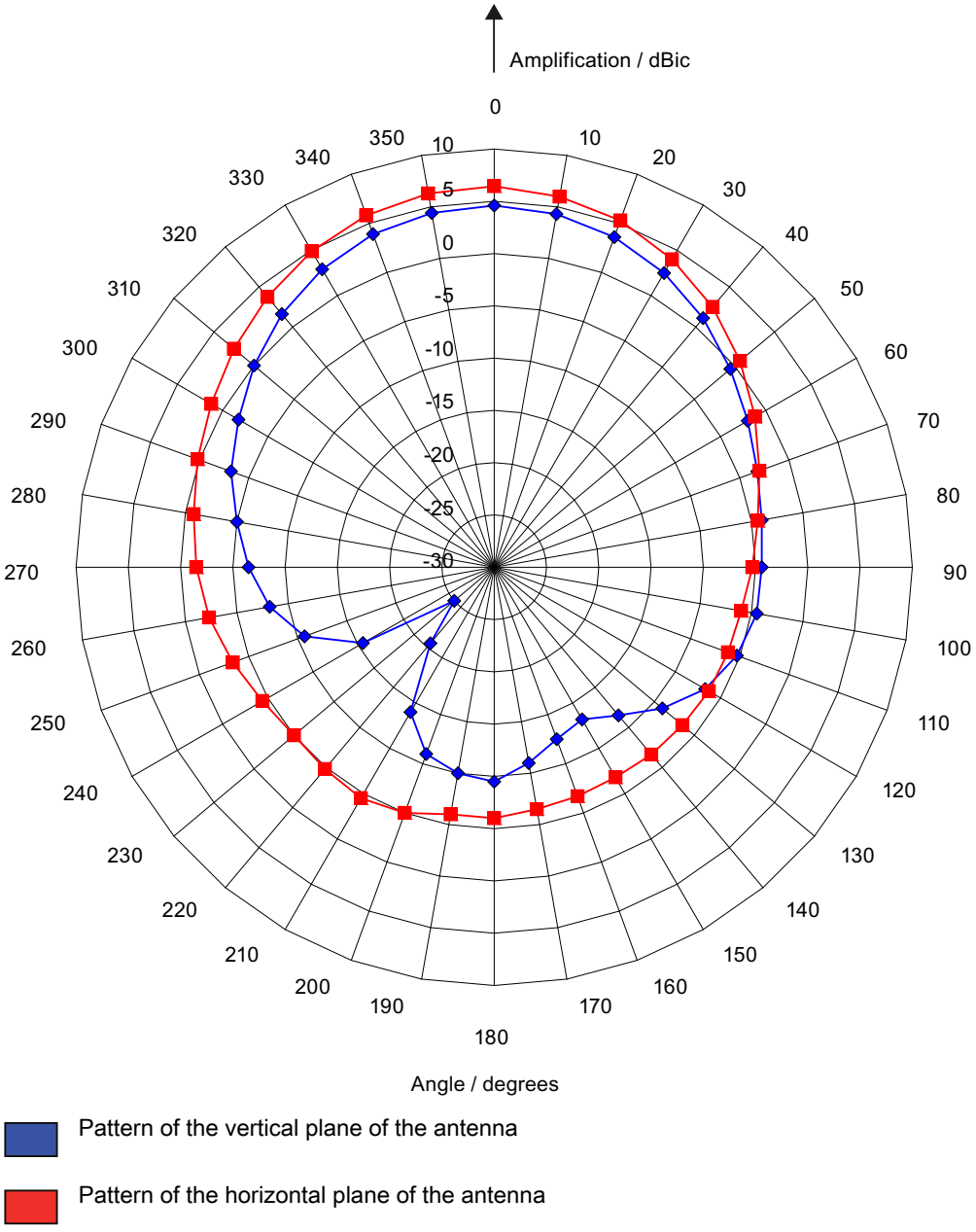
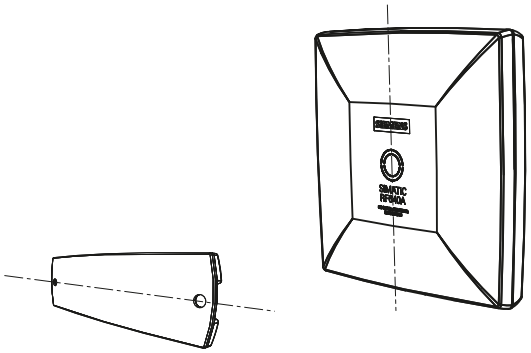


Figure 6-14 The RF640A directional radiation pattern in the ETSI frequency band, polarization axis of the transponder, and axis of symmetry of the antenna are parallel to each other.

Polarization axis and axis of symmetry are orthogonal to each other

In a configuration based on the following directional radiation pattern of the antenna, the axis of symmetry of the antenna and the polarization axis of the transponder are orthogonal to each other.



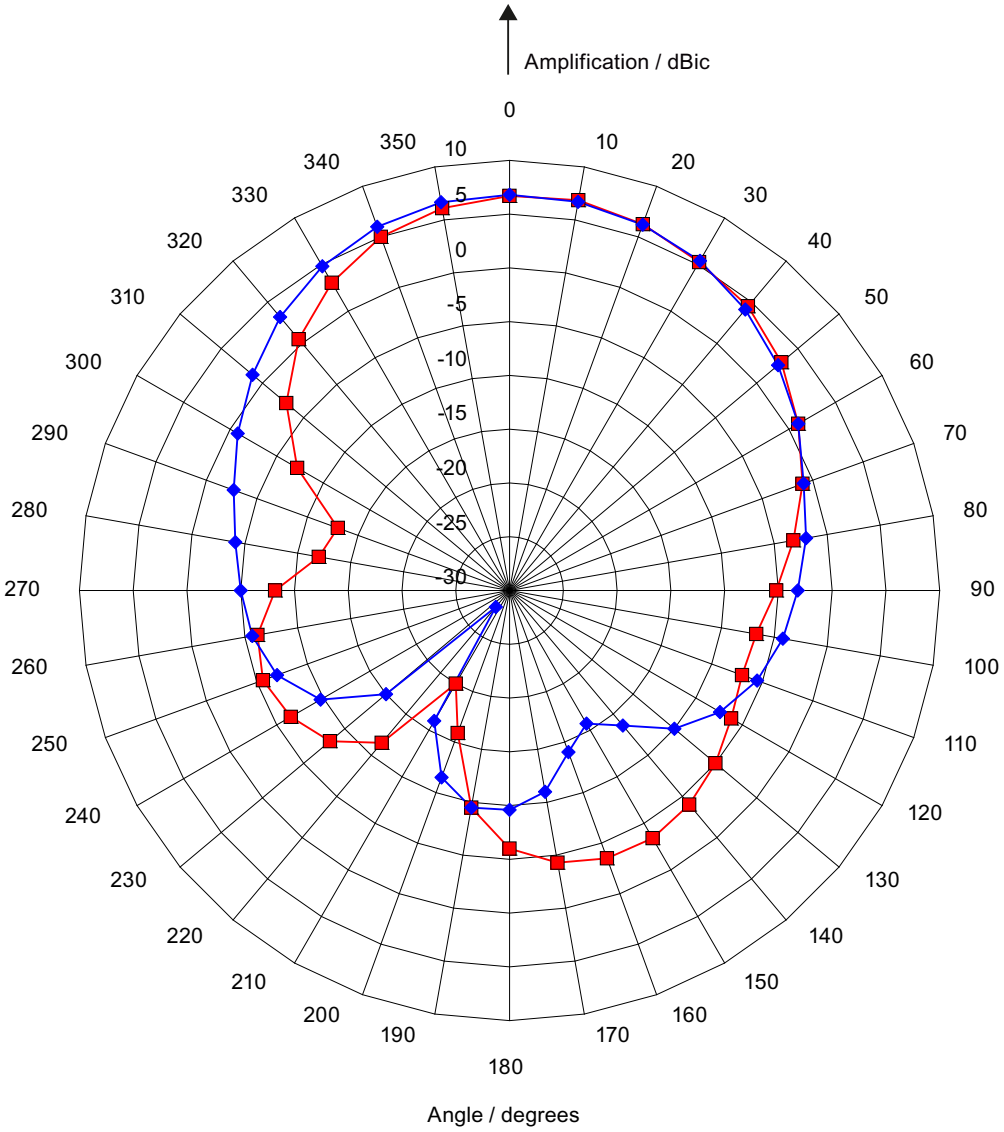


Figure 6-15 The RF640A directional radiation pattern in the ETSI frequency band, axis of symmetry of the antenna, and polarization axis of the transponder are orthogonal to each other

6.3.7.2 Antenna radiation patterns in the FCC frequency band

Directional radiation pattern USA (FCC)

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

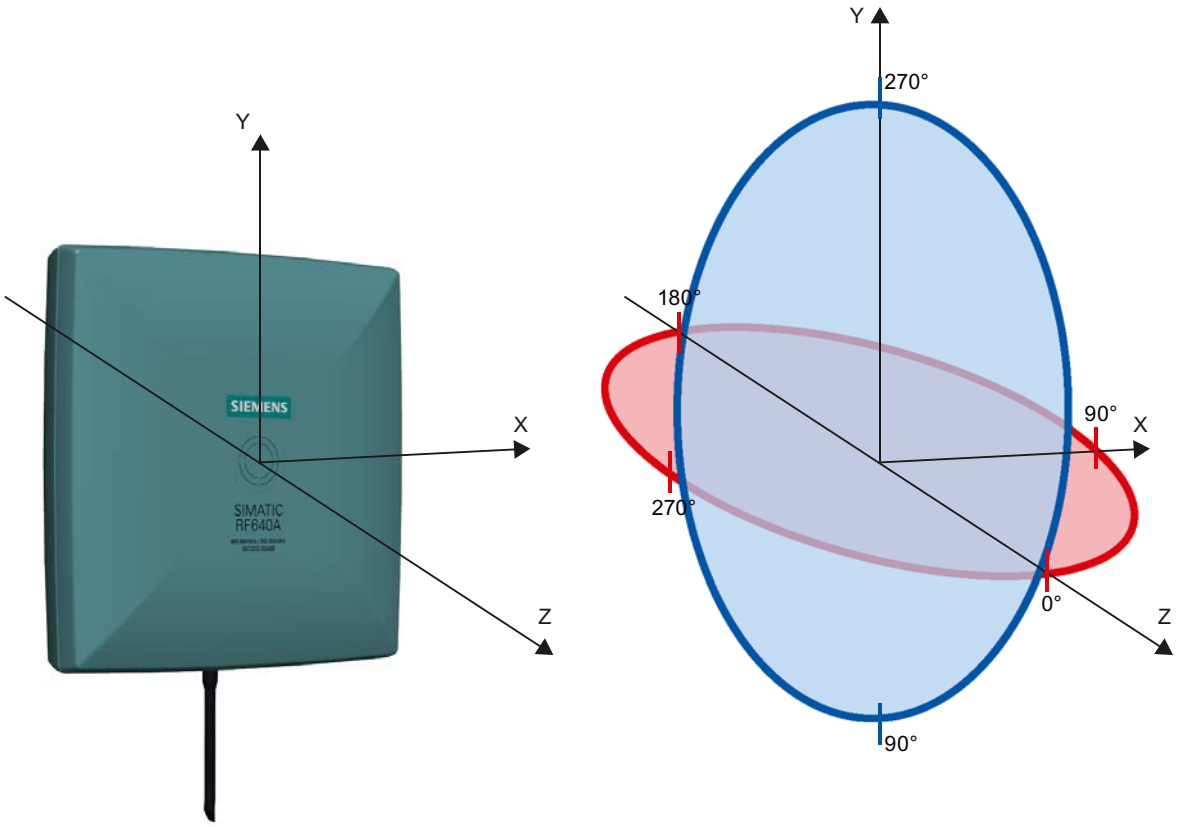


Figure 6-16 Reference system

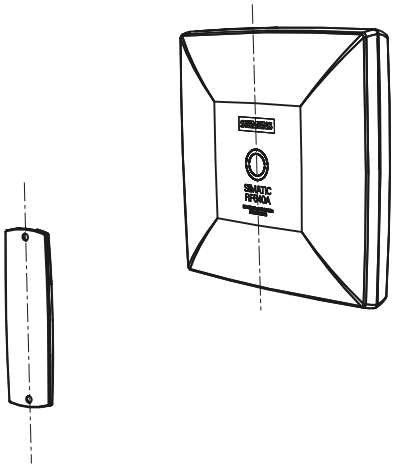
The half-power beam width of the antenna is defined by the angle between the two -3 dB points (corresponding to half the power referred to the maximum power). Which range (in %) corresponds to the dB values in the patterns can be obtained from this table (Page 226).

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

Directional radiation pattern in the FCC frequency band

Polarization axis and axis of symmetry are parallel

In the following directional radiation pattern of the antenna, the axis of symmetry of the antenna and the polarization axis of the transponder are parallel.



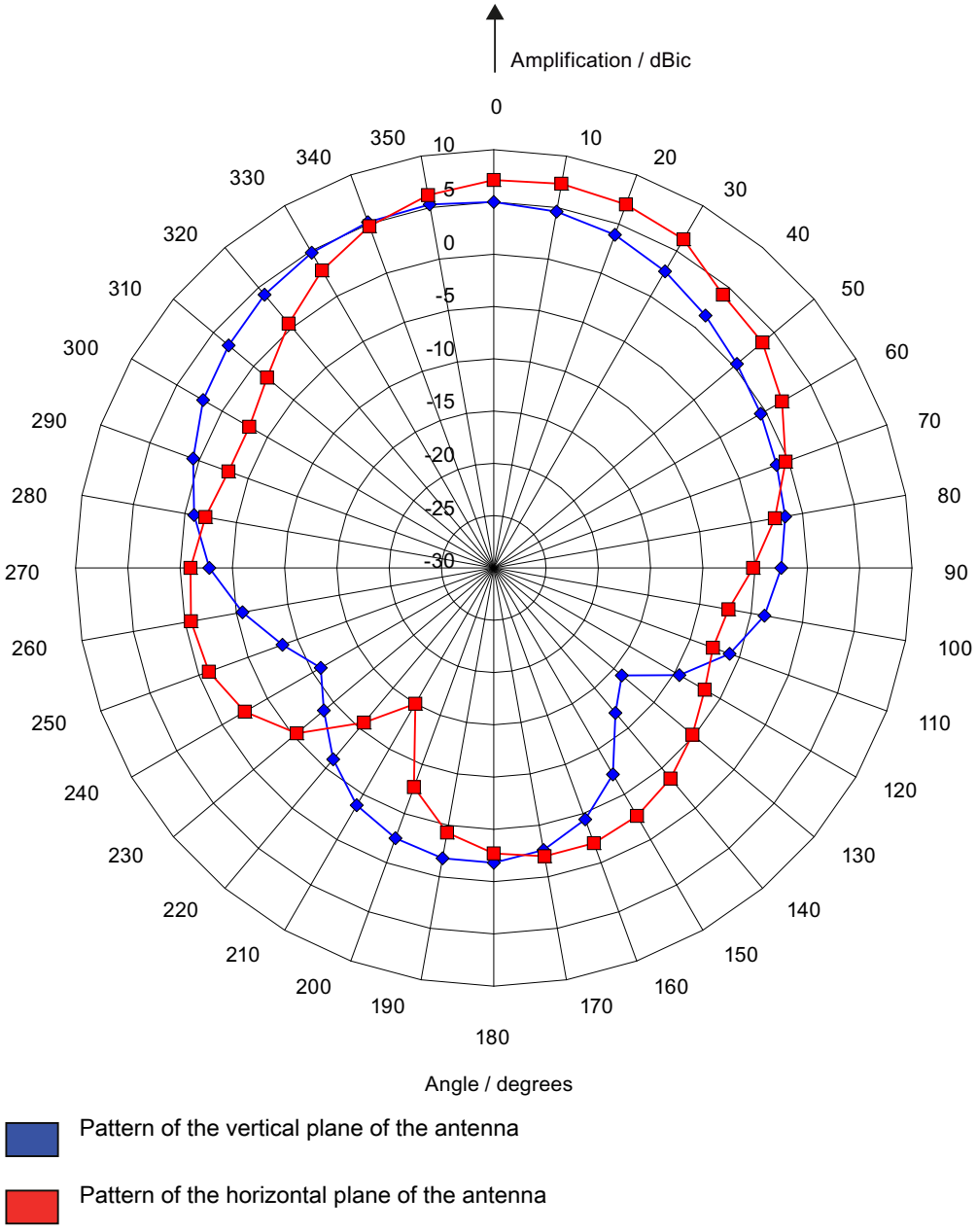
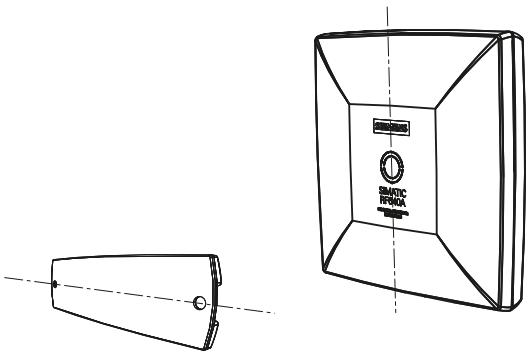


Figure 6-17 The RF640A directional radiation pattern in the FCC frequency band, polarization axis of the transponder, and axis of symmetry of the antenna are parallel to each other

Polarization axis and axis of symmetry are orthogonal to each other

In the following directional radiation pattern of the antenna, the axis of symmetry of the antenna and the polarization axis of the transponder are orthogonal to each other.



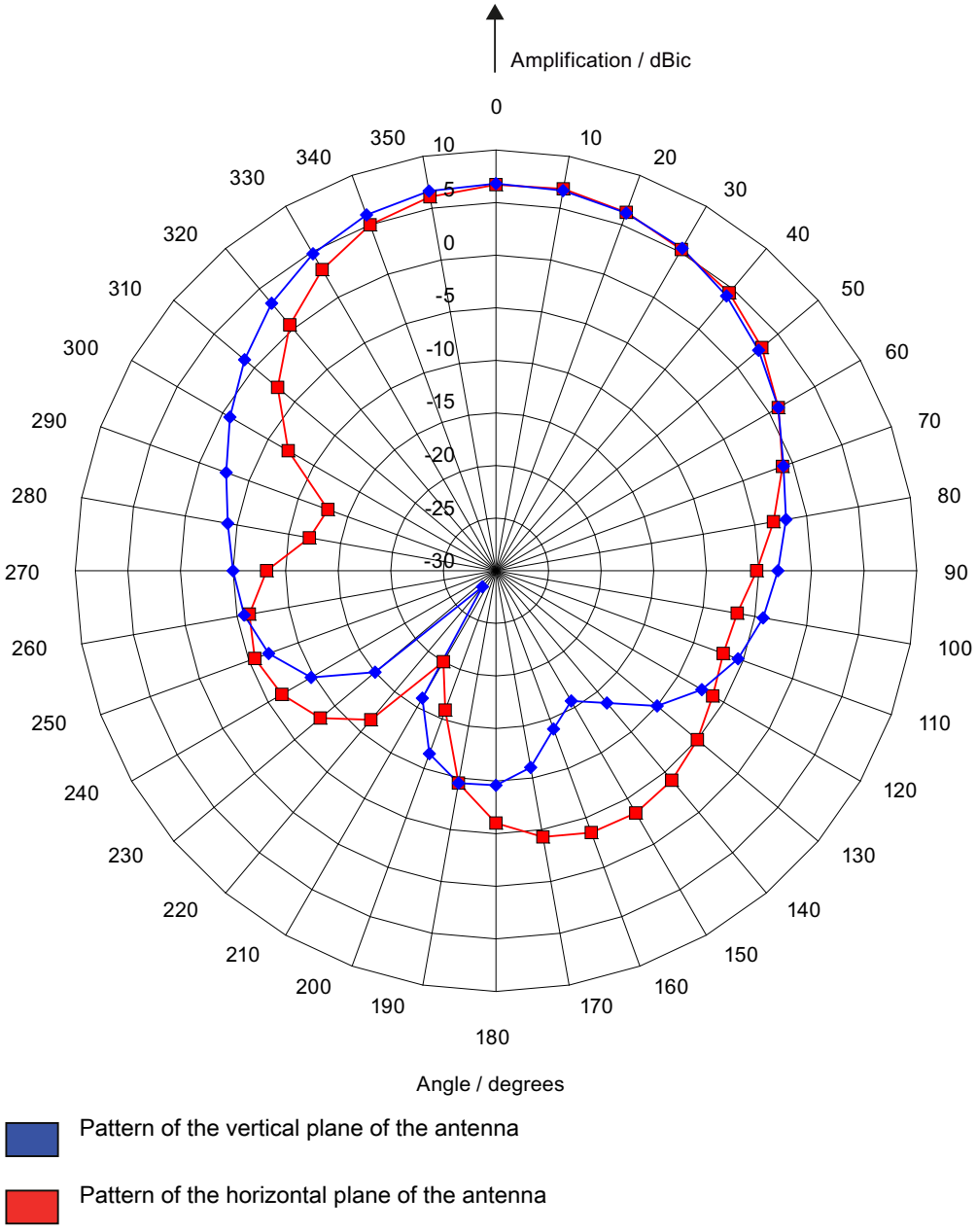


Figure 6-18 The RF640A directional radiation pattern in the FCC frequency band, axis of symmetry of the antenna, and polarization axis of the transponder are orthogonal to each other

6.3.7.3 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.

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 can be seen in Directional radiation patterns in the ETSI frequency band (Page 218), the maximum antenna gain in the vertical plane is 3.45 dBi (6.45 dBic). In this plane, and with the polarization axis of the transponder parallel to the axis of symmetry of the antenna, the antenna gain drops to about 0.5 dBic at +50° or 310°. Therefore the dBr value is -6. The antenna range is only 50% of the maximum range at + 50° or 310° from the Z axis within the vertical plane (see values shown in blue in the directional radiation pattern: Characteristic of the vertical plane of the antenna (Page 218) and the associated representation of the reference system (Page 217)).

6.3.8 Technical data

Table 6- 12 General technical specifications RF640A

Feature	SIMATIC RF640A
Dimensions (L x W x H)	185 x 185 x 45 mm
Color	Pastel turquoise
Material	PA 12 (polyamide 12)
	Silicone-free
Frequency range	865 to 928 MHz
Plug connection	30 cm antenna connection coaxial cable with RTNC coupling, fixed connection to antenna An antenna cable is required for connection to the reader, e.g.: 6GT2815-0BH30
Max. radiated power according to ETSI	• RF620R, RF630R: < 610 mW ERP • RF640R, RF670R: ≤1300 mW ERP
Max. radiated power according to CMIIT	• RF620R, RF630R: ≤650 mW ERP • RF640R, RF670R: ≤ 1300 mW ERP
Max. radiated power according to FCC	• RF620R, RF630R: ≤ 1070 mW EIRP • RF640R, RF670R: ≤2700 mW EIRP

Feature	SIMATIC RF640A
Max. power	2000 mW
Impedance	50 ohms
Antenna gain	ETSI frequency band: 4 dBi (7 dBic)
	FCC frequency band: 4.3 dBi (7.3 dBic)
VSWR (standing wave ratio)	ETSI frequency band: Max. 1.25
	FCC frequency band: Max. 1.6
Polarization	RH circular
Aperture angle for transmitting/receiving	ETSI frequency band: • Horizontal plane: 80° • Vertical plane: 75° See ETSI antenna pattern
	FCC frequency band: • Horizontal plane: 75° • Vertical plane: 85° See FCC antenna pattern
Front-to-back ratio	ETSI frequency band: 14 dB ± 2.4 dB (depends on orientation of the transponder)
	FCC frequency band: 9 dB ± 2.7 dB (depends on orientation of the transponder)
Shock resistant to EN 60068-2-27	30 g
Vibration resistant to EN 60068-2-6	10 g
Attachment of the antenna	4 screws M4 (VESA 100 fastening system)
Tightening torque (at room temperature)	≤ 2 Nm
Ambient temperature	
• Operation	• -25 °C to +75 °C
• Transport and storage	• -40 °C to +85 °C
MTBF in years	445
Degree of protection according to EN 60529	IP67
Weight, approx.	600 g

[1] The values differ for different dimensions/materials of the mounting surface.

