

Wireless

Radioline antenna accessories

Content

- Concept: New antenna assembly for simple access
- Table: product overview

Examples

- Antennas and assembly
 - RAD-2400-IFS
 - RAD-900-IFS

Addendum

- Designing a long-distance link
- Antenna installation
- Connectors – technical details



Radioline

Every new Phoenix Contact wireless device has the RSMA(F) connector



Wireless module

RSMA (female) antenna connectors on all new wireless devices



Antenna - cable

One cable type (RSMA male – N male) in different lengths (0.5...3 m)



Antenna

N (female) connector on antenna

Antennas and cables for Radioline 2.4 GHz

overview 1/2

| Article | RAD-ISM-2400- ANT-OMNI-2-1- RSMA | RAD-ISM-2400- ANT-VAN-3-0-RSMA | ANT-OMNI-2459- 02 | RAD-ISM-2400- ANT-OMNI-6-0 | RAD-ISM-2459-ANT- FOOD-6-0 | RAD-ISM-2400- ANT-OMNI-6-0-SW | | ANT-DIR-2459-01 |
|-------------------|--|--|---|---|--|--|--|--|
| Order No. | 2701362 | 2701358 | 2701408 | 2885919 | 2692526 | 2903219 | | 2701186 |
| Picture |  |  |  |  |  |  | |  |
| Frequency | 2.4 GHz | 2.4 GHz | 2.4 GHz | 2.4 GHz | 2.4 GHz | 2.4 GHz | | 2.4 GHz |
| Gain | 2 dBi | 3 dBi | 2.5 dBi | 6 dBi | >3 dBi | 6 dBi | | 9 dBi |
| Polarization | Vertical | Vertical | Vertical | Vertical | Vertical | Vertical | | Vertical |
| HPBW horizontal |  360° |  360° |  360° (2,4/5 GHz) |  360° |  360° |  360° | |  75° (2.4 GHz) 55° (5 GHz) |
| HPBW vertical |  75° |  85° |  30° |  30° |  30° |  20° | |  55° (2.4 GHz) 55° (5 GHz) |
| Connector | RSMA (m) | RSMA (m) | N (m) | N (f) | N (f) | N (f) | | N (f) |
| Protection class | IP65 | IP55 | IP68 | IP65 | IP68 | IP65 | | IP67 |
| Temperature range | -20...+65°C | -40...+80 °C | -40...+70°C | -40...+75°C | -40...+80°C | -40...+70°C | | -40...+80°C |
| Dimensions | 82,5 x 7,8 mm | 86 x 43 mm | 180 x 23 mm | 250 x 22 mm | 92 x 52 mm | 330 x 20 mm | | 80 x 101 x 35 mm |
| | Incl. fixed cable 1,5 m | Fixed cable 1,5 m | Mount on switching cabinet, use cable No. 2701402 | Wall and mast mount | Incl. separate cable N/m- SMA/m (needs adapter) | Designed to operate in saltwater environments | | Wall and mast mount |

HPBW = Half Power Band Width = opening angle

Antennas and cables for Radioline 2.4 GHz

overview 2/2

| Article | RAD-ISM-2400- ANT-PAR-19-0 | | RAD-PIG-RSMA/N-x | CN-UB-70DC-6-BB | RAD-CAB-LMR** |
|-------------------|---|--|---|---|---|
| Order No. | 2867885 | | 290326 3 /4 /5 /6 | 2803166 | 5606124 /5 /6 |
| Picture |  | |  |  |  |
| Frequency | 2.4 GHz | | Up to 5 GHz | Up to 6 GHz | Up to 6 GHz |
| Gain | 19 dBi | | -1.2 dB/m @ 5 GHz | - | -7.6, -3.9, -3.13 dB per 100 feet |
| Polarization | Vertical | | - | - | - |
| HPBW horizontal |  17° | | - | - | - |
| HPBW vertical |  11° | | - | - | - |
| Connector | N (f) | | RSMA (m)- N (m) | N (f) – N (f) | N (m) – N (m) |
| Protection class | IP65 | | - | IP68 | - |
| Temperature range | -20...+70°C | | -40...+85°C | -40...90°C | -40...105°C |
| dimensions | 610 x 419 mm | | 0,5 or 1 or 2 or 3 m | 24 x 24 x 47 mm | 10, 20 and 25 feet |
| | Wall and mast mount | | Cable between wireless module and antenna or surge arrester | Antenna surge suppression | Antenna cables |

HPBW = Half Power Band Width = opening angle

Various antennas for different applications – all using the same connector

Omni 2.4 GHz
No. 2885919

N (f)

Omni 2.4/5 GHz
No. 2692526

N (f)

Directional 2.4/5 GHz
No. 2701186

N (f)

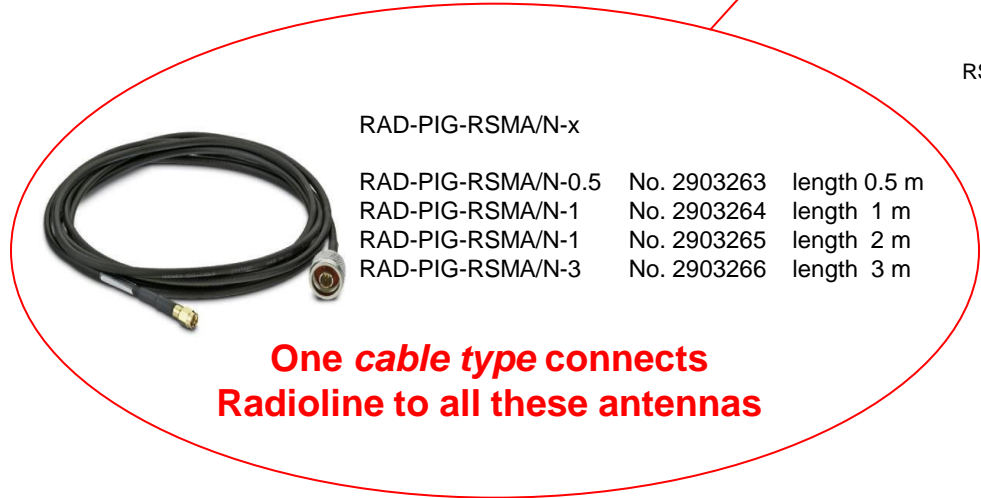
Omni 2.4 GHz saltwater
No. 2903219

N (f)

N (m)

RSMA (m)

RSMA (f)



RAD-PIG-RSMA/N-x

| | | |
|--------------------|-------------|--------------|
| RAD-PIG-RSMA/N-0.5 | No. 2903263 | length 0.5 m |
| RAD-PIG-RSMA/N-1 | No. 2903264 | length 1 m |
| RAD-PIG-RSMA/N-1 | No. 2903265 | length 2 m |
| RAD-PIG-RSMA/N-3 | No. 2903266 | length 3 m |

One cable type connects Radioline to all these antennas



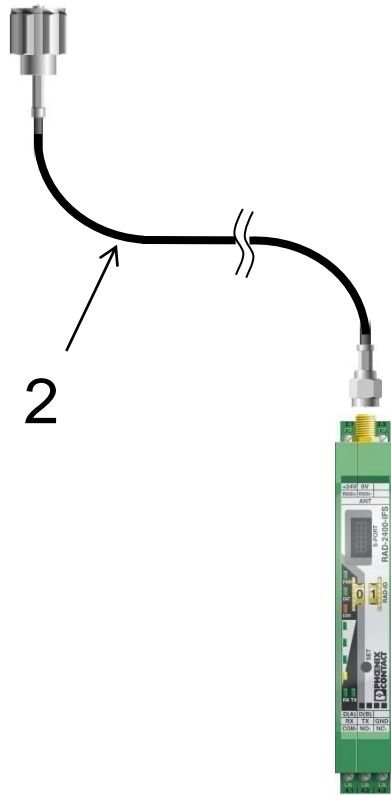
RAD-2400-IFS
Art. No. 2901541



Antenna for omnidirectional radiation with improved gain

Bill of materials

| Index | Part number | Part name | Description | Quantity |
|-------|---------------|---------------------------|--|----------|
| 1 | 2885919 | RAD-ISM-2400-ANT-OMNI-6-0 | Omnidirectional antenna with 6 dBi gain 2.4 GHz N(f) | 1 |
| 2 | 2903263/4/5/6 | RAD-PIG-RSMA/N-0.5/1/2/3 | N(m) to RSMA(m) antenna cable 0.5/1/2/3 m | 1 |
| 3 | 2901541 | RAD-2400-IFS | Radioline 2.4 GHz | 1 |



2.4 GHz

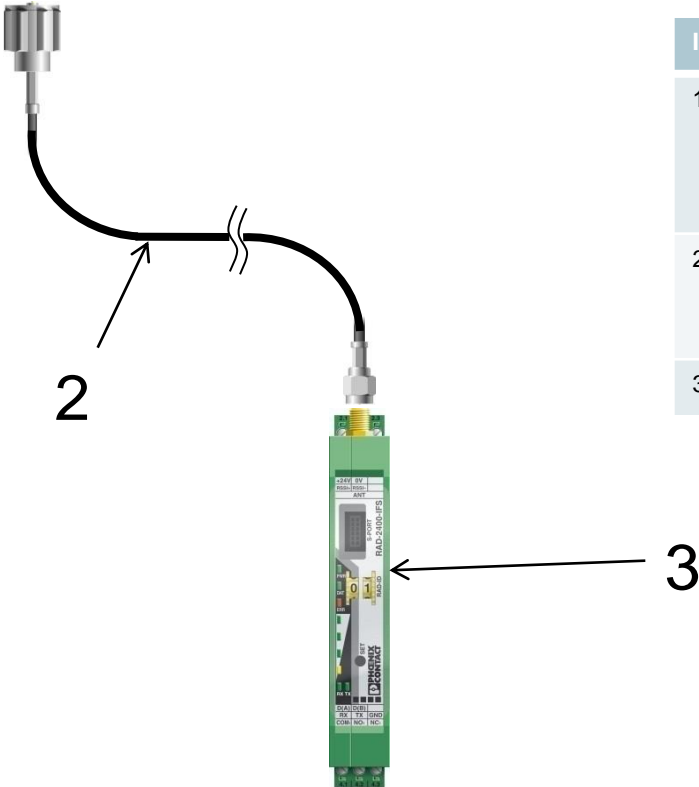
Antenna for directional radiation with improved gain



