SIEMENS

Transparent Processes

SIMATIC RF600 – Taking RFID to the Next Level

SIMATIC Ident

iF DESIGN AWARD 2016

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Undreamed-of transparency

## New possibilities for production and logistics

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 simulatio, 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.
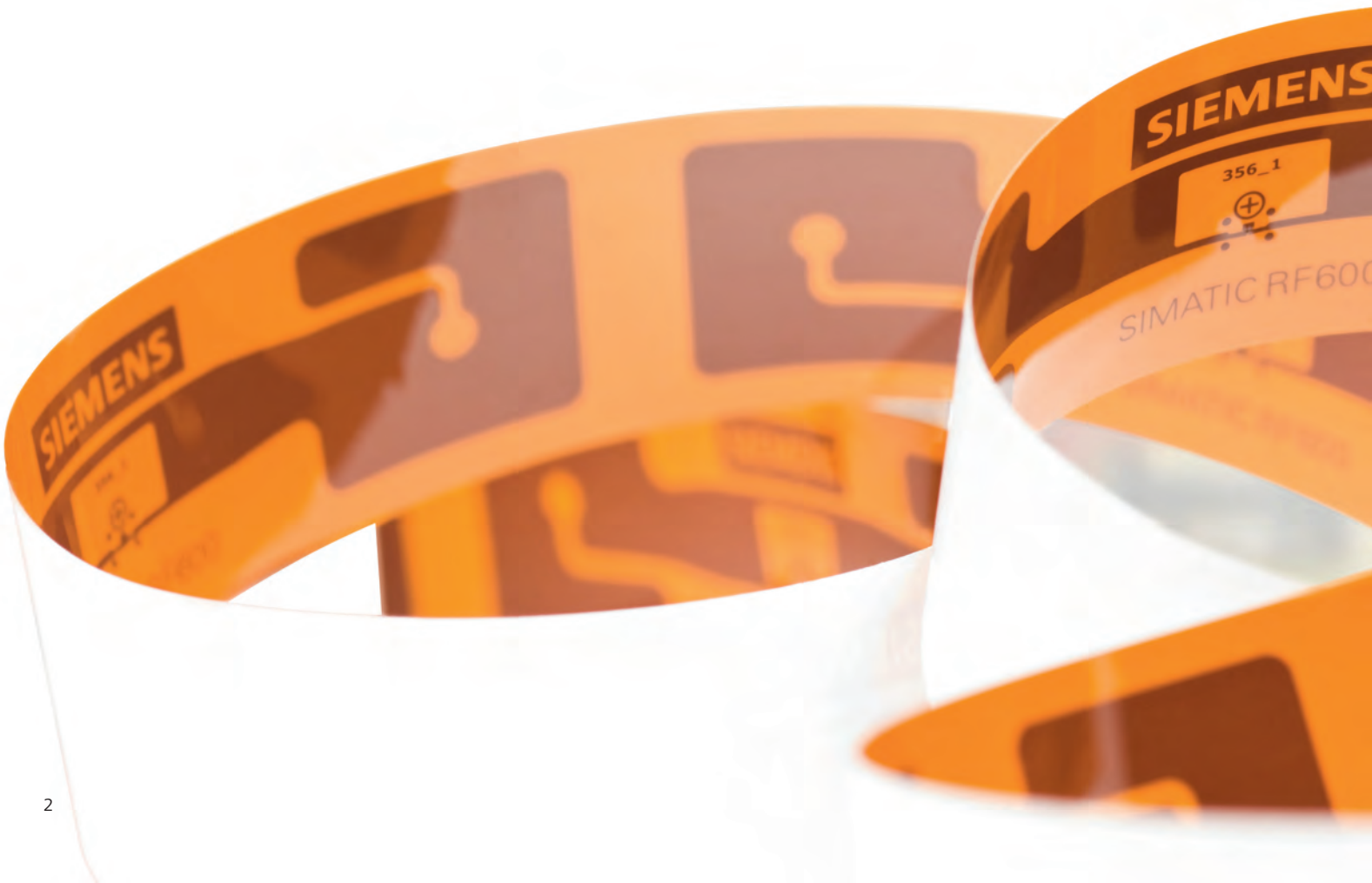
SIMATIC RF600 reads tags with absolute reliability, making it easy for you to take advantage of UHF RFID technology. And it can be integrated seamlessly into your automation (such as in Totally Integrated Automation) and IT. Project planning is done using a standard Web browser or the TIA Portal, and can be performed quickly. SIMATIC RF600 thus opens up new possibilities for you – from production to delivery of the finished products. You can rely on transparent, efficient processes, and always stay one step ahead of the competition.

