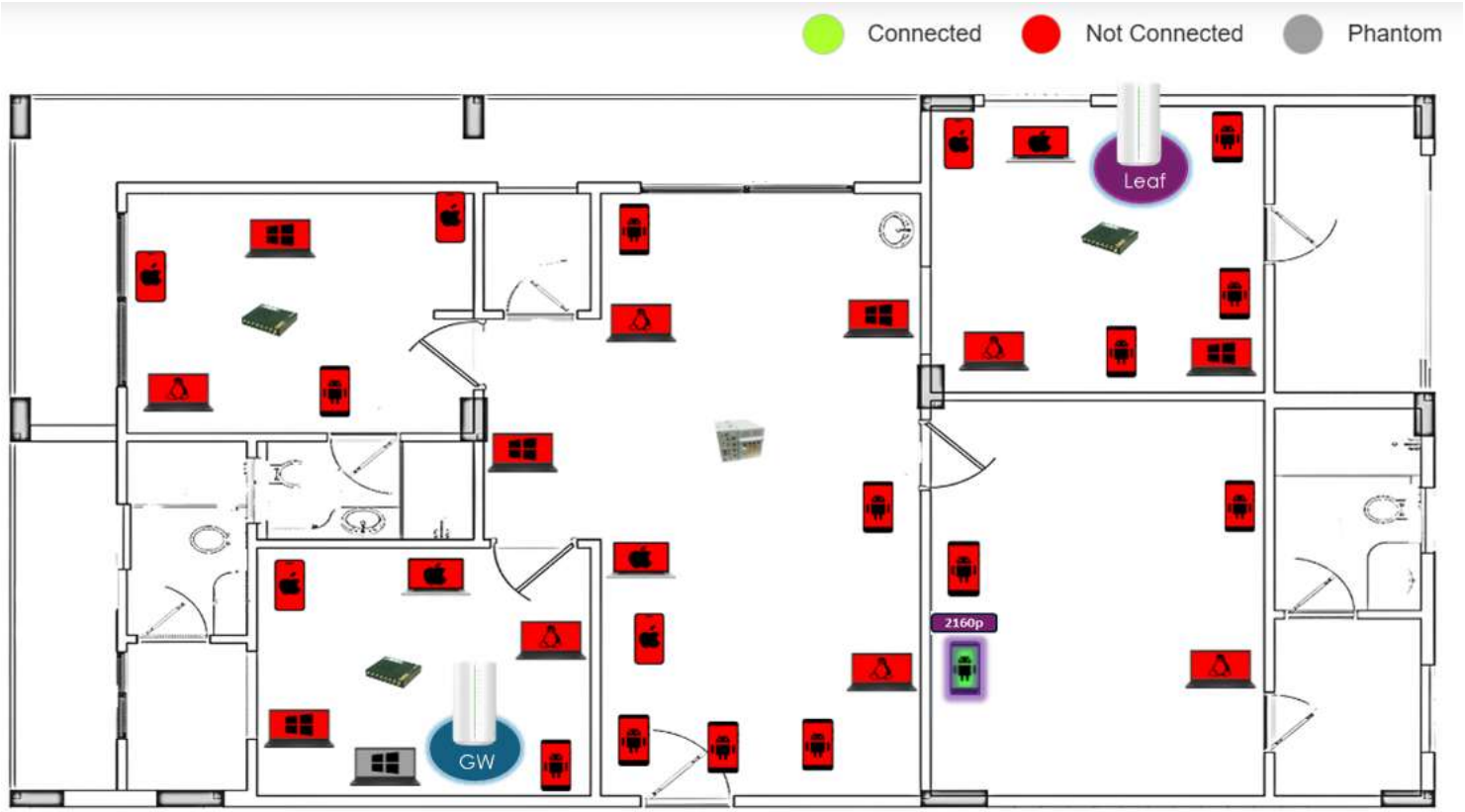
# 8. Set-Top Box (STB) Streaming Validation:

