Bridging the Connectivity Gap

Leveraging the Unconventional Last-Mile

tnc24
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Ben Kyemba Kitimbo

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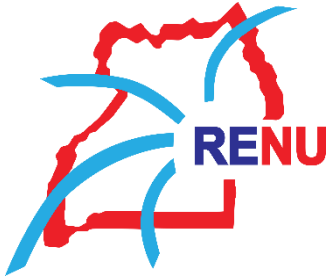


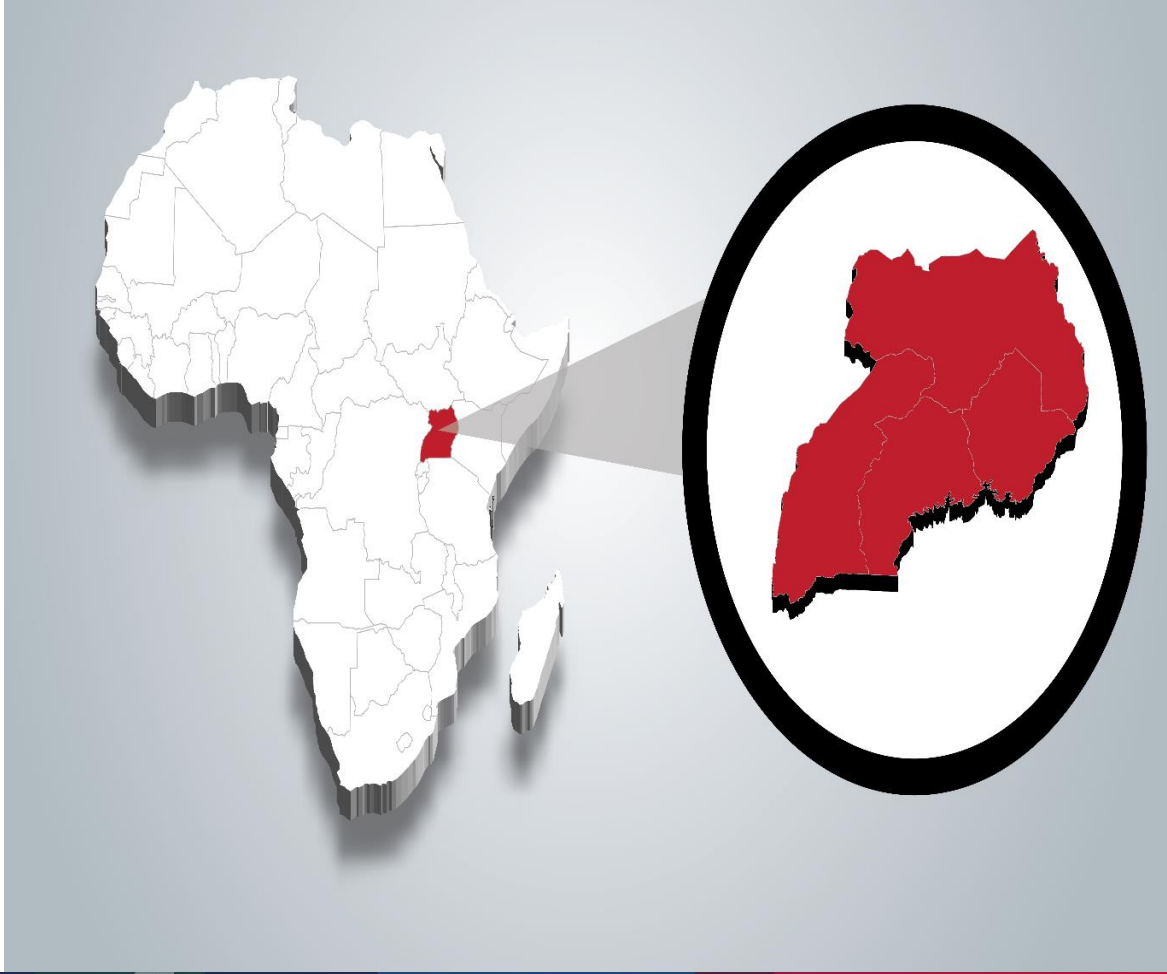
Overview

Outline

- Background
- Underserved Communities
- Connectivity Gap
- Objectives
- Implementation
- Network Performance
- Conclusion
- Q&A

