



#222123

May 2022

Commissioned by  
Ruijie Networks Co., Ltd.

## Reyee Wi-Fi 6 (802.11ax) Home WLAN Access Points Comparative Performance Evaluation vs. NETGEAR and TP-Link

### Executive Summary

Wi-Fi 6 is the latest generation Wi-Fi technology that brings improvements in individual device and overall system throughput. Built upon more than 15 years experience in the WLAN market, Ruijie Networks Co., Ltd. developed a series of Wi-Fi 6 access point models to cover different application scenarios. Now, Wi-Fi 6 technology is coming to the home market where demand for Wi-Fi connectivity and bandwidth has surged. Today, it is not uncommon for homes to have dozens of devices connected to Wi-Fi at any given time. In addition to computers and smartphones, Smart TVs, thermostats, cameras, doorbells, lighting, sensors and more now have persistent Wi-Fi connections.

Ruijie commissioned Tolly to evaluate the performance of its Reyee EW3200GX PRO Wi-Fi 6 access point against similar models from NETGEAR and TP-Link. Tests included multiple user tests of up to 78 simultaneous users, single-client maximum performance tests, and signal coverage tests. Tests were run both at 2.4GHz and 5GHz frequencies.

### The Bottom Line

Ruijie Networks Reyee EW3200GX PRO Wi-Fi 6 access point delivers:

- 1 Better single client performance. Reyee EW3200GX PRO delivered transmit throughput of 918Mbps and receive throughput of 886Mbps - higher than other APs tested.
- 2 Better wireless coverage than TP-Link and NETGEAR. At the most distant test location, Reyee EW3200GX PRO's download throughput was 77% better than TP-Link and 33% better than NETGEAR with the 2.4GHz radio. Reyee EW3200GX PRO was 275% better than TP-Link and 191% better than NETGEAR with the 5GHz radio.
- 3 Better video streaming user experience than TP-Link and NETGEAR with up to 78 users while providing a more stable delivery environment.



# Test Results

## Single-Client Performance

Tests measured transmit and receive performance for a single client co-located with the AP under test in a shielded chamber. Please see the Test Methodology section for all test details and firmware levels for all systems under test. See Figures 1 and 2 for all single-client performance results.

### 2.4GHz Radio

Reyee EW3200GX PRO dramatically outperformed both TP-Link Archer AX50 and NETGEAR Nighthawk RAX40v2. Reyee transmit throughput of 571Mbps was 85% higher than TP-Link and 53% higher than NETGEAR. Receive tests showed similar results with Reyee receive throughput of 590Mbps was 90% greater than TP-Link and 61% better than NETGEAR.

### 5GHz Radio

Reyee EW3200GX PRO outperformed both TP-Link Archer AX50 and NETGEAR Nighthawk RAX40v2. Reyee transmit throughput of 893Mbps was 33% higher than TP-Link and 21% higher than NETGEAR. Receive tests showed similar results. Reyee receive throughput of 886Mbps was 34% greater than TP-Link and 14% better than NETGEAR.

