**Use Case & User Journey Documentation**

**Title:** *Comprehensive Use Case & User Journey Analysis for Smart 5G Deployment*

**A. Objective:**

To document core and edge user scenarios, especially under high-load conditions, to ensure the 5G network delivers seamless experience for all target segments and supports operational planning.

**B. Use Case Examples**

| **Use Case ID** | **Title** | **Description** | **Primary Users** | **Load Type** |  | **Success Criteria** | **Potential Risks** |
| --- | --- | --- | --- | --- | --- | --- | --- |
| UC-01 | Urban Mobile Broadband | High-speed internet access in dense urban areas with peak-hour congestion | Commuters, students, enterprise | High peak load |  | ≥ 300 Mbps throughput, latency ≤ 20ms | Congestion, packet loss |
| UC-02 | Rural Fixed Wireless Access | Providing stable broadband in low-density rural areas with limited fiber | Households, schools | Moderate load |  | Consistent 50 Mbps, 99% uptime | Backhaul limitations, power outages |
| UC-03 | Enterprise Network Slicing | Dedicated slices for financial institutions with SLA and security | Banks, fintech companies | Mission critical |  | <10ms latency, 99.999% SLA compliance | Slice isolation failure, security breaches |
| UC-04 | IoT Sensor Network | Large scale low-power sensor data collection for agriculture and smart city applications | IoT providers, government | Massive IoT bursts |  | Reliable packet delivery, energy-efficient nodes | Interference, data loss |
| UC-05 | Augmented Reality (AR) Gaming | Real-time AR streaming for gaming with ultra-low latency and high reliability | Gamers, tech enthusiasts | Bursty high load |  | Latency <15ms, jitter <5ms | Network congestion, edge server latency |
| UC-06 | Emergency Response Comm. | Priority communication channel during disasters with network reliability and resilience | First responders, authorities | High-priority load |  | Guaranteed preemption, 99.999% uptime | Network overload, failure to preempt |

**C. User Journey Map (Example: Urban Mobile Broadband User)**

| **Stage** | **User Action** | **Network Interaction** | **Key KPIs** | **Pain Points** | **Mitigation Strategies** |
| --- | --- | --- | --- | --- | --- |
| **Onboarding** | User powers on 5G device | Automatic attach to best-serving cell | Attach success rate > 99% | Initial access delays | Optimize initial cell reselection |
| **Browsing** | Streaming video on mobile | Continuous data throughput, QoS management | Throughput > 300 Mbps | Buffering during peak hours | Dynamic resource allocation via SON |
| **Mobility** | Moves through urban zones | Handover between gNodeBs | Handover success > 98% | Dropped calls during handover | Handover parameter tuning, multi-connectivity |
| **Peak Usage** | High simultaneous device activity | Network congestion control, prioritization | Latency < 20ms, packet loss <1% | Congestion induced jitter | Load balancing, traffic shaping |
| **Support** | Calls customer care for issues | Network diagnostics & troubleshooting | Ticket resolution time <24 hrs | Delayed problem identification | AI-driven fault detection & proactive alerts |