

If multiple docket or rulemaking numbers appear in the caption of this proceeding, however, commenters must transmit one electronic copy of the comments to each docket or rulemaking number referenced in the caption. In completing the transmittal screen, commenters should include their full name, U.S. Postal Service mailing address, and the applicable docket or rulemaking number. Parties may also submit an electronic comment by Internet e-mail. To get filing instructions for e-mail comments, commenters should send an e-mail to ecfs@fcc.gov, and should include the following words in the body of the message, "get form <your e-mail address>." A sample form and directions will be sent in reply. Parties who choose to file by paper must file an original and four copies of each filing. If more than one docket or rulemaking number appears in the caption of this proceeding, commenters must submit two additional copies for each additional docket or rulemaking number.

All filings must be addressed to the Commission's Secretary, Office of the Secretary, Federal Communications Commission. Filings can be sent by hand or messenger delivery, by commercial overnight courier, or by first-class or overnight U.S. Postal Service mail (although we continue to experience delays in receiving U.S. Postal Service mail). The Commission's contractor, Natek, Inc., will receive hand-delivered or messenger-delivered paper filings for the Commission's Secretary at 236 Massachusetts Avenue, NE., Suite 110, Washington, DC 20002. The filing hours at this location are 8 a.m. to 7 p.m. All hand deliveries must be held together with rubber bands or fasteners. Any envelopes must be disposed of before entering the building. Commercial overnight mail (other than U.S. Postal Service Express Mail and Priority Mail) must be sent to 9300 East Hampton Drive, Capitol Heights, MD 20743. U.S. Postal Service first-class mail, Express mail, and Priority Mail should be addressed to 445 12th Street, SW., Washington, DC 20554.

Summary of Notice of Proposed Rulemaking

A. Proposed Revisions to Part 15

1. *Advanced Antenna Technologies.* Systems employing advanced antenna designs such as sectorized antennas and phased array adaptive antennas are now being used, or contemplated for use, as part of wide area network systems operating in the 2.4 GHz band. Sectorized antenna systems take a traditional omnidirectional coverage

area and subdivide it into fixed sectors that are each covered using a single beam or antenna element to transmit desired information to all devices in the sector. For example, a sectorized system can be made from two individual antennas, each covering 60° of azimuth around the antenna structure, resulting in 120° of coverage. Operationally, each sector is treated as a different cell, the range of which is greater than that of a system using a single omnidirectional antenna. A phased array antenna system consists of a group of radiating elements arranged and driven in such a way that their radiated fields add in some directions and cancel in others. The combined fields can produce a single beam, or multiple beams pointing in various directions while minimizing radiation in other areas. Properties of the resultant beams such as intensity, direction, or beamwidth can be adjusted by altering the input signal to each radiating element.

2. We believe that it is in the public interest to accommodate efficiently configured sectorized and phased array antenna technologies. To date, the Commission has not generally authorized the operation of sectorized antennas by spread spectrum systems, but, by individual interpretation of its rules, we have allowed a few phased array systems to operate. However, we are receiving an increasing number of questions about how to accommodate these multiple beam systems in spread spectrum operations. After taking these requests under consideration, we tentatively conclude that spread spectrum systems using sectorized and/or phased array systems could provide important benefits for providing communications to a local area. Therefore, we believe that we should revise the rules to clearly facilitate broader deployment of advanced antenna designs with spread spectrum systems and to provide a stable environment in which to foster the continued development and installation of these spectrum efficient technologies.

3. We seek comment regarding the characteristics that a system would need to exhibit in order to be classified as a sectorized or phased array antenna system. As an initial matter, we propose to clarify that sectorized or phased array antenna systems must be capable of forming at least two discrete beams. Second, we propose to limit the total simultaneous beamwidth radiating from the antenna structure to 120°, regardless of the number of beams formed. The 120° of bandwidth need not be continuous and may be divided among various independent beams pointing in different directions around the antenna

structure. Commenting parties should provide detailed suggestions regarding any additional modes of operation that should be considered acceptable as a definition for sectorized or phased array installations.

4. Sectorized and phased array antenna systems divide the total power from a transmitter among various transmission azimuths and the power may be distributed equally or at varying levels among those azimuths. The radiated emissions are directionalized along each sector or azimuth in order to communicate with an associated receiver. Accordingly, these antenna systems may resemble point-to-point operation at any given moment. Therefore, we propose to allow such systems to operate at the same power levels as point-to-point directional antennas. Specifically, we propose to limit the total power that may be applied to each individual beam to the applicable power level specified in 47 CFR 15.247(b), *i.e.*, 0.125 watt or 1 watt, depending upon the type of modulation used. This implies that the total operating power, the aggregate power in all beams, could exceed the output power permitted for a single point-to-point system. We propose, therefore, to limit the aggregate power transmitted simultaneously on all beams to 8 dB above the limit for an individual beam. For instance, the 8 dB limit will enable antenna systems to create up to 6 individual beams or sectors, all operating at the point-to-point limit. Finally, we propose to require that the transmitter output power be reduced by 1 dB for each 3 dB that the directional antenna gain of the complete system exceeds 6 dBi. We seek comment on these proposals. Further, we seek comment with regard to whether the Commission should specify a maximum E.I.R.P. limit for each individual beam. If so, what should that limit be?

5. *Replacement Antennas for Unlicensed Devices.* We wish to develop more flexible antenna requirements for unlicensed devices. We propose to provide that flexibility by requiring testing only with the highest gain antenna of each type that would be used with the transmitter at the maximum output power of that transmitter. Any antenna of a similar type that does not exceed the antenna gain of tested antennas may be used without retesting. Use of an antenna of a different type than the tested antenna (*i.e.* yagi antenna vs. a horn antenna) or one that exceeds the gain of a tested antenna would require retesting and new approval by either a Telecommunication Certification Body or the Commission. Manufacturers would be expected to