

SIMATIC RTLS

Localization systems SIMATIC RTLS PCB OEM Integration




Operating Instructions

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Legal information

Warning notice system

This manual contains notices you have to observe in order to ensure your personal safety, as well as to prevent damage to property. The notices referring to your personal safety are highlighted in the manual by a safety alert symbol, notices referring only to property damage have no safety alert symbol. These notices shown below are graded according to the degree of danger.

 DANGER
indicates that death or severe personal injury will result if proper precautions are not taken.
 WARNING
indicates that death or severe personal injury may result if proper precautions are not taken.
 CAUTION
indicates that minor personal injury can result if proper precautions are not taken.
NOTICE
indicates that property damage can result if proper precautions are not taken.


If more than one degree of danger is present, the warning notice representing the highest degree of danger will be used. A notice warning of injury to persons with a safety alert symbol may also include a warning relating to property damage.

Qualified Personnel

The product/system described in this documentation may be operated only by **personnel qualified** for the specific task in accordance with the relevant documentation, in particular its warning notices and safety instructions. Qualified personnel are those who, based on their training and experience, are capable of identifying risks and avoiding potential hazards when working with these products/systems.

Proper use of Siemens products

Note the following:

 WARNING
Siemens products may only be used for the applications described in the catalog and in the relevant technical documentation. If products and components from other manufacturers are used, these must be recommended or approved by Siemens. Proper transport, storage, installation, assembly, commissioning, operation and maintenance are required to ensure that the products operate safely and without any problems. The permissible ambient conditions must be complied with. The information in the relevant documentation must be observed.

Trademarks

All names identified by ® are registered trademarks of Siemens AG. The remaining trademarks in this publication may be trademarks whose use by third parties for their own purposes could violate the rights of the owner.

Disclaimer of Liability

We have reviewed the contents of this publication to ensure consistency with the hardware and software described. Since variance cannot be precluded entirely, we cannot guarantee full consistency. However, the information in this publication is reviewed regularly and any necessary corrections are included in subsequent editions.

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Introduction

Purpose of this document

This document supports you in the integration of the SIMATIC RTLS PCB OEM products into customer-specific systems:

- SIMATIC RTLS PCB OEM PULSE
- SIMATIC RTLS PCB OEM AC

The configuration and the integration of the devices into a localization network are not described in this document.

Validity of the operating instructions

The document is valid for the devices with the following article numbers:

- SIMATIC RTLS PCB OEM PULSE (6GT2700-8AF03)
- SIMATIC RTLS PCB OEM AC (6GT2700-8DF00-0AX1, 6GT2700-8DF10-0AX1, 6GT2700-8DF30-0AX1)

Trademarks

The following and possibly other names not identified by the registered trademark sign[®] are registered trademarks of Siemens AG:

SIMATIC RTLS

Industry Online Support

In addition to the product documentation, you are supported by the comprehensive online information platform of Siemens Industry Online Support at the following Internet address:
Link: (<https://support.industry.siemens.com/cs/de/en/>)

Apart from news, there you will also find:

- Project information: Manuals, FAQs, downloads, application examples etc.
- Contacts, Technical Forum
- The option submitting a support query:
Link: (<https://support.industry.siemens.com/My/ww/en/requests>)

- Our service offer:

Right across our products and systems, we provide numerous services that support you in every phase of the life of your machine or system - from planning and implementation to commissioning, through to maintenance and modernization.

You will find contact data on the Internet at the following address:

Link: (https://www.automation.siemens.com/aspa_app/?ci=yes&lang=en)

SITRAIN - Training for Industry

The training offer includes more than 300 courses on basic topics, extended knowledge and special knowledge as well as advanced training for individual sectors - available at more than 130 locations. Courses can also be organized individually and held locally at your location.

You will find detailed information on the training curriculum and how to contact our customer consultants at the following Internet address:

Link: (<https://sitrain.automation.siemens.com/DE/sitrain/default.aspx?AppLang=en>)

Industrial Networks Education

Training and certification for Industrial Networks

In our Industrial Networks Education courses you'll learn to design and implement wired and wireless data networks and connect them to a corporate network. You will also receive instruction on how to secure, diagnose and optimize communication networks. Certification can also be offered to supplement almost all training courses.

Link: (<https://www.siemens.com/industrial-networks-education>)

RTLS Technology and Practice (ID-RTLS-TP)

Training and certification

After completing the RTLS certification training, you will be able to plan and implement small and medium-sized RTLS projects and provide efficient and multifaceted support in large projects. Your RTLS basics will be strengthened and, building upon them, you will receive new tools of the trade in order to offer customers the optimal solution for them. The complete project sequence is taken as a reference and important steps, resources and work results for each phase are presented. Comprehensive practical exercises in connection with troubleshooting techniques and a great deal of input from industrial projects allow you to internalize a confident approach to working with different types of localization projects. With the training documents, you also receive extensive reference material for your daily work.

Link: (<https://www.sitrain-learning.siemens.com/EN/en/rw35251/Industrielle-Identifikation-RTLS-Technologie-und-Praxis>)

Security information

Siemens provides products and solutions with industrial security functions that support the secure operation of plants, systems, machines, and networks.

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 form one element of such a concept.

Customers are responsible for preventing unauthorized access to their plants, systems, machines and networks. These systems, machines and components should only be connected to the enterprise network or the Internet if and only to the extent necessary and with appropriate security measures (firewalls and/or network segmentation) in place.

You can find more information on protective measures in the area of industrial security by visiting: (<http://www.siemens.com/industrialsecurity>).

