

ANNEX 1 - SITES

No	Site	X	Y	Users/max	User/Simultaneous	Site Category
Rwamagana						
1	Modern Market	30.437027	-1.955986	1100+	800+	Large
2	Youth/Yego Centre	30.440728	-1.949258	500	400	Medium
3	Open Public Space /Parish front	30.436857	-1.953463	250	150	Small
4	Open Public Space Buswahirini	30.428285	-1.951795	250	150	Small
5	Expo Ground Site	30.4372655	-1.951565	1000+	500+	Medium
6	Tax Park	30.433024	-1.951892	1000+	800	Medium
7	Rwamagana handcraft centre	30.43397	-1.95875	600+	450	Medium
8	Nyagasambu Market	30.2736332	-1.896299	800+	600+	Large
9	Ntunga Market/Kwa Karangara	30.3513310	-1.962239	800+	600	Large
10	Centre kwa Gahiza	30.4512945	-1.88792	800+	700	Large
Bugesera						
11	Bugesera Modern Market	30.0848069	-2.139044	1000+	700+	Large

12	Bugesera Stadium	30.0985995	-2.156307	2500+	1000+	Large
13	Sector Office/open sitting park	30.093885	-2.144809,	300+	150	Small
14	Postal Office	30.090272	-2.147690	500	250	Small
15	Open Sitting Park	30.088394	-2.141561	500+	150	Small
16	Health Centre	30.090909	-2.147366	500	200	Small
17	Nyamata Car Park	30.086602	-2.142306	1200	800	Large
18	Alongside UEDi 1 built roads	30.08882	2.14451	250	150	Small
19	Nyamata Handcraft Centre	30.10842	-2.14651	1000+	400+	Large
20	Bugesera New Youth Centre	30,08998	-2.14867		500+	Large

ANNEX 2. KEY FINDINGS

Key Survey Results

Respondents, who were randomly selected from various areas (as shown in the images below), expressed that the internet is a vital part of their daily lives. However, a recurring theme from their responses is that the quality of the internet they currently use does not meet their expectations.

- **Internet Quality:** A majority of respondents agree that while internet access is crucial for work, communication, and education, the current service quality often falls short. Issues like slow speeds, frequent disconnects, and poor coverage in certain areas were mentioned.
- **Affordability:** Interestingly, 5,000 to 10,000 Rwandan Francs per user per month is not seen as a significant financial burden by the majority of users. Despite some issues with quality, they find this price affordable and manageable for their monthly internet needs.
- **Cost for Better Quality:** Perhaps most telling is that if internet service quality and reliability were to improve, cost would not be a major concern for respondents. They indicated that they would be willing to continue paying the same or slightly more, if necessary, for a better and more reliable internet experience. If a better internet can be provided for less the current average cost per user; it will be a significant achievement.

Distribution of respondents per district/site



Rwamagana





ANNEX 3 - MINIMUM TECHNICAL REQUIREMENTS FOR PUBLIC INTERNET (WI-FI) SERVICES

1. General Requirements

The Service Provider shall design, supply, install, configure, commission, operate and maintain secure, reliable, scalable and high-performance public Internet (Wi-Fi) services at all locations identified in Annex 1.

The proposed solution shall provide affordable, accessible and sustainable public Internet services while supporting the long-term digital transformation objectives of the Government of Rwanda and the CLIMURBA Project.

The proposed design shall be based on site-specific engineering assessments and shall optimize coverage, capacity, performance, security, operational efficiency and future scalability.

The bidder shall provide all hardware, software, licenses, connectivity, accessories, installation materials and supporting infrastructure necessary for a complete operational solution.

2. Site Assessment and Network Design

Before deployment, the Service Provider shall conduct a mandatory site visit so that they can come up with detailed engineering survey report/narrative for each site.

The survey shall include, at minimum:

- RF spectrum analysis
- Site topology
- Existing fiber or other internet infrastructure relevant to their proposal availability
- Power availability
- Existing communications infrastructure
- Expected user density
- Environmental conditions
- Interference assessment
- Equipment mounting requirements
- Security risks

The bidder shall submit logical and physical network diagrams for every hotspot.

3. Coverage Requirements

The proposed solution shall provide continuous and reliable wireless coverage throughout the designated hotspot area.

Minimum performance requirements:

Requirement	Minimum Requirement
Usable Wi-Fi Coverage	≥90% of designated area
Signal Strength	≥ -67 dBm within service area
Network Availability	≥99% monthly
Average Latency	≤70 ms
Packet Loss	≤1%
Jitter	≤30 ms

Equipment placement shall minimize visual impact while ensuring adequate radio coverage.

