Volume 27 Issue 1 January 2023

NEWSLETTER

TELECOMMUNICATION ENGINEERING CENTRE

Message

From the desk of....
Sr. DDG & Head, TEC

Dear Readers,

It is my privilege and pleasure that I am reaching you all regularly through the quarterly e-Newsletter of Telecommunication Engineering Centre (TEC) by sharing our view, vision, and disseminating information about our activities and achievements.

Its a great pleasure to announce that TEC is organizing “First International Quantum Communication Conclave” at Vigyan Bhawan, New Delhi from 27-28 March, 2023 in association with C-DoT, TSDSI and IEEE Communications Society- Delhi Chapter. The event is scheduled to be inaugurated by Sh. Ashwini Vaishnaw, Hon'ble Minister for Railways, Communications, Electronics & IT. I cordially invite you to grace the event with your esteemed presence.

I believe that this newsletter for October- December 2022 months will serve as a window showcasing the complete profile of TEC and its achievements, progress made and co-curricular activities during the stipulated period.

We at TEC are committed to provide an ambience to standardize new telecom technologies and products and strengthen country's testing and certification infrastructure.

We look forward to your continued support and suggestions to further improve the Newsletter.

Best Wishes and Warm Regards,

Ritu Ranjan Mittar

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FIRST INTERNATIONAL QUANTUM COMMUNICATION CONCLAVE

Organized by TEC, C-DOT and TSDSI

in technical collaboration with

IEEE Communications Society

Delhi Chapter

Hall No. 5, Vigyan Bhawan, New Delhi

27-28 March 2023

https://cdot.in/qc23

REGISTER

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Telecommunication Engineering Center (TEC) together with the Telecommunications Standards Development Society, India (TSDSI), Centre for Development Of Telematics (C-DOT) and Institute of Electrical and Electronics Engineers (IEEE) Communications Society Delhi chapter are organising the First International Quantum Communication Conclave, bringing together the international experts in the domain, practitioners, start-ups, researchers and the scientific community. The objective is to exchange the state-of-the-art technologies, discuss implementation challenges and explore collaboration opportunities and networking. The Conclave highlights Quantum Key Distribution, Quantum Random Number Generator, Post Quantum Cryptography, Quantum Networks, Sensors, Advanced detectors, Quantum memory, Testbeds ,Quantum communication Standards, Use cases, Implementation issues etc. The audience include Research community, Telecom Service providers, Start-up companies, Industries working on Quantum communication, Standard development organizations, Regulators & Policy makers, Defense, Fintech companies, Banks etc.

Sh. Ashwini Vaishnaw
Hon'ble Minister of
Communications, Railways and IT

Sh. Devusinh Chauhan
Hon'ble Minister of
State for Communications

Prof. Ajay Kumar Sood
PSA to Govt.of India

Sh. K. Rajaraman
Secretary, DoT

Dr. S. Chandrasekhar
Secretary, DST

Dr. Samir V Kamat
Chairman, DRDO

Sh. Uma Shanker Pandey
Member(S), DoT

Sh. R.R. Mittar
Sr. DDG and Head, TEC

RELEASE OF TEC REPORT ON INDIA MOBILE CONGRESS (IMC) 2022 BY SECRETARY (TELECOM)

Shri K. Rajaraman Secretary (Telecom) and Chairman , Digital Communications Commission released TEC report on India Mobile Congress (IMC) 2022 on 20.10.2022 . He appreciated the efforts of TEC in bringing out the report with good action points.

TEC WELCOMES NEW MEMBER (SERVICES), DCC, DEPARTMENT OF TELECOM

TEC welcomes Shri Uma Shanker Pandey as Member (Services), Digital Communication Commission (DCC), Department of Telecommunications (DoT), on his joining the new assignment on 01 February 2023.

Member (Services) interacting with senior officers of TEC during the review meeting

TEC BIDS FAREWELL TO DR. MAHESH SHUKLA, MEMBER (S),

On his superannuation from service on 31 January 2023, after over 35 years of illustrious service in different capacities in Department of telecommunications.

On his retirement from service , we wish him good health, happiness and success in all his future endeavors.

1. AI FOR AUDIO-VISUAL CONTENT ACCESSIBILITY

Audio-Visual Content

Audio-Visual (AV) content refers to any content that combines audio and visual elements. Examples of such content include live-action videos such as sports events, news and weather broadcasts, online video content such as e-learning courses and webinars, augmented reality (AR), virtual reality (VR), TV shows, music videos, animation, feature films, documentaries, and so on. Such content is often used for entertainment, education, and information dissemination.

AV content has become an integral part of our daily lives and continues to grow in popularity. With the increasing availability of high-speed internet, AV content is now easily accessible to a global audience via streaming platforms and social media.

Accessibility in audio-visual content

Many individuals with disabilities have difficulty accessing and engaging with traditional audiovisual content. This can include individuals with visual or hearing impairments, as well as those with cognitive or learning impairments. The World Bank estimates that 10-12% of the population worldwide has a condition that inhibits their use of standard interactive systems.

Accessibility in AV content is important in enabling people with disabilities to access and understand the content. This can include adding captions or subtitles for the hearing impaired, providing audio descriptions for the visually impaired, and ensuring that the content is usable by assistive technology such as screen readers. Additionally, accessibility can benefit people who speak different languages and those who have difficulty understanding the spoken content.

Artificial Intelligence (AI) for Accessibility

Artificial intelligence can assist in the accessibility of audio-visual content in several ways:

i. Automatic caption generation: AI can use speech recognition technology to generate captions for AV content to help the hearing impaired understand the content.

ii. Audio description generation: AI can use natural language processing (NLP) to generate audio descriptions of visual elements in a video, such as actions or changes in the scenes, to help the visually impaired understand the content.

iii. Language translation: AI can automatically translate AV content into different languages to make the content accessible to people who speak different languages.

iv. Audio enhancement: AI can use signal processing techniques to enhance audio quality, such as increasing the volume or reducing background noise, to make it more accessible for people with hearing impairments.

v. Colour contrast enhancement: AI can use image processing techniques to adjust the colour contrast of video frames to make them more accessible for people with visual impairments.

vi. Object detection and recognition: AI can use computer vision techniques to detect and recognize objects in video frames, to provide additional information for accessibility, such as describing the location and actions of people or objects in the video.

vii. Face detection and recognition: AI can use computer vision techniques to detect and recognize faces in video frames to provide information about who is speaking or appearing in the video to enhance accessibility.

viii. Predictive captioning: AI can use deep learning techniques to predict what will be spoken in a video and generate captions ahead of time. This can help people who are hard of hearing to follow the video more easily.