Siemens' products and solutions undergo continuous development to make them more secure. Siemens strongly recommends performing product updates as soon as they are available and using only 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 ensure that you are always informed about product updates, subscribe to the Siemens Industrial Security RSS feed at: (<https://www.siemens.com/cert>)

Note on firmware/software support

Check regularly for new firmware/software versions or security updates and apply them. After the release of a new version, previous versions are no longer supported and are not maintained.

Security recommendations

General

Note the following security recommendations to prevent unauthorized access:

- Keep the firmware up to date. Check regularly for security updates for the device. You can find information on this at the Industrial Security (<https://new.siemens.com/global/en/company/topic-areas/future-of-manufacturing/industrial-security.html>) website.
- Inform yourself regularly about security recommendations published by Siemens ProductCERT (<https://new.siemens.com/global/en/products/services/cert.html>).
- Evaluate your plant as a whole in terms of security. Use a cell protection concept with suitable products.
- This product requires an additional security concept to prevent unauthorized access.
- Transponder and infrastructure can be configured for radio channels according to IEEE 802.15.4-2015. You will find details in the section "Technical specifications".
- Ensure that the radio frequencies are not used for other purposes and are not affected by other interfering signals. This should be ensured within the operating range of the localization system.
- Interference in the frequency band used can impair the system and, in extreme cases, lead to localization failure.

Physical access

- Restrict physical access to the device to qualified personnel.

Recycling and disposal



The products are low in harmful substances, can be recycled and meet the requirements of the Directive 2012/19/EU for disposal of waste electrical and electronic equipment (WEEE).

Do not dispose of the products at public disposal sites.

For environmentally compliant recycling and disposal of your electronic waste, please contact a company certified for the disposal of electronic waste or your Siemens representative.

Note the different national regulations.

RTLS system description

2.1 Structure and operating principle of the RTLS localization system

The RTLS localization system from Siemens is a wireless communication infrastructure. The system makes it possible to determine the position of a mobile transponder within the localization network through signal travel time measurements.

The RTLS localization system and the customer-specific business application can be divided up into the following three levels:

- Customer-specific business application for display and further processing of the results
- RTLS localization server for the configuration of the RTLS localization system as well as data processing and backup; connection of the RTLS infrastructure devices or gateways as reference points of the RTLS localization system to determine the position of the mobile transponder
- Mobile RTLS transponders, the object to be localized

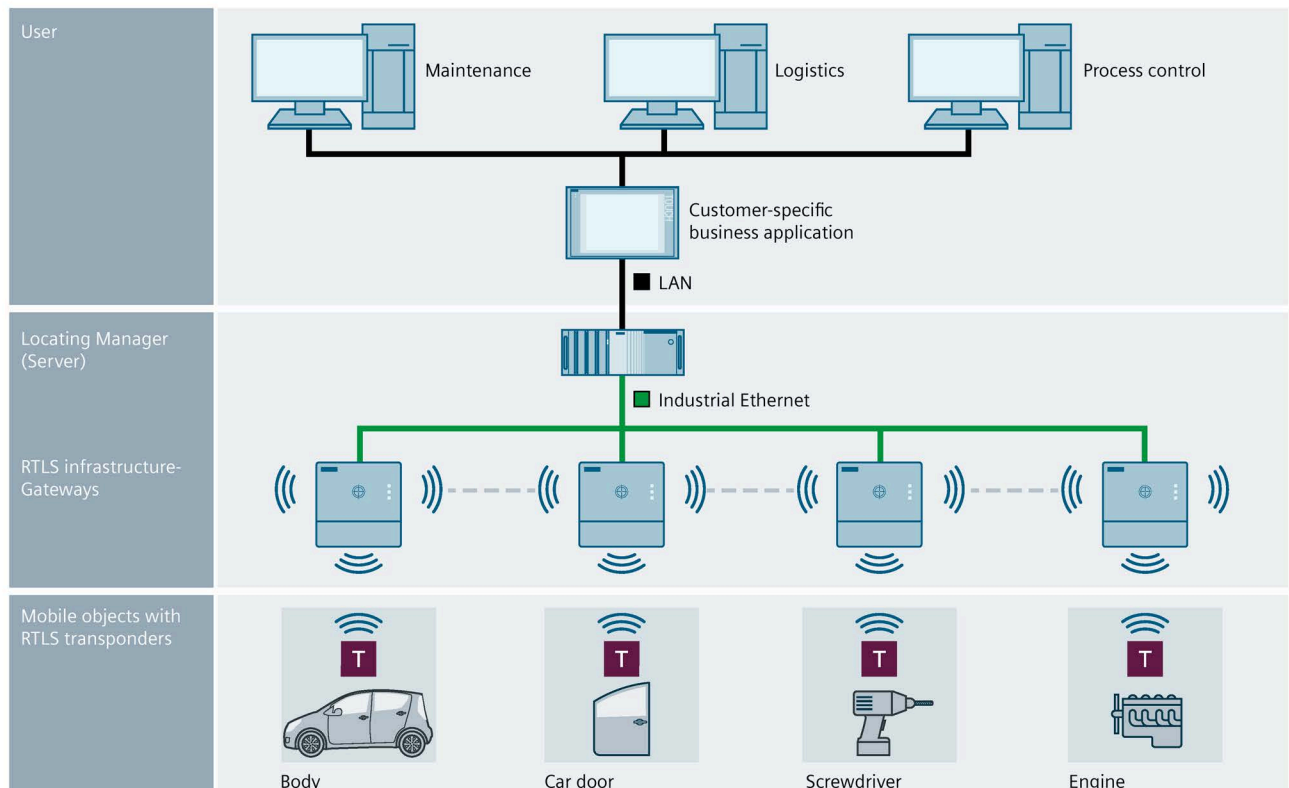


Figure 2-1 Example of an RTLS localization network with customer-specific business application

2.1 Structure and operating principle of the RTLS localization system

The devices of the RTLS localization system are permanently installed gateways and mobile transponders. The distribution and positions of the devices depend on the customer-specific requirements on the localization. The mobile transponders communicate wirelessly with the gateways. The acquired data is sent from the gateway to the RTLS localization server via the local network infrastructure.

