IEEE P802.11
Wireless LANs

Draft PAR and 5 Criteria for Video Transport Stream (VTS) SG

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Abstract

This document provides a proposed PAR and 5 Criteria for IEEE 802.11 VTS SG project. The PAR form is copied from the IEEE web site official PAR submission form.

The PAR Copyright Release and Signature Page must be submitted by FAX to +1-732-875-0695 to the NesCom Administrator.
If you have any questions, please contact the NesCom Administrator.

Once you approve and submit the following information, changes may only be made through the NesCom Administrator.

Submittal Email: ganesh.venkatesan @intel.com
Type of Project: Amendment to an Existing Standard 802.11
1.1 Project Number: TBD by WG Chair
1.2 Type of Document: Standard
1.3 Life Cycle: Full
1.4 Is this project in ballot now? No
2.1 Title of Standard: Standard for Information Technology - Telecommunications and information exchange between systems - Local and Metropolitan Area networks - Specific requirements - Part 11: Wireless LAN Medium Access Control (MAC) and Physical Layer (PHY) specifications - Amendment: MAC enhancements for robust video streaming.
3.1 Name of Working Group: Wireless LAN Working Group
Contact information for Working Group Chair Stuart J Kerry Email: stuart@ok-brit.com Phone: 408-474-7356
Contact Information for Working Group Vice Chair Harry Worstell Email: hworstell@research.att.com Phone: 973-236-6915
3.2 Sponsoring Society and Committee:IEEE Computer Society/Local and Metropolitan Area Networks (C/LM) **Contact information for Sponsor Chair:** Paul Nikolich Email: p.nikolich@ieee.org Phone: 857-205-0050 **Contact information for Standards Representative:** Email: Phone:
3.3 Joint Sponsor:/ () **Contact information for Sponsor Chair:** Email: Phone: **Contact information for Standards Representative:** Email: Phone:

4.1 Type of Ballot: Individual	
4.2 Expected Date of Submission for Initial Sponsor Ballot: 2010-11	
4.3 Projected Completion Date for Submittal to RevCom: 2011-11	
5.1 Approximate number of people expected to work on this project: 50	
5.2 Scope of Proposed Standard: This amendment defines enhancements to the 802.11 MAC for robust video streaming.	**Old Scope:**
5.3 Is the completion of this standard is dependent upon the completion of another standard: No **If yes, please explain:**	
5.4 Purpose of Proposed Standard: This amendment defines a standard for robust video stream transport over 802.11 for consumer/enterprise applications.	**Old Purpose:**

5.5 Need for the Project:
802.11 devices are widely deployed. While the devices, including 802.11n Draft 2.0 devices, provide reliable data and voice performance, the performance of video streaming is not always of acceptable quality. A set of enhancements to 802.11 MAC can improve video streaming performance significantly while maintaining data and voice performance.

A variety of 802.11-like proprietary implementations exist in the market today causing market fragmentation, co-existence and inter-operability issues. In addition, there are several competing and emerging wireless technologies that target this application space. Enhancing the 802.11 MAC to address video streaming performance issues will extend the applicability to 802.11 and eliminate the need for proprietary implementation and/or competing standards.

5.6 Stakeholders for the Standard: Semiconductor manufacturers, consumer electronic device manufacturers and service providers delivering entertainment content to homes.

Intellectual Property

6.1.a. Has the IEEE-SA policy on intellectual property been presented to those responsible for preparing/submitting this PAR prior to the PAR submittal to the IEEE-SA Standards Board? Yes
If yes, state date: 2007-09-19
If no, please explain:

6.1.b. Is the Sponsor aware of any copyright permission needed for this project? No
If yes, please explain:

6.1.c. Is the Sponsor aware of possible registration activity related to this project? No
If yes, please explain:

7.1 Are there other standards or projects with a similar scope? No
If yes, please explain:
and answer the following: Sponsor Organization:
Project/Standard Number:
Project/Standard Date: 0000-00-00
Project/Standard Title:

7.2 Future Adoptions
Is there potential for this standard (in part or in whole) to be adopted by another national, regional, or international organization? No

If Yes, the following questions must be answered:
Technical Committee Name and Number:
Other Organization Contact Information:
Contact person:
Contact Email address:

7.3 Will this project result in any health, safety, security, or environmental guidance that affects or applies to human health or safety? No
If yes, please explain:

7.4 Additional Explanatory Notes: (Item Number and Explanation)

8.1 Sponsor Information:
Is the scope of this project within the approved scope/definition of the Sponsor's Charter? Yes
If no, please explain:

Five Criteria

17.5.1 Broad Market Potential

A standards project authorized by IEEE 802 shall have a broad market potential. Specifically, it shall have the potential for:
a) Broad sets of applicability.
Video is becoming an increasingly important medium for entertainment and enterprise communication. The proliferation of 802.11 devices and the reliability of wireless performance for data and voice services have demonstrated the convenience of wireless connectivity between devices. The next logical step is to extend the reliability of wireless connections to video streams.

b) Multiple vendors and numerous users.

