

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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Report description:

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.

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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

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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.

Table of Contents:

1□INTRODUCTION□	27
1.1□STUDY OBJECTIVES□	27
1.2□MARKET DEFINITION□	27
1.3□STUDY SCOPE□	28
1.3.1□MARKETS COVERED AND REGIONAL SCOPE□	28
1.3.2□INCLUSIONS AND EXCLUSIONS□	29
1.3.3□YEARS CONSIDERED□	30
1.4□CURRENCY CONSIDERED□	31
1.5□UNITS CONSIDERED□	31
1.6□STAKEHOLDERS□	31
1.7□SUMMARY OF CHANGES□	32
2□RESEARCH METHODOLOGY□	33
2.1□RESEARCH DATA□	33
2.1.1□SECONDARY DATA□	34
2.1.1.1□Major secondary sources□	34
2.1.1.2□Key data from secondary sources□	35
2.1.2□PRIMARY DATA□	35
2.1.2.1□List of primary interview participants□	35
2.1.2.2□Key data from primary sources□	36
2.1.2.3□Key industry insights□	37
2.1.2.4□Breakdown of primaries□	37
2.1.3□SECONDARY AND PRIMARY RESEARCH□	38
2.2□MARKET SIZE ESTIMATION□	39
2.2.1□BOTTOM-UP APPROACH□	40
2.2.1.1□Market size estimation through bottom-up approach (demand side)□	40
2.2.2□TOP-DOWN APPROACH□	41

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2.2.2.1	Market size estimation through top-down approach (supply side)	41
2.3	MARKET BREAKDOWN AND DATA TRIANGULATION	42
2.4	RESEARCH ASSUMPTIONS	43
2.5	RISK ASSESSMENT	43
2.6	RESEARCH LIMITATIONS	43
3	EXECUTIVE SUMMARY	44
4	PREMIUM INSIGHTS	49
4.1	OPPORTUNITIES FOR PLAYERS IN FSO & VLC/LI-FI MARKET	49
4.2	VLC/LI-FI MARKET, BY TRANSMISSION TYPE	50
4.3	FSO & VLC/LI-FI MARKET, BY APPLICATION	50
4.4	FSO MARKET, BY COUNTRY	51
4.5	VLC/LI-FI MARKET, BY COUNTRY	51
5	MARKET OVERVIEW	52
5.1	INTRODUCTION	52
5.2	MARKET DYNAMICS	52
5.2.1	DRIVERS	53
5.2.1.1	FSO market	53
5.2.1.1.1	Effective alternative to RF technology for long-distance outdoor communication	53
5.2.1.1.2	Ability to revolutionize high-bandwidth networks through bridging connectivity gap	53
5.2.1.2	VLC/Li-Fi market	54
5.2.1.2.1	Faster and safer data transfer	54
5.2.1.2.2	High adoption of LEDs due to their energy efficiency	55
5.2.2	RESTRAINTS	56
5.2.2.1	FSO market	56
5.2.2.1.1	High installation costs of FSO solutions	56
5.2.2.2	VLC/Li-Fi market	56
5.2.2.2.1	Suited only for short-range communication applications	56
5.2.3	OPPORTUNITIES	57
5.2.3.1	FSO market	57
5.2.3.1.1	Increasing adoption of FSO over RF in space programs	57
5.2.3.2	VLC/Li-Fi market	58
5.2.3.2.1	Growing adoption of Li-Fi in various industries	58
5.2.3.2.2	Emergence of new applications such as IoT and 5G	58
5.2.4	CHALLENGES	60
5.2.4.1	FSO market	60
5.2.4.1.1	Reliability issues due to fading signals during propagation	60
5.2.4.2	VLC/Li-Fi market	61
5.2.4.2.1	Lack of technological awareness	61
5.3	TRENDS/DISRUPTIONS IMPACTING CUSTOMER BUSINESS	62
5.4	PRICING ANALYSIS	63
5.4.1	INDICATIVE PRICING OF FSO & VLC/LI-FI SOLUTIONS, 2024	63
5.4.2	INDICATIVE PRICING OF LI-FI SYSTEMS, BY KEY PLAYER, 2024	63
5.4.3	INDICATIVE PRICING OF FSO & VLC/LI-FI COMPONENTS, BY REGION, 2024	64
5.5	VALUE CHAIN ANALYSIS	64
5.6	ECOSYSTEM ANALYSIS	67
5.7	INVESTMENT AND FUNDING SCENARIO	69
5.8	TECHNOLOGY ANALYSIS	69