Overall, AI can play a key role in making AV content more accessible by providing alternative ways for people to access and understand the content, and by providing additional information that can help people with disabilities navigate the content.

However, it is important to mention that AI-generated captions and audio descriptions may not be 100% accurate, and human review may be required to ensure the accessibility of the content.

TEC initiatives on AV content accessibility

TEC is actively contributing to the standardisation works of ITU-T on audio-video media accessibility. Shri Avinash Agarwal, DDG (Convergence & Broadcasting) TEC is the Rapporteur of ITU-T Study Group Q11/9 titled “Accessibility to cable systems and services”. Under this Question, India is driving two work items related to Common User Profile Format and Live Captioning.

TEC has also recently initiated consultations on a report titled "Audio-Visual content Accessibility Roadmap for India", which would also involve AI for accessibility.

Conclusion

Making audio-visual content accessible is important for inclusivity and equality, as it allows all individuals to have access to the same information and opportunities. It provides individuals with disabilities the opportunity to fully engage and participate in the entertainment, educational, and information that such content provides. Accessibility helps to ensure that everyone, regardless of their abilities, can access and enjoy the same audio-visual experiences.

Artificial Intelligence (AI) has the potential to revolutionize the way we interact with AV content, particularly for individuals with disabilities.

By C&B Division

2. IMT-2030: TECHNOLOGY ENABLERS IN BANDS ABOVE 100 GHZ

High-frequency operation poses a significant challenge due to the high propagation losses and the need for high-gain antennas, which can be overcome with the various technologies as discussed below:

Antenna Technologies

One potential solution to overcome the challenges of high frequency communication is to use phased array antennas, which consist of multiple antenna elements that can be dynamically adjusted to steer the direction of the transmitted or received beam. This allows for better control of the direction of the signal, enabling communication even in non-line-of-sight scenarios.

Metamaterial antennas are another potential solution, as they can manipulate the electromagnetic properties of materials to achieve desired antenna properties, such as high gain, narrow beamwidth, and low profile. These antennas have been explored for use in communication systems above 92 GHz, where they can potentially achieve high directivity and gain.

Also, millimeter-wave massive MIMO (multiple-input and multiple-output) systems, which use large numbers of antennas to improve capacity and robustness, can also be used in high frequency communication. By using a large number of antennas, the system can create multiple beams simultaneously, allowing for greater flexibility and resilience in the face of interference and blockages.

Semiconductor Technology

In addition to the speed of the transistors, other factors such as power consumption and linearity also play a critical role in determining the performance of circuits and systems operating at frequencies above 92 GHz. For example, at these high frequencies, the power consumption of active devices tends to increase significantly, which can lead to issues such as thermal management and reduced battery life in mobile applications. Similarly, linearity becomes increasingly important as higher order harmonics can interfere with the desired signals and cause distortion.

To address these challenges, researchers are exploring a variety of novel device technologies, including III-V compound semiconductors, silicon-based devices such as SiGe and CMOS, as well as emerging materials such as graphene and carbon nanotubes. These materials offer unique advantages and trade-offs in terms of speed, power consumption, and linearity, and careful consideration is needed to select the most appropriate technology for a given application.

Overall, the availability of multiple device technologies capable of supporting >92 GHz applications, coupled with advancements in packaging and system-level design, is paving the way for the development of high-speed, low-power, and highly integrated systems for a variety of applications ranging from wireless communications to sensing and imaging.

Material Technology: Reconfigurable Intelligent Surfaces (RIS)

Some of the challenges associated with RISs include the need for a control system architecture that can support reconfigurability and beamforming, taking into account contextual information and reducing vulnerability due to blockages. This requires channel estimation, which can be computationally intensive and can result in delays. Additionally, the design and optimization of RISs must be carefully considered to ensure that they are effective in aiding communication at high frequency bands. Despite these challenges, RISs have the potential to be a key enabler for Terahertz communications and could play an important role in sustaining non line-of-sight communication and ensuring communication at higher frequencies with mobile objects.

Robust beamforming and tracking techniques:

To address the challenges of beam misalignment and tracking errors in above 92 GHz frequency regime, robust beamforming and tracking techniques are needed.

These techniques should be capable of adapting to the specific conditions and usage scenarios. In addition to thermal expansion, wind loads, and vibrations, mobility in various random trajectories can cause stochastic tracking estimation errors. These errors can be further compounded by hardware imperfections in the antenna array, including array perturbation and mutual coupling.

To mitigate these issues, research is ongoing to develop robust beamforming and tracking algorithms that can handle these challenges. These algorithms should be able to compensate for the misalignment caused by physical phenomena and hardware imperfections, and adjust the beamforming parameters to maintain a stable and reliable communication link. Additionally, they should be able to adapt to the mobility of the transceiver antennas and the stochastic nature of the tracking estimation errors.
Overall, developing robust beamforming and tracking techniques is crucial to enable reliable communication in the above 92 GHz frequency regime, especially in scenarios where perfect alignment of the antennas is not feasible.

Conclusion:

A range of technologies, including phased array antennas, metamaterial antennas, millimeter-wave massive MIMO systems, semiconductor devices, reconfigurable intelligent surfaces (RIS), and robust beamforming and tracking techniques, are being developed to address the challenges in high frequency bands. These technologies offer promising solutions to enable reliable communication in the above 92 GHz frequency regime, which can support a range of applications ranging from wireless communications to sensing and imaging. Continued research and development in these areas are essential to realize the full potential of high frequency bands in future wireless communication systems.

- By 6G Technology Division

STANDARDIZATION

STANDARDS RELEASED

1. GR for Quantum Key Distribution System (No: TEC 91000:2022): These standards would help in validating the specifications and performance of QKD System for deployment in the Communication networks to build a secure end-to-end communication infrastructure.

