



WELCOME



Silicon Labs LIVE:
Wireless Connectivity
Tech Talks

A blue background featuring a repeating pattern of white circuit board traces and components. Interspersed within the pattern are snippets of code, including C and C++ syntax such as 'void init()', 'static const', '#define', and 'static inline'. The overall aesthetic is technical and modern.

APAC Tech Talks LIVE - Mandarin

Topic	Date
Evolution of Bluetooth 5, 5.1, & 5.2	10a.m., Tuesday, May 26
Bluetooth Mesh Solutions & Tools	10a.m., Thursday, May 28
15.4 Mesh Networking Technologies	10a.m., Tuesday, June 2
Bluetooth AoX Solutions	10a.m., Thursday, June 4
Connected Home Over IP (CHIP) for Beginners	10a.m., Tuesday, June 9
Device & Network Security for the IoT	9a.m., Thursday, June 11

Speaker



Steven Lin

Sr. FAE, Silicon Labs Taiwan

Steven works as Sr. FAE in Taiwan team of Silicon Labs, focusing on Zigbee, Thread, Proprietary wireless products, and embedded technologies supports to Customers.



Connected Home Over IP (CHIP) for Beginners

STEVEN LIN | JUNE 2020

*As of 5/11/2021 Project Connected Home over IP is now Matter. Learn more about [Matter](#).



IoT Market Opportunity & Challenges

28Bu

IoT Market
in 2020

>52Bu

IoT Market
in 2028

500Mu

802.15.4 Market
in 2023

>\$14B


Smart Home
in 2028

■ Opportunities

- IoT Market is poised to double by 2028
- Smart Home is a key growth vector for IoT

■ Challenges

- Too many incompatible protocols
- Devices do not work cross ecosystems
- End customers don't know what to choose



Imagine what can happen
if we make the IoT simpler.

We will transform the
industry and the world.

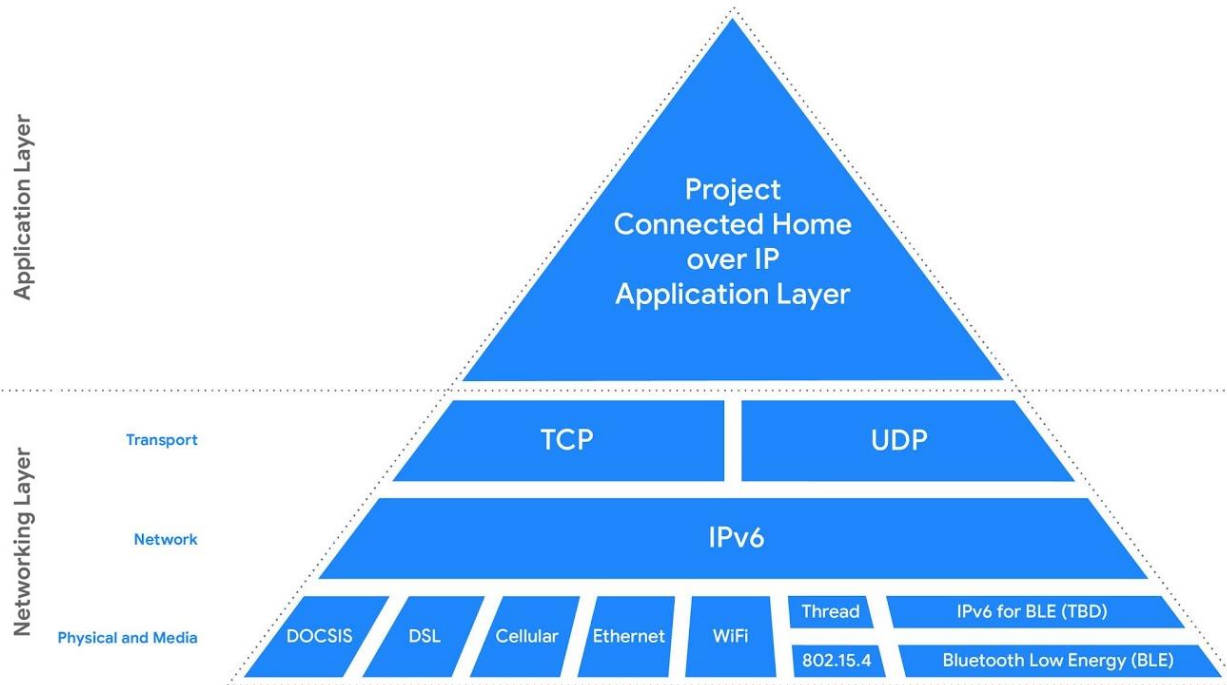
What Does the IoT Market Need to Grow?