6.3.9 Dimension drawing

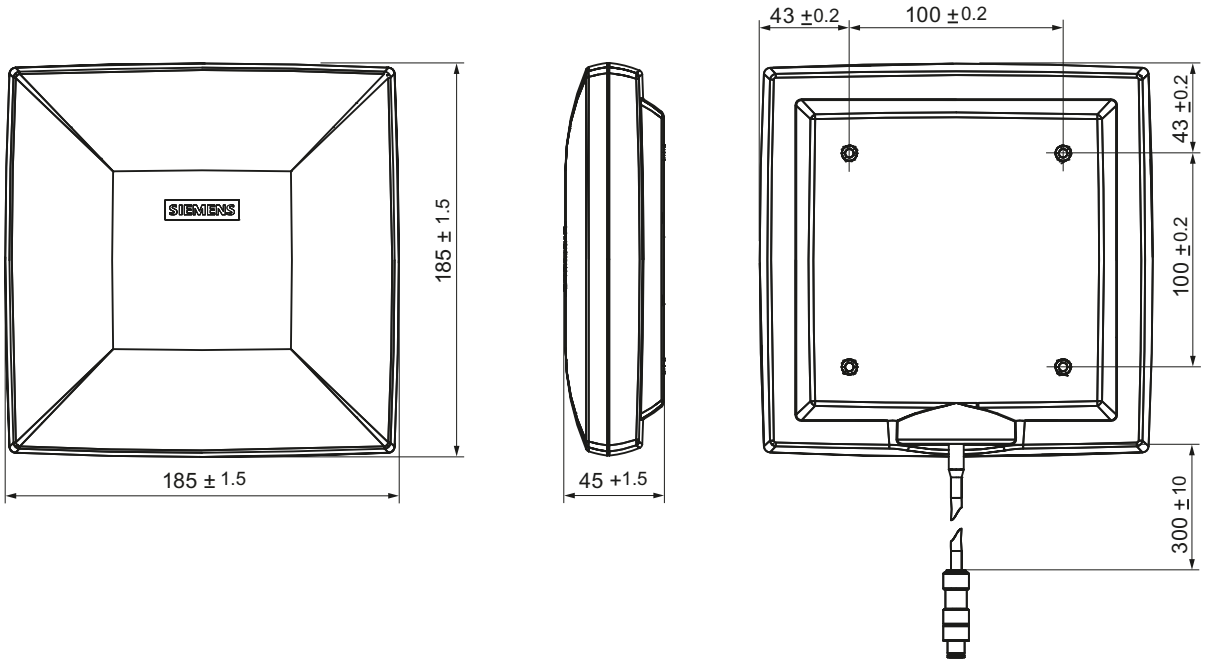


Figure 6-19 Dimension drawing RF640A

All dimensions in mm

6.3.10 Approvals & certificates

Table 6- 13 6GT2812-0GA08

Certificate	Description
CE	Conformity in accordance with R&TTE directive in association with the readers and accessories used

Table 6- 14 6GT2812-0GA08

Standard	
FC 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-RF600R (for RF620R: 6GT2811-5BA00-1AA1, RF630R: 6GT2811-4AA00-1AA1, RF640R: 6GT2811-3BA00-1AA0, RF670R FS C1: 6GT2811-0AB00-1AA0) • FCC ID: NXW-RF630R (for 6GT2811-4AA00-1AA0) • FCC ID: NXW-RF670 (for RF670R as of FS A1: 6GT2811-0AB00-1AA0
Industry Canada Radio Standards Specifications	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-RF630 (for 6GT2811-4AA00-1AA0) • IC: 267X-RF670, RF670R FS A1 (for 6GT2811-0AB00-1AA0) • IC: 267X-RF600R, Model RF620R-2 (for 6GT2811-5BA00-1AA1) • IC: 267X-RF600R, Model RF630R-2 (for 6GT2811-4AA00-1AA1) • IC: 267X-RF600R, Model RF640R (for 6GT2811-3BA00-1AA0) • IC: 267X-RF600R, model RF670R-2 as of FS C1 (for 6GT2811-0AB00-1AA0)
C UL US	This product is UL-certified for the USA and Canada. It meets the following safety standard(s): UL 60950-1 - Information Technology Equipment Safety - Part 1: General Requirements CSA C22.2 No. 60950 -1 - Safety of Information Technology Equipment UL Report E 205089

6.4 Antenna RF642A

6.4.1 Description

SIMATIC RF642A	Features	
	Field of application	The SIMATIC RF642A is a universal UHF antenna of compact, industry-standard design with medium range.
	Frequency range	865 to 928 MHz
	Polarization	Linear polarization Suitable for RF600 transponders that are uniformly aligned while directed past the antenna.
	Writing/reading range	max. 5.0 m
	Mounting	4 x M4 (VESA 100 fixing system)
	Connector	30 cm connecting cable (connected permanently to the antenna) and RTNC coupling An antenna cable is required for connection to the reader, e.g. 6GT2815-0BH30)
	Readers that can be connected	All RF600 readers with external antenna connectors
	Dimensions in mm	185 x 185 x 45
	Degree of protection	IP67

Frequency ranges

The antenna is available for broadband. It can therefore be used for two different frequency ranges that have been specified for the regions of Europe and China/USA respectively.

- The antenna for Europe (EU, EFTA countries) operates in the frequency range of 865 to 868 MHz.
- The antenna for China, the USA, and Canada operates in the frequency range of 902 to 928 MHz.

Function

The SIMATIC RF642A is used for transmitting and receiving RFID signals in the UHF range. The antennas are connected to the SIMATIC RF600 readers via antenna cables that are available in different lengths.

6.4.2 Ordering data

Table 6- 15 Ordering data RF642A

Product	Order no.
SIMATIC RF642A	6GT2812-1GA08

Accessories

Table 6- 16 Ordering data (accessories)

Product		Order no.
Connecting cable between reader and antenna	3 m (cable loss 1.0 dB)	6GT2815-0BH30
	5 m, suitable for drag chains (cable loss 1.25 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
Antenna mounting kit	See "RF600 System Manual", Chapter "Antennas" > "Mounting types"	6GT2890-0AA00

6.4.3 Installation and assembly

6.4.3.1 RF640A mounting types

VESA 100 mounting system

A standardized VESA 100 mounting system is provided to mount the antenna. The mounting system consists of four fixing holes for M4 screws at intervals of 100 mm.

This is therefore suitable for:

- Mounting on metallic and non-metallic backgrounds

Note

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.

Antenna Mounting Kit

The Antenna Mounting Kit allows the fine adjustment of the antenna field by setting the solid angle (see "RF600 System Manual", chapter "Antennas" > "Mounting types").

6.4.4 Connecting an antenna to the reader

The SIMATIC RF642A antenna must be connected to the reader using an antenna cable.

Preassembled standard cables in lengths of 3 m, 10 m, and 20 m are available for the connection.

The range of the antenna is limited by the cable loss. The maximum range can be achieved with the cable 6GT2815-0BH30 (length 3 m), since this has the lowest cable loss.

Requirement

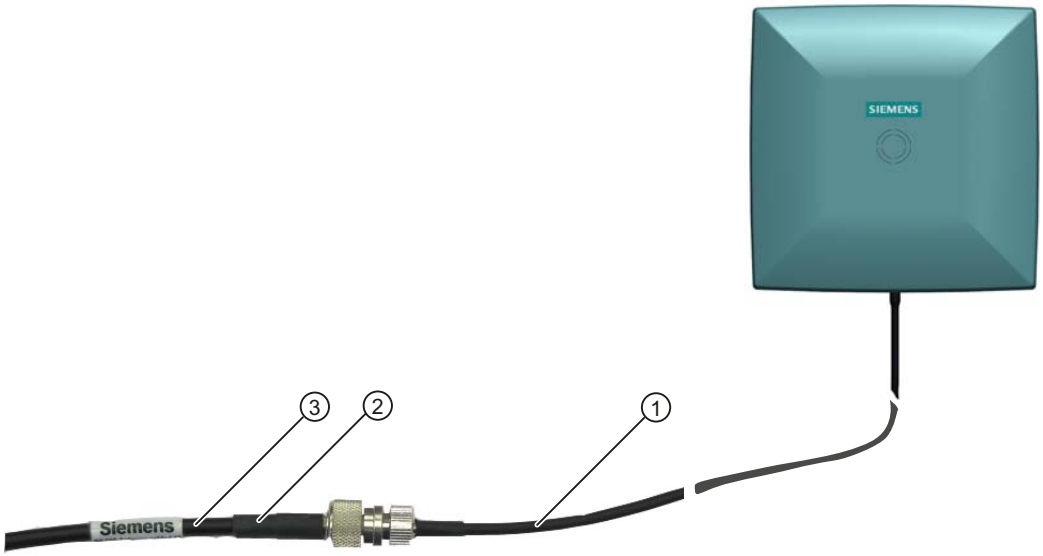
Note

Use of Siemens antenna cable

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

Strain relief

The antenna cable is provided with strain relief as shown in the following diagram:



① RF642A antenna connection (30 cm connecting cable)
② RF600 antenna cable
③ Strain relief (should take place at this position)

Figure 6-20 Strain relief

6.4.4.1 Bending radii and bending cycles of the cable

Cable designation	Order No.	Length [m]	Cable loss [dB]	Bending radius [mm]	Bending cycle
RF642A antenna connection	Fixed connection to antenna	0,3	-	-	1 Mal
Antenna cable	6GT2815-0BH30	3	1	51	1 Mal
Antenna cable (suitable for drag chains)	6GT2815-2BH50	5	1,25	48	1)
Antenna cable	6GT2815-1BN10	10	2	77	1 Mal
Antenna cable	6GT2815-0BN10	10	4	51	1 Mal
Antenna cable (suitable for drag chains)	6GT2815-0BN20	15	4	24	1)
Antenna cable	6GT2815-0BN20	20	4	77	1 Mal

1) With cables suitable for drag chains, 3 million bending cycles at a bending radius of 6.5 m and bending through ± 180 ° are permitted.

6.4.5 Alignment of transponders to the antenna

Polarization axis

Since the RF642A antenna has linear polarization, it is necessary to consider the alignment of the transponders with regard to the polarization axis of the antenna.

The polarization axes of antenna and transponder must always be parallel. The symbol on the antenna indicates the polarization axis.

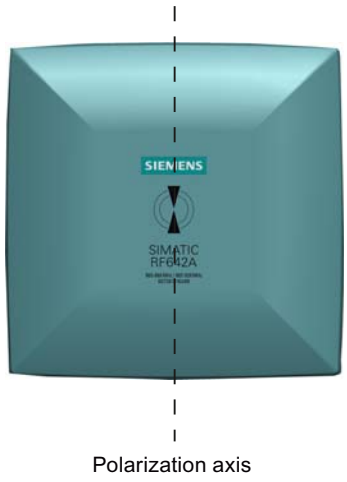


Figure 6-21 Polarization axis

Alignment

The following diagram shows the optimum alignment of the RF600 transponders to the RF642A antenna.

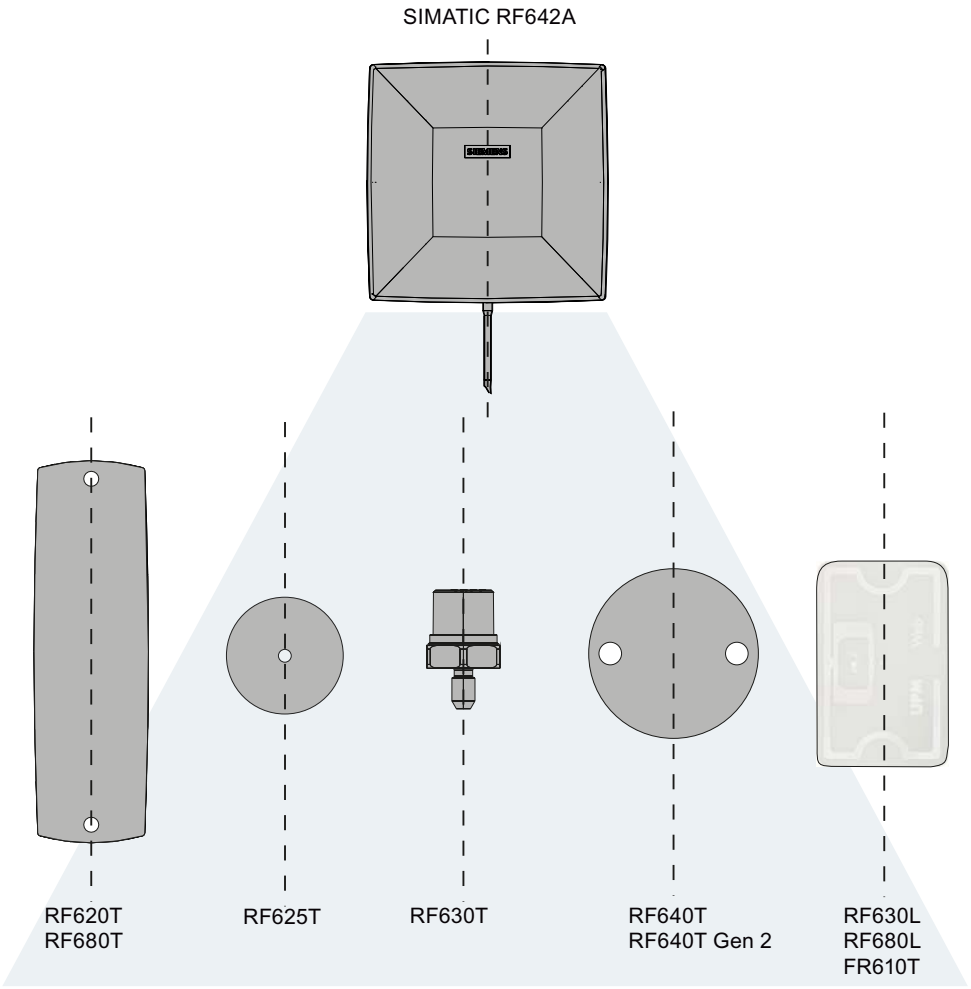


Figure 6-22 Antenna/transponder alignment

Angle deviation diagram for alignment

The following diagram shows the dependence of the following factors.

- Alignment angle of transponder to antenna
- Maximum range of antenna

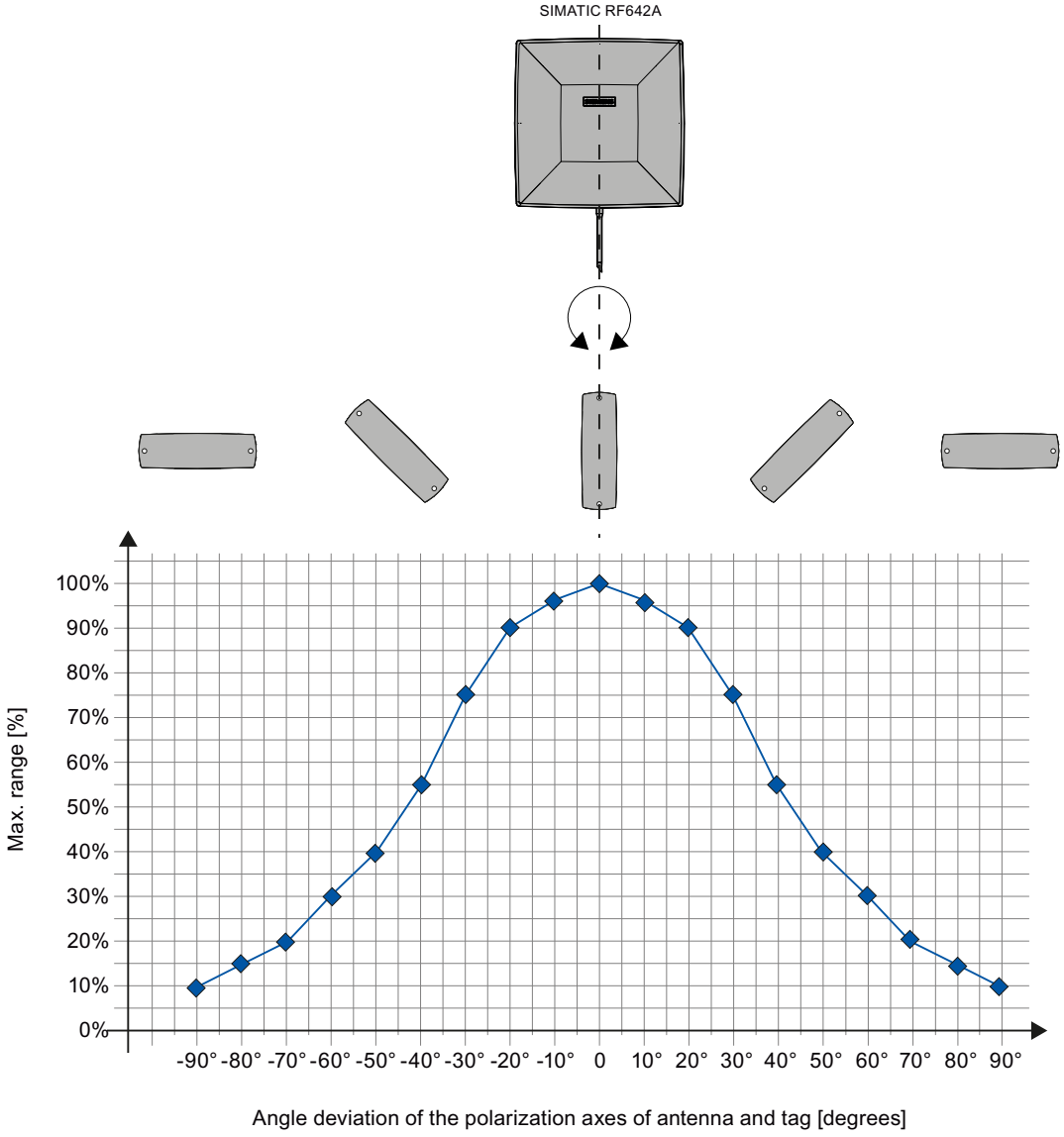


Figure 6-23 Angle deviation diagram for alignment

6.4.6 Parameter settings of RF642A for RF620R/RF630R

Operation within the EU, EFTA, or Turkey according to EN 302 208 V1.3.1

NOTICE
Limitation of the radiated power according to EN 302 208 V1.3.1 RF600 systems that are put into operation within the EU, EFTA, or Turkey (ETSI) can be operated with an RF642A antenna with a maximum radiated power of up to 2000 mW ERP (or 33 dBm ERP, 3250 mW EIRP, 35 dBm EIRP).

By adjusting the transmit power of up to 500 mW ERP (or 27 dBm ERP, 800 mW EIRP, 29.15 dBm EIRP) and taking into account the RF642A antenna gain of 4 dBi (6 dBic) and the cable loss associated with the antenna cable (see table), the radiated power of the antenna cannot be exceeded. You can make the power settings using the "distance_limiting" parameter. You will find more detailed information on the parameters in the section Parameter assignment manual RF620R/RF630R (http://support.automation.siemens.com/WW/view/en/33287195).

Operation in China

The national approval for RF600 systems in China requires a cap of 2000 mW ERP (or 33 dBm ERP, 3250 mW EIRP, 35 dBm EIRP). The possible combination of antenna gain, cable loss, and max. 500 mW radiated power of the RF630R reader means it is not possible to exceed 2000 mW ERP (or 33 dBm ERP, 3250 mW EIRP, 35 dBm EIRP).

Operation in the USA, Canada

NOTICE
Limitation of the radiated power to 4000 mW EIRP (36 dBm EIRP) with an antenna gain of 7 dBi The antenna must be commissioned by qualified personnel. Antennas with a gain >6 dBi may be commissioned, as long as the effective radiated power of 4000 mW EIRP (36 dBm EIRP) is not exceeded. To comply with FCC and IC-FCB requirements, the system must satisfy the following relation: • Conducted power P dBm of the RF600 reader (< 30 dBm) • Antenna gain G_i dBi in the FCC frequency band (≤ 7 dBi) • Cable loss a_k dB (≥ 1 dB) $P(dBm) \leq 30\ dBm - (G_i - 6\ dBi) + a_k$

6.4.7 Parameter settings of RF642A for RF640R/RF670R

Operation within the EU, EFTA, or Turkey

NOTICE
Limitation of the radiated power according to EN 302 208 V1.3.1 RF600 systems that are put into operation within the EU, EFTA, or Turkey (ETSI) can be operated with an RF642A antenna with a maximum radiated power of 2000 mW ERP (or 33 dBm ERP, 3250 mW EIRP, 35 dBm EIRP).

By adjusting the radiated power of up to 2000 mW ERP (or 33 dBm ERP, 3250 mW EIRP, 35 dBm EIRP), the RF642A antenna gain of 6 dBi and the cable loss associated with the antenna cable (see table), the radiated power of the reader is correctly configured and the radiated power at the antenna is thus not exceeded.

Operation in China

By setting a max. radiated power of 2000 mW ERP (or 33 dBm ERP, 3250 mW EIRP, 35 dBm EIRP), the RF642A antenna gain of 7 dBi and the cable loss associated with the antenna cable (see table), the radiated power is correctly configured in the reader.

Operation in the USA, Canada

NOTICE
Limitation of the radiated power to 4000 mW EIRP (36 dBm EIRP) with an antenna gain of 7 dBi The antenna must be commissioned by qualified personnel. Antennas with a gain >6 dBi may be commissioned, as long as the effective radiated power of 4000 mW EIRP (36 dBm EIRP) is not exceeded. To comply with FCC and IC-FCB requirements, the system must satisfy the following relation: • Conducted power P dBm of the RF600 reader (< 30 dBm) • Antenna gain G_i dBi in the FCC frequency band (≤ 7 dBi) • Cable loss a_k dB (≥ 1 dB) $P(dBm) \leq 30\ dBm - (G_i - 6\ dBi) + a_k$

6.4.8 Antenna patterns

6.4.8.1 Antenna radiation patterns in the ETSI frequency band

Directional radiation pattern Europe (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.

