Second Workshop of India-EU Collaboration on Standardization for Select Technologies

TSDSI's Vision & Roadmap for 5G

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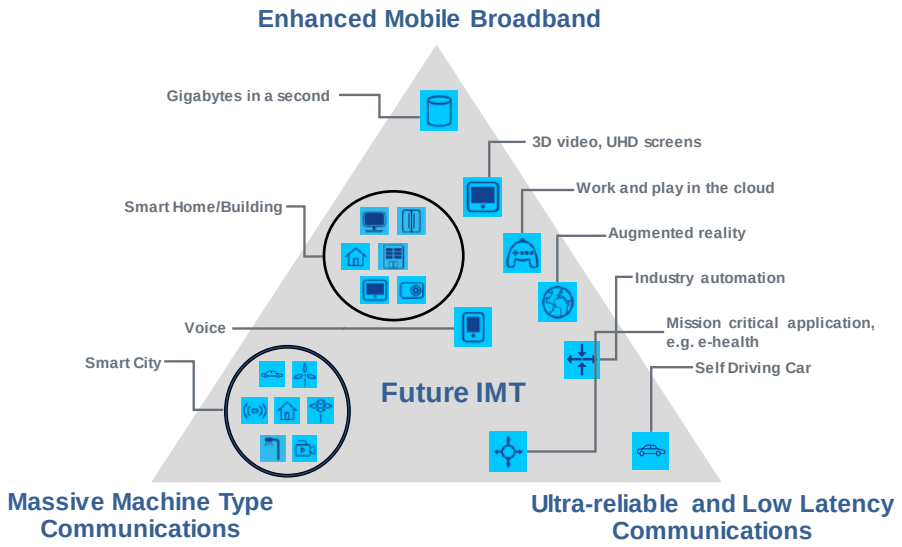
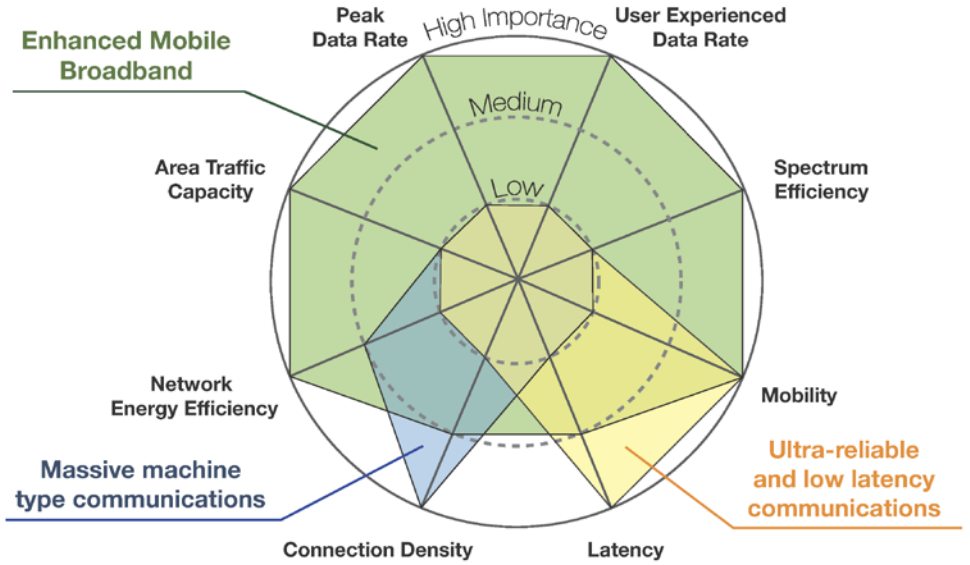
ITU-R vision for IMT-2020 and beyond

ITU-R M.[IMT-Vision]



Use case categories



Key Capabilities

Framework and overall objectives of IMT 2020 and beyond

5G system to be designed to meet the needs of 2020 and beyond

5G standardization to happen alongside 4G technology evolution

The Indian Scenario

Prevailing Scenario

- As per the prevailing definition of Broadband (speed > 512 kbps)[1], there are 108.85m connections (June 2015)[2]
  - About 93.15m are wireless Broadband connections (against 980.81m mobile subscriptions)
    - Mobile to fixed broadband connections in India exceed 4:1, which is greater than the global average
  - While wireless tele density reached 149.70% in urban areas, rural wireless tele density stood at just 48.66% by June 2015[2]
  - India's internet penetration stands at 19.19%[3]

