Connectivity technical brief for Linux

About this document

Scope and purpose

This document describes the supported hardware and software features and limitations of Infineon AIROC™ Wi-Fi and Wi-Fi + Bluetooth® Combo solutions with respect to their integration and usage over the Linux ecosystem.

Intended audience

This document is intended for readers requiring technical details on the supported features and limitations of Infineon AIROC™ Wi-Fi and Wi-Fi + Bluetooth® Combo solutions with respect to its integration and usage over the Linux ecosystem.

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1 Introduction

Infineon AIROC™ Wi-Fi and Wi-Fi + Bluetooth® Combo solutions for Linux ecosystem over A-series host processors are designed to streamline the entire product lifecycle, from initial design and component selection to ongoing product maintenance. These solutions comprehensively address the challenges of regional radio spectrum regulatory compliance, as well as Wi-Fi Alliance interoperability certifications, ensuring your product meets the necessary requirements. By leveraging Infineon's expertise, users can accelerate time-to-market, reduce development costs, and minimize risks, enabling a more efficient and reliable product launch. This document gives an overview of the features, capabilities and support offered by the Infineon AIROC™ Wi-Fi and Wi-Fi + Bluetooth® Combo solutions.

2 Linux ecosystem support

Infineon AIROC™ Wi-Fi and Wi-Fi + Bluetooth® Combo solutions for Linux ecosystem with A-series host processors currently consist of the following out-of-the-box deliverables:

- Infineon AIROC™ Wi-Fi and Wi-Fi + Bluetooth® Combo chips with built-in Wi-Fi and Bluetooth® radios, controller firmware, and an embedded Bluetooth®/Bluetooth® Low Energy application stack.
- Standardized Connectivity Software which includes Infineon FMAC Wi-Fi host driver, Wi-Fi firmware binaries and out-of-the-box support for the Infineon's WPA supplicant (wpa_supplicant) and host access point daemon (hostapd) based on the wpa_supplicant and hostapd open-source utilities, with latest support available over the Linux kernel version 6.1.145 with backports and patches available for different Linux kernel versions.
- Regulatory-compliant radio power configurations with support for tuning to different targeted regions.
- Tool suite to assist various manufacturing, regulatory, and interoperability requirements.

New features, fixes, and improvements are released through a four-month release cycle, with all the artifacts tested and validated stringently to meet strict functional and certification requirements.

Figure 1 illustrates the typical block diagram of integration of Infineon AIROC™ Wi-Fi and Wi-Fi + Bluetooth® Combo with A-series hosts. This connectivity is achieved through various hardware interfaces such as PCIe, SDIO, and USB.

