



LigoWave

LigoWave

Your Partner in Growth

Presented by

GIRISH NAIR

Country Manager

Our Mission Statement

Wireless is a Must.

This belief drives our team forward every day

We Are Global



Selling to over **100+** countries worldwide

R&D Capabilities

- Own many IPs.
- Developed **proprietary protocol** that breaks the limits of standard Wifi Ipoll3.
- OEM partner of more than 5 large brands across the world.
- Other than the Atheros chip set most components are either manufactured or procured internally, even the casing are built in our factory.
- Ligowave belongs to those few companies which own their codes and design. You know how much was Ruckus and Meraki sold for...
- We have tailor made our firmware up to 30% to match the requirements of our large customers.
- Many products in our list was actually designed for a specific customer. Including couple of large customer in India.

iPoll V3

- Polling based proprietary communication protocol
- More CPE's per base-station
- Low Latency
- Hardware based QoS
- Multicast traffic support (triple play)
- Increased throughput



LigoPTP 5-N RapidFire Award

Spectral Efficiency with 80 MHz Channel Bandwidth 8.9 bit/Hz

Presence in India

- Present in India since 2010
- Radmax is oldest distributor and partner of LigoWave in India
- OEM with multiple partner
- Self owned RMA center
- Police Surveillance Projects
- Award Winning Flood Warning System built on RapidFire Radios
- ISP Gigantic and its Network with more than 50k subscribers
- SK Hospital in Chandigarh

Challenges in Rural Wi-Fi Deployment

The techno-Financial demand that we could meet for a Rural WIFI project in Russia & China with following demand.

- The network topology demanded was mix of PTMP & HOTSPOT. Average bandwidth demand was 2MBPS DL & 516 UL.
- Demand was for Extremely cost effective devices as they don't have a strong monetization plan.
- Each PTMP e2e link should not cost them more than 100USD from POP including all the HW & SW at central data center. This mean the total cost for shared BS radio and CPE left is @ 50 USD.
- Each link should be alive for more than three years effectively or give warranty.
- Hotspot radios are installed in areas that are heavily populated.
- They requested for central controller without any license cost. Or a edge router like Mikrotik with effective AAA and online payment facilities.
- The average subscriber load for a Hotspot radios is 100 users of which they expect not more than 20 concurrent user at any point of time.
- In public places like Hospital or small stadium they have installed 2AC to support 100 concurrent users. Here too the total cost requested for one HS Radio is not more than 120USD.
- Beamforming and rouge AP detection was the only major technology demand.

Business Case. Rural Wi-Fi in Russia



Rostelecom

An undisputable leader of the broadband,
pay-TV and fixed voice markets in Russia.

Successful triple play services using LigoDLB

Business Case. Rural Wi-Fi in Russia

LigoWave has supplied more than 100.000 radios each for Government sponsored Rural Wi-Fi Projects in Russia, Brazil and China

