In-building Passive DAS Solutions

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PROSE

Who We Are

Rosenberger Hochfrequenztechnik GmbH & Co. was founded in Germany in 1958 and ranks among the leading manufacturers of high-speed interconnect solutions worldwide. With its long tradition of excellence and innovation, Rosenberger has excelled and earned an outstanding reputation all over the world.

In early 2022 the Rosenberger Group announced the restructure of its antenna and coverage solution product portfolio with a new brand entity PROSE. The strategic focus of PROSE will be on the development of base station antennas, microwave antennas, indoor and outdoor coverage solutions, Open RAN sub-systems, data center, cabling system, IoT solutions, Automotive and related services.

As an independent entity, PROSE, with its lean, agile, and decentralized organizational structure, will be better placed to serve global customers and manage growth by bringing new technologies and solutions, aligned with the changing needs of customers in the telecom industry. The PROSE product portfolio will uphold Rosenberger's tradition of the highest innovation and quality while delivering improved technology expertise and enhanced local customer support around the globe.

PROSE consists of more than 3500 people, with 40+ subsidiaries sales/service offices, 4 factories, and 7 R&D centers covering mainly North America, Europe, the Middle East, Africa, and Asia. It will continue to serve more than 100 operators/service providers worldwide including a wide set of customized solutions for 5G deployments.

PROSE is an ISO 9001 quality system and ISO 14001 environmental system certified company. Equipped with advanced machinery, automatically assembly, and testing centers supported by a large group of more than 400 R&D engineers, state-of-the-art production assembly lines, and stringent product and quality control.

PROSE's reliability and competitiveness are the cornerstones of this sustainable growth, which have resulted in long-term partnerships with most of the leading companies in their respective industries. PROSE will continue to provide excellent product solutions and services for its customers around the world.

A


B

C

D

A: Pune, India
B: Suzhou, China
C: New Jersey, USA
D: New South Wales, Australia

Mission

- Customer always comes first
- Drive innovation together with and for our customers
- Maintain a secure, humane and happy environment for our employees
- Develop our employees by investing in their education
- Take social responsibility
- Protect our environment with ecologically friendly products, production and processes

Core Value

- Value Innovation
- Customer Focus
- Sustainable Growth
- Social Responsibility

Products & Services

Network Systems	Combiner Unit Master Unit Extended Unit Low Power Remote Unit (LPRU) High Power Remote Unit (HPRU)-Cabinet 4G High Power Remote Unit (HPRU)-Cabinet 5G High Power Remote Unit (HPRU)-Blade 4G High Power Remote Unit (HPRU)-Blade 5G Medium Power Remote Unit (MPRU) Passive DAS Components
BTS Antennas	Single-MultiBand Antennas Multibeam Antennas Beamforming Antennas Small Cell Antennas High Efficiency BSA (PROTREEM) 5G Massive MIMO Antennas Camouflage Products
Microwave Products	Class 3 Series Class 4 Series E-Band Series Dual-Band Series Microwave Components
O-RAN Radios	ORAN Radio Unit (ORU) Digital Control Unit (DCU) Small Cell
Archer Site Accessories	RF Coaxial Products Power Products Fiber Products Hybrid Cable Solution Installation Material
Digital World Products	Automatic Infrastructure Management System Building Cabling System Data Center Cabling System Edge Computing Data Center Modular Data Center MDC Cloud Management Platform
Filter Solutions	Interference Mitigation Filters Embedded Filters Site Combiners

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About Passive DAS

Passive Distributed Antenna Systems (DAS) are widely used for a variety of reasons, primarily due to their cost-effectiveness, simplicity, and reliability in certain environments. Here's an overview of why passive DAS are favored.

1. Cost-Effectiveness

> Lower Installation Costs: Passive DAS use fewer electronic components and rely on passive components such as splitters, couplers, and coaxial cables, which are generally less expensive than the active components used in active DAS.
> Reduced Maintenance: With fewer active elements, passive DAS require less maintenance, resulting in lower ongoing operational costs.

2. Simplicity

> Easier to Install: The installation process for passive DAS is typically more straightforward because it involves less complex equipment and fewer electronic components.
> No Need for Power at Each Antenna: Passive DAS do not require power sources at each antenna location, simplifying the infrastructure and reducing potential points of failure.

3. Reliability

> Less Prone to Failure: With fewer active components, there are fewer potential points of failure, making passive DAS more reliable in certain environments.
> No Interference from Power Sources: Passive systems are not affected by power surges or outages at individual antenna locations.

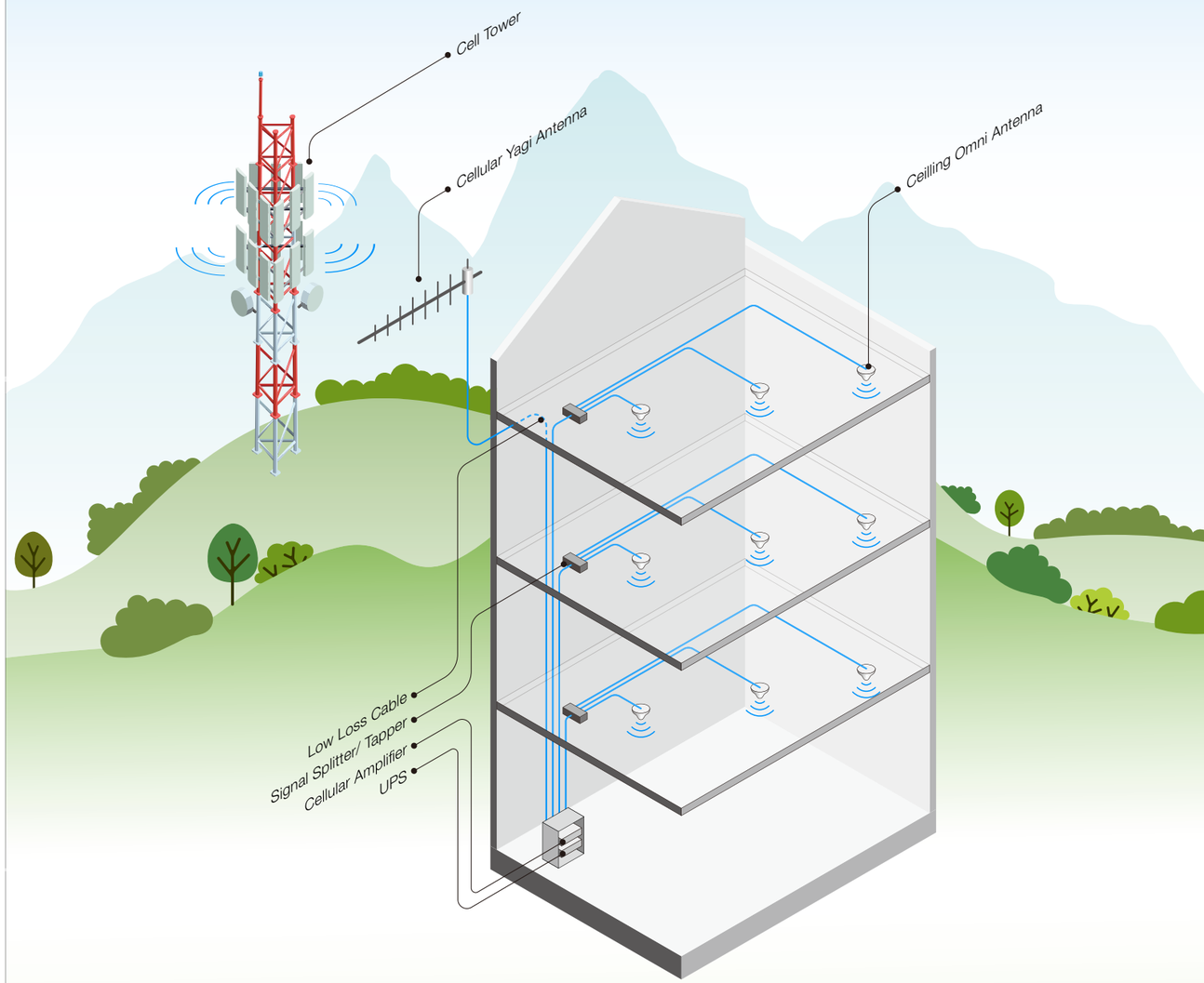
4. Ideal for Small to Medium-Sized Buildings

> Optimal for Smaller Coverage Areas: Passive DAS are well-suited for environments where the coverage area is relatively small to medium-sized, such as small office buildings, shopping centers, or residential buildings.

