Network Densification

Edition 2021/07

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HUBER+SUHNER

When networks densify and cell sites become smaller, HUBER+SUHNER offers solutions to address your challenges: Connecting – today and beyond.

About HUBER+SUHNER

The HUBER+SUHNER group is a leading global supplier of components and systems for electrical and optical connectivity. Our customers in communication, industry and transportation appreciate that we are specialists with detailed knowledge of practical applications. We offer expertise in radio frequency, fiber optics and low frequency all under one roof, thus providing a unique basis for continual innovation which is focused on the needs of our customers all over the world.

At the heart of our offering is a broad range of products that can be relied on to meet the highest standards of quality. Backed by flexible, dependable services with fast response times, our products offer excellent delivery performance. In the wireless market, we concentrate on solutions that allow mobile operators to reduce their total cost of ownership and to make their mobile networks futureproof and reliable.

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Solutions which tackle your challenges

Densification challenges

Adding more capacity to the network while reducing the cost per bit in the network remains one of the biggest challenges faced by infrastructure providers supporting wireless communication networks today.

The solution for this problem is conceptually easy by densifying the network and therefore reducing cell site size, however in reality this has a number of challenges that need to be overcome. While there are many aspects to consider, fundamentally, there are four things to address on the infrastructure level when defining the solution:

- Air interface: antennas need to be easy to handle, radiate where needed and waste as little power as possible
- Location: ensure the physical space is as affordable as possible
- Energy: have a close, affordable and strong enough power source
- Network connection: simple to install and low lease cost for the x-haul

These four aspects decide if and how wireless infrastructure is deployed - making them the main consideration for the business case behind every cell site.

Applications

The sheer amount of different site types possible for cell sites is challenging to tackle. HUBER+SUHNER has identified seven typical application cases that share similar physical assets and/or the same potential solution set. Many other locations used for small cell sites can be seen as variants of the seven applications.

- Advertisement pillar
- Bus shelters
- Street lights
- Department store
- In-building coverage
- Campuses
- Special applications

Advertising pillar

Bus shelter

Street light

Depart

Solutions

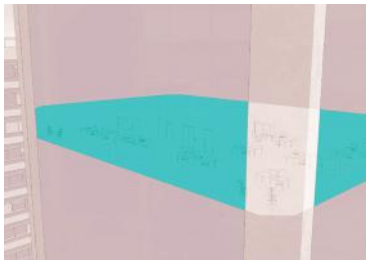
Looking at those seven application types from a mobile network operator or neutral host perspective, three stages are evident when deploying new wireless infrastructure to densify the network: planning, building and operation.

Planning	**Building**	**Operation**
Site design	Equipment/material cost	Maintenance
Mechanical and electrical requirements	Deployment cost	Energy cost
Site acquisition/permitting	Upgradability	Lease/rent cost
Access to front-/mid- and backhaul		Vendor lock in

To better understand the solutions offered by HUBER+SUHNER to simplify, speed up and reduce the cost of the network densification process, this catalogue shows for each application and product proposed, to which above mentioned customer challenge it relates to. At HUBER+SUHNER, we aim to add value in those three dimensions and hence reduce cost per bit for our customers: today and beyond.

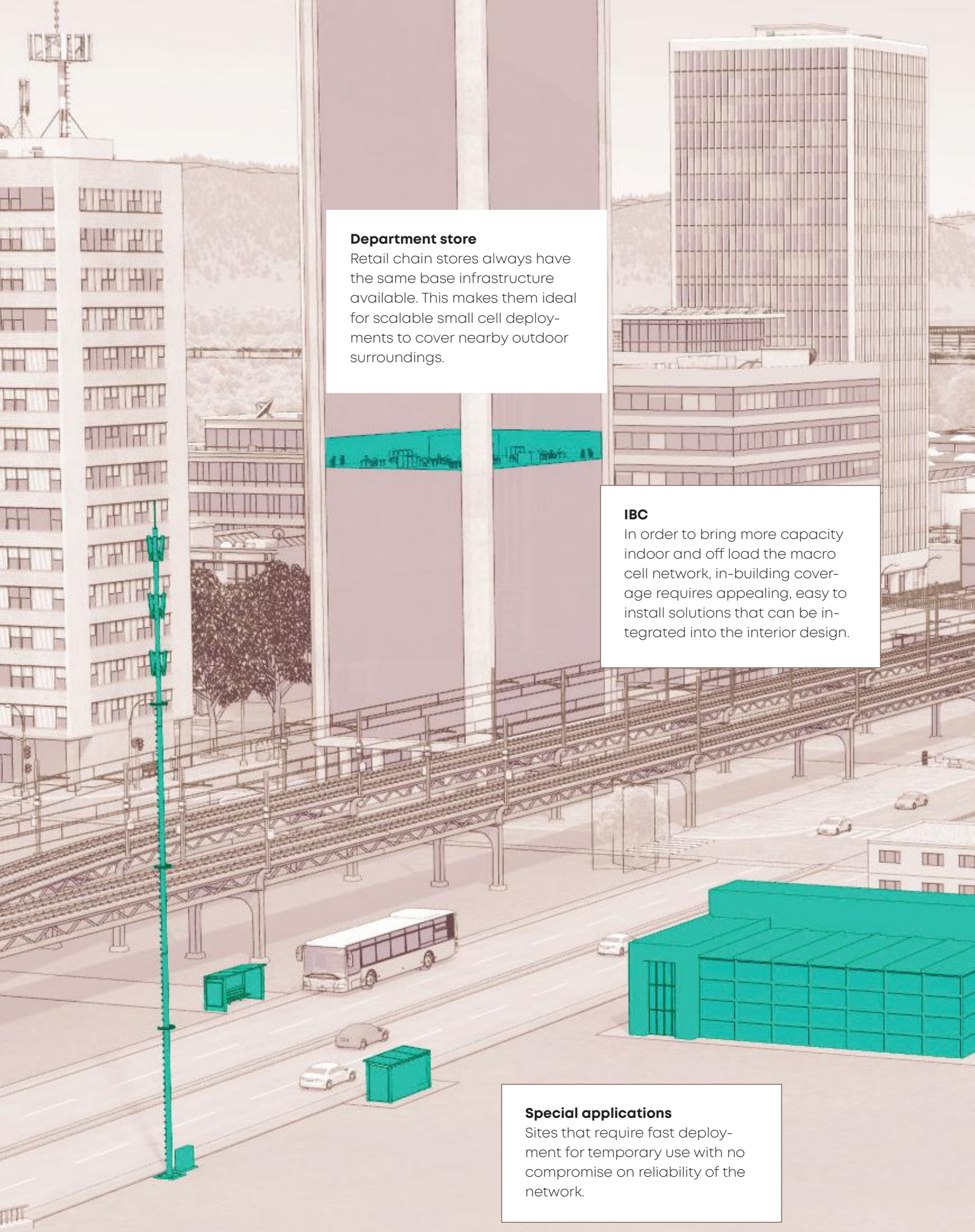
tment store

IBC



Campus

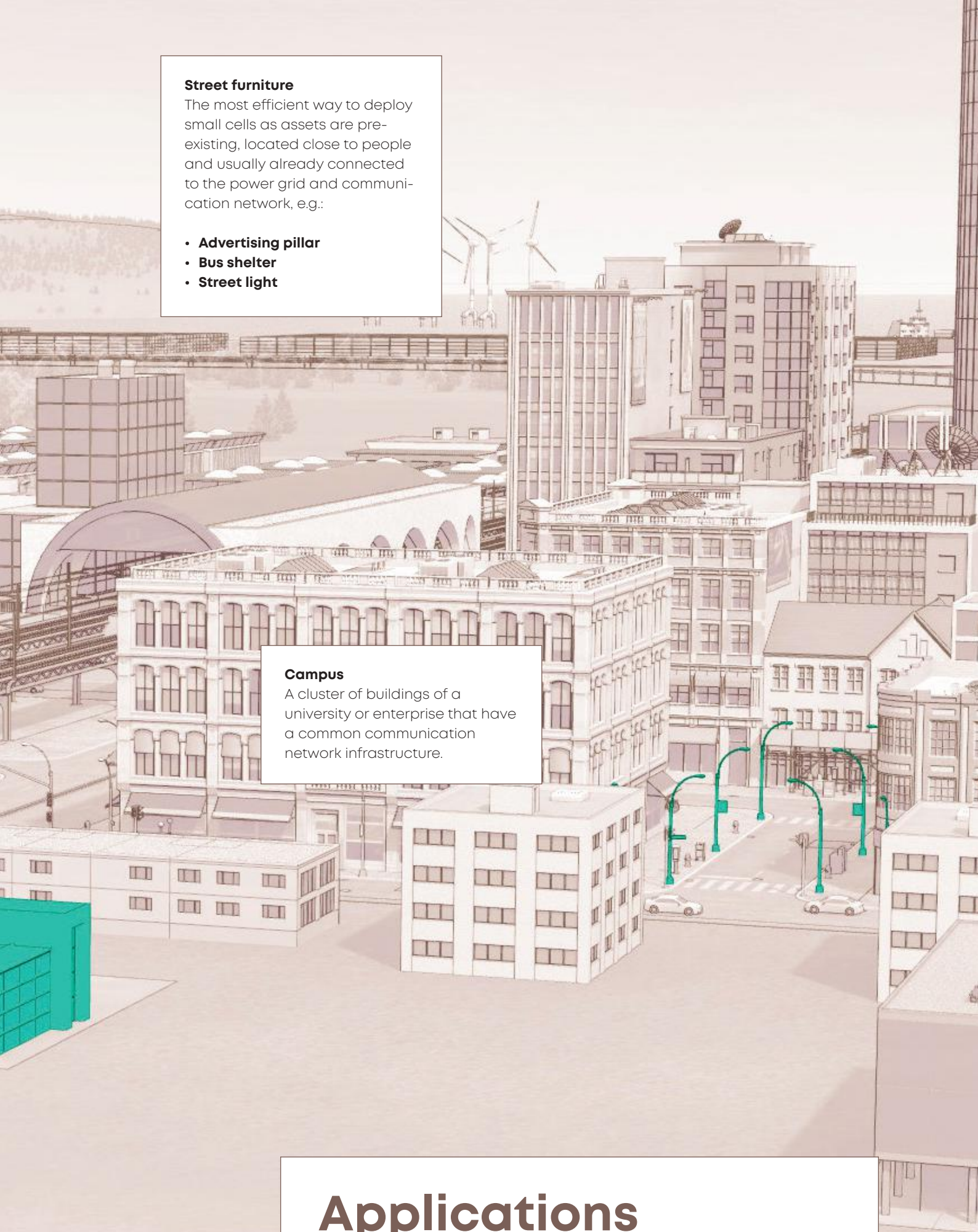
Special applications



Department store
Retail chain stores always have the same base infrastructure available. This makes them ideal for scalable small cell deployments to cover nearby outdoor surroundings.

