

Comments from IEEE 802.16 on “Proposed PAR for IEEE 802.xx Regional Area Network TV Band Specification”

The IEEE 802.16 Working Group appreciates the opportunity to review this PAR from the 802.18 Radio Regulatory TAG.

We appreciate the efforts of 802.18 Study Group to address the upcoming need for an approach to “determine the presence of licensed users in the TV band and adjust [the] frequency of operation, power level, and/or other operational characteristics so as to avoid harmful interference to these operations.” We believe that such approach would allow for the operation of a variety of 802 wireless standards under a common etiquette. We understand that regulators are not seeking to promote the use of a particular air interface technology but instead to provide rules that will allow many MAC/PHY technologies to coexist.

Therefore, the 802.16 Working Group disagrees with the extension of the scope to include the development of a specific air interface technology. We believe that the PAR’s attempt to join these two factors – cognitive radio and a VHF/UHF air interface – into one project is inappropriate. These issues should remain separate.

We believe that the entire proposal is based on a fundamental oversight, as stated in the “Distinct Identity” clause of the Five Criteria: “No current 802 wireless standard specifies operation in the VHF and lower portion of the UHF spectrum, i.e., the TV bands, where, because of the more favorable propagation characteristics, it is possible to cover extensive areas in LOS and non-LOS conditions, making it economically feasible to serve even sparsely populated rural areas.” This is incorrect. The approved IEEE Standard 802.16-2004 does exactly that.

We regret that, since the 802 Executive Committee email reflector was not provided with advance notice of this PAR, members of Working Groups, including 802.16, did not have sufficient advance time to review this proposal.

We note that the PAR procedure (Procedure 2) of the 802 P&P says that “It is highly recommended that a tutorial be given at a previous Plenary session for major new work items.” It is clear that this proposal would represent a major new work item. Therefore, we encourage the Study Group to withdraw its proposal pending a tutorial on the topic. 802.16 members would value the opportunity to become better educated on 802.18’s preceived unique application space requirements that may necessitate the origination of a new air interface standard. A tutorial would help to advance the level of consensus within 802 on this topic.

Given the fact that this PAR has arisen from a Study Group within the Radio Regulatory TAG, we are surprised to find it recommending the development of new air interface. We have done some research to learn the name and charter of this Study Group, but we have not been able to find it on the 802.18 web site. Could you please help us with this query?

Response of IEEE 802.18/SG1 to the Comments from IEEE 802.16 on “Proposed PAR for IEEE 802.xx Regional Area Network TV Band Specification”

[In this document, the comments provided to 802.18 and 802.18 SG1 are in black and 802.18/SG1 responses are in blue.]

The IEEE 802.16 Working Group appreciates the opportunity to review this PAR from the 802.18 Radio Regulatory TAG.

We appreciate the efforts of 802.18 Study Group to address the upcoming need for an approach to “determine the presence of licensed users in the TV band and adjust [the] frequency of operation, power level, and/or other operational characteristics so as to avoid harmful interference to these operations.” We believe that such approach would allow for the operation of a variety of 802 wireless standards under a common etiquette. We understand that regulators are not seeking to promote the use of a particular air interface technology but instead to provide rules that will allow many MAC/PHY technologies to coexist.

Therefore, the 802.16 Working Group disagrees with the extension of the scope to include the development of a specific air interface technology.

Response: 802.18/SG1 does not understand the comment regarding “extension of scope”. SG1, the Study Group that prepared the proposed PAR, was formed in November 2003 and originally proposed by 802.18 as an Executive Committee Study Group. However, the Executive Committee determined that SG1 should be placed in 802.18. This placement of the SG would facilitate the interaction between those interested in developing a standard for unlicensed use of unused TV spectrum on a non-interference basis and the experts who are most familiar with the regulatory and political environment and the requirements that would have to be satisfied in order to successfully gain access to the spectrum in question.

We believe that the PAR’s attempt to join these two factors – cognitive radio and a VHF/UHF air interface – into one project is inappropriate. These issues should remain separate.

Response: IEEE 802.18/802.18 SG1 respectfully disagree that cognitive radio and air interfaces are separate or separable elements. Our studies have led us to the conclusion that a specialized form of cognitive radio techniques, *highly integrated into a purpose-built PHY/MAC/air interface system*, will yield the best, most practical, most cost-effective, and most robust solution to this unique “unlicensed under licensed” sharing situation and will also result in optimum spectrum utilization. We do not believe that these requirements can be successfully or optimally met by attempting to “bolt an appliqué onto” any of the existing 802 PHY/MAC combinations. Therefore 802.18 SG1 still recommends the approach described in our proposed PAR (a new WG/standard).

We believe that the entire proposal is based on a fundamental oversight, as stated in the “Distinct Identity” clause of the Five Criteria: “No current 802 wireless standard specifies operation in the

VHF and lower portion of the UHF spectrum, i.e., the TV bands, where, because of the more favorable propagation characteristics, it is possible to cover extensive areas in LOS and non-LOS conditions, making it economically feasible to serve even sparsely populated rural areas.” This is incorrect. The approved IEEE Standard 802.16-2004 does exactly that.