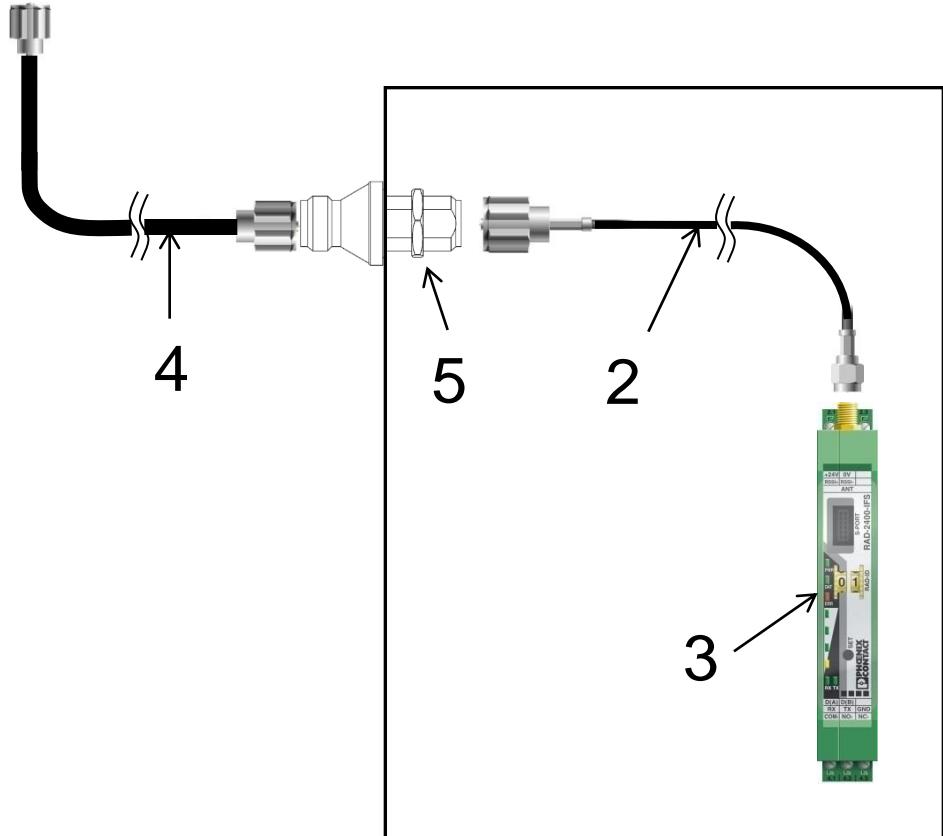
Bill of materials

| Index | Part number | Part name | Description | Quantity |
|-------|---------------|--------------------------|---|----------|
| 1 | 2701186 | ANT-DIR-2459-01 | Panel directional antenna with 9 dBi gain 2.4 GHz IP67 N(f) | 1 |
| 2 | 2903263/4/5/6 | RAD-PIG-RSMA/N-0.5/1/2/3 | N(m) to RSMA(m) antenna cable 0.5/1/2/3 m | 1 |
| 3 | 2901541 | RAD-2400-IFS | Radioline 2.4 GHz | 1 |

2.4 GHz



Antenna for directional radiation prolonged cable with surge protection



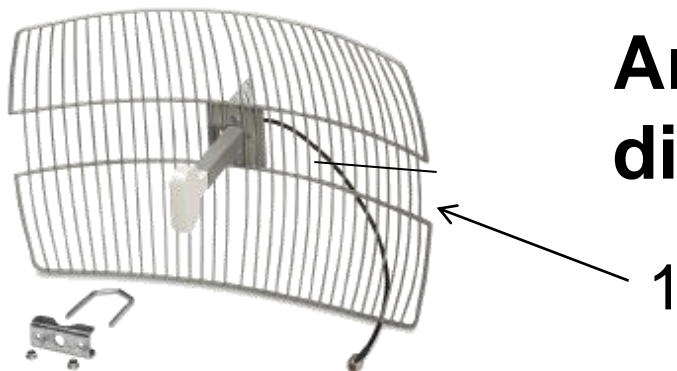
Mounting inside switching cabinet

Bill of materials

| Index | Part number | Part name | Description | Quantity |
|-------|-------------------------------|--------------------------|---|----------|
| 1 | 2701186 | ANT-DIR-2459-01 | Panel-directional antenna with 9 dBi gain 2.4 GHz IP67 N(f) | 1 |
| 2 | 2903263/4/5/6 | RAD-PIG-RSMA/N-0.5/1/2/3 | N(m) to RSMA(m) antenna cable 0.5/1/2/3 m | 1 |
| 3 | 2901541 | RAD-2400-IFS | Radioline 2.4 GHz | 1 |
| 4 | 5606124 5606125 5606126 | RAD-CAB-LMR** | N(m) to N(m) antenna cable 10, 20, 25 foot | 1 |
| 5 | 2803166 | CN-UB-70DC-6-BB | Coaxial surge protection | 1 |

2.4 GHz

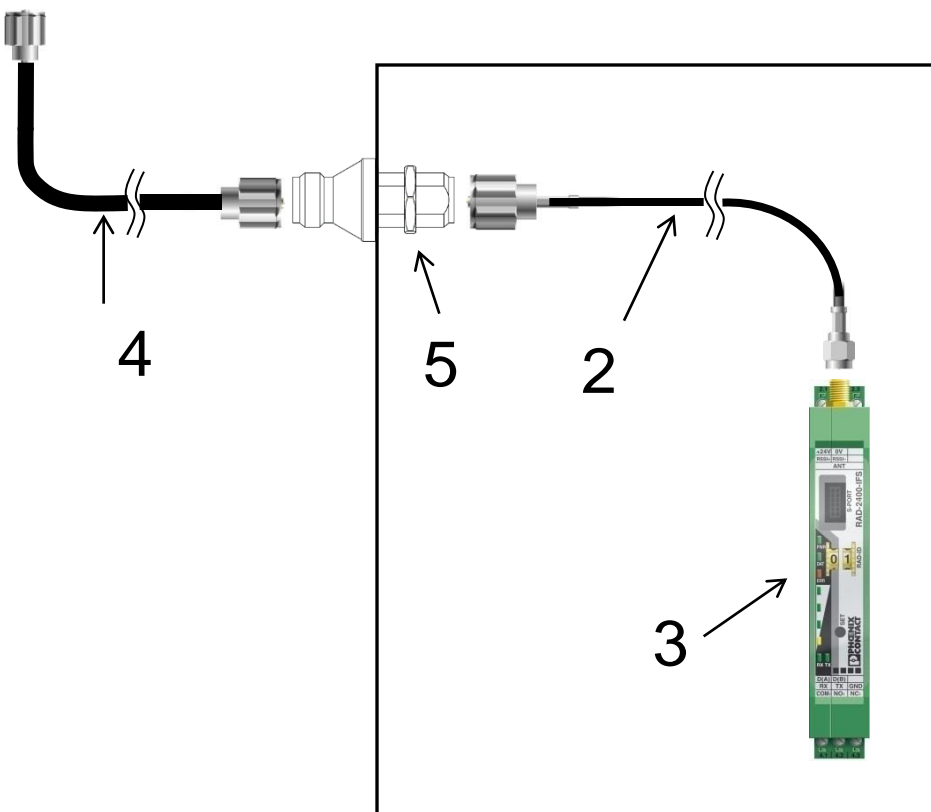
Antenna for directional long distance communication



Bill of materials

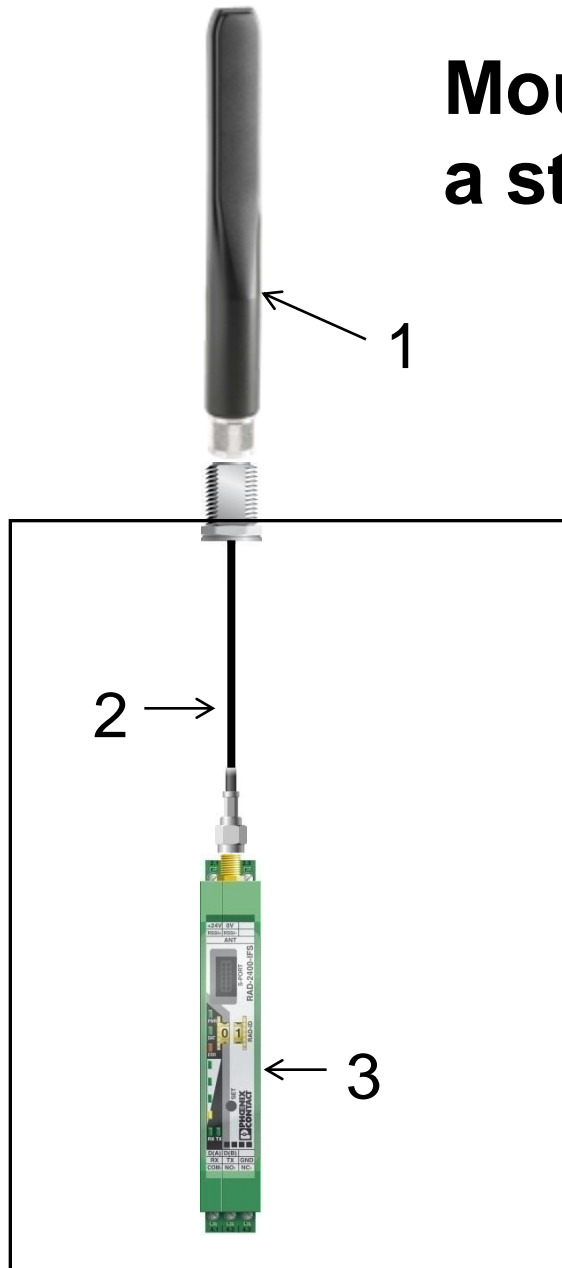
| Index | Part number | Part name | Description | Quantity |
|-------|-------------------------------|---------------------------|--|----------|
| 1 | 2867885 | RAD-ISM-2400-ANT-PAR-19-0 | Parabolic antenna with 19 dBi gain 2.4 GHz IP65 N(f) | 1 |
| 2 | 2903263/4/5/6 | RAD-PIG-RSMA/N-0.5/1/2/3 | N(m) to RSMA(m) antenna cable 0.5/1/2/3 m | 1 |
| 3 | 2901541 | RAD-2400-IFS | Radioline 2.4 GHz | 1 |
| 4 | 5606124 5606125 5606126 | RAD-CAB-LMR** | N(m) to N(m) antenna cable 10, 20, 25 foot | 1 |
| 5 | 2803166 | CN-UB-70DC-6-BB | Coaxial surge protection | 1 |

