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IEEE P802.11  
Wireless LANs

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**5 Criteria for Higher Rate  
IEEE 802.11b Study Group (HRbSG)**

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## IEEE 802 Five Criteria

### 1. BROAD MARKET POTENTIAL

#### a) Broad sets of applicability.

The broad sets of applicability include a number of applications presently supported with Ethernet speeds on wired networks. Some example applications that can be addressed with the higher rate capability include mpeg video, video teleconferencing and applications requiring larger data sets, as well as larger number of users.

The increasing and widespread adoption of today's computing and communications applications (email, Internet browsing, etc.) are placing increased demands on network services and bandwidth.

This is evidenced by the rapid transition from 100 Mbps to 1 Gbps wired Ethernet and shared to switched mediums. Additionally, applications under development such as voice and video over Internet Protocol will further accelerate the demand for higher bandwidth communications services.

The higher rate capability can potentially be used to improve network throughput beyond the capability of the existing 1, 2, 5.5 and 11 Mbps IEEE 802.11 networks in the 2.4GHz band. The 2.4 GHz band is presently available worldwide for such applications.

### **b) Multiple vendors, numerous users.**

The higher rate extension will be supported by the same vendor base and by end users of the existing IEEE 802.11 standard. An indicator of such participation is the active IEEE 802.11 membership itself. The higher rate standard will also attract new vendors that have historically targeted higher speed markets.

The IEEE 802.11 membership supporting this PAR includes a broad range of international wireless industry leaders, ranging from semiconductor manufacturers to system integrators. There are over 63 companies represented at IEEE 802.11 in preparation of this PAR.

### **c) Balanced costs (LAN versus attached stations).**

The cost to achieve the higher rates is projected to be within the range of the existing IEEE 802.11 systems. The changes are anticipated to impact the baseband processing, while the RF/IF front as well as the MAC protocol are expected to remain equivalent to the existing standard. The baseband signal processing will change but the cost of the new processing hardware is projected to be within the cost targets of the existing standard.

## 2. COMPATIBILITY

The compatibility with IEEE 802 requirements will result from the use of the IEEE 802.11 MAC which itself was developed and has been approved as being compatible with those requirements. Since the proposed extension will be compatible with the existing IEEE 802.11 MAC, all LLC and MAC standards shall be compatible and in conformance with IEEE 802.1 Architecture, Management and Internetworking. The MAC/PHY Layer interface shall remain common to the existing IEEE 802.11 definitions.

## 3. DISTINCT IDENTITY

### a) Substantially different from other 802 Projects

The speeds proposed are significantly higher than the existing IEEE 802.11b products at the 2.4 GHz band. It is the only proposed solution to expand the rate capability of the existing IEEE 802.11b standard in an interoperable fashion.

IEEE 802.15.3 is not mandated to be compliant with the IEEE 802.11 MAC, nor is it required to be interoperable with existing IEEE 802.11 modulations in the 2.4GHz band. IEEE 802.15.3 is intended for use as a Wireless Personal Area Network (WPAN), while the proposed IEEE 802.11 extension is intended for use as a Wireless Local Area Network (WLAN).

### b) One unique solution per problem (not two solutions to a problem).

The PAR will define only one additional 2.4 GHz PHY high rate extension in addition to the current IEEE 802.11b PHY.

**c) Easy for document reader to select the relevant specification.**

A separate PHY section, or integration into the current high rate section, will be developed as an addition to the current standard. The resulting document will address the requirements, specifications and any other relevant information in regard to the high rate extension PHY.

**4. TECHNICAL FEASIBILITY****a) Demonstrated system feasibility.**

There are several modulation methods that have been presented as feasible solutions to the rate extension question.

Preliminary proposals from 3Com, Intersil, Supergold, Sharp Labs, and Alantro have been reviewed that indicate the technical feasibility of higher rate extensions to IEEE 802.11b.

Alantro has announced that its proposal has been integrated into a chip demonstrating the technical feasibility to extend the IEEE 802.11b standard to 22Mbps.

**b) Proven technology, reasonable testing.**

The main components of technology of the PHY to be developed have precedents proving their feasibility.

Radio Technology: The existing IEEE 802.11b products already prove the technical feasibility of the 2.4 GHz radio part.

Modulation Methods: There are several modulation methods that are sound candidates for the higher speed PHY.

Modem Technology: The increased processing requirements of the digital modem part are in line with the progress in ASIC technology.

**c) Confidence in reliability.**

The analysis of the existing products and proposals representing the candidates' approaches provides confidence in the reliability of the proposed solutions. This data has been partially presented within the Higher Rate 802.11b Study Group (HRbSG) and the papers are available for review.

**5. ECONOMIC FEASIBILITY****a) Known cost factors, reliable data.**

The fundamental radio architecture and baseband architecture of the candidate approaches are similar to that of the current IEEE 802.11b solutions. The known cost baseline of the current IEEE 802.11b systems has been used to project the cost baseline for the higher rate PHY.

**b) Reasonable cost for performance.**

The primary cost trade-offs are cost vs. rate vs. range vs. multipath resistance of the high rate solution in contrast to the current IEEE 802.11b PHY capability. These trade-offs appear reasonable based on information presented to the HRbSG. The costs of the stations remain approximately the same.

**c) Consideration of installation costs.**

The installation cost of higher rate devices is the same as that of the current IEEE 802.11b devices. Upgrading an existing network to a higher speed can be performed selectively in areas with a demand for higher instantaneous rate.