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5.8.1	KEY TECHNOLOGIES	69
5.8.1.1	Li-Fi technology	69
	?	
5.8.2	ADJACENT TECHNOLOGIES	70
5.8.2.1	Optical fiber technology	70
5.9	IMPACT OF AI ON FSO & VLC/LI-FI MARKET	71
5.10	CASE STUDY ANALYSIS	72
5.10.1	EC SYSTEM DEPLOYS WIRELESS OPTICAL LINK FOR OPTICAL WIRELESS POINT-TO-POINT CONNECTION TO TRANSMIT DATA	72
5.10.2	EC SYSTEM IMPLEMENTS CABLE-FREE OPTICAL TECHNOLOGY IN EBENE CYBER CITY FOR HIGH-RELIABILITY WIRELESS CONNECTIVITY	72
5.10.3	BABCOCK USES LI-FI TO IMPROVE INFORMATION GATHERING	73
5.11	PATENT ANALYSIS	74
5.12	TRADE ANALYSIS	78
5.12.1	IMPORT SCENARIO (HS CODE 853950)	78
5.12.2	EXPORT SCENARIO (HS CODE 853950)	79
5.13	TARIFF AND REGULATORY LANDSCAPE	80
5.13.1	TARIFF ANALYSIS (HS CODE 853950)	80
5.13.2	REGULATORY BODIES, GOVERNMENT AGENCIES, AND OTHER ORGANIZATIONS	81
5.13.3	REGULATORY STANDARDS	83
5.14	KEY CONFERENCES AND EVENTS, 2024-2025	84
5.15	PORTER'S FIVE FORCES ANALYSIS	85
5.15.1	INTENSITY OF COMPETITIVE RIVALRY	86
5.15.2	BARGAINING POWER OF SUPPLIERS	86
5.15.3	BARGAINING POWER OF BUYERS	86
5.15.4	THREAT OF SUBSTITUTES	86
5.15.5	THREAT OF NEW ENTRANTS	86
5.16	KEY STAKEHOLDERS AND BUYING CRITERIA	87
5.16.1	KEY STAKEHOLDERS IN BUYING PROCESS	87
5.16.2	BUYING CRITERIA	88
6	FREE SPACE OPTICS (FSO) MARKET	90
6.1	FSO MARKET, BY COMPONENT	91
6.1.1	INTRODUCTION	91
6.1.2	TRANSMITTERS	92
6.1.2.1	Low maintenance requirements to drive adoption	92
6.1.3	RECEIVERS	92
6.1.3.1	Use of photodetectors to propel market	92
6.1.4	MODULATORS & DEMODULATORS	93
6.1.4.1	Efficient communication to boost demand	93
6.2	FSO MARKET, BY APPLICATION	93
6.2.1	INTRODUCTION	93
6.2.2	MOBILE BACKHAUL	95
6.2.2.1	Increasing demand for high-frequency bandwidth and cost reduction to propel market	95
6.2.3	ENTERPRISE CONNECTIVITY	98
6.2.3.1	Significant reduction in cabling cost and high resistance to signal interception to drive market	98
6.2.4	DISASTER RECOVERY	99
6.2.4.1	Fast and ease of deployment in disaster areas to drive market	99