SIMATIC RF600 RFID system	
Read/ write distance	Max. 8 m (with 1 antenna), farther with antennas mounted opposite each other in portal applications
Fre- quency	865–868 MHz (Europe) 902–928 MHz (North America) 920–925 MHz (China) 920–924 MHz (Japan)
Standards	EPCglobal Class 1 Gen 2 ISO 18000-6B ISO 18000-6C

Versatile applications

Quality and efficiency throughout the value chain
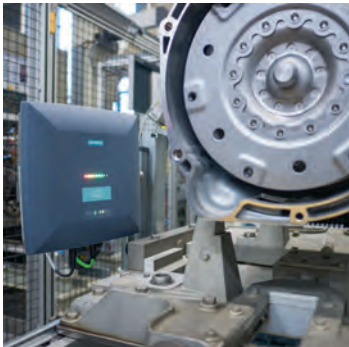
Production control
Make production stations flexible, control material flows

- 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

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

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

SIMATIC RF600

All benefits bundled in a single system

Control your material flows and optimize your logistics. Depend on absolutely reliable tracking and tracing, and manage your assets transparently as never before. With SIMATIC RF600, you always have your processes under control.

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.

Everything in a single device

Reliable tag detection

Simple commissioning, maintenance, and service

Suitable solutions for any application

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'll always find the right product with SIMATIC RF600. The scaled UHF portfolio also offers an optimum price/performance ratio, allowing you to remain flexible at all times.

A sophisticated series of devices

The system in detail

RF650R – efficient for logistics applications

You can connect up to four external antennas to the RFID reader RF650R. Thanks to its attractive pricing, gate applications can be realized efficiently, in areas such as receiving or shipping.

RF680R – rugged in rough production environments

With the RF680R you can map up to four independent reading points and integrate them in one controller. This significantly reduces the price/reading point ratio.

RF685R – optimized for the most demanding applications

With the RF685R you can implement individual reading stations with demanding requirements. Thanks to the integrated adaptive antenna, you have more freedom during project planning and less time, effort and costs during implementation.
In addition, reliability is higher during operation, i.e., when tags are being read and written.

The RF650R, RF680R, and RF685R readers include comprehensive diagnostic and commissioning tools. Diagnostic information can be displayed during ongoing operation, and the diagnostic logbook provides a view of the event history.

The larger LED display of the RF680R and RF685R devices shows all important information. Moreover, the second Ethernet interface permits direct local diagnostics.

All three devices can be integrated quickly and easily into existing IT environments thanks to the integrated Ethernet interface and XML protocol.

Thanks to the integrated PROFINET interface, the RF680R and RF685R devices can be integrated into automation environments with no additional interface modules. They are integrated into TIA, for example, via the TIA Portal, which already includes device information and corresponding standard function blocks.
Integration via PROFIBUS is also possible.

RF650A – efficiency in logistics applications

The new SIMATIC RF650A antenna, in conjunction with the RF650R reader, creates a cost-effective system for logistics applications.

RF680A – the adaptive high-end antenna

The SIMATIC RF680A adaptive high-end antenna achieves extremely high read rates, even in challenging radio environments.

The new SIMATIC RF650A antenna, in combination with RF650R readers, provides a cost-effective system for logistics applications.