IBC
In order to bring more capacity indoor and off load the macro cell network, in-building coverage requires appealing, easy to install solutions that can be integrated into the interior design.

Special applications
Sites that require fast deployment for temporary use with no compromise on reliability of the network.



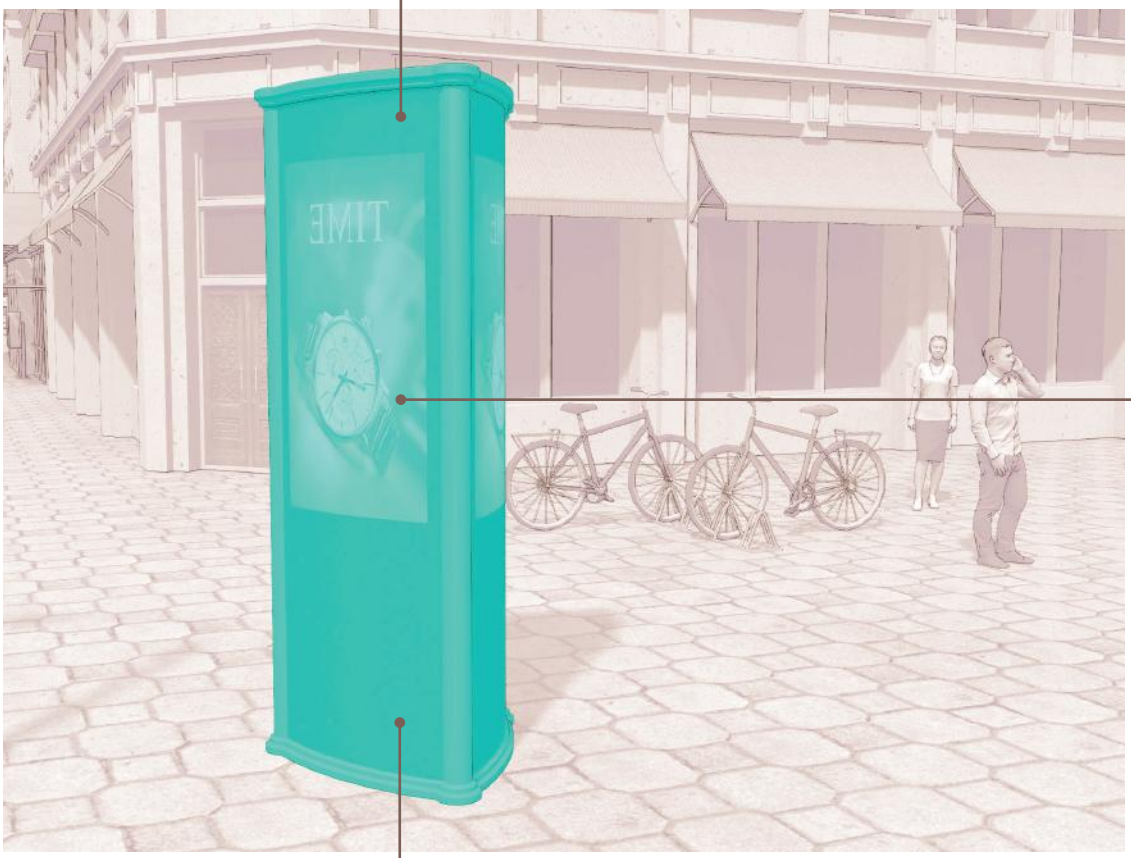
Street furniture
The most efficient way to deploy small cells as assets are pre-existing, located close to people and usually already connected to the power grid and communication network, e.g.:

- **Advertising pillar**
- **Bus shelter**
- **Street light**

Campus
A cluster of buildings of a university or enterprise that have a common communication network infrastructure.

Applications

Street furniture – advertising pillar



Challenges

- Size
- Fiber lease
- Radio frequency restrictions

Solution

Pre-existing street level locations are ideal for deploying small cells as they are positioned in crowed places. The challenge is the limited size available, the visual impact, the lack of fiber to the location and the close proximity to people, resulting in radio frequency performance restrictions.

Similar applications

- Phone booth
- Litter bin

SENCITY® URBAN 100

Features

- Outdoor MIMO 2×2 antenna for 4G and 5G frequency bands
- Easy installation on pre-existing infrastructure
- Available in different models with omnidirectional and directional features

SENCITY® Urban 100 outodoor MIMO round shaped antenna has been specially developed for Small Cell sites on street furniture like advertisement pillars, bus shelters or public phones.

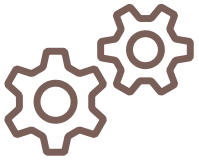
Products relevance of addressing the customer challenge during:

CUBO system

Features

- Versatile housing to adapt to any location
- Various line cards supporting any transport need
- Simple to deploy

The HUBER+SUHNER CUBO system is an active platform designed to increase bandwidth at the edge of the optical access network. This flexible and unique platform is based on modular line cards that can be inserted and integrated into different indoor or outdoor form factors, so it can be installed easily onto street furniture with minimal space requirements. Furthermore, the system is designed to combine 10G and/or 25G transponing multiplexer line cards to enable simple migration from todays 4G to tomorrow's 5G RAN, in combination with Fixed Wireless Access (FWA).



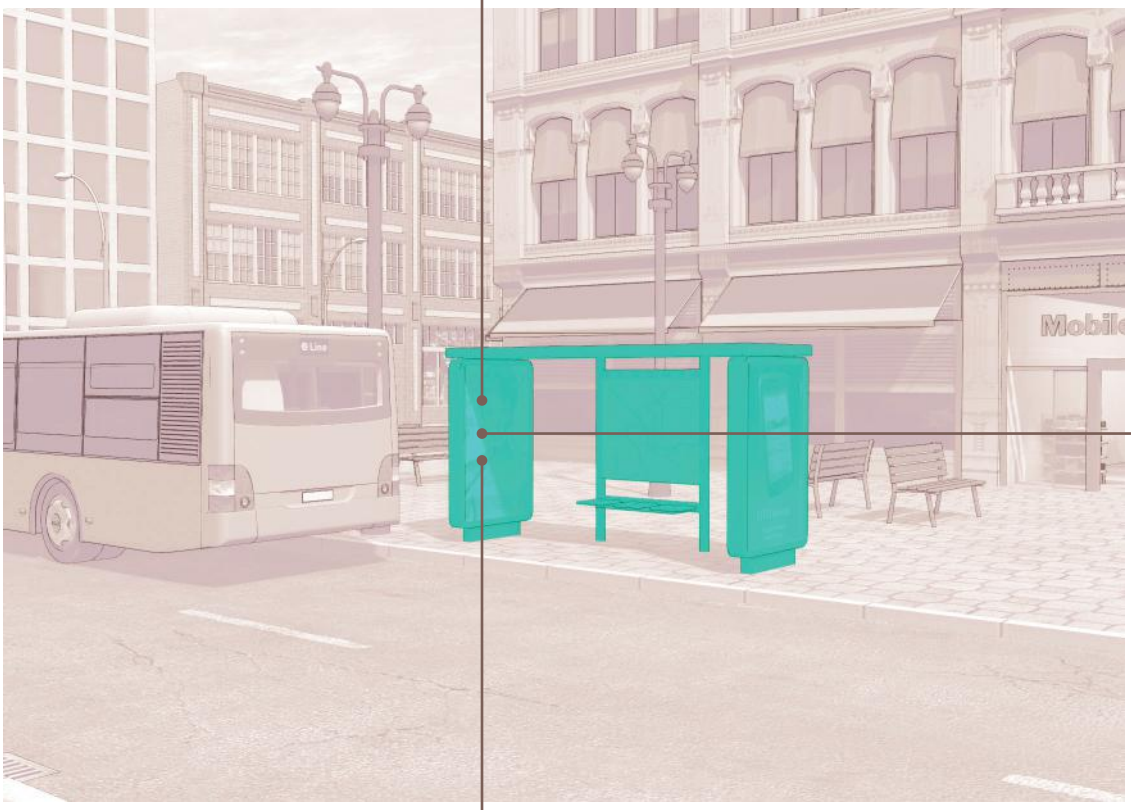
MASTERLINE Ultimate Micro

Features

- Compact design
- WDM or splice capability
- Versatile mounting options

MASTERLINE Ultimate Micro is a hardened distribution box which has been specially developed for use in space-limited locations while still ensuring a high number of connections. It can connect up to six active equipments and its unparalleled space efficiency allows it to be placed anywhere for example, inside advertisment pillars, street lights, hand holes etc. It increases deployment flexibility for the carrier and reduces site permitting issues due to the ease of camouflage into the pre-existing infrastructure.