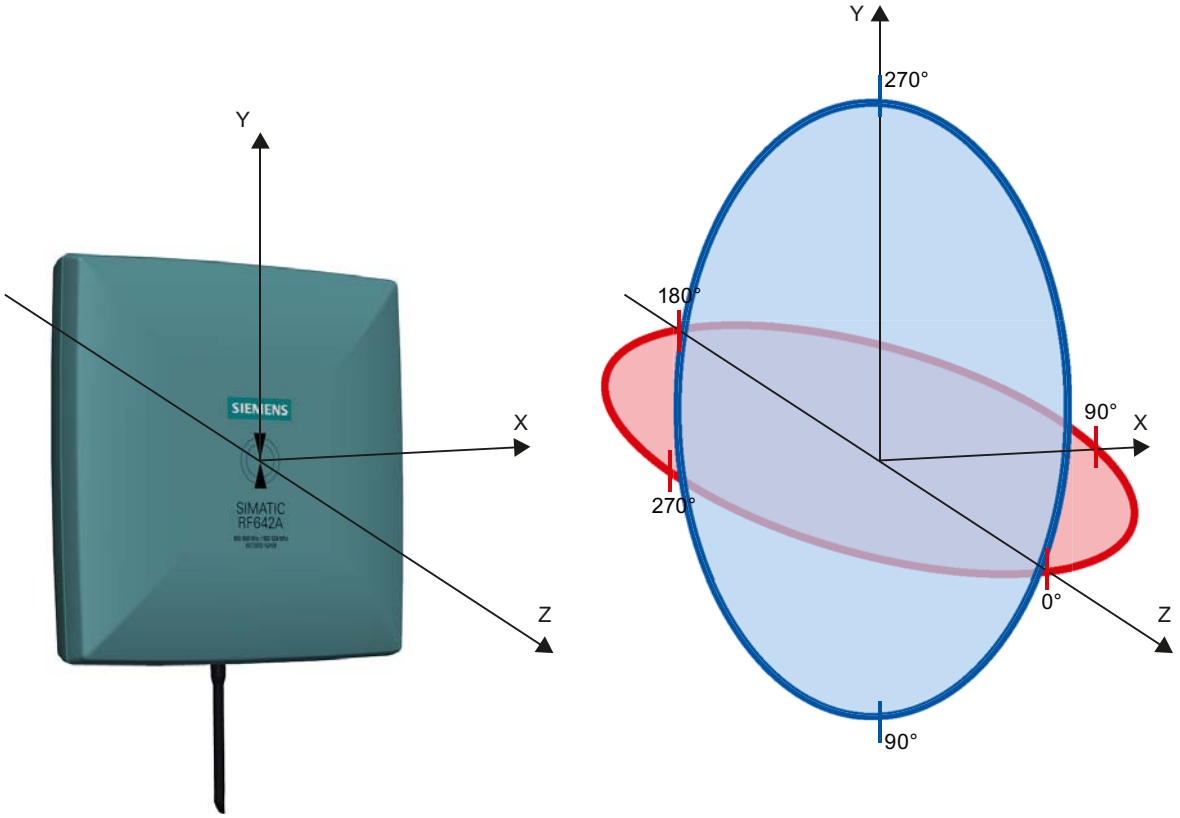


Figure 6-24 Reference system

The half-power beam width of the antenna is defined by the angle between the two -3 dB points. Which range (in %) corresponds to the dB values in the patterns can be obtained from this table .

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

Directional radiation pattern in the ETSI frequency band

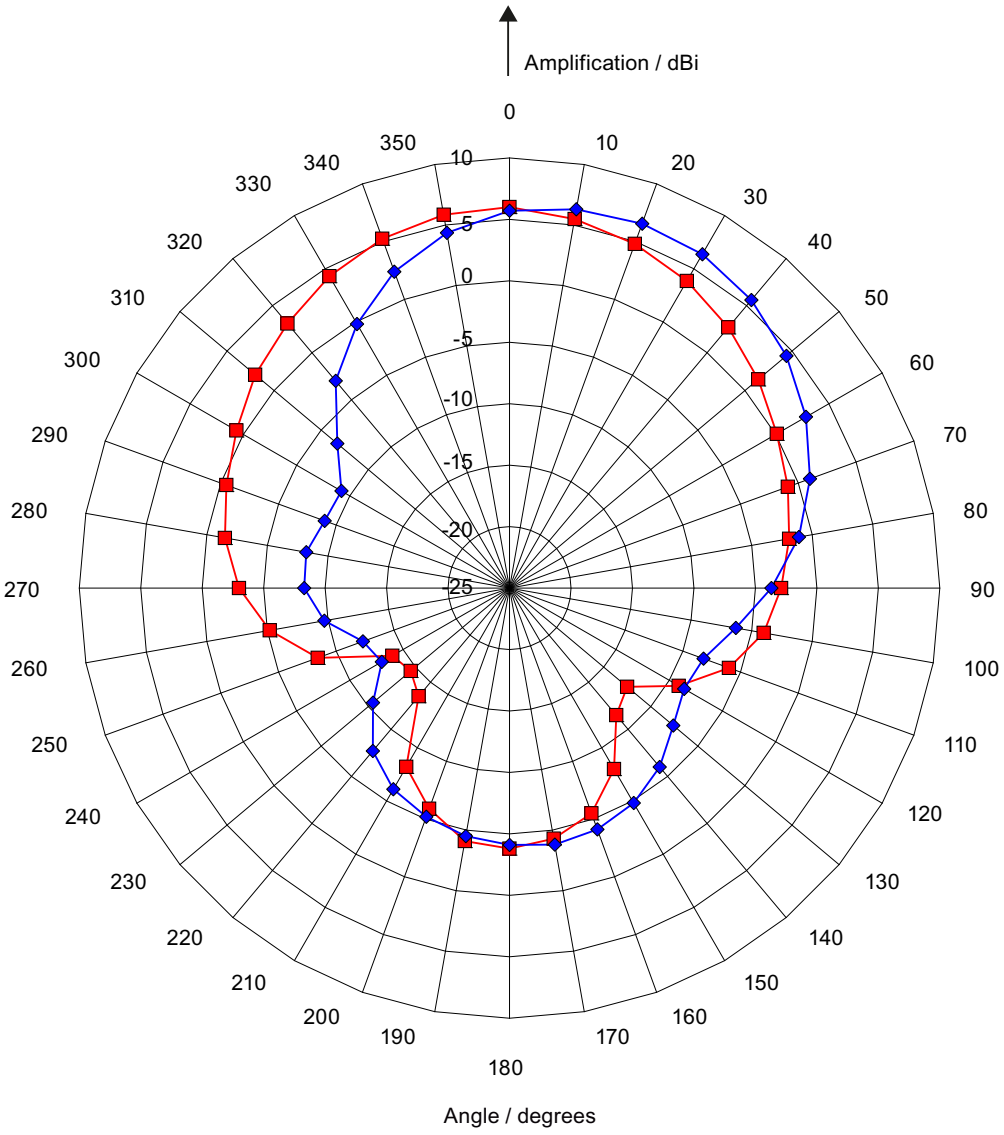


Figure 6-25 Directional radiation pattern of RF642A in the ETSI frequency band

6.4.8.2 Antenna radiation patterns in the FCC frequency band

Directional radiation pattern USA (FCC)

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

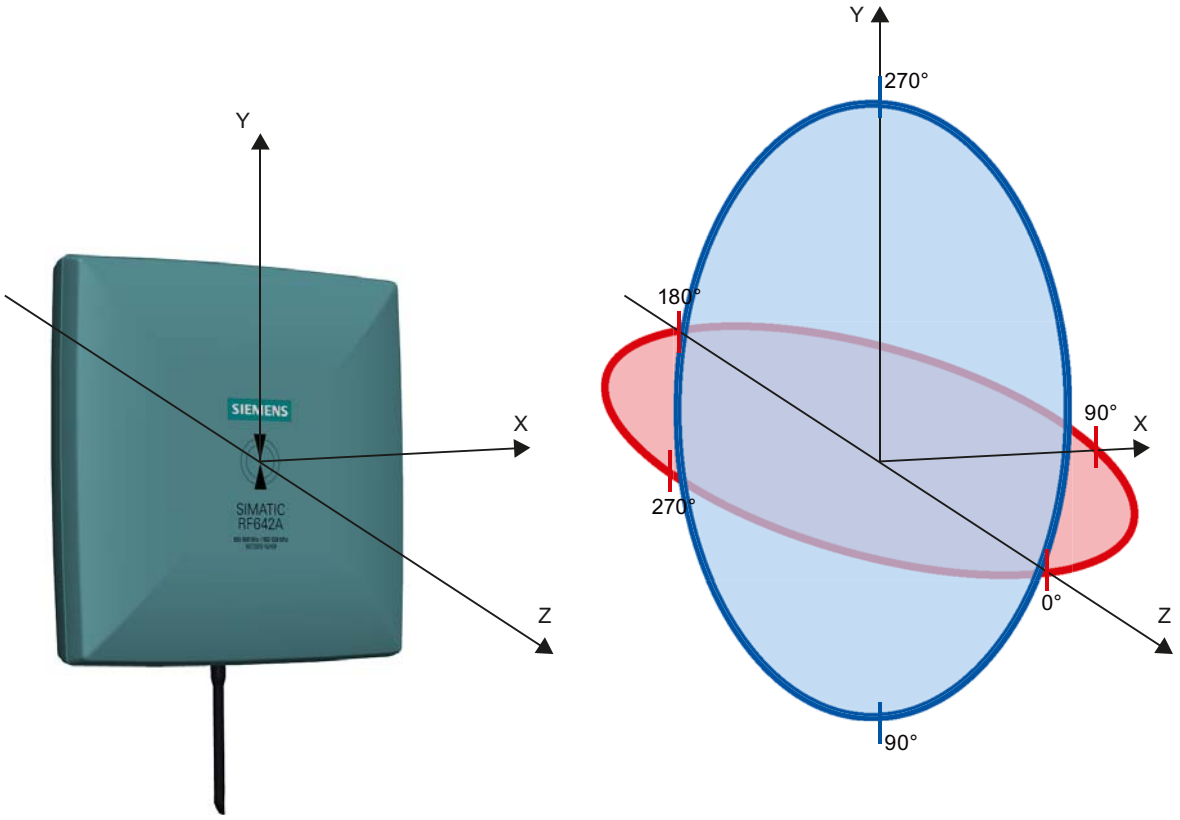


Figure 6-26 Reference system

The half-power beam width of the antenna is defined by the angle between the two -3 dB points (corresponding to half the power referred to the maximum power). Which range (in %) corresponds to the dB values in the patterns can be obtained from this table .

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

Directional radiation pattern of the RF642A in the FCC frequency band

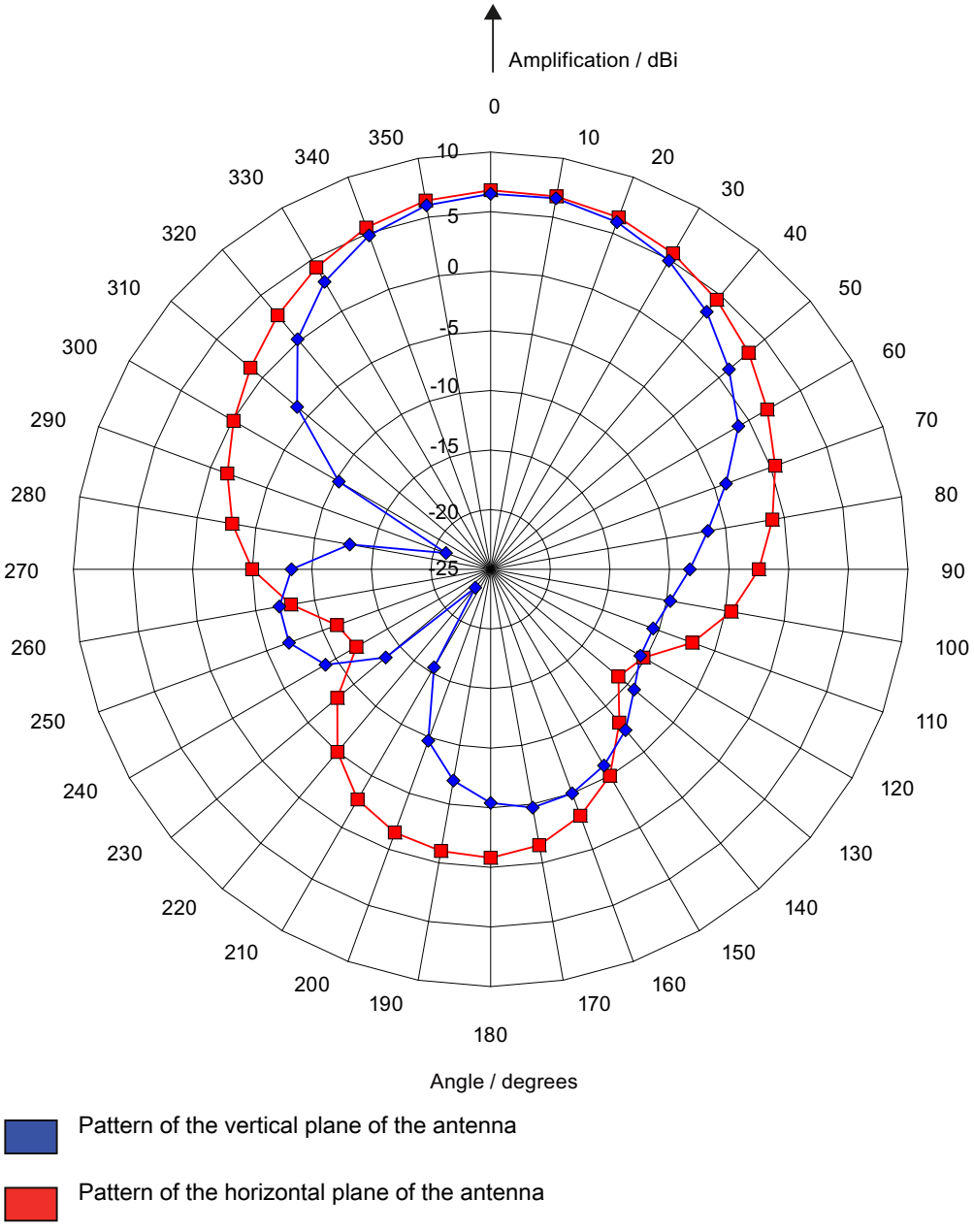


Figure 6-27 Directional radiation pattern of the RF642A in the FCC frequency band

6.4.8.3 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 value and a second dBi value.

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 can be seen in Directional radiation pattern in the ETSI frequency band (Page 241), the maximum antenna gain in the horizontal plane is 6 dBi. In this plane and with the parallel polarization axis at +70° or 300°, the antenna gain dropped to about 0 dBi. Therefore the dBr value is 6. The antenna range is only 70° of the maximum range at + 50° or +300° from the Z axis within the horizontal plane (see values shown in red in the directional radiation pattern: Characteristic of the vertical plane of the antenna and the associated representation of the reference system).

6.4.9 Technical data

Table 6- 17 General technical specifications RF642A

Feature	SIMATIC RF642A
Dimensions (L x W x H)	185 x 185 x 45 mm
Color	Pastel turquoise
Material	PA 12 (polyamide 12)
	Silicone-free
Frequency range	865 to 928 MHz
Plug connection	30 cm coaxial cable with RTNC coupling An antenna cable is required for connection to the reader, e.g.: 6GT2815-0BH30

Feature	SIMATIC RF642A
Max. radiated power according to ETSI	• RF620R, RF630R: < 970 mW ERP • RF640R, RF670R: ≤ 1900 mW ERP
Max. radiated power according to CMIIT	• RF620R, RF630R: < 1200 mW ERP • RF640R, RF670R: ≤ 2000 mW ERP
Max. radiated power according to FCC	• RF620R, RF630R: ≤2000 mW EIRP • RF640R, RF670R: ≤4000 mW EIRP
Max. power	2000 mW
Impedance	50 ohms
Antenna gain	ETSI frequency band: 6 dBi
	FCC frequency band: 7 dBi
VSWR (standing wave ratio)	max.: 1.4
Polarization	Linear polarization
Aperture angle for transmitting/receiving	ETSI frequency band: • Horizontal plane: 75° • Vertical plane: 70° See ETSI antenna pattern
	FCC frequency band: • Horizontal plane: 80° • Vertical plane: 70° See FCC antenna pattern
Front-to-back ratio	ETSI frequency band: 10 dB
	FCC frequency band: 9.8 dB ± 2.2 dB
Shock resistant to EN 60068-2-27	30 g
Vibration resistant to EN 60068-2-6	10 g
Attachment of the antenna	4 screws M4 (VESA 100 fastening system)
Tightening torque (at room temperature)	≤ 2 Nm
Ambient temperature	
• Operation	• -25 °C to +75 °C
• Transport and storage	• -40 °C to +85 °C
MTBF in years	16880
Degree of protection according to EN 60529	IP65
Weight, approx.	600 g

1) The values differ for different dimensions/materials of the mounting surface.

6.4.10 Dimension drawing

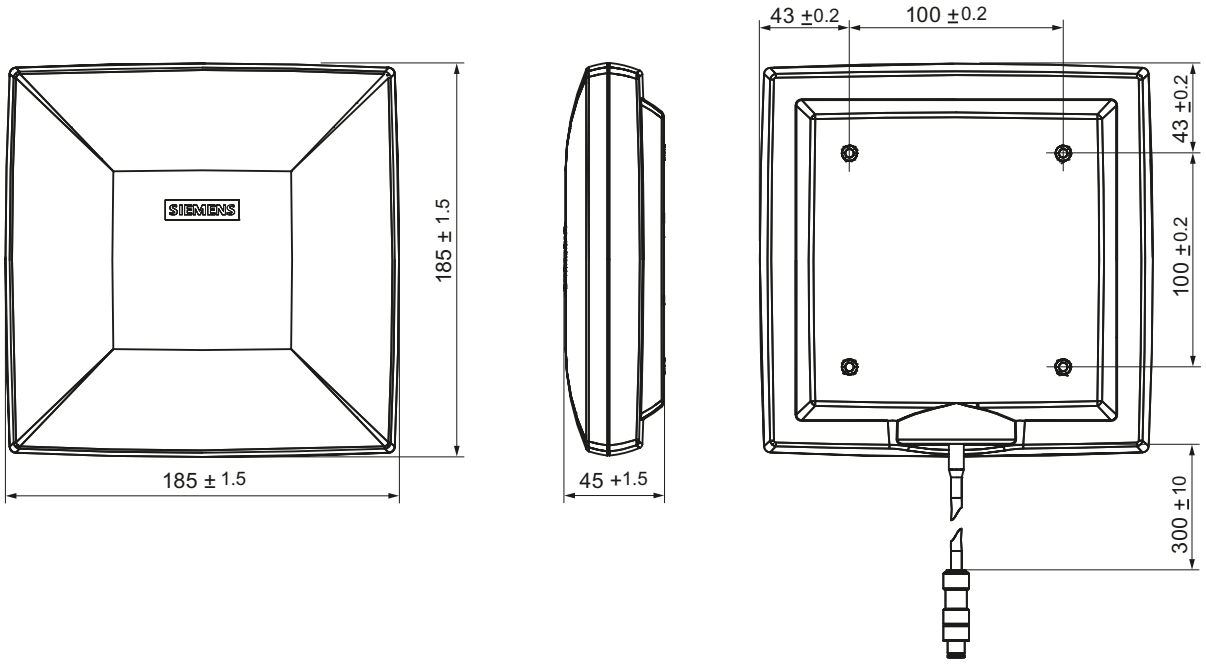


Figure 6-28 Dimensional drawing of RF642A

All dimensions in mm

6.4.11 Approvals & certificates

Table 6- 18 6GT2812-1GA08

Certificate	Description
CE	Conformity in accordance with R&TTE directive in association with the readers and accessories used

Table 6- 19 6GT2812-1GA08

Standard	
FC 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-RF600R (for RF620R: 6GT2811-5BA00-1AA1, RF630R: 6GT2811-4AA00-1AA1, RF640R: 6GT2811-3BA00-1AA0, RF670R as of FS C1: 6GT2811-0AB00-1AA0) • FCC ID: NXW-RF630R (for 6GT2811-4AA00-1AA0) • FCC ID: NXW-RF670 (for RF670R as of FS A1: 6GT2811-0AB00-1AA0)
Industry Canada Radio Standards Specifications	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-RF630 (for 6GT2811-4AA00-1AA0) • IC: 267X-RF670, RF670R FS A1 (for 6GT2811-0AB00-1AA0) • IC: 267X-RF600R, Model RF620R-2 (for 6GT2811-5BA00-1AA1) • IC: 267X-RF600R, Model RF630R-2 (for 6GT2811-4AA00-1AA1) • IC: 267X-RF600R, Model RF640R (for 6GT2811-3BA00-1AA0) • IC: 267X-RF600R, model RF670R-2 as of FS C1 (for 6GT2811-0AB00-1AA0)
C UL US	This product is UL-certified for the USA and Canada. It meets the following safety standard(s): UL 60950-1 - Information Technology Equipment Safety - Part 1: General Requirements CSA C22.2 No. 60950 -1 - Safety of Information Technology Equipment UL Report E 205089

6.5 RF660A antenna

6.5.1 Description

SIMATIC RF660A	Features	
	Field of application	The SIMATIC RF660A is a universal medium range UHF antenna with a compact design suitable for use in industry.
	Frequency ranges	• 865 to 928 MHz (ETSI) • 902 to 928 MHz (FCC)
	Polarization	RH circular Suitable for RF600 transponders that can pass in parallel with the antenna regardless of their orientation.
	Writing/reading range	max. X m
	Mounting	4 x M4 (VESA 100 mounting system)
	Connector	RTNC
	Readers that can be connected	All RF600 readers with external antenna connectors
	Dimensions in mm	313 x 313 x 80
	Degree of protection	IP67

Frequency ranges

The antenna is available for broadband. It can therefore be used for two different frequency ranges that have been specified for the regions of Europe and China/USA respectively.

- The antenna for Europe (EU, EFTA countries) operates in the frequency range of 865 to 868 MHz.
- The antenna for China, the USA, and Canada operates in the frequency range of 902 to 928 MHz.

Function

The SIMATIC RF660A is used to transmit and receive RFID signals in the UHF range. The antennas are connected to the SIMATIC RF600 readers via antenna cables that are available in different lengths.

Ordering data

Description	Machine-Readable Product Code
RF660A antenna for Europe (865-868)	6GT2812-0AA00
RF660A antenna for China and the USA (902-928)	6GT2812-0AA01

Ordering data (accessories)

Description		Machine-Readable Product Code
Antenna mounting kit		6GT2890-0AA00
Connecting cable between reader and antenna	3 m (1 dB cable attenuation)	6GT2815-0BH30
	5 m, suitable for drag chains (cable loss 1.25 dB)	6GT2815-2BH50
	10 m (2 dB cable attenuation)	6GT2815-1BN10
	10 m (4 dB cable attenuation)	6GT2815-0AN10
	15 m, suitable for drag chains (cable loss 4.0 dB)	6GT2815-2BN15
	20 m (4 dB cable attenuation)	6GT2815-0AN20

6.5.2 Installation and assembly

6.5.2.1 RF660A mounting types

VESA 100 mounting system

A standardized VESA 100 mounting system is provided to mount the antenna. The mounting system consists of four fixing holes for M4 screws at intervals of 100 mm.

This is therefore suitable for:

- Mounting on metallic and non-metallic backgrounds

Note

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.

Antenna Mounting Kit

The Antenna Mounting Kit allows the fine adjustment of the antenna field by setting the solid angle (see "RF600 System Manual", chapter "Antennas" > "Mounting types").

