

Millimeter Wave Technology Market By Component (Antenna & Transceiver Components, Frequency Sources & Related Components, Communication & Networking Components, Imaging Components, RF & Radio Components, Sensors & Controls, and Others), By Product (Scanner Systems, Radar & Satellite Communication Systems, and Telecommunication Equipment), By License Type (Light Licensed Frequency, Unlicensed Frequency, and Fully Licensed Frequency), By Frequency Band (24 GHz to 57 GHz, 58 GHz to 86 GHz, and 87 GHz to 300 GHz), By Application (Telecom, Defense & Aerospace, Automotive, Industrial, Consumer, Medical, and Others), By Region, By Competition Forecast & Opportunities, 2018-2028F

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Abstracts

The Global Millimeter Wave Technology Market achieved a valuation of USD 2.08 billion in 2022 and is expected to experience robust growth in the forecast period, with a projected Compound Annual Growth Rate (CAGR) of 25.19% through 2028.

The Millimeter Wave Technology market is a dynamic and rapidly evolving sector within the broader landscape of wireless communication and technology. This market specifically focuses on the development, manufacturing, and deployment of devices,



systems, and components that operate within the millimeter wave frequency range, typically spanning from 24 GHz to 100 GHz.

Millimeter wave technology is characterized by its high-frequency signals, which enable significantly faster data transfer rates compared to lower-frequency counterparts. This technology plays a pivotal role in various critical areas, including telecommunications, where it facilitates the rollout of ultra-fast 5G networks. These networks enable high-speed data transmission, low-latency communication, and support emerging technologies like the Internet of Things (IoT) and autonomous vehicles.

Furthermore, the Millimeter Wave Technology market extends its influence into diverse sectors such as healthcare, automotive radar systems, security and surveillance, and industrial applications. Its unique characteristics, including precise sensing capabilities and the ability to transmit large volumes of data, make it instrumental in shaping the future of advanced communication, connectivity, and technological innovation across numerous industries.

As the demand for high-bandwidth and low-latency communication continues to surge, the Millimeter Wave Technology market is poised for significant expansion and continuous innovation.

Key Market Drivers

5G Network Expansion

The deployment of 5G networks is one of the primary drivers propelling the global Millimeter Wave Technology market. As telecommunication companies worldwide strive to meet the growing demand for high-speed, low-latency connectivity, millimeter wave technology has emerged as a crucial enabler. Unlike earlier wireless technologies, 5G harnesses the millimeter wave spectrum, typically ranging from 24 GHz to 100 GHz, to deliver significantly faster data transfer rates. Millimeter wave frequencies allow for the transmission of vast amounts of data, making 5G networks ideal for applications such as augmented and virtual reality, autonomous vehicles, and the Internet of Things (IoT). As a result, telecom operators and network equipment manufacturers are investing heavily in millimeter wave technology to build the infrastructure required to support 5G networks.

Demand for High-Bandwidth Applications



The exponential growth of data-intensive applications is another major driver for the global Millimeter Wave Technology market. From streaming high-definition video to online gaming and cloud-based services, consumers and businesses require more bandwidth than ever. Millimeter wave technology offers a solution to this demand by providing the necessary capacity to support these applications. For instance, the proliferation of 4K and even 8K video content necessitates robust network infrastructure capable of handling massive data streams. Millimeter wave frequencies can transmit these data loads efficiently, ensuring smooth and uninterrupted user experiences. Moreover, as industries continue to embrace data-driven technologies, such as big data analytics and artificial intelligence, the demand for millimeter wave technology will continue to rise.

Automotive Radar Systems

The automotive industry is driving significant growth in the millimeter wave technology market through the development of advanced driver assistance systems (ADAS) and autonomous vehicles. Millimeter wave radar systems are crucial components of these technologies, providing accurate and reliable sensing capabilities. These radar systems are used for adaptive cruise control, collision avoidance, parking assistance, and more. As the automotive industry moves toward higher levels of automation, the demand for millimeter wave radar systems is expected to surge. These systems enable vehicles to perceive their surroundings with precision, enhancing safety and enabling autonomous driving features. Consequently, the global Millimeter Wave Technology market is benefiting from the automotive sector's rapid innovation.

