

GSMA™

5G Solutions and Opportunities in India

October 2024



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EXECUTIVE SUMMARY

This booklet serves as a reference guide to some of the existing 5G solution offerings for industries in India. It presents a curated selection of 5G applications and solutions that can be leveraged across diverse industries, including manufacturing, agriculture, healthcare and logistics. By showcasing real-world applications and case studies, we aim to highlight the transformative potential of 5G technology to enhance operational efficiency, improve service delivery, and drive innovation.

India's 5G journey is marked by rapid network expansion, contributing significantly to its goal of becoming a digital economy powerhouse. According to GSMA's Mobile Economy Asia Pacific 2024, India is projected to have 641 million 5G connections by 2030, representing nearly 50% of total mobile connections in the country. This expansion is driven by India's strong commitment to 5G deployment, as seen in the commercial launch of 5G Standalone (SA) networks by leading operators like Jio, which has deployed over 1 million 5G cell sites.

In August 2023, Airtel became the first company in India to conduct pre-commercial trials of 5G Reduced Capability (RedCap) technology, which offers cost-effective, energy-efficient solutions for IoT applications and wearables. The trials were done in collaboration with Ericsson and Qualcomm, highlighting Airtel's commitment to driving 5G-enabled IoT innovation.

Reliance Jio Infocomm has been rapidly expanding its 5G network using Standalone (SA) architecture since October 2022. The operator has already deployed its 5G service in 7,764 cities in India, according to the carrier's website. Jio's 5G (SA) network presents a significant opportunity for diverse business ventures using its indigenous 5G technology.

Moreover, the shift to 5G in India has led to a substantial increase in data consumption. On average, 5G users in India consume 3.6 times more mobile data compared to 4G users. This surge in data usage underscores the transformative potential of 5G to fuel growth in industries such as smart cities, manufacturing, and logistics by enabling faster, more reliable, and highly responsive connectivity.

GSMA APAC is helping the Indian ecosystem realize the full potential of 5G networks to benefit society. By fostering collaboration and innovation, we aim to contribute to India's growth as a global leader in the digital economy. With 5G expected to add nearly \$130 billion to the Asia-Pacific economy by 2030, India's share of this growth is set to be significant.

This booklet aims to provide a snapshot of these opportunities and serve as a catalyst for further innovation and adoption of 5G in India's key industries.



Private 5G Network Case studies

Airtel deploys India's first private 5G network at BOSCH facility

The successful trial of the 5G Private Network at Bosch's RBAI facility marks a significant milestone in India's journey towards advanced technological integration in the manufacturing sector. By implementing a private 5G network, Airtel has paved the way for companies to harness the power of high-speed, reliable connectivity tailored specifically for their operational needs. This initiative showcases the potential of 5G technology to revolutionize how industries operate, providing a robust platform for smart manufacturing and real-time data analytics.



Objectives

The primary objectives of this groundbreaking trial included:

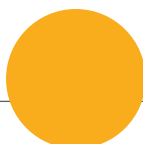
- **Establishing High-Speed Connectivity:** To enable Bosch to leverage ultra-fast data transfer rates that are essential for modern manufacturing processes.
- **Enhancing Operational Efficiency:** To improve the efficiency of various production and operational workflows through reliable and low-latency connectivity.
- **Facilitating Smart Manufacturing:** To support the integration of smart technologies and IoT applications that can optimize production processes.
- **Testing Security Protocols:** To ensure that the private network maintains high standards of data security and integrity while allowing seamless connectivity.

Solutions

The implementation of the 5G Private Network at the Bosch facility involved several innovative solutions:

- **Ultra-Reliable Connectivity:** The network provided Bosch with a dedicated, high-speed connection that enabled real-time communication between machines and systems, essential for coordinating complex manufacturing tasks.
- **IoT Integration:** The 5G network facilitated the deployment of IoT devices throughout the facility, enabling better monitoring of equipment and processes, leading to enhanced automation and reduced downtime.
- **Advanced Data Analytics:** By utilizing real-time data transfer capabilities, Bosch could implement advanced analytics solutions, allowing for timely decision-making and improved operational insights.
- **Enhanced Security Features:** The private network provided robust security measures tailored to the specific requirements of the manufacturing environment, ensuring that sensitive data remained protected from external threats.
- **Scalability and Flexibility:** The 5G infrastructure allows for future scalability, enabling Bosch to adapt and expand their network capabilities as new technologies and processes emerge.

The successful trial at Bosch Automotive Electronics India Pvt Ltd not only underscores Airtel's leadership in telecommunications but also sets a precedent for other industries looking to adopt similar innovations. This achievement marks a pivotal step towards the broader adoption of 5G technology in India, reinforcing the country's position as a frontrunner in digital transformation and smart manufacturing solutions.



