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

In the Matter of

Amendment of Part 15 Rules for License-Exempt ET Docket No. 07-113
57-64 GHz Band.

Via the ECFS

COMMENTS OF IEEE 802.18

IEEE 802.18, the Radio Regulatory Technical Advisory Group (“the RR-TAG”) within IEEE 802¹ hereby submits its Comments in the above-captioned Proceeding. This document was prepared and approved by the RR-TAG, and also was reviewed by the IEEE 802 Executive Committee.²

The members of the RR-TAG that participate in the IEEE 802 standards process are interested parties in this proceeding. We appreciate the opportunity to provide these comments to the Commission.

INTRODUCTION

1. On June 1, 2007, the Commission issued a NOTICE OF PROPOSED RULE MAKING, under ET Docket 07-113, in which the Commission seeks comment on recommendations by Wireless Communications Association (“WCA”) to increase the fundamental radiated emission limit for unlicensed 60 GHz transmitters with very high gain antennas, to specify the

¹ The IEEE Local and Metropolitan Area Networks Standards Committee (“IEEE 802” or the “LMSC”)

² This document represents the views of IEEE 802.18. It does not necessarily represent the views of the IEEE as a whole or the IEEE Standards Association as a whole.

emission limit as an equivalent isotropically radiated power (“EIRP”) level, and to eliminate the requirement for a transmitter identification for 60 GHz transmitters.³

2. In our comments, we begin with an update on recent industry developments regarding the development of Wireless Personal Area Network (“WPAN”) solutions using radios operating in 57-64 GHz spectrum and the impact that increased power levels of point-to-point systems may have on those devices.
3. We then follow with specific comments with respect to the WCA proposals giving our views on the issues raised and recommendations made by WCA.
4. In making these comments, we want to point out that IEEE 802 has been and continues to be committed to developing standards which take into account the need for coexistence between unlicensed and licensed devices, and between various kinds of unlicensed devices. Specifically, we point to the following examples of activities currently being undertaken within IEEE 802 which focus on coexistence issues:
 - a. The IEEE 802.22 Wireless Regional Area Networks (“WRAN”) standards development effort, wherein we are working with TV industry representatives, including the Part 74 device industry, to develop a cognitive radio based standard that will allow operation of unlicensed (or lightly licensed) point to multipoint only (excluding point to point) fixed wireless broadband access devices on geographically unused TV channels without interference to licensed operations.
 - b. The IEEE 802.11y Contention Based Protocol amendment to the IEEE 802.11 Wireless Local Area Networking (“WLAN”) standard, which is being developed to support operation in the 3650-3700 MHz band under the FCC’s rules allowing operation of devices compliant with Part 90 Subpart Z requirements which implement a contention based protocol supporting coexistence with other devices in the band.
 - c. The IEEE 802.19 Coexistence Technical Advisory Group, which acts within the context of IEEE 802 wireless networking standards development activity to develop and maintain policies defining the responsibilities of 802 standards developers for assuring coexistence between unlicensed devices operating under 802 wireless standards.

³ See Petition for Rule Making submitted by WCA, RM-11104.

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5. As these examples indicate, IEEE 802 has developed and continues to develop significant expertise in incorporating coexistence into the design of network standards. In addition, IEEE 802 continues to work with member companies, the FCC, and international regulatory agencies to refine rules for DFS and TPC implementations in the 5 GHz band which support coexistence between WLAN devices and radar systems, reflecting our ongoing commitment to solving these problems.

IEEE 802.18 RECOMMENDS THAT THE COMMISSION TAKE COEXISTENCE WITH LOWER POWER DEVICES INTO CONSIDERATION WITH REGARD TO EIRP LIMITS FOR SYSTEMS USING HIGH GAIN ANTENNAS

