

Ruijie Networks – Innovation Beyond Networks

# Ruijie WLAN PoC Guide (V1.1)

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## Preface

This document providing technical guidance to help engineers testing RG-WLAN products. This document may contain scenario, configuration, command, screenshot image, topology and any related material. This document may not help to solve a similar case due any differences in the real conditions.

#### Audience

- Network Engineers
- Network Administrator

#### **Obtain Technical Assistance**

- Ruijie Networks Websites: <u>http://www.ruijienetworks.com</u>
- Ruijie Service Portal: <u>http://caseportal.ruijienetworks.com</u>

Welcome to report error and give advice in any Ruijie manual to Ruijie Service Portal

#### **Revision History**

Date	Change contents	Reviser
2019.10	Initial publication V1.0	Nick Chen
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## **Test Items Summary**

Category	Test Item	Description	Pass	Fail
	Control Forwarding	The test AP establishes CAPWAP		
	Central Forwarding	tunnel with the AC using Central		
		The test AP establishes CAPWAP		
Basic Setup	Local Forward	tunnel with the AC using Local		
		Forwarding mode		
	Fat Mode	AP switches to FAT mode and		
	Fat Mode	broadcast SSIDs		
		Limit the average data rate and		
	Rate Limit	burst data rate to each wireless		
		user connected to the AP		
	Wireless Bridge	A wireless tunnel will be		
	wireless bridge	established between 2 APs		
Common Eurotion	AD Load Palanco	Load balancing based on the		
	AP LOOU BAIAIICE	number of users		
	Romoto Intelligent Percentive	When the CAPWAP tunnel between		
		AP and AC is down, the AP is still		
	recinology (KIPT)	able to transfer user data normally		
	AC Virtualization (VAC)	Multiple ACs will be virtualized into		
	AC VIITUAIIZATION (VAC)	one logical AC		
	Wireless Encryption	Wireless user needs to input		
		password when connect to wireless		
		network.		
		Different STAs uses different		
	Private Pre-Shared Key (PPSK)	passwords to connect the same		
		SSID		
		When blacklist is enabled, STAs		
		within the blacklist cannot access		
	Blacklist & Whitelist	the wireless network. When		
Security Function		whitelist is enabled, only STAs		
		within the whitelist ca access the		
		wireless network.		
		Ruijie AP interferes with STAs		
	AP Countermeasure	connecting to APs from other		
		vendors		
	User Isolation	Wireless users connect to same AP		
		cannot get access to each other		
	802.1x Authentication	802.1x authentication is required to		
		connect the wireless network		

	Web Authentication	Web authentication is required to		
		connect the wireless network		
Borformanco	AD Throughput Parformanco	Test the AP's max throughput		
Ferrormance	Ar moughput renormance	performance		
WiFi6 AP Throughput		Test the AP's max throughput		
	Performance	performance		
Multi-Users Throughput		Test the Multi-Users throughput		
Performance		performance		
Multi-Users video		Test the Multi-Users video		
performance		performance		

Note: Before PoC, please ensure all the test devices have been upgraded to the latest version.

## **Test Content**

## 1. Basic Setup

### **1.1 Central Forwarding**

Test Item	Central Forwarding					
Description	The test AP establishes CAPWAP tunnel with the AC using Central Forwarding mode					
	Topology:         Image: Accord and the problem of the					
Test Procedure	Procedure:					
	1) Configure AC					
	Step1: config Vlan, include user vlan and interconnect vlan,					
	Ruijie>enable					
	Ruijie#configure terminal					
	Ruijie(config)#vlan 20>user vlan					
	Ruijie(config-vlan)#name sta					
	Ruijie(config-vlan)#exit					
	Ruijie(config)#vlan 30>user vlan					

Ruijie(config-vlan)#name sta
Ruijie(config-vlan)#exit
Ruijie(config)#vlan 40>interconnect vlan for ac and sw1
Ruijie(config-vlan)#exit
Ruijie(config)#interface vlan 20>user interface vlan(must config)
Ruijie(config-int-vlan)#ip add 192.168.20.2 255.255.255.
Ruijie(config)#interface vlan 30>user interface vlan(must config)
Ruijie(config-int-vlan)#ip add 192.168.30.2 255.255.255.0
Ruijie(config-int-vlan)#exit
Step2: Config ssid (multi ssid)
Ruijie(config)#wlan-config 1 Ruijie1
Ruijie(config-wlan)#enable-broad-ssid>enable broadcast ssid
Ruijie(config-wlan)#exit
Ruijie(config)#wlan-config 2 Ruijie2
Ruijie(config-wlan)#enable-broad-ssid>enable broadcast ssid
Ruijie(config-wlan)#exit
Step3: Config ag-group
Ruijie(config)#ap-group default
Ruijie(config-ap-group)#interface-mapping 1 20>associate wlan-
config 1 with user vlan 30
Ruijie(config-ap-group)#interface-mapping 2 30>associate
wian-config 2 with user vian 30
Ruijie(config-ap-group)#exit
Step4. Config svi and routing
Ruijie/config)#ip route $0.0.0.0.0.0.192168401$ >default routing
to sw1
Ruijie(config)#interface vlan 40
Ruijie(config-int-ylan)#ip address 192 168 40 2 255 255 255 0
Ruijie(config-int-vlan)#exit
Ruijie(config)#interface loopback 0
Ruijie(config-int-loopback)#ip address 1.1.1.1 255.255.255.0>AC
initialize CAPWAP tunnel setup from loopback 0 interface
Ruijie(config-int-loopback)#exit
Ruijie(config)#interface GigabitEthernet 0/1
Ruijie(config-int-GigabitEthernet 0/1)#switchport mode trunk
->connect to sw1, trunk port, allow user vlan, AP vlan, AC-to-SW1
vlan
Step5: Save config
Ruijie(config-int-GigabitEthernet 0/1)#end
Ruijie#write

2) Configure core switch(SW1)
Step1: Vlan config, config user vlan, ap vlan and interconnect vlan
Ruijie>enable
Ruijie#configure terminal
Ruijie(config)#vlan 10>ap vlan
Ruijie(config-vlan)#exit
Ruijie(config)#vlan 20>user vlan
Ruijie(config-vlan)#exit
Ruijie(config)#vlan 30>user vlan
Ruijie(config-vlan)#exit
Ruijie(config)#vlan 40>interconnect vlan with AC
Ruijie(config-vlan)#exit
Step2: Config interface and svi
Ruijie(config)# interface GigabitEthernet 0/1
Ruijie(config-int-GigabitEthernet 0/1)#switchport mode trunk
->uplink port, connect to AC, trunk port,allow user vlan、AP vlan、AC-
to-SW1 vlan
Ruijie(config-int-GigabitEthernet 0/1)#exit
Ruijie(config)#interface GigabitEthernet 0/2
Ruijie(config-int-GigabitEthernet 0/2)#switchport mode trunk
->downlink port, connect to SW2,trunk port,allow user vlan、AP vlan
Ruijie(config-int-GigabitEthernet 0/2)#exit
Ruijie(config)#interface vlan 10>ap gateway
Ruijie(config-int-vlan)#ip address 192.168.10.1 255.255.255.0
Ruijie(config-int-vlan)#interface vlan 20>sta gateway
Ruijie(config-int-vlan)#ip address 192.168.20.1 255.255.255.0
Ruijie(config-int-vlan)#interface vlan 30>sta gateway
Ruijie(config-int-vlan)#ip address 192.168.30.1 255.255.255.0
Ruijie(config-int-vlan)#interface vlan 40>interconnect with ac
Ruijie(config-int-vlan)#ip address 192.168.40.1 255.255.255.0
Ruijie(config-int-vlan)#exit
Step3: Conifg ip dhcp server
Ruijie(config)#service dhcp
Ruijie(config)#ip dhcp pool ap_ruijie>create dhcp pool for ap,pool
name is ap_ruijie
Ruijie(config-dhcp)#option 138 ip 1.1.1.1>config option 138,
assign ac loopaback 0 ip address
Ruijie(config-dhcp)#network 192.168.10.0 255.255.255.0>assign
these address to ap
Ruijie(config-dhcp)#default-route 192.168.10.1>assign the gateway
to ap