2.4 GHz



Mounting inside switching cabinet

Mounting the RAD-2400-IFS inside a standard switching cabinet

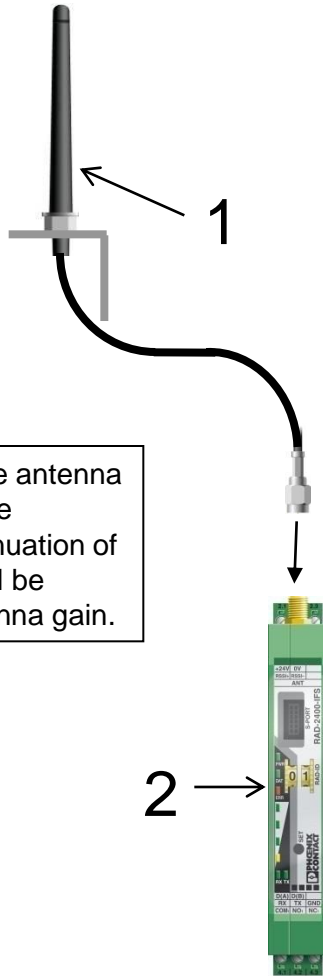


Bill of materials

| Index | Part number | Part name | Description | Quantity |
|-------|-------------|----------------------|--|----------|
| 1 | 2701408 | ANT-OMNI-2459-02 | Omnidirectional antenna with 2.5 dBi gain, 2.4 GHz, IP68, N(m) | 1 |
| 2 | 2701402 | RAD-PIG-EF316-N-RSMA | N(f) to RSMA(m) antenna cable (bulkhead) | 1 |
| 3 | 2901541 | RAD-2400-IFS | Radioline 2.4 GHz | 1 |

2.4 GHz

Mounting the omnidirectional antenna everywhere with a mounting bracket



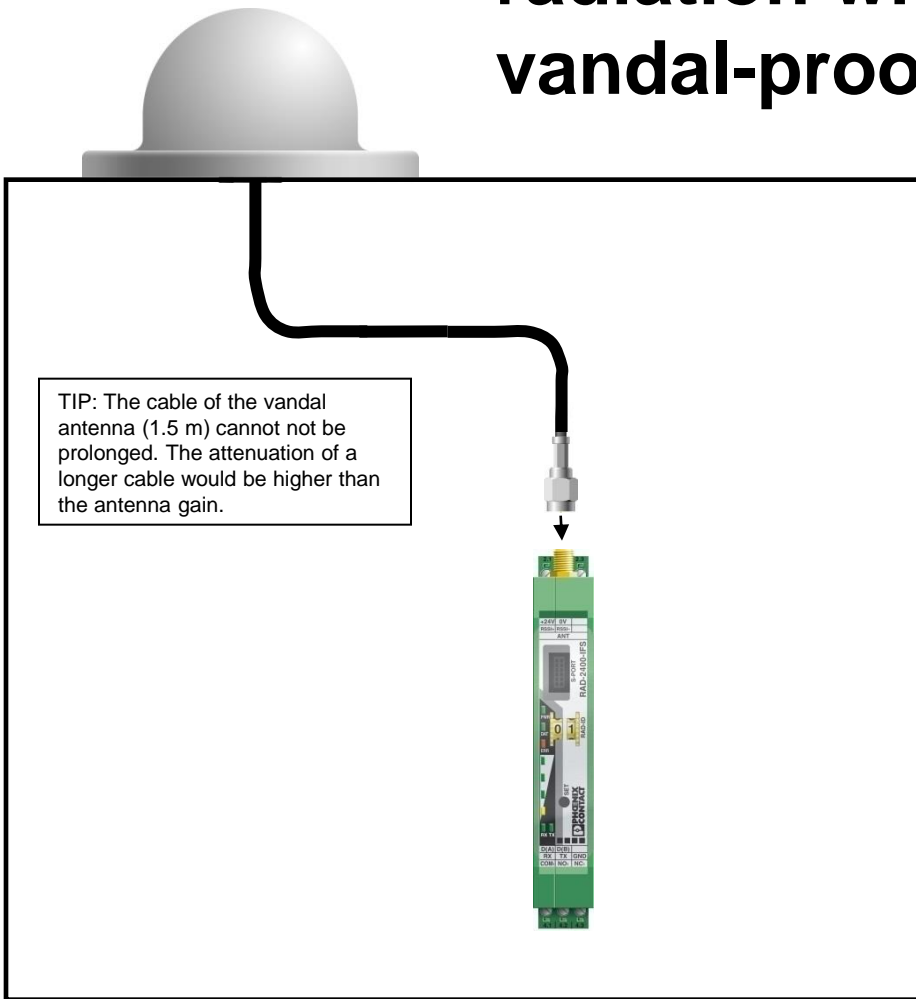
TIP: The cable of the antenna (1.5 m) cannot not be prolonged. The attenuation of a longer cable would be higher than the antenna gain.

Bill of materials

| Index | Part number | Part name | Description | Quantity |
|-------|-------------|--------------------------------|--|----------|
| 1 | 2701362 | RAD-ISM-2400-ANT-OMNI-2-1-RSMA | Omnidirectional antenna with 2 dBi gain 2.4 GHz RSMA(m) IP65 | 1 |
| 2 | 2901541 | RAD-2400-IFS | Radioline 2.4 GHz | 1 |

2.4 GHz

Antenna for omnidirectional radiation with standard gain and vandal-proof design

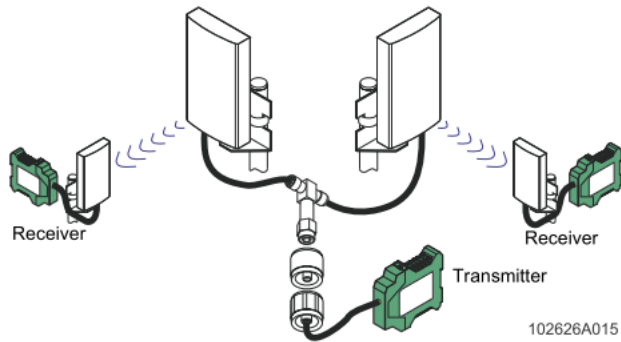


Bill of materials

| Index | Part number | Part name | Description | Quantity |
|-------|-------------|-------------------------------|--|----------|
| 1 | 2701358 | RAD-ISM-2400-ANT-VAN-3-0-RSMA | Omnidirectional antenna with 3 dBi gain 2.4 GHz RSMA(m) IP55 | 1 |
| 2 | 2901541 | RAD-2400-IFS | Radioline 2.4 GHz | 1 |

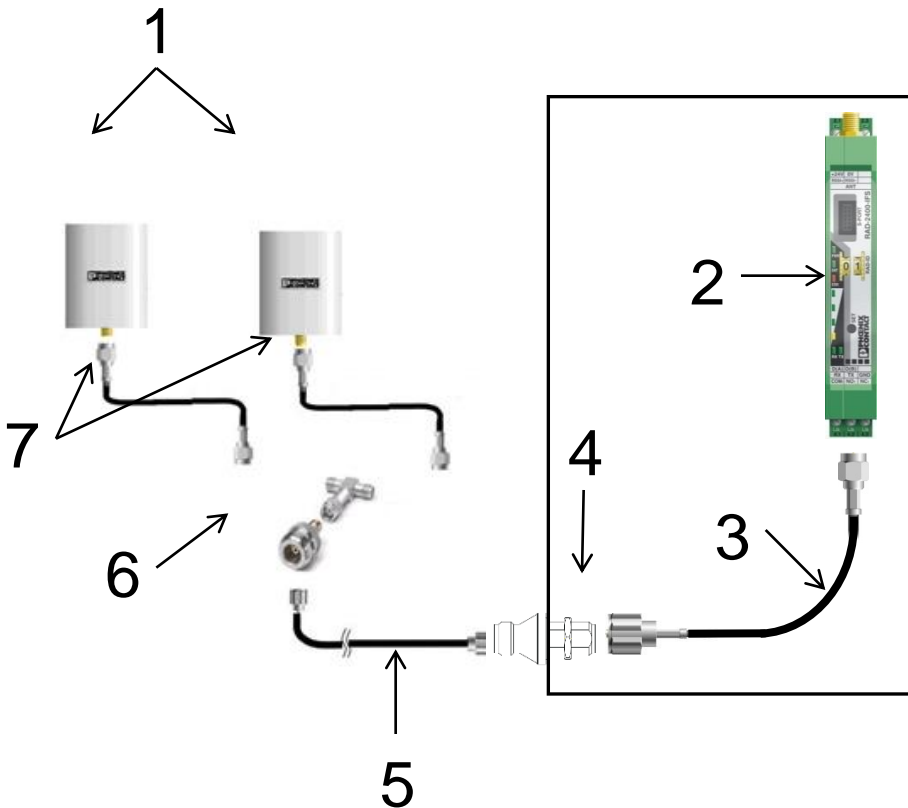
2.4 GHz

Antenna splitter sets for repeater applications



Bill of materials

| Index | Part number | Part name | Description | Quantity |
|-------|-------------------------------|--------------------------|---|----------|
| 1 | 2867610 | RAD-ISM-2400-ANT-PAN-8-0 | Panel-directional antenna with 8 dBi gain 2.4 GHz SMA(f) IP55 | 2 |
| 2 | 2901541 | RAD-2400-IFS | Radioline 2.4 GHz | 1 |
| 3 | 2903263/4/5/6 | RAD-PIG-RSMA/N-0.5/1/2/3 | Antenna cable N(m) to RSMA(m) 0.5/1/2/3 m | 1 |
| 4 | 2803166 | CN-UB-70DC-6-BB | Coaxial surge protection | 1 |
| 5 | 5606124 5606125 5606126 | RAD-CAB-LMR** | N(m) to N(m) antenna cable 10, 20, 25 foot | 1 |
| 6 | 2885595 | RAD-ISM-2400-SPL-2-SMA | Antenna splitter: 2 SMA(f),1 SMA(m) | 1 |
| 7 | 2885618 | RAD-PIG-EF316-SMA-SMA | Antenna cable SMA(m) to SMA(m) 0.5 m | 2 |



2.4 GHz

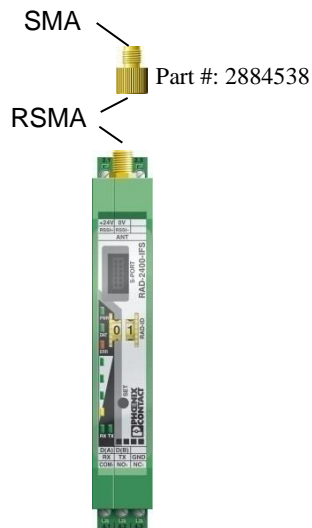
Can the classic antenna portfolio still be used?