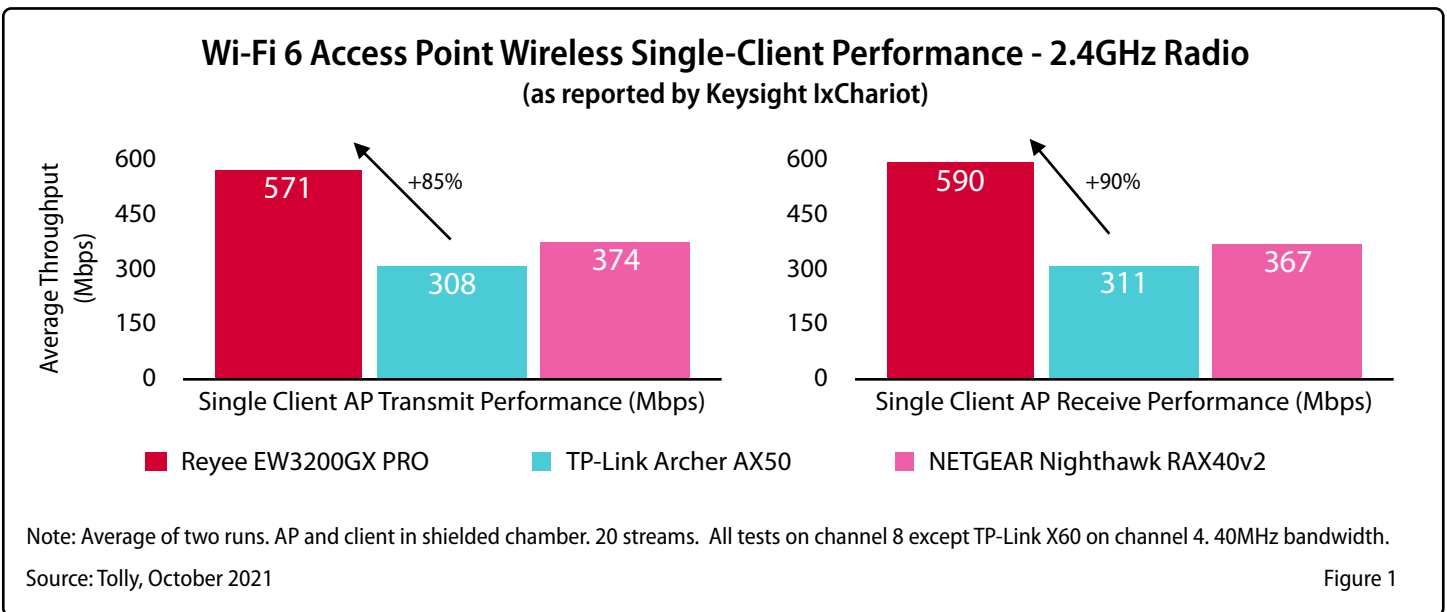


Figure 1

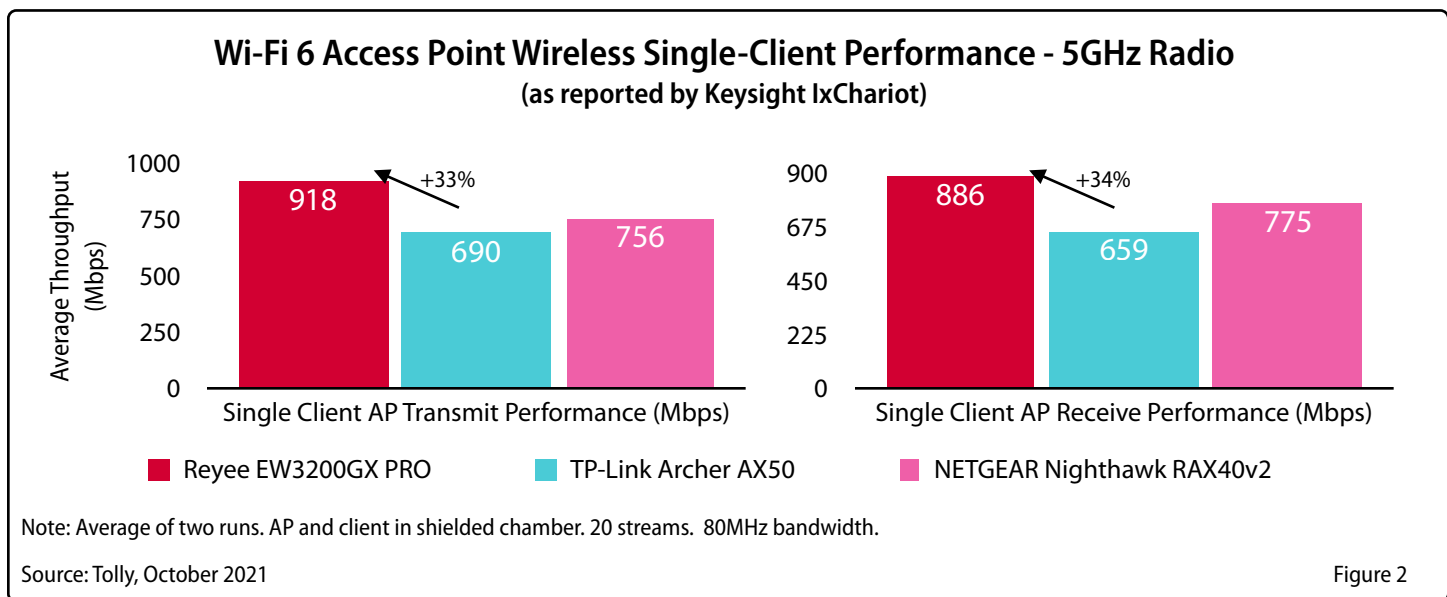


Figure 2



## Signal Coverage/ Performance

Tests measured signal coverage and single-client performance across seven indoor locations within a three-story house. Location #7 was most distant from the AP. This represented the worst case scenario and will be the focus of the discussion. Results for all seven locations can be found in Figure 3 and 4. Note that signal strength is measured in dBm on a negative scale. Thus, values closer to zero represent better signal coverage.

### 2.4GHz Radio

Reyee EW3200GX PRO demonstrated the best signal coverage at location #7 with a strength of -57dBm compared with -69dBm for TP-Link Archer AX50 and -61dBm for NETGEAR Nighthawk RAX40v2.

