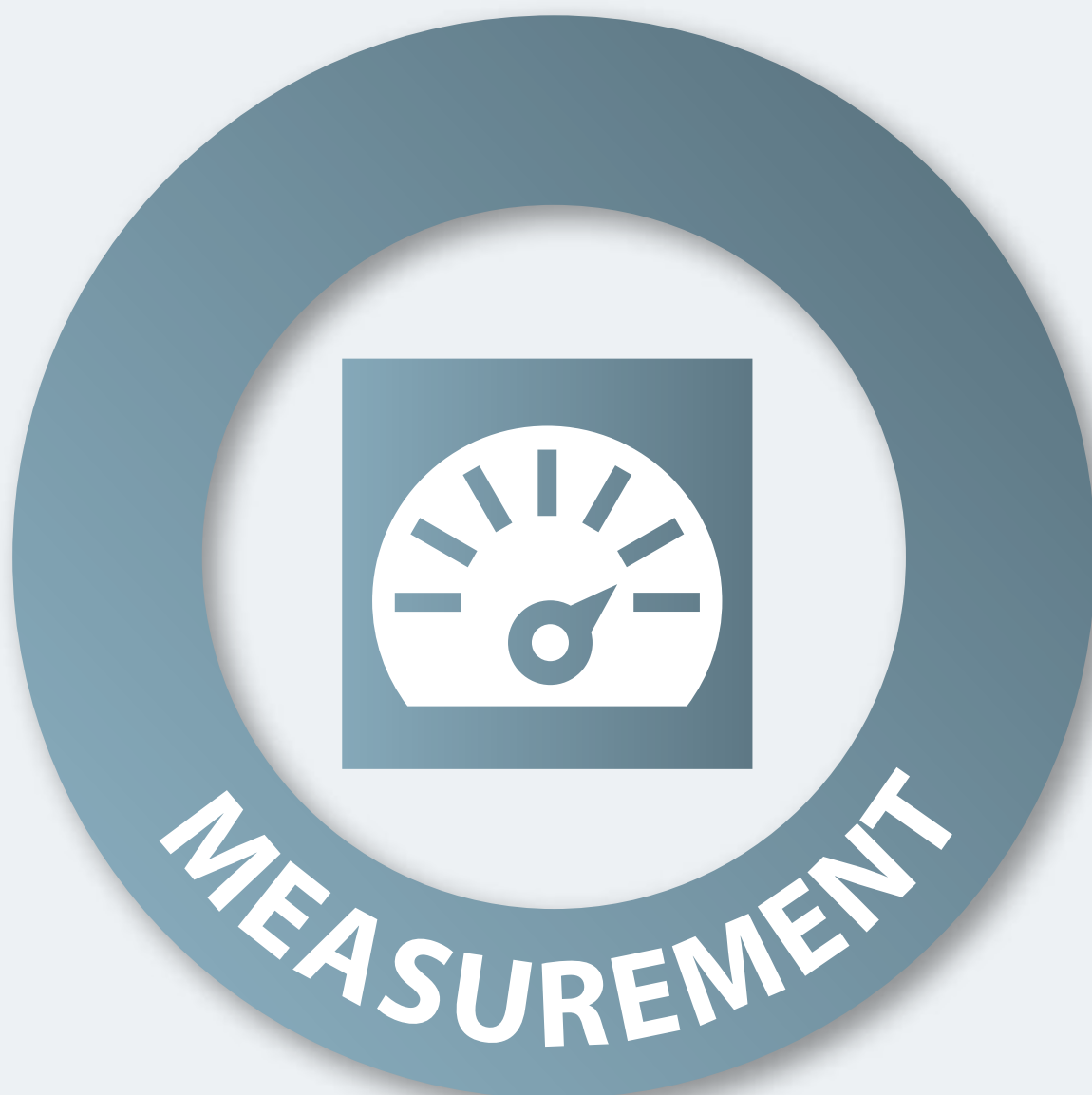


Radio Frequency (RF) installation rules

Energy Efficiency



Introduction



RF communication is a good alternative if there is no wired network or if a measurement point is remote or isolated from the communication network. It is also very practical for adding measurement points into an existing installation without

modifying the existing communication architecture. There are some simple installation rules to follow so that transmission can take place under optimal conditions.

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Products affected

The communication gateways DIRIS G-40 (ref. 4829 0301) or DIRIS G-60 (ref. 4829 0303), collect the measurement data from measurement devices (PMD*) or energy meters via a wired RS485 Modbus communication. These gateways also enable communication with both the RF and a modular measuring device DIRIS B-30 RF (ref. 4829 0002). RF Modem Wireless M-Bus products and long distance ARF868 products are also available. They are not described in this document.

* PMD: Performance measuring and monitoring device according to the norm IEC 61557-12.