Ruijie(config-dhcp)#exit
Ruijie(config)#ip dhcp pool user_ruijie1>create dhcp pool for
sta,pool name is user_ruijie
Ruijie(config-dhcp)#network 192.168.20.0 255.255.255.0>assign
these address to sta
Ruijie(config-dhcp)#default-route 192.168.20.1>assign the gateway
to sta
Ruijie(config-dhcp)#dns-server 8.8.8.8>assign the dns to sta
Ruijie(config-dhcp)#exit
Ruijie(config)#ip dhcp pool user_ruijie2>create dhcp pool for
sta,pool name is user_ruijie
Ruijie(config-dhcp)#network 192.168.30.0 255.255.255.0>assign
these address to sta
Ruijie(config-dhcp)#default-route 192.168.30.1>assign the gateway
to sta
Ruijie(config-dhcp)#dns-server 8.8.8.8>assign the dns to sta
Ruijie(config-dhcp)#exit
Step4: Config static routing
Ruijie(config)#ip route 1.1.1.1 255.255.255.255 192.168.40.2
->config static route, route to AC loopback0
Step5: Save configuration
Ruijie(config)#exit
Ruijie#write
3) Configure access switch (SW2)
Step1: Config vlan, create ap vlan
Ruijie>enable
Ruijie#configure terminal
Ruijie(config)#vlan 10
Ruijie(config-vlan)#exit
Step2: Config interface
Ruijie(config)#interface GigabitEthernet 0/1
Ruijie(config-int-GigabitEthernet 0/1)#switchport access vlan 10
->connect to AC, access port, allow ap vlan
Ruijie(config-int-GigabitEthernet 0/1)#exit
Ruijie(config)#interface GigabitEthernet 0/2
Ruijie(config-int-GigabitEthernet 0/2)#switchport mode trunk
->connect to SW1, trunk port
Step3: Save configuration
Ruijie(config-int-GigabitEthernet 0/2)#end
Ruijie#write

	1) STA will be able to connect to the SSID					
	2) The AP and AC CAPWAP tunnel is established:					
	Ruijie#show ap-config summary					
	======================================					
	Radio: E = enabled, D = disabled, N = Not exit	ist				
	Current Sta number					
Expected Result:	Channel: * = Global					
•	Power Level = Percent					
	Online AP number: 1					
	Omine AP number: 0	ID A LL		D // 4	D	
	AP Name	IP Address	Mac Address	Radio 1	Radio 2	
	Up/Off time State					
		192.168.10.2	1414.4b13.c2	248 E 1	 6 <u>*100</u> E 0	153*
	100 0:09:04:28 Run					
Test Conclusion:						

## **1.2 Local Forwarding**

Test Item	Local Forwarding				
Description	The test AP establishes CAPWAP tunnel with the AC using Local				
Description	Forwarding mode				
	Procedure:				
	1) The AP establishes CAPWAP Tunnel with the AC (See above test				
	procedure)				
	2) Configure the access switch				
	POESwtich(config)#interface gigabitEthernet 0/2> the port connects to				
	AP				
	POESwtich(config-GigabitEthernet 0/2)#switchport mode trunk				
	POESwtich(config-GigabitEthernet 0/2)#switchport trunk native vlan 10				
	->10 is AP's management Vlan				
	POESwtich(config-GigabitEthernet 0/2)#switchport trunk allowed vlan				
Test Procedure	remove 1-9,11-19,21-4094>Prune all VLANs except for AP				
	management Vian and user data Vian				
	3) Configure the AC				
	AC(config)#wlan-config 1 ruijie				
	AC(config-wlan)#tunnel local>enable local forwarding in WLAN 1				
	AC(config)#ap-group ruijie				
	AC(config-ap-group)#no interface-mapping 1 10>all wireless user				
	under this ap-group will be forced offline				
	AC(config-ap-group)#interface-mapping 1 10>Reassociate WLAN ID				
	and VLAN ID to make configuration effect				

Europeted Deputy	The PoE Switch learns the MAC address of wireless users on the downlink port that connects to AP (on Central forwarding mode, the access switch won't learn the user's MAC address since the user data is encapsulated in CAPWAP tunnel)			
Expected Result:	POESWIIC	n(config)#snow mac-	address-tat	Die
	10 10 10 10 10 20 30 30 30	0000.5e00.0101 001a.a972.9dce 001a.a9bc.179f 0026.c763.3310 0811.9692.244c 001a.a94e.d52a 0000.5e00.0101 001a.a97e.9dce 001a.a9bc.179f	DYNAMIC DYNAMIC DYNAMIC DYNAMIC DYNAMIC DYNAMIC DYNAMIC DYNAMIC DYNAMIC	GigabitEthernet 0/1 GigabitEthernet 0/1 GigabitEthernet 0/3 GigabitEthernet 0/2 GigabitEthernet 0/2 GigabitEthernet 0/2 GigabitEthernet 0/1 GigabitEthernet 0/1 GigabitEthernet 0/3
Test Conclusion:				

## 1.3 Fat Mode

Test Item	Fat Mode					
Description	AP switches to FAT mode and broadcast SSIDs					
	Topology:	Access sv	Trunk G 0/1 G 0/1 witch			
Test Procedure	Procedure:	SSID ruijie1 ruijie2	vlan vlan10 vlan20	IP subnet 172.16.10.0/24 172.16.20.0/24		
	Step1: Connect console					
	Default pass	word: ruijie				
	Step2: Set AP i Default mode Ruijie>ap-mc Step3: Create	mode fat e: fit ode fat e VLAN and dho	cp server (ignore dł	ncp configuration when using		
	other dhcp server)					
	Ruijie>enable					

