

SIMATIC Ident

RFID systems SIMATIC RF662A

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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Characteristics

SIMATIC RF662A	Characteristics	
	Area of application	The SIMATIC RF662A is a universal UHF antenna with high range for industrial applications in confined installation conditions.
	Frequency range	865 to 928 MHz
	Read range	Max. 8.0 m
	Polarization	Circular
	Degree of protection	IP67
	Mounting	4 x M4 (VESA 100 fixing system)
	Connector	The antenna is connected directly to the housing with an RP-TNC connector. An antenna cable is required for connection to a SIMATIC RF600 reader (e.g. 6GT2815-0BH30).

Frequency ranges

The antenna is a broadband antenna and covers the frequency ranges from 865 to 928 MHz.

Function

The SIMATIC RF662A is used for transmitting and receiving data in the UHF range. The antennas are connected to the SIMATIC RF600 readers via antenna cables that are available in different lengths.

Ordering data

Table 2- 1 RF662A ordering data

Product	Article number
SIMATIC RF662A	6GT2812-1AA08

Table 2- 2 Ordering data accessories

Product		Article number
SIMATIC RF600 antenna holder 3-way kit		6GT2890-2AB10
Connecting cable between reader and antenna	1 m (cable loss 0.5 dB)	6GT2815-0BH10
	3 m (cable loss 1.0 dB)	6GT2815-0BH30
	5 m, suitable for drag chains (cable loss 1.5 dB)	6GT2815-2BH50
	10 m (cable loss 2.0 dB)	6GT2815-1BN10
	10 m (cable loss 4.0 dB)	6GT2815-0BN10
	15 m, suitable for drag chains (cable loss 4.0 dB)	6GT2815-2BN15
	20 m (cable loss 4.0 dB)	6GT2815-0BN20
	40 m (cable loss 5.0 dB)	6GT2815-0BN40

Installation

Two threaded sleeves for M4 screws are provided for mounting the antenna. These are designed in the standard VESA dimensions 100 x 100 mm so that a VESA standard holder or the SIMATIC RF600 antenna holder 3-way kit can be used.

The antenna is suitable for mounting on metallic and non-metallic surfaces.

Note

Achieving optimum wave propagation

To achieve optimum wave propagation, the antenna should not be surrounded by conducting objects. The area between antenna and transponder should also allow wave propagation without interference.

Note

Conditions relating to UL approval

- The product is designed exclusively for use in industrial environments.
 - For indoor use only (dry location)
 - Coaxial connectors and cables shall comply with NFPA70 art. 820 part V
-

Antenna holders

The Siemens antenna holder allows fine adjustment of the antenna field by setting the solid angle.

Integration into RF600 systems

The RF662A antenna is designed for integration in SIMATIC RF600 systems or for connection to SIMATIC RF600 readers.

Antenna parameter assignment is performed using the Web Based Management (WBM) of the reader to which the antenna is connected. You can specify the parameters for the antenna in the menu "Settings > Read points > Assigned antennas".

Note

Antenna selection with parameter assignment using the WBM

If the RF662A antenna is not displayed in the settings of the read point during parameter assignment of the SIMATIC RF600 readers via the WBM (menu "Settings > Read points > Assigned antennas"), then select the RF660A antenna. The power parameters (radiated power, antenna gain, cable loss) of both antennas are identical.

4.1 Connecting the antenna

4.1.1 Connecting the antenna

The SIMATIC RF662A antenna must be connected to the reader using an antenna cable.

Preassembled standard cables in lengths of 1 m, 3 m, 5 m, 10 m, 15 m, 20 m and 40 m are available to connect the antenna.

The range of the antenna is limited by the cable loss. The maximum range can be achieved with the cable 6GT2815-0BH10 (length 1 m), since this cable has the lowest cable loss.

Requirement

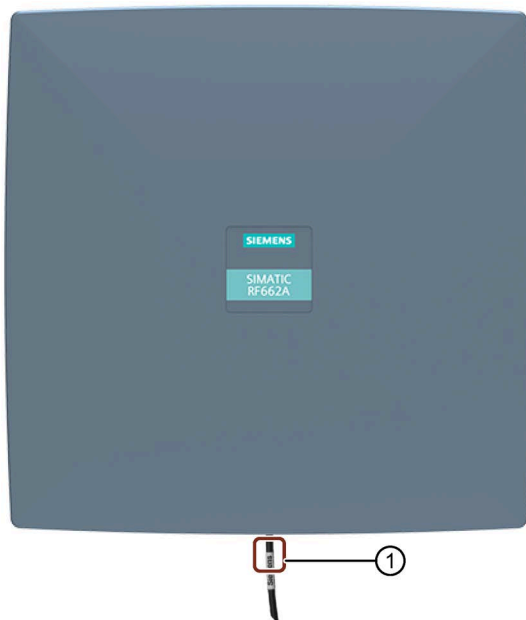
Note

Use of Siemens antenna cable

To ensure optimum functioning of the antenna, it is recommended that a Siemens antenna cable is used in accordance with the list of accessories.