The new SIMATIC RF680A adaptive antenna makes for simplified project planning, because it is no longer necessary to account for polarization of the antenna in the planning phase. In addition, reliable identification is assured, even in challenging radio environments. Another plus is the large, integrated LED display that provides a fast and detailed diagnosis of the detection and error status of each antenna.

Common to both antennas are compact dimensions (198 x 198 x 60 cm) and a high protection class (IP65) – which makes them especially suitable for use in harsh industrial environments. They are also compatible with SIMATIC RF650R, RF680R, and RF685R read / write devices. Thanks to their broadband operating frequency (865–928 MHz), both antennas can be deployed globally.

Technical data at a glance

Read/write devices

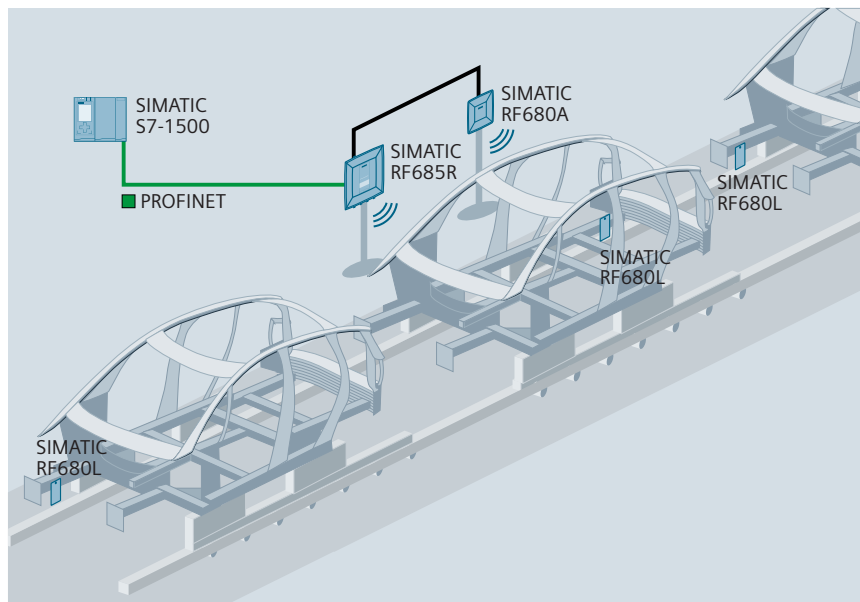|	SIMATIC RF650R read/write device	SIMATIC RF680R read/write device	SIMATIC RF685R read/write device
Description	Stationary UHF read/write device with integrated processing logic for max. four remote antennas	Stationary UHF read/write device with integrated processing logic for max. four remote antennas	Stationary UHF read/write device with integrated processing logic with an integrated antenna and an external antenna connection
Interfaces			
Ethernet	1 × RJ45 (100 Mbps)	2 × M12 (100 Mbps)	2 × M12 (100 Mbps)
RS422		1	1
Digital inputs 24 V	4	4	4
Digital outputs 24 V / 0.5 A nom.	4	4	4
Connection to the automation system			
SIMATIC ■ S7-300 ■ S7-400 ■ S7-1200 ■ S7-1500		■ via integrated PROFINET interface ■ PROFIBUS via communications module ASM456	
Dist. I/O ■ ET 200pro ■ ET 200M			
Bus systems ■ PROFINET ■ PROFIBUS ■ Ethernet (TCP/IP)	■ Ethernet (TCP/IP): integrated	■ PROFINET: integrated ■ PROFIBUS via communications module ASM456 ■ Ethernet (TCP/IP): integrated	
Other properties			
Capable of multi-tag/mass detection	yes	yes	yes
Range, max.	8 m	8 m	8 m
Data transmission rate, max.	300 kbps	300 kbps	300 kbps
Antenna	max. 4 external antennas	max. 4 external antennas	1 internal antenna max. 1 external antenna
Operating temperature	−25 °C to +55 °C	−25 °C to +55 °C	−25 °C to +55 °C
Degree of protection	IP30	IP65	IP65
Approvals	CE, ETSI EN 302208, UL, FCC, CMIIT, ARIB	CE, ETSI EN 302208, UL, FCC, CMIIT, ARIB	CE, ETSI EN 302208, UL, FCC, CMIIT, ARIB
Dimensions in mm (L×W×H)	258 × 258 × 80	258 × 258 × 80	258 × 258 × 80

