IEEE P802.11  
Wireless LANs

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| IEEE 802.11 HEW SG Proposed 5 Criteria | | | | |
| Date: 2014-01-22 | | | | |
| Author(s): | | | | |
| Name | Affiliation | Address | Phone | email |
| Osama Aboul-Magd | Huawei Technologies | 303 Terry Fox Drive  Kanata, ONT, Canada | +1-613-287-1405 | [osama.aboulmagd@huawei.com](mailto:osama.aboulmagd@huawei.com) |
|  |  |  |  |  |

Abstract

This is the IEEE 802.11 HEW SG five criteria.

# Five Criteria

## Broad Market Potential

A standards project authorized by IEEE 802 LMSC shall have a broad market potential. Specifically, it shall have the potential for:

a) Broad sets of applicability.

Cisco’s market forcast predicts that Internet traffic will reach zettabytes by the end of 2016. By 2017 traffic of end stations that connect over wireless links will reach 51% of the total internet traffic. Traffic growth continues to be driven by significant growth in the video traffic. New uses such as video streaming, simultaneous transmission of multiple high rate video streams, on-line gaming, and cloud access will drive the need for improving system level performance and user experience in the home, enterprise, and outdoor environments.

More individuals increasingly rely on Wi-Fi connections to support their connectivity needs including entertainment, web surfing, and e-commerce. Forecasts from International Data Corporation show that 87% of connected devices sales by 2017 will be tablets and smartphones. Those consumer devices are equipped with Wi-Fi interfaces. The use of these devices for video streaming, on-line gaming, and other applications drives an increased traffic volume on Wi-Fi infrastructure. Consequently iGR predicts that Wi-Fi usage in the US will double by 2015.

Similar to the wired Ethernet and the related bridging technology (IEEE 802.3 and IEEE 802.1), the Wi-Fi technology is now finding its way to the carrier domain. Cellular operators are now using Wi-Fi technology for data offloading. Infonetics Research predicts that the carrier Wi-Fi market to reach $2.8 billion by year 2017, at a 5 year CAGR of 40%. Units volume will grow from 985 thousand access points (APs) in year 2012 to 5.3 million APs in year 2017, a 40% CAGR. Carrier hotspot deployments are expected to reach 5.8 million worldwide by year 2015. Hotspot deployments are characterized by densely deployed APs to provide sufficient coverage to a large number of devices. Hotspot users are looking for seamless connectivity and a Wi-Fi experience similar to that they enjoy on the cellular networks.

Enterprises, such as small and medium businesses, are increasingly dependent on Wi-Fi technology as their main networking infrastructure. Network Barometer 2013 report predicts that in the next few years an Enterprise network will be composed of 80% wireless ports and 20% wired ports reversing the current ratio. Improved system performance is a main factor for enterprise to migrate to Wi-Fi technology and to achieve the expected cost savings.

b) Multiple vendors and numerous users.

A wide variety of vendors currently build numerous products for the WLAN marketplace. According to Dell’Oro Group overall Wireless LAN market revenues are forecast to exceed $11 billion in 2017, nearly 50% greater than 2012 revenues. It is anticipated that the majority of those vendors, and others, will participate in the standards development process and subsequent commercialization activities.

ABI Wi-Fi chipset forecast estimates that 25% of homes around the world used Wi-Fi in year 2012. ABI Research expects that the number of devices shipped with Wi-Fi interface to reach 3 billion by year 2015.

c) Balanced costs (LAN versus attached stations).

1. WLAN equipment is accepted as having balanced costs. The development of Wireless capabilities to enhance the efficiency of WLAN network deployments and improve system level performance will not disrupt the established balance.

