
Matter	Connectivity Standards Alliance	Full Matter End Product Testing Reduced or No Testing for (CbS) and (PFC)	• CSA Membership • Matter Testing completed • Certification ID for each transport • CSA Security Attestation completed • Pay CSA Certification fee
Thread	Thread Group	No Testing required if using Silicon Labs Certified Libraries for SOC Authorized Test Lab Testing needed for RCP	• Thread Group Membership required (even for inheritance) • Thread testing completed • Apply for Thread Product Certification • Pay Thread Certification Fee
Bluetooth	Bluetooth SIG	Reduced Testing if using Silicon Labs Bluetooth Qualified Component	• Bluetooth SIG Membership • Completed BLE Testing • Pay BLE Certification Fee
Wi-Fi	Wi-Fi Alliance	No Testing required if using Silicon Labs Certification	• No separate certification at Wi-Fi Alliance required if using Silicon Labs Certified Stack.
Ecosystems	Ecosystem	Varies	• Varies
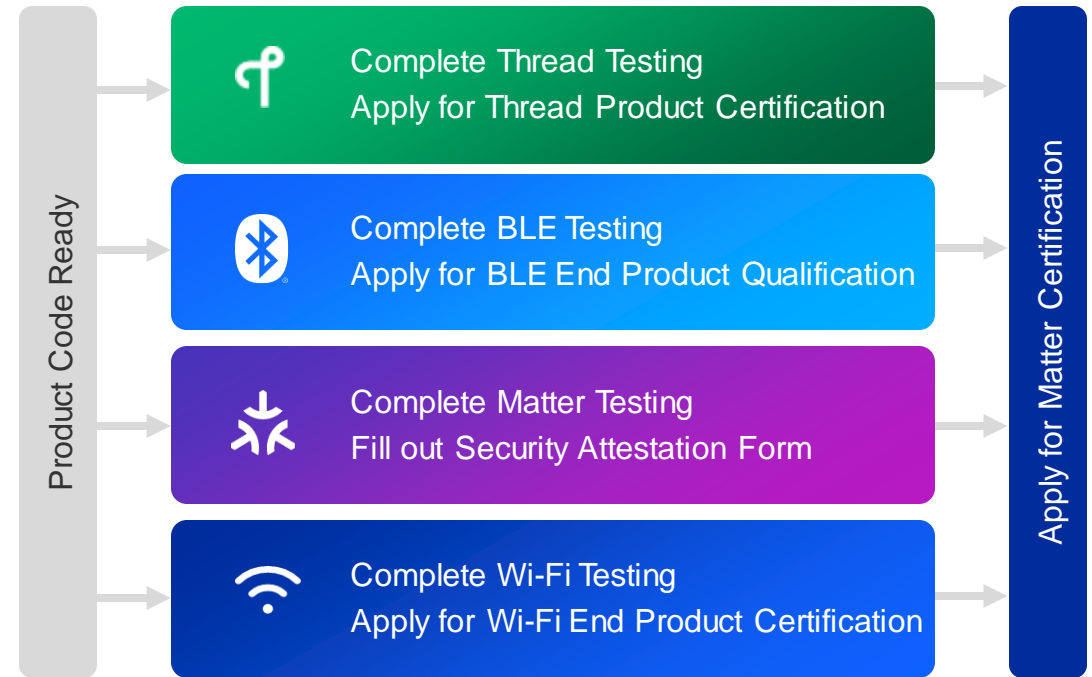
Product Code Ready

- Complete Thread Testing
  Apply for Thread Product Certification
- Complete BLE Testing
  Apply for BLE End Product Qualification
- Complete Matter Testing
  Fill out Security Attestation Form
- Complete Wi-Fi Testing
  Apply for Wi-Fi End Product Certification

Apply for Matter Certification

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Silicon Labs Matter Solutions – More Than Just Silicon

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Silicon Labs Matter Solutions – More Than Just Silicon

HARDWARE

Field-proven SoCs and modules for Wi-Fi, 15.4 with Bluetooth

Best-in-class radio performance, low power, and wireless co-ex

Secure Vault security and AI/ML

Silicon Labs Matter Solutions – More Than Just Silicon

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SOFTWARE

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GitHub-based multiprotocol software platform with OTA