5. Comply with Market Access Requirements

> PROSE places great emphasis on the compliance requirements of the European market for product safety, environmental protection, and more, and can provide information on compliance requirements related to CE, RoHS, WEEE, and LUCID.

Structure of a Passive DAS



Comparison Passive DAS to Active DAS

Passive DAS is widely used because they offer a cost-effective, simple, and reliable solution for enhancing signal coverage in small to medium-sized buildings. They are ideal for environments where extensive coverage and complex signal management are not required. In contrast, active DAS provide better scalability, signal quality, and flexibility, making them more suitable for large buildings or environments with high user density and complex layouts, albeit at a higher cost and with more complexity.

1. Complexity

> Active DAS: Requires active components like amplifiers and remote units that need power, leading to a more complex installation and higher maintenance requirements.
> Passive DAS: Simpler setup with passive components, making it easier to install and maintain.

2. Scalability

> Active DAS: More scalable and suitable for large buildings or campus environments where extensive coverage and capacity are needed.
> Passive DAS: Limited scalability due to signal degradation over long cable runs, making it more suitable for smaller environments.

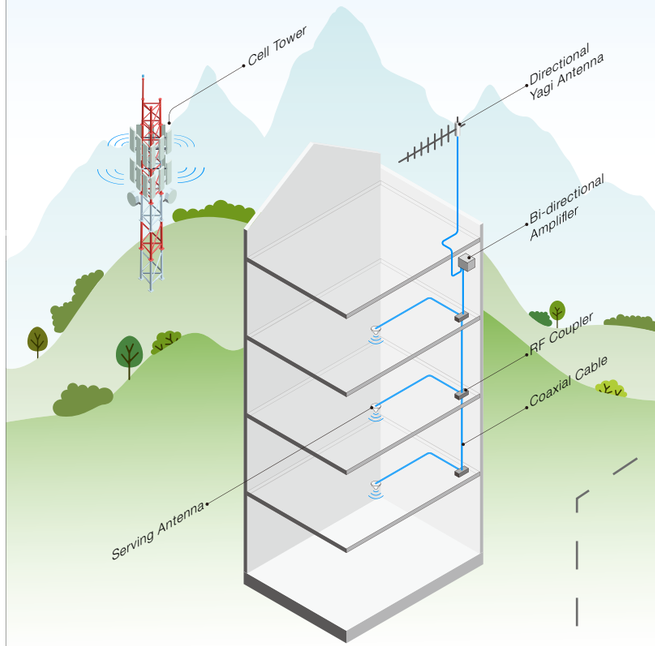
3. Signal Quality and Management

> Active DAS: Offers better control over signal quality and distribution, with the ability to amplify and manage signals actively, ensuring consistent coverage even over large areas.
> Passive DAS: Signal quality can degrade over long distances and with multiple splits, making it less suitable for very large or complex installations.

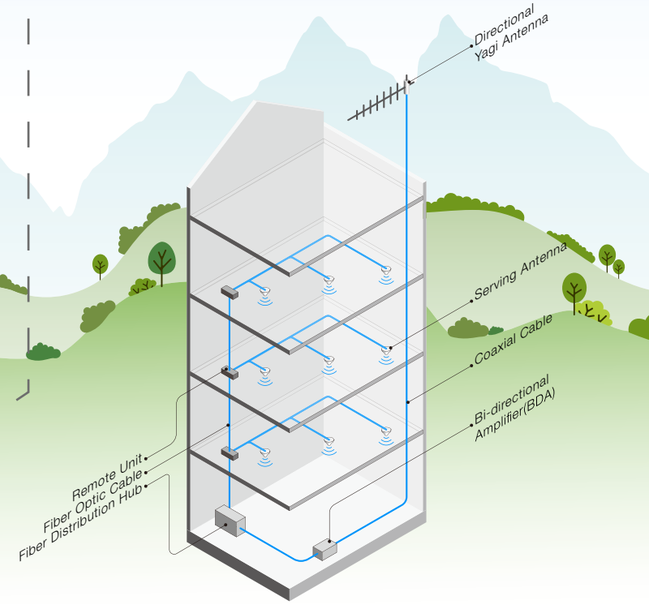
4. Flexibility

> Active DAS: More flexible in terms of adjusting and optimizing signal distribution, especially in environments with high user density and complex layouts.
> Passive DAS: Less flexible once installed, as changes in signal distribution may require significant reconfiguration.

Passive DAS Configuration



Active DAS Configuration



About Passive Components

- **A Tapper** is used to split the signal from a main line, diverting a small portion of it to a secondary line or device without significantly disrupting the main signal flow. This is commonly employed in cable television systems, telecommunication networks, and distributed antenna systems to distribute signals efficiently across multiple endpoints.

- **A Directional Coupler** is used to sample a specific amount of signal power from a transmission line, directing it to another port while maintaining the integrity of the primary signal flow. This is particularly useful for monitoring, testing, and signal distribution in applications such as RF communication systems, microwave systems, and optical fiber networks, where it is essential to analyze or utilize signals without disrupting the main transmission path.

- **A Power Splitter** is used to divide an input signal into multiple output signals with equal or specified proportions, ensuring that each output maintains a consistent signal level. This is essential in applications such as distributing television signals to multiple receivers, splitting radio frequency (RF) signals in communication systems, and sharing a single antenna among multiple devices.

- **A Hybrid Coupler** is used to equally split an input signal into two output signals with a 90-degree or 180-degree phase difference, or to combine two signals while maintaining isolation between the input ports. This is particularly useful in applications such as balanced mixers, antenna feed networks, and signal combining in RF and microwave systems, where precise phase and amplitude control are required for optimal performance.

- **A Dummy Load** is used to terminate a transmission line or a port with a specified impedance to absorb all the incident signal power, preventing reflections and ensuring proper impedance matching. This is essential in applications such as test and measurement setups, RF and microwave circuits, and antenna systems, where maintaining signal integrity and minimizing signal reflections are crucial for accurate performance and analysis.

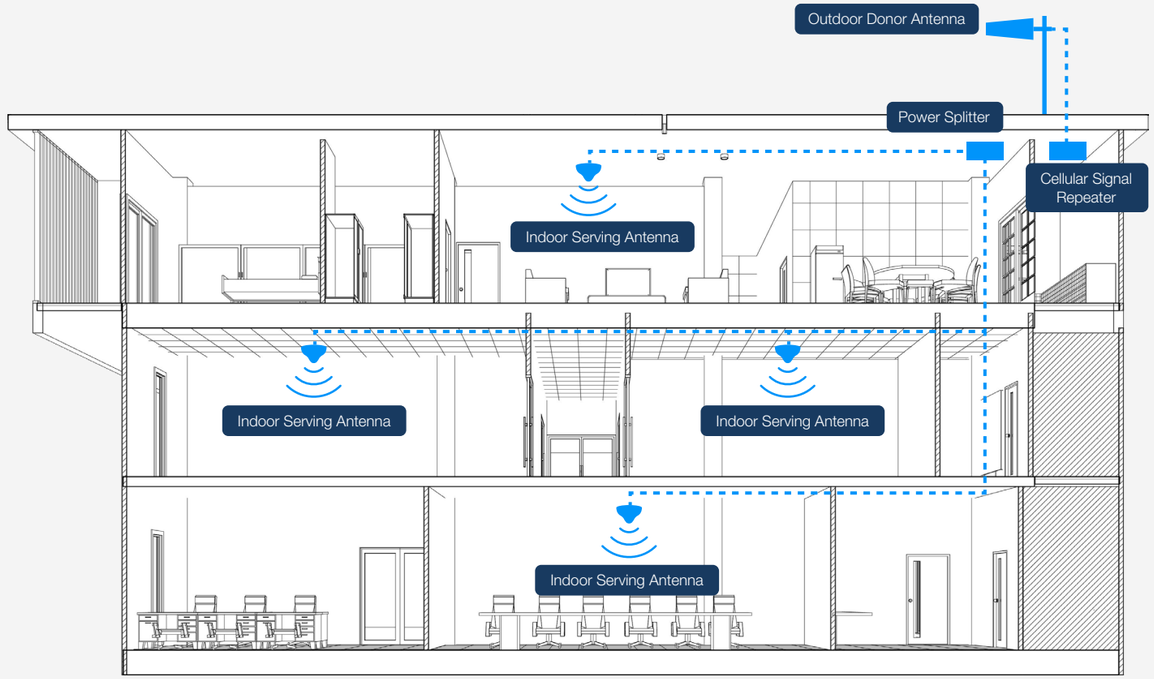
- **An Attenuator** is used to reduce the power level of a signal without significantly distorting its waveform. This is essential in applications such as controlling signal levels to prevent overload in sensitive components, matching signal levels between different devices, and improving impedance matching in RF and microwave circuits, thereby ensuring optimal performance and protection of equipment.