## 8.1 Verify STB video quality under high channel congestion:

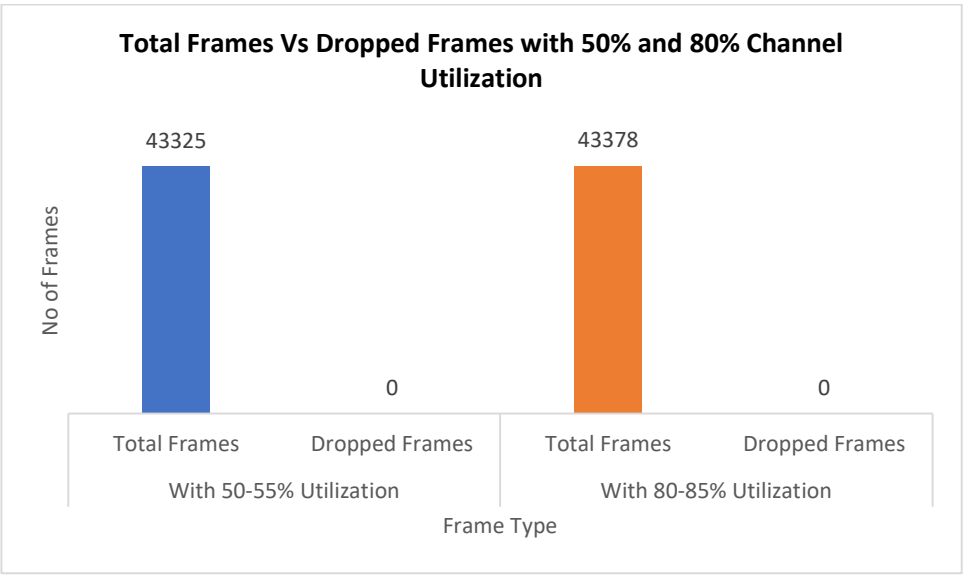
### Test Description:

- Simulate high channel congestion, i.e., 50% channel utilization.
- Connect the STB to the network and start a YouTube video stream for a 30-minute duration.
- Monitor the STB for buffering, no.of dropped frames, and video freezes.
- Repeat steps 2 to 3 with 80% channel utilization.

### Connected Devices:




### Test Results:



| Model | Device Placement | Connected Node | Connected Band | RSSI (dBm) | | With 50-55% Utilization | | With 80-85% Utilization | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | Video Resolution | Total Frames | Dropped Frames | Total Frames | Dropped Frames |
| TCL TV | Master Bedroom | Leaf | 5GHz | -61 | 4k (2160p) | 43325 | 0 | 43378 | 0 |