Technical data at a glance

Antennas

	SIMATIC RF620A antenna	SIMATIC RF640A antenna	SIMATIC RF642A antenna	
Description	Compact antenna for use in production facilities and conveyor technology	Universal medium-range UHF antenna in industrial-suited, compact design	Universal medium-range UHF antenna in industrial-suited, compact design	
Impedance (nominal)	50 ohms	50 ohms	50 ohms	
Polarization	Linear	Circular	Linear	
Antenna gain	−10 dBi to −5 dBi	4.0 dBi (ETSI) / 4.3 dBi (FCC/CMIT)	6 dBi (ETSI) / 7 dBi (FCC/CMIT)	
Frequency range	865 to 868 MHz (ETSI) 902 to 928 MHz (FCC, CMIIT)	865 to 928 MHz (ETSI, FCC, CMIIT)	865 to 928 MHz (ETSI, FCC, CMIIT)	
Conformity	CE, FCC, IC-FCB, UL	CE, FCC, IC-FCB, UL	CE, FCC, IC-FCB, UL	
Connector	Reverse-polarity TNC	Reverse-polarity TNC	Reverse-polarity TNC	
Mounting	2 × M5 drilled hole	4 × M4 drilled hole (VESA 100 mounting system) optional: flexible mounting with antenna mounting kit	4 × M4 drilled hole (VESA 100 mounting system) optional: flexible mounting with antenna mounting kit	
Operating temperature	−20 °C to +70 °C	−25 °C to +75 °C	−25 °C to +75 °C	
IP rating, degree of protection	IP67	IP65	IP65	
Dimensions (L × H × D in mm)	75 × 75 × 20	185 × 185 × 45	185 × 185 × 45	
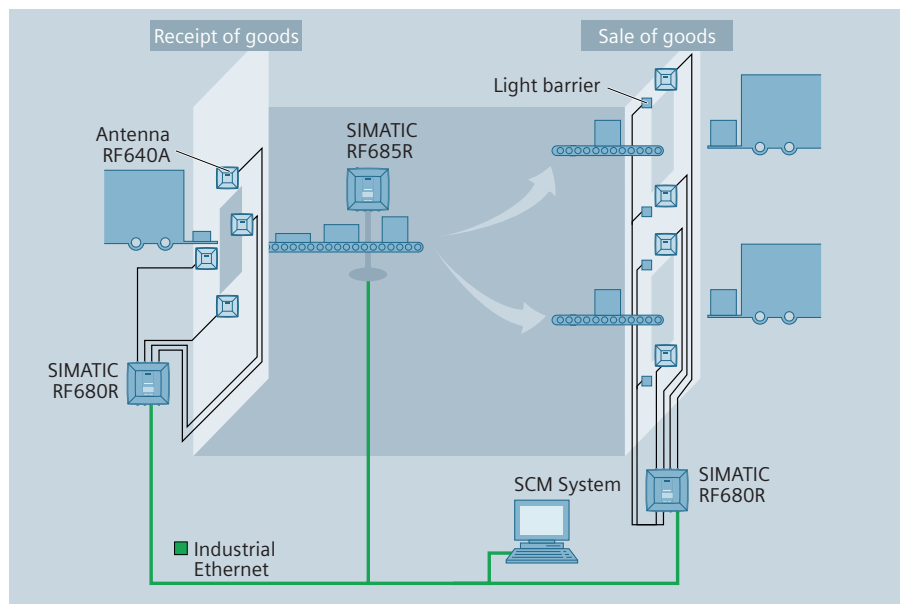
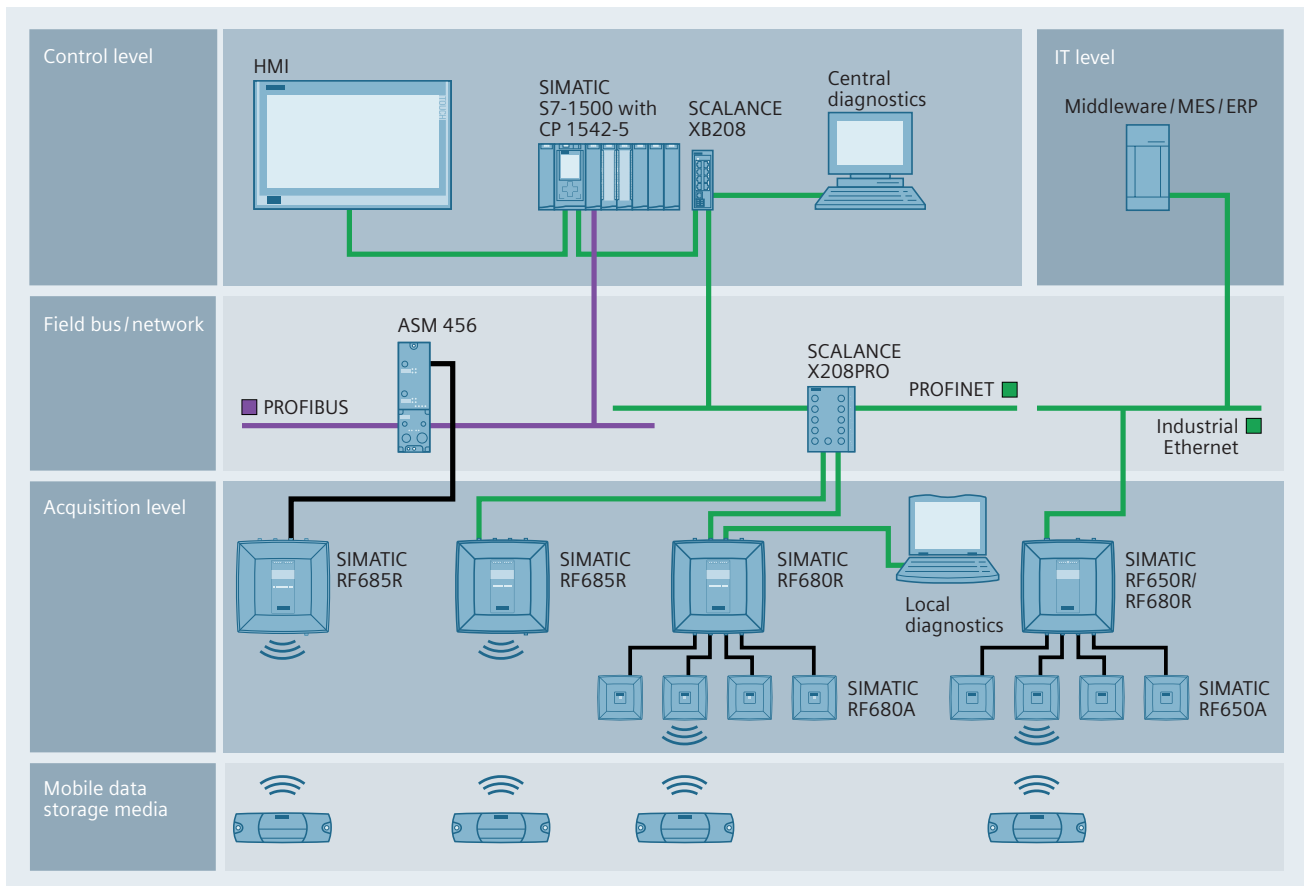*Monitoring of incoming goods, distribution of goods and outgoing goods (Supply Chain Management)*

