

IEEE 802 LAN/MAN STANDARDS COMMITTEE (LMSC)

CRITERIA FOR STANDARDS DEVELOPMENT (CSD)

Based on IEEE 802 LMSC Operations Manuals approved 4 August 2020
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P802.1ASyz Standard for Local and Metropolitan Area Networks – Timing and Synchronization for Time-Sensitive Applications Amendment: Support for IEEE 802.3 links using the Clause 4 MAC in half-duplex.

1. IEEE 802 criteria for standards development (CSD)

The CSD documents an agreement between the WG and the Sponsor that provides a description of the project and the Sponsor's requirements more detailed than required in the PAR. The CSD consists of the project process requirements, 1.1, and the 5C requirements, 1.2.

1.1 Project process requirements

1.1.1 Managed objects

Describe the plan for developing a definition of managed objects. The plan shall specify one of the following:

- a) The definitions will be part of this project.
- b) The definitions will be part of a different project and provide the plan for that project or anticipated future project.
- c) The definitions will not be developed and explain why such definitions are not needed.

Item a) is applicable. Additional managed objects may be specified as part of adding support for the IEEE 802.3 10BASE-T1S PHY with IEEE 802.3 Clause 4 MAC in half-duplex.

1.1.2 Coexistence

A WG proposing a wireless project shall prepare a Coexistence Assessment (CA) document unless it is not applicable.

- a) Will the WG create a CA document as part of the WG balloting process as described in Clause 13? (yes/no)
- b) If not, explain why the CA document is not applicable.

Item b) is applicable. This project is not a wireless project; therefore, the CA document is not applicable.

1.2 5C requirements

1.2.1 Broad market potential

Each proposed IEEE 802 LMSC standard shall have broad market potential. At a minimum, address the following areas:

- a) Broad sets of applicability.
- b) Multiple vendors and numerous users.

a) This project applies to automotive in-vehicle applications and industrial automation applications.

b) The need for this project is driven by requirements of automotive in-vehicle applications, as part of ongoing work on IEEE P802.1DG Time-Sensitive Networking Profile for Automotive In-Vehicle Ethernet Communications. The IEEE P802.1DG project applies to multiple automotive in-vehicle applications, and multiple automotive in-vehicle Ethernet applications vendors and users are participating in its development.

It is anticipated that the support for the IEEE 802.3 Clause 4 MAC operating in half-duplex will be needed for industrial automation applications, as part of ongoing work on IEC/IEEE 60802 project Time-Sensitive Networking Profile for Industrial Automation, or a future amendment, after the competition of low-cost IEEE 802.3 PHYs targeted at Industrial Automation. The need to support the IEEE 802.3 Clause 4 MAC operating in half-duplex is not yet specified in the draft of IEC/IEEE 60802. As those requirements become clear, it is possible that this amendment will meet them. If not, the work on this amendment can serve as a foundation for a subsequent amendment that meets industrial requirements. Therefore, it is anticipated that multiple vendors and users in industrial automation applications will participate in the development of this project.

1.2.2 Compatibility

Each proposed IEEE 802 LMSC standard should be in conformance with IEEE Std 802, IEEE 802.1AC, and IEEE 802.1Q. If any variances in conformance emerge, they shall be thoroughly disclosed and reviewed with IEEE 802.1 WG prior to submitting a PAR to the Sponsor.

- a) Will the proposed standard comply with IEEE Std 802, IEEE Std 802.1AC and IEEE Std 802.1Q?
 - b) If the answer to a) is no, supply the response from the IEEE 802.1 WG.
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- a) Yes, the proposed standard will comply with IEEE Std 802, IEEE Std 802.1AC and IEEE Std 802.1Q.
 - b) Not applicable.

The review and response is not required if the proposed standard is an amendment or revision to an existing standard for which it has been previously determined that compliance with the above IEEE 802 standards is not possible. In this case, the CSD statement shall state that this is the case.

1.2.3 Distinct Identity

Each proposed IEEE 802 LMSC standard shall provide evidence of a distinct identity. Identify standards and standards projects with similar scopes and for each one describe why the proposed project is substantially different.

IEEE Std 802.1AS specifies the transport of synchronized time; however, it does not provide support for the IEEE 802.3 Clause 4 MAC operating in half-duplex. There is no other IEEE standard or project that defines support for the IEEE 802.3 Clause 4 MAC operating in half-duplex for IEEE Std 802.1AS.

1.2.4 Technical Feasibility

Each proposed IEEE 802 LMSC standard shall provide evidence that the project is technically feasible within the time frame of the project. At a minimum, address the following items to demonstrate technical feasibility:

- a) Demonstrated system feasibility.
 - b) Proven similar technology via testing, modeling, simulation, etc.
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- a) Supporting the IEEE 802.3 Clause 4 MAC operating in half-duplex with IEEE 802.1AS has been feasibly demonstrated (see <https://www.ieee802.org/1/files/public/docs2017/tsn-cgunther-802-3cg-multidrop-0917-v01.pdf>).
 - b) The proposed standard will use techniques for which the technology has been proven. The original IEEE 802.1AS design excluded support for the IEEE 802.3 Clause 4 MAC operating in half-duplex as that MAC mode did not meet the original Time-Sensitive Networking (TSN) Audio Video Bridging (AVB) use case needs. This restriction needs to be removed for the expanded use cases of automotive in-vehicle applications and Industrial Automation applications, due to the increasing use of the IEEE 802.3cg PHY in multi-drop applications that require gPTP.

1.2.5 Economic Feasibility

Each proposed IEEE 802 LMSC standard shall provide evidence of economic feasibility. Demonstrate, as far as can reasonably be estimated, the economic feasibility of the proposed project for its intended applications. Among the areas that may be addressed in the cost for performance analysis are the following:

- a) Known cost factors.
 - b) Balanced costs.
 - c) Consideration of installation costs.
 - d) Consideration of operational costs (e.g., energy consumption).
 - e) Other areas, as appropriate.
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- a) The cost factors are known for the IEEE 802.1AS standard and will apply to the proposed standard. Specifically, it is expected that support for the IEEE 802.3 Clause 4 MAC operating in half-duplex can be implemented with small additional costs.
 - b) The well-established cost balance between infrastructure and attached stations will not be changed by the proposed standard.
 - c) There are small incremental installation costs relative to the IEEE 802.1AS standard that will apply to the proposed standard.
 - d) There are no additional operational costs anticipated.
 - e) No other areas have been identified.