

BUILD & DRIVE THE FUTURE OF CONNECTED NETWORK & DEVICES

MAXIMIZING OFFERINGS AND
OPPORTUNITIES FOR THE TELECOM SECTOR

IT'S IMPERATIVE TO STAY ONE STEP AHEAD OF THE TRENDS



The telecom industry no longer operates independently. In the age of digital transformation, the developments in both telecom and technology are intertwined with each other. The advent of artificial intelligence, augmented and virtual reality, blockchain, smart cities and the internet of things has created a ripple effect in the telecom industry, which is moving in the direction of predictive maintenance, process automation, virtual assistants, and increased security. The demand for “**what’s next**” has increased exponentially and is constantly evolving. Consequently, the pressure on telcos to innovate and meet the burgeoning demands of consumers has increased manifold.

5G



5G will account for 15% of global mobile connections by 2025 according to GSMA. The world’s move towards an era of intelligent connectivity will open immense opportunities for telcos.

CUSTOMER EXPERIENCE (CX)



The market for customer experience management is expected to be worth \$18 billion by the end of 2023, Market Research Future predicts. Better CX must top the priority list for telcos if they want to emerge as market leaders, as it cuts costs and is the principal differentiator in the industry.

BLOCKCHAIN



IDC forecasts that the global spending total on blockchain will exceed \$12.4 billion by 2022. The massive numbers on the willingness to spend is a sign for telcos to hop onto the blockchain wagon.

SMART CITIES



Grand View Research, Inc reports that the global market size of smart cities is expected to cross \$237 billion by 2025, at a CAGR of 18.9% from 2019 to 2025. Aiding the race to develop a smart city economy will be the telecom industry.

FIELD SERVICE MANAGEMENT

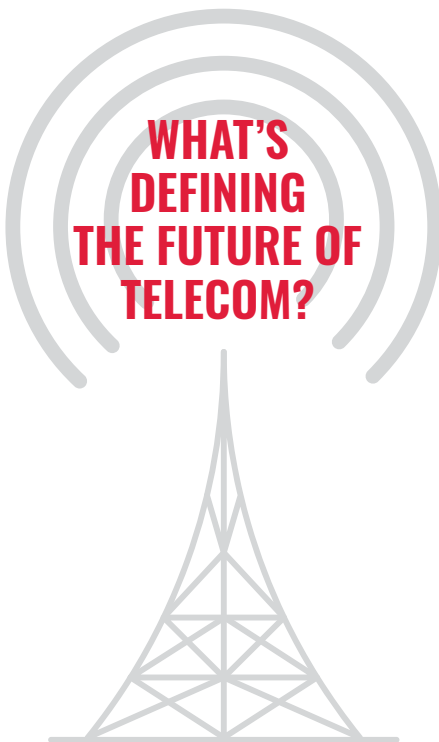


A Mordor Intelligence report estimates the market value for FSM to cross \$6 billion by 2024. As the role of field service technicians in the telecom industry expand, telcos will need to be adequately prepared.

DIGITAL TRANSFORMATION



The digital transformation market is projected to grow to \$665 billion by 2023, according to Research and Markets. Digital transformation will compel telcos to revamp their digital communication strategies to stay on top of the game.



LEAD AT THE FOREFRONT WITH TECH MAHINDRA'S TELECOM OFFERINGS



The rapid pace at which the future of telecommunications is developing is creating several challenges. First, the demand for data is continuously increasing—necessitating a need for high-speed and low-latency connectivity. Second, the race to establish 5G has given birth to stiff competition, with both tech and telecom companies clamoring to come out first. Third, the challenge of increasing capital expenditures looms large, as 5G and dependent technologies require significant investment in infrastructure to ensure proper deployment of 5G.

Tech Mahindra, with over a decade of experience in the telecom space, offers solutions to these challenges with its vast capabilities. The company's investments in state-of-the-art 5G labs across the globe and strategic partnerships have rendered it an industry leader. With a substantial number of man-hours of field testing and lab testing expertise, Tech Mahindra is making huge strides in the telecom waters to enable its partners to stay ahead of the competition.

PRODUCT ENGINEERING

- ▶ Devices, customer-provided equipment and applications for network infrastructure
- ▶ Hardware design and testing
- ▶ Wireless and network services
- ▶ Cloud engineering



DIGITAL ENGINEERING

- ▶ Android SW Development
- ▶ Carrier Customization
- ▶ Post Launch Support – OS/MR/SMR
- ▶ Carrier/AVL Testing & Certification
- ▶ Field Testing/IoT Test Support
- ▶ Friendly User Trial



BUILD FUTURE-READY PRODUCTS WITH TECH MAHINDRA'S PRODUCT ENGINEERING CAPABILITIES



To move shoulder to shoulder with the fast pace of technological advancements, companies must be willing to innovate and experiment. Strong product engineering aids in diminishing the risk associated with high-stake decisions and abates the time taken for the technological shift with its best-in-class features and functionalities.

