



# REVIEWER'S GUIDE

## Deco BE63

BE10000 Whole Home Mesh Wi-Fi 7 System



# TEST OVERVIEW

In this document, we will introduce how we suggest testing the Deco BE63 and for reference, we will provide the test results that we produced in our laboratory and test house.

- **PART 1. Wi-Fi 7 PERFORMANCE**

Test the peak Wi-Fi performance with Wi-Fi 7/6E Client (OnePlus 11 5G / Intel AX210). When testing with a Wi-Fi 7 Client, the Wi-Fi peak performance is twice that of the Wi-Fi 6E mesh.

- **PART 2. Wi-Fi BACKHAUL**

When focusing only on the wireless Backhaul, with the advantage of Wi-Fi 7, Deco BE63's Wi-Fi Backhaul is significantly improved compared to wifi 6E Mesh, which can easily provide multi-gigabit network coverage to the entire house.

- **PART 3. Wi-Fi COVERAGE**

Test the Wi-Fi performance of one mesh unit at different locations in the test house.

- **PART 4. STA LATENCY**

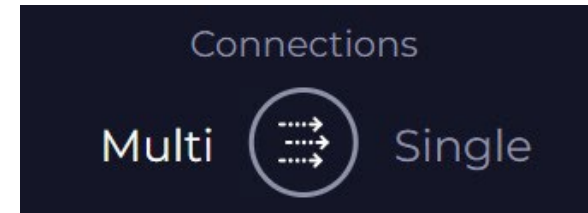
Test the Wi-Fi latency of one mesh unit at different locations in the test house.

# TEST CONSIDERATIONS

## Use Multi-Stream/Connection

The performance of Wi-Fi 7 products can easily reach multi-gigabit.

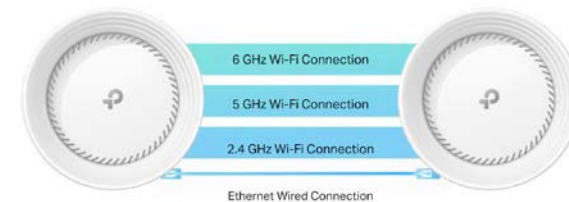
It is recommended to test the performance with multiple streams/connections to leverage the full hardware capabilities.



## Test It as a 2-pack System

As there are a limited number of Wi-Fi 7 client devices on the market, currently, Wi-Fi 7 works most effectively in the backhaul between mesh units. Thus, when tested as a 2-pack, we can see the huge advantages of Wi-Fi 7.

Moreover, backhaul performance is also the most important parameter of a mesh Wi-Fi system.

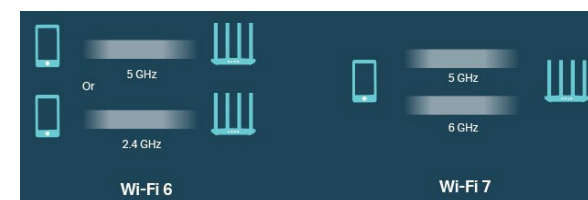


## Wi-Fi 7 and Multi-Link Operation (MLO)

In this guide, we use a OnePlus 11 5G as a Wi-Fi 7 Client. It is the first Wi-Fi 7 client in the market. However, it does not support 5+6G MLO.

### What is Wi-Fi 7's Multi-Link Operation (MLO)

In this guide, we use a BE63 unit as a Wi-Fi 7 MLO client to demonstrate the real performance of Wi-Fi 7.



# SUGGESTED EQUIPMENT AND TOOL

## SERVER/CLIENT PC

CPU: Intel i5-9400

RAM: DDR4 16G

Wired Network Adapter: TP-Link TX401(AQC107), 10Gbps

WiFi Network Cards: Intel AX211, Driver Version: 22.200.0

## Wi-Fi 6E CLIENT

Intel AX210/AX211, Driver Version: 22.200.0

Samsung S21/S22/S23 Ultra

## Wi-Fi 7 CLIENT

OnePlus 11 5G, OxygenOS 13.0

- First Wi-Fi 7 Client in the market, it does not support MLO per our test.
- Please refer to the [APPENDIX](#) to run iPerf 3 in Android phone.