Communication architecture

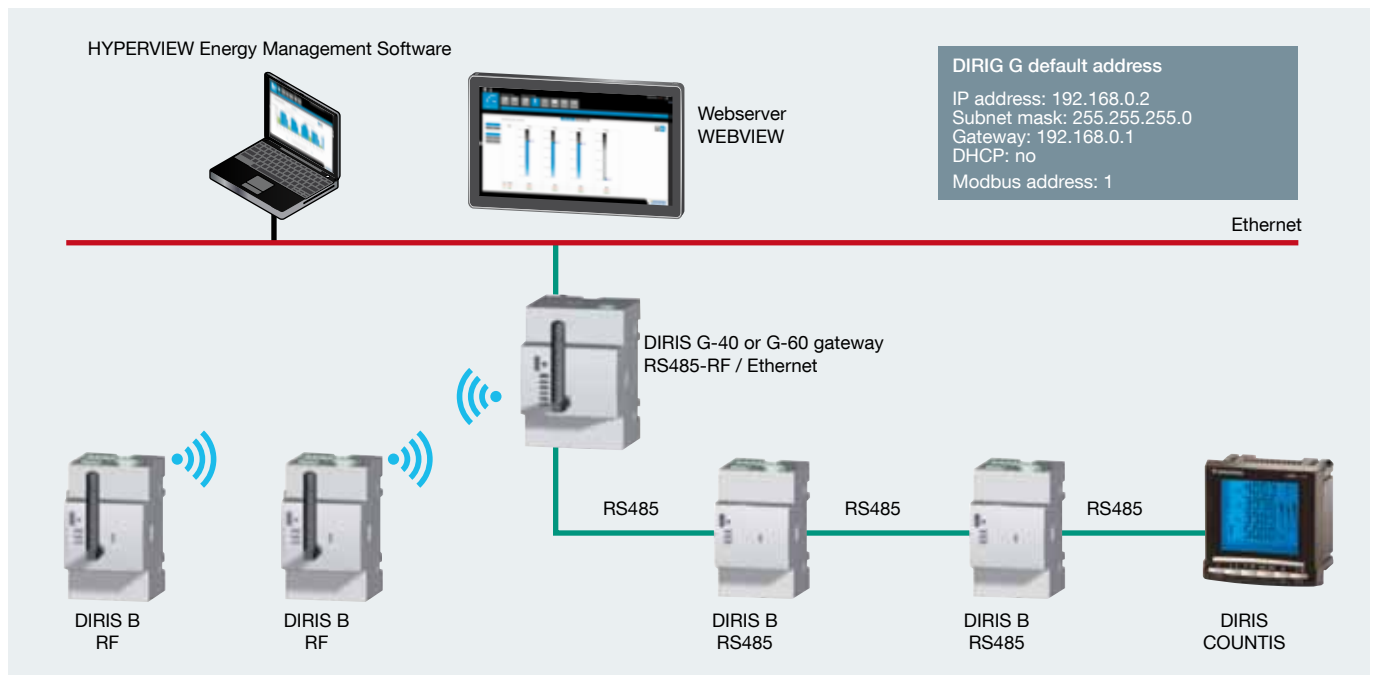
Gateways DIRIS G-40 and G-60 collect measurement data from devices (COUNTIS, DIRIS A, DIRIS Digiware...) via a wired RS485 Modbus connection and DIRIS B-30 RF via radio frequency link. This data can be directly shown on the WEBVIEW webserver embedded into the DIRIS G gateway, or transmitted to the HYPERVIEW energy management software for analysis.

This is a master-slave communication type. The DIRIS G gateway is the master and the slaves are the devices connected by:

- wired communication Modbus RS 485 (COUNTIS, DIRIS A, DIRIS B-30 RS, DIRIS Digiware...),
- RF communication (DIRIS B-30 RF).

The total number of slave products connected (RS485 + RF) to the DIRIS G must be less than 32.

