

# **Free Space Optics (FSO) and Visible Light Communication (VLC)/ Li-Fi Market by FSO Component (Transmitters, Receivers, Modulators & Demodulators), VLC Component (LEDs, Photodetectors, Microcontrollers, Software) - Global Forecast to 2029**

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## **Abstracts**

The FSO & VLC/Li-Fi market was valued at USD 2.78 billion in 2024 and is projected to reach USD 7.39 billion by 2029, growing at a CAGR of 21.6% from 2024 to 2029.

High growth of LEDs due to low energy consumption is one of the major drivers in the VLC/Li-Fi market. The VLC/Li-Fi technology is highly efficient in terms of energy consumption. The VLC system consumes very low energy by using LEDs for data transmission purposes. Low-cost LEDs and lighting units can be used for applications ranging from public Internet access to streetlamps and auto-piloted cars that communicate through their headlights. Using LEDs for residential lighting results in enhanced power efficiency, encouraging customers to choose LEDs over incandescent and fluorescent lamps. LEDs are replacing artificial lighting sources such as incandescent and fluorescent lamps in Australia, Taiwan, China, and countries in the EU. The US Department of Energy (DoE) estimates that the rapid rate of adoption of LED lighting in the US over the next 20 years can save energy, eliminate the need for new power plants, and reduce the demand for lighting electricity by 33%. Suited only for short-range communication applications is one of the major restraints in the VLC/Li-Fi market. VLC/Li-Fi connections depend upon light to transmit data and are highly vulnerable to external interference. A major disadvantage of the VLC technology is that artificial light does not pass through walls and other opaque materials, such as lampshades and frosted glass, unlike radio waves. Thus, a VLC-enabled device

(through its inbuilt photo -receiver) can never be as fast and handy as a Wi-Fi-enabled device in open air. Another limitation is that VLC only works in direct LoS and can thus only be implemented in indoor or closed-space applications. It can be considered as an alternative only for the short-distance communication applications of the RF technology.

Healthcare devices FSO application segment is expected to grow with the highest growth rate during the forecast period

The healthcare devices application segment is expected to record the highest CAGR during the forecast period. Information gathered from wireless portable medical devices could play a significant role in optimizing the administration of existing therapies. The increasing prevalence of chronic diseases such as diabetes, hypertension, cardiac arrhythmias, and heart failure is expected to offer opportunities for the growth of wireless technologies to be integrated into devices, particularly as consumer health and preventive medicine are gaining greater prominence. Hence, the market for the healthcare devices application segment is expected to grow rapidly in the near future.

The transmitters segment in FSO components to account for largest market size during the forecast period.

The transmitters segment is anticipated to continue to hold the largest size of the FSO market during the forecast period as these are used for major applications such as high-density signal transmission in data centers, high-performance computing, high-speed data processing, and communication. Compact size, low power consumption, and high data rate of optical transmitters make them suitable for FSO applications.

North America is expected to have the second-largest market for VLC/Li-Fi during the forecast period.

North America accounted for the second-largest share of the VLC/Li-Fi market in 2023. This is mainly attributed to the increase in investments in telecom infrastructure, government funding, and the rise in military expenditure. Key factors such as the increase in automation, rise in the adoption of the Internet of Things (IoT) platform, surge in cellular M2M connections, and the growth in demand for on-demand video services are the key factors projected to drive the growth of the VLC/Li-Fi market in the region. The early adoption of new technologies, such as machine-to-machine interaction and IoT-enabled devices, along with the presence of key industrial players, is expected to lead to the high growth of the VLC/Li-Fi market in North America.

In determining and verifying the market size for several segments and subsegments gathered through secondary research, extensive primary interviews have been conducted with key officials in the FSO & VLC/Li-Fi market. Following is the breakup of the profiles of the primary participants for the report.

By Company Type: Tier 1 – 45 %, Tier 2 – 35%, and Tier 3 – 20%

By Designation: Directors –40%, Managers- 32%, and Others – 28%

By Region: North America– 37%, Europe- 15%, Asia Pacific – 40%, and RoW – 8%

The report profiles key players in the FSO & VLC/Li-Fi market and analyzes their market shares. Players profiled in this report are Signify Holding (Netherlands), Lucibel SA (France), fSONA Networks Corp. (Canada), Wireless Excellence Limited (UK), Oledcomm (France), pureLiFi (UK), Acuity Brands, Inc. (US), Panasonic Corporation (Japan), Fraunhofer HHI (Germany), Trimble Hungary Kft. (Hungary), JSC Mostcom (Russia), LVX System (US), Velmenni (India), LightBee (Spain), VLNComm (US), IRNAS d.o.o. (Slovenia), nextLiFi (Australia), Infinity Technology Services Limited (China), AIRLINX Communications, Inc. (US), EC SYSTEM (Czech Republic), CACI International Inc (US), Redline Infrastructure (South Africa), Global LiFi Tech (Canada), LumEfficient (US), and QinetiQ (UK).

## Research Coverage

The report defines, describes, and forecasts the FSO & VLC/Li-Fi market based on FSO component, FSO application, FSO vertical, VLC/Li-Fi transmission type, VLC/Li-Fi component, VLC/Li-Fi application, and Region. It provides detailed information regarding drivers, restraints, opportunities, and challenges influencing its growth. It also analyzes competitive developments such as product launches, acquisitions, expansions, contracts, partnerships, and actions carried out by the key players to grow in the market.

## Reasons to Buy This Report

The report will help the market leaders/new entrants with information on the closest approximations of the revenue numbers for the overall FSO & VLC/Li-Fi market and the

subsegments. This report will help stakeholders understand the competitive landscape and gain more insights to position their businesses better and to plan suitable go-to-market strategies. The report also helps stakeholders understand the market pulse and provides information on key market drivers, restraints, challenges, and opportunities.

The report provides insights on the following pointers:

Analysis of key drivers (Effective alternative to RF technology for outdoor networking, limited last mile connectivity, ability to offer faster and safer data transfer, and high growth of LEDs due to low energy consumption), restraints (High installation cost for FSO solutions, and suited only to short-range communication applications), opportunities (Increasing adoption of FSO in place of RF communication, growing adoption of Li-Fi in various industries, emergence of new applications such as IoT and 5G), and challenges (Reliability issues due to fading of signals during propagation, and Lack of technological awareness) influencing the growth of the FSO & VLC/Li-Fi market.

**Product Development/Innovation:** Detailed insights on upcoming technologies, research & development activities, and new product & service launches in the FSO & VLC/Li-Fi market

**Market Development:** Comprehensive information about lucrative markets – the report analyses the FSO & VLC/Li-Fi market across varied regions

**Market Diversification:** Exhaustive information about new products & services, untapped geographies, recent developments, and investments in the FSO & VLC/Li-Fi market

**Competitive Assessment:** In-depth assessment of market shares, growth strategies, and service offerings of leading players like Signify Holding (Netherlands), Acuity Brands, Inc. (US), Oledcomm (France), fSONA Networks Corp. (Canada), pureLiFi (UK), Wireless Excellence Limited (UK), Panasonic Corporation (Japan), Fraunhofer HHI (Germany, Trimble Hungary Kft. (Hungary), JSC Mostcom (Russia), among others in the FSO & VLC/Li-Fi market strategies. The report also helps stakeholders understand the pulse of the automotive airbags & seatbelts market and provides them with information on key market drivers, restraints, challenges, and opportunities.

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