the (spectral) advantages that these new waveform types show in typical simulations and make them also visible in reality. The vendor continues to optimize its 5G test solutions for this and all other purposes currently being considered for the fifth generation of wireless communications.

Keysight Technologies' measurement and application experts are working with industry experts to anticipate the growing complexities of 5G so the industry can accelerate these new technologies. The company provides insight into the 5G research with a full range of simulation and measurement tools. Vector network analyzers allow in-depth design and test of millimeter-wave components such as the antenna array elements needed for beam-steering and MIMO. SystemVue, recently introduced, is a system-level design automation environment that accelerates

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4G network has started in India. This is especially impacting mobile users who are enjoying faster access to net. But real challenge still persists. Use of net on mobile at a faster speed is able to fulfill the demand of pleasure seekers more than those who need this service for institutional use where flow of information relating to business transactions, governance, public services, medical practice, etc. is required. There is no denying the fact that mobile devices and related broadband connectivity continue to be more and more embedded in the fabric of society today, and they are key in driving the momentum around some key trends such as video streaming, mobile payments, etc. But services with wireless connectivity deteriorate with the increase in the number of users in peak hours. In any case, improved connectivity and speed has propelled the demand and expectation in all sectors.

In Indian scenario, this requires addressing requirement of rural sector as well as urban areas. Whereas rural sector has to be provided this facility more for community uses, in urban areas this is required more for individual and institutions all use – be it government, business, educational institutions, or individual households.

Rural area is still a virgin area where emphasis is to provide broadband connectivity to every Panchayat. The government of India has already made budgetary provision for this and the work is being executed through BBNL. Increased demand in urban area has exposed bottlenecks in the communications infrastructure. Service providers are also well aware of the limit of net connectivity through wireless media. It is more than clear that bulk users of data need to be provided broadband with higher bandwidth as they cannot be served with wireless connectivity to the fullest extent.

Therefore, there has to be fiber connectivity up to end-user's premises. All service providers are vying for their space in the market against various types of challenges coming from overcrowded localities in Indian cities. Against all these odds, service providers are investing and working on FTTH which will ultimately provide viable solutions for the users and provide speed much higher than 4G or 5G.

All said and done, Savitri Telecom Services is eying the opportunities coming its way for sale of OFC T&M equipment.

Ajay Gulati
SVP-Sales & Marketing,
Livingston

Encouraged by programs like *Digital India*, the rollout of LTE technology is now taking place at an accelerated rate. Figures from IDC published earlier this year have proclaimed India as the fastest growing smartphone market in the whole of the Asia-Pacific region – with 28.8 percent growth during 2015 leading to annual handset shipments of 103.6 million units. The analyst firm also expects the number of LTE subscribers in India to more than double from 5.8 million at the end of 2015 to over 14 million before this year draws to a close. BoFA ML has predicted that by 2018, this total will have reached 90 million.

In order to test the performance of LTE receivers, it is essential to have a suitable vector signal generator to create the correctly modulated signal. The latest generators, such as the Keysight N5182A (which covers a frequency range of 100 kHz to 6 GHz), can produce the desired signals using built-in modulation software. If it is necessary to examine multipath signals, then a product such as the Rohde & Schwarz SMW200A can be employed to generate multiple simultaneous signal waveforms that emulate real-world environments. This unit supports all key MIMO propagation modes, including 3×3, 4×4, 8×4, 4×8, and 4×2×2.

For analyzing the signal integrity of modulated RF signals, as well as the converted high-speed serial data derived from this, a high-bandwidth oscilloscope is needed to deal with the elevated data rates that are mandated by LTE. One popular example is the 4-channel MSO72004C from Tektronix (which has a bandwidth that reaches 20 GHz and supports a 50G samples/s sample rate). Validating the signal paths requires advanced network analyzer solutions, like the Keysight's E5071C (with a maximum frequency of 20 GHz and a 123 dB dynamic range) or the Rohde & Schwarz ZVA24 (which has a 24 GHz maximum frequency and a 135 dB dynamic range).

To better address the needs of engineers involved in the implementation of LTE network infrastructure, the Microlease Group (which includes Livingston India) offers a comprehensive test portfolio dedicated specifically to such activities. These items (including the ones already mentioned) are available in a variety of different rental packages to suit customers' particular financial and logistical requirements.