Telink

Telink Semiconductor

Building the Future of the Internet of Things

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A Global Leader in Wireless Connectivity SoCs and Solutions

The Telink Story

Founded in 2010, Telink Semiconductor is a global fabless IC design company with offices and subsidiaries covering North America, Europe, and Asia-Pacific.

Telink is dedicated to the development of highly integrated low-power multi-protocol radio frequency system chips and comprehensive protocol stacks for Internet of Things (IoT) applications.

Telink's product portfolio is aimed at serving markets ranging from smart home to location services to consumer electronics and currently includes 2.4GHz RF SoCs and SDKs for Bluetooth® Classic & LE, Bluetooth Mesh, Zigbee, Apple HomeKit, Apple FMN Accessory, 6LoWPAN/ Thread, Matter, and proprietary protocols.

Protocols and Certifications

Bluetooth

- Telink is an Associate Member of the Bluetooth SIG, having full access to all standards and drafts and participating in technical and standard discussions
- Telink has been on the Bluetooth SIG Board of Directors since July 2019
- BQB certification for Bluetooth 4.0, 4.2, 5.0, 5.2, 5.3, and Bluetooth Mesh

zigbee

- Telink is a Participant Member of the Connectivity Standards Alliance, having full access to all standards and drafts and participating in technical discussions
- Zigbee 3.0-ready platform, Zigbee Pro-compliant platform, RF4CE, ZRC2.0, ZHA/ZLL certification, GreenPower certification

HomeKit

- Telink is a Technical Adjunct Partner in Apple's HomeKit Program (part of Apple's MFi Program), granting it full access to all MFi specifications and early access to some non-public technology cooperation
- Telink's Bluetooth LE HomeKit SDK passed Apple adjunct review

THREAD matter

- Telink is a Contributor Member of the Thread Group, having full access to all standards and drafts and participating in technical discussions
- Thread and OpenThread certification
- Telink is ready to support Matter over Thread

2.4GHz

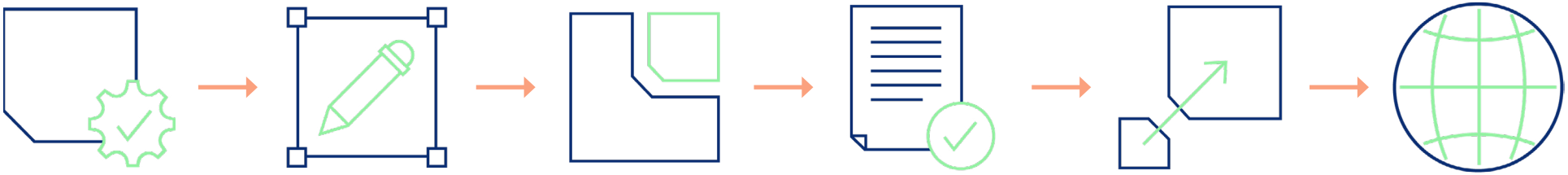
Global and Regional Regulations

- Telink's products are built to comply with FCC, CE, SRRC, KCC, and many other regulations
- Telink can assist customers with tuning for product-level regulations

End-to-End Support

Telink's support infrastructure includes:

- A comprehensive repository of SDKs, datasheets, application notes, user guides, and reference design schematics — all available on the Telink Wiki.
- A Product Selection Tool to help developers quickly narrow down the right Telink ICs for their products.
- A Technical Forum in which clients can pose questions and get answers from fellow developers and/or Telink employees.
- A force of local field application engineers who are available to answer clients' technical questions.
- A complete self-developed protocol stack that makes it easy for Telink to help clients with customizations.
- One-stop support throughout the entire product development cycle.
- OTA capability to ensure field devices always stay up to the latest firmware.



Technology Evaluation → Prototyping → Product Development → Compliance Certification → Trial Production → Mass Production

Telink

Protocols

Bluetooth® Classic

Mature and readily available on almost all platform devices, Bluetooth Classic is used widely in data transfer and audio streaming applications such as headsets, speakers, and car entertainment systems. Telink's TLSR9 Series brings the power of Telink's market-proven, efficient connectivity expertise to the protocol so many consumers and device manufacturers already know and love.