Ruijie#configure terminal
Ruijie(config)#vlan 1
Note: VLAN 1 is only of local meaning
Ruijie(config-vlan)#vlan 10>create user vlan10
Ruijie(config-vlan)#vlan 20>create user vlan20
Ruijie(config)#service dhcp>enable dhcp service
Ruijie(config)#ip dhcp excluded-address 172.16.10.253 172.16.10.254 -
>these address will not assign to user
Ruijie(config)#ip dhcp excluded-address 172.16.20.253 172.16.20.254
Ruijie(config)#ip dhcp pool test_10>config dhcp pool named
with test_10
Ruijie(dhcp-config)#network 172.16.10.0 255.255.255.0
Ruijie(dhcp-config)#dns-server 218.85.157.99
Ruijie(dhcp-config)#default-router 172.16.10.254
Ruijie(dhcp-config)#exit
Ruijie(config)#ip dhcp pool test 20>config dhcp pool named
with test 20
Ruijie(dhcp-config)#network 172.16.20.0 255.255.255.0
Ruijie(dhcp-config)#dns-server 218.85.157.99
Ruijie(dhcp-config)#default-router 172.16.20.254
······································
Step4: Configure dot1g
Ruijie(config)#interface GigabitEthernet 0/1
Ruijie(config-if)#encapsulation dot1Q 1
Ruijie(config)#interface GigabitEthernet 0/1.10
Ruijie(config-if)#encapsulation dot10 10
Ruijie(config)#interface GigabitEthernet 0/1.20
Ruijie(config-if)#encapsulation dot10 20
Step5: Configure SSID
Ruijie(config)#dot11 wlan 10
Ruijie(dot11-wlan-config)#broadcast-ssid
Ruijie(dot11-wlan-config)#ssid ruijie1
Ruijie(config)#dot11 wlan 20
Ruijie(dot11-wlan-config)#broadcast-ssid
Ruijie(dot11-wlan-config)#ssid ruijie2
Step6: Configure Radio interface
Ruijie(config)#interface Dot11radio 1/0 1
Ruijie(config-if-Dot11radio 1/0 1)#encapsulation dot10 1
Ruijie(config)#interface Dot11radio 1/0 10
Ruijie(config-if-Dot11radio 1/0 10)#encapsulation dot10 10
-Sencansulation vian 10
Ruijie(config)#interface Dot11radio 1/0.20

Ruijie(config-if-Dot11radio 1/0.20)#encapsulatio	on dot1Q 20
Puilio(config)#interface Det41redia 2/0.40	
Ruijie(config if Det11redia 2/0.10)	in dat10.10
Rujie(conig-ii-DotTradio 2/0.10)#encapsulatio	
Ruijie(config)#iinterface Dot11radio 2/0.20	
Ruijie(config-it-Dot11radio 2/0.20)#encapsulatio	on dot1Q 20
->encapsulation vlan 20	
Step7: Associate SSID	
Ruijie(config)#interface Dot11radio 1/0	
Ruijie(config-if-Dot11radio 1/0)#wlan-id 10	
Config interface wlan id:10, SSID:ruijie1	// success log
Ruijie(config)#interface Dot11radio 1/0.1	Ū
Ruijie(config-if-Dot11radio 1/0.1)#wlan-id 20	
Config interface wlan id:20. SSID:ruiiie2	// success log
Ruijie(config)#interface Dot11radio 2/0	
Ruijie(config-if-Dot11radio 2/0)#wlan-id 10	
Config interface wian id:10 SSID:ruilie1	// success log
Puilie(config)#interface Dot11radio 2/0.1	// Success log
Puilie(config)#Interface Dot I fradio 2/0.1	
Config interface when id:20, SSID:::::::::::::::::::::::::::::::::::	
Coning interface wan id.20, 351D.ruijiez	// success log
Step8: Configure MGMT IP and routing	
Ruijie(config)#interface BVI 1>configure	MGMT IP address,vlan
1 map bvi 1	
Ruijie(config-if)#ip address 172.16.1.253 255.2	55.255.0
Ruijie(config)#interface bvi 10	
Ruijie(config-if-BVI 10)#ip address 172.16.10.2	53 255.255.255.0
Ruijie(config)#interface bvi 20	
Ruijie(config-if-BVI 20)#ip address 172.16.20.2	53 255.255.255.0
Ruijie(config)#ip route 0.0.0.0 0.0.0.0 172.16.1.	254
Ruijie(config)#end	
Ruijie#write	
Step9: Config switch	
Access_switch:	
Access_switch(config)#vlan 1	
Access_switch(config-vlan)#exit	
Access_switch(config)#interface vlan 1	
Access _switch(config-VLAN 1)#ip address 172	2.16.1.254 255.255.255.0
Access_switch(config)#interface vlan 10	
Access_switch(config-VLAN 10)#ip address 172	2.16.10.254
255.255.255.0	

	Access_switch(config)#interface vlan 20 Access_switch(config-VLAN 20)#ip address 172.16.20.254
	255.255.255.0 Access_switch(config-VLAN 20)#exit Access_switch(config)#interface gigabitEthernet 0/1 // downlink to AP
	Access_switch(config-GigabitEthernet 0/1)#switchport mode trunk Access_switch(config)#interface gigabitEthernet 0/2 //access switch uplink Access_switch(config-GigabitEthernet 0/2)#switchport mode trunk
Expected Result:	STAs are able to connect the SSID and ping to their gateway
Test Conclusion:	

## 2. Common Function

## 2.1 Rate Limit

Test Item	Rate Limit
Description	Limit the average data rate and burst data rate to each wireless user connected to the AP
	<b>Procedure:</b> 1) The AP establishes CAPWAP Tunnel with the AC (See above test procedures)
Tost Procoduro	2) Configure AC:
lest procedure	Ruijie(config)#ap-config AP
	Ruijie(config-ap)#ap-based per-user-l
	imit down-streams average-data-rate 800 burst-data-rate 1600
	Attention: The unit is 8K Bit = 1K Byte.
Expected Result:	1. Connect to wlan and have a speed test
	2. The average speed rate will be limited to 800KBps
Test Conclusion:	

## 2.2 Wireless Bridge

Test Item	Wireless Bridge
Description	A wireless tunnel will be established between 2 APs
Test Procedure	Topology:         AC         AC         AC         Star         Star         Star         AC         Star         AC         Star         AC         Star         AC         Star         AC         AC         AC         Star         AC         AC
	Index Peer IP PortState
	1 110.10.10 5246 Run
	<ul> <li>2) Configure Root-AP by using following command on controller:</li> <li>AC(config)#wlan-config 100 wds-test-root&gt;configure a special ssid for wds</li> <li>AC(config-wlan)#exit</li> <li>AC(config)#wlan-config 200 wds-test-2.4G&gt;Configure assid for 2.4g signal cover</li> <li>AC(config-wlan)#exit</li> <li>AC(config-wlan)#exit</li> <li>AC(config)#vlan 100&gt;Configure vlan for wds AP</li> </ul>
	AC(config-vlan)#exit