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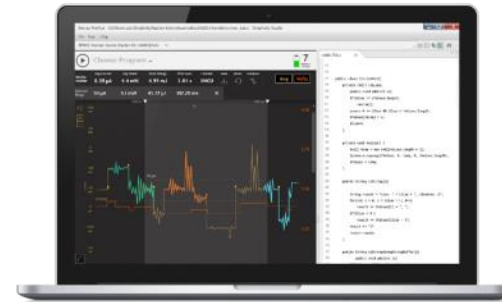
TOOLS

Advanced development hardware, reference designs, and tools

Ease of use through Simplicity Studio & GSDK integration

Windows Development Support

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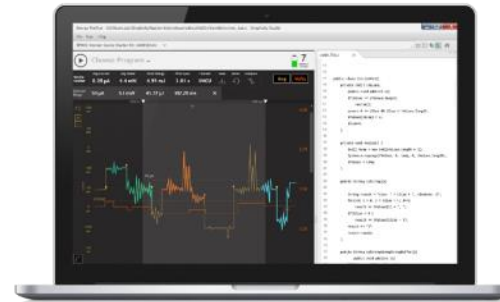
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Windows Development Support

CERTIFICATION

Inheritance for Bluetooth, Thread and Wi-Fi certification

Proven Matter certification

Ecosystems certification

Recommended Matter Solutions

High-performance Low-power SoC

- Feature Rich End Devices
- SoCs and Modules
- Thread + BLE
- Low Power
- Large Flash/RAM
- Robust peripheral set
- AI/ML accelerator
- Secure Vault High

Low-cost RCP / RCP Solution

- Optimized for Hubs/Bridges
- ICs
- Thread
- Radio Coprocessor
- Requires Host MCU/MPU
- Concurrent Zigbee / Thread
- Lowest BOM count
- Secure Vault High

Lowest Power Best Security Wi-Fi 6 SoC

- Wi-Fi 6 End Devices
- ICs and Modules
- Wi-Fi 6 + BLE
- Ultra Low power
- SoC (internal ARM MCU)
- Secure (PSA L2)
- AI/ML accelerator
- SRAM/pSRAM/Flash

Lowest Power Wi-Fi 4 NCP Solution

- Wi-Fi 4 End Devices
- ICs and Modules
- Wi-Fi 4 + BT/BLE
- Ultra Low Power
- Requires external Host MCU/MPU

Matter Selector Guide

Wi-Fi

Thread

	MATTER 1.0/1.1					FUTURE DEVICE TYPES					
Controllers / Bridges	**Lighting, Switches, Plugs**	**TVs**	**Sensors**	**Locks, Shades**	**HVAC Controls**	**Energy Management**	**Cameras**	**White Goods**	**Sensing Controls, Detectors**	**Robot Vacuums**	**Access Points**
	SiWx917		SiWx917								
	SiWx915		SiWx915								
			RS9116								
			WF200								
MR21		MR21									MR21
MG21		MG21									MG21
MG24										MG24	MG24