- **A Combiner** is a device used to merge multiple RF signals into a single output signal. It's commonly used in various applications such as telecommunications, broadcasting, and radio communications. The primary function of an RF combiner is to combine signals without causing significant loss or distortion. Normally, a 2-way combiner is called a diplexer, a 3-way one is called a triplexer and a 4-way one is called a quadplexer.

- **A Duplexer** is a device that enables simultaneous two-way communication by separating the transmit and receive signals in a single antenna system. It allows a single antenna to handle both transmission and reception of RF signals without interference. Essentially, it isolates the transmitting and receiving paths, ensuring that the signals do not interfere with each other, which is crucial for efficient operation in systems like mobile phones and radio transceivers.

For DAS cabling solutions, including coaxial RF cables, leaky cables, and hybrid cables with CPR certification, please consult the PROSE Archer product catalog. For more information and details, visit our website at https://www.prosetechnologies.com/

Illustration of Passive Components



Passive Components

Electronic components that display their characteristics without the need for an external power source. Passive components are mainly resistance, inductance and capacitance components. Its common feature is that it can work when there is a signal without adding power in the circuit. PROSE provides high quality power splitters, directional couplers, and dummy loads and so on, which are manufactured to higher standards to ensure that active or passive system keeps the more efficient wireless networks.

Difference Between Tapper and Coupler

In passive distributed antenna systems (DAS), tappers and couplers are both used to distribute signal power and manage signal distribution in a DAS, but they are used in different scenarios depending on the specific requirements for signal power division and isolation.

- **Function**

A tapper splits the input signal into two or more output signals, but not necessarily with equal power distribution. The primary function is to distribute the signal to different areas while maintaining the overall system balance. The coupler not only provides power distribution, but also provides isolation between the two output ports.

- **Signal Distribution**

For both tapper and coupler, the signal is divided with a fixed ratio, where one output gets a majority of the signal power (main line) and the other outputs get a smaller, predetermined portion (tapped lines/coupling line).

- **Use Case**

Tappers are typically used in scenarios where there is a need to distribute varying levels of signal power to different parts of the DAS. For example, providing a stronger signal to a distant area and a weaker signal to a closer area. Couplers are used to sample or monitor signals, and they are crucial for maintaining the integrity and directivity of the signal flow.

- **Example**

A 10dB tapper would split the signal so that 90% of the signal power continues down the main line, and 10% is diverted to the tap port. A 10dB coupler will fulfill the similar function, and additionally there is a high degree of isolation between the coupling port and the main output port to prevent interference.

Diagram of Tapper

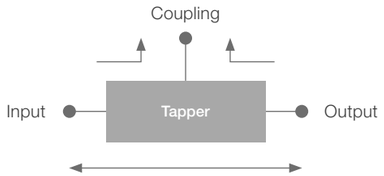
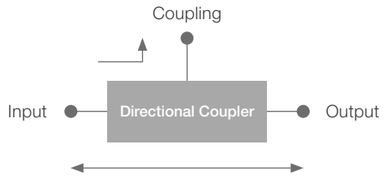


Diagram of Coupler



Tappers

The couplers and tappers have different coupling values, which are used for different applications. PROSE has already formed a passive portfolio to ensure that customer will get their preferable couplers / tappers.

Part Number	Coupling Value	Frequency Band	Distribution Loss	VSWR	Connector Type
T-5-0304-NF-01	5dB	380-470MHz	2.5dB	1.3	N female
T-6-0304-NF-01	6dB	380-470MHz	1.9dB	1.3	N female
T-7-0304-NF-01	7dB	380-470MHz	1.3dB	1.3	N female
T-10-0304-NF-01	10dB	380-470MHz	1.0dB	1.3	N female
T-15-0304-NF-01	15dB	380-470MHz	0.8dB	1.3	N female
T-20-0304-NF-01	20dB	380-470MHz	0.6dB	1.3	N female
T-30-0304-NF-01	30dB	380-470MHz	0.5dB	1.3	N female
T-5-0304-43F-01	5dB	380-470MHz	2.5dB	1.3	4.3-10 female
T-6-0304-43F-01	6dB	380-470MHz	1.9dB	1.3	4.3-10 female
T-7-0304-43F-01	7dB	380-470MHz	1.3dB	1.3	4.3-10 female
T-10-0304-43F-01	10dB	380-470MHz	1.0dB	1.3	4.3-10 female
T-15-0304-43F-01	15dB	380-470MHz	0.8dB	1.3	4.3-10 female
T-20-0304-43F-01	20dB	380-470MHz	0.6dB	1.3	4.3-10 female
T-30-0304-43F-01	30dB	380-470MHz	0.5dB	1.3	4.3-10 female

Part Number	Coupling Value	Frequency Band	PIM	Distribution Loss	VSWR	Connector Type
T-5-0342-NF-155-01	5dB	380-4200MHz	-155dBc	2.5dB	1.4	N female
T-6-0342-NF-155-01	6dB	380-4200MHz	-155dBc	1.9dB	1.4	N female
T-7-0342-NF-155-01	7dB	380-4200MHz	-155dBc	1.3dB	1.4	N female
T-10-0342-NF-155-01	10dB	380-4200MHz	-155dBc	1.0dB	1.4	N female
T-15-0342-NF-155-01	15dB	380-4200MHz	-155dBc	0.8dB	1.4	N female
T-20-0342-NF-155-01	20dB	380-4200MHz	-155dBc	0.6dB	1.4	N female
T-30-0342-NF-155-01	30dB	380-4200MHz	-155dBc	0.5dB	1.4	N female
T-5-0342-43F-163-01	5dB	380-4200MHz	-163dBc	2.5dB	1.4	4.3-10 female
T-6-0342-43F-163-01	6dB	380-4200MHz	-163dBc	1.9dB	1.4	4.3-10 female
T-7-0342-43F-163-01	7dB	380-4200MHz	-163dBc	1.3dB	1.4	4.3-10 female
T-10-0342-43F-163-01	10dB	380-4200MHz	-163dBc	1.0dB	1.4	4.3-10 female
T-15-0342-43F-163-01	15dB	380-4200MHz	-163dBc	0.8dB	1.4	4.3-10 female
T-20-0342-43F-163-01	20dB	380-4200MHz	-163dBc	0.6dB	1.4	4.3-10 female
T-30-0342-43F-163-01	30dB	380-4200MHz	-163dBc	0.5dB	1.4	4.3-10 female
T-5-0642-NF-155-01	5dB	698-4200MHz	-155dBc	2.5dB	1.4	N female
T-6-0642-NF-155-01	6dB	698-4200MHz	-155dBc	1.9dB	1.4	N female
T-7-0642-NF-155-01	7dB	698-4200MHz	-155dBc	1.3dB	1.4	N female
T-10-0642-NF-155-01	10dB	698-4200MHz	-155dBc	1.0dB	1.4	N female
T-15-0642-NF-155-01	15dB	698-4200MHz	-155dBc	0.8dB	1.4	N female
T-20-0642-NF-155-01	20dB	698-4200MHz	-155dBc	0.6dB	1.4	N female
T-30-0642-NF-155-01	30dB	698-4200MHz	-155dBc	0.5dB	1.4	N female
T-5-0642-43F-163-01	5dB	698-4200MHz	-163dBc	2.5dB	1.4	4.3-10 female
T-6-0642-43F-163-01	6dB	698-4200MHz	-163dBc	1.9dB	1.4	4.3-10 female
T-7-0642-43F-163-01	7dB	698-4200MHz	-163dBc	1.3dB	1.4	4.3-10 female
T-10-0642-43F-163-01	10dB	698-4200MHz	-163dBc	1.0dB	1.4	4.3-10 female
T-15-0642-43F-163-01	15dB	698-4200MHz	-163dBc	0.8dB	1.4	4.3-10 female
T-20-0642-43F-163-01	20dB	698-4200MHz	-163dBc	0.6dB	1.4	4.3-10 female
T-30-0642-43F-163-01	30dB	698-4200MHz	-163dBc	0.5dB	1.4	4.3-10 female

Directional Couplers

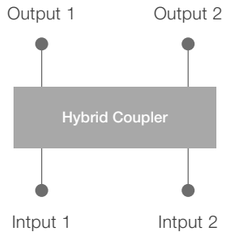
The directional coupler could be a good choice if there is isolation requirement between output port and coupling port. That will minimize the interference in the transmission link. PROSE has released complete series for different bands and coupling values.

