NXP-Wireless-Chipset-Release-Notes

SD-Wi-Fi-UART-BT-FP91-IW416
SD-Wi-Fi-UART-BT-FP91-88W8987
SD-Wi-Fi-FP91-88W8801

Release Notes

Contents

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Revision History

Table 1: Revision History of the document

Revision	Date	Change details
Rev. 1	24-June-2022	Initial release with new Format

Rev. 2	15-Sept-2022	Modifications:
		• Deprecated reference of 88W8977 from the document
		• Table 2:
		  ○ Removed Shared Authentication from Wi-Fi Client
		  ○ Added FIPS in Wi-Fi Client General feature
		  ○ Removed TxPower Config V2 from Wi-Fi AP and Client General Features
		• Section 3.1.1 "Package Information": Updated SDK version
		• Section 3.1.2 "Version Information": Updated FW version
		• Section 3.1.4.1 "WFA Certifications": Mention 802.11ac and WPA3(SAE)
		• Section 3.1.5.1 "Throughput Test Setup": Added Murata module details
		• Section 3.1.5.2 "STA Throughput": Updated TP numbers
		• Section 3.1.5.3 "Mobile AP Throughput": Updated TP numbers
		• Section 3.1.7 "Bug Fixes/Feature Enhancements": Updated FW version and details for fixed issues
		• Section 3.2.1 "Package Information": Updated SDK version
		• Section 3.2.2 "Version Information": Updated FW version
		• Section 3.2.4.1 "WFA Certifications": Mention WPA3(SAE)
		• Section 3.2.5.1 "Throughput Test Setup": Added Murata module details
		• Section 3.2.5.2 "STA Throughput": Updated TP numbers
		• Section 3.2.5.3 "Mobile AP Throughput": Updated TP numbers
		• Section 3.2.7 "Bug Fixes/Feature Enhancements": Updated FW version and details for fixed issues
		• Section 3.3.1 "Package Information": Updated SDK version
		• Section 3.3.5.2 "STA Throughput": Updated TP numbers
		• Section 3.3.5.3 "Mobile AP Throughput": Updated TP numbers

Rev.3	03-Jan-2023	Modifications: • Section 3.1.1 "Package Information": Updated SDK version • Section 3.1.2 "Version Information": Updated FW version • Section 3.2.1 "Package Information": Updated SDK version • Section 3.2.2 "Version Information": Updated FW version

		• Section 3.3.1 "Package Information": Updated SDK version • Section 3.3.2 “Version Information”: Updated FW version • Section 3.3.5.2 "STA Throughput": Updated TP numbers • Section 3.3.5.3 "Mobile AP Throughput": Updated TP numbers

Rev.4	21-Mar-2023	Modifications:
		• Table 2:
		  ○ Removed Shared Authentication from Wi-Fi Client
		  ○ Added 11k, 11v, and 11r in Wi-Fi Client General feature
		  ○ Added TKIP and foot note for TKIP in Wi-Fi Client General feature
		  ○ Removed FIPS from Wi-Fi AP General feature
		• Section 3.1.1 "Package Information": Updated SDK version
		• Section 3.1.2 "Version Information": Updated FW version
		• Section 3.1.4.1 "WFA Certifications": Mentioned FFD, SVD and WPA3 SAE (R3) for STA
		• Section 3.1.5.1 "Throughput Test Setup": Updated External AP details
		• Section 3.1.5.2 "STA Throughput": Updated TP numbers
		• Section 3.1.5.3 "Mobile AP Throughput": Updated TP numbers
		• Section 3.1.7 "Bug Fixes/Feature Enhancements": Updated FW version and details for fixed issues
		• Section 3.2.1 "Package Information": Updated SDK version
		• Section 3.2.2 "Version Information": Updated FW version
		• Section 3.2.4.1 "WFA Certifications": Mentioned FFD, SVD and WPA3 SAE (R3) for STA
		• Section 3.2.5.1 "Throughput Test Setup": Updated External AP details
		• Section 3.2.5.2 "STA Throughput": Updated TP numbers
		• Section 3.2.5.3 "Mobile AP Throughput": Updated TP numbers
		• Section 3.2.7 "Bug Fixes/Feature Enhancements": Updated FW version and details for fixed issues
		• Section 3.3.1 "Package Information": Updated SDK version
		• Section 3.3.2 "Version Information": Updated FW version
		• Section 3.3.4.1 "WFA Certifications": Mentioned FFD, SVD and WPA3 SAE (R3) for STA.
		• Section 3.3.5.2 "STA Throughput": Updated TP numbers
		• Section 3.3.5.3 "Mobile AP Throughput": Updated TP numbers
		• Section 3.3.7 "Bug Fixes/Feature Enhancements": Updated FW version and details for fixed issues

