

INTRODUCTION OF THE IEEE 802.20 STANDARD FOR MOBILE BROADBAND WIRELESS ACCESS SYSTEMS

Purpose

This paper gives a brief introduction of the IEEE¹ 802.20 air interface standard for mobile broadband wireless access (“MBWA”) systems and briefs members on the development of the standard.

Performance Targets of the IEEE 802.20 Standard

2. The IEEE 802.20 standard is an air interface standard for MBWA systems optimized for high speed Internet Protocol (“IP”)-based data services. The final standard is expected to be released by December 2004. It will provide an efficient packet-based air interface with high speed downlink and uplink capabilities. The IEEE targets that the new standard could offer users a downlink data rate of 1 Mbps and an uplink data rate of 300 kbps for 1.25 MHz channel bandwidth, that are comparable to broadband wireline systems. For 5 MHz channel bandwidth, the downlink and uplink data rates could exceed 4 and 1.2 Mbps respectively. It supports vehicle speed up to 250 km/h. One special feature of the standard is to support real-time traffic with extremely low latency which is an important requirement for voice over IP.

Applications

3. As the standard is designed to provide an efficient packet-based air interface optimized for IP traffic, mobile users will be able to access the Internet, intranet and enterprise applications as well as access to

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infotainment services with higher speed and better performance. It would also support roaming and handoff (e.g. from MBWA to wireless local area networks). In effect, the IEEE 802.20 standard is an alternative type of third generation (“3G”) mobile systems. Today, the second and half generation (“2.5G”) and 3G mobile technologies used by mobile carriers still remain best suited for voice and low bandwidth data applications, but the technologies have limitations in offering high speed data and higher bandwidth applications. IEEE 802.20 improves the limitations in high-speed mobile Internet access. It offers the potential to capture high margin business and heavy bandwidth data users which could not be served by the current 2.5G and 3G cellular networks.

Frequency Spectrum

4. The IEEE 802.20 standard will be designed for deployment within the existing and future licensed spectrum below 3.5 GHz. Exact frequency bands have not yet been known. The frequency plan will include both paired and unpaired channel plans with multiple bandwidths, e.g., 1.25 MHz or 5 MHz. Spectrum efficiency of MBWA will depend on types of applications, system loading, etc. The targeted spectral efficiency shall be in excess of 1 b/s/Hz per cell in a loaded network, significantly higher than that achieved by the existing mobile communications systems².

Status of Development

5. Though the 802.20 standard is still in the development stage, a number of overseas mobile carriers have conducted trials of proprietary MBWA systems based on orthogonal frequency multiple access technology. In US, Nextel Communications has launched a trial MWBA system at 700 MHz band comprising 150 base stations in

² Spectral efficiency of existing mobile systems

GSM	0.08 b/s/Hz/cell
IS95A CDMA	0.08 b/s/Hz/cell
3G W-CDMA	0.4 b/s/Hz/cell

Raleigh-Durham area of North Carolina and the test is still in progress. In 2003, three network operators in South Korea, namely Hanaro Telecom, SK Telecom and Korea Telecom also conducted trials of MWBA systems at 2.3 GHz band. The trials conducted by Korean network operators demonstrated using 1.25 MHz bandwidth, when travelling at a vehicular speed of 100 km/h, the downlink data rate was over 2 Mbps while the uplink data rate was about 500 kbps with a round-trip latency of 70 ms. The trial test results indicated that the target performance of the IEEE 802.20 standard could be achieved using state-of-the-art mobile wireless technologies.

Way Forward

6. The Office of the Telecommunications Authority will closely monitor the development of the IEEE 802.20 standard and study in a timely manner the feasibility of allocating frequency bands for meeting the demands for implementation of MBWA systems in Hong Kong.

Office of the Telecommunications Authority
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