Release of TEC standard document on QKD system by Hon'ble Minister of Communication along with Smt. Meenakshi Lekhi, Hon'ble MoS External Affairs on 26th October 2022

2. GR for Compact LTE Mobile System (No: TEC 23070:2022). This document describes functional requirements, general requirements and features of Compact LTE Mobile System systems for use in the Indian telecom network. It may also be called by other names like "LTE Network in One Box (LTE NIOB)" or "LTE Network in a Box (LTE NIB)" or "Compact Cellular Network (CCN)".

3. GR for gNodeB (No: TEC 21060:2022): This document contains the Standard for GR of gNB for New Radio (NR) based mobile communication system for deployment in the Indian mobile communication network. The document specifies Technical Requirements, General Requirements, Features and Functionality of the gNB for NR based mobile communication system.

This GR is applicable for both FDD and TDD modes of operation. For TDD both Mid Band and mmW is considered.

4. GR for Optical Spectrum Analyser (No: TEC 88080:2022): This document describes the standard for generic requirements of the Optical Spectrum Analyser.

The Optical Spectrum Analyser shall be used for measuring wavelength characteristics of active and passive optical devices in the wavelength range from 1260nm to 1650nm.

5. Test Guide for Standard for GR of "Band Pass Filter for C-Band Satellite Earth Receivers in 3700-4200 Mhz Guard Band" (No. TEC 57031:2022) released on 28th December 2022 to address possible interference from 5G to the satellite earth receivers used for DTH television broadcasting by MSOs, etc.

STANDARD ADOPTION

1. 3GPP Release-17 Standards: 3GPP Release 17 standard specifications related to 5G (total 1227) as transposed by TSDSI has been adopted into National Standards by TEC. (**Click** for more details)

2. 3GPP Release 13 to 17 standards: TEC has initiated the process for adoption of TSDSI transposed 3GPP Release 13 to 17 standards in to National Standards. Public comments has been invited on adoption of these into National Standards. (**Click** for More Details)

Note: Adoption Policy and adopted standards are available at
https://www.tec.gov.in/standards-adoption-policy

STANDARD WITHDRAWAN

1. 64 Kbps Digital Cross Connect Equipment with 2048 Kb/s Access Ports (No: GR/DTC-01/03.AUG.2008)

2. Optical Talk Set (No: TEC/GR/ TX/ OPT-001/ 05/ OCT-14)

3. Mechanical Splice For Optical Fibres (No: TEC/GR/TX/OMS-01/02/NOV-09)

4. Wavelength Division Multiplexing (WDM) Analyser (No: GR/WDA-01/02.FEB.2009)

STANDARDIZATION

STANDARDS FOR CONSULTATION

1. **"Assessing and rating Artificial Intelligence Systems for fairness":** Released Draft Standard for assessing and rating AI Systems for fairness (No. TEC 57050:2022) on 29-12-2022 for public consultations.

2. Draft GR on **Post Quantum/Classical Cryptography Systems** were released for Sub-DCC and MF meeting

3. **"Radio over Fibre":** TEC released this document for consultation. This document describes the generic requirements and specifications for Radio over fibre systems for local and access networks, as per, ITU-T G.9803 Recommendations for use in Indian telecom network.

4. Draft Test Guide for **validation of conformance/ functionality/ requirements/ performance of the Quantum Key Distribution (QKD) system** as per the TEC GR No.: 91000:2022 was released for comments/consultation.

5. Draft New TEC standard for GR on **"50G High Speed PON system for FTTx based broadband applications, Number: TEC 71110:2022":** Sub-DCC & Manufacturers Forum (MF) meeting of FA division held on 03rd November 2022 for discussion and consultation.

6. Consultation with MF and Sub DCC was held on 15.12.2022 for TEC Standard **"Specific Absorption Rate (SAR) for Wireless Communication Devices used in close proximity of human body"**

7. Consultation with MF and Sub DCC was held on 14.12.2022 for the revision of following standards Standards-

- **LAN Switch (GR/SLC-01/02.SEP 2005)**
- **Firewall System (TEC/GR/IT/FWS-001/04/MAR-14)**
- **Intrusion detection System for IP network Security (TEC/GR/IT/IDS-001/04/SEP-18)**

8. Discussion Paper on **"Radio Frequency (RF) Electromagnetic Field (EMF) Compliance Assessment of 5G Base Stations"** released for inviting stakeholder comments.

9. **"Middleware for delivering broadcast content to portable devices through Wireless LAN"**: Released draft Standard for consultation for receiving live television and other audiovisual content to portable devices such as mobile phones, laptops, tablets through WLAN/ WiFi without consuming internet/ mobile data. TEC Standard will enhance access to television in rural areas, public utility places, moving vehicles. No extra hardware, software, or app required at the user end. No special phone or chipset required. Click here for more details.

10. **Audio-Visual content Accessibility Roadmap for India**: TEC initiates consultations on Technical Report on Audio-Visual content accessibility roadmap for India aiming to enable persons with disabilities to access broadcast & other audio-visual content using AI and 5G. **Click here** for more details.

मानक
सं: टीईसी 57050:2022 (Draft)

STANDARD
No.: TEC 57050:2022 (Draft)

आर्टिफिशियल इंटेलिजेंस सिस्टम की निष्पक्षता मूल्यांकन और रेटिंग

Fairness Assessment and Rating of Artificial Intelligence Systems

ISO 9001:2015
दूरसंचार अभियांत्रिकी केंद्र
दूरसंचार विभाग, संचार मंत्रालय
खुर्शीदलाल भवन, जनपथ, नई दिल्ली - ११०००१, भारत
TELECOMMUNICATION ENGINEERING CENTRE
DEPARTMENT OF TELECOMMUNCTIONS, MINISTRY OF COMMUNICATIONS
KHURSHIDLAL BHAWAN, JANPATH, NEW DELHI - 110001, INDIA
www.tec.gov.in

STANDARDIZATION

CONTRIBUTIONS TO ITU

- **ITU-T SG2**

An Indian contribution was presented in the Rapporteur Group Meeting (RGM) of ITU-T SG-2 held during 01-04 November 2022. This contribution provides a first draft to **TR.Carrier-Switching** "Technical report on the carrier switching of SIM and e-SIMs for enterprises in M2M/IoT".

