**3. High-Level Risk Register – Smart 5G Project**

| **ID** | **Risk Description** | **Probability (P)** | **Impact (I)** | **Risk Score (P×I)** | **Expected Loss (EMV)** | **Mitigation Plan** | **Contingency Plan** |
| --- | --- | --- | --- | --- | --- | --- | --- |
| R1 | **Spectrum licensing delays** from CAK or regional bodies | High (0.8) | High (9) | 7.2 | $400,000 | Initiate early regulatory engagement; assign regulatory liaison officer | Use existing 4G spectrum with DSS (Dynamic Spectrum Sharing) for initial rollout |
| R2 | **Vendor equipment delays** (e.g., Huawei/Ericsson backlog) | Medium (0.6) | High (8) | 4.8 | $320,000 | Multi-vendor sourcing contracts; buffer stock | Prioritize urban nodes; redeploy spare equipment from low-priority zones |
| R3 | **AI/SON model instability** in live traffic | Medium (0.5) | High (9) | 4.5 | $270,000 | Pilot testing in sandbox environments; use fallback algorithms | Revert to manual optimization mode and vendor-provided baseline SON templates |
| R4 | **Cybersecurity breach** targeting SDN controller or APIs | Low (0.3) | Critical (10) | 3.0 | $1,000,000 | Use Zero-Trust Architecture; API encryption and penetration testing | Isolate affected systems; invoke incident response plan and CERT team |
| R5 | **Negative public perception** in rural areas due to health concerns about 5G | Medium (0.6) | Medium (6) | 3.6 | $100,000 | Launch educational campaigns with health authorities; use transparent communications | Delay rollout in affected zones and substitute with enhanced 4G LTE coverage |
| R6 | **Intra-team conflict** across AI, Network, and IT divisions | Medium (0.5) | Medium (5) | 2.5 | $60,000 | Clear RACI matrix; cross-functional daily scrums | Escalate to program steering committee; rotate integration leads |
| R7 | **High energy consumption** increases OPEX and reduces sustainability | Medium (0.5) | Medium (6) | 3.0 | $150,000 | Deploy energy-efficient RUs; optimize cooling using AI | Shift heavier workloads to low-cost time-of-day energy zones |
| R8 | **Regulatory change mid-project** (e.g., environmental zoning) | Low (0.3) | High (8) | 2.4 | $240,000 | Monitor policy shifts through a legal compliance unit | Adjust implementation schedule; reassign teams temporarily |
| R9 | **Poor adoption by enterprise clients** due to legacy systems | Medium (0.6) | Medium (6) | 3.6 | $180,000 | Provide early integration support, SDN/5G test environments | Offer hybrid connectivity with guaranteed SLA fallback to 4G |
| R10 | **Inadequate CAPEX budget release timing** | Medium (0.5) | High (8) | 4.0 | $200,000 | Agile budgeting, quarterly release requests, and finance pre-approvals | Phase deployment regionally; reallocate resources to high-ROI areas first |

**Risk Prioritization Heat Map**

| **Impact ↓ / Probability →** | **Low** | **Medium** | **High** |
| --- | --- | --- | --- |
| **High (8–10)** | R4, R8 | R2, R10 | R1 |
| **Medium (5–7)** | — | R3, R6, R7, R9 | R5 |
| **Low (1–4)** | — | — | — |

**Key Notes:**

* **EMV (Expected Monetary Value)** is calculated as:  
  EMV = Probability × Estimated Financial Impact
* Critical risks (R1, R4) must have **real-time tracking KPIs** in the project dashboard.
* Medium-level risks (R2, R3, R5) need **weekly review and dynamic mitigation**.
* Risk register must be updated **bi-weekly** and approved by the **Risk Governance Lead**.