Largest IT Park in Bangalore, India (Case Study)

Biggest IT Tech Park in India - Comprehensive 4G/5G Operator Benchmarking and QoE Measurement Analysis

RantCell Pro product of Megron Tech Ltd UK (ISO27001 certified)

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About one of the largest IT & Business Hub Demands Mission-Critical Connectivity

50,000+

Daily **Workforce**

Peak daytime population exceeding fifty thousand employees across offices, retail and services, driving sustained network demand and mobility.

100+

Global **Enterprises**

Over one hundred multinational and domestic enterprises operate here, requiring reliable, secure, and scalable connectivity for mission-critical operations.

1 Million+

Sq Ft **Campus**

Extensive campus footprint exceeding one million square feet of office space, common areas, and amenities that create complex coverage and capacity needs.

Infrastructure Profile

High-density corporate towers, outdoor common areas, food courts, basement parking zones with constant employee movement

Critical Use Cases

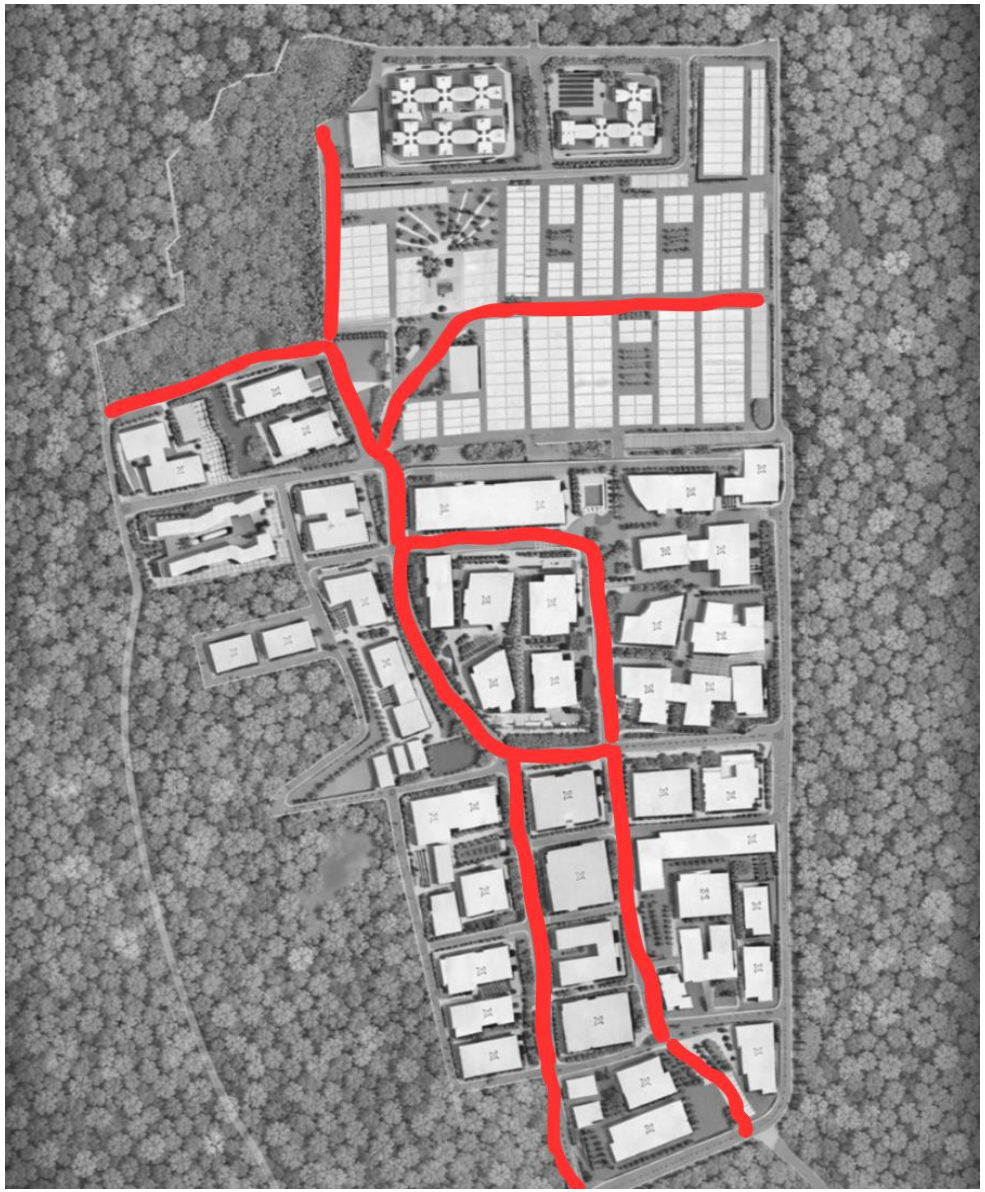
Enterprise productivity, cloud applications, video conferencing, secure VPN access, real-time collaboration, 5G enterprise solutions

