USB-UAPSTA-8801-U16-X86-W14.68.36.p178-CS4X14709_R0-MGPL

88W8801 Release Notes

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Package Information

- Version: USB-UAPSTA-8801-U16-X86-W14.68.36.p178-CS4X14709_R0-MGPL

W14.68.36.p178-CS4X14709_R0-MGPL Information

- SOC version – 88W8801 R0
- Firmware - W14.68.36.p178
    - usb8801_uapsta.bin
- Driver Package - CS4X14709
- WPA supplicant : wpa_supplicant-2.10
- Hostapd : hostapd-2.10
- Linux Kernel : 2.6.32 to 5.11.16

Driver Version

- CS : Indicated Nxp OS independent driver
- 4.X : indicated support for kernel version 4.x
- **Release Number** : this number tracks the incremental changes in the consequent driver releases given to QA or customers.
- **Patch Number** : Customers may want to receive a driver build based on a previous release plus specific bug fixes, or patches. It is not unusual for customers to request this when they are close to production. The patch number starts at zero (no patch), and increments as we release subsequent builds with more bug fixes.

Firmware Version

Following is an explanation of each digit in the versioning scheme designed for the firmware:

- "W" indicates the release includes the WPA/WPA2 VU, WPA Replay Protection Fixes required for WFA Security Detection/Certification testing purpose and Memory copy vulnerability fix.
- Major Revision (first number from the left): Tracks the main FW version.
- Minor Revision (second number from the left): Tracks the chip family, firmware branch, custom projects. etc.
- Release Number (third number from the left): this number tracks the incremental changes in the consequent firmware releases given to QA or customers.
- Patch Number (fourth number from the left): Customers may want to receive a firmware build based on a previous release plus specific bug fixes, or patches. It is not unusual for customers to request this when they are close to production. The patch number starts at zero (no patch), and increments as we release subsequent builds with more bug fixes.

WLAN Features

Wireless Client Features[1x1 b/g/n]

802.11n - High Throughput - Infrastructure Mode

- 2.4GHz Band Operation
- 20MHz channel Bandwidth only
- Short/Long Guard Interval (400ns/800ns)
- Green Field Operation
- 1 Spatial stream (1x1)
- 11n Data rates – Up to 72 Mbps (MCS 0 to MCS 7)
- Tx MCS Rate Adaptation (ABGN)
- AMPDU Tx and Rx Support
- AMSDU-4k Tx and Rx Support
- AMSDU-8k – Only Rx Support
- HT Protection Mechanisms

802.11 b/g Features

- Data Rates (Up to 54 Mbps)
- Tx Rate Adaptation (ABG)
- Tx of RTS/CTS based upon RTS Threshold
- Fragmentation/Defragmentation
- ERP protection, Slot time, Preamble
- ERP Protection using macctrl command (RTS-CTS/Self-CTS)

802.11d

- 802.11d - Regulatory Domain/Operating Class/Country Info

802.11e -QoS

- EDCA (Enhanced Distributed Channel Access) / WMM (Wireless Multi-Media)
- U-APSD[Unscheduled Automatic Power save and Delivery]/ WMM-Power save

802.11i - Security

- Open and Shared Authentication
- WPA2-PSK Security (AES-CCMP Encryption)
- Opensource WPA Supplicant Support

General Features

- Auto Deep Sleep
- Host Sleep (hscfg)
- Background Scan
- User Defined Scan (setuserscan)
- Specific scan (scancfg)
- Network Scan (iwlist scan)
- ARP Filter
- Subscriber Event
- Wakeup on Wireless (WoW)
- Auto Response (MEF)

- Auto Tx
- Vendor Specific IE (Custom IE)
- Broadcast/Multicast data Tx/Rx Support

Power Save Modes

- IEEE PS (Infrastructure Mode)
- PPS
- Inactivity Timeout
- Listen Interval

Loading Driver - Optional Parameters

- Configuring MAC Address during driver load using init_cfg file
- Loading Driver Using CFG80211 and mlanutl commands
- Loading Driver Using WEXT
- Setting Deep sleep.