Private 5G Network Case studies

Reimagining connected factory at Sundaram Clayton

Sundaram Clayton Limited (SCL) is committed to developing a lean, green, and digitally connected factory. The SCL team outlined and designed the business requirements. LTTS provided system integration services, while Airtel supplied the private 5G network services. The pilot phase assessment revealed significant savings potential in several areas, including infrastructure maintainability, real-time machine telemetry, significant ROI in material movement automation, high accuracy in machine vision-based quality inspections, and alert systems for monitoring shop floor safety and workforce movement.



Sundaram-Clayton Limited

Overview of clients, partners, use case, location, scope, and status of 5G deployment

SCL opted to work with a Private 5G network set up. Based on the findings of the pilot program, it was recommended that they plan the network with a specified signal strength of 105dBm, signal quality of 19dB, and throughput of ~300- 400Mbps with 90-95% indoor coverage.

Other aspects include:

- **Enhanced mobile broadband (eMBB):** 5G supports speeds up to 10Gbps and can be leveraged for next-generation use cases such as AI/ML, robotics, AR/VR, etc.
- **Low -latency communication:** Manufacturing machinery telemetry has several components that require low latency for data transmission. 5G has the potential to achieve equal to or less than 1ms latency, which is significantly lower than that of other deployments.
- **Connectivity Density:** One of the key features of 5G is the connectivity density. The ability to support a large number of IoT and other end points per square meter makes it a natural choice for enterprises as a connectivity solution.
- **Network slicing:** 5G network slicing allows the creation of multiple dedicated virtual networks targeting intensive use cases fit-to-purpose virtual networks on a common underlying physical network.
- **Enhanced security:** 5G networks provide a much higher level of security for OT networks. Please outline the challenges the deployment is intended to solve.

Reasons for adopting 5G: Key considerations for clients and partners

Sundaram Clayton Limited (SCL) is one of the world's largest aluminum die casting companies catering to the Heavy vehicle segments in Europe and North America. SCL has five plants in India and one in the USA. Its important customers include brands like Volvo, Daimler, Hyundai and DAF/PACCAR. Manufacturing of aluminum die-casting parts in a sustainable manner and innovating with light weighted technologies are the key differentiators for the business.

SCL embarked on a transformation program to go digital. In the first phase of this, the scope was to connect all its critical equipment to obtain the machine telemetry data. In the next phase, plant connectivity is being addressed.

Traditionally manufacturing industries have suffered from the maintainability of IT networks' passive components on the shop floor. Miles of cables, routers/ access points, switches, etc. turn into a swirl of equipment that needs constant attention to minimize downtimes.

Private 5G for enterprises was announced by the government in October 2022. This gave SCL the impetus to evaluate the same for its connectivity requirements for the factories being built in the future.

As a first step, the 5G technology which was very nascent was evaluated with the help of the system integrators and the Telco providers.

A pilot deployment was done at an existing plant. The business case was to whether "wire up" the plant for connecting the equipment or go wireless with Private 5G. Evaluating the technology and making the equipment connect using the platform had its challenges. Since it was new, the efforts required to configure the equipment and get data out was high.

Once the platform stability was achieved, SCL were able to test the performance of several use cases.

- Machine telemetry
- AMR for material handling
- AR/VR
- 5G Surveillance cameras
- Secured communication using mobile devices

The success of the above test cases helped SCL create the go-to production strategy using 5G as the IT infrastructure backbone for the deployment its upcoming plants.

Factors influencing the choice of 5G

SCL has set out to build a lean, green, and digitally connected factory that will take into consideration the following aspects:

- Managing, in a vast acreage, a set of heavy duty engineering facilities with state-of-the-art manufacturing equipment.
- Efficient and automated plant operations with aligned with automated material storage/ retrieval and integrated with material robots (AMRs).
- Integrating ESG requirements (including energy, water and STP facilities) with the manufacturing operations.
- A completely digitally driven manufacturing plant.
- Seamless and secured connectivity across the OT systems and subsystems.
- Real-time operational insights overarching machines, men, materials and integrated with Industry 4.0. It will eventually be a playbook for Industry 5.0.
- Video based surveillance for movement of men, material with AI based detection of potential safety issues.
- Completely cyber secure OT and IT environments.

Impact of the 5G deployment

Our initial assessment during the pilot phase indicated a substantial savings potential in the following areas:

- Infrastructure maintainability – connecting over 1,000 machines and integrating with other systems in a secure manner.
- Machine telemetry data was available real time.
- Failsafe operating environment for automated material movement.
- Significant ROI in savings between manually moving material vs automated movement. WIP inventory is managed more efficiently.
- Machine vision based quality inspections systems yielding better throughput and very high level of accuracy for inspections.
- Ability to implement foolproof alert mechanisms to monitor shopfloor safety , movement of workforce as well as perimeter safety.

The above are being realized gradually as the use cases get onboarded onto the 5G platform.

