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Type of Project: Amendment to the IEEE Standard 802.22-2011

PAR Request Date: 12-June-2011

PAR Approval Date: xx-xxx-2011

PAR Expiration Date: 31-Dec-2015

Status: PAR for an amendment to an existing IEEE Standard

Project Record: P802.22a

Root PAR: 802.22-2011

Approved on: 17-Jun-2011 (expected)

1.1 Project Number: P802.22a

1.2 Type of Document: Standard

1.3 Life Cycle: Full Use

2.1 Title: Amendment to IEEE Standard for Wireless Regional Area Networks - Part 22: Cognitive Wireless RAN Medium Access Control (MAC) and Physical Layer (PHY) specifications: Policies and procedures for operation in the TV Bands. - **Management and Control Plane Interfaces and Procedures and Management Information Base Enhancements**

3.1 Working Group: Wireless Regional Area Networks Working Group (C/LM/WG802.22)

Contact Information for Working Group Chair

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3.2 Sponsoring Society and Committee: IEEE Computer Society/Local and Metropolitan Area Networks (C/LM)

Contact Information for Sponsor Chair

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Contact Information for Standards Representative

None

4.1 Type of Ballot: Individual

4.2 Expected Date of submission of draft to the IEEE-SA for Initial Sponsor Ballot: 03/2013

4.3 Projected Completion Date for Submittal to RevCom: 01/2014

5.1 Approximate number of people expected to be actively involved in the development of this project: 15

5.2 Scope: This amendment specifies new material to be added to the approved IEEE Standard 802.22-2011, Standard for Wireless Regional Area Networks - Part 22: Cognitive Wireless RAN Medium Access Control (MAC) and Physical Layer (PHY) specifications: Policies and procedures for operation in the TV Bands. Under this amendment, a new clause for Management and Control Plane Interfaces and Procedures will be added to the existing 802.22 Standard. The existing Clause 13 on Management Information Base will be enhanced and new material will be added to it. New material will also be added to the new clause on Management and Control Plane Interfaces and Procedures. Modifications to the existing Clause 10.7 on Primitives for Cognitive Radio Capabilities may be carried out to align it with the content in Clause 13 and the new clause.

5.3 Is the completion of this standard dependent upon the completion of another standard: No

5.4 Purpose: The purpose of this project is to enhance the definition of managed objects to enable efficient control and management of 802.22 devices. This amendment will also create standardized management and control interfaces as well as the procedures for monitoring and control of the 802.22 devices.

5.5 Need for the Project: The IEEE Standard 802.22-2011 on Wireless Regional Area Networks (WRAN) takes advantage of the favorable propagation characteristics in the VHF and low UHF TV bands to provide broadband wireless access over a large area (10 km - 100 km), while operating on a strict non-interference basis in spectrum assigned to, but unused by, the incumbent licensed services. Such an operation in the TV Bands requires a new approach using purpose-designed cognitive radio techniques that permeate not only the PHY and the MAC layers but also the management and control plane procedures. Configuration and management of cognitive radios in TVWS requires extensive control and management interfaces. It is in the best interest of users and the industry to strive for a standardized interface and managed objects used for configuration and monitoring of the 802.22 wireless systems operating in the TVWS so as to allow broad applicability and ensure efficient control. Also, given the large footprint of 802.22 networks as well as support for fixed and portable devices, remote control and management of these devices is a necessity. This project extends upon the work of IEEE 802.22-2011 in enhancing the Management Information Base (MIB) definitions. It will also define Management and Control Plane Interfaces and Procedures so that a standardized specification between various external entities (e. g. Network Control and Management System, authorized TV Band Database Service, Spectrum Sensing Function, Geolocation Function etc.) can be provided for management and control of 802.22 devices and networks.

5.6 Stakeholders for the Standard: Wireless Internet Service Providers (WISPs), TV Band database service providers, manufacturers and users of semiconductor, personal computer, enterprise networking devices, consumer electronic devices, portable devices, defense and homeland security.

Intellectual Property

6.1.a. Is the Sponsor aware of any copyright permissions needed for this project?: No

6.1.b. Is the Sponsor aware of possible registration activity related to this project?: No

7.1 Are there other standards or projects with a similar scope?: No

7.2 International Activities

a. Adoption

Is there potential for this standard (in part or in whole) to be adopted by another national, regional or international organization?: Do Not Know

Organization:

Technical Committee Name:

Technical Committee Number:

Contact Name:

Phone:

Email:

b. Joint Development

Is it the intent to develop this document jointly with another organization?: No

c. Harmonization

Are you aware of another organization that may be interested in portions of this document in their standardization development efforts?: No

8.1 Additional Explanatory Notes (Item Number and Explanation): This project extends upon the work of IEEE 802.22-2011 in enhancing the Management Information Base (MIB) definitions. It will also define Management and Control Plane Interfaces and Procedures so that a standardized specification between various external entities (e. g. Network Control and Management System, authorized TV Band Database Service, Spectrum Sensing Function, Geolocation Function etc.) can be provided for management and control of 802.22 devices and networks.