### Observations:

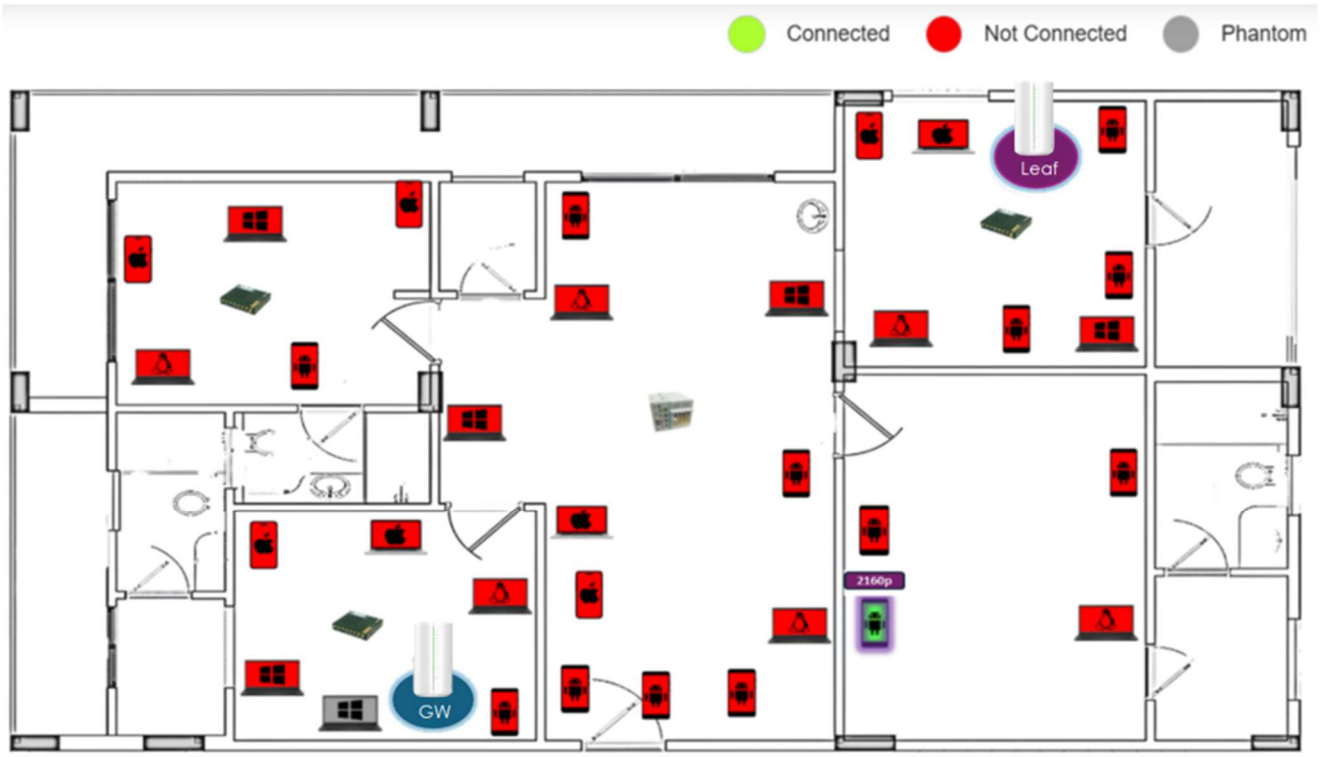
- Throughout the test duration, there were no frame drops or buffering issues, despite channel utilization levels of 50% and 80%.

## 8.2 Validate streaming quality during IoT toggling:

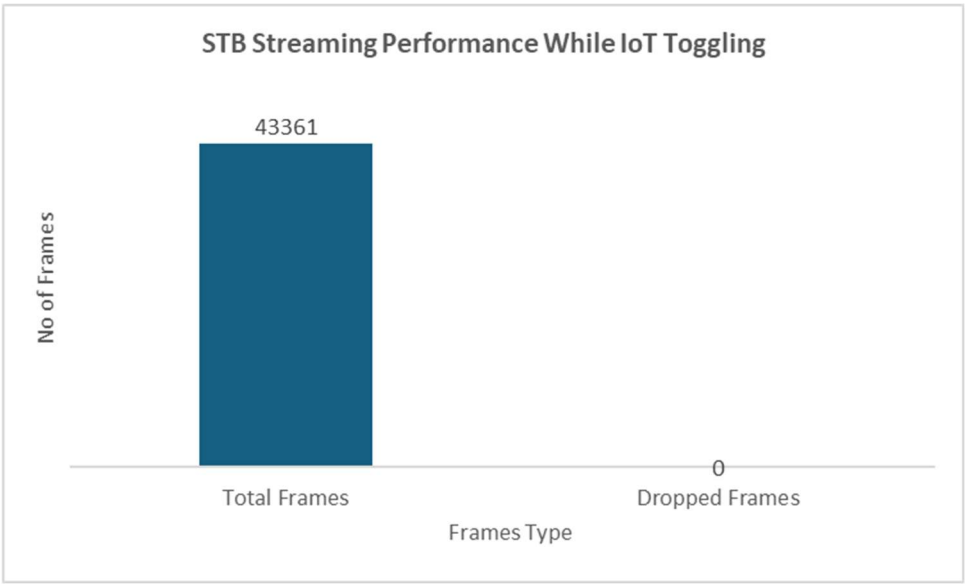
### Test Description:

- Connect the STB to the network and start a YouTube video stream.
- Continuously toggle multiple IoT devices on/off for 30 minutes.
- Monitor the STB for buffering, no.of dropped frames, and video freezes.