Strain relief

To protect the antenna or the antenna connector from strain, you can attach strain relief, e.g. in the form of a strain relief clamp, by securing the antenna cable near the antenna with a clamp against a mounting surface. The following graphic shows the optimum mounting point for attaching strain relief.



① Mounting point for strain relief

Figure 4-1 Strain relief

4.1.2 Bending radii and bending cycles of the cable

Table 4- 1 Bending radii and bending cycles of the antenna cable

Cable designation	Article number	Length [m]	Cable loss [dB]	Bending radius [mm] ¹⁾
Antenna cable	6GT2815-OBH10	1	0.5	51
Antenna cable	6GT2815-OBH30	3	1	51
Antenna cable (suitable for drag chains)	6GT2815-2BH50	5	1.5	44 ²⁾
Antenna cable	6GT2815-1BN10	10	2	77
Antenna cable	6GT2815-0BN10	10	4	51
Antenna cable (suitable for drag chains)	6GT2815-2BN15	15	4	44 ²⁾
Antenna cable	6GT2815-0BN20	20	4	77
Antenna cable	6GT2815-0BN40	40	5	77

¹⁾ Permissible minimum bending radius with multiple bending.

²⁾ With cables capable of being used in drag chains, 100,000 bending cycles at a bending radius of 100 mm and a bend of $\pm 180^\circ$ or 3 million torsion cycles with a bend of $\pm 180^\circ$ on a cable length of 1 m are permitted.

4.2 Antenna parameter assignment

Depending on the country or region in which the antenna is being operated, it is subject to regional limitations with respect to the radiated power.

Limitations in the EU, EFTA, or Turkey

Note

Limitation of the radiated power according to EN 302 208 V3.3.1 (ETSI)

RF600 systems that are put into operation in the EU, EFTA or Turkey must not exceed the following radiated power with an RF662A antenna:

- 2000 mW ERP (or 33 dBm ERP)
Converted into EIRP: 3250 mW EIRP (or 35 dBm EIRP)

Make the following settings to ensure that the maximum permitted radiated power of the antenna is not exceeded:

- Antenna gain: 7 dBi (10 dBic)
- Radiated power: ≤ 2000 mW ERP (or 33 dBm ERP)
Converted into EIRP: ≤ 3250 mW EIRP (or 35 dBm EIRP)
- Use of cable loss associated with the antenna cable.

Limitations in the USA and Canada

Note

Limitation of the radiated power (FCC)

RF600 systems that are put into operation in the USA and Canada must not exceed the following radiated power with an RF662A antenna:

- 4000 mW EIRP (or 36 dBm EIRP)
-

Make the following settings to ensure that the maximum permitted radiated power of the antenna is not exceeded:

- Conducted power P (dBm) of the RF600 reader: < 30 dBm
- Antenna gain G_i (dBi) in the FCC frequency band: ≤ 6 dBi
- Cable loss a_k (dB): ≥ 1 dB

$$P \text{ (dBm)} \leq 30 \text{ dBm} - (G_i - 6 \text{ dBi}) + a_k$$

Limitations in South Korea

Note

Limitation of the radiated power (FCC) in the frequency range 917 - 920.8 MHz

RF600 systems that are put into operation in South Korea must not exceed the following radiated power with an RF662A antenna:

- 4000 mW EIRP (or 36 dBm EIRP)
-

Make the following settings to ensure that the maximum permitted radiated power of the antenna is not exceeded:

- Conducted power P (dBm) of the RF600 reader: < 30 dBm
- Antenna gain G_i (dBi) in the FCC frequency band: ≤ 6 dBi
- Cable loss a_k (dB): ≥ 1 dB

$$P \text{ (dBm)} \leq 30 \text{ dBm} - (G_i - 6 \text{ dBi}) + a_k$$

Limitations in China

Note

Limitation of the radiated power (CMIIT)

RF600 systems that are put into operation in China must not exceed the following radiated power with an RF662A antenna:

- 2000 mW ERP (or 33 dBm ERP)
- Converted into EIRP: 3250 mW EIRP (or 35 dBm EIRP)
-

Make the following settings to ensure that the maximum permitted radiated power of the antenna is not exceeded:

- Antenna gain: 4 dBi (7 dBic)
- Radiated power: ≤ 2000 mW ERP (or 33 dBm ERP)
Converted into EIRP: ≤ 3250 mW EIRP (or 35 dBm EIRP)
- Use of cable loss associated with the antenna cable.