Contributor: Sh. Tejpal Singh, Director DoT

Outcome: Considering the contributions submitted to this RGM, the participants agreed to the following way forward and to instruct the Editors of TR.Carrier-Switching to: *take all the contributions including the contribution from India and integrate the text from the received contributions into a new base text and look to publish the integrated text towards the end of 2022 to allow sufficient time for contributions to be made in advance of the March 2023 SG2 meeting. The meeting participants also agreed to call for contributions for the next SG2 meeting in March 2023 to further develop any points or gaps within the technical report*.

- **ITU-T SG5**

Following four contributions for the ITU-T SG5 meeting held from 17-27 October 2022 at Rome:

1. Proposal to update the Text of draft Recommendation of **ITU-T L.5G_sav "Energy saving technologies and best practices for 5G RAN equipment"**.

Contributors: Prof. Goutam Das, IIT Kharagpur and his team of Research Associates Sourav Dutta Dibbendu Roy.

2. **ITU-T L.ICT_PROCURE "Public procurement of ICTs to mitigate the adverse effects of e-waste"**. (Q7/5). This contribution proposes Addition of text in Baseline document of draft Recommendation.

Contributors: Sh Mohit Agarwal, ADG TEC.

3. Draft Recommendation **ITU-T K.80** - EMC requirements for telecommunication network equipment (1 GHz-6 GHz). This contribution proposes modifications in the baseline text of the draft Rec. ITU-T K.80.

The contribution was recommended for submission in the ITU-T SG-5 meeting TR-FSR (Technical Report):- Factual subscriber base reporting and protected content delivery in conditional access system.

Contributor: Sh Anshul Gupta, AD TEC.

4. Proposal for updating the content of the **ITU-T Recommendation K.small.**

The proposal is for updating the content of ITU-T Rec. K.small. The contribution is on impact of small cells on overall exposure level. The proposed Base Station installation classes as specified in of [IEC 622332] as a reference framework for assessment of impact of small cell deployments on overall level of EMF exposure.

Contributors: Sh Ashish Tayal, Director, TEC

Outcomes: The three contributions ar Sr No 2,3,4 above were accepted by SG5 and further work to continue on these items. The contribution pertaining to L.5G_sav was discussed in SG5 meeting and was appreciated. However, as the contribution document proposed changes to 3GPP recommendation, it was suggested by the chair to take this to 3GPP.

- **ITU-R WP5D**

Following four Indian Contributions submitted in the ITU-R WP5D 42nd meeting, held in October 2022:

1. Proposed modifications to **ITU-R M.1036**. This contribution proposed modifications to ITU-R M.1036. It proposed inclusion of 3GPP identified spectrum band 663-703/612-652 MHz in Section 3 of ITU-R M.1036

Contributor: IFAI

2. Working Document Towards Preliminary Draft New Report **ITU-R M.[IMT.INDUSTRY]**. The contribution proposed further improvements in the ITU-R working document, in Section 2, 4, 6, 7 and 8 dealing with various IMT applications. Further, the contribution proposed revision in Section 5 of the WP5D working document dealing with IMT Applications in Power Utilities.

Contributor: IoT Division, TEC and M/s Qualcomm

3. Proposal towards **"REPORT ITU-R M.[IMT TERRESTRIAL BROADBAND REMOTE COVERAGE]":** This contribution was on WP5D working document towards Preliminary Draft New Report (PDNR) ITU-R M.[IMT TERRESTRIAL BROADBAND REMOTE COVERAGE].

Contributors: M/s Ericsson

4. Working document towards Preliminary Draft New Report **(PDNR) M.[IMT.VISION 2030 AND BEYOND].** The contribution document provides a framework for further development mainly for Section 4: Usage Scenarios for IMT for 2030 and Beyond & Section 5: Capabilities of IMT for 2030 and Beyond of the draft PDNR.

Contributors: M/s Qualcomm

Outcomes: All above (four) contributions were well received in the ITU-T Working Party 5D 42nd meeting and were suitably incorporated in the Working Documents.

- **ITU-T SG9**

Four rapporteur meetings of ITU-T SG9 were held during the period wherein NWG-9 members have participated actively and presented the progress in the Indian contributions.

1. The updated Indian contribution in r/o **technical report on Secondary distribution of digital television and audiovisual content to portable devices using Wi-Fi**- was discussed in the Rapporteur meeting of Q1/9 on 13/12/2022.

Sh. Avinash Agarwal, DDG (C&B), Sh. Rakesh Desai, Director (C&B-II) and Sh. Pallab, C-DOT presented and explained the updated version of the contribution during the meeting.

2. The updated Indian contribution regarding **"Functional requirements for terminal devices of the Broadcast Direct to Mobile (D2M) networks"** was discussed in the Rapporteur meeting of Q6/9 on 22/11/2022.

DDG (C&B) and Ms. Meenakshi Singhvi, Prasar Bharti presented and explained the updated version of the contribution during the meeting.

3. The updated Indian contribution in r/o **Technical Report on Technical advances, challenges, and best practices in live captioning-** was discussed in the Rapporteur meeting of Q11/9 on 01/12/2022 under the Chairmanship of Sh. Avinash Agarwal, DDG (C&B) wherein Director (C&B-II) presented and explained the updated version of the contribution during the meeting.

4. **Q8/9 Rapporteur meeting** of SG9 was held under the chairmanship of Sh. Rakesh Desai, Director (C&B-II) on 23/11/2022 wherein the updated two contributions of MIIT, China regarding -Requirements of microservice architecture for audio-visual media in the converged media cloud and Specification of microservice architecture for audio-visual media in the converged media cloud, were discussed and deliberated.

- **ITU-T SG11**

Following three Contributions submitted and presented to ITU-T SG-11 in WP & RGM of ITU-T SG-11 held from 28th November 2022 to 7th December, 2022:

1. Technical requirements, interfaces and generic functions of CEIR **(Central Equipment Identity Register)** to combat counterfeiting mobile devices.

2. **Consumer Centric framework for combating counterfeit and stolen ICT mobile devices**.

3. Draft ITU-T Recommendation Q.TSRT_IoT **Test specifications for remote testing of Internet of Things using the probes**. Anshul Kumar Gupta, AD(CA) is also Editor of the output draft recommendation

- **ITU-T SG12**

The ITU-T SG12 (Q12/12) recommendation **E.MVS - "Mapping and visualization strategies for the assessment of connectivity and QoS"** is under study. Shri. Abdul Kayum, DDG (6G), TEC has been assigned editor of the recommendation E.MVS.