Testing Objects

Benchmark real user-perceived network performance across operators to identify coverage gaps and optimization opportunities

Test Location & Drive Route Overview

Large IT Park in Bangalore, India (Case Study)



Test Route Overview

- Designed to cover both indoor and outdoor environments
- Includes key access roads, junctions, and central corridors

Coverage Scope

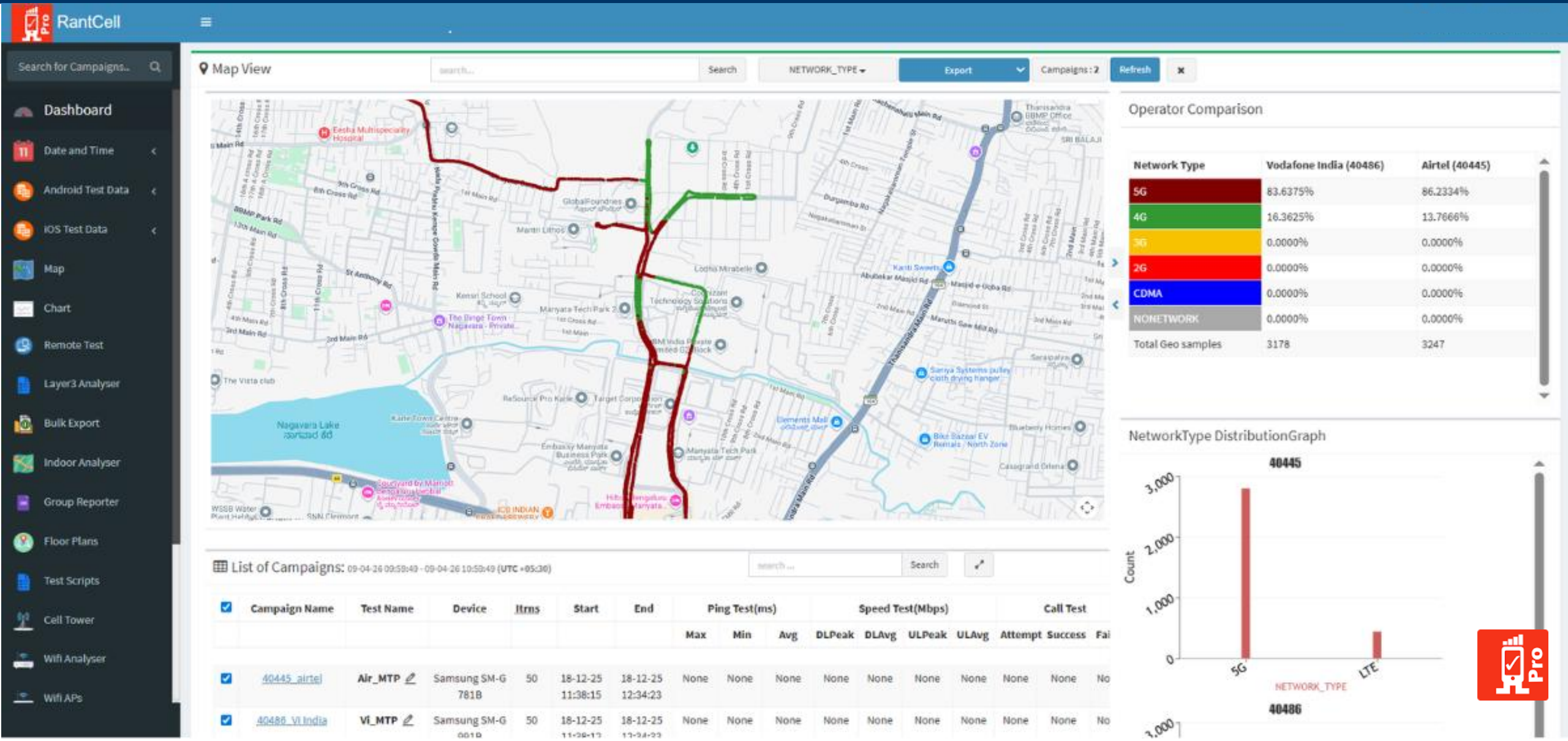
- Major enterprise zones and high-density office areas
- Internal roads and mobility paths for handover analysis

