

5 aprile - Antenna Array for Millimeter Wave/Microwave Communications

Abstract: 5G technology is coming and it is expected to provide data to a larger number of users, with higher data rates with respect to the previous generations. In order to improve data rates it is necessary to increase the spectral efficiency of the system, but also the supported bandwidth. This directs the view to the millimeter wave bands (20-170 GHz), where it is possible to find available bandwidth in the order of a few GHz.

Millimeter wave bands bring new challenges because of high losses due to free space propagation, blockage, rain and atmospheric attenuation. However, since the wavelengths are in the order of millimeters, the aforementioned impairments can be overcome with the use of arrays of large number of antennas with beam-steering and beam-forming capabilities. For these reasons the antenna plays an important role in the performance of near-future wireless networks. In 5G networks the use of antenna arrays is not only foreseen in mobile wireless access, but also in wireless backhaul and fixed wireless access.

So far, this research has been focused on phased array antennas (PAA) for point-to-point (P2P) communications, but it is expected to extend to point-to-multipoint communications for fixed wireless access (FWA) services. The challenges in the PAAs for P2P are based on maintaining the same system gain while adding beam-steering capabilities with a lower profile antenna. A feasibility study was conducted on the use of PAA for SIAE Microelettronica's millimeter wave equipment at 26 GHz.