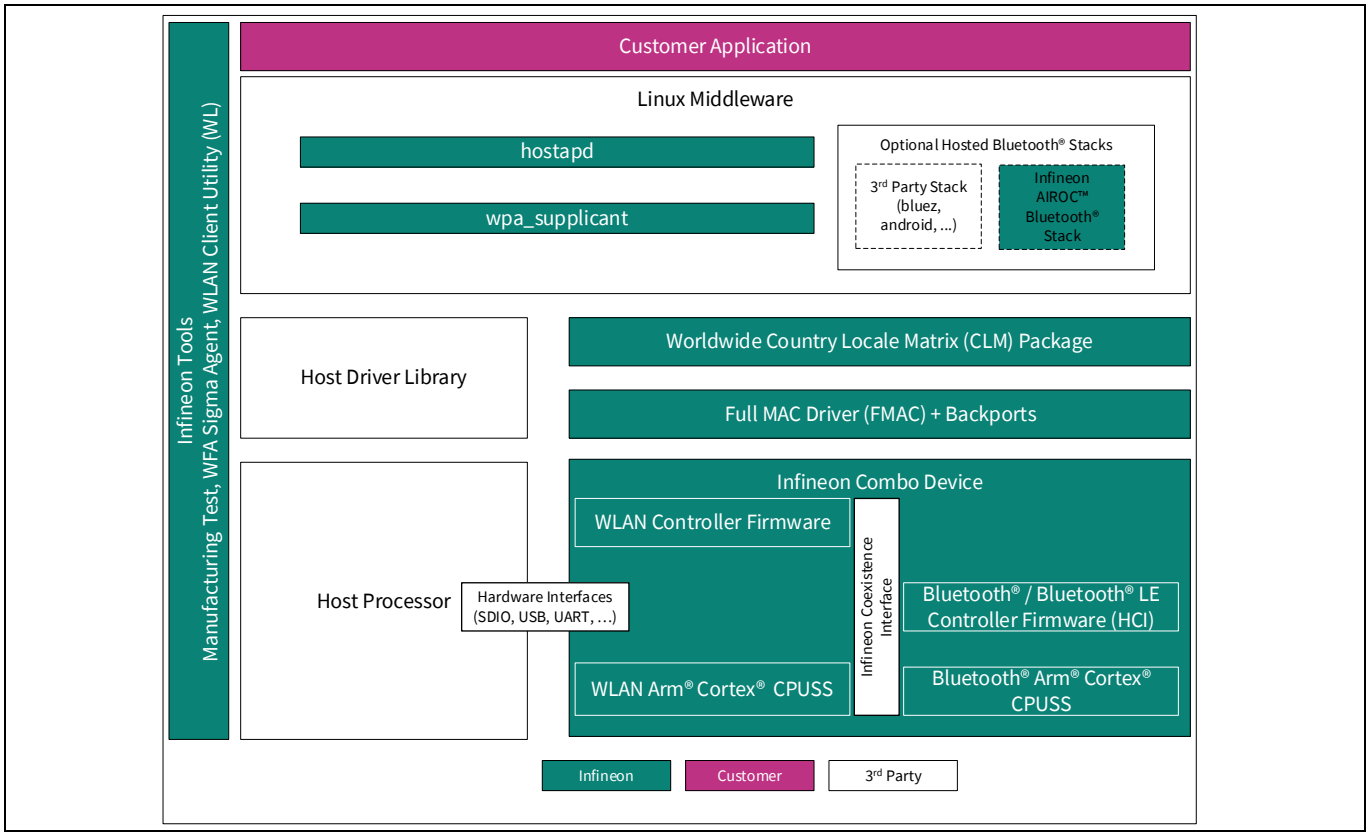

Figure 1 Block diagram for Infineon connectivity paired with A-class hosts

Note: Infineon AIROC™ Wi-Fi and Wi-Fi + Bluetooth® Combo solutions support Infineon-patched wpa_supplicant and hostapd only.

Note: *Infineon AIROC™ Wi-Fi and Wi-Fi + Bluetooth® Combo solutions are also supported over RTOS and Automotive Linux ecosystems (not in the scope of this document).*

2.1 Bluetooth® stack

BTSTACK is Infineon's Bluetooth® Host Protocol Stack implementation. The stack is optimized to work with Infineon Bluetooth® controllers. The BTSTACK supports Bluetooth® BR/EDR and Bluetooth Low Energy core protocols. The stack is available as libraries built using ARM, GCC and IAR tool-chains. Further there are two build variants of stack libraries, LE only and dual mode. Applications that need only the LE protocols can take advantage of reduced size of LE only library and build LE peripheral or central applications. Dual-mode library supports both LE and BR/EDER protocols. The software architecture of Infineon's host Bluetooth® stack (BTSTACK) is available here: AIROC™ BTSTACK architecture.

2.2 Kernel support policy

To service kernel diversity within the IoT market, the kernel support policy embraces the Backports project. The Backports Project is the industry standard practice for enabling older kernels to run the newest drivers. The A-series host provider defines the kernel to be used in the product. In case the kernel version is less than the 6.1.145, it will execute Backports Project in your development environment to enable the latest connectivity software (firmware and drivers) in the design.

Note: *Infineon AIROC™ Wi-Fi and Wi-Fi + Bluetooth® Combo solutions for Linux ecosystem is supported over all non-EOL LTS kernel releases*

See Linux Kernel FAQs for Linux kernel software lifecycle information.

3 Connectivity Software lifecycle and support status

Infineon AIROC™ Wi-Fi and Wi-Fi + Bluetooth® Combo solutions for Linux ecosystem are assigned a state of support in the software lifecycle. State assignment helps users to plan their product lifecycle by ensuring the right device and software solution is selected which is suitable for their product. State change notifications will be communicated in advance via this document. Table 1 and Table 2 list the active, in-maintenance, and EOL (End of Life) devices and software.

This section applies to Connectivity Software for Infineon AIROC™ Wi-Fi and Wi-Fi + Bluetooth® Combo solutions for Linux ecosystem only. Separate software lifecycles are available for our solutions for RTOS and Automotive ecosystems.

