

**CONFIDENTIAL TRADE SECRET**

**FOR USE ONLY BY AUTHORIZED WI-FI ALLIANCE MEMBERS**

**– DO NOT COPY –**

## **ASD #1148 Test Plan**

# **Wi-Fi CERTIFIED n System Interoperability Test Plan**

**Version 2.9**

**Wi-Fi Alliance**



©2011 Wi-Fi Alliance

All Rights Reserved

- 10900-B Stonelake Boulevard, Suite 126
- Austin, TX 78759

Phone: 512.498.9434 • Fax: 512.498.9435 • Email: [certifications@wi-fi.org](mailto:certifications@wi-fi.org)

[www.wi-fi.org](http://www.wi-fi.org)

**This document contains confidential trade secrets intended solely for use by only authorized Wi-Fi Alliance members. For latest up-to-date information, please refer to the Wi-Fi Alliance website's members-only area.**

Copyright 2011 Wi-Fi Alliance. All Rights Reserved.

**WI-FI ALLIANCE PROPRIETARY AND CONFIDENTIAL – SUBJECT TO CHANGE  
WITHOUT NOTICE**

The Wi-Fi Alliance owns the copyright in this document and reserves all rights therein. This document and any related materials may only be used by Wi-Fi Alliance members for their internal use, such as quality assurance and pre-certification activities, and for their participation in approved Wi-Fi Alliance activities, such as the Wi-Fi Alliance certification program, unless otherwise permitted by the Wi-Fi Alliance through prior written consent. A user of this document may duplicate and distribute copies of the document in connection with the authorized uses described above, provided any duplication in whole or in part includes the copyright notice and the disclaimer text set forth herein. Unless prior written permission has been received from the Wi-Fi Alliance, any other use of this document and all other duplication and distribution of this document are prohibited. The Wi-Fi Alliance regards the unauthorized use, duplication or distribution of this document by a member as a material breach of the member's obligations under the organization's rules and regulations, which may result in the suspension or termination of Wi-Fi Alliance membership. Unauthorized use, duplication, or distribution by nonmembers is an infringement of the Wi-Fi Alliance's copyright. Distribution of this document to persons or organizations who are not members of the Wi-Fi Alliance is strictly prohibited.

THIS DOCUMENT IS PROVIDED "AS IS" AND WITHOUT WARRANTY OF ANY KIND. TO THE GREATEST EXTENT PERMITTED BY LAW, THE WI-FI ALLIANCE DISCLAIMS ALL EXPRESS, IMPLIED AND STATUTORY WARRANTIES, INCLUDING, WITHOUT LIMITATION, THE IMPLIED WARRANTIES OF TITLE, NONINFRINGEMENT, MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. THE WI-FI ALLIANCE DOES NOT WARRANT THAT THIS DOCUMENT IS COMPLETE OR WITHOUT ERROR AND DISCLAIMS ANY WARRANTIES TO THE CONTRARY. NOTHING IN THIS DOCUMENT CREATES ANY WARRANTIES WHATSOEVER REGARDING THE SUITABILITY OR NON-SUITABILITY OF A PRODUCT OR A SERVICE FOR CERTIFICATION UNDER ANY CERTIFICATION PROGRAM OF THE WI-FI ALLIANCE OR ANY THIRD PARTY.