## Compatibility

IEEE 802 LMSC defines a family of standards. All standards should be in conformance : IEEE Std 802, IEEE 802.1D, and IEEE 802.1Q. If any variances in conformance emerge, they shall be thoroughly disclosed and reviewed with IEEE 802.1 Working Group. In order to demonstrate compatibility with this criterion, the Five Criteria statement must answer the following questions.

a)Does the PAR mandate that the standard shall comply with IEEE Std 802, IEEE Std 802.1D and IEEE Std 802.1Q? No.

b)If not, how will the Working Group ensure that the resulting draft standard is compliant, or if not, receives appropriate review from the IEEE 802.1 Working Group?

Compatibility with IEEE 802 requirements will be accomplished by keeping the MAC service access point (SAP) interface the same as the existing IEEE 802.11 standard. The proposed amendment shall introduce no IEEE 802.1 architectural changes. The MAC SAP definition shall not be altered, ensuring that all logical link controller (LLC) and MAC interfaces are compatible to and in conformance with the IEEE 802.1 architecture, aanagement and internetworking standards. New managed objects shall be defined as necessary in a format and structure consistent with existing IEEE 802.11 managed objects.

## Distinct Identity

Each IEEE 802 LMSC standard shall have a distinct identity. To achieve this, each authorized project shall be:

a) Substantially different from other IEEE 802 LMSC standards.

This project will focus on a WLAN that can efficiently support deployments with dense stations and dense access points where interference from neighboring devices is an issue affecting the perceived user experience. This project will focus on system level performance and improving the utilization of the spectrum resources as well as interference mitigation and management between neighboring OBSSs.

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

There is no other WLAN standard focusing on significantly improving WLAN efficiency and system level performance in dense deployment scenarios other than this amendment.

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

This amendment will differentiate itself from other IEEE 802 wireless standards via the title which stresses the specification of high efficiency WLAN technology.

## Technical Feasibility

For a project to be authorized, it shall be able to show its technical feasibility. At a minimum, the proposed project shall show:

a) Demonstrated system feasibility.

The IEEE 802.11 HEW SG has reviewed many presentations indicating that the proposed functions are technically feasible. For a complete list of presentations, please refer to:

<https://mentor.ieee.org/802.11/documents?is_dcn=DCN%2C%20Title%2C%20Author%20or%20Affiliation&is_group=0hew>

b) Proven technology, reasonable testing.

Until the full extent of the user models referenced in the IEEE 802.11 HEW PAR is understood, the study group cannot completely assess the extent of reasonable testing for those technologies. However, IEEE 802.11 is a mature technology which has a wide variety of legacy devices and a proven track record, with several billions of devices shipping each year.The increased capabilities envisioned for the baseband and RF parts necessary to implement the proposed amendment are in line with the current progress in technology and not expected to impinge testability.

c) Confidence in reliability.

Analysis of current WLAN products, new academic research, and experience from other wireless technologies provide confidence in the reliability of the technologies that will be developed by the project. This project will result in similar or improved reliability over current levels.

d) Coexistence of IEEE 802 LMSC wireless standards specifying devices for unlicensed operation.

The working group will create a coexistence assurance document as part of the WG balloting process.

## Economic Feasibility

For a project to be authorized, it shall be able to show economic feasibility (so far as can reasonably be estimated) for its intended applications. At a minimum, the proposed project shall show:

a) Known cost factors, reliable data.

Support of the proposed standard will likely require a manufacturer to develop a modified radio, modem and firmware. This is similar in principle to the transition between IEEE 802.11n and IEEE 802.11ac as well as in previous iterations of IEEE 802.11 enhancements. The cost factors for these transitions are well known and the data for this is well understood.

b) Reasonable cost for performance.

The new amendment will provide users with improved efficiency by focusing on system level metrics that directly impact user experience, e.g. area throughput, average per STA throughput, and packet delay and loss. In general, the cost factor changes needed to implement the technology envisioned by the study group are well within the capabilities of existing technology. Competition between manufacturers will ensure that costs remain reasonable.

c) Consideration of installation costs

The proposed amendment has no known impact on installation costs. **References:**