Telink Advantage:

- **Dual-Mode SoC:** Telink's dual-mode solutions deliver both Bluetooth Classic and Bluetooth LE support on a single chip for data transfer and audio streaming applications.
- **Complete Solution:** Telink provides not only basic Bluetooth chips, but also a complete self-developed SDK that streamlines product development.
- **Patent Protection:** Telink holds multiple patents that are for technologies directly related to audio streaming via Bluetooth classic.

Learn more about Telink's solutions for Bluetooth Classic.

Bluetooth® Low Energy

Introduced in Bluetooth version 4.0, Bluetooth LE is a significant foundation for IoT applications. Unlike Bluetooth Classic, Bluetooth LE is more prominent in applications where power consumption is crucial and where small amounts of data are transferred infrequently. Telink's market-proven Bluetooth LE SoCs and SDKs have been powering hundreds of millions of IoT devices since 2014.

Telink Advantage:

- **Scale:** Bluetooth LE brings with it a massive installed user base, diverse addressable markets, and major economies of scale.
- **Efficiency:** Telink's Bluetooth LE chips are power-efficient, cost-effective, and compact.
- **Full Stack:** Telink's tried-and-tested Bluetooth LE stack can support developers taking nearly any product to market.
- **Standard:** Telink's Bluetooth LE chips and SDKs are compliant with the latest version of Bluetooth standards and features.

Learn more about Telink's solutions for Bluetooth LE.

Bluetooth® Mesh

Released in 2017, Bluetooth Mesh further expands the topology of Bluetooth LE to support many-to-many device networks and hence a wider coverage through multi-hop communication. As a market leader in mesh technology, Telink has been supplying proprietary and standard Bluetooth Mesh connectivity into the hands of some of the world's largest device-makers since as early as 2015.

Telink Advantage:

- **Market Leader:** Telink was one of the first companies offering mesh technologies over Bluetooth LE in as early as 2015 – two years ahead of the Bluetooth standard.
- **Flexibility:** Today Telink delivers both a proprietary mesh protocol over Bluetooth LE and the standard Bluetooth Mesh, offering customers the choice between customization and compatibility.
- **Multi-protocol:** Telink's multi-protocol SoCs support both Bluetooth Mesh and Zigbee on the same silicon along with choice of flexible switching schemes from one to the other.

Learn more about Telink's solutions for Bluetooth Mesh.

Zigbee

zigbee

Mature, reliable, and flexible, Zigbee's full-stack platform was designed for mesh applications and built for the IoT from the ground up. With a rich cluster library and a powerful open standard (Dotdot), Zigbee lets device-makers build products that speak the same language, creating highly interoperable ecosystems across multiple verticals.

Telink Advantage:

- **Market Leader:** With its Zigbee development dating back to the early days of the company's history, Telink is now among the world's top Zigbee SoC suppliers.
- **Direct Phone Access:** Telink's multi-protocol SoCs and concurrent SDK enables direct smart phone access to the Zigbee network via Bluetooth LE, which is critical to a better user experience.
- **Multi-protocol:** Telink's multi-protocol SoCs support both Zigbee and Bluetooth Mesh on the same silicon along with choice of flexible switching schemes from one to the other.

Learn more about Telink's solutions for Zigbee.

THREAD

An emerging standard with a host of potential applications, Thread is progressively establishing itself as a viable protocol for a variety of IoT applications. Built on the power-efficient 802.15.4 MAC/PHY, Thread brings secure IP addressability and direct cloud access to mesh networks of up to thousands of devices.

Telink Advantage:

- **Thread Certified Component:** Telink's TLSR9 SoC is the FIRST Thread Component ever certified in China.
- **OpenThread Certified Platform:** Telink's TLSR9 SoC is a certified platform to support OpenThread, being recommended for use in demos and Codelabs.
- **Multi-protocol:** Telink can support concurrent operation of two different protocols, e.g. Thread and Bluetooth LE, on a single SoC.