## Change History

Version	Date dd/mm/yy	Remarks
1.0	28/03/2016	Initial Release

# Table of Contents

<b>1.</b>	<b>OVERVIEW.....</b>	<b>7</b>
1.1	TERMS AND DEFINITIONS.....	7
1.2	DEFINITION OF DEVICES UNDER TEST (DUT) .....	7
1.2.1	<i>Access Points Under Test (APUTs) .....</i>	7
1.2.2	<i>Stations Under Test (STAUTs) .....</i>	7
1.2.3	<i>Applicability of Tests .....</i>	7
1.2.4	<i>Testing Scenarios .....</i>	7
<b>2</b>	<b>TEST TOOLS, METHODOLOGY, AND APPROACH.....</b>	<b>8</b>
2.1.1	<i>Sniffers .....</i>	8
2.1.2	<i>Test Notes .....</i>	8
2.1.3	<i>Chariot Scripts .....</i>	8
2.1.4	<i>Wi-Fi Test Suite Software .....</i>	9
2.2	AUTHENTICATION SERVER.....	9
2.3	BASIC SYSTEM TEST CONFIGURATION .....	9
<b>3</b>	<b>IMPLEMENTATION REQUIREMENTS FOR WFA CERTIFICATION .....</b>	<b>10</b>
<b>4</b>	<b>ACCESS POINT TESTING .....</b>	<b>11</b>
<b>5</b>	<b>STATION TESTING.....</b>	<b>12</b>
5.1	CONFIGURABILITY OF TESTS .....	12
5.1.1	<i>General Configurability Tests.....</i>	12
5.1.2	<i>Security Configurability Tests.....</i>	12
5.2	INFRASTRUCTURE STAUT TEST CASES.....	13
5.2.1	<i>STA Out of Box (OOB).....</i>	13
5.2.2	<i>STA WPA2 Initial Ping Interoperability Test.....</i>	13
5.2.3	<i>AP &amp; STA Association and Throughput, Honoring NAV .....</i>	13
5.2.4	<i>AP &amp; STA Association and Throughput using Fragmentation .....</i>	13
5.2.5	<i>Mixed 802.11b/g Interoperability STA Testing .....</i>	13
5.2.6	<i>Mixed 802.11b/g Interoperability STA Testing with WPA2-PSK .....</i>	13
5.2.7	<i>Mixed 802.11b/g Interoperability STA Testing with WEP or PSK Security .....</i>	13
5.2.8	<i>Mixed 802.11b/g Interoperability STA Testing with WPA2-Enterprise .....</i>	13
5.2.9	<i>AP &amp; STA Association &amp; Throughput using WPA2-PSK .....</i>	13
5.2.10	<i>AP &amp; STA Association and Throughput using WPA2-Enterprise .....</i>	13
5.2.11	<i>AP &amp; STA Association &amp; Throughput with Replay Counter Processing.....</i>	13
5.2.12	<i>AP &amp; STA Association and Throughput using WEP.....</i>	13
5.2.13	<i>AP &amp; STA Association and Throughput using WPA2 with Fragmentation .....</i>	13
5.2.14	<i>Group Traffic Transmission/Reception with WPA/WPA2-PSK Mixed Mode .....</i>	14
5.2.15	<i>Pre-authentication.....</i>	14
5.2.16	<i>PMK Caching .....</i>	14
5.2.17	<i>WPA Specific Countermeasures – Legacy WPA Only Mode .....</i>	14
5.2.18	<i>WPA Specific Countermeasures – WPA2/WPA Mixed Mode .....</i>	14
5.2.19	<i>WPA2 Negative Tests – Non-association with an AP not using WPA2 .....</i>	14
5.2.20	<i>WPA2 Negative Tests – Non-association with PSK-Configured Station .....</i>	14
5.2.21	<i>WPA2 Negative Tests – Non-association with a TLS-Configured Station .....</i>	14
5.2.22	<i>802.11h Testing – Spectrum Management Bit .....</i>	15
5.2.23	<i>802.11h Testing – Channel Switch Test .....</i>	15
5.2.24	<i>Extended EAP Tests (Enterprise STAs Only).....</i>	15
5.2.25	<i>Removed.....</i>	15

