

TAIYO YUDEN Provides Reliable Filtering in Small Cell 5G Base Stations

Wireless communications around the world have been growing at a breakneck speed. Used in anything from mobile phones, personal computers, industrial equipment to Internet of Things (IoT) devices, the volume of data transmitted and received at any instance is prodigious. Moreover, the 5G (5th generation) wireless standard currently rolling out around the globe promises more network capacity, multi-GB peak data speeds, higher reliability, and lower latency.

Small Cell Base Stations Aid Faster 5G Adoption

Many telecommunications providers in developed countries, such as the U.S., are leveraging small cell technology to provide 5G coverage to customers over limited geographical areas. Small cells utilize low-power and short-range wireless systems, also known as base stations or transceivers, for ultra high-speed, wideband data transmission. Nonetheless, small cell base stations use conventional wireless technologies, including Multiple-Input, Multiple-Output (MIMO) and beamforming - ranging anywhere from 10m to a few kilometers. Small cell transceivers are typically wall-mounted indoors or outdoors and use fiber, wired, or radio connections. They require less hardware and reduce design complexity and costs in many applications.

The Role of RF Filtering in 5G Wireless Connectivity

Engineers designing small cell base stations require electronic devices for frequency filtering, called bandpass filters, to minimize interference in 5G communications. By design, a bandpass filter allows frequencies within



a specific range to pass through while attenuating any frequency that falls outside it.

Bandpass filters are viable in a wide range of wireless receivers and transmitters. In receivers, a bandpass filter allows signals within a frequency range to be received and decoded, all the while increasing the sensitivity (signal-to-noise ratio). In transmitters, bandpass filters restrict the output signal bandwidth to the specified range to ensure that signals get transmitted in the correct form at the right speed. Ceramic bandpass filters utilize the dielectric effect of the material to achieve resonance. It is easier to miniaturize filters for 5G due to higher RF. 5G's small cells (<1w) require less power than their conventional counterparts (e.g., ceramic dielectric block filters, ceramic cavity filters, or metal cavity filters), leading to less expensive, smaller footprints.

TAIYO YUDEN Solutions for Seamless Connectivity in 5G Applications

TAIYO YUDEN's multilayer ceramic devices (LTCC) are ideal for today's High Power User Equipment (HPUE) and adopted in major IC platform designs worldwide. These products have a broad range of passband frequencies and come in small-footprint packaging for greater board savings. They are suitable for 5G NR (New Radio) with wide bandwidth support for 5G NR Sub-6GHz (TDD), providing a multiplexer to minimize the number of antennas required. As RoHS and REACH compliant, TAIYO YUDEN's LTCC filters ensure high reliability and stable performance over a wide range of operating temperatures (-40 to +85 °C) - perfect for seamless connectivity in 5G applications of the future.