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July 15, 1996

BY HAND DELIVERY

William F. Caton
Acting Secretary
Federal Communications Commission
1919 M Street, N.W., Room 222
Washington, D.C. 20554

Re: In the Matter of Amendment of the Commission's Rules to
Provide for Unlicensed NII/SuperNet Operations in the 5GHz
Frequency Range.
ET Docket No. 96-102 -- RM-8648, RM-8653

Dear Mr. Caton:

Please find enclosed for filing the original and four (4) copies of the Comments of Microsoft Corporation in response to the Notice of Proposed Rule Making in ET Docket No. 96-102.

If you have any questions or need any additional information please feel free to contact me.

Sincerely yours,


Amy L. Carlson

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Enclosure

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**BEFORE THE
FEDERAL COMMUNICATIONS COMMISSION
WASHINGTON, D.C.**

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IN THE MATTER OF:)
)

AMENDMENT OF THE COMMISSION'S RULES)
TO PROVIDE FOR UNLICENSED NII/SUPERNET)
OPERATIONS IN THE 5 GHz FREQUENCY RANGE)
_____)

ET Docket No. 96-102
RM - 8648
RM - 8653

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COMMENTS OF MICROSOFT CORPORATION

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July 15, 1996

**BEFORE THE
FEDERAL COMMUNICATIONS COMMISSION
WASHINGTON, D.C.**

FEDERAL COMMUNICATIONS COMMISSION

JUL 15 1996

Federal Communications Commission
Washington, D.C. 20541

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**ET Docket No. 96-102
RM - 8648
RM - 8653**

COMMENTS OF MICROSOFT CORPORATION

MICROSOFT CORPORATION ("Microsoft") submits these comments in response to the Notice of Proposed Rulemaking ("NPRM") by the Federal Communications Commission (the "Commission") to implement NII/SUPERNet operations in the 5 GHz frequency range. Microsoft strongly supported the efforts by WINForum and Apple to initiate a rulemaking¹, and the Commission's proposed rules generally push those NII/SUPERNet potentials nearer to reality. However, there are some aspects of the proposed rules that could make operations more costly and difficult and, in fact, could retard development of NII/SUPERNet devices. For example, the proposed rules ask for comment on whether there should be a maximum channel bandwidth for NII/SUPERNet devices or whether the amount of spectrum that can be used by one device at one time should be limited. If either of these options is adopted, they could increase costs and retard development of new services in this band. Accordingly, Microsoft

¹ Comments of Microsoft Corporation in support of Petition for Rulemaking filed July 10, 1995 (Microsoft 1995 Comments).

urges the Commission to review the proposed rules to minimize unnecessary regulatory costs so that NII/SUPERNet operations can be implemented quickly and cost-effectively.

BACKGROUND

As the Commission's NPRM states, NII/SUPERNet devices may offer new opportunities for providing advanced telecommunications services to educational institutions, health care providers, libraries, businesses and other users (NPRM ¶ 2). In its Comments in support of the Petition for Rulemaking, Microsoft laid out possible uses for the NII/SUPERNet Band including:

- Access to the information superhighway in those areas of our country which, due to infrastructure costs, may not be wired with high speed fiber or coaxial connectors;
- Educational applications -- broadband wireless networks will permit a cost-effective alternative to hardwiring a network tap to every child's desktop within a school. Students will be able to browse the Internet to gain access to a multimedia array of services;
- Health care applications are likely to be significant. These wireless networks will permit physicians to review digitally transmitted x-rays, computer-aided tomography, and full motion ultrasound imaging and magnetic resonance imaging diagnostics while at the patient's side.

-- Microsoft 1995 Comments at 2-3

In short, the NII/SUPERNet band holds much promise for improving the quality of our lives by permitting the implementation of new services quickly and cost-efficiently.

DISCUSSION

A. The Spectrum Allocated for These Operations Is Sufficient.

In our 1995 comments, Microsoft proposed that at least 300 MHz be allocated to this new service with a reserve of at least 50 MHz (Microsoft 1995 Comments at 4). The Commission has proposed to make available 350 MHz and requests comments on whether this allocation is necessary to provide service in the 5 GHz range (NPRM ¶ 34). We continue to believe that 350

MHz is both necessary and sufficient for the service at the present time. However, that will be available in two bands, 5.15-5.35 GHz and 5.725-5.895 GHz. While we believe contiguous bandwidth would be most beneficial for these operations, Microsoft does not foresee any substantial costs being imposed by separating these operations into two bands so long as operations in both bands are governed by rules that are as similar as possible.