Street furniture – bus shelter



Challenges
- Equipment cost
- Deployment cost
- Radio frequency restrictions

Solution
The continuous upgrade of transportation and advertisment infrastructure to meet the global trend of urbanisation creates ideal locations to deploy small cells allowing them to be located in places where people consume a large amount of data while waiting for transportation. But the challenge is the cost of the whole asset to be upgraded and deployed for this additional purpose as well as the close proximity to people resulting in radio frequency performance restrictions.

Similar applications
- Advertising panel

SENCITY® Urban 200

Features
- Outdoor directional MIMO 2×2 antenna for 4G and 5G frequency bands
- Easy installation in pre-existing infrastructure
- Available in different aperture models

SENCITY® Urban 200 outodoor MIMO rectangular shaped antenna is a compact solution with very high isolation between ports that has been specially developed for Small Cell sites on street furniture like advertisement pillars, bus shelters and public phones.

Products relevance of addressing the customer challenge during:

SPJ

Features
- Excellent electrical performance
- Plenum rated cable
- Connectors can be exchanged on site

SPJ (Standard Plenum Jumpers) products are designed especially for small cell applications where restrictions in space and flexibilty in connector choice are requested. The connector can be exchanged allowing for an upgrade if required.

MASTERLINE Flex Box

Features
- Robust and versatile housing accommodating various deployment scenarios
- Time saving cable installation due to split grommets in cable entry
- Mountable on wall, pole or rail

MASTERLINE Flex Box is a versatile distribution box simplifying outdoor deployment. It is designed for maximum planning flexibility to be used in most street furtniture and is simple to install with a guided cabling layout inside. It has integrated cable overlength management for maximum comfort when performing maintenance or site upgrades and is designed to stay in the network today and beyond.

Street furniture – street light

Challenges
- Speed of installation
- Simple to install solutions
- Access to front-/mid- and backhaul

Solution
Street lights are becoming smarter and are increasingly being connected to the network. This is challenging, as street lights have a lot of visibility from the municipality and offer limited space to mount equipment alongside connectivity solutions. Furthermore, fiber to the street pole can be very costly to deploy and/or rent. The quantity of poles needing to be installed is vast, making the speed and ease of deployment, critical.

Similar applications
- Hand hole/man hole
- Strand mount

MQ4/MQ5 Cluster jumpers

Features

- Easy to connect four or five RF connections at the same time
- PIM stable connection
- Space saving

The MQ4/MQ5 Cluster jumpers are the answer to the need for increasing number of channels in modern mobile antennas, for example canister antennas on lamp poles in North America. The combination of four or five connections per plug considerably reduces the required connector footprint on antennas and radios while also reducing the installation effort on site allowing for faster deployment.

Products relevance of addressing the customer challenge during:

Q-ODC-2 Mini

Features

- Compact design for high packaging density, 50 % size reduction compared to traditional connectors
- Dustproof and watertight (IP65)
- Push-pull coupling mechanism for easy installation

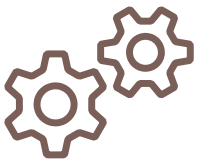
The size optimised connector for two fibers is used in particularly harsh environmental conditions, even when installation has to be fast and safe. This small fiber optic interface is the ideal solution for space constraint locations found in communication and even industrial applications.

CUBO system

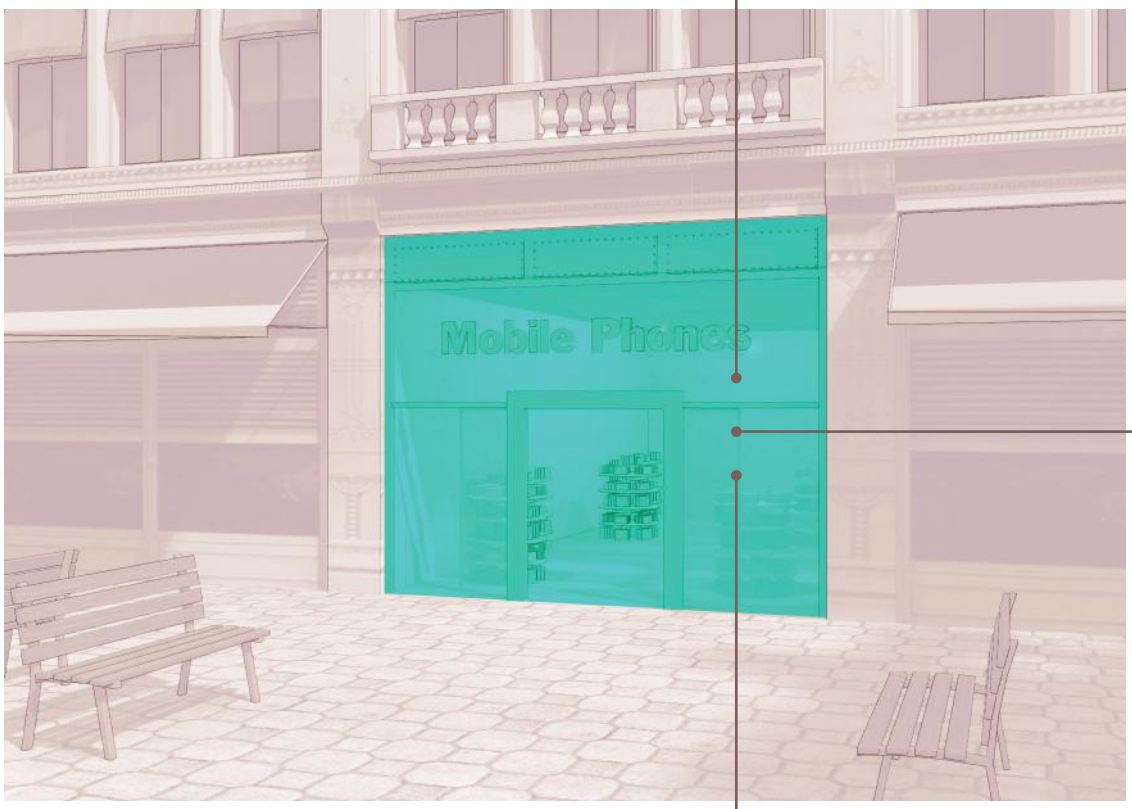
Features

- Versatile housing to adapt to any location
- Various line cards supporting any transport need
- Simple to deploy

The HUBER+SUHNER CUBO system is an active platform designed to increase bandwidth at the edge of the optical access network. This flexible and unique platform is based on modular line cards that can be inserted and integrated into different indoor or outdoor form factors, so it can easily be integrated onto street furniture with minimal space requirements. Furthermore, the system is designed to enable simple migration from todays 4G to tomorrow's 5G RAN.



Department store



Challenges
- Size
- Upgradability
- RF restrictions

Solution
Department stores of carriers or retail store chains offer a good opportunity to increase mobile network capacity in a simple way. Taking into account that space, energy and x-haul is available, the remaing deployment challenges are visual impact and size, upgradeability of the solution and the close proximity to the people resulting in radio frequency performance restrictions.

Similar applications
- Wall mount

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- Outdoor directional MIMO 2×2 antenna for 4G and 5G frequency bands
- Easy installation in pre-existing infrastructure
- Available in different aperture models

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Features
- Excellent electrical performance
- Plenum rated cable
- Connectors can be exchanged on site

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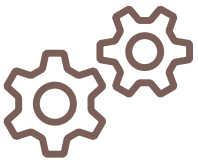
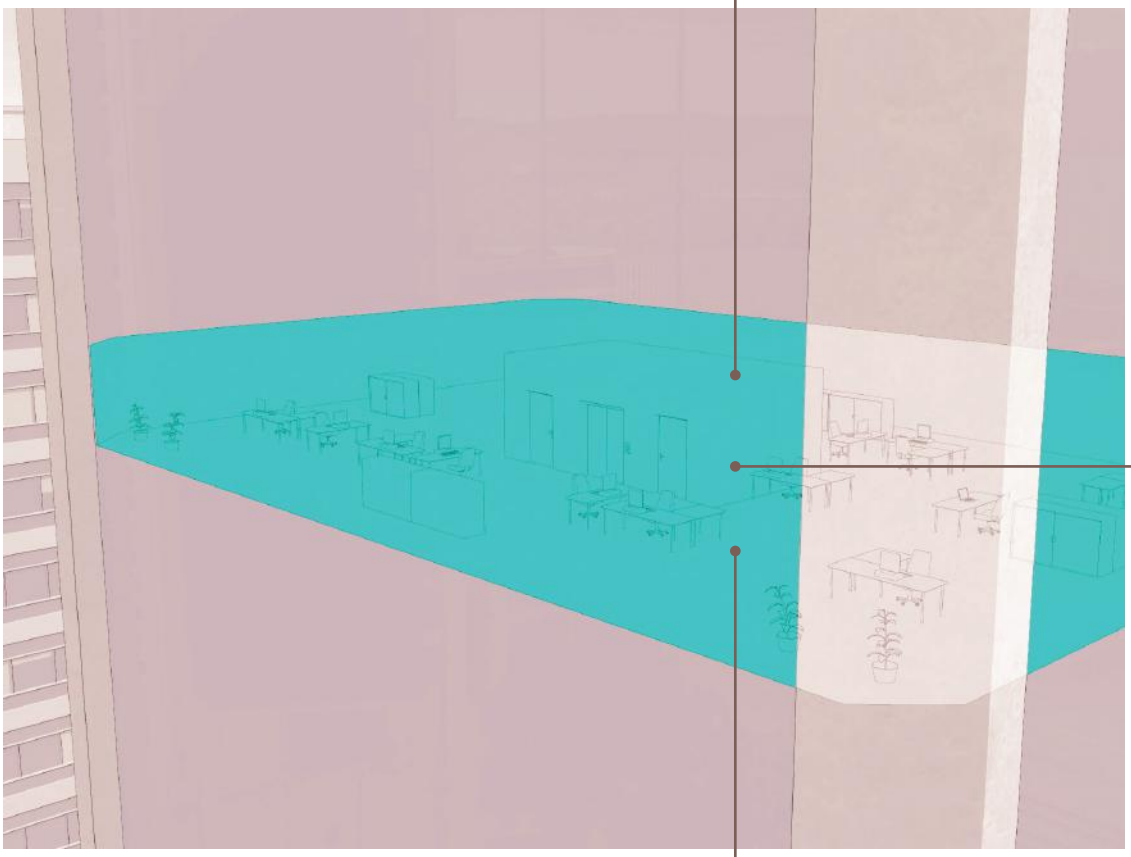
Network cubes

Features
- Capacity increase up to 96 times
- CWDM, DWDM
- Assembled to any required local form factor for simple installation

The HUBER+SUHNER network cubes are a range of passive optical transport solution products. The fiber access network requirements are extremely diverse and can differ drastically from site to site. Network cubes are therefore a toolbox of state of the art WDM components and various enclosures. Regardless of CWDM or DWDM, small or large channel count, ultra compact or easy access, indoor or outdoor, the network cubes can be assembled to fit pretty much any requirements.