AC(config)#vlan 200>Configure vlan for clients
AC(config-vlan)#exit
AC(config)#int vlan 100>Configure dhcp pool for wds AP
AC(config-if-VLAN 100)#ip address 90.0.100.254 255.255.255.0
AC(config-if-VLAN 100)#exit
AC(config)#int vlan 200>Configure dhcp pool for clients
AC(config-if-VLAN 200)#ip address 90.0.200.254 255.255.255.0
AC(config-if-VLAN 200)#exit
AC(config)#ip dhcp pool vlan-100
AC(dhcp-config)#network 90.0.100.0 255.255.255.0
AC(dhcp-config)#default-router 90.0.100.254
AC(dhcp-config)#option 138 ip 10.10.10.10
AC(dhcp-config)#exit
AC(config)#ip dhcp pool vlan-200
AC(dhcp-config)#network 90.0.200.0 255.255.255.0
AC(dhcp-config)#default-router 90.0.200.254
AC(dhcp-config)#dns-server 192.168.58.110
AC(dhcp-config)#exit
AC(config)#service dhcp>enable dhcp service
AC(config)#ap-group wds> configure a new ap-group to
associate the wlan-id and vlan
AC(config-group)#interface-mapping 100 100 radio 2
AC(config-group)#interface-mapping 200 200 radio 1
AC(config-group)#exit
AC(config)#ap-config ap630> configure the AP which needs to be set as Root-AP in WDS
AC(config-ap)#ap-group wds
AC(config-ap)#station-role root-bridge bridge-wlan 1 radio 2
AC(config-ap)#end
AC#write
3) Configure the non-root Ap
Change AP to fat-mode
Ruijie#conf
Ruijie#(config)ap-mode fat
Connect AP (with ip add 192.168.110.1), and run the following command in this AP:

	Ruijie#conf
	Ruijie(config)#int dot11radio 2/0
	Ruijie(config-if-Dot11radio 2/0)#station-role non-root-bridge
	Ruijie(config-if-Dot11radio 2/0)#parent ssid wds-test-root> bridge SSID
	Ruijie(config-if-Dot11radio 2/0)#wds pre-config create
	Ruijie(config-if-Dot11radio 2/0)#exit
	Change the AP to fit mode
	Ruijie#conf
	Ruijie#(config)ap-mode fit>change AP to fit mode, then ap will reload automatically, the WDS will be set up successfully.
	1) the bridge status will be shown on the controller
	AC#show ap-config wds-bridge summary
	WS5708#sh ap-config wds-bridge-info summary Ap NameMac Address Radio Station-Role
	1414.4bc2.3156 1414.4bc2.3156 2NONROOT-BRIDGE 630wdsxia 28fb.d311.48d9 2ROOT-BRIDGE
Expected Result:	WS5708#sh ap-config wds-bridge-info 630wdsxia radio 2 WDS-MODE: ROOT-BRIDGE BRIDGE-WLAN: Status: OK WlanID 1, SSID wds-test-root, BSSID 06fb.d311.48dd
	WBI 2/0 NONROOT 0014.4bc2.315a WS5708#sh ap-config wds-bridge-info 1414.4bc2.3156 radio 2 WDS-MODE: NONROOT-BRIDGE MAC: 0014.4bc2.315a
	WBI 2/0 ROOT 06fb.d311.48dd
	2) The ping from non-root AP to root AP will be successful

	Ruijie#ping 10.10.10.10 Sending 5, 100-byte ICMP Echoes to 10.10.10.10, timeout is 2 seconds: < press Ctrl+C to break > !!!!! Success rate is 100 percent (5/5), round-trip min/avg/max = 1/4/11 ms. Ruijie#
Test Conclusion:	

## 2.3 AP load balance

Test Item	AP load balance
Description	Load balancing based on the number of users
	Topology:
	Note: AP need to broadcast the same SSID signal. Procedure:
	1) Create a number-based balancing group on the AC, named test1.
Test Procedure	Ruijie(config)#ac-controller
	Ruijie(config-ac)#num-balance-group create test1
	2) Configure the load balance threshold
	Ruijie(config-ac)#num-balance-group num test1 1> when the
	difference of more than 1 STAs on APs, the AP which carries more
	users will not response new associations.
	3) Add APs to the load balance group
	Ruijie(config-ac)#num-balance-group add test1 ap320-1>put AP
	named ap320-i into load balance group
	Ruijie(config-ac)#num-balance-group add test1 ap320-2

	1) The load balance state will be shown on AC
	Ruijie#show ac-config flow-balance summary Group State Enable Threshold Base mode AP NAME
	flow_huiyi UP 5*100kbps 4% 10 ap-mode(0) ap220-1,ap220-2
	2) Perform the following step:
	1. Before configuring the load balancing, associate STA1 and STA2 with
	the network. Run <b>show ac-config client</b> to confirm that STA1 and STA2
Expected Result:	are associated with AP1.
	2. Get STA1 and STA2 offline. Configure the load balancing group based
	on the number of users.
	3. Associate STA1 with the network. Run <i>show ac-config client</i> to confirm
	that STA1 is associated with AP1.
	4. Associate STA2 with the network. The STA2 is associated with the
	network in a short period of time. Run show ac-config client to confirm
	that STA2 is associated with AP2
Test Conclusion:	

## 2.4 Remote Intelligent Perceptive Technology (RIPT)

Test Item	Remote Intelligent Perceptive Technology (RIPT)
Description	When the CAPWAP tunnel between AP and AC is down, the AP is still able to transfer user data normally.
Test Procedure	To transfer user data normally. Topology:

	2) configure RIPT as below steps:
	1. Configure escape SSID
	Ruijie(config)#wlan-config 10 "escape SSID"
	Ruijie(config-wlan)#tunnel local
	Ruijie(config-wlan)# enable-ssid at-capwap-down
	2. Enable RIPT under AP group configuration mode
	Ruijie(config)#ap-group default
	Ruijie(config-group)#ript enable
	1. Ping the PC from STA
Expected Result:	2. Shutdown the physical interface of AC
	3. STA is still be able to ping the PC
Test Conclusion:	

## 2.5 AC Virtualization (VAC)

Test Item	AC Virtualization (VAC)				
Description	Multiple ACs will be virtualized into one logical AC				
	GO/5         GO/5           AC1         AC2				
Test Procedure	Procedure:				
	Configure the AC1:				
	AC(config)#virtual-ac domain 90 # The domain ID is a digit. The same				
	domain ID must be configured for each AC.				
	AC(config-vac-domain)#device 1 # Specify the device ID of the AC.				
	AC(config-vac-domain)#device 1 priority 100 # A higher priority indicates a				
	higher probability of being selected as the active AC.				
	AC(config-vac-domain)#exit				
	AC(config)# vac-port				

	AC(config-vac-port)#port-member interface gigabitEthernet 0/5 # Specify						
	6 card, spe	cify TE poi	rts as VS	L ports.			
	Configure the AC2						
	AC(config)#virtual-ac domain 90						
	AC(config-vac-domain)#device 2 # Specify the device ID of the AC.						
	AC(config-vac-domain)#device 2 priority 90						
	AC(config	-vac-domaii	n)#exit				
	AC(config	)# vac-port					
	AC(config	-vac-port)#p	port-memb	er interface	e gigabitE	thernet 0/	5
	Switch th	e 2 ACs to	the VAC m	ode			
	AC#write						
	AC#device convert mode virtual						
	Convert mode will backup and delete config file, and reload the switch. Are						
	you sure to continue[yes/no]:yes						
	Do you want to recover config file from backup file in virtual mode (press 'ctrl						
	+ c' to car	cel) [yes/nc	]:yes				
	Run <b>shov</b>	virtual-ac	command	d, each AC	's inform	nation will	be displayed.
Expected Result:	Device_id	Domain_id	Priority	Position	Status	Role	Description
	1(1)	90 (90)	100 (100)	LOCAL	ОК	ACTIVE	switch1-slot3
	2(2)	90 (90)	90 (90)	REMOTE	OK	STANDBY	switch1-slot4
Test Conclusion:							

