Hirschmann™ Antenna Guide

Contents

Introduction

Since 2005 Hirschmann Automation and Control GmbH has offered a steadily increasing product portfolio of wireless LAN devices. This is comprised not only of industrial-grade active devices such as Access Points and Clients. Cables, antennas, lightning protection and so on also form an integral part of the range. Together these components offer the customer the possibility to deploy simple and secure wireless installations.
This product portfolio is of course subject to a continuous improvement process. Particularly because WLAN technology is still an innovative field. As a result, the portfolio can experience short term changes. In some cases not all of our previous accessories have been able to meet our customers' requirements. For example, resistance to vibration, grounding properties, sealing, and not least radio coverage.

For this reason we have now decided to bring our antenna portfolio up to the best and latest technological state.

- The radio coverage of the new antennas is considerable more homogeneous, and in live operation leads to a manifestly better result.
- The scope of delivery now consists of a complete solution, including antenna, 1 meter cable, and pigtail. This enables problem-free connection to the BAT-F and BAT-Rail.
- Vibration-resistant, waterproof, and stable mounting kit is also included.
- In addition there is no longer any difference between indoor and outdoor antennas. For example, all new antennas are now DC grounded, which protects the hardware against damage caused by electrical surges.
- All antennas comply with the IP65 protection class.
- Also, the connection of cables to lightning protection devices has been simplified, because all antennas are now equipped with N connectors.

Einführung

Hirschmann Automation and Control GmbH bietet seit 2005 ein stetig wachsendes Produktportfolio rund um das Thema Wireless LAN. Hierzu gehören nicht nur industrietaugliche aktive Geräte wie Access Points oder Clients. Auch Kabel, Antennen, Überspannungschutze etc. sind integraler Bestandteil des Angebotes, das den Kunden die Möglichkeit gibt, einfach und sicher komplette Installationen zu realisieren.
Dieses Produktportfolio unterliegt selbstverständlich einem ständigen Verbesserungsprozess. Insbesondere da die WLAN-Technologie ein weiterhin sehr innovatives Feld ist, kann es vorkommen, dass aus Erfahrungen, die man gemacht hat, kurzfristig Änderungen des Portfolios resultieren. Leider haben nicht alle unserer bisherigen Produkte allen Anforderungen bei Kunden standgehalten. Als Beispiele seien Rüttelfestigkeit, Erdungsverhalten, Dichtigkeit und nicht zuletzt das Abstrahlverhalten genannt.

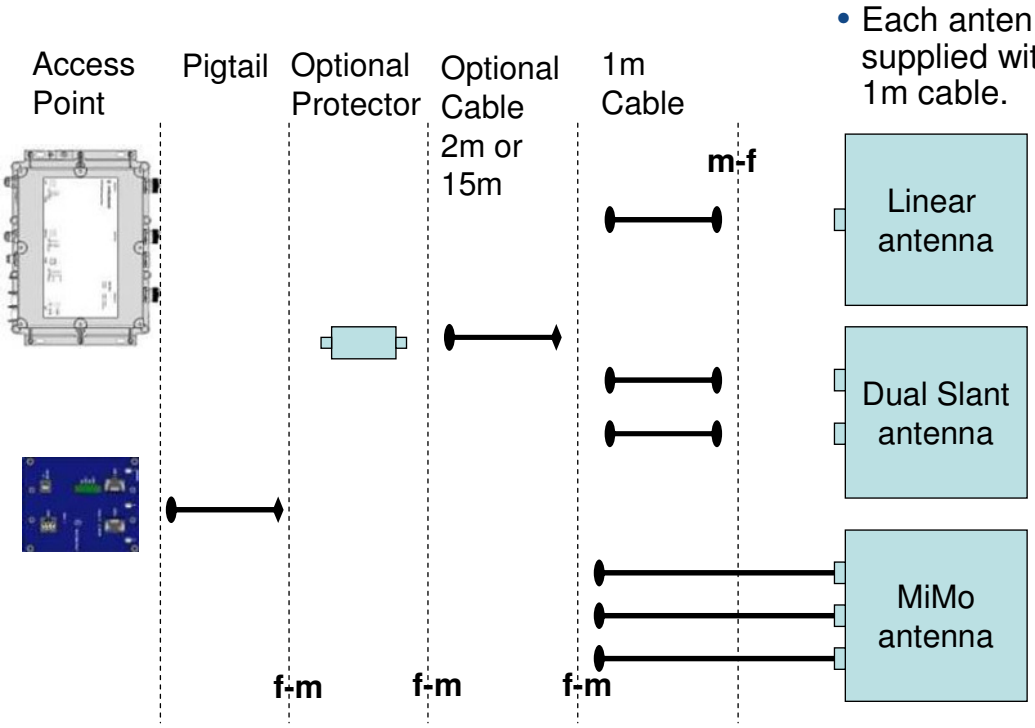
Deswegen haben wir uns jetzt entschlossen, unser Antennenportfolio auf den besten und neuesten Stand der Technik zu bringen.

- Das Abstrahlverhalten der neuen Antennen ist wesentlich homogener und führt im Realbetrieb zu deutlich besseren Ergebnissen.
- Der Lieferumfang besteht nun durchgängig aus Antenne, 1m Kabel und Pigtail, um problemlosen Anschluss an BAT-F und BAT-Rail zu ermöglichen.
- Rüttelfestes, wetterfestes und stabiles Montagematerial ist ebenfalls inbegriffen.
- Zudem soll kein Unterschied mehr gemacht werden zwischen Indoor- und Outdoor-Antennen. Z.B. sind alle neuen Antennen jetzt DC-grounded, was Beschädigungen der Hardware durch Überspannungen vorbeugt.
- Alle Antennen entsprechen nun der Schutzklasse IP65.
- Ebenfalls soll die Verbindung zu Kabeln und Überspannungschutzen vereinfacht werden, indem alle Antennen nun mit N-Buchsen ausgestattet sind.

Current BAT portfolio

BAT family data and facts		
Product description	**BAT-Rail** The devices are supplied in a metal enclosure for mounting on DIN rails in automation or vehicle applications.	**BAT-F** The devices are supplied in IP65/67 metal housings. They are designed for field-level applications or harsh industrial environments.
BAT54 These products support WLAN standards IEEE 802.11a/b/g/h, and operate at up to 108 Mbps (raw data rate)		
	BAT54-Rail • Industrial WLAN access point for installation on DIN rails • Two IEEE 802.11a/b/g/h/i compliant WLAN interfaces • 2 x LAN/PoE, 2 x 24 V, 1 x 12 V power supply **BAT54-Rail Client** • Industrial WLAN access client for installation on DIN rails • One IEEE 802.11a/b/g/h/i compliant WLAN interface • 1 x LAN/PoE, 2 x 24 V, 1 x 12 V power supply	**BAT54-F** • Industrial WLAN access point with IP65/67 enclosure • Two IEEE 802.11/ b/g/h/i compliant WLAN interfaces • 1 x LAN/PoE, 2 x 24 V power supply **BAT54-F Single** • Industrial WLAN access point with IP65/67 enclosure • One IEEE 802.11a/b/g/h/i compliant WLAN interface, two PoE LAN interfaces • 2 x LAN/PoE power supply **BAT54-F Client** • Industrial WLAN access client with IP65/67 enclosure • One IEEE802.11a/b/g/h/i compliant WLAN interface • 1 x LAN/PoE, 2 x 24 V power supply
BAT300 These devices support WLAN standards IEEE 802.11a/b/g/h/n and 802.11n (Draft 2.), and they operate at up to 300 Mbps (raw data rate)		
	BAT300-Rail • Industrial WLAN access point for installation on DIN rails • One IEEE 802.11a/b/g/h/n/i compliant WLAN interface (up to 300 Mbps) • 2 x LAN/PoE, 2 x 24 V, 1 x 12 V power supply	**BAT300-F** • Industrial WLAN access point with IP65/67 enclosure • One IEEE 802.11a/b/g/h/n/i compliant WLAN interface (up to 300 Mbps) • 1 x LAN/PoE, 2 x 24 V power supply