Limitations in Japan

Note

Limitation of the radiated power (ARIB)

RF600 systems that are put into operation in Japan must not exceed the following radiated power with an RF662A antenna:

- 500 mW EIRP (or 27 dBm EIRP) for operation with RF650R (ARIB STD-T107)
 - 4000 mW EIRP (or 36 dBm EIRP) for operation with RF680R/RF685R (ARIB STD-T106)
-

Antenna patterns

5.1 Alignment of transponders to the antenna

Transponder alignment

The RF662A antenna has a circular polarization. With a circular antenna the alignment of the antenna axis of symmetry changes between horizontal and vertical each time it transmits. For this reason the alignment of the transponder polarization axis (horizontal/vertical) is unimportant. Make sure, however, that the transponder is aligned with the antenna.

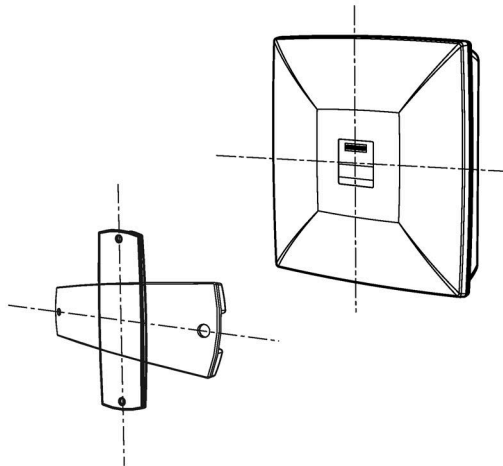


Figure 5-1 Alignment of the transponder polarization axis with a circular antenna axis of symmetry

5.2 Antenna patterns in the ETSI frequency band

Directional radiation pattern ETSI

The directional radiation pattern is shown for nominal alignment and a center frequency of 866.3 MHz. The nominal antenna alignment is given when the antenna elevation is provided as shown in the following figure.