Distance: 100 m to 3km

Proprietary Protocol: **iPoll 3**

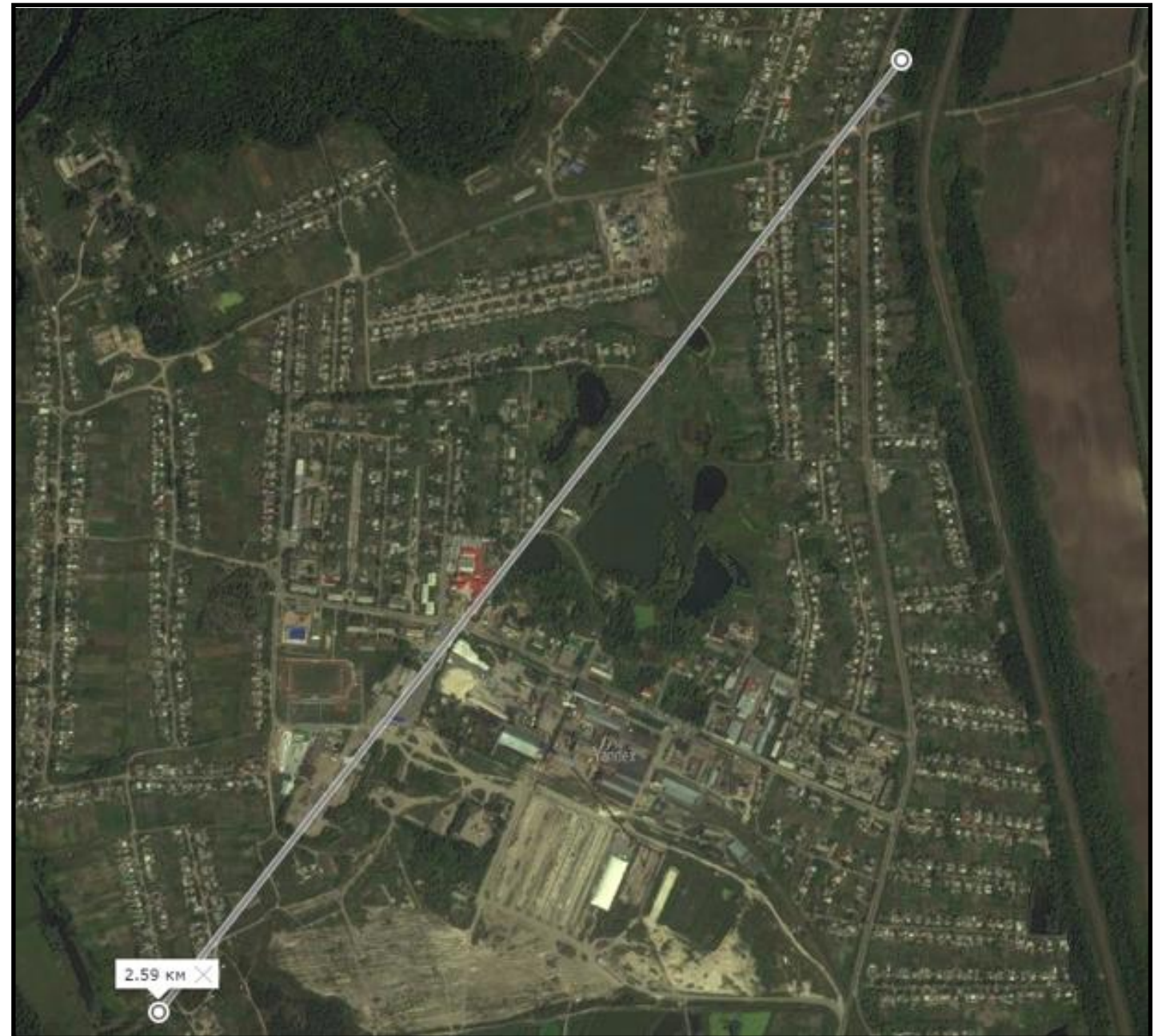
Channel Bandwidth: 20MHz

BS: LigoDLB 5-90-17ac PRO

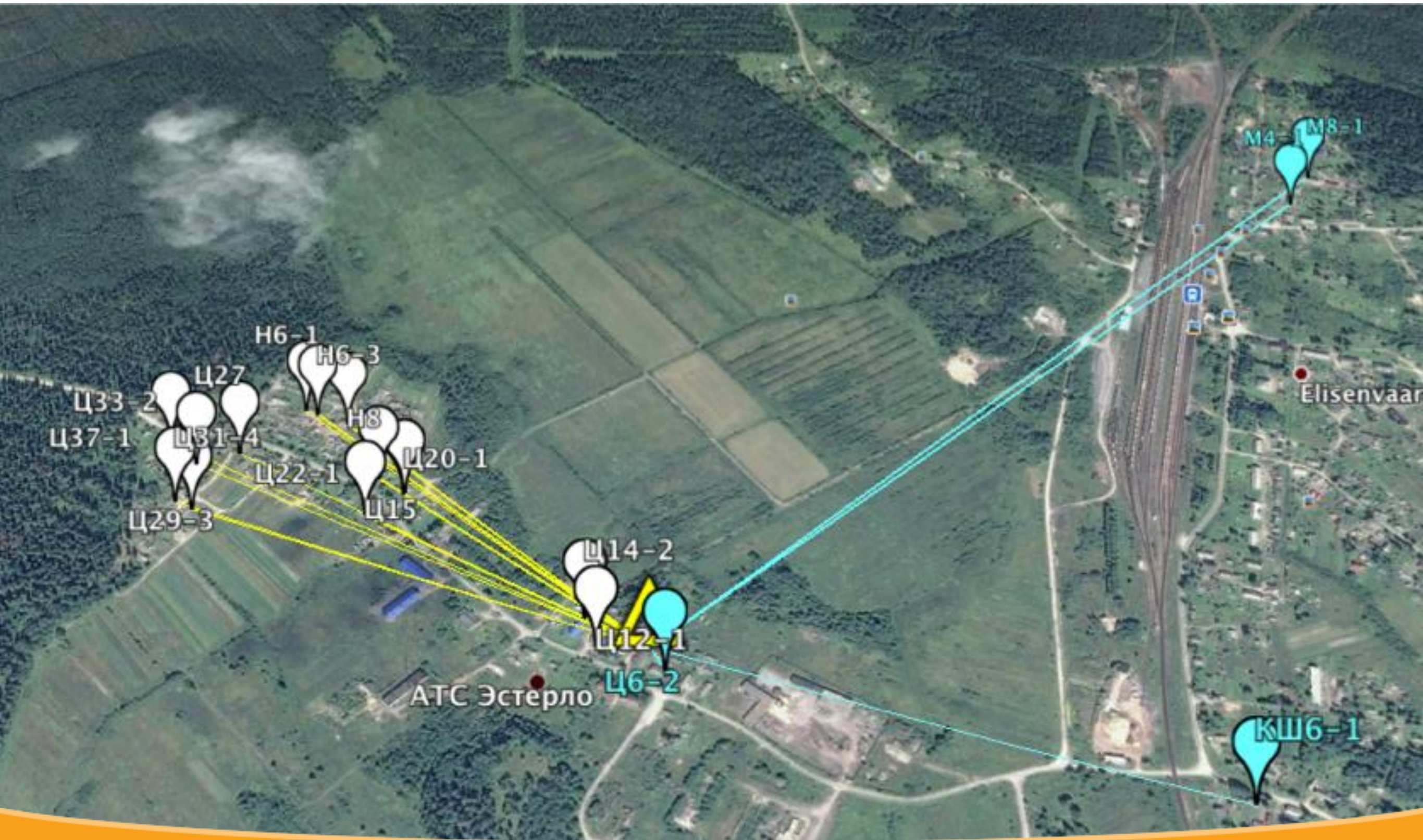
CPE: LigoDLB 5-15ac/LigoDLB 5-20ac

10,000+Radios deployed

Effective Cost per Link: 150 USD



Typical Network



LigoDLB ac base station



LigoDLB ac CPE



LigoDLB ac status

10.123.35.42	-50 / -52	173 / 173	100 / 100	iPoll 3	19 hours 52 min. 23 sec.
10.123.35.43	-54 / -53	173 / 153	100 / 88	iPoll 3	14 hours 52 min. 48 sec.
10.123.35.44	-67 / -68	129 / 68	75 / 39	iPoll 3	14 hours 53 min. 20 sec.
10.123.35.45	-60 / -58	173 / 153	100 / 88	iPoll 3	19 hours 52 min. 23 sec.
10.123.35.47	-53 / -50	104 / 117	60 / 68	iPoll 3	41 min. 37 sec.
10.123.35.48	-58 / -55	104 / 146	60 / 84	iPoll 3	3 min. 19 sec.