Increased Security and Surveillance Needs

The global security and surveillance industry is another key driver of millimeter wave technology adoption. Millimeter wave scanners and imaging systems are being widely used for various security applications, including airport security, border control, and crowd monitoring. These systems can detect concealed weapons, explosives, and other threats with high accuracy. As security concerns continue to evolve, governments and organizations are investing in advanced millimeter wave technology to enhance their surveillance capabilities. The ability to detect concealed objects on individuals or in luggage without the need for physical contact makes millimeter wave technology an essential tool in maintaining public safety.

Growing Telemedicine Applications



Telemedicine has seen a significant surge in popularity, especially in the wake of the COVID-19 pandemic. Millimeter wave technology plays a crucial role in enabling high-resolution medical imaging and remote patient monitoring. Its ability to quickly and reliably transmit large amounts of medical data is vital for telemedicine applications. Telehealth solutions, including remote consultations, telesurgery, and real-time medical imaging, depend on millimeter wave technology to deliver quality healthcare services over long distances. This driver underscores the importance of millimeter wave technology in healthcare, particularly as telemedicine becomes an integral part of modern healthcare systems.

IoT and Industry 4.0

The Internet of Things (IoT) and Industry 4.0 initiatives are transforming industries by connecting devices and enabling data-driven decision-making. Millimeter wave technology provides the necessary connectivity and data transfer capabilities for IoT devices and Industry 4.0 applications. In manufacturing, for example, millimeter wave sensors can be used for precision measurements and quality control. In agriculture, they enable smart farming practices, optimizing crop yields. In smart cities, millimeter wave technology can enhance public services through applications like traffic management and environmental monitoring.

In conclusion, the global Millimeter Wave Technology market is being driven by a combination of factors, including the expansion of 5G networks, the demand for highbandwidth applications, automotive radar systems, increased security and surveillance needs, growing telemedicine applications, and the proliferation of IoT and Industry 4.0. These drivers underscore the versatile and essential role that millimeter wave technology plays across various sectors, positioning it for continued growth and innovation in the future.

Government Policies are Likely to Propel the Market

Spectrum Allocation and Regulation

Spectrum allocation and regulation policies are pivotal in shaping the global Millimeter Wave Technology market. Governments worldwide allocate specific portions of the electromagnetic spectrum for various purposes, including millimeter wave communication. This allocation plays a fundamental role in ensuring efficient use and preventing interference among users of this spectrum. Millimeter wave frequencies, typically ranging from 24 GHz to 100 GHz, are considered high-band frequencies and



have unique propagation characteristics. As such, government policies govern their allocation for applications like 5G networks, point-to-point communication, and scientific research. Regulators establish rules for licensing, interference mitigation, and spectrum sharing to encourage innovation while safeguarding public interests. In recent years, governments have been actively working to allocate more millimeter wave spectrum for 5G deployments, promoting technological advancement and economic growth in the telecommunications sector.

Research and Development Funding

Government policies regarding research and development (R&D) funding significantly impact the Millimeter Wave Technology market. Governments worldwide recognize the strategic importance of millimeter wave technology in fostering innovation, competitiveness, and national security. Through various funding mechanisms, such as grants, subsidies, and tax incentives, governments incentivize private sector investment in millimeter wave R&D. These policies aim to accelerate the development of new applications, components, and systems, especially in areas like defense, healthcare, and telecommunications. Moreover, public-private partnerships often emerge as a result of government-funded R&D initiatives, fostering collaboration between academia, industry, and research institutions. These partnerships stimulate knowledge transfer and drive technological advancements in the millimeter wave sector.

Export Controls and National Security

National security concerns drive government policies related to export controls on millimeter wave technology. Governments implement stringent regulations to prevent sensitive millimeter wave technologies from falling into the wrong hands, especially those that could be used for military or espionage purposes. Export control policies include the classification of specific millimeter wave technologies as dual-use items, requiring licenses for international transfers. These policies ensure that companies and individuals cannot export sensitive millimeter wave components, equipment, or software without government approval. Such policies are essential to safeguard national security interests while still allowing for legitimate trade and cooperation in non-sensitive areas. Balancing security and commercial interests is a delicate task, and government policies in this domain aim to strike that balance effectively.