B. There Should Be Minimal Technical Rules for the Service.

There have been several proposals for technical standards for the NII/SUPERNet. As a general matter, Microsoft believes that the marketplace rather than government mandate should set the essential rules. Accordingly, we agree with the Commission that the rules should provide maximum technical flexibility in the design and operation of these devices and that any technical rules should be specifically addressed to minimizing harmful interference to incumbent and proposed operations in these or adjacent bands.

In general, existing Part 15 rules should continue to apply to the 5.15-5.35 GHz and 5.725-5.875 GHz bands with certain modifications that are detailed below.

1. Peak Power Output of 0.1 Watt May Be Acceptable or Necessary for the 5.15-5.35 GHz Band, But the 5.725-5.875 GHz Band Should Not Be Similarly Restricted.

The Commission should allow channelized (narrowband) NII/SUPERNet devices to operate up to 0.1 watts in the 5.15-5.35 GHz band. The Commission should also be careful to not restrict the band to only channelized devices. Limiting the peak power (EIRP) level for NII/SUPERNet devices to -10 dBW in the 5.15-5.35 GHz band is acceptable only if it is necessary to promote wide bandwidth channelized operations that do not interfere with other devices. However, we do not think that the same limitation is appropriate in the 5.725-5.875 GHz band. Instead, the Commission should keep the same regulations that apply now to the

5.725-5.875 GHz band (except for certain modifications to permit directional antennas as discussed below) and continue to permit power output up to 1 watt to accommodate longer range community network applications.

2. Limit the 5.15-5.35 GHz Band to Asynchronous Operations.

The Commission must be careful to ensure that the 5.15-5.35 GHz band is not taken over by unlicensed PCS services using the spectrum to provide wireless PBX or other unlicensed non-NII/SUPERNet services. To ensure that the band is used as intended, a requirement that communications in this band be asynchronous-only may be appropriate.

Narrow bandwidth cordless telephones (*e.g.*, cordless phones and unlicensed PCS) operate in a synchronous mode – always ensuring that adequate bits are delivered in every unit of time. Asynchronous operation *at narrow bandwidths* generally prevents voice grade circuits, particularly if other spectrum users are active. Thus, restricting operations to asynchronous-only transmissions will address our major concern which is preventing the use of the 5.15-5.35 GHz band for inexpensive, narrow bandwidth cordless telephony.

3. There Should Be No Channeling Plan.

WINForum has proposed a channeling plan that would divide the allocated spectrum into approximately 10 broadband subchannels, each capable of supporting a data rate of 20 Mbps or more (NPRM ¶ 40). Microsoft agrees with the Commission's proposal not to establish a channeling plan (NPRM ¶ 51), since that would unnecessarily limit design flexibility.

NII/SUPERNet devices operating in the 5.15-5.35 GHz range will only operate over short distances of 100 to 200 meters. Acknowledging that no RF spectrum is "interference free," we believe that NII/SUPERNet devices operating over these short distances should be designed to accommodate interference rather than relying on a channeling plan to reduce or eliminate

interference. Correspondingly, the Commission should not allocate channels and wait for several years for standards to be developed, especially as this approach would only limit the type of applications that may be designed in the future.

4. The Use of High-Gain Antennas Should Be Allowed in the 5.725-5.875 GHz Band.

We believe that there are several benefits to the use of high-gain directional antennas in the upper band. By relaxing the limitations on directional antennas and allowing the flexible construction of low power, low cost unlicensed networks, including point-to-point applications, the Commission will encourage the development of new innovations whose scope can no more be imagined than was our ability to envision the applications created under existing Part 15 rules in the 902-928 MHz and 2400-2483.5 MHz bands.

Directional antennas enable low powered, low cost communications systems to be used in more applications than those made possible by multi-directional, unity gain antennas, including:

- Establishing point-to-point high speed Internet connections to schools, remote government offices or other entities in rural or impoverished inner city areas that are devoid of fiber network connections; and
- Linking between medical offices and hospitals, particularly in areas lacking a suitable wired communications infrastructure.