10.123.35.49	-56 / -52	104 / 160	60 / 92	iPoll 3	30 min. 50 sec.
10.123.35.5	-49 / -50	116 / 173	67 / 100	iPoll 3	14 hours 30 min. 34 sec.
10.123.35.50	-58 / -65	104 / 81	60 / 47	iPoll 3	12 hours 41 min. 46 sec.
10.123.35.52	-56 / -54	104 / 129	60 / 75	iPoll 3	2 hours 5 min. 19 sec.
10.123.35.53	-47 / -47	104 / 173	60 / 100	iPoll 3	4 hours 18 min. 16 sec.
10.123.35.54	-61 / -57	173 / 128	100 / 74	iPoll 3	14 hours 53 min. 24 sec.
10.123.35.56	-57 / -55	104 / 161	60 / 93	iPoll 3	11 hours 14 min. 53 sec.
10.123.35.57	-49 / -46	173 / 172	100 / 99	iPoll 3	14 hours 53 min. 28 sec.
10.123.35.58	-65 / -64	129 / 117	75 / 68	iPoll 3	14 hours 53 min. 21 sec.
10.123.35.6	-54 / -52	129 / 164	75 / 95	iPoll 3	14 hours 53 min. 32 sec.
10.123.35.60	-65 / -52	104 / 102	60 / 59	iPoll 3	52 min. 34 sec.