## 3. Security Function

## 3.1 Wireless Encryption (WPA/WPA2)

Test Item	Wireless Encryption (WPA/WPA2)					
Description	Wireless user needs to input password when connect to wireless network.					
Test Procedure	Topology: AC1 PoE Switch AP Procedure: 1. WPA configuration WS5708(config)#wlansec 1					

	WS5708(config-wlansec)#security wpa enable				
	WS5708(config-wlansec)#security wpa ciphers aes enable				
	WS5708(config-wlansec)#security wpa akm psk enable				
	WS5708(config-wlansec)#security wpa akm psk set-key ascii				
	1234567890>wifi password, no less than 8 digits				
	2. WPA2 configuration				
	WS5708(config)#wlansec 1				
	WS5708(config-wlansec)#security rsn				
	WS5708(config-wlansec)#security rsn ciphers aes				
	WS5708(config-wlansec)#security rsn akm psk				
	WS5708(config-wlansec)#security rsn akm psk set-key ascii				
	1234567890>wifi password, no less than 8 digits				
	Note: One SSID can support both WPA and WPA2, but two passwords MUST				
	match.				
	1. when connecting the SSID, the security key authentication is required				
	E Connect to a Network				
	Type the network security key				
	Security key:				
	Hide characters				
Expected Result:	OK Cancel				
	2. type in the right security key, the STA can connect wireless network				
	successfully				
	AM5528 Connected				
	Name: AM5528				
	Signal Strength: Excellent Security Type: WPA2-PSK				
	Radio Type: 802.11n SSID: AM5528				
	RSC-AP220E(M)-V2				
	Open Network and Sharing Center				
Test Conclusion:					

## 3.2 Private Pre-Shared Key (PPSK)

Test Item	Private Pre-Shared Key (PPSK)

Description	Different STAs uses different passwords to connect the same SSID					
Test Procedure	Topology:         Image: Act         Act         PoE Switch         AP         Procedure:         1) Enabling the PPSK         On the AC's Web page, choose Network > WiFi/WLAN, select WPA/WPA2-PSK, and select Enable PPSK.         Image: Action of the mathematical select tenable PPSK.         Image: Action of the mathematical select tenable PPSK.					
	2) PPSK Account Management On the Web page, choose Security > Security user manage. The following figure shows the effect of importing user names. Import of the transformation of the state of the					
	3) Add users Click Add User. The following dialog box is displayed. Enter the user name. A random 8-character key is automatically generated. Add at least 2 users for testing.					

	Ruíjie AC	WEB Model: WS800	8 Detail		C Quick	Settings 🕱 Online Service 🖏 Simplifi	ed Chinese [→ Logout
	Monitor Disclosuble Late	Security user man	nage				
	Biscownite Lists	Note: Each STA has	a unique W/Fi key and up to 1,500	STAs are allowed. Please retrieve the WIFI key not in use to ave	sid limit violation.		
	Network Blacklist	+ Add User X Del	ete Selected 🖪 Import User ,	🖞 Export User 🕑 Batch Add User 🛧 Export Key	Username:	STA MAC:	Search
	Security User Isolation		Username	Created on	WIFI Key	STA MAC	Action
			levy	≡ Add User		× Null	Delete
	Optimiza ACL	Show No.: 10 ~	Total Count:1			Ill First II Pre 1 Next ⊁ La	ist M 1 GO
	DHCP Snooping			Username:	· ·		
	Security user manago						
	System				Save Cano	ol	
	Connect authenti	2 STAs cation s	to the SS succeed,	ID with differen the STAs MAC a	it passwords. ddress will b	e displayed o	on the
	Security		anage pa	age.	🔀 Quick	Settings 오 Online Service 태양Simplifi	ed Chinese 🕞 Logout
	Containment	Security user mar	1000				
European I Describe	Monitor Black/white Lists	Coconty user man	age.				
Expected Result:	Dynamic	Note: Each STA has	a unique WFi key and up to 1,500	STAs are allowed. Please retrieve the WIFi key not in use to ave	sid limit vielation.		
	Blacklist	+ Add User X Del	ete Selected 🛃 Import User	🖞 Export User 🛃 Batch Add User 📩 Export Key	Username:	STA MAC:	Search
	User Isolation Security		Username	Created on	WiFi Key	STA MAC	Action
			levy	2018/3/9 05:59:50	dhb46hpq	ec51.bc3b.4cc1	Delete
	Optimiza ACL		test1	2017/12/6 17:03:01	jhb4hppx	Null	Delete
	DHCP Snooping		test1	2017/12/6 17:03:00	hhb4h4ef	Null	Delete
	Advanced Security user		test1	2017/12/6 17:03:00	hb84he67	Null	Delete
	System		test1	2017/12/6 17:03:00	jhb42he5	Null	Delete
	o journ		test1	2017/12/6 17:03:00	hb64he43	Null	Delete
			test 1	2017/12/017:03:00	4nD4nezz	NUI	Delete

## 3.3 Blacklist & Whitelist

Test Item	Blacklist & Whitelist					
	When blacklist is enabled, STAs within the blacklist cannot access the wireless network. When whitelist is enabled, only STAs within the					
Description						
	whitelist ca access the wireless network.					
	Topology:					
Test Procedure	AC PoE Switch AP					
	Blacklist:					
	WS5302(config)#wids					
	WS5302(config-wids)#static-blacklist mac-address 6809.27b0.169f					
->6809.27b0.169f is denied to access						
	Whitelist:					

	WS5302(config)#wids
	WS5302(config-wids)#whitelist mac-address 6809.27b0.169f> only
	6809.27b0.169f is allowed to access
Expected Result:	1. if blacklist is enabled, the STA with MAC address 6809.27b0.169f
	cannot connect to the network.
	2. if whitelist is enabled, all STAs except 6809.27b0.169f cannot connect
	to the network.
Test Conclusion:	

## 3.4 AP Countermeasure

Test Item	AP Countermeasure				
Description	Ruijie AP interferes with STAs connecting to APs from other vendors				
	Topology:         AC         PoE Switch         Note: Ruijie AP will not countermeasure Ruijie AP by defau         Recommend to use AP from the other vendor as the Rogue	(('L')) AP (('L')) Rogue AP alt. 2 AP			
Test Procedure	Procedure:				
	1) Configure AP as monitor mode				
	AC(config)# ap-config ap220-e				
	AC(ap-config)# device mode monitor				
	2) Configure countermeasure rogue ap static list				
	AC(config)#wlan-config 5 monitor				
	AC(config-wlan)#no enable-broad-ssid				
	AC(config-wlan)#exit				
	AC(config)#ap-group Countermeasure				
	AC(config-group)#interface-mapping 5 1				
	AC(config-group)#exit				
	AC(config)# ap-config ap220-e				
	AC(config-ap)#ap-group Countermeasure				