## DECO APP

The Deco app allows you to quickly and easily install and manage your Deco Whole Home Mesh Wi-Fi System. Scan the QR code below or go to Google Play or the App Store to download the Deco app.



## TP-Link Deco BE63

Firmware Version: 1.0.1 Build 20230615 Rel. 42970 (or the latest firmware)

After Onboarding, Enable below features:

Enable MLO Network When test MLO Feature

Enable 5G 240MHz

## TESTING TOOLS

### iPerf 3

Download via the link below and refer to [APPENDIX](#) for installation details.

<https://iperf.fr/iperf-download.php>

- Client Parameters: -P 20 -w 2M
- Duration: WiFi6 15s, WiFi7 60s

### IxChariot 6.7

- TCP Stream Pairs for Ethernet Client: 150
- TCP Stream Pairs for Wi-Fi Client: 50
- Script for Ethernet Client : High\_Performance\_Throughput.scr
- Script for Wi-Fi Client: Throughput.scr
- Duration: WiFi6 15s, WiFi7 60s

### NOTES:

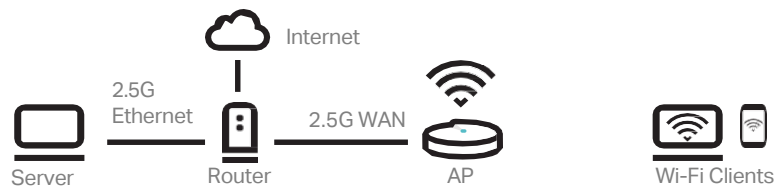
Tools like fast.com and speedtest.net are great for confirming whether the DUT can handle your internet plan. Tools like iPerf, however, are required for testing network throughput to its limits and collecting an objective comparable performance metric.

# PART 1. Wi-Fi 7 PERFORMANCE

## TEST FOCUS

Test the peak Wi-Fi performance of a single mesh unit with Wi-Fi 7 / 6E Client (OnePlus 11 5G / Intel AX210) . Test the wireless peak performance of DUT, including different STAs (covering typical adapters, mobile phones and WiFi7 clients on the market), different frequency bands (2GHz/5GHz/6GHz/MLO), typical placement (STA facing DUT, 1m distance) , the best placement.