The SIMATIC RTLS Locating Manager is the central software of the RTLS localization system. The positions of the mobile transponders that are to be localized are calculated based on the acquired data. A database that is connected to the RTLS localization system manages and stores the data. Various client software products of the SIMATIC RTLS Locating Manager are used for the administration and configuration of the RTLS localization system.

The localization and status information is sent to the business application via defined interfaces. There, it is processed further and made available in prepared form.

2.2 Technical basics

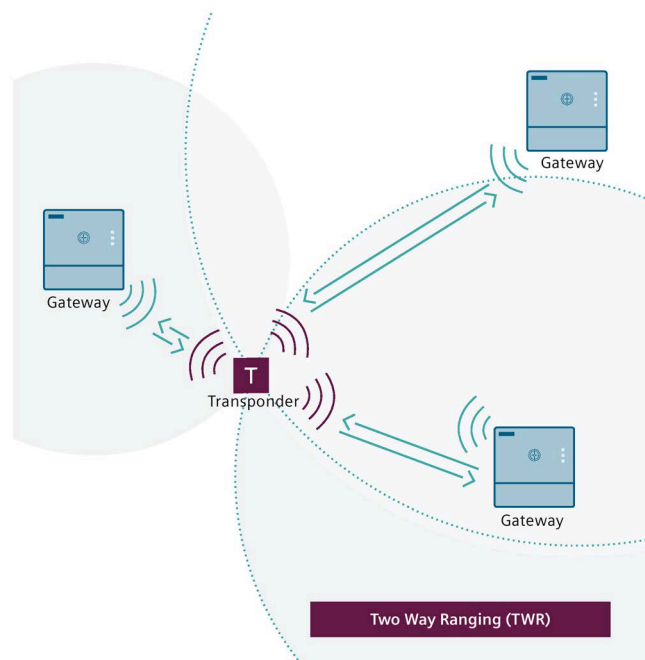
2.2.1 Localization using wireless technologies

2.2.1.1 TWR - Two Way Ranging

Below, you will find a description of the wireless technology "Two Way Ranging" or "TWR":

Trilateration or general multilateration is a method used in surveying in which the coordinates of a point are determined by measuring distances to points with known coordinates.

The coordinates of the transponder must be determined, while the coordinates of the gateways are known. The circles represent the measured distances of the gateways to the transponder. The intersection of the circles can be calculated and provides the coordinates of the transponder. In the RTLS localization system, the distances are measured using the travel time of the radio waves between transponder and gateways. A wireless signal is sent from the gateways to the transponder in this case, and the transponder sends back a second wireless signal. The distance d is determined using the speed of light c with $d=c \cdot \Delta t$ based on the time that elapses between sending the first signal and receiving the second signal.

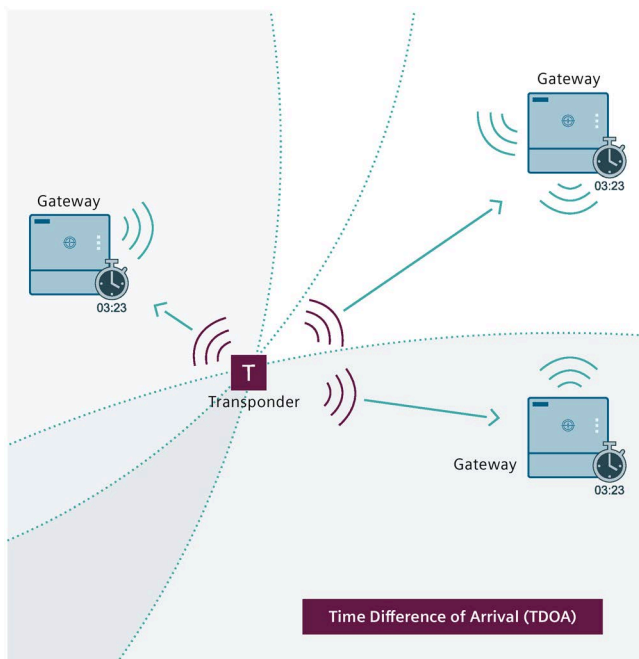


2.2.1.2 TDOA - Time Difference of Arrival

Below, you will find a description of the wireless technology "Time Difference of Arrival" or "TDOA":

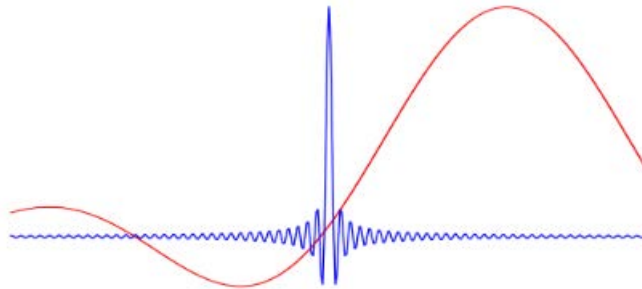
Unlike with the "TWR" wireless technology, localization of the transponder is achieved with only one single wireless signal with "TDOA". This increases the service life of the transponder batteries and makes it possible to localize as many transponders as possible within a short period of time. To do so, the transponder sends a wireless signal that is received by the gateway. The receiving times depend on the distance of the respective gateway to the transponder. Because the gateways have a common time basis, the time difference as to when a wireless signal is received can be determined at two different gateways.