Part Number	Coupling Value	Frequency Band	Distribution Loss	Directivity	VSWR	Connector Type
DC-5-0304-NF-01	5dB	380-470MHz	2.3dB	20dB	1.25	N female
DC-6-0304-NF-01	6dB	380-470MHz	1.8dB	20dB	1.25	N female
DC-7-0304-NF-01	7dB	380-470MHz	1.8dB	20dB	1.25	N female
DC-10-0304-NF-01	10dB	380-470MHz	1.1dB	20dB	1.25	N female
DC-15-0304-NF-01	15dB	380-470MHz	0.5dB	20dB	1.25	N female
DC-20-0304-NF-01	20dB	380-470MHz	0.5dB	20dB	1.25	N female
DC-30-0304-NF-01	30dB	380-470MHz	0.5dB	20dB	1.25	N female
DC-5-0304-43F-01	5dB	380-470MHz	2.3dB	20dB	1.25	4.3-10 female
DC-6-0304-43F-01	6dB	380-470MHz	1.8dB	20dB	1.25	4.3-10 female
DC-7-0304-43F-01	7dB	380-470MHz	1.8dB	20dB	1.25	4.3-10 female
DC-10-0304-43F-01	10dB	380-470MHz	1.1dB	20dB	1.25	4.3-10 female
DC-15-0304-43F-01	15dB	380-470MHz	0.5dB	20dB	1.25	4.3-10 female
DC-20-0304-43F-01	20dB	380-470MHz	0.5dB	20dB	1.25	4.3-10 female
DC-30-0304-43F-01	30dB	380-470MHz	0.5dB	20dB	1.25	4.3-10 female

Part Number	Coupling Value	Frequency Band	PIM	Distribution Loss	Directivity	VSWR	Connector Type
DC-5-0342-NF-155-01	5dB	380-4200MHz	-155dBc	2.7dB	16dB	1.25	N female
DC-6-0342-NF-155-01	6dB	380-4200MHz	-155dBc	2.2dB	16dB	1.25	N female
DC-7-0342-NF-155-01	7dB	380-4200MHz	-155dBc	1.8dB	16dB	1.25	N female
DC-10-0342-NF-155-01	10dB	380-4200MHz	-155dBc	1.2dB	16dB	1.25	N female
DC-15-0342-NF-155-01	15dB	380-4200MHz	-155dBc	0.8dB	16dB	1.25	N female
DC-20-0342-NF-155-01	20dB	380-4200MHz	-155dBc	0.6dB	16dB	1.25	N female
DC-30-0342-NF-155-01	30dB	380-4200MHz	-155dBc	0.6dB	16dB	1.25	N female
DC-5-0342-43F-163-01	5dB	380-4200MHz	-163dBc	2.7dB	16dB	1.25	4.3-10 female
DC-6-0342-43F-163-01	6dB	380-4200MHz	-163dBc	2.2dB	16dB	1.25	4.3-10 female
DC-7-0342-43F-163-01	7dB	380-4200MHz	-163dBc	1.8dB	16dB	1.25	4.3-10 female
DC-10-0342-43F-163-01	10dB	380-4200MHz	-163dBc	1.2dB	16dB	1.25	4.3-10 female
DC-15-0342-43F-163-01	15dB	380-4200MHz	-163dBc	0.8dB	16dB	1.25	4.3-10 female
DC-20-0342-43F-163-01	20dB	380-4200MHz	-163dBc	0.6dB	16dB	1.25	4.3-10 female
DC-30-0342-43F-163-01	30dB	380-4200MHz	-163dBc	0.6dB	16dB	1.25	4.3-10 female
DC-5-0642-NF-155-01	5dB	698-4200MHz	-155dBc	2.3dB	20dB	1.25	N female
DC-6-0642-NF-155-01	6dB	698-4200MHz	-155dBc	1.7dB	20dB	1.25	N female
DC-7-0642-NF-155-01	7dB	698-4200MHz	-155dBc	1.5dB	20dB	1.25	N female
DC-10-0642-NF-155-01	10dB	698-4200MHz	-155dBc	1.0dB	20dB	1.25	N female
DC-15-0642-NF-155-01	15dB	698-4200MHz	-155dBc	0.5dB	20dB	1.25	N female
DC-20-0642-NF-155-01	20dB	698-4200MHz	-155dBc	0.4dB	20dB	1.25	N female
DC-30-0642-NF-155-01	30dB	698-4200MHz	-155dBc	0.3dB	20dB	1.25	N female
DC-5-0642-43F-163-01	5dB	698-4200MHz	-163dBc	2.3dB	20dB	1.25	4.3-10 female
DC-6-0642-43F-163-01	6dB	698-4200MHz	-163dBc	1.7dB	20dB	1.25	4.3-10 female
DC-7-0642-43F-163-01	7dB	698-4200MHz	-163dBc	1.5dB	20dB	1.25	4.3-10 female
DC-10-0642-43F-163-01	10dB	698-4200MHz	-163dBc	1.0dB	20dB	1.25	4.3-10 female
DC-15-0642-43F-163-01	15dB	698-4200MHz	-163dBc	0.5dB	20dB	1.25	4.3-10 female
DC-20-0642-43F-163-01	20dB	698-4200MHz	-163dBc	0.4dB	20dB	1.25	4.3-10 female
DC-30-0642-43F-163-01	30dB	698-4200MHz	-163dBc	0.3dB	20dB	1.25	4.3-10 female

Hybrid Couplers

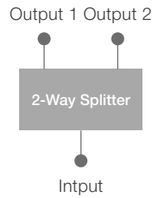
Hybrid coupler are often used for coupling the same band signal, A hybrid coupler is a special case of directional coupler that divides an input signal evenly between two output ports with 3 dB coupling. PROSE offers different kinds of hybrid coupler with variety of connector type and levels of power handling for choice.

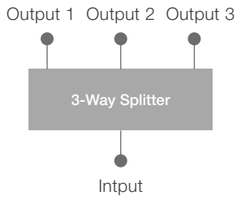


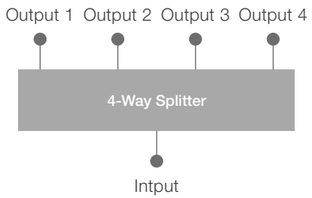
Part Number	Description	Frequency Band	PIM	VSWR	Connector Type
HC-22-0642-NF-155-01	2in/2out 3dB Type	698-4200MHz	-155dBc	1.3	N female
HC-22-0642-43F-163-01	2in/2out 3dB Type	698-4200MHz	-163dBc	1.3	4.3-10 female
HC-22-0642-DF-163-01	2in/2out 3dB Type	698-4200MHz	-163dBc	1.3	DIN female
HC-33-0642-NF-155-01	3in/3out 5dB Type	698-4200MHz	-155dBc	1.3	N female
HC-33-0642-43F-163-01	3in/3out 5dB Type	698-4200MHz	-163dBc	1.3	4.3-10 female
HC-33-0642-DF-163-01	3in/3out 5dB Type	698-4200MHz	-163dBc	1.3	DIN female
HC-44-0642-NF-155-01	4in/4out 6dB Type	698-4200MHz	-155dBc	1.3	N female
HC-44-0642-43F-163-01	4in/4out 6dB Type	698-4200MHz	-163dBc	1.3	4.3-10 female
HC-44-0642-DF-163-01	4in/4out 6dB Type	698-4200MHz	-163dBc	1.3	DIN female

Power Splitters

Predominantly there are two types of power splitters: coaxial and microstrip. Withing the PROSE portfolio, both variants are available up to 6GHz frequency range.