Evaluating the role of 5G against LTE and unlicensed technologies in the organization

- 5G is the platform for the future given its characteristics around :
 - Low latency.
 - High volumes of data transfer.
 - Locational deployment designed to provided full coverage with more than one radio backing up others (in case of failure).
 - Deployment addresses signal loss issues due to Faraday zones.
 - In specific use cases as in the AMRs, continuous and strong signals are needed for the robots to move through the programmed route. Drop in signal strength due to interference or failure of any WiFi routers can be disastrous for our business.

Technologies under exploration for digital transformation: Edge-cloud computing, IoT, AI, AR/ VR, Robotics, Digital Twins, etc.

The digital transformation will co-exist with new technology use cases such as AI/ ML with LLMs, Edge-cloud computing, Data lakes, Immersive technologies and external linkages. Digital Twinning of the operations is one such planned activity. These integrated views are possible because we have built a very powerful network eco-system.



Private 5G Network Case studies

Nokia Chennai Smart Factory

The digital replica of the Nokia Chennai smart factory, referred to as a digital twin, is a virtual representation of the physical factory, including its machinery, testing equipment, devices, and sensors. By leveraging sensors and Internet of Things (IoT) devices, the digital twin continuously collects and visualizes real-time data from the factory floor. This advanced system delivers immediate insights into the operational status of machines, enabling the detection of performance metrics, potential malfunctions, and maintenance needs. This proactive approach improves monitoring capabilities and significantly minimizes downtime, facilitating smooth and efficient factory operations.

NOKIA

Digital Twin: Digital Replica of Factory

Real-Time Decision Making and Control of Factory Operations:

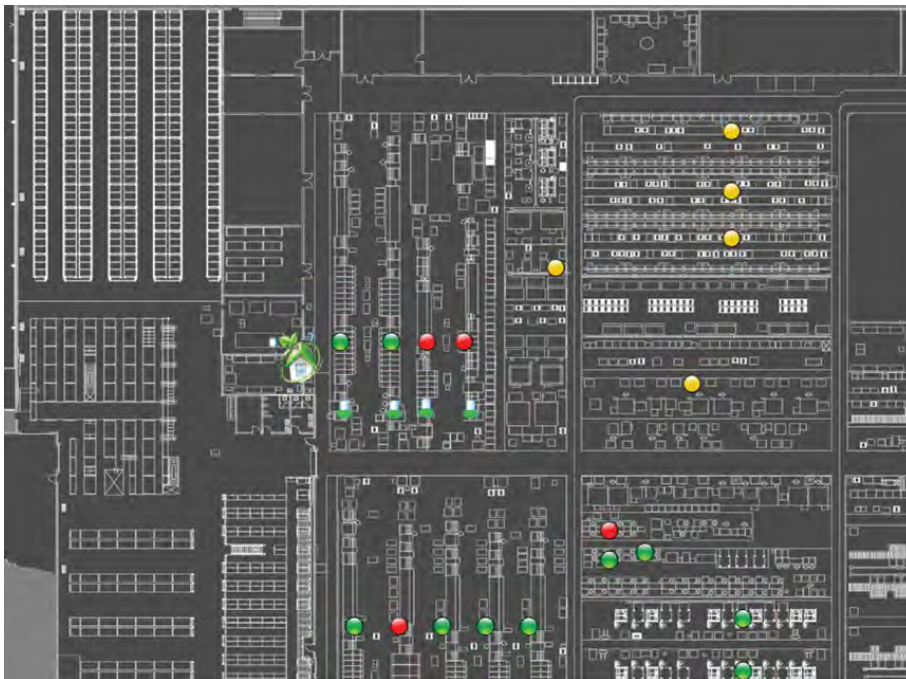
With real-time data being continuously fed into the system, decision-makers can take quick and informed actions to optimize production. This real-time decision-making allows factory managers to adjust machine settings, reassign tasks, and even control operations remotely. The immediacy of data means problems are solved before they escalate, improving factory throughput and reducing production delays.

Improved Efficiency and Productivity:

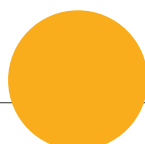
Real-time monitoring and decision-making contribute significantly to factory efficiency and productivity. Predictive maintenance prevents machine breakdowns, ensuring continuous production, while predictive analytics optimize workflow, reducing wastage and improving resource utilization. The insights provided help fine-tune operations, reducing energy consumption and maximizing output, thereby driving up productivity.

Scalable Architecture and Secure Global Accessibility:

The system is designed with scalability in mind, using Microsoft Azure Cloud for data aggregation and storage. Azure ensures secure global accessibility while offering a flexible, scalable infrastructure that can grow as the factory's operations expand. Integration with Nokia platforms enhance connectivity, allowing seamless coordination between devices and systems across multiple locations.



Digital Twin



Pick to light: Smart Material Management

Fully Wireless Operation Powered by Private wireless and IoT:

The factory's wireless operation is enabled by private wireless Network for robust and reliable connectivity. Spare parts Storage is integrated with IoT and data management is centralized in the cloud, ensuring seamless coordination of devices and real-time monitoring.

