Infineon Linux Wi-Fi driver (FMAC) release notes

About this document

Scope and purpose

Thank you for your interest in Infineon's Linux Wi-Fi driver (FMAC). This document provides an overview of the new features, bug fixes, known issues for the AIROC™ Wi-Fi chips (CYW4373, CYW43012, CYW43439, and CYW5557X) on the current release for Linux (v5.15.58-2023_1128 and v6.1.19-2023_1128).

Table of contents

1 Overview

1.1 High-level summary

This document details the new features and bug fixes for CYW4373, CYW43012, CYW43439, and CYW5557X on the software release.

This software release includes the following:

- FMAC driver
  - ifx-backports GitHub page
- Firmware and Clm blob
  - ifx-linux-firmware GitHub page
- Supplicant and hostapd
  - ifx-hostap GitHub page

All the above files can also be found in the Infineon Developer Community page.

- To bring up Wi-Fi with IFXFMAC on RPI host for kernel 6.1.21, download the image source from the GitHub page.
- To bring up Wi-Fi with BRCMFMAC on non-RPI host for kernel 6.1.19, download the image source from the GitHub page and Infineon Developer Community page.

IFXFMAC is a new WLAN full MAC Linux driver dedicated for Infineon (Cypress) AIROC™ family of WLAN + Bluetooth® combo chipsets. For more details on IFXFMAC, see the Difference between Infineon v6.1.21 BRCMFMAC & IFXFMAC application note.

1.2 Device firmware change summary

Table 1 Device firmware change summary

Device	SDIO	PCIe
CYW4373	Bug fixes	Not applicable
CYW43012	Bug fixes	Not applicable
CYW55572 / CYW55571 / CYW55573	New feature and bug fixes	New feature and bug fixes
CYW43439	Bug fixes	Bug fixes

Note: Contact the local Infineon Technologies distribution channel (FAE or local sales representative) to get the latest hardware, NVRAM, and software files.

1.3 Device Firmware revision details

Table 2 Firmware revision details

Device		Wi-Fi firmware version
CYW4373	PCIe	13.35.205.87
	SDIO	13.10.246.334
	Industrial	13.10.246.334
	USB	13.10.246.334
CYW43012	SDIO	13.10.271.314
CYW55572/ CYW55571/CYW55573	PCIe	18.53.284.17
	SDIO	18.53.284.17
CYW54591	PCIe	13.35.327
	SDIO	13.35.327
CYW43439	SDIO	7.95.75

2 Description of changes

This section explains the features, enhancements, and issues that may have an impact on various devices.

2.1 Driver - FMAC changes

- Fix to handle CSA completion notification to supplicant on channel switch
- Support for external OWE in Access Point mode
- Reordering the elements of the owe_info structure.
- TWT
  - Fix for TWT feature check as part of the FMAC
  - Fix for handling unsolicit setup accept and solicit setup reject TWT sessions
  - Fix for unique dialog token to handle TWT session establishment
  - Fix for handling the TWT *teardown All* from connected station
  - Fix for handling TWT setup and teardown on timeout
  - Fix on updating the additional debug information with details
  - Fix for cleaning the stale sessions on deauthentication reception
- Fix for roam time enhancement with supplicant
- Fix for compile warning for OWE feature.
- Fix for offload configuration support in the FMAC driver
- Fix for IPV6 notification for ICMP and NDoE offloads
- FMAC support for APSTA iovar
- Fix for updating the SAE password for roaming scenarios
- Fix for updating the ARP and NDOE offloads
- Support for WPA3 Fast transition SAE roam offload
- Fix for kernel crash on TX statistics updation
- Fix for memory free updation on scan timeout

2.2 Hostapd/supplicant changes

- Support for DPP2.0 and enablement of PFS flow on event update
- Updation of AKM value on 11w MFP flag enabled
- Reset authentication and encryption parameters in hostapd while handling roam event
- Add a configurable link_loss parameter for background scan

2.3 Firmware changes

2.3.1 CYW4373

New features

Component	Description	Implication / advantages
Wi-Fi	Fast BSS Transition[11r] enablement in 4373E modules.	Enables roaming with Fast BSS transition[11r], which reduces the roam time and jitter

Wi-Fi certification

Chipset	WFA Program supported
CYW4373	11n, 11ac, PMF, P2P, and vulnerability

Bug fix

- Fix for single channel concurrency in AP+STA scenario (switch SoftAP channel to STA channel)

Known issues

N/A

Description of changes

2.3.2 CYW43439

New features

Component	Description	Implication / advantages
Wi-Fi	External SAE support enablement	This support is enabled for WPA3 and SAE connection.

