

In the past few years, the Indian testing and measurement (T&M) market has remained fairly insulated from the global environment and has continued to grow even as its Western counterparts have been battling stagnation. This can be attributed primarily to the success of the overall Indian telecom industry.

In the wake of increasing subscriber numbers and ongoing technological advancements in the Indian telecom market, the T&M segment is all set for the next level of growth. The introduction of next-generation technologies like 3G and long term evolution-time division duplex (LTE-TDD) is expected to further boost the demand for T&M solutions. The launch of mobile number portability (MNP) has increased operators' focus on quality of service, and T&M is expected to play an important part in guaranteeing a rich end-user experience.

Other technological advancements like building of fibre-to-the-X networks, the shift towards an all-internet protocol (IP)-based ecosystem, the growing focus on convergence and the preference of voice over IP will be the key demand generators for T&M solutions in the near future.

Growth drivers

T&M plays a pivotal role in the design, development, deployment, maintenance and optimisation of telecom networks. The constant evolution of network design and equipment has fuelled the demand for T&M equipment. With service providers investing in network expansion to support the growing subscriber base and tap the rural and semi-urban areas, the demand for T&M will only increase going forward.

The recent rollout of 3G networks by operators has also increased the demand for T&M solutions. The much-awaited rollout of broadband wireless access (BWA) services will also drive uptake. This is mostly because the launch of any new technology needs to be matched with fast-paced innovation in the T&M space. The full-scale implementation of 3G and LTE services will increase the demand for conformance and interoperability testing between handsets and base stations, and existing network services.

With operators showing a preference for LTE-TDD while rolling out BWA services, T&M vendors are gearing up to come out with suitable solutions for catering to this future demand. Ensuring the operational readiness of LTE-TDD networks is vital not only at the time of the launch of the technology, but also as the network and LTE services mature. From a testing standpoint, this implies more complex conformance testing. Testing the components of a 4G network requires comprehensive test coverage of radio frequency, protocol and system-level elements including base stations, cell sites, handsets and network infrastructure.

The increasing operator and government focus on the broadband segment will also lead to the building and expansion of broadband networks. The government has already sanctioned a Rs 200 billion fibre optic rollout project. Such developments are being welcomed by T&M vendors.

The introduction of next-generation technologies has increased operators' focus on user functionality. The success of 3G and BWA services is largely dependent on end-user experience. Consequently, operators are now focusing more on T&M and increasing their spends on this segment.

Also, with the urban areas already saturated, operators are shifting their focus from customer acquisition to retention. In fact, with the rollout of MNP, managing customer retention, and consequently T&M solutions, has become a key area of focus. Today, T&M is being viewed more as a means of securing a competitive edge over rivals than as just an added cost.

Handset manufacturing is another segment driving the uptake of T&M solutions. The demand for measuring equipment used in manufacturing handsets is expected to rise, especially with increasingly faster, multifunctional smartphones hitting the market. Moreover, the handset manufacturing segment is growing, with several Indian vendors like Micromax, Spice and Lava having entered this space. Players like Micromax have already chalked out plans of setting up domestic manufacturing units, which will further increase the demand for T&M solutions.

With the launch of 3G and next-generation technologies, handsets are undergoing constant innovation, increasing their potential and utility. T&M vendors are stepping up their research and development (R&D) efforts to respond to the evolving needs of handset manufacturers.

Going forward, the uptake of T&M solutions is projected to increase due to emerging application areas such as satellite-based personal networks, home automation networks, wireless local area networks (WLANs) and wireless internet. New broadband wireless technologies are expected to increase the expenditure on wireless LAN equipment in double-digit figures over the next five years.

Also, factors like cost advantages, availability of skilled manpower and low cost of living have transformed India into an R&D hub for T&M vendors. Many international telecom majors have set up their R&D and testing facilities in the country.

Heightened security concerns with regard to equipment purchased from foreign vendors are also adding to the demand for T&M solutions. The government, responding to fears that equipment and software used by the telecom sector may be used to spy on the country, has increased the budgetary allocation for the defence sector, thereby opening up a huge potential market for telecom test equipment.

Minister for Communications and IT Kapil Sibal recently announced that an \$11 million facility would be built in Bangalore to test all foreign-made telecommunication products. Indian regulations require telecom companies to obtain security clearance before buying equipment from foreign vendors. This would lead to growth of the T&M industry.

Key trends

With the emergence of new technologies, refinement of telecom networks and innovation in the handset and network equipment space, the T&M segment has undergone a steady change over the past few years. Protocol testing of Wi-Fi test systems, SIM cards, and network testers has been a common trend in the T&M segment. T&M vendors are constantly innovating and adapting to the new standards required with regard to data speed, encryption, dynamic resource allocation, etc. of modern systems.

Today, more than 90 per cent of all commercial wideband code division multiple access networks globally support high speed downlink packet access and many are being upgraded to high speed uplink packet access. Mobile data traffic is escalating and network operators will soon have to upgrade their 3G high speed packet access (HSPA) networks to either HSPA+ or

LTE or both.

To meet the growing demand from operators, T&M vendors are gearing up to extend their existing HSPA portfolio to support HSPA+, and LTE frequency division duplex (FDD) and TDD.

Another trend is shifting of the testing location from bench tops to onsite in the case of cell towers, power substation yards or network control racks. This has led to an increased demand for full-feature, compact and rugged T&M tools.

Meanwhile, to deal with increasing telecom network complexities, the T&M sector has switched to using software packages, and large-scale integration (LSI) chips are being widely deployed. However, inadequate availability of trained manpower and vital components locally are major challenges.