Pick-by-Light Solution for Spare Parts:

Managing over 650 types of spare parts, the pick-by-light system uses color-coded bins and slots to guide operators efficiently. This solution reduces first-response time by 95% during downtime support, ensuring rapid access to critical spare parts and minimizing delays in operations.

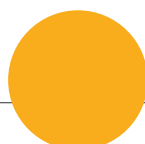
Sound and Light Enabled Poka-Yoke System:

The system features location-specific alarms with sound and light, guiding workers directly to the desired spare part. Colored LEDs at sub-slot locations provide a foolproof (Poka-Yoke) system, preventing human errors in spare part selection, further optimizing maintenance operations.



Reduction in Non-Value-Added (NVA) Time

With this system, non-value-added time spent in locating and identifying parts is eliminated, leading to a 30% reduction in Mean Time to Repair (MTTR). This approach can scale to handle inbound and outbound material management systems, enhancing overall operational efficiency.



AIV/AMR: Mobile Robots

Autonomous Intelligent Vehicles (AIVs)/Mobile Robot (AMR) in Factory Operations:

AIVs/AMRs help in factory operations by automating material handling, transportation, and logistics within the facility. AIV/AMRs are advanced and capable of navigating autonomously (without requiring predefined paths) and suitable for tasks such as moving raw materials, components, or finished products across the production floor. AIVs use sophisticated sensors, to adapt to changing environments, avoid obstacles, and optimize routes in real time.

Enhanced Efficiency and Safety:

AIVs/AMRs help factory to improve operational efficiency. These vehicles reduced manual labour, streamline the flow of materials, and ensured timely delivery between workstations and departments. They also enhanced safety by minimizing the risk of accidents in high-traffic areas, as they are equipped with sensors that detect and avoid human and obstacles.

Increased Flexibility and Scalability:

AIVs/AMRs are particularly beneficial for our factory's operations enabling flexibility since they can easily adapt to changes in layout or production demands more efficiently. They are integrated with existing factory systems, including inventory management and production scheduling, making them scalable for expanding operations on demand. This automation supports continuous production, minimizes downtime, and contributes to overall cost savings in logistics and material handling.

IOT Enabled Pick to Light



Mobile robots



Modular Automation Cell (MAC): Flexible Automation Assembly

M2M Communication:

A Modular Automated Cell (MAC) line integrates humans and machines to create a highly adaptable production environment. The system links various workstations wirelessly, enabling seamless communication and coordination between human workers and robots. The MAC line allows for efficient handling of both complex and repetitive tasks while maintaining flexibility. Human workers collaborate with machines, contributing to tasks requiring precision and decision-making, while robots handle high-speed, repetitive processes. This fusion maximizes efficiency while maintaining quality across different production stages.

Customization Based on Product/Process Needs:

The number of cells in the MAC line is determined by the specific requirements of the product or process. The system allows for the use of either single or dual robots in a station, depending on the complexity and throughput of the operation. Dual robots can work in tandem, completing multiple tasks in parallel, such as handling separate parts of a product simultaneously, increasing productivity and reducing cycle times.

Automation of Critical and Repetitive Tasks:

Automation within the MAC line focuses on processes that are both critical and repetitive, such as screw tightening, bullet assembly, 3D Automated Visual Inspection (AVI), and Auto Outgoing Goods Inspection (OGI). By automating these tasks, the system reduces human error, increases consistency, and enhances production speed.

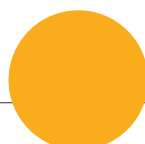
Modularity, Scaling Capacity Based on Demand:

One of the standout features of a MAC line is its modularity. Cells can be easily added or removed from the system, allowing factories to scale production capacity up or down based on demand. This plug-and-play functionality ensures that manufacturers can adapt quickly to market changes without overhauling the entire system.

Compatibility and Flexibility:

Each cell is highly versatile, designed for compatibility across different processes by interchanging End of Arm Tooling (EOAT). This means that a single cell can perform various tasks, and combinations of dual robots (e.g., screw/bullet, inspection/screw) can be used to further streamline the process, making the MAC line extremely adaptable to different manufacturing needs.

Modular Automation Cells



NEMS & AQI: Environment Monitoring

NEMS (Nokia Environment Management System):

The soldering of components onto SMT boards is carried out by automated Paste Printing Machine. However, even minor fluctuations in temperature and humidity inside the machine can affect the soldering process, leading to instability of components on the boards and compromising performance. With the new 5G boards containing a significantly higher number of components, any defects in soldering can result in quality issues and production delays. NEMS is a system in where sensors monitor and detect changes in temperature and humidity, alerting operators to address and resolve the issue promptly. After soldering, all boards undergo inspection by an optical machine, followed by a final check using a fully automated 3D inspection machine.