Market expectations:

- **Simple** – Simplicity for end customers, developers and manufacturers
- **Secure** – Robust security from end devices to the cloud is essential
- **Inclusive and Open** – Products to work together and across ecosystems



Project Connected Home Over IP - Introduction



 **zigbee** Zigbee Alliance Dotdot Data Models

 **WEAVE** Google Weave

 Apple HomeKit

 Amazon Alexa's Smart Home

- Project Connected Home over IP is a Working Group within the Zigbee Alliance that plans to develop and promote the adoption of a new, royalty-free connectivity standard to increase compatibility among smart home products, with security as a fundamental design tenet.
- Amazon, Apple, Google, and the Zigbee Alliance joined together to promote the formation of the Working Group. Silicon Labs is fully endorsing this project and actively engaged
- Goals
 - Simplify development for manufacturers and increase compatibility for consumers
 - Enable communication across smart home devices, mobile apps, and cloud services

Connected Home Over IP – Participating Companies

<https://www.connectedhomeip.com>

amazon



Google

zigbee
alliance



legrand[®]

LEEDARSON



resideo

SmartThings

Schneider
Electric[®]

signify

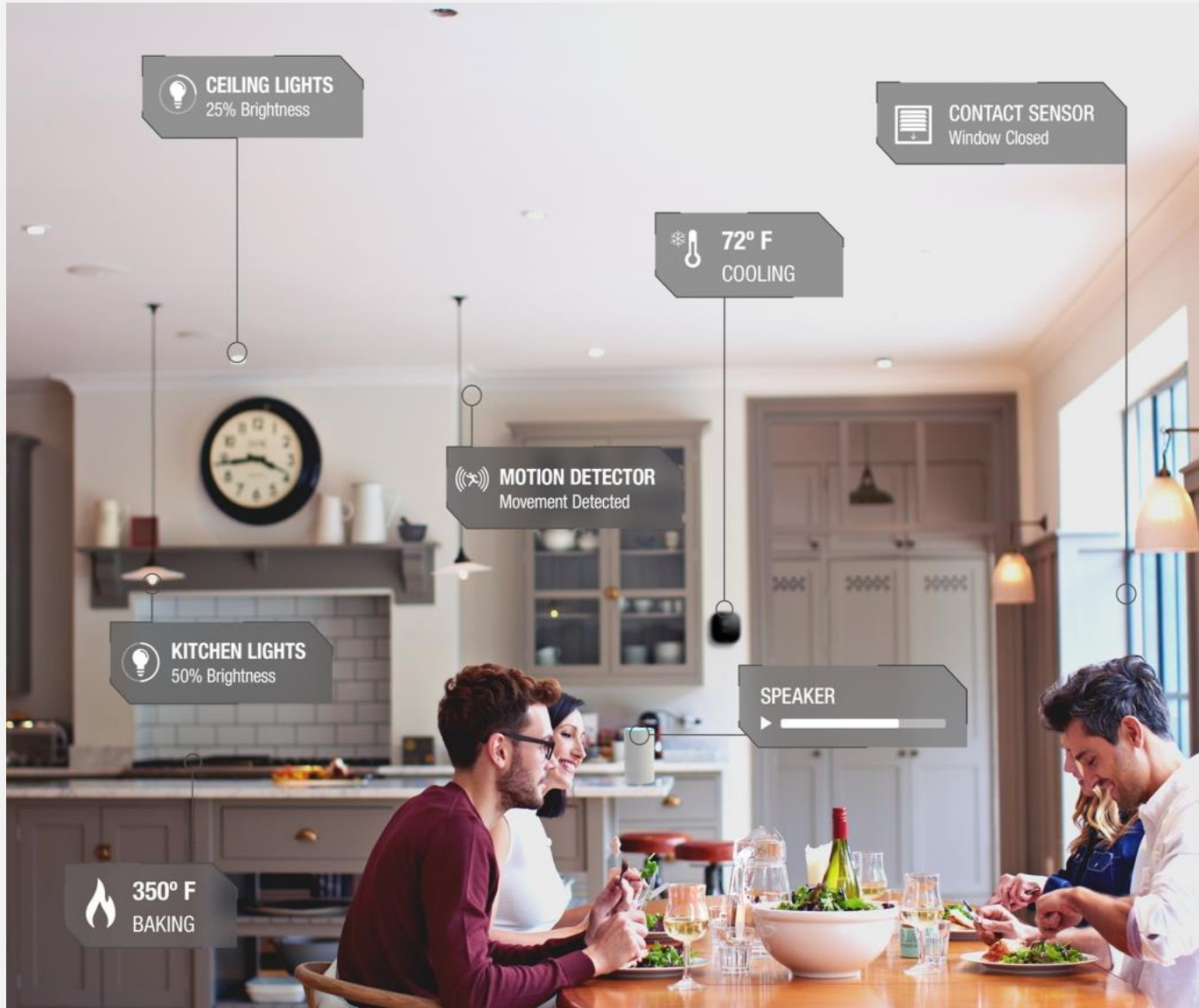


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Note: More than 90 Companies joined the project since announcement

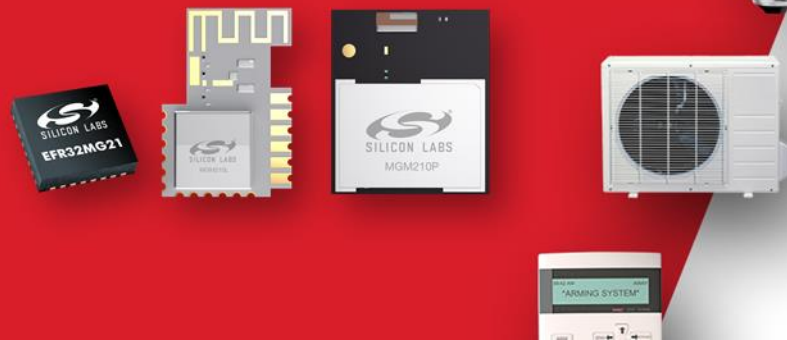
Project Connected Home Over IP – Key Takeaways