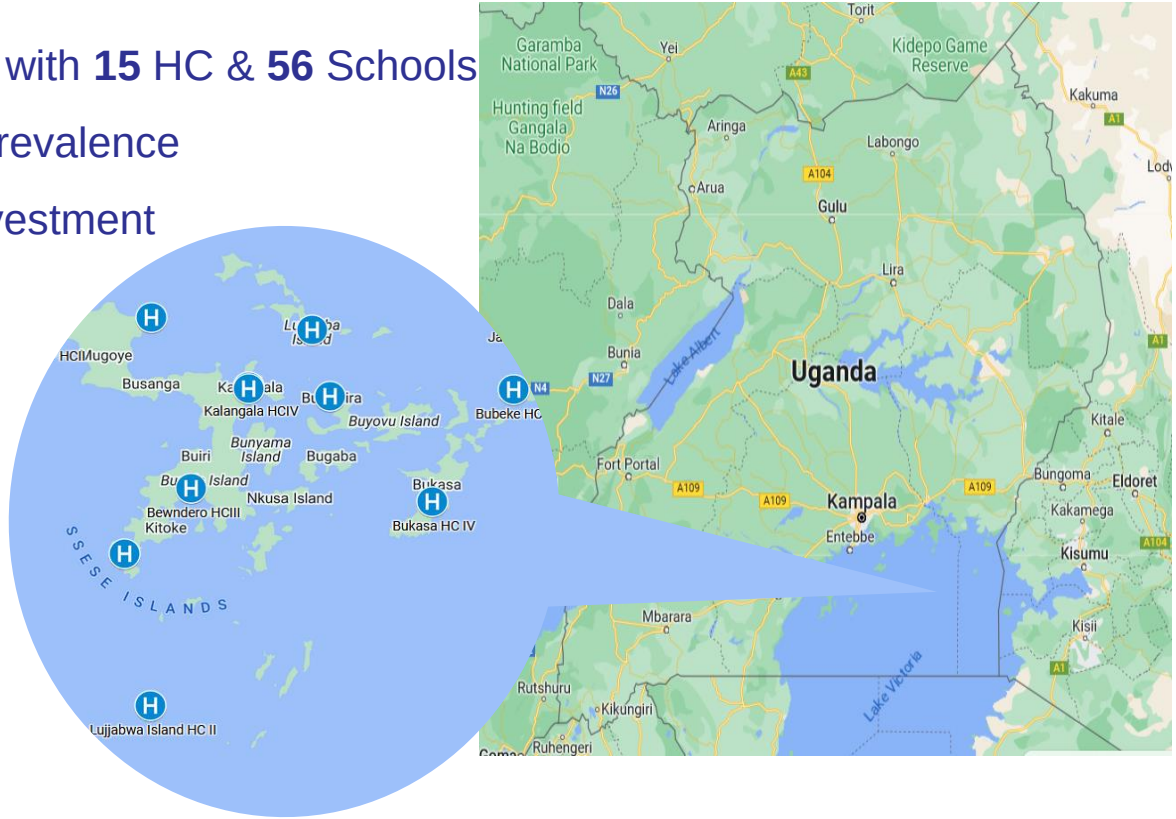
Background

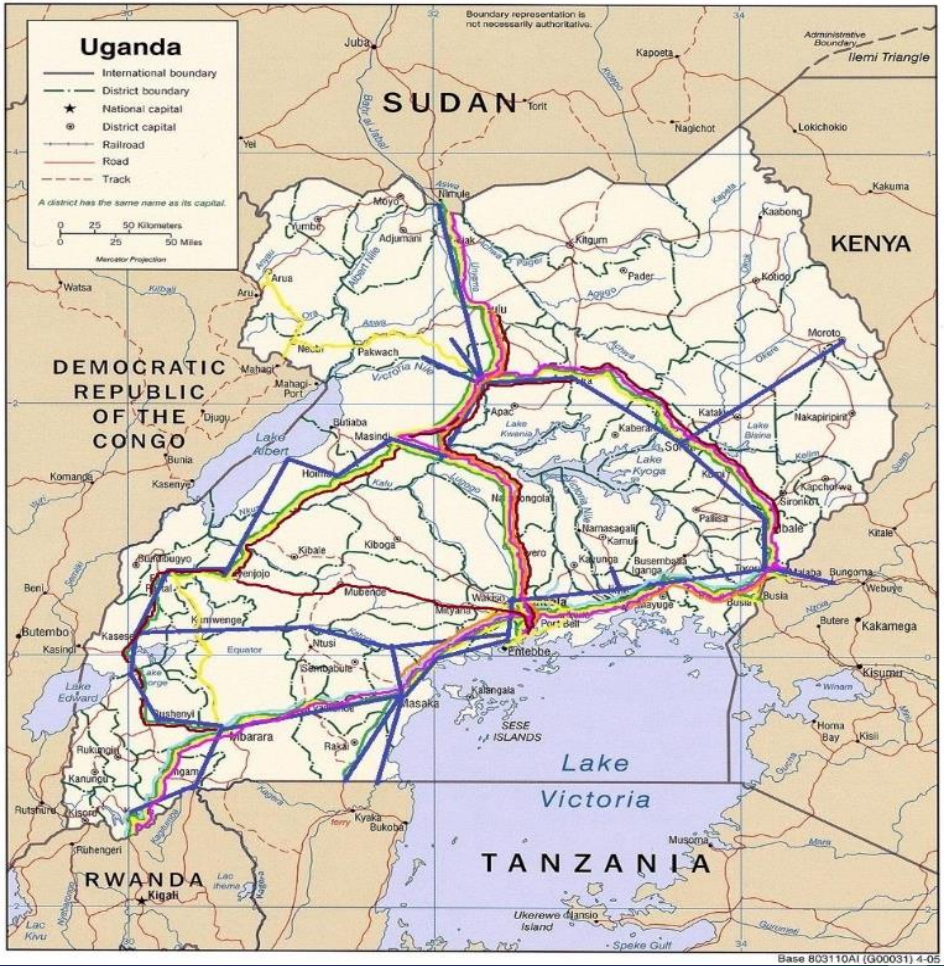
- Landlocked country
- Underserved communities
  - Schools & Health Centers
- Need for reliable connectivity
  - To empower research in tackling HIV prevalence
  - To enhance collaboration, innovation, and equal opportunities
  - To improve patient care and reduce maternal mortality



Underserved Community – Kalangala District

- **84** islands located in L. Victoria with **15** HC & **56** Schools
- Fishing villages with high HIV prevalence
- No commercial drive for ISP investment
- RENU mandated to connect all R&E anywhere





The Connectivity Gap

- ~ 60% Optical fiber coverage
