

reasonable opportunity to operate.”⁷⁷ Although the Commission stated that it would not certify equipment that appeared “to be designed to preclude others from using this spectrum,”⁷⁸ it was not the Commission’s intent that only one type of contention protocol be used by all equipment deployed in the band. The record, however, reveals two broad categories of contention-based protocols, discussed below, both of which appear to meet our definitional requirements for operation in this band. Nonetheless, they may not be compatible with each other, and the use of both types could result in co-frequency interference and thus frustrate the Commission’s goal of allowing for multiple entrants in the band

34. Under the Commission’s rules, contention-based protocols can be broadly categorized as either “unrestricted” or “restricted.” Those contention protocols that we refer to as unrestricted protocols are broadly compatible and function to prevent interference even with other, dissimilar contention technologies on the market. A listen-before-talk technology such as is used by Wi-Fi devices is a prime example of an unrestricted contention-based protocol. If a system using Wi-Fi technology hears a competing signal before it transmits, it takes steps to avoid interfering, regardless of the format of, or interference technology associated with, the other signal. It thus allows each device a “reasonable opportunity to operate.” On the other hand, restricted contention protocols can prevent interference only with other devices incorporating the same protocol. Wi-Max, with its scheduling protocol, currently stands as the main example of a restricted contention technology. In its present format, Wi-Max technology effectively prevents interference among multiple transmitters on a single Wi-Max system. Different Wi-Max systems can be coordinated to avoid interfering with each other, thus providing each Wi-Max device a “reasonable opportunity to operate.” However, because it relies on a scheduling protocol and does not empirically determine whether other types of transmitters are operating on a channel, a Wi-Max system cannot now avoid causing interference to with other technologies, such as Wi-Fi, which rely on different interference-avoidance strategies. Equipment incorporating Wi-Max technology thus runs the risk of interfering with, or drowning out, transmissions using other contention technologies.

35. Allowing the use of different protocols in the band will serve our goal of speeding deployment of service, since operators will be able to deploy many different technologies, including those already being developed for use in the 3650 MHz band world-wide. Nonetheless, we must resolve the potential for conflict between certain types of protocols, which could result in interference and/or a denial of access to the band for certain users. To resolve this conflict, we will certify equipment using a restricted contention protocol – *i.e.*, one which can avoid co-frequency interference only with other devices incorporating the same type of protocol – but will limit the operation of such equipment to the lower 25 megahertz of the 3650 MHz band. Devices incorporating a restricted contention-based protocol will only be certified for operation in, and may only transmit over, the lower 25 megahertz of the 3650 MHz band. This will effectively permit equipment using unrestricted protocols to operate in the band since it will be able to operate in the upper 25 megahertz of the band without being subjected to potential interference from licensees with equipment using restricted contention protocol. On the other hand, equipment using an unrestricted contention protocol – *i.e.*, one which can avoid co-frequency interference with devices using all types of protocols – will be allowed to operate throughout the 50 megahertz in the 3650 MHz band since it will be able to detect other transmissions throughout the band and thus avoid co-frequency interference anywhere in the band. We conclude that this approach will ensure efficient use of the spectrum and permit the prompt deployment in this country of equipment that is already being used in this spectrum in other countries around the globe.⁷⁹ Permitting a number of different contention based

⁷⁷ 3650 MHz Order, 20 FCC Red at 6508, ¶ 16.

⁷⁸ 3650 MHz Order, 20 FCC Red at 6523, ¶ 58.

⁷⁹ See, e.g., Motorola Petition at 2. For example, spectrum in the 3.5 GHz range is already in use for fixed, and in some cases mobile, operations in Germany, Ireland, Spain, Austria, France, Chile and Argentina.