Technological and product innovation in the telecom space provides significant opportunities for the test and measurement (T&M) industry. In recent years, the demand for T&M equipment and solutions in the Indian telecom sector has been largely driven by 3G services, and growing operator focus on quality of service (QoS) and network uptime. Further, with data emerging as the future growth driver, testing has become important for improving customer experience. Factors such as service speed, assurance and quality are now influencing the end-user's loyalty towards an operator and services such as mobile number portability have facilitated the process of shifting from one operator to another. Consequently, subscriber retention has become the key focus area for operators and they are deploying T&M solutions for testing and detailed troubleshooting on the network. Further, the launch of long term evolution (LTE)-based 4G services will drive the demand for advanced T&M solutions.

tele.net takes a look at the key trends, challenges and opportunities in the telecom T&M segment…

Current status

The past one year has been a challenging one for the Indian telecom industry, which is reflected in the demand for telecom T&M equipment and solutions. During 2012, T&M procurements by telecom companies were subdued. Cancellation of 2G licences, low subscriber growth and regulatory uncertainty have been the key factors that prevented operators from earmarking significant capex towards research and development (R&D) and testing new solutions/services.

The technology mix of T&M solutions has also undergone a change during the past two years. While earlier 2G and 3G testing equipment constituted the majority of service providers' procurements, the demand for LTE testing equipment has also been rising. However, 4G testing equipment will gain higher adoption after these services are commercially launched by all service providers.

From a supply point of view, the telecom T&M manufacturing ecosystem has also undergone a change. Earlier, most of the Indian core telecom equipment companies largely operated as resellers of products manufactured by international companies. Domestic companies acted as Indian subsidiaries or local partners of global players. However, the past few decades have witnessed the emergence of domestic telecom equipment companies such as Tejas Networks, Aishwarya Telecom, VMC Systems and TTL Technologies. These companies offer affordable solutions to operators as compared to global vendors. Further, many domestic companies have

started exporting their manufactured solutions and equipment.

Industry requirements

Each segment within the telecom industry has specific T&M requirements. Companies involved in telecom R&D work on cutting-edge technologies and they need T&M solutions to ensure the future-readiness of these technologies. Companies involved in product development need to test their products to ensure shorter time-to-market with cost competitiveness.

Service providers need testing solutions so that they can measure and manage metrics such as downtime and call drops. Globally, India has the largest installation of base stations (over 700,000) and cell sites (around 400,000). And going by the current demand, these installations will grow significantly in the future. This network expansion would require huge investments and T&M solutions will help operators in selecting and planning network architecture in a more intelligent and cost-effective manner.

The telecom tower industry needs T&M solutions to test and measure the radiation generated from mobile towers. This domain of testing has received a major fillip following the government's mandate for telecom towers to reduce radiation to one-tenth of existing levels.

In the optical communications segment, T&M is needed from development to deployment, from R&D and manufacturing of fibre to installation and for commissioning of networks. Currently, the industry needs high performance and all-in-one T&M solutions that are upgradeable to higher technology standards. Optic fibre-based communication is emerging as a key medium for transmitting bandwidth-intensive data services, which will drive T&M growth in this domain. The government's National Optical Fibre Network (NOFN) is a key project, which aims to provide fibre connectivity to 250,000 gram panchayats in the country. The network project, expected to be completed by 2015, will provide a fillip to optical communications T&M testing. Further, the Department of Telecommunications (DoT) is undertaking the Network for Spectrum project for the defence forces, under which an exclusive optic fibre-based nationwide communication network will be deployed. This will be a countrywide secure, multi-service and multiprotocol converged next-generation network based on an exclusive and dedicated tri-services optical transport backbone. The project would require advanced T&M solutions.

Handset manufacturers also require T&M solutions and equipment for testing devices before launching them in the market. Further, with the proliferation of data services and growth in mobile broadband, handset manufacturers are now focusing on developing devices that are compatible with multiple technologies and have several capabilities. The testing of such devices before they reach end-users is crucial.

Besides segment-specific T&M requirements, there is a general demand for compact, sophisticated and affordable equipment. The industry is promoting product innovation to ensure shorter design cycle and time-to market.

Key trends

Over the years, several key trends have been witnessed in the Indian telecom T&M market. These include:

- Emergence of application-aware testing solutions: With increased usage of applications such as Twitter, WhatsApp, Facebook and Skype, the composition of traffic on operators' network has undergone a change. It is no longer dominated by voice, as data-intensive applications currently account for over 60 per cent of the network traffic. In this scenario, testing of network components and configurations on a real-time basis becomes crucial for operators. However, using conventional test tools that focus on network protocols is proving to be inadequate. As a result, operators are increasingly deploying application-aware testing solutions to identify and categorise the kind of applications that are riding on their networks. These solutions ensure security of networks and monitor the quality of data services on a continuous basis.