- 64% Internet Penetration
- No low budget last mile

The Connectivity Gap

- Satellite Connectivity – a challenge
  - High-Latency (600ms +)
  - High setup cost
  - Star Link not available in Uganda
- 20% of the population including R&E in need of fairly low-latency connectivity!
- Low budget reliable last mile

Project goals

- Affordable last mile (setup & maintenance)
- Fairly low latency (up to 50ms to RENU backbone)
- Low budget and Bandwidth – Sufficient for the use cases

Last mile – Microwave P2P

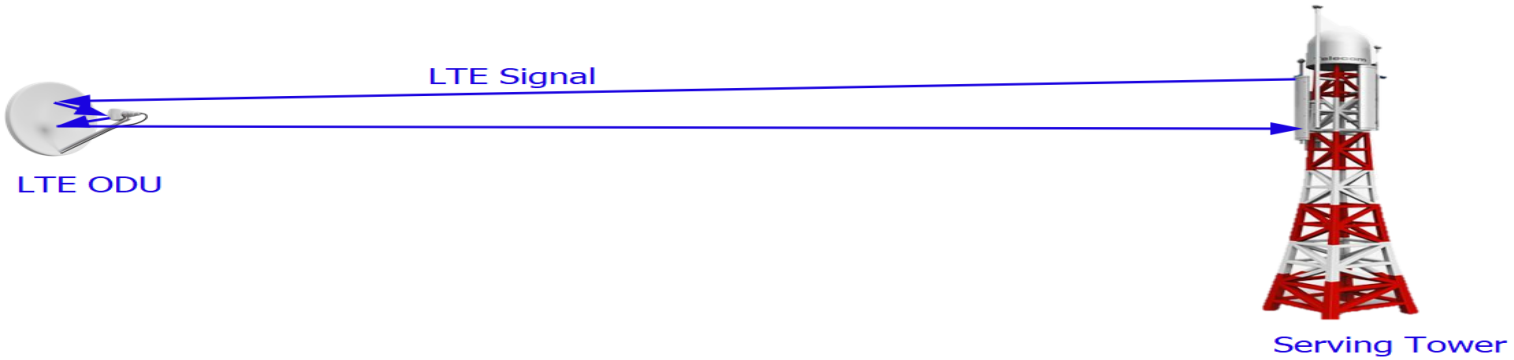
- Efficient in areas with gentle terrain
- Stable LOS is hard to establish in areas with rugged terrain

