Unveiling the Depths of Wi-Fi Active Survey Test Data:

A Comprehensive Exploration of Metrics

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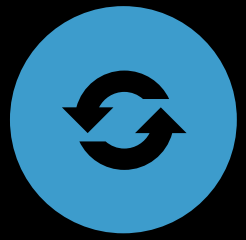
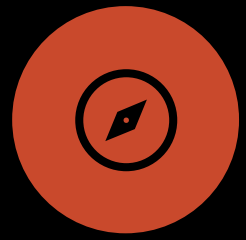
Survey Methods

STOP & GO



CONTINUOUS

AUTOPILOT



GPS

JUSTGO

Which iOS device should I buy?

- LiDAR
- LTE / GPS
- USB-C
- Camera
- Pencil 2
- Screen Size

Details in a blog

Survey Types

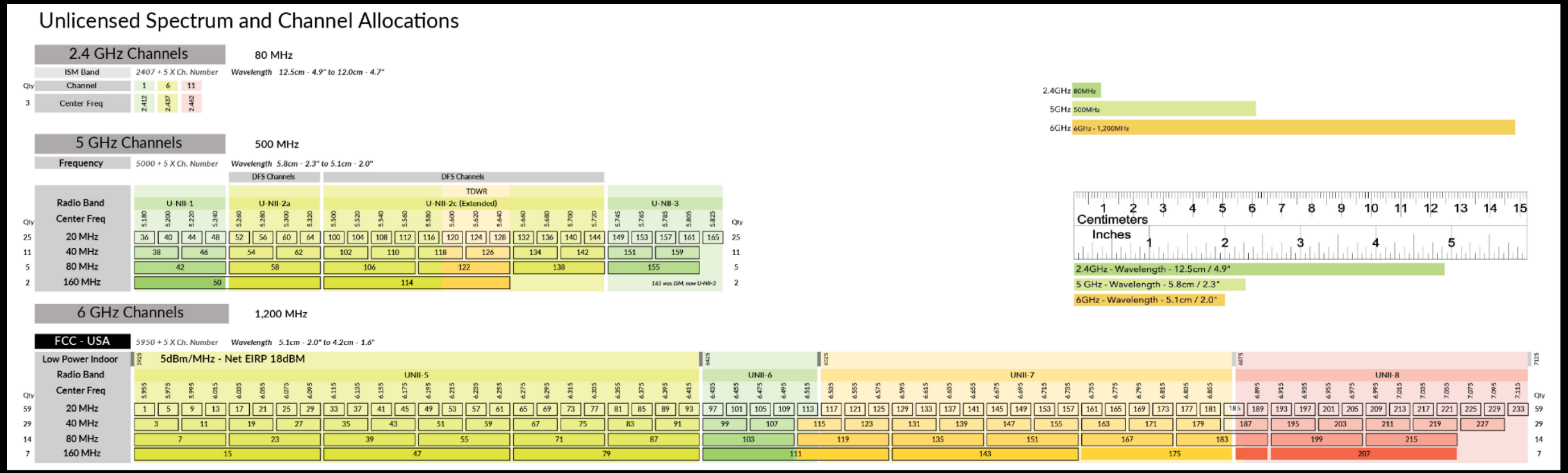
Active

- RTT
- Packet Loss
- Jitter
- Throughput

Passive

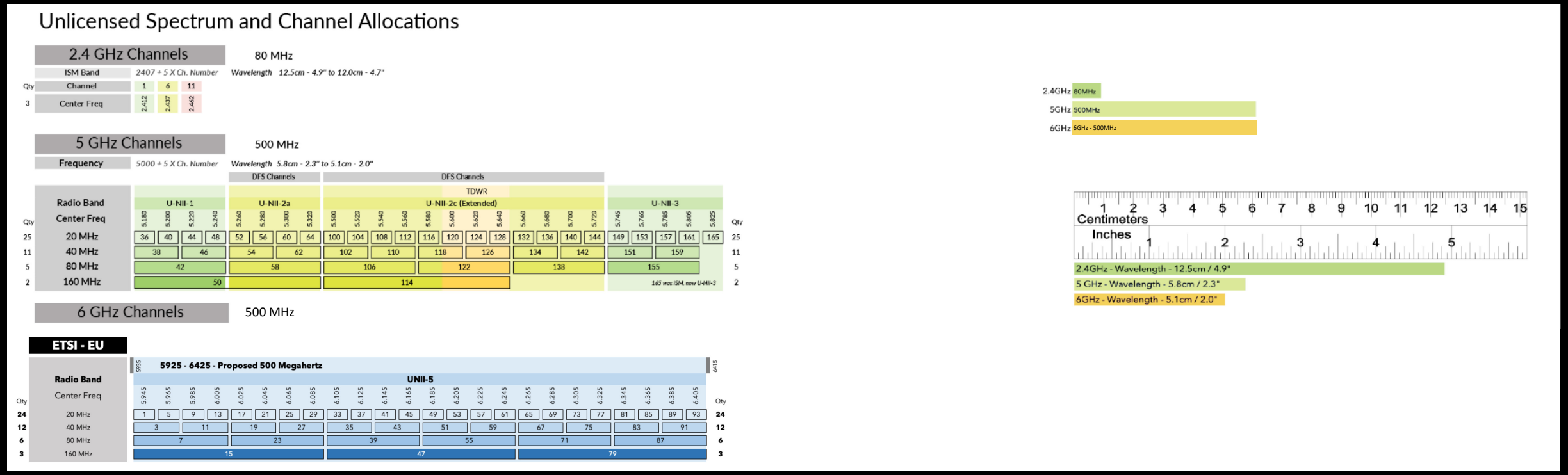
- RSSI
- SNR
- Channel Interference (CCI/ACI)

Wi-Fi Spectrum (US)



Source: WLANPros (https://wlanprofessionals.com/updated-unlicensed-spectrum-charts/)

Wi-Fi Spectrum (EU)

