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FCC Newsrelease on new Spread Spectrum rules



# NEWS

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This is an unofficial announcement of Commission action. Release of the full text of a Commission order constitutes official action. See MCI v FCC 515 F 2d 385 (D.C. Cir. 1975)

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Report No. DC-

ACTON IN DOCKET CASE

June 14, 1990

**FCC AMENDS RULES TO FACILITATE GREATER FLEXIBILITY IN DESIGN AND  
USE OF LOW POWER, NON-LICENSED SPREAD SPECTRUM SYSTEMS  
(GEN. DOCKET 89-354)**

The Commission has amended Parts 2 and 15 of its rules to facilitate greater flexibility in the design and use of low power, non-licensed spread spectrum systems. The new rules will significantly increase the potential range of permissible designs for Part 15 spread spectrum systems and thereby broaden the opportunities for development and use of this important new technology, which has a variety of applications, such as, wireless local area networks, remote meter reading by utilities, and personal communication networks.

Specifically, these rule changes provide clarification of the minimum operating characteristics for direct sequence and frequency hopping systems to qualify for operation under Part 15 rules and expand and refine the permissible operating characteristics for frequency hopping systems.

Spread spectrum systems use special modulation techniques that spread the energy of the signal being transmitted over a very wide bandwidth. The information to be conveyed is modulated onto a carrier by some conventional technique, such as AM, FM, or digital, and the bandwidth of the signal is simultaneously or subsequently deliberately widened by a spreading function. Spread spectrum systems offer two important technical advantages over conventional transmission schemes. First, the spreading reduces the power density of the signal at any frequency within the transmitted bandwidth, thereby reducing the potential for interference to other signals occupying the same spectrum. Second, the signal processing in spread spectrum systems tends to suppress interference from undesired signals.

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## FCC Newsrelease on new Spread Spectrum rules

-2-

The two types of spread spectrum systems authorized under Part 15 are direct sequence and frequency hopping. Direct sequence systems combine the information signal, which is usually digital, with a much faster stream of pseudorandom binary code that is repeated continuously. The pseudorandom code dominates the modulating signal and is the direct cause of the wide frequency spreading of the transmitted signal. Frequency hopping systems spread their energy by changing, or "hopping", the center frequency of the transmission many times a second in accordance with the sequence of a pseudorandomly generated list of channels. The same sequence of channel shifts is repeated continuously. A spread spectrum system's performance in terms of minimizing interference to other signals and improving processing gain is determined in large part by the attributes of the pseudorandom sequence, or "spreading code", used to spread the RF carrier. The degree to which interference to other signals is reduced depends on the length of the spreading code, i.e., the number of bits or channels in the code.

The FCC noted that clarifying the rules to provide minimum standards will encourage industry to make investments in developing systems that utilize this beneficial technology, while ensuring that such systems are spectrally efficient and do not increase the potential for interference to authorized devices. Therefore, the Commission adopted a power spectrum density standard for direct sequence systems that is based on the maximum permitted 1 Watt power spread over the minimum permitted bandwidth of 500 kHz for these systems.

In addition the Commission increased the hopping channel bandwidth from 25 kHz to 500 kHz in the 902-928 MHz band and to 1 MHz in the 2400-2483.5 MHz and 5725-5850 MHz bands. To accommodate non-overlapping channels of 500 kHz in the 902-928 MHz band, the minimum number of hopping channels in this band would be reduced from the current 75 channels to 50 channels and the interval over which channel occupancy would be measured would be reduced from 30 seconds to 20 seconds.

The Commission also established minimal performance requirements for spread spectrum systems. Direct sequence systems must exhibit a minimum 10 dB processing gain. Frequency hopping systems must employ a receiver that hops in the same sequence as the transmitter and uses a similar operating channel bandwidth.

Action by the Commission June 14, 1990, by Report and Order (FCC 90-///), Commissioners

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