AP / Cable / Antenna assembly



- Each antenna is supplied with pigtail and 1m cable.

Since all antenna kits are equipped with 1m cable and pigtail, both AP types BAT-F or BAT-Rail can be seamlessly connected to the antennas.
The BAT Protector can be directly screwed on BAT-F or placed in between two cables since it is equipped with male to female connectors.

Which for what?

Art.-Nr	Antennae		Description	BAT-Rail	BAT-F	BAT54	BAT300
943 981-002	BAT-ANT-N-6G-IP65		2,4GHz omnidirectional	+++	+++	+++	+
943 981-003	BAT-ANT-N-5A-IP65		5GHz omnidirectional	+++	+++	+++	+
943 981-004	BAT-ANT-N-6ABG-IP65		Dualband hemispherical	+++	+++	+++	+
943 981-005	BAT-ANT-N-14G-IP23		2,4GHz directional	+++	+++	+++	+
943 981-006	BAT-ANT-N-18A-V-IP65		5GHz medium directional	+++	+++	+++	+
943 981-007	BAT-ANT-N-23A-V-IP65		5GHz very directional	+++	+++	+++	-
943 981-008	BAT-ANT-N-23A-VH-IP65		5GHz very directional - 11n	+	+	+	+++
943 981-009	BAT-ANT-N-8G-DS-IP65		2,4GHz - Dual Slant	+++	+++	+++	++
943 981-010	BAT-ANT-N-9A-DS-IP65		5GHz - Dual Slant	+++	+++	+++	++
943 981-001	BAT-ANT-N-LC-G-50m-IP65		2,4GHz leaky cable	+++	+++	+++	-
943 981-101	BAT-ANT-N-LC-G-100m-IP65		2,4GHz leaky cable	+++	+++	+++	-
943 981-012	BAT-ANT-N-MiMoDB-5N-IP65		Dualband MiMo 11n - omnidirectional	-	-	-	+++
943 981-013	BAT-ANT-N-MiMo5-9N-IP65		5GHz MiMo 11n - directional	-	-	-	+++
943 903 373	BAT-ANT-Protector m-f		Protector against overvoltage for antennae	+++	+++	+++	+++
943 903 374	BAT-LAN-Protector IP68		Protector against overvoltage - LAN/PoE	+++	+++	+++	+++
943 903 360	BAT-Pigtail		Adapter cable R-SMA to N-jack	+++	-	nr	nr
943 903 514	BAT-CLB-2 N m-f		Antenna cable N-plug to N-jack	+++	+++	+++	+++
943 903 515	BAT-CLB-15 N m-f		Antenna cable N-plug to N-jack	+++	+++	+++	+++

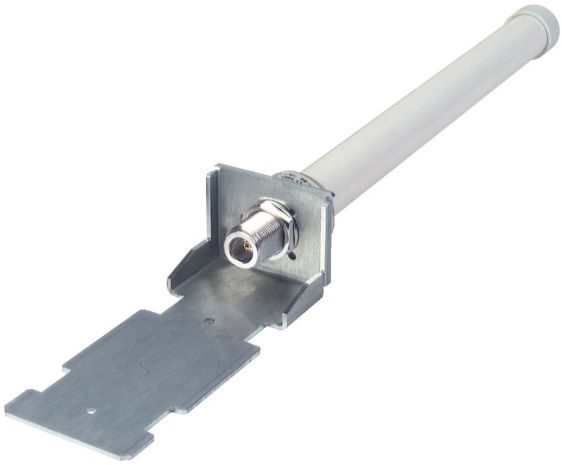
Very good	+++
Good	++
Possible	+
Not usable	-

Which replaces which?

Current		New		
Art.-Nr	**Antennae**	**Art.-Nr**	**Antennae**	**Description**
943 903 401	BAT-ANT-N-8G	943 981-002	BAT-ANT-N-6G-IP65	2,4GHz omnidirectional
943 903 301	BAT-ANT-N-8A	943 981-003	BAT-ANT-N-5A-IP65	5GHz omnidirectional
943 903 421	BAT-ANT-N-6ABG	943 981-004	BAT-ANT-N-6ABG-IP65	Dualband hemispherical
943 903 380	BAT-ANT-N-14G	943 981-005	BAT-ANT-N-14G-IP23	2,4GHz directional
943 903 320	BAT-ANT-N-12A	943 981-006	BAT-ANT-N-18A-V-IP65	5GHz medium directional
943 903 340	BAT-ANT-N-23/9A	943 981-007	BAT-ANT-N-23A-V-IP65	5GHz very directional
		943 981-008	BAT-ANT-N-23A-VH-IP65	5GHz very directional - 11n
943 903 411	BAT-TNC-B-D-085-02	943 981-009	BAT-ANT-N-8G-DS-IP65	2,4GHz Dual Slant
943 056 111	BAT-TNC-B-D-085-01	943 981-009	BAT-ANT-N-8G-DS-IP65	2,4GHz Dual Slant
		943 981-001	BAT-ANT-N-LC-G-50m-IP65	2,4GHz leaky cable
		943 981-101	BAT-ANT-N-LC-G-100m-IP65	2,4GHz leaky cable
943 903 310	BAT-ANT-TNC-8b/g DS	943 981-009	BAT-ANT-N-8G-DS-IP65	2,4GHz Dual Slant
943 903 330	BAT-ANT-TNC-10A DS	943 981-010	BAT-ANT-N-9A-DS-IP65	5GHz Dual Slant
		943 981-012	BAT-ANT-N-MiMoDB-5N-IP65	Dualband 11n - omnidirectional
		943 981-013	BAT-ANT-N-MiMo5-9N-IP65	5GHz 11n - directional
943 903 372	BAT-Surge Arrestor m-f	943 903 373	BAT-ANT-Protector m-f	Protector against overvoltage for antennae
		943 903 374	BAT-LAN-Protector IP68	Protector against overvoltage - LAN/PoE
943 903 360	BAT-Pigtail	943 903 360	BAT-Pigtail	Adapter cable R-SMA to N-jack
		943 903 514	BAT-CLB-2 N m-f	Antenna cable N-plug to N-jack
943 903 350	BAT-CLB-7-N	943 903 515	BAT-CLB-15 N m-f	Antenna cable N-plug to N-jack