### Connected Devices:




### Test Results:



### Observations:

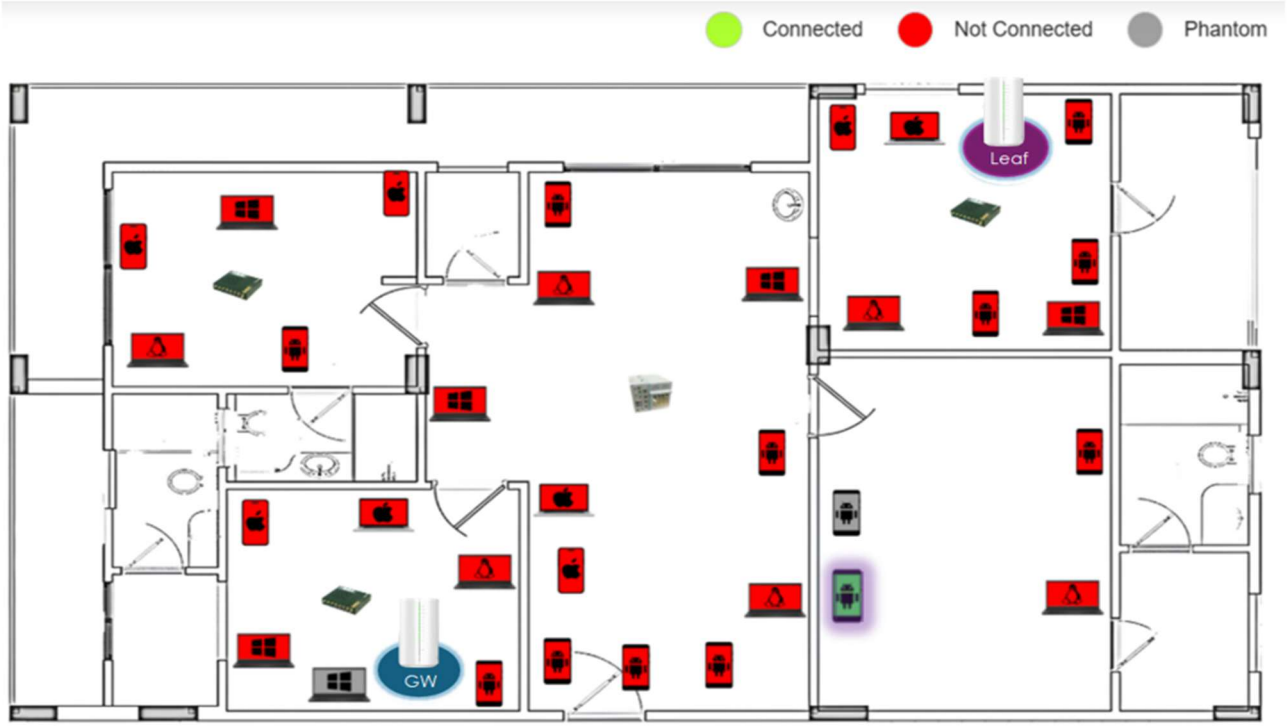
- Despite continuous toggling of IoT devices, the STB video stream on YouTube showed 0 dropped frames, no buffering, and no video freezes, indicating stable performance.