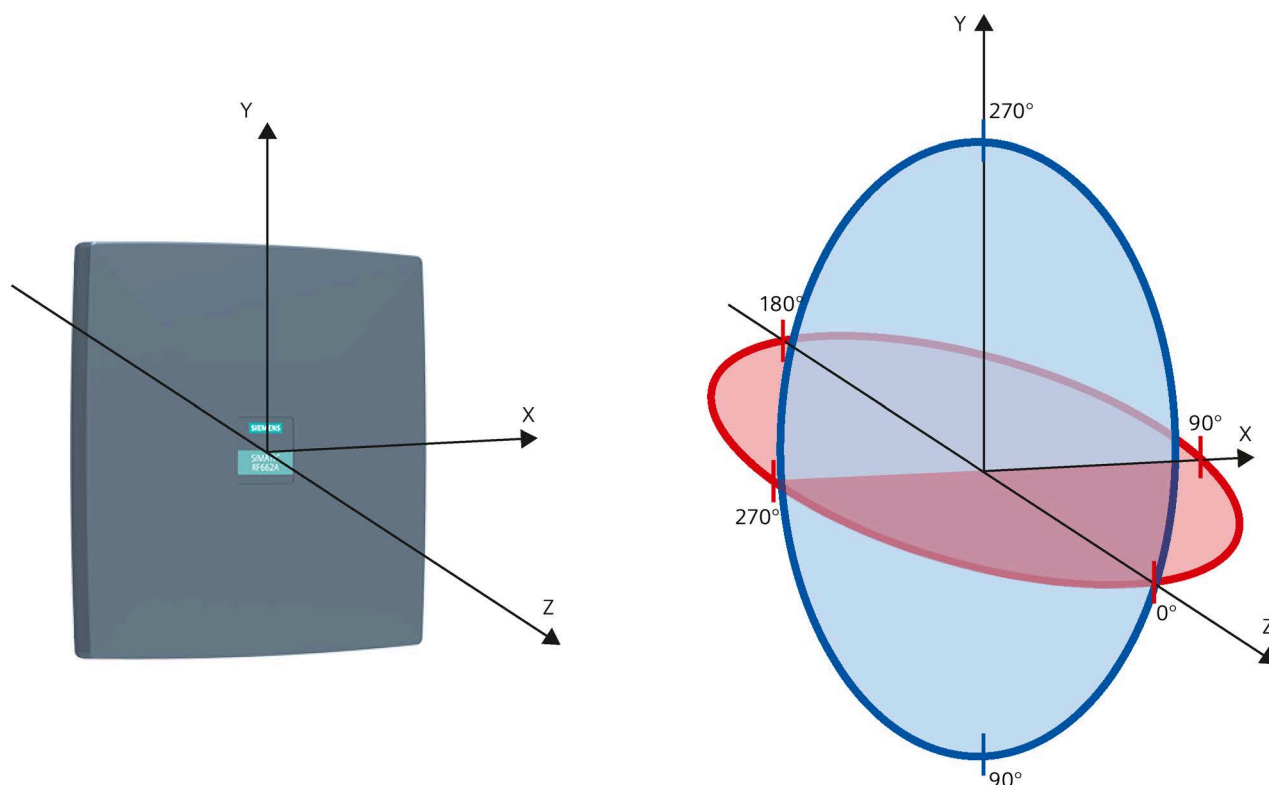


Figure 5-2 Reference system

The half-power beamwidth of the antenna (opening angle) is defined by the angle between the two -3 dB points (corresponding to half the power in relation to the maximum power). The range (in %) corresponding to the dB values in the patterns can be obtained from the table in the section "Interpretation of directional radiation patterns (Page 22)".

Note that the measurements presented graphically below were carried out in a low-reflection environment. Deviations can therefore occur in a normally reflecting environment.