Last mile – LTE

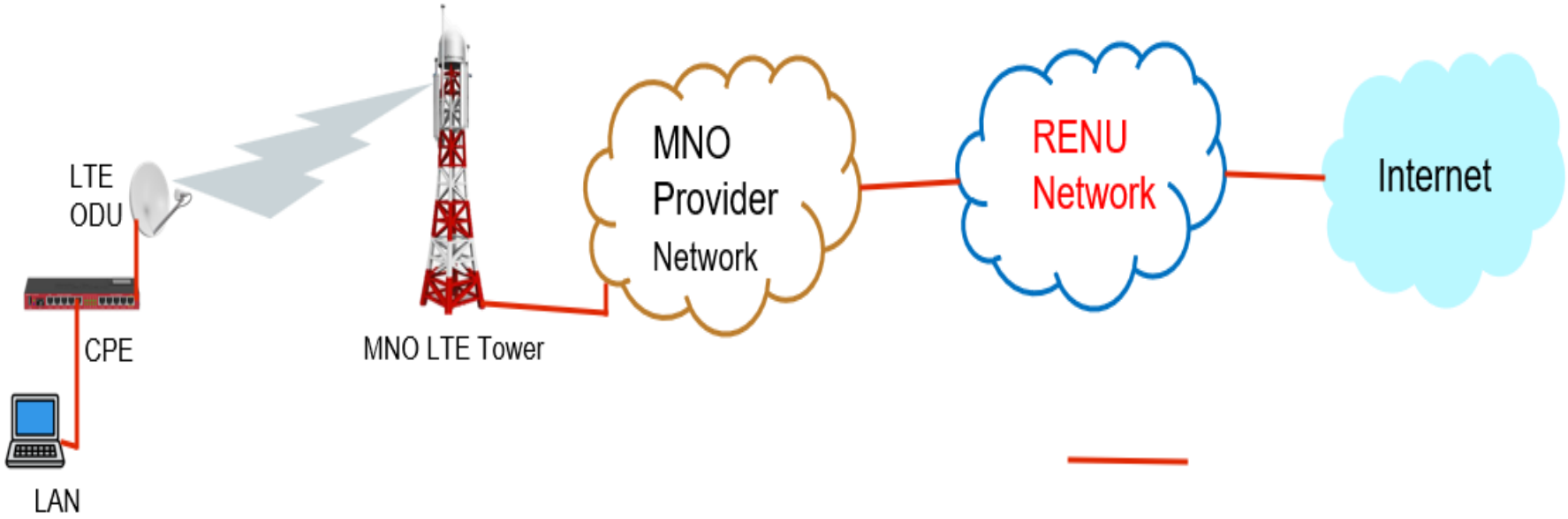
- Leveraging:- 80% 4G national coverage
- A parabolic reflector antenna to enhance signal reception
- Enhanced antenna gain of more than 30 dBi
- LTE antenna compatible with satellite TV offset dish