With more than 15 years of experience in product engineering services under the belt, Tech Mahindra boasts of 20,000+ man-years in its offering. State-of-the-art labs, facilities, and processes help

Tech Mahindra meet the ever-changing demands in a dynamic market and stay on top of the game. Furthermore, strategic partnerships enable quick adoption to new technologies and early access to different software and development tools.

Having worked with both major and emerging telecom equipment manufacturers and independent software vendors, Tech Mahindra is equipped with deep domain knowledge and a variety of reusable IPS in their arsenal—making Tech Mahindra the engineering partner of choice.

PRODUCT ENGINEERING CAPABILITIES FROM TECH MAHINDRA

Devices, CPEs, access, core, and transport networks, and applications covering entire network infrastructure

Technology horizontals including virtualization, management applications, hardware design and testing, and agile/CI/CD across an array of verticals

Wireless and network services

Switching and signaling

Cloud engineering, CBRS, vCPE and uCPE



The Tech M Advantage:
FIELD TESTING EXPERIENCE ACROSS GEOGRAPHIES
FULL CONTROL OVER TESTING WITH REAL-TIME MONITORING AND REPORTING

ESTABLISH A DIGITAL FUTURE WITH TECH MAHINDRA'S DIGITAL ENGINEERING

DEVICE ENGINEERING



The world is going digital, and there is simply no stopping it. Technology has caused widespread disruption across industries, forcing companies to rethink and rebuild their strategies to prepare for a digital future. In order to safeguard a company's interests and ensure profitability in the long term, steps must be taken to shape their workflow and output for a strong digital future.

Tech Mahindra—a Forbes' "World's Top 15 Digital Shapers" offers end-to-end services across the lifecycle of a device, beginning with product conceptualization to market launch support. Tech Mahindra has made investments exceeding \$90 million in Certification and Conformance Labs for big players such as Tier-1 Carriers in the United States. These labs have been accredited for carrier acceptance and conformance testing for OEMs and chipset vendors.

TECH MAHINDRA'S DEVICE SERVICE PORTFOLIO

Design Development Engineering Testing

- ▶ Field testing
- ▶ Conformance and Pre-Conformance testing

Test consultancy Certification

- ▶ Carrier certification
- ▶ GCF and PTCRB certification

TECH MAHINDRA'S SERVICE PORTFOLIO

- ▶ Network CPE devices (switches/routers)
- ▶ Smartphones/Tablets
- ▶ IoT/Automotive devices (HMI, OBD, etc.)
- ▶ Enterprise devices (MTT, rugged devices)



THE TECH M ADVANTAGE The Tech Testing labs for mobile devices

Fremont, USA

5G FR1/FR2, IoT Testing, Home Automation (Audited, Approved & Certified in 5G Certification for Network Carriers)

Redmond, USA

Carrier Acceptance and Conformance (Tier-1 Carriers), MVNO Certification Lab

New Jersey, USA

Carrier Acceptance & Conformance Lab (CCF, PTCRB, CTIA, A2LA)

Toronto, Canada

Operator Acceptance & Conformance Lab (Live network tests)

Bengaluru, India

Carrier Pre-Cert Lab

Noida, India

Carrier Acceptance & Conformance Lab (GCF, NABL, OTA and Tier-1 Carriers in the United States)



ESTABLISH A DIGITAL FUTURE WITH TECH MAHINDRA'S DIGITAL ENGINEERING

5G AND NB-IOT CAPABILITIES



As the world progresses towards 5G, organizations need to cater to changing consumer demands and unprecedented competition. Tech Mahindra's significant strides in this domain, with well-equipped 5G labs and investments for 5G solutions, provide businesses with bespoke solutions for their future investments. It is already dealing with different 5G engineering projects for major OEMs and T&M equipment providers.

Moreover, the company's 5G Academy ensures that its resources receive proper training and have a hands-on experience with all aspects of 5G. Tech Mahindra's 5G portfolio and capabilities make it a forerunner for becoming a 5G engineering services partner across devices, base stations, packet cores, and end-to-end solutions. Tech Mahindra is also the proud owner of the world's first 5G GCF/PTCRB-ready lab.

**Tech Mahindra's
5G
CAPABILITIES**



- ▶ Active participation in 5G standardization, especially on NAS/RRC
- ▶ 5G product development
- ▶ 5G subsystem development and validation
- ▶ 5G test and measurement tool solutions

The Tech M Bonus

LAB COVERAGE FOR NETWORK COMMUNICATIONS

TEST SECTIONS	COVERAGE %	LAB LOCATION
DDR 10776	100%	Noida, India
DDA 10776	100%	Redmond, USA
AVDFT 10776	100%	Redmond, USA
ODI	100%	New Jersey, USA
SFN	100%	New Jersey, USA
Stock	100%	2G, 3G-Noida, India LTE – Redmond, USA
Non-stock	100%	2G, 3G-Noida, India LTE – Redmond, USA
2G Protocol	100%	Noida, India
3G, LTE Protocol	100%	New Jersey, USA
2G RF	100%	Through Partner labs
2G, 3G, LTE – Protocol, RF/RRM	100%	Upcoming lab, Fremont, USA

WHY TECH MAHINDRA?