Going Forward

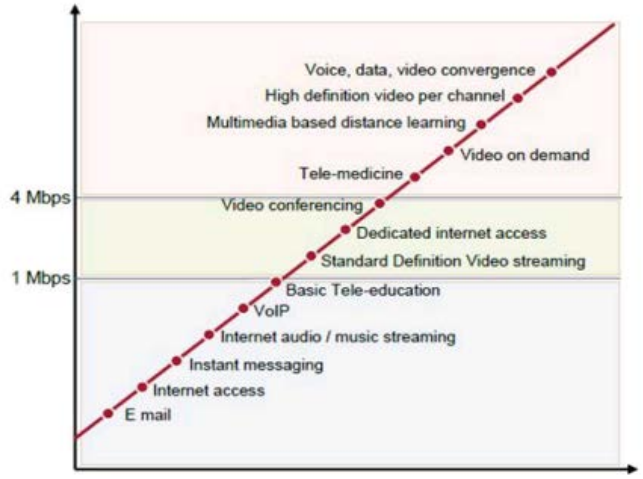
- Internet penetration in India is expected to be pushed by growing use of wireless devices (eg., smart phones, dongles, etc.)

- National Telecom Policy 2012[4] has an objective to
  - Provide affordable and reliable broadband-on-demand by the year 2015
  - To achieve 175 million broadband connections by the year 2017
  - 600 million by the year 2020 at minimum 2 Mbps download speed
  - Making available higher speeds of at least 100 Mbps on demand
    - Has severe network and spectrum requirements, from the service providers perspective

There is genuine interest within the Indian community to see that connectivity for rural masses and the delivery of internet services is offered during the similar time frame.

Going Forward (ctd.)

- Affordable and reliable broadband is a declared major public policy priority
  - Schemes like Digital India, e-Citizen, mission critical communication, smart cities and others rely on the Internet penetration
  - NOFN [5] is seen as a one of the key enablers of these services, especially to rural India
- These services have different QoS requirements (refer fig)



[Source: Analysys Mason, Industry Reports]

Going Forward (ctd.)

- As per the national telecom M2M roadmap [6], the most promising markets for M2M will arise from
  - Transport and logistics (fleet mgmt, asset tracking, logistics planning, etc.)
  - Utilities (smart metering, water, gas, etc.)
  - Automotive (remote vehicle diagnostics, safety & security, etc.)

- Govt. of India has proposed several large scale initiatives:
  - Proposal to develop 100 Smart cities
  - Pilots on 14 Smart Grids, with average Customer base of around 20,000 each
  - Mandate that all commercial passenger vehicles with capacity exceeding 22 seats to be enabled with GPS, emergency calls, etc.
  - National Optical Fiber Network (NOFN) – Enabling M2M reach to rural India

- 5G will be one of the underlying technology over which M2M services will be deployed, there are many requirements to be met
  - Support for large scale device connectivity (spectrum)
  - QoS for communication (low latency, medium latency)
  - Ultra low cost and energy efficient networks

Going Forward (ctd.)