## 8.3 Assess STB video quality while transferring a 1GB file:

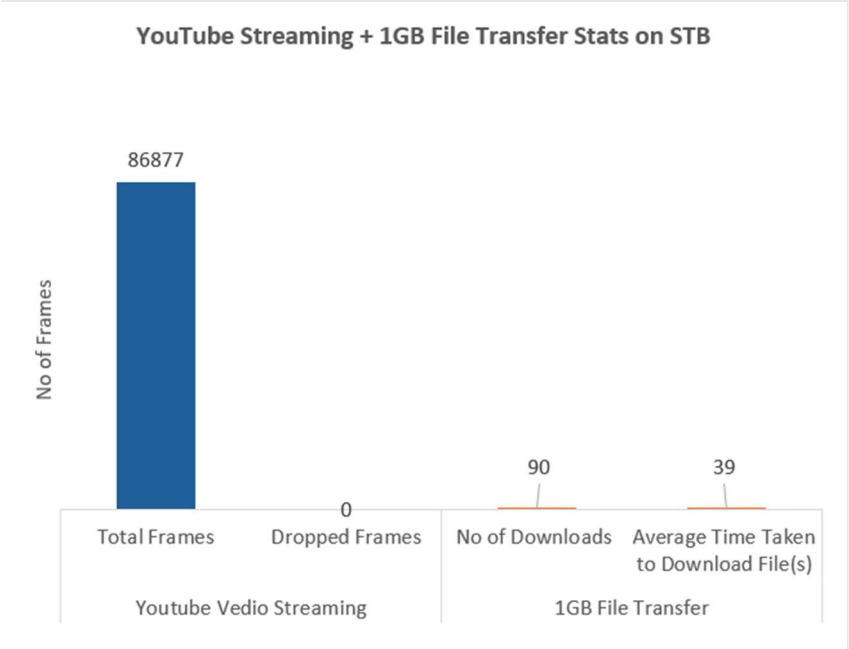
### Test Description:

- Connect the STB to the network and start a YouTube video stream for a 30-minute duration.
- Simultaneously download a large file (≥ 1GB) using the FTP protocol.
- Monitor the STB for buffering, no.of dropped frames, and video freezes.

### Connected Devices:




### Test Results



| Model | Device Placement | Connected Node | Connected Band | RSSI (dBm) | Metrics | Value |
|---|---|---|---|---|---|---|
| TCL TV | Master Bedroom | Leaf | 5GHz | -64 | Video Resolution | 4k (2160p) |
| | | | | | Total Frames | 86877 |
| | | | | | Dropped Frames | 0 |
| | | | | | No of Downloads | 90 |
| | | | | | Average Time Taken to Download File(ms) | 39292 |
| | | | | | Average Time Taken to Download File(s) | 39 |

### Observations:

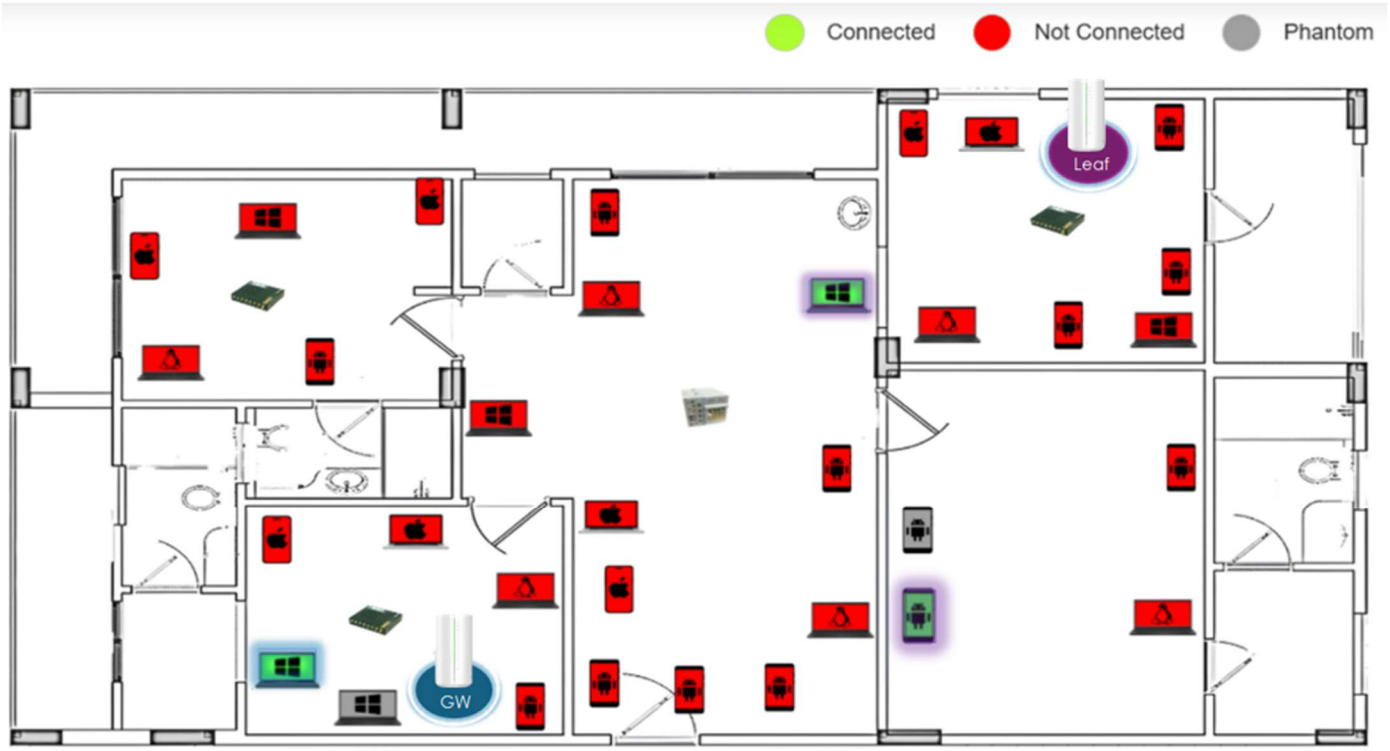
- While downloading a 1GB file observed no Video frame drops; as a result YouTube Video has no buffering.