At the most distant location, Reyee download throughput was 77% better than TP-Link and 33% better than NETGEAR. Reyee upload throughput was 55% better than TP-Link and 53% better than NETGEAR.

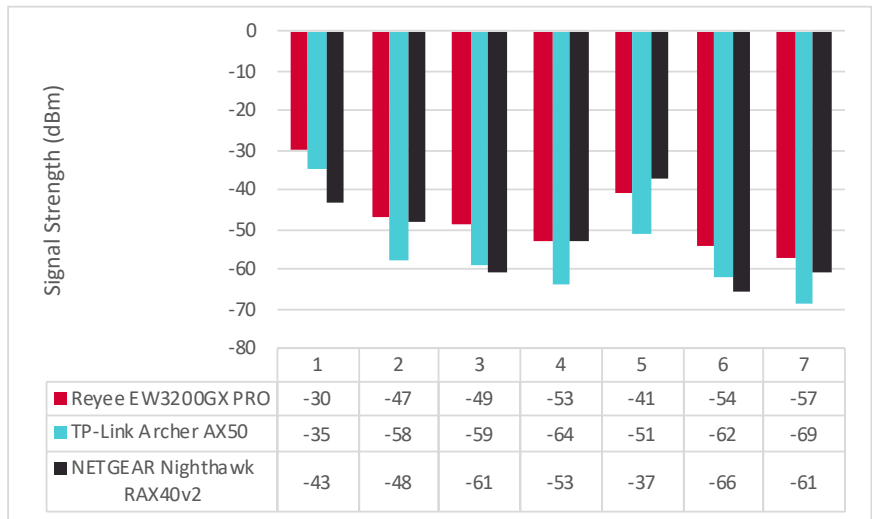
### 5GHz Radio

Reyee EW3200GX PRO demonstrated the best signal coverage at location #7 with a strength of -78dBm compared with -85dBm for TP-Link Archer AX50 and -83dBm for NETGEAR Nighthawk RAX40v2. At the most distant location, Reyee download throughput was 275% better than TP-Link and 191% better than NETGEAR. Reyee upload throughput was 112% better than TP-Link and 424% better than NETGEAR.