Radiation diagram (circular) in the ETSI frequency band

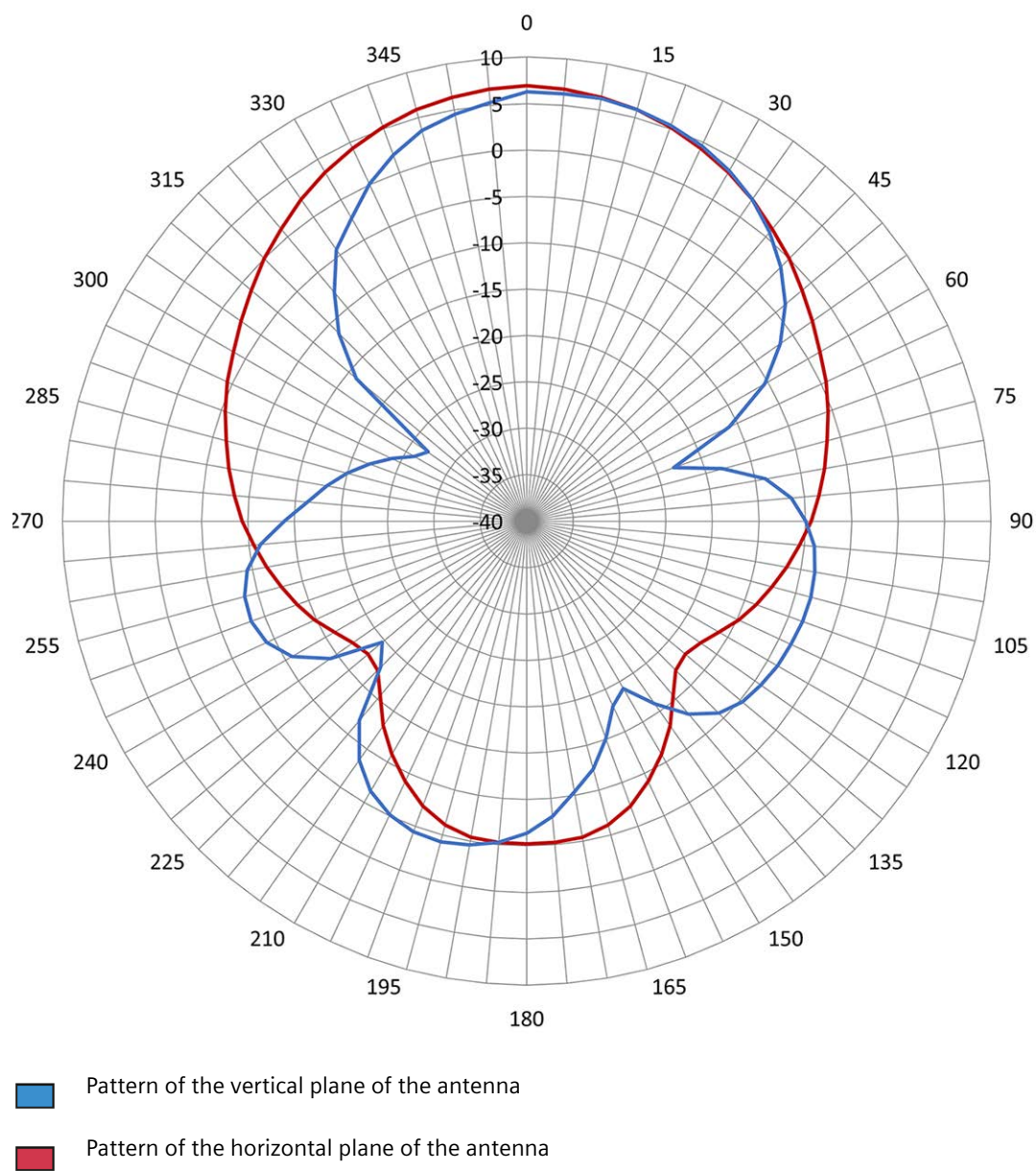


Figure 5-3 Directional radiation pattern of RF662A in the ETSI frequency band

5.3 Antenna patterns in the FCC frequency band

Directional radiation pattern FCC

The directional radiation pattern is shown for nominal alignment and a center frequency of 915 MHz.

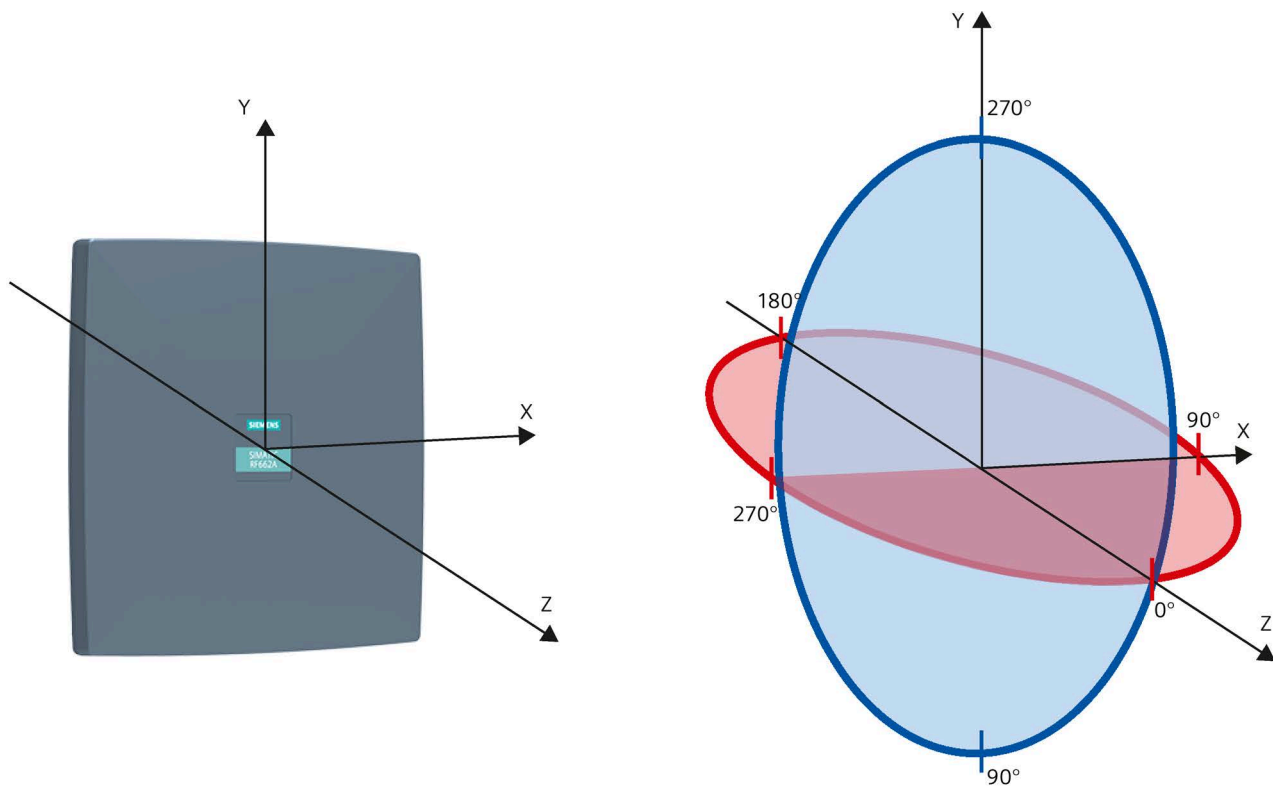


Figure 5-4 Reference system

The half-power beamwidth of the antenna (opening angle) is defined by the angle between the two -3 dB points (corresponding to half the power in relation to the maximum power). The range (in %) corresponding to the dB values in the patterns can be obtained from the table in the section "Interpretation of directional radiation patterns (Page 22)".