IBC



Challenges
- Aesthetics
- Speed
- Reliability

Solution
With 80 % of data in mobile networks being consumed indoors, more and more buildings require in-building solutions to cope with the in-building data demand. In order to comply with modern low energy building standards and make use of higher frequency bands for 5G, in-building systems are more frequently required for private buildings also. The main challenges to address are visual impact, deployment speed and reliability of the network.

Similar applications
- No similar applications

SENCITY® Rondo

Features

- Indoor MIMO and SISO multiband omnidirectional antenna
- Available in 617 to 4200 MHz and 698 to 3800 MHz versions
- ETL tested for Plenum space (UL2043)

MIMO and SISO indoor antennas feature an attractive design. It can be easily mounted in various ways for different materials and requirements. It is also capable of ceiling flush mount installation.

Products relevance of addressing the customer challenge during:

SENCITY® Occhio

Features

- 4×4 MIMO (2×2) omnidirectional antenna
- Multiband capability between 1.7 – 6 GHz
- Smart connect-sytem with a self locking adaptor and quick lock feature for ease of installation

SENCITY® Occhio antenna offers the operator 5G coverage, a simple, time-saving installation process and an attractive industry preferred design with a small form factor. Thanks to its multiband capability between 1.7 – 6 GHz and 2×2/4×4 MIMO configuration it supports today and future wireless applications.

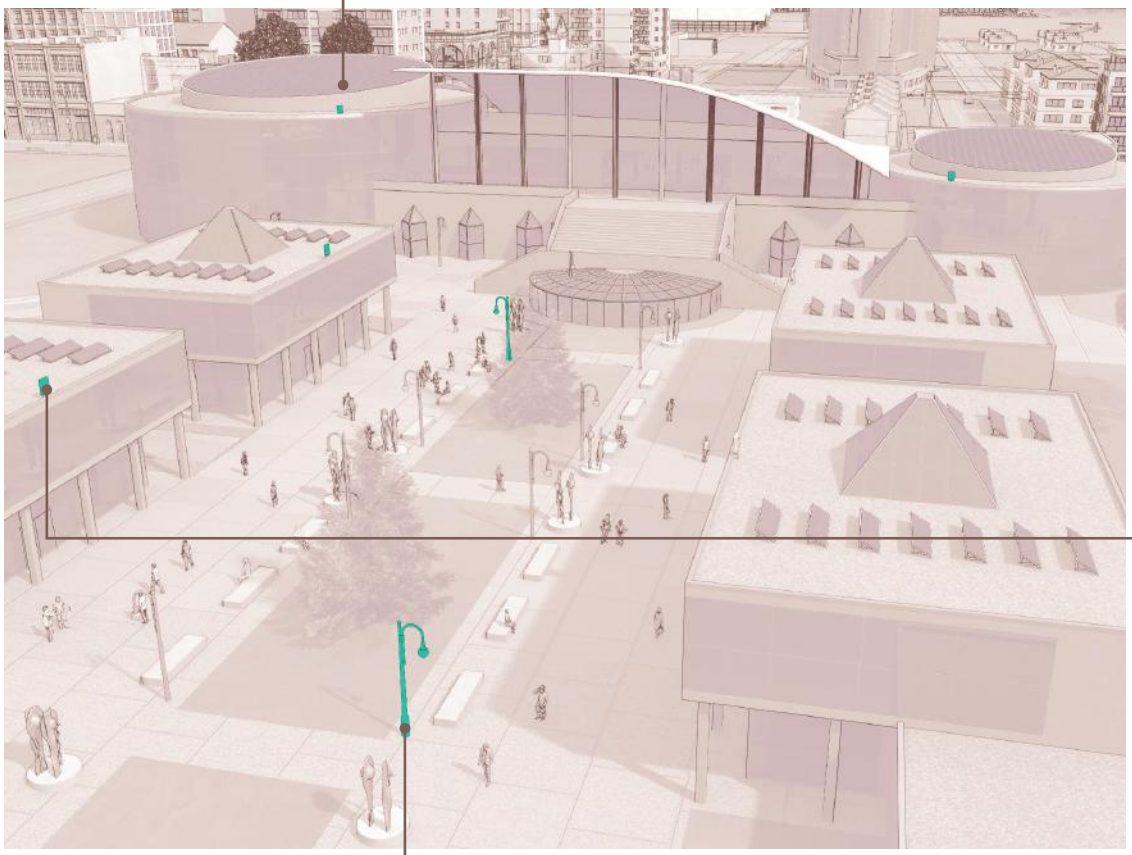
Quick-Fit plus

Features

- Extraordinary static and dynamic PIM stability
- Fast and easy cable preparing process
- One-piece design, no torque wrench required

Quick-Fit plus connectors allow extremely easy and fast assembly by combining cutting and stripping of the cable in one step thanks to the HUBER+SUHNER developed assembly tool. These connectors are ideal for deployments requiring reliable and field terminated solutions.

Campus



Challenges
- Fiber lease
- Low power consumption
- Upgradability

Solution
Any conglomeration of buildings such as university or enterprise campuses, amusement parks or even a subway system can be seen as a campus: high volumes of people results in a large amount of data traffic. Therefore it is critical to make efficient use of available fibers, reduce the power consumption as much as possible (particularly in subway systems) and enable the transition to future technologies. Furthermore, it is critical to have accurate timing solutions coordinating network elements and reduced interference.

Similar applications
- Venue
- Metro/subway
- Amusement park
- Railway station

Direct GPS-over-Fiber

Features
- Copperless link – signal and power distributed over fiber
- Imune to RFI, EMI and EMP
- Easy to install, Plug-and-Play

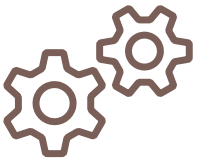
Direct GPSoF enables a fiber optic connection directly from the antenna to the receiver over optic cabling - delivering the world's first "truly copperless" link. The use of Power-over-Fiber removes power delivery constraints by eliminating the need for external power to the remote antenna unit. Using Power-over-Fiber also saves time and money in environments preventing the installation of conductive cable such as roof tops. GPSoF modules are focused on distributing a single GPS signal into multiple receiver systems - enabling unlimited flexibility and scalability in signal distribution.

Products relevance of addressing the customer challenge during:

CUBO system

Features
- Versatile housing to adapt to any location.
- Various line cards supporting any transport need
- Simple to deploy

The HUBER+SUHNER CUBO system is an active platform designed to increase bandwidth at the edge of the optical access network. This flexible and unique platform is based on modular line cards that can be inserted and integrated into different indoor or outdoor form factors, so it can easily be integrated onto street furniture with minimal space requirements. Furthermore, the system is designed to enable simple migration from todays 4G to tomorrow's 5G RAN.



Fiber optic buried cable

Features
- CPR classification ranging from Dca, Cca to Bca
- Longitudinal and transversal watertight cables
- Halogen-free and non-corrosive fire gasses

Fiber optic cables with a rugged jacket, the highest possible flexibility and minimal size are required when connecting equipment in special environments. HUBER+SUHNER specialises in fiber optic cables covering those last meters of a site from a demarcation point to e.g. a mobile base band unit (cell on wheels), a ground station for drones providing coverage in emergency siutations or use our cables with up to 144 optical fibers to connect a small cell site to the nearest fiber optic distribution point.

Special applications

Challenges
- Deployment speed
- High reliability

Solution
With increasing digitalisation, our dependency on a working communication network is crucial, particularly, in the event of a disaster. When disaster occurs, fast deployment and high reliability of the emergency network are some of the biggest challenges to be overcome.

Similar applications
- Drones
- Blue light organisation networks
- Disaster recovery networks
- Mobile cell sites for event coverage

SPJ

Features
- Excellent electrical performance
- Plenum rated cable
- Connectors can be exchanged on site

SPJ (Standard Plenum Jumpers) products are designed specially for small cell applications where restrictions in space and flexibilty in connector choice are requested. The connector can be exchanged allowing an upgrade if required.

Products relevance of addressing the customer challenge during:

Q-ODC-2 Mini

Features
- Compact design for high packaging density, 50 % size reduction compared to traditional connectors
- Dustproof and watertight (IP65)
- Push-pull coupling mechanism for easy installation

The size optimised connector for two fibers is used in particularly harsh environmental conditions, even when installation has to be fast and safe. This small fiber optic interface is the ideal solution for space constraint locations found in communication and even industrial applications.