- New application layer based on market-tested technologies running on multiple network protocols like Wi-Fi, Bluetooth and 802.15.4
- Aims to improve customer experience by creating a protocol widely adopted across ecosystems and assistants
- Initial emphasis in the Smart Home which could be later expanded to other applications areas
- Removes barriers for Smart Home Ecosystems Providers and IoT Product Manufacturers
- Rapid pace development based on open source

Futureproof Your Design and Start Building Products Today

Series 2



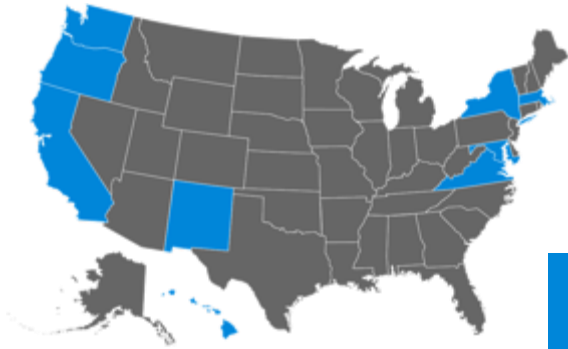
■ Question:

- I'm developing new products today. How does the Project affect my development path?

■ Answer:

- The new application protocol will complement existing technologies
- Start building products today using existing technologies like Zigbee or Thread
- Update your product in the future using secure over the air updates
- Use larger memory variant ICs and Modules since memory requirements are not fully defined today
- Join project [Connected Home Over IP](#) in [Zigbee Alliance](#)

IoT Security legislation is happening



Already accounts for
~30% US population

- **California Consumer Privacy Act (§ SB-327)**

- Approved Sept 28th, 2018
- Effective Jan 1st, 2020

- **Requires ‘reasonable security features’**

- appropriate to the nature and function of the device
- appropriate to the information it may collect, contain, or transmit
- designed to protect the device and any information contained therein from unauthorized access, destruction, use, modification, or disclosure