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6.2.5	DEFENSE OPERATIONS	99
6.2.5.1	Secure and reliable communication to boost adoption	99
6.2.6	SATELLITE	101
6.2.6.1	Significant data quantity transfer at high speed to foster market growth	101
6.2.7	HEALTHCARE DEVICES	102
6.2.7.1	Need to collect vital data from daily routines to increase adoption	102
6.2.8	SECURITY	103
6.2.8.1	Security and non-interception of data to drive market	103
6.2.9	ENGINEERING & DESIGN	104
6.2.9.1	Growing use for end-to-end system simulations to support market growth	104
6.2.10	OTHER FSO APPLICATIONS	105
6.3	FSO MARKET, BY VERTICAL	106
6.3.1	INTRODUCTION	106
6.3.2	IT & TELECOMMUNICATIONS	108
6.3.2.1	Increasing deployment of 5G networks to propel market	108
6.3.3	CONSUMER ELECTRONICS	108
6.3.3.1	Significant increase in global demand for high-speed internet connectivity to fuel market	108
6.3.4	AEROSPACE & DEFENSE	109
6.3.4.1	Concerns regarding national security to drive demand	109
6.3.5	MEDICAL	109
6.3.5.1	Reliability in healthcare and biomedical services to boost market	109
6.3.6	AUTOMOTIVE	109
6.3.6.1	Growing demand for vehicular communication to drive market	109
6.3.7	OTHER FSO VERTICALS	110
6.4	FSO MARKET, BY REGION	110
6.4.1	INTRODUCTION	110
6.4.2	NORTH AMERICA	112
6.4.2.1	Macroeconomic outlook for North America	114
6.4.2.2	US	114
6.4.2.2.1	Rising government subsidies and direct investments in telecommunication infrastructure to boost market	114
6.4.2.3	Canada	114
6.4.2.3.1	Rising use in disaster recovery applications to fuel market growth	114
6.4.2.4	Mexico	115
6.4.2.4.1	Increasing awareness about benefits of FSO solutions to boost adoption	115
6.4.3	EUROPE	115
6.4.3.1	Macroeconomic outlook for Europe	118
6.4.3.2	Germany	118
6.4.3.2.1	Strong focus on digitalization to fuel market growth	118
6.4.3.3	France	119
6.4.3.3.1	Increasing demand for high-speed data transfer for businesses and residents to boost market	119
6.4.3.4	UK	119
6.4.3.4.1	Robust telecommunications network to support integration	119
6.4.3.5	Rest of Europe	119
6.4.4	ASIA PACIFIC	120
6.4.4.1	Macroeconomic outlook for Asia Pacific	122
6.4.4.2	China	122

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6.4.4.2.1	Rapid urbanization and increasing demand for high-speed data to boost deployment	122
6.4.4.3	Japan	123
6.4.4.3.1	Technological advancements, dense urban areas, and focus on innovation to drive market	123
6.4.4.4	South Korea	123
6.4.4.4.1	Increasing demand for high-speed, reliable connectivity in densely populated cities to propel market	123
6.4.4.5	Rest of Asia Pacific	123
6.4.5	ROW	123
6.4.5.1	Macroeconomic outlook for RoW	125
6.4.5.2	South America	126
6.4.5.2.1	Rapid urbanization and increasing demand for high-speed connectivity to boost market	126
6.4.5.3	Middle East & Africa	126
6.4.5.3.1	Pressing need for high-speed connectivity in remote and underserved areas to propel market	126
6.4.5.3.2	GCC countries	126
6.4.5.3.3	Africa & Rest of Middle East	126
7	VISIBLE LIGHT COMMUNICATION (VLC)/ LIGHT FIDELITY (LI-FI) MARKET	127
7.1	VLC/LI-FI MARKET, BY COMPONENT	128
7.1.1	INTRODUCTION	128
7.1.2	LIGHT-EMITTING DIODES (LEDs)	130
7.1.2.1	Ability to create new form of high-speed optical wireless communication to drive market	130
7.1.2.2	Phosphorus LEDs	131
7.1.2.3	Red, green, and blue (RGB) LEDs	131
7.1.2.4	Resonant cavity LEDs (RCLEDs)	132
7.1.2.5	Organic LEDs (OLEDs)	132
7.1.2.6	Microlens LEDs	132
7.1.2.7	Near-infrared or ultraviolet LEDs	133
7.1.3	PHOTODETECTORS	134
7.1.3.1	Ability to transmit data at high speed to boost demand	134
7.1.3.2	Photodiode	134
7.1.3.3	Image sensor	134
7.1.4	MICROCONTROLLERS	136
7.1.4.1	Ability to simplify data processing to drive market	136
7.1.4.2	Modulator & demodulator	136
7.1.4.2.1	Modulation	136
7.1.4.2.1.1	Pulse width modulation (PWM)	136
7.1.4.2.1.2	Pulse position modulation (PPM)	136
7.1.4.2.1.3	Variable pulse position modulation (VPPM)	136
7.1.4.2.1.4	Pulse amplitude modulation (PAM)	137
7.1.4.2.1.5	Color shift keying (CSK)	137
7.1.4.2.1.6	Frequency shift keying (FSK)	137
7.1.4.2.1.7	Orthogonal frequency division multiplex (OFDM)	137
7.1.4.2.1.8	Spatial modulation (SM)	137
7.1.4.2.2	Demodulation	137
7.1.4.2.2.1	Diode detector	137
7.1.4.2.2.2	Synchronous detector	138
7.1.5	SOFTWARE	139