Yes!

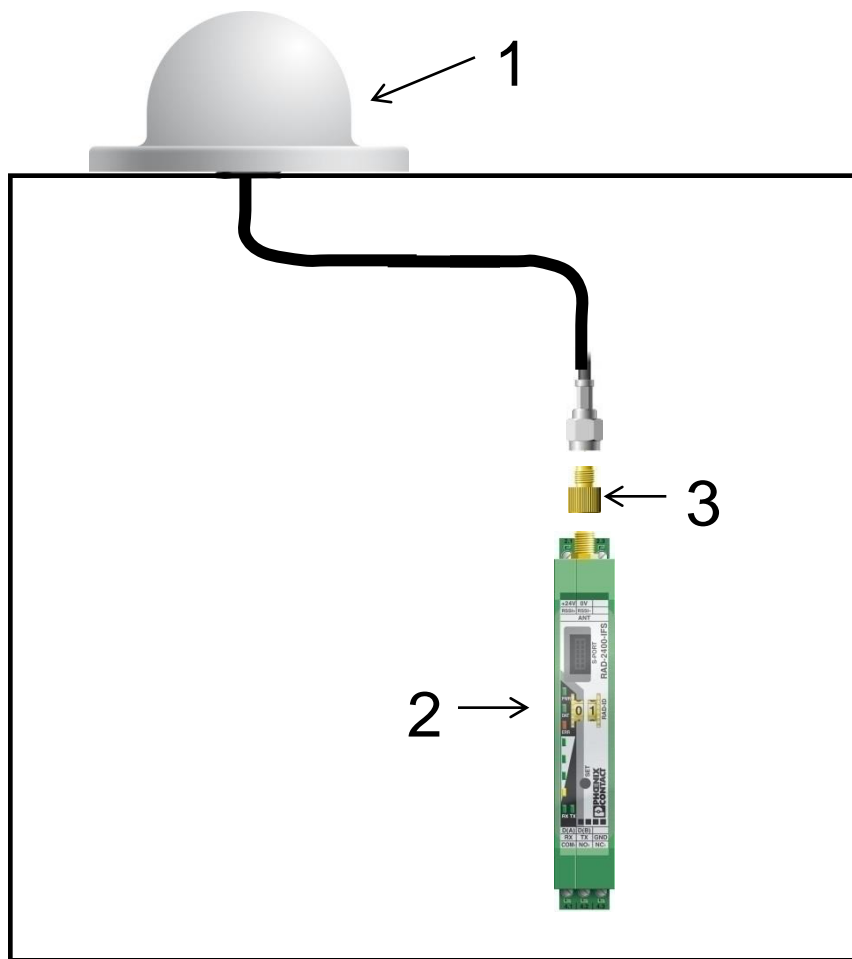
- Match the appropriate antenna with the correct frequency band

2.4 GHz

- One antenna cable adapter changes from RSMA to SMA



Vandal-proof, omnidirectional antenna mounted on switching cabinet or mobile device

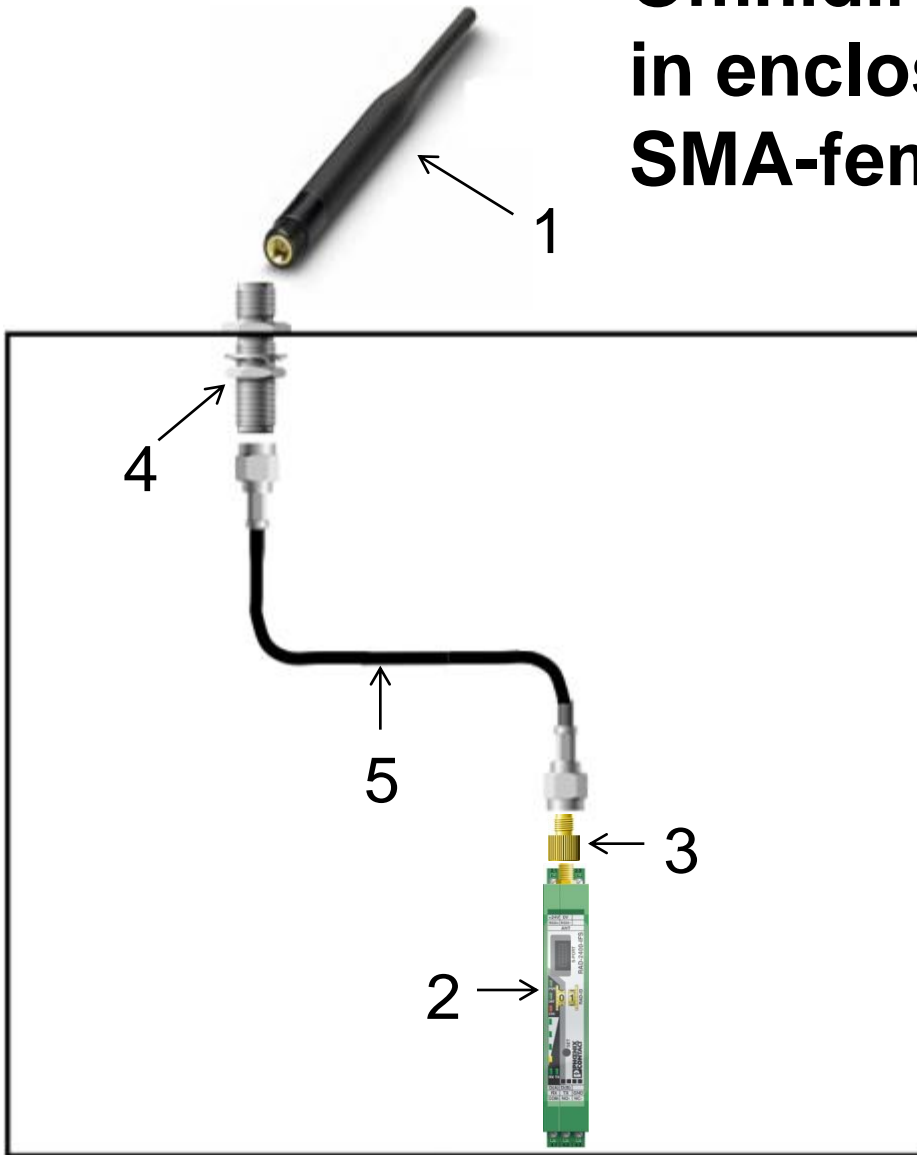


Bill of materials

| Index | Part number | Part name | Description | Quantity |
|-------|-------------|------------------------------|---|----------|
| 1 | 2885867 | RAD-ISM-2400-ANT-VAN-3-0-SMA | Omnidirectional antenna with 3 dBi gain 2.4 GHz SMA(m) IP55 | 1 |
| 2 | 2901541 | RAD-2400-IFS | Radioline 2.4 GHz | 1 |
| 3 | 2884538 | RAD-ADP-RSMA/F-SMA/F | Adapter for RSMA(f) to SMA(f) | 1 |

2.4 GHz

Omnidirectional antenna (5 dBi) in enclosure with SMA-female to SMA-female bulkhead adaptor

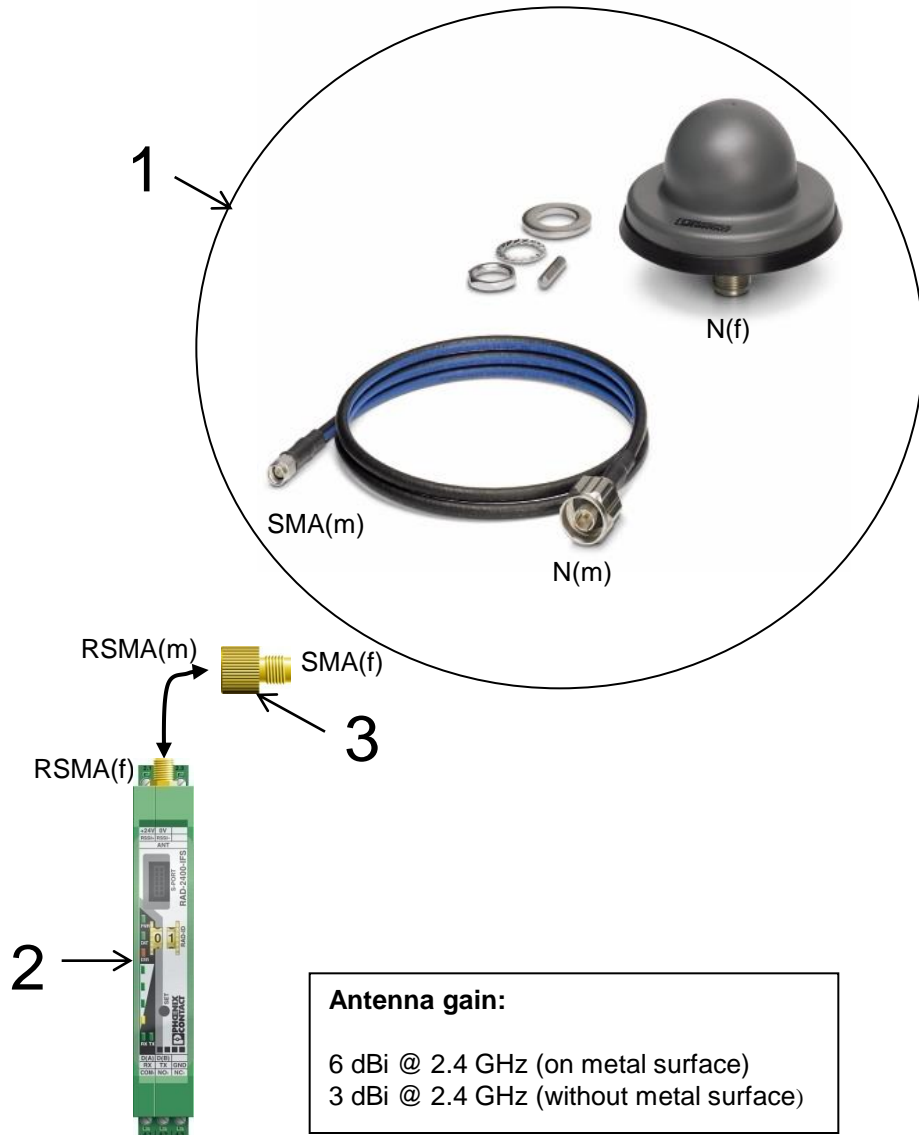


Bill of materials

| Index | Part number | Part name | Description | Quantity |
|-------|-------------|----------------------------|---|----------|
| 1 | 2884923 | RAD-ISM-2400-ANT-OMNI-5-0 | Omnidirectional antenna with 5 dBi gain 2.4 GHz SMA(m) IP55 | 1 |
| 2 | 2901541 | RAD-2400-IFS | Radioline 2.4 GHz | 1 |
| 3 | 2884538 | RAD-ADP-RSMA/F-SMA/F | Adapter for RSMA(f) to SMA(f) | 1 |
| 4 | 2884541 | RAD-ADP-SAM/F-SMA/F | Adapter for SMA(F) to SMA(f) | 1 |
| 5 | 2885618 | RAD-PIG-EF-316-SMA/M-SMA/M | Antenna cable SMA(m) to SMA(m) 0.5 m | 1 |