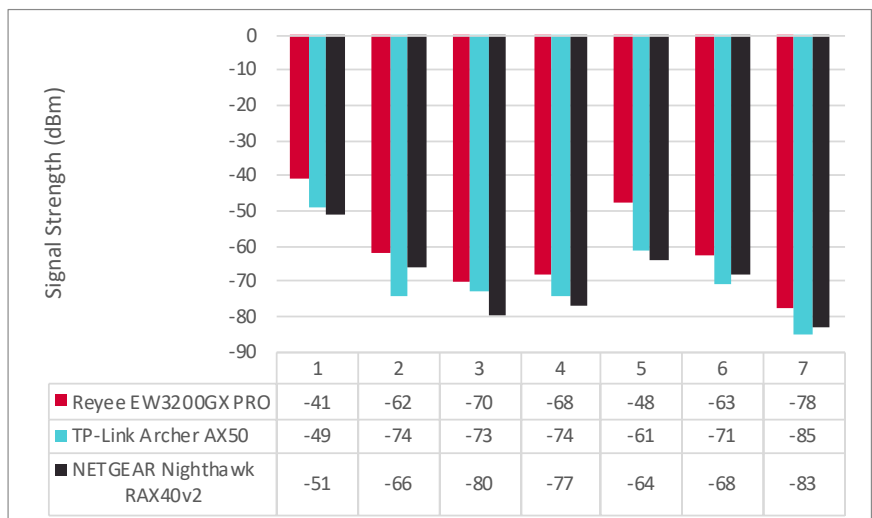
## Wi-Fi 6 Access Point Coverage Tests - Signal Coverage (as reported by Keysight IxChariot)

Shorter bars indicate stronger signal

### 2.4GHz Radio



### 5GHz Radio



Source: Tolly, October 2021

Figure 3

## Wi-Fi 6 Access Point Wireless Coverage Tests - Single Client - Standalone APs

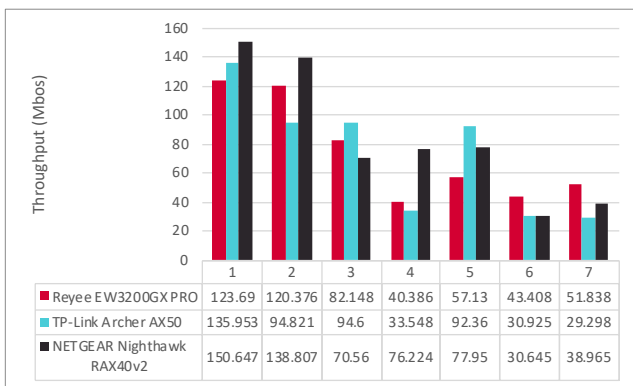
### Higher is Better

(as reported by Keysight IxChariot)

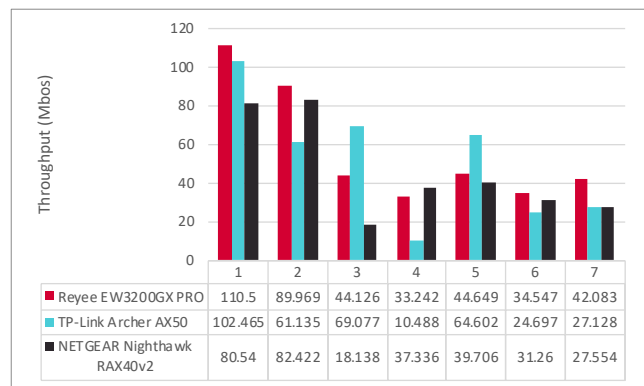
### 2.4GHz Radio

At the most distant location, Reyee download throughput was 77% better than TP-Link and 33% better than NETGEAR.  
 Reyee upload throughput was 55% better than TP-Link and 53% better than NETGEAR.