Learn more about Telink's solutions for Thread.

Matter

matter

Matter is a unified IP-based royalty-free connectivity protocol built on proven technologies, including Thread, Bluetooth LE, and Wi-Fi, helping connect and build reliable, secure IoT ecosystems. Certified by Thread standard, Telink's TLSR9 series SoC can help customers quickly develop IoT smart devices that comply with both the Thread protocol and Matter standards.

Telink Advantage:

- **Multi-protocol:** Telink's multi-protocol SoC runs both Bluetooth LE and Thread, the two low-power connectivity options for Matter.
- **Mature Solution:** Telink has been developing Matter since the project launch and now supports the latest spec with its TLSR9 platform.
- **Complete Reference:** Telink provides a complete set of hardware and software reference to accelerate Matter development.

Learn more about Telink's solutions for Matter.

2.4GHz Proprietary

2.4GHz

The de facto radio frequency band for the IoT, 2.4GHz has applications spanning every vertical and device class. For applications that call for custom or proprietary protocols beyond industry defaults, developers have access to tried-and-true solutions in Telink's 2.4GHz SoCs.

Telink Advantage:

- **Cost Effectiveness:** Telink 2.4GHz removes unnecessary complexity from hardware through protocol stack, which equates to optimized costs across the board.
- **Time-to-Market:** The ease of designing and manufacturing products based on Telink 2.4GHz SoCs and reference designs enables developers to accelerate their time-to-market.
- **Customizable:** A flexible architecture in many aspects, Telink 2.4GHz solution allows developers to create proprietary protocol stacks for custom applications.

Learn more about Telink's solutions for 2.4GHz.

Ecosystem Platforms

Today's smart home applications are primarily supported by ecosystems from the major vendors. Telink's SDKs are built to be inherently compatible with mainstream platforms including Apple HomeKit, Amazon Echo, OpenThread, Alibaba, and Mi. This continues Telink's legacy of providing customers with the most cutting-edge smart home solutions.

Telink Advantage:

- **Market Leader:** Telink has been one of the IC partners recommended by a US T1 ecosystem player for its smart home platform since 2016.
- **Interoperability:** Telink's SDKs are built to support seamless interoperability with most mainstream ecosystems right out of the box.
- **Multi-protocol:** Telink's multi-protocol SoCs and SDKs support mainstream standards on the same silicon, reducing manufacturers' risk of being locked in one technology.

Learn more about Telink's solutions for Ecosystem Platforms.

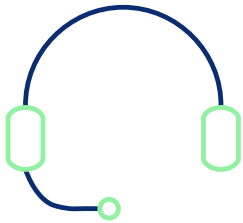
Telink

Applications

Applications Overview

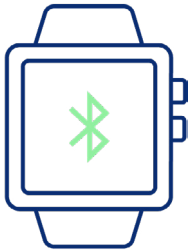
Smart Home

Remote Controls

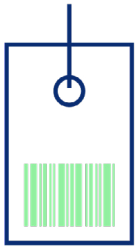


Wireless Audio

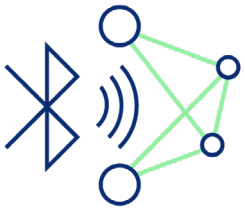
Human Interface Devices



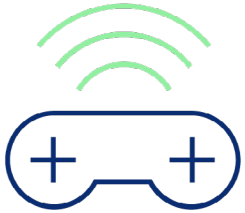
Wearables



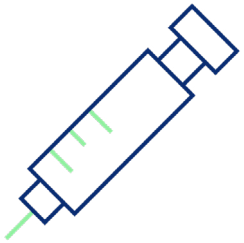
Electronic Shelf Labels



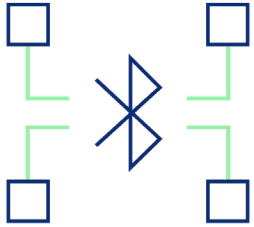
Location Services



Gaming



Health and Wellness



Bluetooth Multi-Connection

Smart Home

Smart devices that are easy to use and deliver seamless connectivity and convenience are in high demand. From smart lighting systems to smart locks and everything in between, Telink's chips deliver the high performance, power efficiency, optimized BOM cost, and out-of-the-box interoperability developers need to build the home of the future.