- Multiple US states have already introduced other bills that resemble California’s example

- **European Regulation**

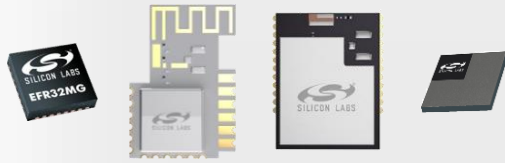
- European Standard EN 303 645
- Technical Specification TS 103 645

- **Cyber Security for Consumer Internet of Things**

- No universal default passwords
- Securely store credentials and security-sensitive data
- Implement a means to manage reports of vulnerabilities
- Keep software updated
- Communicate securely
- Minimize exposed attack surfaces
- Ensure software integrity
- Ensure that personal data is protected
- Make it easy for consumers to delete personal data
- Make installation and maintenance of devices easy
- Etc...

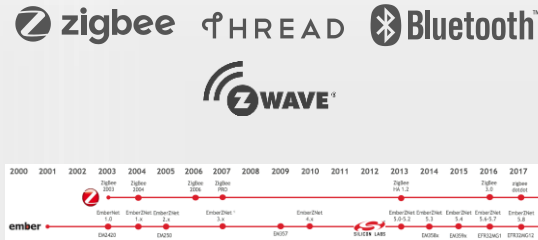
Why Silicon Labs?

COMPREHENSIVE WIRELESS PORTFOLIO



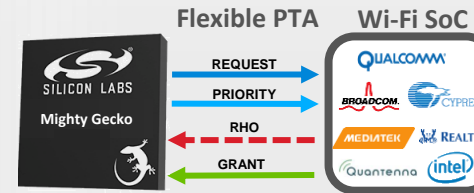
- 80+ active OPNs for ICs and Modules
- +20dBm PA and best in class RF sensitivity
- Low power, Secure Element, Vault™
- Innovative SiP technology for modules

EXTENSIVE EXPERIENCE IN MESH NETWORKS



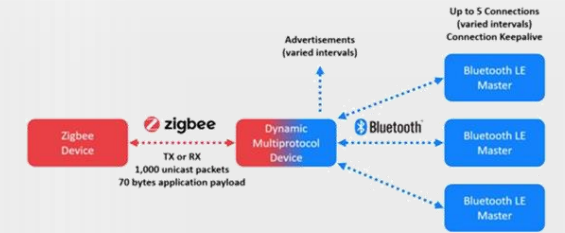
- Zigbee/Thread BoD seats and WG Chairs
- Main Zigbee/Thread spec developers
- Leading Bluetooth Mesh implementers
- Z-Wave Alliance and specification drivers

PROVEN COEXISTENCE WITH OTHER SHORT-RANGE RF



- Flexible PTA Interface for managed CoEX
- Multi-vendor Wi-Fi support
- Application optimized performance
- Best in class unmanaged coexistence

MULTIPROTOCOL SUPPORT



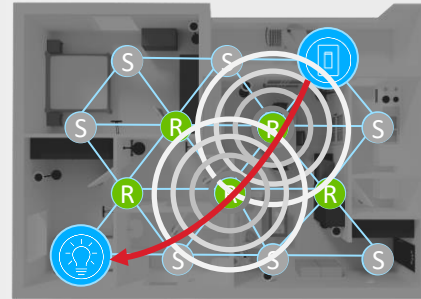
- Run simultaneously multiple protocols
- Increase functionality by adding BLE
- Lower product cost, lower design cost
- Proven customer products available today

PLATFORM SCALABILITY FOR SW AND SECURITY

Host Environment		Toolchains		Other	
Energy Profiler	Hardware Config	App Builder	IAR	Sample Apps	Pre-certification
Network Analyzer	Radio Config	Secure Programming	GCC	MISRA, Static Analysis	Community & Support
SEMICONDUCTOR PROVIDED		CUSTOMER IMPLEMENTED		Other	
				Coexistence, BR / Gateway, Multiprotocol, Test Harness	
Radio Abstraction Layer					
RTOS	Core Platform	Drivers	Security	Utilities	Middleware
KAL	Sleep	IPC	Memory	POSH	Security Libraries
Kernel	Timers	Events	System	CMSIS	C-Lib, Diag, Stats, Error Codes, Assert
IoT SoC		Modules		Development Boards	
Secure MCU	Multi Protocol Radio	Crypto HW, PUF, DPA, Key Storage	Antenna & Match	Certifications	Starter Kits
Flash & RAM	I/O, Interfaces	Power / Energy Management	PCB, SE	Shield	Reference Designs
				Radio / Expansion Cards	
				Evaluation Boards	