Download Throughput



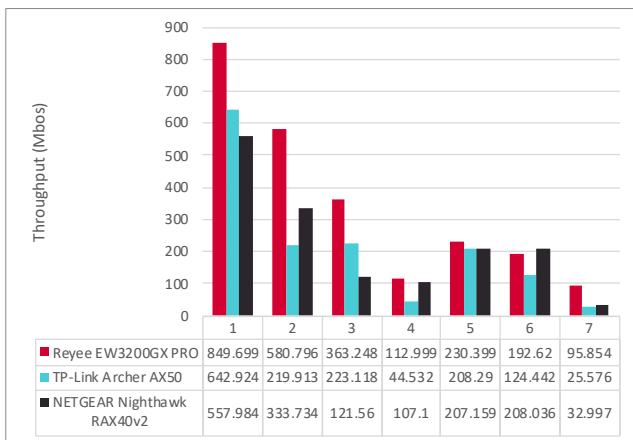
Upload Throughput



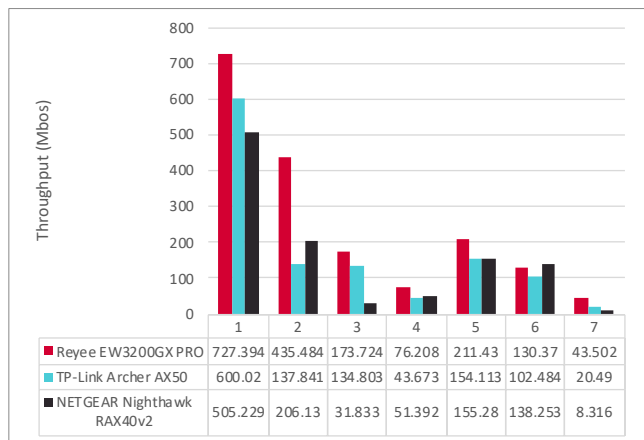
### 5GHz Radio

At the most distant location, Reyee download throughput was 275% better than TP-Link and 191% better than NETGEAR.  
 Reyee upload throughput was 112% better than TP-Link and 424% better than NETGEAR.

Download Throughput



Upload Throughput



Source: Tolly, October 2021

Figure 4



## Multi-User Test

### 78 Clients

This test measured the projected user experience when many clients were streaming video simultaneously via the AP's 5GHz radio. The test was run using the Ruijie internal user experience app which calculated a quality score with 10 as the maximum. The adjusted test score was

calculated by multiplying this result by the percentage of clients that were able to complete the test successfully. See Figure 7 for detailed test results.

The Reyee EW3200GX PRO earned a higher score than TP-Link Archer AX50 and NETGEAR Nighthawk RAX40v2. Importantly, Reyee's video delivery was more stable than the competing systems. The stability reports (below) visually illustrate the results of the

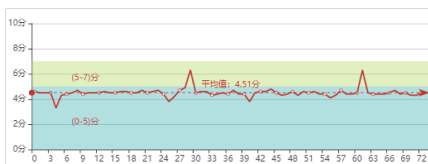
test while in progress. It should be noted that the NETGEAR AP would become unstable and reboot when more than 64 clients were running the test.

### Wi-Fi 6 Access Point Wireless Multi-User Test - 78 Users (as reported by Ruijie User Experience App)

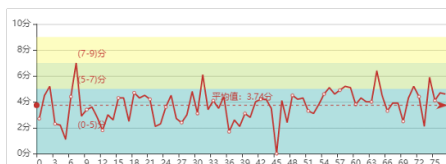
Vendor	Model	Successful	Failed	Errors	Max. Users Tested	Success Rate	Test Score (Raw)	Test Score (Adjusted)
Ruijie Reyee	EW3200GX PRO	74	0	4	78	94.9%	4.51	<b>4.28</b>
TP-Link	Archer AX50	77	1	0	78	98.7%	3.79	<b>3.74</b>
NETGEAR	Nighthawk RAX40v2	52	11	1	64 (AP would reboot above 64)	66.7%	6.22	<b>4.15</b>

### Stability Reports

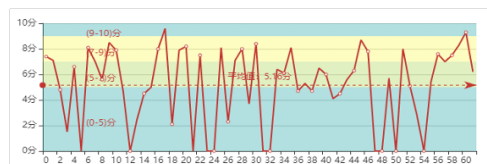
Ruijie Reyee EW3200GX PRO



TP-Link Archer AX50



NETGEAR Nighthawk RAX40v2



Note: Each client played back a video file via the AP under test. Adjusted test score calculated by multiplying the raw test score by the success rate. The Stability Report graph shows variations in performance over the run time of the test.

Source: Tolly, October 2021

Figure 7



### Multi-User Test: 32 Clients

This test was the same as the prior test except that the number of simultaneous clients was reduced by more than half. See Figure 8 for detailed test results.

With the reduced load, all of the vendor APs scored significantly higher than the previous test.

All three APs under test had scored 9.4 or higher with NETGEAR Nighthawk RAX40v2 having the highest score at 9.94 and Reyee EW3200GX PRO just behind it at 9.88. TP-Link and NETGEAR demonstrated more stable test results than previous but Reyee was the most stable.

