SD8787 Driver/Firmware Release Note

Table of Contents

October 13, 2011

1. Package Information

- Version: **14.66.9.p49-M2614210**

2. Version info:

- **SOC Version: 8787**
- **Firmware: 14.66.9.p49**
  - sd8787_uapsta.bin (AX)
- **Driver Package: M2614210**
- **WPS and WPS-WFD Application: 10.032**
- **WPA Supplicant (STA): wpa_0.6.10-M103**
- **Hostapd Authenticator (MMH): WPA-HOSTAPD_0.7.3-M001**
- **WAPI Supplicant (MMH): 1.1.0-M032**
- **Bluetooth Stack: BlueZ v4.58 Host stack**

- **Driver version:**
  - Following is an explanation of each digit in the versioning scheme designed for the Driver:
    - **M** : Indicated Marvell OS independent driver
    - **26** : indicated support for kernel version 2.6.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:
    - **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** (forth 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.

3. Host Platform

- PXA920 platform Linux 2.6.35/GB
- Interfaces used
  - WLAN over SDIO
  - BT over SDIO and AMP over SDIO

4. Tested HW

- WLAN SOC/RF chipset: W8787 A1

5. Software features:

Access Point Features:

802.11a Feature

802.11bg Feature:

- Data rate Up to 54Mbps.
- BG rate Adaptation.
- ERP protection, Slot time, Preamble

802.11d Feature

802.11i Security:

- Open and Shared key authentication
- WEP Data Encryption (64/128 bit)
- TKIP and AES-CCMP Encryption.
- WPA-PSK, WPA2-PSK, WPA/WPA2 Mixed Mode Security Methods.
- Group Key Refresh

WAPI Encryption Method

802.11n Features:

- 20/40 MHz Channel Bandwidth Operation.
- 2.4GHz Support.
- 5 GHz Support
- 11n Data rates – Up to 150 Mbps is supported (MCS 0 to MCS 7)
- 1 Spatial stream (1x1)
- Short and long Guard Interval Operation.
- AMPDU Tx/Rx support
- AMSDU Rx (only AMSDU 4k) is supported. No AMSDU Tx support.
- Green Field Operation.
- HT Protection Mechanisms.
- RIFS Rx
- 20/40 Coexistence Support.

WMM Support

WMM PS (UAPSD)

WiFi Protected Setup (WPS)

- Micro AP act as internal Registrar.
- PIN and PBC configuration methods.
- Micro AP act as Enrollee – configured using Wireless External Registrar.

Multi-BSS Support

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

General:

- MAC address Filter table configuration (allowed list/banned list).
- Hidden SSID/Broadcast SSID Enable-Disable.
- IEEE Power Save for associated STA's
- Association support up to 10 Stations.
- Retry Limit support.
- ACS (Automatic Channel Selection).
- MMH Power Save. (Inactivity Based Powermode)
- Custom IE or Vendor Specific IE.
- RTS/CTS.
- Fragmentation/Defragmentation.
- Broadcast/Multicast.
- STA Ageout feature.
- Host Sleep Feature.
- Auto Deep Sleep.
- Host based Authenticator (Hostapd) Support.
- Configuring MAC Address during Driver load

Wlan Client Features:

802.11 n Features

- 802.11 a/b/g/n
- 1 Spatial stream (1x1)
- 11n Data rates – Up to 150 Mbps is supported (MCS 0 to MCS 7)
- Support for Tx and Rx of AMPDU and AMSDU-4k Packets
- Support for Only Tx of AMSDU-8k Packets
- Green Field Operation
- STBC Rx
- RIFS Rx
- 20/40 MHz channel Bandwidth operation
- Short Guard Interval (400ns / 800ns is supported)

Security

- Open and Shared key authentication
- WEP data encryption (64/128 bit)
- WPA-PSK and WPA2-PSK
- 802.1x Authentication methods

- Embedded Supplicant

Power Save Modes

- IEEE PS
- PPS
- UAPSD

WMM

WAPI

WPS (PIN and PBC methods)