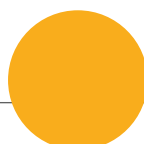
AQI (Air Quality Index):

The Air Quality Index in a manufacturing factory is a critical metric for ensuring a safe and healthy environment for workers. The AQI measures the concentration of air pollutants, such as particulate matter (PM2.5 and PM10), nitrogen dioxide (NO₂), sulphur dioxide (SO₂), carbon monoxide (CO), and volatile organic compounds, which can accumulate in factory settings due to machinery, chemical processes, and combustion.

In manufacturing environments, poor air quality can pose significant health risks to employees, leading to respiratory issues, irritation, and long-term health complications. High levels of particulate matter can also impact the performance of sensitive machinery and equipment, potentially affecting production quality.

To maintain a safe AQI, factories typically implement advanced air filtration systems, use local exhaust ventilation, and monitor pollutant levels with sensors to detect any rise in harmful gases or particulates. Strict adherence to occupational safety standards, such as those set by OSHA (Occupational Safety and Health Administration), helps ensure the indoor air quality remains within acceptable limits.

Continuous monitoring and control of AQI not only protect employee health but also contribute to overall operational efficiency, reducing downtime caused by health-related issues and ensuring compliance with environmental regulations.





5G Solution Offerings From Our Members

Airtel partners Tech Mahindra to deploy captive private network at Mahindra's Chakan Facility

Bharti Airtel, India's premier communications solutions provider, announced a strategic partnership with Tech Mahindra, a leading provider of digital transformation, consulting, and business re-engineering solutions. This collaboration focuses on deploying '5G for Enterprise' solutions, marking a significant step towards enhancing the capabilities of businesses across various sectors in India.



Overview

The partnership between Airtel and Tech Mahindra aims to leverage the transformative power of 5G technology to drive digital innovation and operational excellence in enterprises. By combining Airtel's extensive telecommunications infrastructure with Tech Mahindra's expertise in digital solutions, this initiative seeks to empower businesses to navigate the complexities of the digital landscape effectively. The deployment of '5G for Enterprise' is designed to facilitate high-speed connectivity, streamline operations, and enable the integration of advanced technologies.

Objectives

The primary objectives of the partnership include:

- **Enhancing Business Connectivity:** To provide enterprises with robust, high-speed 5G connectivity that meets the growing demands for faster data transfer and real-time communication.
- **Driving Digital Transformation:** To enable organizations to adopt digital-first strategies, ensuring they remain competitive in a rapidly evolving market.
- **Improving Operational Efficiency:** To enhance productivity through real-time data processing and analytics, which support better decision-making and resource management.
- **Facilitating Smart Technologies:** To support the implementation of IoT solutions and automation in various business processes, driving innovation and efficiency.

Solutions

The '5G for Enterprise' initiative encompasses several innovative solutions tailored to meet the diverse needs of businesses:

- **High-Speed Connectivity:** The deployment of 5G networks provides enterprises with enhanced bandwidth and speed, allowing for seamless communication and efficient data transfer across operations.
- **IoT Deployment:** Businesses can leverage 5G technology to integrate IoT devices, enabling better monitoring, control, and automation of their processes, from supply chain management to production.
- **Smart Manufacturing Solutions:** The partnership empowers manufacturing firms to implement smart factory solutions, utilizing 5G for real-time data collection and analysis, leading to improved production efficiency.
- **Advanced Data Analytics:** With increased connectivity, enterprises can utilize advanced analytics tools to derive insights from data quickly, optimizing operations and enhancing customer experiences.
- **Private Network Solutions:** The partnership also aims to provide secure, private 5G networks customized for enterprise requirements, ensuring data security while facilitating high-performance operations.

By deploying these solutions, Airtel and Tech Mahindra are positioned to significantly impact the enterprise landscape in India, helping businesses harness the potential of 5G technology for greater agility and competitiveness. This strategic partnership not only emphasizes the commitment of both companies to drive innovation but also sets a benchmark for future technological advancements in the Indian market, contributing to the country's vision of becoming a leader in digital transformation.

**5G Solution Offerings
From Our Members**

JioHealthcare

Your complete care network



Objectives

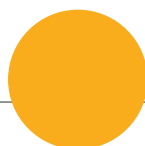
To transform healthcare delivery by seamlessly integrating JioHealthHub, JioTrue5G, and advanced medical technology, ensuring swift, efficient, and connected emergency response services

Overview

Jio's innovative healthcare solutions empower both patients and medical professionals. We aim to transform healthcare with an IoT-based mobile clinic, integrating Edge AI and 5G for on-the-go critical assistance and streamlined medical care. We bring together all the aspects of emergency patient care from Remote Health Monitoring to Digital Health Records. With a goal of evolving healthcare, our services are digital and easily accessible.

