

Manufacturers could design and market products for designated services within these parameters and the predicted environment. In some services, licensees could choose the transmitter and receiver products that best meet their particular needs for the provision of radio communication services. In other services, including broadcast radio and television services, receiver products are designed and marketed for a mass consumer market, with the licensees having limited control or influence over their technical parameters and capabilities. Therefore, to some extent our existing rules, such as the TV allotment table, while limited to transmitting requirements, also assume certain levels of receiver performance.

6. Generally, this model has served well to control interference and to facilitate effective use of the spectrum in environments in which the specific services and operating technology are stable and very well defined. However, as recognized in the *Task Force Report*, the dramatic increases in the overall demand for spectrum based services, rapid technical advances in radio systems, in particular the introduction of various advanced digital modulation technologies such as code division multiple access (CDMA), and the need for increased access to the limited supply of spectrum in recent years are straining the effectiveness of the Commission's longstanding spectrum policies. These changes are prompting the Commission to revisit its traditional model and evolve its spectrum policy toward more flexible and market-oriented approaches that will provide incentives for users to migrate to more technologically innovative and economically efficient uses of the spectrum.

7. We now need to provide opportunities for an ever increasing array of new digital radio technologies and services and to allow licensees the flexibility to implement and modify these new technologies and services in accordance with market forces. We also need to relieve equipment manufacturers and service providers from the delays inherent in our regulatory processes, in particular, those involving lengthy rule makings. To meet these needs, we have implemented new licensing schemes under which bands of spectrum are assigned to licensees on a geographic basis and those licensees are allowed the flexibility to determine the nature of the services that operate in that spectrum and the technologies used to provide those services. The only operating restrictions applied to these operations are those necessary to ensure

that interference is not caused to services operating in adjacent geographic areas or on adjacent frequency bands. These restrictions typically take the form of limits on signal strength at the edge of a licensee's service area and limits on maximum transmitter power, antenna height and out-of-band emissions.

8. It often is not possible to perform a reliable, comprehensive analysis to predict the strength of potential signal sources in a given frequency band and geographic area because licensees have discretion to select and modify transmitter locations, operating power, antenna directivity and type of transmissions. In addition, we observe that new digital technologies generally are inherently more robust, and resistant to interference, than analog systems. Our spectrum policies should account for this increased ability of digital signals to tolerate the presence of other signals. Further, with the increasingly intense use of the spectrum, there are now very few opportunities to allocate unused spectrum for new services and correspondingly, few bands in which there are not many users seeking to access the available frequencies. Thus, as indicated in the *Task Force Report*, interference management is now more difficult because of the greater density, mobility, and variability of transmitters and our flexible use policy that allows users the flexibility to determine how and where to operate in their assigned spectrum.

9. As part of our effort to revise our spectrum management policies to address the changes in RF operations and environments that have occurred in recent years, we are now beginning to investigate alternative approaches for managing interference. Consistent with the recommendations of the Task Force, we believe it will be necessary to shift our current paradigm for assessing interference from approaches based primarily on transmitter operations towards new approaches that focus on the actual RF environment and interaction between transmitters and receivers, such as the interference temperature metric. Such new approaches would better allow the Commission to anticipate and enable future users of the spectrum while providing a greater degree of certainty to incumbents regarding the RF environment they will continue to operate in.

10. In many cases, the effects of RF interference can be mitigated or eliminated through attention to receiver hardware design and signal processing software. There are many attributes of receiver performance that can be varied

to increase a device's immunity to undesired emissions, and standards could be established for minimum performance requirements. Improving the general level of receiver performance with respect to interference immunity would allow increased operation of radio services on adjacent channels and frequency bands and thereby promote spectrum sharing and radio system interoperability that would permit more efficient use of the spectrum. In addition, more robust receiver performance would help to facilitate more flexible use of the spectrum. Such robust performance would allow receivers to tolerate changes in operating systems, services and frequency loading that are expected to occur under flexible use of the spectrum. At the same time, however, we recognize that improvements in receiver performance almost always increase production costs, and so there are trade-offs in costs and performance that must be balanced. In addition, we need to address how the benefits of upgraded receiver performance would be distributed among users. For example, improved receiver immunity may permit government operations over wider areas or at higher powers without causing interference.

11. In this proceeding, we seek additional information on the broad range of issues relating to the possible incorporation of receiver performance incentives, guidelines or standards. As discussed below, we invite interested parties to submit information, research, and comment on subjects including: potential receiver performance parameters, the manner in which receiver immunity performance capabilities should be incorporated into our spectrum policies and rules, including the scope of our authority to establish mandatory receiver standards by rule; possibilities for use of receiver interference immunity performance guidelines and standards in specific radio services; the impact of receiver minimum immunity performance requirements on innovation and the marketplace; the current receiver environment; and transition issues such as the treatment of legacy receivers.

Receiver Performance Parameters

12. A radio receiver's immunity to interference is dependent on a number of factors in its technical design and, in addition, the characteristics of the signals it receives. These factors may be closely related and in many cases interdependent, and a receiver's performance in one factor may often affect its performance in others. The factors determining receiver immunity