Introducing TSDSI
India’s Telecom SDO
Pioneering Telecom and ICT Standards for India’s Digital Transformation

- Technology Directions/Roadmap
- Pre-Standardization (ex. SDR)
- Standardization Studies
- Standardization in Global bodies
- Global SDOs/Forum Relationship
OUR VISION

“To ensure that Digital Communication Standards increasingly drive domestic, economic and policy activities and enhance India’s competitiveness for ICT goods and services in global markets. It aims to do this by creating a leadership position through India’s participation and contribution to emerging Digital Communication Standards in global SDOs”

About Us

We are an autonomous, membership based, standards development organization (SDO) for Telecom/ICT products and services in India.

We develop standards for access, core, back-haul, core telecom networks, ICT solutions & services that best meet India specific Telecom/ICT needs, based on research and innovation in India.

We work closely with global standards’ bodies to reflect Indian requirements into International Telecom/ICT standards.

We play as important role in incorporation of indian IP into Global Telecom standards

We are recognised by Department of Telecommunications as India’s Telecom SDO

We are registered as a not for profit Society, under the Indian Societies Registration Act XXI of 1860

Our Objectives

Developing, promoting and standardizing India-specific Telecom/ICT requirements and solutions

Taking Indian requirements to Global Standards organizations

Adhere to the principles of Openness, Transparency, Fairness, Consensus and due Process in conducting its activities

Maintain technology neutrality and provide a uniform playing field for its members
OUR ACTIVITIES

Technical Groups

Study Group - Networks
- 6G
- 5G Enhancements
- Broadcast offload
- Spectrum Studies
- Open Systems
- Wireless Backhaul

Study Group - Services & Solutions
- Security - Covering Machine KYC, Post Quantum Cryptography, security aspect of AI/ML model transfer in 5G

Strategic Initiatives
- Technology Roadmap Item Proposal Forums
- Open Source, Global Standards Forum, Engagement with Startups & Industry, Standards Driven Research, Test & Certification
- TSDSI Tech Deep Dive Conference
- Partnered Workshop Series with ITU-T
- Pre-Standards Workshops
- ITU Sector Member
- TSDSI Members - Key Contributors to 3GPP & oneM2M
- Adoption Agreements with ATSC & IEEE-SA
# STANDARDIZATION ROADMAP 2.0

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<td>• Rural Coverage and Capacity Enhancement</td>
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**OUR ACCOMPLISHMENTS**

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**Technical Standards Published:**
- Cloud Interoperability & Portability Standard
- 5Gi (merged with 3GPP Rel 17 in 2022)
- CPRI Fronthaul

**Standards Adopted:**
- 19 Specifications of ATSC3.0 Standards
- Transposed 3GPP and oneM2M Specifications into TSDSI Standards

**TSDSI transposed standards mandated as National Standards by TEC**
- 3GPP Specifications for 3G, 4G and 5G
- 3GPP Specifications for Indian Telecom Security Assurance Requirements
- oneM2M Rel 2 & Rel 3 Standards
TECHNICAL REPORTS

Reports Published:

6G / 5G Enhancements
- Slice Identification in 5G RAN for End-to-End Secure Services
- 6G: Use Cases, Requirements and Enabling Technologies
- Visible Light Communication/Li-Fi
- Enhancements of flexible UL/DL Resource Utilization

Spectrum Studies
- Characterization of E-band for 4G/5G Backhaul & Rural Broadband
- 6 GHZ spectrum for IMT services in India

Broadcast Convergence
- Broadcast Offload
- 5G Broadcast based Service Delivery for TV, Radio, IPTV and File-casting

Open Systems
- Open Disaggregated RAN

Wireless Backhaul
- Channel Characteristics of 60GHz for 4G/5G Backhaul

Applications / Verticals
- Drone Communication Services
- Public Protection Disaster Recovery (PPDR)
- Indian Languages in Mobile Transactions
- Information Centric Networking
- Data Pruning in Smart IoT Applications
- M2M Use Cases in Various Verticals - India Context
- NB IoT capabilities for Energy Metering

Services Architecture
- Edge Intelligence for haptics IoT use cases
- Performance Measurements for Dual SIM Devices
- Cloud Interoperability and Portability Standards