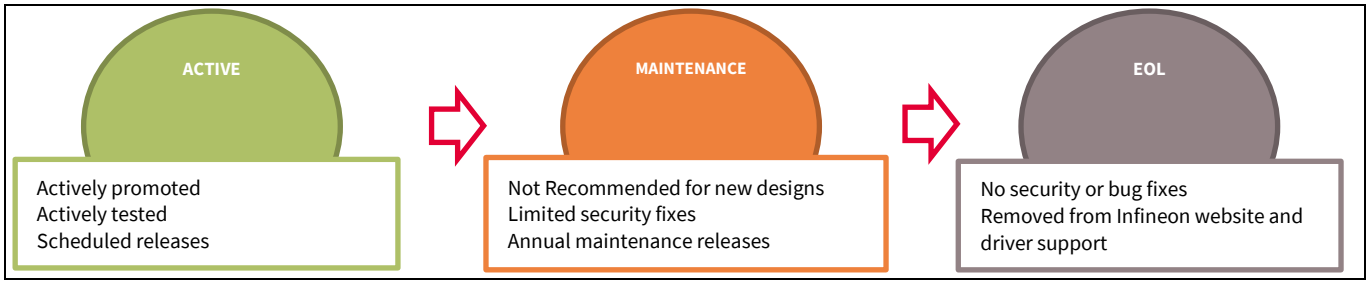

Figure 2 Connectivity Software lifecycle

Table 1 Current software support status for Infineon AIROC™ Wi-Fi and Wi-Fi + Bluetooth® Combo devices

Device	State of Support	Replaced by
CYW5557x	ACTIVE	-
CYW5551x	ACTIVE	-
CYW43022	ACTIVE	-
CYW43439	ACTIVE	-
CYW4373/4373E	ACTIVE	-
CYW54590/54591	ACTIVE	-
CYW43012	ACTIVE	CYW43022
CYW43455	MAINTENANCE	CYW4373/4373E
CYW4343x	MAINTENANCE	CYW43439
CYW435x	EOL	CYW54590/54591
431x, 432x, 433x	EOL	CYW43439

4 Release platform and software artifacts

Infineon GitHub and Infineon Developer Community are the release platforms for our connectivity software. Each release is posted over GitHub in the community in tarball/zip format containing a set of patches that can be applied to your development environment as describe in Table 2. It is recommended to use these packages (or the new Yocto packages) as the primary source for the software required to integrate or upgrade our Infineon AIROC™ Wi-Fi and Wi-Fi + Bluetooth® Combo solutions for Linux ecosystem over A-series host processors.

Table 2 Description of released software artifacts

GitHub repository	Tarball artifact	Description
ifx-backports	Backports	Enables old kernels to run latest drivers. For more details, see the Backports project documentation.
ifx-linux-wireless	Devicetree	Out-of-the box NXP iMX6SX + Murata Wi-Fi/Bluetooth® EVKs integration
ifx-linux-firmware	Firmware	Device software delivered in binary form
ifx-hostap	Hostapd	Patch files that enable the Infineon connectivity within the hostapd application
ifx-wireless-drivers	Patch	Patch files that enable the FullMAC driver
ifx-linux-bluetooth	Bluetooth® FW, BTSTACK & Linux Code examples	The Bluetooth® SDK package contains the Bluetooth® firmware, Linux BT-STACK of various architectures, and code examples . It provides a comprehensive set of tools for developing Bluetooth®-enabled applications in Linux.

5 Wireless connectivity portfolio

Table 3 lists available AIROC™ Wi-Fi and Wi-Fi + Bluetooth® Combo product families with respect to the Linux ecosystem. For additional information such as product briefs and datasheets, see Wireless Connectivity or contact Infineon sales representative.

Note: The letter 'x' denotes the different flavors of products available in the product family e.g., CYW5557x consists of CYW55571, CYW55572, CYW55573 and CYW5551x consists of CYW55511, CYW55512 and CYW55513