Wi-Fi certification

Chipset	WFA Program supported
CYW43439	WPA3 (SCV, TLS 1.3)
	11n, PMF, P2P, and vulnerability

Bug fix

- WFA certification :
  - WPA3: Test case - 5.8.7 - Fix for device roam from WPA2 secured AP to WPA3 secured AP
  - WPA3 : Test case - 5.60.2 - Device sends assoc request as malformed
  - P2P : Fix for device failing to send group owner negotiation request
- Fix for STA advertising empty AKM type for WPA-PSK-SHA256 security

Known issues

NA

Description of changes

2.3.3 CYW43012

New features

N/A

Wi-Fi certification

Chipset	WFA Program supported
CYW43012	11n, 11ac, WPA3, PMF, and vulnerability

Bug fix

- WPA3: Test case - 5.8.7 -Fix for device to roam from WPA2 secured AP to WPA3 secured AP.
- Fix for delay in SoftAP enablement

Known issues

N/A

Description of changes

2.3.4 CYW55572/55573

New features

Component	Description	Implication / advantages
Wi-Fi	Support for WLBGA.	Requires NVRAM update. Contact module vendor or local Infineon distribution channel for NVRAM
	AP/SAP support with WPA3 – Enhanced open security (OWE enablement)	Enables usage of AP/SAP with enhanced open security when user does not need to key-in password for connection.
	Roaming enhancements for secured profiles.	Improves overall roam time, which will result in seamless roaming and jitter reduction in WPA2/WPA3 security modes.
	Offload support for TKO, NDOE, ICMP, mDNS and Keepalive features	Enables the host to offload the network stack functionality to the device when the host is in power save or Sleep mode. This improves the battery performance by not waking the host unnecessarily.
	Support for Easy Connect feature	Enables to configure the devices with WFA Easy Connect (Device Provisioning protocol 2.0).
	Support for Unsolicit iTWT session establishment	Enables the AP to set up the iTWT session and group multiple STAs for traffic transmission, and improves power saving.

Wi-Fi certification

Chipset	WFA Program supported
CYW55572/55573	11ax – R2, 6E
	MBO , OCE, OWE
	WPA3 (192 bits, TLS 1.3, PSK, SCV)
	11n, 11ac, PMF, P2P, and vulnerability

Bug fix

- WFA certification fixes:
  - 11AX-6E-STA : Test case - 5.60.2 , Fix for low up-link throughput with Individual TWT parameters
  - WPA3-192bit: Test case – 19.6.1 , Fix for connection Failure with PMK with WPA3-192 bit security
  - WPA3: Test case – 5.8.6 :Fix for roam issue from 6G configured AP to 5G configured AP
  - MBO: Test case – 5.2.3 : Fix for beacon report as per the test requirement
  - MBO OCE:Test case -5.12.1: Fix for the AP selection based on the test requirement
  - MBO OCE: Test case – 5.2.6 : Fix for association failure with FT-PSK AP
  - 11ax: Test case – 5.59.1 : Fix for the SIFS failures
  - 11ax : Test case – 5.62.2 : Rate drop fix for UL-OFDMA case in 6GHz
  - 11ax : Test case – 5.44.1 : Rate drop fix for UL-OFDMA case in 2.4 GHz
- Fix for packet loss noticed in AP/STA environment with dual band concurrency (for example, AP in 2 GHz 20 MHz and STA in 6 GHz 80 MHz)
- Fix for 6G AP (such as Asus / NEC / TPLink) interop issues (beacon reception issues)

Description of changes

- Fix for 5G probe request issue seen in some corner cases
- Fix for Association Failure issue noticed with WMM and OWE enabled AP
- Fix for WoWLAN support enablement.
- Fix for low throughput in AP + STA environment with dual band concurrany (for example, AP in 2.4 GHz 20 MHz and STA in 5 GHz 80 MHz)
- [SDIO] Fix for PMF SA query handling procedure on timeout attacks
- Fix for STA connection with WPA3 SAE transition mode enabled AP
- Fix for regulatory power issues for 6E

NVRAM changes

- Support for 6 GHz ED threadhold parameters
- Updates for 6 GHz lower rates for Tx related parameters

Note: *Contact the module vendor or local Infineon distribution channel (FAE or local sales representative) to get the NVRAM changes.*

Known issues

- Low throughput/zero stalls noticed with WPA3 security with ASUS ROG RAPTURE-AXE6000.
- [SDIO] Connection issue noticed with WPA3 security specific to Dlink N300 R04 AP.
- [SDIO] Notice packet loss with AP-STA scenario of 2.4 GHz 20 MHz AP and 6 GHz 80 MHz STA.

3 Documentation

For more details, see the following documents:

- 002-38637: Getting started with AIROC(TM) CYW5557x Wi-Fi & Bluetooth(R) combo chip on Raspberry Pi CM4 Lite in Linux

  This guide provides step-by-step instructions to configure the AIROC™ CYW5557x Wi-Fi & Bluetooth® combo chip on the host, load the FMACdriver, and establish a Wi-Fi connection between an Access Point (AP)/SoftAP and a Station (STA).
- 002-30394: Connectivity technical brief for Linux

  Infineon's Wi-Fi & Bluetooth® or Bluetooth® Low Energy connectivity solutions are integrated into the Linux open-source ecosystem. The supported hardware and software are described in this document, including their features, modes, and limitations.

Glossary

AKM
Authentication and key management

AP
Access Point

ARP
Address Resolution Protocol

CSA
Channel Switch Announcement

DPP
Device Provisioning Protocol

mDNS
Multicast DNS

NDOE
Neighbor Discovery Offload Engine

OWE
Opportunistic Wireless Encryption

PFS
Perfect Forward Secrecy

PMF
Protected Management Frame

SAE
Simultaneous Authentication of Equals

SAP
Soft Access Point

TKO
TCP Keep Alive Offload

TWT
Target Wake Time

SCV
Server Certificate Validation

TLS
Transport Layer Security

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