Implementation

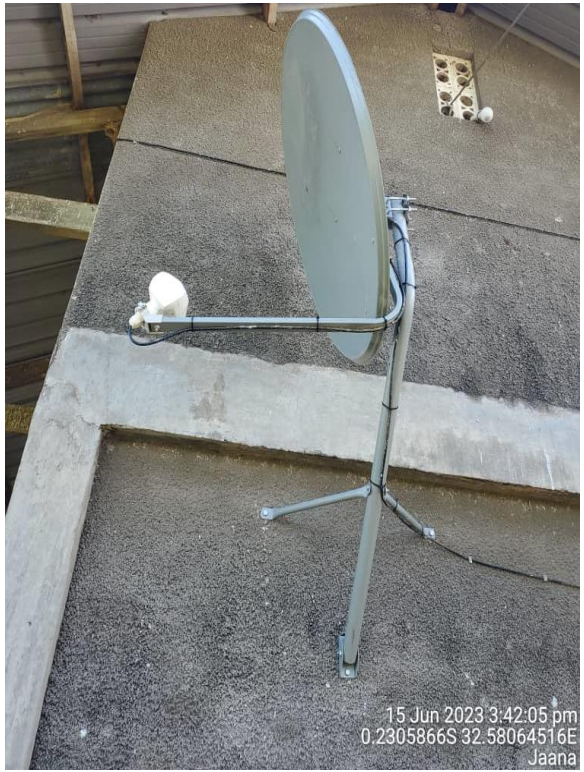
- Satellite TV Offset Dish
  - Directional reflector antenna – (Oriented to face tower)
  - Concentrates incoming signal
  - Focuses outgoing signal to serving tower in a beam