The contribution provides the framework for a rating of Buildings as needed in the implementation of the TRAI recommendation on "Rating of Buildings".

STANDARDIZATION

• ITU-T SG13

Three contributions were submitted/ presented to ITU-T SG-13 meeting held from 14th – 25th Nov 2022 and all have been accepted

1. The contribution on draft new recommendation ITU-T Y.Trust-Registry for **Devices and applications: requirements, architectural framework**" has been accepted as recommended under Q16/13.

2. The Contribution on draft Rec. Y.ML-IMT2020-MLFO **"Architectural framework for MLFO in future networks including IMT-2020"** under Q20/13; and

3. The Proposal to initiate a new work item on **"Architectural framework for NGN evolution by extending SDN paradigm to the Network control plane"** under Q2/13.

• ITU-T SG20

1. Contributions on proposed revision of work item Y. SRC **"ICT and IoT requirements for deployment of Smart services in rural community"** was submitted, presented and discussed in detail in ITU-T SG-20 Q2/20 Rapporteur's e-meetings, Oct and Dec 2022. The meetings were attended by Mr. Sushil Kumar, DDG (IoT) and Ms. Namrata Singh, ADG(IoT).

This work item is targeted for consent in the ITU-T SG-20 meeting, Jan - Feb 2023.

2. Two contributions namely **Applications of Drones, AI and IoT in Cashewnuts farming** and **IoT based Farmland Surveillance System with Disease Detection in Paddy Crops**, based on the projects in VIT Chennai were prepared, submitted and presented in SG-20 Focus Group on 'AI and IoT for Digital Agriculture' (**FG-AI4A**), meeting from 17-19 Oct 2022. The virtual meeting was attended by DDG (IoT), ADG (IoT) and academia members from VIT Chennai.

Ms. Namrata Singh, ADG (IoT) got the position of Vice-chair in ITU-T Focus Group on 'Artificial Intelligence (AI) and Internet of Things (IoT) for Digital Agriculture' (FG-AI4A) in Working Group for Mapping and Analyzing AI and IoT standards related Activities in Digital Agriculture.

TEC RECOGNITION BY ITU

International Telecommunication Union (ITU) has posted following five Technical Reports released by TEC in M2M/ IoT domain in 2021-22, on its website recognizing them as insightful resource for the global community- Click here for more details

1. Framework of National Trust Centre for M2M/IoT Devices and Applications
2. IoT/ ICT Standards for Smart Cities
3. Emerging Communication Technologies & Use Cases in IoT Domain
4. Code of Practice for Securing Consumer Internet of Things (IoT)
5. IoT/ICT Enablement in Smart Village and Agriculture

TEC has released eighteen Technical Reports so far in M2M/ IoT domain covering various verticals, Communication technologies and Security click here.

OTHER INTERNATIONAL MEETINGS:

1. Mr. Sushil Kumar, DDG (IoT) participated as head of Indian delegation in **12th Plenary & WG meetings of ISO/IEC JTC 1/SC 41 (IoT and Digital Twin)**, virtually, held in Berlin, Germany, 28 Nov-2 Dec 2022. This meeting was attended by Indian delegation of four members in-person in Germany and several industry members including Dir (IoT) and ADG (IoT) virtually.

2. Ms. Namrata Singh, ADG (IoT) attended 8th **Interop event** at TTA premises, South Korea, 5-7th Dec 2022.

STANDARDIZATION

TEC'S MEMBERSHIP FOR IEEE-SA

Telecommunication Engineering Centre (TEC), has taken the Advanced Level Corporate Membership of Institute of Electrical and Electronics Engineers Standards Association (IEEE-SA) for the year 2023. The IEEE Standards Association (IEEE SA) is a globally recognized standards-setting body within IEEE. It develops standards based on consensus and requirements gathered through the stakeholders participating in the working groups. IEEE standards set specifications and best practices based on current scientific and technological knowledge. The IEEE SA has a portfolio of over 1,300 active standards and more than 500 standards under development. Organizational Members, or Entity Members, enjoy networking and access to a broad cross-section of industry thought leaders and standards development participants.

STANDARDS COORDINATION PORTAL

TEC has developed the Standards Coordination Portal (SCP) on the lines of ITU-T portal to facilitate Indian contributions to various global standardisation organisations. This portal will act as a platform to share the information and collaborate on the standards development activities. Home page of the Portal displays information related to SDOs, NWGs/NSGs/SGs, DOT social media and having the features of 'Login/Sign-up option', 'Bulletin Board', 'Events Calendar', 'What's New', 'FAQ', 'Chat Bot' for Virtual AI assistance, opting for E-mail subscription, etc. DDG (C&B), TEC Demonstrated, functions and features of SCP to to the Secretary (T) & DDG (IR) on 25.10.2022. All 11 NWGs related to ITU-T SGs are on-board and the Group Admin concerned is updating the information related to his / her group. Security audit of the Standards Coordination Portal Web Application has been successfully completed on 31/12/2022.

NWG/ NSG MEETINGS/ ACTIVITIES

NWG-2: Third meeting of NWG-2 to discuss the contribution on "Carrier switching" (Q2/2) for further submission to ITU-T SG2 was held on 10 Oct 2022.

NWG-9: Two meeting of National Working Group (NWG)-9 were held in period for discussing the contributions for rapporteur meetings of ITU-T SG9.

NWG-12: The Fifth meeting of NWG-12 was held on 05 Dec 2022. The following contributions were finalized for submission in the ITU-T SG 12 meeting scheduled in Geneva from 18-26 January, 2023:

- ITU-T E.AIQ (Q12/12) – Objective Quality evaluation of voice based chats (Indian contribution).
- ITU-T E.MVS (Q12/12) -Mapping and visualization strategies for the assessment of connectivity and QoS
- A new contribution (Q2/12) titled "Framework for Enhanced Quality of Experience by using Cultural and Emotional Context in Applications based on Natural Language Understanding".

NWG-13: Third meeting of NWG 13 was held on 14 Oct to discuss three contributions for submission in ITU-T SG-13 meeting held from 14– 25 Nov 2022.

NWG-15: Third NWG-15 meeting was held on 14 Oct to apprise about contributions submitted and adopted by ITU-T SG15 in last plenary meeting dated 19-30 Sept 2022.