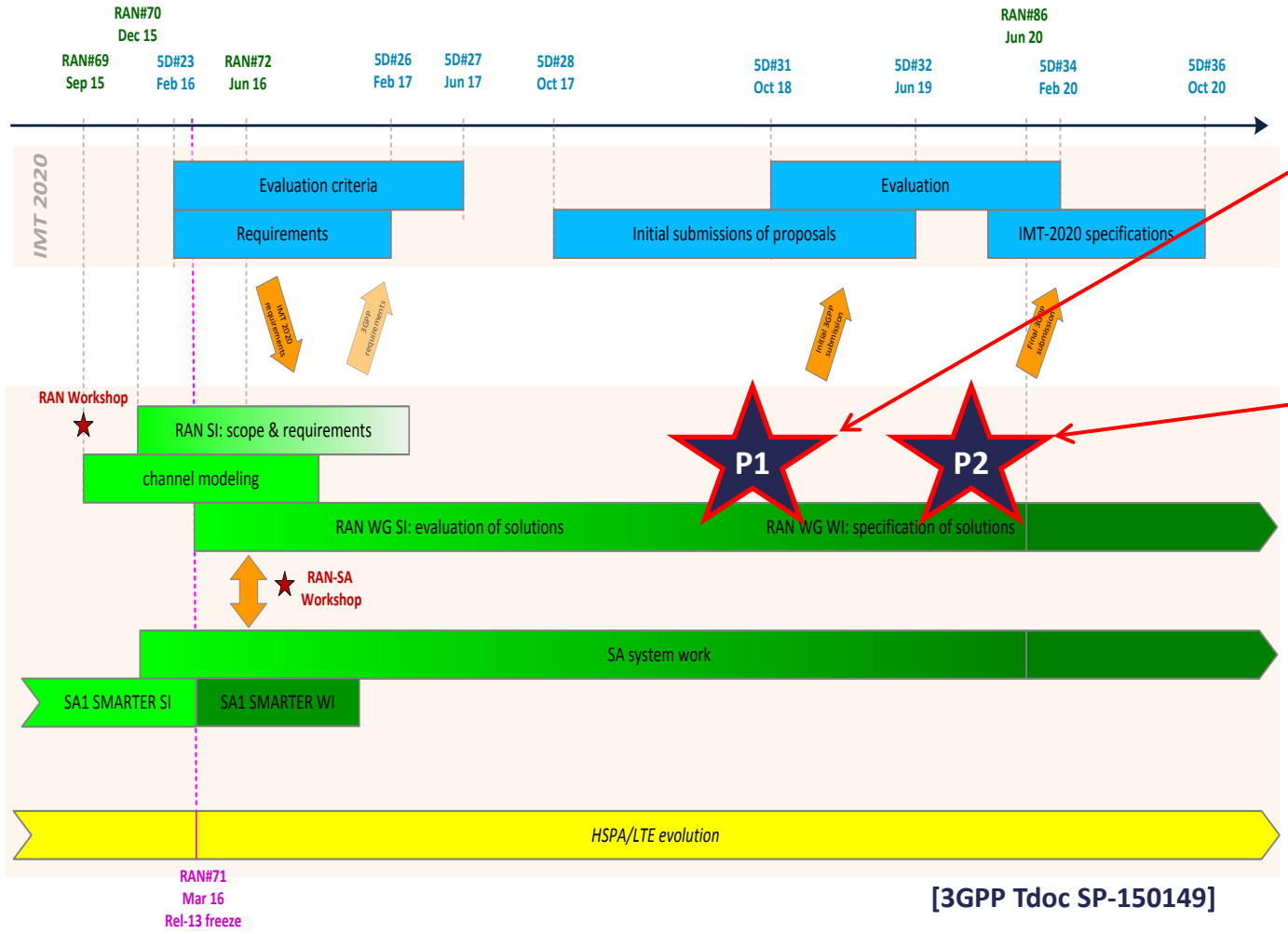
- Spectrum for 5G is going to be a challenge as we go forward
- Spectrum is fragmented, and reserved for other purposes
  - Eg. Of the potential bands identified for IEEE 802.11 ah (sub GHz), India only has 2 MHz to serve this purpose (865-867 MHz)
- There is an opportunity for India to collaborate with the global community in reallocating spectrum and harmonizing its effort for WRC 2019
- Looking forward to facilitate a dialogue within TSDSI to address the gaps

In Summary

- Given the potential, India will see within the next few years:
  - An avalanche of traffic volume in mobile broadband, and machines communicating
  - An explosion in the number of connected devices
  - A large diversity, and therefore opportunity across telecom verticals
  - More demand for data from remote / under served areas
  - Wireless as an enabler for delivering all Govt. of India related initiatives

- We understand that 5G standards will be made available during the timeline of interest, and look to it as an opportunity for India to leverage

5G Timeline: ITU & 3GPP



[3GPP Tdoc SP-150149]

Phase I specifications should be completed in 2018

Phase II specifications should be completed in 2019

Phase I for early commercial deployment of 'initial 5G' features

Phase II for 'full 5G' and final ITU-R submission

Current Activity in TSDSI

- 5G specific activities happening within several TSDSI groups
  - RNES WG studying mm-wave characterization, path loss modeling, etc.
  - NFV related activities in the CN WG
  - 5G WG continuing discussions on deployment scenarios, key performance indicators, evaluation criterion, etc.
  - M2M WG activities on use cases, scenarios, requirements, etc. across verticals
  - Transport network related activities in the Backhaul WG

- Current plans are to make these inputs available in the same timeline as other global 5G efforts, and contribute to global standards development

References

1. TRAI recommendation “Delivering Broadband Quickly: What do we need to do?” dated Apr 2015
2. TRAI report “Highlights of Telecom Subscription Data as on 30th June 2015” dated Sept 2015
3. IAMAI & KPMG report titled “*India on the Go: Mobile Internet Vision 2017*”
4. National Telecom Policy 2012, Department of Telecommunications, Government of India
5. Project - National Optical Fibre Network (NOFN)
6. National Telecom M2M Roadmap

7. Recommendation ITU-R M.[IMT-Vision] “Framework and overall objectives of the future development of IMT for 2020 and beyond”
8. 3GPP SA1 studies on Service and Market Technology Enablers (SMARTER)
9. Cisco Visual Networking Index update, dated Feb 2015
10. METIS reports on 5G technology creation

tsdsi
India's Telecom SDO

Thank You