Response: IEEE 802.18/SG1 apologizes for our inadvertent oversight of the recent change removing the lower spectrum limit from the 802.16 scope. It was not our intent to misrepresent.

Establishing distinct identity does not require distinct spectrum usage as is indicated by the existence of 802.11 and 802.15. E.g., there are currently multiple air interface standards within IEEE 802 in the 2.4 and 5 GHz bands. Furthermore, 802.16 affirmed this concept in IEEE 802.16-04/43 2004-07-14 “Response to Comments from 802.20 Working Group regarding modified 802.16e PAR” where they state:

“Therefore, it is clear that band overlap is not the critical factor in determining distinct identity.”

It is the application and its unique requirements for a tightly integrated cognitive radio system tailored to the requirement to operate as an unlicensed device in the presence of licensed TV band services (such as analog TV, digital TV, translators and repeaters, and private land mobile radio) that establish distinct identity.

It is not an attempt to develop a generalized cognitive radio solution, but rather an optimized one “keyed and tuned” to the detection of the specific incumbent services’ unique spectral characteristics.).

Communications Research Centre Canada has examined the unique requirements of this application and the current technologies available to address them. According to their findings, much more TV-spectrum will be available in rural and remote areas than in metropolitan areas and the propagation conditions will be different in rural and remote areas (near LOS over trees and forests and NLOS because of blockage by hills and mountains, less multipath but with larger excess delays caused by reflections off hills and mountains), than those prevalent in metropolitan environments (LOS, NLOS and multipath with relatively shorter excess delays). Trying to retrofit a system optimized for metropolitan environment in rural and remote areas where most of the spectrum will actually exist seems to be a rather sub-optimal solution. This is why a new WG is needed to look objectively at the system requirements.

Representatives of the U.S. TV broadcasting industry have indicated that they would prefer that a new working group be formed whose objective is directly attuned to their needs and would be dedicated to solving a very unique problem addressing the first use of unlicensed devices sharing spectrum with licensed users. That in itself indicates a level of distinct identity and broad market potential.

We regret that, since the 802 Executive Committee email reflector was not provided with advance notice of this PAR, members of Working Groups, including 802.16, did not have sufficient advance time to review this proposal.

Response: The notice requirement in the LMSC P&P is that a copy of the proposed PAR be delivered to the members of the Executive Committee at least 30 days prior to the opening of the

plenary session at which the PAR is to be considered for approval. The P&P further states “Delivery may be assumed if sent by either fax or email one full working day prior to the deadline...”. The Chair of 802.18 sent the PAR and 5 Criteria via email to all the members of the Executive Committee at their most recent email address on May 15, 2004 and received no bounces. Other WG chairs received the PAR and forwarded it to their WG reflectors.

We note that the PAR procedure (Procedure 2) of the 802 P&P says that “It is highly recommended that a tutorial be given at a previous Plenary session for major new work items.” It is clear that this proposal would represent a major new work item. Therefore, we encourage the Study Group to withdraw its proposal pending a tutorial on the topic. 802.16 members would value the opportunity to become better educated on 802.18’s perceived unique application space requirements that may necessitate the origination of a new air interface standard. A tutorial would help to advance the level of consensus within 802 on this topic.

Response: Tutorials are not a mandatory requirement. We have considered your request that we withdraw the PAR and resubmit it.

However, due to the NPRM timeline and due to the fact that we have received wide industry support including the broadcasters, we believe that a delay would be deleterious to the best interests of 802. Delaying the commencement of the development of the proposed standard will only result in a loss of opportunity to gain early access to this highly desirable spectrum, delay the development of the market, and unnecessarily and undesirably delay the provision of broadband service to the rural and unserved consumers that the standard is intended to serve. With the FCC NPRM coming out earlier than expected, the need to proceed promptly is only increased.

We also have concerns that arbitrarily denying the interested parties, who want to proceed promptly, the opportunity to do so may raise issues of anti-competitive practices that 802 and the IEEE-SA normally go to great lengths to avoid, could prompt an appeal to the IEEE-SA or the Standards Board, or could prompt the parties to seek an alternative sponsor or take the work to a “SIG” when we believe that the work should properly be done in the proposed new working group in IEEE 802.

Given the fact that this PAR has arisen from a Study Group within the Radio Regulatory TAG, we are surprised to find it recommending the development of new air interface. We have done some research to learn the name and charter of this Study Group, but we have not been able to find it on the 802.18 web site. Could you please help us with this query?

Response: As stated earlier, in response to the comment on “extension of scope”, the Study Group that prepared the proposed PAR was originally proposed by 802.18 as an Executive Committee Study Group, but the EC determined that it should be placed in 802.18 and approved our request to form a Study Group at the November 2003 plenary. The motion to form the Study Group included as an objective the creation of a PAR to develop a new standard. The EC voted in March to extend the SG including all the elements of the original motion. Please see the minutes of the closing EC meetings of the November 2003 and March 2004 plenaries for these details.

802.18 and 802.18 SG1 therefore respectfully request that 802.16 reconsider its position and allow the interested parties who have worked on this topic for many months to proceed promptly.