10.123.35.61	-56 / -54	173 / 157	100 / 91	iPoll 3	14 hours 53 min. 28 sec.
10.123.35.63	-54 / -51	104 / 171	60 / 99	iPoll 3	5 hours 12 min. 51 sec.
10.123.35.65	-52 / -49	173 / 173	100 / 100	iPoll 3	14 hours 53 min. 28 sec.
10.123.35.66	-57 / -58	144 / 131	83 / 76	iPoll 3	14 hours 53 min. 28 sec.
10.123.35.67	-46 / -49	173 / 173	100 / 100	iPoll 3	19 hours 52 min. 23 sec.
10.123.35.68	-57 / -55	104 / 150	60 / 87	iPoll 3	14 hours 53 min. 27 sec.
10.123.35.69	-56 / -56	173 / 150	100 / 87	iPoll 3	14 hours 53 min. 29 sec.
10.123.35.71	-67 / -67	104 / 103	60 / 60	iPoll 3	14 hours 5 min. 59 sec.
10.123.35.72	-51 / -58	173 / 148	100 / 86	iPoll 3	11 hours 56 min. 42 sec.
10.123.35.73	-54 / -51	104 / 124	60 / 72	iPoll 3	1 hour 15 min. 36 sec.

Uptime
19 hours 53 min. 30 sec.

CPU load (25 %)