## TEST TOPOLOGY



## TEST STEPS

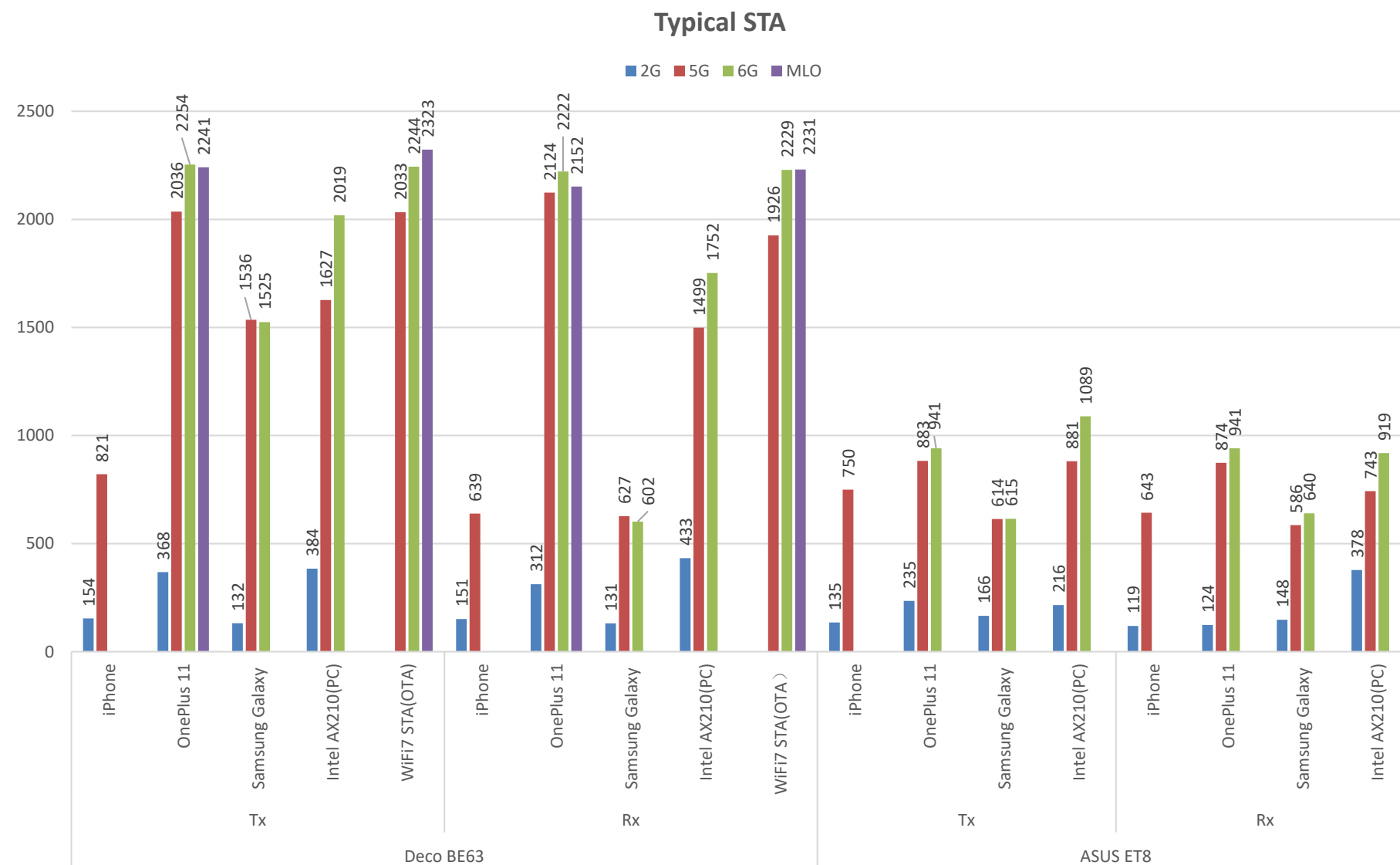
1. Connect the Wi-Fi Client to the 6GHz band of the AP (primary mesh unit).
2. Run throughput test from the Server to the Client for 60 seconds.

## TIPS

- When testing with Wi-Fi 7 Client (OnePlus 11), the Wi-Fi peak performance is twice that of the Wi-Fi 6E mesh.
- The peak performance can be doubled again when devices that support Wi-Fi 7 MLO become available.