2.4 GHz

Vandal-proof, omnidirectional antenna to be mounted on switching cabinet or mobile device: IP68 for food and beverage

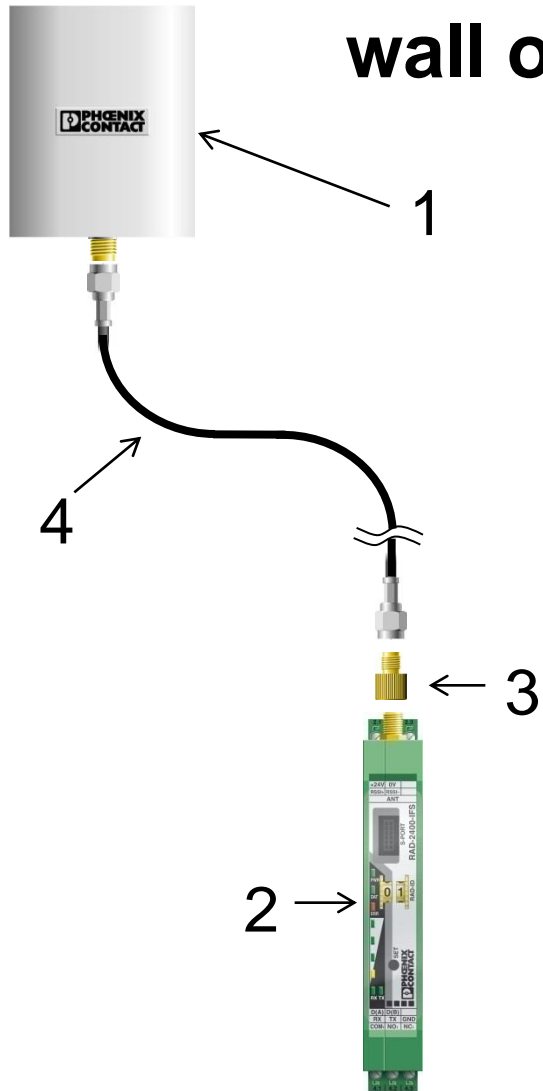


Bill of materials

| Index | Part number | Part name | Description | Quantity |
|-------|-------------|---------------------------|---|----------|
| 1 | 2692526 | RAD-ISM-2459-ANT-FOOD-6-0 | Omnidirectional antenna with 6 dBi gain 2.4 GHz SMA(m) IP68 | 1 |
| 2 | 2901541 | RAD-2400-IFS | Radioline 2.4 GHz | 1 |
| 3 | 2884538 | RAD-ADP-RSMA/F-SMA/F | Adapter for RSMA(f) to SMA(f) | 1 |

2.4 GHz

Directional antenna mounted on wall or mast
























Bill of materials

| Index | Part number | Part name | Description | Quantity |
|-------|--------------------|--------------------------|---|----------|
| 1 | 2867610 | RAD-ISM-2400-ANT-PAN-8-0 | Panel-directional antenna with 8 dBi gain 2.4 GHz SMA(f) IP68 | 1 |
| 2 | 2901541 | RAD-2400-IFS | Radioline 2.4 GHz | 1 |
| 3 | 2884538 | RAD-ADP-RSMA/F-SMA/F | Adapter for RSMA(f) to SMA(f) | 1 |
| 4 | 2884512 2884525 | RAD-CAB-EF142-3M/5M | Antenna cable SMA(m) to SMA(m) 3/5 m | 1 |

2.4 GHz

Antennas and cables for Radioline 900 MHz







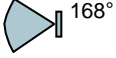
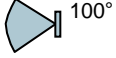
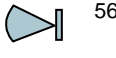

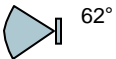

overview 2/2

| Article | RAD-900-ANT-OMNI-2-2-RSMA | RAD-900-ANT-OMNI-2-N | RAD-ISM-900-ANT-OMNI-RPSMA | RAD-ISM-900-ANT-OMNI-0-N | RAD-ISM-900-ANT-OMNI-FG-3-N | RAD-ISM-900-ANT-OMNI-FG-6-N | RAD-ISM-900-ANT-OMNI-5 |
|-------------------|--|--|--|---|--|--|--|
| Order No. | 2904801 | 2904802 | 2885676 | 5604160 | 2867791 | 2885579 | 2867199 |
| Picture |  |  |  |  |  |  |  |
| Frequency | 900 MHz | 900 MHz | 900 MHz | 900 MHz | 902-928 MHz | 900 MHz | 900 MHz |
| Gain | 2.15 dBi | 2.15 dBi | 2 dBi | 2.15 dBi | 5.15 dBi | 8 dBi | 7 dBi |
| Polarization | Vertical | Vertical | Vertical | Vertical | Vertical | Vertical | Vertical |
| HPBW horizontal |  360° |  360° |  360° |  360° |  360° |  360° |  360° |
| HPBW vertical |  78° |  78° |  78° |  78° |  28° |  15° |  30° |
| Connector | RSMA (m) | N (f) | RPSMA (m) | N (f) | N (f) | N(f) | N (f) |
| Protection class | IP65 | IP66 | IP55 | IP65 | IP65 | IP65 | IP65 |
| Temperature range | -40...+75°C | -40...+70°C | -20...+65°C | -40...+75°C | -40...+80°C | -40...+80°C | -40...+80°C |
| Dimensions | 89 x 12 mm | 89 x 38 mm | 203 x 13 mm | 89 x 3 mm | 1120 x 60 mm | 1800 x 60 mm | 610 x 3 mm |
| | Fixed cable 6 m | Mounts on switching cabinet | Direct mount on radio | Fixed cable 76 mm | Fiber glass with wall mount kit | Fiber glass with wall mount kit | Wall and mast mount |

HPBW = Half Power Band Width = opening angle

Antennas and cables for Radioline 900 MHz

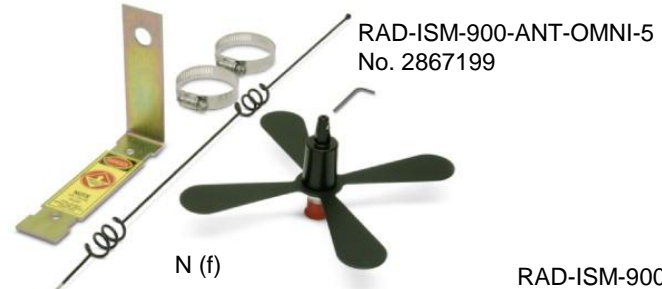
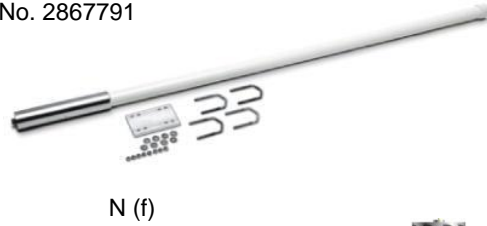
overview 2/2

| Article | RAD-ISM-900-ANT-YAGI-3-N | RAD-ISM-ANT-YAGI-6.5-N | RAD-ISM-900-ANT-YAGI-10-N | | RAD-PIG-RSMA/N-x | CN-UB-70DC-6-BB | RAD-CAB-LMR** |
|-------------------|--|--|---|--|---|---|---|
| Order No. | 2867801 | 2867814 | 5606614 | | 290326 3 /4 /5 /6 | 2803166 | 5606124 /5 /6 |
| Picture |  |  |  | |  |  |  |
| Frequency | 900 MHz | 900 MHz | 900 MHz | | up to 5 GHz | up to 6 GHz | up to 6 GHz |
| Gain | 5 dBi | 8.5 dBi | 12.15 dBi | | -1.2 dB/m @ 5 GHz | - | -7.6, -3.9, -3.13 dB per 100 feet |
| Polarization | Vertical | Vertical | Vertical | | - | - | - |
| HPBW horizontal |  168° |  100° |  56° | | - | - | - |
| HPBW vertical |  78° |  62° |  46° | | - | - | - |
| Connector | N (f) | N (f) | N(f) | | RSMA (m) – N (m) | N (f) – N (f) | N (m) – N (m) |
| Protection class | IP65 | IP65 | IP65 | | - | IP68 | - |
| Temperature range | -40...+80°C | -40...+80°C | -40...+70°C | | -40...+85°C | -40...+90°C | -40...105°C |
| dimensions | 170 x 60 mm | 170 x 60 mm | 172 x 60.5 mm | | 0,5 or 1 or 2 or 3 m | 24 x 24 x 47 mm | 10, 20 and 25 feet |
| | Yagi directional antenna | Yagi directional antenna | Yagi directional antenna | | Cable between wireless module and antenna or surge arrester | Antenna surge suppression | Antenna cables, Visit www.phoenixcontact.com/antennas for more lengths |

HPBW = Half Power Band Width = opening angle

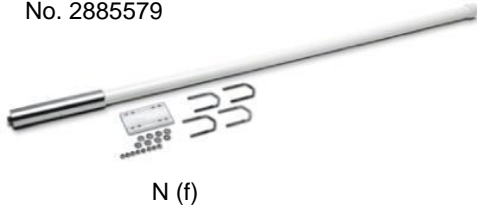
Various antennas for different applications – all using the same connector (900 MHz)