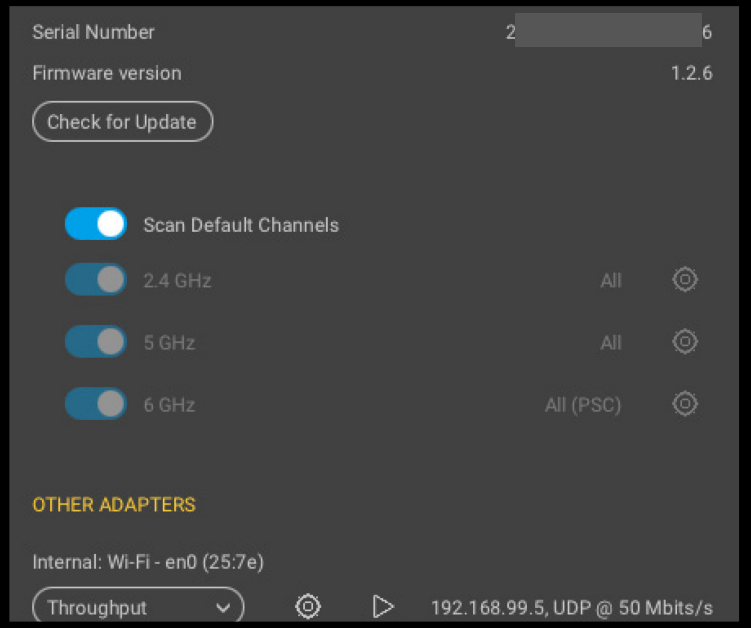


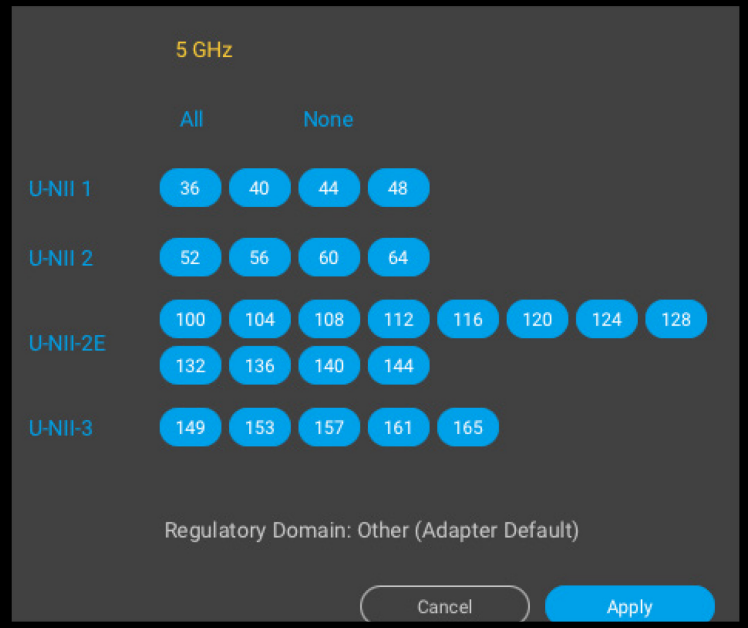
Source: WLANPros (https://wlanprofessionals.com/updated-unlicensed-spectrum-charts/)

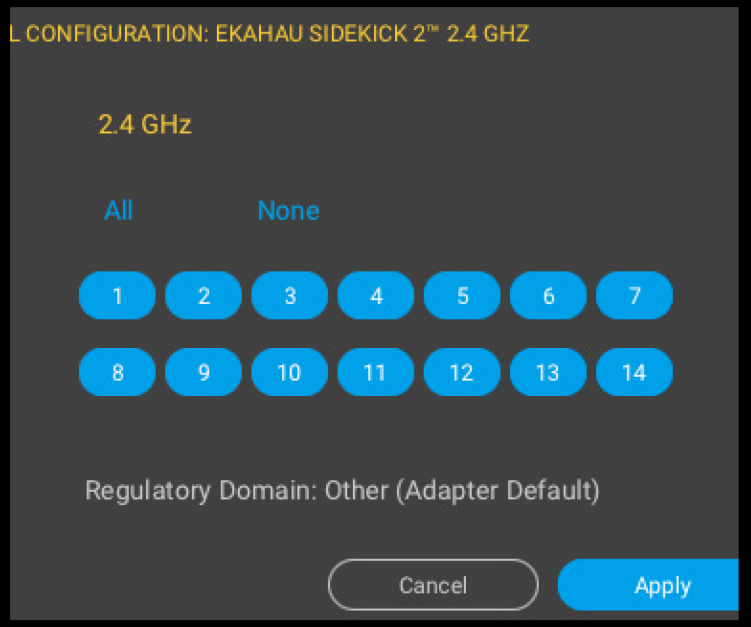
Time to Scan ALL Channels

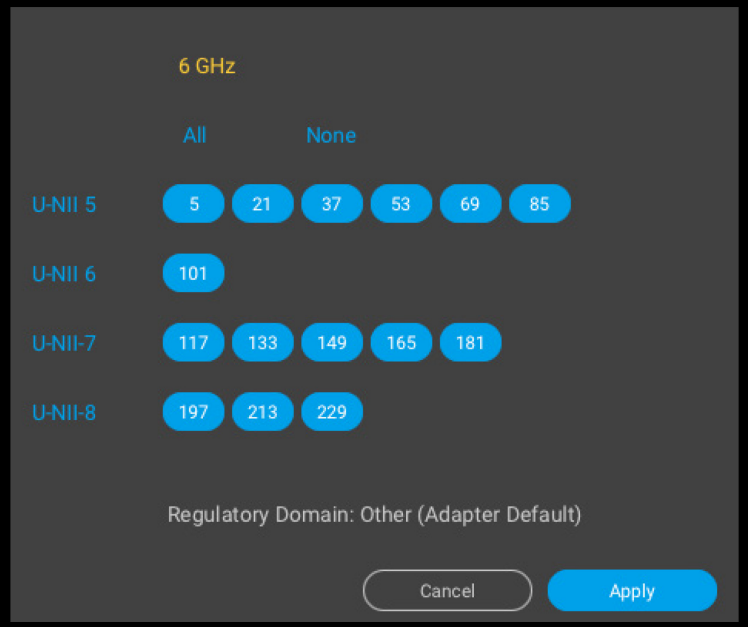
- 2.4 GHz (14 channels)
  - 1.47s / 1.365s (13 ch)
- 5 GHz (28 channels)
  - 2.94s / 2.625 (25 ch)
- 6 GHz (59 / 15 / 6 channels)
  - 6.195s / 1.575s (PSC-US) / 0.63s (PSC-EU)