Omni-Directional Antennas

Omni-Directional Antenna for 2.4 GHz

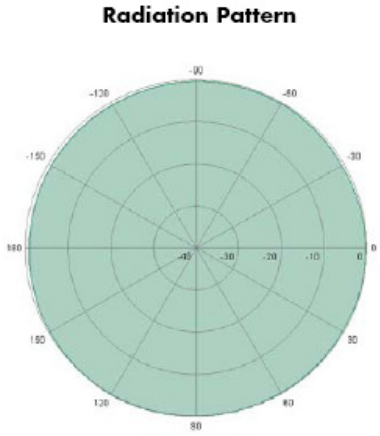


BAT-ANT-N-6G-IP65

Order Number: 943 981-002

Electrical Specification

Frequency range	2400 MHz - 2500 MHz
Gain	6.0 dBi
VSWR	< 1,8
Polarization	Linear, vertical
HPBW /	horizontal 360°
Down tilt	0°
Max. Power	25 W
Impedance	50 Ω
Connector	N female
Lightning Protection	DC grounded



Environmental & Mechanical Characteristics

Temperature	– 40°C to +80°C
Lightning protection	DC ground
Radome color	Grey-white
Radome material	Fiber glass
Weight	0.34kg
Dimensions	Ø22 x 250 mm
IP	IP65

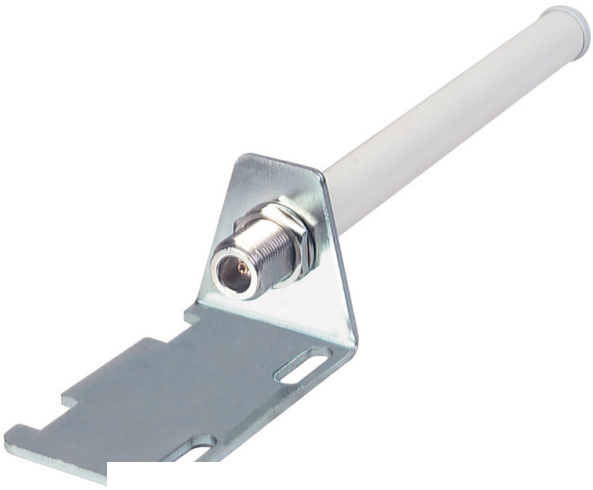
Cable, Accessories

1m with N male connectors at both ends.
Pigtail, R-SMA male to N female
Mounting material

Purpose

To be placed in the middle of the illuminated area. Halls or outdoor areas.

Omni-Directional Antenna for 5 GHz



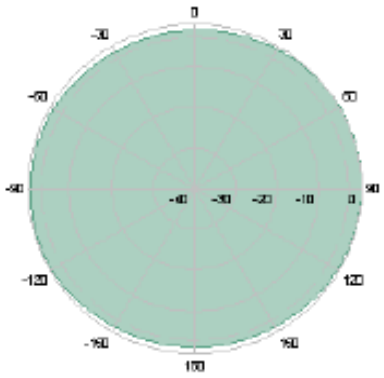
BAT-ANT-N-5A-IP65

Order Number: 943 981-003

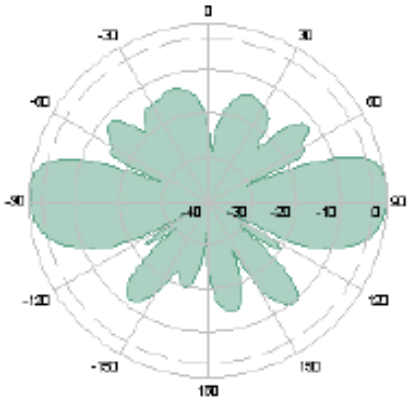
Electrical Specification

Frequency range	5150 MHz - 5875 MHz
Gain	5 dBi
VSWR	1,5
Polarization	Linear, vertical
HPBW /	horizontal 360°
HPBW /	vertical 25°
Max. Power	6 W
Impedance	50 Ω
Connector	N female

Radiation Pattern



horizontal 5470 MHz



vertical 5470 MHz

Environmental & Mechanical Characteristics

Temperature	– 45°C to +70°C
Radome color	Gray-white
Radome material	Polypropylene
Weight	0,3 kg
Dimension	16 x 160 mm
IP	IP65

Cable, Accessories

1m with N male connectors at both ends.
Pigtail, R-SMA male to N female
Mounting material

Purpose

To be placed in the middle of the illuminated area. Halls or outdoor areas.

Omni-Directional Dualband Antenna for MiMo

BAT-ANT-N-MiMoDB-5N-IP65

Order Number: 943 981-012

Electrical Specification

Frequency range MHz	2400-2500 / 5150-5875
Gain	3,5 dBi / 5,5 dBi
VSWR	1,8
Polarization	3x Linear, vertical
HPBW /	horizontal 360°
Downtilt	0°
Max. Power	2 W
Impedance	50 Ω
Connector	3x N male at 1m cable directly attached

Environmental & Mechanical Characteristics

Temperature	– 40°C to +80°C
Radome color	7035 (Light Gray)
Radome material	plastic
Weight	0,3 kg
Dimension	310 x 110 x 40 mm
IP	IP65

Cable, Accessories

3x 1m with N male connectors at both ends.
3x Pigtail, R-SMA male to N female
Mounting material

Purpose

To be placed in the middle of the illuminated area. Halls or outdoor areas.
To be used with BAT300 devices for optimal support of MiMo functionality.