RAD-ISM-900-ANT-OMNI-FG-3-N
No. 2867791



RAD-ISM-900-ANT-OMNI-5
No. 2867199

RAD-ISM-900-ANT-OMNI-FG-6-N
No. 2885579



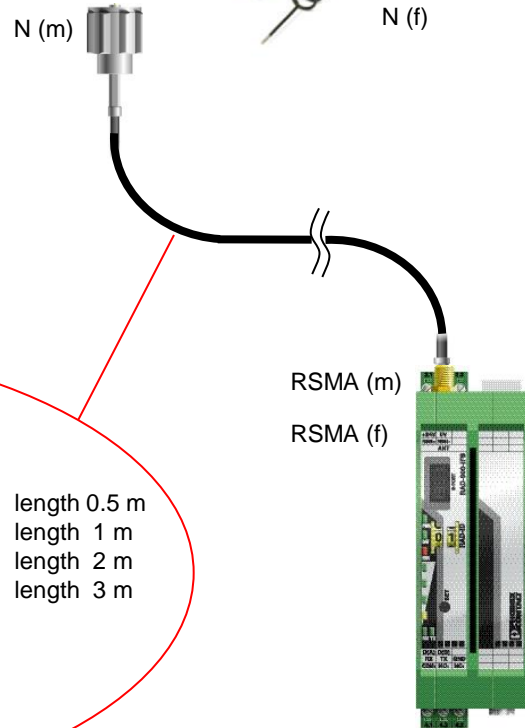
RAD-ISM-900-ANT-YAGI-3-N
No. 2867801



RAD-PIG-RSMA/N-x

| | | |
|--------------------|-------------|--------------|
| RAD-PIG-RSMA/N-0.5 | No. 2903263 | length 0.5 m |
| RAD-PIG-RSMA/N-1 | No. 2903264 | length 1 m |
| RAD-PIG-RSMA/N-1 | No. 2903265 | length 2 m |
| RAD-PIG-RSMA/N-3 | No. 2903266 | length 3 m |

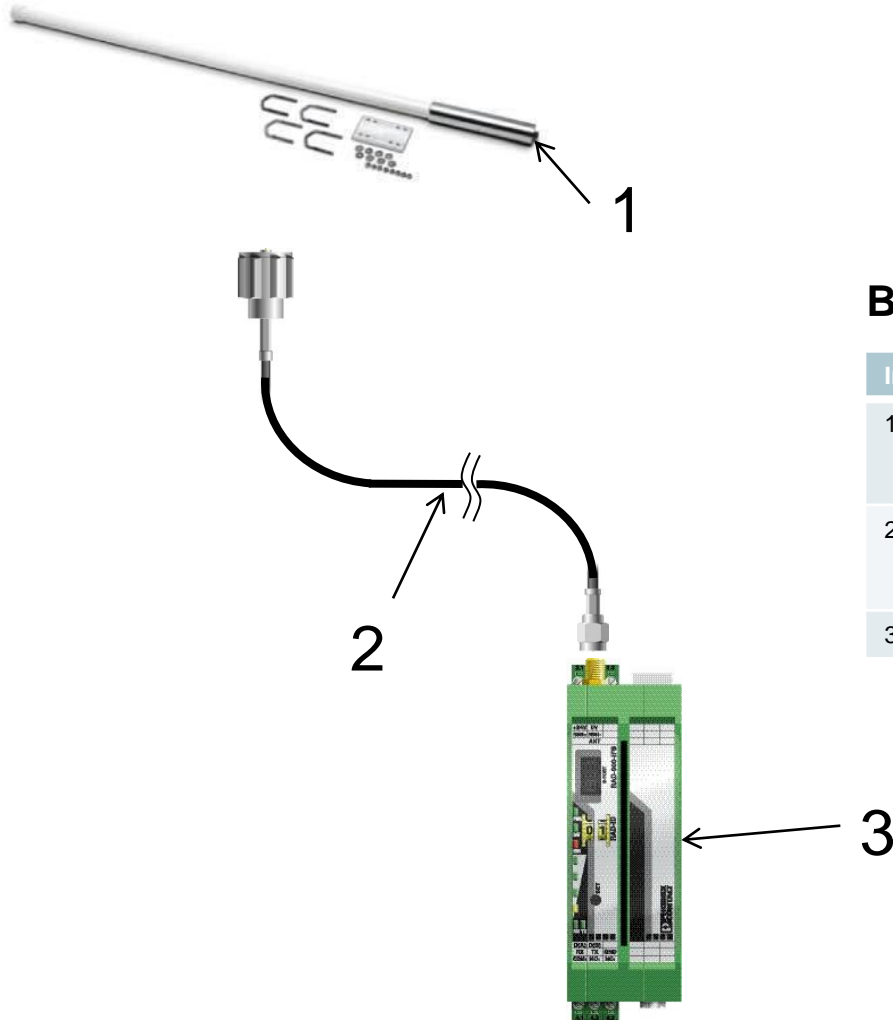
One cable type connects Radioline to all these antennas



RAD-900-IFS
Art. No. 2901540

900 MHz

Antenna for omnidirectional radiation with improved gain (5 dBi)

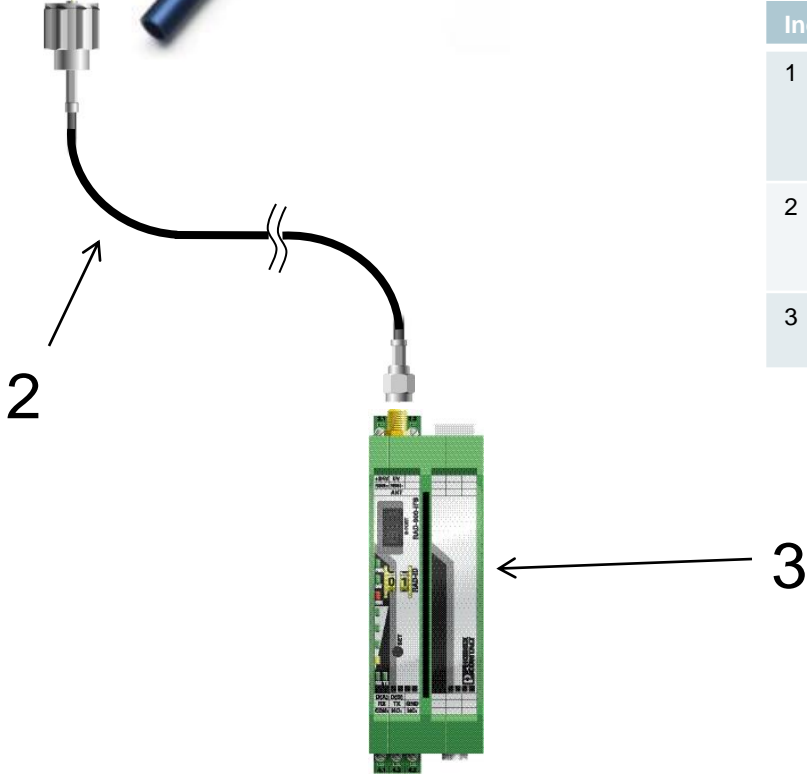


Bill of materials

| Index | Part number | Part name | Description | Quantity |
|-------|---------------|-----------------------------|--|----------|
| 1 | 2867791 | RAD-ISM-900-ANT-OMNI-FG-3-N | Omnidirectional antenna with 5 dBi gain 900 MHz N(f) | 1 |
| 2 | 2903263/4/5/6 | RAD-PIG-RSMA/N-0.5/1/2/3 | N(m) to RSMA(m) antenna cable 0.5/1/2/3 m | 1 |
| 3 | 2901540 | RAD-900-IFS | Radioline 900 MHz | 1 |

900 MHz

Antenna for directional radiation with improved gain (8.5 dBi)

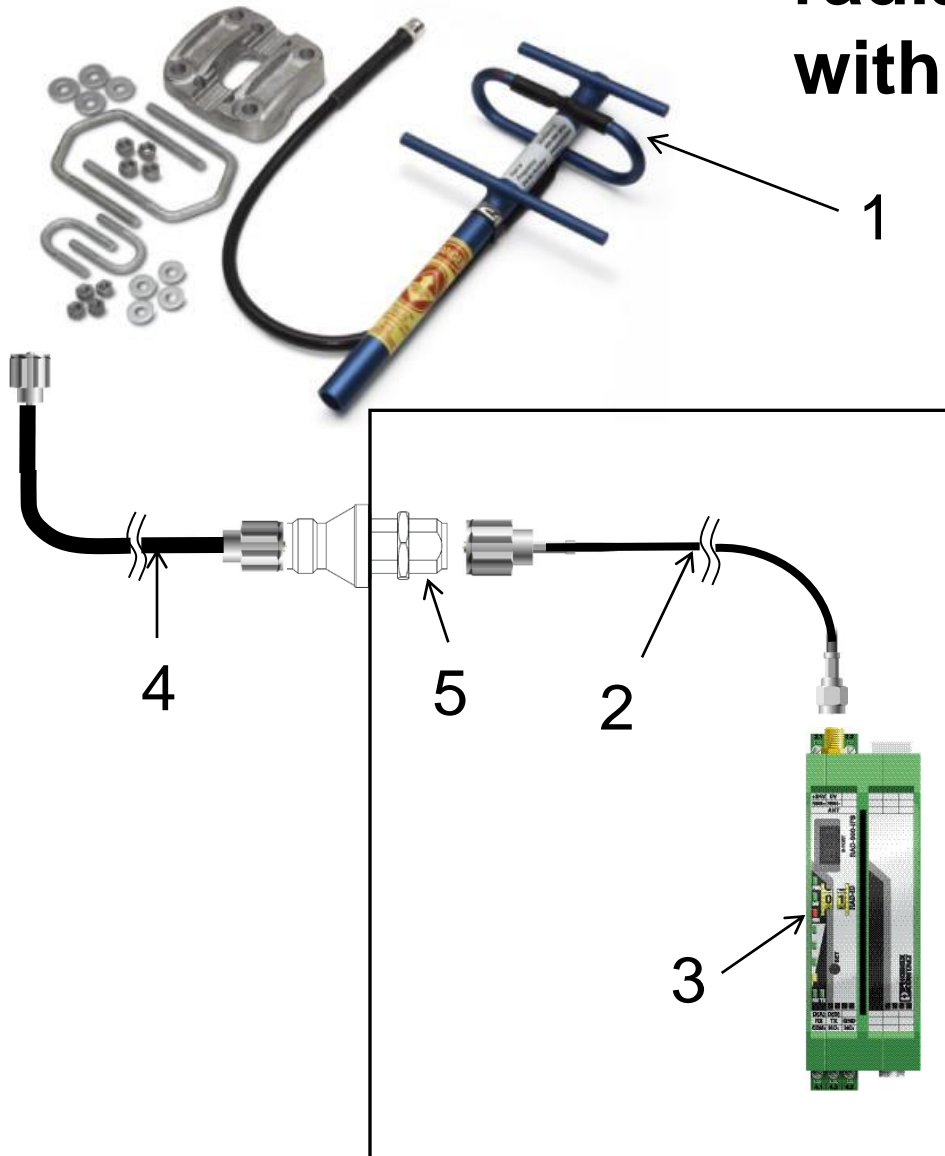


Bill of materials

| Index | Part number | Part name | Description | Quantity |
|-------|---------------|----------------------------|---|----------|
| 1 | 2867814 | RAD-ISM-900-ANT-YAGI-6.5-N | Yagi directional antenna with 8.5 dBi gain 900 MHz N(f) | 1 |
| 2 | 2903263/4/5/6 | RAD-PIG-RSMA/N-0.5/1/2/3 | N(m) to RSMA(m) antenna cable 0.5/1/2/3 m | 1 |
| 3 | 2901540 | RAD-2400-IFS | Radioline 900 MHz | 1 |