Testing Objective

- Evaluate real-world user experience across the campus
- Capture congestion, consistency, and performance variations

Network Coverage Overview (4G vs 5G)

Large IT Park in Bangalore, India (Case Study)



Network Coverage Overview (4G vs 5G)

Large IT Park in Bangalore, India (Case Study)

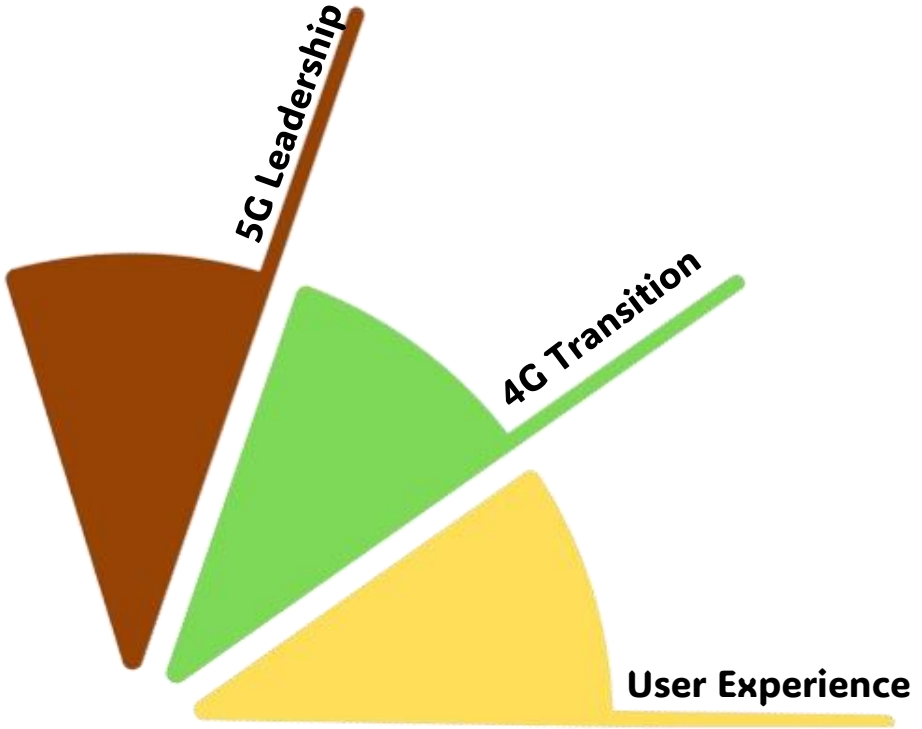
Coverage Insights

5G Coverage Dominance

- Strong 5G presence across primary corridors
- Consistent high-performance zones in central business areas

RantCell – RF Drive Test Tool

- Enables accurate 4G/5G network coverage analysis across indoor and outdoor environments
- Supports drive testing, walk testing, and in-building surveys using standard smartphones
- Provides real-time data collection with cloud-based analytics and dashboards
- Helps identify coverage gaps, handovers, and performance bottlenecks
- Allows multi-operator benchmarking and QoE analysis for better decision-making



4G Transition Zones

- 4G observed in peripheral and branching routes
- Indicates localized coverage gaps and fallback behavior

Overall Network Experience

- Core zones deliver robust 5G performance
- Outer areas rely on 4G for continuity

QoE Test Methodology & Setup

Testing conducted using RantCell QoE Measurement Platform

Comprehensive multi-device, multi-operator QoE measurement framework conducted across the IT Tech Park campus covering indoor offices, outdoor walkways, and common areas.