WPS/WSC2.0 Functionality

- PIN Config Method - 8 Digit/4 Digit
- PIN Config Method - Static/Dynamic PIN
- PBC - Virtual Push Button Config Method
- PBC Session Overlap Detection
- STA as Enrollee
- STA as Registrar
- Auto PIN
- Auto PBC
- Standalone ER
- Backward Compatibility with WPS1.0 Devices
- Using mwu_cli app with Opensource WPA Supplicant

WPA3 Support (Host MLME Enabled)

- Opensource WPA Supplicant Support

WPA3 Security - SAE (Simultaneous Authentication of Equals)

- SAE Connectivity and PMK Caching
- SAE Transition Mode
- Anti-Clogging
- SAE Finite Cyclic Group - Group-19, Group 20, Group-21
- Reflection Attack
- WPA2 Personal Compatibility

Access Point Features

802.11 a/b/g Features

- Data Rates (Up to 54 Mbps)
- Tx Rate Adaptation (ABG)
- Tx of RTS/CTS based upon RTS Threshold
- Fragmentation/Defragmentation
- ERP protection, Slot time, Preamble
- Handling Associated STAs with IEEE PS - PS-Poll and Null Data

802.11d

- 802.11d - Regulatory Domain/Operating Class/Country Info

802.11e -QoS

- EDCA[Enhanced Distributed Channel Access] / WMM (Wireless Multi-Media)
- U-APSD[Unscheduled Automatic Power save and Delivery]/ WMM-Power save

802.11i - Security

- Open and Shared Authentication
- Auto Auth
- WPA2-PSK Security (AES-CCMP Encryption)
- Opensource Host based Authenticator Support (Hostapd)
- Group Key Refresh (Rekeying GTK)

Security WAPI

- WAPI-PSK
- WAPI-CERT
- WAPI-PKCS12

802.11n - High Throughput

- 2.4GHz Band Operation
- 20 MHz channel Bandwidth only
- Short/Long Guard Interval (400ns/800ns)
- Green Field Operation
- 1 Spatial stream (1x1)
- 11n Data rates – Up to 72 Mbps (MCS 0 to MCS 07)
- Tx MCS Rate Adaptation (ABGN)
- AMPDU Tx and Rx Support
- AMSDU 4K Tx/Rx Support
- AMSDU-8k Rx Support
- HT Protection Mechanisms

WPA3 Support (Host MLME Enabled)

- Opensource WPA Supplicant Support

WPA3 Security - SAE (Simultaneous Authentication of Equals)

- SAE Connectivity and PMK Caching
- SAE Transition Mode
- Anti-Clogging
- SAE Finite Cyclic Group - Group-19, Group 20, Group-21

- Reflection Attack
- WPA2 Personal Compatibility

General Features

- Auto Deep Sleep
- Host Sleep (hscfg)
- Automatic Channel Selection (ACS)
- Hidden SSID (Broadcast SSID Disabled)
- MAC Address Filter (Allowed/Denied List)
- Vendor Specific IE (Custom IE)
- STA Age out Feature for non-PS clients
- STA Age out Feature for Power save clients
- Configurable MAX Supported Stations (Up to 8)
- Configurable Retry Limit
- Configurable Unicast Data Rate
- Configurable Broadcast/Multicast Data Rate
- Broadcast/Multicast data Tx/Rx Support
- MMH Events
- BSS Privacy Control (Packet forward Control) or AP Isolation
- Sticky TIM

MMH Power Save Modes

- Inactivity based Power save

Multi-BSS support

- MAX MMH BSS = 2
- Independent security configurations on different interfaces (All Security Methods)

Loading Driver - Optional Parameters

- Configuring MAC Address during driver load using init_cfg file
- Loading Driver Using CFG80211 and mlanutl commands
- Loading Driver Using WEXT
- Setting Deepsleep
- Loading MMH configuration using uaputl.conf file