Benefits of Telink Solution:

- **Multi-protocol:** Telink's multiprotocol chips support major connectivity standards, reducing the risk involved in protocol selection for manufacturers and offering greater flexibility.
- **Compatibility:** Telink's SoCs have passed comprehensive compatibility tests for most mainstream mobile phones, and are built to operate seamlessly in today's complex smart home ecosystems.
- **Performance and BOM Cost:** Telink's solutions deliver industry-leading connection stability, power consumption, and BOM savings for smart home devices.

Solutions for Smart Homes:

- **Bluetooth Mesh:** Telink was one of the first companies to deliver solutions for Bluetooth LE Mesh, which is now the fastest-growing smart home/smart lighting standard and has been adopted in most Tier 1 ecosystems.
- **Zigbee:** Integrate devices with Tier 1 customers' platforms on Telink's reliable, mature, and cost-efficient 802.15.4 SoCs and protocol stack.
- **Thread & Matter:** Certified by Thread, Telink can help customers quickly develop IoT smart devices that comply with both the Thread protocol and Matter standards.
- **Telink SoCs:** TLSR825x, TLSR827x, TLSR921x

Bluetooth® zigbee THREAD matter HomeKit

Remote Controls

Telink's chips power remotes for some of the largest smart TV, set-top box, and OTT box manufacturers in the world. Telink's RCU product line gives developers the complete solutions they need to build feature-rich, user-friendly remote controls, scale rapidly, and adjust on the fly to new entertainment technology.

Benefits of Telink Solution:

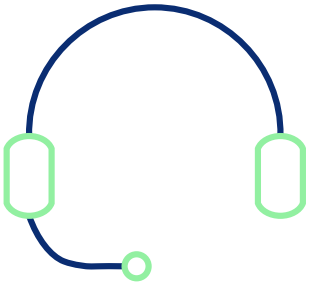
- **Performance:** Telink's SoCs deliver great RF performance, ultra-low power consumption, and exceptional audio performance.
- **BOM Cost:** Telink's highly integrated SoCs reduce the number of external components manufacturers need to include in their remotes, lowering BOM costs.
- **Voice Control:** From voice recognition over the cloud to local keyword spotting, Telink offers cutting-edge systems that maximize the impact of the latest features and functionality.
- **Multiprotocol:** Telink's multiprotocol chips support multiple modes of RCU operation - Bluetooth LE, RF4CE, and IR – serving as the foundation of universal remote controls.

Solutions for Remote Controls:

- **Bluetooth LE:** High-performing, cost-effective, and feature-rich, Telink's Bluetooth LE chips power millions of televisions, set-top boxes, and OTT boxes around the world.
- **RF4CE:** Telink's highly integrated Zigbee chips are designed to function across a wide range of devices, including the RF4CE protocol widely used in the remote control market.
- **Google Certified Reference:** Telink offers a complete set of hardware and firmware reference design to build voice-enabled remote controls for Google TV.
- **Telink SoCs:** TLSR827x, TLSR951x

Bluetooth® rf4ce

Wireless Audio



Moving from traditional single-purpose devices like wireless stereo headsets and speakers to True Wireless Stereo (TWS) earbuds and next generation Bluetooth LE Audio devices, new audio streaming products are ready for prime time.

Benefits of Telink Solution:

- **Bluetooth Dual-Mode:** Telink's dual-mode chip offers the choice of both Bluetooth Classic and Bluetooth LE audio, allowing for a seamless technology transition on the same product.
- **Ultra-Low Latency:** Telink's wireless audio solutions deliver industry-leading ultra-low end-to-end latency that satisfies the most demanding ears.
- **Real-time Mixing:** Telink goes beyond single connection by supporting two simultaneous audio streams on a single chip with real-time mixing, enabling more advanced use cases.