	AC(config-ap)#scan-channels 802.11b channels 1 2 3 4 5 6 7 8 9 10 11 12			
	13>configure the scanning channel of 2.4G			
	AC(config-ap)#scan-channels 802.11a channels 149 153 157 161 165			
	->configure the scanning channel of 5G			
	AC(config)#wids>enter wids mode			
	AC(config-wids)#countermeasure enable>enable countermeasure			
	AC(config-wids)#countermeasures channel-match>enable channel-			
	based containment			
	AC(config-wids)#countermeasures mode config>choose the			
	countermeasures mode			
	AC(config-wids)#device attack mac-address 061b.b120.700c> add			
	rogue AP bssid:061b.b120.700c. you can scan rogue AP with			
	Wirelessmon to get the bssid.			
	Ruijie(config-wids)#countermeasures interval 20			
Expected Posult:	When STAs connect to the SSID that rogue AP broadcasts, there will be			
	significant packets drop and disconnection.			
Test Conclusion:				

## 3.5 User Isolation

Test Item	User Isolation			
Description	Wireless users o	connect to same AP canno	t get access to each	other
Test Procedure	Topology: ((((())))) AC Procedure: Isolate user assist AC(config)#wids AC(config-wids)#	PoE Switch	AP	STA1
Expected Result:	Connect 2 STAs	to the AP, they cannot pin	g from each other	
Test Conclusion:				

### 3.6 802.1x Authentication

Test Item	802.1x Authentication
Description	802.1x authentication is required to connect the wireless network
	Topology: AC ip address: 192.168.34.77(vian 90) AC AC AC AC AC AC AC AC AC AC
	Procedure:
	1. Enable 802.1x AAA authentication
	AC-1(config)#aaa new-model>enable AAA authentication
	AC-1(config)#aaa authentication dot1x default group radius>define the
	default group of dot1x authentication
Tost Drocoduro	AC-1(config)#aaa accounting network default start-stop group radius
lest Procedure	->define the default group of aaa accounting
	2 Configure Radius server's IP addrsess and KEY
	AC-1(config)#radius-server host 192.168.33.244 key ruijie> configure
	ip address and key of radius server
	AC-1(config)#ip radius source-interface bvi 90> AC communicate with
	radius using the IP address of vlan 90
	3. Configure parameters of 802.1x authentication
	AC-1(config)#dot1x authentication default> use default list for
	dot1x authentication
	AC-1(config)#dot1x accounting default> use default list for
	dot1x accounting
	AC-1(config)#dot1x eapol-tag> make AC able to process
	authentication packets with VLAN tag
	4. Enable 802.1X authentication
	AC-1(config)#wlansec 1> enable authentication on wlan 1
	AC-1(config-wlansec)# security rsn enable

AC-1(config-	w/opeoo)# ecourity rep eight		
	-wiansec)# security isn cipi	iers aes enable	
AC-1(config-	-wlansec)# securitv rsn akm	1 802.1x enable	
e . (soning			
5 Configure S			
5. Configure S			
AC-1(config)	#snmp-server host 192.168	3.33.244 traps vers	sion 2c ruijie
AC-1(config)	#snmp-server enable traps		
AC-1(config)	)#snmp-server community r	uijie rw	
( 0)		,	
6 Configuro r	adius convor		
//the second:		:fferrent verdiren h	
//the config	guration may vary with d	merent radius, h	ere we take Kuljië
SMP server	as an example:		
1) Login to SN	<pre>//P server&gt; "Authentication</pre>	& Authority"> "D	evice"> "NAS
Configuration	Templates"		
IP RG-SMP	Security Management Platform	Feedback	Online Service 😌 Technical Forum 🛕 About
Administrator (admin) Login IP (	120.35.11.195] Login Date [2016-07-14 14:48.27]	🖾 Online User 🐣 System	m Status Change Password QLogout
Authentication & Authority *	<ul> <li>Authentication &amp; Authority &gt; Device &gt; Query</li> </ul>		
🔒 User 🚇 User Group	NAS IP: NAS Configuration T	emplates: All	
Blacklist	Query Kes		
Self-Registration	Add Delete Search Device Import Device	Synchronize MAC	NAS Configuration Templates
MAC Terminal     Fylengel Identity Control		NAS Configuration	Operation
External Identity Center	All Rocket A	Templates	Operation Telept Men Medite
Authentication Settings	10.10.1.31 300300141	the sense	Terries Area Area
Authentication Settings	10:10:1.31         36656:141           10:10:1.63         14144b5f7           172.29.3.1         58696c20b	Ruijie Wirel Device           a84         Ruijie Wireless Device	Teinet   Mew   Modify Teinet   Mew   Modify
Authentication Settings     Portal Settings     Settings     Settings     Settings     Generation     Of Client Control	10.10.131         306950.141           10.10.163         14144677           172.293.18         141446751           172.293.2         58696c153	Ruijie Wired Device           a84         Ruijie Wired Device           127         Ruijie Wired Device           dda         Ruijie Switch Device	Telnel J Wei   Modify Telnel   Mei   Modify
Authentication Settings  Authentication Settings  Authentication  Authentication  Calent Control	10 10 1 3 00055 11 000055 11 00055 11 00055 11 00055 11 00055 11 00055 11 00055 11 00055	100         Collection           101         Collection           102         Ruije Writelsa Denkor           102         Ruije Writelsa Denkor           103         Ruije Switch Denkor           104         Ruije Switch Denkor	Latitati i steri i iliolati Tarineti Viene i iliolati
Client Control  Generation  Client Control  Client Control  Client Control  Client Control  Client Control  Authentication &	jie Wireless Device", and click gement Platform - Internet Explorer norty > Device > NAS Configuration Templates > Query	189 Rule: Vited Desice 844 Rule: Viteds: Desice 948 Rule: Viteds: Desice 948 Rule: Satich Desice 141 Pages   60 "Modify"	
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Chertal Settings Chert	jie Wireless Device", and click gement Platform - Internet Explorer northy > Device > NAS Configuration Templates > Query Close Clos	189 Rule: Vited Desice 184 Rule: Viteds: Desice 184 Rule: Viteds: Desice 19 Pages   60  "Modify"  G0  SNMP v2c community public public public rulije	1000     1000     1000     1000     1000     1000     1000     1000     1000     1000     1000     100
Client Control  Client Contro	jie Wireless Device", and click gement Platform - Internet Explorer Close Clos	Bayley Mind Deator         Bayley Mind Deator           84         Ruley Windss Deator           84         Ruley Winds Deator           84         Ruley Winds Deator           84         Ruley Saidth Deator           84         Ruley Saidth Deator           84         Ruley Saidth Deator           91         Radie Saidth Deator           91         Rode Saidth Deator           92         Saidth Deator           93         Radie Saidth Deator           94         Radie Saidth Deator           94         Radie Saidth Deator           95         Simple Saidth Deator           94         Radie Saidth Deator<	Later I were I Modify Coperation Coperation View I Modify Mew Modify Mew Modify Mew Modify Mew Modify
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Clence Control  Clence Contro	in to 10.163 144407 172.293.1 0466647 172.293.1 04666767 172.293.2 06666757 Totally 5 Records   Each Page 20 Records   Page 1 / Istall jie Wireless Device", and click gement Platform - Internet Explorer notify > Device > NAS Configuration Templates > Query Query Reset Close Clos		2000         Coperation           User:         Modify           Verw:         Modify