Channel Scanning (AI Pro) “Other” region

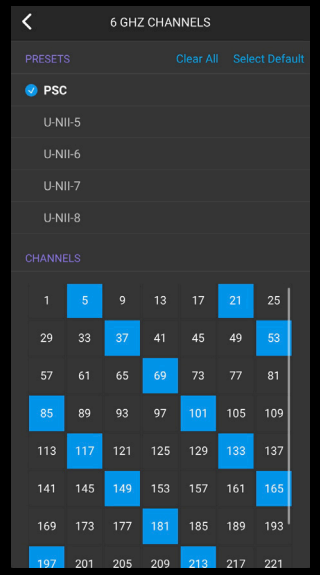


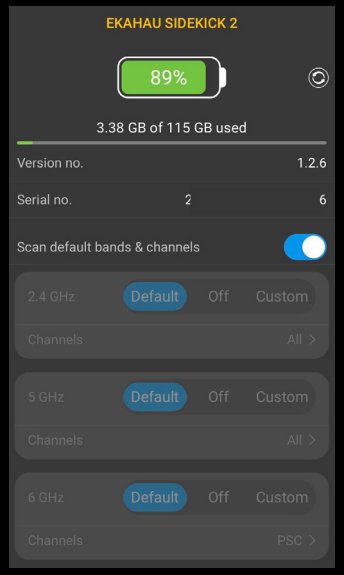


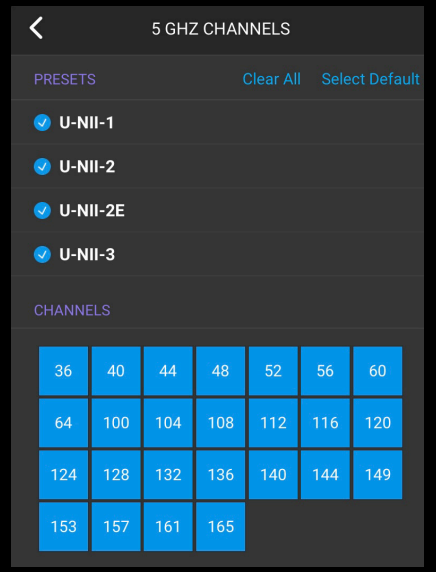


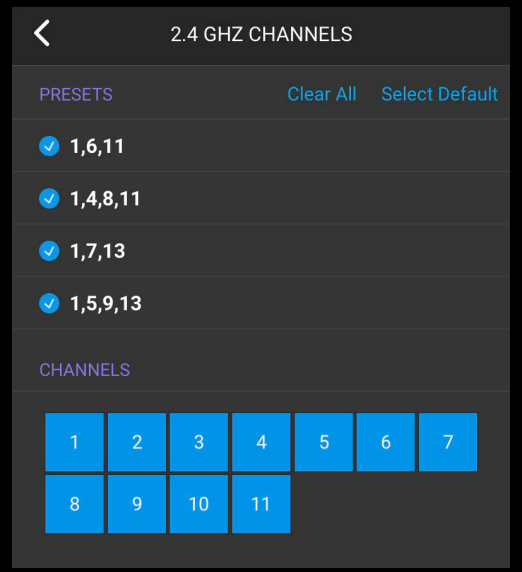


Channel Scanning (Survey App) US region

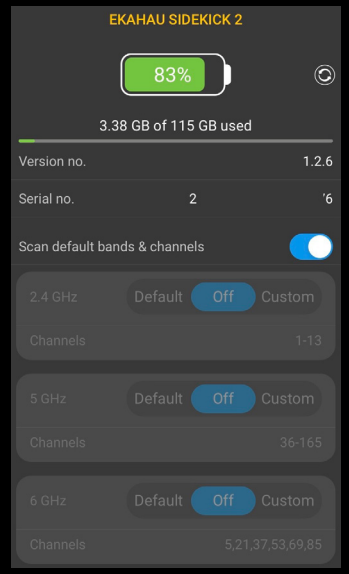