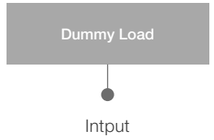


Part Number	Description	Frequency Band	Power Rating	VSWR	Connector Type
S-2-0304-NF-01	2-way	380-470MHz	300W	1.3	N female
S-2-0304-43F-01	2-way	380-470MHz	500W	1.3	4.3-10 female
S-2-0304-DF-01	2-way	380-470MHz	500W	1.3	DIN female
S-3-0304-NF-01	3-way	380-470MHz	300W	1.3	N female
S-3-0304-43F-01	3-way	380-470MHz	500W	1.3	4.3-10 female
S-3-0304-DF-01	3-way	380-470MHz	500W	1.3	DIN female
S-4-0304-NF-01	4-way	380-470MHz	300W	1.3	N female
S-4-0304-43F-01	4-way	380-470MHz	500W	1.3	4.3-10 female
S-4-0304-DF-01	4-way	380-470MHz	500W	1.3	DIN female

Part Number	Description	Frequency Band	PIM	Power Rating	VSWR	Connector Type
S-2-0642-NF-155-01	2-way	698-4200MHz	-155dBc	300W	1.3	N female
S-2-0642-43F-163-01	2-way	698-4200MHz	-163dBc	500W	1.3	4.3-10 female
S-2-0642-DF-163-01	2-way	698-4200MHz	-163dBc	500W	1.3	DIN female
S-3-0642-NF-155-01	3-way	698-4200MHz	-155dBc	300W	1.3	N female
S-3-0642-43F-163-01	3-way	698-4200MHz	-163dBc	500W	1.3	4.3-10 female
S-3-0642-DF-163-01	3-way	698-4200MHz	-163dBc	500W	1.3	DIN female
S-4-0642-NF-155-01	4-way	698-4200MHz	-155dBc	300W	1.3	N female
S-4-0642-43F-163-01	4-way	698-4200MHz	-163dBc	500W	1.3	4.3-10 female
S-4-0642-DF-163-01	4-way	698-4200MHz	-163dBc	500W	1.3	DIN female

Dummy Loads

In this place, various kinds of dummy loads are listed with power handling up to 200W for representatively comprehensive use. In fact, in order to chase after customers' challenging requirements, the higher power handling up to 200W is also available.

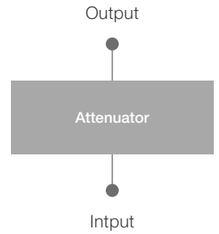


Part Number	Description	Frequency Band	PIM	VSWR	Connector Type
L-2-DC42-43M-01	2 Watts	DC-4200MHz	/	1.15	4.3-10 male
L-2-DC42-NM-01	2 Watts	DC-4200MHz	/	1.15	N male
L-5-DC42-43M-01	5 Watts	DC-4200MHz	/	1.15	4.3-10 male
L-5-DC42-NM-01	5 Watts	DC-4200MHz	/	1.15	N male
L-10-DC42-43M-01	10 Watts	DC-4200MHz	/	1.2	4.3-10 male
L-10-DC42-NM-01	10 Watts	DC-4200MHz	/	1.2	N male
L-50-DC42-43M-01	50 Watts	DC-4200MHz	/	1.2	4.3-10 male
L-50-DC42-NM-01	50 Watts	DC-4200MHz	/	1.2	N male
L-100-DC42-43M-01	100 Watts	DC-4200MHz	/	1.25	4.3-10 male
L-100-DC42-NM-01	100 Watts	DC-4200MHz	/	1.25	N male
L-200-DC42-43M-01	200 Watts	DC-4200MHz	/	1.25	4.3-10 male
L-200-DC42-NM-01	200 Watts	DC-4200MHz	/	1.25	N male
L-2-0642-43M-163-01	2 Watts	698-4200MHz	-163dBc	1.25	4.3-10 male
L-2-0642-NM-155-01	2 Watts	698-4200MHz	-155dBc	1.25	N male
L-5-0642-43M-163-01	5 Watts	698-4200MHz	-163dBc	1.25	4.3-10 male
L-5-0642-NM-155-01	5 Watts	698-4200MHz	-155dBc	1.25	N male
L-10-0642-43M-163-01	10 Watts	698-4200MHz	-163dBc	1.25	4.3-10 male
L-10-0642-NM-155-01	10 Watts	698-4200MHz	-155dBc	1.25	N male
L-50-0642-43M-163-01	50 Watts	698-4200MHz	-163dBc	1.25	4.3-10 male
L-50-0642-NM-155-01	50 Watts	698-4200MHz	-155dBc	1.25	N male
L-100-0642-43M-163-01	100 Watts	698-4200MHz	-163dBc	1.25	4.3-10 male
L-100-0642-NM-155-01	100 Watts	698-4200MHz	-155dBc	1.25	N male
L-200-0642-43M-163-01	200 Watts	698-4200MHz	-163dBc	1.25	4.3-10 male
L-200-0642-NM-155-01	200 Watts	698-4200MHz	-155dBc	1.25	N male

* "/" means there is no PIM influence for the low power dummy loads.

Fixed Attenuators

In this place, various of fixed attenuators are listed with frequency of DC-3GHz & DC-4GHz for representatively comprehensive use. PROSE has attenuators which could achieve up to 18GHz if needed, meanwhile some special connector types such as SMA or some coaxial variable attenuators are also available.



Part Number	Power Handling	Frequency Band	Attenuation	PIM	VSWR	Connector Type
A-XX-2-DC42-43M43F-01	2 Watts	DC-4200MHz	XX=1-9,10,20,30,40dB	/	1.25	4.3-10 male to female
A-XX-2-DC42-NMNF-01	2 Watts	DC-4200MHz	XX=1-9,10,20,30,40dB	/	1.25	N male to female
A-XX-5-DC42-43M43F-01	5 Watts	DC-4200MHz	XX=1-9,10,20,30,40dB	/	1.25	4.3-10 male to female
A-XX-5-DC42-NMNF-01	5 Watts	DC-4200MHz	XX=1-9,10,20,30,40dB	/	1.25	N male to female
A-XX-5-0642-43M43F-163-01	5 Watts	698-4200MHz	XX=5,6,7,8,10,15,20,30,40dB	-163dBc	1.3	4.3-10 male to female
A-XX-5-0642-NMNF-155-01	5 Watts	698-4200MHz	XX=5,6,7,8,10,15,20,30,40dB	-155dBc	1.3	N male to female
A-XX-10-0642-43M43F-163-01	10 Watts	698-4200MHz	XX=5,6,7,8,10,15,20,30,40dB	-163dBc	1.3	4.3-10 male to female
A-XX-10-0642-NMNF-155-01	10 Watts	698-4200MHz	XX=5,6,7,8,10,15,20,30,40dB	-155dBc	1.3	N male to female
A-XX-25-0642-43M43F-163-01	25 Watts	698-4200MHz	XX=5,6,7,8,10,15,20,30,40dB	-163dBc	1.3	4.3-10 male to female
A-XX-25-0642-NMNF-155-01	25 Watts	698-4200MHz	XX=5,6,7,8,10,15,20,30,40dB	-155dBc	1.3	N male to female
A-XX-50-0642-43M43F-163-01	50 Watts	698-4200MHz	XX=5,6,7,8,10,15,20,30,40dB	-163dBc	1.3	4.3-10 male to female
A-XX-50-0642-NMNF-155-01	50 Watts	698-4200MHz	XX=5,6,7,8,10,15,20,30,40dB	-155dBc	1.3	N male to female
A-XX-100-0642-43M43F-163-01	100 Watts	698-4200MHz	XX=5,6,7,8,10,15,20,30,40dB	-163dBc	1.3	4.3-10 male to female
A-XX-100-0642-NMNF-155-01	100 Watts	698-4200MHz	XX=5,6,7,8,10,15,20,30,40dB	-155dBc	1.3	N male to female

* "/" means there is no PIM influence for the low power attenuator.

Combiners and Duplexers

PROSE can provide RF cavity combiners with various specifications to combine signals from multiple systems and play the role of a shared antenna feeder system. PROSE combiners can be used indoors or outdoors, and connectors can be customized according to customer requirements. According to system requirements, we can provide diplexer, triplexer, quadplexer, and even up to heptaplexer in single, double or triple unit.

Additionally, PROSE offers duplexer to seperate the uplink and downlink signals for the FDD communication systems, to avoid the cross interference to the receivers.