	RG-SMP Security Management Platform - Internet Explorer     -      X     -     -      X     -     -     -     X     -     -     -     -     X     -     -     -     -     X     -     -     -     -     X     -     -     -     -     X     -     -     -     -     -     -     X     -
	Authentication & Authority > Device > NAS Configuration Templates > Modify
	Basic Information
	* Template Name: Ruijie Wireless Device * Type: Ruijie Wireless Device
	Identity Authentication Configuration
	* Identity Authentication Key. ruijie x
	① Tips: The system and devices perform user authentication via the Radius Protocol. Identity authentication key is used for the encryption of data packets and should be the same as that of the devices.
	Web Authentication Configuration
	① Tips. After the Web authentication key is specified, the system will support Web authentication.
	SNMP Configuration
	* SNMP v2c Community. rulije
	() Tips The SNMP configuration should be the same as that on the devices. Otherwise the system cannot manage the devices.
	Security Management
	Device based NAC: OSupported OUnsupported
	🔍 тру:
	You can set a template for the devices sharing the same SNMP version, authentication and Telinet parameters.  Modify Reset Return
	noon toon
	4) Add new device, fill in the IP address of the AC, and select "Ruijie Wireless
	Device" as configuration Templates
	IP RG-SMP Security Management Platform Professional Context Security Management Platform Platfo
	Administrator (admin) Login IP (120 35: 11.195) Login Date (2016-07-14 14.48 27) 😥 Online User 🐣 System Status 🔒 Change Pass word 🕠 Logout
	Authentication & Authonity *  Authentication & Authonity > Device > Add Colline User
	Basic Information  NASIP: 192.168.34.77 Format 192.168.20.1)
	Image: State of comparison     NAS Configuration       Rulie Wireless Device     Device information   Wew Template   Add Template
	Sar Blacklist         NAS MAC:         (Format. 00D0 F8000001)           © Self-Registration         NAS Name:         (Format. 00D0 F8000001)
	Mobile Terminal NAS Location:
	AAS Information:     AAS Information:
	C Authentication Settions
	Portal Settings
	Add     Reset     Return       Otient Control     Client Control     Client Control
	5) Add a new user
	IP RG-SMP Security Management Platform   Profession
	Administrator [admin] Login IP [120.35.11.195] Login Date [2016-07-14 14:48:27]
	Authentication & Authority * O Authentication & Authority > User > Query Users
	Conline User
	All V In Blacklistor not All V Accurate Search
	Blacklist
	Self-Registration Add Delete Modify All Delete All
	Mobile Terminal
	MAC Terminal Add to Blacklist Issue Message or Patch Suspend Resume
	1. The STA is able to connect to the SSID with configured waves and
Even entre di De suitte	1. The STA is able to connect to the SSID with configured username and
Expected Result:	password
	<ol><li>"show dot1x summary" command shows online users</li></ol>

	AC#show dot1x summary ID MAC Address Username Interface VLAN Authen-State Backend-State User-Type Online-Duration 
Test Conclusion:	

### 3.7 Web Authentication

Test Item	Web Authentication		
Description	Web authentication is required to connect the wireless network		
Test Item Description	Web Authentication         Web authentication is required to connect the wireless network         Topology:         Image: AC       PoE Switch         AC       AC         Procedure:       AC         1. Configuring AAA       AC(config)#aaa new-model         AC(config)#aaa accounting network default start-stop none		
	AC(config)#web-auth template iportal		
	AC(config)#wlansec		
	AC(config-wlansec)#web-auth portal iportal		
	AC(config-wlansec)#webauth		
Expected Result:	1. Connect to wireless ssid, the authentication page will pops up.		

	Vireless network       Ex         Username       Anonouncement         Password       (2)Select Settings) icon on the desktop         Clear saved user information       (3)Select the wireless network you want to connect, click the arrow to the right of the wireless network settings [automatic login]
	© 2012 Ruille Networks Co., Ltd. 2. input the correct username/password, the authentication succeeds.
	Wireless network       ±x       Anonouncement         Login Success       If your device is an los terminal, please follow these steps to turn off the automatic login option for wireless networks:         Collect       Logout         User Information       User Information         User IP:       172.29.6.147         User MAC:       501a.c5e6.e0f5         SSID:       web_portal         Time limit:       NA
Test Conclusion:	© 2012 Ruijie Networks Co., Ltd.

## 4. Performance

## 4.1 AP Throughput Performance

Test Item	AP Throughput Performance
Description	Test the AP's max throughput performance
Test Procedure	Topology:



<ul> <li>Components of IxChariot:</li> <li>1 IxChariot Console: It is installed in the Windows system to generate and simulate traffic, and output the data simulation result.</li> <li>2 Endpoint: It is installed in the Windows system to send and receive traffic.</li> </ul>
Step1: Install IxChariot 6.7 (both the Console and Endpoint) on the server.
Step2: Install Endpoint on STAs
Step3: Start IxChariot
LChariot Test - untiled.1st
File Edit View Ban Jool: Window Help 그 같더니 이 이 이 나 가 가 가 해 해 5. 또 용·각 해 46 가 승규가 이 기 제 Tor 501 P1 92 50 P0 PC 이 가 이 2 50 P0 PC
Test Setup           Pair Group         Endpoint 1         Endpoint 2         Service 1         Service 1         Pair Group         Console I Group         Endpoint 3         Endpoint 2         Protocol Quality         Pair Group         Console I Group I Group         Endpoint 3         Endpoint 3         Endpoint 4         Endpoir 4
-
Results are not available for graphing.
Note: On the server, you should ensure proper running of both the Console and Endpoint, but on an STA, you need to ensure only proper running of the Endpoint.
3. Create a downward data sending stream, and send data from Serve 1.1.1.1 to STA 1.1.1.2.
Click 🛅 to add a pair.

			_
IxChariot Te	t - untitled1.tst		3
<u>F</u> ile <u>E</u> dit <u>V</u> ie	w <u>R</u> un <u>T</u> ools	<u>W</u> indow <u>H</u> elp	
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	Set the test run options for performance testing.
	How to end a test run
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	C Run until all pairs end
	(• Kun for a fixed duration 0 +Hrs 1 +Min 0 +Sec
	How to report timings
	( Batch (gives most accurate results)
	C Real-time (see results as the test is run)
	Polling
	Poll endpoints Interval 1 minutes
	Retrieve Timing Records
	-Nom to hendle feilures
	Stop run on initialization failure
	Connect timeout during test: 0 minutes
	Ston test after 1 running nairs fail
	Allow neir reinitialization for setun
	Try reinitializing 3 times
	Retry reinitializing after 10 milliseconds
	Allow pair reinitialization at runtime
	Try reinitializing 3 times
	Retry reinitializing after 10 milliseconds
	Clock synchronization
	Use Ixia hardware clock synchronization External synchronization
	Management Quality of Service
	Console Service Quality Endpoint Service Quality
	Collect endpoint CPU utilization
	Collect TCP statistics
	Validate data upon receipt
	Use a new seed for random variables on every run Use fewer connections for test setup
Ì	Enable Ixia hardware timestamps
	lindo Help
6.	. Right click to set the Graph Content as "Groups"