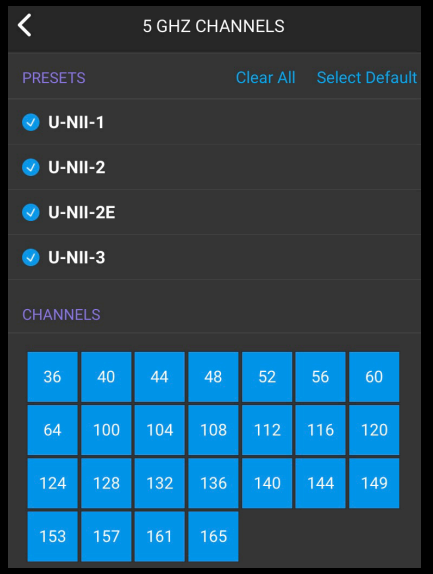


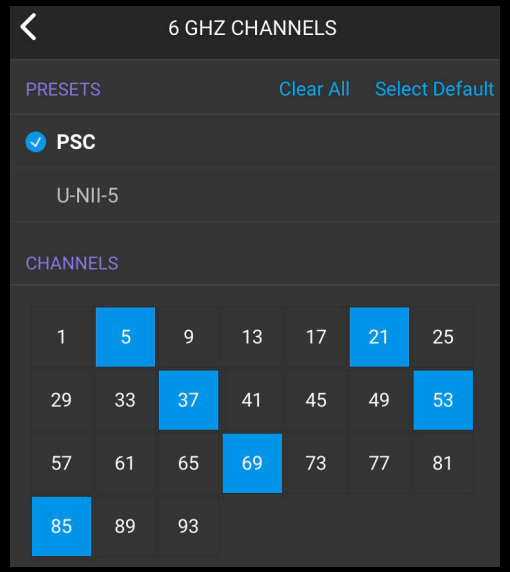


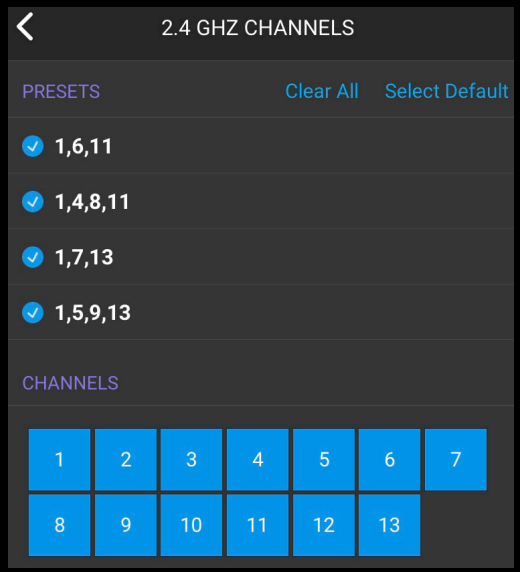


Channel Scanning (Survey App) UK region









Types of Active Survey

Ping

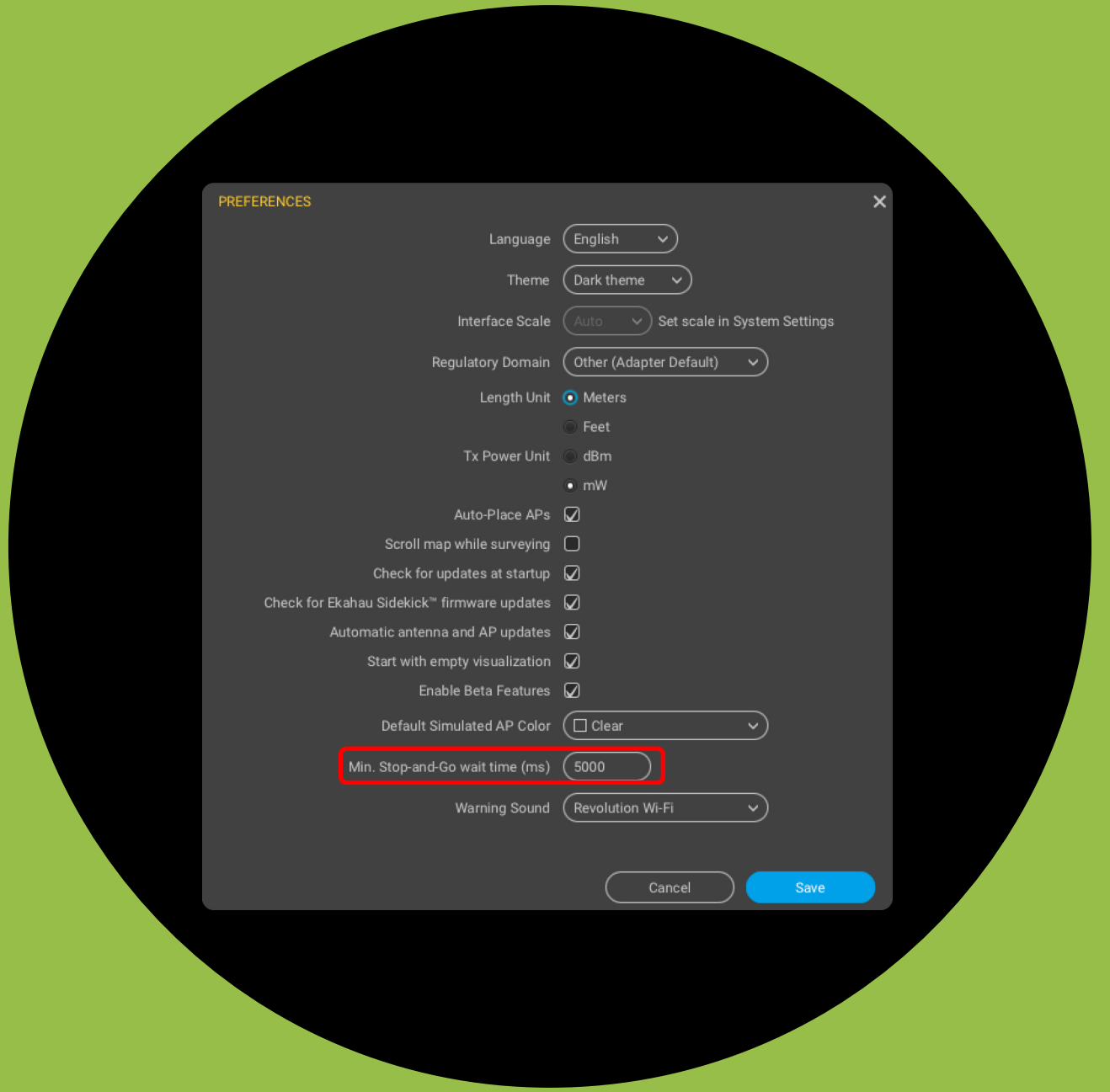
ICMP

Throughput (iPerf/ePerf)