5.2.26	<i>Roaming Test for Single &amp; Dual Band STAs with WPA2-PSK</i>	15
5.2.27	<i>Traffic Differentiation in Single BSS with 802.11n STA</i>	16
5.2.28	<i>Traffic Differentiation in Single BSS with 2 802.11n STAs</i>	16
5.2.29	<i>Traffic Differentiation in Single BSS with WMM STA</i>	16
5.2.30	<i>Traffic Differentiation in Single BSS with Legacy non-WMM STA</i>	16
5.2.31	<i>Test ACM Bit Conformance</i>	16
5.2.32	<i>Test the AC Parameter Modification</i>	17
5.2.33	<i>TXOP Limit Test</i>	18
5.2.34	<i>STAUT “No Acknowledgement” Test</i>	18
5.2.35	<i>Basic Association in 802.11n Environment</i>	20
5.2.36	<i>Ability to Receive 1 and 2 Spatial Streams</i>	20
5.2.37	<i>A-MPDU Aggregation when the STA is the Recipient with and without WPA2-PSK</i>	20
5.2.38	<i>A-MSDU Aggregation when the STA is the Recipient</i>	20
5.2.39	<i>Overlapping BSS – 2.4 GHz</i>	20
5.2.40	<i>Overlapping BSS – 5 GHz</i>	20
5.2.41	<i>HT-Greenfield Operation</i>	20
5.2.42	<i>Short GI Operation</i>	20
5.2.43	<i>Overlapping BSS on the Extension Channel</i>	20
5.2.44	<i>HT Duplicate Mode (MCS Index = 32)</i>	20
5.2.45	<i>RIFS Test</i>	20
5.2.46	<i>STBC Receive Test</i>	21
5.2.47	<i>A-MPDU Aggregation when the STA is the Transmitter</i>	21
5.2.48	<i>STA 20/40 MHz Coexistence</i>	21
5.2.49	<i>Ability to Receive 3 Spatial Streams</i>	21
5.2.50	<i>STAUT Transmitting to AP using Supported Number of Spatial Streams</i>	21
5.2.51	<i>Disallow TKIP with HT Rates Test</i>	22
5.2.52	<i>STA Negative tests to ensure WEP is not used with HT associations in 11n devices</i>	22
5.2.53	<i>Support for WPA2/AES if WPA/TKIP is supported</i>	22
5.2.54	<i>removed</i>	22
5.2.55	<i>OOB-STAUT association (Testbed AP: PMF enabled, supports SHA-1 only)</i>	22
5.2.56	<i>removed</i>	22
5.2.57	<i>removed</i>	22
5.2.58	<i>removed</i>	22
5.2.59	<i>removed</i>	22
5.2.60	<i>Access Point without 1 and 2 Mbps in the basic rate sets in the 2.4 GHz band</i>	22
5.3	<b>IBSS STAUT TEST CASES</b>	23
5.3.1	<i>IBSS Test</i>	23
5.3.2	<i>IBSS WEP On &amp; Off Test</i>	23
5.3.3	<i>IBSS Rejoin Test</i>	25
6	<b>APPENDIX A: TEST BED PRODUCTS</b>	26
7	<b>APPENDIX B: TESTING NOTES</b>	26
8	<b>APPENDIX C: CHANNEL FREQUENCIES</b>	26
9	<b>APPENDIX D: DEFAULT WMM AC PARAMETERS</b>	26
10	<b>APPENDIX E: THRESHOLD VALUES</b>	27
11	<b>APPENDIX F: WPA2 INTEROPERABILITY TEST CASE</b>	29
12	<b>APPENDIX G: WMM INTEROPERABILITY TEST CASE</b>	29
13	<b>APPENDIX H: TRAFFIC DESCRIPTION</b>	29
14	<b>APPENDIX I: ACKNOWLEDGMENTS</b>	29

## List of Tables

Table 1: Broadcast/Multicast Transmission/Reception with WPA2-PSK Mode Procedure and Results....	14
Table 2: Traffic Differentiation in Single BSS with Legacy non-WMM STA Procedure and Results .....	16
Table 3: Test ACM Bit Conformance Procedure and Results .....	17
Table 4: Test the AC Parameter Modification Procedure and Results .....	18
Table 5: STAUT “No Acknowledgement” Test Procedure and Results .....	19
Table 6: RIFS Test Configurations.....	21
Table 7: RIFS Operation Configuration.....	21
Table 8: RIFS Operation Procedure and Results .....	21
Table 9: IBSS Scanning Test Procedure and Results .....	23
Table 10: IBSS WEP On & Off Test Procedure and Results.....	24

# 1. Overview

Unchanged from the base test plan

## 1.1 Terms and Definitions

Unchanged from the base test plan

## 1.2 Definition of Devices Under Test (DUT)

The DUT is an application of IoT (Internet of Thing) that has limited resource OS.

**This ASD test plan is an 11N test plan.**

### 1.2.1 Access Points Under Test (APUTs)

Unchanged from the base test plan

### 1.2.2 Stations Under Test (STAUTs)

Unchanged from the base test plan

### 1.2.3 Applicability of Tests

The DUT doesn't support Multicast, 5.2.14 is modified to Broadcast instead which later explained in section 5.

The DUT does not support multi-stream, 5.2.27, 5.3.2 step 4 and 5 are removed and 5.2.30, 5.2.31, 5.2.34, 5.3.1, 5.3.2 step 3 are modified which explained in section 5.

The DUT does not support 30000 bytes for RIFS, it's replaced to 10000 bytes and the number of pings is increased to 300.

### 1.2.4 Testing Scenarios

Unchanged from the base test plan

## 2 Test Tools, Methodology, and Approach

### 2.1.1 Sniffers

Unchanged from the base test plan

### 2.1.2 Test Notes

Unchanged from the base test plan

### 2.1.3 Scripts

Since WTS is not used in the ASD test plan to generate data traffic to/from the STAUT, it needs to be defined how a similar traffic scenario can be achieved with the IPERF tool. However, WTS must be used for all the setups for the test bed devices.