Key benefits

- **Health Center at Residential Complex with Jio's Clinic in a Bag:** Clinic in a Bag is a 5G innovation with connected medical devices like stethoscopes and ECG machines.
- **Connected Ambulance:** Jio True5G-powered ambulances provide real-time patient vitals to hospitals via smart devices, ensuring swift communication for emergency workers.
- **Remote Patient Monitoring:** 5G-enabled wearables allow precise remote patient monitoring; AI detects anomalies in vital signs, alerting medical staff promptly.
- **Clinical Collaborations:** 5G facilitates rapid transfer of large medical files like CT scans, enabling remote consultations and immediate expert opinions.





5G Solution Offerings From Our Members

Jio Agriculture

Enhancing farming and dairy management with connected smart agri IoT devices and milk traceability solution.



Objectives

To enhance agricultural efficiency and dairy production using JioKrishi platform, powered by Jio True5G.

Overview

JioKrishi platform, powered by Jio True5G, utilizes real-time data processing for Agribots and drone surveillance, integrating AI and ML for crop health, fruit ripeness, providing farmers with actionable insights through JioCloud. Jio Milk Volunizer enables continuous milk quality monitoring at farm and cattle levels, ensuring that only the highest quality milk is processed and enhancing the market value of the dairy farm. With JioGauSamridhhi app, dairy farmers gain real-time milking data of cattle.

Key benefits

- **Enhanced Crop and Milk Quality:** Our solutions provide unparalleled visibility into crops and milk production, ensuring higher fruit quality and improved milk product standards.
- **Cost Efficiency:** Farmers can achieve significant cost savings through targeted spraying, reduced post-harvest wastage, and optimized cattle feeding, leading to improved profitability.
- **Data-Driven Decision-Making:** Real-time data enables farmers to make informed decisions and promptly address non-productive cattle on their farms.





5G Solution Offerings From Our Members

Jio Managed Warehouse

Transforming warehousing



Objectives

To develop a comprehensive, all-in-one, enterprise-grade solution and service framework for creating the warehouse of the future.

Overview

Jio's Managed Warehouse solution is an all-in-one, comprehensive solution that includes connectivity, IoT, surveillance analytics, cloud, including automation, nearautonomous facilities, AI, robotics to create the warehouse of the future.

Key benefits

- **End-to-End ICT Solutions:** Experience an enterprise-grade service encompassing reliable connectivity, devices, infrastructure, cloud solutions, and security, all managed under a single, efficient umbrella.
- **Streamlined Supply Chain Management:** Address the complete ICT requirements of the entire logistics supply chain, ensuring seamless operations from connectivity to security, enhancing efficiency and coordination across the logistics network.
- **Innovative Technology Integration:** Embrace the future with cutting-edge technologies such as automation, robotics, IoT, AI, and AR, fostering innovation and efficiency in warehouse operations, ensuring a competitive edge in the market.





5G Solution Offerings From Our Members

Digital Twin

Driving transformation through operational efficiency and predictive maintenance



Objectives

To help manufacturing leaders, Industry 4.0 | digital technologists, Government Executives, establish a smart factory.