Table 3 Product families

Family	Wi-Fi fundamental features				Bluetooth® or Bluetooth® LE fundamental features	
	Wi-Fi standard	MAC	Interface(s)	Bands (GHz)	Version	Interface(s)
CYW5551x	Wi-Fi 6/6E	802.11 a/b/g/n/ac/ax -compliant	SDIO 3.0	2.4/ 5 / 6	6.0	PCM TDM SCB I2S UART
CYW5557x	Wi-Fi 6/6E	802.11/a/b/g/ n/ac/ax/6E 2x2 MIMO	PCIe 3.0 / SDIO 3.0	2.4/ 5 / 6	6.0	PCM 2x SCB : 2x I2S UART
CYW5459x	Wi-Fi 5	802.11 a/b/g/n/ac 2x2 MIMO RSDB ac/n beamforming	PCIe / SDIO 3.0	2.4/ 5	5.4	UART PCM I2S
CYW43022	Wi-Fi 5	802.11 ac	SDIO 3.0 / SPI	2.4/ 5	5.4	UART PCM
CYW4373/E	Wi-Fi 5	802.11 a/b/g/n/ac beamformee	UART / USB / SDIO 3.0	2.4/ 5	5.4	UART USB PCM
CYW43455	Wi-Fi 5	802.11 a/b/g/n/ac beamformee	UART / SDIO 3.0	2.4/ 5	5.3	UART PCM I2S
CYW43012	Wi-Fi 4	802.11 a/b/g/n/ac ultra-low power beamformee	SDIO 3.0	2.4/ 5	5.4	UART PCM I2S
CYW43439	Wi-Fi 4	802.11 b/g/n	SDIO 2.0 / SPI	2.4	5.4	UART PCM I2S

6 Device features and capabilities

This section provides comprehensive information on the various features and configuration capabilities for Wi-Fi and Bluetooth® offered in each Infineon AIROC™ Wi-Fi and Wi-Fi + Bluetooth® Combo solution for Linux ecosystem. It also provides information on features available for coexistence (COEX) modes of operation, which allow different wireless communication technologies to operate simultaneously without interference.

This section should enable the reader to make informed decisions on component selection and interfacing with respect to their intended use cases. By understanding the various modes of operation and features supported in a particular device, users can design and implement effective wireless communication systems that meet their specific requirements.

Note: The features listed in the feature matrices in this section are with respect to connectivity software for Linux ecosystem only. The feature support might vary in case of software for RTOS or Automotive Linux ecosystem.

6.1 Wi-Fi features

Table 4 Wi-Fi features

Legend: ✓ - Feature Supported and Tested | **O** – Can be Supported* | **X** – Feature Not Supported | **–** - Feature not relevant

***Contact Infineon Support for clarification before confirmation**

Category	Feature	CYW5551x	CYW5557x		CYW54591		CYW54590		CYW4373E			CYW4373		CYW 43022	CYW 43012	CYW 43439	CYW 43455
	Description	1x1 20MHz 11ax/6E Tri-Band	2x2 80 MHz 11ax/ 6E Tri-Band		2x2 80 MHz 11ac		2x2 80 MHz 11ac		1x1 80 MHz 11ac Dual Band Industrial (-40°C-85°C)			1x1 80MHz 11ac Dual Band		1x1 20 MHz 11ac Dual Band	1x1 20 MHz 11n Dual Band	1x1 20 MHz 11n	1x1 80 MHz
	Supported Wi-Fi standard	Wi-Fi 6	Wi-Fi 6		Wi-Fi 5		Wi-Fi 5		Wi-Fi 5			Wi-Fi 5		Wi-Fi 5	Wi-Fi 4	Wi-Fi 4	Wi-Fi 5
	Host Interface	SDIO	PCIe	SDIO	PCIe	SDIO	PCIe	SDIO	PCIe	SDIO	USB	SDIO	USB	SDIO	SDIO	SDIO	SDIO
Device modes	STA	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Soft AP	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	P2P	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	AP + STA	✓	✓	✓	✓	✓	✓[1]	✓[1]	✓	✓	✓	✓	✓	✓	✓	✓	✓
	AGO + STA	O	✓	✓	O	O	O	O	O	O	O	O	✓	O	O	O	O
	P2P + STA	O	✓	✓	O	O	O	O	O	O	O	O	✓	O	O	O	O
	AP + AP (MBSS)	O	O	O	✓	O	O	O	O	O	O	O	O	O	O	O	O
	STA + STA	O	O	O	O	O	O	O	O	O	O	✓	✓	O	O	O	O
	AP + STA 6G	✓	✓	✓	-	-	-	-	-	-	-	-	-	-	-	-	-
	Wi-Fi 6E (STA + AP)	✓	✓	✓	-	-	-	-	-	-	-	-	-	-	-	-	-
Wi-Fi security	WPA3-R3 Personal STA	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	WPA3-R3 Enterprise (STA)	✓	✓	✓	✓	✓	O	O	✓	✓	✓	✓	✓	O	✓	O	O
	WPA3-R3 AP*	✓	✓	✓	✓	O	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	OWE	✓	✓	✓	O	O	X	X	X	X	X	X	X	O	X	X	X
	OWE_AP	✓	✓	✓	X	X	X	X	X	X	X	X	X	X	X	X	X
Device security	Signed FW Authentication	✓	✓	✓	X	X	X	X	X	X	X	X	X	✓	X	X	X
	Encrypted FW	✓	✓	✓	X	X	X	X	X	X	X	X	X	✓	X	X	X
Wi-Fi key features	bgscan	✓	✓	✓	O	O	O	O	O	O	O	O	O	O	O	O	O
	BSS color STA	✓	✓	✓	-	-	-	-	-	-	-	-	-	-	-	-	-
	BSS color MAP	✓	✓	✓	-	-	-	-	-	-	-	-	-	-	-	-	-

