
**Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554**

In the Matter of)
)
Facilitating Opportunities for Flexible,) ET Docket No. 03-108
Efficient, and Reliable Spectrum Use)
Employing Cognitive Radio Technologies)
)
Authorization and Use of Software Defined) ET Docket No. 00-47
Radios) (Terminated)

Via the ECFS

REPLY COMMENTS OF IEEE 802.18

IEEE 802.18 ¹ hereby respectfully offers its Reply Comments on the Notice of Proposed Rulemaking (the “NPRM”) in the above-captioned Proceeding.²

The members of the IEEE 802.18 that participate in the IEEE 802 standards process are interested parties in this proceeding. IEEE 802, as a leading consensus-based industry standards body, produces standards for wireless networking devices, including wireless local area networks (“WLANs”), wireless personal area networks (“WPANs”), and wireless metropolitan area networks (“Wireless MANs”).

IEEE 802.18 is an interested party in this Proceeding and we appreciate the opportunity to provide these comments to the Commission.

¹ The Radio Regulatory Technical Advisory Group (“RR-TAG”) within the IEEE 802 Local and Metropolitan Area Networks Standards Committee (“IEEE 802” or the “LMSC”)

² This document solely represents the views of IEEE 802.18 and does not necessarily represent a position of either the IEEE or the IEEE Standards Association..

INTRODUCTION

1. On December 30, 2003, the FCC released the subject NPRM and Order seeking comment on the cognitive radio technologies and FCC proposed rules related to cognitive radio operation.
2. In these reply comments, the IEEE 802 reiterates our support for the Commission in its efforts to amend the rules to support implementation of cognitive radio technologies. We believe these technologies offer new economic opportunities to reuse fallow spectrum in urban, suburban and rural areas, and believe that it is in the public interest to implement rules supporting cognitive radio based services in these otherwise wasted spectrum segments, where it can be shown to be technically feasible to reliably provide appropriate protection to incumbent licensees.
3. In particular, IEEE 802.18 recognizes the potential of extending the benefits of wireless technologies using cognitive radio as a means of increasing spectrum utilization for license exempt applications through opportunistic use of unoccupied spectrum.
4. The Commission identifies opportunistic use of fallow spectrum as a fourth scenario in the introductory comments to the instant NPRM, but does not address the issue in its rulemaking later in the body of the NPRM.
5. Nonetheless, many of the commenting parties chose to oppose opportunistic use in their comments. In our reply comments, we will generally address their statements.

IEEE 802.18 SUPPORTS OPPORTUNISTIC USE OF FALLOW SPECTRUM BY LICENSE EXEMPT NETWORKS ON A NON-INTERFERING BASIS WITH LICENSED SERVICES USING COGNITIVE RADIO TECHNIQUES

6. The commenting parties opposed to authorization of cognitive radio technology as a means to enable license exempt opportunistic use of fallow spectrum fall into the following broad categories:
 - Band managers/network operators/public safety entities with interests in PLMRS.
 - Service providers/manufacturers/and non-profit organizations with interests in CMRS.
 - Amateur radio/amateur satellite organizations..
 - A satellite system operator.
 7. These commenting parties uniformly oppose opportunistic use of spectrum within their particular sphere of interest, citing the usual litany of reasons: protection of economic interests, protection of public safety interests, protection of historic spectrum rights, etc.
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8. IEEE 802.18 believes that cognitive radio techniques can in many cases make possible licensed exempt use of spectrum that is otherwise not in use or lightly used without infringing upon the rights of licensed users or causing harmful interference to licensed operations.
 9. IEEE 802.18 also believes that unused spectrum being left fallow is not in the public interest. Wasting spectrum by allowing license holders to acquire licenses without putting the spectrum to use, or by allowing allocated spectrum to remain underutilized due to economic, historic, or other systemic reasons does not represent the best and highest use of this valuable and scarce public resource.
 10. Layering more licensed allocations on top of existing allocations as a solution to the underutilized spectrum does not, in our view, increase economic incentives for new applications in these spectrum slots, since obtaining the investor support required to build out licensed services becomes problematic when the economic history of a particular allocation in a particular geographic area has shown little promise for significant profits.
 11. In contrast, license exempt use can support business models which do not require large capital investment to roll out services because of the low cost of unlicensed equipment and the lack of the high up-front costs of acquiring spectrum at auction. As a result, rural areas, and other low population density areas could obtain services which would otherwise be unavailable from the business entities which operate on licensed spectrum and tend to focus their investments on the larger, more profitable, urban and suburban marketplaces.
 12. For similar reasons, community based networks and other not-for-profit groups could make use of otherwise unused spectrum to offer their constituencies innovative services and applications which would otherwise be viewed as uneconomic, and, as a result, ignored by profit-oriented entities.
 13. The assertions by some that license exempt use interferes with business opportunities flies in the face of the clear evidence that a vast amount of spectrum remains unused because the high cost of rolling out licensed infrastructure is not justified on a return on investment basis. Without the opportunity to reclaim this spectrum in the public interest using cognitive radio technology under license exempt rules, this fallow spectrum, in our view, would continue to be underutilized.
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IEEE 802.18 SUPPORTS THE COMMISSION’S APPROACH TO RURAL APPLICATIONS OF COGNITIVE RADIO TECHNOLOGY AS A MEANS TO INCREASE THE COVERAGE AREA OF WISPS AND OTHER UNLICENSED SERVICES IN THE ISM BANDS

14. Some commenting parties expressed concern that operations of license exempt equipment under the high power rules proposed by the Commission as a new part, “15.206 Cognitive radio devices”, would interfere with existing equipment or operations authorized under Part 15.247 or Part 15.249.

15. We agree with the Commission’s approach of limiting high power operations to cognitive devices within a geographic region where the subject unlicensed spectrum is lightly used. Establishing a reasonable criterion (in our comments, we recommended an occupancy threshold of 10%) for determining lightly used (e.g. rural) environments as a conservative approach to permitting higher power operation. We also believe that the threshold for determining an unoccupied spectrum segment (-83 dBm in a 1.25 MHz bandwidth) is sufficiently conservative, when combined with a 10% occupancy criterion, to support the proposed higher power operations while offering some level of confidence that pre-existing networks operating under Part 15.247 and Part 15.249 rules are not unduly penalized.

FINAL COMMENTS

16. The Commission, in proposing rules authorizing cognitive radio technologies, especially under Part 15 rules, has taken another important step forward in addressing the issue of improving spectrum utilization.

17. We believe enabling more pervasive and economical rural broadband access to unserved or underserved communities by selectively and conservatively allowing modestly higher power operational capabilities in the ISM bands as the Commission has proposed is appropriate, and urge the Commission to proceed as rapidly as possible to implement these rules changes.

18. In the broader context of license exempt sharing of licensed spectrum, we believe that opportunities exist to apply sophisticated cognitive radio technologies to recover otherwise underutilized spectrum for uses which have significant economic and societal benefits without harming the interests of licensed services.

19. We also recognize that some bands may not be good candidates for the application of cognitive radio technologies to support license exempt operations due to the nature and characteristics of the incumbent licensed services. However, the Commission should make the determination to exclude bands from consideration on a case by case basis on the basis of sound technical facts, rather than bowing to pressure from licensees who are simply reciting the “not in my backyard” mantra.

20. We appreciate this opportunity to offer these reply comments to the Commission.

Respectfully submitted,

/s/

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