FIVE CRITERIA

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.*
- b) Multiple vendors and numerous users.*
- c) Balanced costs (LAN versus attached stations).*

a) IEEE 802 systems require consistent management and control features. The MIB and management and control interfaces and procedures are applicable to all IEEE 802 systems including IEEE 802.22. A standardized management and control interfaces and procedures will allow efficient operation of the 802.22 devices in many regulatory domains around the world for a variety of applications such as broadband wireless access, live-stock monitoring, monitoring of the deforestation, environment protection, disaster recovery and relief, defense and homeland security etc.

b) It is expected that such MIB and Management and Control Plane Interfaces and Procedures will be applicable in all markets where the 802.22 technology will be used and provided by the equipment vendors. Standardizing these definitions and interfaces will allow multiple vendors to provide equipment that is inter-operable.

c) Development of a MIB and Management Plane Interfaces and Procedures is a common feature of current IEEE 802-based systems. Standardizing the MIB and Management Plane Interfaces and Procedures will in fact ensure efficient operation of the IEEE 802.22 systems and lower the cost of the equipment.

Compatibility

The proposed project will be developed in conformance with the 802 Overview and Architecture. The proposed project will be developed in conformance with 802.1D, 802.1Q, 802.1f. Managed objects will be defined consistent with existing policies and practices for 802.1 standards.

Consideration will be made to ensure compatibility with the 802 architectural model including 802, 802.1, 802.1D, 802.1f and 802.1Q.

The proposed amendment will address the requirement(s) for managed object(s) that are consistent with existing policies, practices, and procedures for the 802.1 and 802.22 family of standards.

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.*
- b) One unique solution per problem (not two solutions to a problem).*
- c) Easy for the document reader to select the relevant specification.*

a) IEEE 802.22-2011 is a cognitive radio-based standard for license-exempt operation in TV whitespaces. The 802.22a amendment standard will specifically develop the management and control plane interface and procedures, as well as enhanced MIBs to support the operation of 802.22 devices. Adequately defined MIB and Management Plane Interfaces and Procedures will ensure regulatory compliant operation and avoid interference with primary users.

b) The intended MIB and Management Plane Interfaces and Procedures enhancements are uniquely applicable to 802.22 devices.

c) The title, scope, and purpose of this amendment are defined such that, it will make it easy for the document reader to select this specification for their relevant application.

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.*

a) MIBs and Management and Control Plane Procedures have been demonstrated to be feasible. Many IEEE 802 systems have MIB and Management and Control Plane Procedures components.

b) The many types and numbers of IEEE 802 systems deployed today, demonstrate that MIBs and Management / Control Plane Interfaces and Procedures have been proven in the field and testing requirements for such components have not hindered their deployment. In fact, the lack of adequately defined MIB and Management / Control Plane Procedures may hinder the development, testing, and operation of 802.22 band devices and management tools as well as potentially create interference to incumbent licensed services in the TV Bands due to in-adequate controllability of such devices.

c) Adequately defined MIB and Management Plane Interfaces and Procedures definition improve confidence and reliability, by enhancing inter-vendor interoperability with management tools.

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.*
- b) Reasonable cost for performance.*
- c) Consideration of installation costs.*

a) Implementations of MIBs and Management and Control Plane Interfaces and Procedures components have been deployed widely amongst IEEE 802 devices in a cost effective manner.

b) MIBs and Management and Control Plane Interfaces and Procedures are required by the 802.22 base standard. The cost of these enhancements should be minimal, and significantly enhance performance and inter-vendor interoperability, thus reducing the cost of development. Standardized interfaces for control and monitoring will also ensure efficient operation of these devices.

c) MIBs and Management and Control Plane Procedure components will be integrated into the products during development by the manufacturer. Standardization, including standardization of MIBs and Management and Control Plane Interfaces and Procedures, have been known to reduce the cost of installing networks. The use of standardized MIBs and Management Plane Interfaces and Procedures allow for the remote control of devices in the field. Given the large footprint of 802.22 networks (e.g. 10-100km) as well as support for fixed and portable devices, remote control and management of these devices is a necessity, resulting in costs that are significantly lower than the alternatives, such as traveling to the device location.