

IW693

2x2 Dual-Band CDW Wi-Fi® 6/6E and Bluetooth Combo Solution

The IW693 is a highly integrated Wi-Fi 6/6E device enabling concurrent dual Wi-Fi (CDW) and Bluetooth + Bluetooth LE operation. IW693 supports four modes:

- **Mode 1:** CDW 2x2 Wi-Fi 6/6E 5-7 GHz (802.11ax) + 1x1 Wi-Fi 6 2.4 GHz (802.11ax)
- **Mode 2:** CDW 1x1 Wi-Fi 6/6E 5-7 GHz (802.11ax) + 1x1 Wi-Fi 6 2.4 GHz (802.11ax)
- **Mode 3:** 2x2 Wi-Fi 6 2.4 GHz (802.11ax)
- **Mode 4:** 2x2 Wi-Fi 6/6E 5-7 GHz (802.11ax)

The System-on-chip (SoC) for IW693 implements advanced features including MU-MIMO, OFDMA, target wake-up time (TWT), and Bluetooth LE Audio. With integrated 2.4 GHz and 5-7 GHz TX power amplifiers (PA), RX low noise amplifiers (LNA) and TX/RX switches (T/R SW) as well as a full Bluetooth radio, it simplifies design. The IW693 supports external front-end modules (FEM) with PA and LNA and supports a flexible front-end design with either two or three antennas.

The IW693 implements advanced real-time Wi-Fi and Bluetooth arbitration hardware with software algorithms to optimize coexistence performance. NXP's Edgelock technology is integrated. The embedded security subsystem supports hardware crypto accelerated secure boot, key management firmware authentication, secure life cycle management and anti-rollback protection. The IW693 integrates dedicated CPUs and memories for both the Wi-Fi and Bluetooth subsystems for real time, independent protocol processing. The interfaces to external host processors include PCIe and SDIO for Wi-Fi and UART for Bluetooth.

The IW693 is a performance-oriented Wi-Fi 6E + wireless connectivity solution to meet the needs for smart home applications supporting high-



performance or visually connected services and advanced Bluetooth/Bluetooth LE audio capabilities.

For industrial and commercial applications, the IW693 brings high-bandwidth, long-reaching Wi-Fi connectivity to support high-concurrency networks serving many clients and to gain access to 6 GHz Wi-Fi networks that can relieve congestion from legacy / crowded 5 GHz campus or corporate Wi-Fi deployments. Wi-Fi 6E Wi-Fi support enables offload from crowded 2.4 GHz or channel-limited 5 GHz network spectrum and provides maximum forward longevity for next-generation Wi-Fi networks. Bluetooth LE Audio enables support for a leap in Bluetooth-audio capabilities, enabling multiple streams of user-specific content and broadcast or one-to-many audio sharing services.

The IW693 delivers high-performance multi-radio connectivity that enable devices to benefit from the latest global Wi-Fi and Bluetooth network deployments and services. It provides high-integration multi-radio connectivity with extended temperature (-40° to +85°C) support and flexible design options. NXP solutions provide built-in

coexistence management for both integrated and external radios on the same PCB.

NXP's connectivity solutions also enable accelerated certification for both Wi-Fi Alliance and Bluetooth standards and help ensure global regulatory emissions and cybersecurity conformance in a fast-changing regulatory compliance landscape.

IW693 Feature Overview

Wi-Fi key features

- 2x2 Wi-Fi 6/6E and 1x1 Wi-Fi 2.4 GHz concurrent dual wireless mode (mode 1)
 - 40 MHz channel for 2.4 GHz (RF paths 2A/2B)
 - 1024 QAM (MCS11), up to 80 MHz channel for 5-7 GHz (RF paths 5A/5B)
- 2x2 radio
 - 20 MHz channel for 2.4 GHz (RF path C)
 - 1024 QAM (MCS11), up to 80 MHz channel for 5-7 GHz (RF paths 5A)
- 1x1 radio
 - 20 MHz channel for 2.4 GHz (RF path C)
 - 1024 QAM (MCS11), up to 80 MHz channel for 5-7 GHz (RF paths 5A)
- 2x2 and 1x1 radios
 - STA and mobile AP
 - Wireless multi-streaming
 - Adaptive scheduler
 - Agile channel switching
 - Wi-Fi TSF host clock sync between AP and STA
 - Wi-Fi cross-chip TSF clock sync between AP and AP
- PCIe and SDIO host interface

Bluetooth key features

- High speed, long range, advertising extensions
- Isochronous channels supporting LE Audio
- Integrated PA (+13 dBm)/LNA/SW
- UART host interface

Operating Characteristics

- Supply voltage: 1.8 V and 3.3 V
- Operating temperature: -40°C to 85°C
- Storage temperature: -55°C to 125°C

Package options

- HVQFN148 (dual-row) 11 mm x 11 mm x 0.85 mm with 0.5 mm pitch

Modules

- Broad array of module offerings from industry leading global suppliers

Target applications

- Wireless power over ethernet (POE) hub
- Smart home hub
- Mobile routers
- Internet of things (IoT) gateways
- Video-enabled smart appliances
- Wireless edge connectivity
- Visual smart homes
- Wireless medical connectivity
- Industrial connectivity

| Orderable Part Numbers | Operation Mode | Host Interface | Package Type |
|------------------------|---------------------------------------------|----------------|--------------|
| IW693SPHN/A1ZDIMP | 2x2 (2.4/5/6 GHz) + 1x1 (2.4 GHz), Wi-Fi 6E | PCIe | DRQFN |
| IW693SSHN/A1ZDIMP | 2x2 (2.4/5/6 GHz) + 1x1 (2.4 GHz), Wi-Fi 6E | SDIO | DRQFN |

IW693 Internal Block Diagram