Devices Used

- Samsung SM-A166B
- Samsung SM-G781B
- Samsung SM-G991B

Qualcomm chipset-based devices

Network Operators Evaluated

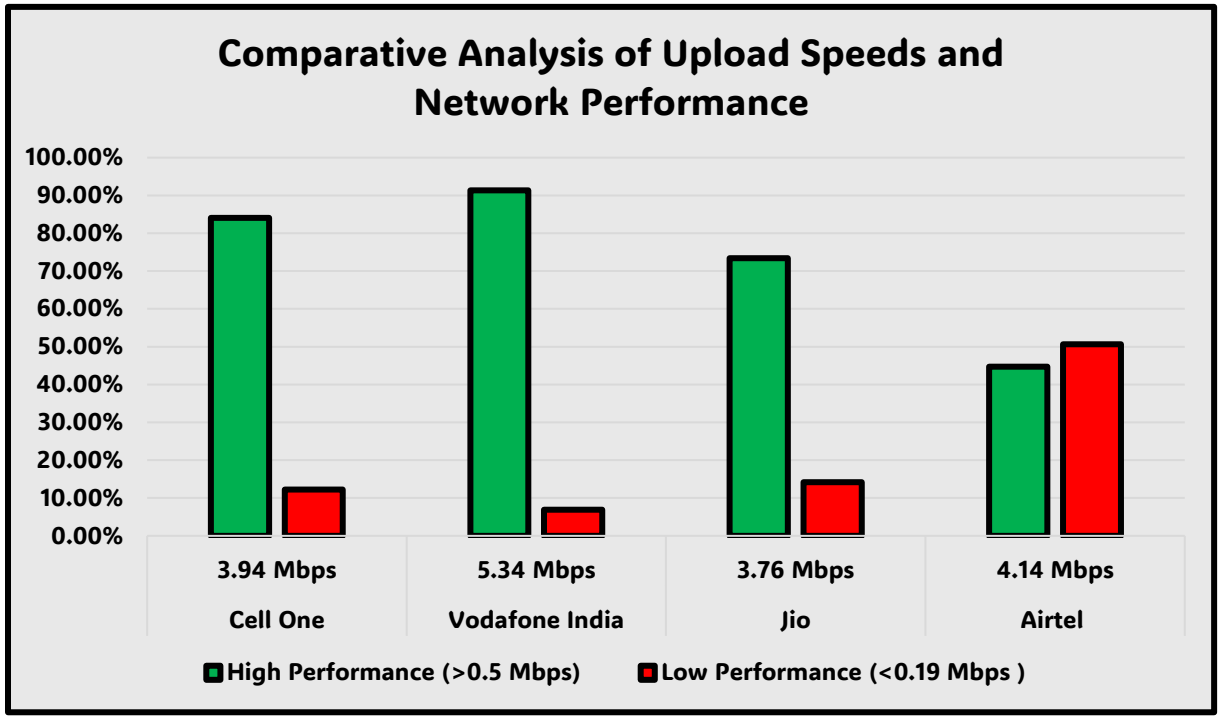
- BSNL
- Vodafone Idea
- Jio
- Airtel

Key Test Parameters

- Download & Upload Throughput
- Signal Strength & Quality (RSRP, RSRQ, SNR)
- Cell ID & Frequency Mapping (PCI, ARFCN)
- 4G/5G Technology Classification

