The wireless boom, coupled with increasing digital convergence, is driving telecom growth in India. It has opened up several opportunities for all stakeholders in the telecom value chain. The communication testing and measurement (T&M) segment, for example, has evolved significantly in recent years mainly due to the introduction of several advanced technologies. T&M products and solutions are required throughout the life cycle of a communication technology, beginning from the design and development stage to network deployment and service assurance.

The evolution in technology standards is driving a significant shift in T&M offerings. The new wireless networks are complex and prone to impairment, and thus call for advanced testing techniques. Further, the market is increasingly adopting a software-defined approach to instrumentation. This will allow speedy upgradation of solutions at a much lower cost, without replacing the existing hardware set-up. Going forward, the industry will require advanced, modular and future-proof testing solutions that have advanced features and can ensure round-the-clock monitoring of network performance.

A look at the emerging trends and key growth drivers in the Indian T&M space…

T&M for improving QoS

Given the increasing competition in the Indian telecom market, an operator's success depends on two factors – enhanced user experience and high quality of service (QoS). In this scenario, T&M has become critical for ensuring QoS. Further, operators are adopting T&M solutions to reduce call drop instances and optimise voice networks. On the data front, the launch of 3G and 4G services has created a demand for solutions that can measure the performance of such networks. In fact, this is emerging as a critical test area, given the spate of data applications being introduced in the market on a daily basis. These are real-time services, and are highly intolerant of delays and packet loss in the network. Therefore, they require specialised T&M solutions. Recently, Bharti Airtel got a T&M vendor on board to assess and analyse 4G and 3G smartphone performance on its live network. The aim was to evaluate variation in the key performance indicators impacting user experience in various smartphone models. The results will help the operator develop a process for smartphone qualification for its services, and smartphone manufacturers to improve their future products.

Growing demand for low-cost solutions

Indian operators have always struggled to offer the latest technologies at the most affordable prices. Rock-bottom ARPUs, huge capex and high spectrum acquisition cost leave little scope for investment in other areas such as T&M. As a result, the operators often deploy passable solutions with limited features to save costs. In fact, the price consciousness of operators has pushed the rental T&M market in a big way. In recent years, the use of rental T&M equipment has helped operators keep pace with the evolving technology standards, besides cutting costs. The rental T&M market has witnessed significant uptake as it allows the flexibility to switch to the latest equipment without incurring significant investment.

Demand for fibre optic testing

The telecom industry is pushing fibre deployment in a big way, to ensure high speed last-mile broadband connectivity and meet the backhaul needs of next-generation technologies such as 4G. Fibre is also witnessing increasing adoption due to cable TV digitisation. These factors are creating a high demand for fibre optic testers. Further, the government's BharatNet project, which aims to offer fibre-based broadband connectivity to 250,000 gram panchayats in the country, has opened up opportunities for T&M vendors that provide solutions for fibre testing. The network has already been rolled out in more than half of the targeted gram panchayats, and is expected to be implemented in the remaining panchayats by mid-2019. The government is also steadily progressing with its Network for Spectrum project for the defence sector, which will create a significant demand for fibre testers. The optic fibre cable (OFC) testing equipment is expected to witness significant uptake till 2023, mainly on the back of these projects and the industry's growing uptake of fibre solutions.

Focus on equipment compatible with multiple technologies

Currently, multiple technology standards, namely 2G, 3G and long term evolution (LTE), coexist in the Indian telecom space. While it took several years for the country to transition from 2G to 3G, it transitioned from 3G to 4G fairly quickly. As a result of these evolving standards, the product life cycle of T&M equipment has reduced considerably. There is a constant need for new equipment in order to keep pace with the changing standards. Therefore, T&M vendors need to focus on developing solutions that are compatible with multiple technologies. Intelligent

T&M solutions will be required to address issues arising due to the various kinds of traffic flowing through the same channel.

Growing demand for in-building solutions testing

In-building wireless solutions such as small cells are gaining traction as operators look to offer seamless connectivity to their users. The testing of in-building solutions is more complex than that of outdoor/macro networks as the potential sources of interference are more in the case of the former. Further, the backhauling required for small cells is often non-deterministic in nature. The demand for testing solutions for small cells will further increase as operators roll out voice over LTE services. While this presents an opportunity for T&M vendors, it would require them to fine-tune their existing equipment, which is currently being used to test macro networks. This may prove to be both expensive and cumbersome for a small cell environment.

