Rapid growth in the telecommunications industry has increased the growth prospects of the test and measurement (T&M) industry. T&M equipment today is extensively being used by network operators to deliver high quality service at each stage of the network life cycle – production, research and development (R&D), and service assurance. Mobile equipment manufacturers, particularly handset makers, are significantly investing in T&M solutions required at the design, development, verification, and maintenance and repair stages.

In recent years, the T&M market for telecom has received a significant boost world over, with the launch of 4G/long term evolution (LTE) services. As a growing number of operators are looking to join the 4G bandwagon, they have partnered with T&M vendors to test their networks for service quality and experience.

The trend is mirrored in the Indian telecom industry as well, where the majority of operators have initiated 4G service launches, post the successful testing of their networks through partnerships with T&M vendors. For instance, Bharti Airtel and Reliance Jio Infocomm Limited (RJIL) partnered with Keysight Technologies for 4G network testing in September 2015. Prior to this, RJIL had used the vendor's LTE conformance test system to ensure the conformity of its devices and dongles with the 3GPP telecom standards before deployment in the network. Later, RJIL also invested in a 4G LTE device manufacturing test solution to independently test third-party devices before mass roll-out. Meanwhile, Bharti Airtel has set up a 4G technology test lab in Gurgaon called the Centre of Excellence. In the past, Spirent Communications have partnered with Bharat Sanchar Nigam Limited, Tata Teleservices Limited, Reliance Communications and Bharti Airtel, among others.

At present, the T&M telecom market in India is being served by several global and local vendors, which help the industry in drive testing in live networks; proof-of-concept lab testing; wireless and wireline network infrastructure testing; and voice, data and video quality testing on smartphones. The T&M equipment allows service providers to test their networks on parameters such as sensitivity, power, noise, transmission loss, load conditions and service quality. Vendor-operator partnerships also often include training operators on wireless domains and gear testing during installation and deployment.

Key trends and growth drivers

Launch of VoLTE: With 4G gaining traction, operators are now also keen to offer voice services over these networks. Deploying voice over LTE (VoLTE) requires several rounds of testing in terms of data migration to the next generation of network. Testing of end-to-end integrated measurement system signalling over the LTE radio access network is a key requirement to offer seamless service.

Evolving device ecosystem: With the growing uptake of smart devices, the terminal device test segment will see high demand. The assembly and end-to-end manufacturing of smartphones and other terminal devices create several testing requirements. Meanwhile, the increasing complexity of terminal devices and over-the-top applications will essentially drive the demand for wireless test equipment at the R&D and manufacturing stages. At present, leading handset manufacturers such as Apple and Samsung are significantly investing in T&M solutions required at the design, development, verification and repair stages.

Need for better QoS: In recent years, quality of service (QoS) has become an extremely crucial parameter that helps determine the customer churn of an operator. With subscribers demanding better coverage, good voice quality, better data performance and best uptime, QoS is clearly emerging as a key driver for service uptake over tariffs. This puts pressure on network operators to engage in continuous and reliable testing at all stages of the network life cycle.

Growing popularity of connected devices: The concept of connected devices is gaining traction as the internet of things (IoT) is becoming a widely accepted phenomenon. In such a scenario, network operators will require T&M solutions that can validate the performance of every constituent in the IoT value chain. Enterprises will have to continuously ensure that the entire machine-to-machine ecosystem remains resilient across every industry vertical where IoT finds a use case.

Automation in test equipment: In recent times, end-users, especially large enterprises, have started showing a preference for automated testing equipment over conventional stand-alone equipment. Automation in highly complex and integrated networks substantially brings down the overall effort put into testing. Automated test equipment can perform multifunctional operations simultaneously, thereby reducing the time for product delivery and lowering operational costs. By end-2020, automated fibre optic test equipment is anticipated to see high demand, thus boosting the T&M market.

Equipment compatibility: The continuously evolving technology space has shortened the T&M product life cycle. However, it is extremely challenging for vendors to introduce new equipment in a short span of time. This has created a need for T&M vendors to develop new equipment, which is capable of testing new technologies and is also compatible with old technologies. Field instruments are more rugged now and they support multiple interfaces and technologies. The all-in-one box for production testing is also seeing increased interest as it saves space, time and cost during production.

Software-defined testing: The industry is witnessing a transition from vendor-defined functionality based instruments to software-defined architecture. This allows user-defined testing in real time. Developers and integrators today are building on standard software platforms and using commercial off-the-shelf technology to extend the functionality of complex hardware to applications.

Rental T&M equipment: Renting T&M equipment has become a popular trend in the past couple of years. Rental equipment is a good choice for projects of shorter duration. However, it is the rapidly changing technology standards that are the key driving force behind this trend. With everything in a constant state of evolution, there is always a risk of purchased equipment becoming obsolete. Therefore, rental presents an attractive alternative to direct purchase.

Trend of miniaturisation: Companies are increasingly demanding miniaturised T&M equipment, which is flexible and easy to use. The fast growth of the consumer electronics industry is leading to the development of small-sized electronic devices for which miniaturised T&M equipment is required.

Opportunities from SDN/NFV: Software-defined networking (SDN) testing is imperative to meet the demands for accessibility, connectivity, server processing, as well as for new applications and services. SDN vendors have now introduced comprehensive solutions that help conform to standards and undertake functional and performance testing. Meanwhile, virtual test assets can play an important role even in hardware testing by reducing the number of technicians required to conduct tests. According to experts, such network functions virtualisation (NFV) testing solutions can benefit operators that are considering deploying NFV.

Emergence of cloud-based testing: Cloud-based software testing is an upcoming domain in the T&M industry. These testing solutions are gaining traction as they allow organisations to develop and maintain several in-house testing environments that simulate real-time situations,

thereby providing an insight into the quality of applications. However, organisations opting for cloud-based testing face two key challenges – security concerns and lack of standards. Since the applications and data are stored by third-party vendors, developers have concerns regarding data loss, phishing and data integrity under such testing.

Challenges

Given the rapidly evolving technologies and standards, customers are demanding solutions with reduced testing time as well as lower costs. This translates into a challenge for testing equipment vendors, who have to continuously innovate and modify their solutions to offer them at competitive prices without compromising on their features. India being a highly price-sensitive market, offering affordable solutions becomes very challenging at times and also leads to reduced margins.

Also, the manufacturing ecosystem for T&M products is still underdeveloped and fraught with challenges. The two important issues in local manufacturing are inability to rapidly prototype any hardware start-up and the lack of testing skills.

Outlook

With the digital world becoming a reality and the increasing complexity of smart devices, networks and applications, there will be a need for T&M solutions going forward. The fusion of technologies such as carrier aggregation, multiple-input and multiple-output, LTE, and Wi-Fi offload will pose challenges and also create opportunities for T&M vendors.

Meanwhile, the increased demand for faster and reliable devices and networks, will see the Indian T&M equipment market growing at a compound annual growth rate of about 13.24 per cent between 2015 and 2019. Advanced technologies such as 4G and later 5G, increasing smartphone penetration, evolving small cell ecosystem and the industry’s growing alignment with IoT are expected to drive the T&M market in the next five years. The key areas that will need testing solutions include SDN, fibre management, high grit chips, system-on-a chip, and space communications.

Moreover, with the government's Make in India initiative, T&M vendors are expected to set up manufacturing facilities in the country so as to benefit from low-cost labour and the high demand for such equipment.

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