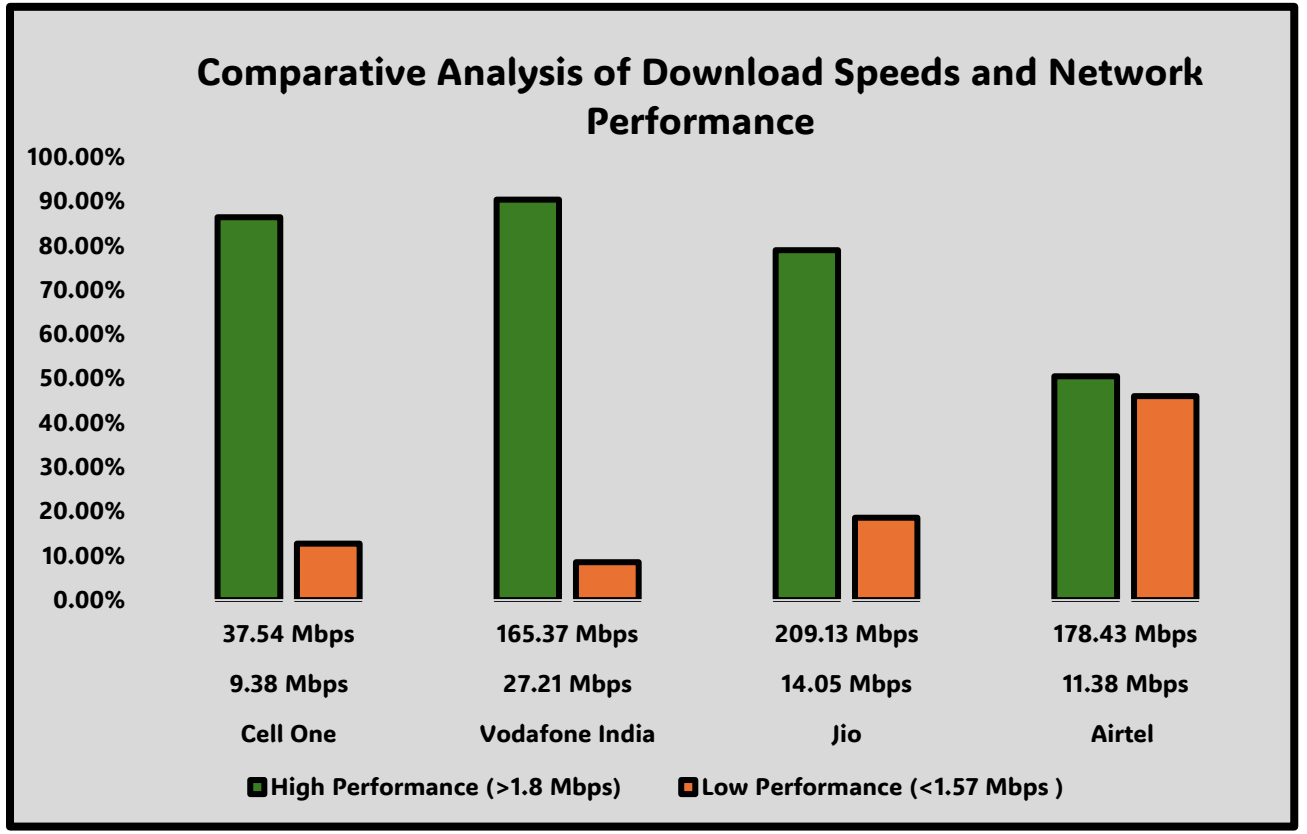
Upload Speed Performance: Vodafone Leads in Consistency

Operator	Average Upload Speed	High Performance (>0.5 Mbps)	Low Performance (<0.19 Mbps)
Cell One	3.94 Mbps	84.09%	12.27%
Vodafone Idea	5.34 Mbps	91.38%	6.87%
Jio	3.76 Mbps	73.44%	14.21%
Airtel	4.14 Mbps	44.71%	50.67%



Download Speed Comparison Across Operators: Vodafone Leads in Consistency, Jio in Peak Speed

Operator	Average Download Speed	Peak Speed	High Performance (>1.8 Mbps)	Low Performance (<1.57 Mbps)
Cell One	9.38 Mbps	37.54 Mbps	86.50%	12.75%
Vodafone Idea	27.21 Mbps	165.37 Mbps	90.48%	8.55%
Jio	14.05 Mbps	209.13 Mbps	79.05%	18.63%
Airtel	11.38 Mbps	178.43 Mbps	50.60%	46.13%



Key Download Performance Insights Across Operators

Vodafone Vi: Most Consistent

- Highest average speed (~27 Mbps)
- Strong high-speed coverage (~90%)
- Minimal low-speed occurrences

Jio: Peak Speed Leader

- Highest peak speeds (~209 Mbps).
- Strong capacity performance.
- Some variability in consistency.