1 About this document

This document contains important information about the supported features, release versions, fixed/known issues and performance of the Wi-Fi, Bluetooth and Co-ex.

This is a consolidated release that has been tested for wireless chipsets mentioned below in this document with SDK version 2.13.1.

2 Feature List

Table 2: Feature List for available SoCs

Wireless Type	Type	Features List	Sub Features List	SD-UART		SD
				8987	IW416	8801
Wi-Fi	Client	802.11n - High Throughput	2.4 GHz band operation supported channel bandwidth: 20 MHz	Y	Y	Y
			2.4 GHz band supported channel bandwidths : 40 MHz	Y	Y	N
			5 GHz band supported channel bandwidths : 20 MHz	Y	Y	N
			5 GHz band supported channel bandwidths : 40 MHz	Y	Y	N
			Short/long guard interval (400 ns/800 ns)	Y	Y	Y
			11n data rates – Up to 72 Mbit/s (MCS 0 to MCS 7)	Y	Y	Y
			11n data rates – Up to 150 Mbit/s (MCS 0 to MCS 7)	Y	Y	N
			1 spatial stream (1x1)	Y	Y	Y
			HT protection mechanisms	Y	Y	Y
			Aggregated MAC Protocol Data Unit(AMPDU) Rx support	Y	Y	Y
			Aggregated MAC Service Data Unit(AMSDU) -4k Rx support	Y	Y	Y
			Tx MCS rate adaptation (BGN)	Y	Y	Y
			Rx Low Density Parity Check (LDPC)	Y	N	N
		802.11 ac - Very High Throughput	2.4 GHz band supported channel bandwidths : 20MHz	Y	N	N
			5 GHz band supported channel bandwidths: 20 MHz	Y	N	N
			5 GHz band supported channel bandwidths: 40 MHz	Y	N	N
			5 GHz band supported channel bandwidths: 80 MHz	Y	N	N
			11ac data rates - Up to 433.3 Mbps (MCS 0 to MCS 9) - 1x1	Y	N	N
			MU-MIMO Beamformee (Explicit and Implicit)	Y	N	N
			RTS/CTS with BW Signaling	Y	N	N
			Operation Mode Notification	Y	N	N
			Backward Compatibility with non-VHT devices	Y	N	N
			Tx VHT MCS Rate Adaptation	Y	N	N
		802.11 a/b/g Features	11 b/g data rates - Up to 54 Mbit/s	Y	Y	Y
			11 a data rates - Up to 54 Mbit/s	Y	Y	N
			Tx rate adaptation (BG)	Y	Y	Y
			Fragmentation/defragmentation	Y	Y	Y
			ERP protection, slot time, preamble	Y	Y	Y
		802.11d	802.11d - Regulatory Domain/Operating Class/Country Info	Y	Y	Y
		802.11e - QoS	EDCA [Enhanced Distributed Channel Access] / WMM (Wireless Multi-Media)	Y	N	N
		802.11i - Security	Open security	Y	Y	Y
			WPA2-PSK Security (AES-CCMP Encryption)	Y	Y	Y
			WPA + WPA2 mixed mode	Y	Y	Y
			WPA3 SAE (R3)	Y	Y	Y
		Power Save Mode	Deep sleep	Y	Y	Y
			IEEE power save	Y	Y	Y