Video streaming is a huge market. The desire to stream video wirelessly is demonstrated by the availability of numerous proprietary solutions and the emergence of specifications based on a variety of radio technologies. Contributions to the IEEE 802.11 document server from individuals affiliated with consumer electronics companies, service providers, and equipment manufacturers are an indication of broad interest in this amendment.

c) Balanced costs (LAN versus attached stations).

WLAN equipment is recognized as having balanced costs. The new MAC layer enhancements for VTS created as part of this amendment will not disrupt the established balance.

17.5.2 Compatibility

IEEE 802 defines a family of standards. All standards shall be in conformance with the IEEE 802.1 Architecture, Management, and Interworking documents as follows: 802. Overview and Architecture, 802.1D, 802.1Q, and parts of 802.1f. If any variances in conformance emerge, they shall be thoroughly disclosed and reviewed with 802.
Each standard in the IEEE 802 family of standards shall include a definition of managed objects that are compatible with systems management standards.

This amendment will not make existing implementations incompatible or non-conformant. This amendment will not impact the compatibility that has already been demonstrated by 802.11. In other words devices implementing this amendment will continue to work with legacy devices.

Devices implementing some or all the mechanisms specified in this amendment will, in addition, be able to:

(a) Provide robust transport of video streams
(b) Provide support for mechanisms defined in 802.1avb.

17.5.3 Distinct Identity

Each IEEE 802 standard shall have a distinct identity. To achieve this, each authorized project shall be:
a) Substantially different from other IEEE 802 standards.

This amendment will create MAC layer enhancements for robust video streaming over WLAN. No other IEEE 802 standard addresses this specific requirement.

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

The proposed amendment will provide a unique set of MAC layer enhancements to address specific issues observed while streaming video over 802.11 – jitter, delay and packet loss management, inter-stream Quality of Service, impairments due to overlapping BSS, interworking with 802.1avb mechanisms and multicast QoS. Not all of these issues exist in all environments. A subset of the mechanisms specified in this amendment will be sufficient in each case. No other IEEE standard provides a solution to this.

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

The project will produce an amendment to the IEEE 802.11 specification. The MAC layer enhancements specified in this amendment will be clearly distinguishable.

17.5.4 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.
b) Proven technology, reasonable testing.
c) Confidence in reliability.

The streaming of video over existing 802.11 networks is sensitive to network loading, interference from other networks, packet loss and latency.

Proposed solutions include:

- Interworking with relevant 802.1 mechanisms including but not limited to 802.1avb and 802.1as
- Modified FCS/ACK/ARQ behavior allowing the delivery of frames with video payload bit errors.
- Transport of unicast/multicast video streams.
- Mechanisms increasing robustness for overlapping BSS
- Enhancements to QoS mechanisms

Tests have been carried out that demonstrate the feasibility of these approaches and the corresponding benefits. In addition proprietary implementations exist that demonstrate improved performance resulting from the implementation of all or some of these approaches. Based upon test results, discussion documents and existing solutions, it is clear that robust transportation of video streams over 802.11 networks is feasible.

17.5.4.1 Coexistence of 802 wireless standards specifying devices for unlicensed operation

A working group proposing a wireless project is required to demonstrate coexistence through the preparation of a Coexistence Assurance (CA) document unless it is not applicable. The Working Group will create a CA document as part of the WG balloting process. If the Working Group elects not to create a CA document, it will explain to the EC the reason the CA document is not applicable.

A CA document is not necessary for this amendment. It will change neither the IEEE 802.11 channel access mechanism nor physical layer operation in such a fashion to impact coexistence with other 802 standards specifying unlicensed operation.

17.5.5 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.

A small set of MAC layer enhancements will be sufficient to achieve the characteristics required for robust video streaming. The proposed amendment will probably require a manufacturer to develop modified firmware and/or modified device drivers, but typically no hardware modifications. Hardware modifications, if any will be relatively small and not contribute significantly to device cost.

b) Reasonable cost for performance.

An insignificant cost is anticipated in order to support mechanisms that are part of this project. The performance gain for this cost is robust video streaming between 802.11 devices in a variety of home/enterprise environments. This increases the applicability of 802.11 to a large number of devices.

c) Consideration of installation costs.

MAC enhancements specified in this project can be implemented in the firmware and/or device driver. Some of the enhancements may be implemented as hardware changes. It is anticipated however, that the installation costs are minimal.