6.5.3 Connecting an antenna to a reader

The SIMATIC RF660A antenna must be connected to the reader using an antenna cable.

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.

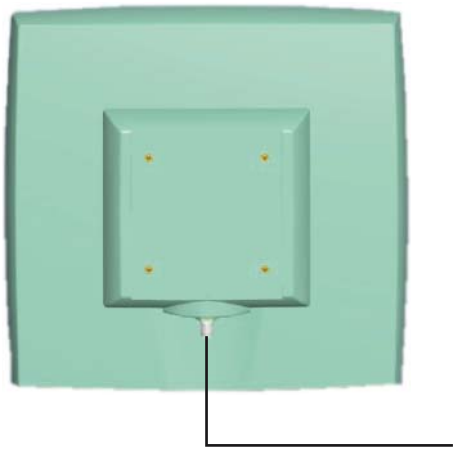


Figure 6-29 Rear of antenna with RTNC connection

Connecting RF660A to RF640R/RF670R

Preassembled standard cables in lengths of 3 m, 10 m and 20 m are available for connection.

The cable between antenna and reader can be up to 20 m in length.

When less than four antennas are used, we recommend that the antennas are connected to the reader as follows:

Number of antennas	Connections on the reader
2 antennas	ANT 1, ANT 2
3 antennas	ANT 1, ANT 2, ANT 3

Connecting RF660A to RF630R

Preassembled standard cables in lengths of 3 m, 10 m and 20 m are available for connection.

The cable between antenna and reader can be up to 20 m in length.

When one antenna is used, it is recommended that the remaining antenna connection is sealed using the supplied protective cap.

6.5.3.1 Bending radii and bending cycles of the cable

Cable designation	Order No.	Length [m]	Cable loss [dB]	Bending radius [mm]	Bending cycle
Antenna cable	6GT2815-0BH30	3	1	51	1 Mal
Antenna cable (suitable for drag chains)	6GT2815-2BH50	5	1,25	1)	1)
Antenna cable	6GT2815-1BN10	10	2	77	1 Mal
Antenna cable	6GT2815-0BN10	10	4	51	1 Mal
Antenna cable (suitable for drag chains)	6GT2815-0BN20	15	4	1)	1)
Antenna cable	6GT2815-0BN20	20	4	77	1 Mal

1) With cables suitable for drag chains, 3 million bending cycles at a bending radius of 6.5 mm and bending through ± 180° are permitted.

6.5.4 Parameter settings of RF660A for RF620R/RF630R

Operation within the EU, EFTA, or Turkey

NOTICE
Limitation of the radiated power according to EN 302 208 V1.3.1
RF600 systems that are put into operation within the EU, EFTA, or Turkey (ETSI) can be operated with an RF660A antenna with a maximum radiated power of up to 2000 mW ERP (or 33 dBm ERP, 3250 mW EIRP, 35 dBm EIRP).

By adjusting the transmit power of up to 500 mW ERP (or 27 dBm ERP, 800 mW EIRP, 29.15 dBm EIRP) and taking into account the RF660A antenna gain of 7 dBi (9 dBic) and the cable loss associated with the antenna cable (see table (Page 251)), the radiated power of the antenna cannot be exceeded. You can make the power settings using the "distance_limiting" parameter. You will find more detailed information on the parameters in the section Parameter assignment manual RF620R/RF630R (http://support.automation.siemens.com/WW/view/en/33287195).

Operation in China

The national approval for RF600 systems in China requires a cap of 2000 mW ERP (or 33 dBm ERP, 3250 mW EIRP, 35 dBm EIRP). The possible combination of antenna gain, cable loss, and max. 500 mW radiated power of the RF620R/RF630R reader means it is not possible to exceed 2000 mW ERP (or 33 dBm ERP, 3250 mW EIRP, 35 dBm EIRP).

Operation in the USA, Canada

NOTICE
Limitation of the radiated power to 4000 mW EIRP (36 dBm EIRP) So that the FCC and IC-FCB requirements are met, the radiated power may not exceed 4000 mW EIRP (36 dBm EIRP). Therefore the system must satisfy the following relation: • Conducted power P dBm of the RF600 reader (< 30 dBm) • Antenna gain G_i dBi in the FCC frequency band (≤ 4.3 dBi) • Cable loss a_k dB (≥ 1 dB) $P(dBm) \leq 30\ dBm - (G_i - 6\ dBi) + a_k$

6.5.5 Parameter settings of RF660A for RF640R/RF670R

Operation within the EU, EFTA, or Turkey

NOTICE
Limitation of the radiated power according to EN 302 208 V1.3.1 RF600 systems that are put into operation within the EU, EFTA, or Turkey (ETSI) can be operated with an RF660A antenna with a maximum radiated power of 2000 mW ERP (or 33 dBm ERP, 3250 mW EIRP, 35 dBm EIRP).

By adjusting the radiated power of up to 1300 mW ERP (or 31.15 dBm ERP, 2140 mW EIRP, 33.3 dBm EIRP), the RF660A antenna gain of 7 dBi (9 dBic) and the cable loss associated with the antenna cable (see table (Page 251)), the radiated power of the reader is correctly configured and the radiated power at the antenna is not exceeded.

Operation in China

By setting a max. radiated power of 1300 mW ERP (or 31.15 dBm ERP, 2140 mW EIRP, 33.3 dBm EIRP), the RF660A antenna gain of 6 dBi (8 dBic) and the cable loss associated with the antenna cable (see table (Page 251)), the radiated power of the reader is correctly configured.

Operation in the USA, Canada

NOTICE
Limitation of the radiated power to 4000 mW EIRP (36 dBm EIRP) So that the FCC and IC requirements are met, the radiated power may not exceed 4000 mW EIRP (36 dBm EIRP). Therefore the system must satisfy the following relation: • Conducted power P dBm of the RF600 reader (< 30 dBm) • Antenna gain G_i dBi in the FCC frequency band (≤ 4.3 dBi) • Cable loss a_k dB (≥ 1 dB) $P(dBm) \leq 30\ dBm - (G_i - 6\ dBi) + a_k$

6.5.6 Antenna patterns

6.5.6.1 Antenna pattern

Spatial directional radiation pattern

The following schematic diagram shows the main and auxiliary fields of the RF660A antenna in free space in the absence of reflecting/absorbing materials. Please note that the diagram is not to scale.

The recommended working range lies within the main field that is shown in green.

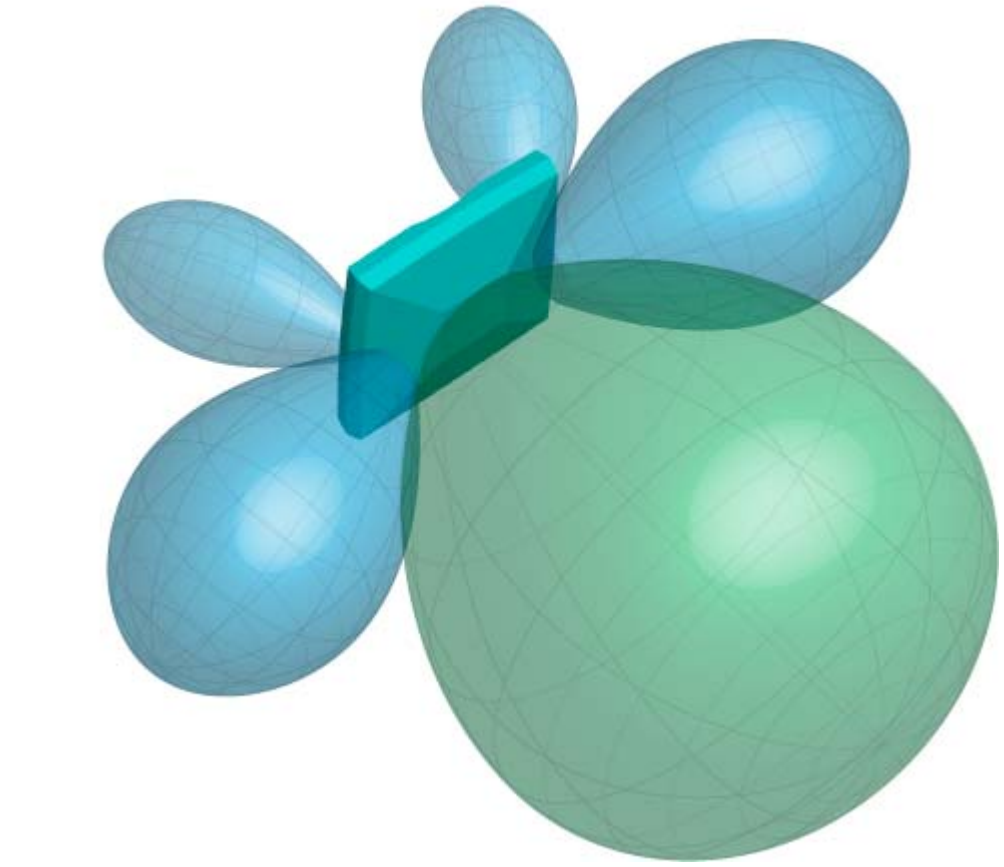


Figure 6-30 Main and auxiliary fields of the RF660A antenna

Radiation diagram (horizontal)

Europe (ETSI)

The radiation diagram is shown for horizontal alignment and for a center frequency of 865 MHz. Horizontal antenna alignment is provided when the TNC connection on the antenna points vertically up or down.

The radiating/receiving angle of the antenna is defined by the angle between the two -3 dB points (corresponding to half the power referred to the maximum performance at a 0° angle).

The optimum radiating/receiving angle is therefore approximately ±30 degrees.

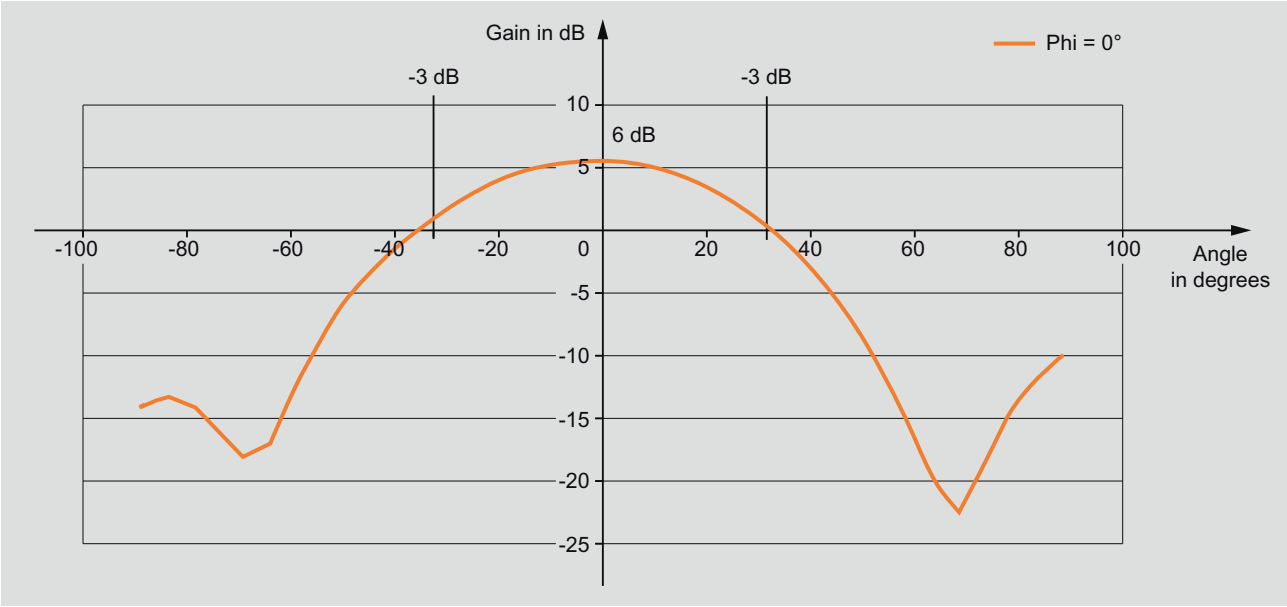


Figure 6-31 Directional radiation pattern of the antenna (at 865 MHz, horizontal alignment)

USA (FCC)

The radiation diagram is shown for horizontal alignment and for a center frequency of 915 MHz.

The radiating/receiving angle of the antenna is defined by the angle between the two -3 dB points (corresponding to half the power referred to the maximum performance at a 0° angle).

The optimum radiating/receiving angle is therefore approximately ±35 degrees.

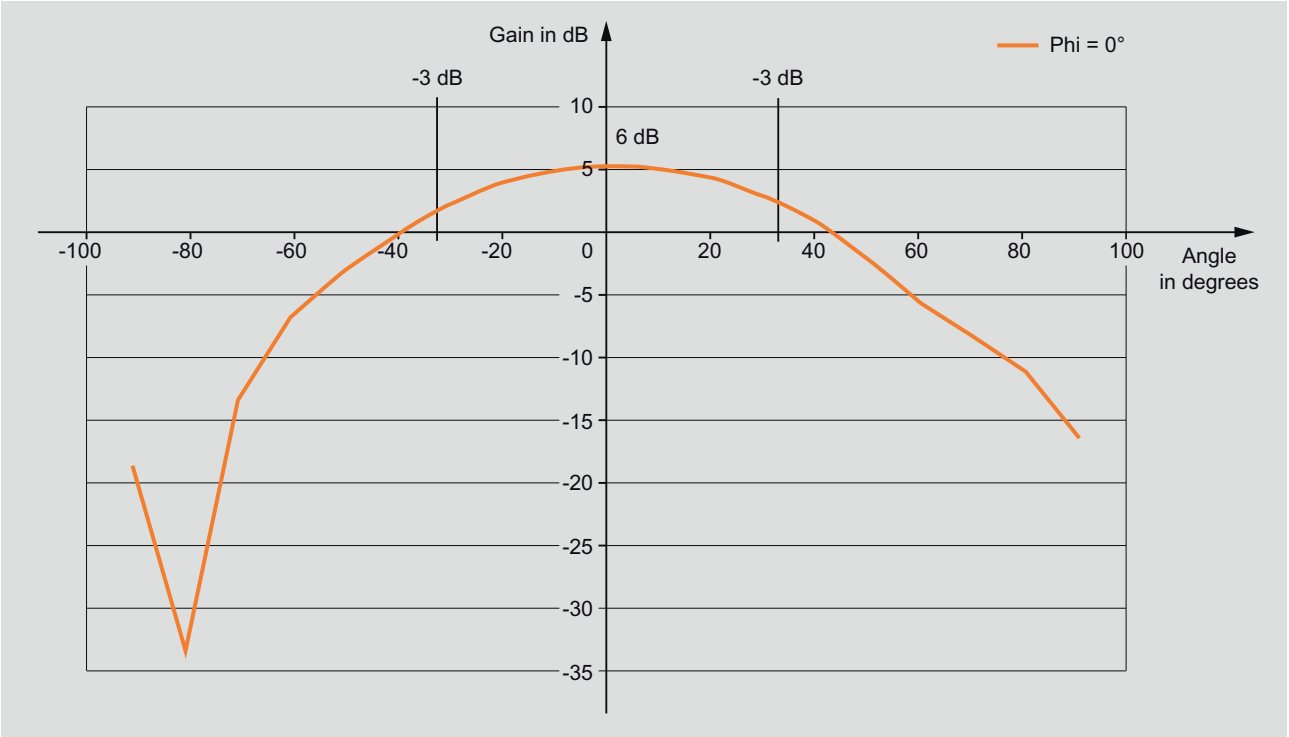


Figure 6-32 Directional radiation pattern of the antenna (at 915 MHz, horizontal alignment)

6.5.7 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 value and a second dBi value.

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 one can see from the section Antenna pattern (Page 253), the maximum antenna gain is 6 dBi. In the vertical plane, the antenna gain has dropped to approx. 3 dBi at +30°. Therefore the dBr value is -3. The antenna range is only 50% of the maximum range at ± 30° from the Z axis within the vertical plane.

6.5.8 Technical data

Table 6- 20 General technical specifications RF660A

Feature	SIMATIC RF660A ETSI	SIMATIC RF660A FCC
Dimensions (L x W x H)	313 x 313 x 80 mm	
Color	Pastel turquoise	
Material	PA 12 (polyamide 12)	
	Silicone-free	
Frequency range	865 to 868 MHz	902 to 928 MHz
Plug connection	RTNC	
Max. radiated power according to ETSI	• RF620R, RF630R: < 1200 mW ERP • RF640R, RF670R: < 2000 mW ERP	-
Max. radiated power according to CMIIT	• RF620R, RF630R: < 1200 mW ERP • RF640R, RF670R: < 2000 mW ERP	-
Max. radiated power according to FCC	-	• RF620R, RF630R: < 1600 mW EIRP • RF640R, RF670R: < 4000 mW EIRP
Max. power	2000 mW	
Impedance	50 ohms	
Antenna gain	7 dBi (5-7 dBic)	6 dBi (> 6 dBic)
VSWR (standing wave ratio)	Max. 2:1	
Polarization	RH circular	
Aperture angle for transmitting/receiving	55° - 60°	60° - 75°
Front-to-back ratio	-	-
Attachment of the antenna	4 screws M4 (VESA 100 mount system)	
Tightening torque (at room temperature)	≤ 2 Nm	

Feature	SIMATIC RF660A ETSI	SIMATIC RF660A FCC
Ambient temperature		
• Operation	• -20 °C to +70 °C	
• Transport and storage	• -40 °C to +85 °C	
MTBF in years	2 x 10^9	
Degree of protection according to EN 60529	IP67	
Weight, approx.	1.2 kg	

6.5.9 Dimension drawing

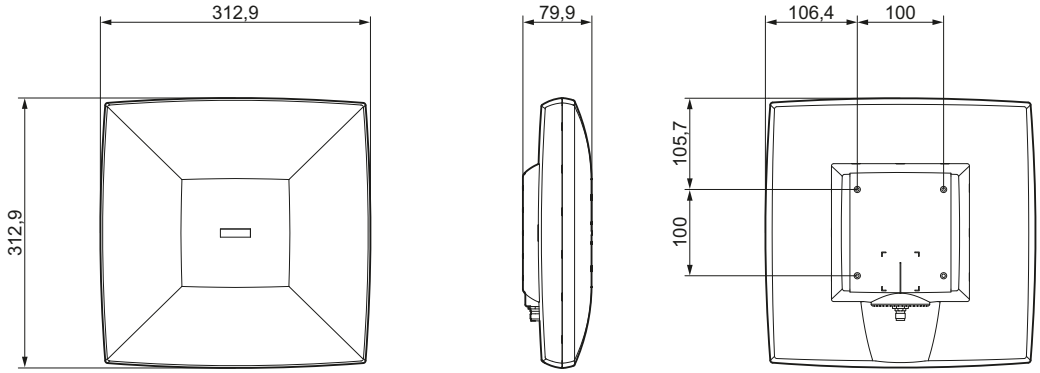


Figure 6-33 Dimension drawing RF660A

All dimensions in mm (± 0.5 mm tolerance)

6.5.10 Approvals & certificates

6.5.10.1 CE mark

Table 6- 21 6GT2812-0AA00

Certificate	Description
CE	Conformity in accordance with R&TTE directive in association with the readers and accessories used

6.5.10.2 FCC approvals

Table 6- 22 6GT2812-0AA01

Standard	
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-RF600R (for RF620R: 6GT2811-5BA00-1AA1, RF630R: 6GT2811-4AA00-1AA1, RF640R: 6GT2811-3BA00-1AA0, RF670R as of FS C1: 6GT2811-0AB00-1AA0) • FCC ID: NXW-RF630R (for 6GT2811-4AA00-1AA0) • FCC ID: NXW-RF670 (for RF670R as of FS A1: 6GT2811-0AB00-1AA0)
Industry Canada Radio Standards Specifications	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-RF630 (for 6GT2811-4AA00-1AA0) • IC: 267X-RF670, RF670R FS A1 (for 6GT2811-0AB00-1AA0) • IC: 267X-RF600R, Model RF620R-2 (for 6GT2811-5BA00-1AA1) • IC: 267X-RF600R, Model RF630R-2 (for 6GT2811-4AA00-1AA1) • IC: 267X-RF600R, Model RF640R (for 6GT2811-3BA00-1AA0) • IC: 267X-RF600R, model RF670R-2 as of FS C1 (for 6GT2811-0AB00-1AA0)
C UL US	This product is UL-certified for the USA and Canada. It meets the following safety standard(s): UL 60950-1 - Information Technology Equipment Safety - Part 1: General Requirements CSA C22.2 No. 60950 -1 - Safety of Information Technology Equipment UL Report E 205089

6.6 Mounting types

6.6.1 Overview

The following readers and antennas feature a standardized VESA 100 fixing system (4 x M4):

- SIMATIC RF620R/RF630R/RF640R/RF670R
- SIMATIC RF640A
- SIMATIC RF660A

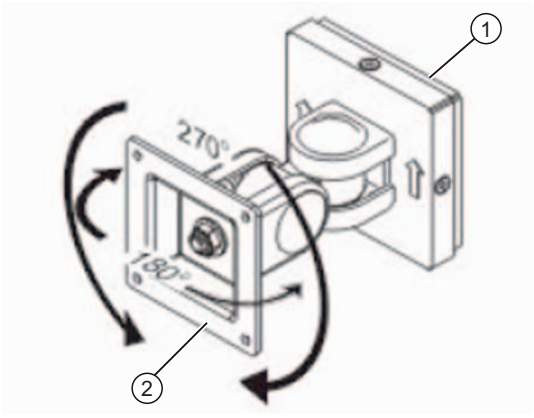
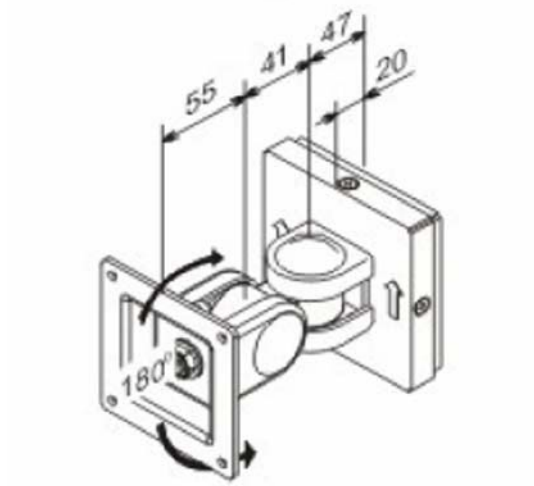
It is used to fix the above-mentioned antennas in place through a mounting plate or the antenna mounting kit.

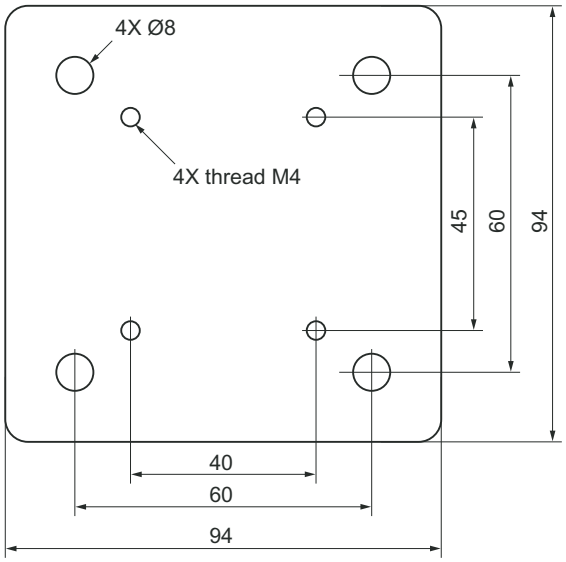
6.6.2 Ordering data

Description	Machine-Readable Product Code
Antenna mounting kit	6GT2890-0AA00

6.6.3 Mounting with antenna mounting kit

Flexible mounting is possible using the antenna mounting kit.
An antenna can then be rotated through any angle in space.

