

ABI RESEARCH COMPETITIVE RANKING

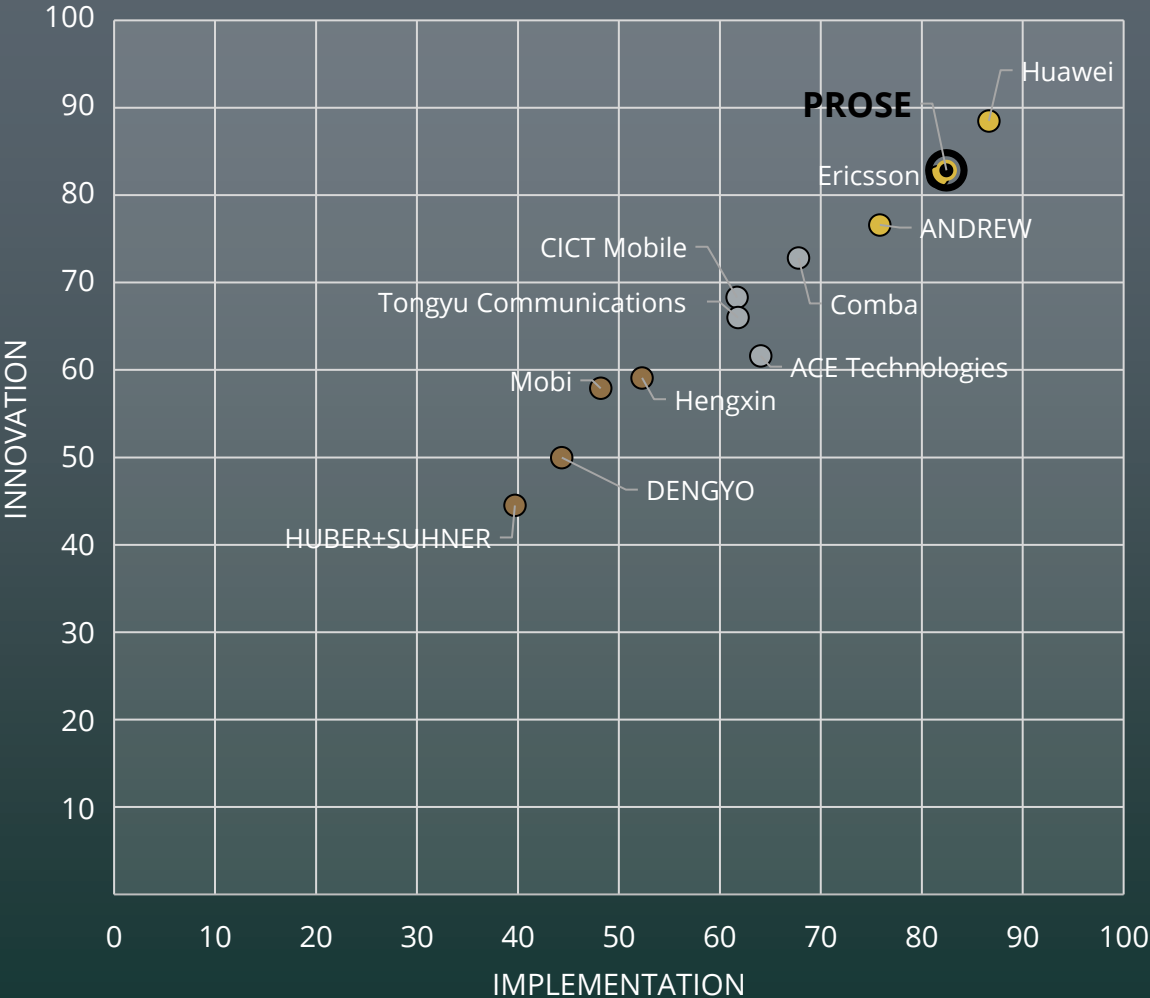
# PASSIVE CELLULAR ANTENNA COMPETITIVE RANKING

# ***PROSE***



**OVERALL: 82.7 | INNOVATION: 82.9 | IMPLEMENTATION: 82.5 | RANK: 2**

INNOVATION  
VERSUS  
IMPLEMENTATION  
MATRIX



## INNOVATION

# PROSE

**INNOVATION  
SCORE: 82.9**



PROSE Technologies specializes in creating and deploying networks for telecommunications providers, including services such as radio optimization, transmission system design, and managed technical support.