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7.1.5.1	Importance of software component for communicating in VLC systems to boost market	139
7.2	VLC/LI-FI MARKET, BY TRANSMISSION TYPE	140
7.2.1	INTRODUCTION	140
7.2.2	UNIDIRECTIONAL TRANSMISSION	142
7.2.2.1	Wide range of applications in broadcast services, streetlights, museums, smart stores, and indoor to propel market	142
7.2.3	BIDIRECTIONAL TRANSMISSION	142
7.2.3.1	Demand for high-speed internet connectivity between devices to drive market	142
7.3	VLC/LI-FI MARKET, BY APPLICATION	142
7.3.1	INTRODUCTION	142
7.3.2	SMART STORES	145
7.3.2.1	Growing use of VLC/Li-fi solutions to improve customer experience to fuel market growth	145
7.3.3	STREETLIGHTS	146
7.3.3.1	Ability to offers internet connectivity with installation of LED lights to drive market	146
?		
7.3.4	CONSUMER ELECTRONICS	148
7.3.4.1	Rising demand for interconnected electronic gadgets to propel market	148
7.3.4.2	Residential	150
7.3.4.3	Commercial	150
7.3.5	DEFENSE & SECURITY	151
7.3.5.1	Escalating demand for highly secure communication networks to drive market	151
7.3.6	VEHICLES & TRANSPORTATION	152
7.3.6.1	Growing adoption of VLC in intelligent transportation systems to drive market	152
7.3.6.2	Vehicle-to-vehicle communication	155
7.3.6.3	Location-based service	155
7.3.6.4	Intelligent transportation system	156
7.3.6.4.1	Advanced traffic management system	156
7.3.6.4.2	Advanced traveler information system	156
7.3.6.4.3	Vehicle-to-infrastructure communication	157
7.3.6.4.4	Advanced public transportation system	157
7.3.7	AVIATION	158
7.3.7.1	Rising preference for radiation-free communication in aircraft to fuel market	158
7.3.8	HOSPITALS	160
7.3.8.1	Increasing use of e-healthcare solutions to support market growth	160
7.3.8.2	Asset tracking	162
7.3.8.3	Patient tracking	162
7.3.8.4	Data monitoring	162
7.3.9	UNDERWATER COMMUNICATION	162
7.3.9.1	Urgent need to overcome limitations of communication systems to drive market	162
7.3.10	HAZARDOUS ENVIRONMENTS	164
7.3.10.1	Increasing demand for safer communication modes to propel market	164
7.3.11	OTHER VLC/LI-FI APPLICATIONS	166
7.3.11.1	Museums	168
7.3.11.2	Digital signages	168
7.3.11.3	Hotels & casinos	168