Rise of cloud testing

Cloud-based software testing solutions, which create environments emulating real-time situations, provide several benefits to operators. One, such solutions have limited capex and opex requirements. This is because cloud-based testing does not require a physical in-house testing set-up. Further, cloud-based testing solutions utilise various automation and orchestration features, bringing down the cost of IT operations significantly. Cloud-based testing is often provided as-a-service so that enterprises need to pay only for the hardware, software and tools that are actually used. Second, these solutions offer a higher degree of accuracy, flexibility and agility as compared to the traditional solutions, thus allowing companies to use modelling tools and work in live environments. Third, cloud solutions are scalable and can be used to address the growing infrastructure requirements in the future. Unlike a traditional testing set-up, a cloud-based testing laboratory can provide as many servers as required and offer different testing environments. These testing environments can be simulated using various configurations, browsers and operating systems, without impacting the production environment. However, enterprises opting for cloud-based testing have concerns regarding data loss and security breach. Further, performance testing on cloud is different from that on traditional applications. While all the basic performance metrics to be measured such as system throughput and latency remain the same, cloud makes the entire set-up a lot more complicated due to the presence of various virtual machines.

Testing for NFV

Network function virtualisation (NFV) testing can be accomplished through both physical as well as virtual solutions. While physical solutions are typically deployed to measure traffic and evaluate congestion in networks, virtual solutions are used for testing voice and video quality, and transaction latency. Virtual solutions have an edge over physical solutions as they help improve the performance of applications, reduce the time-to-market and bring down the capex and opex associated with traditional testing equipment. The currently available NFV test functions are used in the areas of configuration, quality of experience and assurance. In a hardware set-up, virtual testing can clearly reduce the requirement of technicians. Despite these benefits, the uptake of NFV testing solutions has been limited so far. Operators are confident when operating the physical testing equipment, and are still cautious about making a shift to virtualised software as they do not want to impact the quality of service delivered to end-users.

IoT-driven testing needs

The growing adoption of the internet of things (IoT) will significantly increase the number of connected devices. It has been estimated that by 2021, the number of connected devices will far exceed the number of people in the world. While all such devices would have to be tested, there is no single product that can test all the new IoT product design capabilities. Further, as major operators are looking to commercialise narrowband IoT (NB-IoT), testing will play a vital role in this process. It will ensure the delivery of high quality NB-IoT services, while mitigating interference from other devices. Also, the growing instances of cybersecurity attacks have brought the vulnerabilities of IoT-enabled systems to the limelight. Operators are now demanding T&M solutions that not only measure/validate their networks and systems from a performance perspective, but also protect against any future hacking attacks. To this end, T&M vendors are revisiting their strategies as testing next-generation firewalls to ensure network resiliency will not be enough. Modern cyber security attacks are much more complex and can cause irreversible damage, given the sophistication of data that gets exchanged between devices today.

Focus on 5G

The emergence of 5G technology will be the key growth driver for the T&M market. Currently, all key operators in the Indian telecom sector are devising strategies to develop 5G frameworks. They will enter the trial stage soon, thus fuelling the demand for high-end T&M equipment. Further, significant research and development (R&D) needs to be done to optimise and verify user/network equipment ahead of the commercial launch of the services. R&D presents a huge

challenge for T&M vendors as they will have to be well equipped to manage different use cases and architectures associated with 5G technology.

Need for a thriving local T&M market

The Indian telecom T&M space is mostly dominated by the local subsidiaries of top multinational companies (MNCs), with only a handful of home-grown T&M vendors. As R&D budgets of the latter are often small as compared to MNCs, introducing products at competitive costs is a challenge. Further, the rate of technology obsolescence is very high and new technologies are way more complex than their predecessors. Margins also get affected due to the import of Chinese products.

Conclusion

Going forward, the technology shift in the Indian telecom space will be the biggest demand driver for T&M equipment. The industry has already started the groundwork for introducing 5G technology in the country. To gain a competitive edge, T&M players in India will have to introduce innovative and cost-effective solutions that have the ability to address the complexities of emerging technologies while maintaining compatibility with existing standards. Meanwhile, operators should start looking at T&M expenditure as an investment that will help them up their game through assured quality to users.