Part Number	Sub-category	Frequency Band	VSWR	Isolation	PIM	Dimension (mm)	Weight (kg)	Connector Type	Ingress Protection
CB-2-NE-64F-A12	Diplexer	2300/2600	1.22	50dB	-155dBc	248x150x79	2	4.3-10 female	IP67
CB-2-YZ-64F-A10	Diplexer	850/900	1.22	50dB	-155dBc	205x171x57	3	4.3-10 female	IP67
CB-3-BMS-64F-A02	Triplexer	2100/2300/3800	1.22	50dB	-155dBc	175x165x49	1.8	4.3-10 female	IP67
CB-4-LDUM-64F-A09	Quadplexer	900/1800/2100/2300	1.22	50dB	-155dBc	260x177x50	3.2	4.3-10 female	IP67
CB-7-YRZDUE-64F-B02	Heptaplexer	700/850/900/1800/2100/2600	1.22	50dB	-155dBc	453x213x65	9.5	4.3-10 female	IP67
DX-09-35-64F-B01	Duplexer	900	1.22	50dB	-155dBc	402x393x78	13.5	4.3-10 female	IP65
DX-18-75-64F-B01	Duplexer	1800	1.22	50dB	-155dBc	290x273x58	5.7	4.3-10 female	IP65
DX-21-60-64F-B01	Duplexer	2100	1.22	50dB	-155dBc	237x130x50	1.9	4.3-10 female	IP65

About Indoor Antennas

- **An Omni-SISO** (single input single output) antenna is used to provide 360-degree coverage, radiating or receiving signals uniformly in all horizontal directions. This is particularly useful in applications such as wireless communication systems, Wi-Fi networks, and IoT (Internet of Things) devices, where reliable and consistent signal coverage is needed across a wide area without the need for directional alignment.

- **An Omni-MIMO** (multiple input multiple output) antenna is used to enhance data transmission and reception by utilizing multiple antennas within a single device, providing 360-degree coverage with improved capacity and reliability. This is particularly useful in applications such as advanced Wi-Fi networks, cellular base stations, and modern wireless communication systems, where increased throughput, better signal quality, and robust connectivity are essential for handling multiple simultaneous data streams and mitigating interference.

- **A Panel SISO** antenna in passive networks is used to provide directional coverage, focusing the signal in a specific direction for enhanced performance. This is particularly useful in applications such as point-to-point communication links, targeted coverage areas in wireless networks, and outdoor installations where precise signal direction is required to optimize connectivity, reduce interference, and improve overall network efficiency.

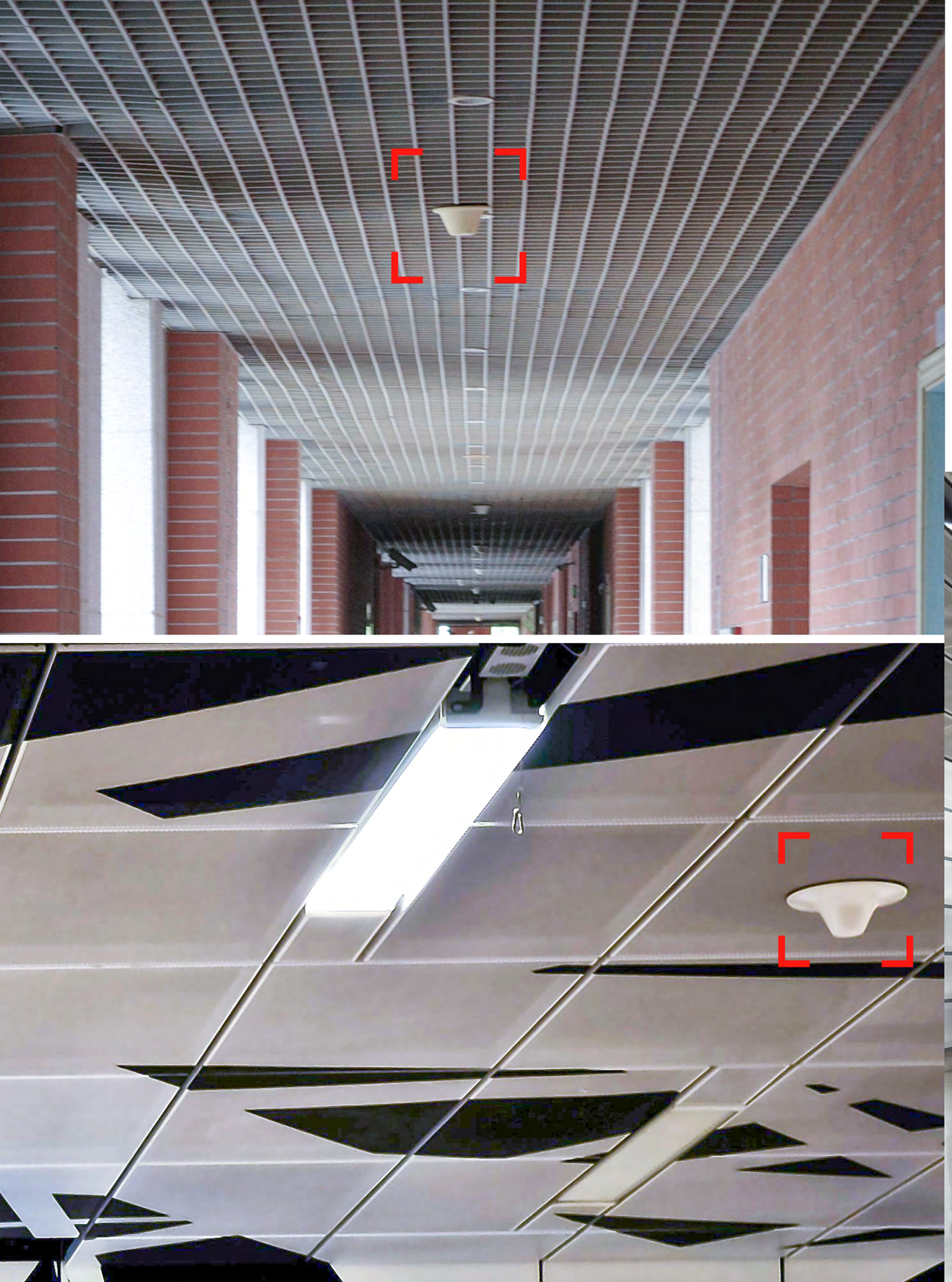
- **A Panel MIMO** antenna in passive networks is used to provide directional coverage with multiple antennas working together to enhance data transmission and reception. This is particularly useful in applications such as high-capacity wireless communication systems, long-range point-to-point or point-to-multipoint links, and environments requiring robust and reliable connectivity. The directional nature of the antenna combined with MIMO technology improves signal strength, increases data throughput, reduces interference, and enhances overall network performance.

- **A Bi-Directional** antenna in passive networks is used to provide focused coverage in two opposite directions. This is particularly useful in applications such as connecting two distant points in a wireless network, extending the range of communication along a linear path (like corridors or long hallways), and in situations where coverage is needed in two opposite areas without the need for multiple antennas. The bi-directional design helps in efficiently utilizing the signal in both desired directions, optimizing connectivity and performance.

- **A Log-Periodic** and a **Yagi antenna** in passive networks is used for wideband frequency coverage with directional characteristics. This type of antenna is particularly useful in applications such as television reception, radio communication, wireless communication systems, antenna testing and measurement and antenna arrays.

IBS Antennas

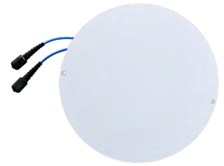
For the in-building network system, IBS antennas are the devices that ensure the signal coverage, whose performance plays a very important role in whole system. PROSE constantly drives the innovation to make better IBS antenna products for more comprehensive use.