High-efficiency 2L4H and 3L8H configurations support existing and new frequency bands, with an ongoing study of radiating elements and feeding networks contributing up to or beyond 60% bandwidth extension. Active + Passive (A+P) and Frequency Selective Surface (FSS) designs extend UWB capabilities further, and sub-6 GHz performance is enhanced by PIM and low-loss design techniques.

The creation of new technologies for digital RET solutions has led to the development of both high-precision Engineering Parameters Units (EPU) and advanced new materials, including metamaterials and radome composite materials. Beam Positioning Systems (BPSs) and reconfigurable antennas utilize high-accuracy sensing and algorithmic controls. The Intellectual Property (IP) associated with these technologies includes patented methods for decoupling antennas, low wind load structural designs, and methods for creating repeatable manufacturing processes.

Configurability and maintenance of BPS capabilities are enabled using high-precision EPUs, and remote tilt adjustment of the BPS can be controlled through one interface. Dual Global Positioning System (GPS) chips and multi-axis sensors provide feedback on beam and orientation parameters in real time; and AI-assisted modules PROSE AI Building Blocks (PABB) and Antenna Module On Board (AMOB) provide operational support and installation feedback, thus enhancing the efficiency of optimizing the network.

Structural efficiency remains a priority for PROSE, as aerodynamic-shaped radome profiles, bionic end caps, slim form factor, and lightweight composites serve to decrease the wind load at the site and reduce the overall weight, while maintaining electrical performance of the products. In creating the cylindrical product families, the reflector plates and optimal mounting solutions have been integrated to enhance the resilience of the deployment on cellular towers and rooftops.

PROSE's design choices have sustainability built into them, including energy-efficient green antennas, eco-friendly radomes and mounting materials, using laser welding instead of electroplating, and utilizing biodegradable packaging materials which lessen their environmental impact. The establishment of green energy generation investments and ongoing R&D into low-power, high-performance antennas illustrates a dedication toward sustainable network deployments.

## IMPLEMENTATION

# PROSE

**IMPLEMENTATION  
SCORE: 82.5**



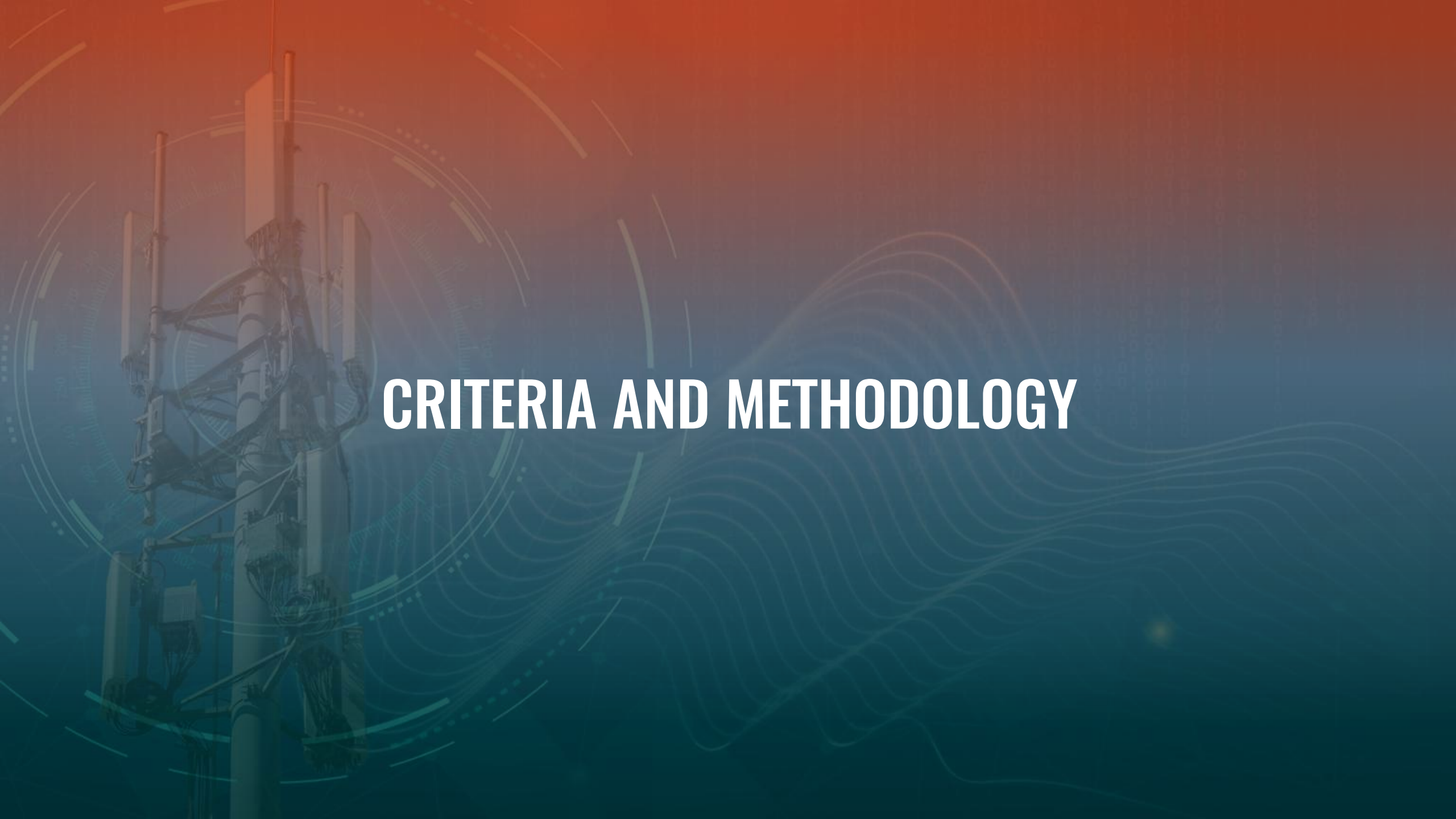
PROSE Technologies has maintained its position in the marketplace across all major regions, despite facing tough market conditions. Strong product promotion and acceptance of new technology such as A+P platforms and high-efficiency designs were the key factors to this success. Other contributing factors included shorter lead times and competitive pricing across multiple markets, which allowed PROSE to maintain a stable market share and grow, demonstrating the resilience of the company in an increasingly competitive environment.

