

would not have sufficient range to reach the base station from the edge of the base station coverage area regardless of whether the base station power is 1,640 (maximum under the rules today), 1,806, or 1,968 W EIRP.

45. Microwave point-to-point systems generally consist of a highly directional, high gain transmitting antenna and a highly directional, high gain receive antenna separated by some distance along a path. System performance is impacted by, among other things, transmitter power, propagation characteristics of the frequency band, antenna directionality (gain), height of transmit and receive antennas, terrain between the antennas, interference, clutter, man-made obstructions, weather, type of modulation, and sensitivity of the receiver. Unlike a base/mobile system, however, the system designer can increase the distance of the path by increasing transmitter power or using a higher gain antenna as well as elevating the receive antenna. Point-to-multipoint microwave systems share many of the characteristics of point-to-point microwave systems, except that there are multiple receive antennas situated in an area of desired service and the transmitting antenna may not be as highly directional. In either case, as with base/mobile systems, increasing the transmitter power may cause unacceptable levels of interference to neighboring paths, or limit the number of paths in a particular area.

46. For example, in the theoretical case of a typical rural microwave path in the 6.8 GHz band, a 45 percent increase in transmitter output power yields only a one km (0.62 mi) increase in path length. We seek comment on whether the benefits of such a modest increase in path length outweigh the potential for unacceptable levels of interference to neighboring paths, or siting limitations on new paths in the same area.

47. We seek comment on whether it is beneficial, feasible, and advisable to increase the current power limits for stations located in rural areas licensed under parts 22, 24, 27, 80, 87, 90, and 101. A licensee can increase power by increasing transmitter output power and/or by using a directional antenna that focuses energy on the specific area to be covered and reduces energy in other directions, serving to limit interference potential, and potentially improving reception of signals from mobile units. Commenters should indicate which radio service(s) and power level(s) should be increased, specify a particular amount of additional power (either transmitter

output power, EIRP, or both), specify directional antenna parameters if applicable (e.g., front to back ratio or beamwidth), and quantify the benefits that one could expect from the power increase. In particular, we are interested in how such increases may increase the potential for unacceptable levels of interference to other stations, increase exposure to electromagnetic radiation for workers and consumers, or limit future use of the spectrum in such areas.

48. We also seek comment on how best to define the term "rural" for purposes of permitting increased power levels. In the case of base/mobile systems, would both the base stations and mobile stations need to be located in a rural area? For point-to-point and point-to-multipoint systems, would both ends of the transmission path need to be in a rural area? Rather than defining certain geographic areas as rural for these purposes, would some other measure (e.g., taking into account a combination of terrain and nearby spectrum usage) be more appropriate?

49. We also seek comment on other measures that licensees may be using to minimize the costs associated with serving rural areas, and whether our rules and policies are sufficiently flexible to facilitate and encourage such innovations. For example, cellular and PCS licensees in rural areas may be using tower top amplifiers to boost incoming mobile signals. Similarly, licensees may deploy "smart antenna" systems capable of increasing base station range and suppressing interference from unwanted sources.

E. Appropriate Size of Geographic Service Areas

1. Background

50. Over the past decade, the Commission has moved from the use of site-based licenses to the use of geographic areas for licensing commercial wireless services. In selecting the initial size of geographic service areas for licenses with mutually exclusive applications (and thus competitive bidding), section 309(j)(4)(C) directs the Commission to promote certain goals. Specifically, section 309(j)(4)(C) requires the Commission to, consistent with other objectives, prescribe service areas "that promote (i) an equitable distribution of licenses and services among geographic areas, (ii) economic opportunity for a wide variety of applications, including small businesses, rural telephone companies, and businesses owned by members of minority groups and women, and (iii) investment in and

rapid deployment of new technologies and services."

2. Discussion

51. We believe that the Commission's choice for the initial size of geographic service areas plays an important role in promoting a number of policy goals, including efficiency of spectrum use, competition among providers, and advancing service to rural areas. If geographic service area licenses are assigned with an initial size that does not represent the needs of service providers, then transaction costs are incurred, as carriers seek to acquire rights to spectrum in areas they wish to serve and divest their interest in areas they do not wish to serve. While we hope that the Commission's recent efforts to facilitate the development of secondary markets will make these transaction costs less burdensome, we recognize that some costs to moving spectrum to its highest valued use will remain.

52. Since it is costly to aggregate or disaggregate spectrum, it is important that the Commission select initial license sizes and boundaries that are appropriate for the likely users and services to be provided. We recognize that there are tradeoffs between the use of large service areas and small service areas. Large service areas provide economies of scale and reduce coordination costs. On the other hand, smaller service areas allow local, independent operators to better tailor their services to local conditions and provide greater financial incentives to local licensees than if they were managers in very large enterprises. Adopting small license areas also may allow smaller enterprises with limited financing to acquire spectrum licenses. In addition, license boundaries are also a concern of the Commission, which has attempted to choose boundaries that combine people and firms who are part of the same community and who are likely to communicate with each other. The Commission also has attempted to avoid setting boundaries that would preclude incumbents from bidding on licenses because of cross-ownership rules.

53. We recognize that carriers are divided on the issue of the appropriate size of geographic service areas. In various Commission proceedings, representatives of small, regional, and rural providers have argued that CMAs are the most appropriate size. In contrast, representatives of large regional and nationwide CMRS providers and other parties have argued that service areas that are too small may be inefficient. Still other parties have