

Signal Generator Market - Growth, Trends, Covid-19 Impact, and Forecasts (2023 - 2028)

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Report description:

The signal generator market is expected to register a CAGR of 8.39% over the forecast period from 2022 to 2027. Signal generators are also called frequency synthesizers and are crucial instruments of almost all RF/microwave test -and -measurement systems. They are extensively used to test, repair, and troubleshoot various electronic devices and systems. Further, they are expected to be the fastest-growing segment in the global test-measurement market over the next few years. Signal generators have evolved from simple continuous-wave devices to advanced modulation devices with superior software control, modulation capabilities, and user interfaces. Improvements such as using new software techniques that enhance the linearity, bandwidth, and signal creation capabilities further increase the market share for signal generators.

Key Highlights

It is expected that the demand will be driven by wireless communications, aerospace and defense, automotive industries, and new technologies such as 5G. 5G R&D and design activity primarily impact demand for RF Generators. Continued development of wireless standards is further expected to push the need for this equipment over the forecast period. The industry also demands more complex waveforms, ranging from traditional analog modulation to complex vector formats such as IQ modulation. A shift in market requirements toward higher operating frequencies and wider modulation bandwidths is expected due to new technologies such as 5G and the next generation of wireless cellular technology.

The rapid development of standards such as wireless interoperability for microwave access (WiMAX), third-generation (3G) wireless, fourth-generation (4G) wireless, and wideband code-division multiple access (WCDMA) will aid in growth in the 5G domain. This would further increase the demand for signal generators. Testing is forecast to be the most widely used among all the applications. With the increased adoption of the Internet of Things (IoT), many devices are connected to the internet. While low latency is not provided for all applications and devices in the short term due to costs, the desire for low or no latency for several devices and applications exists and offers opportunities to test manufacturers, who then utilize signal generators.

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In February 2021, STI Vibration Monitoring Inc. launched its CMCP-TKSG field signal generator, a compact, portable device for vibration and displacement measurements. The CMCP-TKSG field signal generator is ideal for engineers and technicians who perform installation, maintenance, troubleshooting, and calibration verification on vibration monitoring systems. The battery-powered CMCP-TKSG simulates a fixed frequency acceleration, velocity or displacement signal, and DC voltages for gap/position monitors. The signal amplitude can be adjusted in 10 pre-defined increments or manually adjusted using the variable output setting.

Companies are also involved in partnerships. For instance, in November 2021, Lockheed Martin, a security and aerospace company, and Keysight Technologies Inc. announced a partnership to advance 5G to check the response and security of signal generators to support mission-critical communications for aerospace and defense applications.

Educating end users on interoperability and the need for specialized testing equipment is essential for market success. At present, the lack of end-user awareness of the need for proactive solutions limits the large-scale use of a signal generator. End-user inability to identify the appropriate answer from various identical systems limits adoption. The COVID-19 pandemic harmed the market, with customers' preferences moving toward essential items, dropping the demand for automobiles and electronics. The aerospace sector also witnessed a significant decline due to the closing of borders and the international travel ban. Thus, vendors supplying these industries reported a decline in revenue in the first quarter of 2020.

Signal Generator Market Trends

Automotive Expected to Hold Significant Share

The automotive industry is one of the driving forces for the market studied. The growing adoption of electric cars in emerging countries may support market growth over the forecast period. Due to the increased use of electronic components and sensors in vehicles, signal generators have become necessary for testing and troubleshooting sensors, solenoids, actuators, primary and secondary ignitions, and communication data streams. In the Automotive industry, signal generators are generally used to test in-car entertainment and driver assisting aids such as reverse parking sensors and remote keys.

In recent years, the demand for signal generators has increased due to testing requirements in the R&D of autonomous vehicle technologies and hybrid power-train systems. Global automakers increasingly use signal generators to ensure the safety, quality, and reliability of radars and sensors used in autonomous vehicle technologies. Signal generators test the communication link between critical devices such as radars, sensors, and the central computing unit. Advances in electrical and electronic vehicle technology, which occurred over recent years, made signal generators in testing, troubleshooting, and diagnosis almost mandatory.

The European Union has also deployed a new regulation, the emergency call (eCall) system, which offers fast assistance in the event of a car accident. Due to the above factor, all new vehicles sold in the European market after the first quarter of 2018 are necessitated to have an In-Vehicle System (IVS) supporting eCall. These systems are required to be appropriately tested before being sold. It is necessary to stimulate the IVS with standard conform GNSS signals in a laboratory to ensure repetitive and standard testing, where a signal generator plays a prominent role.