A specific receiving time difference between two gateways can be assigned to many possible transponder positions. These possible positions form a hyperbola when using the "TDOA" method. The coordinates of the transponder are determined based on the intersection of multiple hyperbolas.



2.2.1.3 Wireless technologies

Because the speed of light is very fast, the time information provided for the wireless signals must be very precise. The accuracy with which a point in time can be determined depends on how quickly the signal changes.



The maximum of the quickly changing signal (blue) is much more sharply defined than the maximum of the slowly changing signal (red). Signals for wireless localization, therefore, must contain quickly changing components. SIMATIC RTLS uses a variety of wireless signals for localization. We distinguish between PULSE, PHASE and CHIRP. PULSE uses short amplitude-modulated pulses and CHIRP uses longer but therefore frequency-modulated pulses to measure the time. For PHASE, the phase of the carrier signal is evaluated. Due to the short cycle duration in the 2.4 GHz ISM band, the pure carrier signal can also be considered as changing quickly. The resulting ambiguity is resolved by measuring at multiple different frequencies.

2.2.2 Interfering influences on radio waves

2.2.2.1 Influence of reflections and interferences

The RED guideline and the corresponding standards regulate the requirements of electromagnetic compatibility. Even though the requirements of electromagnetic compatibility are defined, different components will still influence each other.

Reflections and interferences

The antenna fields are weakened by absorbing materials and reflected by conducting materials. When electromagnetic fields are reflected or there are other radio sources, this will result in interferences. These circumstances will result in incorrect measurements; however, these can be largely detected and corrected with the appropriate software (e.g. SIMATIC RTLS Locating Manager). We still recommend that you prevent these influences. Especially objects that cannot be penetrated by radio waves can cause localization errors.

Note

Metal surfaces reflect radio waves more than any other types of surfaces. Water, on the other hand, attenuates radio waves. You should therefore evaluate your working environment and integration for these influences.

2.2.2.2 Coexistence and de-sensing

To prevent interfering with each other, wireless applications will use different frequency bands. Use of these frequency bands is controlled by the government. Because a frequency range is considered a finite good, technologies were developed over the years that enable a coexistence of different wireless applications in the same frequency band. These technologies are also used by SIMATIC RTLS. However, interferences can still be caused by other wireless devices. Arrangements are being made here, too, so that these interferences do not impact the operation of the RTLS localization system. To keep interferences to a minimum, the RTLS infrastructure components must not be installed in the close vicinity of other wireless applications. Strong senders in close vicinity can interfere with the reception, even when they are located in neighboring frequency bands (de-sensing). This is true, for example, for the 2.4 GHz ISM band and PULSE in the UWB channel 5.

SIMATIC RTLS PCB OEM transponder

3.1 SIMATIC RTLS PCB OEM PULSE

3.1.1 Characteristics

SIMATIC RTLS PCB OEM PULSE	Characteristics	
	Setup	<ul style="list-style-type: none"> ① Status indicators (LED) ② Connection solder contacts operating voltage and communication P4 ③ Antenna ④ Antenna connectors ⑤ Antenna cable ⑥ Connection plug operating voltage and communication P1 ⑦ Internal interface P2
	General	<p>The transponder is a mobile device for localization in the RTLS localization system. It sends position data to gateways which transmit the data to the Locating Manager server. The wireless address is on the front of the device.</p>
	Area of application	<p>The integration and use of the transponder are limited to customer-specific systems.</p>

3.1.2 Order data RTLS PCB OEM PULSE

Table 3- 1 Order data RTLS PCB OEM PULSE

		Article number
SIMATIC RTLS PCB OEM PULSE	CE	6GT2700-8AF03

3.1.3 Pin assignment

Solder contact P4

Pin	Description / Function
1	GND
2	Optional serial interface (level 3.3 V)
3	Optional serial interface (level 3.3 V)
4	Supply voltage, 3.3 V DC

P1 connector

The individual pins are connected to the solder contacts (P4).

Type: JST SM04B-SRSS-TB

Pin	Description / Function
1	Optional serial interface (level 3.3 V)
2	Optional serial interface (level 3.3 V)
3	GND
4	Supply voltage, 3.3 V DC

P2 connector

Internal interface for production and manufacturing test, do not use.

3.1.4 Technical specifications

Table 3- 2 Technical specifications of the transponder RTLS PCB OEM PULSE

		6GT2700-8AF03
Product name	SIMATIC RTLS PCB OEM PULSE	
PULSE radio frequencies (localization)		
Wireless method	IEEE 802.15.4-2015 UWB HRP PHY	
Transmission speed	850 kbit/s	
Operating frequency rated value	3993.6 MHz (UWB channel 2; CE) 6489.6 MHz (UWB channel 5; CE)	
Bandwidth	499.2 MHz	
Frequency range	3100 MHz ... 4800 MHz (CE) 6000 MHz ... 7000 MHz (CE)	
Transmit power	0.037 mW (-41.3 dBm/MHz)	
Range	30 m	
Accuracy of the localization (typical)	0.2 m	
Antenna	Connected via antenna cable	
Supply voltage, power consumption		
Supply voltage	3.3 V DC (± 100 mV)	
Energy intake	Maximum 0.3 A	
Permitted ambient conditions		
Ambient temperature	<ul style="list-style-type: none"> • During operation • Outside of operation • During storage 	
	<ul style="list-style-type: none"> • 0 ... +50 °C • 0 ... +50 °C • 0 ... +50 °C 	
Design, dimensions, weights and connectors		
Dimensions of board (L x W x H)	44 x 24 x 7.5 mm	
Dimensions of antenna (L x W x H)	38 x 20 x 3 mm	
Length of the antenna cable	50 mm	
Weight	10 g	
Degree of protection	IP00	
Fastening method	PCB: 3 screws for hole with \varnothing 1.7 mm Antenna: provided by customer	

3.1.5 Approvals

Note

The specified approvals apply only when the corresponding mark is printed on the product. You can check which of the following approvals have been granted for your product by the markings on the type plate.