Fiber optic buried cable

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- CPR classification ranging from Dca, Cca to Bca
- Longitudinal and transversal watertight cables
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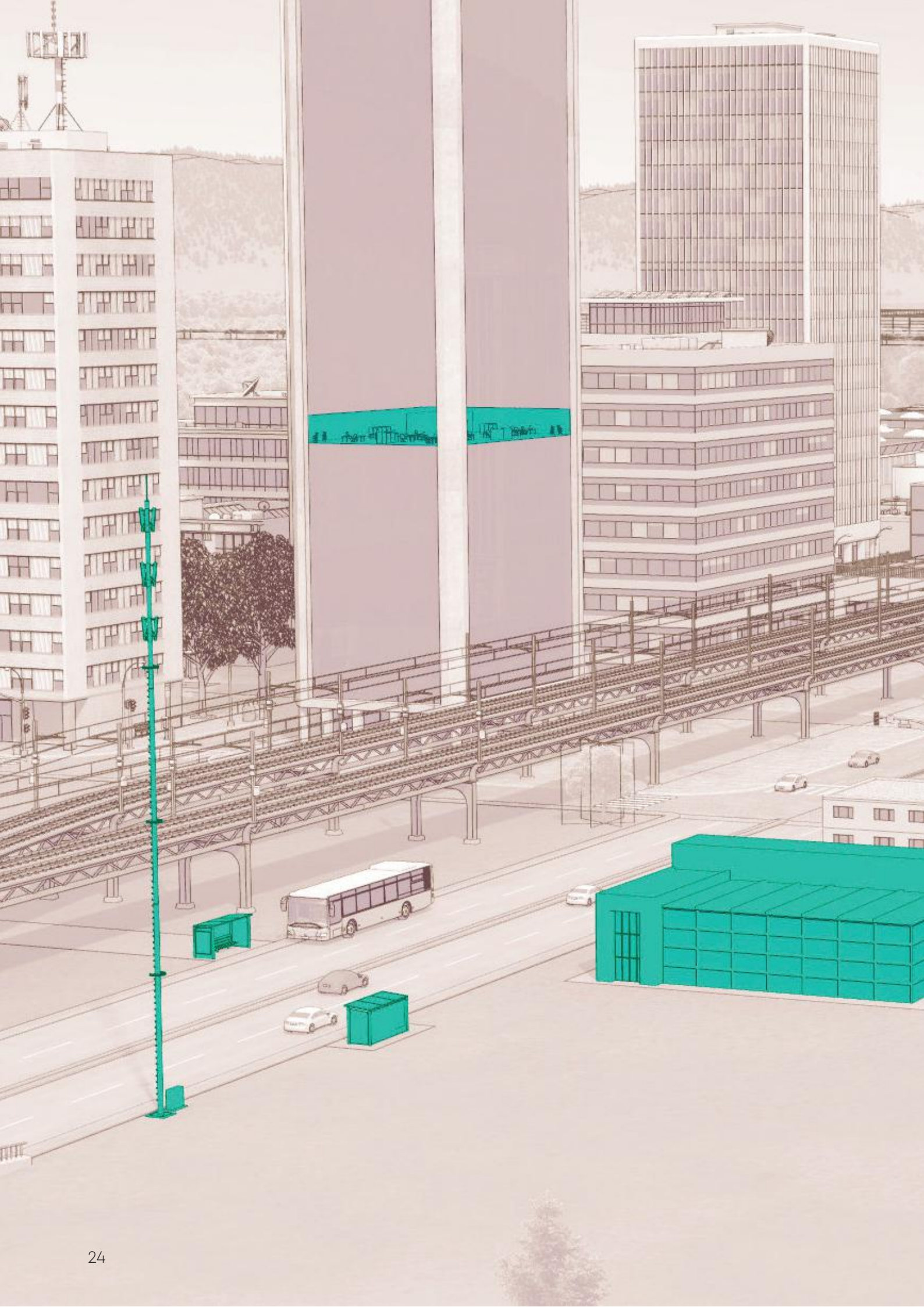
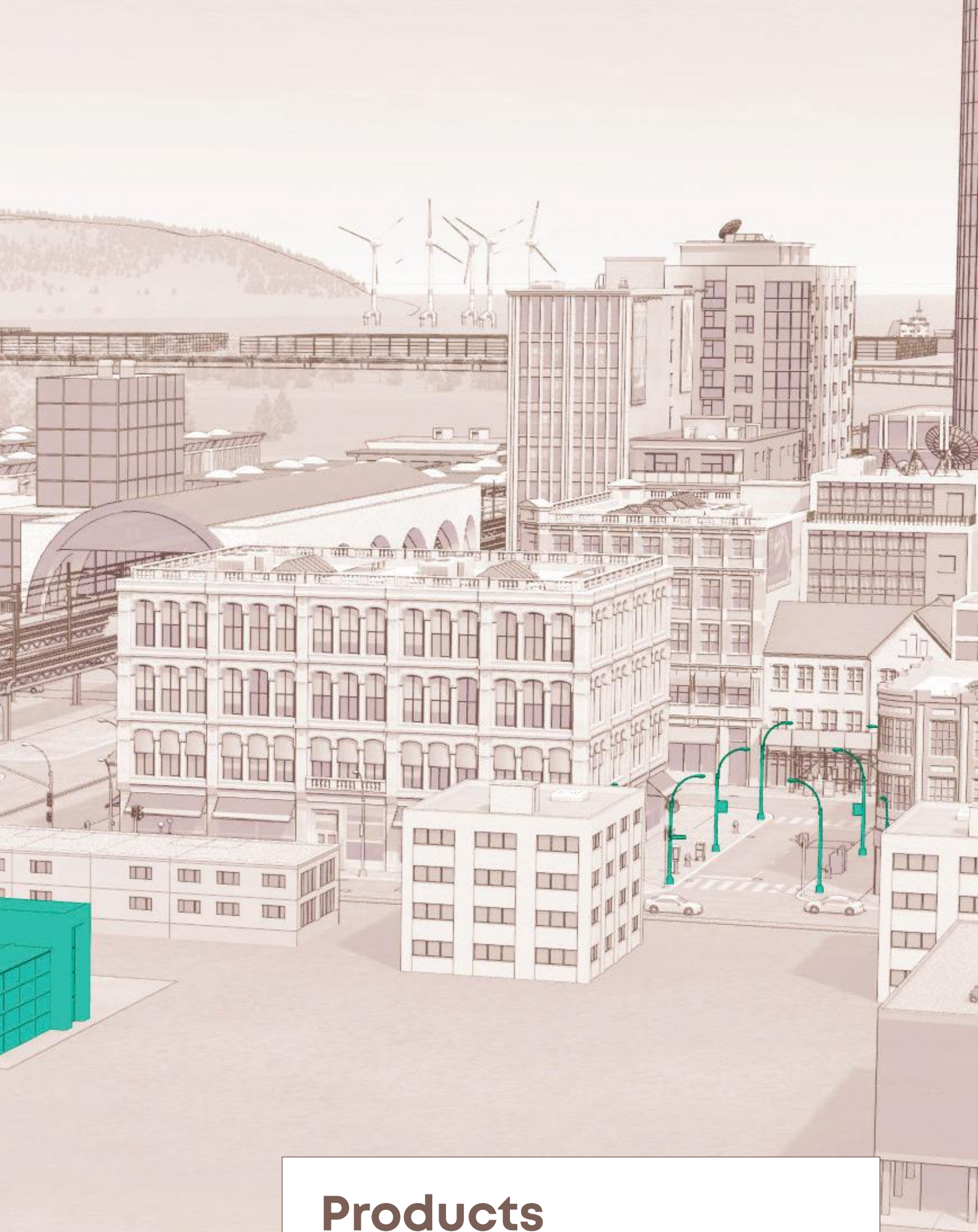


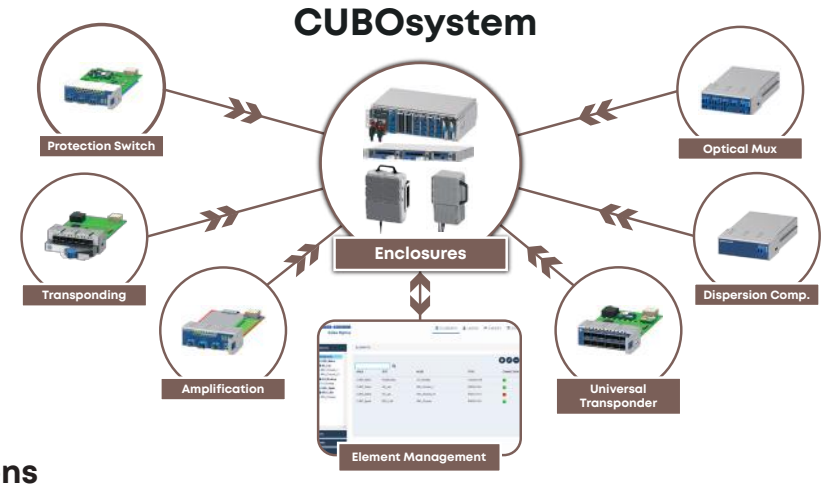


Products

CUBO system

Description of product

The HUBER+SUHNER CUBO system is an active processing platform based on modular line cards that can be inserted and integrated into different indoor or outdoor form factors. In addition to the active line cards, passive modules such as optical multiplexers are also available for the CUBO system platform. This flexible and unique platform can be used for a multitude of scenarios in demanding optical access applications such as small cell, macro cell, enterprise access and last mile backhaul.
For example, the outdoor enclosures located at the radio sites combined with the 10G and/or 25G transponing multiplexer line cards are ideal for mobile fronthaul transport of current and future 4G/5G RAN.
As new line cards with different functionalities are continuously being added to the CUBO system portfolio, service providers can future-proof their networks in line with changing demands