NWG-16: Third meeting of NWG-16 was held online on 24 Nov. Four questions (Q5/16, Q8/16, Q13/16, Q27/16) were selected by members earlier for contributions. In the meeting, IIT Kharagpur shared some ideas as initial contributions for Q13/16 and Q27/16. The members were asked to contribute for questions which are beneficial for India and to identify the work items against which their contributions would map.

NWG-20: Virtual meetings of NWG- 20 were held on 9th Nov and 20th Dec to discuss and finalize contributions for the upcoming SG-20 meeting, Jan-Feb 2023.

TESTING AND CERTIFICATION

MANDATORY TESTING (MTCTE)

Indian Telegraph (Amendment) Rules, 2017 provides that telecom equipment are to be mandatorily tested and certified against EMI/EMC, Safety, Technical, Security and other requirements like SAR, IPv6 etc before its sale, import or use in India.

a) Certificates issued: Quarter Q3 = 99, Total = 367 till date

b) Status of OEM registration: Indian OEM = 03, (Total= 94 till date); Foreign OEM = 10, (Total= 141 till date)

More details about MTCTE are available at https://www.mtcte.tec.gov.in/

CAB DESIGNATION ISSUED

CAB designations issued : New = 02; Renewed = 02

Total Designanted CABs = 62 (as on 31.12.2022)

IT Safety = 43	EMI/EMC Testing = 32
SAR Testing = 04	Environmental Testing = 24
Optical Fibre =02	BLE Interface=05
Wi-Fi Interface =08	Radio Safety =04
LPWAN LoRA Interface = 03	RFID Interface=03

UPDATES

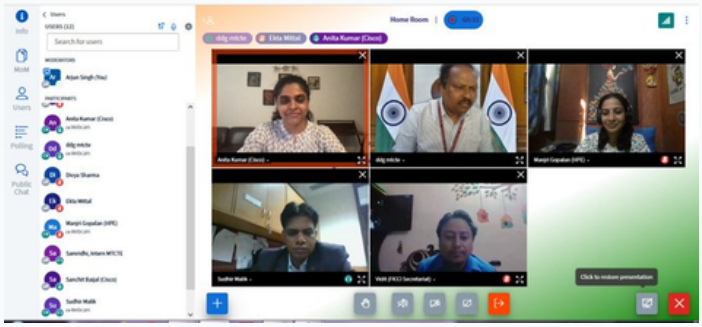
1.MTCTE Dashboard developed by CDoT to monitor applications (pending) and certificates status, made effective w.e.f. 20.10.2022.

2. An online meeting was held on 15 Nov with IIT Madras, as an initiative for collaboration of Testing Infrastructure created by IIT Madras for catering to Conformity Assessment/Testing requirements of Telecom Sector.

3. Certain products namely Routers, Switches, PON Equpment, Cordless Telephone, EPABX etc were shifted from General Certification Scheme (GCS) to Simplified Certification Scheme (SCS) under MTCTE w.e.f. 01.01.2023 was notified on dated 01.11.2022.

4. Stakeholders Consultation regarding EOL and HSE exemption under MTCTE was held on 02.11.2022.

5. TEC had a virtual online meeting on 11.11.2022 , with FICCI and number of Global OEMs in a bid to resolve their issues related to MTCTE. This is as a part of Ease of Doing Business



VOLUNTARY TESTING

Certificate issued in Q3 = 03 (02 Type Approval Certificates (TAC), 01 Technology Approval)
Total certificate issued till 31.12.2022 = 28 (16 TAC, 07 IAC, 01 Certificate of Approval (CoA) and 04 Technology Approval)

UPDATES:

1. An online training session was organised for all designated CABs about process of filling CAB application for NSWS portal, on 11.10.2022. M/s Invest India team briefed participants about the process of registration and submission of application on Portal.

2. A meeting with all designated CABs on “Development of testing capabilities for 5G Testing & ECR Testing” was held on 12.12.2022.

3. A presentation/ virtual meeting on test solution for 4G/5G/ORAN developed by M/s Rebeca Technologies, Kolkata was held on 22 Dec 2022.

4.TEC has Invited EOI for submission of Technical Solution along with Budgetary Quote for the project “Test as a Service (Taas)”.

5.C-DoT 4G RAN eNodeB testing has started on 26.08.2022 and 130 test cases out of 240 carried by the End of Dec 2022.

TESTING AND CERTIFICATION

TESTING & EVALUATION OF CDOT'S 4G CORE:

Sr. DDG, TEC visited CDoT and other Pilot PoC Project sites on 18-20 November to boost up the **4G RAN eNodeB** testing at various pilot project sites.

C-DoT Testing Site:

For speedy deployment of indigenous C- DoT 4G Core, the same is being evaluated by TEC officers with C- DoT testing and validation team for technology approval and Certification.

Internal Audit for ISO 9001:2015 was conducted from 13-16 Dec 2022 for 20 Divisions of TEC.

KNOWLEDGE DISSEMINATION

IMPORTANT MEETINGS & ACTIVITIES

1. As a part of the initiative from TEC to collaborate and **develop synergy among the stakeholders from academia, industries, startups, and R&D institutions for facilitating Indian ecosystem work in emerging technologies to mature into standards in line with Global Developments**, the visits/interaction with following institutions were made:

- Jaypee Institute of Information technology, Noida on works being carried out on QKD and PQC Systems.
- IIT Roorkee and IIT Patna on works being carried out on Terahertz Communications.
- M/s VVDN Technologies, Gurugram on the testing facilities available for conformance testing of 4G and 5G network elements.

2. Sh. Abdul Kayum, DDG(6G) delivered the talks as Expert speaker in the panel discussion on **"Leading the 6G Standards to a sustainable future"** in the 5th Edition of TSDSI Tech Deep Dive Conference 2022, held from 7-10 November 2022.

3. DDG(6G) Chair for the Session - **"Delivering a 6G R&D roadmap"** at 2nd India Spectrum Management Conference held in Delhi from 06-07 December, 2022.

4. DDG(6G) delivered the talks as Keynote speaker and a panelist in a round table with industry experts at **"6G Mobile Wireless Communication Symposium"** organized at IIT Patna from 09-10 December, 2022.