You can find the current EU Declaration of Conformity for these products on the Internet at Siemens Industry Online Support.

Link: (<https://support.industry.siemens.com/cs/de/en/ps/14970/cert>)

The products described in this document meet the requirements of the following EU directives:

- RoHS Directive 2011/65/EU
Directive of the European Parliament and of the Council of 8 June 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment, official journal of the EU L174, 1 July 2011, pages 88-110
- Radio Equipment Directive 2014/53/EU (RED)
Directive of the European Parliament and of the Council of 16 April 2014 on the harmonization of the laws of the member states relating to placing radio equipment on the market; official journal of the EU L153, 22 May 2014, pages 62-106

UK Declaration of Conformity

The UK declaration of conformity is available to all responsible authorities at:

Siemens Aktiengesellschaft
Process Industries and Drives Division,
Process Automation
DE-76181 Karlsruhe
Germany

Importer UK:

Siemens plc,
Manchester M20 2UR

You can find the current UK Declaration of Conformity for these products on the Internet pages under Siemens Industry Online Support

(<https://support.industry.siemens.com/cs/en/en/view/109801531>).

The SIMATIC RTLS products described in this document meet the requirements of the following directives/regulation:

- Radio Equipment Regulations:
SI 2017/1206 Radio Equipment Regulations 2017, and related amendments
- RoHS Regulations:
SI 2012/3032 Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Regulations 2012, and related amendments

RoHS directive (restriction of the use of certain hazardous substances)

The products described in these operating instructions meet the requirements of the EU directive 2011/65/EU on the restriction of the use of certain hazardous substances in electrical and electronic equipment.

Applied standard:

- IEC 63000
Technical documentation for the assessment of electrical and electronic products with respect to the restriction of hazardous substances

The products described in this document meet the requirements of the applied standards:

Article 3 (1) a) Protection of health and safety

- EN 62311
Assessment of electronic and electrical equipment related to human exposure restrictions in electromagnetic fields (0 Hz - 300 GHz)

The products described in these operating instructions meet the requirements of EU directive 2014/30/EU "Electromagnetic Compatibility" according to the designated standards for the following areas of application.

Article 3 (1) b) EMC

- ETSI EN 301 489-1
Electromagnetic compatibility and radio spectrum matters (ERM) - Electromagnetic compatibility for radio equipment and services - Part 1: Common technical requirements
- ETSI EN 301 489-33
Electromagnetic compatibility and radio spectrum matters (ERM) - Electromagnetic compatibility for radio equipment and services - Part 33: Special conditions for ultra-wideband (UWB) devices
- EN 55011
Industrial, scientific and medical equipment - Radio-frequency disturbance characteristics – Limits and methods of measurement
- EN 55032 Class A, Class B
Electromagnetic compatibility of multimedia equipment – Emission requirements
- EN 55035
Electromagnetic compatibility of multimedia equipment - Immunity requirements
- EN 61000-6-1
Electromagnetic compatibility (EMC) - Part 6-1: Generic standards - Immunity for residential, commercial and light-industrial environments
- EN 61000-6-2
Electromagnetic compatibility (EMC) - Part 6-2: Generic standards - Immunity for industrial environments

3.1 SIMATIC RTLS PCB OEM PULSE

- EN 61000-6-3
Electromagnetic compatibility (EMC) - Part 6-3: Generic standards - Emission standard for residential, commercial and light-industrial environments
- EN 61000-6-4
Electromagnetic compatibility (EMC) - Part 6-4: Generic standards - Emission standard for industrial environments

Article 3 (2) Efficient use of the radio spectrum

- ETSI EN 302 065-2
Short Range Devices (SRD) using ultra-wideband technology (UWB); Harmonized standard covering the essential requirements of article 3.2 of the Directive 2014/53/EU; Part 2: Requirements for UWB location tracking

FCC information

Siemens SIMATIC RTLS PCB OEM PULSE (MLFB 6GT2700-8AF13); FCC ID NXWOEMPULSE

This device complies with part 15 of the FCC rules. Operation is subject to the following two conditions:

- (1) This device may not cause harmful interference, and
- (2) this device must accept any interference received, including interference that may cause undesired operation.

Caution

Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Note

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules.

These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Host labelling guidance for the end integrator

This is an advise for host manufacture to provide a physical / e-label on their host product stating, "Contains FCC ID: NXWOEMPULSE":

A permanently affixed label must be used. The modular transmitter must be labeled with its own FCC identification number, and, if the FCC identification number is not visible when the module is installed inside another device, then the outside of the device into which the module is installed must also display a label referring to the enclosed module. This exterior label can use wording such as the following: "Contains Transmitter Module FCC ID: NXWOEMPULSE" or "Contains FCC ID: NXWOEMPULSE". Any similar wording that expresses the same meaning may be used.