It can execute iperf command on DUT.

#### FILESNDL

Server side: iperf -s

Client side: lperf -c <server IP > -t <sec.>

#### FILESNDL(UDP)

Server side: iperf -s -u

Client side: lperf -c <server IP > -u -t <sec.>

#### FILESNDL-HT, High Performance

Server side: iperf -s

Client side: lperf -c <server IP > -t <sec.>

#### FILESNDL-HT (UDP)

Server side: iperf -s -u

Client side: lperf -c <server IP > -u -b 30M -t <sec.>

#### FILESNDL-HT (UDP) with TID 5

Server side: iperf -s -u

Client side: lperf -c <server IP > -u -S 160 -b 30M -t <sec.>

#### INQUIRYL

Server side: iperf -s

Client side: lperf -c <server IP address> -d -t <sec.>

#### INQUIRYL (UDP)

Server side: iperf -s -u

Client side: lperf -c <server IP address> -d -t <sec.> -u

#### INQUIRYL-Replay

Server side: iperf -s -u -n 7M

Client side: lperf -c <server IP address> -d -u -n 7M

#### IPTVxMbps

Receiver: iperf -s -u -i 2 -p <port no.>



Transmitter: iperf -c <Receiver IP > -u -i 2 -S < TOS value> -t 20 -b <bandwidth> -p <port no.>  
**IPTVxMbpsDelay10sec** --- Delay execution after 10s than RTP1/2

Receiver: iperf -s -u -i 2 -p <port no.>

Transmitter: iperf -c <Receiver IP > -u -i 2 -S < TOS value> -t 10 -b <bandwidth> -p <port no.>

Below defines how to link the access categories to the Iperf TOS values by using DSCP:

Mapping Access categories to TOS values

**Access Category TOS value**

BE 0x60 (96)

BK 0x20 (32)

VI 0xA0 (160)

VO 0xE0 (224)

## 2.1.4 Wi-Fi Test Suite Software

Unchanged from the base test plan

## 2.2 Authentication Server

Unchanged from the base test plan

## 2.3 Basic System Test Configuration

Unchanged from the base test plan

---

### **3 Implementation Requirements for WFA Certification**

Unchanged from the base test plan

## **4 Access Point Testing**

Not Applicable.

## **5 Station Testing**

All ECNs to the base test plan that have come after the approval of the original ASD plan shall be applied to both ASD plans before any testing is performed.

### **5.1 Configurability of Tests**

#### **5.1.1 General Configurability Tests**

Unchanged from the base test plan

#### **5.1.2 Security Configurability Tests**

Unchanged from the base test plan

## **5.2 Infrastructure STAUT Test Cases**

Unchanged from the base test plan

### **5.2.1 STA Out of Box (OOB)**

Unchanged from the base test plan

### **5.2.2 STA WPA2 Initial Ping Interoperability Test**

Unchanged from the base test plan

### **5.2.3 AP & STA Association and Throughput, Honoring NAV**

Unchanged from the base test plan

### **5.2.4 AP & STA Association and Throughput using Fragmentation**

Unchanged from the base test plan

### **5.2.5 Mixed 802.11b/g Interoperability STA Testing**

Unchanged from the base test plan

### **5.2.6 Mixed 802.11b/g Interoperability STA Testing with WPA2-PSK**

Unchanged from the base test plan

### **5.2.7 Mixed 802.11b/g Interoperability STA Testing with WEP or PSK Security**

Unchanged from the base test plan

### **5.2.8 Mixed 802.11b/g Interoperability STA Testing with WPA2-Enterprise**

Unchanged from the base test plan

### **5.2.9 AP & STA Association & Throughput using WPA2-PSK**

Unchanged from the base test plan

### **5.2.10 AP & STA Association and Throughput using WPA2-Enterprise**

Unchanged from the base test plan

### **5.2.11 AP & STA Association & Throughput with Replay Counter Processing**

Unchanged from the base test plan

### **5.2.12 AP & STA Association and Throughput using WEP**

Unchanged from the base test plan

### **5.2.13 AP & STA Association and Throughput using WPA2 with Fragmentation**

Unchanged from the base test plan

### 5.2.14 Group Traffic Transmission/Reception with WPA/WPA2-PSK Mixed Mode

Since the DUT doesn't support Multicast, it's replaced to Broadcast.

#### Purpose and Description

Unchanged from the base test plan

#### Test Environment

Unchanged from the base test plan

#### Test Configuration

Unchanged from the base test plan

#### Test Procedure and Expected Results

The following table defines the test procedures and expected results.