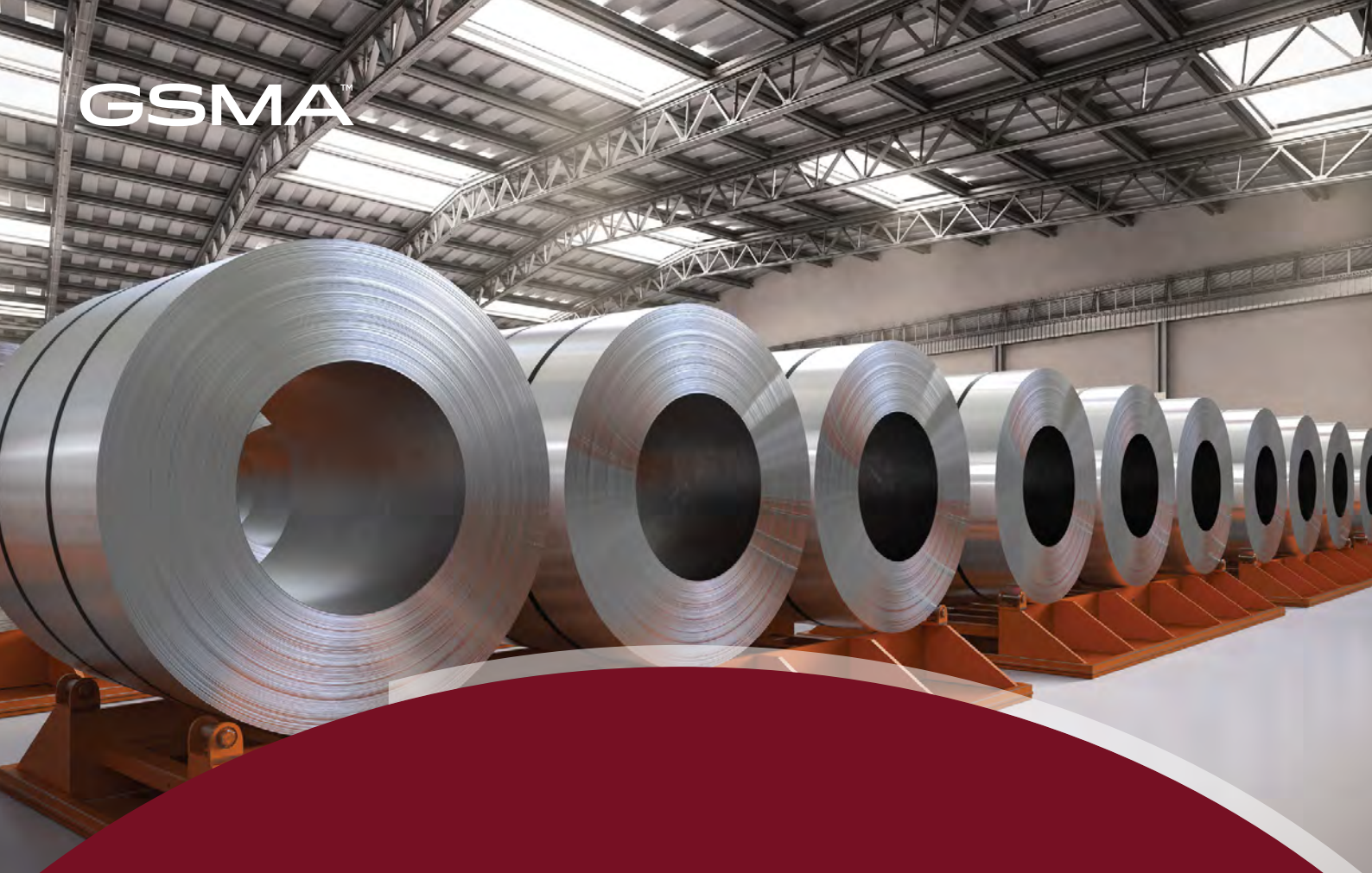
Overview

In partnership with Rockwell, Jio Private 5G coupled with Industry 4.0 empowers smart factories with a dedicated high-speed network, enabling real-time synchronization between physical assets and digital counterparts

Key benefits

- **Reduced Downtime:** Private 5G networks in factories, coupled with real-time sensor data and digital twins, enable predictive maintenance, reducing unplanned disruptions.
- **More effective and efficient:** Optimization of processes becomes more effective as simulations are powered by AI-driven analysis, leading to increased efficiency.
- **Innovation and Competitiveness:** The seamless interaction drives innovation, accelerates product development cycles, and enhances competitiveness in the manufacturing industry.





**5G Solution Offerings
From Our Members**

Steel Manufacturing

**TATA
COMMUNICATIONS**

Overview

The steel manufacturer had a digital roadmap for their plants, mines and other business verticals that will help them optimize their operational efficiency, productivity, employee safety etc. and remotely monitor & analyze various types of data points to improve business KPIs across safety and overall productivity.

Business Challenge

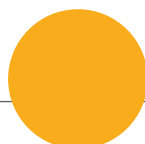
- The plant was spread over a huge area and the network connectivity at some points were very weak. This was causing delay in day-to-day operations.
- The lack of connectivity caused latency in the RF scanning process and as a result, the trucks in the inbound and outbound logistics process had to wait for some time resulting in domino's effect.
- The enterprise needed a network connectivity that can address their coverage and latency challenge as this was their critical business imperative.

Our Solution

- Implemented private 5G network at one of their largest plants.
- Private network with 5G radios, 5G core, and Point to Point links were deployed in production environment & integrated with usecase application (inbound/ outbound logistics).
- Successfully validated device connectivity, seamless data transfer from device to application and network continuity testing.

Business Impact

- Higher operational efficiency leads to cost savings and increased production output.
- Improved supply chain efficiency and reduced operational costs.
- Time and cost savings with faster decision-making and process optimization.





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**5G Solution Offerings
From Our Members**

Automotive Manufacturing

TATA
COMMUNICATIONS

Overview

The automotive organization utilized the Private 5G network of Tata Communication for their application integration, testing & collecting early feedback in real road like environment. It was specifically tailored to simulate real road conditions, offering a controlled & authentic environment for the testing and development of applications.

Business Challenge

- Vehicle R&D requires a dedicated network where parameter can be tuned as often as daily to ensure speed, agility and time to market.
- Additionally, Pre roll out testing is critical in determining the customer experience in real driving environment.
- Ability to simulate and customize road like practical connectivity conditions, in shortest time, to analyze application behavior.
- The outdoor Wi-Fi which they had deployed was failing due to interference issues, physical obstacles and weather conditions.

