Transparent Processes
SIMATIC RF600 – Taking RFID to the Next Level
Today we manufacture products in global networks with increasingly shorter life-cycles. And we gear our manufacturing processes to increasingly specific customer requests while meeting increasingly strict standards and requirements.

To keep pace with the global competition, companies need a continuous, up-to-the-minute overview of their processes and material flows, because knowing where materials are at all times is crucial for better planning and optimization of production and logistics.

RFID provides this transparency. Stationary read / write devices in the production and supply chain as well as transponders on products, workpieces, and goods allow uninterrupted tracking and tracing.

Modern systems in the ultra-high frequency band (UHF-RFID) offer long ranges, high reading speed, and the option of bulk reading.

As processes within companies and in the outside world become more interlinked, RFID technology is becoming increasingly important for Industry 4.0. The concept of the digital factory encompasses the entire process from development and simulation, to the physical implementation of a product in a highly automated production sequence. This requires technologies that can identify semi-finished products, tooling, containers and machines, as well as communication technologies to digitally transmit data between machines or factories.

Undreamed-of transparency
New possibilities for production and logistics

To be successful in the future, companies have to invest in solutions for the digital enterprise today – solutions that bring lower costs, higher quality, greater flexibility and efficiency, as well as shorter response times to customer requests and market requirements. UHF-RFID technology is an important part of the digital factory, and SIMATIC RF600 makes it easy for you to take advantage of all its benefits. The system reads transponders with absolute reliability, and it can be integrated seamlessly into your automation (such as in Totally Integrated Automation) and IT environments (such as in cloud solutions). Project planning is carried out using a standard Web browser or the TIA Portal, and can be performed quickly. It is also easy to use, even during factory operation. From production to delivery of the finished products, SIMATIC RF600 opens up new possibilities for you.

SIMATIC RF600 RFID system

<table>
<thead>
<tr>
<th>Read/write distance</th>
<th>Max. 8m (with 1 antenna), farther with antennas mounted opposite each other in portal applications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency</td>
<td>865–868 MHz (Europe), 902–928 MHz (North America), 920–925 MHz (China), 920–924 MHz (Japan)</td>
</tr>
<tr>
<td>Standards</td>
<td>EPCglobal Class 1 Gen 2 ISO 18000-6B ISO 18000-6C</td>
</tr>
</tbody>
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Everything you need: Commissioning and diagnostic tools are already integrated in SIMATIC RF600. This makes it unnecessary to install and update PC software – everything is available when it is needed. The reading results are preprocessed right in the reader, substantially reducing the time and effort needed for integration in higher-level systems.

Nothing gets lost: SIMATIC RF600 detects tags reliably – whether individually or in mass detection, static or moving quickly, with fluctuating tag quality, or in a difficult, reflective radio environment. A high-quality radio processor as well as the proven “UHF for Industry” algorithms enable top-notch detection quality. A special feature of the RF685R is that its integrated antenna automatically adapts to different ambient conditions, thus increasing reading reliability.

For fast results: Simply open the user interface for RF600 via your web browser or TIA Portal and you’re ready to start. The tools facilitate the alignment of the antennas and make it easier to calculate the response performance of tags. You can initialize tags and edit data content, and you also have access to the error log and diagnostic views, even when the plant is in operation. If a device is damaged, it can easily be replaced, because stored parameters are compared automatically. The result is reduced downtime and increased plant availability.

Always the right system: Whether you need RFID for a standard logistics application or a high-end solution for harsh production conditions, you will always find the right product with SIMATIC RF600. The scales UHF portfolio also offers an optimum price/performance ratio. This allows you to remain flexible at all times. It is the first RFID system that supplies data to MindSphere, the cloud-based open IoT operating system from Siemens.

SIMATIC RF600

All benefits bundled in a single system

Production control
- Make production stations flexible, control material flows
- Reliable and rugged, even in challenging radio environments
- Economic production, even down to unique-item runs
- Suitable for difficult-to-access assembly stations
- Greater availability thanks to distributed control
- Optimized inventory management
- Greater manufacturing efficiency through automatic, synchronous feeding of parts and components
- Simple material flow control thanks to automation with Kanban

Asset management
- Maintain an overview
- Increased rate of inventory turnover
- Reduction of inventory and less need for replenishment
- Increased availability
- Improved service, maintenance and repair processes
- New business models based on service life

