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Before the
FEDERAL COMMUNICATIONS COMMISSION
Room 8608
Washington, D.C. 20554

FEDERAL COMMUNICATIONS COMMISSION
OFFICE OF SECRETARY

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In the Matter of)
)
Amendment of Section 15.247(a)(1)(ii)) RM 8608
of the Commission's Rules on)
Spread Spectrum Operation)

OPPOSITION TO PETITION FOR RULEMAKING

AT&T respectfully submits the following opposition to the Petition for Rulemaking ("Petition") filed by Symbol Technologies, Inc. ("Symbol").

The Petition requests the Commission to commence a rulemaking proceeding to amend § 15.247(a)(1)(ii) of the rules (47 CFR § 15.247(a)(1)(ii)), which governs how frequency hopping spread spectrum Part 15 devices can use the 2400-2483.5 MHz and 5725-5280 MHz bands.¹ Symbol's proposed amendment reduces the minimum number of hopping frequencies from 75 to 15 and eliminates the 1 MHz ceiling on the bandwidth of the hopping channel. The Commission should not institute any such proceeding because one of the underpinnings of the Petition was eliminated

¹ The discussion in the Petition is entirely in terms of the lower of those two bands.

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by the Commission's subsequent decision in ET Docket No. 94-32² Moreover, Symbol's proposal, although permitting a higher data rate, provides an offsetting reduction in the time a system can transmit. Thus, there is no increase in data throughput. The proper way to facilitate high speed wireless data systems is to allocate the 5000-5250 MHz band to mobile services, as AT&T has proposed in IC Docket No. 94-31.³ Finally, the rule proposed by Symbol should not be adopted because it will increase the potential for interference to other devices in the band.

The present rule requires 75 hopping channels with a maximum bandwidth of 1 MHz each, i.e., a total of 75 MHz, in the band 2400-2483.5 MHz. In ET Docket No. 94-32 the Commission had considered allocating the 2402-2417 MHz sub-band to licensed services and to auction off that spectrum. It is true, as AT&T and many others had pointed out, that the presence of licensed services between 2402 and 2417 MHz would have impaired the ability of Part 15 devices to use those frequencies and would not have left the necessary 75 MHz of spectrum usable by those devices. Symbol's Petition explains that its proposal to reduce

² Allocation of Spectrum Below 5 GHz Transferred from Federal Government Use, First Report and Order, FCC No. 95-47, released February 17, 1995.

³ Preparation for International Telecommunication Union World Radiocommunication Conferences. The pleading cycle regarding the Commission's Second Notice of Inquiry (FCC No. 95-36) has not yet closed.

to 15 the number of hopping channels solves the problem by permitting the Part 15 devices to avoid the 2402-2417 MHz band.

However, the Commission's decision in ET Docket No. 94-32⁴ does not allocate the 2402-2417 MHz sub-band to licensed services. Rather, it preserves that spectrum for the incumbent users, specifically Part 15 devices and the Amateur service. Thus, this reason for the Petition does not apply.

Nor does Symbol's proposal produce the intended benefits. The maximum practical data rate under the present rule is about 1 megabit/second, as Symbol states (para. 8). It is true that the wider bandwidth permitted by Symbol's proposal⁵ produces a higher data rate during the instant of transmission. A reasonable estimate of that higher rate is 5 megabits/second. However, because Symbol proposes no change in the 0.4 seconds of time within a thirty second period that each channel can be occupied, its rule produces no increase in data throughput. Under the present rule, each of 75 channels can be occupied for 0.4 second in a 30 second period, meaning that the system can transmit for the entire 30 second period ($75 \times 0.4 \text{ second} = 30 \text{ seconds}$). Under Symbol's proposed rule, the system can occupy each of 15 channels for 0.4 second in a 30 second period, or 6

⁴ Note 2 supra.

⁵ Symbol represents (fn. 15) that the effective band-width under its proposed rule increases from the presently permitted 1 MHz to 5 MHz.

seconds in total (15 x 0.4 seconds = 6 seconds), and thus cannot transmit for the remaining 24 seconds. The five fold increase in data rate is thus offset by permitting transmission only 20% of the time.

Symbol also errs in claiming that its proposal "will not significantly increase the threat of interference to other users of the band" (para. 1). Frequency hopping systems using a wider band have a greater chance of transmitting on a frequency used by a nearby system and thus of interfering with that other system. With only 15 channels, frequency hopping systems would more frequently collide with other frequency hopping systems and with direct sequence systems.⁶ Symbol's approach is counter to the underlying concept of frequency hopping: narrow transmission bandwidths and rapid changes of operating frequency together lead to an acceptable level of threatened interference to other systems.

The technical discussion in Appendix A to the Petition, claimed to show that the reduced number of hops permitted by Symbol's proposed rule produces very little additional interference to wideband systems, is erroneous. The interference received by the wideband receiver is determined by the ratio

⁶ Symbol's point (para. 7) that there is a burgeoning market in spread spectrum devices, while valid, shows that the interference potential created by its proposed rule will increase as these devices proliferate.

between the bandwidth of the wideband system and the total bandwidth used by the frequency hopping system. That ratio is independent of the hopping rate. Thus, the wider the frequency hopping system's bandwidth, specifically 5 MHz as proposed versus 1 MHz as now permitted, the more it will interfere with wideband systems. The same principle applies to other victim systems, including other frequency hopping systems.

Respectfully submitted,

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CERTIFICATE OF SERVICE

I, Karen Gillis, hereby certify that on this 7th day of April, 1995, copies of the foregoing Opposition to Petition for Rulemaking were mailed, postage prepaid, to the following:

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