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IAFI[1]

PROPOSED UPDATES TO THE WORKING DOCUMENT TOWARDS A PRELIMINARY DRAFT NEW REPORT ITU-R M.[IMT-FOR-FWBB-ACCESS]

Technical and operational feasibility of providing fixed wireless broadband access using IMT technology in mobile service bands identified for IMT

INTRDUCTION

During the last 50th WP-5D Meeting, USA submitted a contribution (C-963), regarding Technical and operational feasibility for providing fixed wireless broadband access using IMT technology in mobile service bands identified for IMT. Contribution was discussed and a Working Document, was developed and carried forward in the Chairman's Report in Annexure-3.7 of the chairman report (Document WP5D/C989)

PROPOSAL

IAFI through this contribution proposes further updates to the Working Document ITU-R M.[IMT-FOR-FWBB-ACCESS] *Technical and operational feasibility of providing fixed wireless broadband access using IMT technology in mobile service bands identified for IMT*

Attachment: 1

[1] IAFI is a sector member of ITU-R, ITU-T and ITU-D

Attachment

ANNEXURE-3.7 OF 50TH WP-5D CHAIRMAN REPORT

WORKING DOCUMENT TOWARDS A PRELIMINARY DRAFT NEW REPORT ITU-R M.[IMT-FOR-FWBB-ACCESS]

Technical and operational feasibility of providing fixed wireless broadband access using IMT technology in mobile service bands identified for IMT

1 Scope

This report discusses the technical and operational feasibility of using IMT technology for providing wireless broadband access to stationary users. The report describes the expected characteristics of Wireless broadband services, and solutions for using IMT to provide internet access for various scenarios – homes, small-offices building. The Report would also include ability to serve mobile broadband as well as fixed wireless broadband from the same IMT infrastructure. Consideration of IMT for FWA applications in this report is limited to the bands allocated to mobile service and identified for IMT in the Radio Regulations.

2 Background

The evolution of IMT has enabled new use cases and broadband applications into the marketplace. FWA has emerged as one such use case that offers cost-efficient and reliable consumer and enterprise wireless broadband connectivity, without extensive last-mile infrastructure expenditures and with much shorter deployment times. By using wireless links between fixed points – a nearby tower and an antenna on the customer's premises– IMT-based FWA provides a high bandwidth broadband connection wirelessly. FWA solutions also address the needs of customers in rural or otherwise underserved communities with minimal or no wired connection for reliable and affordable high-speed internet access.

3 IMT for Wireless Broadband

FWA is a way of providing high-speed wireless broadband connectivity using point-to- multipoint links between fixed points – such as a cell tower and customer home or business, instead of laying fiber-optic or cable lines. Essentially, it is a last-mile method capable of delivering multi-gigabit connectivity speeds with simple self-installation methods that allow for quick deployments.

Newer generations of wireless technology such as IMT-Advanced have improved IMT-based FWA and have expanded coverage mirroring that of existing mobile networks. Advancements in IMT-2020 network technologies have significantly improved the download, upload and latency capabilities of IMT-based FWA services. By leveraging advances in wireless network technologies like IMT-2020, a FWA connection can potentially deliver sustained download speeds of 10 Gbps serving various distances based on the frequency band of operation.

Demand for Fixed Wireless Access (FWA) has been increasing with projected growth in both enterprise and consumer areas[2]. FWA devices exhibit different mobility characteristics and traffic compared to existing eMBB-oriented IMT-2020 network architectures. This provides opportunities

[2] Tefficient FWA Tracker 2024, https://tefficient.com/analysis/tefficients-fwa-tracker/

for solutions that can further improve spectrum efficiency and economies of scale for FWA are essential to ensure the long-term success of the business model. Mobile operators seek to enhance FWA's functionality by optimizing systems, such as physical layer (PHY) optimizations, to better address the needs of FWA users. By optimizing key elements like mobility management, control channel overhead, and other PHY layer enhancements, network capacity could be significantly increased to meet the higher bandwidth demands of fixed users.

Mid-band spectrum, which balances data capacity and reliable coverage, and millimeter wave spectrum, which offers greater capacity and lower latency, offer spectral efficiencies that allow wireless providers to offer competitive speeds while minimizing the cost of new tower deployments required for full market coverage. Moreover, the advantages of the mid-band can be effective at extending IMT-2020 FWA networks, particularly into underserved markets like rural communities.

The average household now has multiple, high-bandwidth devices operating simultaneously, serving multiple purposes. With IMT-2020 FWA advances, this technology can deliver high-speed broadband connectivity. Given that upgrades to IMT-based FWA service will rely upon the same standards and equipment of IMT-2020 and future mobile network generations, this interoperability makes IMT-based FWA relatively future-proof and scalable. As advanced IMT-2020 technology rolls out with high-band spectrum (e.g. above 10 GHz), FWA will have 10 to 100 times more capacity than IMT-Advanced, allowing for increasingly higher –and potentially symmetrical– download and upload speeds. Additionally, future IMT-2020-enabled FWA services will provide ultra-reliable service with under 10 millisecond latencies that are critical to many emerging 5G use cases.

Characteristics for Wireless Broadband – Coverage, Capacity, Guaranteed Data Rate, spectrum.

4 Technical features of IMT enabling FWA

Even though FWA is not new, IMT-2020 has allowed for significant improvements to the quality of IMT-based FWA services.

- Network. In legacy network architecture, many of the costs are driven by the deployment of radio access networks (RAN). Network function virtualization (NFV) and software-defined networking (SDN) enable improved RAN economics and network optimization. By leveraging these IMT-2020 network innovations, operators can achieve better economics by virtualizing RAN to flexibly manage download and upload capacity based on real-time user requirements. Combined with improvements in spectral efficiency and beamforming, operators can optimize resources to maximize performance.
- Potential air interface optimization for better spectrum efficiency.
- MNO selectable RAN signalling and protocols optimized to support fixed wireless access deployment.
- Support for link adaptation, channel estimation, and RRM schemes that leverage the unique characteristics of FWA user profiles (mobility, usage pattern etc).
- Device capabilities tailored for FWA.
- RAN architecture options.
- IMT Beamforming and beam management for coverage.
- Multi-user MIMO.
- Network Slicing.

– Consumer Premise Equipment (CPE) with enhanced capabilities such as higher number of Rx/Tx elements, HPUE, signalling optimization, multi-band support.

– Indoor and Outdoor Equipment. Outdoor CPE are often deployed on a wall or roof of the premises (usually by professional installation). Indoor CPE are placed in the premises at a location that customer determines it can obtain the best signal. As a result, indoor CPEs allow for cost-efficient and quick deployments, and it is widely preferred by the operators.

  • CPEs with integrated signalling optimization; self-aligning antennas and improved beam forming that reduce the need for professional installation while improving link robustness.

5 Operational and Deployment Features

Since IMT-based FWA uses point-to-multipoint radio links to connect network access units (AUs) with consumer premise equipment (CPEs) installed in homes and businesses, new subscribers can be granted broadband access through simple self-installation methods, instead of requiring time-intensive traditional installations.

5.1 Rural and Underserved Communities

High-speed broadband connectivity has become increasingly important to unlock economic opportunities, quality education, access to healthcare and civic participation. A stable video stream is integral to many of these connectivity use cases and requires a high-speed broadband connection at home. In rural areas, however, such bandwidth is often much harder to come by. Fixed Wireless Access (FWA), powered by IMT technology, offers a robust, high-speed connectivity option that can serve these unserved and underserved areas.

6 Conclusion

TBD