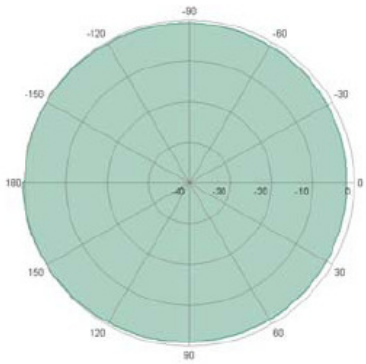
Omni-Directional Antenna for 2.4/ 5 GHz

BAT-ANT-N-6ABG-IP65

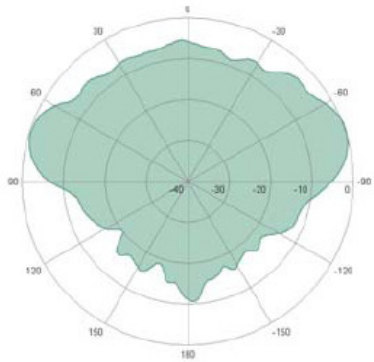
Order Number: 943 981 004

Electrical Specification

Radiation Pattern



horizontal 2450 MHz

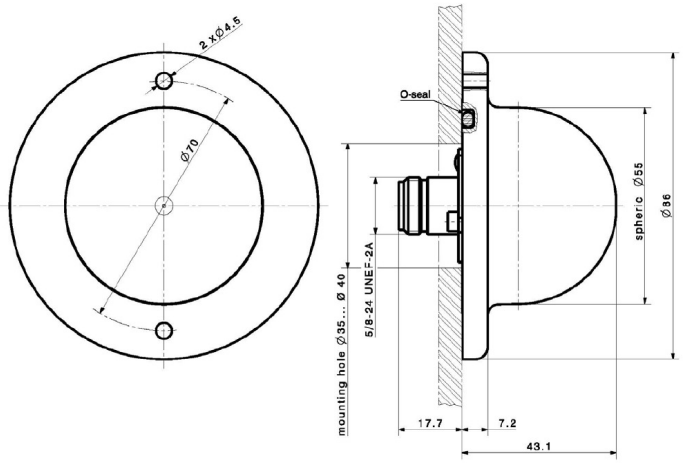


vertical 2450 MHz

Electrical Specification

Frequency range	2300 - 2500 and 4900 - 5935 MHz
Impedance	50 Ω
VSWR	1.8
Polarization	linear, vertical
Gain	6dBi @2,4GHz, 8dBi @5GHz
3 dB beam width horizontal @	2,4GHz 360°
3 dB beam width horizontal @	5GHz 173°
Max. power	75 W (CW) at 25°C

Dimensions (mm)



Cable, Accessories

1m with N male connectors at both ends.
Pigtail, R-SMA male to N female

Purpose

To be placed on moving parts, vehicles or boxes.

Directional Antennas

Diversity Sector Antenna for 2.4 GHz

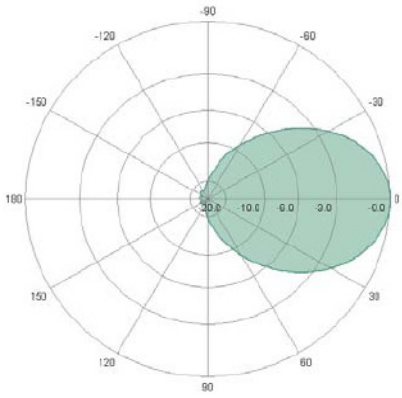
BAT-ANT-N-8G-DS-IP65

Order Number: 943 981-009

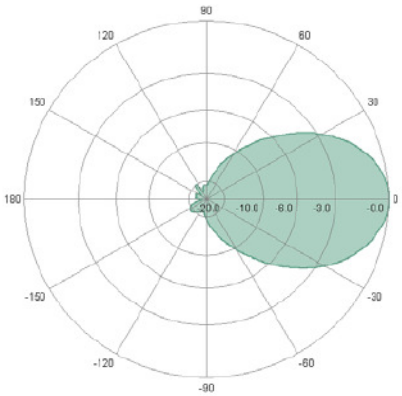
Electrical Properties

Frequency range	2400 - 2485 MHz
Impedance	50 Ω
VSWR	1.5
Polarization	dual linear, ± 45° slant
Gain	8 dBi
3 dB beamwidth horizontal	75°
3 dB beamwidth vertical	70°
Downtilt	0°
Isolation between ports	25 dB
Front to back ratio	14 dB
Max. power	10 W (CW) at 25°C
Connectors	2x N female

Radiation Pattern



horizontal



vertical

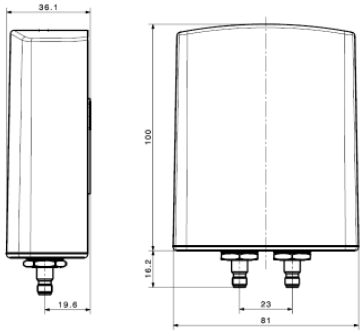
Mechanical Properties

Dimensions	101 x 80 x 35 mm
Weight	0.11 kg
Radome material	LEXAN EXL 9330
Radome color	RAL 7044 (silk gray)
Operating temperature range	- 40°C to + 80°C
Storage temperature range	- 40°C to + 80°C
Windload	15 N at 160km/h
IP	65

Cable, Accessories

2x 1m with N male connectors at both ends.
2x Pigtail, R-SMA male to N female
Mounting material

Very well usable with BAT300



Directional Antenna linear for 2.4 GHz

BAT- ANT- N-14G-IP23

Order Number: 943 981 005

Electrical Properties

Frequency range	2300 - 2500 MHz
Impedance	50 Ω
VSWR	1.5
Polarization	vertical
Gain	14 dBi
3 dB beamwidth horizontal	35°
3 dB beamwidth vertical	30°
Downtilt	0°
Front to back ratio	20 dB
Max. power	75 W (CW) at 25°C
Connector	N female

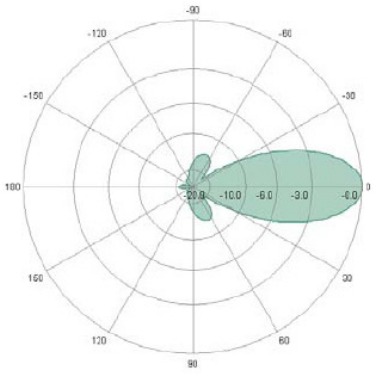
Mechanical Properties

Dimensions	101 x 80 x 35 mm
Weight	0.11 kg
Radome material	LEXAN EXL 9330
Radome color	RAL 7044 (silk gray)
Operating temperature range	- 40°C to + 80°C
Storage temperature range	- 40°C to + 80°C
Windload	15 N at 160km/h
IP	23

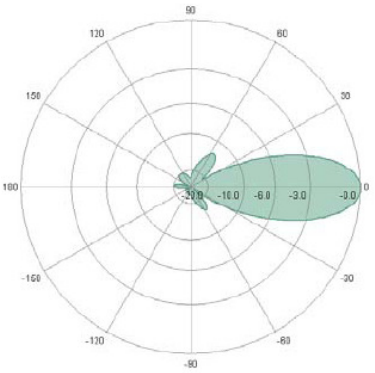
Cable, Accessories

1m with N male connectors at both ends.
Pigtail, R-SMA male to N female
Mounting material

Radiation Pattern



horizontal



vertical

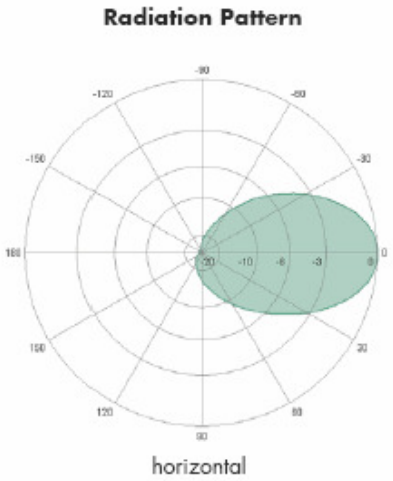
Sectoral Diversity Antenna for 5 GHz

BAT-ANT-N-9A-DS-IP65

Order Number: 943 981-010

Electrical Properties

Frequency range	5150 - 5925 MHz
Impedance	50 Ω
VSWR	2
Polarization	dual linear, ± 45° slant
Gain	9 dBi
3 dB beamwidth horizontal	70°
3 dB beamwidth vertical	60°
Downtilt	0°
Isolation between ports	20 dB
Front to back ratio	20 dB
Max. power	10 W (CW) at 25°C
Connectors	2x N female