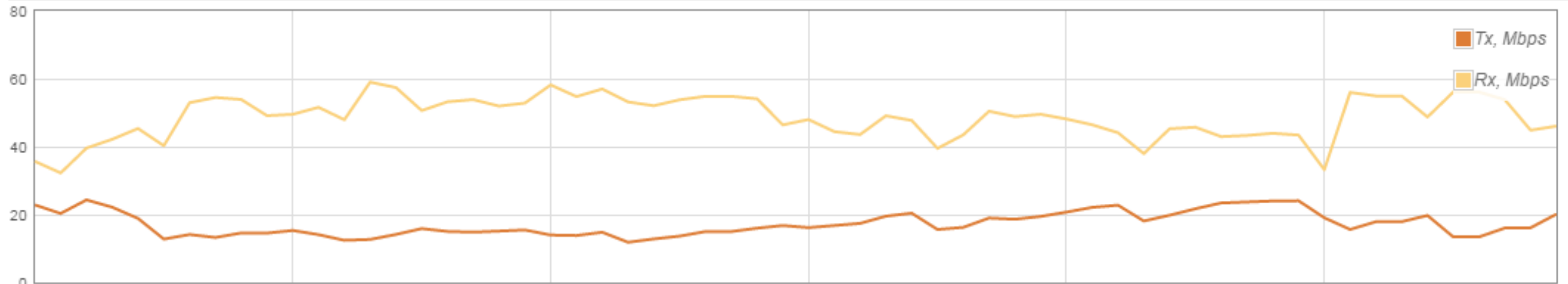
Ethernet: 1000BaseT/full

60 stations

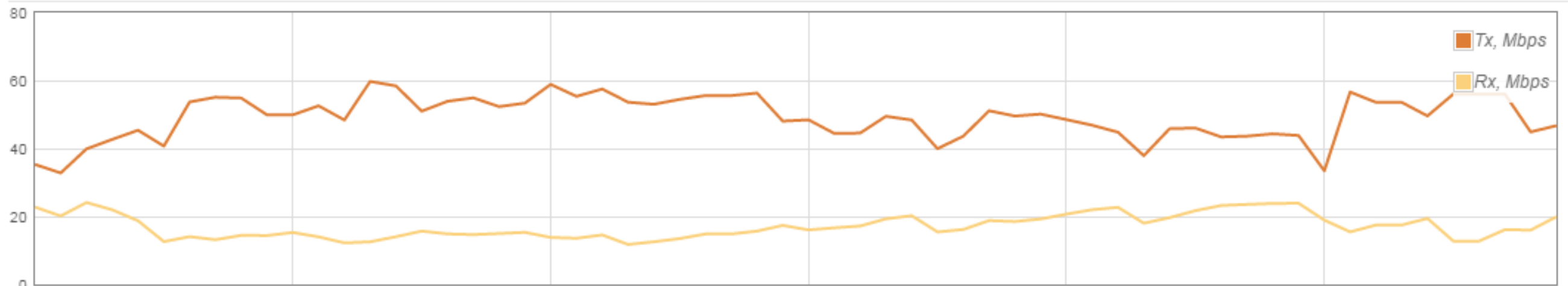
LigoDLB ac throughput

TCP duplex per BS: 70 Mbps

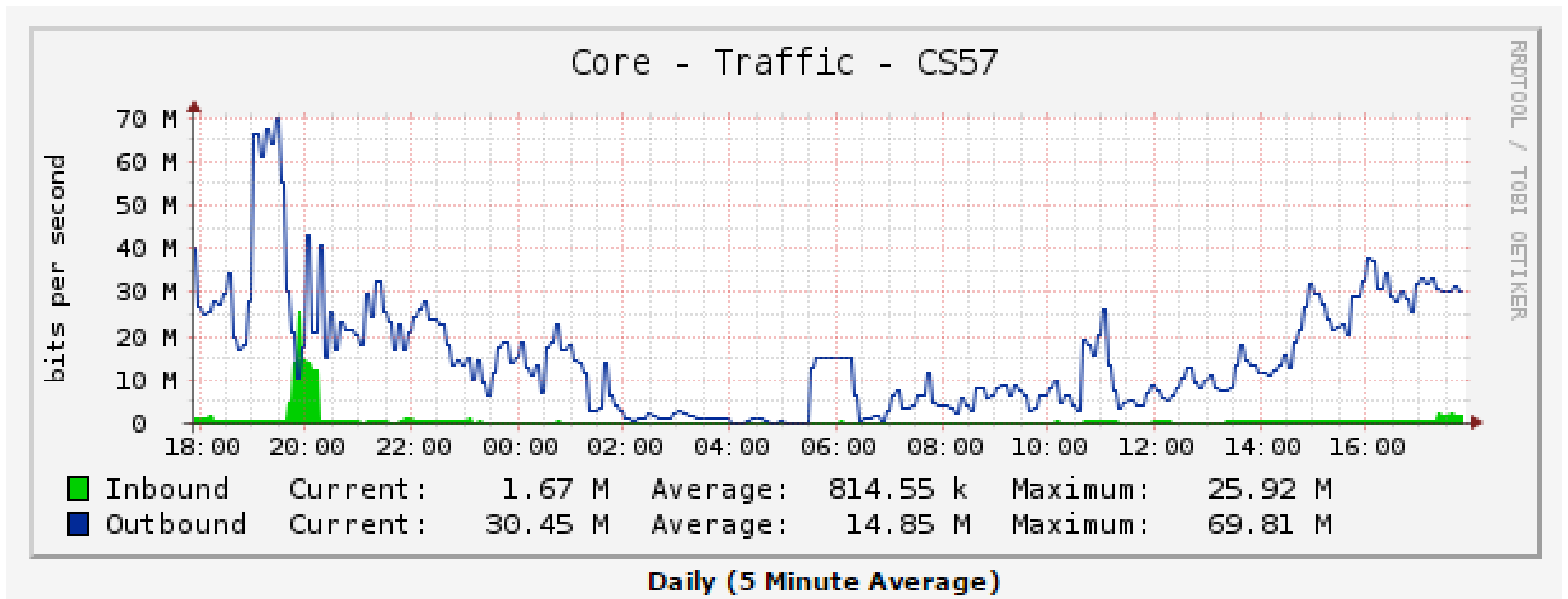
Wired (Ethernet) traffic (last 5 min.)