SIMATIC RF650A antenna	SIMATIC RF650A antenna	SIMATIC RF680A antenna	
Universal antenna for general applications in production and logistics	Circular antenna for universal deployment in industrial applications in production and logistics	Adaptive high-end antenna for use in harsh industrial environments. Polarization can be switched over automatically	Description
50 ohms	50 ohms	50 ohms	Impedance (nominal)
Circular	Circular	Linear, circular, automatic	Polarization
7 dBi (ETSI) / 6 dBi (FCC/CMIT)	4 dBi (ETSI) / 3.5 dBi (FCC/CMIT)	3.5 dBi (ETSI) / 3.5 dBi (FCC/CMIT)	Antenna gain
865 to 868 MHz (ETSI) 902 to 928 MHz (FCC, CMIIT)	865...928 MHz (ETSI, FCC, CMIIT)	865...928 MHz (ETSI, FCC, CMIIT)	Frequency range
CE, FCC, IC-FCB, UL	CE, FCC, IC-FCB, UL	CE, FCC, IC-FCB, UL	Conformity
Reverse-polarity TNC	Reverse-polarity TNC	Reverse-polarity TNC	Connector
4 × M4 drilled hole (VESA 100 mounting system) optional: flexible mounting with antenna mounting kit	4 x M4 drilled hole (VESA 100 fixing system) optional: flexible installation with antenna mounting kit	4 x M4 drilled hole (VESA 100 fixing system) optional: flexible installation with antenna mounting kit	Mounting
−25 °C to +75 °C	−25 °C ... +75 °C	−25 °C ... +75 °C	Operating temperature
IP67	IP65	IP65	IP rating, degree of protection
313 × 313 × 80	198 × 198 × 60	198 × 198 × 60	Dimensions (L × H × D in mm)

Consistent, end-to-end identification of car bodies, from the shell construction to the final assembly

Seamless integration

Standard interfaces for flexible architectures

Control level

HMI

SIMATIC S7-1500 with CP 1542-5

SCALANCE XB208

Central diagnostics

IT level

Middleware / MES / ERP

Field bus / network

ASM 456

■ PROFIBUS

SCALANCE X208PRO

PROFINET ■

Industrial Ethernet ■

Acquisition level

SIMATIC RF685R

SIMATIC RF685R

SIMATIC RF680R

Local diagnostics

SIMATIC RF650R/ RF680R

SIMATIC RF680A

SIMATIC RF650A

Mobile data storage media

Whether for automation or IT, the RF600 system can be seamlessly integrated into your existing environment.

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Labels

	SIMATIC RF622L Smart Label	SIMATIC RF630L Smart Label	SIMATIC RF640L Smart Label	SIMATIC RF680L Smart Label	SIMATIC RF690L Smart Label
Description	UHF smart label with fast FRAM user memory for logistic applications, for example, for permanent identification of products	UHF smart label for attaching to paper, cardboard, plastic, or film packaging	UHF smart label for direct mounting to metal surfaces	Heat-resistant UHF smart label, for example, for identification of products in the paint/drying sector	UHF smart label for direct mounting on metal surfaces
Memory size	EPC 496 bits User memory: 3424 bytes	EPC 96/128/240 bits User memory: 512 bits	EPC 96 to 480 bits [1] User memory: 16 to 64 bytes [1]	EPC 96/240 bits User memory: 512 bits	EPC 96 to 480 bits [1] User memory: 16 to 64 bytes [1]
Standard	ISO 18000-6C	ISO 18000-6C	ISO 18000-6C	ISO 18000-6C	ISO 18000-6C
Frequency	860 to 960 MHz (ETSI, FCC, CMIIT)	860 to 960 MHz (ETSI, FCC, CMIIT)	865 to 868 MHz (ETSI) 902 to 928 MHz (FCC, CMIIT)	860 to 960 MHz (ETSI, FCC, CMIIT)	865 to 868 MHz (ETSI) 902 to 928 MHz (FCC, CMIIT)
Data retention	10 years	10 years	10 years	10 years	10 years
Write/read distance, typ.	Write up to 3 m on nonmetallic subsurface Read up to 3 m on nonmetallic subsurface	Write up to 5 m Read up to 8 m	Write up to 0.5 m Read up to 3.5 m on metal, up to 2.3 m on nonmetallic subsurface	Write up to 3 m Read up to 4 m	Write up to 1.5 m Read up to 2.4 m on metal, up to 4.5 m on nonmetallic subsurface
Read cycles	min. 10^{10}	Unlimited	Unlimited	Unlimited	Unlimited
Write cycles	min. 10^{10}	min. 100,000	min. 500	min. 100,000	min. 100,000
Dimensions in mm	90 x 18 x 0.5 mm	101.6 × 152.4 mm (4" x 6") / 101.6 × 50.8 mm 74 x 27 mm (4" x 2") / 97 × 27 mm 54 × 34 mm	50 × 22.5 × 1.6 mm	54 × 89 x 0.3 mm	88 × 25 × 1.6 mm (ETSI) 77 × 25 × 1.6 mm (FCC, CMIIT)
Operating temperature	−20 °C to +85 °C	−40 °C/−25 °C to +65 °C/+85 °C	−20 °C to +85 °C	−25 °C to +85 °C (permanent) +200 °C up to six hours +220 °C up to one hour +230 °C briefly	−20 °C to +85 °C (permanent), higher temperature ranges on request
Material	PET plastic	Paper / PET plastic	Plastic, top surface PET	Paper (silicon-free)	Plastic, top surface PEN
Degree of protection	IP64 (bonded)	IP65 (plastic only)	IP67	IP67	IP67
Labeling	Printable by thermal transfer	Printable by thermal transfer, depending on design	Printable by thermal transfer	Printable by thermal transfer	Printable by thermal transfer

