agreements. Thus, applicants considering authorizations for these BTAs should consider the impact of the additional border requirements in their valuation of the service areas for competitive bidding purposes.

3. Treatment of Incumbents

44. As we have stated, a principal objective in this proceeding is to allow incumbents to continue existing operations without objectionable interference from new MDS operations and to allow them sufficient flexibility to modify their facilities to respond to market forces. Expansion of the protected service boundary to 35 miles will increase an incumbents' service area from 710 square miles to 3848 square miles, which will allow for the future orderly development of wireless cable systems, particularly as digital technology is introduced. Second Order on Reconsideration at ¶¶2-31.

45. Incumbents, unless they also control the adjacent BTA territory (either as BTA authorization holders or through interference agreements) will not be free to expand further their service area into the adjacent BTA. The manner we choose to prevent such occurrences is to define a limiting power flux density of -73 dBw/m^2 , which may not be exceeded at points along the 35-mile protected service area. Subject only to this limitation, incumbents will be free to file long-form applications at any time to modify their facilities or add facilities such as signal boosters. In a small number of cases involving directional antennas, an incumbent's power flux density may already exceed -73 dBw/m^2 , for signal paths in some directions at a distance of 35 miles. In such cases, we would not force the incumbent to reduce the signal strength to the allowable limit, nor would we allow the signal level to increase. Incumbents who propose to modify their stations must continue to seek prior Commission approval pursuant to 47 C.F.R. §§ 21.40 through 21.42, and include any agreements with the holder(s) of a BTA authorization(s). All other current rules continue to apply to MDS incumbents unless specifically amended.

46. Finally, since the incumbents' 35mile protected circles will be embedded within one or more BTAs, to prevent additional encroachment into a BTA we must at some point fix the 35-mile circles around a permanent reference point, absent an interference agreement with a BTA authorization holder. Accordingly, on the effective date of the rules adopted in the Second Order on Reconsideration, we will permanently fix the location of the protected 35-mile

circles in the following manner. For incumbent licensees with no conditional licenses or pending applications, the "protected reference coordinates" will be those of the current site. Subsequent changes in site location would be permitted; however, the 35mile circle would remain centered about the previous site coordinates. For incumbents having only a conditional license or a new station application pending before the effective date, the site coordinates specified for the conditional license or pending application will become the reference coordinates. In cases where an incumbent has two or more authorizations and/or pending applications on the effective date, the reference coordinates in each authorization and/or application will be provisionally treated as the permanent reference coordinates of the protected circle. Eventually, pending applications will be disposed of and conditional licenses will either become licenses or be forfeited for failure to construct.

4. Alternative Uses of MDS Frequencies

47. The principal use of MDS frequencies is wireless cable service. Under Section 21.903(a) of the Commission's rules, 47 C.F.R. § 21.903(a), MDS stations are "generally intended to provide one-way radio transmission (usually in an omnidirectional pattern) from a stationary transmitter to multiple receiving facilities located at fixed points." At the same time, our rules permit use of MDS frequencies for other kinds of services. Section 21.903(b), 47 C.F.R. §21.903(b), states that "[u]nless otherwise directed or conditioned in the applicable instrument of authorization, Multipoint Distribution Service stations may render any kind of communications service consistent with the Commission's rules on a common carrier or on a non-common carrier basis *." We wish to emphasize that nothing in this Report and Order precludes either new licensees or incumbents from using MDS frequencies for other kinds of services pursuant to 47 C.F.R. §21.903(b). We note, however, that such applicants may need to apply for waivers of certain MDS technical rules, such as 47 C.F.R. §§ 21.903(a) and 21.906.

B. Interference Criteria and Data Elements

48. Proposals. As a complement to the filing proposals and electronic procedures, the Notice proposed to adopt a technical equation as the basis for the "free space" interference protection calculations. The Commission's MDS engineers currently utilize this formula and it is recognized by engineering consulting firms in the wireless cable industry:

The received signal power level $(RSL)_{dBW}$ at the output of the FCC reference receiving antenna is obtained from the following:²³ $(RSL)_{dBW}$ =(EIRP)_{dBW} - (L_{FS})_{dB}+(G_{AR})_{dB} where the free space loss (L_{FS})_{dB} is

 $(L_{FS})_{dB}=20 \log (4\pi d/\lambda) dB$

In these equations, (RSL)_{dBW} is received power in decibels referenced to one watt, (EIRP)_{dBW} is equivalent isotropically radiated power in decibels above one watt, d is the distance of the signal path in meters, λ is the wavelength of the signal in meters, and G_{AR} is the gain of the reference receiving antenna, as obtained in 47 C.F.R. §21.902(f)(3), Figure 1. The Notice proposed to formalize the above equations by adopting them as a rule provision as part of a plan to implement computerized interference studies. Additionally, the Notice stated that we will require proposed facilities to meet the 45 dB and 0 dB cochannel and adjacent channel desired-to-undesired signal strength ratios at points along the service contours of protected facilities which were authorized under the current interference standards. With regard to long-form applications, we proposed to retain the requirement in 47 C.F.R. §21.902, that an applicant perform analyses of the potential for harmful interference and serve such interference studies upon the authorized or previously proposed station applicants, conditional licensees or licensees required to be studied, but we would not require the submission of a list of those served at the time the longform application was filed. We explained that, on the revised long-form application form, the applicant would supply certain crucial data elements describing the station parameters, such as antenna polarization and the station EIRP, while the Commission staff would perform interference analyses using a computer program. The Notice stated that, although the submission of interference or other engineering analyses would not be required with the long-form application, we would require the applicant to make the records available for Commission inspection upon request. We also questioned in the Notice whether we should eliminate signal contour maps as a required part of the interference studies.

49. Pursuant to our streamlining effort, the Notice proposed to improve the current application form used for

²³ Leon W. Couch II, Digital and Analog Communication Systems, p. 384 (3rd ed. 1990).