900 MHz

Antenna for directional radiation prolonged cable with surge protection



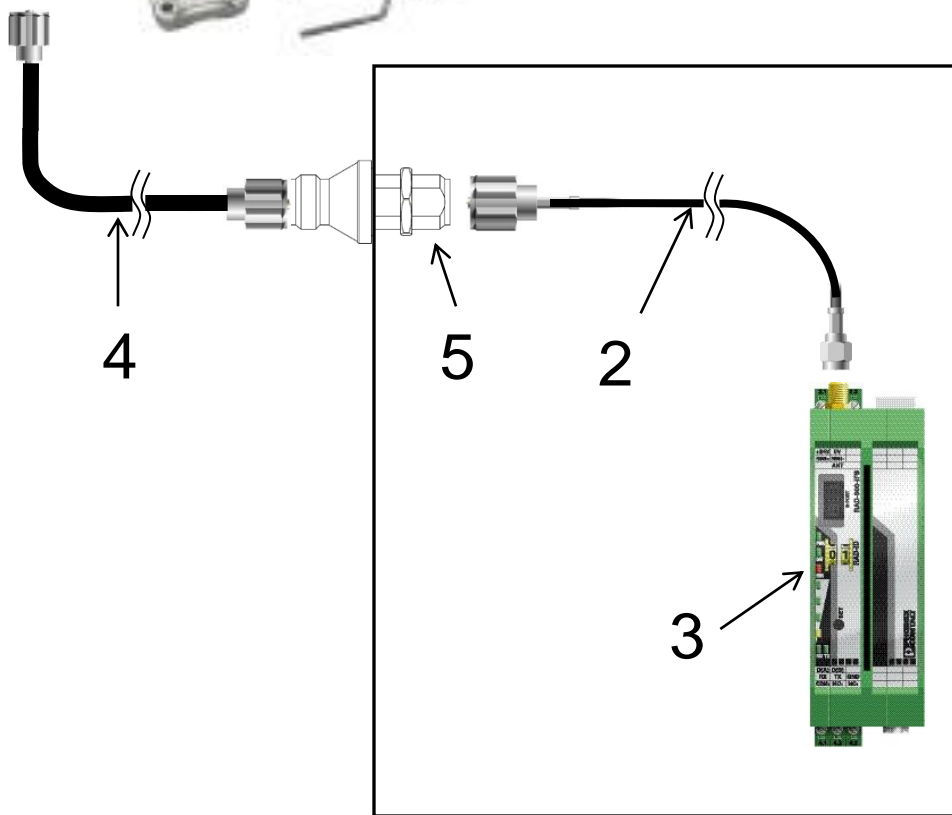
Mounting inside switching cabinet

Bill of materials

| Index | Part number | Part name | Description | Quantity |
|-------|-------------------------------|----------------------------|---|----------|
| 1 | 2867814 | RAD-ISM-900-ANT-YAGI-6.5-N | Yagi directional antenna with 8.5 dBi gain 900 MHz N(f) | 1 |
| 2 | 2903263/4/5/6 | RAD-PIG-RSMA/N-0.5/1/2/3 | N(m) to RSMA(m) antenna cable 0.5/1/2/3 m | 1 |
| 3 | 2901540 | RAD-900-IFS | Radioline 900 MHz | 1 |
| 4 | 5606124 5606125 5606126 | RAD-CAB-LMR** | N(m) to N(m) antenna cable 10, 20, 25 foot | 1 |
| 5 | 2803166 | CN-UB-70DC-6-BB | Coaxial surge protection | 1 |

900 MHz

Antenna for directional long distance communication



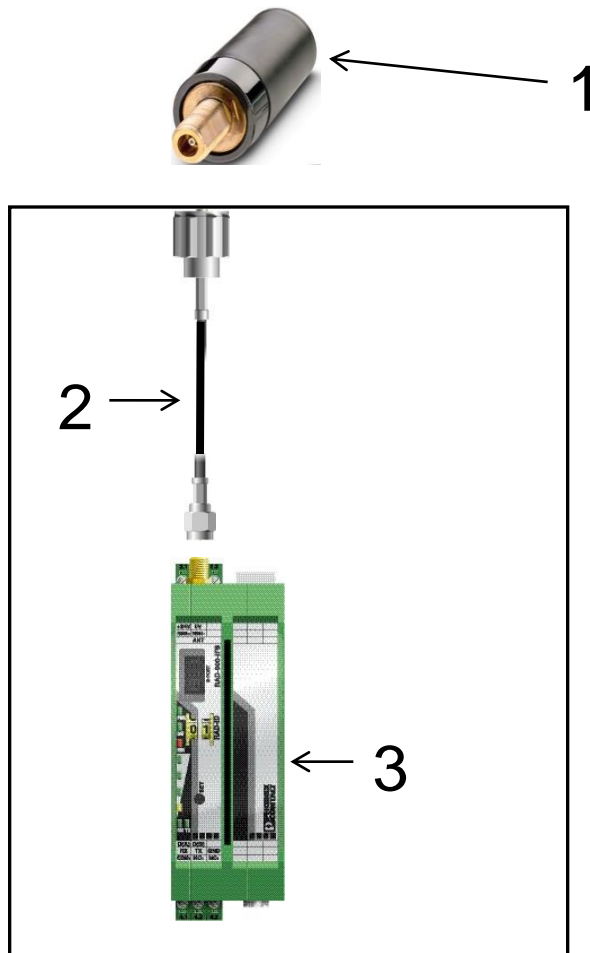
Mounting inside switching cabinet

Bill of materials

| Index | Part number | Part name | Description | Quantity |
|-------|-------------------------------|---------------------------|---|----------|
| 1 | 5606614 | RAD-ISM-900-ANT-YAGI-10-N | Yagi directional antenna with 12.15 dBi gain 900 MHz N(f) | 1 |
| 2 | 2903263/4/5/6 | RAD-PIG-RSMA/N-0.5/1/2/3 | N(m) to RSMA(m) antenna cable 0.5/1/2/3 m | 1 |
| 3 | 2901540 | RAD-900-IFS | Radioline 900 MHz | 1 |
| 4 | 5606124 5606125 5606126 | RAD-CAB-LMR** | N(m) to N(m) antenna cable 10, 20, 25 foot | 1 |
| 5 | 2803166 | CN-UB-70DC-6-BB | Coaxial surge protection | 1 |

900 MHz

Mounting the RAD-900-IFS inside a standard switching cabinet

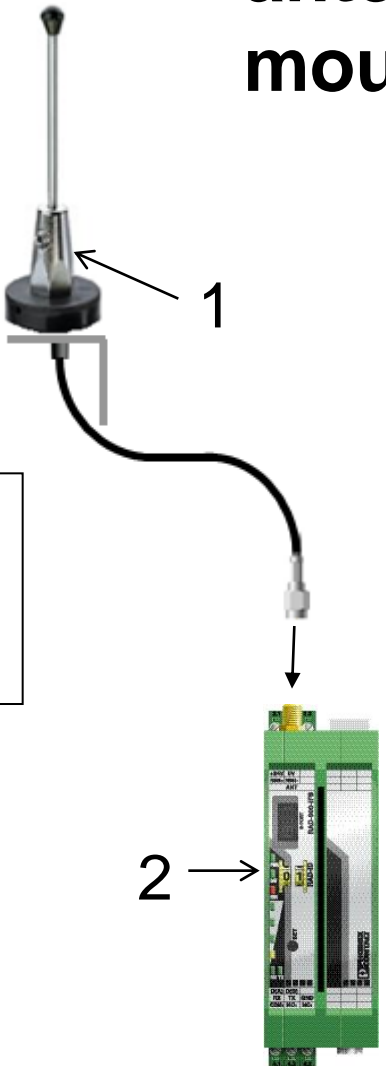


Bill of materials

| Index | Part number | Part name | Description | Quantity |
|-------|---------------|--------------------------|--|----------|
| 1 | 2904802 | RAD-900-ANT-OMNI-2-N | Omnidirectional antenna with 2 dBi gain 900 MHz N(f) | 1 |
| 2 | 2903263/4/5/6 | RAD-PIG-RSMA/N-0.5/1/2/3 | N(m) to RSMA(m) antenna cable | 1 |
| 3 | 2901540 | RAD-900-IFS | Radioline 900 MHz | 1 |

900 MHz

Mounting the omnidirectional antenna everywhere with a mounting bracket



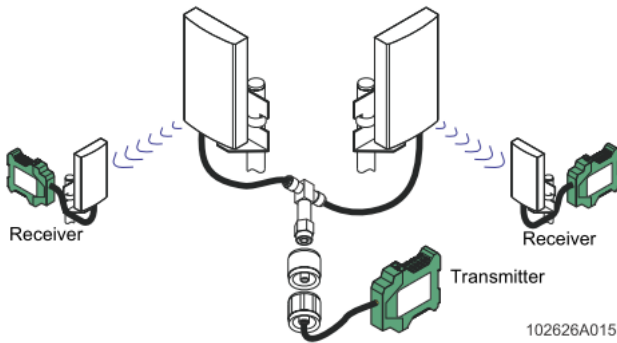
TIP: The cable of the antenna (1.5 m) cannot be prolonged. The attenuation of a longer cable would be higher than the antenna gain.