Antenna mounting kit	Description
	Swivel range of wall mounting (1) Wall side (2) Antenna side
	Distances for wall mounting

Antenna mounting kit	Description
	VESA adapter plate from VESA 75 x 75 to VESA 100 x 100 The VESA adapter plate is required for fixing the antenna to the antenna mounting kit.
	Hole drilling template for fixing the antenna mounting kit to the wall

Transponder/tags

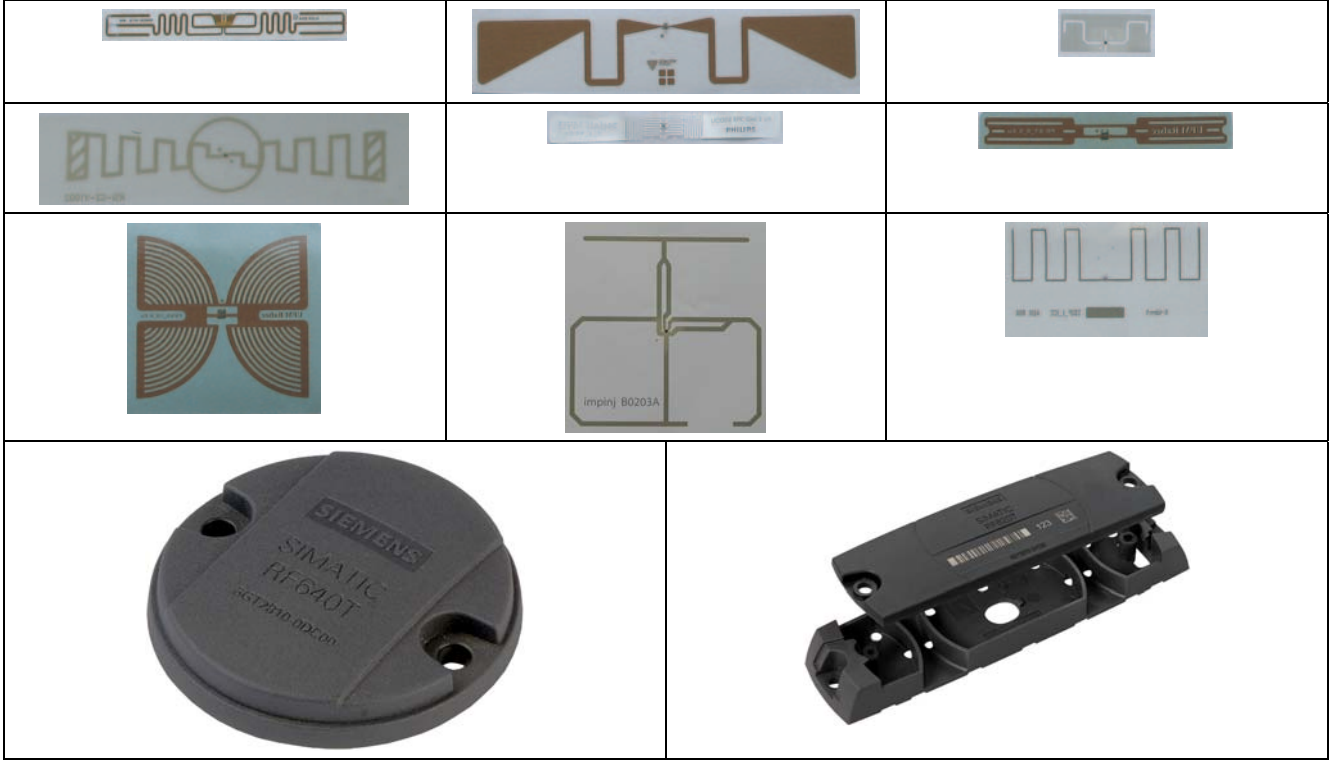
7

7.1 Overview

7.1.1 Tags in different sizes and types

Tags/transponders and labels are available in a variety of shapes, sizes and materials. The pictures below show some examples of tags and labels in different designs.

Tags in different sizes and types



7.1.2 Mode of operation of transponders/tags

The tag/transponder mainly comprises a microchip with an integral memory and a dipole antenna.

The principle of operation of a passive RFID transponder is as follows:

- Diversion of some of the high-frequency energy emitted by the reader to supply power to the integral chip
- Commands received from reader
- Responses are transmitted to the reader antenna by modulating the reflected radio waves (backscatter technique)

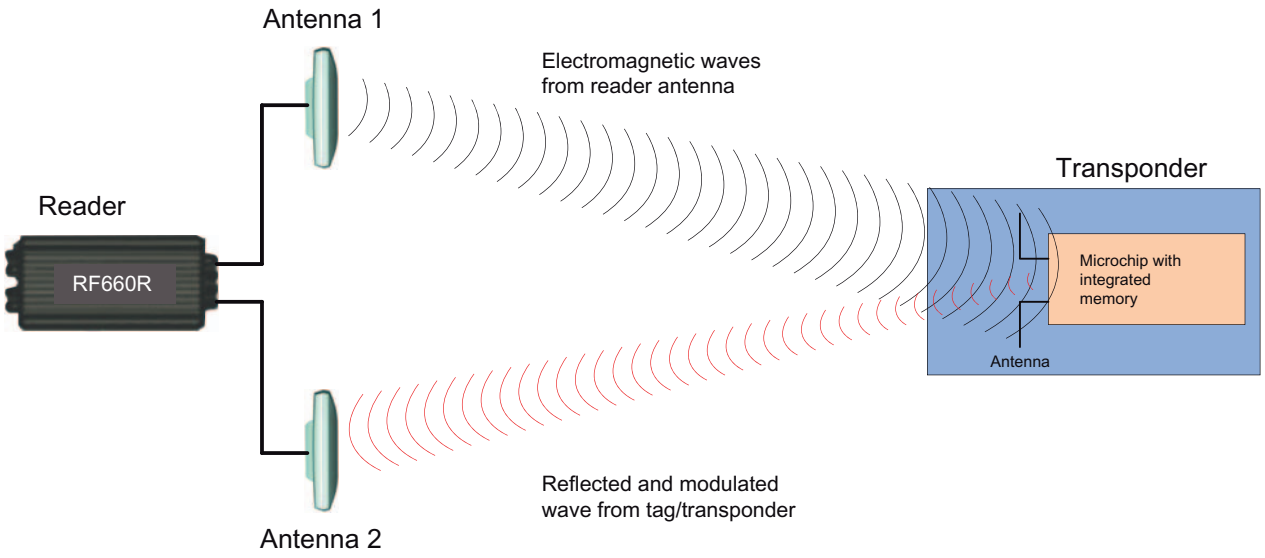


Figure 7-1 Mode of operation of transponders

The transmission ranges achieved vary in accordance with the size of the tag and the corresponding dipole antenna. In general the following rule applies: The smaller the tag and therefore the antenna, the shorter the range.

7.1.3 Transponder classes and generations

The transponder classes are distinguished by the different communication protocols used between the reader and transponder. Transponder classes are mostly mutually incompatible.

The following transponder classes are supported by the RF 600 system:

- EPC Global Class 1 Gen 2 with full EPC Global Profile (ISO 18000-6C)

Support for protocol types using the RF600

The definition of the transponders/tags according to ISO 18000-6 (corresponds to EPC Global Class 1 Gen 2) refers to implementation of the air-interface protocols.

EPC Global

EPC Class	Definition	Programming	Supported in RF600
Class 1	Passive tags with the following minimum features: • EPC ID (Electronic Product Code IDentifier) • Tag ID • A function which permanently ensures that tags no longer respond. • Optional use or suppression of tags • Optional password-protected access control • Optional USER memory area.	Programming by the customer (cannot be reprogrammed after locking)	Yes
Class 2	Passive tags with the following additional features (in comparison with Class 1 tags): • Extended tag ID, • Extended USER memory area • Authenticated ACCESS access • Additional features	Freely programmable	No
Class 3	Passive tags with the following additional features (in comparison with Class 2 tags): • Source of energy that supplies power to the tag or its sensors • Sensors with optional data logging		No
Class 4	Active tags with the following features: • EPC ID (Electronic Product Code IDentifier) • Extended tag ID • Authenticated ACCESS access • A source of energy • Communication using an autonomous transmitter • Optional USER memory area. • Optional sensors with or without optional data logging		No

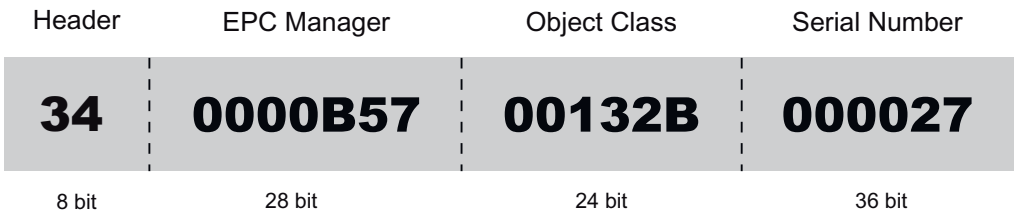
Table 7- 1 Comparison of EPC Class 1 Gen 1 and Class 1 Gen 2

Property	Class 1 Gen 1	Class 1 Gen 2 = ISO 18000-6 C
Frequency	860-930 MHz	860-960 MHz
Memory capacity	64 or 96 bits	96-256 bits
Can be programmed on site	Yes	Yes
Programming	written once; read many times	Yes
Other Features	_	Reading is faster and more reliable than for Generation 1. Enhanced compliance with global standards.

7.1.4 Electronic Product Code (EPC)

The Electronic Product Code (EPC) supports the unique identification of objects (e.g. retail items, logistical items or transport containers). This makes extremely accurate identification possible. In practical use, the EPC is stored on a transponder (tag) and scanned by the reader.

There are different EPC number schemes with different data lengths. Below is the structure of a GID-96-bit code (EPC Global Tag Data Standards V1.1 Rev. 1.27) :



- **Header:** This identifies the EPC identification number that follows with regard to length, type, structure and version of the EPC
- **EPC manager:** This identifies the company/corporation
- **Object class**: Corresponds to the article number
- **Serial number:** Consecutive number of the article

The Siemens UHF transponders are all suitable for working with EPC and other number schemes. Before a transponder can work with a number scheme, the relevant numbers must first be written to the transponder.

Allocation of the ECP ID by the tag manufacturer

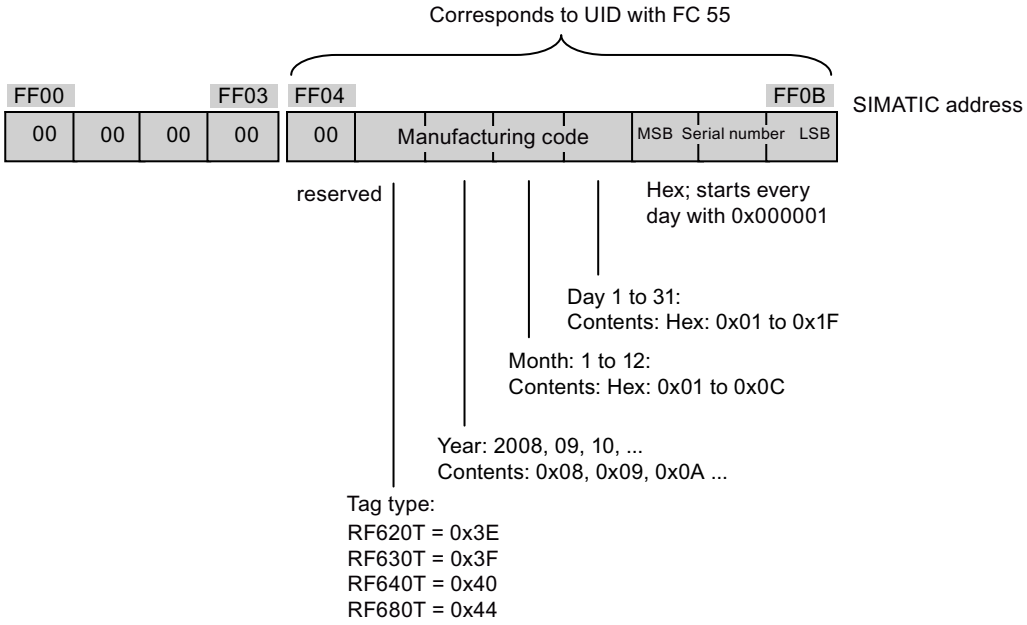


Figure 7-2 Allocation of the EPC ID on delivery of the tag

7.1.5 SIMATIC memory configuration of the RF600 transponders and labels

SIMATIC memory configuration

The following graphic shows the structure of the virtual SIMATIC memory for the RF620R/RF630R reader and explains the function of the individual memory areas. The SIMATIC memory configuration is based on the 4 memory banks, as they are defined in EPC Global.

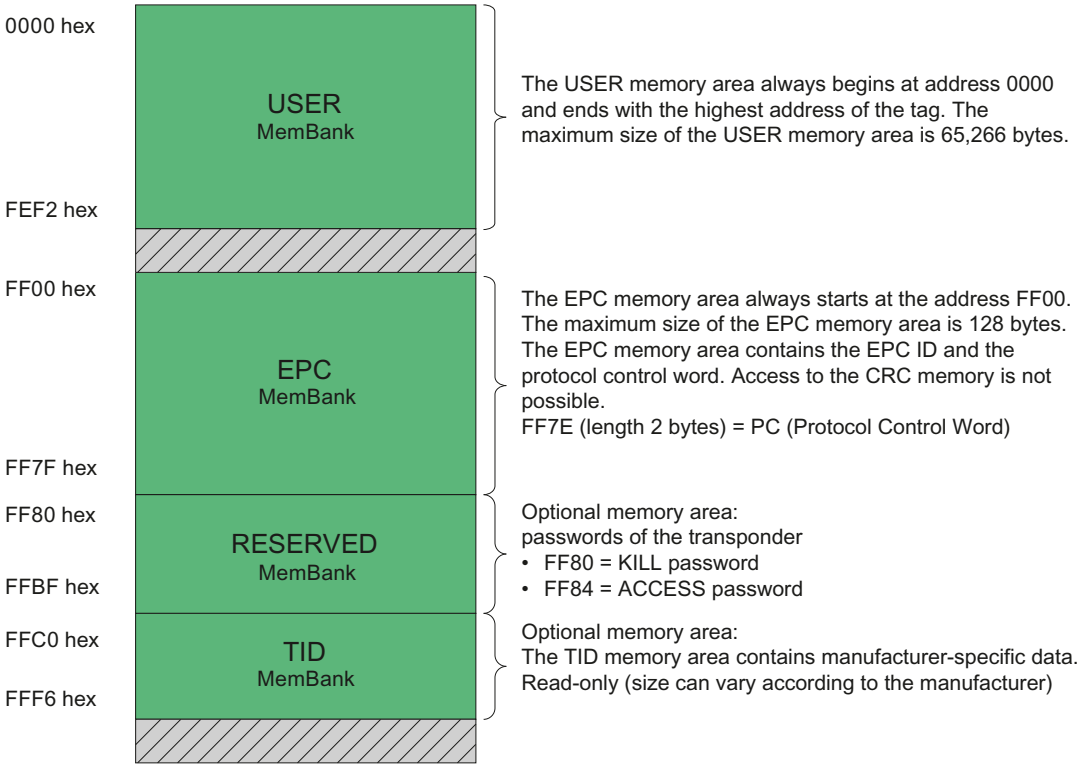


Figure 7-3 SIMATIC memory areas of the RF600 transponders

Special memory configuration of the RF600 transponders and labels

Tags	Chip type	User [hex]	EPC		TID	RESERVED (passwords)	Special	
			Range	Access			KILL-PW	Lock function
RF630L (-2AB00, -2AB01)	Impinj Monza 2	00 - 3F	FF00-FF0B (96 bits = FF00-FF0F)	read/ write	FFC0-FFC7	FF80-FF87	Yes	Yes
RF630L (-2AB02)	Impinj Monza 4QT	00 - 3F	FF00-FF0B (128 bits = FF00-FF0F)	read/ write	FFC0-FFC9	FF80-FF87	Yes	Yes
RF630L (-2AB03)	NXP G2XM	00 - 3F	FF00-FF0B (240 bits = FF00-FF0F)	read/ write	FFC0-FFC7	FF80-FF87	Yes	Yes
RF680L	NXP G2XM	00 - 3F	FF00-FF0B (240 bits = FF00-FF0F)	read/ write	FFC0-FFC7	FF80-FF87	Yes	Yes
RF610T	NXP G2XM	00 - 3F	FF00-FF0B (240 bits = FF00-FF0F)	read/ write	FFC0-FFC7	FF80-FF87	LOCKED	Yes
RF620T	Impinj Monza 4QT	00 - 3F	FF00-FF0B (128 bits = FF00-FF0F)	read/ write	FFC0-FFC9	FF80-FF87	LOCKED	Yes
RF625T	Impinj Monza 4QT	00 - 3F	FF00-FF0B (128 bits = FF00-FF0F)	read/ write	FFC0-FFC9	FF80-FF87	LOCKED	Yes
RF630T	NXP G2XM	00 - 3F	FF00-FF0B (240 bits = FF00-FF0F)	read/ write	FFC0-FFC7	FF80-FF87	LOCKED	Yes
RF640T	NXP G2XM	00 - 3F	FF00-FF0B (240 bits = FF00-FF0F)	read/ write	FFC0-FFC7	FF80-FF87	LOCKED	Yes
RF680T	NXP G2XM	00 - 3F	FF00-FF0B (240 bits = FF00-FF0F)	read/ write	FFC0-FFC7	FF80-FF87	LOCKED	Yes

Note

Default EPC ID

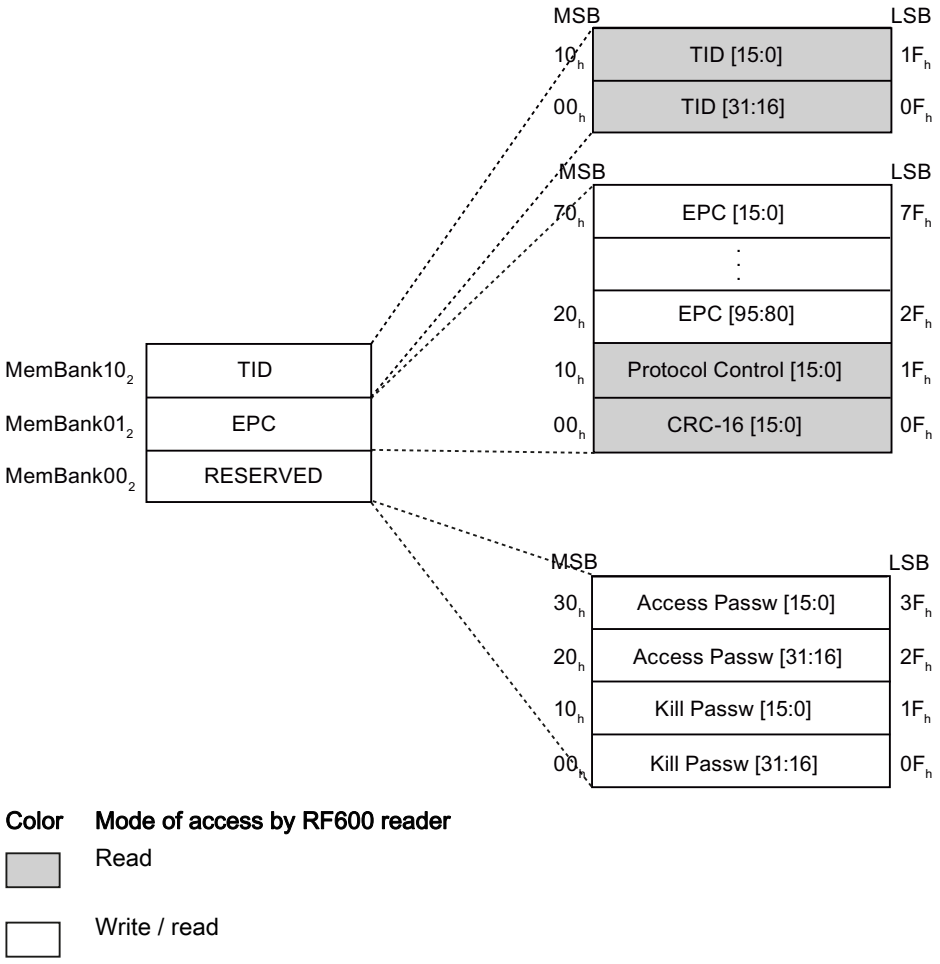
When an RF610T-RF680T transponder is supplied, a 12 byte long identifier is assigned by the manufacturer as the EPC ID according to a number scheme (see "Assignment of the ECP ID by the manufacturer").

Memory map of the ISO 18000-6C Monza 2 chip according to EPC

The memory of the ISO 18000-6C Monza 2 chip is divided logically into four different memory banks:

Memory bank (decimal)	Memory type	Description
MemBank 11_2	USER	User-writable USER memory area
MemBank 10_2	TID	Is defined by the manufacturer, contains the class identifier and serial number of a transponder.
MemBank 01_2	EPC	Contains the EPC UID, the protocol and the CRC of a transponder. You can write to the EPC memory area. In the delivery condition, the memory contents can have the following states: • empty • containing the same data • containing different data
MemBank 00_2	RESERVED	Contains the access and kill password.

The graphic below illustrates the exact memory utilization. Each box in the right part of the graphic represents one word (16 bit) in the memory.