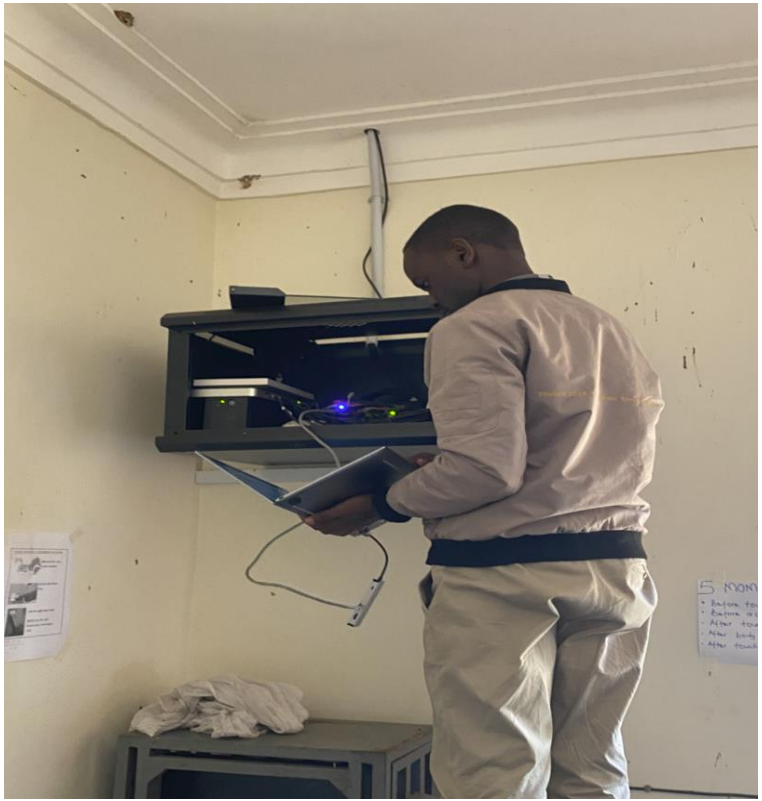
Implementation



Installation Pictorial

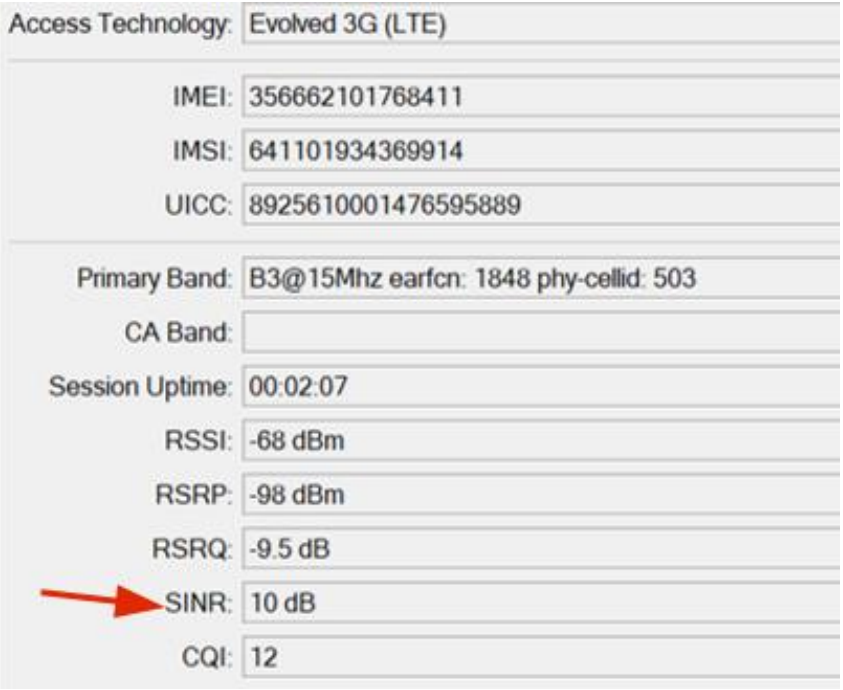


Installation teams

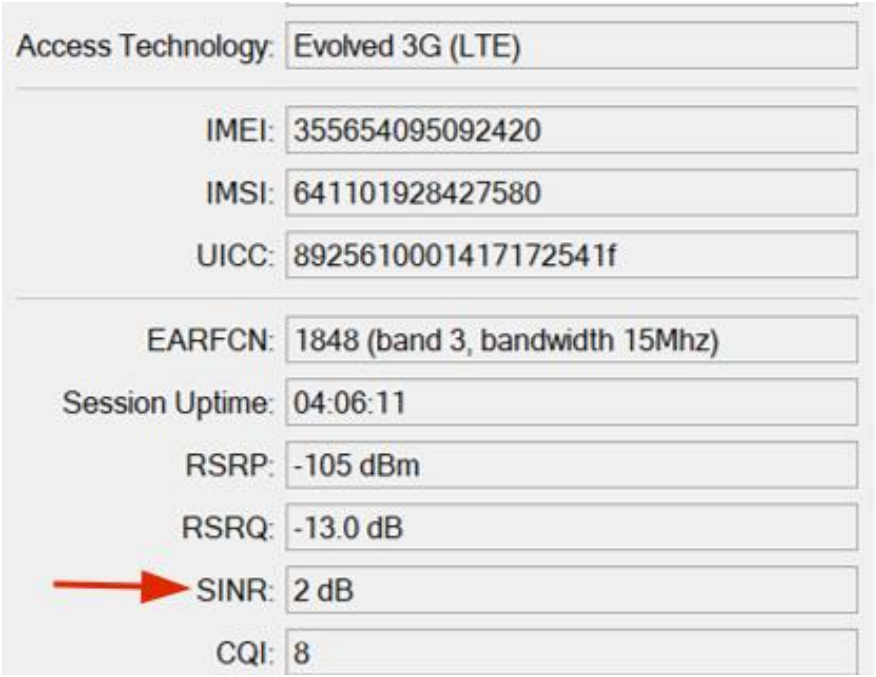


Network Performance

- With LDF: Antenna gain = 30 dBi

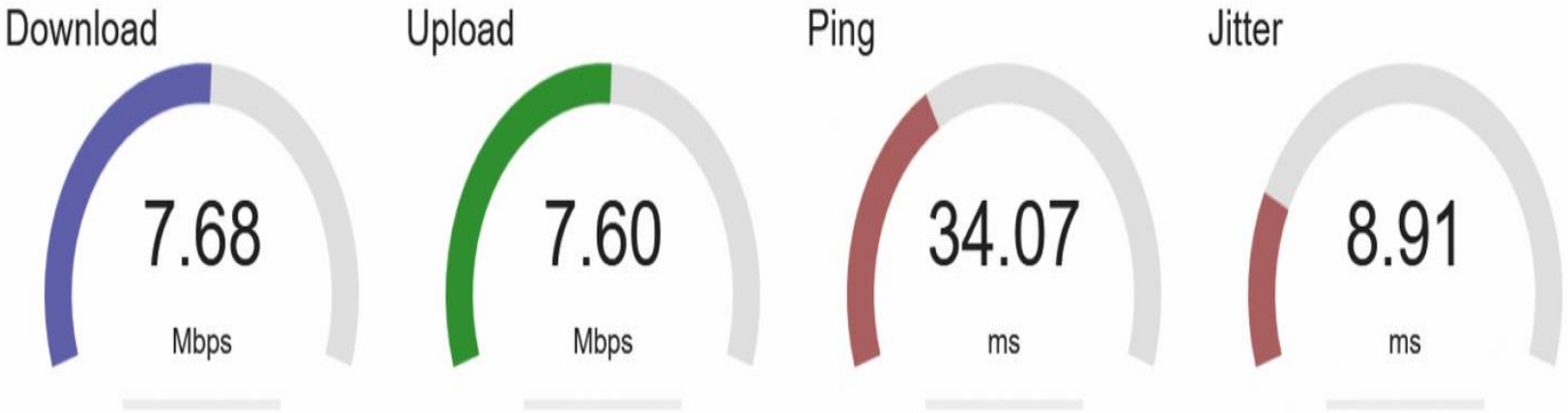


- Without LDF: Antenna gain = 21 dBi



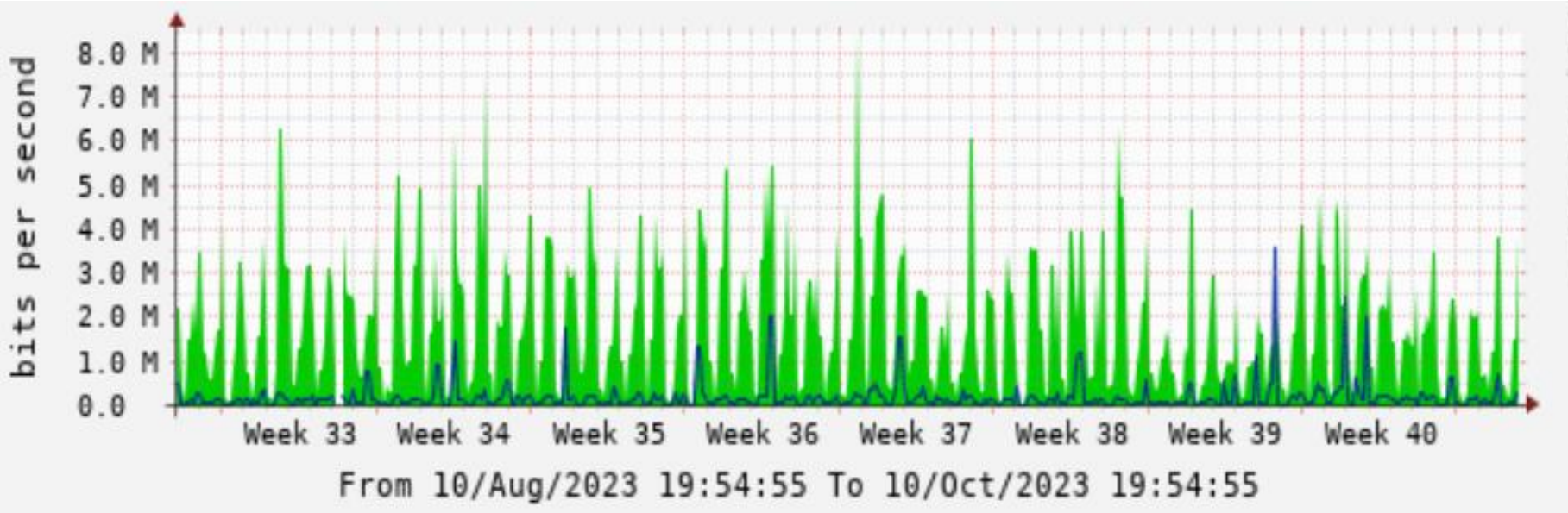
Network performance

- Tests from one of the Health Centers – Subscribed BW 8 Mbps



Network performance

- Up to 8 Mbps delivered



Challenges Overcome

- Frequent downtime as a result of LTE session hanging
    - Required physical LTE ODU restart
    - Overcome by running a script to check the LTE interface and restart in the event of a session hang
- Accessibility to the islands

Testimonial

“ Remote health centers now have seamless Internet-based communication with the Ministry of Health, Regional Referral Centers, District Health Offices, and regional health authorities. This has enhanced remote working, training, mentoring, and monitoring of health workers, systems and services. ”

Joseph Mutaasa
RHSP Regional ICT Supervisor

Thank you

Any questions?

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