## 8.4 Assess STB video quality with active multicast traffic in the same network:

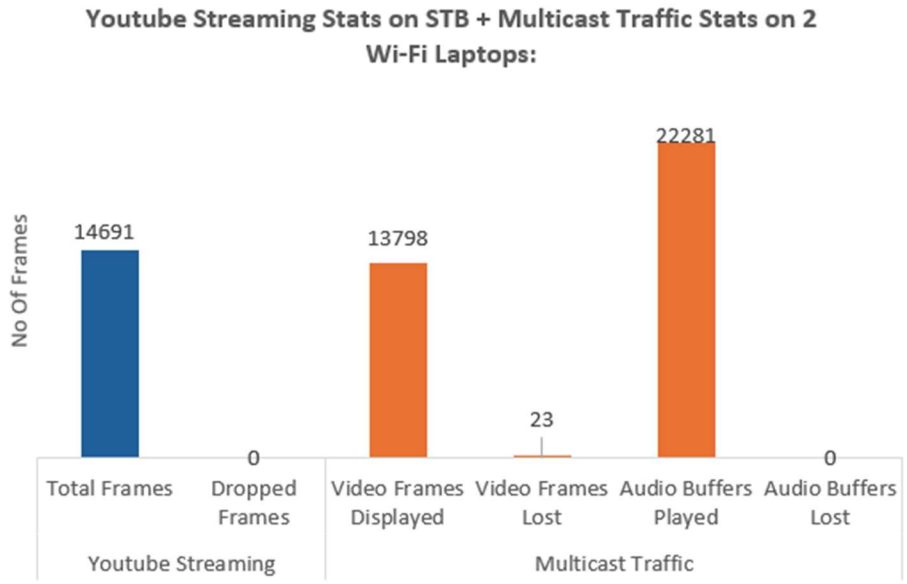
### Test Description:

- Connect the STB to the network and stream a YouTube video for a 10-minute duration.
- Connect another 2 clients to the server.
- On one client, run the VLC server, and on another client, run the VLC client and start streaming the video.
- Start the Multicast traffic and YouTube Video simultaneously.
- Monitor the STB for buffering, no.of dropped frames, and video freezes.

### Connected Devices:



## Test Results:




- Below table indicates Multicast Traffic Stats:

| Model | Device Placement | Connected Node | Connected Band | RSSI (dBm) | Operating Mode | Metrics | Value |
|---|---|---|---|---|---|---|---|
| Dell-Test | Guest Bedroom | GW | 5GHz | -21 | VLC Server | - | - |
| Dell-V9S | Living Room | Leaf | 5GHz | -46 | VLC Client | Video Frames Displayed | 13798 |
| | | | | | | Video Frames Lost | 23 |
| | | | | | | Audio Buffers Played | 22281 |
| | | | | | | Audio Buffers Lost | 0 |

## Observations:

- While running Multicast traffic on other clients, there was no YouTube video buffering on the STB, but the Multicast server and client experienced buffering.