

# Update to P1900.7 PAR and 5C

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## Abstract

- **DySPAN-SC WS Radio ad hoc is currently performing coordination of P1900.7 PAR with 802**
- **This presentation introduces the current status of this coordination process**

## **Actions taken for coordination**

- **The following WGs/TGs have been contacted**
  - 802.11/802.11af
    - Teleconference on February 22
    - 7 comments are collected
  - 802.16/802.16h
    - Comments to be provided by the end of March plenary
  - 802.19/802.19.1
    - Teleconference on February 23
    - No comments so far
  - 802.22
    - Teleconference on March 1
    - 8 comments are collected
- **Comments are available at**
  - <http://grouper.ieee.org/groups/scc41/adhoc-wsr/contrib/dyspan-ws-radio-11-0011-00-Comment-Tracking-File.xlsx>

## **Actions taken for coordination**

- **Comments from the following WGs/TGs have been considered and resolved**
  - 802.11/802.11af
    - Teleconference on February 22
    - 7 comments are collected
  - 802.22
    - Teleconference on March 1
    - 8 comments are collected
- **5C and PAR are updated based on comment resolution**
  - These are not final versions, because we are waiting for comments from 802.16/802.16h
- **Current versions of 5C and PAR are available at**
  - <http://grouper.ieee.org/groups/scc41/adhoc-wsr/contrib/dyspan-ws-radio-11-0013-00-5C-Proposed.doc>
  - <http://grouper.ieee.org/groups/scc41/adhoc-wsr/contrib/dyspan-ws-radio-11-0014-00-PAR-Proposed.doc>

# Updated PAR

- **Title**
  - Medium Access Control (MAC) Sublayer and Physical (PHY) Layer Specification for Fixed and Mobile Operation of White Space Dynamic Spectrum Access Radio Systems
- **Scope**
  - This standard specifies a radio interface including medium access control (MAC) sublayer and physical (PHY) layer of white space dynamic spectrum access radio systems supporting fixed and mobile operation in white space frequency bands, while avoiding causing harmful interference to incumbent users in these frequency bands. The standard provides means to support other related IEEE 1900 standards.

# Updated PAR

- **Purpose**

- This standard enables the development of cost-effective, multi-vendor white space dynamic spectrum access radio systems capable of interoperable operation in white space frequency bands on a non-interfering basis to incumbent users in these frequency bands. This standard facilitates a variety of applications, including the ones capable to support high mobility, both low-power and high-power, short-, medium, and long-range, and a variety of network topologies. This standard is a baseline standard for a family of other standards that could be developed focusing on particular applications, regulatory domains, etc.

# Updated PAR

- **Standards/projects with a similar scope**
  - ECMA-392 standard specifies local area network (LAN) based MAC and PHY for operation in TV white space.
  - IEEE P802.22 draft standard specifies MAC and PHY for point-to-multipoint wireless regional area networks comprised of a professional fixed base station with fixed and portable user terminals operating in TV white space.
  - IEEE P802.11af draft standard defines modifications to 802.11 MAC and PHY to meet the legal requirements for channel access and coexistence in the TV White Space.
  - IEEE standard 802.16h specifies improved mechanisms, as policies and medium access control enhancements, to enable coexistence among license-exempt systems based on IEEE Standard 802.16 and to facilitate the coexistence of such systems with primary users.

## Updated PAR

- **Standards/projects with a similar scope**
  - The proposed standard will support the other IEEE 1900 standards, such as P1900.4a for white space management, P1900.5 for policy languages, and P1900.6 to obtain and exchange sensing related information (spectrum sensing and geolocation information). Also, the proposed standard may support other standards, for example, P802.19.1 for white space coexistence.
  - With regard to ECMA-392, IEEE P802.22, IEEE P802.11af, and IEEE 802.16, physical layer features, MAC sublayer features, and cognitive features that are important for dynamic spectrum access in white space frequency bands have been analyzed. Below are the results of these analyses.



# Updated PAR

- **Standards/projects with a similar scope**
  - It is beneficial to develop a new white space radio system standard because, compared to ECMA-392 standard, IEEE P802.22 draft standard, and IEEE P802.11af draft standard, it will have the following new features:
    - Full mobility support including handover etc
    - Support of cellular and mesh topologies
    - Multichannel support including support of non-adjacent channels
    - Support of inter-system coexistence.
  - The new standard will enable efficient implementation of the following usage models as compared to ECMA-392 standard, IEEE P802.22 draft standard, and IEEE P802.11af draft standard and would enable other relevant usage models:
    - Wide Area Connectivity usage model due to simultaneous support of long range and high data rate by combining multiple channels (including non-adjacent channels)
    - Transportation Logistics, Land Mobile Connectivity, and High Speed Vehicle Broadband Access usage models due to full mobility support
    - Maritime Connectivity usage model due to full mobility support and support of cellular and mesh topologies.

# Updated PAR

- **Standards/projects with a similar scope**
  - These usage models drive PHY and MAC layer requirements and parameters that cannot be met by simple extensions or modifications of ECMA-392, IEEE P802.22 or **IEEE P802af**. Therefore, a new standards development effort is required.
  - IEEE 802.16h standard is designed for license-exempt operation and does not have cognitive features for dynamic spectrum access in white space frequency bands, such as, interface with geolocation device, TVWS database, and spectrum sensors, quiet periods for spectrum sensing, and support of inter-system coexistence. Compared to IEEE 802.16h standard, the new standard will have all cognitive features that are required for white space communication.

# Summary

- **This standard will specify a radio interface of white space dynamic spectrum access radio systems supporting fixed and mobile operation in white space frequency bands**
- **Avoiding causing harmful interference to incumbent users is mandatory**
- **Providing means to support other related IEEE 1900 standards in order to enable them is one of the key goals**
- **This standard facilitates a variety of applications, including the ones capable to support high mobility, both low-power and high-power, short-, medium, and long-range, and a variety of network topologies**
- **This standard is a baseline standard for a family of other standards that could be developed focusing on particular applications, regulatory domains, etc**

## Further actions

- **Finalize collecting comments from 802**
  - By the end of March 802 plenary
- **Finalize comment resolution and approve updated PAR and 5C by DySPAN-SC**
  - By the end of March DySPAN-SC plenary
- **Submit updated PAR to NesCom**
  - P1900.7 PAR is in the agenda of March 30 NesCom meeting