802.11d

General

- Auto Deep Sleep
- Host Sleep
- Background Scan
- Auto Tx
- ARP Filter
- MEF
- WoW
- Inactivity time out
- Set user Scan
- Subscriber Event
- Vendor specific IE
- Extended Scan

Simultaneous AP-STA Operation:

- AP-STA functionality.
- Independent security configurations on different interfaces.
- Enhanced Power Save (AP-STA simultaneous power save)

WiFi Direct/P2P Features:

- Autonomous Group Owner (GO) Mode.
- P2P Client Mode.
- Non P2P Client Association with GO.
- P2P client association with WLAN AP.
- P2P Client Powersave.
- P2P Client WMM PS (UAPSD).
- GO WMM PS for associated P2P Clients.
- GO IEEE PS for associated P2P Clients.
- 8 Client Support.
- Provision Discovery

Simultaneous AP-STA Operation

- Independent security configurations on different interfaces.
- Enhanced Power Save (AP-STA simultaneous power save)

Bluetooth

- BT 3.0 + HS
- Adaptive Frequency Hopping (AFH)
- Channel Quality Driven Data Rate (CQDDR)
- Enhanced Bluetooth Transmit Power Control
- Support for class 1.5 operation
- BT and AMP over SDIO
- Multi slot ACL with eSCO
- Low Power Page/Inquiry Scan
- UCD

6. Bug Fixes

Component	Area	Description
Wlan MMH	**Firmware Driver**	• Micro AP processes broadcast deauth sent from another BSS • Micro AP Host becomes unresponsive if Internal-STA tries to associate to External-AP when Micro AP has some buffered data for External-STA • No response to SCAN cmd when issuing command repeatedly while iperf is running • Change uaputl to allow WEP key with all zeros • DUT does not use correct transmitter address in Null data frames transmitted by Micro AP(Micro AP MAC addresses is changed) when Powermode is enabled on DUT.
BT		• After few LMP sniff collision firmware hangs • Packets are transmitted only at Tpoll interval(Minimum Guaranteed Qos Interval) though packets are Queued in baseband and bandwidth is available • Reject Sniff request with small interval while SCO link presents • Sometime connection to headset failed after repeating unpair/connect
FM		• FM RDS function on GUI does not work

7. STA Throughput

STA Throughput AMPDU

No security								
CBW	20				40			
	TCP		UDP		TCP		UDP	
	Tx	Rx	Tx	Rx	Tx	Rx	Tx	Rx
Long	41.2	36.7	52.8	50.7	62.7	60.6	85.2	78.6
Short	44.7	39.9	57.9	55.8	63.2	61.2	85.4	79.1
WPA2								
CBW	20				40			
	TCP		UDP		TCP		UDP	
	Tx	Rx	Tx	Rx	Tx	Rx	Tx	Rx
Long	40.9	36.2	52.6	50.6	60.8	58.2	85.4	79.1
Short	44.2	39.7	57.8	55.6	61.5	59.0	85.2	77.5

8. WAPI STA Throughput

STA Throughput AMPDU								
CBW	20				40			
	TCP		UDP		TCP		UDP	
	Tx	Rx	Tx	Rx	Tx	Rx	Tx	Rx
WAPI-PSK	37	35.6	52.3	49.1	50.5	45.7	78.3	68
WAPI-CERT	37	35.5	52.1	49.2	50.6	45.5	76.1	68.3
CBW	20							
	TCP		UDP					
	Tx	Rx	Tx	Rx				
WEP 64	23	26.6	28.3	35.3				
WEP 128	23.1	26.5	27.4	35.4				

9. MMH Throughput

MMH Throughput AMPDU								
No security								
CBW	20				40			
	TCP		UDP		TCP		UDP	
	Tx	Rx	Tx	Rx	Tx	Rx	Tx	Rx
Long	38.6	33.6	51.6	51.6	60.6	61.7	85.8	76.9
Short	41.1	37	57.1	56.6	62	62	85.4	77.3
WPA2								
CBW	20				40			
	TCP		UDP		TCP		UDP	
	Tx	Rx	Tx	Rx	Tx	Rx	Tx	Rx
Long	37.6	32.8	51.8	51.5	58.8	59.8	85.2	76.6
Short	39.6	37	56.7	56.6	59.3	60.2	85.7	76.6