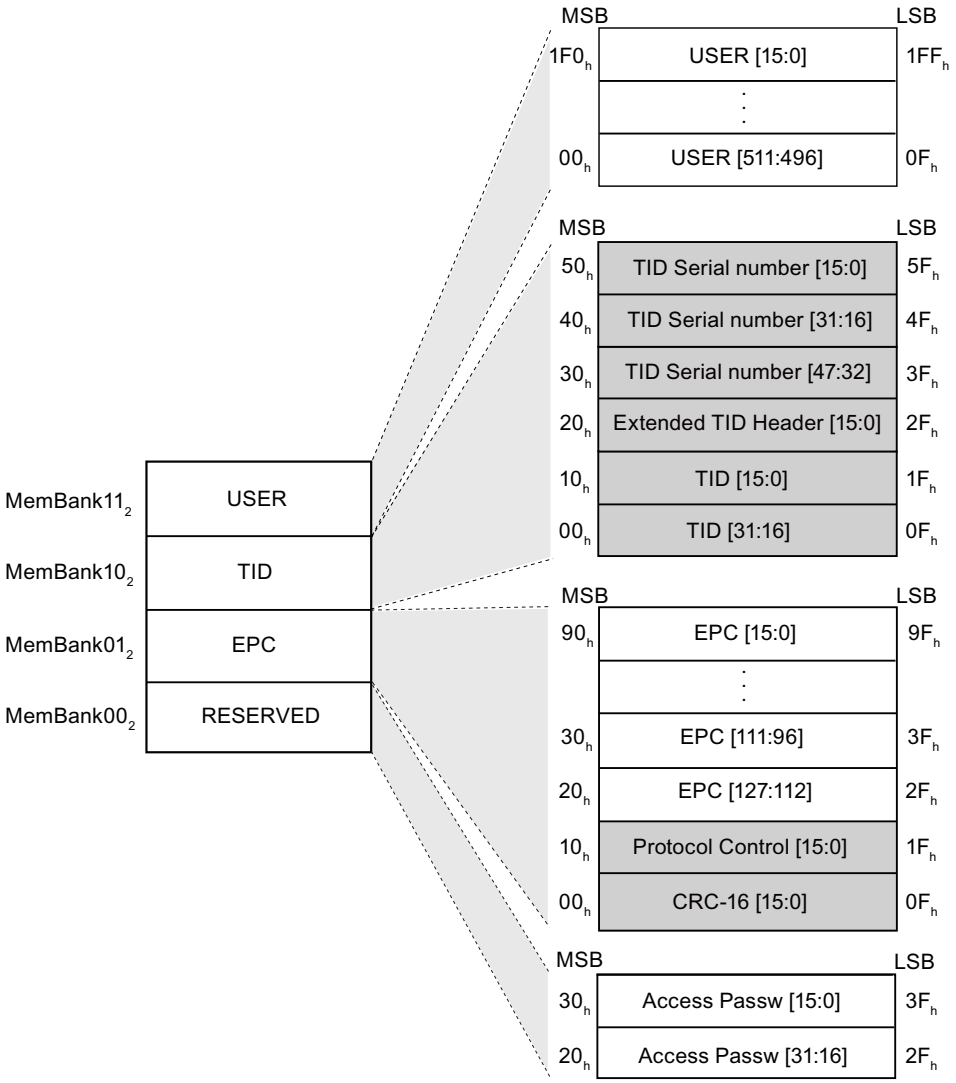
Color	Mode of access by RF600 reader
	Read
	Write / read

Memory map of the ISO 18000-6C Monza 4QT chip according to EPC

The memory of the ISO 18000-6C Monza 4QT chip is divided logically into four different memory banks:

Memory bank (decimal)	Memory type	Description
MemBank 11_2	USER	User-writable USER memory area
MemBank 10_2	TID	Is defined by the manufacturer, contains the class identifier and serial number of a transponder.
MemBank 01_2	EPC	Contains the EPC data, the protocol information and the CRC data of a transponder. You can write to the EPC memory area. In the delivery condition, the memory contents can have the following states: • containing the same data • containing different data
MemBank 00_2	RESERVED	Contains the access and kill password.

The graphic below illustrates the exact memory utilization. Each box in the right part of the graphic represents one word (16 bit) in the memory.

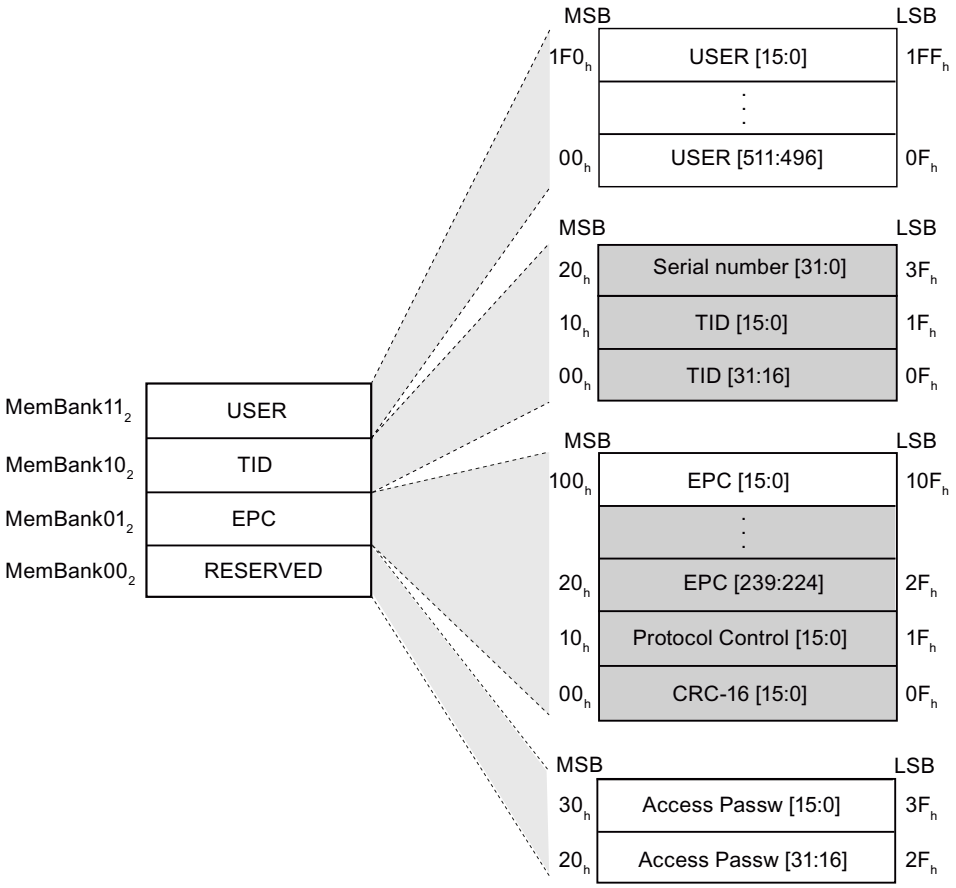

MSB
LSB
1F0h
USER [15:0]
1FFh
00h
USER [511:496]
0Fh
MSB
LSB
50h
TID Serial number [15:0]
5Fh
40h
TID Serial number [31:16]
4Fh
30h
TID Serial number [47:32]
3Fh
20h
Extended TID Header [15:0]
2Fh
10h
TID [15:0]
1Fh
00h
TID [31:16]
0Fh
MSB
LSB
90h
EPC [15:0]
9Fh
30h
EPC [111:96]
3Fh
20h
EPC [127:112]
2Fh
10h
Protocol Control [15:0]
1Fh
00h
CRC-16 [15:0]
0Fh
MSB
LSB
30h
Access Passw [15:0]
3Fh
20h
Access Passw [31:16]
2Fh
MemBank11 2
USER
MemBank10 2
TID
MemBank01 2
EPC
MemBank00 2
RESERVED
Color
Mode of access by RF600 reader
Read
Write / read

Memory map of the ISO 18000-6C G2XM chip according to EPC

The memory of the ISO 18000-6C G2XM chip is divided logically into four different memory banks:

Memory bank (decimal)	Memory type	Description
MemBank 11_2	USER	User-writable USER memory area
MemBank 10_2	TID	Is defined by the manufacturer, contains the class identifier and serial number of a transponder.
MemBank 01_2	EPC	Contains the EPC data, the protocol information and the CRC data of a transponder. You can write to the EPC memory area. In the delivery condition, the memory contents can have the following states: • containing the same data • containing different data
MemBank 00_2	RESERVED	Contains the access and kill password.

The graphic below illustrates the exact memory utilization. Each box in the right part of the graphic represents one word (16 bits) in the memory.



Color	Mode of access by RF600 reader
	Read
	Write / read

Parameterization

Which parameter assignment options available to you for which reader of the RF600 family is outlined in the section "Overview of parameterization of RF600 reader (Page 377)". Detailed information for parameterization as well as examples for describing and reading specific memory areas can be found in the referenced chapters of the documentation.

7.2 SIMATIC RF630L Smartlabel

7.2.1 Features

SIMATIC RF630L smart labels are passive, maintenance-free data carriers based on UHF Class 1 Gen2 technology that are used to store the "Electronic Product Code" (EPC).

Smart labels offer numerous possible uses for a wide range of applications and support efficient logistics throughout the process chain.

	SIMATIC RF630L transponder			
	6GT2810-2AB00	6GT2810-2AB01	6GT2810-2AB02-0AX0	6GT2810-2AB03
Design				
Application	Simple identification such as barcode replacement or supplementation, through warehouse and distribution logistics, right up to product identification.			
Memory	EPC 96 bits		EPC 96/128 bits	EPC 96/240 bits
Additional user memory	No		64 bytes	64 bytes
Write range	0.2 m to 5 m			
Reading range	0.2 m to 8 m		0.2 m to 5 m	
Mounting	Self-adhesive paper labels, for example for attaching to packaging units, paper or cartons		Self-adhesive plastic labels, for example for attaching to packaging units, paper or cartons	
	Not suitable for fixing straight onto metal or onto liquid containers			

7.2.2 Ordering data

RF630L transponder	Order number	Type of delivery
RF630L transponder, smart label 101.6 mm x 152.4 mm (4" x 6")	6GT2810-2AB00	Minimum order amount 1600 items (800 on one roll)
RF630L transponder, smart label 101.6 mm x 50.8 mm (4" x 2")	6GT2810-2AB01	Minimum order amount 1000 items (1000 on one roll)
RF630L transponder, smart label 97 mm x 27 mm	6GT2810-2AB02- 0AX0	Minimum order amount 5000 items (5000 on one roll)
RF630L transponder, smart label 54 mm x 34 mm	6GT2810-2AB03	Minimum order amount 2000 items (2000 on one roll)

7.2.3 Minimum spacing between labels

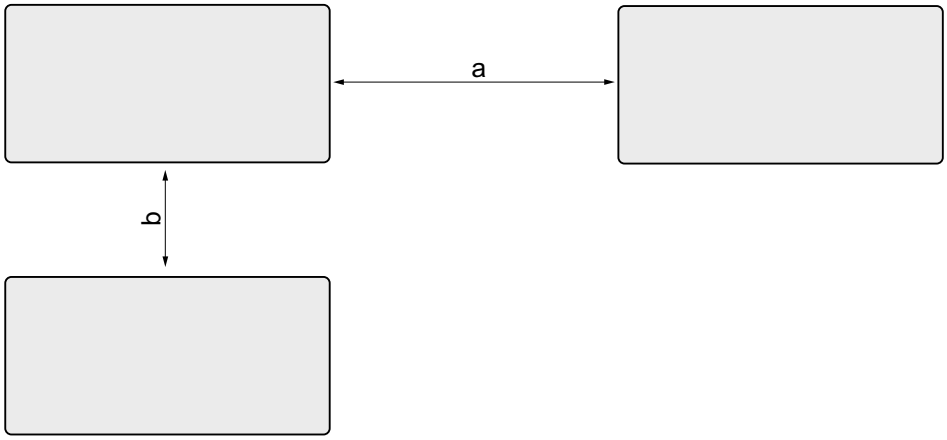


Figure 7-4 Minimum spacing between labels

The specified minimum spacing applies for the SIMATIC RF630L smart labels with the following order numbers:

- 6GT2810-2AB00
- 6GT2810-2AB01
- 6GT2810-2AB02-0AX0
- 6GT2810-2AB03

Table 7- 2 Minimum spacing

Name	Minimum spacing
a	50 mm
b	50 mm

Please note that smart labels can also be attached one above the other. The spacing between the labels attached one above the other depends on the damping characteristics of the carrier material.

7.2.4 Memory configuration of the smart label

The memory configuration of the smart label is described in the section SIMATIC memory configuration of the RF600 transponders and labels (Page 270).

7.2.5 Technical data

Table 7- 3 Mechanical data

	6GT2810-2AB00	6GT2810-2AB01	6GT2810-2AB02-0AX0	6GT2810-2AB03
Dimensions (L x W)	101.6 mm x 152.4 mm (ca. 4" x 6")	101.6 mm x 50.8 mm (ca. 4" x 2")	97 mm x 27 mm	54 mm x 34 mm
Design	Paper with integrated antenna		Plastic with integrated antenna	
Label type	Paper label		Inlay	
Antenna material	Aluminum			
Static pressure	10 N/mm^2			
Material surface	Paper		Plastic PET	
Type of antenna	Shortened dipole			
Color	white		Transparent	
Printing	Can be printed using heat transfer technique			
Mounting	Single-sided adhesive (self-adhesive label).		Single-sided adhesive (self-adhesive inlay).	
Degree of protection	None, the label must be protected against humidity.		IP65	
Weight	Approx. 3 g	Approx. 2 g	Approx. 1 g	

Table 7- 4 Electrical data

	6GT2810-2AB00	6GT2810-2AB01	6GT2810-2AB02-0AX0	6GT2810-2AB03
Air interface	ISO 18 000-6 Type C			
Polarization type	Linear			
Polarization direction	The polarization direction is parallel with the short side of the paper label	The polarization direction is parallel with the long side of the paper label	The polarization direction is parallel with the long side of the inlay	
Frequency range	860 to 960 MHz			
Typical read distance				
• Paper/cardboard	• 0.2 m to 8 m			• 0.2 m to 5 m
• Plastic film	• 0.2 m to 8 m			• 0.2 m to 5 m
• Plastic (boxes, surface resistance > 10 MΩ	• 0.2 m to 4 m			• 0.2 m to 3 m
• Wood (dry, < 30 % residual humidity)	• 0.2 m to 4 m			• 0.2 m to 3 m
• Glass	• 0.2 m to 4 m			• 0.2 m to 3 m
Typical write distance				
• Paper/cardboard	• 0.2 m to 5 m			• 0.2 m to 3 m
• Plastic film	• 0.2 m to 5 m			• 0.2 m to 3 m
• Plastic (boxes, surface resistance > 10 MΩ	• 0.2 m to 2.5 m			• 0.2 m to 1 m
• Wood (dry, < 30 % residual humidity)	• 0.2 m to 2.5 m			• 0.2 m to 1 m
• Glass	• 0.2 m to 2.5 m			• 0.2 m to 1 m
Minimum spacing between labels				
• Vertically	• 50 mm			
• Horizontally	• 100 mm			
Energy source	Field energy via antenna, without battery			
Multi-tag capability	Yes			

Table 7- 5 Memory specifications

	6GT2810-2AB00	6GT2810-2AB01	6GT2810-2AB02-0AX0	6GT2810-2AB03
Type	EPC Class 1 Gen2			
Memory organization	EPC 96 bits		EPC 96/128 bits	EPC 96/240 bits
Additional user memory	No		64 bytes	64 bytes
Listing	ISO 18000-6C			
Data retention at +25 °C	10 years			
Read cycles	Unlimited			
Write cycles	100,000			
Anti collision	Approx. 100 labels/sec			

Table 7- 6 Environmental conditions

	6GT2810-2AB00	6GT2810-2AB01	6GT2810-2AB02-0AX0	6GT2810-2AB03
Temperature range during operation	-40 °C … 65 °C, up to 80 °C (200 cycles)			
Temperature range during storage	The label should be stored in the range of +15°C and +25°C at a humidity of 40% to 60%.			
Storage duration	Two years, determined by the shelf life of the adhesive			
Torsion and bending load	Partially permissible			
Distance from metal	Not suitable for fixing straight onto metal			

Table 7- 7 Identification

	6GT2810-2AB00	6GT2810-2AB01	6GT2810-2AB02-0AX0	6GT2810-2AB03
CE	CE approval to R&TTE			
FCC	Passive labels or transponders comply with the valid regulations; certification is not required.			

7.2.6 Dimension drawings

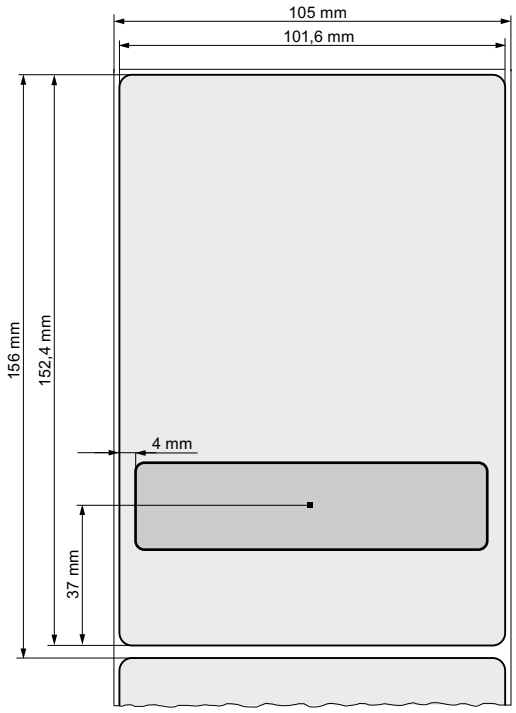


Figure 7-5 SIMATIC RF630L 6GT2810-2AB00 dimension drawing

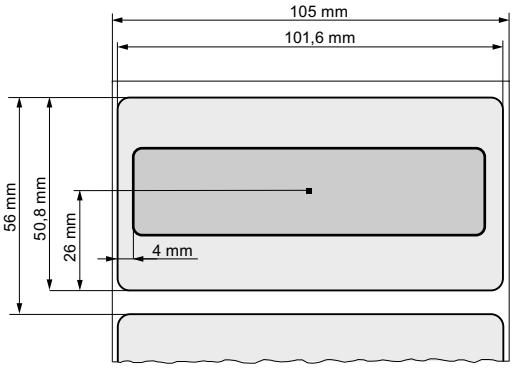


Figure 7-6 SIMATIC RF630L 6GT2810-2AB01 dimension drawing

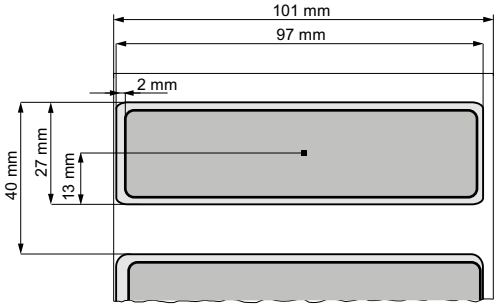


Figure 7-7 Dimension drawing SIMATIC RF630L 6GT2810-2AB02-0AX0

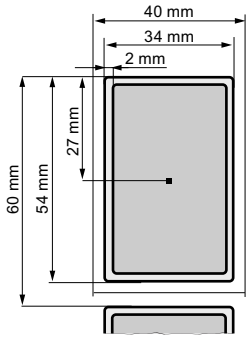


Figure 7-8 SIMATIC RF630L 6GT2810-2AB03 dimension drawing

7.3 SIMATIC RF680L Smartlabel

7.3.1 Features

The SIMATIC RF680L Smartlabel is passive and maintenance-free. It functions based on the UHF Class 1 Gen 2 technology and is used for saving the electronic product code (EPC) of 96 bits/240 bits. The label also has a 512 bit user memory.

The SIMATIC RF680L is a heat-resistant Smartlabel with a limited service life. Its target use is the direct identification of objects in high-temperature applications.

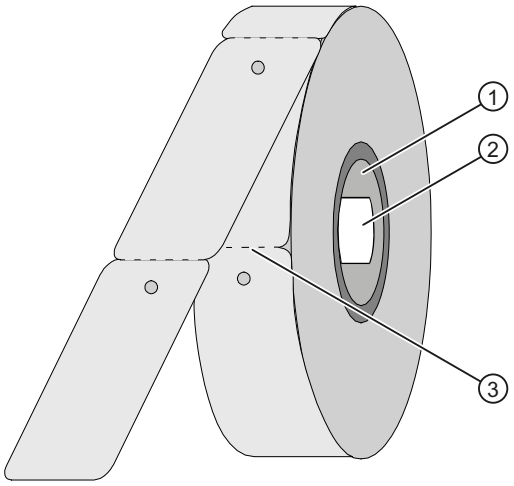
Thanks to its antenna geometry, the transponder can be read from any direction. However, the range is reduced if it is not aligned in parallel with the antenna.

SIMATIC RF680L Smartlabel	Features	
	Application	Production logistics applications subject to high temperatures
	Air interface	according to ISO°18000-6C
	Memory	EPC 96 bit/240 bit Add-on-memory 64 bytes
	Reading / writing range	Up to 4 m[1)] in connection with: • RF640R/RF670R reader and • RF660A antennas
		Up to 3.2 m[1)] in connection with: • RF640R with integrated antenna
		Up to 3 m[1)] in connection with: • RF620R/630R reader and • RF660A antenna
		Up to 2 m[1)] in connection with: • RF620R with integrated antenna
	Mounting	Via a hole on the narrow side. Can also be glued by customer.

1) Depending on the environment

7.3.2 Delivery format

The SIMATIC RF680L is supplied on a roll. One roll always contains 1000 Smartlabels. You can tear off the Smartlabel from the roll at the perforation.



① Cardboard tube, inner dia 76 mm
② Roll label
③ Perforation

Figure 7-9 SIMATIC RF680L roll

7.3.3 Ordering data

Ordering data	Order no.	Delivery format
SIMATIC RF680L • Smartlabels 54 x 89 mm • heat-resistant	6GT2810-2AG80	1,000 units on a roll

7.3.4 Minimum spacing between labels

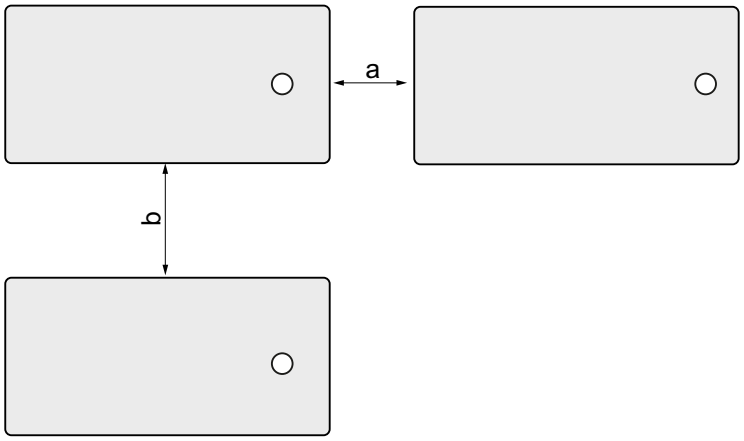


Figure 7-10 Minimum spacing between labels

Table 7- 8 Minimum spacing

Minimum spacing	
a	20 mm
b	50 mm

7.3.5 Memory configuration of the smart label

The memory configuration of the smart label is described in the section SIMATIC memory configuration of the RF600 transponders and labels (Page 270).