Supply chain management
- Keep global logistics under control
- Greater transparency in logistics
- Support of new logistics concepts
- Automatic data entry instead of the manual processing of goods, which can frequently incur errors, for example during the receipt and shipping of goods
- Integration in global supplier networks
- Automatic monitoring of cold chains

Tracking and tracing
- Track with precision
- Improved product quality
- Focused after-sales support (e.g. product recalls)
- Observation of legal regulations
- Automatic data recording for process optimization

Simple commissioning, maintenance, and service

Suitable solutions for any application

Reliable tag detection

Versatile applications

Quality and efficiency throughout the value chain
New in the cloud

SIMATIC RF600 supplies data to MindSphere

Digitalization is changing everything: Billions of smart devices and machines are generating staggering volumes of data that flow together into virtual clouds to the Internet of Things (IoT). The analysis and utilization of this data are opening up unimaginable potential. Siemens has developed MindSphere, the cloud-based open IoT operating system that allows this potential to be fully exploited. MindSphere supports the digital transformation of enterprises of any size and in any sector – in the shortest possible time.

The Future is Digital

The simple act of connecting the SIMATIC RF600 RFID system to MindSphere via OPC UA opens up exciting new scopes for the use of data captured from RFID transponders. As a link between the real and digital world, the RFID system allows operating resources such as containers, pallets or products that previously could not be mapped digitally to now be registered and tracked. The new firmware version V3 makes this link possible. SIMATIC RF600 uses it to support the OPC UA interface, which is an important standard on the way towards digitalization. As a platform-independent standard, OPC UA offers high performance and proven security mechanisms. It enables seamless communication and can be scaled to meet any requirement. The data is transmitted to MindSphere via a connect element such as the Industrial IoT gateway RUGGEDCOM RX1400 with MindConnect or MindConnect Nano. Siemens relies on OPC UA as the open interface – from the sensor to the cloud.

The analysis of the data that are provided to MindSphere with the help of SIMATIC RF600 is creating transparency in terms of KPIs such as plant availability, utilization of assets, or energy-saving potential. This will allow the targeted optimization of production processes and supply chains with a view to improving efficiency and quality in production, logistics, asset management, and other areas. In all industries.

Highlights

- OPC UA enables standardized connection to MindSphere
- Simple connection, for example, via the Industrial IoT gateway RUGGEDCOM RX1400 with MindConnect or MindConnect Nano
- Project engineering via web interface in a browser
- Worldwide availability of KPIs thanks to the web-based concept
- Complete solution from the sensor and the connection to MindSphere to the point of applications and digital services

SIMATIC RF600 and MindSphere are essential components of a successful digitalization strategy and the basis for data-based services from Siemens for predictive maintenance and management of energy data, assets, and supply chain management.
### Technical data at a glance

#### Read/write devices

<table>
<thead>
<tr>
<th>Description</th>
<th>SIMATIC RF600</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Dimensions</td>
<td>258 × 258 × 80 mm</td>
<td>258 × 258 × 80 mm</td>
<td>258 × 258 × 80 mm</td>
</tr>
<tr>
<td>Approval</td>
<td>CE, ETSI EN 302208, UL, FCC, CMIIT, ARIB</td>
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<td>CE, ETSI EN 302208, UL, FCC, CMIIT, ARIB</td>
</tr>
<tr>
<td>Degree of protection</td>
<td>IP30</td>
<td>IP65</td>
<td>IP65</td>
</tr>
<tr>
<td>Operating temperature</td>
<td>–25 °C to +55 °C</td>
<td>–25 °C to +55 °C</td>
<td>–25 °C to +55 °C</td>
</tr>
<tr>
<td>Antenna</td>
<td>4 external antennas</td>
<td>1 internal antenna</td>
<td>1 external antenna</td>
</tr>
<tr>
<td>Data transmission rate</td>
<td>300 kbps</td>
<td>300 kbps</td>
<td>300 kbps</td>
</tr>
<tr>
<td>Range</td>
<td>8 m</td>
<td>8 m</td>
<td>8 m</td>
</tr>
</tbody>
</table>

#### Digital outputs

- 24 V / 0.5 A nom.
- RS422

#### Digital inputs

- 4
- 4
- 4

#### Other properties

- Ethernet (TCP / IP)
- Ethernet / IP
- PROFIBUS
- PROFINET
- ET 200M
- S7-1500
- S7-1200
- S7-400
- S7-300
- SIMATIC

#### Ethernet interfaces

- RJ45 (100 Mbps)
- M12 (100 Mbps)
- M12 (100 Mbps)

