

one of the most important features required by the industry with the goal to increase peak data rates. The real driving force behind CA, however, is to obtain a much more efficient use of the fragmented spectrum allocations available to network operators. The push of network operators to deploy these new features leads to high-workload in the wireless industry, especially on the chipset and handset side, including a strong demand for test solutions. Another trend is intelligent traffic offloading, with exponential increase of data traffic operators running into capacity issues. The addressable solution is a smart offload of data traffic from LTE to WiFi to address capacity issues efficiently. Different modus operandi are currently under discussion, using slightly different technical approaches, which leads to different requirements in terms of test and measurement solutions.

The wireless market is one area where customers can benefit from a flexible and scalable system. Here, the standards are constantly evolving and vendors are aggressively helping their customers keep pace with these standards through measurement applications that can be supported using a customer's existing hardware solutions. Customers working on digital buses like USB or PCIe can also benefit by upgrading their existing instrumentation for new standards like the change from USB 2.0 to USB 3.0 or as they start working on other bus systems. The unlockable element is typically software. MDO3000s, for example, ship as standard with the ability to be upgraded using software keys. Measurement applications are usually software upgrades, while performance upgrades are either hardware or software.

Clearly, there are limits to the cost that manufacturers can build into the equipment to provide future upgrade opportunities. A lot of extra cost is not acceptable as products need to be offered at competitive prices. Some capability in the form of connectors has been built in anticipation of users finding value in the value-added functions.

Another key market driver is the rollout of VoLTE across the world. This creates demand for sophisticated testing and monitoring equipment that assesses network quality and the ease with which mobile devices are handed over the heterogeneous network. Although VoLTE would boost cost savings among network operators, the heterogeneous nature of the network remains a challenge, due to which the demand for VoLTE-specific testing and monitoring equipment is expected to increase.

From the infrastructure perspective, network operators need to make sure that their network is interoperable with currently available 3G & 2G networks and be able to do seamless handover from one tech-



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A need has always been there to move on to a telecom technology wherein data transfer becomes easy. This has become more and more a necessity in view of social, economic, and other changes taking place in the area of governance so as to make the financial benefits reach to the lowest strata of the society.

In the area of data transfer, not only mobility is considered an important requirement, speed of data transfer has also acquired equal importance. Even in a developing country like India use of smart phones is growing at fast pace and its presence can be noticed in the hands of people who may have studied only upto school final level. Time is not far when it will be forgotten that phones are for voice communication and text messaging only. Everything on the move is the call of the day, and the advent of 4G will pave the way with proper speed and accuracy for this.

But again large volume of data transfer which includes video as well cannot be through smart phones alone as a lot of data transfer will be taking place in households or offices. Indoor data transfer through wireless means has been facing a big bottleneck as quality of signal deteriorates drastically within the four walls. Further in the dense urban environment, installation of BTSs is another problem. In a country like India where Internet users are still less, growth is around 10–20 percent on YoY basis, which is proving big challenges and bottlenecks. This is where 4G technology is going to bring ease-of-transfer of big volume of data on very high speed.

4G technology takes care of these problems wherein connectivity through OFC is established in any building and one or more pico cells installed within the complex or buildings which work as dedicated *base transceiver stations* for any complex or house hold. The network access becomes fault-free on a very high speed in the complex no matter whether a mobile device, a PC, or a fixed line telephone device is used. Hazards of radiation through such pico cells are non-existent.

Thus, 4G can work efficiently outdoor where voice communication and data transfer can be taken care of either by 3G or 4G and within the complex 4G will provide seamless voice and data communication overcoming the entire bottleneck presently being felt. However, due to some challenges in the way, rollout of 4G technology is very slow in India. Only two operators viz. Airtel and Reliance Jio have started their operation in few cities. These challenges are mostly of financial nature as establishing OFC network to the household is a costly affair though OFC in itself is not costly. Marketing prospect of OFC active and passive products will see a big boom in the time to come in India.