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7.3.11.4	Logistics	168
7.4	VLC/LI-FI MARKET, BY REGION	169
7.4.1	INTRODUCTION	169
7.4.2	NORTH AMERICA	171
7.4.2.1	Macroeconomic outlook for North America	173
7.4.2.2	US	173
7.4.2.2.1	Increasing demand for alternative communication technologies to accelerate growth	173
7.4.2.3	Canada	174
7.4.2.3.1	Commercial and industrial applications enhancing data transmission speeds and network reliability to fuel market	174
7.4.2.4	Mexico	174
7.4.2.4.1	Favorable economic conditions, expanding consumer base, government incentives, and technological advancements to drive market	174
7.4.3	EUROPE	175
7.4.3.1	Macroeconomic outlook for Europe	177
7.4.3.2	Germany	178
7.4.3.2.1	Automotive, manufacturing, and technology sectors to fuel market growth	178
7.4.3.3	France	178
7.4.3.3.1	Presence of prominent players to boost market growth	178
7.4.3.4	UK	179
7.4.3.4.1	Presence of leading research institutions and key market players to drive market	179
7.4.3.5	Rest of Europe	179
7.4.4	ASIA PACIFIC	180
7.4.4.1	Macroeconomic outlook for Asia Pacific	182
7.4.4.2	China	182
7.4.4.2.1	Rapid urbanization, technological advancements, and increasing demand for high-speed wireless connectivity to drive market	182
7.4.4.3	Japan	183
7.4.4.3.1	Demand for underwater communications and intelligent transportation systems to propel market	183
7.4.4.4	South Korea	183
7.4.4.4.1	Technological advancements, increased consumer demand, and evolving regulatory frameworks to drive market	183
7.4.4.5	Rest of Asia Pacific	184
7.4.5	ROW	184
7.4.5.1	Macroeconomic outlook for RoW	186
7.4.5.2	South America	186
7.4.5.2.1	Early adoption of VLC/Li-Fi technology in Brazil to drive market	186
7.4.5.3	Middle East & Africa	187
7.4.5.3.1	Strong need for reliable communication equipment from oil & gas industry to contribute to market growth	187
7.4.5.3.2	GCC countries	187
7.4.5.3.3	Africa & Rest of Middle East	187
8	COMPETITIVE LANDSCAPE	188
8.1	INTRODUCTION	188
8.2	KEY PLAYER STRATEGIES/RIGHT TO WIN, 2021-2023	188
8.3	REVENUE ANALYSIS, 2021-2023	190
8.4	MARKET SHARE ANALYSIS, 2023	190
8.5	COMPANY VALUATION AND FINANCIAL METRICS	194

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8.6	PRODUCT COMPARISON	195
8.7	COMPANY EVALUATION MATRIX: KEY PLAYERS, 2023	195
8.7.1	STARS	195
8.7.2	EMERGING LEADERS	195
8.7.3	PERVASIVE PLAYERS	196
8.7.4	PARTICIPANTS	196
8.7.5	COMPANY FOOTPRINT: KEY PLAYERS, 2023	197
8.7.5.1	Company footprint	197
8.7.5.2	Region footprint	198
8.7.5.3	Component footprint	199
8.7.5.4	Application footprint	200
8.8	COMPANY EVALUATION MATRIX: STARTUPS/SMES, 2023	201
8.8.1	PROGRESSIVE COMPANIES	201
8.8.2	RESPONSIVE COMPANIES	201
8.8.3	DYNAMIC COMPANIES	201
8.8.4	STARTING BLOCKS	201
8.8.5	COMPETITIVE BENCHMARKING: STARTUPS/SMES, 2023	203
8.8.5.1	Detailed list of key startups/SMEs	203
8.8.5.2	Competitive benchmarking of key startups/SMEs	204
8.9	COMPETITIVE SCENARIO	205
8.9.1	PRODUCT LAUNCHES	205
8.9.2	EXPANSIONS	205
9	COMPANY PROFILES	206
9.1	INTRODUCTION	206
9.2	KEY PLAYERS	206
9.2.1	SIGNIFY HOLDING	206
9.2.1.1	Business overview	206
9.2.1.2	Products/Solutions/Services offered	208
9.2.1.3	Recent developments	209
9.2.1.3.1	Deals	209
9.2.1.3.2	Expansions	209
9.2.1.4	MnM view	210
9.2.1.4.1	Right to win	210
9.2.1.4.2	Strategic choices	210
9.2.1.4.3	Weaknesses and competitive threats	210
9.2.2	LUCIBEL SA	211
9.2.2.1	Business overview	211
9.2.2.2	Products/Solutions/Services offered	213
9.2.2.3	Recent developments	214
9.2.2.3.1	Product launches	214
9.2.2.4	MnM view	214
9.2.2.4.1	Right to win	214
9.2.2.4.2	Strategic choices	214
9.2.2.4.3	Weaknesses and competitive threats	214
9.2.3	FSONA NETWORKS CORP.	215
9.2.3.1	Business overview	215
9.2.3.2	Products/Solutions/Services offered	215