## 4.2 WiFi6 AP Throughput Performance

Test Item	WiFi6 AP Throughput Performance		
Description	Test the AP's max throughput performance		
Description	Test the AP's max throughput performance         Topology:         STA(IxChariot Endpoint)         Poe Switch         Chariot server         IP address: 1.1.1         Install Endpoint         Poe Switch         Procedure:         1. Test Environment Check         Use a signal scanning tool such as WirelessMon to scan the onsite environment. If the interference from other service set identifiers         (SSIDs) is detected, these SSIDs should be turned off; if they cannot be turned off the test should avoid the channel where a SSID of strong		
Test Procedure	turned off, the test should avoid the channel where a SSID of strong signal interference is located. Before the test, you can also use WirelessMon to scan the RSSI of the test SSID to ensure that the RSSI is not smaller than –55 dBm. When there is any interference in the test environment, configure the AP channel to the one with the smallest interference. AC#conf AC(config)#ap-config AP840 The AP name is AP840. AC(config-ap)#channel 64 radio 2 AC(config-ap)#chan-width 80 radio 2 AC(config-ap)#11acsupport enable AC(config-ap)#11axsupport enable AC(config-ap)#end		
	<ul> <li>2. Install IxChariot</li> <li>IxChariot is the industry's leading test tool for simulating real-world applications and assessing network performance in live networks.</li> <li>IxChariot uses distributed, low-profile endpoint to assess point to point performance and network capacity. It can be used to test the highest performance of an AP, thereby obtaining the its upstream and downstream throughput (official website of IxChariot: http://www.ixiacom.com).</li> <li>Components of IxChariot:</li> <li>IxChariot Console: It is installed in the Windows system to generate</li> </ul>		



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	Try reinitializing 3 times
	Retry reinitializing after 10 milliseconds
	Allow pair reinitialization at runtime
	Try reinitializing 3 times
	Retry reinitializing after 10 milliseconds
	Clock synchronization
	Use Ixia hardware clock synchronization External synchronization
	Management Quality of Service
	Console Service Quality Endpoint Service Quality
	Collect endpoint CPU utilization
	Collect TCP statistics
	Validate data upon receipt
	Use a new seed for random variables on every run Use fewer connections for test setup
Ì	Enable Ixia hardware timestamps
	lindo Help
6.	. Right click to set the Graph Content as "Groups"



#### 4.3 Multi-Users Throughput Performance

Test Item	Multi-Users Throughput Performance
Description	Test the Multi-Users throughput performance
Test Procedure	Topology:



Step3: Start IxChario	t
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Re Note: On the serve	esults are not available for graphing.
Console and Endpoi running of the Endpo	nt, but on an STA, you need to ensure only proper pint.
3. Create a downwa	rd data sending stream, and send data from serve
Click to add	a pair.
IxChariot Test - untitled1.tst	
	Mugoon Telb
5% # < 4 @ <i>P</i> #	🎽 🐖 🔛 🕺 📶 TCP SCR EP1 EP2 SQ PG PC 🔄 🕤 🚱 🗙 🗰
10 2 2 2 10 2 10 10 10 10 10 10 10 10 10 10 10 10 10	
Group Name Rus	Add an Endpoint Pair
	Endpoint 1 to Endpoint 2 Traffic Endpoint 1 address 1.1.1.1 Endpoint 2 address 1.1.1.2
	Network protocol Service quality TCP  Edit This Script
< <u> </u>	Select Script
	Open a Script File
Results	查扰范围(1):     Seripts     ◆ ② 節 國▼       名称     修改日期       ③ Low_Performance_Throughput     10/6/2008 1:43       ③ Response_Time     英型: AutoCAD 脚本       大小: 710 字节     校田期: 10/6/2008 1:43 AM       ③ Ultra_High_Performance_Throughput     修改日期: 10/6/2008 1:43 AM
Pairs: 0 Status Changed	文件名 07): Throughput 打开 (0) 文件类型 (T): IxChariot Script 更消 Application script name: [Throughput]
Fairs: 0 Status: Stopped	

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Pair 8 Ho Group	n/a	n/a 1.1.1.	1 1.1.1.9	TCP	Throughput. sci	1	1.1.1	205	n/a	1.1.1.9	2/4 2/4
Pair 5 Ho Group Pair 10 Ho Group	n/a n/a	n/a 1.1.1. n/a 1.1.1.	1 1.1.1.10	TCP	Throughput. sci	1	1.1.1	TCP	n/a n/a	1.1.1.10	5/a 2/a
Pair 12 No Group	n/a	n/a 1.1.1.	1 1.1.1.12	TCP	Throughput, set	1	1.1.1	TCP	n/a n/a	1.1.1.12	n/a n/a
Pair 15 No Group	n/a n/a	n/s 1.1.1. n/s 1.1.1.	1 1.1.1.15	TCP	Throughput. sci	1	1.1.1	TCP	n/a n/a	1.1.1.15	n/a
Pair 15 No Group	n/a n/a	n/a 1.1.1. n/a 1.1.1.	1 1.1.1.16 1 1.1.1.17	TCP	throughput.sci Throughput.sci	1	1.1.1	TCP	n/a n/a	1.1.1.16	n/a n/a
Pair 17 Ho Group	n/a n/a	n/a 1.1.1. n/a 1.1.1.	1 1.1.1.19 1 1.1.1.19	TCP	throughput.sci Throughput.sci	1	1.1.1	TCP	n/a n/a	1.1.1.18	n/a n/a
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Set the test run options for performance testing.
How to end a test run
C Run until any pair ends C Run until all pairs and
Run for a fixed duration
-How to report timings
C Real-time (see results as the test is run)
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Console Service Quality Endpoint Service Quality
Collect endpoint CPU utilization
Validate data upon receipt
Use a new seed for random variables on every run
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#### 4.4 Multi-Users Video Performance

Test Item	Multi-Users video performance					
Description	Test the Multi-Users video performance					
Test Item Description	Multi-Users video performance Test the Multi-Users video performance Topology:					
	AC(config-ap)#channel 1 radio 1					
	AC(config-ap)#chan-width 20 radio 1					
	AC(config-ap)# sta-limit 5 radio 1					
	AC(config-ap)#channel 149 radio 2					

	AC(config-ap)#chan-width 80 radio 1
	AC(config-ap)# sta-limit 25 radio 2
	AC(config-ap)#end
	2. Open all the test devices, connect to the SSID. Check all devices connect succeed with Eweb or CLi command.
	3. All STAs access the video on the video server at the same time, record the experience.
	4. All STAs access to the video website, access the same video at the same time.
Expected Result:	The Multi-Users video performance of the AP will be tested
Test Conclusion:	

## 4.5 Dual 5G Mode Test

Test Item	Dual 5G Test
Description	Test Dual 5G, AP820-L V2 support change the Radio1 to 5G
	Topology:
	PoE Switch Video Server
Test Procedure	Multi STAs
	Procedure:
	1. Test Environment Check
	Change the Radio1 to 5G
	AP#conf
	AP(config)#interface dot 1/0
	AP(config-ap)#radio-type 802.11a
	AP(config-ap)#chan-width 80
	AP(config-ap)#channel 149
	AP(config-ap)#exit
	AP(config)#interface dot 2/0

	AP(config-ap)#channel 64
	AP(config-ap)#chan-width 80
	AP(config-ap)#end
	2. Open the WiFi MoHo to check the AP have dual 5G SSID.
	3. Connect to the SSID, check the negotiate rate and do the speedtest.
Expected Result:	The Radio1 support change to 5G
Test Conclusion:	