Steps	STAUT	Testbed 802.11ag STA1	Testbed 802.11ag AP1	Expected Results
1	Association Request	Association Request	Association Response to STAUT Association Response to STA1	If any stations fail to associate then fail
2			DHCP server assigns IP address to STAUT and STA1	If STAUT does not get assigned IP address from DHCP server, then fail.
3			Ping STAUT and STA1 from console	If the console fails to receive ping responses from the STAUT within 90 seconds then fail

**Table 1: Broadcast/Multicast Transmission/Reception with WPA2-PSK Mode Procedure and Results**

### 5.2.15 Pre-authentication

Unchanged from the base test plan

### 5.2.16 PMK Caching

Unchanged from the base test plan

### 5.2.17 WPA Specific Countermeasures – Legacy WPA Only Mode

Unchanged from the base test plan

### 5.2.18 WPA Specific Countermeasures – WPA2/WPA Mixed Mode

Unchanged from the base test plan

### 5.2.19 WPA2 Negative Tests – Non-association with an AP not using WPA2

Unchanged from the base test plan

### 5.2.20 WPA2 Negative Tests – Non-association with PSK-Configured Station

Unchanged from the base test plan

### 5.2.21 WPA2 Negative Tests – Non-association with a TLS-Configured Station

Unchanged from the base test plan

#### **5.2.22 802.11h Testing – Spectrum Management Bit**

Unchanged from the base test plan

#### **5.2.23 802.11h Testing – Channel Switch Test**

Unchanged from the base test plan

#### **5.2.24 Extended EAP Tests (Enterprise STAs Only)**

Unchanged from the base test plan

#### **5.2.25 Removed**

#### **5.2.26 Roaming Test for Single & Dual Band STAs with WPA2-PSK**

Unchanged from the base test plan

**5.2.27 Traffic Differentiation in Single BSS with 802.11n STA**

Not Applicable

Since the DUT doesn't support multi-streams, 5.2.27 is not applicable.

**5.2.28 Traffic Differentiation in Single BSS with 2 802.11n STAs**

Unchanged from the base test plan

**5.2.29 Traffic Differentiation in Single BSS with WMM STA**

Unchanged from the base test plan

**5.2.30 Traffic Differentiation in Single BSS with Legacy non-WMM STA**

Since the DUT doesn't support multi-streams and STA1's WMM is off. Step 4 and 6 are not applicable.

**Purpose and Description**

Unchanged from the base test plan

**Test Environment**

Unchanged from the base test plan

**Test Procedure and Expected Results**

The following table defines the test procedures and expected results.

Steps	STAUT	Testbed 802.11a/b/g non-WMM STA1	Testbed 802.11n AP in legacy mode with WMM	Expected Results
0				
1	-	-	Beacon	
2	Probe Request	Probe Request	Probe Response	SN: If a Probe Request occurs and STAUT Probe Request contains any WMM element, Fail
3	Association Request	Association Request	Association Response	SN: If STAUT Association Request contains WMM information element AND STA Associated, PASS
4	Not Applicable			
5	Transmit RTP2_VI	Transmit RTP1_BE RTP3_BE	Receive RTP1_BE RTP2_VI RTP3_BE	CH: Receive Data RTP1, RTP2, RTP3 If RTP2 in second phase (11~19s) is 90% or more than RTP2 in first phase (1~9s), PASS
6	Not Applicable			

**Table 2: Traffic Differentiation in Single BSS with Legacy non-WMM STA Procedure and Results****5.2.31 Test ACM Bit Conformance**

Since the DUT doesn't support multi-streams, step 4 is modified.

**Purpose and Description**

Unchanged from the base test plan



**Test Environment**

Unchanged from the base test plan

**Test Configuration**

Unchanged from the base test plan

**Test Procedure and Expected Results**

The following table defines the test procedures and expected results.

Steps	STAUT	Testbed 802.11a/b/g WMM Capable STA1	Testbed 802.11a/b/g WMM Capable AP	Expected Results
1	-	-	Beacon	
2	Probe Request	Probe request	Probe Response	(Probe requests are optional)
3	Association Request	Association Request	Association Response	
4	Transmit RTP2_VI	Transmit RTP1_BE, RTP3_BE	Receive RTP1_BE, RTP2_VI, RTP3_BE	CH: Receive Data RTP1, RTP2, RTP3 If RTP2 in second phase (11~19s) is 115% or less than RTP1 in second phase (11~19s), or if RTP2 in second phase (11~19s) is 115% or less than RTP3 in second phase (11~19s), PASS  SN: No packets shall be transmitted with QoS level AC_VI.