TCP or UDP

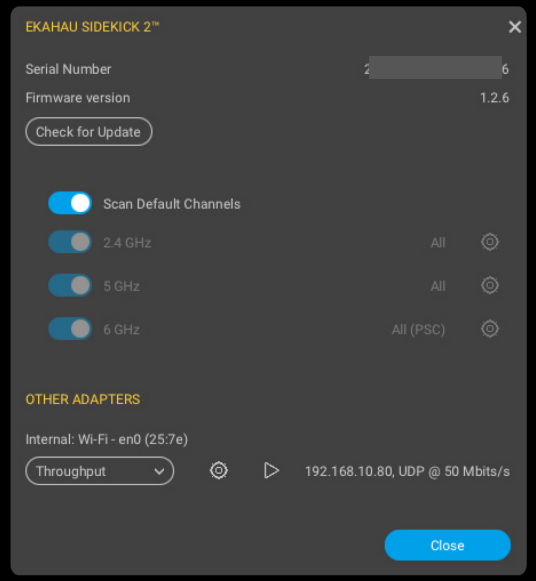
Send or Receive

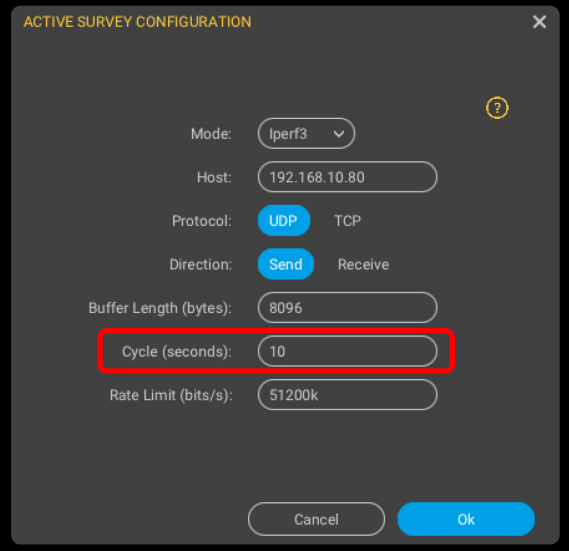
Stop & Go (PING)


PREFERENCES
Language
English
Theme
Dark theme
Interface Scale
Auto
Set scale in System Settings
Regulatory Domain
Other (Adapter Default)
Length Unit
Meters
Feet
Tx Power Unit
dBm
mW
Auto-Place APs
Scroll map while surveying
Check for updates at startup
Check for Ekahau Sidekick™ firmware updates
Automatic antenna and AP updates
Start with empty visualization
Enable Beta Features
Default Simulated AP Color
Clear
Min. Stop-and-Go wait time (ms)
5000
Warning Sound
Revolution Wi-Fi
Cancel
Save

Continuous

Throughput
(TCP / UDP packet blasting)





Cycle time will impact Stop & Go timer when using Throughput mode

Visualizations

- Data Rate
- Throughout
- Jitter
- Packet Loss
- RTT

Sample Survey

5000ms / Ping

15000ms / Ping

15000ms / 10s / TCP

15000ms / 20s / TCP

5000ms / 10s / UDP

5000ms / 20s / UDP

15s survey with 20s cycle TCP

7s survey with 10s cycle TCP

50s survey with 20s cycle TCP

56s survey with 10s cycle TCP

55s survey with 10s cycle UDP

Custom Report Template

Map <#${floor-name}#> has <#"count": {"type": "throughputs"}#> throughput measurements.

#	Start Time	End Time	Duration	Session-host	Loss #	Loss %	Jitter	Throughput Rate	Bytes Sent	Packets Sent	Measurement mode	Session Limit	Session Buffer	Session cycle
<#"loop-start": {"type": "throughputs"}#><#${throughput-number}#>	<#${throughput-start}#>	<#${throughput-end}#>	<#${throughput-duration}#>	<#${throughput-session-host}#>	<#${throughput-packets-lost}#>	<#${throughput-packet-loss-percent}#>	<#${throughput-jitter}#>	<#${throughput-rate}#>	<#${throughput-data}#>	<#${throughput-packets}#>	<#${throughput-session-protocol}#> <#${throughput-session-direction}#>	<#${throughput-session-limit}#>	<#${throughput-session-buffer}#>	<#${throughput-session-cycle}#><#"loop-end": {"type": "throughputs"}#>

Custom Report Output

Map Floor 5 has 30 throughput measurements.