[1] The EPC memory has a standard size of 96 bits. If required, the EPC memory size can be increased in 16-bit increments up to 480 bits, at the expense of the user memory.

Technical data at a glance

Mobile transponders

	SIMATIC RF610T transponder	SIMATIC RF620T transponder	SIMATIC RF622T transponder	SIMATIC RF625T transponder
Description	UHF transponder for simple identification, screw-on or adhesive	UHF transponder for industry and logistics, mountable on conductive materials with spacer	UHF transponder with fast FRAM user memory to use, for example, in the fields of production control, asset management and intra-logistics	Compact UHF transponder for mounting in and on metal
Memory size	EPC 96/240 bits User memory: 512 bits	EPC 96/128 bits User memory: 512 bits	EPC 496 bits User memory: 3424 bytes	EPC 96/128 bits User memory: 512 bits
Standard	ISO 18000-6C	ISO 18000-6C	ISO 18000-6C	ISO 18000-6C
Frequency	860 to 960 MHz (ETSI, FCC, CMIIT)	860 to 960 MHz (ETSI, FCC, CMIIT)	860 to 960 MHz (ETSI, FCC, CMIIT)	865 to 868 MHz (ETSI) 902 to 928 MHz (FCC, CMIIT)
Data retention	10 years	10 years	10 years	10 years
Write/read distance, typ.	Write: 3 m Read: 5 m	Write: 6 m Write: 4 m (on metal with spacer) Read: 8 m Read: 6 m (on metal with spacer)	Write: 3 m Write: 1 m (on metal with spacer) Read: 3 m Read: 1 m (on metal with spacer)	Write: 1.2 m (on metal) Read: 1.5 m (on metal)
Read cycles	Unlimited	Unlimited	min. 10^{10}	Unlimited
Write cycles	min. 100,000	min. 100,000	min. 10^{10}	min. 100,000
Dimensions in mm	86 × 54 × 0.4 (L × H × D)	Transponder: 127 × 38 × 6 (L × H × D) Spacer: 155 × 38 × 12 (L × H × D)	120 x 30 x 6.5 (L x H x D)	30 × 8 (ø × H)
Operating temperature	−25 °C to +85 °C	−25 °C to +85 °C	−20 °C to +85 °C	−25 °C to +85 °C
Material	PVC plastic	PP plastic housing (food grade)	Plastic housing (PA12)	Plastic housing (PA6.6)
Degree of protection	IP67	IP67	IP67	IP68 / IPx9K
Labeling	Printable	Laser printing	Laser printing	no