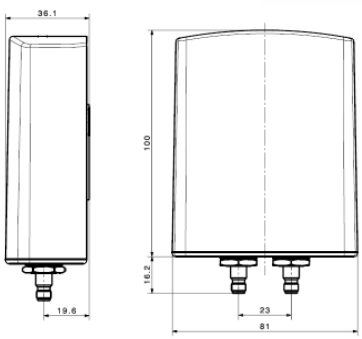
Mechanical Properties

Dimensions	101 x 80 x 35 mm
Weight	0.11 kg
Housing material	ASA and aluminum
Radome material	ASA
Radome material	LEXAN EXL 9330
Radome color	RAL 7044 (silk gray)
Operating temperature range	- 40°C to + 80°C
Storage temperature range	- 40°C to + 80°C
Windload	15 N at 160km/h
IP	65

Cable, Accessories

2x 1m with N male connectors at both ends.
2x Pigtail, R-SMA male to N female
Mounting material

Very well usable with BAT300



Sectoral MiMo Antenna for 5 GHz

BAT-ANT-N-MiMo5-9N-IP65

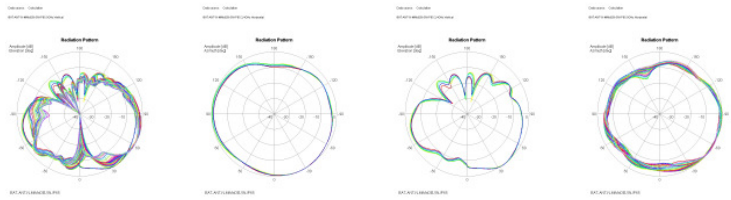
Order Number: 943 981-013

Electrical Properties

Frequency range	5150 - 5875 MHz
Impedance	50 Ω
VSWR	1.5
Polarization	3x linear vertical / horizontal / +45°
Gain	9 dBi
3 dB beamwidth horizontal	65°
3 dB beamwidth vertical	65°
Downtilt	0°
Max. power	2 W (CW) at 25°C
Connector	N female

Mechanical Properties

Dimensions	101 x 80 x 35 mm
Weight	0.11 kg
Radome material	LEXAN EXL 9330
Radome color	RAL 7044 (silk gray)
Operating temperature range	- 40°C to + 80°C
Storage temperature range	- 40°C to + 80°C



Windload	15 N at 160km/h
IP	65

Cable, Accessories

3x 1m with N male connectors at both ends.
3x Pigtail, R-SMA male to N female
Mounting material

Purpose

To be placed on walls or edges of the illuminated sector. Halls or outdoor areas.
Also usable for medium distance point-to-point connections.
To be used with BAT300 devices for optimal support of MiMo functionality.

Directional Antenna linear for 5 GHz

BAT-ANT-N-18A-V-IP65

Order Number: 943 981 006

Electrical Specification

Frequency range	5150 – 5250 / 5250 – 5350 / 5350 – 5725 / 5725 – 5875 MHz
Gain	18 dBi / 19 dBi / 18.5 dBi / 18 dBi
VSWR	
Polarization	Linear, vertical
HPBW / horizontal	18°
HPBW / vertical	18°
Front to back ratio	> 30 dB
Power handling	6W (CW)
Impedance	50 Ω
Connector	N Jack

Environmental & Mechanical Characteristics

Windload @ wind speed	104N @ 216 km/hr
Temperature	- 45° C to +70° C
Radome material	plastic
Radome color	Light gray
Weight	107 g
Dimensions	190 x 190 x 30,5 mm
IP	IP65

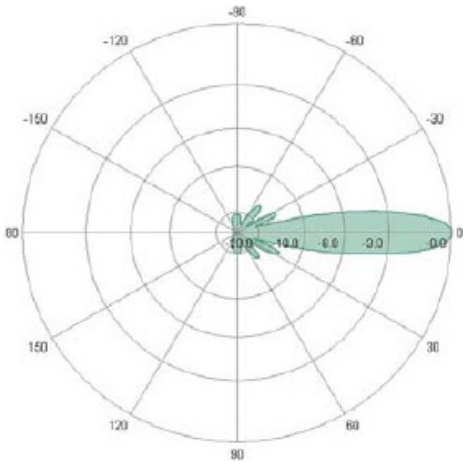
Cable, Accessories

1m with N male connectors at both sides.
Pigtail, R-SMA male to N female
Mounting material for wall and mast mount

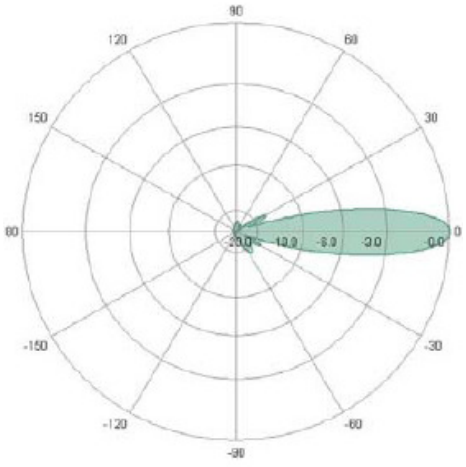
Purpose

For medium distances, partly sectoral coverage in 5GHz, indoors and outdoors.

Radiation Pattern



horizontal



vertical

Directional Antenna linear for 5 GHz

BAT-ANT-N-23A-V-IP65

Order Number: 943 981 007

Electrical Specification

Frequency range	5150 - 5350 MHz / 5470 - 5875 MHz
Gain	23 dBi
VSWR	< 1,5
Polarization	Linear, vertical
HPBW / horizontal	9°
HPBW / vertical	9°
Front to back ratio	> 30 dB
Max. Power	6W
Impedance	50 Ohms
Connector	N female

Environmental & Mechanical Characteristics

Windload @ survival speed	264N @ 220 km/h
Temperature	- 45° C to +70° C
Lightning protection	DC ground
Radome material	plastic
Radome color	Gray-white
Weight	1.5 kg
Dimensions	305 x 305 x 25
IP	IP65 / IP67

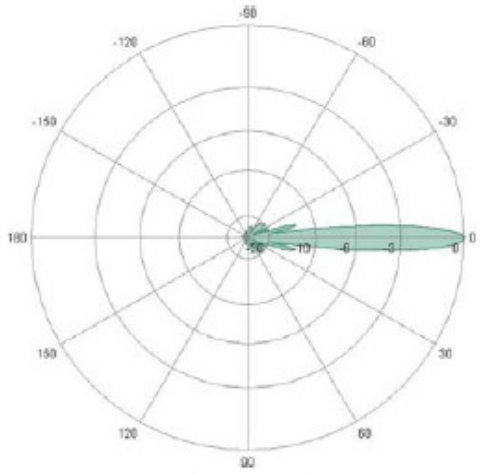
Cable, Accessories

1m with N male connectors at both sides.
Pigtail, R-SMA male to N female
Mounting material for wall and mast mount

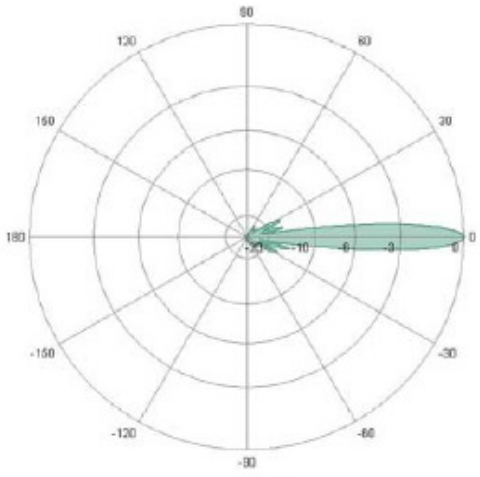
Purpose

For long distances in 5GHz.
Suggested for BAT54 devices only.