**Table 3: Test ACM Bit Conformance Procedure and Results**

**5.2.32 Test the AC Parameter Modification**

Since the DUT doesn't support multi-streams, step 4 is modified.

**Purpose and Description**

Unchanged from the base test plan

**Test Environment**

Unchanged from the base test plan

**Test Configuration**

Unchanged from the base test plan

**Test Procedure and Expected Results**

The following table defines the test procedures and expected results.

Steps	STAUT	Testbed 802.11a/b/g WMM Capable STA1	Testbed 802.11a/b/g WMM Capable AP	Expected Results
1	-	-	Beacon	
2	Probe Request	Probe request	Probe Response	(Probe requests are optional)
3	Association Request	Association Request	Association Response	
4	Transmit RTP2_VI	Transmit RTP1_BE, RTP3_BE	Receive RTP1_BE, RTP2_VI	CH: Receive Data RTP1, RTP2, RTP3

			RTP3_BE	If RTP2 in second phase (11~19s) is 115% or less than RTP1 in second phase (11~19s), and if RTP2 in second phase (11~19s) is 115% or less than RTP3 in second phase (11~19s), PASS
--	--	--	---------	---

**Table 4: Test the AC Parameter Modification Procedure and Results****5.2.33 TXOP Limit Test**

Unchanged from the base test plan

**5.2.34 STAUT “No Acknowledgement” Test**

Since the DUT doesn't support multi-streams, step 4 and 6 are modified.

**Purpose and Description**

Unchanged from the base test plan

**Test Environment**

Unchanged from the base test plan

**Test Configuration**

Unchanged from the base test plan

**Test Procedure and Expected Results**

The following table defines the test procedures and expected results.

Steps	STAUT	Testbed 802.11a/b/g WMM Capable AP	Expected Results
1	-	Beacon	
2	Probe request	Probe Response	(Probe requests are optional)
3	Association Request	Association Response	
4	Receive RTP1_BE	Transmit RTP1_BE	SN: QoS Data frame Verify ACK policy bits are set to "Acknowledge" in packets from AP. If STAUT generates ACK packets, PASS. CH: Receive Data RTP1 Record values of RTP1 throughput
5		Configure the testbed AP to set the "ACK policy" field to "012" (no acknowledgement) in QoS Control frames for all AC (see § 2.1.6 in [2].	
6	Receive RTP1_BE,	Transmit RTP1_BE	SN: QoS Data frame Verify ACK policy bits are set to "No Acknowledge" in packets from AP. If STAUT does not generate ACK packets, PASS. CH: Receive Data RTP1 If RTP1-T06/RTP1-T04 $\geq$ 88%, PASS

**Table 5: STAUT "No Acknowledgement" Test Procedure and Results**

**5.2.35 Basic Association in 802.11n Environment**

Unchanged from the base test plan

**5.2.36 Ability to Receive 1 and 2 Spatial Streams**

Unchanged from the base test plan

**5.2.37 A-MPDU Aggregation when the STA is the Recipient with and without WPA2-PSK**

Unchanged from the base test plan

**5.2.38 A-MSDU Aggregation when the STA is the Recipient**

Unchanged from the base test plan

**5.2.39 Overlapping BSS – 2.4 GHz**

Unchanged from the base test plan

**5.2.40 Overlapping BSS – 5 GHz**

Unchanged from the base test plan

**5.2.41 HT-Greenfield Operation**

Unchanged from the base test plan

**5.2.42 Short GI Operation**

Unchanged from the base test plan

**5.2.43 Overlapping BSS on the Extension Channel**

Unchanged from the base test plan

**5.2.44 HT Duplicate Mode (MCS Index = 32)**

Unchanged from the base test plan

**5.2.45 RIFS Test****Purpose and Description**

Unchanged from the base test plan

**Test Environment**

Unchanged from the base test plan

**Test Configuration**

The DUT doesn't support 30,000 bytes for RIFS.

Run test for 300 pings with length of 10,000 bytes

The test is run multiple times with the testbed RIFS transmitter as outlined in table 258.

