

SAMSUNG

**5G - Untethering Smart
Manufacturing Operations**



Overview

Product manufacturing cycles are tightening. The consumer demands for newer, better, faster “things” are pushing manufacturers to not only innovate faster but to produce higher quality products more quickly at lower price points, and many Industry 4.0 technologies are helping achieve these goals. The drive to optimize production, improve quality, and react to new trends is the foundation of the smart factory trend. Central to a more efficient workplace is that the smart factory leverages the abilities of modern operational and communication technologies to revolutionize the production industry.

5G is a key communication technology that takes these benefits to a new level. High-speed wireless networks offer the opportunity to use untethered connections to carry data from thousands of sensors to processors that automate and control production. And by automating the production, manufacturers are reducing production cycles and increasing product quality. Now, these advanced manufacturing lines are meeting the demand for newer, faster, better things.



5G-Enabled Automated Production Lines Increase Production Efficiency

On the manufacturing floor, communication delays can be costly. Not only do delays limit productivity, but they also increase production costs by wasting both energy and natural resources when products are not being built. When an “active” production line is not producing, the line is increasing product costs unnecessarily. Systems that efficiently control production lines drive down these unnecessary costs.

With 5G-enabled smart factories, production facilities use real-time communication between systems to control their manufacturing processes efficiently. For example, sensors along the line send real-time information to the scheduling system to track the progress of the product. Based on this progress tracking, the scheduler

calculates the consumption rate of components in the build process across all production lines. This real-time flow of information means the completed components, both to ensure delivery of parts needed to produce the component and to inform the next phase of the build of the arriving components.

While existing technologies enable this type of automation, 5G takes the system to the next level by supporting up to one million sensors, connected machines, and smartphones. A manager can access production metrics quickly and accurately and make real-time decisions to control production efficiency right from his or her smartphone while sitting in a meeting. And when input components are not available, or sensors indicate that a line needs immediate maintenance, the manager has the necessary information to make the best decision. With the ability to adjust quickly, the efficiency- and profitability - of the production line increases, all because of the ultra-reliable communication benefits that 5G has over Wi-Fi.



5G Connects Cameras, Sensors and Alert Systems to Improve Environmental Safety

In today's manufacturing environment, high-resolution cameras and purpose-built safety sensors provide continuous real-time safety and security monitoring that increases plant security and environmental safety. Wireless 5G-enabled cameras can be placed anywhere to capture and send high-quality images over high-speed connections to security staff or AI-enabled image processors to identify the need for a response – or not in the case of a false alarm.

With the high number of devices that can connect to the 5G network, it becomes simpler to monitor

sensors on safety suits for tracking personnel location and other necessary values for ensuring employee health and safety. The 5G network can not only alert the emergency team of the need to respond to a place but can also provide additional information about the incident. For example, workers who wear sensors will have their vital signs, like pulse and respiration rates provided to the emergency responders. And if there are possible environmental challenges, the network can send statistics like air temperature and quality to alert the responders to any environmental hazards that may be present in the area.

With its ability to support up to one million devices in an area less than four-tenths of a square mile, 5G offers the scalability of sensors and devices that allow a smart factory to provide health and safety support and to enable systems to communicate with production lines.



5G Expedites the Benefits of Improved Quality Control

Manufacturers have been looking for effective and fast quality-control mechanisms, and with high-bandwidth low-latency capabilities, 5G-powered smart-factories offer one reliable answer. Factories with 5G connectivity can incorporate real-time video streams with computer-based analysis to quickly identify and remove defective products from the line to improve product quality.

These smart-QC-enabled factories that use 5G infrastructure have the speed, bandwidth, and reliability to send the images and video to the defect-analysis-engine for time-critical product-quality decisions. The transmission and processing of the stream and images in just a few seconds allow the system enough time to alert the 5G-connected sorter to remove defective items. This approach is more effective than human

analysis: the computer is faster at detecting flaws than humans and is more accurate as it analysis: the computer is faster at detecting flaws than humans and is more accurate as it “sees” those defects the human eye cannot see. And when a defective unit is found, the human sorts the item at the time they find the error; the smart quality control system not only triggers the sorter to remove the defective component, it also maintains an accurate real-time count of the defective units for production line QC metrics. With the analysis and trending from the real-time data, additional input about the line’s quality is available earlier to identify problems in the line. The count of defective parts allows the system to alert the disposal robot to replace the receptacle containing the out-of-specification components.

Leveraging these advanced technologies allows manufacturers to improve the quality of their products and increase the speed of production by automating the detection of defective components and increasing the efficiency of the quality control process.



Samsung - Leading by Example in 5G

Samsung is at the forefront of bringing 5G networks and technology to people and businesses everywhere. By envisioning a connected world that brings together multiple technologies—artificial intelligence, IoT, cloud data, and computing—Samsung is delivering the network that transforms everyday experiences. The creators of 5G are designing the network of tomorrow to handle several different services – enhanced mobile broadband, massive IoT, and ultra-reliable and low-latency communications. Samsung has introduced a comprehensive solution from chips, mobile devices, RAN, and Core to services, tools, and applications that will enable operators and companies to commercialize a 5G network in no time.

Samsung has taken a leading role by accelerating the deployment of 5G and is taking significant steps to reduce time-to-market for advanced 5G concepts. Fostering innovation through collaboration with carriers and suppliers allows the industry to create and validate advanced technologies for new business solutions, like with smart manufacturing. Samsung's product partnerships – including Marvell to develop 4G and 5G

processors for radios, Xilinx to innovate in antenna beamforming, HPE for edge-to-core infrastructure, and Zhilabs AI-based analytics – illustrate this commitment.

Samsung leverages these new technologies to drive efficiencies into Industry 4.0 initiatives. In February, Orange Spain and Samsung demonstrated 5G and AI-control and distribution of components in a smart factory. In partnership with AT&T and Samsung, the Samsung Austin Semiconductor facility in Austin, Texas, is highlighting the potential of 5G to help workers communicate and stay safe and secure and to increase the operational benefits in the smart factory. In Korea, KT and Samsung partnered to create the Smart Manufacturing Innovation Center to prove how manufacturing sites can build on new ideas that reduce the time to market of high-quality products. The drive to optimize production, improve quality, and react to new trends is the foundation of the smart factory.

5G is real, and it is here now. Samsung is doing more than just showcasing ideas and concepts. Enabling smart factories is only one of the endless possibilities for 5G that Samsung plans to make a reality. With blazing 5G speed, minimal latency, and massive connectivity, Samsung networks and devices will transform the way we live, work, learn, engage, and more.

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