7.3.6 Mounting on metal

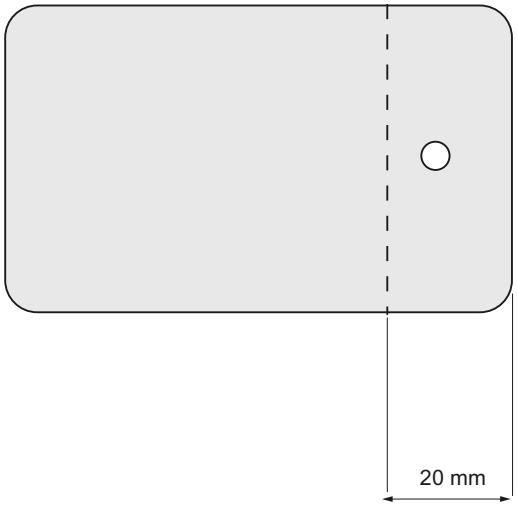


Figure 7-11 Metal mounting surface

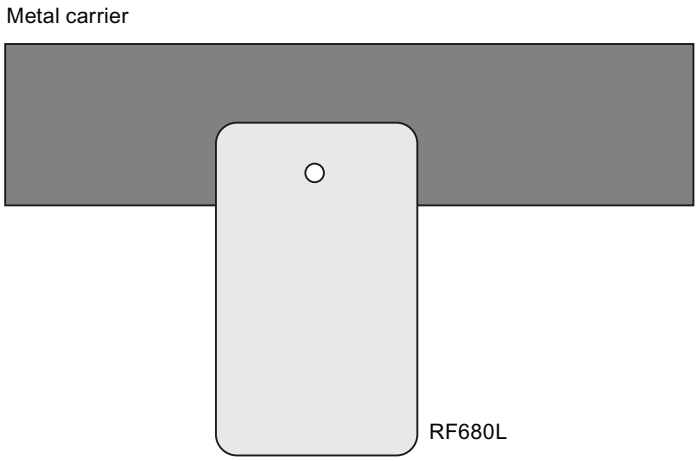


Figure 7-12 Mounting on metal

7.3.7 Technical data

7.3.7.1 Mechanical data

Feature	Description
Dimensions (L x W)	156 mm x 40 mm
Thickness of the label	0.4 mm (±25% incl.. chip)
Design	Synthetic paper
Antenna material	Aluminum
Static pressure	10 N/mm^2
Silicone-free	Yes
Type of antenna	Shortened dipole
Color	beige
Printing	Yes, customized
Mounting	Via a hole on the narrow side. Can also be glued by customer.
Weight	Approx. 3 g

7.3.7.2 Electrical data

Feature	Description			
Air interface	According to ISO 18 000-6 C			
Polarization type	Linear			
Polarization direction	The polarization direction is parallel with the long side of the inlay			
Frequency range	Europe 865…868 MHz / USA 902…928 MHz			
Reading range [1]	RF640R/RF670R	RF640R [2]	RF620R/RF630R	RF620R [2]
	Up to 4 m	Up to 3.2 m	Up to 3 m	Up to 2 m
Writing range [1]	RF640R/RF670R	RF640R [2]	RF620R/RF630R	RF620R [2]
	Up to 3 m	Up to 2.4 m	Up to 1.8 m	Up to 0.7 m
Minimum spacing between labels • Vertically • Horizontally	 • 50 mm • 20 mm			
Energy source	Field energy via antenna, without battery			
Multi-tag capability	Yes			

[1] Depending on the environment

[2] internal antenna

7.3.7.3 Memory specifications

Property	Description	
Type	EPC Class 1 Gen 2	
Memory organization	EPC code	96 bits/240 bits
	User memory	64 bytes
	TID	64 bits
	Reserved (passwords)	64 bits
Protocol	ISO 18000-6C	
Data retention time	10 years	
Read cycles	Unlimited	
Write cycles	Minimum at +22 °C 100 000	

7.3.7.4 Environmental conditions

Property	Description
Temperature range during operation	-25 °C … +85 °C (permanent) +200 °C up to six hours +220 °C up to one hour +230 °C for a short time
Temperature range during storage	-40 °C … +85 °C
Torsion and bending load	Partially permissible
Distance from metal	Whole surface not suitable for fixing straight onto metal (see chapter Mounting on metal (Page 287))

7.3.8 Certificates and approvals

Certificate	Description
CE	Conformity with R&TTE directive
FCC Federal Communications Commission	Passive labels and transponders comply with the valid regulations; certification is not required.
RoHS	Compliant according to EU Directive 2002/95/EC

7.3.9 Dimension drawing

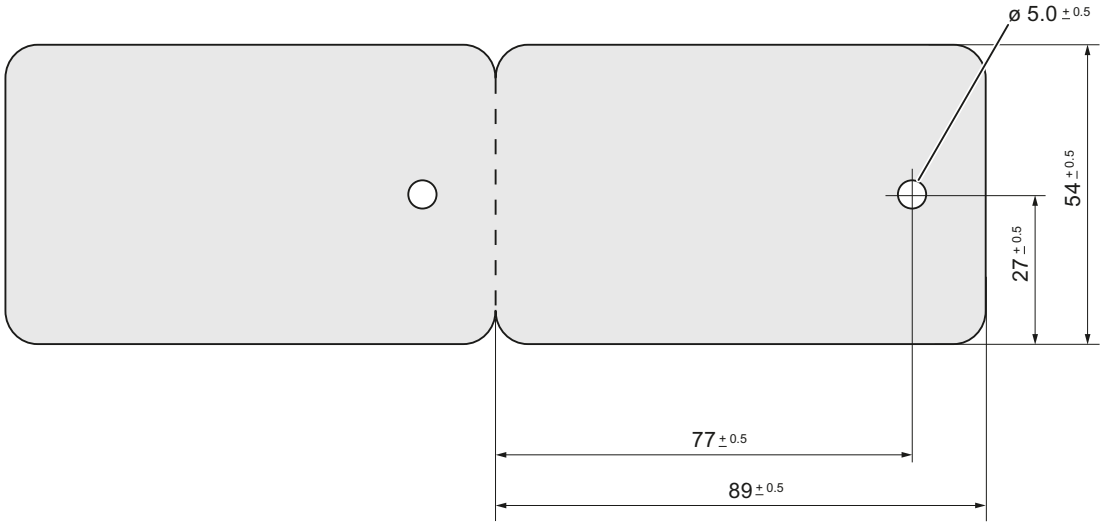


Figure 7-13 SIMATIC RF680L

7.4 SIMATIC RF610T

7.4.1 Features

The SIMATIC RF610T is passive and maintenance-free. It functions based on the UHF Class 1 Gen 2 technology and is used for saving the electronic product code (EPC) of 96 bits/240 bits. The label also has a 512 bit user memory.

The SIMATIC RF610T offers a host of possible uses for a wide range of applications and supports efficient logistics throughout the entire process chain.

Thanks to its antenna geometry, the transponder can be read from any direction. However, the range is reduced if it is not aligned in parallel with the antenna.

SIMATIC RF610T	Features	
	Application	• Simple identification, such as barcode replacement or barcode supplement • Warehouse and distribution logistics • Product identification For the Food & Beverage sector, a special version can be supplied on request that is certified for use in contact with food.
	Air interface	according to ISO°18000-6C
	Memory	EPC 96 bit/240 bit Add-on-memory 64 bytes
	Reading / writing range	Typically 5 m[1)] in connection with: • RF640R/RF670R reader and • RF660A antennas
		Typically 3.2 m[1)] in conjunction with: • RF640R with integrated antenna
		Typically 3 m[1)] in connection with: • RF620R/RF630R reader and • RF660A antenna
		Typically 2 m[1)] in connection with: • RF620R with integrated antenna
	Mounting	• Suspended by means of cable ties, or similar • Can also be fixed with screws or glued by customer. • Not suitable for mounting straight onto metal.

1) Depending on the environment

7.4.2 Ordering data

Ordering data	Order no.	Type of delivery
SIMATIC RF610T	6GT2810-2BB80	Min. order quantity 500 units

7.4.3 Safety instructions for the device/system

NOTICE
This device/system may only be used for the applications described in the catalog and the technical documentation "System manual MOBY D, RF200, RF300, RF600 (http://support.automation.siemens.com/WW/view/en/10805817) and only in combination with third-party devices and components recommended and/or approved by Siemens.

7.4.4 Minimum spacing between labels

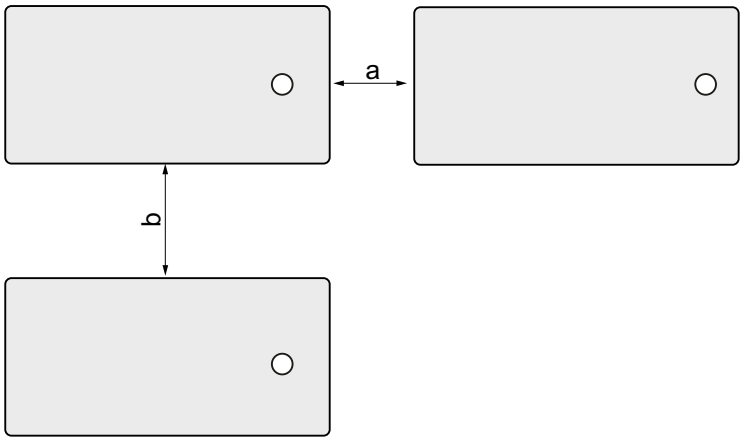


Figure 7-14 Minimum spacing between labels

Table 7- 9 Minimum spacing

Minimum spacing	
a	20 mm
b	50 mm

7.4.5 Memory configuration of the transponder

The memory configuration of the transponder is described in the section SIMATIC memory configuration of the RF600 transponders and labels (Page 270).

7.4.6 Technical data

7.4.6.1 Mechanical data

Feature	Description
Dimensions (L x W x H)	86 mm x 54 mm x 0.4 mm
Design	PVC (polyvinyl chloride)
Antenna material	Aluminum
Static pressure	10 N/m^2
Type of antenna	Shortened dipole
Color	white
Printing	Can be printed using heat transfer technique
Mounting	• Suspended by means of cable ties, or similar • Can also be fixed with screws or glued by customer. • Not suitable for mounting straight onto metal.
Weight	Approx. 3 g

7.4.6.2 Electrical data

Feature	Description
Air interface	According to ISO 18 000-6 C
Polarization type	Linear
Polarization direction	The polarization direction is parallel with the long side of the inlay
Frequency range	Europe 865…868 MHz / USA 902…928 MHz

Reading range typical	RF640R/RF670R/ with RF660A	RF640R	RF620R/RF630R with RF660A	RF620R
Paper/cardboard	0.2 m ... 5.0 m	0.2 m to 4.5 m	0.2 m ... 3.0 m	0.2 m ... 2.0 m
Plastic film	0.2 m ... 5.0 m	0.2 m to 4.5 m	0.2 m ... 3.0 m	0.2 m ... 2.0 m
Plastic	0.2 m ... 3.0 m	0.2 m to 2.7 m	0.2 m ... 2.0 m	0.2 m ... 1.5 m
Wood	0.2 m ... 3.0 m	0.2 m to 2.7 m	0.2 m ... 2.0 m	0.2 m ... 1.5 m
Glass	0.2 m ... 3.0 m	0.2 m to 2.7 m	0.2 m ... 2.0 m	0.2 m ... 1.5 m

Write distance typical	RF640R/RF670R/ with RF660A	RF640R	RF620R/RF630R with RF660A	RF620R
Paper/cardboard	0.2 m ... 3.0 m	0.2 m to 2.7 m	0.2 m ... 1.8 m	0.2 m ... 0.7 m
Plastic film	0.2 m ... 3.0 m	0.2 m to 2.7 m	0.2 m ... 1.8 m	0.2 m ... 0.7 m
Plastic	0.2 m ... 1.0 m	0.2 m to 0.9 m	0.2 m ... 0.7 m	0.2 m ... 0.5 m
Wood	0.2 m ... 1.0 m	0.2 m to 0.9 m	0.2 m ... 0.7 m	0.2 m ... 0.5 m
Glass	0.2 m ... 1.0 m	0.2 m to 0.9 m	0.2 m ... 0.7 m	0.2 m ... 0.5 m

Energy source	Field energy via antenna, without battery
Multi-tag capability	Yes

7.4.6.3 Memory specifications

Property	Description	
Type	EPC Class 1 Gen 2	
Memory organization	EPC code	96 bits/240 bits
	User memory	512 bits
	TID	64 bits
	Reserved (passwords)	64 bits
Protocol	ISO 18000-6C	
Data retention time	10 years	
Read cycles	Unlimited	
Write cycles	Minimum at +22 °C 100 000	

7.4.6.4 Environmental conditions

Feature	Description
Temperature range during operation	-25 °C … +85 °C
Temperature range during storage	-40 °C … +85 °C
Shock resistant acc. to EN 60068-2-27 Vibration acc. to EN 60068-2-6	100 g[1] 50 g[1]
Torsion and bending load	Partially permissible
Distance from metal	Not suitable for fixing straight onto metal
Degree of protection	IP67

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

Note

Note that in temperature ranges > 70 °C, the transponder can become slightly deformed. However, this has no effect on the transponder function.

7.4.7 Certificates and approvals

Certificate	Description
CE	Conformity with R&TTE directive
FCC Federal Communications Commission	Passive labels and transponders comply with the valid regulations; certification is not required.
cULus	This product is UL-certified for the USA and Canada. It meets the following safety standard(s): • UL508 - Industrial Control Equipment • CSA C22.2 No. 142 - Process Control Equipment • UL Report E 120869

7.4.8 Dimension drawing

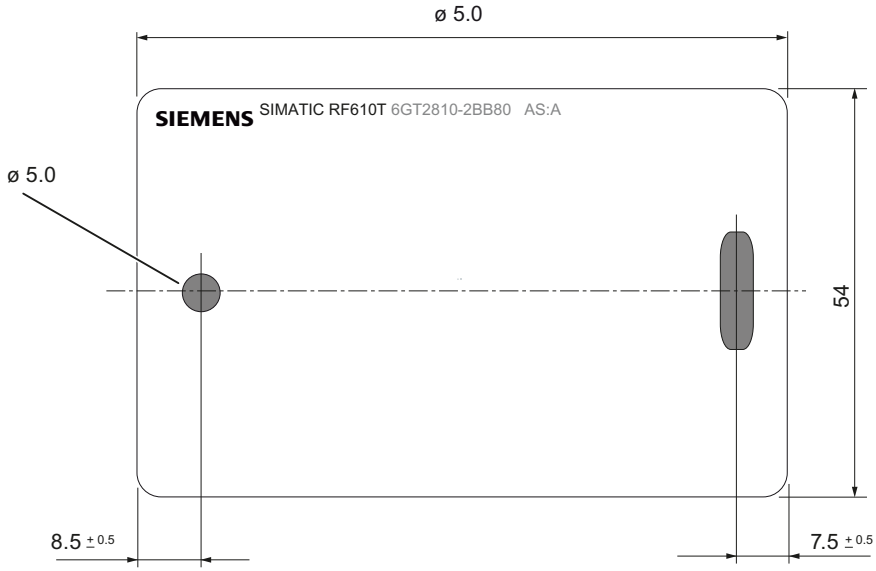


Figure 7-15 Dimensional drawing of SIMATIC RF610T

All dimensions in mm

7.5 SIMATIC RF620T

7.5.1 Characteristics

The SIMATIC RF620T Transponder is passive and maintenance-free, based on the UHF Class 1 Gen2 technology for storing 96-bit/128-bit electronic product codes (EPC).

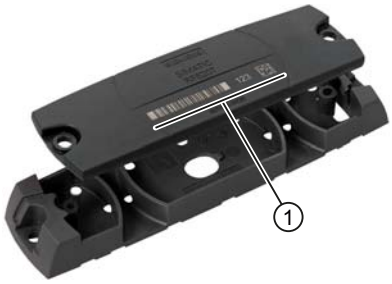
The transponder also has a 64-byte user memory.

The container tag for industrial applications is rugged and highly resistant to detergents. It is designed for easy attachment onto plastic, wood, glass, e.g. containers, palettes, and trolleys

The optimum functionality/range of the RF620T on metal is achieved by means of the spacer.

Since the plastic is food safe, it is also suitable for use in the food-processing industry.

This container tag is designed for the frequency bands of 860 MHz and 960 MHz and can be operated in combination with our UHF system RF660.

SIMATIC RF620T Transponder	Features	
	Application	Transponder for rugged, industrial requirements such as RF identification in warehouses and the logistics and transport area.
	Frequency band	860 to 960 MHz
	Polarization	Linear
	Memory	EPC 96 bit/128 bit
	Additional USER memory	64 byte
	Read/write range • with non-metallic carriers • direct on metallic carriers • with spacer on metallic carriers	 • Typically 0.2 to 8°m • Typically 0.2 to 3°m • Typically 0.2 to 7 m
	Mounting	• Screw, bond • On metal by means of spacers
	① Labeling area	You can inscribe the transponder itself using laser, or adhere a label to position ①. Possible types of labeling: • Barcode • Inscription in plain text • Data matrix code
	Housing color	Anthracite

7.5.2 Ordering data

Ordering data	Order number
SIMATIC RF620T • Frequency 865 MHz to 928 MHz, • UHF Class 1 Gen2 technology (96 bit/128 bit) • -25 °C to +85 °C operating temperature • Dimensions (L x W x H) 127 x 38 x 6 mm • IP67 degree of protection	6GT2810-2HC81
Spacer for SIMATIC RF620T • For attaching to metal surfaces • Dimensions (L x W x H) 155 x 38 x 12 mm	6GT2898-2AA00

7.5.3 Planning the use

7.5.3.1 Reading range when mounted on non-metallic carriers

The transponder is generally designed for mounting on non-metallic objects which provide the conditions for the maximum reading ranges

Table 7- 10 Reading range on non-metallic carriers

Carrier plate material	Reading range
Transponder on wooden carrier (dry, degree of moisture < 15%)	typ. 6 m
Transponder on plastic carrier	typ. 6 m
Transponder on glass	typ. 6 m
Transponder on plastic mineral water bottle	typ. 1.2 m

100% reading range is achieved when mounted in empty, anechoic rooms.

7.5.3.2 Directional radio pattern of the transponder on non-metallic surfaces

Preferably, align the data carrier parallel to the transmitting antenna. If, however, the data carrier including the metallic carrier plate is tilted, the reading range will be reduced.

Rotation about the polarization axis

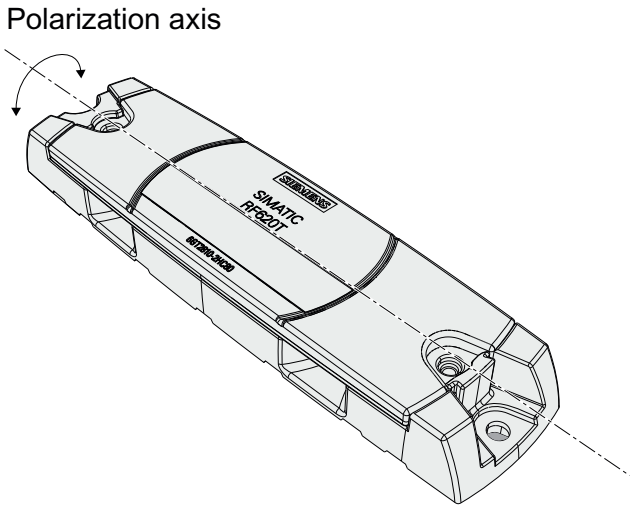


Figure 7-16 Rotation of the transponder about the polarization axis

Generally the range does not change when the transponder without carrier material is rotated about the polarization axis.

Rotation orthogonal to the polarization axis

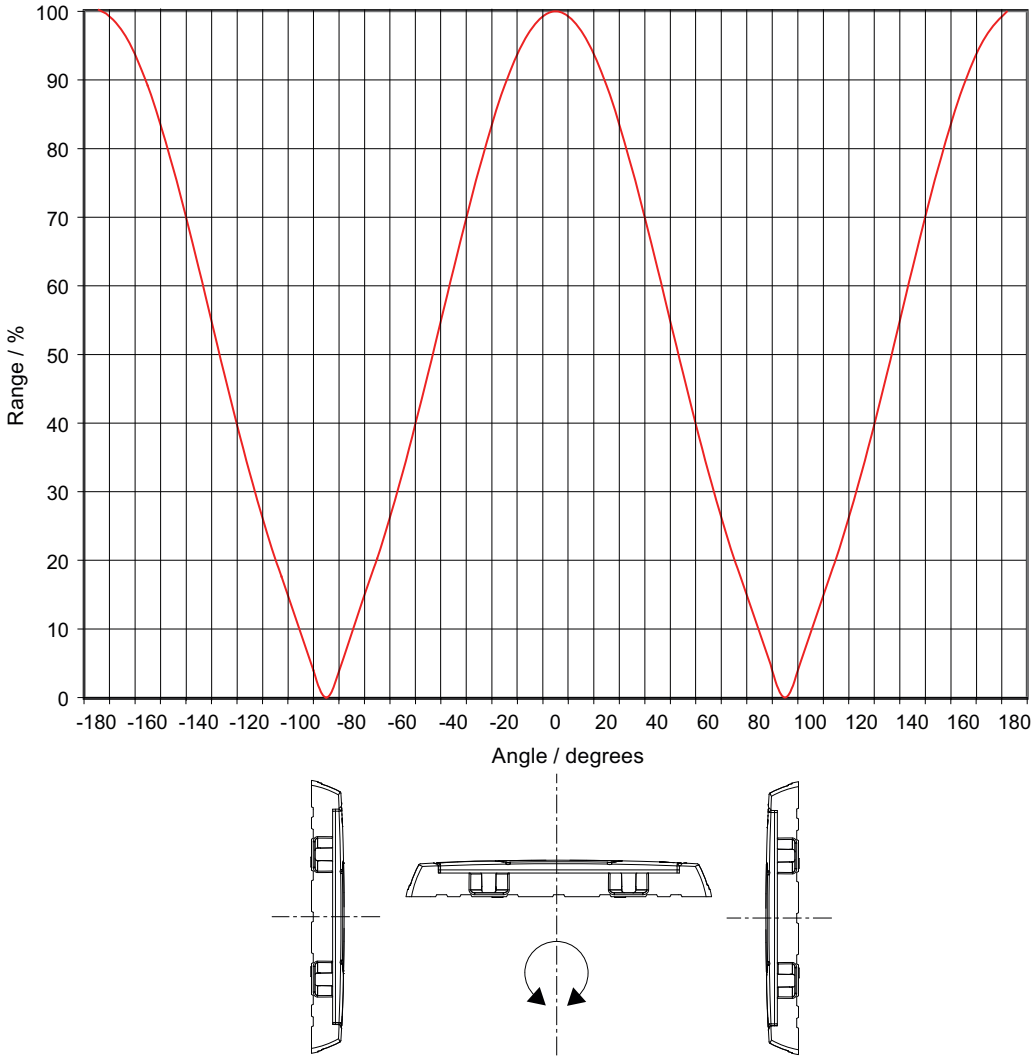


Figure 7-17 Transponder characteristics when rotated orthogonally to the polarization axis (within the tag plane)

If the transponder is positioned orthogonally to the transmitting antenna, it normally cannot be read. Therefore the data carrier is preferably to be aligned parallel to the transmitting antenna. The following figure illustrates this situation.