### Wi-Fi 6 Access Point Wireless Multi-User Test - 32 Users (as reported by Ruijie User Experience App)

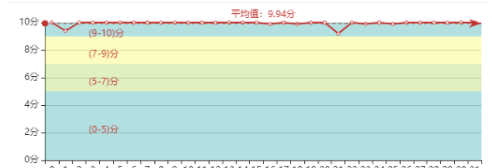
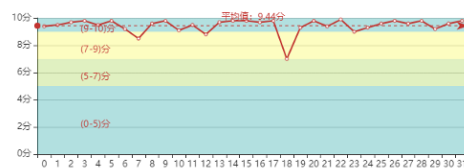
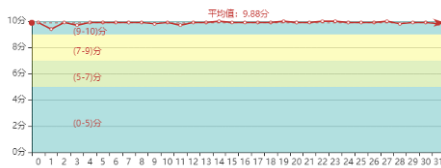
Vendor	Model	Successful	Failed	Errors	Success Rate	Test Score (Raw)	Test Score (Adjusted)
Ruijie Reyee	EW3200GX PRO	32	0	0	100%	9.88	<b>9.88</b>
TP-Link	Archer AX50	32	0	0	100%	9.44	<b>9.44</b>
NETGEAR	Nighthawk RAX40v2	32	0	0	100%	9.94	<b>9.94</b>

### Stability Reports

Ruijie Reyee EW3200GX PRO

TP-Link Archer AX50

NETGEAR Nighthawk RAX40v2



Source: Tolly, October 2021

Figure 8

# Test Methodology

## Single-Client Performance Test

This test focused on demonstrating the maximum single-client performance through the DUT under optimal conditions.

DUT and the wireless client were both placed inside of the same shielded chamber. The client wireless network card was an ASUS PCE-AC88 802.11ac Network Adapter. This card communicated with a wired test client connected to the DUT via an Ethernet switch.

Keysight/Ixia IxChariot 6.7 was used to generate test traffic. Tests were run separately for transmit and receive using 20 session pairs. Each test was run twice for 30 seconds and the results were averaged. Tests used the IxChariots Throughput script. Tests were run using the 2.4GHz radio and then again using the 5GHz radio. For the former, bandwidth was set to 20MHz and for the latter to 80MHz.

## Signal Coverage/ Performance

This test focused on demonstrating the single-client performance through the DUT from seven different locations in a three-story dwelling. See Figure 9 for a diagram of the test environment. Test location P1 was closest to the DUT and locations became progressively farther away with location P7 being on a different floor and the most distant from the DUT.

There was a fixed wireless client at each location. The clients consisted of:

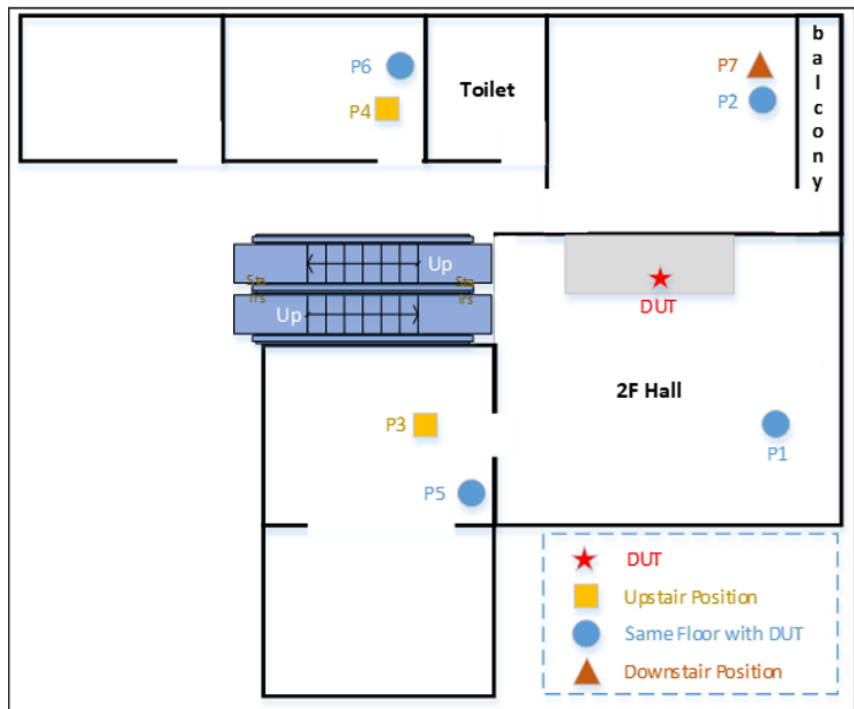
### Dual-Band Wi-Fi 6 Devices Under Test

