The Heart of the Matter: Interoperability and Wireless Know-How to Define the Next Phase of Smart Home

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by Rafael Sotomayor

In today's fully connected world, living in a smart home means interacting with many wireless protocols at once. Lighting systems, heating and cooling systems, security systems, entertainment systems – just about every aspect of home life can now be enhanced and controlled wirelessly. Despite all the benefits that wireless brings, wireless connectivity in today's home has not been headache free. Dealing with so many different, incompatible wireless protocols on a single home network can be challenging, even for the most technically advanced Smart Home enthusiast.

But, as my colleague, Ron Martino, explained in a recent post, the new, widely backed industry standard for Smart Home interoperability, called Matter , is designed to change that. By standardizing on the IP protocol – the same protocol used to run the internet – Matter makes it possible for all those wireless protocols to work together in harmony.

The Next Wireless Revolution

To help drive the adoption of Matter, NXP has been quick to introduce solutions that support the new standard. At CES 2022, we introduced the IW612, the industry's first monolithic tri-radio solution, equipped with Wi-Fi® 6, Bluetooth 5.2, and 802.15.4. It's designed to support Matter with unprecedented coexistence performance and radio integration, for seamless Smart Home connectivity.

By any measure, the IW612 is a triumph of engineering. Now, admittedly, I'm a bit biased, since I've seen first hand what our design teams have been able to accomplish in such a short time. Anyone who has designed with wireless knows that RF engineering is notoriously hard and combining radios in a single solution only makes the challenge more difficult. Successful RF integration requires a delicate balance of

internal functionality, with special attention paid to hard-to-control parameters, such as gain values, noise factors, crosstalk attenuation and spectral efficiency, while also considering external factors, such as thermal constraints, chip-package and package-board interfaces, and other non-functional properties that can impact performance and long-term reliability. The need to pass regulatory requirements adds another layer of complexity, too, by imposing limits on things like radiated and conducted emissions and susceptibility.

The seamless and interoperable smart home

IW612 for Smarter Smart Home Products

As the basis for border routers that support Matter, the IW612 combines the most advanced versions of the three most commonly deployed wireless protocols in Smart Home: Wi-Fi 6 (802.11ax), Bluetooth 5.2 (802.15.1) and 802.15.4 (which covers a range of low-power, low-data-rate wireless personal area networks, or WPANs, including Thread).

Next-Level Performance

It enables simultaneous transmit and receive, for higher bandwidth, improved network efficiencies and reduced latency in smart home solutions. The IW612 also integrates the critical RF front end components including +20 dBm power amplifiers (PAs), thereby maximizing range, lowering the bill of materials (BoM) and reducing supply-chain issues.

Multi-Protocol Integration

By offering a single chip solution for Wi-Fi, Bluetooth and Thread, the IW612 makes it possible to integrate the capabilities of a Thread Border Router into everyday products already familiar to consumers, such as display hubs, smart speakers, voice assistants and thermostats. With its unique Tri-radio integration of Wi-Fi, Bluetooth, and 802.15.4 the IW612 is able to deliver market leading performance and coexistence, along with BOM integration to reduce cost and board space.
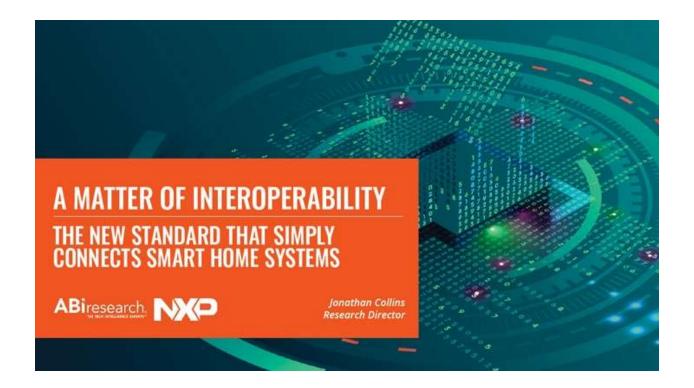
High-Level IoT Protection

Another key capability of IW612 is the integration of advanced IoT security features including secure boot and firmware updates, key generation and lifecycle management as well as hardware encryption supporting the latest cryptographic algorithms. The IW612 supports the latest security standards required by Bluetooth, Thread, Wi-Fi and Matter wireless protocols.

Pre-Integrated and Validated Software

NXP eases the burden of host software integration by providing validated radio drivers that simply work across NXP's broad portfolio of application processors and microcontrollers. This gives product manufacturers the flexibility to select the ideal host processor to meet their product requirements and enables them to focus on application development and product innovation.

The IW612 in Action

If you are in Las Vegas for CES 2022 this week, then you may have seen our Smart Home demo, which highlights Matter and showcases the IW612 in the form of a Thread border router and a Matter controller. The demo shows how switches, lights, sensors, door locks, smart plugs, smart speakers and other Smart Home devices can easily be controlled and monitored using a Wi-Fi network. It underscores NXP's ability to provide all the necessary components for building secure devices that "just work" with each other, so device manufacturers can finally deliver on the promise of the truly smart home.

Matter Makes Smart Home Smarter

Interoperability, with built-in security, is why those of us working in Smart Home have been so quick to support Matter. Rarely have so many global brands, from such a broad spectrum of industry segments, rallied around a single cause, and it's easy to see why: by simplifying development, increasing compatibility, and ensuring security and privacy, Matter will create truly smarter homes.

At NXP, we've dedicated significant resources to helping Matter succeed, and we've been heavily involved in the specification's technical definition. Building on our broad-based leadership in developing IoT standards, we've contributed to key areas of the Matter specification, including issues of security, platforms, certification and source code. As a true one-stop-shop for all things relating to the IoT – covering every aspect of compute, connectivity and security – we've given our full support to every Matter use case.

A True Milestone

Years from now, when the history of Smart Home is written, I think 2022 will be viewed as a breakout year and the start of a new era. That's because the new Matter standard, with its emphasis on interoperability and security, is what Smart Home has needed to move forward. It's deeply gratifying to think that NXP development teams, and their remarkable achievement in producing the IW612, will help make that future a reality.

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Rafael Sotomayor is executive vice president and general manager of Connectivity and Security for NXP Semiconductors. In this role, he oversees the solutions that drive the security and connectivity ecosystems. These solutions include devices enabled with NFC, UHF, UWB, Bluetooth and Wi-Fi; and secure products for mobile payment, banking, secure ID, transit and secure services for IoT. Prior to joining NXP in 2014, Rafael was as vice president of marketing at Broadcom in the wireless connectivity business and prior to that, he was at Motorola and Intel.