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Choosing the Right Products

MATTER 1.0/1.1					
Controllers / Bridges	**Lighting, Switches, Plugs**	**TVs (MG21)**	**Sensors**	**Locks, Shades**	**HVAC Controls**
MG24	**SiWx917**	**MG24**	**SiWx917**	**SiWx917**	**SiWx917**
• High-perf Thread RCP, BLE co-ex • Low power, Long battery life • Long-range, +20 dBm TX • AI/ML • High PSA L3 security	• Single-SoC Matter Solution • Lowest-power Wi-Fi 6 for battery devices • BLE co-ex • Best Wi-Fi IoT security • AI/ML • CA Title 20	• High-perf Thread RCP, BLE co-ex • Long-range, +20 dBm TX • AI/ML • High PSA L3 security	• Single-SoC Matter Solution • Lowest-power Wi-Fi 6 for battery devices • BLE co-ex • AI/ML • Best Wi-Fi IoT security • ULP Sensor Hub • 16-bit ADC	• Single-SoC Matter Solution • Lowest-power Wi-Fi 6 for battery devices • AI/ML • Best Wi-Fi IoT security • ULP Sensor Hub	• Single-SoC Matter Solution • Lowest-power Wi-Fi 6 for battery devices • AI/ML • Best Wi-Fi IoT security • ULP Sensor Hub
MG21		**MG21**		**SiWx915**	**SiWx915**
• Thread RCP for gateways • BLE co-ex & Multiprotocol • Long range, +20 dBm TX • Low power, long battery life • High PSA L3 security		• Thread RCP for gateways • BLE co-ex & Multiprotocol • Long range, +20 dBm TX • High PSA L3 security		• Single-SoC Matter Solution • Wi-Fi 6 for line powered devices • BLE co-ex • Best Wi-Fi IoT security	• Single-SoC Matter Solution • Wi-Fi 6 for line devices • BLE co-ex • Best Wi-Fi IoT security
MR21	**SiWx915**	**MR21**	**MG24**	**RS9116**	**RS9116**
• Thread RCP for gateways • BLE co-ex • Low power, long battery life • Long range, 20 dBm TX • Secure Vault Mid	• Wi-Fi 6 for line devices • Single-SoC Matter Solution • BLE co-ex • Best Wi-Fi IoT security • CA Title 20	• Thread RCP for gateways • BLE co-ex • Long range, +20 dBm TX • Secure Vault Mid	• Thread SoC for battery devices • Low power, Long battery life • Long-range, +20 dBm TX • BLE co-ex • AI/ML • High PSA L3 security • High accuracy ADC	• Lowest power Wi-Fi 4 & BLE co-ex for battery devices • Matter NCP Solution • Comprehensive networking stack	• Lowest power Wi-Fi 4 & BLE co-ex for battery devices • Matter NCP Solution • Comprehensive networking stack
	MG24			**WF200**	**WF200**
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				MG24	**MG24**
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Choosing the Right Products

FUTURE DEVICE TYPES

Energy Management

SiWx917
- Lowest-power Wi-Fi 6 for battery devices
- Single-SoC Matter Solution
- AI/ML
- Best Wi-Fi IoT security
- ULP Sensor Hub

SiWx915
- Wi-Fi 6 for line devices
- Single-SoC Matter Solution
- BLE co-ex
- Best Wi-Fi IoT security

RS9116
- Lowest power Wi-Fi 4 & BLE co-ex for battery devices
- Matter NCP Solution
- Comprehensive networking stack
- 72 Mbps

WF200
- Low-power Wi-Fi 4 only for battery & line devices
- Matter RCP Solution
- MCU offload
- 72 Mbps
- Small 4 x 4 mm

MG24
- Thread SoC for battery devices
- Low power, Long battery life
- Long-range, +20 dBm TX
- BLE co-ex
- AI/ML
- High PSA L3 security
- High accuracy ADC

Cameras

SiWx917
- Lowest-power Wi-Fi 6 for battery devices
- 86 Mbps
- Single-SoC Matter Solution
- BLE co-ex
- AI/ML
- Best Wi-Fi IoT security
- ULP Sensor Hub

SiWx915
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- BLE co-ex
- Best Wi-Fi IoT security

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White Goods

SiWx917
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- Matter RCP Solution
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- 72 Mbps
- Small 4 x 4 mm

Sensing Controls, Detectors

SiWx917
- Lowest-power Wi-Fi 6 for battery devices
- Single-SoC Matter Solution
- BLE co-ex
- AI/ML
- Best Wi-Fi IoT security
- ULP Sensor Hub
- 16-bit ADC

MG24
- Thread SoC for battery devices
- Low power, Long battery life
- Long-range, +20 dBm TX
- BLE co-ex
- AI/ML
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- High accuracy ADC

Robot Vacuums

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- Lowest-power Wi-Fi 6 for battery devices
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SiWx915
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MG24
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- Long-range, +20 dBm TX
- BLE co-ex
- AI/ML
- High PSA L3 security

Access Points

MG24
- High-perf Thread RCP, BLE co-ex
- Low power, Long battery life
- Long-range, +20 dBm TX
- AI/ML
- High PSA L3 security

MG21
- Thread RCP for gateways
- BLE co-ex & Multiprotocol
- Long range, +20 dBm TX
- Low power, long battery life
- Secure Vault High

MR21
- Thread RCP for gateways
- BLE co-ex
- Low power, long battery life
- Long range, 20 dBm TX
- Secure Vault Mid