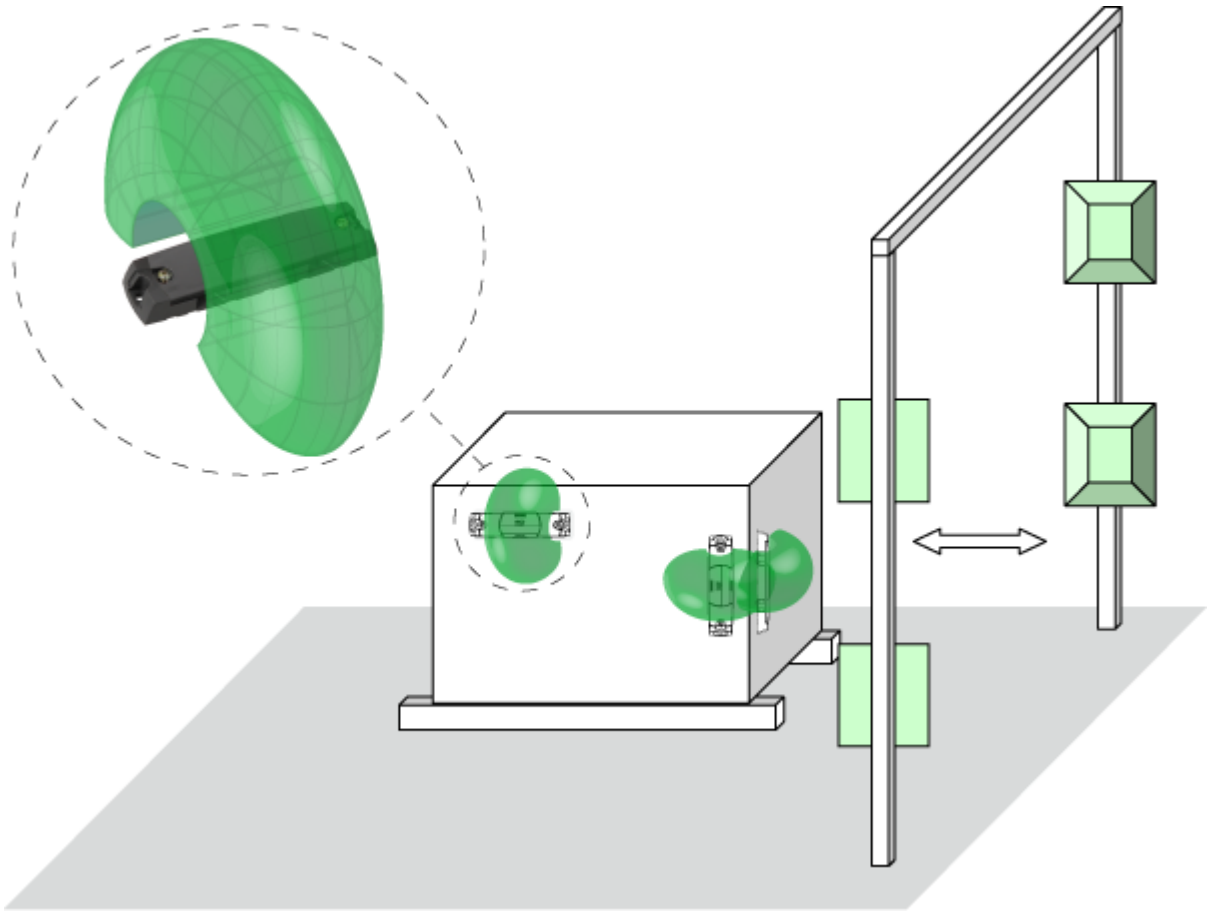


Figure 7-18 Application example for possible orientations of the transponder.

7.5.3.3 Optimum antenna/transponder positioning with planar mounting of the transponder on metal

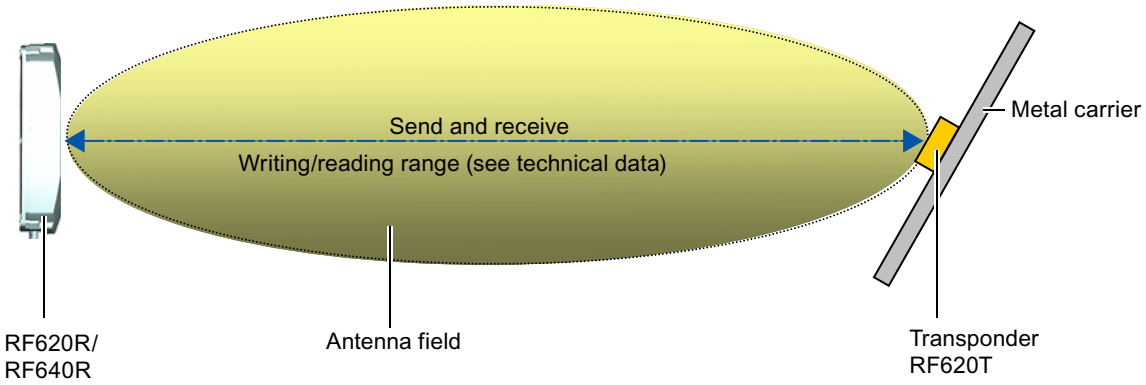


Figure 7-19 Example of optimum reader-transponder positioning with RF620R and RF640R via the internal reader antenna.

7.5.3.4 Reading range when mounted on flat metallic carrier plates

The transponder generally has linear polarization. The polarization axis runs as shown in the diagram below. If the tag is centrically mounted on a flat metal plate, which may either be almost square or circular, it can be aligned in any direction since the transmitting and receiving RF660A antennas operate with circular polarization.

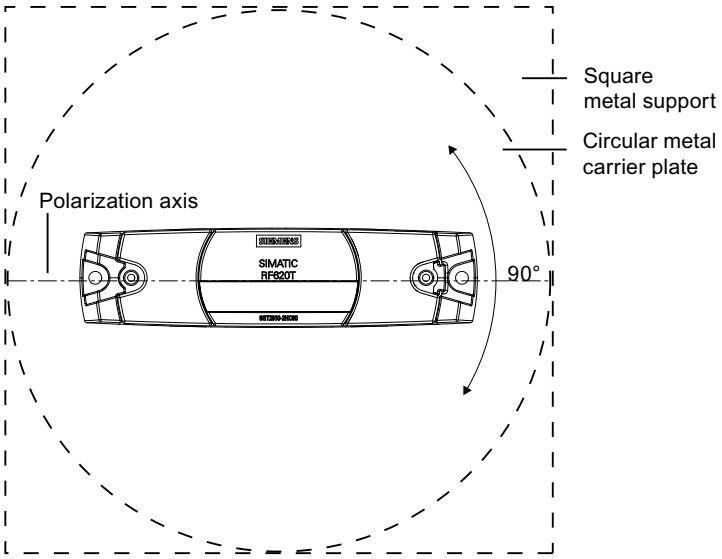


Figure 7-20 Optimum positioning of the transponder on a (square or circular) metal carrier plate

Table 7- 11 Reading range with metallic, plane carriers without spacer

Carrier plate material	Reading range
Metal plate at least 300 x 300 mm	Typ. 3 m

Table 7- 12 Reading range with metallic, plane carriers with spacer

Carrier plate material	Reading range
Metal plate at least 300 x 300 mm	Typ. 7 m

The use of spacers on metallic surfaces is therefore recommended.

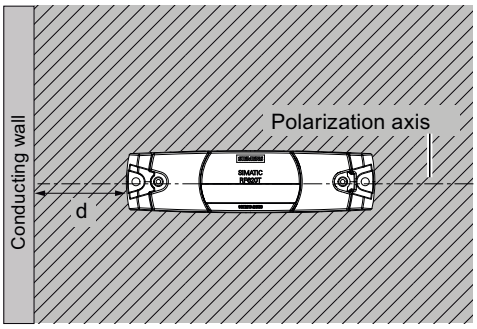
On rectangular carrier plates, the reading distance depends on the mounting orientation of the transponder A 90° rotation of the transponder about the axis of symmetry may result in greater reading distances

7.5.3.5 Influence of conducting walls on the reading range

If there are conducting walls or restrictions in the vicinity that could shade the radio field, a distance of approx. 10 cm is recommended between the transponder and the wall In principle, walls have least influence if the polarization axis is orthogonal to the conducting wall. A spacer must be used in any case.

Reading range: One conducting wall

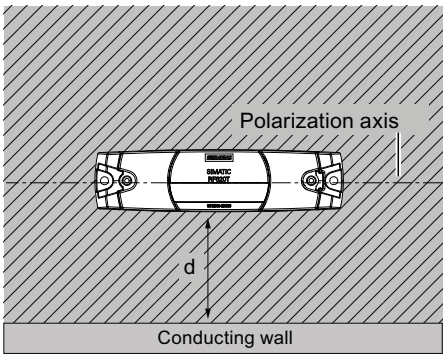
Dependence of the reading distance when positioned orthogonally to the conducting wall



Top view

Distance d	20 mm	50 mm	100 mm	
Reading range	Approx. 100%	Approx. 100%	Approx. 100%	Wall height 20 mm
	Approx. 100%	Approx. 100%	Approx. 100%	Wall height 50 mm
	Approx. 80%	Approx. 100%	Approx. 100%	Wall height 100 mm

Dependence of the reading distance when positioned parallel to the conducting wall

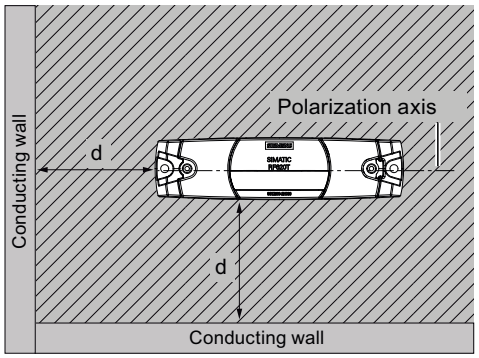


Top view

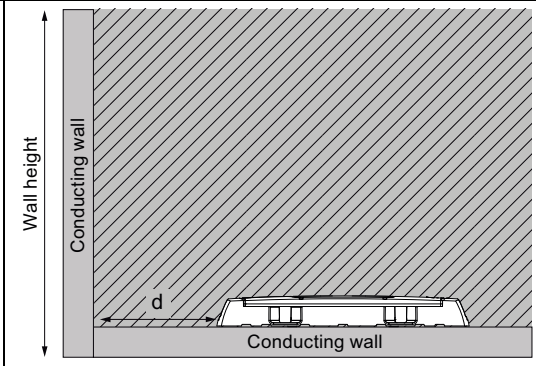
Distance d	20 mm	50 mm	100 mm	
Reading range	Approx. 70 %	Approx. 100%	Approx. 100%	Wall height 20 mm
	Approx. 60 %	Approx. 90 %	Approx. 100%	Wall height 50 mm
	Approx. 30 %	Approx. 70 %	Approx. 100%	Wall height 100 mm

Reading range: Two conducting walls

Influence on reading range when positioned against two conducting walls



Top view



Side view

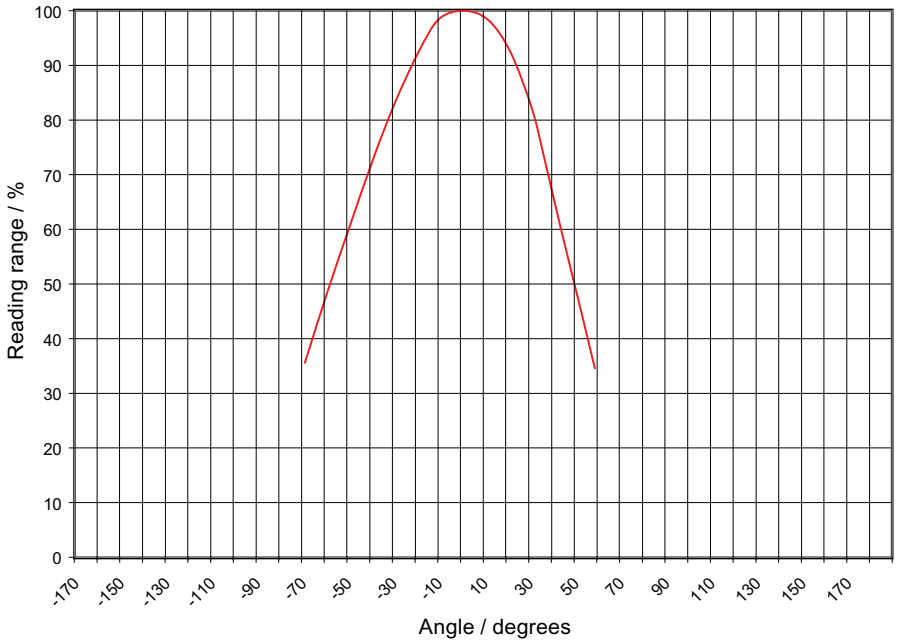
Distance d	20 mm	50 mm	100 mm	
Reading range	Approx. 70 %	Approx. 100%	Approx. 100%	Wall height 20 mm
	Approx. 60 %	Approx. 90 %	Approx. 100%	Wall height 50 mm
	Approx. 30 %	Approx. 70 %	Approx. 100%	Wall height 100 mm

The values specified in the tables above are reference values.

7.5.3.6 Directional radio pattern of the transponder on metallic surfaces

Preferably, align the data carrier parallel to the transmitting antenna. If, however, the data carrier including the metallic carrier plate is tilted, the reading range will be reduced.

Rotation about the polarization axis or orthogonal to the polarization axis



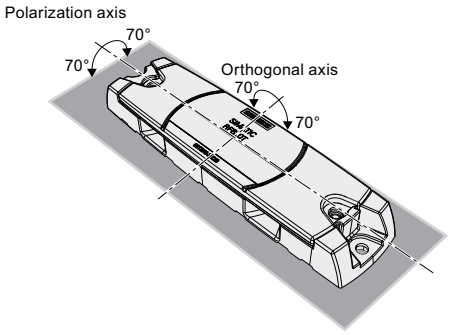


Figure 7-21 Characteristic of the transponder when rotated about the polarization axis or orthogonally to the polarization axis

7.5.3.7 Reading range when mounted on ESD carrier materials

The transponder is generally designed for mounting on non-conductive objects which provide the conditions for the maximum reading ranges The conductive or dissipativesurface of ESD materials limits the reading range depending on the surface resistance. Generally, dissipative materials with a surface resistance of 1 x 10^5 to 1 x 10^{11} ohm and conductive materials with 1 x 10^3 to 1 x 10^5 ohm are available.

Table 7- 13 Limited reading range with ESD materials

Carrier plate material	Reading range
Transponder on electrostatic dissipative materials, dimensions 60°x°40 cm (surface resistance 2 x 10^9 ohm)	Approx. 4 m
Transponder on electrostatic conductive materials, dimensions 60 x 40 cm (surface resistance 1 x 10^4 ohm) Use of spacers	Approx. 1 m Approx. 2 m

100% reading range is achieved when mounted in empty, anechoic rooms. With multi-tag capability, limitations may result in the reading range.

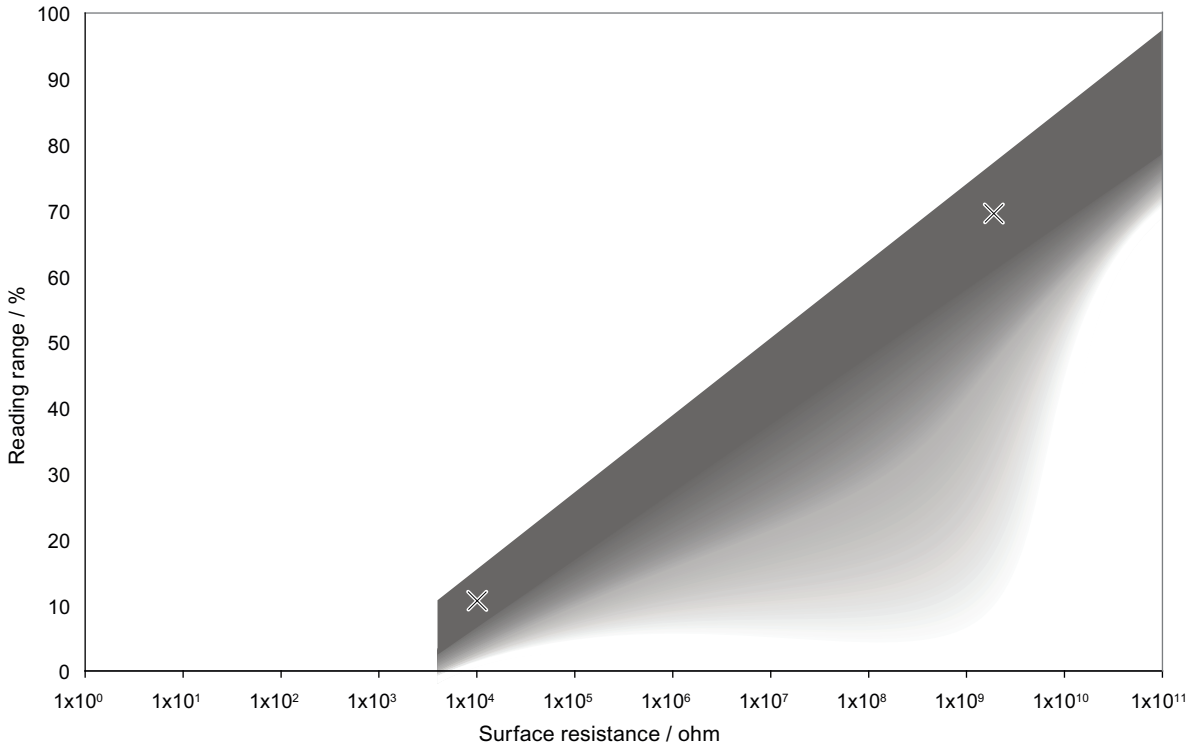


Figure 7-22 Schematic representation of how the reading range depends on the surface resistance of the ESD material

In the representation above, the two reading points with regard to the dependence of the reading range in % on the surface resistance are shown At the same time a linear dependence between the reading points is to be expected, however with measurement inaccuracies. The darker the hatching, the greater the probability that the reading point is found in the hatched area.

7.5.3.8 Communication with multiple transponders

The RF600 system is multitag-capable. This means that the reader can detect and write to several transponders almost simultaneously. The minimum distance between the transponders is ≥ 50 mm.

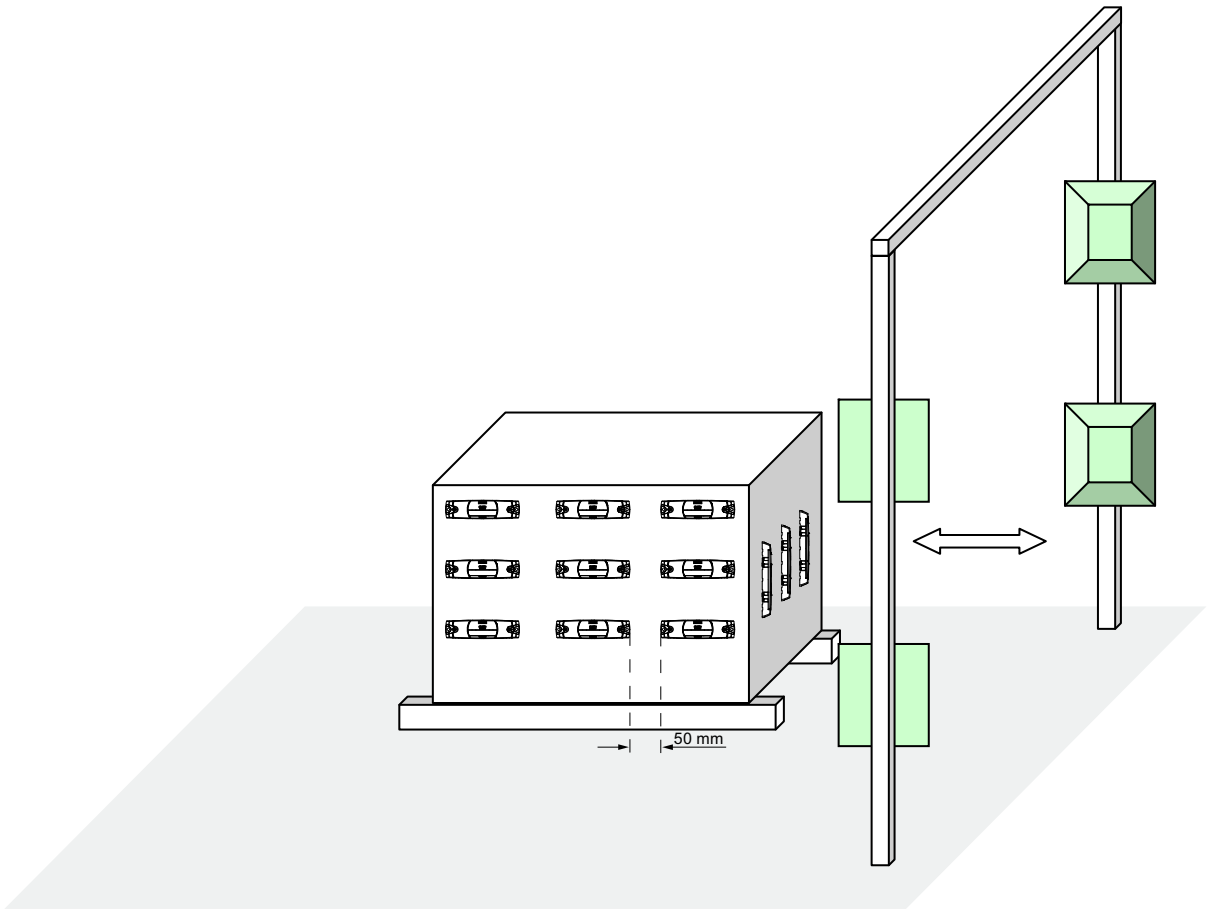


Figure 7-23 Multitag reading

7.5.4 Mounting instructions

CAUTION
Level mounting Please note that both the transponder and the spacer must be mounted on a level surface.

CAUTION
The screw fixing element was tested with the types of screws, spring washers and plain washers indicated below. Depending on the application area, the user must use similar, correspondingly certified screws, spring washers and plain washers (e.g. for the food processing industry).

EJOT screws can be additionally etched and passivated in some areas of the food processing industry, e.g if they made of stainless steel A2. In other areas without special requirements, the screws can be, for example, zinc plated and blue passivated.

Note

In case of high mechanical loads (such as shocks or vibration), the transponder must be fixed onto the spacer by means of screws.

Properties		Description	Graphics
Mounting type	• Transponder	• Screw mounting (e.g. 2 x M4 hexagon socket head cap screws DIN 6912, spring lock and grommet DIN 433) or glued	
	• Transponder on spacer	• Clips or screw on the side of the clip, or 2°x° screws (e.g. EJOT PT ® WN 5411 35x10 VZ crosshead screw/torx)	
	• Spacer	• Screw mounting (e.g.°2 x M4 hexagon socket head cap screws DIN 6912, spring lock and grommet DIN 433) or glued or secured with tape	
Tightening torque		(at room temperature) < 1.2 Nm	

7.5.5 Memory configuration of the transponder

The memory configuration of the transponder is described in the section SIMATIC memory configuration of the RF600 transponders and labels (Page 270).

7.5.6 Technical Specifications

7.5.6.1 Mechanical data

Property	Description
Dimensions (L x W x H) • Transponder • Spacer	 • 127 x 38 x 6 mm • 157 x 39 x 12 mm
Design	Plastic enclosure (PP; food safe), silicon-free
Housing color	Anthracite
Weight • Transponder • Spacer • Transponder with spacer	 • Approx. 18 g • Approx. 22 g • Approx. 40 g
Mounting on metal	Preferably with spacer

7.5.6.2 Electrical data

Characteristic	Description
Air interface	According to ISO 18 000/ISO -6
Frequency band	860 to 960 MHz
Read distance • on non-metallic carriers • on metallic carriers • on conductive plastic • on metal using spacers[1)]	 • Typ. 8 m • Typ. 3 m • Typ. 1 m • Typ. 7 m
Write distance • non-metallic carriers • on metallic carriers • on conductive plastic • on metal using spacers[1)]	 • Typ. 5.6 m • Typ. 2.1 m • Typ. 0.7 m • Typ. 4.9 m
Polarization type	Linear
Minimum distance to transmitting antenna	Approx. 0.2 m