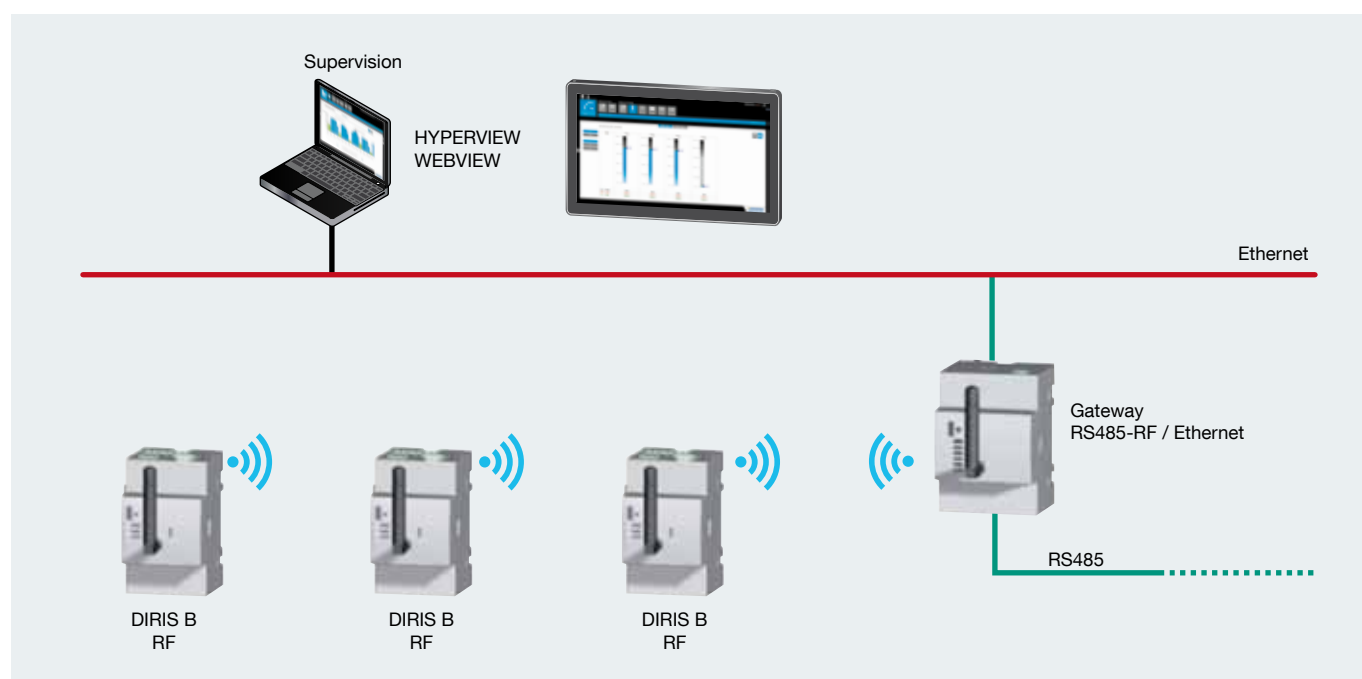
Example of communication architecture



- The DIRIS G gateway allows both RS485 and RF communication.
- The maximum number of products connected to the DIRIS G must be less than 32.

In the following sections we focus only on configuring and implementing the RF communication.

Configuration



Basic rules

- Only use antennas recommended by Socomec.
- The radio frequency is in the 868 MHz band.
- DIRIS B-30 RF and gateway DIRIS G must be on the same communication channel.
- The maximum number of DIRIS B-30 RF connected depends on the permitted occupancy rate for the channel.

The table below details the permitted occupancy rate depending on the selected frequency and the maximum number of DIRIS B-30 that can be connected as a result.

Channel number	Frequency (MHz)	Permitted occupancy rate	Maximum number of DIRIS B-30 connected
420	868.1000	1 %	16
436	868.3000	1 %	16
452	868.5000	1 %	16
472	868.7500	0.10 %	3
488	868.9500	0.10 %	3
504	869.1500	0.10 %	3
534*	869.5250	10 %	32
539	869.5875	10 %	32

According to EN300 220 norms, radio and REC7003 transmissions: usage rate of the band RF 868 MHz.

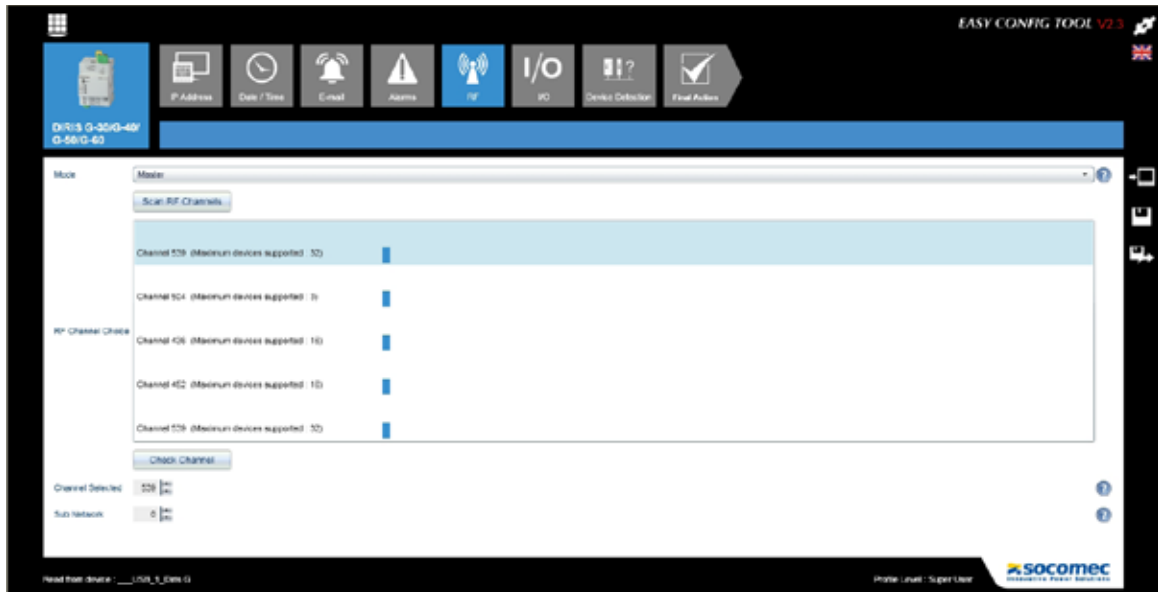
* Default channel.