PROSE Technologies operates in multiple regions worldwide, including Asia-Pacific, the Middle East & Africa, Europe, North America, and Latin America. Of these regions, PROSE has been most active in the Asia-Pacific market. Regions that promote densifying their networks and the protection of environment, i.e., Europe and India, have been particularly interested in PROSE's offerings, and PROSE has also maintained its flexible, energy-efficient network deployments for its customers in the Middle East & Africa, helping to create a level of stability across differing regional environments.

PROSE has seen Year-over-Year (YoY) growth, increased employment levels, and expansion into new markets. The investment that PROSE is making in both manufacturing and technical services strengthens its capacity to invest in R&D, and global distribution capabilities.

The high-value contracts for antenna sales from several prominent telco networks in 2024 indicate that there is a high level of confidence among operators. For example, multiple European telco networks elected to use the PROTREEM high-efficiency class antennas as part of their various green initiatives. In addition, the ongoing discussions with Vodafone Idea in India on PROSE's ability to provide cost-effective, energy-efficient solutions demonstrate how trust continues to grow between both firms. Working closely with Airtel Group and Viettel Group further illustrates PROSE's well-developed customer base.

PROSE's antenna portfolio includes TDD/FDD, and combined FDD+TDD solutions, covering multiple port configurations from compact low-wind installations to high-efficiency multi-band systems. The A+P family and hybrid FSS designs extend UWB coverage, while platforms such as PROTREEM+ and cylindrical base station antennas enhance efficiency, coverage, and structural optimization.



# **CRITERIA AND METHODOLOGY**

## VENDOR MATRIX

**Methodology:** After individual scores are established for innovation and implementation, an overall company score is established using the Root Mean Square (RMS) method:

$$\text{Score} = \sqrt{\frac{\text{innovation}^2 + \text{implementation}^2}{2}}$$

The resulting overall scores are then ranked and used for percentile comparisons.

The RMS method, in comparison with a straight summation or average of individual innovation and implementation values, rewards companies for standout performances.

For example, using this method, a company with an innovation score of nine and an implementation score of one would score considerably higher than a company with a score of five in both areas, despite the mean score being the same. ABI Research believes that this is appropriate as the goal of these matrices is to highlight those companies that stand out from the others.