Vendor	AP Model	Firmware Version
Ruijie Reyee	EW3200GX PRO	ReyeeOS 1.65.2118
NETGEAR	Nighthawk RAX40 v2	V1.0.2.82_2.0.50
TP-Link	Archer AX50	1.0.8 Build 20200426 rel.65338(4555)

Source: Tolly, October 2021

Table 1

### Test Environment - Signal Coverage



Note: Residential environment with three floors. DUT on middle floor (shown in blue).

Source: Tolly, October 2021

Figure 9



Four 802.11ax 2 spatial streams (SS) mobile phones; one 802.11ac 2SS mobile phone; two 802.11 1SS tablet.

All clients communicated with a wired station outfitted with a: Realtek PCIe GbE Family Controller Ethernet network adapter and connected to a Ruijie EW 105G Ethernet switch.

Keysight IxChariot was used to generate test traffic and to measure signal strength at the client locations. Each test was run twice for 30 seconds and the results were averaged. For test locations P1 through P3 (closer to the DUT), the IxChariot High Performance Throughput script was used. For all other locations the standard Throughput script was used. Tests were run using the 2.4GHz radio and then again using the 5GHz radio. For the former, bandwidth was set to 20MHz and for the latter to 80MHz

the percentage of stations that were successful in completing the test.

The clients were located near one another on shelves in the same room as the DUT.

For the 78-user test, the clients consisted of: 42 802.11ax 2SS and 36 802.11ac 1SS stations.

For the 32-user test, the clients consisted of: 32 802.11ax 2SS phones.

## Multi-User Test


This test focused on quantifying the performance of the DUT when delivering video streams to many users simultaneously. The test was run using the 5GhZ radio only with bandwidth set to 80MHz. The test was run with 78 users and again with 32 users.

All test clients ran the open Ruijie Multi-User Experience Application. Test clients were controlled by a wired Ethernet station that ran the application controller.

The controller connected to all of the clients simultaneously and streamed a video to each of the clients for a test period of 120 seconds. Each client produced a quality score ranging from 1 (worst) to 10 (best).

The console also tracked any errors in client connections. The final (adjusted) score was calculated by multiplying the raw score by

### Test Tool Summary

Vendor	Product	Web
Keysight/Ixia	IxChariot v6.7	 <a href="https://www.ixiacom.com">https://www.ixiacom.com</a>

Source: Tolly, October 2021

Table 2





## About Tolly

The Tolly Group companies have been delivering world-class ICT services for over 30 years. Tolly is a leading global provider of third-party validation services for vendors of ICT products, components and services.

You can reach the company by E-mail at [sales@tolly.com](mailto:sales@tolly.com), or by telephone at +1 561.391.5610.

Visit Tolly on the Internet at: <http://www.tolly.com>

## Learn More About Reyee

Reyee was founded by a group of ambitious professionals with rich experience in the ICT industry. It was officially launched in 2013 by its parent company, Ruijie Networks Co., Ltd., a reputed ICT infrastructure and solutions provider for numerous leading Internet enterprises, such as Alibaba and ByteDance. Ruijie is recognized for outstanding quality, advanced technology, innovative solutions, and top-notch service. Assimilating Ruijie's creativity and drive for excellence, Reyee's offerings are designed around its core value of "Providing Practical, Accurate and Simplified Solutions." With 8 years of experience and deeper insight into the industry, Reyee is now specialized in mesh Wi-Fi, especially Wi-Fi 6 wireless routers for household units.

Redefine Your Easy Network.

For more information visit: [www.ireyee.com](http://www.ireyee.com)

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