2.4 GHz single band devices use row 1, 5 GHz single band devices use row 2, and dual band devices use row 3.

Device Capability	Broadcom AP RIFS Tx
2.4 GHz, 20 MHz	Run test in 20 MHz
5 GHz, 20 MHz, 40 MHz, 20/40 MHz	Run test in 20/40 MHz

2.4 GHz & 5 GHz, 20 MHz, 40 MHz, 20/40 MHz	Run test in 5 GHz, 20/40 MHz
--	------------------------------

**Table 6: RIFS Test Configurations**

Parameter	802.11n AP	STAUT Values
Vendor	Broadcom 11n	-
ESSID	R1F5%	R1F5%
AP Control Channel	1 or 36	-

**Table 7: RIFS Operation Configuration****Test Procedure and Expected Results<sup>1</sup>**

The following table defines the test procedures and expected results.

Steps	Testbed 802.11n 20/40 MHz Capable AP	802.11n STAUT	Expected Results
1	Use MCS 4 for single stream devices and MCS 12 for non single stream devices  Switch off all the optional features. Disable AMPDU and AMSDU aggregation. Configure the AP to reject any ADDBA request by sending ADDBA response with status DECLINE.		
2	Association Response to STAUT	Association Request	
3	Start a long packet ping to Endpoint 1. Ping xx.xx.xx.xx -l 10000 -v 160 -n 300		The number of lost pings should be less than 30%  SN. Check that there are no ACKs during RIFS frame sequence

**Table 8: RIFS Operation Procedure and Results****5.2.46 STBC Receive Test**

Unchanged from the base test plan

**5.2.47 A-MPDU Aggregation when the STA is the Transmitter**

Unchanged from the base test plan

**5.2.48 STA 20/40 MHz Coexistence**

Unchanged from the base test plan

**5.2.49 Ability to Receive 3 Spatial Streams**

Unchanged from the base test plan

**5.2.50 STAUT Transmitting to AP using Supported Number of Spatial Streams**

Unchanged from the base test plan

<sup>1</sup>For 1x1 devices use MCS 4

### **5.2.51 Disallow TKIP with HT Rates Test**

Unchanged from the base test plan

### **5.2.52 STA Negative tests to ensure WEP is not used with HT associations in 11n devices**

Unchanged from the base test plan

### **5.2.53 Support for WPA2/AES if WPA/TKIP is supported**

Unchanged from the base test plan

### **5.2.54 removed**

### **5.2.55 OOB-STAUT association (Testbed AP: PMF enabled, supports SHA-1 only)**

Unchanged from the base test plan

### **5.2.56 removed**

### **5.2.57 removed**

### **5.2.58 removed**

### **5.2.59 removed**

### **5.2.60 Access Point without 1 and 2 Mbps in the basic rate sets in the 2.4 GHz band**

Unchanged from the base test plan

### 5.3 IBSS STAUT Test Cases

Unchanged from the base test plan

#### 5.3.1 IBSS Test

Since DUT doesn't support multi-streams, DT1 and DT2 need to be tested separately.

##### Purpose and Description

Unchanged from the base test plan

##### Test Environment

Unchanged from the base test plan

##### Test Configuration

Unchanged from the base test plan

##### Test Procedure and Expected Results

The following table defines the test procedures and expected results.

Steps	802.11 STAUT	STA1	Expected Results
1	Create IBSS Network Start Sniffer		-
2	-	Start IBSS Mode	STAUT responds with Basic rate enumerated in beacon message is per default channel is correct
3	Start TCP throughput FILESNDL to testbed STA 1.1, run for 90 seconds		If 1.1 throughput is less than 5.3.1SI1DT2 then fail
4		Start TCP throughput FILESNDL to STAUT 2.1, run for 90 seconds	If 2.1 throughput is less than 5.3.1SI1DT1 then fail

**Table 9: IBSS Scanning Test Procedure and Results**

#### 5.3.2 IBSS WEP On & Off Test

The DUT doesn't support multi-streams, 1.1 and 2.1 need to be tested separately.

The DUT doesn't support group traffic, step 5 and step 6 are not applicable.

##### Purpose and Description

Unchanged from the base test plan **excluding Group traffic operation**

##### Test Environment

Unchanged from the base test plan

**Test Configuration**

Unchanged from the base test plan

**Test Procedure and Expected Results**

The following table defines the test procedures and expected results.

