

The FCC should reject the ARRL's Petition for Rulemaking RM-11708 because its adoption would significantly increase interference from automatic stations, and eliminate an opportunity to reduce such interference.

Section 97.221 permits an automatically controlled station to transmit in response to interrogation by a remote station. In this form of operation, the remote station is not in control of the automatically controlled station – rather, the remote station activates the automatic station by transmitting a request in the protocol understood by the automatic station. In particular, the remote station cannot reliably know whether transmission by the automatic station will interfere with communications among other stations already in progress on the frequency. The frequency may appear clear to the remote station's operator, but propagation may preclude that operator from accurately determining that the frequency is already in use from the perspective of the automatic station, and thus that transmission by the automatic station would interfere with an ongoing communication.

Despite the development of digital signal processing algorithms that can effectively determine whether a frequency is already occupied by a signal employing common amateur radio modulation schemes like CW, SSB, RTTY, PSK, and Pactor, many automatic stations operate without this "listen before transmit" capability, and thus cause interference to communications among other stations.

Section 97.221(c) limits automatically controlled stations to a maximum bandwidth of 500 hertz unless transmitting in one of the frequency ranges specified in 97.221(b). Within these frequency ranges, there is currently no regulatory limit on bandwidth, but 97.307(f)(3) limits the symbol rate within these frequency ranges to 300 baud.

Automatic stations that convey messages at an aggregate rate greater than 300 baud do so by employing modulation techniques with multiple subcarriers, such as Orthogonal Frequency Division Multiplexing, and by employing sophisticated encoding schemes like Quadrature Amplitude Modulation. These techniques and schemes are limited by characteristics of the transmitting and receiving equipment used by the remote stations that activate automatic stations – characteristics such as the width of the passband, and the consistency of electrical parameters like group delay across the passband.

Thus the 300 baud symbol rate limit specified by 97.307(f)(3) has established a practical limit on the width of signals used by automatic stations in the frequency ranges specified in 97.221(b). This practical limit is 2.2 kilohertz. The widest protocol now commonly used by automatic stations in the 97.221(b) frequency ranges is Pactor 3, with a bandwidth of 2.2 kilohertz and the ability to convey uncompressed messages at up to 2722 bits per second. With the symbol rate limited to 300 baud, conveying messages more rapidly would require modulation techniques that employ more sub-carriers and more sophisticated encoding schemes; such techniques and schemes cannot be used, because their more demanding passband requirements are not satisfied by the equipment used in most remote stations.

RM-11708 proposes to eliminate the 300 baud symbol rate limit specified by 97.307(f)(3), and establish a bandwidth limit of 2.8 kilohertz for Amateur data transmissions below 29.7 Mhz. If adopted, this would enable automatic stations to convey messages at rates significantly faster than 2722 bits per second, using modulation techniques with bandwidths of up to 2.8 kilohertz that are compatible with the equipment used in most remote stations.

Thus if RM-11708 is adopted, many automatic stations now transmitting 2.2 kilohertz wide signals will be upgraded to convey messages at faster rates by transmitting 2.8 kilohertz wide signals. Such upgrades will increase the incidence and amount of interference generated when an automatic station without "listen before transmit" capability is activated by a remote station unaware that transmission by the automatic station will interfere with an ongoing communication. For this reason, the FCC should reject RM-11708.

Eliminating the 300 baud symbol rate limit provides an opportunity to incentivize automatic stations to reduce the interference they cause by incorporating "listen before transmit" capability. For example, automatic stations without "listen before transmit" capability could be limited to a bandwidth of 2.2 kilohertz (the current practical maximum), whereas automatic stations with "listen before transmit" capability could be limited to a bandwidth of 2.8 kilohertz. Automatic stations with "listen before transmit" capability could thus convey messages at faster rates than automatic stations without this capability. Automatic stations upgraded for faster performance would thus be simultaneously upgraded to generate less interference. Approval of RM-11708 would eliminate this opportunity to reduce interference from automatic stations; for this reason, the FCC should reject RM-11708.

In summary, approval of RM-11708 would increase the incidence and amount of interference generated by automatic stations within the frequency ranges defined by 97.221(b), and would eliminate an opportunity to reduce such interference. RM-11708 should be rejected in favor of a petition that limits all automatic stations to a bandwidth of 2.2 kilohertz, or in favor of a petition that requires automatic stations with bandwidths greater than 2.2 kilohertz to include "listen before transmit" capability.

David H. Bernstein, AA6YQ
Member, ARRL