#### Technical data at a glance

#### Antennas

<table>
<thead>
<tr>
<th>Description</th>
<th>SIMATIC RF620A</th>
<th>SIMATIC RF642A</th>
<th>SIMATIC RF650A</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dimensions</td>
<td>198 × 198 × 60 mm</td>
<td>219 × 219 × 80 mm</td>
<td>258 × 258 × 80 mm</td>
</tr>
<tr>
<td>Approval</td>
<td>CE, FCC, IEC</td>
<td>CE, FCC, IEC</td>
<td>CE, FCC, IEC</td>
</tr>
<tr>
<td>Impedance (nominal)</td>
<td>50 ohms</td>
<td>50 ohms</td>
<td>50 ohms</td>
</tr>
<tr>
<td>Frequency range</td>
<td>865 to 868 MHz (ETSI)</td>
<td>902 to 928 MHz (FCC, CMIIT)</td>
<td>902 to 928 MHz (FCC, CMIIT)</td>
</tr>
<tr>
<td>Antenna gain</td>
<td>4 dBi</td>
<td>3.5 dBi</td>
<td>3.5 dBi</td>
</tr>
<tr>
<td>Polarization</td>
<td>Circular</td>
<td>Circular</td>
<td>Circular</td>
</tr>
<tr>
<td>Impedance (nominal)</td>
<td>50 ohms</td>
<td>50 ohms</td>
<td>50 ohms</td>
</tr>
</tbody>
</table>

#### Technical data at a glance

#### Antennas

<table>
<thead>
<tr>
<th>Description</th>
<th>SIMATIC RF680R</th>
<th>SIMATIC RF685R</th>
<th>SIMATIC RF680L</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dimensions</td>
<td>198 × 198 × 60 mm</td>
<td>219 × 219 × 80 mm</td>
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<tr>
<td>Approval</td>
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<td>CE, FCC, IEC</td>
</tr>
<tr>
<td>Impedance (nominal)</td>
<td>50 ohms</td>
<td>50 ohms</td>
<td>50 ohms</td>
</tr>
<tr>
<td>Frequency range</td>
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<td>902 to 928 MHz (FCC, CMIIT)</td>
<td>902 to 928 MHz (FCC, CMIIT)</td>
</tr>
<tr>
<td>Antenna gain</td>
<td>6 dBi</td>
<td>3.5 dBi</td>
<td>3.5 dBi</td>
</tr>
<tr>
<td>Polarization</td>
<td>Linear</td>
<td>Circular</td>
<td>Circular</td>
</tr>
<tr>
<td>Impedance (nominal)</td>
<td>50 ohms</td>
<td>50 ohms</td>
<td>50 ohms</td>
</tr>
</tbody>
</table>

#### Technical data at a glance

#### Antennas

<table>
<thead>
<tr>
<th>Description</th>
<th>SIMATIC RF680L</th>
<th>SIMATIC RF680A</th>
<th>SIMATIC RF680L</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dimensions</td>
<td>258 × 258 × 80 mm</td>
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</tr>
<tr>
<td>Approval</td>
<td>CE, FCC, IEC</td>
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<td>CE, FCC, IEC</td>
</tr>
<tr>
<td>Impedance (nominal)</td>
<td>50 ohms</td>
<td>50 ohms</td>
<td>50 ohms</td>
</tr>
<tr>
<td>Frequency range</td>
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<tr>
<td>Antenna gain</td>
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<td>3.5 dBi</td>
<td>3.5 dBi</td>
</tr>
<tr>
<td>Polarization</td>
<td>Linear</td>
<td>Circular</td>
<td>Circular</td>
</tr>
<tr>
<td>Impedance (nominal)</td>
<td>50 ohms</td>
<td>50 ohms</td>
<td>50 ohms</td>
</tr>
</tbody>
</table>
### Technical data at a glance