4. Performance and Capacity Requirements

Each hotspot shall consist of multiple centrally managed enterprise-grade Access Points (APs).

The number of Access Points shall be determined by the bidder based on the mandatory site visit/assessment, RF planning, coverage requirements, expected user density and hotspot category identified in Annex 1. The proposed design shall ensure seamless wireless coverage, efficient spectrum utilization and adequate capacity during peak usage periods.

Hotspot Capacity

The proposed solution shall be dimensioned according to the hotspot categories defined in Annex 1.

Hotspot Category	Typical Sites	Estimated Concurrent Users	Estimated Active Users	Minimum Internet speed
Small	Parks, Health Centres, Public Service Centres	150–250	45–75	200–300 Mbps

Medium	Youth Centres, Handcraft Centres, Bus Parks	250–500	75–150	300 Mbps–500 Mbps
Large	Markets, Stadiums, Expo Grounds	500–1,200	150–360	500 Mbps –1 Gbps

The bidder may propose higher capacities where justified through engineering calculations and expected user demand.

Minimum Performance Requirements:

- Each hotspot shall provide uninterrupted (wireless) connectivity throughout the designated service area.
- Average user throughput (upload/download) during peak usage shall be **2–3 Mbps**, in accordance with the proposed Fair Usage Policy.
- Higher throughput may be provided where network conditions permit.
- The solution shall support:
 - Free/basic access;
 - Registered user packages; and
 - Premium user packages.
- The proposed solution shall maintain service quality during peak usage through appropriate bandwidth management, Quality of Service (QoS), traffic prioritization and load balancing.
- The network architecture shall support future increases in user demand without requiring major infrastructure replacement.

Minimum service requirements:

The Service Provider shall provide unlimited Internet access at each hotspot throughout the service period, without data-volume caps, fair-use restrictions, or additional charges based on data consumption. The service shall have sufficient dedicated backhaul capacity to support the required number of concurrent users and shall meet the below specified throughput, latency, and availability requirements.

Requirement	Minimum Requirement
Usable Wi-Fi Coverage	≥90% of designated area
Signal Strength	≥ -67 dBm within service area
Network Availability	≥99% monthly
Average Latency	≤70 ms
Packet Loss	≤1%
Jitter	≤30 ms
Service period:	18 months of operational Internet service after installation/commissioning
Internet data	unlimited

The bidder shall demonstrate through engineering calculations that the proposed solution can support the anticipated user demand while maintaining the required service quality.

5. Bandwidth Dimensioning and Backhaul Requirements

The bidder shall provide a bandwidth dimensioning model based on:

- expected concurrent users;
- traffic profiles;
- peak-hour demand;
- oversubscription ratio;
- expected application mix;
- projected future growth.

The proposed contention ratio shall not exceed **20:1**.

Internet backhaul shall be designed to prevent congestion during peak usage.

Minimum requirements:

Requirement	Minimum
Initial Internet Backhaul	Dimensioned according to hotspot category (300 Mbps–2 Gbps)

Upgrade Capability	Scalable to at least 5 Gbps
Access Point Uplink	Minimum 2.5 GbE
Core Aggregation Links	Minimum 10 GbE

6. Technology Standards

The proposed solution shall comply with internationally recognized standards.

Minimum requirements include:

- At least Wi-Fi 6E
- IEEE 802.11ax/802.11be where applicable
- WPA3 Enterprise
- IEEE 802.1X Authentication
- IPv4 and IPv6 support
- Dynamic frequency management
- Automatic RF optimization
- Quality of Service (QoS)
- VLAN support

All firmware shall be fully supported and updated.

MIMO Requirements

- 2.4 GHz: Minimum **2 × 2 MIMO**.
- 5 GHz: Minimum **4 × 4 MIMO**.

Network Interfaces

- Access Point uplink: Minimum **2.5 GbE PoE+**.
- Core aggregation links: Minimum **10 GbE SFP+**.
- Router/Switch interfaces: Minimum **1 × 1/2.5/10 GbE SFP+** and **1 × 1/2.5 GbE RJ-45**, or equivalent.

Environmental Requirements

- Operating temperature: **−40°C to +70°C**.
- Outdoor equipment: Minimum **IP67** protection rating.

- Automatic recovery following power restoration

7. Network Equipment Requirements

The bidder shall provide enterprise-grade equipment suitable for continuous outdoor and indoor public service operation.