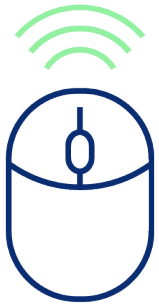
Solutions for Wireless Audio:

- **Bluetooth Classic:** Telink's latest TLSR9 SoC supports Bluetooth Classic, the industry standard technology powering billions of audio streaming devices.
- **Bluetooth LE Audio:** TLSR9 is also certified to support Bluetooth LE Audio specifications, including the LC3 audio codec and isochronous channels for TWS earbuds, audio sharing, and hearing assistance devices.
- **Proprietary Low Latency:** With its own proprietary solution, Telink can deliver an end-to-end latency of as low as 20ms, which is critical for timing-sensitive products including gaming headsets.
- **Telink SoCs:** TLSR951x

Bluetooth® **Classic Audio**
LE Audio

2.4GHz

Human Interface Devices



Seamless connectivity is essential in the wireless human interface device market — devices that drop a connection will get dropped themselves.

Benefits of Telink Solution:

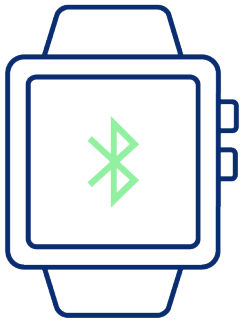
- **Performance:** Telink's SoCs feature low power consumption, high RF link budget, multiple receiver, and secure protocols.
- **Optimized BOM:** Telink's highly efficient and integrated products reduce the BOM manufacturers need to include in their products.
- **Mature Reference:** From Mouse to Keyboard to Dongle, Telink supports full array of device types with turn-key reference designs to accelerate time-to-market.
- **Compatibility:** Telink's solution is certified by Allion Labs to be fully compatible with host devices on the market.

Solutions for HIDs:

- **Bluetooth:** Telink's Bluetooth chips ensures interoperability across a wide variety of platforms.
- **2.4GHz:** Based on mature technologies, Telink's 2.4GHz protocols ensure a most efficient and cost effective solution.
- **Multi-Mode:** Consumers are looking for wireless accessories that run on Bluetooth, 2.4GHz proprietary protocols, and USB. Telink has the solution.
- **Telink SoCs:** TLSR825x, TLSR921x, TLSR951x

Bluetooth® 2.4GHz USB Enabling Connections™

Wearables



Wearable devices have grown into a major market over the past decade. Most recently, a number of wearable contact tracing and social distancing solutions have hit the market in an effort to stop the spread of the novel coronavirus.

Benefits of Telink Solution:

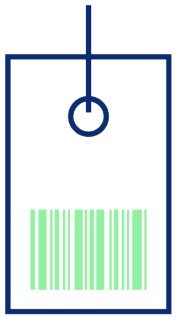
- **Rich Product Portfolio:** Telink offers multiple product lines for customers to develop a variety of wearables for different markets.
- **Performance:** Telink's solutions deliver industry-leading power consumption, RF link budget, and processing capability required by today's wearable devices.
- **One-Stop Service:** Telink helps customers bring products to market efficiently by providing technical support throughout the product development cycle.

Solutions for Wearables:

- **Bluetooth Dual-mode:** Telink provides a Bluetooth Classic and Bluetooth LE dual-mode SDK for high-end smart watches with advanced audio streaming capabilities.
- **Bluetooth LE:** Telink also provides a single Bluetooth LE SDK for the development of high-performance, ultra-low power consumption wearable devices.
- **Pandemic Management:** Telink's Bluetooth LE solutions let wearable devices deliver continuous location and distance management capabilities, helping governments enforce self-quarantines and businesses implement safe return-to-work strategies.
- **Telink SoCs:** TLSR825x, TLSR921x, TLSR951x

Bluetooth®

Electronic Shelf Labels



From dynamic centralized pricing and in-store heat-mapping to automated inventory management, ESL solutions are leading a digital transformation in retail. It is all happening on the shoulders of Telink's low- power connectivity SoCs designed for seamless management, flexible configuration, and cost-effective deployment.