SIMATIC RF630T transponder	SIMATIC RF640T transponder	SIMATIC RF680T transponder	
UHF screw transponder (M6), for mounting on metal	UHF tool transponder for mounting on metal	UHF high-temperature transponder, for mounting on metal, robust and heat-proof (up to 220 °C) with long range for harsh industrial environments	Description
EPC 96/240 bits User memory: 512 bits	EPC 96/240 bits User memory: 512 bits	EPC 96/240 bits User memory: 512 bits	Memory size
ISO 18000-6C	ISO 18000-6C	ISO 18000-6C	Standard
865 to 868 MHz (ETSI) 902 to 928 MHz (FCC, CMIIT)	865 to 868 MHz (ETSI) 902 to 928 MHz (FCC, CMIIT)	865 to 928 MHz (ETSI, FCC, CMIIT)	Frequency
30 years	30 years	30 years	Data retention
Write: 1.2 m (on metal) Read: 1.5 m (on metal)	Read: 4 m Read: 2.5 m (on metal)	Write: 4 m (on metal) Read: 6 m (on metal)	Write/read distance, typ.
Unlimited	Unlimited	Unlimited	Read cycles
min. 100,000	min. 100,000	min. 100,000	Write cycles
21 × 20 mm (ø × H), Wrench size 19	50 × 8 mm (ø × H)	130 × 32 × 15 mm	Dimensions in mm
−25 °C to +85 °C	−25 °C to +85 °C	−25 °C to +100 °C (permanent) +200 °C up to 5,000 hours or 3,000 cycles tested +220 °C up to 2,000 hours or 1,500 cycles tested	Operating temperature
Plastic/stainless steel	PA12 plastic, anthracite	PPS plastic	Material
IP68 / IPx9K	IP68 / IPx9K / Ex ibD 21 T140 °C	IP68 / IPx9K	Degree of protection
no	no	no	Labeling

Technical data at a glance

Mobile handheld terminal

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 (W × H in pixels)	240 × 320
Operating temperature	−20 °C to +55 °C
Degree of protection	IP54
Power supply	Lithium-polymer battery (2260 mAh)
Operating elements	
Display	Function keys and touch screen
Keyboard	Alphanumeric
Storage	
Flash / RAM	256 MB / 256 MB
RFID reader	
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	
Wireless	WLAN integrated (IEEE 802.11 a/b/g/n)
USB, Ethernet	via docking station
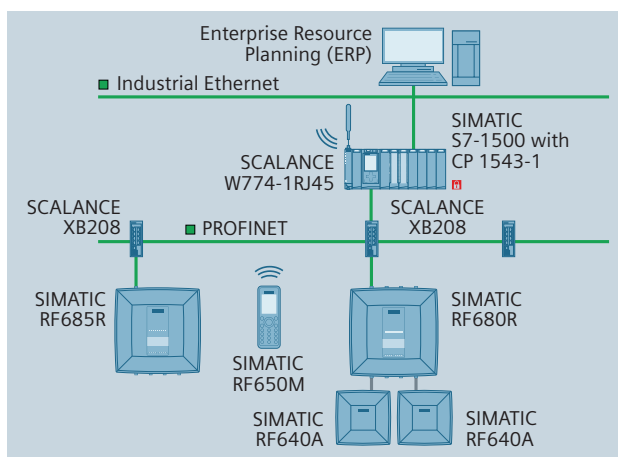
Exemplary configuration for an assembly line with SIMATIC RF600, SCALANCE W and SCALANCE X

Find out more:

siemens.com/ident/rfid

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› **SIMATIC contact:**
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  partner

**SIMATIC RFID
systems**

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Siemens provides products and solutions with industrial
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In order to protect plants, systems, machines and networks
against cyber threats, it is necessary to implement – and
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Customer is responsible to prevent unauthorized access to its
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