Applications

- Advertising pillar
- Street light
- Department store/campus

Enclosures

Standard outdoor	2 line cards, dual power supply (AC or DC), integrated management, IP65, operating temperature (–40 to +65 °C), compact size (H/W/D) 340/270/135 mm – 22.07/10.63/6.02 inch
Slim Outdoor	1 line card, single power supply (AC or DC), integrated management, IP65, operating temperature (–40 to +65°C), compact size (H/W/D) 295/158/124 mm – 11.61/6.22/4.88 inch
3RU Chassis	9 line cards, dual power supply (AC or DC), dedicated slot for management, (all hot swappable), operating temperature (–40 to +55 °C)
1RU Chassis	2 line cards, dual external power supply, dedicated slot for management, (all hot swappable), operating temperature (–40 to +55 °C)

Line cards (selection)

10G transponing multiplexer	6 services, SFP+, Ethernet (up to 10G), CPRI (Options 1-8), eCPRI (10G), integrated mux
25G transponding multiplexer	6 services, SFP28, Ethernet (10G – 25G), eCPRI (10G/25G), O-RAN, nFAPI, integrated mux
Erbium doped fiber amplifier (EDFA)	Booster and pre-amp versions available
Optical protoection switch	Single or dual version, automatic, semi-automatic and manual switching modes

Related products

Masterline Ultimate Micro (page 28)

FO buried cable (page 32)

Network cubes (page 27)

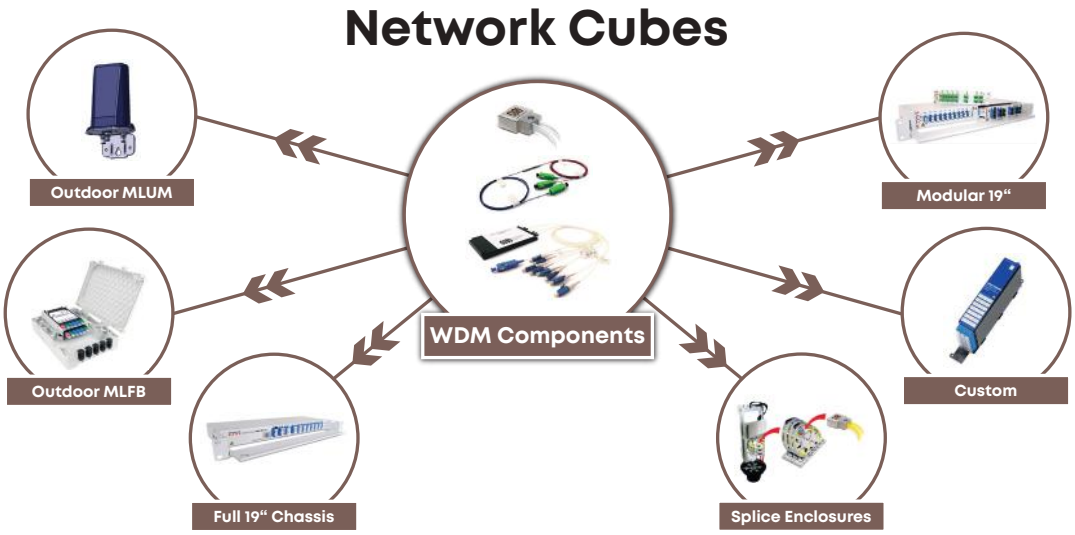
Masterline Flex Box (page 30)

SENCITY® Urban 100 (page 33)

Network cubes

Description of product

The HUBER+SUHNER network cubes are a range of passive optical transport solution products for indoor and outdoor applications using state of the art WDM technology. The variety of different enclosures are specifically designed to cover the full range of requirements needed in an edge optical access network of today. From ultra compact and modular 19" chassis versions to miniature outdoor enclosures and custom designs: the integrated CWDM and DWDM components in the different enclosures are carefully chosen to best fit the diverse requirements of optical performance, size, channel count, temperature range and cost.



Applications

- Advertising pillar
- Street light
- Department store/campus

Enclosures (selection)

Standard Modular 19"	1RU 19" chassis for up to 2 standard Network Cube modules. The standard Network Cube modules are ideally suited for mux/demux with up to 16 channels.
High Density (HD) Modular 19"	1RU 19" chassis for up to 4 HD Network Cube modules. The HD Network Cube modules can support mux/demux with up to 4 channels.
Network Cube X Ultra High Density	Ultra high density 1RU half-19" wide module with 84 LC ports resulting in 2x 40 channel DWDM mux/demux on 1RU. The Network Cube X modules are accommodated in the NCX modular chassis.
Outdoor MLFB	The Master Line Flex Box is specifically designed for outdoor applications and can hold up to 2 IANOS cassettes. CWDM or DWDM components can be integrated into the IANOS cassettes.

Related products

Masterline Ultimate Micro (page 28)

Masterline Flex Box (page 30)

FO buried cable (page 32)

IANOS (hubersuhner.com)

CUBO system (page 26)

MASTERLINE Ultimate Micro

Key features

- Compact design allowing for various installation locations (e.g. wall and pole)
- Up to 4 × Q-ODC-2 with 1 × Q-ODC-12 input or 1 × gland
- Rugged design to withstand harshest environments (e.g. submersible)

Description of product

MASTERLINE Ultimate Micro is a compact distribution box which has been specially developed for use in very space-limited locations while still ensuring a high number of connections. With up to 6 remote radio units, it offers unparalleled space efficiency and environmentally hardened sealing and can be placed anywhere.

Applications Communication Market

- Advertising pillar
- Street light
- Bus shelter
- Department store

Applications Industrial and Transport Market

- Industrial and Transport
- Market
- Windfarm
- Oil&Gas plattform
- Energie transport
- Transportation mobile and fixed

Technical data

Dimensions W × H × D	116 × 117 × 77 mm	
Weight (without cable)	0.3 kg	
Material	UV stable poliycarbonate (cover), stainless steel (bracket)	
Number of ports sockets (output)	4 × Q-ODC-2, 6 × Q-ODC-2 Mini (other sockets on request)	
Enironmental data	Temperature range during installation	–10 °C up to +50 °C
	Temperature range in service	–40 °C up to +75 °C
	Ingress protection	IP68
	Impact resistance	IK 07
	Flammability class	UL94-V0
	UV resistance	1000 h (ISO 4892-2)
	Halogen-free	Yes (IEC 60754-2)

Ordering information

Description	Item no.
MLUM exit: 3 x Q-ODC-2 entry: gland with 3 x LCD	
MLUM-J-10-06-0-LCUDGLND-3QOU1-006-SS	85157929
MLUM-J-10-06-0-LCUDGLND-3QOU1-008-SS	85157933
MLUM-J-10-06-0-LCUDGLND-3QOU1-010-SS	85157930
MLUM-J-10-06-0-LCUDGLND-3QOU1-012-SS	85157936
MLUM-J-10-06-0-LCUDGLND-3QOU1-016-SS	85157935
MLUM-J-10-06-0-LCUDGLND-3QOU1-020-SS	85157934
MLUM exit: 4 x Q-ODC-2 entry: gland with 4 x LCD	
MLUM-J-10-08-0-LCUDGLND-4QOU1-006-SS	85157941
MLUM-J-10-08-0-LCUDGLND-4QOU1-008-SS	85157940
MLUM-J-10-08-0-LCUDGLND-4QOU1-010-SS	85157928
MLUM-J-10-08-0-LCUDGLND-4QOU1-012-SS	85157939
MLUM-J-10-08-0-LCUDGLND-4QOU1-016-SS	85157938
MLUM-J-10-08-0-LCUDGLND-4QOU1-020-SS	85157937
MLUM exit: 4 x Q-ODC-2 entry: 1 x Q-ODC-12	
MLUM-J-10-08-0-NNNNQOR9-4QOU1-000-SS	85142329

Related products

Q-ODC-2 Mini
(page 31)

LISA
(hubersuhner.com)

CUBO system
(page 26)

SPJ
(page 35)

SENCITY® Urban 100
(page 33)

MASTERLINE Flex Box

Key features

- Robust housing made of fiberglass reinforced polycarbonate
- Cost saving termination with split grommets while still IP56
- Wall, pole or cap rail mountable
- Up to two exchangeable fiber optic IANOS cassettes
- Up to 10 cables for diameter of 4.8 mm to 7 mm

Description of product

MASTERLINE Flex Box is a versatile distribution box simplifying outdoor deployment. It is designed for maximum planning flexibility for use in many street furniture and is simple to install with a guided inside layout and the IP protection around the fiber optic jumpers. And it has integrated cable overlength management for maximum comfort when doing maintenance or site upgrades. The MASTERLINE Flex Box is designed to stay in the network until 7G.

Applications

- Bus shelter
- Advertising pillar
- Campus

Technical data

Dimensions W × H × D (without DIN rail and animal proof bracket)	210 × 310 × 92 mm (for 1 IANOS cassette) 210 × 310 × 107 mm (for 2 IANOS cassettes)	
Weight	2.1 kg	
Box material	Fiberglass polycarbonate (housing, cover), stainless steel (bracket)	
Enironmental data	Temperature range during installation	–10 °C up to +50 °C
	Temperature range in service	–40 °C up to +75 °C
	Ingress protection	IP66
	Impact resistance	IK 07
	Flammability class	UL94-V0
	UV resistance	1000 h (ISO 4892-2)
	Halogen-free	Yes (IEC 60754-2)

Ordering information

Description	Item no.
Masterline Flex Box for 1 IANOS module	85114792
Masterline Flex Box for 2 IANOS modules	85144638

Related products

Network cube
(page 27)

FO buried cable
(page 32)

IANOS
(hubersuhner.com)

SPJ
(page 35)

SENCITY® Urban 100
(page 33)

Q-ODC-2 Mini

Key features

- Compact design for high packaging density, 50 % size reduction
- 40 % reduced weight (similar to QMA – RF)
- Simple and reliable push-pull connection like existing Q-ODC-2
- Dustproof and watertight (IP65)

Description of product

The size optimised connector with two fibers is used in particularly harsh environmental conditions, even when installation has to be fast and safe. The small fiber optic interface is the ideal solution space constraint locations found in communication and industrial applications.