Wireless (ath0) traffic (last 5 min.)



LigoDLB ac base station performance

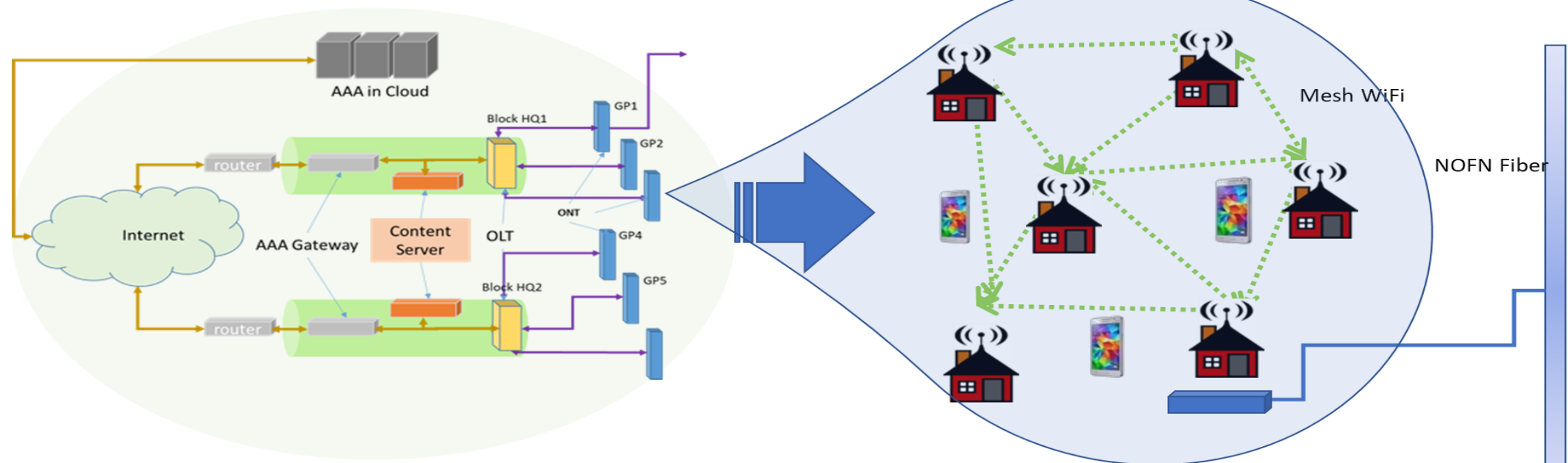


Data from WISP Linkfor

Hotspot Deployment Scenarios

- Central data center

Field deployment scenarios



Scenario 1: iPhone 6s >>>> Access SSID >>>> Mesh Node >>> Backhaul SSID >>>> Mesh AP----ADSL WiFi Router----Internet Internet Speed

4.5Mbps Internet speed – broadband internet

3Mbps Internet speed – iPhone 6s to ADSL WiFi Router

3Mbps Internet speed – iPhone 6s to Mesh AP

3Mbps Internet speed – iPhone 6s to Mesh Node

Internet speed are approximately the same from any point of access.

THANK YOU

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