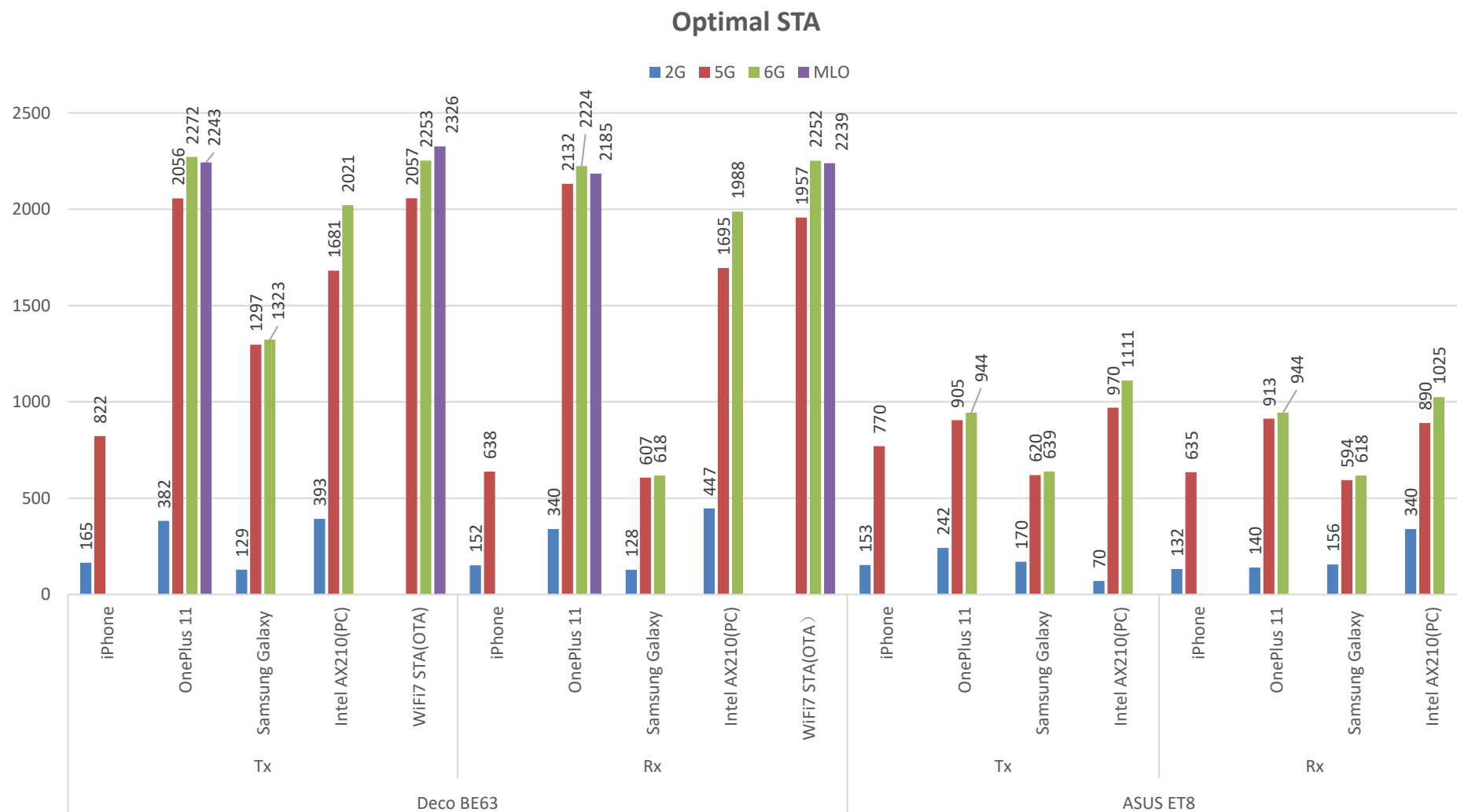
# PART 1. Wi-Fi 7 PERFORMANCE

## TEST RESULT



# PART 1. Wi-Fi 7 PERFORMANCE

## TEST RESULT

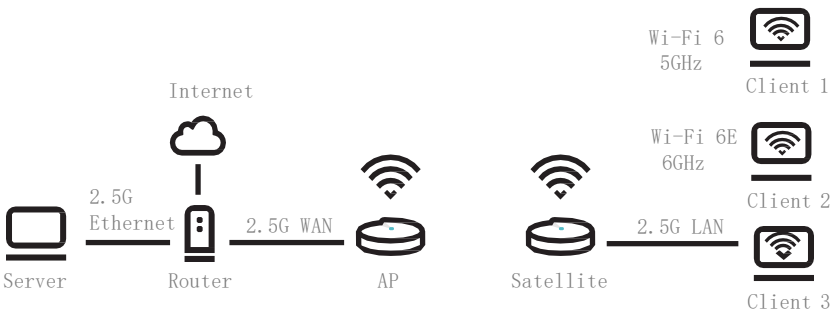


# PART 2. Wi-Fi BACKHAUL

## TEST FOCUS

Test the bandwidth between the AP(Primary Deco) and Satellite(RE) when they are connected through Wi-Fi backhaul.

## TEST TOPOLOGY



Client	Device Type	Connection Type
1	Wi-Fi 6 + Wi-Fi 6E	5GHz + 6GHz Wi-Fi
2	Wired	2.5Gbps LAN