Note that the measurements presented graphically below were carried out in a low-reflection environment. Deviations can therefore occur in a normally reflecting environment.

Radiation diagram (circular) in the FCC frequency band

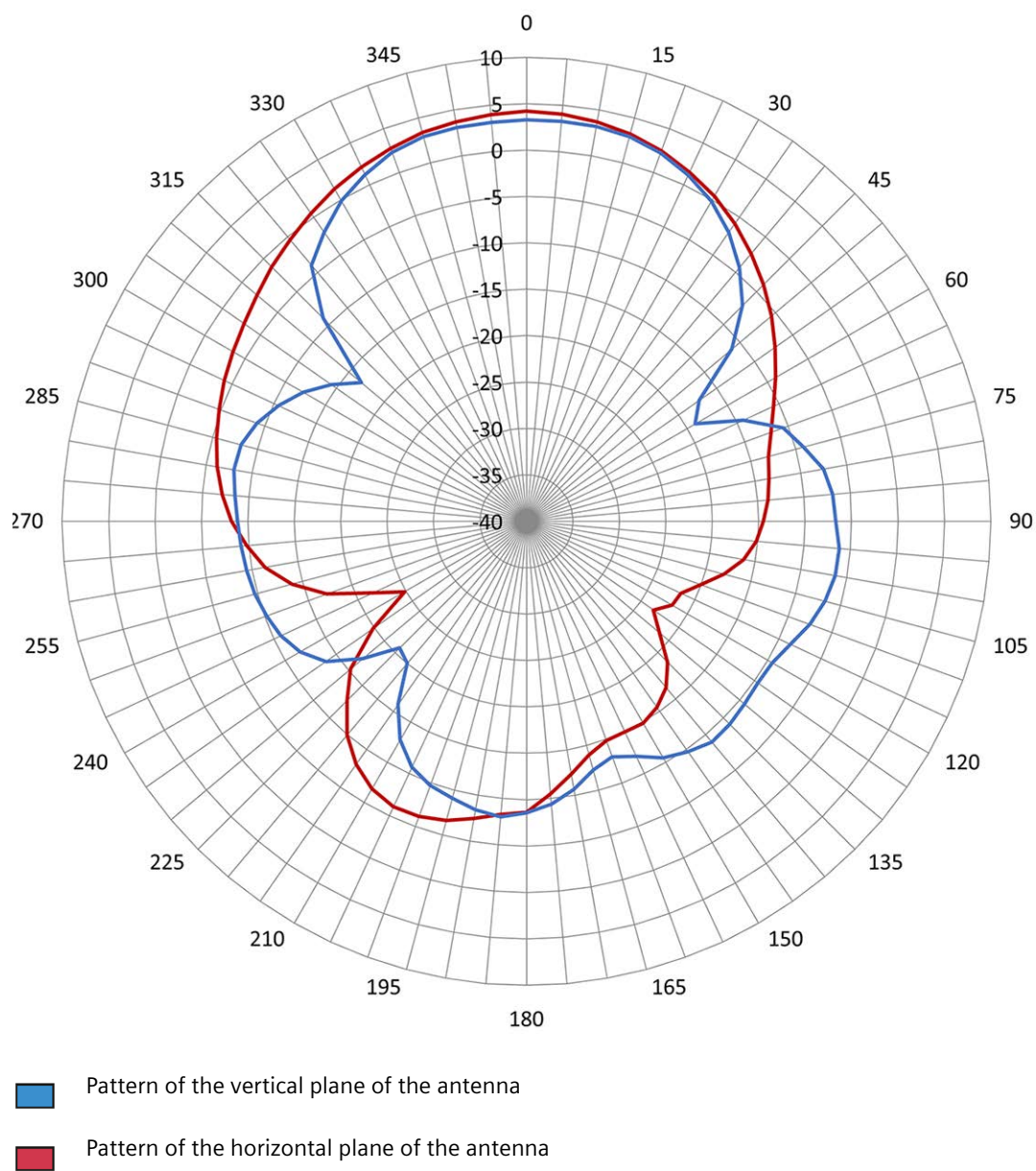


Figure 5-5 Directional radiation pattern of the RF662A in the FCC frequency band

5.4 Interpretation of directional radiation patterns

The following overview table will help you with the interpretation of directional radiation patterns.