Wireless Type	Type	Features List	Sub Features List	SD-UART		SD
				8987	IW416	8801
Wi-Fi	Client	802.11w - PMF (Protected Management Frames)	PMF require and capable	Y	Y	Y
			Unicast management frames - Encryption/decryption - using CCMP	Y	Y	Y
			Broadcast management frames - Encryption/decryption - using BIP	Y	Y	Y
			SA query request/response	Y	Y	Y
			PMF Support using Embedded supplicant	Y	Y	Y
		General Features	Embedded Supplicant	Y	Y	Y
			Embedded MLME	Y	Y	Y
			EU adaptivity support (ETSI Cert)	Y	Y	Y
			DFS Radar Detection in Slave Mode (Follow AP)	Y	Y	N
			External Coex (Software interface)	N	N	Y
			IPv6	Y	Y	Y
			FIPS	Y	Y	N
			TKIP*	Y	Y	Y
			11k	Y	Y	N
			11v	Y	Y	N
			11r	Y	Y	N
	AP	802.11n - High Throughput	2.4 GHz band operation supported channel bandwidth: 20 MHz	Y	Y	Y
			2.4 GHz band supported channel bandwidths : 40 MHz	Y	Y	N
			5 GHz band supported channel bandwidths : 20 MHz	Y	Y	N
			5 GHz band supported channel bandwidths : 40 MHz	Y	Y	N
			Short/long guard interval (400 ns/800 ns)	Y	Y	Y
			11n data rates – Up to 72 Mbit/s (MCS 0 to MCS 7)	Y	Y	Y
			11n data rates – Up to 150 Mbit/s (MCS 0 to MCS 7)	Y	Y	N
			1 spatial stream (1x1)	Y	Y	Y
			HT protection mechanisms	Y	Y	Y
			Aggregated MAC Protocol Data Unit(AMPDU) Rx support	Y	Y	Y
			Aggregated MAC Service Data Unit(AMSDU) -4k Rx support	Y	Y	Y
			Max client support (up to 8 devices)	Y	Y	Y
			Tx MCS rate adaptation (BGN)	Y	Y	Y
			Rx Low Density Parity Check (LDPC)	Y	N	N
		802.11ac – Very High Throughput	5 GHz band supported channel bandwidth: 20 MHz	Y	N	N
			5 GHz band supported channel bandwidth: 40 MHz	Y	N	N
			5 GHz band supported channel bandwidth: 80MHz	Y	N	N
			Short/Long Guard Interval (400ns/800ns)	Y	N	N
			11ac Data rates – Up to 433.3 Mbps (MCS 0 to MCS 9)	Y	N	N
			11ac Data rates - Up to 866.7 Mbps (MCS 0 to MCS 9)	Y	N	N

* As per Wi-Fi specification, connecting in TKIP security in non 802.11n mode is allowed.

Wireless Type	Type	Features List	Sub Features List	SD-UART		SD
				8987	IW416	8801
Wi-Fi	AP	802.11ac – Very High Throughput	Single User- Aggregated MAC Protocol Data Unit (SU-AMPDU) Aggregation	Y	N	N
			RTS/CTS with BW Signaling	Y	N	N
			Backward Compatibility with non-VHT devices	Y	N	N
			Tx VHT MCS Rate Adaptation	Y	N	N
			MU-MIMO Beamformee (Explicit and Implicit)	Y	N	N
			Operation Mode Notification	Y	N	N
		802.11d	802.11d - Regulatory Domain/Operating Class/Country Info	Y	Y	Y
		802.11e -QoS	EDCA [Enhanced Distributed Channel Access] / WMM (Wireless Multi-Media)	Y	N	N
		802.11i - Security	Open security	Y	Y	Y
			WPA2-PSK security (AES-CCMP encryption)	Y	Y	Y
			WPA2 + WPA3 (SAE) mixed mode	Y	Y	Y
			WPA3 SAE (R3)	Y	Y	N
		802.11w - Protected Management Frames (PMF)	PMF require and capable	Y	Y	Y
			Unicast management frames -Encryption/decryption - using CCMP	Y	Y	Y
			Broadcast management frames - Encryption/decryption - using BIP	Y	Y	Y
			SA query request/response	Y	Y	Y
		General Features	Embedded Authenticator	Y	Y	Y
			Embedded MLME	Y	Y	Y
			EU adaptivity support	Y	Y	Y
			Automatic channel selection (ACS)	Y	Y	Y
			Extended channel switch announcement (ECSA)	Y	Y	Y
			External Coex (Software interface)	N	N	Y
	AP-STA	Simultaneous AP-STA Operation (Same Channel)	AP-STA functionality	Y	Y	Y