Device features and capabilities

Category	Feature	CYW5551x	CYW5557x		CYW54591		CYW54590		CYW4373E			CYW4373		CYW 43022	CYW 43012	CYW 43439	CYW 43455
	802.11h (DFS Slave)	✓	✓	✓	✓	O	✓	✓	O	O	O	✓	✓	O	✓	✓	✓
	DFS Master (AP)	X	✓	X	✓	✓	✓	✓	O	O	O	O	O	O	O	X	✓
Performance	Band Steering	X	O	X	O	O	O	O	O	O	O	O	O	O	O	X	O
	MBO	✓	✓	✓	-	-	-	-	-	-	-	-	-	-	-	-	-
	ACS	X	✓	✓	O	O	✓	O	O	O	O	O	O	O	O	O	O
Power saving/Offloads	TWT	✓	✓	✓	-	-	-	-	-	-	-	-	-	-	-	-	-
	Wake On WLAN (WoWL)	✓	O	✓	O	O	O	O	O	O	O	✓	✓	✓	O	✓	✓
	Packet Filter	O	O	O	O	O	O	O	O	O	O	O	O	✓	O	O	O
	ARP offload	✓	O	✓	O	O	O	O	O	O	O	O	O	✓	O	O	O
	TCP Keep Alive offload	✓	O	O	O	O	O	O	O	O	O	O	O	✓	✓	X	O
	DHCP lease time renewal offload	✓	O	O	O	O	O	O	O	O	O	O	O	✓	O	O	O
	GTK offload engine	✓	O	O	O	O	O	O	O	O	O	✓	O	✓	O	O	O
	ICMP offload engine	✓	O	O	O	O	O	O	O	O	O	O	O	✓	O	O	O
	Neighbor Discovery offload engine	✓	O	O	O	O	O	O	O	O	O	O	O	✓	O	O	O
	Null/NAT Keepalive	✓	O	O	O	O	O	O	O	O	O	O	O	✓	O	O	O
	MQTT offload	✓	O	✓	X	X	X	X	X	X	X	X	X	O	X	X	X
	ICMP Echo Req offload	✓	O	O	X	X	X	X	X	X	X	X	X	X	X	X	X
	Suspend/Resume	✓	✓	✓	✓	✓	O	✓	O	✓	✓	O	O	✓	✓	✓	✓
	iLPO Support	X	O	✓	X	X	X	X	X	X	X	X	X	X	X	✓	X
Roaming	Enterprise Roaming	✓	✓	✓	O	O	O	O	O	O	O	O	O	O	O	O	O
	Smooth Roaming	✓	✓	✓	✓	O	✓	✓	O	✓	✓	O	O	✓	✓	✓	✓
	Fast Roaming (11r)	✓	✓	✓	✓	X	O	O	O	O	O	O	O	O	✓	X	✓
	11k/v Support	✓	✓	✓	O	O	O	O	O	O	O	O	O	O	O	O	O
Miscellaneous	DPP	✓	✓	✓	O	O	O	O	O	O	O	✓	✓	O	O	O	O
	Thermal Throttling	O	✓	✓	O	O	O	O	O	O	O	O	O	O	O	O	O
	OCE	✓	✓	✓	O	O	O	O	O	O	O	O	O	O	O	O	O
	MPN	O	O	✓	X	X	X	X	X	X	X	X	X	X	X	X	X
	Shared Interface	X	X	X	X	X	X	X	X	X	X	X	X	O	X	O	X
	11mc (FTM)	✓	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	CSI	✓	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	Beacon Trim	O	✓	O	X	X	X	X	X	X	X	X	X	X	X	X	X
	TPC	O	O	✓	X	X	X	X	X	X	X	X	X	X	X	X	X