The table shows which dBi values correspond to which read/write ranges (in %): You can read the radiated power depending on the reference angle from the directional radiation patterns, and thus obtain information on the read/write range with this reference angle with regard to a transponder.

The dBr values correspond to the difference between the maximum dBi/dBic value and a second dBi/dBic value.

Table 5- 1 Interpretation of directional radiation patterns

Deviation from maximum antenna gain [dBr]	Read/write range [%]
0	100
-3	70
-6	50
-9	35
-12	25
-15	18
-18	13

Example

As you can see in the pattern in the section "Antenna patterns in the ETSI frequency band (Page 18)", the maximum antenna gain is 7 dBi. In the vertical plane, the antenna gain has dropped to approx. 5 dBi at +20° and 340°. This means that the dBr value is -2. The antenna range is only 50% of the maximum range at $\pm 40^\circ$ from the Z axis within the vertical plane (see line shown in blue in the directional radiation pattern: Characteristic of the vertical plane of the antenna and the associated representation of the reference system).

Maximum read/write ranges

Please observe the installation notes (Page 9) and antenna alignment (Page 17) to achieve the maximum read/write range.

The measurements were made under the following conditions:

- Maximum possible radiated power of the reader or antenna
- With a 3 meter long antenna cable with 1 dB cable loss (article number: 6GT2815-0BH30)
- Room temperature of approx. 20 - 25 °C
- Optimized real measurement conditions (laboratory with few metallic reflecting surfaces)

Table 6- 1 Read ranges of the antenna (all ranges in meters [m])

	SIMATIC RF662A with		
	SIMATIC RF615R	SIMATIC RF650R	SIMATIC RF680R / RF685R
SIMATIC RF630L (6GT2810-2AB02- 0AX0)	4.0	5.0	5.0
SIMATIC RF630L (6GT2810-2AB03)	1.4	2.5	2.5
SIMATIC RF630L (6GT2810-2AB04)	1.6	3.0	3.0
SIMATIC RF630L (6GT2810-2AE82-0AXx)	3.0	4.0	5.0
SIMATIC RF630L (6GT2810-2AE82-0AX2)	3.0	4.0	5.0
SIMATIC RF630L (6GT2810-2AE82-1AX0)	3.0	4.0	5.0
SIMATIC RF630L (6GT2810-2AE82-2AXx)	3.0	4.0	5.0
SIMATIC RF630L (6GT2810-2AE82-0AX1)	3.0	4.0	5.0
SIMATIC RF630L (6GT2810-2AB04-0AX1)	2.5	3.5	5.0
SIMATIC RF635L	4.5	5.0	6.0
SIMATIC RF642L	1.8	1.6	1.6
SIMATIC RF690L	1.4	1.4	1.4
SIMATIC RF610T	3.0	3.0	3.0
SIMATIC RF620T	4.0	6.0	6.0
SIMATIC RF625T	0.8	1.4	1.4
SIMATIC RF630T	1.0	1.8	1.8
SIMATIC RF640T	1.2	2.0	2.0
SIMATIC RF645T	3.5	5.0	5.0
SIMATIC RF680T	4.0	4.5	4.5
SIMATIC RF682T	2.0	4.0	4.0

Maximum write ranges

The antenna requires more power for writing than for reading data. When writing, the maximum range reduces by approximately 30% - 50% compared with the read range, depending on the transponder used.

Technical data

Table 7- 1 Technical specifications of the RF662A antenna

6GT2812-1AA08	
Product type designation	SIMATIC RF662A
Radio frequencies	
Operating frequency	865 to 928 MHz
Electrical data	
Maximum radiated power	
• ETSI	• ≤ 2000 mW ERP
• FCC	• ≤ 4000 mW EIRP
• CMIIT	• ≤ 2000 mW ERP
• ARIB	• STD-T107: RF650R: ≤ 500 mW EIRP • STD-T106: RF680R/RF685R: < 4000 mW EIRP
Antenna gain	
• ETSI	• 7 dBi see section "Antenna patterns in the ETSI frequency band (Page 18)"
• FCC	• 4 dBi (at 915 MHz) see section "Antenna patterns in the FCC frequency band (Page 20)"
Aperture angle for transmitting/receiving	
• ETSI	• Horizontal plane: 56° Vertical plane: 50° see section "Antenna patterns in the ETSI frequency band (Page 18)"
• FCC	• Horizontal plane: 56° Vertical plane: 58° see section "Antenna patterns in the FCC frequency band (Page 20)"
Range	See section "Maximum read/write ranges (Page 23)"
Impedance	50 Ω
Polarization	Circular
VSWR (standing wave ratio)	≤ 1.5:1