Airtel: Consistency Challenges

- High peak speeds (~178 Mbps).
- Significant low-speed occurrences (~46%).
- Performance varies across zones

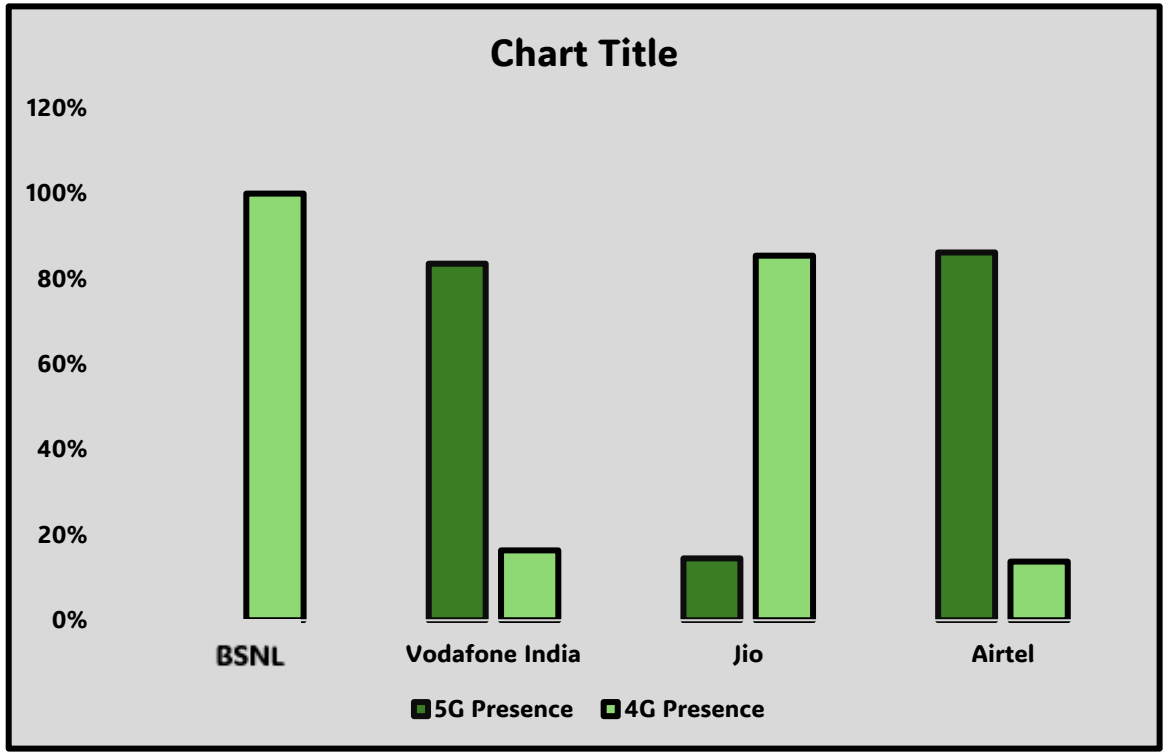
BSNL: Stable but Moderate

- Consistent performance (~86% high speed).
- Lower average speeds (~9 Mbps).
- Suitable for basic usage.

4G vs 5G Coverage Distribution Across Operators

Comparison of 4G and 5G coverage distribution across operators

Operator	5G Presence	4G Presence
BSNL	0%	100%
Vodafone Idea	83.63%	16.36%
Jio	14.48%	85.51%
Airtel	86.23%	13.77%



Strategic Insight: Vodafone and Airtel demonstrate dominant 5G footprint positioning the IT Tech Park as 5G-ready campus for IoT edge computing and URLLC applications

Signal Strength (RSRP) Analysis

Based on RSRP measurements captured using RantCell QoE Platform

Critical Finding: Widespread Weak Signals

- 75–89% samples fall under very weak signal (≤ -79 dBm).
- Minimal strong signal presence across campus.

Root Cause: Infrastructure Limitations

- High-density construction causing signal attenuation.
- Building materials and layout blocking signal propagation.
- Limited indoor coverage infrastructure.