## TEST ENVIRONMENT



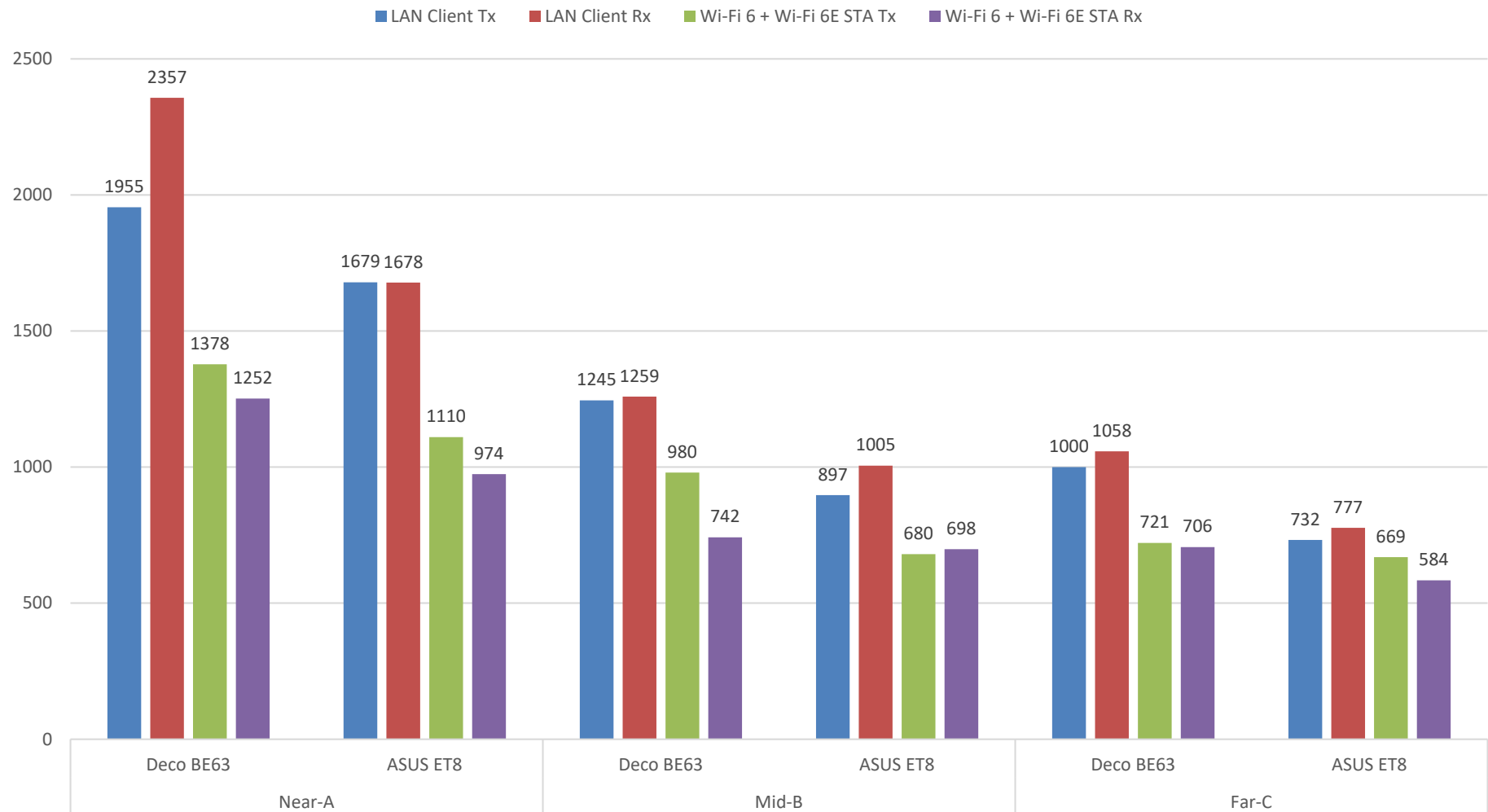
Satellite Location	Description
A	a distant location in the same room
B	a location on the same floor separated by 3 concrete walls
C	a location on the second floor



## PART 2. Wi-Fi BACKHAUL

### TEST RESULT

#### Wireless Backhaul Performance

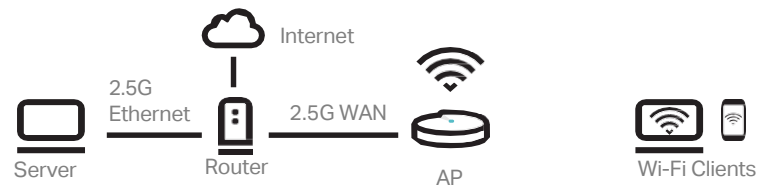


# PART 3. Wi-Fi COVERAGE

## TEST FOCUS

Test the Wi-Fi coverage capability of a single mesh unit with different Wi-Fi clients.