Configuring with Easy Config

To configure the RF communication for DIRIS G and DIRIS B-30, just use the configuration tool Easy Config with the following parameters:

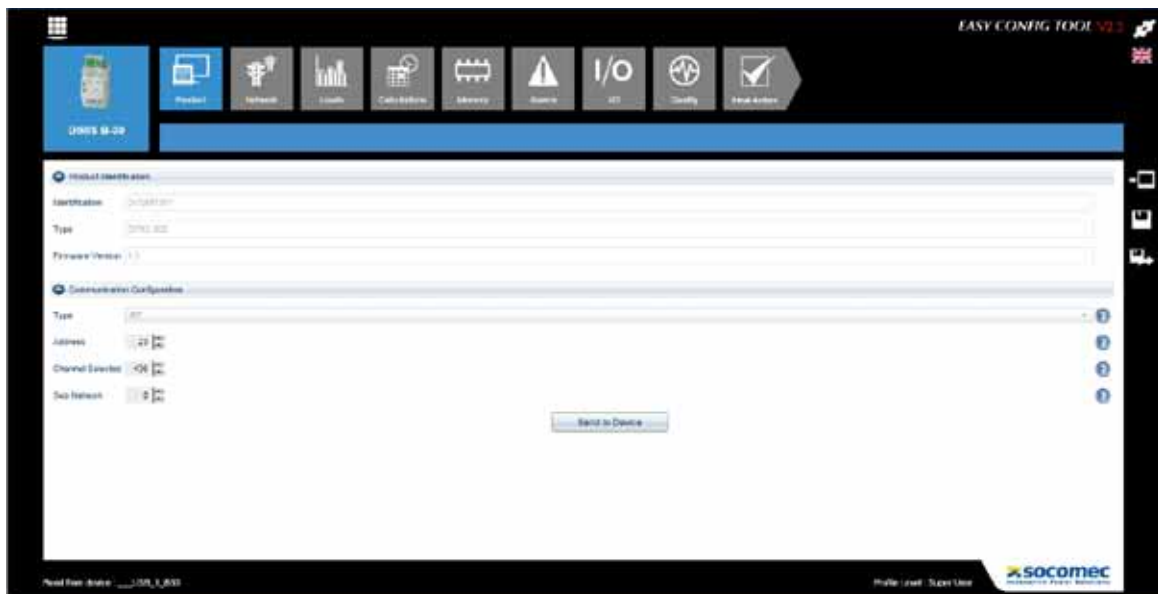
Setting	Value	Default value
Communication address	1 to 247	DIRIS G: 1 DIRIS B-30: 5
Channel number	chosen according to the RF signal level	
Subnetwork	0 to 255	0

RF configuration of the DIRIS G gateway



After having scanned the RF channels, one channel is selected from the 5 channels identified that give the best signal.

RF configuration screen of the DIRIS B-30 RF

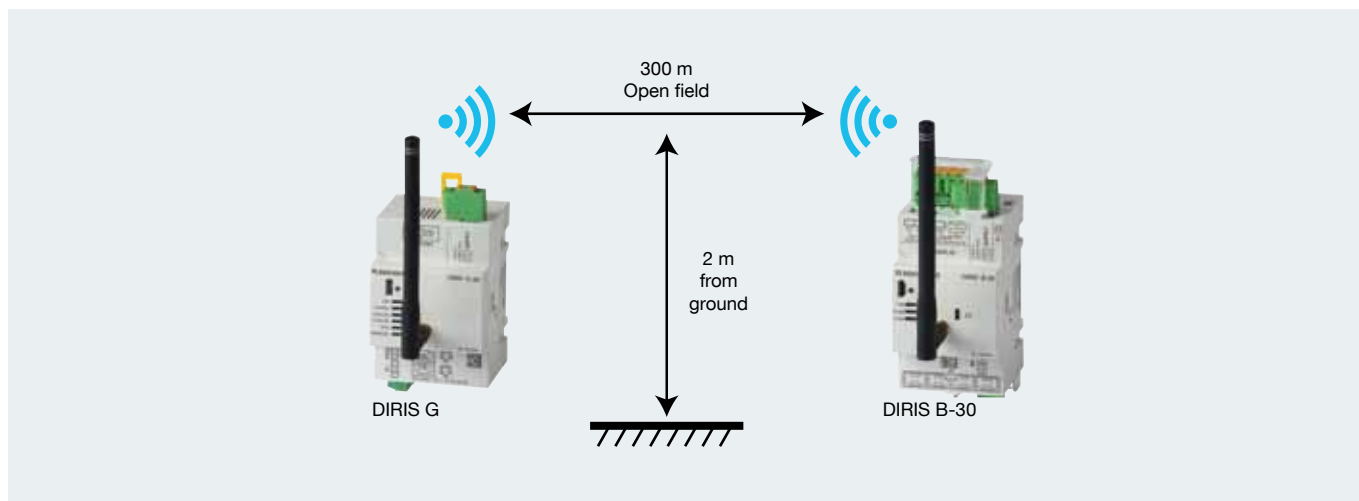


- The selected address between 1 and 247 is similar to a Modbus address.
- This address must be different for each of the RF products connected to the gateway.
- It must be also different from the addresses used by the RS485 slaves physically connected to the gateway.
- You can configure the address by using the auto-addressing function.
- The selected channel and the subnet must be identical to those chosen for the gateway.
- From a communication aspect, after configuration, the B-30 RF DIRIS acts as a connected slave in a conventional wired RS485 Modbus link.
- **With the Easy Config configuration software you can easily configure the DIRIS G gateway and PMD DIRIS B-30 RF.**
- **The selected channels must be the same on DIRIS G and DIRIS B-30 RF.**
- **After configuration, the DIRIS B-30 RF are assimilated to Modbus.**

RF reach

The RF transmission/reception reach for DIRIS G and DIRIS B-30 RF is 300 m open field. The notion of open field is the maximum reach without obstacles. If there are obstacles, the maximum reach may be reduced.

