Mobile Broadband Wireless Access Systems "Five Criteria" Vehicular Mobility

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Approved by MBWA ECSG

Broad Market Potential

a) Broad sets of applicability.
b) Multiple vendors and numerous users.
c) Balanced costs

- The capability of the wireless medium to support mobility is a feature unmatched by the capabilities of wireline broadband access networks. The mobile capability has proven vastly successful as can be seen from the abundance of narrow-band mobile devices. Mobile broadband wireless access, based on IP mobility, unlocks all Internet content to the general public, potential addressable market is all users of IP - based services and applications. These include:
  - Enterprise Intranets and VLAN Services
  - Entertainment & Gaming
  - Internet and Location Services
- Mobile station and terminal equipment are provided by multiple international telecommunications equipment vendors, deployed by international carriers and made available to the end-user community. Tutorial and Call for Interest (CFI) sessions were held at the IEEE 802 plenary in March 2002. The tutorial session was attended by 180 individuals from 110 organizations. The CFI was attended by 55 individuals from 45 organizations expressing support for the project. The ECSG meeting in September 2002 was attended by 36 individuals representing 23 organizations.
- This project will achieve cost balance between terminal devices and network infrastructure equipment that is comparable to existing cellular wireless networks and encourage mass deployment of wireless data services. Given that base stations can serve many mobile terminals, the cost of the network equipment can easily be spread over many users. Terminal devices and associated chip-sets are expected to benefit from volume deployment, large-scale integration and an optimized IP-centric design to achieve low cost.

Compatibility

a) Conformance with 802 Overview and Architecture
b) Conformance with 802.1D (MAC Bridges) and 802.1F (VLAN Bridges)
c) Conformance with 802.1F and compatible managed object definitions
d) Identification of any variance in conformance

- The proposed standard will conform with the appropriate IEEE 802 functional requirements.
- Compatibility will be addressed during development of the standard and any variance that may be required will be clearly identified and justified.
- The standard will include the definition of a compliant MIB in support of the PHY and MAC layer capabilities.

Coexistence

- The proposed standard is applicable to licensed spectrum and all issues of coexistence will be subject to the respective constraints imposed by the spectrum license. Deployment related coexistence issues will be addressed during the development of the proposed standard.

Distinct Identity

a) Substantially different from other IEEE 802 standards.
b) One unique solution per problem.
c) Easy for the document reader to select the relevant specification.

- IEEE 802 presently has no project that supports vehicular mobility. The mobile BWA standard is intended to provide for public access networks operated by a third party, where the user typically makes use of a wide-area network through an access network when mobile. It differs from a wireless LAN, which typically is operated over smaller distances.
- The project has been socialized with the existing 802 wireless working groups. (To be done at the November meeting).
- The proposed project will specify a unique solution to the PHY and MAC layer of the air interface operating in spectrum allocated to the Mobile Service and specify TDD and/or FDD modes. It is envisioned that the standard will flexibly and efficiently support a variety of services, some of which may have stringently bounded delay requirements. This solution will incorporate support for both traffic engineering and QoS for real-time and non-real-time data traffic.
- The specification will be a stand-alone document with clearly defined scope.

Technical Feasibility

a) Demonstrated system feasibility.
b) Proven technology, reasonable testing.
c) Confidence in reliability.

- The technical feasibility of such a system has been demonstrated by proprietary systems currently in deployment and trial. These systems use technological components in wide deployment today, such as modems, radios, antennas and PHY/MAC protocols.
- The solution may use well understood spread spectrum technologies (such as frequency hopping), radio technologies (such as OFDM), advanced signal processing techniques (such as adaptive antennas) and cellular architectures. These technologies have been successfully tested and deployed over the past decades and are finding increased usage in the LAN/MAN and mobile environments.
- Commercial deployment of cellular wireless networks in the bands licensed for mobile services demonstrates that air interface support for high reliability suitable for commercial deployment can be achieved.

Economic Feasibility

a) Known cost factors, reliable data.
b) Reasonable cost for performance.
c) Consideration of installation costs.

- Cost factors for mobile services and components are well known and understood. Worldwide deployment of mobile wireless networks and burgeoning demand for mobile services demonstrate the economic viability of mobile networks. The willingness of investors to spend large sums to acquire spectrum rights, plus the large additional investment required for hardware in public networks, attests to the economic viability of the mobile wireless access industry as a whole.
- The solution will offer better cost/performance characteristics than existing mobile networking solutions since it is based on a packet-based access network and designed for optimal spectral efficiency. Data services, characterized by high peak demands but bursty requirements overall, are best handled by packet technologies. As demonstrated in many IEEE 802 standards, shared-media packet systems effectively serve users whose requirements vary over time within the constraints of the total available resources.
- Installation costs will be reduced by decreasing the number of base stations required and eliminating the need for frequency planning. The reduction in the required number of base stations is achieved by supporting higher numbers of users per base station, which is accomplished by designing the air interface for frequency reuse of 1 or less and/or other techniques. Frequency reuse of 1 or less also eliminates the need for frequency planning.