Security
- Study of Post-Quantum Cryptography for Future 5G Networks and Application
- Digital Process for Know Your Machine Custodian
- Smartphone User Data & Privacy Protection
- Reducing Threats to the National Critical Infrastructure using DNS

https://tsdsi.in/tr/
WHITE PAPERS

Status of Telecom Startup Ecosystem in India

6G Use Cases and Enabling Technologies

Privacy & Personal Data Protection on Mobile Devices

Feasibility of Open Source for 5G
ENGAGEMENT WITH GLOBAL FORUMS

**TSDSI @ ITU:**
5Gi standard (recognised as one of the ITU-R Recommendation M.2150, and now merged into 3GPP 5G)
LMLC requirement to address requirements of Rural & Remote areas mandatory in IMT.2020
TSDSI obtained A.5 Certification from ITU-T

**TSDSI @ 3GPP:**
64 TSDSI Members to 3GPP as Individual Members
NavIC (Satellite based Indian Navigation System) advanced to 3GPP Rel 16 based on proposal introduced by TSDSI IM
TSDSI hosted 3GPP TSG#101 meetings in Bengaluru on 11-15 September 2023
Recently conducted an online Microworkshop Series on 3GPP Release 19

**TSDSI@oneM2M:**
62 TSDSI Members to oneM2M as Individual Members
oneM2M Centres of Excellence @ IIIT Hyderabad and UIET Chandigarh
CDOT Centre of Innovation for IoT /M2M focusses on developing resources in India on oneM2M
TSDSI’s 5Gi JOURNEY: FROM REQUIREMENTS TO STANDARD

TSDSI’s LMLC Req. incorporated @ ITU in Q3 2017

Indian Enhancements
To address Indian needs
Technical studies and finalization done in TSDSI

TSDSI creates 5Gi Standard

India Requirement LMLC

TSDSI 5Gi Standard merged into 3GPP Rel17

TSDSI's LMLC Requirement incorporated at ITU in Q3 2017

Config A
- 700 MHz
- ISD 1.732 km
- 120/500 km/h

Config B
- 4 GHz
- ISD 1.1732 km
- 120/500 km/h

Config C (LMLC)
- 700 MHz
- ISD 6 km
- 3/30 km/h

Existing rural models 3G, 4G, 5G

New model 5G

Indian Enhancements
To address Indian needs
Technical studies and finalization done in TSDSI

TSDSI creates 5Gi Standard

India Requirement

TSDSI’s 5Gi JOURNEY: FROM REQUIREMENTS TO STANDARD

6G @ TSDSI

Adopted a two-pronged strategy:
1. Steer research in India to serve its goals
2. Continue engagement with global standard bodies for harmonization of efforts including ITU WP 5D.

TSDSI began 6G work with an introductory workshop “Telecom Technologies for the next Decade” in Jan’2020

Published Technical Report on 6G: Use Cases, Requirements and Enabling Technologies in July 2022

TSDSI white paper based on TSDSI Technical Report released in September 2022
TSDSI contributed to ITU-R Framework document and Future Technology Trends document in 2021-22 and 2022-23
STANDARDISATION PROCESS @ TSDSI
TECHNICAL ACTIVITIES

Standards being developed:

6G / 5G Enhancements
- New Architecture for 6G Communication Systems
- Coreless RAN
- AI Architecture for RAN
- Architecture for tactile applications with edge intelligence over 5GS
- B5G Network Architecture to support Multilevel End-to-End User Plane Security
- Functional Split and Fronthaul Interface in FBS Driven C-RAN (TR Published)
- Enhancement of Security and Privacy of User Subscription Identity in 5G AKA

Broadcast Convergence
- Extension of Broadcast Offload
- Wireless Backhaul
- Characterization of E-band for 4G/5G Backhaul & Rural Broadband
- Evaluation of the existing IAB architecture in 5G Networks (TR Published)

Open Systems
- Open Disaggregated RAN

Applications / Verticals
- Integrated Communication and Sensing
- Local Language for financial workflows

Services Architecture
- Rural Broadband Services Architecture (TR Published)

Technical Studies:

6G / 5G Enhancements
- Waveforms for B5G
- Channel Modeling and PHY Layer Requirements for NFC in 6G
- Joint Communication & Sensing in B5G
- Qualitative Metrics for 6G KPIs
- Futuristic Architecture of 5G Backbone and Slicing
- Dynamic Joint Deployment of SDN Controllers and Hypervisors
- Security Aspects of AI/ML
- Privacy Preserving Detection of False Base Stations

Spectrum Studies
- Sub-THz Channel Modeling
- 6 GHz spectrum for license-exempt wireless applications in India

Applications / Verticals
- Communications Requirements and Recommendations for the Energy Sector