Wireless Type	Type	Features List	Sub Features List	SD-UART	
				8987	IW416
Bluetooth	Bluetooth Classic Features	General Features	BT Class 1.5 and Class 2 support	Y	Y
			Scatternet support	Y	Y
			Maximum of seven simultaneous ACL connections	Y	Y
			Automatic Packet Type Selection	Y	Y
			Bluetooth - 2.1 to 5.0 Specification Support	Y	Y
			Low power sniff	Y	Y
		Bluetooth Packet Type Supported	ACL (DM1, DH1, DM3, DH3, DM5, DH5, 2-DH1, 2-DH3, 2-DH5, 3-DH1, 3-DH3, 3-DH5)	Y	Y
			SCO (HV1, HV3)	Y	Y
			eSCO (EV3, EV4, EV5, 2EV3, 3EV3, 2EV5, 3EV5)	Y	Y
		Bluetooth Profiles Supported	A2DP Source/Sink	Y	Y
			AVRCP Target/Controller	Y	Y
			HFP Dev/AG	Y	Y
			OPP Server/Client	Y	Y
			SPP Server/Client	Y	Y
			HID Target/Device	Y	Y
		Bluetooth Audio Features	PCM NBS Master / Slave	Y	Y
			PCM WBS Master / Slave	Y	Y
	Bluetooth LE Features	Generic Features	Maximum 16 Bluetooth LE connections (Master role)	Y	Y
		Bluetooth Profile Support	Bluetooth LE GATT	Y	Y
			Bluetooth LE HID over GATT	Y	Y
			Bluetooth LE GAP	Y	Y
		Bluetooth LE 4.0 Support	Low Energy Physical Layer	Y	Y
			Low Energy Link Layer	Y	Y
			Enhancements to HCI for Low Energy	Y	Y
			Low Energy Direct Test Mode	Y	Y
		Bluetooth 4.1 Support	Low duty Cycle Directed Advertising	Y	Y
			Bluetooth LE Dual Mode Topology	Y	Y
			Bluetooth LE Privacy v1.1	Y	Y
			Bluetooth LE Link Layer Topology	Y	Y
		Bluetooth 4.2 Support	Bluetooth LE secure connection	Y	Y
			Bluetooth LE Link Layer Privacy v1.2	Y	Y
			Bluetooth LE Data Length Extension	Y	Y
			Link Layer Extended Scanner Filter Policies	Y	Y
		Bluetooth 5.0 Support	Bluetooth LE 2 Mbps Support	Y	Y
			High Duty Cycle Directed Advertising	Y	Y
Coex	Bluetooth + Wi-Fi Coexistence	BCA TDM Co-ex Mode (Shared Antenna)	STA + Bluetooth Coex	Y	Y
			STA + Bluetooth LE Coex	Y	Y
			STA + Bluetooth + Bluetooth LE Coex	Y	Y
			AP + Bluetooth Coex	Y	Y
			AP + Bluetooth LE Coex	Y	Y
			AP + Bluetooth + Bluetooth LE Coex	Y	Y

3 Release Notes

3.1 SD-UART 8987

3.1.1 Package Information

- SDK Version: 2.13.1

3.1.2 Version Information

- Wireless SoC : 88W8987
- Wi-Fi and Bluetooth/Bluetooth LE Firmware Version : 16.91.21.p82
  - 16 - Major revision
  - 91 - Feature pack
  - 21 - Release version
  - P82 - Patch number

3.1.3 Host Platform

- All i.MX RT Platform running FreeRTOS
- Interface used
  - Wi-Fi over SDIO (SDIO 2.0 Support, SDIO clock frequency : 50 MHz)
  - Bluetooth/Bluetooth LE over UART
- Test Tools
  - iPerf (version 2.0.5)

3.1.4 Wi-Fi and Bluetooth Certification

The Wi-Fi and Bluetooth certification is obtained with the following combinations.