[1] No RSDB

6.2 Bluetooth® features

Table 5 Bluetooth® core specification features

Legend: ✓ - Functionality supported and tested | **X** – Functionality not supported | **O** – Can be Supported*

***Contact Infineon Support for clarification before confirmation**

Core Specification	Features	CYW5551x	CYW5557x	CYW43022	CYW4373/E	CYW43439	CYW43455
v6.0	Channel Sounding, including Channel Sounding HCI Updates (C)	X	X	X	X	X	X
	LL Extended Feature Set (C)	X	X	X	X	X	X
	Decision-Based Advertising Filtering (C)	X	X	X	X	X	X
	ISOAL Unsegmented Framed Mode	✓	✓	X	X	X	X
	Monitoring Advertisers (C)	X	X	X	X	X	X
	Frame Space Update (O)	X	X	X	X	X	X
v5.4	Advertising Coding Selection (C)	✓	X	X	X	X	X
	Encrypted Advertising Data (O)	X	X	X	X	X	X
	Periodic Advertising with Responses (C)	X	X	X	X	X	X
v5.3	Periodic Advertising ADI support (C)	✓	✓	X	X	X	X
	Bluetooth® LE Enhanced Connection Update (C)	✓	X	✓	X	X	X
	Bluetooth® LE Channel Classification (O)	✓	✓	✓	X	X	X
	Host to Controller Encryption Key Control Enhancements	X	X	X	X	X	X
v5.2	Bluetooth® LE Isochronous Channels (C)	✓	✓	X	X	X	X
	Bluetooth® LE Power Control (C)	✓	✓	X	X	X	X
v5.1	Angle of Arrival/Angle of Departure (C)	✓	✓	X	X	X	X
	Periodic Advertising Sync Transfer(C)	✓	✓	X	X	X	X
	Advertising Channel Index	✓	✓	X	X	X	X
	Sleep clock accuracy update mechanism	✓	✓	X	X	X	X
	ADI field in scan response data	✓	✓	X	X	X	X
	Host channel classification for secondary advertising	✓	✓	X	X	X	X
v5.0	Slot Availability Mask (SAM) (O)	✓	✓	✓	X	✓	X
	2 Msym/s PHY for LE (O)	✓	✓	✓	X	X	X
	Bluetooth® Low Energy Long Range (O)	✓	✓	X	X	X	X
	High Duty Cycle Non-Connectable Advertising	✓	✓	✓	✓	✓	✓
	Bluetooth® LE Advertising Extensions (C)	✓	✓	X	X	X	X
	Bluetooth® LE Channel Selection Algorithm #2 (O)	✓	✓	✓	X	✓	X
v4.2	Bluetooth® LE Data Packet Length Extension (O)	✓	✓	✓	✓	✓	✓
	Bluetooth® LE Secure Connections (C)	✓	✓	✓	✓	✓	✓
	Link Layer privacy (O)	✓	✓	✓	✓	✓	X
	Link Layer Extended Scanner Filter policies (O)	✓	✓	✓	✓	✓	X

Device features and capabilities

Table 6 Bluetooth® firmware features

Legend: ✓ - Functionality supported and tested | X – Functionality not supported | O – Can be Supported*

Features category	Features	CYW55513/2/1	CYW55573	CYW43022	CYW4373/E	CYW43439	CYW43455
Bluetooth® Audio	A2DP / Dual A2DP	✓	✓	✓	✓	✓	✓
	HFP (NBS, WBS)	✓	✓	✓	✓	✓	✓
	Dual eSCO	✓	✓	✓	✓	✓	✓
Security	KNOB attack Fixes	✓	✓	✓	✓	✓	✓
	BrakTooth Vulnerability Fixes	✓	✓	✓	✓	✓	✓
	SweynTooth Vulnerability Fixes	✓	✓	✓	✓	✓	✓
	BLURtooth Vulnerability Fixes	✓	✓	✓	✓	✓	✓
	Blueborne Vulnerability Fixes	✓	✓	✓	✓	✓	✓
Low Power Mode	Power Down Sleep	✓	✓	✓	✓	✓	✓

6.3 COEX features

Table 7 COEX features

Legend: ✓ - Functionality supported and tested | **X** – Functionality not supported