Services Architecture
- Common Ontology for Adaptive Traffic Control System
- Metaverse Use Cases in Mobile Network
- Unified Network Slicing Model
- Common Edge Connectivity for Public Utility Services

Security
- Common User Profile Format
Membership

- Manufacturers with Indian IP
- Domestic Manufacturers
- Telecom Service Providers
- Other Service Providers
- Manufacturers of Mobile Device/CPE
- End User Devices
- Developers of Application Solution/Service Platform
- Semiconductor components designer/manufacturer
- R&D Organizations
- Academic Institutions
- Government Department/Autonomous bodies
- Others

Scan the QR code to view our membership categories
Scan the QR code to view our current members

Alliances

TSDSI is a constituent SDO of Global Standards Collaboration (GSC) – a voluntary forum of the world’s leading information and communication technologies standards organizations (SDOs).

- IEEE-SA
- TIA
- ATSC
- ATIS

TSDSI is the Organizational Partner of 3GPP. This entitles TSDSI members to become Individual Members of 3GPP through TSDSI and take their IPR into the global arena. This also enables them to contribute in the development of upcoming standards such as 5G.

TSDSI is the Partner Type I of oneM2M, one the leading forums driving M2M service layer standards. This entitles TSDSI member organizations to become Individual Members of oneM2M and contribute to standards development in M2M space.


Multilateral MoU

- 6GIA
- 6GMF
- 6G Forum
- 6G Americas
- IMT2030 PG
- 5G Brasil for Global 5G Event meetings.
TSDSI JOURNEY SO FAR

- Published Standard on Cloud Interoperability & Portability
- Adopted 19 Specifications of the ATSC3.0 Standards as TSDSI Standards
- TEC adopted TSDSI Transposed 3GPP Release-17 Standards as National Standards

2023

- TSDSI’s 5G merged with 3GPP 5G
- Released Technical Report and a White Paper on 6G
- TEC adopts TSDSI transposed standards as National Standards for 5G, 4G, ITSAR, oneM2M Rel 3

2021

- Published TSDSI Standardisation Roadmap V2.0
- TSDSI contributes to ITU-R 6G Vision

2020

- TSDSI’s RIT (5G) became part of ITU-R M.2150
- TEC adopted TSDSI transposed IMT Advanced and oneM2M Rel 2 as National Standards
- Initiated 6G activities through a Workshop
- Issued White Paper on “Status of Telecom Startup Ecosystem in India”

2019

- Introduced 3GPP NavIC support as Work Item for 3GPP Rel 16 along with ISRO
- Released TSDSI Vision 2025
- Initiated Standards development dialog with Developing Countries

2018

- Published 1st TSDSI developed Standard (CPRI-Fronthaul)

2017

- Organised 5G Vision Workshop
- Contribution on Low Mobility Large Cell (LMLC) incorporated in IMT2020 at ITU

2016

- Initiated Roadmap for Standardization

2015

- Admitted into 3GPP and oneM2M
- Contributed M2M Use Cases to ITU - T SG20

2014

- Registered as a Non-for-Profit Society | Elected 1st Governing Council in October 2014
RESOURCES

- Visit [https://tsdsi.in/about/](https://tsdsi.in/about/) for more information on TSDSI
- Introductory Video on TSDSI @ [https://tsdsi.in/introductory-video-of-tsdsi/](https://tsdsi.in/introductory-video-of-tsdsi/)
- TSDSI Standards [https://tsdsi.in/published-standards/](https://tsdsi.in/published-standards/)
- TSDSI Transposed Standards at [https://tsdsi.in/3gpp/](https://tsdsi.in/3gpp/) and [https://tsdsi.in/onem2m/](https://tsdsi.in/onem2m/)
- TSDSI Technical Reports from [https://tsdsi.in/tr/](https://tsdsi.in/tr/)
- TSDSI White Papers:
  - 6G at [link here](https://tsdsi.in/)
  - Status of Telecom Startup Ecosystem in India at [link here](https://tsdsi.in/)
  - Focus on Open-Source for 5G at [link here](https://tsdsi.in/)
  - Privacy and Personal Data Protection on Mobile Devices at [link here](https://tsdsi.in/)
- Download our monthly bulletins from [https://tsdsi.in/tsdsi-monthly-bulletin/](https://tsdsi.in/tsdsi-monthly-bulletin/) and newsletters from [https://tsdsi.in/newsletter/](https://tsdsi.in/newsletter/)

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