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9.2.3.3	MnM view	217
9.2.3.3.1	Right to win	217
9.2.3.3.2	Strategic choices	217
9.2.3.3.3	Weaknesses and competitive threats	217
9.2.4	WIRELESS EXCELLENCE LIMITED	218
9.2.4.1	Business overview	218
9.2.4.2	Products/Solutions/Services offered	218
9.2.4.3	MnM view	219
9.2.4.3.1	Right to win	219
9.2.4.3.2	Strategic choices	219
9.2.4.3.3	Weaknesses and competitive threats	219
9.2.5	OLED COMM	220
9.2.5.1	Business overview	220
9.2.5.2	Products/Solutions/Services offered	220
9.2.5.3	Recent developments	221
9.2.5.3.1	Product launches	221
9.2.5.4	MnM view	222
9.2.5.4.1	Right to win	222
9.2.5.4.2	Strategic choices	222
9.2.5.4.3	Weaknesses and competitive threats	222
9.2.6	PURELIFE	223
9.2.6.1	Business overview	223
9.2.6.2	Products/Solutions/Services offered	223
9.2.6.3	Recent developments	225
9.2.6.3.1	Product launches	225
9.2.6.3.2	Deals	225
9.2.7	ACUITY BRANDS, INC.	226
9.2.7.1	Business overview	226
9.2.7.2	Products/Solutions/Services offered	227
9.2.7.3	Recent developments	228
9.2.7.3.1	Deals	228
9.2.7.3.2	Other developments	228
9.2.8	PANASONIC CORPORATION	229
9.2.8.1	Business overview	229
9.2.8.2	Products/Solutions/Services offered	230
9.2.9	FRAUNHOFER HHI	231
9.2.9.1	Business overview	231
9.2.9.2	Products/Solutions/Services offered	232
9.2.10	TRIMBLE HUNGARY KFT.	233
9.2.10.1	Business overview	233
9.2.10.2	Products/Solutions/Services offered	233
9.3	OTHER KEY PLAYERS	234
9.3.1	SC MOSTCOM	234
9.3.2	LVX SYSTEM	235
9.3.3	LIGHTBEE	236
9.3.4	VELMENNI	237

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9.3.5	VLNCOMM	238
9.3.6	IRNAS D.O.O.	239
9.3.7	NEXTLIFI	240
9.3.8	INFINITY TECHNOLOGY SERVICES LIMITED	241
9.3.9	AIRLINX COMMUNICATIONS, INC.	242
9.3.10	EC SYSTEM	243
9.3.11	CACI INTERNATIONAL INC	244
9.3.12	REDLINE INFRASTRUCTURE	245
9.3.13	GLOBAL LIFI TECH	246
9.3.14	LUMEFFICIENT	247
9.3.15	AXIOM OPTICS	248
10	APPENDIX	249
10.1	DISCUSSION GUIDE	249
10.2	KNOWLEDGESTORE: MARKETSANDMARKETS? SUBSCRIPTION PORTAL	252
10.3	CUSTOMIZATION OPTIONS	254
10.4	RELATED REPORTS	254
10.5	AUTHOR DETAILS	255

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