Benefits of Telink Solution:

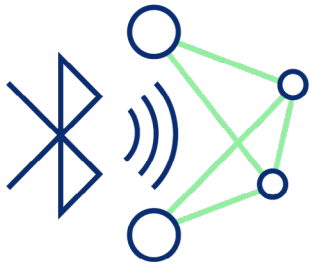
- **Performance:** With industry-leading RF performance, Telink's SoCs power large number of ESLs that dynamically display flexible product information and support centralized synchronous changes.
- **Optimized Cost:** The number of ESLs required by a typical deployment can easily reach tens of thousands, which can only be achieved by a cost efficient solution offered by someone like Telink.
- **Energy Efficiency:** Telink's SoCs are extremely power-efficient, an essential feature for retail environments in which the chore of replacing paper tags should not be replaced with the chore of replacing batteries.

Solutions for ESLs:

- **Custom 2.4GHz Stack:** Telink delivers an efficient custom stack that enables ESL clients to develop proprietary 2.4GHz solutions tailored to their unique requirements.
- **Energy Harvesting:** Telink partners with industry leading energy harvesting IC supplier to make ESLs energy-autonomous.
- **Telink SoCs:** TLSR8359

2.4GHz

Location Services



Accurate location information is the cornerstone of use cases like tracking assets inside a building or finding one's way in a complex indoor facility. IoT devices can use approaches like received signal strength indicator (RSSI), angle of arrival (AoA), angle of departure (AoD), or even more sophisticated algorithms to deliver highly precise location services.

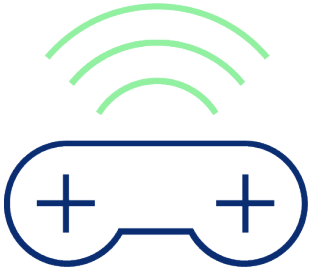
Benefits of Telink Solution:

- **Bluetooth 5.1 Support:** Telink's latest SoCs fully support AoA/AoD, a key feature set introduced by Bluetooth version 5.1, to enable better indoor positioning and asset tracking services.
- **Real-Time Location:** By combining high-precision RSSI and AoA/AoD technologies, Telink's SoCs support complex algorithms that report location information in real time.
- **Future Proof:** Telink's chips reserve hardware support for future Bluetooth specifications that will take the performance of indoor location services to the next level.

Solutions for Location Services:

- **Bluetooth LE:** Telink's Bluetooth LE chips support mature, cost-effective RSSI-based beacons that are an essential part of most location solutions.
- **Direction-Finding:** Telink offers customers AoA/AoD demos, reference code, and quick guides to facilitate further development.
- **High-Accuracy Distance Measurement:** Telink's Bluetooth LE-based technologies add advanced distance measurement capabilities to devices.
- **Apple Find My Network:** Telink provides comprehensive solution for customers who want to equip their products with the power of Apple's Find My network.
- **Telink SoCs:** TLSR8232, TLSR8208, TLSR8298, TLSR827X, TLSR921x

Wireless Gaming



By eliminating wire limitations, the advanced gaming gadgets offer improved mobility and better gameplay for gamers. Ultra-low-latency and seamless interoperability are at the heart of today's wireless headsets, mice, keyboards, and game pads. Telink delivers comprehensive connectivity solutions for players to keep the fun going.

Benefits of Telink Solution:

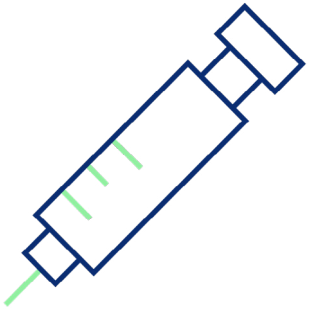
- **Comprehensive Solution:** From wireless headsets to game pads, from mice to keyboards, Telink supports a full array of gaming products – all working seamless together through a universal USB dongle.
- **Ultra-Low Latency:** Telink's proprietary wireless audio solutions deliver an industry-leading ultra-low end-to-end latency that satisfies the most demanding ears.
- **High Speed HID:** Telink's connectivity protocol is optimized from bottom up to ensure high speed response for wireless HIDs, matching the most demanding fingers.