Standards and Interoperability

Government policies play a pivotal role in setting standards and promoting



interoperability in the Millimeter Wave Technology market. Establishing common standards is crucial for ensuring that millimeter wave devices from different manufacturers can work seamlessly together, fostering competition and innovation. Governments often work in collaboration with industry bodies and international organizations to develop and adopt standards for millimeter wave technology. These standards cover areas such as device compatibility, frequency bands, and data transmission protocols. By enforcing interoperability through regulatory policies, governments encourage the growth of a healthy ecosystem of millimeter wave products and services. This, in turn, benefits consumers by providing them with a wider range of choices and ensuring that their devices can communicate effectively across networks and applications.

Infrastructure Investment

Government policies related to infrastructure investment have a substantial impact on the Millimeter Wave Technology market. Infrastructure, especially for high-frequency millimeter wave networks, requires substantial investment in terms of deploying base stations, backhaul connectivity, and small cell installations. Governments can accelerate the growth of millimeter wave technology by allocating funds, subsidies, or tax incentives for infrastructure development. These policies are particularly important for ensuring that underserved or rural areas have access to high-speed millimeter wave networks. Furthermore, policies encouraging private sector involvement in infrastructure deployment can create a more competitive landscape, driving innovation and reducing costs for consumers. Public-private partnerships often play a pivotal role in expanding millimeter wave networks and improving connectivity across regions.

Intellectual Property Protection

Intellectual property (IP) protection policies are critical for the global Millimeter Wave Technology market. IP rights, such as patents, copyrights, and trademarks, incentivize innovation by ensuring that inventors and creators can benefit from their work. Governments play a key role in enforcing IP protection through legal frameworks and regulations. These policies safeguard the interests of inventors, companies, and research institutions involved in millimeter wave technology development. By offering strong IP protection, governments create an environment conducive to investment in R&D and technology commercialization. This, in turn, drives competition and fosters the development of cutting-edge millimeter wave solutions, benefiting both the industry and society as a whole.



In conclusion, government policies significantly influence the global Millimeter Wave Technology market by shaping spectrum allocation, research funding, export controls, standards, infrastructure investment, and intellectual property protection. Effective policy formulation and implementation are crucial to fostering innovation, competitiveness, and the responsible use of millimeter wave technology on a global scale.

Key Market Challenges

Regulatory and Spectrum Management

One of the primary challenges confronting the global Millimeter Wave Technology market is the complex landscape of regulatory and spectrum management. Millimeter wave technology operates within a specific portion of the electromagnetic spectrum, typically spanning frequencies from 24 GHz to 100 GHz. Due to the unique characteristics of these frequencies, there are several regulatory and spectrum-related hurdles that companies and governments must navigate. One major challenge is the allocation of suitable millimeter wave spectrum for various applications. As millimeter wave frequencies are essential for the deployment of 5G networks and other highspeed wireless communication systems, there is a growing demand for spectrum allocation. Governments worldwide must balance this demand with other critical uses, such as satellite communication, defense applications, and scientific research. The allocation process often involves complex negotiations and coordination between regulatory bodies, telecom operators, and industry stakeholders. Disputes over spectrum allocation can lead to delays in deploying millimeter wave technology, hindering innovation and economic growth. Additionally, regulatory policies need to address interference issues associated with millimeter wave technology. High-frequency signals have limited range and can be easily obstructed by physical barriers, such as buildings and trees. This interference challenge requires careful spectrum planning, interference mitigation strategies, and the establishment of standards for spectrum sharing. Furthermore, as millimeter wave technology is deployed in various sectors, including telecommunications, automotive radar, and healthcare, governments must develop coherent and consistent regulatory frameworks to ensure safety, security, and compliance with international standards. Balancing innovation with regulatory safeguards remains a complex challenge in the dynamic Millimeter Wave Technology market.