Omni SISO

Part Number	Description	Frequency Band	Gain (dBi)	VSWR	PIM	Dimension (mm)	Weight (kg)	Metal Ground Plane	Connector Type
S-Wave OD-0642-1S-43F-153-01	Omni SISO	698-4200 MHz	1.8 for Low-Band 4.0 for High-Band	1.8 for Low-Band 1.5 for High-Band	-153 dBc	Ø203×115	0.3	No	4.3-10 female
S-Wave OD-0642-1S-NF-153-01	Omni SISO	698-4200 MHz	1.8 for Low-Band 4.0 for High-Band	1.8 for Low-Band 1.5 for High-Band	-153 dBc	Ø203×115	0.3	No	N female
S-Wave OD-0342-1S-43F-153-01	Omni SISO	380-4200 MHz	2.0 for Low-Band 4.0 for High-Band	3.0 for Low-Band 2.0 for High-Band	-153 dBc	Ø298×152	0.8	No	4.3-10 female
S-Wave OD-0342-1S-NF-153-01	Omni SISO	380-4200 MHz	2.0 for Low-Band 4.0 for High-Band	3.0 for Low-Band 2.0 for High-Band	-153 dBc	Ø298×152	0.8	No	N female
S-Wave OD-0304-1S-43F-153-01	Omni SISO	380-470 MHz	2.0	2.5	/	Ø298×152	0.8	No	4.3-10 female
S-Wave OD-0304-1S-NF-153-01	Omni SISO	380-470 MHz	2.0	2.5	/	Ø298×152	0.8	No	N female

Omni MIMO



Part Number	Description	Frequency Band	Gain (dBi)	VSWR	PIM	Dimension (mm)	Weight (kg)	Metal Ground Plane	Connector Type
S-Wave OD-0642-2M-43F-153-01	Omni MIMO	698-4200 MHz	1.5 for Low-Band 5.5 for High-Band	1.8 for Low-Band 1.8 for High-Band	-153 dBc	Ø266×18	0.5	No	4.3-10 female
S-Wave OD-0642-2M-NF-153-01	Omni MIMO	698-4200 MHz	1.5 for Low-Band 5.5 for High-Band	1.8 for Low-Band 1.8 for High-Band	-153 dBc	Ø266×18	0.5	No	N female
S-Wave OD-0642-4M-43F-153-01	Omni MIMO	698-4200 MHz	3.0 for Low-Band 4.5 for High-Band	1.8 for Low-Band 1.8 for High-Band	-153 dBc	Ø360×24	1.0	No	4.3-10 female
S-Wave OD-0642-4M-NF-153-01	Omni MIMO	698-4200 MHz	3.0 for Low-Band 4.5 for High-Band	1.8 for Low-Band 1.8 for High-Band	-153 dBc	Ø360×24	1.0	No	N female

Panel SISO

Part Number	Description	Frequency Band	Gain (dBi)	VSWR	PIM	Dimension (mm)	Weight (kg)	Metal Ground Plane	Connector Type
S-Wave PD-0642-1S-43F-153-01	Panel SISO	698-4200 MHz	5.0 for Low-Band 7.5 for High-Band	1.8 for Low-Band 1.8 for High-Band	-153 dBc	180x170x60	0.4	Yes	4.3-10 female
S-Wave PD-0642-1S-NF-153-01	Panel SISO	698-4200 MHz	5.0 for Low-Band 7.5 for High-Band	1.8 for Low-Band 1.8 for High-Band	-153 dBc	180x170x60	0.4	Yes	N female
S-Wave PD-0342-1S-43F-153-01	Panel SISO	380-4200 MHz	2.0 for Low-Band 6.0 for High-Band	2.5 for Low-Band 2.0 for High-Band	-153 dBc	308x190x65	0.6	Yes	4.3-10 female
S-Wave PD-0342-1S-NF-153-01	Panel SISO	380-4200 MHz	2.0 for Low-Band 6.0 for High-Band	2.5 for Low-Band 2.0 for High-Band	-153 dBc	308x190x65	0.6	Yes	N female
S-Wave PD-0304-1S-43F-153-01	Panel SISO	380-470 MHz	3.0	2.5	/	308x190x65	0.6	Yes	4.3-10 female
S-Wave PD-0304-1S-NF-153-01	Panel SISO	380-470 MHz	3.0	2.5	/	308x190x65	0.6	Yes	N female

Panel MIMO

Part Number	Description	Frequency Band	Gain (dBi)	VSWR	PIM	Dimension (mm)	Weight (kg)	Metal Ground Plane	Connector Type
S-Wave PD-0642-2M-43F-153-01	Panel MIMO	698-4200 MHz	5.0 for Low-Band 6.0 for High-Band	2.0 for Low-Band 2.0 for High-Band	-153 dBc	404x180x62	1.2	Yes	4.3-10 female
S-Wave PD-0642-2M-NF-153-01	Panel MIMO	698-4200 MHz	5.0 for Low-Band 6.0 for High-Band	2.0 for Low-Band 2.0 for High-Band	-153 dBc	404x180x62	1.2	Yes	N female
S-Wave PD-0642-4M-43F-153-01	Panel MIMO	698-4200 MHz	6.0 for Low-Band 7.0 for High-Band	2.0 for Low-Band 2.0 for High-Band	-153 dBc	310x420x100	2.7	Yes	4.3-10 female
S-Wave PD-0642-4M-NF-153-01	Panel MIMO	698-4200 MHz	6.0 for Low-Band 7.0 for High-Band	2.0 for Low-Band 2.0 for High-Band	-153 dBc	310x420x100	2.7	Yes	N female

Bi-Directional

Part Number	Description	Frequency Band	Gain (dBi)	VSWR	PIM	Dimension (mm)	Weight (kg)	Connector Type
S-Wave BD-0642-1S-43F-153-01	Bi-Directional	698-4200MHz	4.0 for Low-Band 6.0 for High-Band	2.0 for Low-Band 2.0 for High-Band	-153dBc	303x80x185	0.7	4.3-10 female
S-Wave BD-0642-1S-NF-153-01	Bi-Directional	698-4200MHz	4.0 for Low-Band 6.0 for High-Band	2.0 for Low-Band 2.0 for High-Band	-153dBc	303x80x185	0.7	N female

Log-Periodic

Part Number	Description	Frequency Band	Gain (dBi)	VSWR	PIM	Dimension (mm)	Weight (kg)	Connector Type
S-Wave LP-0642-1S-43F-153-01	Log-Periodic	698-4200MHz	7.0 for Low-Band 9.0 for High-Band	1.8 for Low-Band 1.8 for High-Band	-153dBc	440×210×65	0.6	4.3-10 female
S-Wave LP-0642-1S-NF-153-01	Log-Periodic	698-4200MHz	7.0 for Low-Band 9.0 for High-Band	1.8 for Low-Band 1.8 for High-Band	-153dBc	440×210×65	0.6	N female
S-Wave YG-0309-1S-NF-01	Yagi Antenna	350-960MHz	12	1.5	/	433×1300	1.1	N female

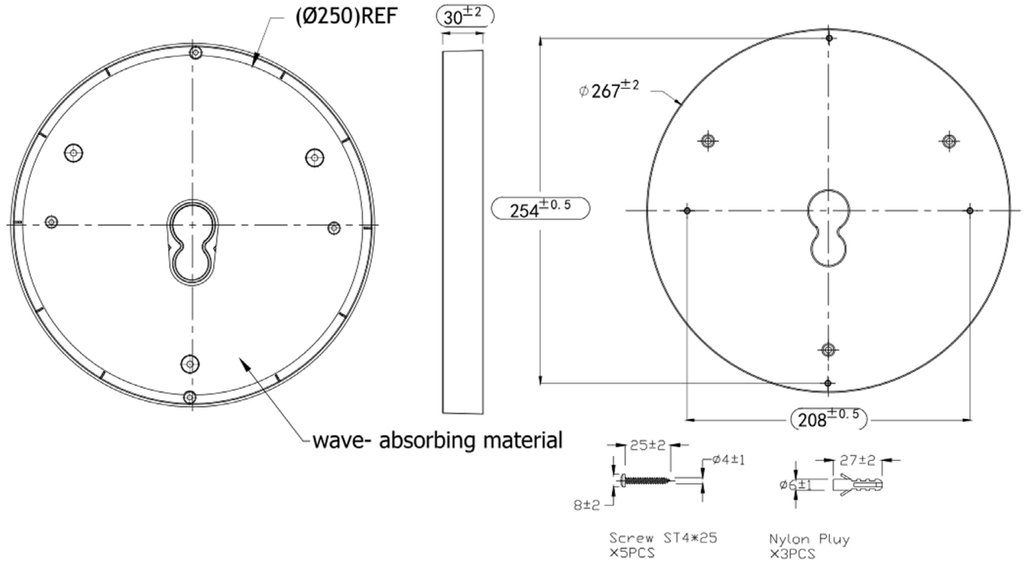
Accessories

Besides the components and antennas, PROSE can provide the accessories for mounting/installation as well, including the antenna absorber and mounting bracket.