#	Start Time	End Time	Duration	Session-host	Loss #	Loss %	Jitter	Throughput Rate	Bytes Sent	Packets Sent	Measurement mode	Session Limit	Session Buffer	Session cycle
1	2024-03-06-16:29:44	2024-03-06-16:29:54	10s	192.168.10.80	N/A	N/A	N/A	135 Mbits/s	172 MBytes	N/A	TCP Send	-	32 kBytes	10s
2	2024-03-06-16:29:54	2024-03-06-16:30:04	10s	192.168.10.80	N/A	N/A	N/A	147 Mbits/s	187 MBytes	N/A	TCP Send	-	32 kBytes	10s
3	2024-03-06-16:30:04	2024-03-06-16:30:14	10s	192.168.10.80	N/A	N/A	N/A	143 Mbits/s	182 MBytes	N/A	TCP Send	-	32 kBytes	10s
4	2024-03-06-16:30:14	2024-03-06-16:30:25	10s	192.168.10.80	N/A	N/A	N/A	152 Mbits/s	193 MBytes	N/A	TCP Send	-	32 kBytes	10s
5	2024-03-06-16:30:25	2024-03-06-16:30:35	10s	192.168.10.80	N/A	N/A	N/A	137 Mbits/s	175 MBytes	N/A	TCP Send	-	32 kBytes	10s
6	2024-03-06-16:32:12	2024-03-06-16:32:32	20s	192.168.10.80	N/A	N/A	N/A	139 Mbits/s	351 MBytes	N/A	TCP Send	-	32 kBytes	20s
7	2024-03-06-16:32:32	2024-03-06-16:32:52	20s	192.168.10.80	N/A	N/A	N/A	141 Mbits/s	356 MBytes	N/A	TCP Send	-	32 kBytes	20s
8	2024-03-06-17:56:29	2024-03-06-17:56:40	10s	192.168.10.80	N/A	N/A	N/A	125 Mbits/s	159 MBytes	N/A	TCP Send	-	32 kBytes	10s
9	2024-03-06-17:56:46	2024-03-06-17:56:56	10s	192.168.10.80	N/A	N/A	N/A	134 Mbits/s	171 MBytes	N/A	TCP Send	-	32 kBytes	10s
10	2024-03-06-18:15:41	2024-03-06-18:16:02	20s	192.168.10.80	0	0%	0.799 ms	43.2 Mbits/s	109 MBytes	14140	UDP Send	50 Mbits/s	7.9 kBytes	20s
11	2024-03-06-18:16:02	2024-03-06-18:16:22	20s	192.168.10.80	0	0%	0.601 ms	43.3 Mbits/s	109 MBytes	14152	UDP Send	50 Mbits/s	7.9 kBytes	20s
12	2024-03-06-18:14:17	2024-03-06-18:14:27	10s	192.168.10.80	0	0%	0.499 ms	42.8 Mbits/s	54.6 MBytes	7068	UDP Send	50 Mbits/s	7.9 kBytes	10s
13	2024-03-06-18:14:27	2024-03-06-18:14:38	10s	192.168.10.80	0	0%	0.681 ms	43 Mbits/s	54.8 MBytes	7091	UDP Send	50 Mbits/s	7.9 kBytes	10s
14	2024-03-06-18:14:38	2024-03-06-18:14:48	10s	192.168.10.80	0	0%	0.601 ms	43.2 Mbits/s	54.9 MBytes	7109	UDP Send	50 Mbits/s	7.9 kBytes	10s
15	2024-03-06-18:14:48	2024-03-06-18:14:58	10s	192.168.10.80	0	0%	0.622 ms	42.9 Mbits/s	54.6 MBytes	7073	UDP Send	50 Mbits/s	7.9 kBytes	10s
16	2024-03-06-18:14:58	2024-03-06-18:15:08	10s	192.168.10.80	0	0%	0.578 ms	42.8 Mbits/s	54.5 MBytes	7060	UDP Send	50 Mbits/s	7.9 kBytes	10s
17	2024-03-06-17:57:36	2024-03-06-17:57:56	20s	192.168.10.80	N/A	N/A	N/A	141 Mbits/s	357 MBytes	N/A	TCP Send	-	32 kBytes	20s
18	2024-03-06-17:57:59	2024-03-06-17:58:19	20s	192.168.10.80	N/A	N/A	N/A	121 Mbits/s	305 MBytes	N/A	TCP Send	-	32 kBytes	20s
19	2024-03-06-17:58:26	2024-03-06-17:58:46	20s	192.168.10.80	N/A	N/A	N/A	120 Mbits/s	302 MBytes	N/A	TCP Send	-	32 kBytes	20s
20	2024-03-06-17:58:48	2024-03-06-17:59:08	20s	192.168.10.80	N/A	N/A	N/A	124 Mbits/s	314 MBytes	N/A	TCP Send	-	32 kBytes	20s
21	2024-03-06-18:22:32	2024-03-06-18:22:52	20s	192.168.10.80	0	0%	0.464 ms	43.1 Mbits/s	109 MBytes	14090	UDP Send	50 Mbits/s	7.9 kBytes	20s
22	2024-03-06-18:22:57	2024-03-06-18:23:17	20s	192.168.10.80	0	0%	0.640 ms	43.1 Mbits/s	109 MBytes	14114	UDP Send	50 Mbits/s	7.9 kBytes	20s
23	2024-03-06-18:23:19	2024-03-06-18:23:39	20s	192.168.10.80	0	0%	0.837 ms	43.3 Mbits/s	109 MBytes	14094	UDP Send	50 Mbits/s	7.9 kBytes	20s
24	2024-03-06-18:23:41	2024-03-06-18:24:01	20s	192.168.10.80	0	0%	0.497 ms	43.1 Mbits/s	109 MBytes	14105	UDP Send	50 Mbits/s	7.9 kBytes	20s
25	2024-03-06-18:24:03	2024-03-06-18:24:24	20s	192.168.10.80	0	0%	0.760 ms	42.8 Mbits/s	108 MBytes	14021	UDP Send	50 Mbits/s	7.9 kBytes	20s
26	2024-03-06-18:24:26	2024-03-06-18:24:46	20s	192.168.10.80	0	0%	0.718 ms	42.9 Mbits/s	108 MBytes	14028	UDP Send	50 Mbits/s	7.9 kBytes	20s
27	2024-03-06-18:21:15	2024-03-06-18:21:25	10s	192.168.10.80	0	0%	0.508 ms	42.7 Mbits/s	54.3 MBytes	7032	UDP Send	50 Mbits/s	7.9 kBytes	10s
28	2024-03-06-18:21:28	2024-03-06-18:21:38	10s	192.168.10.80	0	0%	0.517 ms	43 Mbits/s	54.6 MBytes	7073	UDP Send	50 Mbits/s	7.9 kBytes	10s
29	2024-03-06-18:21:40	2024-03-06-18:21:51	10s	192.168.10.80	0	0%	0.603 ms	42.6 Mbits/s	54.2 MBytes	7022	UDP Send	50 Mbits/s	7.9 kBytes	10s

Data Analysis (TCP)

- ✓ Data Rate
- ✓ Throughput

- ❖ RTT
- ❖ Packet Loss
- ❖ Jitter

#	Start Time	End Time	Duration	Session-host	Loss #	Loss %	Jitter	Throughput Rate	Bytes Sent	Packets Sent	Measurement mode	Session Limit	Session Buffer	Session cycle
1	2024-03-06-16:29:44	2024-03-06-16:29:54	10s	192.168.10.80	N/A	N/A	N/A	135 Mbits/s	172 MBytes	N/A	TCP Send	-	32 kBytes	10s
2	2024-03-06-16:29:54	2024-03-06-16:30:04	10s	192.168.10.80	N/A	N/A	N/A	147 Mbits/s	187 MBytes	N/A	TCP Send	-	32 kBytes	10s
3	2024-03-06-16:30:04	2024-03-06-16:30:14	10s	192.168.10.80	N/A	N/A	N/A	143 Mbits/s	182 MBytes	N/A	TCP Send	-	32 kBytes	10s
4	2024-03-06-16:30:14	2024-03-06-16:30:25	10s	192.168.10.80	N/A	N/A	N/A	152 Mbits/s	193 MBytes	N/A	TCP Send	-	32 kBytes	10s
5	2024-03-06-16:30:25	2024-03-06-16:30:35	10s	192.168.10.80	N/A	N/A	N/A	137 Mbits/s	175 MBytes	N/A	TCP Send	-	32 kBytes	10s