Applications

- Advertisement pillar
- Bus shelter
- Street light

Technical data

Construction

Description	
Technology	Full ceramic ferrule and sleeve
Housing material	Nickel-plated brass
Mating mechanism	Push-pull with two clearly defined states

Specifications

Characteristics	Tested acc. to	Values
Mechanical performance Q-ODC plug		≤ 150 N tensile load
Operating temperature [1]	IEC 61300-2-22	–40 up to +85 °C
Mating durability	IEC 61300-2-2	50 cycles [2]
Ingress protection (mated)	IEC 60529	IP65
Salt mist	IEC 61300-2-26	30 days passed

[1] depending on cable type
[2] with repeated cleaning

Optical performance

Description	Item no.
Q-ODC-2 Mini Plug to FullAXS, 4.8 mm cable, 5 m	85153223
Q-ODC-2 Mini Plug to LCD Breakout, 4.8 mm cable, 5 m	85153224
Q-ODC-2 Mini Plug to LCD Breakout, 7.0 mm cable, 5 m	85153230

Related products

FO buried cable
(page 32)

Masterline Ultimate Micro
(page 28)

SENCITY® Urban 100
(page 33)

CUBO system
(page 26)

SPJ
(page 35)

Fiber optic buried cables

Key features

- Metal free indoor and outdoor cables
- CPR classification
- Rodent-protected, glass-armoured
- Longitudinal and transversal watertight cables
- Halogen-free and non-corrosive fire gasses

Description of product

Fiber optic cable with multifiber loose tube jelly-filled or jelly-free up to 144 optical fibers in a PE or LSFH outer jacket and glass roving tension strength member. The cable constructions are optimised for the respective application: choose a PE jacket which is suitable for outdoor use or a LSFH jacket which can be used as an option for indoor and outdoor applications.

Applications

- For installation directly in the ground and in mechanically unprotected environments
- Data cable for distribution networks
- For installation outdoor, in wet cable ducts and pipes
- With LSFH jacket ideal for applications involving high safety requirements in case of fire

Technical data

Tube	Multifiber loose tube up to 144 fibers, jelly-filled or jelly-free
Strain relief and rodent protection	Glass-roving
Jacket material	LSFH™ or PE
Jacket colour	Black (optional with 2 orange stripes)

Main performance

Temperature range	°C	–40 to +70 °C	IEC 60794-1-22 F1
Tensile strength1)	N	9000	IEC 6094-1-2 E1
Crush resistance1)	N/dm	6000	IEC 60794-1-2 E3
Water penetration	h=1 m, 24 h, p < 3 m	Pass	IEC 60794-1-2 F5A
(EU) No 305/2011 (CPR)1)		Up to Cca-s1a,d0,a1	EN 50575

Ordering information (selection)

Description	Approvals	Item no.
Jellyfree glass-armoured multi-fiber loose-tube cable Ø 7.0 mm, 12 × 50/125 µm OM2, loose tube 2.8 mm, LSFH black	UL - OFN / OFNG	85026737
Jellyfree glass-armoured multi-fiber loose-tube cable Ø 7.0 mm, 12 × 9/125 µm G.652.D, loose tube 2.8 mm, LSFH black	CPR - class Cca-s1a,d0,a1	85139010
Jellyfree glass-armoured multi-fiber loose-tube cable Ø 9.6 mm, 48 × 9/125 µm G.652.D, loose tube 2.2 mm, LSFH black	CPR - class Dca-s1a,d0,a1	85065362

Related products

Q-ODC-12
(hubersuhner.com)

Masterline Flex Box
(page 30)

IANOS
(hubersuhner.com)

LISA
(hubersuhner.com)

SENCITY® Urban 100
(page 33)

SENCITY® Urban 100

Key features

- Outdoor MIMO 2×2 antenna for 4G and 5G frequency bands
- Frequency range 2500 to 2690 MHz/3300 to 4200 MHz
- Compact solution with very high isolation between ports to maximise MIMO performance
- Easy installation in pre-existing infrastructure
- Available in different models with omnidirectional and directional features

Description of product

SENCITY® Urban 100 outdoor MIMO round-shaped antenna covers both 4G and 5G high frequency ranges and is as compact as possible for installation in different types of street furnitures. Available in different models with omnidirectional and directional features.

Applications

- Small cell
- Street furnitures (bus shelter, advertising pillar, phone booth)

Technical data

Model	**Omidirectional**	**Directional**
Frequency (MHz)	2500 to 2690/3300 to 4200	
VSWR	2	
Impedance (Ohm)	50	
Gain (dBi)	2-3	6
Port isolation (dB)	30	20
PIM	–153 dBc at carrier power 2 × 43 dBm	
Polarisation	Vertical & horizontal	Dual slant
Mechanical dimension (mm)	96 × 117 mm (height × diameter)	
Weight (Kg)	0.45	
Enviromental data	Enviromental conditions	Indoor/outdoor
	Operation temperature (°C)	–40 to 70
	IP rating	IP 66

Ordering information

1399.32.0003 (item no. 85121225)	MIMO 2×2 directional with Nex10 connectors
1399.17.0255 (item no. 85106948)	MIMO 2×2 directional with low loss pigtails with N connectors
1399.17.0253 (item no. 85106726)	MIMO 2×2 omnidirectional with low loss pigtails with N connectors
1399.32.0004 (item no.85113723)	MIMO 2×2 omnidirectional with Nex10 connectors

Related products

SENCITY® Urban 200
(page 34)

SPJ
(page 35)

RF passives
(hubersuhner.com)

Masterline Ultimate Micro
(page 28)

Q-ODC-2 Mini
(page 31)

SENCITY® Urban 200

Key features

- Outdoor MIMO 2×2 directional antenna (1695-2690 MHz and 3000-4200 MHz) with different horizontal HPBW
- Compact solution with very high isolation between ports to maximise MIMO performance
- Easy installation in pre-existing infrastructure

Description of product

SENCITY® Urban 200 outdoor MIMO rectangular-shaped antenna covers both 4G and 5G high frequency bands and is as compact as possible for installation in different types of street furniture such as bus shelters, poles or walls, depending on the location. Available in different models in 70° and 110° horizontal half power beamwidth.

Applications

- Small cell
- Street furnitures (bus shelter, advertising pillar, public phones)
- Department store and wall mount

Technical data

Freqency band (MHz)		**Band 1 1695 - 1920**	**Band 2 1920 - 2180**	**Band 2300 - 2690**	**Band 4 3300 - 3800**	**Band 5 3800 - 4200**
VSWR		2				
Impedance (Ohm)		50				
Gain (dBi)		5.7	4.8	5	5.9	4.9
3 db beamwidth (h) (°)		100	120	100	110	120
3 db beamwidth (v) (°)		105	120	95	95	85
Isolation		20	20	18	20	20
Composite power max. (W)		125	125	110	95	90
Front to back ratio (dB)		10	11	11	15	12
Co/crosspolar ratio		27	22	14	15	19
PIM		–150 at 2 × 43 dBm				
Polarisation		+/–45° dual slant				
Mechanical dimension (mm)		184.8 × 164.6 × 84.2 (height × width × depth)				
Weight (kg)		0.5				
Enviromental data	Enviromental conditions	Indoor/outdoor				
	Operation temperature (°C)	–40 to 70				
	IP rating	IP66				

Ordering information

1399.32.0002 (item no. 85117565)	Nex10 connectors
1399.17.0250 (item no. 85110147)	N connectors

Related products

SENCITY® Urban 100 (page 33)

SPJ (page 35)

RF passives (hubersuhner.com)

Masterline Ultimate Micro (page 28)

Q-ODC-2 Mini (page 31)

SPJ

Key features

- Plenum rated cable ETL listed, UL 444, CMP, FT6
- Excellent RF performance up to 6 GHz
- Low PIM ≤ –160dBc (typical –165dBc)
- Low attenuation with small bending radius

Description of product

SSPJ (Standard Plenum Jumpers) products are based on HUBER+SUHNER low loss Sucoform cables. All cables are Plenum rated CMP with white jacket. In these assemblies the connector can be exchanged making the assemblies are upgradeable, allowing its installation in limited space environments. This flexible, high performing, economic and high quality jumper solution for indoor and outdoor DAS/Small Cell applications provides excellent return loss, low attenuation with low passive intermodulation (PIM) and high shielding efficiency.

Applications

- Street light
- Advertising pillar
- Bus shelter

Technical data

Frequncy band (MHz)		DC up to 6 GHz		
Return loss		**Frequency**	**Straight/straight**	**Straight/angle**
		0.38 to 1.0 GHz	≥ 29 dB	≥ 28 dB
		Up to 2.2 GHz	≥ 27 dB	≥ 25 dB
		Up to 2.7 GHz	≥ 26 dB	≥ 24 dB
		Up to 3.8 GHz	≥ 23 dB	≥ 20 dB
		Up to 6.0 GHz	≥ 20 dB	≥ 18 dB
PIM performance		–160 dBc (QMA: ≤ 140 dBc, static)		Typical –165 dBc
Enviromental data	Temperature range	–40 to +105 °C		
	Waterproof	IP67 (0.5 m/1 h/20 °C)		
	UV resistance			

Ordering information

SPJ/SM(*141)L/(**11)(***4310)/(**21)(***4195)/(****01000)

- *: cable type code: 122,141 or 222
- **: pattern code of connector: 11, 15, 21, PCC
- ***: interface code of connector: 716,N,431X,SMA,QMA,N10
- ****: SPJ/SM length in mm:
  - 122 → 500,1000,2000
  - 141 → 500, 1000, 2000, 3000, 4000, 5000
  - 222 → 500, 1000, 2000, 3000, 4000, 5000

Related products

SENCITY® Urban 100 (page 33)

SENCITY® Urban 200 (page 34)

RF passives (hubersuhner.com)

Masterline Ultimate Micro (page 28)

Q-ODC-2 Mini (page 31)

MQ4/MQ5 Cluster jumpers

Key features

- 4 or 5 connections mated at the same time
- PIM stable connection
- Space saving
- Easy to connect
- For jumpers up to cable size ¼" HF

Description of product

The MQ4/MQ5 Cluster jumpers are the answer to the need for increasing number of channels in modern mobile antennas. The combination of 4 or 5 connections per plug considerably reduces the necessary connector footprint on antennas and radios while also reducing the installation effort on site. MQ4/MQ5 Cluster jumpers ensure the state-of-the-art radio frequency performance for PIM stability while ensuring environmental protection. The connectors are suitable for various cable types up to ¼" HF corrugated cables.