Radiation Pattern



horizontal



vertical

HIRSCHMANN
A BELDEN BRAND

Directional Antenna dual linear for 5 GHz

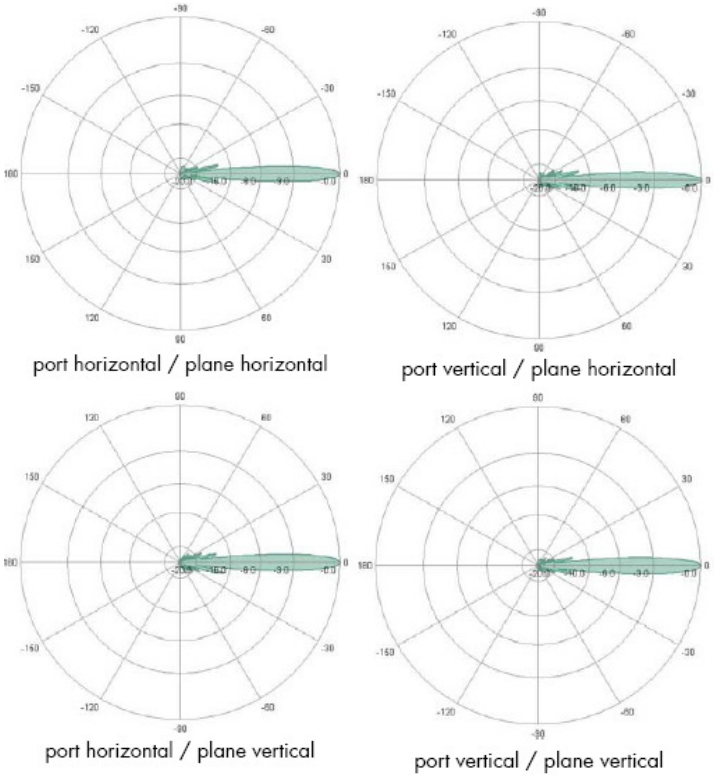
BAT-ANT-N-23A-VH-IP65

Order Number: 943 981 008

Electrical Specification

Frequency range	5150 - 5875 MHz
Gain	23 dBi
VSWR	< 1,7
Polarization	dual Linear, vertical and horizontal
HPBW / horizontal	9°
HPBW / vertical	9°
Front to back ratio	-30 dB
Max. Power	6W
Impedance	50 Ohms
Connector	2x N female

Radiation Pattern



port horizontal / plane horizontal

port vertical / plane horizontal

port horizontal / plane vertical

port vertical / plane vertical

Environmental & Mechanical Characteristics

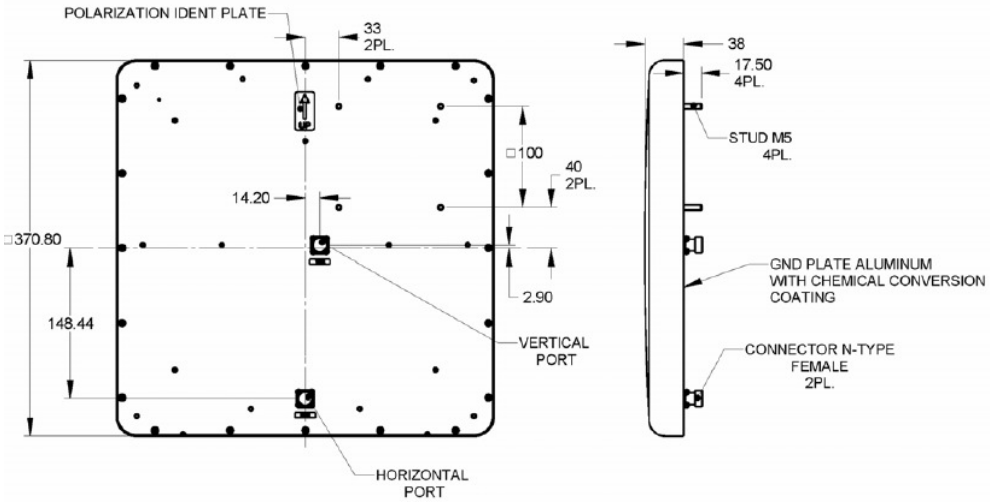
Windload @ survival speed	264N @ 220 km/h
Temperature	- 45° C to +70° C
Lightning protection	DC ground
Radome material	plastic
Radome color	Gray-white
Weight	2.5 kg
Dimensions	371 x 371 x 40 mm
IP	IP65 / IP67

Cable, Accessories

2x 1m with N male connectors at both ends.
2x Pigtail, R-SMA male to N female
Mounting material for wall and mast mount

Purpose

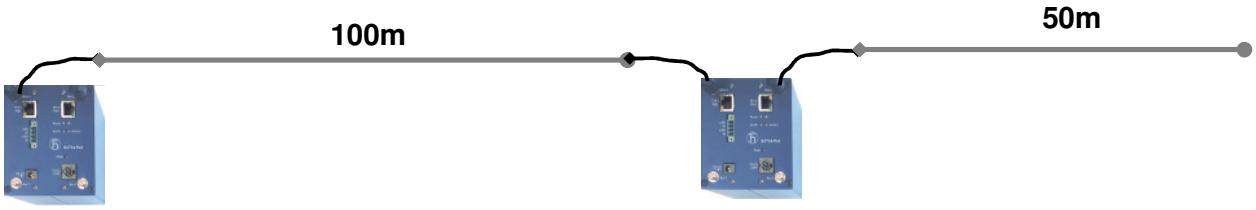
For long distances in 5GHz
Suggested for BAT300 devices.



Radiating Cable Antennas (Leaky Cable)

Antennas for 2,4 GHz

Radiating cables are in fact coaxial cables that are equipped with small slots that operate as antennas. This leads to a homogeneous field around the cable in which clients can move without roaming.



The 100m cable is designed for feeding the signal from both ends. The 50m cable is designed to be used with one AP and equipped with a terminator at the end.