For optimal transmission, we also recommend you position the device's antenna 2 m off the ground.



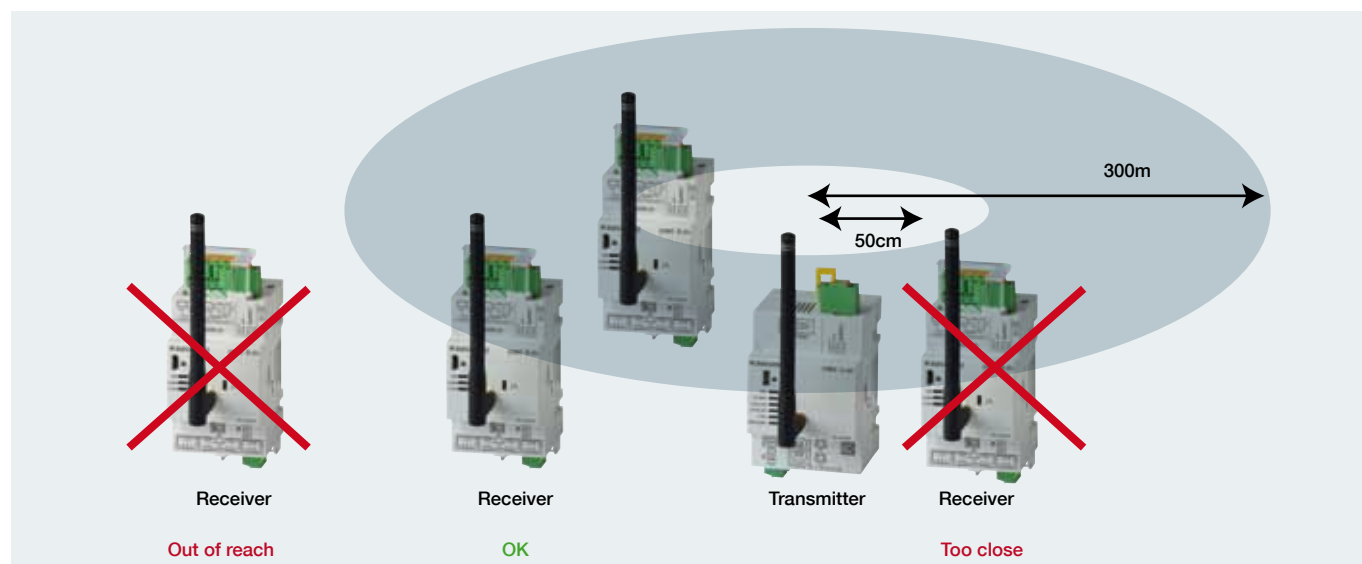
- 300 m open-field reach.
- Place antennas 2 m off the ground for optimal transmission.

Signal propagation

DIRIS G and DIRIS B-30 RF play the role of both transmitter and receiver.

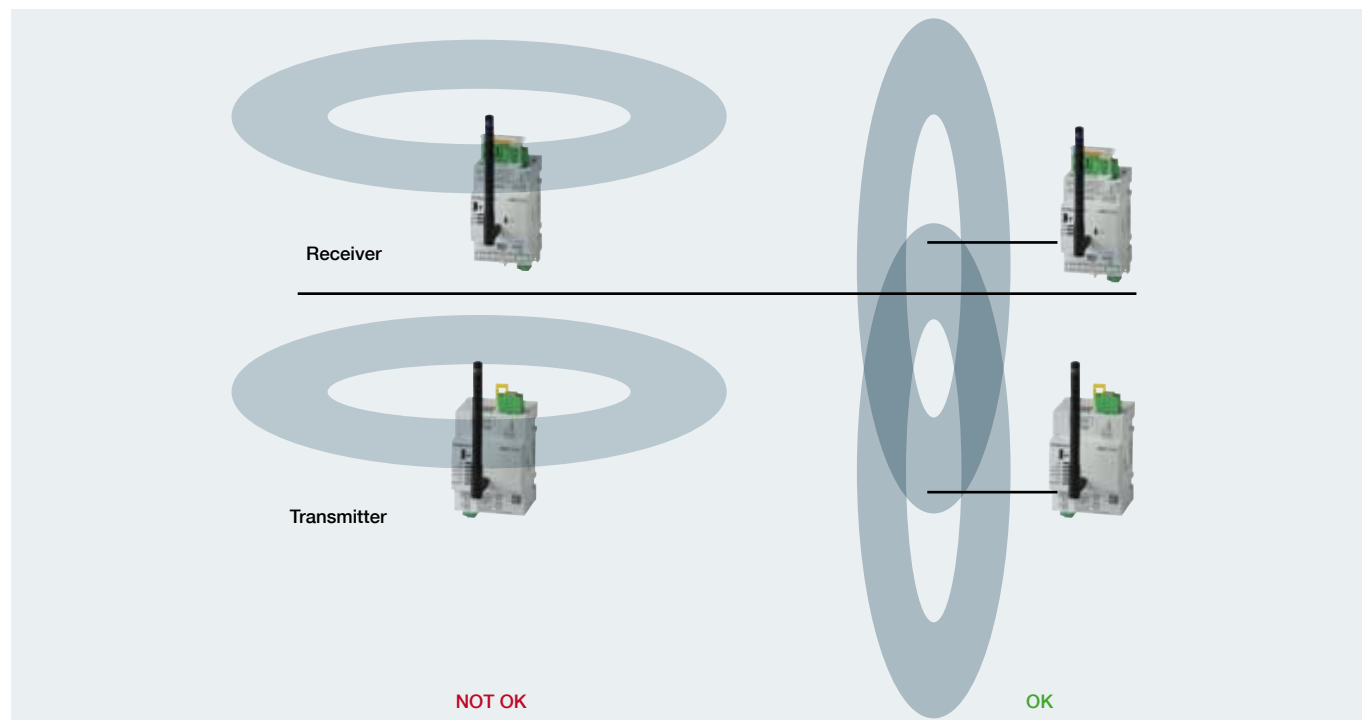
As a first approximation, the transmitter signal is broadcast in a radius, with the following consequences:

- the receivers must be within the transmitter reach,
- placing a receiver too close to the transmitter can limit transmission. As a guideline, observe a minimum distance of 50 cm between devices.



As far as possible, the transmitter and receiver must be on the same plane. If this is not the case, changing the orientation of the antennae may increase the reach.

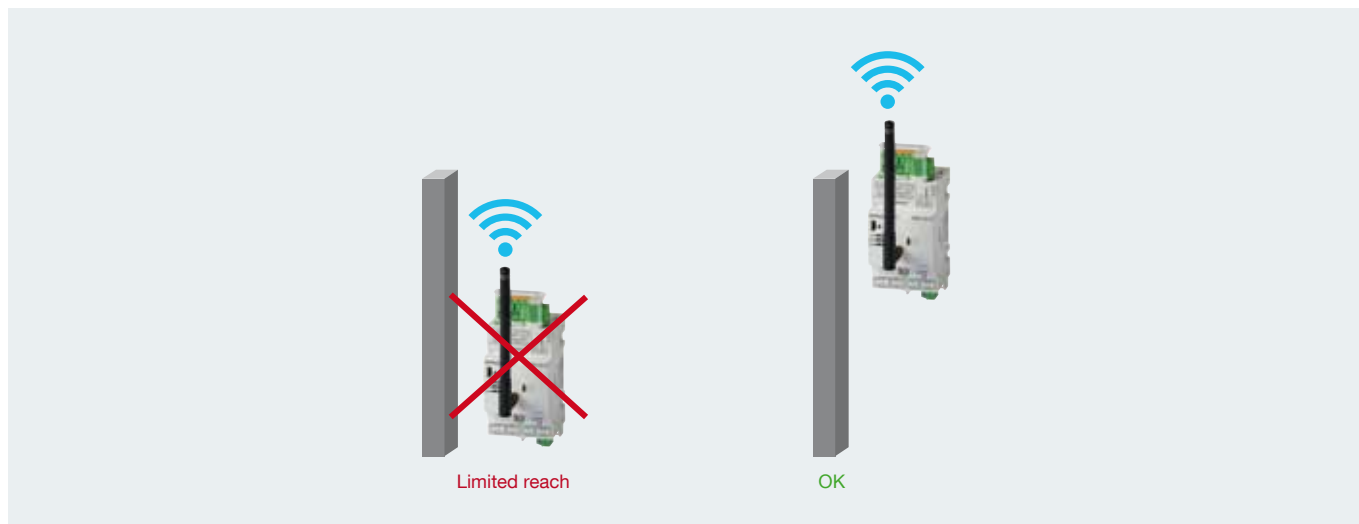
For example, for devices installed on different floors of a building, placing their antennae in a horizontal position would be better than a vertical position.



- As a first approximation, the RF signal is transmitted over a maximum radius of 300 m.
- The orientation of the antenna helps optimise a device's transmission/reception.

Obstacles

The presence of physical obstacles (wall, pillar, panel...) limits the reach of the RF signal. This must be taken into account when you choose the location of the devices.



Example of positions that could limit the reach of the RF signal:

- behind or near a pillar,
- inside a control cabinet.