ONLY full cycles count (55s walk)

Data Analysis (UDP)

- ✓ Data Rate
- ✓ Throughput
- ✓ Packet Loss
- ✓ Jitter

- ❖ RTT

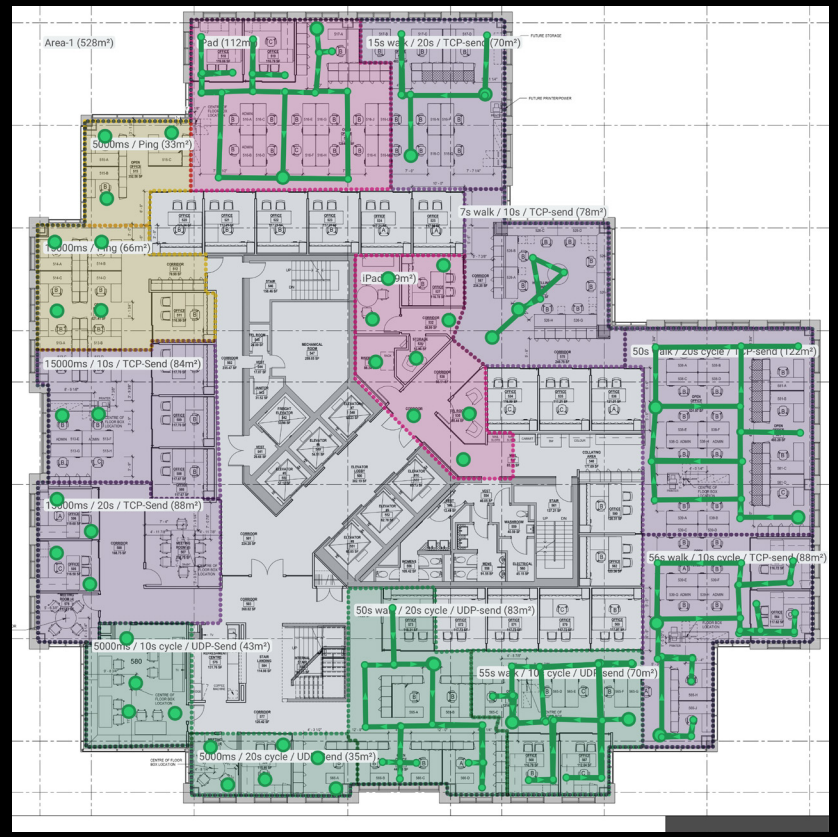
#	Start Time	End Time	Duration	Session-host	Loss #	Loss %	Jitter	Throughput Rate	Bytes Sent	Packets Sent	Measurement mode	Session Limit	Session Buffer	Session cycle
10	2024-03-06-18:15:41	2024-03-06-18:16:02	20s	192.168.10.80	0	0%	0.799 ms	43.2 Mbits/s	109 MBytes	14140	UDP Send	50 Mbits/s	7.9 kBytes	20s
11	2024-03-06-18:16:02	2024-03-06-18:16:22	20s	192.168.10.80	0	0%	0.601 ms	43.3 Mbits/s	109 MBytes	14152	UDP Send	50 Mbits/s	7.9 kBytes	20s

ONLY full cycles count (50s walk)

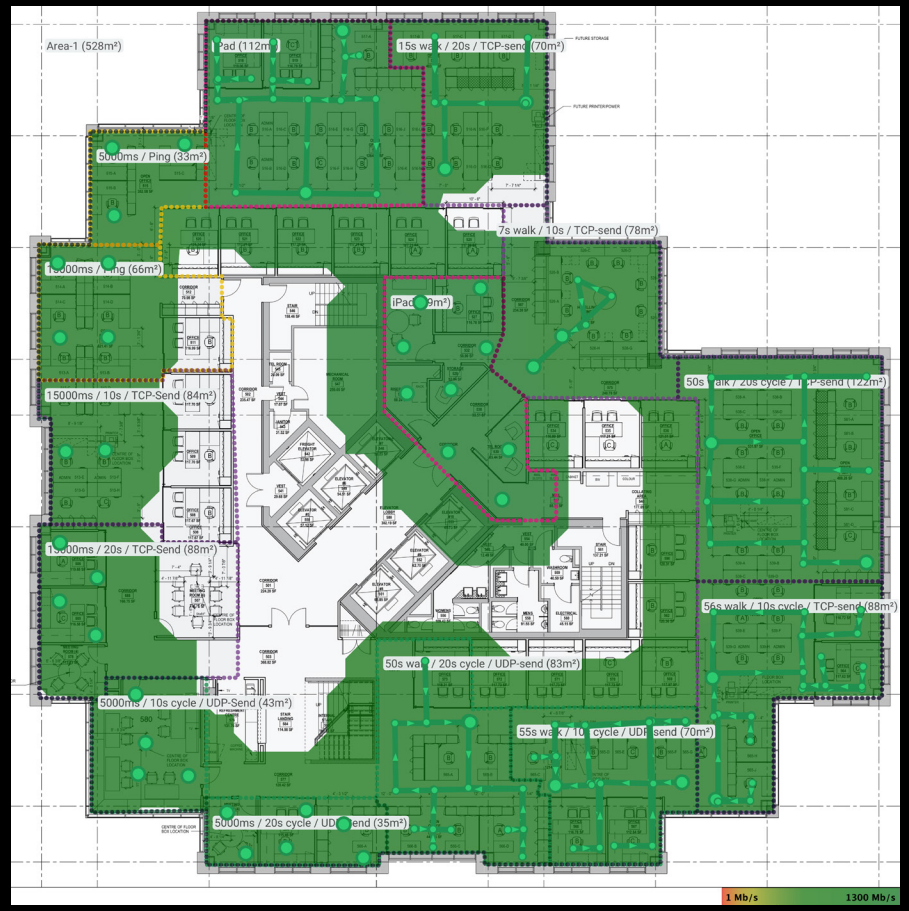
Data Analysis (Ping)