RF Exposure guidance

In order to comply with FCC RF Exposure requirements, this device must be installed to provide at least 20 mm separation from the human body at all times.

IC information

Siemens SIMATIC RTLS PCB OEM PULSE (MLFB 6GT2700-8AF33); IC ID 267X-OEMPULSE

This device complies with Industry Canada license-exempt RSS standard(s). Operation is subject to the following two conditions:

- (1) This device may not cause interference, and
- (2) this device must accept any interference, including interference that may cause undesired operation of the device.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes :

- (1) L'appareil ne doit pas produire de brouillage, et
- (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

Host labelling guidance for the end integrator

This is an advise for host manufacture to provide a physical / e-label on their host product stating, "Contains IC: 267X-OEMPULSE":

A permanently affixed label must be used. The modular transmitter must be labeled with its own IC identification number, and, if the IC identification number is not visible when the module is installed inside another device, then the outside of the device into which the module is installed must also display a label referring to the enclosed module. This exterior label can use wording such as the following: "Contains Transmitter Module IC: 267X-OEMPULSE" or "Contains IC: 267X-OEMPULSE". Any similar wording that expresses the same meaning may be used. The manual needs to include host labelling guidance for the end integrator.

Instructions d'étiquetage de l'hôte pour l'intégrateur final

Il est conseillé aux fabricants de l'hôte de prévoir une étiquette physique / électronique sur leur produit hôte indiquant : "Contient le CI : 267X-OEMPULSE" :

Utiliser une étiquette apposée de façon permanente. L'émetteur modulaire doit être étiqueté avec son propre numéro d'identification de CI et, si le numéro d'identification de CI n'est pas visible lorsque le module est installé à l'intérieur d'un autre matériel, l'extérieur du matériel dans lequel le module est installé doit également porter une étiquette faisant référence au module joint. Cette étiquette extérieure peut utiliser une formulation telle que la suivante : "Contient le module CI émetteur : 267X-OEMPULSE" ou "Contient le CI : 267X-OEMPULSE". Toute formulation de signification identique peut être utilisée. Le manuel doit inclure les instructions d'étiquetage de l'hôte pour l'intégrateur final.

RF Exposure guidance

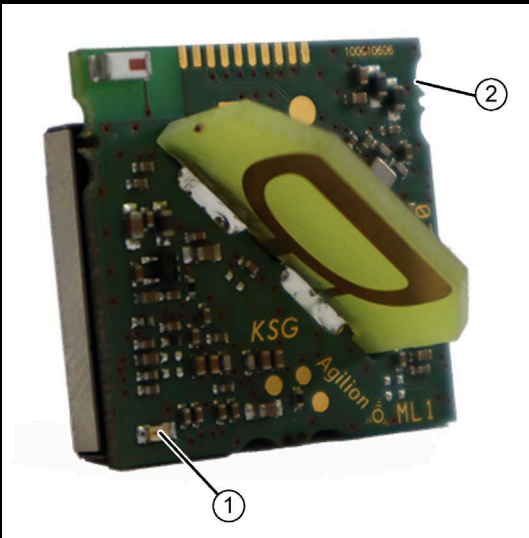
In order to comply with ISED RF Exposure requirements, this device must be installed to provide at least 20 mm separation from the human body at all times.

Instructions relatives à l'exposition aux RF

Pour être conforme aux exigences de la ISED relatives à l'exposition aux radiofréquences, ce matériel doit être installé de manière à assurer à tout moment une distance d'au moins 20 mm du corps humain.

3.2 SIMATIC RTLS PCB OEM AC

3.2.1 Characteristics

SIMATIC RTLS PCB OEM AC	Characteristics	
	Setup	① Status indicators (LED) ② Connection operating voltage (on rear)
	General	The transponder is a mobile device for localization in the RTLS localization system. The wireless address is on the rear of the device.
	Area of application	The integration and use of the transponder are limited to customer-specific systems.

3.2.2 Order data RTLS PCB OEM AC

Table 3- 3 Order data RTLS PCB OEM AC

		Article number
SIMATIC RTLS PCB OEM AC	CE	6GT2700-8DF00-0AX1
	FCC	6GT2700-8DF10-0AX1

3.2.3 Pin assignment

P2 socket

Type: JST SM02B-SRSS-TB

Pin	Description / Function
1	Supply voltage, 3.3 V DC
2	GND

P1 connector

Internal interface for production and manufacturing test, do not use.

3.2.4 Technical specifications

Table 3- 4 Technical specifications of the transponder RTLS PCB OEM AC

6GT2700-8DF00-0AX1, 6GT2700-8DF10-0AX1	
Product name	SIMATIC RTLS PCB OEM AC
PULSE radio frequencies (localization)	
Wireless method	IEEE 802.15.4-2015 UWB HRP PHY
Transmission speed	850 kbit/s
Operating frequency rated value	3993.6 MHz (UWB channel 2; CE, FCC) 6489.6 MHz (UWB channel 5; CE, FCC)
Bandwidth	499.2 MHz
Frequency range	3100 MHz ... 4800 MHz (CE, FCC) 6000 MHz ... 7000 MHz (CE, FCC)
Transmit power	0.037 mW (-41.3 dBm/MHz)
Range	Maximum 30 m
Accuracy of the localization (typical)	0.2 m
Antennas	Built-in UWB antenna
PHASE radio frequencies (data transfer and optional localization)	
Wireless method	IEEE 802.15.4
Transmission speed	1 Mbit/s
Operating frequency rated value	2410 MHz ... 2480 MHz ISM band
Bandwidth	2 MHz; data transmission on 802.15.4; channels configurable
Frequency range	2400 MHz ... 2483.5 MHz
Transmit power	Maximum 4 dBm (configurable)
Range	Maximum 50 m
Accuracy of the localization (typical)	1 m
Antennas	Built-in 2.4 GHz antenna