#### Mobile transponders 1)

<table>
<thead>
<tr>
<th>Description</th>
<th>SIMATIC RF600</th>
<th>SIMATIC RF600</th>
<th>SIMATIC RF600</th>
<th>SIMATIC RF600</th>
<th>SIMATIC RF600</th>
</tr>
</thead>
<tbody>
<tr>
<td>Memory size</td>
<td>EPC 496 bits</td>
<td>EPC 96 / 128 bits</td>
<td>EPC 96 / 240 bits</td>
<td>EPC 96 / 480 bits</td>
<td>EPC 96 / 480 bits</td>
</tr>
<tr>
<td>Description</td>
<td>UHF smart label with fast FRAM user memory</td>
<td>UHF transponder with fast FRAM user memory</td>
<td>UHF transponder for industry</td>
<td>UHF transponder for industry</td>
<td>UHF transponder for industry</td>
</tr>
<tr>
<td>Dimensions in mm</td>
<td>90 x 18 x 0.5</td>
<td>105 x 25</td>
<td>120 x 30 x 6.5</td>
<td>127 x 38 x 6</td>
<td>155 x 38 x 12</td>
</tr>
<tr>
<td>Standard</td>
<td>ISO 18000-6C</td>
<td>ISO 18000-6C</td>
<td>ISO 18000-6C</td>
<td>ISO 18000-6C</td>
<td>ISO 18000-6C</td>
</tr>
<tr>
<td>Frequency</td>
<td>860 to 960 MHz (ETSI, FCC, CMIIT)</td>
<td>860 to 960 MHz (ETSI, FCC, CMIIT)</td>
<td>902 to 928 MHz (FCC, CMIIT)</td>
<td>902 to 928 MHz (FCC, CMIIT)</td>
<td>902 to 928 MHz (FCC, CMIIT)</td>
</tr>
<tr>
<td>Read cycles, min.</td>
<td>1010</td>
<td>Unlimited</td>
<td>Unlimited</td>
<td>Unlimited</td>
<td>Unlimited</td>
</tr>
<tr>
<td>Write / read distance, typ.</td>
<td>3 m</td>
<td>2 m</td>
<td>1.5 m</td>
<td>1.2 m</td>
<td>6 m</td>
</tr>
<tr>
<td>User memory</td>
<td>3424 bytes</td>
<td>512 bits</td>
<td>512 bits</td>
<td>512 bits</td>
<td>512 bits</td>
</tr>
<tr>
<td>Data retention</td>
<td>10 years</td>
<td>10 years</td>
<td>30 years</td>
<td>30 years</td>
<td>30 years</td>
</tr>
</tbody>
</table>

1) Technical data is valid at 23 °C / 50% relative humidity. If ambient temperature or relative humidity is different, please refer to the local specifications.
Technical data at a glance

Mobile handheld terminal

### SIMATIC RF650M

**Description**
Powerful, compact, mobile RFID reader for applications in production logistics, warehouse management, inventory and service

**Display**
TFT colour touch screen

**Size**
2.2” screen size

**Resolution**
240 x 320 pixels

**Operating temperature**
–20 °C to +55 °C

**Degree of protection**
IP54

**Power supply**
Lithium-polymer battery (2260 mAh)

**Display**
Function keys and touch screen

**Keyboard**
Alphanumeric

**Storage**
Flash / RAM 256 MB / 256 MB

**Frequency**
865 to 868 MHz (Europe) per ETSI
902 to 928 MHz (USA) per FCC

**Write-read distance**
typ. 2.5 m

**Capable of multi-tag / mass detection**
yes

**Interfaces**
- WLAN integrated (IEEE 802.11 a / b / g / n)
- USB, Ethernet via docking station

**SIMATIC**

- S7-1500 with CP 1543-1 SCALANCE W774-1RJ45

**PROFINET**

- SCALANCE XB208

**Exemplary configuration**

Exemplary configuration for an assembly line with SIMATIC RF600, SCALANCE W and SCALANCE X

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In order to protect plants, systems, machines and networks against cyber threats, it is necessary to implement – and continuously maintain – a holistic, state-of-the-art industrial security concept. Siemens’ products and solutions only form one element of such a concept.

Customer is responsible to prevent unauthorized access to its plants, systems, machines and networks. Systems, machines and components should only be connected to the enterprise network or the internet if and to the extent necessary and with appropriate security measures (e.g. use of firewalls and network segmentation) in place.

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Siemens’ products and solutions undergo continuous development to make them more secure. Siemens strongly recommends to apply product updates as soon as available and to always use the latest product versions. Use of product versions that are no longer supported, and failure to apply latest updates may increase customer’s exposure to cyber threats.

To stay informed about product updates, subscribe to the Siemens Industrial Security RSS Feed under http://www.siemens.com/industrialsecurity.

Find out more

siemens.com/rf600

Further information:

- Industrial identification with SIMATIC Ident: www.siemens.com/ident
- Industry Mall for online ordering: www.siemens.com/industrymall
- SIMATIC contact: www.siemens.com/automation/partner

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