Our Solution

- Private 5G network for outdoor test track environment and indoor for device testing.
- Customization to cover gray areas, changeover scenarios, network simulations.
- Testing of network integration with the use cases:
Over-the-air updates, Seamless OTT experience & live streaming, Remote diagnostics & fault management, Driver Monitoring

Business Impact

- Significantly optimized overall time to market by reducing time for beta testing.
- Reducing R&D spends by simulating production like environment in their campus.
- Reduced customer reported defect through customized & comprehensive testing.



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5G Solution Offerings From Our Members

Agriculture Equipment
Manufacturing

**TATA
COMMUNICATIONS**

Overview

The manufacturer of agriculture equipment had planned to deploy a private network at their warehouse and integrate their inventory management application, testing for real-time inventory count and updates.

Business Challenge

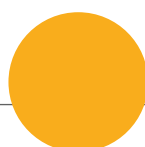
- Customer was unable to update inventory in real-time, resulting in supply chain and operational issues.
- Unable to plan cutting-edge use-case/application for warehouse automation that can enhance business KPIs.
- Intermittent coverage across the warehouse due to which hand-held devices were not seamlessly connected to network.
- Customer had to manage multiple Wi-Fi access points to provide coverage across warehouse resulting in higher operation expense.

Our Solution

- Private network as a service to cover the entire warehouse.
- Manage migration of inventory mgmt. application to the private network.
- 13 RF Scanners were connected on private network with existing Wi-Fi completely switched off.
- Provided 99.99% network availability with seamless coverage with 40% less access points.

Business Impact

- Due to highly available network, inventory was always updated resulting in less supply chain issues.
- Seamless hand-held devices connectivity from anywhere in the warehouse for faster turnaround.
- Reduced overall time to set up network connectivity and improved responsiveness to business needs.



5G Solution Offerings From Our Members

Airtel and Jio

Deployment of Fixed Wireless Access (FWA) in India



Airtel and Jio - Deployment of Fixed Wireless Access (FWA) in India

As part of India's 5G rollout, both Airtel and Reliance Jio are leveraging Fixed Wireless Access (FWA) to provide high-speed broadband services in areas with limited or no fibre connectivity. FWA is seen as a cost-effective alternative to traditional fibre deployments, especially in rural and underserved regions, helping to bridge India's digital divide.

Airtel's FWA Deployment

Airtel has been actively deploying FWA as a key part of its 5G service offerings. With its vast network infrastructure, Airtel is using FWA to target urban, suburban, and rural markets where extending fibre infrastructure is either challenging or cost-prohibitive. Airtel's FWA solutions provide households and businesses with broadband speeds comparable to fibre, making it an attractive option for last-mile connectivity.

In its initial rollout, Airtel focused on expanding FWA services in regions with high broadband demand but poor fibre penetration, especially in rural and semi-urban areas. Airtel's FWA services are positioned to support home broadband, IoT, and enterprise applications, allowing users to benefit from high-speed internet over a 5G network.

Jio's FWA Deployment

Reliance Jio has been more aggressive in deploying FWA as part of its broader 5G strategy. Jio has invested heavily in building one of the largest 5G Standalone (SA) networks in the world, which includes a substantial focus on FWA. In 2023, Jio launched its FWA services under the Jio AirFiber brand, aiming to offer high-speed internet services to households and small businesses.

Jio AirFiber is designed to provide fibre-like speeds to homes and offices using wireless connections, eliminating the need for physical fibre cables. This makes it easier and faster to deploy across a wide range of environments, including remote and difficult-to-reach areas. Jio's FWA services are part of its broader ambition to deliver broadband to homes across India, significantly expanding internet access in rural and suburban areas.

Benefits of FWA in India

- **Cost-effective:** FWA provides a faster, more affordable broadband option compared to laying fibre, which can be time-consuming and expensive, especially in remote areas.
- **Scalability:** Both Airtel and Jio can rapidly scale their FWA networks to meet growing demand for high-speed internet in urban and rural settings.
- **Increased coverage:** FWA helps both companies extend their broadband services to areas where fibre deployment is difficult, such as hilly terrains or low-density regions.

Through FWA, Airtel and Jio are enhancing connectivity in India, bringing high-speed internet to millions of homes and businesses that previously lacked reliable broadband access. According to the GSMAi report "5G FWA: state of the market, new trends and commercial practices shaping growth", by 2030, it is projected that India will have around 16.6 million 5G FWA connections, becoming one of the largest markets globally.



About the GSMA

The GSMA is a global organisation unifying the mobile ecosystem to discover, develop and deliver innovation foundational to positive business environments and societal change. Our vision is to unlock the full power of connectivity so that people, industry, and society thrive. Representing mobile operators and organisations across the mobile ecosystem and adjacent industries, the GSMA delivers for its members across three broad pillars: Connectivity for Good, Industry Services and Solutions, and Outreach. This activity includes advancing policy, tackling today's biggest societal challenges, underpinning the technology and interoperability that make mobile work, and providing the world's largest platform to convene the mobile ecosystem at the MWC and M360 series of events.

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