- ✓ Data Rate
- ✓ RTT

- ❖ Throughput
- ❖ Packet Loss
- ❖ Jitter



Data Rate & Throughput Visualization

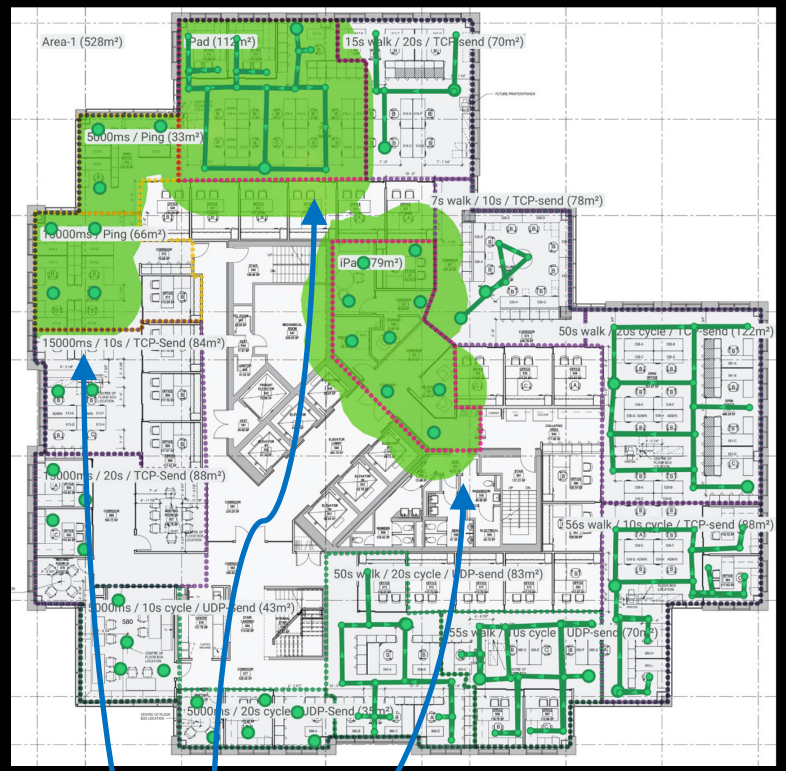


Data Rate

Throughput

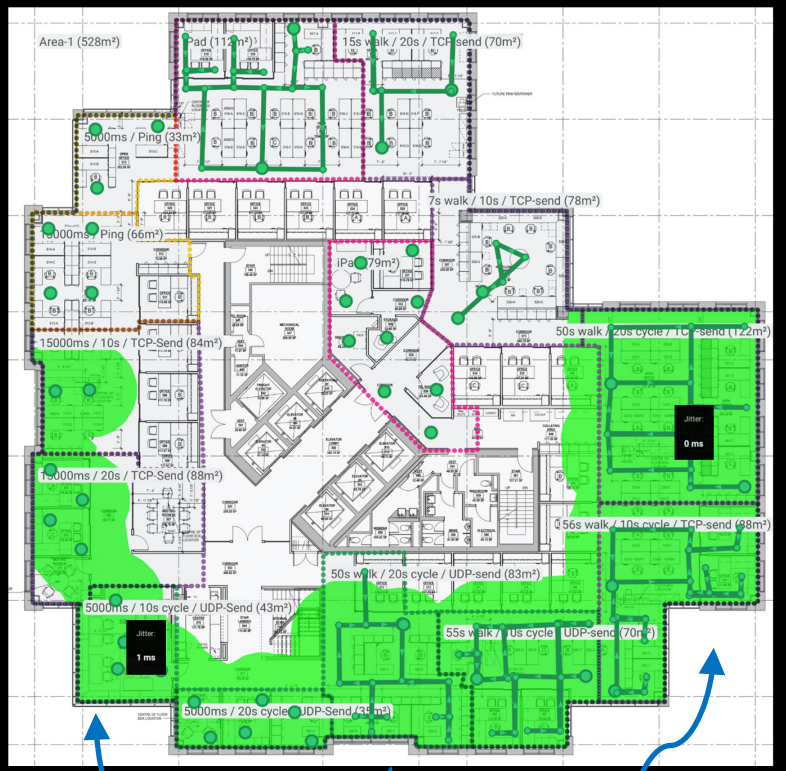
RTT, Packet Loss, and Jitter

RTT



Packet Loss

Jitter



Active Survey Data Collection Summary

Active Mode	RTT	Packet Loss (% or #)	Jitter	Data Rate	Throughput	AI Pro (macOS/Win)	Survey App (iOS/Android)
Ping	✓			✓[2]		✓	✓
UDP		✓	✓	✓[2]	✓	✓	
TCP			✓[1]	✓[2]	✓	✓	

1) Jitter is displayed in the visualization when TCP tests are performed; however, the reported jitter is 0ms at these locations.
2) Visualizations reflect AP capabilities advertised in beacon frames.

Active Survey Best Practices

- Attempt to convince stakeholders ONLY passive is required
- Budget ~7x more for project ($ + time)
- Walk in UDP mode (receive)
- Walk again in UDP mode (send)
- Walk again in Ping mode (RTT)
- Walk again in TCP mode (receive)
- Walk again in TCP mode (send)
- Before walking, did you remember to disable the SSID on ALL neighbouring APs to prevent premature roaming?

“Find your flow.”

Scan for contact details