

802-22 Response to Comments on the 802.22 Revision PAR

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Summary

802.22 General Comments

1. The 802.22 WG submitted the initial revision PAR as contained in document [[22-13-0138Rev2](#)] on October 10th 2013
2. A corrected PAR document was sent out on October 11th 2013 [[22-13-0138Rev3](#)]
3. 5C [[22-13-0156Rev0](#)] document was sent out on Nov 1st as per the instructions from the Chair of the 802 EC
4. We considered the comments from the various working groups and here is the summary of our response.

Summary

802.22 General Comments

- **Since 2005, when the 802.22 PAR was first submitted and approved, FCC, NTIA and other regulators have broadened their horizons for cooperative spectrum sharing approaches in order to optimize spectrum utilization. [[For example see the PCAST Report - Realizing Full Potential of Government Held Spectrum](#)]**
- **FCC/ NTIA are in the process of opening new spectrum bands which specifically require multi-levels of regulated users to share the spectrum utilizing cognitive radio behavior. For our purposes, we defined spectrum sharing as a mechanism which ensures that licensed services are protected from interference while retaining flexibility for other devices to share spectrum with new services or to change frequencies**
- **While these new bands have been specified by the FCC for the United States, they may be different in other countries.**
- **The intention of this PAR is to align the current 802.22 technology with emerging regulations.**

Summary

802.22 General Comments (continued)

- **White Space database implementers are looking to leverage their existing TV Band solutions into these new bands where interfaces to the devices are likely to remain the same as defined for the TV Bands**
- **Wireless device manufacturers are seeking a common protocol to be used across these shared spectrum bands.**
- **The aim is not to change the 802.22 protocol (PHY and MAC) but to change the spectrum management framework to align 802.22 to be used in these other bands. For example, 802.22 may be used in the proposed Federal radar bands (e. g. 2700 MHz – 3650 MHz) which allow spectrum sharing, since 802.22 already contains the basic cognitive radio capabilities and mechanisms that are needed to enable spectrum sharing**

Comments from 802.19

IEEE 802.22 Revision

Since Gerald Chouinard is no longer the vice chair of the working group Section 3.1 of the PAR should be updated with the current vice chair.

ANS: ACCEPT

In the Purpose section it says that a new clause will be added. This sounds a bit like an amendment. Is there a reason a 5C was not provided for this new clause?

ANS: The primary purpose of the revision is to merge the amendments (P802.22a and P802.22b) as well as make the necessary corrections. The new clause is likely to be a recommendation on how 802.22 may be used in other shared spectrum bands which may have rules that are similar to the ones defined in the TV Bands but there may be some additional nuances. So it was interpreted that the 5C may not be required. However, when the 802 EC Chair requested a 5C it was promptly provided on November 1st

Comments from 802.11

2.1 spell out the first use of RAN

ANS: ACCEPT

3.1 Update the WG Vice chair

ANS: ACCEPT

5.2 the scope is not describing what band is truly being used. “any band” is too broad a scope.

ANS:

- **Since 2005, when the 802.22 PAR was first submitted and approved, FCC, NTIA and other regulators have broadened their horizons for cooperative spectrum sharing approaches in order to optimize spectrum utilization. [[For example see the PCAST Report - Realizing Full Potential of Government Held Spectrum](#)]**
- **FCC/ NTIA are in the process of opening new spectrum bands which specifically require multi-levels of regulated users with spectrum sharing and cognitive radio behavior.**
- **While these new bands have been specified by the FCC for the United States, they may be different in other countries.**
- **The aim is not to change the 802.22 protocol (PHY and MAC) but to change the spectrum management framework to align 802.22 to be used in these other bands. For example, 802.22 may be used in the proposed Federal radar bands (e. g. 2700 MHz – 3650 MHz) which require spectrum sharing, since 802.22 already contains the basic cognitive radio capabilities and mechanisms that are needed to enable spectrum sharing**

Comments from 802.11

5.4 the added sentences of “This Revision project...” is not being added in the right place. This should be part of 5.5 Need for the project. (see slide notes for all the text that should be moved to 5.5.)

Ans: ACCEPT

5.5 the initial part of this section seems to be why the 802.22 was originally started, and that would not necessarily be the reason for the revision, but only the latter part of this section should be used (Why are you doing the revision not why 802.22.)

Ans: ACCEPT

Comments from 802.11

5.2 Is the scope of the revision only to reband the existing 802.22 radio?

ANS: The aim is not to change the 802.22 protocol (PHY and MAC) but to provide a spectrum management framework to align 802.22 to be used in these other bands. For example, 802.22 may be used in the proposed United States Federal radar bands (e. g. 2700 MHz – 3650 MHz) which require spectrum sharing, since 802.22 already contains the basic cognitive radio capabilities and mechanisms that are needed to enable spectrum sharing

5.2 Which bands do you intend to occupy? (this should be stated in the Scope statement) All Unlicensed Spectrum is not a reasonable response. A specific range of bands should be specified.