5. Mr. Sushil Kumar, DDG (IoT) chaired the 22nd meeting of **BIS Sectional Committee, LITD 27 on 'Internet of Things and Related Technologies'** on 25th October 2022 for preparing contributions for ISO/IEC JTC1 SC41 meeting, Dec 2022. This meeting was attended by several industry members including ADG(IoT) TEC.

6. A meeting was held under the chairmanship of Secretary (T) on 29th December 2022, on **IoT Security and setting up a National Trust Centre for M2M/IoT Devices and Applications.** DDG (IoT) made a presentation on policy actions required for IoT Security and Framework of NTC. C-DOT presented on the development of NTC. This meeting was also attended by Member (S), Member (T), NT wing DoT HQ and NCCS Bengaluru.

7. DDG (IoT) delivered key note address on **IoT Security** in TSDSI Tech Deep Dive 2022 on 10th Nov 2022.

8. DDG (IoT) expressed his views virtually on 22nd Nov 2022 in the session on **STANDARDS TRACK** in Future Tech Congress 2022, Bangalore.

9. DDG (IoT) delivered his talk on **Intelligent Transport System (ITS)** with 5G and beyond in Smart Mobility Conference, Mumbai, 17th November 2022.

10. DDG (IoT) delivered the inaugural address in Anritsu Telecom Symposium, 30th Nov 2022.

11. DDG (IoT) shared views on **Certification / Compliance Ecosystem** virtually in oneM2M conference Korea, 2nd Dec 2022.

12. DDG (IoT)shared views on **IoT Security and initiatives taken by TEC in IoT domain** in a Webinar organized by DoT – TEC for M2MSPs on 7th Dec 2022.

13. DDG (IoT) delivered his talk on **IoT Security & trust** in C-DOT global conference on 16th Dec 2022.

KNOWLEDGE DISSEMINATION

14. Sh. Avinash Agarwal DDG (C&B) talked on **'Broadcast/Local content delivery through last mile Wi-Fi APs'** at the USOF Conference on New Technologies for BharatNet at SCOPE Complex Auditorium New Delhi. He highlighted that such access technology will help in spreading the reach of #television and audio visual content in use cases like education and healthcare etc.

15. Bengaluru Tech Summit 2022 (16-18 November 2022): TEC participated in **Bengaluru Tech summit** along with NCCS. Sh. N. Murali Krishna DDG RTEC SR has given the presentation on the Role of TEC and Importance of Mandatory certification of Telecom Equipment.

WEBINARS/ WORKSHOPS/ TRAINING

1. Conducted a **hybrid Workshop** on **"Contributions to IEEE and Blockchain for Telecom"** on 15th December 2022. Distinguished Speakers are from IEEE, NITI Aayog, Reliance JIO, and Vidhi Centre for Legal Policy. The Workshop has twin objectives:

(i) to enhance the contributions from DoT officers in IEEE Standards and IEEE Journals, and

(ii) discuss the role of Blockchain technology in the Telecom Sector

2. An Open House session was organised on 10th November 2022 on **Role of Standard Setting Organisation for the Broadcasting Sector in India**. Sh. RR Mittar, Sr. DDG &Head TEC highlighted significance of standards in strengthening initiatives under AtmaNirbharBharat.

3. A group of officers from TEC **(**Venkata Rama Raju Chelle, Director (QT), Dhanesh Goel, ADG (TC), Mohit Agarwal, ADG (M), Preetika Singh, Director (TS)) has undergone the following training during this quarter:
a) Phase-I of the Competency Development Program – Domain Expert "Network & Mobile Security" in online mode at IIT-Kanpur from 10-13 Oct, 2022.
b) Phase-II of the Competency Development Program – Domain Expert "Network & Mobile Security" at C-DAC Pune from 07 Nov to 02 Dec, 2022.

4. TEC on 19.10.2022 organized one day training program consisting of 5 technical sessions including various TEC functions, ongoing activities and Lab visits for the Officers Trainees of IP&TAFS Group A officers of 2020&21 batch

UPDATES

6G TECHNOLOGY

The Department of Telecommunications has constituted a Technology Innovation Group on 6G **(TIG-6G)** on 1st November 2021 with members from various Ministries/Departments, research and development institutions, academia, standardization bodies, Telecom Service Providers and industry to develop Vision, Mission and Goals for the 6G and also develop roadmap and action plans for 6G in India.

The TIG-6G has constituted six Task Forces with industry, academia, R&D institutions and Government as members on Multi-Disciplinary Innovative Solutions, Multiplatform Next Generation Networks, Spectrum for Next Generation Requirements, Devices, International Standards Contribution and Funding Research and Development. India is also contributing to International Telecommunications Union (ITU) in 6G visioning exercise.

ADVANCED OPTICAL COMMUNICATIONS (AOC)

A Roundtable on Advanced Optical Communications (AOC) was organised by DoT, to explore how different Academic and Industry organizations can contribute to the indigenous technology development and demonstration in the domain of AOC

WORLD STANDARDS DAY

World Standards Day (or International Standards Day) is an international day celebrated internationally each year on 14 October. The day honours the collaborative efforts of thousands of experts worldwide who develop voluntary standards within standards development organizations such as ITU, IEEE, ETSI, and IETF etc. The aim of World Standards Day is to raise awareness among regulators, industry and consumers as to the importance of standardization to the global economy.

TEC celebrated World Standards Day on 14th October. Sh. RR Mittar, Sr.DDG & Head TEC emphasised the need to keep pace with fast changing technologies while achieving the objective of #AtmanirbharBharat. TEC Officers shared ideas on improving the standardisation process of Working Groups.

HR ACTIVITIES

TEC WELCOMES ON NEW JOINING

- Shri N. Murali Krishna, DDG (SR), RTEC, Bangalore
- Shri Ziaur Rahman, ADET (6G Tech.), TEC, New Delhi
- Shri Rakesh Goyal, ADET (QT), TEC, New Delhi
- Shri Arjun Singh, ADET (TC), TEC, New Delhi

CONGRATULATIONS ON PROMOTION

- Sh Sudhir Kr. Rai, Dir to DDG joined as DDG (NR)
- Sh Piyush Chetiya, Dir to DDG joined as DDG (FN),
- Sh Rakesh S. Desai, Dir to DDG joined as DDG (FA).
- Sh Anand Katoch, Dir to DDG joined as DDG (TC).
- Sh Sushil Kumar, Dir (NR-I) joined BSNL as GM
- Sh Hoshiar Singh, Dir (NGN) joined MTNL as GM.
- Sh Ashish Tayal, Director (R-I) joined BSNL as GM.
- Shri S. K. Vijaivergia, Dir (TS) joined BSNL as GM.