Cost and Infrastructure Deployment

Another significant challenge facing the global Millimeter Wave Technology market is

Millimeter Wave Technology Market By Component (Antenna & Transceiver Components, Frequency Sources & Related...



the cost associated with infrastructure deployment. The millimeter wave spectrum has unique propagation characteristics; signals at these frequencies do not travel long distances and are susceptible to atmospheric absorption and blockage by physical obstacles. As a result, deploying millimeter wave networks requires a more extensive infrastructure compared to lower-frequency alternatives. One major cost challenge is the need for a dense network of base stations and small cells to provide comprehensive coverage. Millimeter wave signals have limited range, typically ranging from a few hundred meters to a few kilometers. Consequently, deploying a millimeter wave network in urban areas requires a significantly larger number of base stations and small cells, increasing capital and operational expenses. Moreover, the small cell deployment itself poses challenges, as it requires access to infrastructure such as utility poles, streetlights, and buildings. Negotiating access agreements, obtaining permits, and coordinating with municipalities can lead to delays and additional costs for network deployment. Fiber backhaul infrastructure is another cost challenge. Millimeter wave networks demand high-capacity backhaul connections to carry the substantial amount of data generated by these systems. Extending fiber optic networks to support millimeter wave backhaul can be expensive and time-consuming, particularly in rural and underserved areas. Furthermore, the cost of millimeter wave equipment, such as transceivers, antennas, and amplifiers, can be relatively high compared to lowerfrequency counterparts. Manufacturers and service providers need to find ways to reduce production costs and make millimeter wave technology more accessible to consumers and businesses. To address these cost challenges, industry players and governments are exploring innovative solutions, including shared infrastructure models, public-private partnerships, and cost-sharing mechanisms. Reducing the cost barrier is essential to fostering widespread adoption of millimeter wave technology and realizing its potential across various applications.

In conclusion, the global Millimeter Wave Technology market faces significant challenges related to regulatory and spectrum management, as well as the cost of infrastructure deployment. Addressing these challenges requires cooperation among governments, industry stakeholders, and technology innovators to create a regulatory environment that encourages innovation while ensuring responsible use and to develop cost-effective deployment strategies to make millimeter wave technology accessible to a broader range of applications and users.

Segmental Insights

Telecommunication Equipment Insights



The telecommunication equipment segment had the largest market share in 2022 & expected to maintain it in the forecast period. One of the primary factors driving the dominance of telecommunication equipment in the millimeter wave technology market is the rapid rollout of 5G networks worldwide. Millimeter wave technology plays a pivotal role in 5G infrastructure, particularly in delivering the ultra-fast data transfer rates and low latency that 5G promises. Telecommunication companies are investing heavily in millimeter wave equipment to build out the necessary infrastructure for 5G networks, making this sector a dominant force in the market.

The global appetite for data-intensive applications is insatiable. With the proliferation of high-definition video streaming, online gaming, and IoT devices, there is a growing need for high-capacity, low-latency communication. Millimeter wave technology, with its ability to transmit large volumes of data quickly, is ideally suited to meet these demands. Telecommunication equipment manufacturers are at the forefront of developing and deploying millimeter wave solutions to meet this ever-increasing demand for bandwidth. While telecommunication is a key driver, millimeter wave technology also finds applications in various other sectors such as automotive radar, healthcare, and security. However, the telecommunications sector remains the most prominent and lucrative, as it forms the backbone of modern communication systems. Telecommunication equipment manufacturers have the scale, resources, and expertise to lead the way in harnessing millimeter wave technology's potential for the benefit of consumers and businesses globally. Telecommunication equipment manufacturers leverage economies of scale to produce cost-effective millimeter wave equipment. As demand for 5G and high-speed connectivity grows, these companies can produce equipment more efficiently, driving down costs and making their solutions more accessible to network operators and service providers. This competitive advantage allows them to maintain dominance in the market. Telecommunication giants invest significantly in research and development to advance millimeter wave technology. They actively collaborate with industry partners, standards organizations, and governments to drive innovation and standardization in this space. This proactive approach positions them as leaders in shaping the market's future and driving its growth.

Antenna & Transceiver Components Insights

The Antenna & Transceiver Components segment had the largest market share in 2022 and is projected to experience rapid growth during the forecast period. Antenna and transceiver components are at the heart of millimeter wave communication systems. Antennas are responsible for transmitting and receiving millimeter wave signals, while transceivers handle the modulation and demodulation of data. These components are