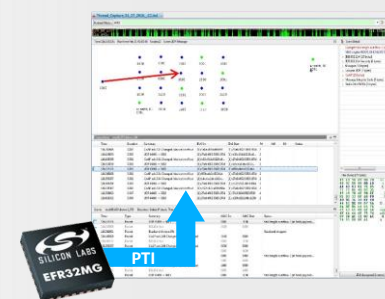
- Same software components and drivers for each wireless stack
- Easy migration across hardware portfolio
- Faster time to market

BEST IN CLASS MESH STACKS



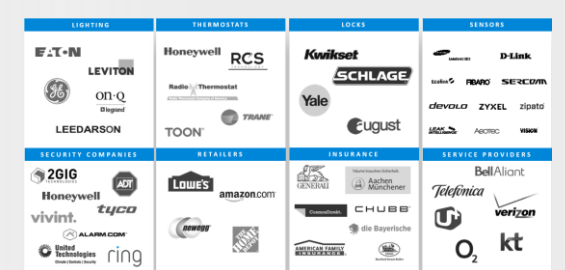
- 500+ nodes test network for SQA
- Large network performance benchmarks
- Interoperability testing for each release
- Comprehensive RF performance testing

ESSENTIAL TOOLS








- Packet Trace Interface (PTI)
- Timestamp synchronized Network Analyzer
- Energy Profiler for battery life calculations
- App builder for easy project configuration

TRUSTED ECOSYSTEM PARTNER



- Trusted by leading platforms
- Deep ecosystem relationships
- Leading Market Share
- Over 250M 802.15.4 devices shipped

Silicon - Labs Mesh Networks Portfolio

	 Bluetooth®		 THREAD	 zigbee	 Z-WAVE	 Proprietary	
Application	Customer Application		Customer Application	Customer Application	Customer Application	Customer Application	
	GATT (profiles / services)	Mesh Models (e.g. lighting)	Application Layer (e.g. OpenWeave, CoAP, OCF, etc.)	Application Profile (ZCL)	Application Profile (Device Class)		
Network / Transport	Bluetooth LE Core	Bluetooth Mesh Core	OpenThread	Zigbee Compliant Platform Stack	Z-Wave Network Layer	Connect Stack	
Link	Bluetooth Link Layer		IEEE 802.15.4 MAC	IEEE 802.15.4 MAC	ITU-T G.9959 MAC	IEEE 802.15.4 like MAC	Customer Proprietary Stack
Physical	Bluetooth PHY (2.4 GHz)	IEEE 802.15.4 PHY (2.4 GHz)	IEEE 802.15.4 PHY (2.4 GHz)	IEEE 802.15.4 PHY (2.4 GHz)	ITU-T G.9959 PHY (Sub-GHz)	Proprietary PHY (2.4 GHz or Sub-GHz)	
Platform	RAIL						
	Common Platform Drivers, Middleware & Bootloader						

Silicon Labs OpenThread Roadmap



OpenThread Support

- GitHub: [EFR32MG12](#), [EFR32MG13](#), [EFR32MG21](#)
- Gecko SDK & Simplicity Studio integration (Jun 2020)

OpenWeave GitHub Door Lock Sample App

- Control via Thread and BLE
- Easily integrate into Google ecosystem

Dynamic Multi-Protocol (DMP) Thread and Bluetooth

- Develop devices that work simultaneously over BLE and Thread

Certification (MG12, MG13, MG21)