Steps	802.11n STAUT	STA1	STA2	Expected Results
1	-	.	Create IBSS Network Start Sniffer	-
2	Start IBSS Mode	Start IBSS Mode	-	If the STAUT does not join IBSS network then fail (verify basic rate enumeration in the beacon message is the default).  If beacons not distributed evenly between participating STAs, then fail. (33% +/- 20%) (13% to 53%)
3	Start TCP throughput FILESNDL to testbed STA1 1.1 for 90 seconds		-	If 1.1 completes without errors then pass
		Start TCP throughput FILESNDL to STAUT 2.1 for 90 seconds		If 2.1 completes without errors then pass
4	Not Applicable			
5	Not Applicable			

**Table 10: IBSS WEP On & Off Test Procedure and Results**



### **5.3.3 IBSS Rejoin Test**

Unchanged from the base test plan

## **6 Appendix A: Test Bed Products**

Unchanged from the base test plan

## **7 Appendix B: Testing Notes**

Unchanged from the base test plan

## **8 Appendix C: Channel Frequencies**

Unchanged from the base test plan

## **9 Appendix D: Default WMM AC Parameters**

Unchanged from the base test plan

## 10 Appendix E: Threshold Values

The values shown in each of these tables are the thresholds that are required to pass each throughput test. When a device is running in Legacy Mode use the 1SS (1 Spatial Stream) column. If the device is required to be run for 2 SS then use this column. Finally when a device is required to run in 3 SS then use this column.

### STAUT

	iPerf (Mbps)		
STA Thresholds	1 x 1	2 x 2	3 x 3
5.2.3S1DT1	0.4	N/A	N/A
5.2.3S1DT2	0.4	N/A	N/A
5.2.3S1DT3	0.4	N/A	N/A
5.2.4S2DT1	0.4	N/A	N/A
5.2.4S2DT2	0.4	N/A	N/A
5.2.4S2DT3	0.4	N/A	N/A
5.2.5MS8GDT1	0.4	N/A	N/A
5.2.5MS8BDT1	0.4	N/A	N/A
5.2.5MS8GDT2	0.4	N/A	N/A
5.2.5MS8BDT2	0.4	N/A	N/A
5.2.5MS8GDT3	0.4	N/A	N/A
5.2.5MS8BDT3	0.4	N/A	N/A
5.2.6MS9GDT1	0.4	N/A	N/A
5.2.6MS9BDT1	0.4	N/A	N/A
5.2.6MS9GDT2	0.4	N/A	N/A
5.2.6MS9BDT2	0.4	N/A	N/A
5.2.6MS9GDT3	0.4	N/A	N/A
5.2.6MS9BDT3	0.4	N/A	N/A
5.2.7MS10GDT1	0.4	N/A	N/A
5.2.7MS10BDT1	0.4	N/A	N/A
5.2.7MS10GDT2	0.4	N/A	N/A
5.2.7MS10BDT2	0.4	N/A	N/A
5.2.7MS10GDT3	0.4	N/A	N/A
5.2.7MS10BDT3	0.42	N/A	N/A

5.2.8MS11GDT1	0.4	N/A	N/A
5.2.8MS11BDT1	0.4	N/A	N/A
5.2.8MS11GDT2	0.4	N/A	N/A
5.2.8MS11BDT2	0.4	N/A	N/A
5.2.9T3DT1	0.4	N/A	N/A
5.2.9T4DT2	0.4	N/A	N/A
5.2.9T5DT3	0.4	N/A	N/A
5.2.10T3DT1	0.4	N/A	N/A
5.2.10T4DT2	0.4	N/A	N/A
5.2.10T5DT3	0.4	N/A	N/A
5.2.12T3DT1	0.4	N/A	N/A
5.2.12T4DT2	0.4	N/A	N/A
5.2.12T5DT3	0.4	N/A	N/A
5.2.13T3DT1	0.4	N/A	N/A
5.2.13T4DT2	0.4	N/A	N/A
5.2.13T5DT3	0.4	N/A	N/A
5.2.37T4DT1	5	10	15
5.2.37T8DT1	5	10	15
5.2.38T4DT1	5	10	15
5.2.39T4DT2A	4.00	4.00	4.00
5.2.39T4DT2B	2.50	2.50	2.50
5.2.40T4DT2A	4.00	4.00	4.00
5.2.40T4DT2B	3.00	3.00	3.00
5.2.43T4DT2A	2.50	2.50	2.50
5.2.43T4DT2B	2.50	2.50	2.50
5.2.47T3DT1	5		
5.2.47T6DT1		10	
5.2.47T9DT1			15
5.3.1SI1DT1	0.4		

5.3.1SI1DT2

0.4

## 11 Appendix F: WPA2 Interoperability Test Case

Unchanged from the base test plan

## 12 Appendix G: WMM Interoperability Test Case

Unchanged from the base test plan

## 13 Appendix H: Traffic description

Unchanged from the base test plan

## 14 Appendix I: Acknowledgments

Unchanged from the base test plan

*- End -*