The proposed solution shall include, where applicable:

- Enterprise Access Points
- Routers
- Layer 3 Managed Switches
- Controllers
- Firewalls
- Fibre equipment
- Racks
- UPS systems
- Cabling
- Mounting accessories

Minimum functional capabilities:

Routing Platform

- IPv4 and IPv6
- VLAN Routing
- QoS
- Dynamic Routing (OSPF/BGP or equivalent)
- VPN
- VRRP or equivalent
- Minimum forwarding capacity of 10 Gbps
- High Availability

Switching Platform

- Layer 2/Layer 3
- PoE+
- PoE++

- 10 Gb uplinks
- Non-blocking architecture
- SNMPv3
- QoS
- VLAN
- IGMP
- STP/RSTP/MSTP
- IPv6 support

Outdoor equipment shall have a minimum protection rating of IP67.

Equipment shall operate under Rwanda's environmental conditions without degradation of performance.

8. Security Requirements

The proposed solution shall ensure secure access and protection of both users and infrastructure.

Minimum requirements include: The proposed solution shall support one or more of the following.:

- WPA3
- 802.1X
- Captive Portal
- User Authentication
- Role-Based Access Control
- Network Segmentation
- Guest Network Isolation
- Secure Administrator Access
- Multi-factor authentication for administrators
- Password management
- Audit logging

The solution shall comply with applicable Rwanda ICT and data protection regulations.

9. Firewall and Cybersecurity

The proposed solution shall include enterprise-grade Next Generation Firewall functionality.

Minimum capabilities:

- Stateful Inspection
- Deep Packet Inspection
- Intrusion Detection
- Intrusion Prevention
- Application Control
- URL Filtering
- Anti-malware
- SSL Inspection
- DDoS Protection
- VPN Support
- Geo-IP Filtering
- Threat Intelligence
- High Availability
- Syslog
- SNMPv3
- NetFlow/IPFIX

Minimum firewall throughput:

- 5 Gbps (standard forwarding)
- Minimum 2 Gbps with all security services enabled.

10. Quality of Service (QoS) and User Access

The solution shall support differentiated service delivery.

Minimum requirements:

- Traffic Prioritization
- Fair Usage Policy
- Bandwidth Management
- Session Management
- Data Quotas
- Time-based Access
- User Groups

- Free Basic Access
- Registered User Packages
- Premium Packages
- SMS Authentication
- Voucher Authentication
- Captive Portal
- Mobile Money integration for paid services

The system shall allow policy updates without service interruption.

The landing page or captive portal shall include clear support and escalation information, including contact details, reporting channels, and basic user guidance for connectivity issues.

11. Monitoring, Management and Monetization Platform

The Service Provider shall provide centralized management for all hotspot locations.

Minimum functionality:

- Real-time monitoring
- Cloud or Hybrid Management
- Interactive dashboards
- Automatic alerts
- Performance analytics
- Usage statistics
- SLA monitoring
- AI-assisted fault analysis
- Zero Touch Provisioning
- Configuration backup
- Policy management
- Digital topology maps
- API integration
- Payment platform integration
- Revenue reporting

The bidder may propose equivalent intelligent monitoring capabilities
Historical performance data shall be retained for at least twelve (12) months.

12. Power and Infrastructure Resilience

The bidder shall provide reliable power protection.

Minimum requirements:

- UPS backup of 30–60 minutes
- Surge protection
- Proper grounding
- Automatic recovery after power restoration
- Equipment redundancy where appropriate

13. Operations and Maintenance

The Service Provider shall operate and maintain the deployed infrastructure throughout the contract period.

Minimum Service Levels:

KPI	Minimum Requirement
Network Availability	≥99%
Critical Incident Response	≤2 hours
Major Incident Response	≤4 hours
Critical Fault Resolution	≤8 hours
Major Fault Resolution	≤24 hours
Preventive Maintenance	Quarterly
Security Updates	As released by vendor
Performance Reports	Monthly

The bidder shall provide a helpdesk and escalation procedure.

14. Documentation

The Service Provider shall provide:

- Network Design Report
- Logical Network Diagrams
- Physical Network Diagrams
- IP Addressing Plan
- As-Built Drawings
- Test Reports
- Acceptance Reports
- Security Configuration Documentation
- User Manuals
- Administrator Guides
- Maintenance Procedures

15. Capacity Building

The Service Provider shall train designated District ICT Officers and relevant stakeholders.

Training shall include:

- Basic hotspot administration
- User management
- Monitoring platform
- Incident reporting
- Cybersecurity awareness
- Basic troubleshooting
- Preventive maintenance

Training materials shall be provided in electronic format.

16. Testing and Acceptance

Before operational acceptance, the Service Provider shall successfully complete:

- Site survey verification

- Coverage testing
- Throughput testing
- Latency testing
- User load testing
- Authentication testing
- Security testing
- Failover testing
- Monitoring validation
- User acceptance testing

Acceptance shall be based on successful demonstration that all minimum performance requirements defined in this Annex have been achieved.