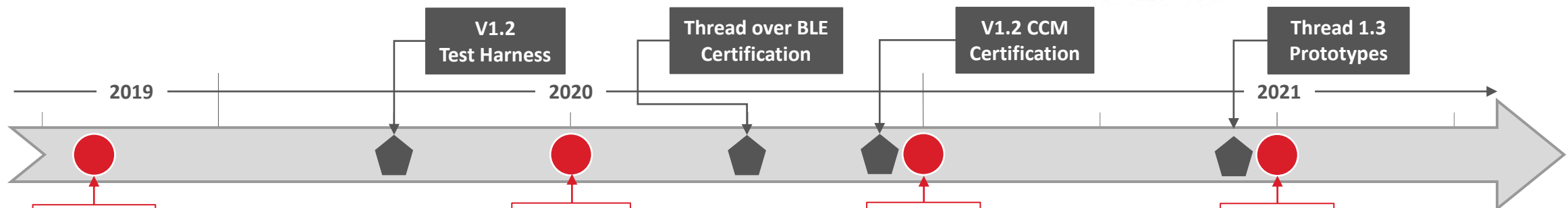
- Thread 1.1 certification on EFR32 running OpenThread

NCP & RCP Support

- Develop a border router application using a Raspberry Pi
- Functional with the Thread commissioning app

Wi-Fi Coexistence (Roadmap)

- Managed coexistence with PTA interface
- Un-managed coexistence with great blocking performance

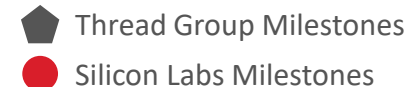


- GitHub Release**
- OpenThread GitHub
 - OpenWeave GitHub

- Release 3.0.0**
- OpenThread GSDK
 - DMP OpenWeave GitHub

- Release 3.1.0**
- Managed Wi-Fi Coex
 - Large Network Testing
 - DMP OpenWeave GSDK

- Release 3.2.0**
- OpenThread 1.2 / 1.3
 - CMP OpenThread + Zigbee



Silicon Labs Zigbee 3.0 (EmberZNet) Roadmap



Dynamic Multiprotocol Zigbee and Bluetooth

- Develop devices that work simultaneously over BLE and Zigbee
- Fully integrated GATT configurator

Zigbee Green Power (GPD, Sink, GPPB)

- Proxy functionality required for Zigbee 3.0
- Expand energy savings of Zigbee Pro by 5x

Works With All Hubs

- Easily integrate into Amazon ecosystem
- Test harness provided by Silicon Labs running on EFR32

Friends of Hue

- Easily integrate into Philips Hue ecosystem
- Sample applications for battery powered switches

Low Power Support

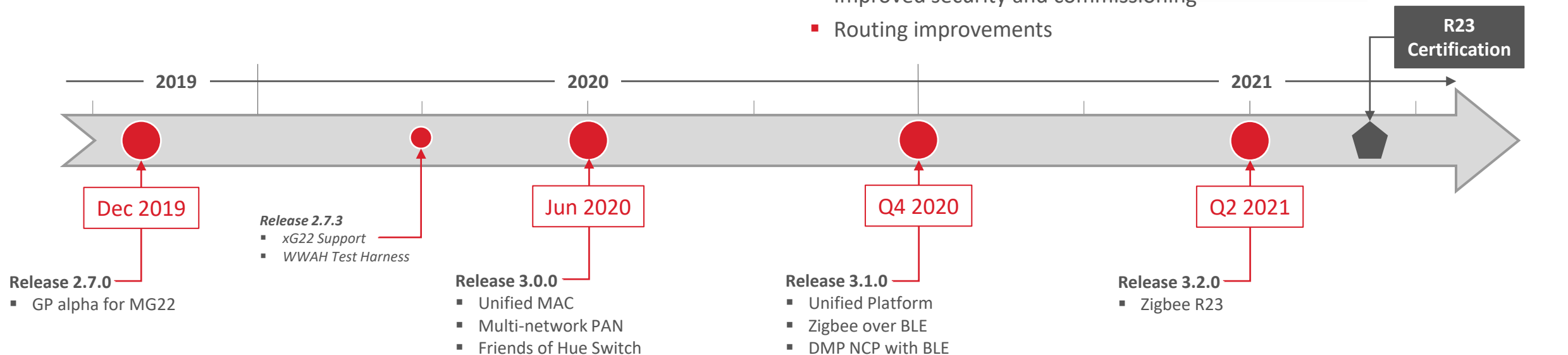
- EM2 & EM4 to support long-lasting battery powered sensors

Wi-Fi Coexistence

- Managed coexistence with PTA interface
- Un-managed coexistence with great blocking performance