TEC BIDS FAREWELL ON TRANSFER

- Sh Saurabh Gupta, DDG (NR), transfer to BSNL
- Sh Nitin Jain, DDG (CA), transfer to BSNL
- Sh Rajeev Kumar Tyagi, DDG (FN), transfer to Meerut, UP West LSA
- Sh Ashish Tayal, Director (R), transfer to BSNL
- Sh Hoshiar Singh, Director (NGN), transfer to MTNL
- Sh Sushil Kumar, Director (NR), transfer to BSNL
- Sh Paritosh Kr. Shah, Director, transfer to BSNL
- Sh T.B. Shetake,ADG(WR), transfer to Guj. LSA

Farewell program of Sh Saurabh Gupta, DDG (NR), and Sh Nitin Jain DDG (CA) in TEC

HAPPY RETIREMENTS

- Shri Maheshanand, Director, TEC (Retired on December, 2022).

On his retirement from service , we wish him good health, happiness and success in all his future endeavors.

हिंदी गतिविधियाँ

दूरसंचार अभियांत्रिकी केंद्र, नई दिल्ली में दिनांक 20 दिसंबर, 2022 को राजभाषा कार्यान्वयन समिति की तिमाही बैठक का आयोजन किया गया। इस बैठक में अध्यक्ष महोदय द्वारा विशेष रूप से कार्यालय का ज्यादा से ज्यादा कार्य हिंदी में करने तथा हिंदी की तिमाही रिपोर्ट समय पर भेजना सुनिश्चित करने का आह्वान किया गया ।

OTHER ACTIVITIES

CYBER JAGROOKTA DIWAS

TEC has organised a Webinar on **"Cyber Hygiene Practices"** on the occasion of **Cyber Jagrookta Diwas (CJD)** on 06.10.22. A Quiz competition on Cyber Awareness was also held on 07.10.22, wherein large number of TEC officers/staff participated.

VIGILANCE AWARENESS WEEK

On the occasion of Vigilance Awareness Week from 31st Oct to 6th Nov, **integrity pledge** was taken by the officers and staff of Telecommunication Engineering Centre (TEC), Department of Telecommunications.

Integrity Pledge

I believe that corruption has been one of the major obstacles to economic, political and social progress of our country. I believe that all stakeholders such as Government, citizens and private sector need to work together to eradicate corruption.

I realise that every citizen should be vigilant and commit to highest standards of honesty and integrity at all times and support the fight against corruption.

I, therefore, pledge:

- To follow probity and rule of law in all walks of life;
- To neither take nor offer bribe;
- To perform all tasks in an honest and transparent manner;
- To act in public interest;
- To lead by example exhibiting integrity in personal behaviour;
- To report any incident of corruption to the appropriate agency.

सत्यनिष्ठा प्रतिज्ञा

मेरा विश्वास है कि हमारे देश की आर्थिक, राजनीतिक तथा सामाजिक प्रगति में भ्रष्टाचार एक बड़ी बाधा है। मेरा विश्वास है कि भ्रष्टाचार का उन्मूलन करने के लिए सभी संबन्धित पक्षों जैसे सरकार, नागरिकों तथा निजी क्षेत्र को एक साथ मिल कर कार्य करने की आवश्यकता है।

मेरा मानना है कि प्रत्येक नागरिक को सतर्क होना चाहिए तथा उसे सदैव ईमानदारी तथा सत्यनिष्ठा के उच्चतम मानकों के प्रति वचनबद्ध होना चाहिए तथा भ्रष्टाचार के विरुद्ध संघर्ष में साथ देना चाहिए।

अतः मैं प्रतिज्ञा करता हूँ कि :-

- जीवन के सभी क्षेत्रों में ईमानदारी तथा कानून के नियमों का पालन करूंगा ;
- ना तो रिश्वत लूँगा और ना ही रिश्वत दूँगा ;
- सभी कार्य ईमानदारी तथा पारदर्शी रीति से करूंगा ;
- जनहित में कार्य करूंगा ;
- अपने निजी आचरण में ईमानदारी दिखाकर उदाहरण प्रस्तुत करूंगा ;
- भ्रष्टाचार की किसी भी घटना की रिपोर्ट उचित एजेंसी को दूँगा।

ABOUT TEC

- Telecommunication Engineering Centre (TEC) is an ISO 9001:2015 Organization.
- Standards Setting Organization (SSO) for telecom & related ICT sector.
- Designated Authority (DA) for implementation of Mandatory Testing & Certification of Telecom Equipment (MTCTE) and designation of Conformance Assessment Bodies (CAB) & Certifying Bodies (CBs).
- Designated Authority (DA) for testing and certification of Conditional Access System (CAS)/ Subscriber Management System (SMS) used in broadcasting sector as per TRAI notification.
- Designated Authority (DA) for Voluntary Schemes such as Type Approvals/Interface Approvals/Technology Approvals/Certificate of Approvals.
- National enquiry point for WTO –TBT (Technical Barrier to Trade) for telecom sector.
- Complaint resolution authority for local content under PPP-MII (Public Procurement Preference to Make in India) Policy.
- Technical arm/attached office of DoT, responsible for technical inputs on technology/policy matters to DoT and other Govt. Departments/Regulator.
- Nodal agency for all ITU-T Study Group Activities and ITU-R SG5 activities.
- TEC coordinates and participates in the meetings of standards development organizations, viz., ITU, APT, WRC, 3GPP, ETSI, IEEE etc. TEC also interacts with stakeholders and associations, viz., COAI, BIS, CII, TEMA, CMAI, FICCI, etc.
- In addition:
  - 5G Pilot Trials- Test Guide finalised in consultation with stakeholders.
  - BSNL 4G Proof of Concept (PoC)- Committee for monitoring of PoC trial being chaired by TEC.
  - oneM2M and 3GPP 5G standards of TSDSI- Adoption as National standards.

SUGGESTIONS/ FEEDBACK ARE WELCOME AND MAY BE SENT AT-

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