6GT2700-8DF00-0AX1, 6GT2700-8DF10-0AX1

Supply voltage, power consumption

Supply voltage	3.3 V DC (± 100 mV)
Energy intake	Maximum 0.5 A

Permitted ambient conditions

Ambient temperature

- | | |
|-----------------------------|----------------|
| • During write/read access | • 0 ... +50 °C |
| • Outside write/read access | • 0 ... +50 °C |
| • During storage | • 0 ... +50 °C |

Design, dimensions, weights and connectors

Dimensions of board (L x W x H)	25 x 25 x 18 mm
Dimensions of antenna (L x W x H)	20.6 x 12.7 x 1.6 mm
Weight	6 g
Degree of protection	IP00
Fastening method	Provided by customer

3.2.5 Approvals**Note**

The specified approvals apply only when the corresponding mark is printed on the product. You can check which of the following approvals have been granted for your product by the markings on the type plate.

You can find the current EU Declaration of Conformity for these products on the Internet at Siemens Industry Online Support.

Link: (<https://support.industry.siemens.com/cs/de/en/ps/14970/cert>)

The products described in this document meet the requirements of the following EU directives:

- RoHS Directive 2011/65/EU
Directive of the European Parliament and of the Council of 8 June 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment, official journal of the EU L174, 1 July 2011, pages 88-110
- Radio Equipment Directive 2014/53/EU (RED)
Directive of the European Parliament and of the Council of 16 April 2014 on the harmonization of the laws of the member states relating to placing radio equipment on the market; official journal of the EU L153, 22 May 2014, pages 62-106

UK Declaration of Conformity

The UK declaration of conformity is available to all responsible authorities at:

Siemens Aktiengesellschaft
Process Industries and Drives Division,
Process Automation
DE-76181 Karlsruhe
Germany

Importer UK:

Siemens plc,
Manchester M20 2UR

You can find the current UK Declaration of Conformity for these products on the Internet pages under Siemens Industry Online Support (<https://support.industry.siemens.com/cs/en/en/view/109801531>).

The SIMATIC RTLS products described in this document meet the requirements of the following directives/regulation:

- Radio Equipment Regulations:
SI 2017/1206 Radio Equipment Regulations 2017, and related amendments
- RoHS Regulations:
SI 2012/3032 Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Regulations 2012, and related amendments

RoHS directive (restriction of the use of certain hazardous substances)

The products described in these operating instructions meet the requirements of the EU directive 2011/65/EU on the restriction of the use of certain hazardous substances in electrical and electronic equipment.

Applied standard:

- IEC 63000
Technical documentation for the assessment of electrical and electronic products with respect to the restriction of hazardous substances

The products described in this document meet the requirements of the applied standards:

Article 3 (1) a) Protection of health and safety

- EN 62311
Assessment of electronic and electrical equipment related to human exposure restrictions in electromagnetic fields (0 Hz - 300 GHz)

The products described in these operating instructions meet the requirements of EU directive 2014/30/EU "Electromagnetic Compatibility" according to the designated standards for the following areas of application.

Article 3 (1) b) EMC

- ETSI EN 301 489-1
Electromagnetic compatibility and radio spectrum matters (ERM) - Electromagnetic compatibility for radio equipment and services - Part 1: Common technical requirements
- ETSI EN 301 489-17
Electromagnetic compatibility and radio spectrum matters (ERM) - Electromagnetic compatibility for radio equipment and services - Part 17:
Specific conditions for broadband data transmission systems
- ETSI EN 301 489-33
Electromagnetic compatibility and radio spectrum matters (ERM) - Electromagnetic compatibility for radio equipment and services - Part 33:
Special conditions for ultra-wideband (UWB) devices
- EN 55011
Industrial, scientific and medical equipment - Radio-frequency disturbance characteristics – Limits and methods of measurement
- EN 55032 Class A, Class B
Electromagnetic compatibility of multimedia equipment – Emission requirements
- EN 55035
Electromagnetic compatibility of multimedia equipment - Immunity requirements
- EN 61000-6-1
Electromagnetic compatibility (EMC) - Part 6-1: Generic standards - Immunity for residential, commercial and light-industrial environments
- EN 61000-6-2
Electromagnetic compatibility (EMC) - Part 6-2: Generic standards - Immunity for industrial environments
- EN 61000-6-3
Electromagnetic compatibility (EMC) - Part 6-3: Generic standards - Emission standard for residential, commercial and light-industrial environments
- EN 61000-6-4
Electromagnetic compatibility (EMC) - Part 6-4: Generic standards - Emission standard for industrial environments

Article 3 (2) Efficient use of the radio spectrum

- ETSI EN 300 328
Wideband transmission systems; Data transmission equipment operating in the 2.4 GHz ISM band and using wide band modulation techniques. Harmonized standard covering the essential requirements of article 3.2 of the EU Directive 2014/53/EU
- ETSI EN 302 065-2
Short Range Devices (SRD) using ultra-wideband technology (UWB); Harmonized standard covering the essential requirements of article 3.2 of the Directive 2014/53/EU; Part 2:
Requirements for UWB location tracking

FCC information

Siemens SIMATIC RTLS PCB OEM AC (6GT2700-8DF10-0AX1); Contains FCC ID NXWOEMAC

This device complies with part 15 of the FCC rules. Operation is subject to the following two conditions:

- (1) This device may not cause harmful interference, and
- (2) this device must accept any interference received, including interference that may cause undesired operation.