10. BT Co-ex throughput

Item	Description
Endpoint	AP95 endpoint
iperf	-w 128k -b 100m

AP/ SD8787	
SD8787	A1 short GI, default aggregation, external antenna,RBC disabled
AP95	v 5.0.8.3, Ch11, OPEN, 20Mhz
DIR855	HW A2, v 1.22NA, Ch11, OPEN
AppleEXT	v 7.5.1, Ch11, OPEN
AppleTC	v 7.5.1, Ch11, OPEN
WRT120N	v 1.0.01, Ch11, OPEN
Buffalo	v 1.72 (R4.01/B1.07), Ch11, OPEN

Ref device: 590 Plantronics

			Paired/Idle Mode		Coex + A2DP-BDR		Coex+SCO	
PS Mode	Protocol	AP	TX	RX	TX	RX	TX	RX
IEEE-PSPOLL								
	TCP							
		AP95	29.1	20.3	4.7	5.4	9.07	6.51
		DIR855	37.7	36.4	5.1	7.65	8.56	5.47
		AppleEXT	21.6	25.7	7.13	6.12	6.32	7.24
		Buffalo	31.4	35.8	5.13	5.15	7.93	5.59
		AppleTC	21.3	27.3	6.78	6.34	6.89	6.54
		Linksys	44.1	34.4	4.55	5.12	7.31	5.65
	UDP							
		AP95	56.7	30.1	7.23	8.36	31.30	8.98
		DIR855	51.9	52.1	6.25	5.10	28.00	6.78
		AppleEXT	28.6	37.6	9.12	7.24	21.1	7.86
		Buffalo	51.1	50.8	5.77	8.38	28.3	8.03
		AppleTC	28.4	36.5	9.34	7.14	19.8	8.16
		Linksys	56.3	41.2	7.31	6.71	29.50	5.77

Ref device: Sony Ericcson HBH205

			Paired/Idle Mode		Coex + A2DP-BDR		Coex+SCO	
PS Mode	Protocol	AP	TX	RX	TX	RX	TX	RX
IEEE-PSPOLL								
	TCP							
		AP95	30.8	17.7	6.57	7.68	13.80	10.60
		DIR855	38	36.7	7.63	9.93	29.30	24.60
		AppleEXT	21.6	27.6	10.2	8.56	11.50	12.30
		Buffalo	34.9	35.8	7.64	7.77	9.89	9.79
		AppleTC	22.3	27.2	9.67	8.79	13.50	12.70
		Linksys	42.8	33.8	6.81	7.24	10.7	8.24
	UDP							
		AP95	56.4	30.2	6.72	10.60	46.00	13
		DIR855	52.3	51.3	8.41	6.64	40.70	9.54

	AppleEXT	29.4	37	11.2	9.23	26.5	12.3
	Buffalo	51.7	51.9	9.73	11.60	39.2	14.1
	AppleTC	29.6	36.8	14.6	10.50	26.8	13.7
	Linksys	57	45.1	10.5	7.98	43.9	10.6

Ref device: Nokia BH102

			Paired/Idle Mode		Coex + A2DP-BDR		Coex+SCO	
PS Mode	Protocol	AP	TX	RX	TX	RX	TX	RX
IEEE-PSPOLL								
	TCP							
		AP95	29.6	20.1	NA	NA	12.70	9.13
		DIR855	37.6	36.2	NA	NA	25.60	22.70
		AppleEXT	21.2	25.6	NA	NA	10.30	7.70
		Buffalo	37.1	35.8	NA	NA	14.50	9.78
		AppleTC	21.3	25.5	NA	NA	11.20	8.11
		Linksys	37.5	35.2	NA	NA	9.79	8.04
	UDP							
		AP95	56.9	30	NA	NA	43.80	8.32
		DIR855	52	51.8	NA	NA	38.50	9.8
		AppleEXT	28.1	34	NA	NA	24.30	11.2
		Buffalo	51.6	51.1	NA	NA	38.30	7.78
		AppleTC	28.1	32.3	NA	NA	26.50	10.9
		Linksys	56.7	43.6	NA	NA	41.90	8.72