Infrastructure Gap Identified

- Poor signal distribution despite good peak speeds.
- Need for indoor solutions (DAS / small cells).
- Critical for enterprise-grade connectivity

Weak signal strength directly impacts call quality, data reliability, and overall user experience in enterprise environments

Signal Quality (RSRQ) Analysis: Network Load and Interference Issues

Based on RSRQ measurements captured using RantCell QoE Platform

BSNL

- Strong signal quality distribution.
- Lower throughput performance.
- Suitable for basic connectivity.

Vodafone Idea

- Balanced signal
- quality across zones.
- Stable performance under load.
- Consistent user experience.

Jio

- Moderate signal
- quality distribution.
- Indicates balanced
- load handling.
- Scope for optimization in dense areas.

Airtel

- Highest poor-quality instances.
- (~58%)Indicates congestion and interference.
- Requires capacity optimization.

Implication: Quality degradation suggests operators need traffic engineering optimization and capacity augmentation during peak enterprise hours

5G NR Maturity Across Operators

Based on 5G NR performance data captured using RantCell QoE Platform

Vodafone (Vi): Mature 5G

- Strong and consistent 5G signal distribution.
- Stable SINR performance.
- Well-optimized NR layer.

Jio: Optimization In Progress

- Moderate 5G presence
- Ongoing network optimization
- Requires further RF planning

Airtel: Selective Strong Zones

- Strong performance in specific areas
- Inconsistent SINR across campus
- Needs broader coverage optimization

BSNL: Limited 5G Presence

- No significant 5G deployment observed
- Primarily 4G-based network

5G infrastructure is present, but optimization maturity varies across operators, impacting readiness for advanced enterprise use cases

Who Benefits from This Study?

Enterprises

- Ensure uninterrupted productivity.
- Enable data driven partnerships.
- Prepare for 5G adoption.

Telecom Operators

- Identify coverage gaps.
- Optimize network performance.
- Improve infrastructure ROI.

Facility Managers

- Enable indoor coverage (DAS).
- Improve tenant experience.
- Reduce service complaints.

Professionals

- Reliable video calls.
- Faster cloud access.
- Stable remote connectivity.

Strategic Optimization Framework

Recommendations based on RantCell QoE Analytics

Immediate (0-3 Months)

- Deploy indoor small cells in high-traffic areas.
- Optimize PCI planning to reduce interference.
- Implement load balancing during peak hours.

Med-Term (3-9 Months)

- Evaluate neutral-host DAS deployment.
- Establish SLA-based operator monitoring.

Long-Term (9-24 Months)

- Plan private 5G infrastructure.
- Deploy edge computing capabilities.
- Enable continuous QoE monitoring.

Improves user experience, reduces complaints, and enhances enterprise productivity.

Why RantCell QoE Benchmarking Matters

Enterprise Campuses

- High-density, data-driven environments.
- Depend on cloud and real-time applications.
- Require carrier-grade performance.

Traditional Approach Limitations

- Drive tests miss real user experience.
- Coverage maps lack performance validation.
- Optimization is reactive (complaint-driven).

RantCell QoE Advantage

- Real device-based testing.
- End-to-end KPI visibility.
- Multi-operator comparison.
- Continuous QoE monitoring.

RantCell bridges the gap between network performance and real user experience. Enables faster decision-making, better SLA validation, and improved user experience.

Conclusion: 5G Readiness Requires Indoor Optimization

Insights powered by RantCell QoE Analytics Platform

Key Findings

- Strong 5G presence (Vi ~84%, Airtel ~86%)
- Best download: Vi (avg), Jio (peak)
- Airtel shows upload inconsistency
- Weak signal across 75–89% samples
- Indoor coverage gap identified

Network optimization is critical to unlocking the full potential of 5G in enterprise environments.

Next Steps

- Operators: Invest in weak coverage zones
- Enterprises: Enable continuous QoE monitoring
- Facility Managers: Deploy DAS / small cells
- Goal: Unlock 5G-ready enterprise environment

Improves user experience, reduces downtime, and enables mission-critical applications.