- End-user satisfaction becomes a key success determinant: As new and advanced services are being introduced by a large number of operators, customer satisfaction has become a key differentiating factor and operators are demanding testing solutions that can measure parameters like QoS and quality of experience (QoE). As a result, several vendors have now modified their product portfolio to include solutions and equipment that can test the overall user activity on operator networks. These solutions are suited for the Indian context where users often complain about poor QoS/QoE, owing to a weak network.

• Software-based solutions gain prominence: Technological advancement in the telecom sector has gained momentum. Since most of the T&M equipment is technology agnostic, it needs to be customised and upgraded in accordance with network advancements. For instance, the equipment required to undertake a drive test in the 3G environment may not be the same as that used in a 2G set-up. With the coexistence of several technologies, changing the telecom equipment – every time a new technology is introduced in the network – makes little business sense. As a result, all operators have turned to software upgrades that facilitate migration across technologies. In the long run, this also proves to be a more economical option than making new investments in equipment.

• Growing demand for low-cost solutions: Indian operators face the key challenge of striking a balance between offering affordable services to price-sensitive end-users and procuring expensive T&M equipment and solutions. Consequently, it has been observed that operators may deploy passable solutions instead of standardised ones to save costs. Further, faced with low profitability margins, operators have resorted to low-priced, home-grown test solutions which may not match international standards.

Overall, the technology shift in the sector is promoting innovation in the T&M industry as well. There is an increasing demand for instruments and solutions that can be customised to the users' needs. The industry is also moving towards developing automated test solutions which comprise a mix of radio frequency, digital and general-purpose test equipment along with custom-built software. To gain a competitive edge, T&M players and operators are working together to come up with integrated and comprehensive testing solutions that are backward compatible.

Emerging opportunities

Deployment of LTE technology is emerging as a key opportunity for the T&M industry. LTE deployment involves a new level of complexity and challenges related to installation and network management. Thus, it becomes important to test these services and networks to ensure QoS and QoE. Interoperability between technology standards such as 2G, 3G and LTE will also require intelligent T&M solutions to address issues arising from the flow of various kinds of traffic through the same channel. Further, with the introduction of LTE, operators are shifting their wireless backhaul from time division multiplexing (TDM) architecture to IP and Ethernet, which will drive the mobile backhaul test equipment market.

In India, LTE-based T&M has started gaining traction, but the uptake has not been significant, primarily due to limited technology deployment. Currently, Bharti Airtel is the only broadband wireless access (BWA) spectrum holder to have launched these services in the country and that too in select circles. All other operators have repeatedly failed to meet their LTE roll-out targets. The demand for telecom T&M solutions is expected to increase as Reliance Jio Infocomm launches service. The player has pan-Indian spectrum and will provide major opportunities for the T&M segment, once the services are launched in 2014. Other players are also aiming at an early or mid-2014 launch. Further, with the government's finalisation of unified licensing, new players may enter the 4G segment – for example, Videocon Mobile Services, which is optimistic about utilising its liberalised spectrum for LTE deployment.

BWA players have also started conducting voice trials on the LTE network and this will also open up new avenues for telecom T&M players. As VoLTE is standardised, operators will have the option to use circuit-switched fallback for voice calls over LTE networks.

Data centres, cloud computing and virtualisation are other emerging areas that will drive growth of the T&M segment. Several small and large enterprises are increasingly using these services. Ensuring security in deploying these services is important and can be achieved through the adoption of T&M solutions.

The provision under the National Telecom Policy, 2012, which mandates testing and certification of telecom products for conformance, performance, interoperability, health, safety and security to ensure smooth functioning of existing and future networks will also provide an impetus to the telecom T&M market. In order to meet these testing and certification standards, operators are expected to turn to a wide range of T&M solutions. DoT plans to conduct security tests on imported handsets, SIM cards and telecom equipment. While this process is yet to be finalised, it will significantly contribute to the demand for T&M solutions in the country.

The way forward

In the coming years, growth in the Indian telecom sector will be largely driven by data services. These services which will ride on intricate technologies and networks such as LTE and LTE Advanced will require support from the T&M industry. This will offer new opportunities for T&M players in the areas of R&D, manufacturing and installation/deployment. In such a scenario, innovation, the low cost of equipment, low time-to-market and future-ready solutions will drive the T&M industry.

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