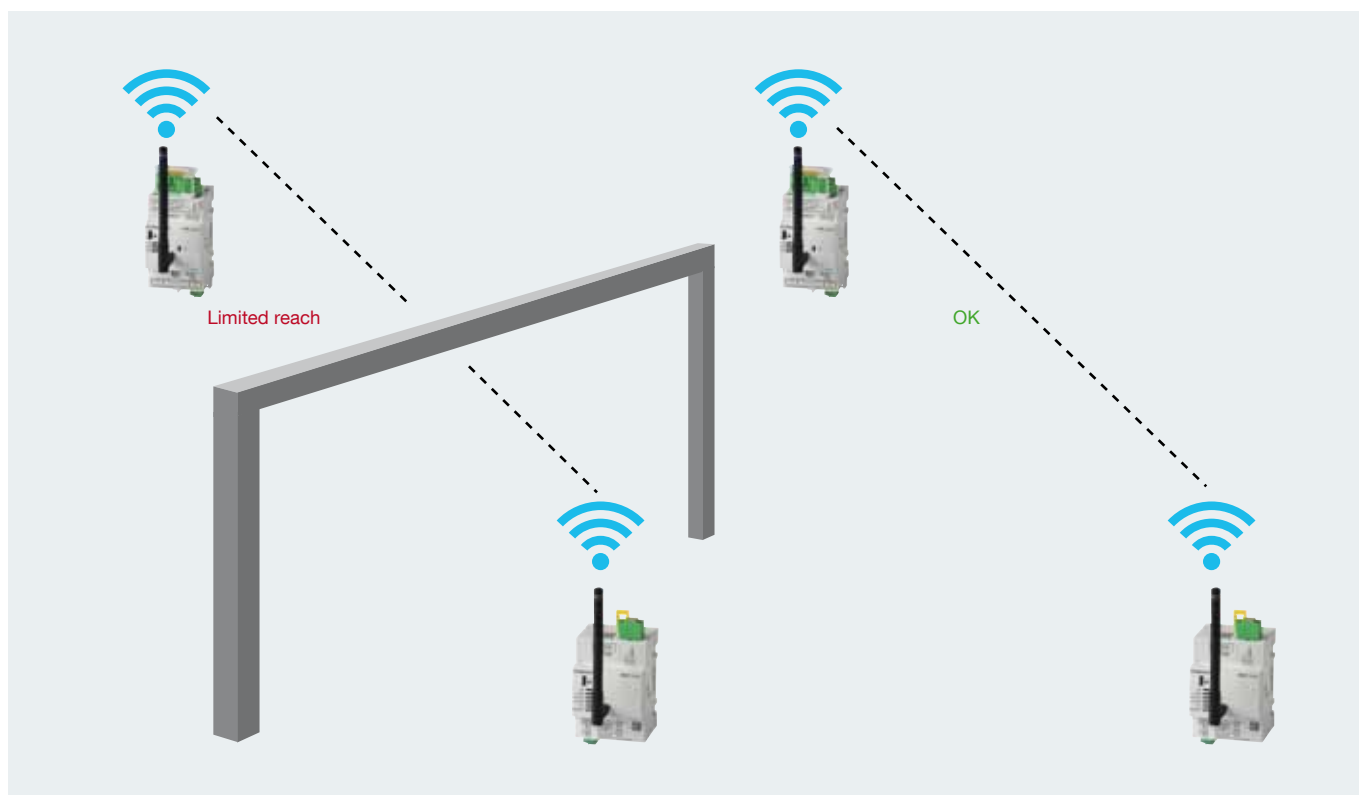
Consider using an external antenna (ref. 4854 0126) with a 3M extension cable if it is not possible to bypass these obstacles. For example, the external antenna may be positioned above the obstacle disrupting transmission or outside the control cabinet. The extensions are cumulative 3 m/6 m/9 m... After 6 extensions, the reach is divided by 2.

An external antenna can be used to bypass an obstacle limiting the reach of the RF signal.

Taking into account the layout of a building

Study the building's configuration before installing the devices.

For example, a gantry in an industrial building may disrupt communication between devices.

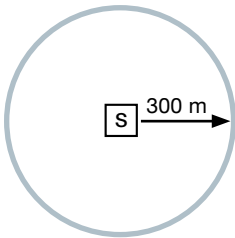


Multi-product installation

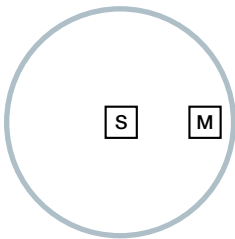
With RF communication, the DIRIS G gateway is the master and it must be able to interact with all DIRIS B-30 RF slaves on its network.

Product	Function	Symbol
 DIRIS G	Master	M
 DIRIS B-30 RF	Slave	S

Each DIRIS B-30 (S) can transmit up to 300 m open field. This reach can be represented by a circle:



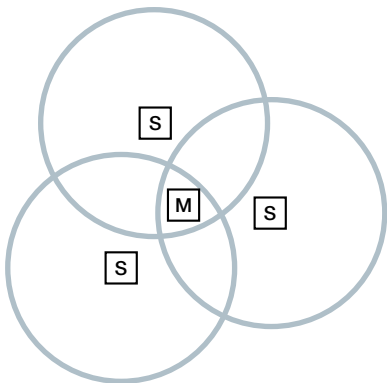
So the DIRIS B-30 can communicate with the DIRIS G gateway (M), it must be located inside the circle representing the reach:



Follow this rule for installations with multiple DIRIS B-30 RF.

Example:

Installation with a DIRIS G gateway and 3 DIRIS B-30.
 The gateway must be within the reach of the 3 DIRIS B-30 → The 4 devices are located so that the DIRIS G gateway lies within the 3 circles of reach of the DIRIS B-30:



In a multi-device configuration, devices are located so that the DIRIS G gateway can communicate with all DIRIS B-30 RF.