Also, to the new eCall regulations, there is a new standard to safeguard GNSS-based devices from the consequences of adjacent band interference. This standard was deployed by the European Telecommunications Standards Institute (ETSI). The standard ensures that any new or altered GNSS product launched in the European Union can withstand adjacent band interference and continue operating without interruption. These systems also need to be tested, generating demand for signal generators.

The development of autonomous cars has increased the demand for sensors and radar-based systems deployed for safe operation. These sensors and radars are based on an ultrasonic frequency with a spectrum range of around 40 kHz. With the increasing deployment of the in-car entertainment systems and growing investments in R&D, new automotive systems generate the demand for signal generators with frequencies of 50-100 MHz.

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Asia-Pacific Expected to Witness Significant Growth

The Asia-Pacific region is expected to witness significant growth in the signal generator market. The increase is due to the surging demand for signal generators, especially in nations, like China, India, and South Korea. The growing LTE adoption in Asia-Pacific is also driving the market's growth. Ericsson estimated that Asia-Pacific would account for approximately 3 billion LTE subscriptions in 2020, increasing from 300 million LTE subscriptions in 2019. There is a rising demand for signal generators among automotive and electronics manufacturers, helping the market grow across the region.

In October 2021, China Mobile selected the R&S SMM100A vector signal generator from Rohde & Schwarz to validate its 5G technology. The new signal source generates 5G signals in research applications to verify current and future 5G technologies. The project continues the long-term cooperation between China Mobile and Rohde & Schwarz China. Also, China Mobile has equipped its research lab with the R&S SMM100A vector signal generator for 5G test projects.

In January 2021, Rohde & Schwarz introduced the R&S SMM100A, the only vector signal generator with mmWave testing capabilities in its class. The instrument meets the rigorous expectations for generating digital signals for the most advanced wireless communication devices entering production and developing future products and technologies. The new R&S SMM100A vector signal generator meets this need, displaying excellent RF characteristics across the entire frequency range from 100 MHz to 44 GHz. It covers all the bands used by any wireless standards, including LTE and 5G NR, and the latest WLAN standards, Wi-Fi 6, and Wi-Fi 6E (up to 7.125 GHz).

In January 2022, Anritsu Corporation announced the launch of its new Interference Waveform Pattern for 5G NR Receiver Test MX371055A and Interference Waveform Pattern for LTE Receiver Test MX371054A software in Australia. These tools generate 3GPP interference waveform patterns for testing the receiver sensitivity and throughput of 5G and LTE user equipment (UE) and modules using the Signal Generator MG3710E. Installing these tools in the MG3710E combined with the Radio Communication Test Station MT8000A and Radio Communication Analyzer MT8821C facilitates easy interference evaluation tests required by the 3GPP RF Compliance Test.

Signal Generator Market Competitor Analysis

The Signal Generator Market is quite fragmented as many companies occupy a significant share in the market. Increased R&D efforts, new technologies, and increased adoption of signal generators provide lucrative opportunities in the spectrum analyzer market. Overall, the competitive rivalry among the existing competitors is high.

May 2021 - LYNX Technik, a modular signal generating and processing interfaces provider, announced its latest greenMachine general-purpose hardware device, Callisto+. Callisto+ is 2x 3G capable and complements the existing greenMachine Titan hardware (4K capable) with the same feature set and performance. Callisto+ provides users with a more cost-effective, entry-level signal processing solution when 4K is unnecessary or required.

May 2021 - Keysight Technologies Inc., a technology firm that delivers advanced design and validation solutions to accelerate innovation to connect and secure the world, announced the launch of the Keysight N9042B UXA X-Series signal analyzer solution, which enables customers to test the performance of millimeter-wave (mmWave) innovations in aerospace and defense and satellite communications.

June 2021 - Wireless Telecom Group Inc. announced that its Boonton brand had entered the signal generation market by introducing the SGX1000 RF Signal Generator, a new series of instruments that combine high-performance signal generation capabilities with an intuitive user interface. The SGX1000 is built on the latest Boonton instrument platform that provides an easy-to-use modern interface in a compact form and offers high-performance signal generation within an affordable price range for general use in semiconductors, aerospace, medical, military, and communications industries.

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