6GT2812-1AA08	
Maximum input power	
• ETSI	• $\leq 2 \text{ W}$
• FCC	• $\leq 1 \text{ W}$
Interfaces	
Plug connection	RP-TNC connector (for connection of the antenna cable)
Mechanical specifications	
Material	Pocan
Color	TI-Grey
Permitted ambient conditions	
Ambient temperature	
• During operation	• $-25 \dots +75 \text{ }^{\circ}\text{C}$
• During transportation and storage	• $-40 \dots +85 \text{ }^{\circ}\text{C}$
Degree of protection	IP67 (IP rating is not investigated by UL)
Shock resistant according to EN 60068-2-27	30 g ¹⁾
Vibrations according to EN 60068-2-6	2 g ¹⁾
Design, dimensions and weight	
Dimensions (H x W x D)	312 x 312 x 68 mm ($\pm 1.5 \text{ mm}$)
Weight	1500 g
Mounting	4x screws M4 $\leq 2 \text{ Nm}$
Standards, specifications, approvals	
Proof of suitability	
• ETSI	• CE (ETSI EN 302208)
• FCC	• FCC (Title 47, Part 15.247), cULus
MTBF	1190 years

¹⁾ The values for shock and vibration are maximum values and must not be applied continuously.

Dimension drawing

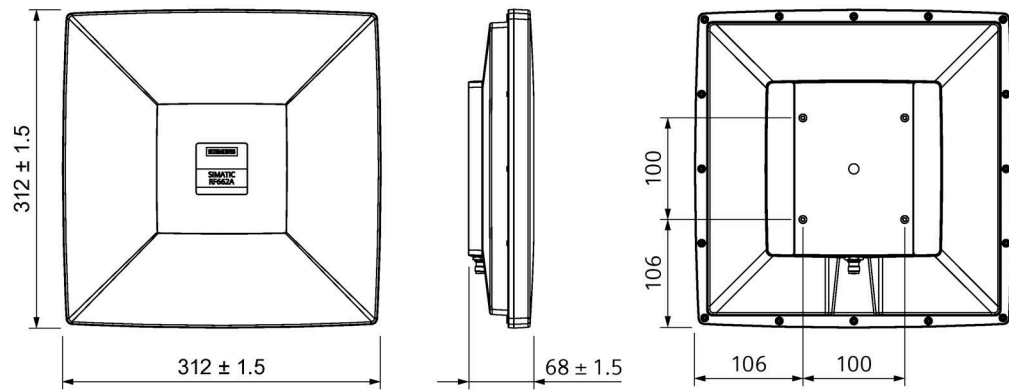


Figure 8-1 Dimension drawing for RF662A

All dimensions in mm

Approvals & certificates

Table 9- 1 6GT2812-1AA08

Labeling	Description
	Conformity with the RED directive 2014/53/EU Conformity with the RoHS directive 2011/65/EU

If a device has one of the following marks, the corresponding approval has been obtained.

Table 9- 2 6GT2812-1AA08

Labeling	Description
 Federal Communications Commission	FCC CFR 47, Part 15 sections 15.247 Radio Frequency Interference Statement This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. The FCC approval is granted in association with the FCC approval of the following RF600 readers: - FCC ID: NXW-RF615R (for RF615R: 6GT2811-6CC10-1AA0) - FCC ID: NXW-RF600R2 (for RF650R: 6GT2811-6AB20-1AA0, RF680R: 6GT2811-6AA10-1AA0, RF685R: 6GT2811-6CA10-1AA0)
Industry Canada Radio Standards Specifications	RSS-247 Issue 27 The approval for Industry Canada is granted in association with the Industry Canada approval of the following RF600 readers: - IC: 267X-RF615R, Model RF615R (for 6GT2811-6AB20-1AA0) RSS-210 Issue 7, June 2007, Sections 2.2, A8 The approval for Industry Canada is granted in association with the Industry Canada approval of the following RF600 readers: - IC: 267X-RF600R2, Model RF650R (for 6GT2811-6AB20-1AA0) - IC: 267X-RF600R2, Model RF680R (for 6GT2811-6AA10-1AA0) - IC: 267X-RF600R2, Model RF685R (for 6GT2811-6CA10-1AA0)

Labeling	Description
	This product is UL-certified for the USA and Canada. It meets the following safety standard(s): • UL Report E115352 • UL 62368-1 - AVICT Equipment - Part 1: Safety Requirements • CSA C22.2 No. 62368-1-14 AVICT Equipment - Part 1: Safety Requirements
	Korea Communications Commission Certificate of Broadcasting and Communication Equipments Republic of Korea