Solutions for Wireless Gaming:

- **Proprietary Protocol:** A completely optimized 2.4GHz protocol that inherits the strength of Telink's HID and wireless audio solutions, delivering a comprehensive offering for a full array of gaming accessories that demand low latency and instant response.
- **Telink SoCs:** TLSR8355, TLSR827x, TLSR951x

2.4GHz

Health and Wellness



Bluetooth LE has become the first choice for adding intelligence to healthcare devices and consumer goods. Smart healthcare devices and consumer goods use sensors to monitor health and usage data and transmit it to mobile devices for analysis, treatment, and improved user experience.

Benefits of Telink Solution:

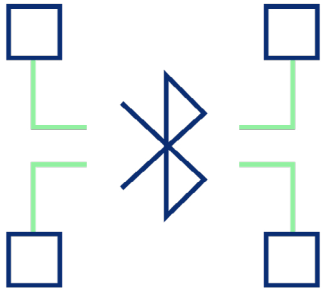
- **Disposable Applications:** Telink's highly-integrated cost-optimized SoCs reduce the number of external components developers must include, making disposable applications a reality.
- **Ultra-Low Power:** Telink's products offer ultra- low power consumption for long device battery life.
- **Artificial Intelligence:** The embedded power-efficient AI engine in Telink's SoC enables more intelligent medical devices.
- **Compatibility:** Telink's SoCs have passed comprehensive compatibility tests for most mainstream mobile phones on the market.

Solutions for Health and Wellness:

- **Bluetooth LE:** The ubiquitous presence, low power consumption and cost efficiency make Bluetooth LE the ideal technology when it comes to mobile phone connection. Telink supports the latest version of Bluetooth standards with its world-class SoCs and SDKs.
- **Bluetooth Mesh:** This M to M mesh topology based on Bluetooth LE enables applications that involve multiple inter-connected devices or sensor nodes.
- **Telink SoCs:** TLSR8232, TLSR8208, TLSR8298, TLSR827x, TLSR921x

Bluetooth®

Bluetooth Multi-Connection



From data transfer to audio streaming, multiple peripheral devices can connect over both types of Bluetooth radios simultaneously to the central device powered by a Telink dual-mode SoC and multi-connection SDK.

Benefits of Telink Solution:

- **Bluetooth Dual-Mode:** Telink offers dual-mode Bluetooth capabilities on a single chip, simplifying hardware design, lowering system cost, and allowing for more innovative products.
- **Multi-Connection:** Developed based on proven technology, Telink's multi-connection SDK supports simultaneous Bluetooth Classic and multiple Bluetooth LE connections.
- **Seamless Multitasking:** Telink's high-performance SoCs and mature SDK enable stable connections to multiple Bluetooth peripherals simultaneously, even in the most complex multitasking use cases.

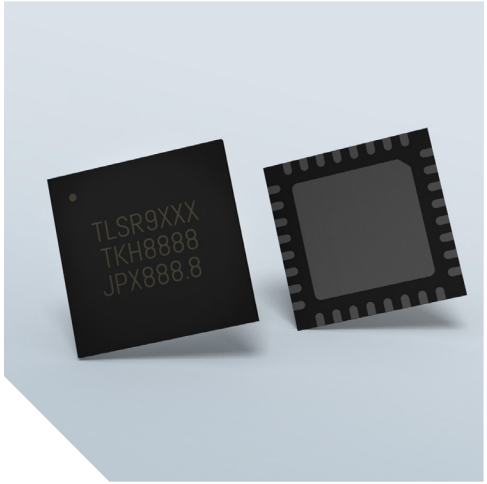
Solutions for Bluetooth Multi-Connection:

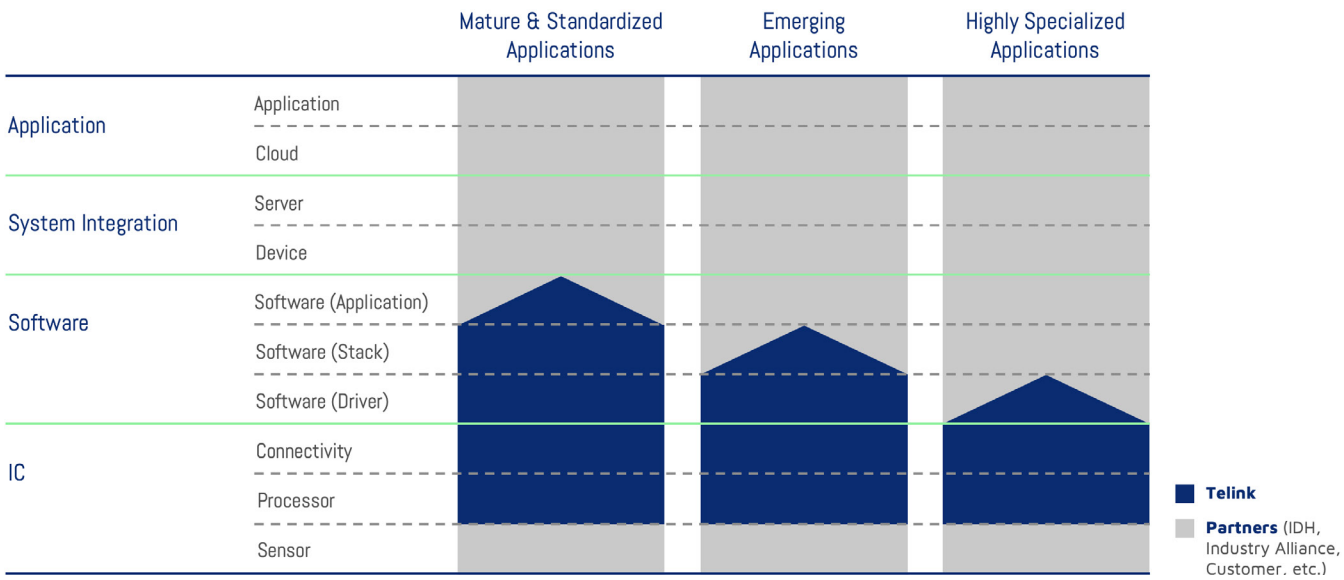
- **Universal USB Dongle:** When plugged into a USB port on a PC, a universal dongle acts as the center of multiple Bluetooth peripherals, letting a user operate the PC, stream music, or make voice calls all at the same time.
- **Bluetooth Controller:** When connected to the host chip in a bigger system like STB or TV, Telink's chip can function as the dual-mode Bluetooth controller, allowing simultaneous wireless connections to multiple peripherals, including remote controls, joysticks, keyboards, and audio devices.
- **Telink SoCs:** TLSR825x, TLSR827x, TLSR951x

Bluetooth®

Full-Stack Deliverables

Telink's complete connectivity solutions are ideal for a wide range of IoT applications. By working closely with IDH partners and industry alliances, Telink is able to deliver a full-stack solution that can be tailored to customers' different business models.





Product Naming Rules

Ordering No.

Part No.

TLS R 9 5 1 8 A ER

Packing Type: R-tape & reel, E-tube, Y-tray

Temp. Grade: E(-40°C~85°C), G(-40°C~105°C), A(-40°C~125°C)

Package Variant Code: Indicating differences in package type, pin count, Flash size, etc.

Feature Code: Indicating major IC feature differences (RF Mode, SRAM, Audio, AI, etc.)

Product Generation within the family: Starting from 0 to 9

Product family: 1 (Wi-Fi + X), 2 (Bluetooth LE + X), 3 (2.4Ghz Proprietary), 5 (Bluetooth Classic + X), 6 (Zigbee)

MCU Category: 8-Telink 32b, 9-RISC-V

Product Category: RF

Company prefix

Comments: X represents zero to multiple other protocols.
TLSR8 parts in production before 2020 does not follow the above naming rules.
Check individual IC datasheets for details.

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