Socomec worldwide

IN EUROPE

BELGIUM

Critical Power / Power Control & Safety /
Energy Efficiency

Tel. +32 2 340 02 30
Fax +32 2 346 28 99
info.be@socomec.com

FRANCE

Critical Power / Power Control & Safety /
Energy Efficiency

Tel. +33 1 45 14 63 00
Fax +33 1 48 67 31 12
dcm.ups.fr@socomec.com

GERMANY

Critical Power

Tel. +49 621 71 68 40
Fax +49 621 71 68 444
info.ups.de@socomec.com

Power Control & Safety / Energy Efficiency

Tel. +49 7243 65292 0
Fax +49 7243 65292 13
info.scp.de@socomec.com

ITALY

Critical Power

Tel. +39 02 98 242 942
Fax +39 02 98 240 723
info.ups.it@socomec.com

Power Control & Safety / Energy Efficiency

Tel. +39 02 98 49 821
Fax +39 02 98 24 33 10
info.scp.it@socomec.com

NETHERLANDS

Critical Power / Power Control & Safety /
Energy Efficiency

Tel. +31 30 760 0900
Fax +31 30 637 2166
info.nl@socomec.com

POLAND

Critical Power

Tel. +48 22 825 73 60
Fax. +48 22 825 73 70
info.ups.pl@socomec.com

Power Control & Safety / Energy Efficiency

Tel. +48 91 442 64 11
Fax +48 91 442 64 19
info.scp.pl@socomec.com

PORTUGAL

Critical Power / Power Control & Safety /
Energy Efficiency

Tel. +351 261 812 599
Fax +351 261 812 570
info.ups.pt@socomec.com

ROMANIA

Critical Power / Power Control & Safety /
Energy Efficiency

Tel. +40 21 319 36 88
Fax +40 21 319 36 89
info.ro@socomec.com

SERBIA

Critical Power / Power Control & Safety /
Energy Efficiency

Tel. +381 11 40 43 246
Fax +381 11 40 43 245
info.rs@socomec.com

SLOVENIA

Critical Power / Power Control & Safety /
Energy Efficiency

Tel. +386 1 5807 860
Fax +386 1 561 11 73
info.si@socomec.com

SPAIN

Critical Power / Power Control & Safety /
Energy Efficiency

Tel. +34 93 540 75 75
Fax +34 93 540 75 76
info.es@socomec.com

SWITZERLAND

Critical Power

Tel. +41 44 745 40 80
Fax +41 44 745 40 85
info@socomec.ch

TURKEY

Critical Power / Power Control & Safety /
Energy Efficiency

Tel. +90 216 540 71 20-21-22
Fax +90 216 540 71 27
info.tr@socomec.com

UNITED KINGDOM

Critical Power

Tel. +44 1285 863 300
Fax +44 1285 862 304
info.uk@socomec.com

Power Control & Safety / Energy Efficiency

Tel. +44 1462 440 033
Fax +44 1462 431 143
info.uk@socomec.com

IN ASIA PACIFIC

AUSTRALIA

Critical Power / Power Control & Safety

Tel. +61 2 9325 3900
Fax +61 2 9888 9544
info.ups.au@socomec.com

CHINA

Critical Power / Power Control & Safety /
Energy Efficiency

Tel. +86 21 52 98 95 55
Fax +86 21 62 28 34 68
info.cn@socomec.com

INDIA

Critical Power / Power Control & Safety /
Energy Efficiency

Tel. +91 44 39215400
Fax +91 44 39215450 & 51
info.in@socomec.com

SINGAPORE

Critical Power / Power Control & Safety /
Energy Efficiency

Tel. +65 6506 7600
Fax +65 64 58 7377
info.sg@socomec.com

THAILAND

Critical Power

Tel. +66 2 941 1644 7
Fax +66 2 941 1650
info.ups.th@socomec.com

IN MIDDLE EAST

UNITED ARAB EMIRATES

Critical Power / Power Control & Safety /
Energy Efficiency

Tel. +971 4 29 98 441
Fax +971 4 29 98 449
info.ae@socomec.com

IN AMERICA

USA, CANADA & MEXICO

Power Control & Safety / Energy Efficiency

Tel. +1 617 245 0447
Fax +1 617 245 0437
info.us@socomec.com

OTHER COUNTRIES

NORTH AFRICA

Algeria / Morocco / Tunisia
info.naf@socomec.com

AFRICA

Other countries

info.africa@socomec.com

SOUTH EUROPE

Cyprus / Greece / Israel / Malta
info.se@socomec.com

SOUTH AMERICA

Tel. +34 93 540 75 75
info.es@socomec.com

MORE DETAILS

www.socomec.com/worldwide

HEAD OFFICE

SOCOMECS GROUP

SAS SOCOMECS capital 10 686 000 €
R.C.S. Strasbourg B 548 500 149
B.P. 60010 - 1, rue de Westhouse
F-67235 Benfeld Cedex - FRANCE
Tel. +33 3 88 57 41 41
Fax +33 3 88 74 08 00
info.scp.isd@socomec.com

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www.socomec.com

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