## RANKING CRITERIA

**Leader:** A company that receives a score of **75 or above** for its overall ranking

**Mainstream:** A company that receives scores **between 60 and 75** for its overall ranking

**Follower:** A company that receives a score of **60 or below** for its overall ranking

**Innovation Leader:** A company that receives a score of **75 or above** for its innovation ranking.

**Implementation Leader:** A company that receives a score of **75 or above** for its implementation ranking.



## INNOVATION CRITERIA

**Ultra-Wideband (UWB) Capabilities:** How extensive is the vendor's antenna support for UWB capabilities, while also supporting high gain and coverage?

**Essential Intellectual Property (IP) and Research & Development (R&D):** Level of IP, also factors in collaborative partnerships, and quality of the antenna design and manufacturing process. This also encapsulates innovations that the company released to improve on product performance. This segment can also include any other innovations that are relevant to the passive base station antenna market undertaken by the vendors.

**Antenna Configurability and Maintenance:** Degree of maintenance, quality of materials and components to resist downtime of antenna, and simplicity of configuration, Self-Organizing Network (SON), and Remote Electrical Tilt (RET). Conformance to requirements from the Antenna Interface Standards Group (AISG), which develops and sets out the standards for the control and monitoring interface between base stations and tower-top equipment, including antennas with RET, are also considered.

**Wind-Load and Structural Efficiency:** Assesses the vendor's capability to engineer antennas that reduce wind load, weight, and tower structural stress without compromising electrical performance. Includes innovations in aerodynamic radome design, mechanical robustness, form-factor optimization, and structural stability in adverse weather. Also considers ease of mounting and how well the antenna minimizes tower-top reinforcement needs.

**Sustainability Measures:** How has the company committed to environmental responsibility and sustainable practices? This includes the energy efficiency of the antennas, the sustainability of the manufacturing process and end-of-life management, and the incorporation of recyclable materials into the antenna design.

*For this report, low bands are defined as frequencies below 1 Gigahertz (GHz), lower mid-bands as frequencies between 1 GHz and 2.6 GHz, and upper mid-bands as frequencies between 3.5 GHz and 6 GHz.*



## IMPLEMENTATION CRITERIA

**Commercial Success and Overall Antenna Market Share:** The greater the market share in terms of revenue, the higher the ranking.\*

**Antenna Sales Regional Geographical Penetration:** Partly based on sales presence in each global region. Also, the more regions the vendor's clients are in, the higher the ranking.

**Financial and Organizational Health:** Based on the size of overall firm sales and operating margin. Tries to assess how robust the vendor is to shocks and to fund internal needs, such as R&D, regional distribution, channel expansion, etc.

**Major Antenna Customer Contract Wins:** Weights based on significant clients. Major player decisions often reassure/guide small operators. Operators have a herding instinct.

**Vendor's Antenna Portfolio:** Range of portfolio. Does the portfolio support all the protocols, have a wide range of spectrum bands, and offer competitive pricing?