Matter over Thread Development Kits

Matter over Thread Development Kits

Explorer Kit

- Low-cost board
- On-board debugger
- mikroBus socket
- Qwiic connector

Dev Kit

- Low-cost development board
- On-board debugger
- Signal breakouts
- On-board sensors

Kit contents

- 1 x board

Matter over Thread Development Kits

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Dev Kit

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Kit contents

- 1 x board

Starter Kit / Pro Kit

- Modular development platform
- Advanced development
- RF measurements
- Energy profiling
- External device debug
- Ethernet for large network test

Kit contents

- WSTK main board(s)
- Radio board(s)

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https://www.silabs.com/wireless/matter?tab=kits
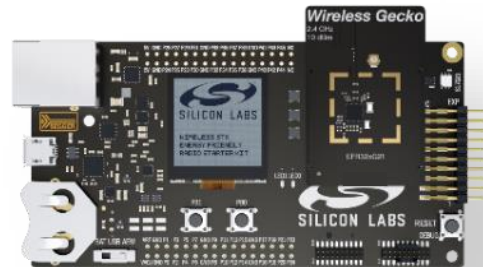
Radio Board

- Radio board
- Optimized RF layout and performance
- Ideal for RF measurements
- SoC, PCB modules and SiPs
- Uses existing WSTK boards
- Uses existing software tools

Kit contents

- 1 x Radio board

Matter over Wi-Fi Development Kits

Matter over Wi-Fi Development Kits

- **RS9116 Kits**
  - Modular development platform
  - Advanced development
  - RF measurements
  - Current measurements
  - Serial interface to host

- **Kit contents**
  - Baseboard
  - Wireless daughter card

https://www.silabs.com/wireless/matter?tab=kits

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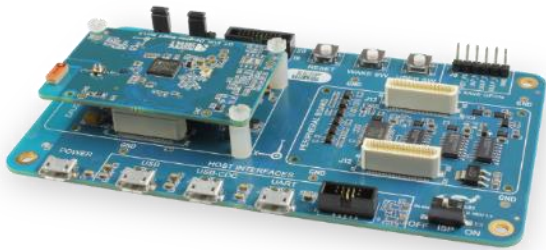
Matter over Wi-Fi Development Kits

- **RS9116 Kits**
  - Modular development platform
  - Advanced development
  - RF measurements
  - Current measurements
  - Serial interface to host

- **Kit contents**
  - Baseboard
  - Wireless daughter card
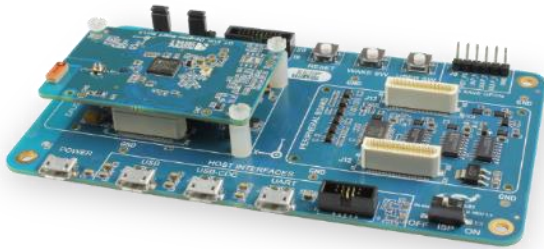
- **SiWx917 Kits - Announced**
  - EXP and Radio board options
  - Optimized RF layout and performance
  - Ideal for RF measurements

- **Kit contents**
  - Radio Board Kit (SoC Mode)
    - 1 x Radio board
    - 1 x Main Board
  - EXP Kit (NCP Mode)
    - 1 x EXP board
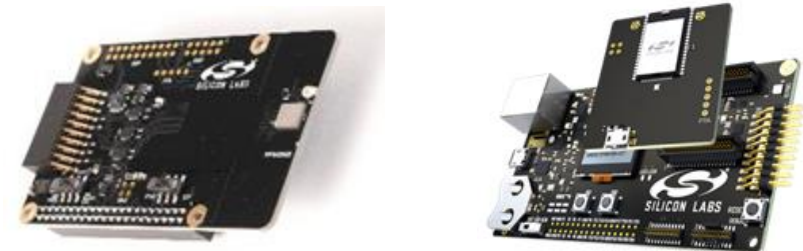
Contact Sales for availability