## TEST TOPOLOGY

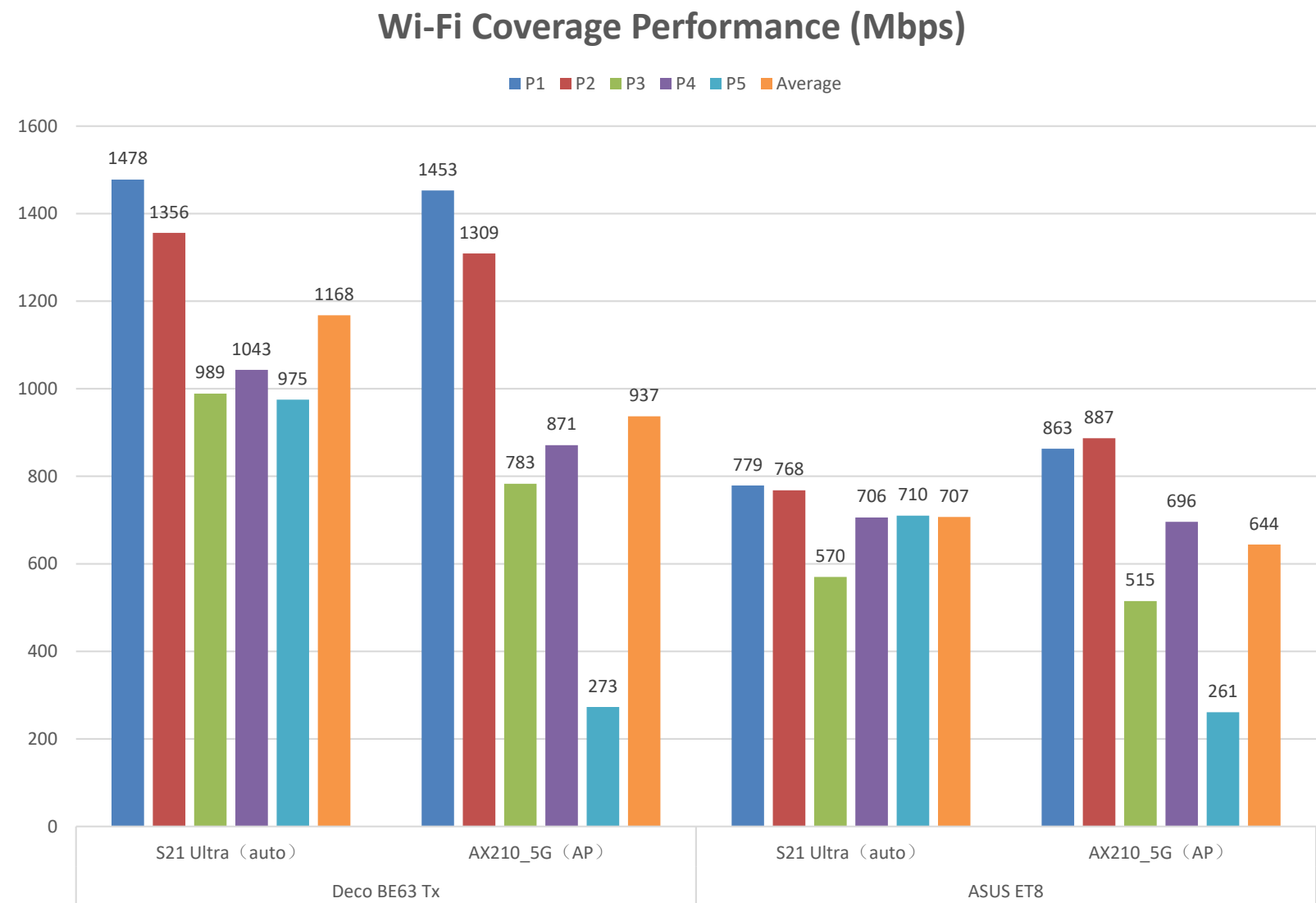


## TEST ENVIRONMENT



# PART 3. Wi-Fi COVERAGE

## TEST RESULT



# PART 4. STA LATENCY

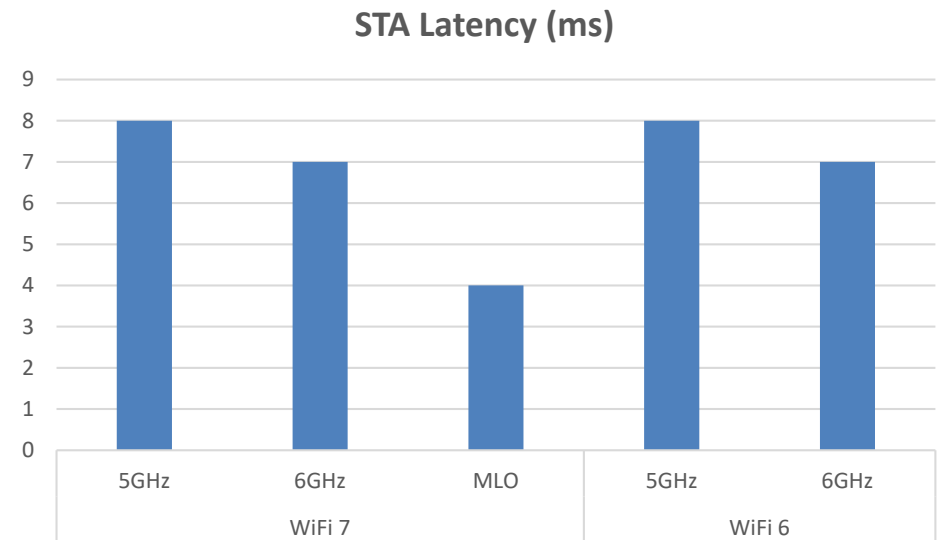
## TEST DESCRIPTION

- Background traffic STA: 1 STA in the 5GHz frequency band and 1 STA in the 6GHz frequency band. Place it 1 meter away from the DUT.
- Latency test SUT: SUT is placed 1 meter away from DUT.
- Delay statistics: Ping DUT on SUT, ping 60 packets, and check the average delay in the statistical results; or use Chariot to run the response script from SUT to DUT, and check the average delay of Chariot statistics.
- Background traffic: Chooses a high performance throughput script in Chariot. Each STA adds 2 pairs. Run traffic in the lan-wlan direction.

## TEST STEPS

1. Onboarding DUT and turning on the MLO network, associate the 5GHz and 6GHz frequency bands of the DUT with 1 STA respectively;
2. Test the peak background traffic: run the peak traffic of LAN-WLAN, record the peak traffic of the 5GHz frequency band as L1, and the peak traffic of the 6GHz frequency band as L2.