Antenna Interference Absorber

The antenna absorber is to be installed between the slim indoor antenna and the metal ceiling, so as to minimize the negative influences caused by the reflection power by the ceiling. The standard diameter model is for common usage and different diameter models also could be customized on request.

Part Number	S-Wave OD IA267-B01
Size	Ø267×30 (mm)
Weight	0.38kg
Locking Mode	ST4*25 ×5pcs; NYLON PIUY ×3pcs
Color	White
Material	ABS



Mounting Brackets

For some certain scenarios, the antenna is difficult to be installed without the hanging ceiling. PROSE has prepared the right-angle brackets to provide the mounting support for the omni antenna. Besides, there is also “Z” type brackets available for the coupler/ splitter installation. The various mounting brackets help to install the devices with flexibility.

Part Number	Shape Type	Applicable Products	General Usages
PR-MTK-ME01	“Z” type	Coupler / Splitter	Flexible installation
PR-MTK-ME02	Right-angle type	Ceiling antenna	Flexible installation
PR-MTK-ME03	Right-angle type	Ceiling antenna	Flexible installation

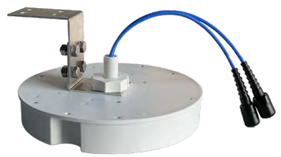
Z Type

PR-MTK-ME01

Right Angle Type

PR-MTK-ME02

PR-MTK-ME03



POI

POI (Point of Interface) is a kind of passive system that combines multi-band and multi-operator. Compared to the distributed components, POI works with less interference and long-term reliability. PROSE has more than 15 years of experience for the POI developments and productions, offering cost competitive products with short lead time and stable quality.

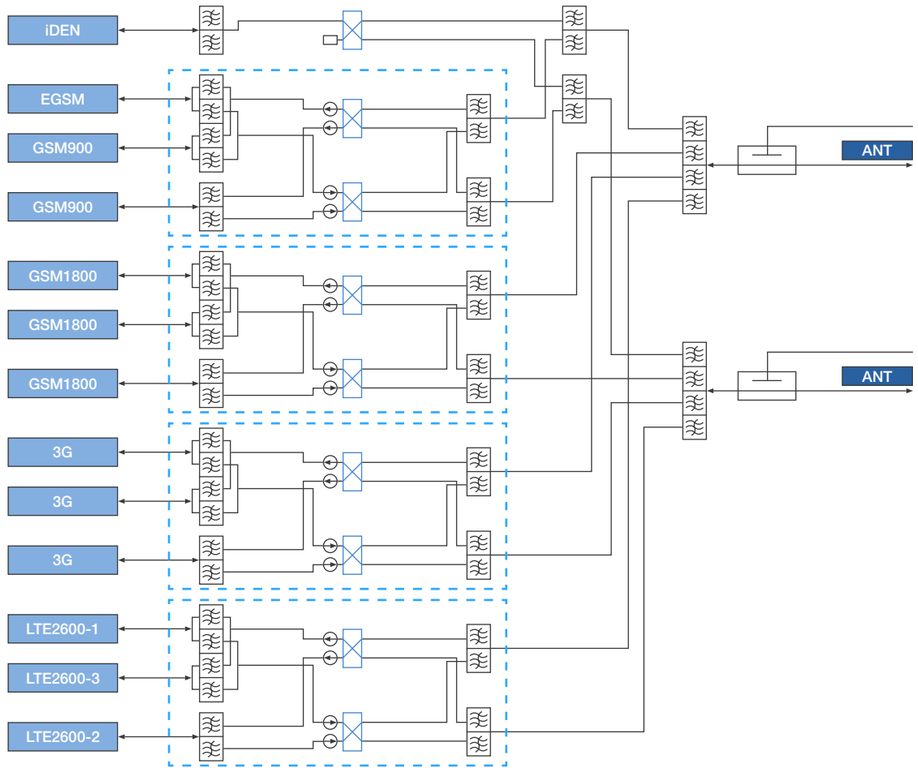
19'' Cabinet POI

The 19'' cabinet POI is designed flexibly and cost optimized. PROSE with its efficient R&D platform develops the POI as per customer request, including a variety of frequency bands and operator input ports. The advantages are fast technical evaluation, standard production, and fast delivery.

Modular POI

PROSE placed great emphasis on maximum modularity when developing the POI. The individual unit for each frequency band is plug-and-play module. The modular design aims for easy maintenance and low-cost upgrading. By such advanced design, the POI could be upgraded flexibly for any frequency refarming. The PROSE modular POI could be customized for different operators and frequency bands with low MOQ requirement.



PROSE Service

PROSE offers professional services that improve network design, reliability, scalability and efficiency.

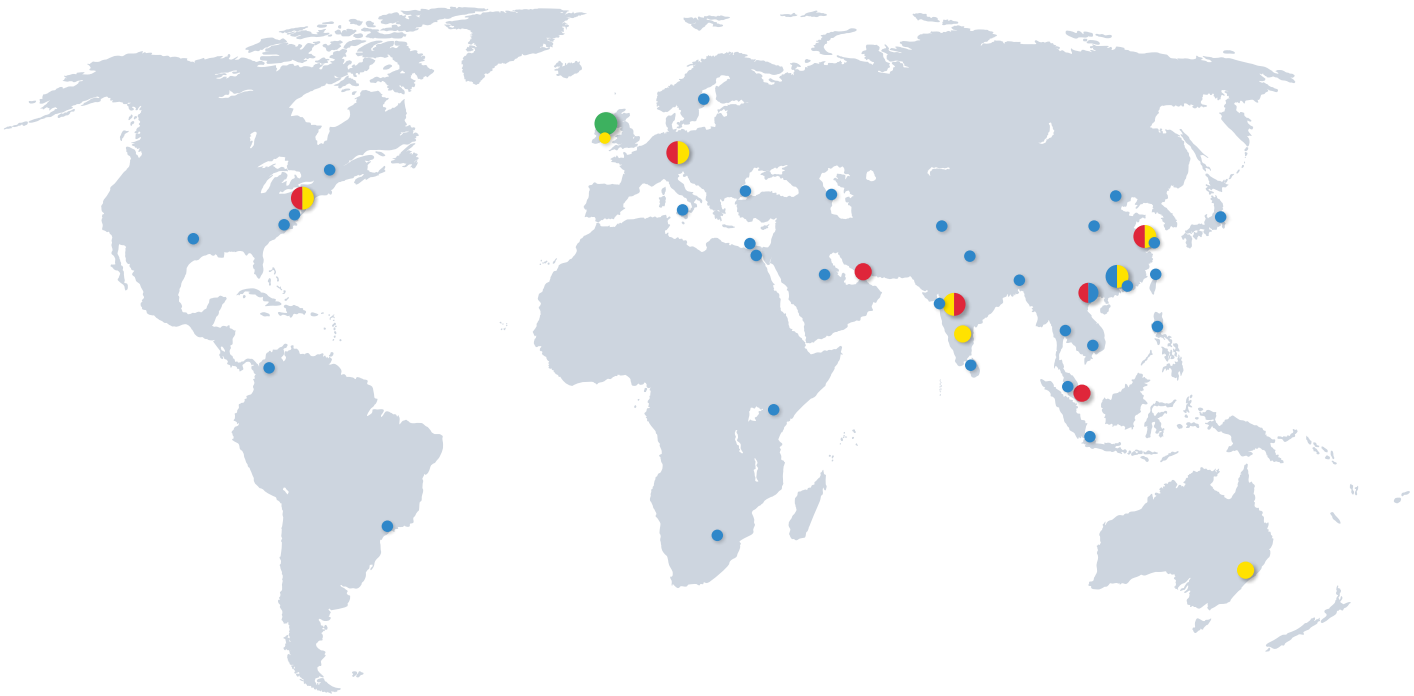
Our service core competences include:

- Network optimization
- Technical consultation
- Customized product design
- Installation & commissioning
- Onsite training & supervision
- System troubleshooting
- After-sales services

In addition, we also offer professional training, technical support and workshops for distributors and agents. We are committed to offering exceptional services for our customers.

PROSE is much more than just a supplier – PROSE is a valued development partner and we will strive to meet new challenges in order to scale to new heights.

GLOBAL FOOTPRINT



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