ANS: That is correct. 802.22 is unlikely to be used in an Unlicensed band such as the ISM bands. However, due its cognitive radio capabilities, 802.22 is highly suitable to bands that require spectrum sharing with other primary users. As specified earlier, such bands may include 2700 MHz – 3650 MHz in the United States where sharing with radar systems may be allowed.

Comments from 802.11

7.1 What about 802.16? If you are expanding the bands and the type of station definition, does this become similar to 802.16?

ANS: Counter to 802.16, the fundamental assumption behind the operation of IEEE 802.22 systems is that spectrum is shared with primary users. Hence the shared spectrum may or may not be available at all times and at all the locations. The radio will have to automatically change its characteristics and behavior to operate in appropriate alternate spectrum as directed by the cognitive sharing mechanism (e. g. database, sensing or beaconing). Hence 802.22 is highly applicable for use in bands that require spectrum sharing such TV Bands or in the newly available radar bands in the United States between 2700 MHz to 3650 MHz.

8.1 No section number with the text, and it seems to be a cut and paste error as it is identical to the purpose statement. Delete.

Ans: ACCEPT

Comments from 802.11

General: Missing updated 5C – see 10.2 and 10.3 of the LMSC OM – This Project is not qualified to be considered at this Session.

ANS: The primary purpose of the revision is to merge the amendments (P802.22a and P802.22b) as well as make the necessary corrections. The new clause is likely to be a recommendation on how 802.22 may be used in other shared spectrum bands which may have rules that are similar to the ones defined in the TV Bands. So it was interpreted that the 5C may not be required. However, when the 802 EC Chair requested a 5C it was promptly provided on November 1st

General: the PAR form presented is not the correct PAR form. An old PAR form should not be used for consideration.

ANS: This PAR form was generated by the IEEE myProject so we are not aware if the form automatically generated by the tool is an old PAR form or a new PAR form.

Comments from 802.16

The IEEE 802.16 Working Group has reviewed the draft
P802.22 PAR Revision

<<https://mentor.ieee.org/802.22/dcn/13/22-13-0138-03-0000-802-22-revision-par.pdf>> and offers the following comment.

The Scope, per the draft PAR revision, is:

*This standard specifies the air interface, including the cognitive **radio** medium access control layer (MAC) and physical layer (PHY), of point-to-multipoint and **point-to-point** wireless regional area networks comprised of a professional fixed base station with fixed and portable user terminals operating **in the bands that allow spectrum sharing such as VHF/UHF TV broadcast bands between 54 MHz to 862 MHz.***

Comments from 802.16

We note the proposed addition of the term “point-to-point” to the scope, implying the draft standard will specify an air interface of point-to-point in addition to point-to-multipoint wireless regional area networks. To the extent that a point-to-multipoint system can be considered a point-to-point system when a fixed base station communicates with a single user terminal, this additional “point-to-point” text is superfluous since the capability is already included in the existing 802.22 standard. Alternatively, if the intention of this PAR revision is to broaden the PAR scope (for example, to include an air interface between a pair of base stations or a pair of user terminals), this would be a major change in the scope of the existing standard and would require full justification through a Five Criteria statement. However, the Five Criteria statement circulated on 1 November does not provide details justifying such a broadening of scope. We propose to remove the term “point-to-point” from the PAR revision, since there is currently no restriction on the application of a point-to-multipoint system with only a single user terminal communicating with a fixed base station in the 802.22 standard.

ANS: ACCEPT – Removed the term Point-to-Point from the Scope

Comments from 802.16

We are also concerned about the proposed text “bands that allow spectrum sharing such as” to the modified scope (noting that the word “allow” was not used in the draft PAR revision 02 that was reviewed by many EC members and dramatically alters the meaning of the scope). To our understanding some form of spectrum sharing is allowed in virtually all wireless bands, including licensed bands. Thus, the proposal would expand the scope of the standard from cognitive radio networks to radio networks applicable to any spectrum sharing method in any known band, including bands in which spectrum sharing is allowed but not normally used. Such a significant change of scope would need to be supported by an analysis in an accompanying Five Criteria statement addressing the expansion to all possible spectrum sharing methods. We propose to limit the expansion of the scope to bands requiring cognitive radio solutions.

ANS: Please see the next page

Comments from 802.16

Continued from the earlier page

ANS: The PAR document with the words “allow” was circulated as a correction via e-mail that was sent out on October 11th [22-13-0138Rev2]. However, we are okay with changing the word “that Allow Spectrum Sharing” to “that Allow Spectrum Sharing between Primary Services and Opportunistic Communication Devices”

The fundamental assumption behind the operation of IEEE 802.22 systems is that spectrum is shared with primary users. Hence the shared spectrum may or may not be available at all times and at all the locations. The radio will have to automatically change its characteristics and behavior to operate in appropriate alternate spectrum as directed by the cognitive sharing mechanism (e. g. database, sensing or beaconing). Hence 802.22 is highly applicable for use in bands that allow or require spectrum sharing such as the radar bands between 2700 MHz to 3650 MHz in the United States.

References