Feature	CYW5551x		CYW5557x		CYW54591		CYW4373E			CYW4373		CYW43022	CYW43012	CYW43439	CYW43455
Description	1x1		2x2 80 MHz 11ax/ 6E Tri-Band		2x2 80 MHz 11ac Dual Band		1x1 80 MHz 11ac Dual Band Industrial (-40°C-85°C)			1x1 80 MHz 11ac Dual Band		1x1 20 MHz 11ac Dual Band	1x1 20 MHz 11n Dual Band	1x1 20 MHz 11n	1x1 80 MHz
Host interface	SDIO (0.35)	SDIO (0.4)	PCIE	SDIO	PCIE	SDIO	PCIE	SDIO	USB	SDIO	USB	SDIO	SDIO	SDIO	SDIO
STA	✓	✓	✓	✓	✓	✓	X	✓	✓	✓	X	✓	✓	✓	✓
SOFTAP	✓	✓	✓	✓	X	X	X	X	X	X	X	X	X	X	X
P2P	✓	X	✓	✓	X	X	X	X	X	X	X	X	X	X	X
COEX_CVE	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
ZigBee COEX	✓	X	X	✓	X	X	X	X	X	✓	X	X	X	X	X

7 Miscellaneous

7.1 Wi-Fi Offload support

Each Wi-Fi device contains an Arm® core that implements the media access control (MAC) layer. The software running on these cores implement several A-series host offloads (shown in Table 8), which enable and facilitate low-power application development and improve the power and performance of such applications by offloading select operations to Wi-Fi device for processing, allowing the host system to remain in a low-power state for longer duration.

Table 8 Wi-Fi offload support

Offloads	Description
Preferred network offloads (PNO)	Monitor/join Wi-Fi networks automatically when screens are off, and devices are in suspended. WPA-personal security negotiation and roaming are supported
TCP keepalive	Prevent APs from timing out an IoT device's network connection because of inactivity
Packet filtering	Customizable network layer interrupt management to keep your devices in a lower state for a longer period
GTK offload	On GTK renewal timeout it handles the Group rekeying process of installing the new key without waking the host
Wake on wireless lan (WoWL) offload	Wake on WLAN offloads include waking up the host on receiving a specific (prior set) magic pattern, network pattern, loss of beacon, and other wakeup events
DHCP lease time renew offload	Renews the IP address without host intervention and does not come out from Deep Sleep state, improving the power saving
ICMP offload	The ICMP offload is a feature that allows the ICMP ping request directly from the chip, instead of waking the host
MQTT offload	Handles MQTT/TLS Keepalive to maintain MQTT connection
Network discovery offload engine	Handles responding to NDOE request (Solicit) from network so that these requests will not wake up the host
Null keepalive	Maintains the wireless connection between two devices, even when there is no data being transmitted
NAT keepalive	Maintains the NAT mapping between the private IP address and public IP address of a device
Address resolution protocol (ARP) offloads	OSI Layer-2 packet processing

7.2 Bluetooth® offload support

Table 9 Bluetooth® offload support

Offloads	Description
Bluetooth® LE audio offload	The Bluetooth® LE audio offload feature enables the transfer of LC3 audio encoding/decoding process from the host device to the Bluetooth® controller, allowing the controller to handle the encoding/decoding tasks.
A2DP offload	The A2DP offload feature enables the transfer of the Advanced Audio Distribution Profile (A2DP) audio encoding/decoding process from the host device to the Bluetooth® controller, allowing the controller to handle the encoding/decoding tasks. The BT firmware takes care of transcoding received linear PCM data to SBC according to the configured stream SBC parameters (sampling frequency, mode (mono, stereo, join stereo), block length, maximum and minimum bitpool values) and sending SBC data in L2CAP packets (on transport channel) to remote device

7.3 Resources

Table 10 Tools package

Category	Tool	Purpose	Resource link
Bluetooth® HCI	AIROC™ Bluetooth® Test and Debug Tool	AIROC™ Bluetooth® Test and Debug tool is a GUI tool for testing and debugging Infineon Bluetooth® devices. AIROC™ Bluetooth® Test and Debug Tool connects to the Bluetooth® devices at HCI protocol layer and currently supports HCI UART and HCI USB transport interfaces. The tool allows users to send Bluetooth® HCI commands and receive Bluetooth® HCI events from the Bluetooth® controller of the connected devices	AIROC™ Bluetooth® Test and Debug Tool
	Manufacturing Bluetooth® Test tool (MBT)	The manufacturing Bluetooth® Test tool (MBT) is used to test and verify the RF performance of the Infineon Bluetooth® Classic and Bluetooth® Low Energy devices on Linux platforms	Manufacturing Bluetooth® Test tool (MBT)