TECH MAHINDRA COMES WITH STRONG CREDENTIALS IN TELECOM

- ▶ 15+ years' experience in wireless product testing and certification globally
- ▶ World's fastest-growing test lab across 2G, 3G, 4G, and 5G technologies
- ▶ 1500+ Device Development and Test Engineers world wide
- ▶ 1,00,000+ man-hours of field-testing expertise
- ▶ 2,00,000+ man-hours of lab testing expertise
- ▶ 100+ phones, tablets and module manufacturers

INTERNATIONAL MEMBERSHIPS



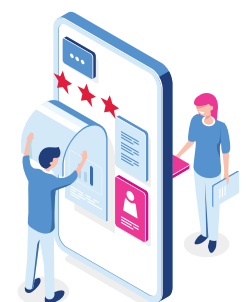
FORUM	TYPE OF MEMBERSHIP
GCF / CCF	Observer
PTCRB	Observer
Bluetooth SIG	Adopter member
Wi-Fi Alliance	Implementer member
CTIA	Member
ATIS / 3GPP	Contributor
CCC (MirrorLink)	Adaptor
LoRa	Contributor

DEVICE TESTING CERTIFICATIONS

- ▶ GCF certification
- ▶ PTCRB certification
- ▶ CCF – CDMA certification
- ▶ Carrier certification

SERVICE PORTFOLIO

- ▶ Android bring-up
- ▶ Carrier customization, including customization of Tier-1 Carrier handsets and of other leading carriers.
- ▶ Security patch/OS upgrades
- ▶ New device launch
- ▶ Testing and certification



TECH MAHINDRA DEVICE ENGINEERING SERVICE PORTFOLIO

TIER-1 CARRIERS IN THE UNITED STATES



HARDWARE	SOFTWARE	CERTIFICATION	OTHER SERVICES
Device Specification Definition	Systems Engineering and SW Architecture	Regulatory & Conformance Testing	Quality Process Def (Plan)
HW ID Design	Software Development	Carrier Certification	Field Service/Beta Deployment
HW Reliability Verification	Market/Carrier/Custom Feature Development	Third Party Support	Production Inspection (FAI)
OTA RF Testing	Stability Testing	BT, Wi-Fi, Accessory Testing	Motive IoT Support
	System & Performance Testing	Field Testing Resources	IEC Deliverables
	Regionalization	Carrier Lab Support	iQi Support
		Re-Flashing Software/ Logistics	RTC Lab Support
		TAM Support	

Tech Mahindra represents the connected world, offering innovative and customer-centric information technology experiences, enabling Enterprises, Associates and the Society to Rise™. We are a USD 4.9 billion company with 121,840+ professionals across 90 countries, helping over 935 global customers including Fortune 500 companies. Our convergent, digital, design experiences, innovation platforms and reusable assets connect across a number of technologies to deliver tangible business value and experiences to our stakeholders. Tech Mahindra is the highest ranked Non-U.S. company in the ForbesGlobal Digital 100 list (2018) and in the Forbes Fab 50 companies in Asia (2018).

At Tech Mahindra we live the philosophy of connected world and connected solutions. We appreciate that the new revolution is powered by the intelligent symphony of solutions designing 'experiences'. With the ever growing importance of technologies and platforms only those who can create and sustain world class experiences through them will thrive. Consumer 'experiences' are driving and disrupting industries like never before.

Businesses must build seamless and integrated technology capabilities across dimensions – the digital, the physical, the convergent, and everything in between. That's when connected experiences manifest. And that's when enterprises and people alike will be empowered to Rise™ in a connected world.

INTEGRATED ENGINEERING SOLUTIONS(IES) IES IS A CONNECTED ENGINEERING SOLUTIONS BUSINESS UNIT OF TECH MAHINDRA.

At Integrated Engineering Solutions, customers are at the core of every innovation. We align Technology, Businesses and Customers through innovative frameworks. We deliver future-ready digital convergence solutions across Aerospace and Defense, Automotive, Industrial Equipment, Transportation, Consumer Products, Energy and Utilities, Healthcare and Hi-Tech products.

Our 'Connected' solutions are designed to be platform agnostic, scalable, flexible, modular and leverage emerging technologies like Networking, Mobility, Analytics, Cloud, Security, Social and Sensors, that enable launching of smart products and deliver unique connected consumer experiences weaving a connected world. Coupled with this, our strong capabilities in Electronics, Mechatronics and Mechanical Engineering along with domain understanding and product knowledge, bring excellence to the entire lifecycle of these connected ecosystems.

To know more on how Tech Mahindra can help your company please contact

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**Connected World.
Connected Experiences.**