



**Telecommunications  
Standards Development  
Society, India**

**tsds**  
India's Telecom SDO

Roadmap



A roadmap is an integral part of the Journey of an SDO. TSDSI Governing Council has approved a Roadmap for standards development till the year 2020 as recommended by the Roadmap Committee of TSDSI.

The roadmap has been created after a broad-based stakeholder consultation process. The Committee conducted workshops inviting members and external organisations to gather inputs on the need for standardization in different areas. A large number of ideas were received. After detailed analysis of available standards or standards already under development and the time horizon and Members' interest for delivering the standards/reports, nine topics have been made part of the Roadmap. These topics are:

1. Spectrum Studies
2. Dual SIM
3. Critical Communication - Public Protection & Disaster Relief (PPDR)
4. Cloud Interoperability
5. Information Centric Networking (ICN)
6. Rural Broadband Architecture
7. Zero Call Drop Rate
8. Unified Authentication Framework
9. vRAN using Wireless Backhaul

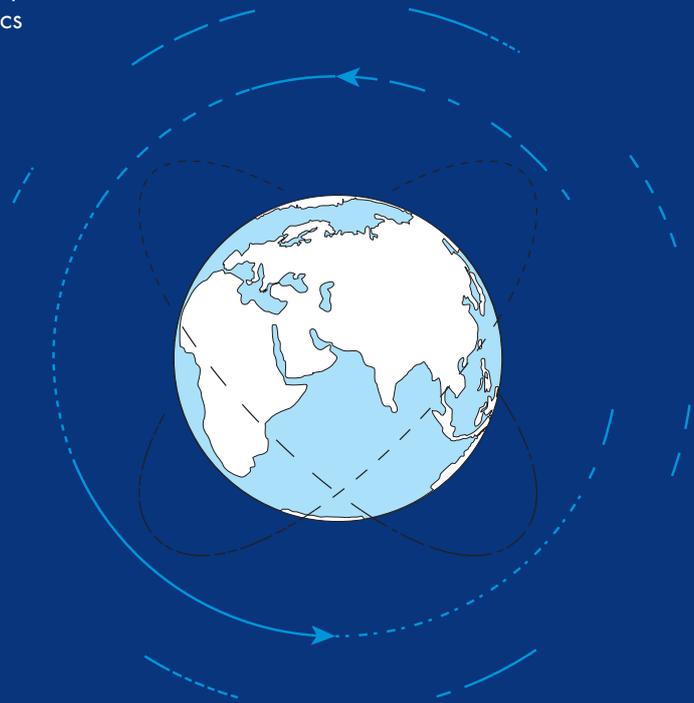
Each of these items has a lead member and some supporting members to enable introduction of items and to provide contributions for further activity in the Study Groups.

Items covered in the Roadmap are in addition to the ongoing work in the Study Groups (Study Group- Services and Solutions or SGSS and Study Group- Networks or SGN) or any other item introduced in the Study Groups for development of standards/reports. A number of Roadmap items were taken up in SGSS and SGN for further work.

As a first step, Technical Reports have been released on first five Roadmap topics mentioned above, based on active participation and contributions by the TSDSI members.

The roadmap is a dynamic document as the needs for standardization in different areas will continue to emerge and TSDSI will remain responsive to India specific standardization needs. The process to start the work on Roadmap version 2 has already started.

In the meantime, the lead and supporting members as well as other members will also assess the need and timing of further work on existing Roadmap items as well as taking up work on the remaining items.



A brief description of the work done in respect of five items is provided below:

## 1. Spectrum Studies

The phase I of this exercise was to generate reports for compatibility and coexistence in various bands of interest like V-band, mm-Wave bands.

There were considerable interest and support amongst the members of TSDSI including OEMs, operators, chipset manufacturers, academia and R&D who have actively participated in technical group meetings to carry out this activity.

This work was taken up in SG-Networks where, to begin with, a new item was proposed for studying channel characteristics for 60 GHz (NIP 186) during the January 2019 SGN technical meeting. The proposal culminated in a TSDSI study item (SI 59). After detailed deliberation in various group meetings, TSDSI members have finalized study report namely "60 GHz Channel Characteristics" in September 2019.

The report comprises of inherent characteristics of the band as well as the compatibility aspects i.e. coexistence between the proposed MGWS (Multi-Gigabit Wireless System) application w.r.t some of the planned services and systems operating in the frequency range of 57 GHz to 66 GHz. The report also deals with the coexistence for deployment scenarios across various links in V band including MGWS and existing FS (Fixed Service) systems, WLAN and WPAN applications operating in 57-59 GHz and 64-66 GHz at indoors.

The objective for the phase I of this roadmap item has been achieved as SGN the Technical Report showcases various compatibility and co-existence studies for 60 GHz. The outcome of this study report will act as an important input to the Government and other stakeholders for the allocation of spectrum and network deployments.

Spectrum studies being an area with a wide scope, there may be requirements arising from various India specific studies or those arising from the outcome of WRC 19. The assessment of future studies on Spectrum will be done by the members as per emerging requirements.

## 2. Dual SIM

The phase I of this exercise was to analyze the use case scenarios including single/dual RF capabilities and subsequently outline requirements for performance analysis of various dual sim devices.

The objectives can be summarized as below:

- To pave the path to standard testing methodology and support the test cases to ensure uniform user experience e.g. data speed (DL/UL), latency, etc. irrespective of operator and sim slot being used.
- To bridge the performance gap of various dual sim devices.
- To provide consistent network and user experience irrespective of sim slot and network operator.
- To enable adoption of a standard set of test procedures and test cases to test and verify the performance of dual-sim devices.