Applications

- Street light
- Canister antennas on street furniture
- Macro Base stations

Technical data

General data		
Supported cables	SUCOFEED ¼" HF, SUCOFORM_141, SUCOFORM_86	
Electical data		
Impedance	50 Ω	
Frequency range	DC to 6 GHz	
Return loss	DC to 3 GHz: ≥ 26dB	3 to 6 GHz: ≥ 19dB
Passive Intermodulation	≥ 160 dBc, 0-2.7 GHz, 2 × 20W, 2 × 43 dBm	
Environmental Data		
Temperature range	–55°C to 125°C	
IP rating	IP68 (IEC 60529)	

All specifications meet IEC 63138 Standard for Multi-channel radio-frequency connectors

Ordering information

24_MQ4-50-3-1	MQ4 straight buldhead jack suitable for SUCOFORM_141 cable
SM141/24MQ4/114310/1000	SUCOFORM_141 assembly with MQ4 straight bulkhead jack and straight 4.3-10 female connector. Length 1 m.
LIS-C5-11MQ4X-4x21430-01000-53	LISCA jumper with straight MQ4 screw type and 4 × straight 4.3-10 female connector. Length 1 m.
LIS-C5X-11MQ5X-5x16NXX-02000-53	LISCA jumper with straight MQ5 screw type and 5 × right angle NEX10® male connector. Length 2 m.

Related products

LISCA jumpers
(hubersuhner.com)

SPJ
(page 35)

RF passives
(hubersuhner.com)

CUBO system
(page 26)

Direct GPS-over-Fiber
(page 40)

SENCITY® Rondo

Key features

- Indoor MIMO and SISO multiband omnidirectional antenna
- Available in 617 to 4200 MHz and 698 to 3800 MHz versions
- ETL tested for Plenum space (UL2043)
- One bracket for different mounting options

Description of product

MIMO and SISO indoor antenna with attractive design and different mounting options that can be easily mounted in various ways depending on the materials and requirements necessary.

Applications

- Indoor DAS

Technical data

Frequncy Band (MHz)		**Band 1 617-698**	**Band 2 698-790**	**Band 3 790-960**	**Band 4 1695-2180**	**Band 5 2180-2400**	**Band 6 2400-2690**	**Band 7 3300-4200**
VSWR		1.8	1.9	2	1.6	1.6	1.5	2
Impedance (Ohm)		50						
Gain (dBi)		2.5	3.5	4.5	5	6	6.5	5.5
Port isolation (dB)		13	15	17	20	18	18	21
PIM		–155 dBc at carrier power 2 × 43 dBm						
Polarisation		Vertical						
Connector		4.3/10, jack (female)						
Cable type		SUCOFORM_141_CU_CMP						
Mechanical dimension (mm)		87 × 238 (height × diameter)						
Weight (Kg)		0.82						
Enviromental data	Enviromental conditions	Indoor						
	Operation temperature (°C)	0 to 55						
	2011/65/EU RoHS	Compliant						

Ordering information

1399.31.0007 (item no. 85086028)	4.3/10 (female)

Related products

SENCITY® Occhio
(page 38)

RF passives
(hubersuhner.com)

Direct GPS-over-Fiber
(page 40)

SPJ
(page 35)

FO buried cable
(page 32)

SENCITY® Occhio

Key features

- 4×4 MIMO (2×2) omnidirectional antenna
- Multiband capability between 1.7 – 6 GHz
- Smart connect-sytem with a self locking adaptor and quick lock feature
- Attractive industry preferred design with a small form factor (Reddot award 2019)

Description of product

SENCITY® Occhio antenna offers the operator 5G coverage, a simple, time-saving installation process and an attractive industry preferred design with a small form factor. Thanks to its multiband capability between 1.7 – 6 GHz and 2×2/4×4 MIMO configuration it supports wireless applications of today and beyond.
As standard, the antenna utilises the latest NEX10 connector interface with outstanding PIM performance. Cable assemblies to connect the SENCITY® Occhio to any other interface are also available upon customer request.

Applications

- Indoor DAS
- CBRS network

Technical data

Frequncy band (MHz)		**Band 1 1695 – 2690**	**Band 2 3300 – 4200**	**Band 3 4500 – 5000**	**Band 4 5150 - 6000**
VSWR		1.5			
Impedance (Ohm)		50			
Gain (dBi)		4.5	4.5	6	6.5
Port isolation (dB)		19.5	22	25	25
PIM		–155 dBc at carrier power 2 × 43 dBm			
Polarisation		Vertical			
DC grounded		No			
Connector		NEX10, jack (female)			
Mechanical dimension (mm)		32 × 200 (height × diameter)			
Weight (kg)		0.79			
Enviromental data	Enviromental conditions	Indoor			
	Operation temperature (°C)	0 to 55			
	2011/65/EU RoHS	Compliant			

Ordering information

1399.32.0013 (Item no. 85115709)	Includes cable assemblies: SUCOFORM_122_LA Plenum cable with NEX10 male (antrenna side) and 4.3-10 male (network connection side)
1399.32.0015 (Item no. 85138318)	Antenna terminated directly with Nex10 connectors, no cable included

Related products

SENCITY® Rondo
(page 40)

Stick antenna
(hubersuhner.com)

SENCITY® Urban 100
(page 33)

LISA
(hubersuhner.com)

Masterline Flex Box
(page 30)

Quick-Fit plus

Key features

- Extraordinary PIM stability
- Fast and easy cable preparing process
- Reliable “one click/positive stop” connector assembling
- One piece connector design
- Multi-brand cable compatibility
- High quality materials and plating

Description of product

Quick-Fit plus connectors allow extremely easy and fast in-field assembly and removes the need for additional steps such as the application of grease on sealings. The innovative cable entry design allows the connectors to be mounted using standard wrenches, eliminating the need for expensive tools or calibrated torque wrenches.

Applications

- DAS

Technical data

General data

Cable size/type	Corrugated ½“ annular
Interfaces	Nex10, 4.3-10, N, 4 1/95 1), 7/16

[1] on request

Electrical data (typical)

Impedance	50 Ω		
Frequency range	DC to 6 GHz		
Return loss (gated measurement)	Straight version	≥ 30 dB up to 3.7 GHz	
	Right angle version	≥ 28 dB up to 3.7 GHz	
Passive intermodulation [2]	Typical –160 dBc, miniumum –155 dBc		

[2] Carrier to 3rd order intermodulation product ratio with 2 × 20 W (43 dBm) carrier power.

Environmental data (typical)

Temperature range	–55 to +85 °C/–67 to 185 °F
IP rating	IP68 (according to IEC 60529)

Cable compabtibility

• HUBER+SUHNER	Sucofeed_1/2, _1/2_LW, _1/2_FR, _1/2_PW
• RFS CELLFLEX	LCF-50JFN, ICA12-50JPL, ICA12-50JPLW, ICA12-50JPLLW
• ANDREW/COMMSCOPE (Further cables on request)	LDF4-50A, HL4RPV-50, AL4RPV-50

Related products

SENCITY® Occhio
(page 38)

RF passives
(hubersuhner.com)

SPJ
(page 35)

FO buried cables
(page 32)

Masterline Flex Box
(page 30)

Direct GPS-over-Fiber

Key features

- Truly copperless link – signal and power distributed over fiber.
- Allows for greater distances between the RF (GPS) source and the RF (GPS) receiver system
- Reduces the amount of hardware required - distributing a single GPS signal into multiple receiver systems
- Imune to RFI, EMI and EMP
- Easy to install, Plug-and-Play

Description of product

The use of Power-over-Fiber perfectly addresses power delivery constraints in timing applications by eliminating the need for external power to the antenna (outdoor) unit. Using Power-over-Fiber also saves time and money in environments that may be hindered by the installation of conductive cable - which is typical when extending the supply of power to the installation areas. GPSoF modules are focused on distributing a single GPS signal into multiple receiver systems. This approach ensures that signal data, such as time synchronisation into separate, yet connected, systems are always the same. It enables unlimited flexibility and scalebaility in signal distribution with a minimum of hardware.

Applications

- Department store
- Inbuilding coverage/DAS
- Venues/campus

Technical data

Parameters		**Value**			**Remarks**
All specifications at 25 °C case temperature Tc , unless otherwise specified		**Min.**	**Typ.**	**Max.**	
Frequency range	MHz	1170		1620	
Gain flatness	dB		< 2		
Noise figure	dB		6.5		
Time delay	ns		45		Optical path delay not included
Module dimensions – transmitter	mm	160 height, 120 diameter.			Antenna
Module dimensions – receiver	mm	482.6 × 286 × 43.65			19" 1U
RF connector (output)		4 ×/8 × SMA female			
FO connector (power and signal)		QODC-12			GPS antenna (TX) to receiver
FO connector (output)		LC/UPC			Further signal distrubution

Ordering information (selection)

Direct GPSoF (TX)	85077810
Direct GPSoF (RX)	85077811

Related products

SENCITY® Occhio
(page 38)

SENCITY® Rondo
(page 40)

CUBO system
(page 26)

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