foundational to the functionality of millimeter wave technology, making them indispensable in various applications. The rollout of 5G networks is a major driver of the millimeter wave technology market, and antenna and transceiver components are central to this technology. 5G networks rely on the high-frequency millimeter wave spectrum to deliver ultra-fast data speeds and low latency. Antenna and transceiver components are essential for 5G base stations and user devices, making them a dominant force in the market. While 5G telecommunications is a primary driver, antenna and transceiver components find applications in numerous other sectors, including automotive radar, aerospace, defense, and healthcare. Their versatility and adaptability make them a go-to choice for implementing millimeter wave technology across a wide range of industries. Ongoing advancements in antenna and transceiver technologies have led to improved performance, efficiency, and miniaturization. These innovations have expanded the scope of millimeter wave technology, enabling it to be used in more compact and power-efficient devices, which further bolsters their dominance in the market. As the demand for high data rates continues to soar, particularly for dataintensive applications like 4K/8K video streaming and IoT, antenna and transceiver components are indispensable. Their ability to support the rapid transmission of large volumes of data aligns perfectly with the needs of modern consumers and businesses. In an increasingly connected world, millimeter wave technology is vital for addressing global connectivity needs. Antenna and transceiver components are essential for establishing robust, high-speed communication links, both in urban and rural areas, making them pivotal for bridging digital divides and supporting global communication infrastructure. Companies specializing in antenna and transceiver components invest heavily in research and development to enhance their performance, reliability, and costeffectiveness. This commitment to innovation ensures that these components remain at the forefront of millimeter wave technology advancements.

Regional Insights

North America had the leading market for millimeter wave technology in 2022. The growth of the market in this region is being driven by the early adoption of 5G technology and the presence of a large number of major players in the region. The United States is the largest market for millimeter wave technology in North America, followed by Canada and Mexico.

Asia Pacific had the second-largest market for millimeter wave technology in 2022. The growth of the market in this region is being driven by the growing demand for high-speed data transfer and the increasing adoption of 5G technology. China is the largest market for millimeter wave technology in Asia Pacific, followed by Japan and South



Korea.

Key Market Players

NEC Corporation

Siklu Communication, Ltd.

L3Harris Technologies, Inc.

BridgeWave Communications Inc.

E-Band Communications, LLC

Millimeter Wave Products Inc.

Keysight Technologies, Inc.

Farran Technology Ltd.

Smiths Group PLC

SAGE Millimeter, Inc.

Report Scope:

In this report, the Global Millimeter Wave Technology Market has been segmented into the following categories, in addition to the industry trends which have also been detailed below:

Millimeter Wave Technology Market, By Component:

Antenna & Transceiver Components

Frequency Sources & Related Components

Communication & Networking Components



Imaging Components

RF & Radio Components

Sensors & Controls

Others

Millimeter Wave Technology Market, By Product:

Scanner Systems

Radar & Satellite Communication Systems

Telecommunication Equipment

Millimeter Wave Technology Market, By License Type:

Light Licensed Frequency

Unlicensed Frequency

Fully Licensed Frequency

Millimeter Wave Technology Market, By Frequency Band:

24 GHz to 57 GHz

58 GHz to 86 GHz

87 GHz to 300 GHz

Millimeter Wave Technology Market, By Application:

Telecom

Defense & Aerospace

Automotive

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Industrial

Consumer

Medical

Others

Millimeter Wave Technology Market, By Region:

North America

United States

Canada

Mexico

Europe

France

United Kingdom

Italy

Germany

Spain

Asia-Pacific

China

India

Japan



Australia

South Korea

South America

Brazil

Argentina

Colombia

Middle East & Africa

South Africa

Saudi Arabia

UAE

Kuwait

Turkey

Competitive Landscape

Company Profiles: Detailed analysis of the major companies present in the Global Millimeter Wave Technology Market.

Available Customizations:

Global Millimeter Wave Technology market report with the given market data, Tech Sci Research offers customizations according to a company's specific needs. The following customization options are available for the report:

Company Information

Detailed analysis and profiling of additional market players (up to five).



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12. MARKET TRENDS & DEVELOPMENTS

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- 13.2. Siklu Communication, Ltd.
- 13.3. L3Harris Technologies, Inc.
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- 13.5. E-Band Communications, LLC
- 13.6. Millimeter Wave Products Inc.
- 13.7. Keysight Technologies, Inc.
- 13.8. Farran Technology Ltd.
- 13.9. Smiths Group PLC
- 13.10. SAGE Millimeter, Inc.

14. STRATEGIC RECOMMENDATIONS

15. ABOUT US & DISCLAIMER



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