3. Add 75% peak background traffic: limit the speed of each pair, modify the send data rate in the chariot script, the speed limit of the 5GHz frequency band is  $L1/2*75\%$ , the speed limit of the 6GHz frequency band is  $L2/2*75\%$ ; continue to run chariot until the end of the delay test.
4. The SUT associates the 5GHz frequency band of the DUT through 5GHz, "ping dut\_lan\_ip -I 4096 -n 60(Windows)/ping dut\_lan\_ip -s 4096 -c 60(Linux)" on the SUT, and record the test result WiFi7\_Latency\_5G
5. The SUT associates the 6GHz frequency band of the DUT through 6GHz, "ping dut\_lan\_ip -I 4096 -n 60(Windows)/ping dut\_lan\_ip -s 4096 -c 60(Linux)" on the SUT, and record the test result WiFi7\_Latency\_6G
6. The SUT associates the MLO network of the DUT through the MLO, "ping dut\_lan\_ip -I 4096 -n 60(Windows)/ping dut\_lan\_ip -s 4096 -c 60(Linux)" on the SUT, and record the test result WiFi7\_Latency\_MLO
7. Replace DUT with CMP, replace SUT with AX210, repeat steps 2-5, and record the results as WiFi6\_Latency\_5G, WiFi6\_Latency\_6G