Caution

Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Note

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules.

These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Host labelling guidance for the end integrator

This is an advise for host manufacture to provide a physical / e-label on their host product stating, "Contains FCC ID: NXWOEMAC":

A permanently affixed label must be used. The modular transmitter must be labeled with its own FCC identification number, and, if the FCC identification number is not visible when the module is installed inside another device, then the outside of the device into which the module is installed must also display a label referring to the enclosed module. This exterior label can use wording such as the following: "Contains Transmitter Module FCC ID: NXWOEMAC" or "Contains FCC ID: NXWOEMAC". Any similar wording that expresses the same meaning may be used.

RF Exposure guidance

In order to comply with FCC RF Exposure requirements, this device must be installed to provide at least 20 mm separation from the human body at all times.

Notes on the module approval

NOTICE

Additional country-specific requirements

The SIMATIC RTLS PCB OEM devices listed in this document meet the status of a module. A module is designed so that it can be installed into another device. It must not be operated without proof that country-specific requirements are being observed, such as EMC requirements for wireless devices.

Notes for the EU region

The devices can be installed as a module into a customer-specific product. This means, however, that the product becomes subject to the scope of the directive 2014/53/EU (RED). Compliance with this directive must be proven and a Declaration of Conformity must be created. It is possible to not have to repeat some of the wireless tests completely but to use the results of the module tests instead. This is also true for tests involving exposing persons. If you need support with the test certificates, please contact Siemens support.

Note the following additional important information:

- Application of the test certificates according to directive 2014/53/EU (RED) becomes void, for example, when
 - an antenna other than the one delivered is used or
 - another wireless device is used at distances of less than 15 cm.
- The evaluation of observing the applicable standards and guidelines is the responsibility of the party introducing the final product into the market.

Notes for the USA and Canada region

The devices can be installed as a module into a customer-specific product without requiring a new wireless approval (module approval). The requirements regarding operation on the human body (RF Exposure) are met.

Note the following additional important information:

- The existing wireless approval is only valid in combination with the specified antennas.
- No other wireless devices may be operated at distances of less than 20 cm.
- The specifications in the respective "Technical specifications" in the section "SIMATIC RTLS PCB OEM transponder (Page 15)" regarding supply voltage and ambient conditions of the devices must be observed.
- The module approval does not waive the obligation of the operator to observe additional requirements on the total product, such as the EMC regulations, for example.

- Products that contain a wireless module must be identified with the label "Contains FCC ID ..." or "Contains IC ...".
- In addition, information regarding "FCC Part 15.21" and "RSS-Gen Clause 8.4" in the operating instructions of the supplier is required.

Integration of the SIMATIC RTLS PCB OEM transponders

5

Observe the following installation guidelines for the integration of the devices into your system:

Installation location and position of the devices

Place the device antenna so that all metal parts (enclosure, screws, cables) and potential shadowing during operation (e.g. hand) fall below a level that is determined by the underside of the device. Otherwise, the radio propagation is disturbed, and localization may be impaired. For technical reasons, observe a minimum clearance of 10 cm to other radio antennas of your system, if installed. Also see the notes described in the section "Notes on the module approval (Page 29)" for the regions EU, USA and Canada.

Enclosure of the devices

The customer-specific enclosure of the devices must, at least above the level listed under "Installation location and position of the devices", consist of a plastic that must not contain any metal or be coated with metal. Any applied paints, prints or labels must not contain any metal.

Labels on the devices

When the supplied label with the printed wireless address of the device is a silver label, it must not be applied above the level listed under "Installation location and position of the devices". White, metal-free labels can be applied anywhere on the device at a location where they can be easily read/seen.

Plugs and cables for the device

Use only the connection options listed in the operating instructions of the device. The cable contacts must be assembled with a crimping tool approved by the plug manufacturer. As an alternative, you can purchase pre-assembled cables from the plug manufacturer. See the plug types listed in the operating instructions. The cable length is not to exceed 10 cm. If you need longer cables in your system, you must switch to a larger wire cross-section for cables that are longer than 10 cm. For a cable length of more than 10 cm, the wire cross-section must be at least 0.25 mm². For a cable length of more than 30 cm, the wire cross-section must be at least 0.5 mm².

Supply voltage of the device

For device operation, ensure a stable supply voltage of 3.3 V DC (+/- 100 mV) with a permanent load capacity of at least 400 mA that must not be interrupted for load peaks up to 500 mA. Also observe correct polarity because the device may be damaged otherwise. The operating voltage limits must be observed including any spikes.

Function test for the device

For a function test of the device, you check whether the LED on the device lights up as described in the associated operating instructions. Measure the stability of the supply voltage using an electronic measuring device, such as an oscilloscope, directly on the device, especially for short spikes of more than 50 mVpp. When greater spikes occur, you may have to increase the wire cross-section of the operating voltage cable. Check the wireless and localization functionality in your application environment.

Maintenance of the device

Only authorized dealers or the manufacturer are permitted to repair the device.

5.1 Adding SIMATIC RTLS PCB OEM transponders to the RTLS localization system

To add customer-specific products with integrated SIMATIC RTLS PCB OEM transponders to an RTLS localization system, the respective operator of the RTLS localization system must be contacted. Before adding the SIMATIC RTLS PCB OEM transponders, the selection of the parameters to be used must be coordinated to match the customer-specific area of application. The operator can then commission the device independently.