Matter GitHub and GSDK Offerings

	Item	**GitHub** **For Cutting Edge Matter Protocol Developers**	**Stable Silicon Labs Matter Source on GitHub**	**Silicon Labs Simplicity Studio and GSDK support**
Development	Thread Part Support	Yes	Yes	Yes
	Wi-Fi Part Support	Yes	Yes	Yes (Studio)
	Developer Platforms	MacOS, Linux	MacOS, Linux	Windows, MacOS Linux
	Studio Tools Support		Limited	Full
	Memory Optimizations		Limited	Full
	Core Protocol Stack	Source Code	Source Code	Pre-built Compliant Library
QA	Production Testing		Yes	Yes
	Performance Testing		Limited	Yes
Certification	Thread Certified Libraries	Yes	Yes	Yes
	Matter Compliance Testing		Yes	Yes
Support	Application Engineering Support	Limited	Full	Full
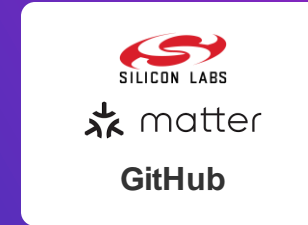
The Development Journey

Silicon Labs Matter Development Journey

The Matter Developer Journey web page is planned to be available on Q3/2023.

The Silicon Labs Connectivity Lab build-up is in progress in 2023.

Learn > Kits > Tools > Examples > Support > Testing > Certification

Silicon Labs Matter Development Journey

Developer Journeys
Before starting, go to our Ecosystem webpage, and learn how the process goes end-to-end!

WORKS WITH alexa

Works with Apple HomeKit

works with Google Home

Works with SmartThings

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SILICON LABS

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Kits
Learn about our ICs, Modules and Kits for Matter!

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3. **Unify SDK** – Multiprotocol SW development platform for Matter Bridge and gateways

Simplicity Studio 5

Unify SDK

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Official Ecosystem Certification

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SILICON LABS

Welcome   Recent   Tools   Install   Preferences

Launcher   Simplicity IDE   Debug   Network Analyzer

Debug Adapters

> EFR32xG24 2.4 GHz 10 dBm RB (ID:440231943)

Welcome to Simplicity Studio

Everything you need to develop, research, and configure devices for IoT applications.

Get Started

Select a connected device or search for a product by name to see available documentation, example projects, and demos.

Connected Devices   All Products

Connected Devices
J-Link Silicon Labs (440231943) (ID: 000440231943)   **Start**

Recent Projects

Recent Projects
MatterLightSwitchOverThread_MG24   **Open**

Learn and Support

📄 **Simplicity Studio User's Guide**
The official Simplicity Studio 5 User's Guide   **OPEN**

📹 **Getting Started (Video Series)**
Getting started with Simplicity Studio video series   **START**