Limited domestic manufacturing has been a key shortcoming in the sector and the trend has continued in spite of the immense opportunities present. Although all major global vendors are supplying equipment to Indian operators, lack of adequate indigenous manufacturing has proved to be a damper on the overall sector growth. Most of the domestic demand is catered to through imports from the US, Europe, the UK, Singapore, Thailand and China.

The high cost and early redundancy of equipment have given rise to the concept of renting in the T&M equipment segment. The rental model is gaining popularity as compared to equipment purchase due to the huge capital expenditure involved in the latter, the long gestation period between placing an order and delivery, and rapid obsolescence due to constant advancements in technology.

In addition to saving costs, renting T&M equipment offers operators the flexibility to lease out equipment for a short-term period or for a specific project, or when there is uncertainty about the lifespan of the equipment being used. Moreover, it saves operators from the problem of equipment becoming obsolete since rentals also offer the flexibility of upgrading.

Key players

The telecom sector has, over the years, emerged as the most promising industry for T&M equipment vendors. Consequently, many equipment manufacturers are producing devices exclusively for this sector. The T&M market is fragmented and is characterised by a large number of players.

Agilent is one of the leading T&M manufacturers for the telecom sector in India. It offers both wireless and wireline communication solutions. The company has worked closely with industry bodies like the WiMAX Forum and the 3rd Generation Partnership Project to keep abreast of the latest developments in the field. The company offers comprehensive solutions in 2G, 2.5G, 3G, base station testers as well as in antenna testers. It is a leading player in the LTE domain and develops design and automation tools and flexible instrumentation solutions used in R&D. It also produces LTE-based components, base station equipment and mobile devices.

Aplab has been producing and exporting T&M instruments to India since 1964. It offers a range of optic fibre test equipment including professional optical splicing machines, time domain reflectometers, optical power meters, variable power meters and stabilised light sources. With the introduction of products like mixed-signal oscilloscopes, digital storage oscilloscopes with TFT screens and synthesised signal generators, Aplab expects its revenues to grow by 20-30 per cent in the coming years.

Japan-based Anritsu provides measurement, quality assurance and information network solutions for telecom networks. Its range of T&M equipment includes hand-held products like compact cable and antenna analysers with spectrum analysers and land mobile radio testers and base station analysers. The company has a range of solutions catering to mobile life-cycle testing for R&D, conformance, manufacturing and maintenance.

Rohde & Schwarz has been serving the calibration and measurement needs of telecom manufacturing industries in India since the 1950s. The company offers a range of instruments and systems for radio frequency and microwave measurements, sound and TV broadcasting measurements and network testing. Its instruments portfolio for the telecom space consists of wireless device testers, infrastructure testers, protocol testers, and conformance and pre-conformance testers. The company was one of the first to offer electromagnetic interference and electromagnetic compatibility test systems.

Scientech Technologies is a global technology company in the field of T&M instruments. Its T&M equipment portfolio for telecom includes digital storage oscilloscopes, spectrum analysers (portable and bench top), network analysers, frequency counters, signal generators, optical time domain reflectometers, time domain reflectometers, microwave power meters, fibre optic sources and power meters.

Established in 1963, Scientific Mes-Technik is one of the leading organisations offering a range of electronic T&M equipment for various industries in India including telecom. Its products for the telecom sector include spectrum analysers, field strength meters and radio frequency power meters. It is the first T&M manufacturing company to have obtained National Accreditation Board for Testing and Calibration Laboratories accreditation and its R&D lab is recognised by the Ministry of Science and Technology.

Tektronix provides T&M solutions to the telecom market for both wireless and wireline networks technology. It offers solutions to equipment manufacturers to test the design of new equipment. The company's instruments help in troubleshooting of live networks and mobile network optimisation, and provide network management solutions. Its products and solutions for the telecom sector include real-time spectrum analysers, protocol analysers, signal generators and wireless field testers.

The Fluke Corporation is a global manufacturer, distributor and service provider of test tools and software. It is one of the leading players providing quality precision measurement and quality control T&M equipment to telecom companies.

Established in 1992, Singapore-based Qmax offers solutions in the areas of diagnostic and functional test equipment for populated printed circuit boards, and parametric and functional testing of semiconductor devices. Its clients in India include the Department of Telecommunications; Bharat Heavy Electricals Limited, telecom division, Bengaluru; Bharat Sanchar Nigam Limited (BSNL), Ahmednagar; and the Centre for Development of Telematics, Delhi.

Aishwarya Telecom Limited is an India-based T&M company that produces an extensive range of fibre optic test equipment and cable fault locators. Its clients include Bharti Telenet, BSNL, Tata Teleservices Limited, Mahanagar Telephone Nigam Limited, Vodafone Essar and Idea Cellular.

Rishabh is a 25-year-old organisation that has built its core competence in the manufacturing, design and development of T&M instruments for sectors like telecom. Its T&M instruments for the telecom industry include digital multimeters, clamp meters, voltage testers, insulation testers, earth testers, power quality analysers, RCD/loop/line testers, LAN testers, cable testers, optical LAN testers and calibrators.

Conclusion

Though T&M was initially considered to be an extra expenditure, it has been gradually moving up the priority list of operators. Testing equipment is vital for ensuring a smooth transition to newer technologies as well as for conforming to government-defined standards. The advent of sophisticated next-generation technologies will also drive the growth of the T&M segment. To make the most of the advances in the telecom space, T&M solution providers need to gear up in terms of their product offerings. The future success of this industry would depend on its ability to adapt to the fast changing telecom sector.

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