3.1.4.1 WFA Certifications

- STA | 802.11n
- STA | 802.11ac
- STA | PMF
- STA | FFD
- STA | SVD
- STA | WPA3 SAE (R3)

Refer TN00066-WFA Derivative Certification Process document available in the SDK Package

NOTE: *This release Supports STAUT only certifications*

3.1.4.2 Bluetooth Controller Certification

QDID : https://launchstudio.bluetooth.com/ListingDetails/115533

3.1.5 Wi-Fi Throughput

3.1.5.1 Throughput Test Setup

- Environment: Shield Room - Over the Air
- External Access Point: ASUS AX88U
- DUT: W8987 Murata (Module : **1ZM M.2**) with EVK-MIMXRT1060 platform
- DUT Power Source: External power supply
- External Client: Apple MacBook Air
- Channel: 6 | 36
- Wi-Fi application: wifi_cli
- Compiler used to build application: armgcc
- Compiler Version: gcc-arm-none-eabi-9-2020-q2-update
- iPerf Commands used in test:

TCP TX	TCP RX	UDP TX	UDP RX
iperf -c <remote_ip> -t 60	iperf -s	iperf -c <remote_ip> -t 60 -u -B <local_ip> -b 120 **NOTE:** Defaults data rate is 100mbps	iperf -s -u -B <local_ip>

Refer to **Section-2.3** in *UM11442-NXP Wi-Fi and Bluetooth Demo Applications User Guide for i.MX RT Platforms* to read more about the throughput test setup and topology.

3.1.5.2 STA Throughput

External APs: ASUS AX88U

STA Mode Throughput - BGN Mode | 2.4 GHz Band | 20 MHz				
Protocol	**TCP (Mbit/s)**		**UDP (Mbit/s)**	
Direction	Tx	Rx	Tx	Rx
Open Security	36	41	42	59
WPA2-AES	36	45	41	58
WPA3-SAE	36	45	42	58

STA Mode Throughput - BGN Mode | 2.4 GHz Band | 40 MHz				
Protocol	**TCP (Mbit/s)**		**UDP (Mbit/s)**	
Direction	Tx	Rx	Tx	Rx
Open Security	33	45	42	58
WPA2-AES	36	45	41	57
WPA3-SAE	35	44	43	58

STA Mode Throughput - AN Mode | 5 GHz Band | 20 MHz				
Protocol	**TCP (Mbit/s)**		**UDP (Mbit/s)**	
Direction	Tx	Rx	Tx	Rx
Open Security	39	48	47	64
WPA2-AES	39	43	47	64
WPA3-SAE	39	47	47	64

STA Mode Throughput - AN Mode | 5 GHz Band | 40 MHz				
Protocol	**TCP (Mbit/s)**		**UDP (Mbit/s)**	
Direction	Tx	Rx	Tx	Rx
Open Security	56	76	88	102
WPA2-AES	56	76	93	101
WPA3-SAE	57	76	94	100

STA Mode Throughput - AC Mode | 5 GHz Band | 20 MHz (VHT)				
Protocol	**TCP (Mbit/s)**		**UDP (Mbit/s)**	
Direction	Tx	Rx	Tx	Rx
Open Security	43	55	47	69
WPA2-AES	43	54	43	69
WPA3-SAE	41	54	48	69

STA Mode Throughput - AC Mode | 5 GHz Band | 40 MHz (VHT)				
Protocol	**TCP (Mbit/s)**		**UDP (Mbit/s)**	
Direction	Tx	Rx	Tx	Rx
Open Security	59	84	94	97
WPA2-AES	59	86	94	98
WPA3-SAE	58	85	94	97

STA Mode Throughput - AC Mode | 5 GHz Band | 80 MHz (VHT)				
Protocol	**TCP (Mbit/s)**		**UDP (Mbit/s)**	
Direction	Tx	Rx	Tx	Rx
Open Security	69	90	94	183
WPA2-AES	66	85	94	183
WPA3-SAE	62	83	94	182

3.1.5.3 Mobile AP Throughput

External client: Apple Macbook Air

Mobile AP Mode Throughput - BGN Mode | 2.4 GHz Band | 20MHz				
Protocol	**TCP (Mbit/s)**		**UDP (Mbit/s)**	
Direction	Tx	Rx	Tx	Rx
Open Security	33	33	44	55
WPA2-AES	32	30	44	52
WPA3-SAE	27	35	44	58