Upcoming Zigbee R23 (Roadmap)

- Improved security and commissioning
- Routing improvements



Mesh SoC Portfolio Highlights

	Series 1 - MG12	Series 2 – MG21
Target applications	Mesh Routers and End Devices	Mesh Routers and End Devices
Availability	Now	Now
Protocols features	Zigbee 3.0, Green Power, OpenThread, OpenWeave, Bluetooth LE, Bluetooth Mesh Multiprotocol (Zigbee/OpenThread/BLE)	Zigbee 3.0, Green Power, OpenThread, OpenWeave, Bluetooth LE, Bluetooth Mesh Multiprotocol (Zigbee/OpenThread/BLE)
Proprietary 2.4G	2/4(G)FSK, OQPSK/(G)MSK, DSSS, BPSK/DBPSK TX, OOK/ASK	N/A
TX / RX (802.15.4)	+19 dBm / -102.7 dBm	+20 dBm / -104.5 dBm
TX Current	9.5 mA (@ 0 dBm)	9.3 mA (@ 0 dBm)
RX Current (802.15.4)	11.9 mA	9.4 mA
CPU / Clock Speed	Cortex M4 (38.4 MHz)	Cortex M33 (80Mhz)
Flash (kB)	1024	Up to 1024
RAM (kB)	256	Up to 96
Sleep Current (EM2)	1.3µA (16kB RAM)	4.5 µA (96 RAM)
Active Current (EM0)	70 µA/MHz	51 µA/MHz
Security	2x AES-128/256, ECC, SHA-1/224/256, TRNG	AES-128/256, SHA-1/2, ECC, ECDSA and TRNG DPA countermeasures Secure boot with RTSL Secure OTA and secure debug unlock + Secure Enclave (MG21B)
Operating Voltage	1.8V – 3.6V	1.71V – 3.8V
Packages (mm)	7x7 QFN48	4x4 QFN32

Note:

- Project Connected Home Over IP Memory requirements and exact configurations are not fully defined today
- For more information join project [Connected Home Over IP](#) in [Zigbee Alliance](#)

Mesh Module Portfolio



MGM12P



MGM210P



MGM210L

	MGM12P	MGM210P	MGM210L
Protocols	Bluetooth 5.0 & mesh Zigbee or Thread	Bluetooth 5.1 & mesh Zigbee or Thread	Bluetooth 5.1 & mesh Zigbee or Thread
Status	Production	Production	Production
EFR32 SoC	xG12	xG21	xG21
Antenna	Chip or U.FL	Chip or RF pin	PCB trace antenna
Max TX power (250 kbps O-QPSK)	+8 / +19 dBm	+10 / +20 dBm	+12.5 dBm
TX (125 kbps GFSK)	-95 dBm	-104.5 dBm	-104.5 dBm
TX (1Mbps GFSK)	N/A	-105 dBm	-105 dBm
Flash / RAM	1024 / 256 kB	1024 / 96 kB	1024 / 96 kB
GPIO	25	20	12
Operating Voltage	1.8 to 3.6 V	1.71 to 3.8 V	1.8 to 3.8 V
Operating Temperature	-40°C to +85°C	-40°C to +125°C	-40°C to +125°C
Dimensions W x L x H (mm)	12.9 x 15 x 2.2	12.9 x 15 x 2.2	15.5 x 22.5 x 2.3
Certifications	BT, CE, FCC, ISED, Japan, S-Korea and Taiwan	BT, CE, FCC, ISED, Japan & S-Korea	BT, CE, FCC, ISED, Japan & S-Korea
Other	Options with LNA available	No LF XTAL	No LF XTAL

Note:

- Project Connected Home Over IP Memory requirements and exact configurations are not fully defined today
- For more information join project [Connected Home Over IP](#) in [Zigbee Alliance](#)

Key Takeaways to Futureproof for the Project

Choose a
larger
memory
variant part

You can OTA
to support
Connected
Home Over
IP

Start your
development
with Zigbee
or
OpenThread

Incorporate
the required
security
features into
your product



works with
BY SILICON LABS

SEPTEMBER 9-10, 2020 | Virtual

<https://workswith.silabs.com>

Thank You | Questions

Any query, please contact us or email to Denis.Chiang@silabs.com

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