BAT-ANT-N-LC-G-50m-IP65

Order Number 943 981-001

Specification

Cable length	50 m
Cable specification	N male connector, N-terminator; 1.5 dB at 2.4GHz

Radio technology

Frequency band	2000 MHz - 2900 MHz
Antenna connector	N-type male

Ambient conditions

Operating temperature	-40 ºC to +85 ºC
Storage/transport temperature	-70 ºC to +85 ºC
Dimensions (W x H x D)	50m; d=15mm
Mounting	wall
Protection class	IP 65
Weight	12 kg

Fire behavior

Halogen free and flame retardant outer sheath
Low corrosive gas emission acc. to IEC 60754-2
Flame retardant acc. to IEC 60332-1 and IEC 60332-3 cat. C
Low smoke emission acc. to IEC 61034

Scope of delivery and accessories

Leaky Cable, 2 x N-connector preassembled, 1 x terminator 50 Ohm, 50 x fastening clip

BAT-ANT-N-LC-G-100m-IP65

Order Number 943 981-101

Specification

Cable length	100 m
Cable specification	2 x N male connectors; 1.5 dB at 2.4GHz
Radio technology	
Frequency band	2000 MHz - 2900 MHz
Antenna connector	N-type male
Ambient conditions	
Operating temperature	-40 ºC to +85 ºC
Storage/transport temperature	-70 ºC to +85 ºC
Dimensions (W x H x D)	100m; d=15mm
Mounting	wall
Protection class	IP 65
Weight	24 kg

Fire behavior

Halogen free and flame retardant outer sheath
Low corrosive gas emission acc. to IEC 60754-2
Flame retardant acc. to IEC 60332-1 and IEC 60332-3 cat. C
Low smoke emission acc. to IEC 61034

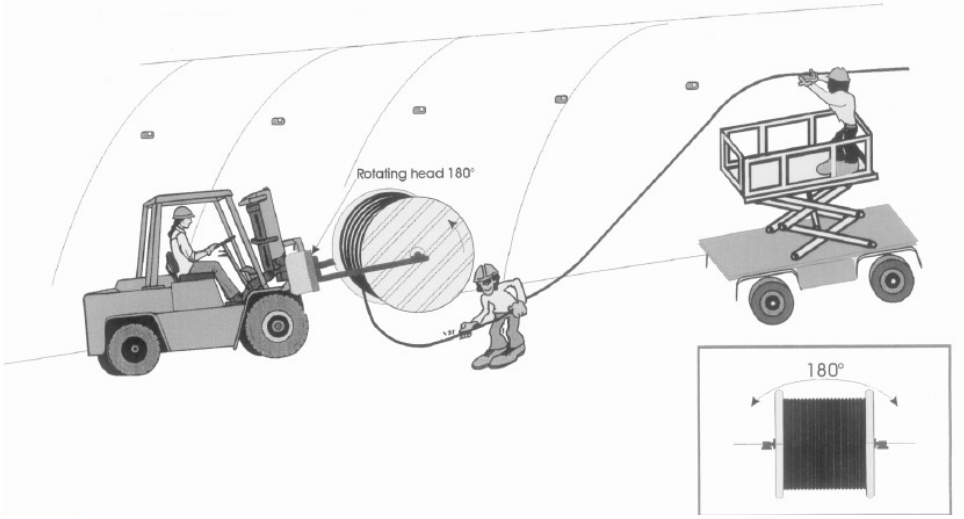
Scope of delivery and accessories

Leaky Cable, 2 x N-connector preassembled, 1 x terminator 50 Ohm, 100 x fastening clip

Longitudinal attenuation of both cables between 2.4 and 2.485 GHz

Configurations Longitudinal Attenuation

	dB/100 m
LC at 10 cm from a concrete floor	15
LC at 15 mm from a metal surface	17
LC directly against a metal surface	34



Cables/Adapter

Available as accessories. Please note that all antennas are supplied with 1m cable N m-m and Pigtail!

BAT-CLB-2 N

Low loss cable GX_023272_D-06

Order Number: **m-m**: 943 903 513; **m-f**: 943 903 514

Characteristics

Length	2 m
Attenuation	1,4 dB / 2,4 GHz 3 dB / 5 GHz
Connector	N male on male or male on female
Sealing	IP65

BAT- CLB- 15 N m-f

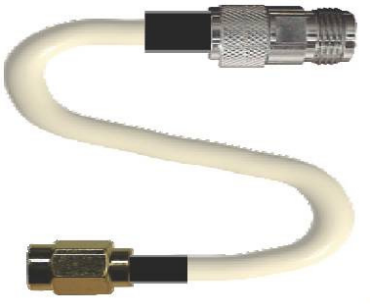
Low loss cable

Order Number: 943 903 515

Characteristics

Length	15 m
Attenuation	4 dB / 2,4 GHz 7 dB / 5 GHz
Connector	N male/ N female

BAT- Pigtail



Order Number: 943 903 360

Note: Pigtail is already part of all antenna kits!

Characteristics

Length	0,2 m
Attenuation	0,5 dB / 2,4 GHz 1 dB / 5 GHz
Connector	N female/ RPSMA-Plug

BAT-ANT Protector m-f

Order Number: 943 903 373

Product Configuration

Main path connectors	Port 1: unprotected, N plug (male) - Port 2: protected, N jack (female)
Mounting and grounding	MH170/brk (MH=bulkhead mounting/brk=bracket)
Side of bulkhead	protected side
Design specialty	inline design

Technical Data

Electrical Data

Impedance	50 Ohm
Frequency range	2000 to 6000 MHz
Return loss	>= 20 dB
Insertion loss	<= 0.2 dB
RF CW power	<= 300 W
PIM 3rd order	not specified
Surge current handling capability	50 multiple kA (test pulse 8/20 µs)
Residual pulse energy	0.0001 µJ typically (test pulse 4 kV 1.2/50 µs / 2 kA 8/20 µs) Main path - protected side

Mechanical Data

Weight	85 g

Environmental Data

Operating temperature	-40 °C to +85 °C
Waterproof degree	IP 65 (according to IEC 60529, data refers to the coupled state)
2002/95/EC (RoHS)	compliant

This BAT-ANT Protector is additionally equipped with a capacitor that also avoids damage of electrical static discharge.
This device is strongly recommended to be used in- and outdoor wherever electrical discharge, overvoltage or unclear grounding occur.
Please refer to the **Outdoor Installation Guide** for how to mount and plan the installation.

BAT-LAN Protector m-f

Order Number: 943 903 374

Surge and overvoltage protector for the PoE/LAN cable.

IP68 shielded. Cable not included.

