

Re: Consultation on “Leveraging Artificial Intelligence and Big Data in Telecommunication Sector”

Dear TRAI,

IEEE 802 LAN/MAN Standards Committee (LMSC) thanks TRAI for issuing the consultation and the opportunity to provide feedback on “Leveraging Artificial Intelligence and Big Data in Telecommunication Sector”. The Consultation is an important mechanism for soliciting feedback that will provide TRAI with the information necessary.

IEEE 802 LMSC is a leading consensus-based industry standards body, producing standards for wireless networking devices, including wireless local area networks (“WLANs”), wireless specialty networks (“WSNs”), wireless metropolitan area networks (“Wireless MANs”), and wireless regional area networks (“WRANs”). We also produce standards for wired ethernet networks, and technologies produced by implementers of our standards are critical for all networked applications today.

IEEE 802 LMSC is a committee of the IEEE Standards Association and Technical Activities, two of the Major Organizational Units of the Institute of Electrical and Electronics Engineers (IEEE). IEEE has about 400,000 members in over 160 countries. IEEE’s core purpose is to foster technological innovation and excellence for the benefit of humanity. In submitting this document, IEEE 802 acknowledges and respects that other components of IEEE Organizational Units may have perspectives that differ from, or compete with, those of IEEE 802 LMSC. Therefore, this submission should not be construed as representing the views of IEEE as a whole¹.

In the past ten years, the IEEE 802 LMSC has overseen the development of standards (including both IEEE Std. 802.11ac-2014 [1] and IEEE Std. 802.11ax-2021 [2]) that operate in unlicensed bands and are capable of providing gigabit throughput, i.e., provide physical layer throughput over 1 Gb/s. The current Wi-Fi 6 and Wi-Fi 6E technologies [3] are developed based on the IEEE Std. 802.11ax-2021 standard. IEEE P802.11be [4] is expected to provide physical layer throughput capacity at gigabit speeds and it is the basis that the upcoming Wi-Fi 7 technologies [5] utilize for development. These IEEE 802 technologies have become an integral part of global citizens’ lives, known best as “the 5 GHz network”. Next generation technologies utilizing both 5 GHz and 6 GHz bands in order to satisfy new requirements in internet of things or lower latency and jitter requirements for applications such as home video, video conferencing or video gaming are already developed and continue to be improved by our hundreds of standards development contributors.

The next generation of WSN will increasingly play a role in the handset market segment. The secure digital transition of India’s households, public sector and industry will critically depend on opportunities from emerging technologies like high-precision positioning, object sensing, increased security and privacy by design feature and many other features already under development in IEEE 802. Notably, IEEE Std 802.15.4 serves billions of devices worldwide using unlicensed spectrum for many applications such as IoT sensors, monitoring, control, real-time location services, and secure access control. A major revision to the IEEE Std 802.15.4-2020 standard has commenced, rolling up several published amendments since 2020, including IEEE Std 802.15.4z-2020 [6], which defined enhanced UWB technology. IEEE Std 802.15.4z-2020 is already widely being used in consumer, automotive, commercial, and industrial markets. In addition to the revision to IEEE Std 802.15.4-2020 a new amendment on "Next generation UWB", which will be rolled up in a future revision to IEEE 802.15.4, is being developed in task group IEEE 802.15.4ab [7] to

¹ This document solely represents the views of IEEE 802 LMSC and does not necessarily represent a position of either the IEEE or the IEEE Standards Association.

further enhance UWB capabilities for better performance, greater precision, and new uses such as presence detection and other sensing applications.

In light of the important role IEEE 802 technologies play in Indian network ecosystems and as related to the needs of citizens of India, IEEE 802 LMSC would like to highlight the importance of sufficient availability of license exempt spectrum. Developments in Wireless Access Systems (WAS) including Radio Local Area Networks (RLAN) such as Wireless Local Area Networks (WLAN) (IEEE 802.11) and Wireless Specialty Networks (WSN) (IEEE 802.15) technologies are crucial components in realizing the National Digital Communications Policy (NDCP) 2018 [8], seeking unlocking of the transformative power of digital communications networks for achieving the goal of digital empowerment and improved well-being of the people of India. More specifically, IEEE 802 technologies are critical in realizing Connect India mission to create broadband for all and the goal of 10 million public Wi-Fi Hotspots.

In this response, IEEE 802 LMSC would like to provide our response to Question 40 by informing TRAI about relevant IEEE 802 standards activities to the consultation.

Artificial Intelligence Machine Learning (AIML) Topic Interest Group within the IEEE 802.11 working group [9] was initiated in May 2022 to explore use cases of AI/ML that will apply to IEEE 802.11 systems and devices as well as the technical feasibility of these use cases. The topic interest group is expected to complete its report on the topic by March 2023. The report is expected to include AI/ML use cases, requirements and features analysis, and technical feasibility analysis for IEEE 802.11.

The IEEE 802.11 AI/ML Topic Interest Group has delivered a tutorial on computation over the air for AI/ML for wireless communication in September 2022 and the materials can be downloaded in [10]. During the IEEE 802 November 2022 plenary from 13 November to 18 November 2022, there was also an IEEE 802 Tutorial entitled “Wi-Fi Meets ML: Re-thinking Next-generation Wi-Fi Networks” that describes representative use cases where AI/ML techniques are used to improve IEEE 802.11 performance, covering several examples in detail [11].

IEEE 802 LMSC would like to invite TRAI to follow IEEE 802 work in the AI/ML area and to incorporate IEEE 802 views on Artificial Intelligence and Machine Learning into the proceedings in addition to those from 3GPP. Our response highlights the role of IEEE 802 and IEEE 802.11 RLANs in supporting the Connect India mission to create broadband for all, for which we believe IEEE 802 technologies to be critical, while also supporting and complementing 5G networks.

Conclusion

IEEE 802 LMSC thanks the TRAI for providing this invaluable opportunity to provide this submission. IEEE 802 LMSC respectfully provides information about its project in the area of Artificial Intelligence and Machine Learning that will apply to IEEE 802.11 systems and RLAN.

Respectfully submitted

By: /ss/.

Paul Nikolich

IEEE 802 LAN/MAN Standards Committee Chairman

em: p.nikolich@ieee.org

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