Mobile AP Mode Throughput - BGN Mode | 2.4 GHz Band | 40MHz				
Protocol	**TCP (Mbit/s)**		**UDP (Mbit/s)**	
Direction	Tx	Rx	Tx	Rx
Open Security	32	65	69	119
WPA2-AES	32	65	69	119
WPA3-SAE	32	65	71	118

Mobile AP Mode Throughput - AN Mode | 5 GHz Band | 20 MHz				
Protocol	**TCP (Mbit/s)**		**UDP (Mbit/s)**	
Direction	Tx	Rx	Tx	Rx
Open Security	34	41	44	63
WPA2-AES	31	43	44	62
WPA3-SAE	32	40	43	59

Mobile AP Mode Throughput - AN Mode | 5 GHz Band | 40 MHz				
Protocol	**TCP (Mbit/s)**		**UDP (Mbit/s)**	
Direction	Tx	Rx	Tx	Rx
Open Security	35	50	82	110
WPA2-AES	35	51	82	113
WPA3-SAE	34	44	82	119

Mobile AP Mode Throughput - AC Mode | 5 GHz Band | 20 MHz				
Protocol	**TCP (Mbit/s)**		**UDP (Mbit/s)**	
Direction	Tx	Rx	Tx	Rx
Open Security	24	36	32	69
WPA2-AES	32	60	47	69
WPA3-SAE	32	60	47	65

Mobile AP Mode Throughput - AC Mode | 5 GHz Band | 40 MHz				
Protocol	**TCP (Mbit/s)**		**UDP (Mbit/s)**	
Direction	Tx	Rx	Tx	Rx
Open Security	34	98	70	69
WPA2-AES	34	97	71	67
WPA3-SAE	33	97	70	68

Mobile AP Mode Throughput - AC Mode | 5 GHz Band | 80 MHz				
Protocol	**TCP (Mbit/s)**		**UDP (Mbit/s)**	
Direction	Tx	Rx	Tx	Rx
Open Security	30	63	41	69
WPA2-AES	34	109	71	69
WPA3-SAE	33	105	70	69

3.1.6 EU Conformance Tests

- EU Adaptivity test - EN 300 328 v2.1.1 (for 2.4 GHz)
- EU Adaptivity test - EN 301 893 v2.1.1 (for 5 GHz)

3.1.7 Bug Fixes/Feature Enhancements

3.1.7.1 FW Version : From 16.91.21.p64.1 to 16.91.21.p82

Component	Description
Wi-Fi	• WPA3-R3 enabled APUT beacons does not have RSNXE when configured in H2E mode • Associated event is received even when connecting using wrong password • WFA APUT Low iperf TCP/UDP Tx throughput with Realtek station

3.1.8 Known Issues

Component	Description
-	NA

3.2 SD-UART IW416

3.2.1 Package Information

- SDK version : 2.13.1

3.2.2 Version Information

- Wireless SoC: IW416
- Wi-Fi and Bluetooth/Bluetooth LE Firmware Version : 16.91.21.p82
    - 16 - Major revision
    - 91 - Feature pack
    - 21 - Release version
    - P82 - Patch number

3.2.3 Host Platform

- All i.MX RT Platform running FreeRTOS
- Interface used
    - Wi-Fi over SDIO (SDIO 2.0 Support, SDIO clock frequency : 50 MHz)
    - Bluetooth/Bluetooth LE over UART
- Test Tools
    - iPerf (version 2.0.5)

3.2.4 Wi-Fi and Bluetooth Certification

The Wi-Fi and Bluetooth certification is obtained with the following combinations.

3.2.4.1 WFA Certifications

- STA | 802.11n
- STA | PMF
- STA | FFD
- STA | SVD
- STA | WPA3 SAE (R3)

Refer TN00066-WFA Derivative Certification Process document available in the SDK Package

NOTE: *This release Supports STAUT only certifications*

3.2.4.2 Bluetooth Controller Certification

QDID : https://launchstudio.bluetooth.com/ListingDetails/108035

3.2.5 Wi-Fi Throughput

3.2.5.1 Throughput Test Setup

- Environment: Shield Room - Over the Air
- Access Point: Asus AX88u
- DUT: IW416 Murata (Module : 1XK M.2) with EVK-MIMXRT1060 platform
- DUT Power Source: External power supply
- Client: Apple MacBook Air
- Channel: 6 | 36
- Wi-Fi application: wifi_cli
- Compiler used to build application: armgcc
- Compiler Version: gcc-arm-none-eabi-9-2020-q2-update
- iPerf Commands used in test:

TCP TX	TCP RX	UDP TX	UDP RX
iperf -c <remote_ip> -t 60	iperf -s	iperf -c <remote_ip> -t 60 -u -B <local_ip> -b 120 **NOTE:** Defaults data rate is 100mbps	iperf -s -u -B <local_ip>

Refer to **Section-2.3** in UM11442-NXP Wi-Fi and Bluetooth Demo Applications User Guide for i.MX RT Platforms to read more about the throughput test setup and topology.

3.2.5.2 STA Throughput

External AP: Asus AX88u

STA Mode Throughput - BGN Mode | 2.4 GHz Band | 20 MHz				
Protocol	**TCP (Mbit/s)**		**UDP (Mbit/s)**	
Direction	Tx	Rx	Tx	Rx
Open Security	27	31	33	43
WPA2-AES	27	35	33	53
WPA3-SAE	27	33	33	49

STA Mode Throughput - BGN Mode | 2.4 GHz Band | 40 MHz				
Protocol	**TCP (Mbit/s)**		**UDP (Mbit/s)**	
Direction	Tx	Rx	Tx	Rx
Open Security	35	52	45	86
WPA2-AES	35	50	45	100
WPA3-SAE	35	50	45	100

STA Mode Throughput - AN Mode | 5 GHz Band | 20 MHz (HT)				
Protocol	**TCP (Mbit/s)**		**UDP (Mbit/s)**	
Direction	Tx	Rx	Tx	Rx
Open Security	36	47	44	57
WPA2-AES	35	46	44	55
WPA3-SAE	35	46	44	54

STA Mode Throughput - AN Mode | 5 GHz Band | 40 MHz (HT)				
Protocol	**TCP (Mbit/s)**		**UDP (Mbit/s)**	
Direction	Tx	Rx	Tx	Rx
Open Security	51	73	94	103
WPA2-AES	49	65	82	105
WPA3-SAE	50	65	94	99

3.2.5.3 Mobile AP Throughput

External client: Apple MacBook Air

Mobile AP Mode Throughput - BGN Mode | 2.4 GHz Band | 20MHz				
Protocol	**TCP (Mbit/s)**		**UDP (Mbit/s)**	
Direction	Tx	Rx	Tx	Rx
Open Security	34	21	44	51
WPA2-AES	34	21	44	48
WPA3-SAE	34	20	44	46

Mobile AP Mode Throughput - BGN Mode | 2.4 GHz Band | 40MHz				
Protocol	**TCP (Mbit/s)**		**UDP (Mbit/s)**	
Direction	Tx	Rx	Tx	Rx
Open Security	35	85	82	130
WPA2-AES	35	69	82	102
WPA3-SAE	35	69	82	102

Mobile AP Mode Throughput - AN Mode | 5 GHz Band | 20 MHz				
Protocol	**TCP (Mbit/s)**		**UDP (Mbit/s)**	
Direction	Tx	Rx	Tx	Rx
Open Security	35	52	45	64
WPA2-AES	35	52	45	64
WPA3-SAE	35	52	45	64

Mobile AP Mode Throughput - AN Mode | 5 GHz Band | 40 MHz				
Protocol	**TCP (Mbit/s)**		**UDP (Mbit/s)**	
Direction	Tx	Rx	Tx	Rx
Open Security	35	85	94	135
WPA2-AES	35	68	94	103
WPA3-SAE	35	66	94	103

3.2.6 EU Conformance Tests

- EU Adaptivity test - EN 300 328 v2.1.1 (for 2.4 GHz)
- EU Adaptivity test - EN 301 893 v2.1.1 (for 5 GHz)

3.2.7 Bug Fixes/Feature Enhancements

3.2.7.1 FW Version : From 16.91.21.p64.1 to 16.91.21.p82

Component	Description
Wi-Fi	• WPA3-R3 enabled APUT beacons does not have RSNXE when configured in H2E mode