Bill of materials

| Index | Part number | Part name | Description | Quantity |
|-------|-------------|---------------------------|---|----------|
| 1 | 2904801 | RAD-900-ANT-OMNI-2-2-RSMA | Omni directional antenna with 2 dBi gain 900 MHz RSMA(m) IP65 | 1 |
| 2 | 2901540 | RAD-900-IFS | Radioline 900 MHz | 1 |

900 MHz

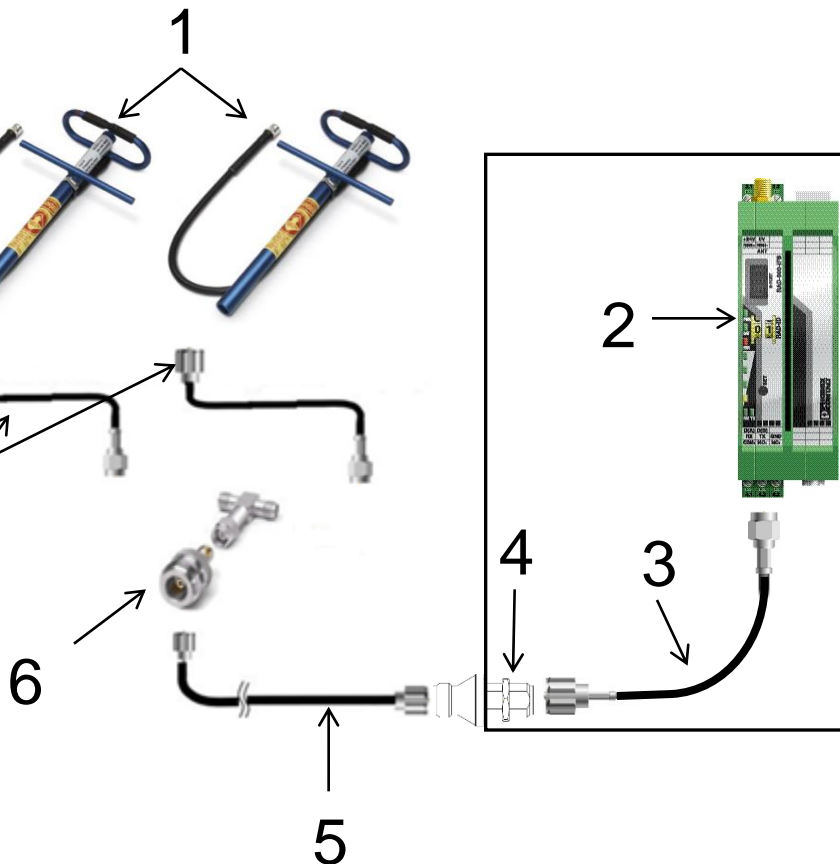
Antenna splitter sets for repeater applications



Bill of materials

| Index | Part number | Part name | Description | Quantity |
|-------|-------------------------------|--------------------------|--|----------|
| 1 | 2867814 | RAD-ISM-900-ANT-YAGI-3-N | Yagi directional antenna with 5 dBi gain 900 MHz N(f) IP65 | 2 |
| 2 | 2901540 | RAD-900-IFS | Radioline 900 MHz | 1 |
| 3 | 2903263/4/5/6 | RAD-PIG-RSMA/N-0.5/1/2/3 | Antenna cable N(m) to RSMA(m) 0.5/1/2/3 m | 1 |
| 4 | 2803166 | CN-UB-70DC-6-BB | Coaxial surge protection | 1 |
| 5 | 5606124 5606125 5606126 | RAD-CAB-LMR** | N(m) to N(m) antenna cable 10, 20, 25 foot | 1 |
| 6 | 2885595 | RAD-ISM-2400-SPL-2-SMA | Antenna splitter: 2 SMA(f), 1 SMA(m) | 1 |
| 7 | 2867403 | RAD-CON-SMA-N-SS | Antenna cable SMA(m) to N(m) 1.2 m | 2 |

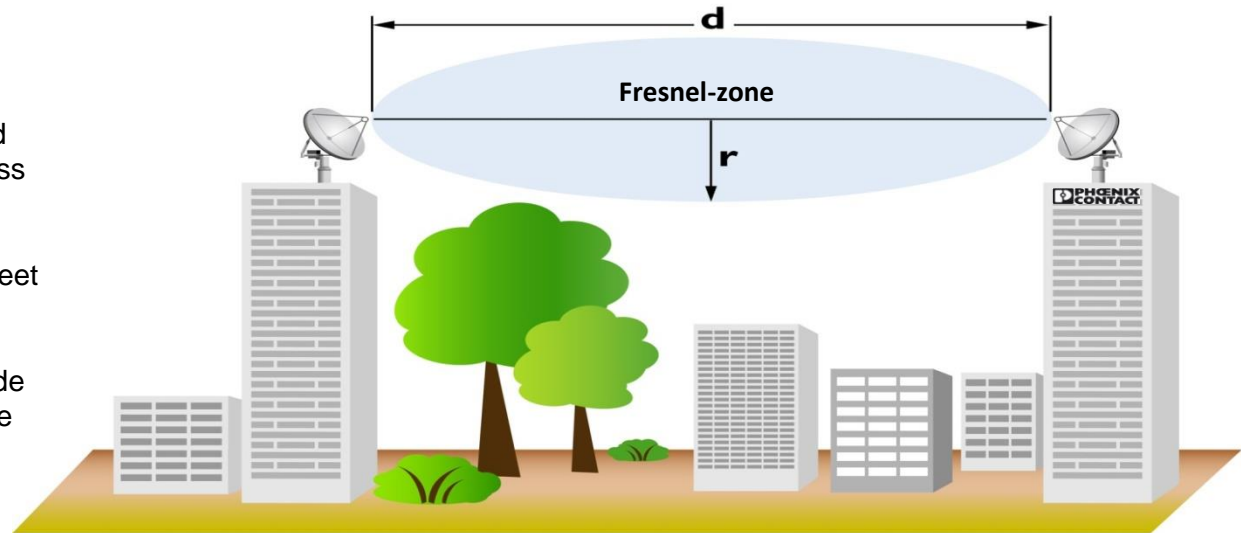
900 MHz



Dimensioning a long distance link

Boundary conditions for planning of a wireless link:

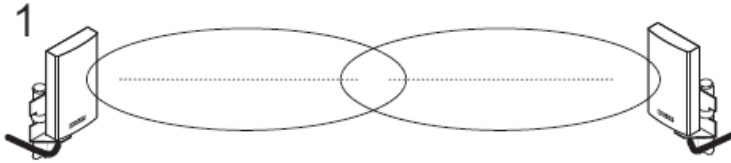
A free line of sight is recommended between the communicating wireless devices, especially for longer distances. It may be necessary to mount the device (antenna) a few feet above the ground, keeping the so-called "Fresnel-zone" clear. No additional obstacles should be inside the Fresnel-zone. The energy of the radio transmission is transferred within the entire Fresnel-zone, not only in line of sight.



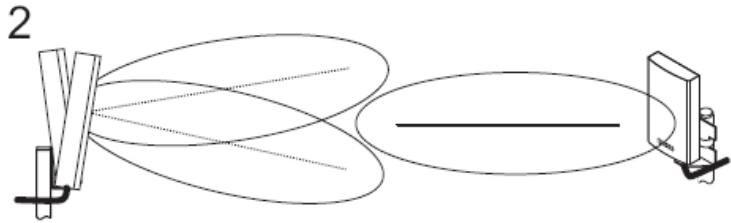
| Distance wireless link (d) | | Antenna height 2.4 GHz (r) | Antenna height 5 GHz (r) |
|----------------------------|--|----------------------------|--------------------------|
| 200 m | | 2.5 m | 1.5 m |
| 500 m | | 4 m | 2.5 m |
| 1000 m | | 5 m | 4 m |
| 2000 m | | 8 m | 6 m |
| 4000 m | | 11 m | 8 m |

Directional/Yagi antenna installation

Adjustment of a directional panel antenna



Good: two antennas facing each other



Bad: one antenna beam cannot reach the opposite antenna

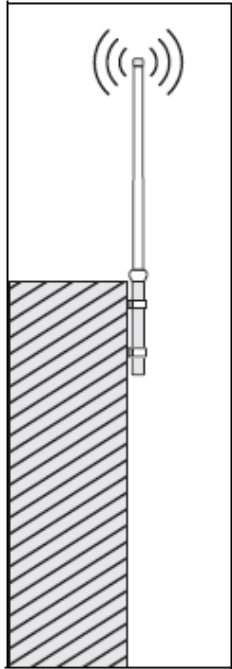


Both possibilities are okay.

A metal plane behind a directional antenna is **not critical** because of its radiation purpose to the front.

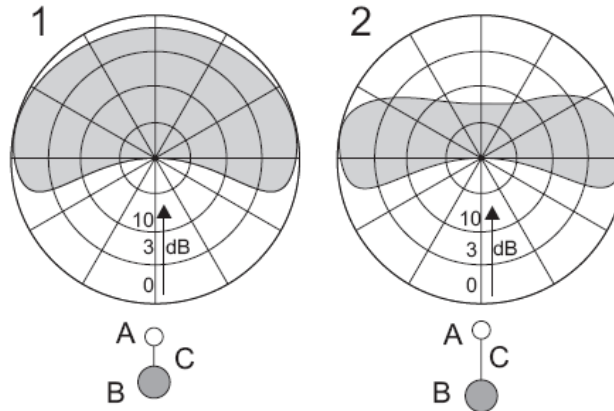


Omnidirectional antenna installation



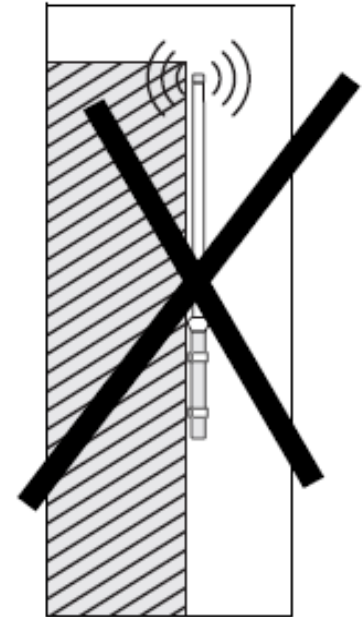
Correct installation of an omnidirectional antenna: free radiation in all directions

Top view: omnidirectional antenna radiation



| | 1 | 2 |
|----------|----------------------------|----------------------------|
| A | Antenna | Antenna |
| B | Mast | Mast |
| C | Antenna bracket (C = 3 cm) | Antenna bracket (C = 6 cm) |

Bad influence of metal near the radiating part of the antenna: the radiation pattern is deformed. The antenna no longer works as an omnidirectional antenna.



Wrong installation: The radiating part is "grounded" to a metal plane

Adapter comparison



SMA female

SMA male

RSMA female

RSMA male

| | Radio | Antenna | Cable |
|-----------|--------------|----------|---------------------|
| Connector | RSMA* female | N female | RSMA* male - N male |

*RSMA = Reverse- SMA

Reverse SMA (RSMA):

- A common antenna connector type approved worldwide
- Connector polarity is “reverse”, which means RSMA “female” has a pin



N male

N female