

P802.22.1

Submitter Email: apurva_mody@yahoo.com
Type of Project: Revision to IEEE Standard 802.22.1-2010
PAR Request Date: 05-Oct-2012
PAR Approval Date: 05-Dec-2012
PAR Expiration Date: 31-Dec-2016
Status: PAR for a Revision to an existing IEEE Standard
Root Project: 802.22.1-2010

1.1 Project Number: P802.22.1
1.2 Type of Document: Standard
1.3 Life Cycle: Full Use

2.1 Title: Standard for Information Technology--Telecommunications and information exchange between systems--Local and metropolitan area networks--Specific requirements Part 22.1: Standard to Enable Spectrum Sharing using Advanced Beacons

Changes in title: ~~IEEE Standard for Information Technology--Telecommunications and information exchange between systems--Local and metropolitan area networks--Specific requirements Part 22.1: Standard to Enhance Enable Harmful Spectrum Interference Sharing Protection using for Advanced Low Beacons Power Licensed Devices Operating in TV Broadcast Bands~~

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

Contact Information for Working Group Chair

Name: Apurva Mody
Email Address: apurva_mody@yahoo.com
Phone: 404-819-0314

Contact Information for Working Group Vice-Chair

Name: Gerald Chouinard
Email Address: gerald.chouinard@sympatico.ca
Phone: 819-684-2490

3.2 Sponsoring Society and Committee: IEEE Computer Society/LAN/MAN Standards Committee (C/LM)

Contact Information for Sponsor Chair

Name: Paul Nikolich
Email Address: p.nikolich@ieee.org
Phone: 857.205.0050

Contact Information for Standards Representative

Name: James Gilb
Email Address: gilb@ieee.org
Phone: 858-229-4822

4.1 Type of Ballot: Individual

4.2 Expected Date of submission of draft to the IEEE-SA for Initial Sponsor Ballot: 11/2014

4.3 Projected Completion Date for Submittal to RevCom: 05/2015

5.1 Approximate number of people expected to be actively involved in the development of this project: 20

5.2 Scope: This standard specifies methods for spectrum sharing using advanced beacons. The beacon specifies a format that facilitates its detection at low Signal to Noise Ratios. It contains information about a system that requires interference protection and is willing to share the spectrum with other systems.

The Standard defines Physical Layer (PHY) and Medium Access Control Layer (MAC) for advanced beacon operation in High Frequency (HF), Very High Frequency (VHF), Ultra High Frequency (UHF) (3MHz to 862 MHz) and the S-Band (2 GHz - 4 GHz). Enhanced security features, spectrum management, self-organizing network and relay capabilities are included in the beacon specification.

The beacon supports spectrum sharing with licensed wireless microphones, radars, fixed and transportable space to earth receiver stations and other services.

This standard supports mechanisms to enable coexistence

Changes in scope: This standard specifies methods for spectrum sharing using advanced beacons. The beacon specifies a format that facilitates its detection at low Signal to Noise Ratios. It contains information about a system that requires interference protection and is willing to share the spectrum with other systems.

The Standard defines Physical Layer (PHY) and Medium Access Control Layer (e.g., MAC) devices for licensed advanced beacon secondary operation under in Title 47 Frequency of (HF), the Very High Frequency (VHF), Ultra High Frequency (UHF) (3MHz to 862 MHz) and equivalent the devices S-Band in (2 other GHz regulatory- domains) 4 from GHz). Enhanced security features, by spectrum management, self-exempt devices organizing (network

with other 802 systems in the same band.

and relay capabilities are included in the beacon specification.⁹
The beacon supports spectrum sharing with licensed wireless microphones, IEEE radars, P802.22) fixed that and also transportable are space intended to earth receiver stations and other services.
This standard supports mechanisms to operate enable coexistence with other 802 systems in the TV same Broadcast Bands band.

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

5.4 Purpose: This standard proposes an advanced beaoning specification to facilitate spectrum sharing. The beacon contains information about the system that is willing to share the spectrum but needs interference protection. Any new system that wants to operate in the same bands will decode this information from the beacon and adjust its parameters accordingly to not cause the interference with that system.

Changes in purpose: This standard provides an advanced and beaoning efficient specification method to facilitate license-exempt spectrum devices sharing. The provide beacon enhanced contains protection information to about low-powered the licensed system devices that are is entitled willing to protection share from the harmful spectrum but needs interference, and protection. Any new system that share wants to operate in the same spectrum bands This will standard decode may this be information applicable from in the global beacon regulatory and environments adjust its parameters accordingly to not cause the interference with that system.

5.5 Need for the Project: The IEEE 802.22.1-2010 Standard was published in 2010. This standard defines a beaoning specification that enables spectrum sharing between licensed Part 74 (e. g. licensed wireless microphone) systems and the unlicensed Television Band (VHF/ UHF Band) White Space Devices.

In June 2010, the President of the United States signed a Memorandum calling for the National Telecommunications and Information Administration (NTIA), in collaboration with the Federal Communications Commission (FCC), to make 500 megahertz of spectrum available for fixed and mobile wireless broadband. Please see Section 8.1 for the reference to the PCAST report.

One of the portions of the spectrum identified to achieve this goal is the S-Band (2000-3700 MHz) where radars have been deployed. The current plan is to use exclusion zones to protect U.S. Navy coastal operations and other Department of Defense test and training areas. However, advanced beaoning approaches, such as the one developed in the IEEE Standard 802.22.1-2010 for spectrum sharing and interference protection between the primary signals and commercial wireless microphone signals may be used especially for the 3550-3650 Band. Such an advanced beacon, will enable efficient spectrum sharing and make 100 MHz of spectrum available nation-wide, and especially in the coastal areas where significant US population resides. The designed beacon will contain peace time temporal patterns of the radars (e. g. Frequency, Pulse Width , Pulse Repetition Interval), which when combined with some universal time clock such as GPS can help commercial communications systems to use the empty time slots for their operation. During emergency scenarios, the beacon will be able to send urgent messages, to ask all the commercial systems to shut down immediately. IEEE 802.22 WG is working with the US Navy to incorporate this information into the beaoning protocol.

Security features for such beacons are very important. IEEE Std. 802.22.1-2010 has incorporated many such security mechanisms that may be applied relatively readily for secure identification and authentication of the beacon but may need enhancements.

The IEEE Std. 802.22.1-2010 beacon may require alternate technologies for the PHY and enhancements to the MAC in order to carry the information for spectrum sharing. It may also require relay, and spectrum management attributes to fulfil its duties. This advanced beaoning technology may be used to protect other types of services such as the satellite to earth receiver stations, emergency services etc.

5.6 Stakeholders for the Standard: Chip and equipment manufacturers, government organizations, Department of Defense personnel, broadcasters, utility companies, wireless internet and data service providers and other entities such as database service providers to which the standard may need to interface.

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 Joint Development

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

8.1 Additional Explanatory Notes (Item Number and Explanation): The United States President's Council of Advisors on Science and Technology (PCAST) report that promotes spectrum sharing between federal and commercial systems can be found at the following URL:

PCAST Report - Report to the President - Realizing Full Potential of the Govt. held Spectrum to Spur Economic Growth

http://www.whitehouse.gov/sites/default/files/microsites/ostp/pcast_spectrum_report_final_july_20_2012.pdf