3.2.8 Known Issues

Component	Description
-	NA

3.3 SD 8801

3.3.1 Package Information

- SDK Version: 2.13.1

3.3.2 Version Information

- Wireless SoC : 88W8801
- Wi-Fi Firmware Version : 14.91.36.p180
  - 14 - Major revision
  - 91 - Feature pack
  - 36 - Release version
  - p180 - Patch number

3.3.3 Host Platform

- All i.MX RT Platform running FreeRTOS
- Interface used
  - Wi-Fi over SDIO (SDIO 2.0 Support, SDIO clock frequency : 50 MHz)
- Test Tools
  - iPerf (version 2.0.5)

3.3.4 Wi-Fi Certification

The Wi-Fi certification is obtained with the following combinations.

3.3.4.1 WFA Certifications

- STA | 802.11n
- STA | PMF
- STA | FFD
- STA | SVD
- STA | WPA3 SAE (R3)

Refer TN00066-WFA Derivative Certification Process document available in the SDK Package
NOTE: : *This release Supports STAUT only certifications*

3.3.5 Wi-Fi Throughput

3.3.5.1 Throughput Test Setup

- Environment: Shield Room - Over the Air
- External Access Point: Asus-AX88U
- DUT : W8801 Murata (Module: 2DS M.2) with EVK-MIMXRT1060 platform
- DUT Power Source: External power supply
- External Client: IW620-Kestrel
- Channel: 6
- Wi-Fi application: wifi_cli
- Compiler used to build application: armgcc
- Compiler Version: gcc-arm-none-eabi-9-2020-q2-update
- iPerf Commands used in test:

TCP TX	TCP RX	UDP TX	UDP RX
iperf -c <remote_ip> -t 60	iperf -s	iperf -c <remote_ip> -t 60 -u -B <local_ip> -b 120 **NOTE:** Defaults data rate is 100mbps	iperf -s -u -B <local_ip>

Refer to **Section-2.3** in *UM11442-NXP Wi-Fi and Bluetooth Demo Applications User Guide for i.MX RT Platforms* to read more about the throughput test setup and topology.

3.3.5.2 STA Throughput

External AP: Asus-AX88U (Open/WPA2/WPA3-SAE)

STA Mode Throughput - BGN Mode | 2.4 GHz Band | 20 MHz				
Protocol	**TCP (Mbit/s)**		**UDP (Mbit/s)**	
Direction	Tx	Rx	Tx	Rx
Open Security	31	42	43	63
WPA2-AES	30	42	41	62
WPA3-SAE	30	42	42	62

3.3.5.3 Mobile AP Throughput

External client: IW620-Kestrel

Mobile AP Mode Throughput - BGN Mode | 2.4 GHz Band | 20MHz				
Protocol	**TCP (Mbit/s)**		**UDP (Mbit/s)**	
Direction	Tx	Rx	Tx	Rx
Open Security	30	49	39	61
WPA2-AES	29	48	35	61
WPA3-SAE	31	50	39	63

3.3.6 EU Conformance Tests

- EU Adaptivity test - EN 300 328 v2.1.1 (for 2.4 GHz)

3.3.7 Bug Fixes/Feature Enhancements

3.3.7.1 FW Version : From 14.91.36.p178 to 14.91.36.p180

Component	Description
--	NA

3.3.8 Known Issues

Component	Description
--	NA

4 Acronyms & Abbreviations

Table 3: List of Acronyms & Abbreviations

Acronyms	Definitions
A2DP	Advanced audio distribution profile
AP	Access Point
BW	Bandwidth
CCMP	Counter Mode CBC-MAC Protocol
CTS	Clear To Send
ERP	Extended Rate Physical
GATT	Generic attribute profile
HFP	Hands free profile
HID	Human interface device
HT	High Throughput
MCS	Modulation and Coding Scheme
MLME	Mac Layer Management Entity
RTS	Request To Send
SAE	Simultaneous Authentication of Equals
STA	Station
VHT	Very High Throughput
WEP	Wired Equivalent Private
WFD	Wi-Fi Direct
WPA	Wi-Fi protected access
WPS	Wi-Fi Protected Setup
WSC	Wi-Fi Simple Configuration

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