

SD-Wi-Fi-FP91-88W8977

# Wi-Fi Software Features for FreeRTOS



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## Revision History

Table 1: Document revision history

| Revision | Date        | Change details  |
|----------|-------------|---|
| Rev. 1   | 17-Jul-2020 | Initial release   |
| Rev. 2   | 30-Nov-2020 | Removed Wi-Fi Certification and EU Conformance details and moved them to Release note document  |
| Rev. 3   | 11-Jan-2021 | Added Section for Wi-Fi Test mode   |
| Rev. 4   | 15-Mar-2022 | <a href="#">Section 1.1.4 "802.11i - Security"</a> : Added WPA3 SAE (R3) and removed WPA2 + WPA3 (SAE) mixed mode<br><a href="#">Section 1.2.2 "802.11 b/g Features"</a> : Removed PS Poll and null data<br><a href="#">Section 1.2.4 "802.11i - Security"</a> : Added WPA3 SAE (R3) and WPA2 + WPA3 (SAE) mixed mode<br><a href="#">Section 1.1.7 General Features</a> : Added IPv6<br><a href="#">Section 1.2.6 General Features</a> : Added IPv6 |

## 1. Wi-Fi Features

### 1.1. Wireless Client Features

#### 1.1.1. 802.11n - High Throughput

- 2.4 GHz and 5 GHz band operation
- 2.4 GHz band supported channel bandwidths : 20MHz
- 5 GHz band supported channel bandwidths : 20MHz, 40MHz
- Short/long guard interval (400 ns/800 ns)
- 1 spatial stream (1x1)
- 11n data rates - Up to 150 Mbit/s (MCS 0 to MCS 7)
- Aggregated MAC Protocol Data Unit(AMPDU) Rx support
- Aggregated MAC Service Data Unit(AMSDU)-4k Rx support
- HT protection mechanisms
- Tx MCS rate adaptation (BGN)

#### 1.1.2. 802.11 a/b/g Features

- 11 a/b/g data rates - Up to 54 Mbit/s
- Tx rate adaptation (BG)
- Fragmentation/defragmentation
- ERP protection, slot time, preamble

#### 1.1.3. 802.11d

- 802.11d - Regulatory domain/operating class/country info

#### 1.1.4. 802.11i - Security

- Embedded supplicant support
  - Open security
  - WPA-PSK, WPA2-PSK security (AES-CCMP encryption)
  - WPA + WPA2 mixed mode
  - WPA3 SAE (R3)

#### 1.1.5. 802.11w - Protected Management Frames(PMF)

- PMF require and capable
- Unicast management frames - Encryption/decryption - using CCMP
- Broadcast management frames - Encryption/decryption - using BIP
- SA query request/response
- PMF support (embedded supplicant)

#### 1.1.6. Power Save Mode

- Deep sleep
- IEEE power save

#### 1.1.7. General Features

- Embedded MLME
- EU adaptivity support (ETSI cert)
- DFS radar detection in slave mode (Follow AP)
- IPv6

## 1.2. Mobile AP Features

### 1.2.1. 802.11n - High Throughput

- 2.4 GHz and 5 GHz band operation
- 2.4 GHz band supported channel bandwidths: 20 MHz
- 5 GHz band supported channel bandwidths: 20 MHz, 40 MHz
- Short/long guard interval (400 ns/800 ns)
- 1 spatial stream (1x1)
- 11n data rates – Up to 150 Mbit/s (MCS0 to MCS7)
- Tx MCS rate adaptation (BGN)
- Aggregated MAC Protocol Data Unit(AMPDU) Rx support
- Aggregated MAC Service Data Unit(AMSDU) - 4k Rx support
- Max client support (up to 8 devices)
- HT protection mechanisms

### 1.2.2. 802.11 b/g Features

- 11 b/g data rates – Up to 54 Mbit/s
- Tx rate adaptation (BG)
- ERP protection, slot time, preamble
- Handling of associated STAs with IEEE PS

### 1.2.3. 802.11d

- 802.11d - Regulatory domain/operating class/country info

### 1.2.4. 802.11i - Security

- Embedded authenticator support
  - Open security
  - WPA2-PSK security (AES-CCMP encryption)
  - WPA2+WPA3 (SAE) mixed mode
  - WPA3 SAE (R3)

### 1.2.5. 802.11w - Protected Management Frames(PMF)

- PMF require and capable
- Unicast management frames - Encryption/decryption - using CCMP
- Broadcast management frames - Encryption/decryption - using BIP
- SA query request/response

### 1.2.6. General Features

- Deep sleep
- Embedded MLME
- EU adaptivity support (ETSI Cert)
- Automatic channel selection (ACS)
- Extended channel switch announcement (ECSA)
- IPv6

## 2. Simultaneous AP-STA Operation (Same Channel)

- AP-STA functionality

## 3. Test Mode

### 3.1.1. Wi-Fi

- Transmit Continuous Wave (CW) mode
- Transmit standard 802.11 packets
- Receive mode

Refer to **Section: wifi\_test\_mode sample application** in the document: *UM11442-NXP Wi-Fi and Bluetooth Demo Applications for i.MX RT platforms User Guide* for more details.

## 4. Notes

None.



## 5. Acronyms & Abbreviations

| Acronyms | Definitions                           |
|----------|---------------------------------------|
| AP       | Access Point                          |
| WPA      | Wi-Fi protected access                |
| MLME     | Mac Layer Management Entity           |
| STA      | Station                               |
| HT       | High Throughput                       |
| MCS      | Modulation and Coding Scheme          |
| ERP      | Extended Rate Physical                |
| SAE      | Simultaneous Authentication of Equals |
| CCMP     | Counter Mode CBC-MAC Protocol         |

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