There was interest and support from handset OEMs and telecom service providers

A new proposal on "Standards for dual sim devices (Smartphones) including DSDS, DSDA and DSDV implementations (NIP 201)" was proposed by TSDSI members in the SG-Networks. After deliberations, the proposal was accepted as a study item (SI 65).

Based on study conducted during subsequent meetings, the study report namely "Performance Analysis of Dual Sim Devices" was finalised in September 2019. The report comprises of various mechanisms to improve the quality of service (QoS) offered by Dual Sim Devices and covers the objectives mentioned above.

The conformance reports as per test-cases derived from this report could be the part of TEC certification for dual SIM devices. Further, outcome of this report can be used to develop new specifications in the Indian context for dual SIM devices in order to ensure no performance degradation in services (data throughput, Voice quality, etc.) irrespective of any operator SIM in any of the slots in the devices.



### 3. Critical Communication - Public Protection and Disaster Relief (PPDR)

This item was to be done in 2 phases - The phase I of this exercise was to generate a report on Indian usage scenarios & user requirements along with the gap analysis based on available standards that have been achieved successfully. This was to be followed by Standard specifications for gaps identified and certifications etc.

This item started as a new proposal (NIP 185) to conduct the study on the Requirements for a Broadband PPDR Communication System for India submitted in January 2018 SG2 Technical plenary. The NIP was approved as a Study item (SI58) with the objectives of phase I mentioned above which, was also preceded & followed by well attended interactive workshops which significantly included the user agencies as well.

A lot of member organizations showed interest in the proposal which includes academia, OEMs manufacturers and R&D initially. The work in this SI included TSDSI experts from Industry as also those working with the various government agencies like Directorate of Coordination Police Wireless (DCPW) and other agencies etc for documenting the current PPDR landscape. The report was approved in June 2019 SGSS technical plenary and published in July 2019.

This study documents the existing deployments and equipment used by the PPDR agencies in India thereby analysing what needs to be done in order for the PPDR agencies to transition to using PS-LTE (LTE for Public Safety) for PPDR activities in India. It also introduces the TRAI recommended BB-PPDR model which is based on 3GPP PS-LTE standards.

This study report is expected after due diligence to help work on phase 2 of this roadmap item which may include forming of standards specifications for the identified gaps and platforms etc.



## 4. Cloud Interoperability

This Roadmap 1.0 item envisioned considering 5 to 6 use cases for smart city projects, Identifying the gaps that exist for interoperability of these standards and arrive at the minimum standards (Common + Gaps) required to be complied with for ensuring interoperability of cloud services followed by other phases to include testbeds, specifications, standards contribution

As was mandated by DoT based on TRAI recommendations to develop Cloud Service Interoperability Standards in India, the Standardization committee took this subject as one of its items.

This subject started with a new proposal (NIP 197) in SG-Services and Solutions TP in March 2018.

TSDSI had kickstarted the work by conducting several workshops with the stakeholders. On the basis of the outcome of those workshops, TSDSI expert members along with the Cloud Innovation Council of India (CCICI) task force on interoperability have been working jointly towards defining a Cloud Interoperability specification.

Work on study item generated great interest amongst experts from various entities like academic institutions, Government, along with TSDSI members. The group of experts had continuous remote fortnightly meetings besides F2F and FCCs (Formal Conference Calls).

The progress thus far has resulted in interim reports (More reports would come out progressively in phased manner) as a comprehensive study on the following topics as part of Phase I:

- Defining use cases in the Indian context and requirements arising from those use cases
- Gap Analysis for the Indian context
- Mapping of standards
- Working towards Test Cases & Test Bed Arch

The report also reviews and analyses important international standards like ISO-IEC 19941, IEEE-NEST and P2302 as well as many others including open standards to assess their applicability for the Indian cloud ecosystem.

Work on drafting specifications for ensuring the interoperability of cloud service is in progress. The architecture of testbeds is also initiated.

It is expected that the new standards combined with existing international standards will provide a viable framework for cloud interoperability and portability in India.

Work on Phase 2 objectives which includes setting up of Interoperability testbed and test suite for testing and validation of recommendations of the report is also going on. Phase 3 objectives may be taken up based on the interest of the member organisations. A Workshops is proposed with CSPs (Cloud Service Providers), government agencies and other stakeholders to discuss and receive their inputs on the interim report.

## 5. Information Centric Network (ICN)

This item was also a constituent of Road Map 1.0 which was to be done in 3 phases as is mentioned in the road map summary

It was taken up in the Study Group – Services & Solutions after some members showed interest in the subject

It started as a new proposal (NIP 200) in SGSS TP in March 2018 which was converted into an SI (SI60) with the objective of drafting a white paper about the use cases and requirements of wireless edge caching and technology requirements

A workshop was also organized with the objective of exploring interests and possible contributions.

This subject was received with interest by a lot of TSDSI experts including academia, R&D, operators, and OEMs. Their active participation and high-quality contributions in the workshop, FCCs and face to face meetings resulted in much progress towards the completion of Phase 1 objective. After due deliberations on the subject in the study group earlier, an ICN technical report was finally approved by the SGSS in the June 2019 technical plenary.

This document presents various potential use cases, challenges, and requirements. These use cases have the potential to be benefitted from the ICN deployment since the current infrastructure is not able to match their QoS requirements. This report has also tried to address India's specific requirements and challenges for the adoption of ICN.

The work on creation of test beds and technical specifications which are part of phase 2 and Phase 3 objectives respectively may be taken up based on the interest of the member organisations.



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