11. WLAN Known issues

Component	Description
WLAN MMH	• None
WLAN STA	• None
MMH+STA	• None

Simultaneous Mode	
WiFi Direct (P2P)	• None
MMH+STA+P2P Simultaneous Mode	• None

12. BT Known issues

Component	Description
BT	• None
BT AMP	• None
BT Coex 2.4 GHz	• None

13. Notes:

- 5Ghz operation is supported in non DFS channel.
- The default value for the MMH TX power is now 18 dBm and not 13 dBm. Customers interested in using a different TX power setting will need to explicitly set the value using the TX power configuration API
- Min Sleep duration used should be greater than 6ms for MMH to go to sleep
- iwpriv mlan0 vsiecfg command is removed and replaced with a new command – mlanconfig mlan0 customie. Please refer to the README file for more details
- MMH + Bluetooth Coexistence is not supported currently.

14. Simultaneous AP-STA Limitations:

- The uAP BSS will adopt to the same channel as of Ex-AP
- The uAP BSS will be stopped and started automatically, whenever In-STA (re)associates to Ex-AP
- Scan on In-STA stops the uAP BSS; It will be restarted again automatically
- WMM Tx queues are shared between MMH and In-STA interfaces

- TX power settings, Radio control commands, Antenna config commands, wireless slot, preamble, and ERP protection settings 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)

15. Multi-BSS (MBSS) Limitations:

- In MBSS scenario (uap0+uap1) interfaces has below limitations.
  - Channel Settings, TX power settings, 802.11d settings will be used as same across two interfaces;
  - Custom IE Buffers are shared between two interfaces. IE_Buffer Index used by one interface cannot be used by other interface.
  - MMH Powermode is not supported in MBSS scenario, i.e. when both interfaces(uap0+uap1) are active.

16. WiFi Direct (P2P) Limitations

- STA IBSS is not simultaneously supported with MMH or P2P_GO.
- Use Case 8 (Simultaneous STA-P2P_CLIENT. STA supports IBSS role) not supported.
- P2P GO Powersave is not supported currently.
- Device configuration ‘wdf_config’ is required before starting P2P.
- GET command ‘wfd_mode’ will show operating modes only i.e. DEVICE / GO / CLIENT

17. Simultaneous Use cases

Use cases
Use Case 1: STA-only mode. Supports both Infra and Ad-hoc
Use Case 2: MMH-only mode

Use Case 3: AP-STA simultaneous support. STA does not support IBSS role
Use Case 4: MMH-only mode with MBSS support (up to 2 BSSs)
Use Case 5: AP (MBSS)-STA simultaneous support. STA does not support IBSS role. MBSS = 2 BSSs
Use Case 6: P2P only mode. Both GO and Client are supported
Use Case 7: Simultaneous STA-P2P_GO. STA does not support IBSS role
Use Case 8: Simultaneous STA-P2P_CLIENT. STA supports IBSS role **- Not Supported**
Use Case 9: Simultaneous MMH (single BSS)-P2P_GO. STA not supported
Use Case 10: Simultaneous MMH (single BSS)-P2P_client. STA not supported
Use Case 11: Simultaneous STA-MMH (single BSS)-P2P_GO. STA does not support IBSS role
Use Case 12: Simultaneous STA-MMH (Single BSS)-P2P_Client. STA does not support IBSS role
Use Case 13: Simultaneous MMH (2 BSSs)-P2P_GO. STA is not supported
Use Case 14: Simultaneous MMH (2 BSSs)-P2P_Client. STA is not supported
Use Case 15: Simultaneous STA-MMH (2 BSSs)-P2P_GO. STA does not support IBSS role
Use Case 16: Simultaneous STA-MMH (2 BSSs)-P2P_Client. STA does not support IBSS role

Simultaneous use cases verified using command line interface.