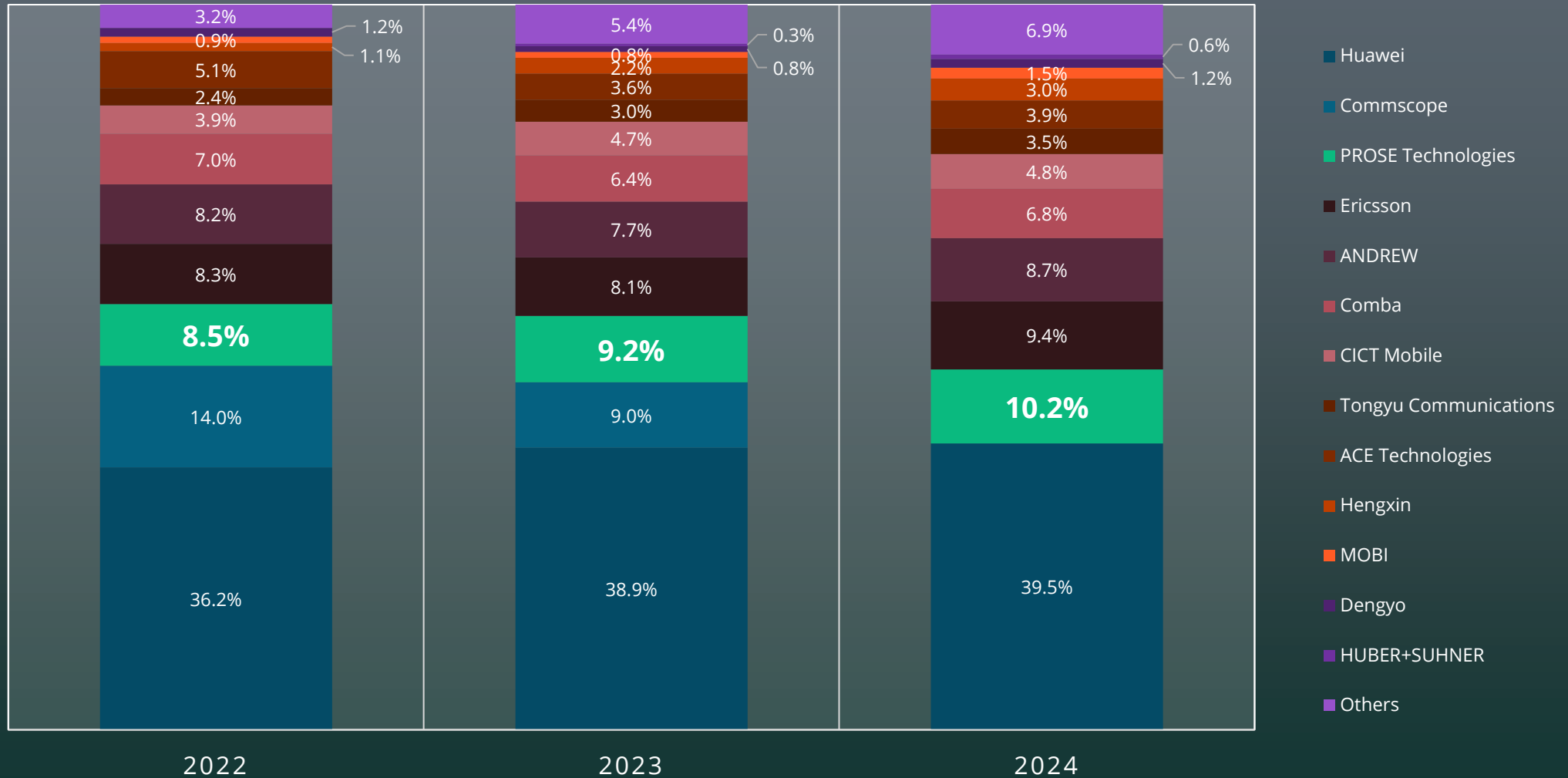
*\*Vendors are requested to fill out a questionnaire and requested to participate in an interview. If confidential data are provided under a Non-Disclosure Agreement to ABI Research, they are evaluated, but they are not fully presented in this report.*

# MARKET TRENDS

The main trends in passive antenna base stations are:

- Operators are increasingly investing in passive antenna modernization to address performance degradation from aging installed bases, as losses in spectral efficiency, uplink capacity, and power consumption become more visible through public benchmarking and growing traffic asymmetry driven by 4 Transmit and 4 Receive (4T4R) and 8T8R uplink evolution, 2G sunset programs, and the move toward 5G Standalone (SA) architectures.
- The passive antenna industry is continuing to evolve from large-scale macro deployments to targeted capacity site upgrades and integrated antenna solutions mainly due to space constraints on sites from additional active radio equipment being added, operator consolidation, and the need for compact, multi-band, high-port antennas with low Passive Intermodulation (PIM), less loading on towers, and ease of installation.
- The evolution of low- and mid-band spectrum continues to favor the use of passive antennas, especially due to the buildout of 600 Megahertz (MHz) (New Radio (NR)) and 700 MHz (NR) deployments, and the upgrade of mid-band spectrum to Frequency Division Duplex (FDD), which will continue to drive demand for passive antenna replacement and/or reconfiguration, while operators are shifting to using active antennas in some higher-frequency bands.
- The digital transformation of passive antennas is adding a new basic need for Artificial Intelligence (AI)-powered autonomous networks with a growing demand for antennas that can sense their parameters in real time, be configured from a distance, and optimize multi-dimensional beams for fully automated networks, as well as reduce Operational Expenditures (OPEX), while enabling end-to-end intelligent network operations.
- As passive antennas evolve, efficiency, resiliency, and security are becoming key differentiating factors. Operators are focusing their efforts on reducing energy consumption (Kilowatt-Hour per Gigabyte (kWh/GB)), capturing heat effectively with higher power densities, and employing secure firmware-enabled control interfaces. All of this is happening, while also ensuring geo-resilient supply chains to reduce geopolitical risk and manage the complexity of automating networks.

# 2024 MARKET SHARE





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