6. Remarkable progress in the use of low-cost semiconductor technology (primarily CMOS and SiGe) for 60 GHz radios is now being made by major international corporations, and this technology is rapidly finding its way into planned commercial products. Also, the IEEE 802.15.3c task group has been approved to develop a standard for radios operating in this spectrum.⁴ While there are market applications for high-power, long-range point-to-point links based on conventional and historically-used compound semiconductor technologies, the large consumer markets for wireless personal area networks and other consumer applications envisioned and projected by these companies rely entirely upon the exploitation of newer low-cost semiconductor technologies. The products envisioned are relatively short-range (a few tens of meters) and will be primarily used indoors. IEEE 802.15.3c estimates that tens of millions of homes and businesses will be impacted in the U.S.
7. The existing FCC regulations regarding the use of this spectrum are ideally suited for the large consumer marketplace that we envision and project. The power limitations imposed by these low-cost electronics are perfectly in line with the vision originally foreseen by the FCC Report and Order of 1995 and, in fact, were designed to allow for coexistence of indoor and outdoor links. We recommend that coexistence continue to be a valued element in crafting regulations for higher power operation of devices with high gain transmit antennas.

⁴ <http://standards.ieee.org/board/nes/projects/802-15-3c.pdf>

**IEEE 802.18 RECOMMENDS THAT THE FCC INCORPORATE A REQUIREMENT
FOR TRANSMIT POWER CONTROL (“TPC”) INTO THE PROPOSED RULES FOR
FOR OPERATION WITH HIGH GAIN ANTENNAS**

8. The NPRM proposes an increase in EIRP limits for average power from 40 dBm to “82 dBm less 2 dB for every dB that antenna gain is below 51 dBi.”⁵ We understand that this proposed increase would enhance the range of outdoor point-to-point wireless links. Moreover, we understand that, in some cases, it would be more economical to use an indoor mount for transmitters and receivers for outdoor links (the so-called “window links”). Our concern lies in the possibility that a remotely-mounted transmitter, whether indoors or outdoors, may inadvertently transmit radiation into the window of a room where a product that incorporates a WPAN receiver may be operating. For for an antenna with 40 dBi of gain, the proposed increase would allow an EIRP of 60 dBm [1000 Watts], a factor of 100 greater than present limits. For higher gain antennas, the proposed allowed power would increase to tens of kilowatts.
9. Based on our estimates of the impact of the power levels proposed in the NPRM, we are convinced that this amount of power radiated into a room, either from a “window link” mounted within and directed outwards or mounted from outside and (intentionally or unintentionally) directed through a window at some distance away, would render products based on proposed IEEE 802.15.3c standards inoperable. We estimate that the proposed increase in emission limits causes a “penalty” of between 35 dB and 45 dB in interference (increased noise and/or modulated signal)⁶. Using the proposed limits⁷ of 82 dBm less 2 dB for every dB that antenna gain is below 51 dBi, an outdoor transmitter broadcasting at the highest limit allowed would only need to be about 200 meters away from a typical receiver to produce as much received signal as the WPAN system itself. We consider this distance to be unacceptably close and therefore propose, at the very least, a reduction in the maximum power limitations, or methods to ensure that maximum received power does not exceed the power level required for the received signal to be 30 dB above the noise floor, and does not result in a field strength greater than $9\mu\text{W}/\text{cm}^2$ at the perimeter of any building.
10. We are, therefore, recommending that the Commission *define* the maximum power allowed in point-to-point links as follows:

⁵ See NPRM, Revision of the Commission’s Rules Regarding Operation in the 57 – 64 GHz Band, page 5, Sections 8 – 11.

⁶ See *Ex Parte* filing from Henry Goldberg, Counsel to SiBEAM, Inc., July 27, 2005.

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- Transmitters operating indoors are limited to a maximum EIRP of 40 dBm average, 43 dBm peak.
 - Transmitters operating outdoors at EIRP levels greater than 40 dBm average/43 dBm peak EIRP shall implement TPC to limit the maximum power at the receiver end of the link to a level no more than 30 dB above the receiver noise floor.
 - Transmitters shall be positioned in a manner that limits the power density at the perimeter of any nearby building to a level less than $9 \mu\text{W}/\text{cm}^2$.

CONCLUSION

11. IEEE 802.18 recommends that the FCC modify the proposed amendment of the rules for power levels in the 57-64 GHz band to include our suggested changes. We believe our recommendations support better coexistence between high power point to point networks and lower power systems similar to those being developed for consumer applications envisioned by the IEEE 802.15.3c standards development activity.

Respectfully submitted,

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/s/

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