Miscellaneous

Table 11 Application notes and user guides

Category	Title	Purpose	Resource link
Application note	Infineon Wi-Fi software guide	provides an overview of the building blocks of the Linux 802.11 ecosystem. This document helps you to use Wi-Fi modules conveniently with a host of your choice and configure it based on your application	AN232689
Getting started guide	Getting started with AIROC™ Wi-Fi & Bluetooth® combo chip on iMX8 Nano Developer's Kit V3 in Linux	provides step-by-step instructions to configure the Infineon's AIROC™ Wi-Fi & Bluetooth® combo chip from a host, load the WLAN driver, and establish a Wi-Fi connection between an Access Point (AP)/SoftAP and STA. Further sections describe flashing a new image and setting up the toolchain for image customization for advanced users. This guide also includes step-by-step instructions to configure and validate Bluetooth® and Bluetooth® Low Energy functionality of the Infineon's AIROC™ Wi-Fi & Bluetooth® combo chip with iMX8 Nano Developer's Kit V3.	002-38038
Regulatory	Infineon Wi-Fi CLM regulatory manual	Wi-Fi regulatory compliance process and steps required to submit a regulatory configuration to us. This application note provides the background on various Wi-Fi requirements and technical details as it pertains for regulatory certification.	AN225347
Wi-Fi Development Tools	OTP programming and NVRAM development in SDIO mode	NVRAM and OTP development is required for out-of-the-box feature setup of every product/application.	AN214807

Table 12 Miscellaneous

Title	Purpose	Resource link
Module Platform/Product Selection Guide	Provides the portfolio for Infineon Wi-Fi and Bluetooth Combo and Connected MCU partner modules.	Module Selection Guide
Infineon Bluetooth® Stack Applications	The release notes provide detailed information about the code examples and the specific chipsets that are supported for Linux.	Code Examples

8 Technical support

Infineon Developer Community is the recommended forum for any queries regarding Infineon AIROC™ Wi-Fi and Wi-Fi + Bluetooth® Combo solutions. This forum is moderated by Infineon to assist users with issues encountered while using these solutions.

For support on modules, go to Partner Finder to know more.

In case of further support, contact our Sales Representatives or go to Support to know more.

9 Software licensing

Connectivity Software for Linux ecosystem follows three licensing standards:

ISC for application and device driver software for which we release full source code to, the Binary License for device software that we release in binary form and is free to be used or distributed on our devices only and End User License Agreement device software is scanned regularly for open-source license identifiers and fingerprints. Given these two types of software and the licensing mechanisms we provide, you can be rest assured of safety and compliance for your products.

For official Infineon FOSS disclosures, see the Free and open-source software (FOSS) webpage.

Glossary

Abbreviation	Extended form
A2DP	Advanced Audio Distribution profile
AKM	Authentication Key Management
APSTA	Access Point and Station
BSS	Basic Service Set
CLM	Country Locale Matrix
DLTRO	DHCP Lease Time Request Offload
DTIM	Delivery Traffic Indication Message
EA	Embedded Artists
GTKOE	Group Temporal Key Offload
H2E	Hash-to-Element
ICMP	Internal Control Message Protocol
iLPO	Internal Low Power Oscillator
MBO	Multi-band Operation
P2P	Peer-to-Peer
PMF	Protected Management Frame
RPI	Raspberry Pi
RSNXE	Robust Security Network X Element
SAE	Simultaneous Authentication of Equals
SSID	Service Set Identifier
STAUT	Station Under Test
WFA	Wi-Fi Alliance
WMM	Wireless Multimedia
HFP	Hands-Free Profile
KNOB attack	Key Negotiation of Bluetooth (KNOB) attack
LE	Low Energy
PHY	Physical Layer
QoS	Quality of Service
GATT	Generic Attribute Profile
ADI	AdvDataInfo
WBS	Wide Band Speech
LL	Link Layer
HCI	Host Controller Interface
NBS	Narrow Band Speech
LC3	Low Complexity Communication Codec
WNM	Wireless Network Management (802.11v)

Revision history

Document revision	Date	Description of changes
**	2020-06-28	Q3 2020 – Initial version
*A	2020-09-30	Q4 2020 – Update
*B	2024-02-21	Q2 2024 – Update
*C	2024-11-15	Q1 2025 – Update
*D	2026-01-28	Q2 2026 – Update
*E	2026-02-02	Q2 2026 – Update

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Do you have a question about this document?

Email:

erratum@infineon.com

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