WPS/WSC2.0 Functionality

- PIN Config Method - 8 Digit/4 Digit
- PIN Config Method - Static/Dynamic PIN
- PBC - Virtual Push Button Config Method
- AP Setup Locked State - PIN Method
- PBC Session Overlap Detection
- MMH as Enrollee
- MMH as Wireless Registrar
- MMH as Wired ER (Bridging uap0 and eth interfaces)
- MMH as Proxy - Configuration by ER and Adding an Enrollee (UPnP)
- Using mwu_cli app

Wifi Direct / P2P features

P2P Basic Functionality

- Protocol conformance tests
- Autonomous GO Mode
- WFD Client Mode

P2P Backward Compatibility

- Non P2P Client Association with GO

P2P Client Power save

- P2P Client with IEEE Power save enabled
- P2P Client with WMM PS enabled
- P2P Client with NoA PS enabled on GO
- P2P Client with Opportunistic PS enabled on GO

P2P GO Power save

- GO Operating with IEEE PS Clients(PS-Poll and non_PS-Poll)
- GO Operating with WMM PS Clients

Other P2P Features

- Max Client Support (Up to 7 Devices)
- Provision Discovery
- Persistent Group
- P2P Invitation

Simultaneous AP-STA Operation

- AP-STA functionality.
- Enhanced Power Save (AP-STA simultaneous power save)

WLAN Throughput

STA Throughput

STA Infra Throughput - BGN Mode | 2.4GHz Band				
AMPDU Throughput				
Security	HT20			
	TCP		UDP	
	Tx	Rx	Tx	Rx
OPEN	41.4	57.5	53.0	60.2
WPA2	43.7	56.8	52.1	59.1
WPA3	41.7	57.0	52.1	58.7

MMH Throughput

MMH Throughput - BGN Mode | 2.4GHz Band				
AMPDU Throughput				
Security	20MHz			
	TCP		UDP	
	Tx	Rx	Tx	Rx
OPEN	42.0	51.0	45.8	55.0
WPA2	40.2	51.0	47.1	55.0
WPA3	40.4	51.0	50.0	55.0

P2P Throughput

P2P(GO) Throughput - BGN Mode | 2.4GHz Band				
AMPDU Throughput				
Security	HT20			
	TCP		UDP	
	Tx	Rx	Tx	Rx
WPA2	40.0	45.0	47.4	48.0

Bug Fixes/Feature Enhancements

Component	Description
Wi-Fi	• Fix for DUT connection issue with WPA2 AP at the first attempt when set to host_mlme=1 • Fix for Command timeout issue due to scan failure with edmac enabled. • Code enhancement to avoid Deadlock scenario in driver for locking mechanism • Fix for source code static program analysis error • Improvement on FW Download time • Added logic to initiate additional scan before Auth process if Ex-AP is not in scan list, applicable to host_mlme=1

Notes

- Simultaneous AP-STA Limitations:
  - MMH BSS beacons are paused unconditionally whenever In-STA Performs scan and are resumed automatically once the scan is complete.
  - TX power settings, Radio control commands, Antenna config commands, wireless slot, 802.11d are not unified across MMH and In-STA interfaces
  - Custom IE Buffers are shared between two interfaces (uap0 and mlan0). IE_Buffer Index used by one interface cannot be used by other interface.
  - Notes:
    - Ex-AP - External AP (AP to which mlan0 interface is associated)
    - In-STA - Internal Station (mlan0 interface)
    - Ex-STA - External Stations associates to MMH.
    - uAP - Micro AP/ MMH – (Marvell Mobile Hotspot)
- Multi-BSS (MBSS) Limitations:
  - TX power settings, Radio control commands, Antenna config commands, wireless slot, 802.11d are not unified across two interfaces.
  - Custom IE Buffers are shared between two interfaces. IE_Buffer Index used by one interface cannot be used by other interface.
- The driver needs to be loaded with “low_power_mode_enable=1” to enable low power mode.
  Usage: insmod sd8xxx.ko low_power_mode_enable=1

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