Product Configuration

Main path connectors	RJ45 jack (female) – RJ45 jack (unprotected side – protected side)	
Mounting	via mounting bracket	
Grounding	via mounting bracket or grounding screw M6 (cable shoe eye > 6,5mm)	
Data transmission rate	1000 Mbps	
Frequency range	DC to 100 MHz	
Impedance	100Ohm	
Votage rating	line – line (pair)	± 6V
	line – ground	± 60V
Current rating	per line	1,5 A
Response Time	2 ns	

Surge current handling capability 50 multiple kA (test pulse 8/20 µs)

line – line (pair)	0,1 kA
line – ground	2,5 kA
screen – ground	6 kA

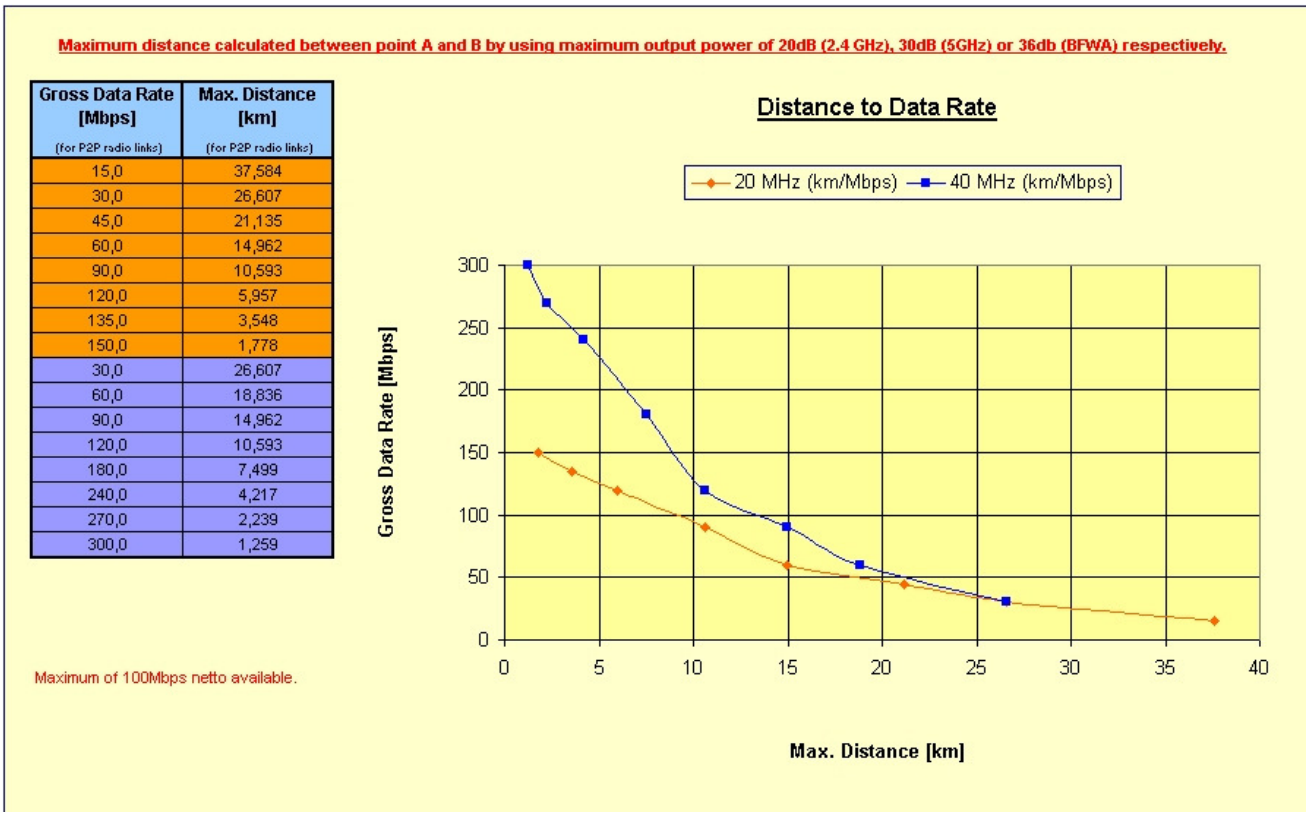
Cable category	acc. to ISO/IEC 11801:2002 class D specified (up to CAT-5e system)
Operating temperature	-40° to +85°C
Protection class	IP68
Weight	330 g

Please refer to the **Outdoor Installation Guide** for how to mount and plan the installation.

Output power calculation

WLAN systems need to be set up in a way that the country's regulatory restrictions are not violated. Hirschmann™ has prepared BAT devices in a way that they can be configured accordingly.
→ choose the correct country setting
→ enable or disable DFS if necessary (e.g. by choosing indoor mode)
→ insert the correct gain of the antenna/cable/protector system
Please refer to the user's manual for instructions how to configure BAT devices correctly.

In order to easily calculate the possible range and distance of a WLAN installation, Hirschmann provides the Antenna Distance Calculator.
Please download this Excel tool from www.hirschmann-ac.de or www.hirschmann-ac.com.

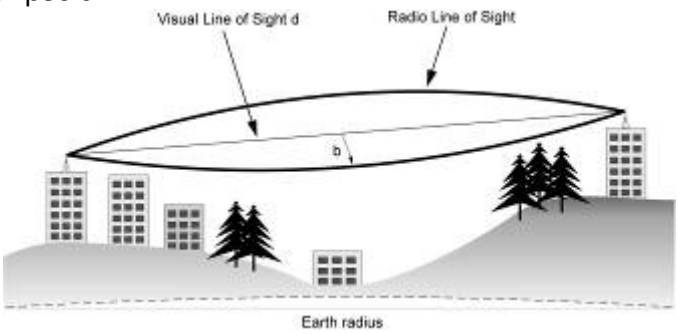


Fresnel Zone

The Hirschmann™ Antenna Distance calculator is based on the following calculation scheme:

In order to make an undisturbed transmission possible the transmission circuit between the antennas needs a free area. This 1st Fresnel zone has the form of an ellipsoid of rotation whereby the antennas are located in the focal points of the ellipsoid.

This zone is calculated by the shaft section b of the ellipsoid



$$b=0{,}5*\sqrt{(\lambda*d)}$$

d stands for the distance between the antennas (km)
λ = wavelength of electromagnetic wave **λ =** c / f
c is the speed of the wave, nearly like vacuum approx. 300,000 km/s
f = frequency of the wave in 1/s = Hz.

Examples:
d = 2km
f = 2.4 GHz b= 0.5 * √ (300,000km/s / 2.4GHz * 2km) = 7.9m
f = 5.8 GHz b= 0.5 * √ (300,000km/s / 5.8GHz * 2km) = 5m

At distance above 2 km, it is necessary to add earth curvature to calculate the altitude at which the antenna has to be mounted. Some examples:
5km => 0.50m
10km => 2.00m

Statement about passive antennas in hazardous environment

All Hirschmann™ BAT-ANT antennas are passive devices which are not able to increase the power by themselves.

The BAT54-F X2 fulfils the requirements of **EN 60 079-15 (IEC60079-15)**
(type of protection: Ex nA II T4) independent of the passive accessories used.

See KEMA test report No. 2109557, Annex A.1., last clause “Other issues”

The radiated radio frequency energy is not more than 100 mW (less than 20dBm), which is acceptable for apparatus group IIC (maximum 2W allowed in accordance with TR EN 50427)

Hirschmann™ therefore states that all BAT-ANT antennas can be used in Atex Zone II in operation with the certified BAT54-F X2.