Although 4G technology has been meeting the growing consumer appetite for data, the transition to 5G technology promises benefits like low latency of around 1 millisecond, peak download rates of 10 Gbps, high data carrying capacity (about a thousand times more than 4G) and low network energy consumption (about 90 per cent less than 4G). These are emerging as the key drivers for operators to move towards 5G across the globe.

Telecom operators in India too are gearing up for the shift to 5G. Operators like Bharti Airtel and Bharat Sanchar Nigam Limited are collaborating with equipment vendor Nokia to accelerate the development of a 5G ecosystem in the country.

However, the deployment of 5G technology is expected to exert additional pressure on the existing backhaul network of operators. This is because the technology will have specific requirements from backhaul networks, in terms of capacity, latency and availability.

Backhaul requirements for 5G

The eventual migration of networks from 4G to 5G will result in certain changes, which, in turn, will have a significant impact on operators' existing mobile backhaul networks. Since 5G networks will require a fifteen- to twentyfold increase in capacity, it will change the sizing requirements of backhaul networks and drive dense 10G and 100G requirements close to the cell site.

Further, it is estimated that the accuracy requirements of 5G will be three times more stringent than those of 4G Advanced networks. Therefore, the underlying backhaul network may have to undergo a step change in performance to support these requirements for 5G, specifically in the areas of frequency synchronisation, phase synchronisation and latency performance.

In addition, with the growing importance of backhaul networks for 5G technology, the performance monitoring capabilities of these networks is going to become critical. This will hold true for operators providing backhaul connections themselves as also in scenarios where a

third-party operator provides some or the entire backhaul connection. Therefore, the backhaul networks of telecom operators are crucial components for the development of a 5G ecosystem in the country.

Current scenario

At present, the majority of telecom tower sites in India use microwave radio technology for backhauling data to their core network. While microwave has been able to provide speeds of up to 1 Gbps as a result of greater spectrum availability, it will not be able to support speeds of up to 10 Gbps as promised by 5G technology. Further, with the large-scale adoption of 3G and 4G technologies, microwave backhaul has become congested and overloaded. Therefore, as the industry witnesses greater demand for capacity and faster download speeds, microwave technology will prove to be inadequate.

In such a scenario, it is important that operators explore more efficient backhaul technologies to develop a more robust infrastructure for the deployment of 5G services. In India, a number of operators have started laying fibre across their backhaul networks. However, the deployment of fibre in backhaul networks is not enough to support the capacity requirements of 5G technology. The level of fiberisation in India is extremely low as compared to the developed countries. According to market reports, the number of fiberised sites stood at only 20 per cent of the total tower sites in 2016 as compared to 65-80 per cent in countries like the US, China, Japan and Korea. In a recent poll conducted by Light Reading, the lack of fibre backhaul was the biggest challenge faced by operators across the globe while implementing 5G technology.

Future plans

The Indian market has taken early steps to create an ecosystem that is conducive to 5G deployment. However, a lot still needs to be done in terms of developing backhaul networks to support the technology. According to industry experts, 5G operates in spectrum bands with frequencies of more than 6,000 MHz. Although spectrum bands between 700 MHz and 2.6 GHz are available for mobile services, upgrading backhaul networks to support 5G in the respective spectrum bands will require significant investments.

With the stage set for the transition from 4G to 5G, operators in India will have to rework their

backhaul strategy to ride the 5G wave.

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