Training and Tutorials
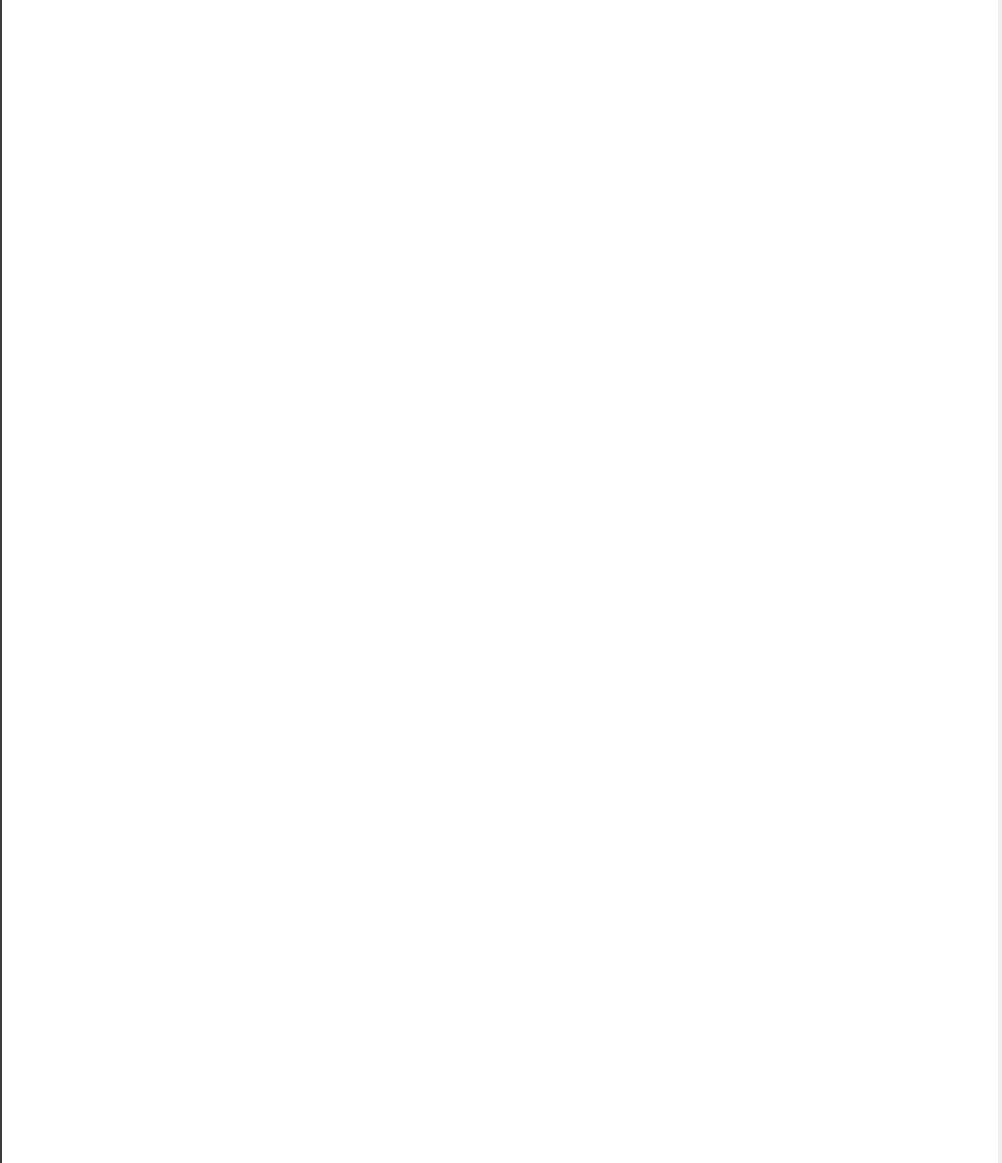Our collection of Simplicity Studio training and tutorial videos   **START**

Silicon Labs Community
Where users come together to learn, get help, and grow their skills   **JOIN**

Technical Support
Get technical support directly from Silicon Labs   **START**

💡 **Tips and Tricks**
Useful tips and tricks to help you optimize your tools setup   **START**

My Products

Enter product name

- My Products 1
  - Adapter Board for SX1262MB2CAS (BRD8042A Rev A02)
  - EFR32MG12 2.4 GHz 19 dBm Radio Board (SLWRB4161A)
  - EFR32xG24 2.4 GHz 10 dBm Radio Board (xG24-RB4186C)
  - EFR32xG24 2.4 GHz 20 dBm Radio Board (xG24-RB4187C)
  - EFR32xG27 2.4 GHz 8 dBm Radio Board (BRD4194A Rev A04)
  - KG100S for Amazon Sidewalk Radio Board (BRD4332A Rev A03)
  - RS9116W-DB00-CC0
  - RS9116W-SB00-B00
  - xG24 Dev Kit (xG24-DK2601B)

Summary

SILICON LABS

Matter Resources

Website

- **Silicon Labs Matter Web Page**
  - Provides Matter Info, Getting Started, Demos, Hardware, Kits and Boards

Training

- **Matter Tech Talks**
- **Works With 2022 – Matter Track On-Demand**

Whitepapers

- **Foundations of Matter and Smart Home Ecosystems**
- **Matter Security**
- **Matter Certification**

Silicon Labs Matter Software

- **Silicon Labs Matter Github**
- **Simplicity Studio**

Silicon Labs Community

- **Matter Forum**

Summary

- Smart Home today has been hindered by complexities for manufacturers, retailers, and consumers

- Matter is released now to simplify the Smart Home

- Wi-Fi and Thread are supported natively for Matter

- Bridging exists for other networks like Zigbee and Z-Wave

- Matter certification ensures interoperability and security

- Key ecosystems are ready for development and deployment

- Silicon Labs hardware, software, tools and certification experience helps speed your time to market