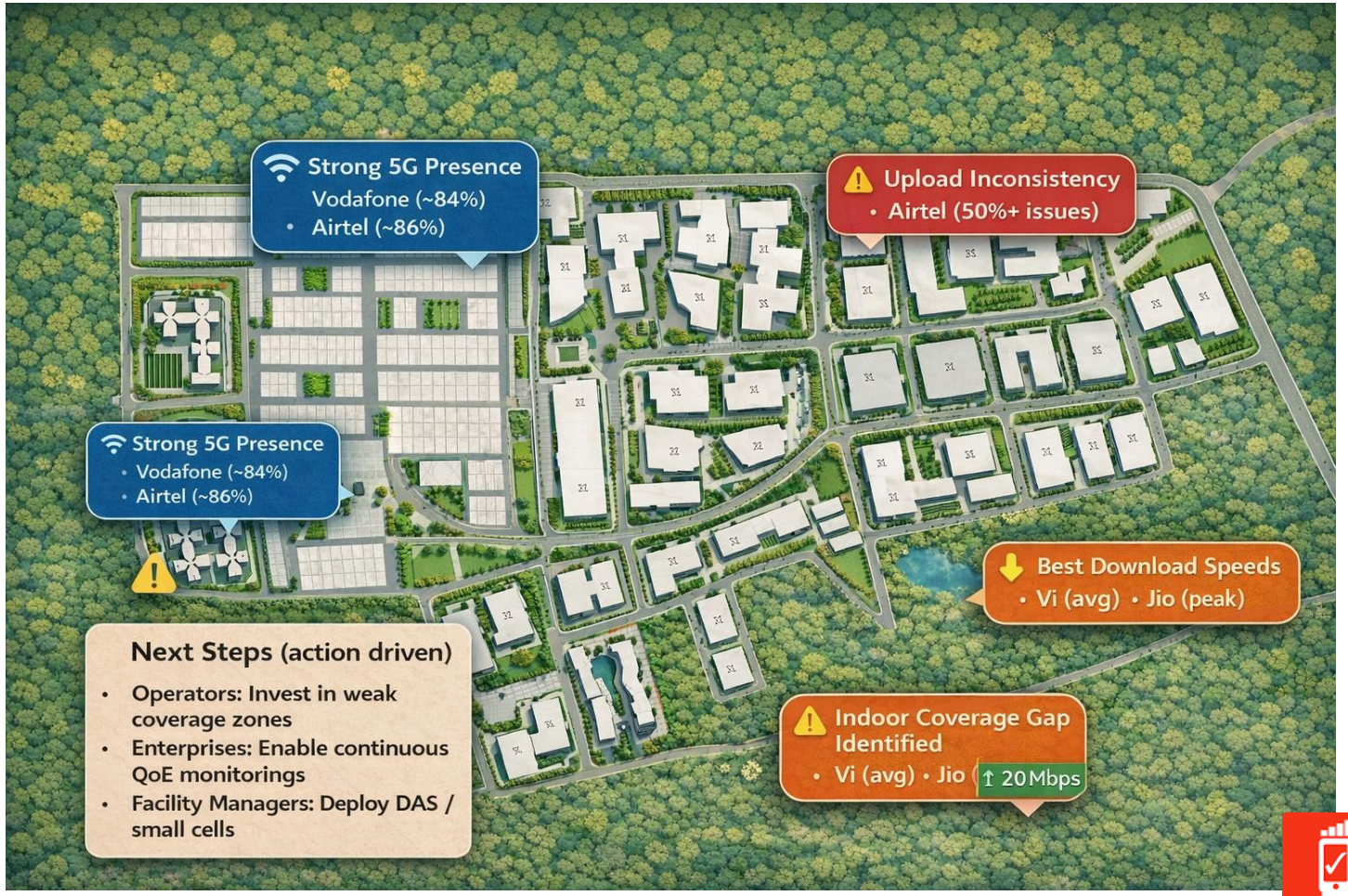
Conclusion: Targeted Indoor Optimization Required for 5G Enterprise Readiness

Key Findings (data driven)

- Strong 5G presence (Vi ~84%, Airtel ~86%)
- Best download: Vi (avg), Jio (peak)
- Airtel shows upload inconsistency
- Weak signal in 75–89% of samples
- Indoor coverage gap identified

Next Steps (action driven)

- Operators: Invest in weak coverage zones
- Enterprises: Enable continuous QoE monitoring
- Facility Managers: Deploy DAS / small cells
- Goal: Enable 5G-ready enterprise environments



Contact & Next Steps

Get in touch to explore how RantCell can support your network testing and optimization needs

Contact Details

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