## TEST RESULT



## TIPS

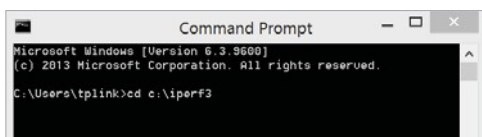
- The performance of the PC must meet the test requirements. Before the test, you can directly connect it to the 10Gbps adapter of the PC for throughput testing.
- 2.5Gbps wired port test, using Category 6 and above network cables.
- When testing the notebook, select the performance mode and plug in the power supply.
- When testing the mobile phone, restart the mobile phone once before the test.
- For wireless adapters with external antennas, it is necessary to pay attention to the proper expansion of multiple antennas and maintain a certain distance when placing them.
- Multi-frequency performance test: keep a certain distance between STAs to avoid mutual influence.
- USB test: Use high-speed SSD devices, and ensure the specifications and quality of USB extension cables.
- Multi-frequency client concurrency test can better reflect the advantages of Backhaul performance.

# APPENDIX

## How to install iPerf 3 in Windows and Mac OS

### Windows:

- Right-Click the zip file and Extract **All contents** to "C:\iperf3"
- Press the "Windows" button and "X" simultaneously to open the Windows quick access menu
- Select **Command Prompt (Admin)** or **Terminal (Admin)** and click **Allow** if the User Account Control window appears
- Type "**cd c:\iperf3**" into the command prompt, then hit enter to change to the iPerf directory



- (Optional) Type "iperf3" and hit enter to view a list of available iPerf commands

### Mac OS:

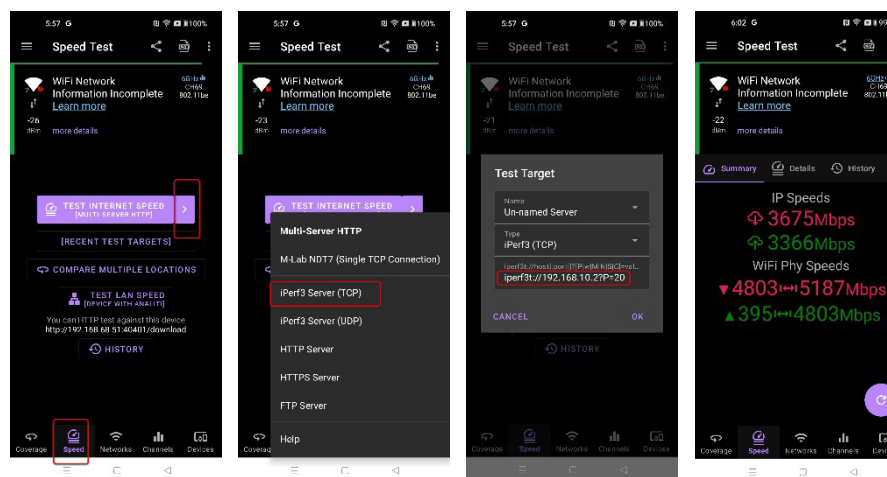
- Copy iperf3 to your desktop
- Press the "**Command**" button and "**Spacebar**" simultaneously, type "Terminal", then press **Enter**
- Copy and paste the following into the Terminal app, then press enter:

```
ruby -e "$(curl -fsSL https://raw.githubusercontent.com/Homebrew/install/master/install)" < /dev/null 2> /dev/null
```

- Type "**brew install iperf3**"
- (Optional) Type "iperf3" and hit enter to view a list of available iPerf commands

## How to install iPerf 3 Client in Android Phone

- Install the [anality](#) app and open it
- Tap **Speed**, and the ">" button to select a test target
- Select **iPerf3 Server(TCP)**
- Input the iPerf3 Server IP Address and Client Parameters like this: iperf3t://[Server IP Address]?P=20



- To test it again, just tap **[RECENT TEST TARGETS]**.

## Tips for Performance Test

- Turn off sources of Wi-Fi that are not needed for testing to minimize interference.
- When test with smart phone, please restart the phone before test.
- When testing with multiple clients, keep them at a certain distance to avoid interference.