Directional antennas are critical for these types of applications where other services are *not* providing solutions -- or not providing cost effective solutions where solutions do exist -- for these types of users.

In fact, rather than increasing potential interference as feared by the Commission, directional antennas and links may be used to minimize interference by limiting -- or

directionalizing -- the pattern of communications. Directional antennas may actually increase overall spectrum usage by partitioning links away from potential interferers (similar to cellular telephony "sectoring" of cells). Also, if the Commission requires all unlicensed point-to-point links to use vertical antenna polarization, it becomes possible to create additional separation, typically in excess of 20 dB, between unlicensed users (who are using vertical polarization) and licensed users (who have the option to use horizontal polarization).

5. Spectrum Etiquette for Sharing Should Be Simple.

The Commission proposes a simple spectrum etiquette, *i.e.*, a "listen before talk" standard similar to that established for unlicensed Data-PCS (NPRM ¶ 52). However, the Commission also encourages the industry to develop appropriate protocols through industry consensus which may eventually be codified by the Commission through rulemaking. Microsoft believes that "listen before talk" is sufficient. NII/SUPERNet is a new service and rigidity reached through "consensus" or otherwise is unlikely to provide a basis for real innovation. We suggest that the need for more sophisticated sharing protocols should be deferred until there has been some real world experience with this band so that reality frames any rules that may be necessary rather than relying on speculation on how the band will develop.

6. Minimum Modulation Efficiency Requirements Should Not Be Required.

The devices used in this band will be short range. Accordingly, we believe that minimum modulation efficiencies of 1bps/Hz can and will be achieved. While an FCC requirement establishing this as the minimum efficiency requirement presents no great burden (*see* NPRM ¶ 53), we see little need for such a requirement in the context of this service. Moreover, a minimum standard always runs the risk of being treated as a maximum. Since, as the

Commission itself notes, technological advances may make 1bps/Hz too low, there seems little reason to specify this as a standard. And the same is likely to be true of any other standard put forward.

7. LMS-Type Criteria Should Be Established.

We do see considerable merit in adopting the Commission's proposal to establish sharing rules between licensed services and unlicensed NII/SUPERNet devices that are the same as the standards adopted in the Location Monitoring Service proceeding (NPRM ¶ 54). These standards established that Part 15 devices are deemed to not cause interference to licensed services, provided that they operate in accordance with the Commission's technical rules and are located indoors or employ an outdoor antenna that is mounted 15 meters or less above the ground, and that such devices must accept any interference caused by licensed services. We oppose changes in any of these existing rules concerning antenna height or power levels.

C. The Commission Should Regulate NII/SUPERNet Under Part 15; There Should Be No Licensing.

The Commission has suggested that if higher power or directional antenna operations were approved for the 5.785-5.875 GHz band, it might be appropriate to license in this portion of the spectrum. (NPRM ¶ 56). Apple proposes that unlicensed NII operations should be governed by a new Part 16 regulatory structure (NPRM ¶ 57). Microsoft disagrees with both proposals.

Licensing the upper NII band would in essence create two distinct services. Both bands must be treated the same to the maximum extent possible; different requirements in each band will increase costs without providing meaningful additional benefits.

Nor do we believe a Part 16 scheme is appropriate. We agree with the Commission that Part 15 provides sufficient operational certainty (NPRM ¶ 60). We believe that the current

approach to unlicensed devices is one that is successful and should not be changed. No "higher status" for NII/SUPERNet devices or "lower status" for ISM devices is necessary due to the protocols established in the Location Monitoring Service proceeding discussed previously which requires unlicensed devices to handle or accommodate interference from other sources. Because of these requirements, Part 15 devices, and hopefully NII/SUPERNet devices, are built with interference accommodating technology which provides for a more efficient shared use of the spectrum.

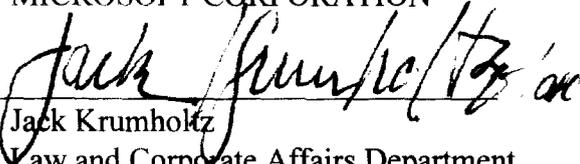
CONCLUSION

Microsoft hopes that these comments have been helpful to the Commission and that these new rules will take our proposals into account.

Respectfully submitted,

MICROSOFT CORPORATION

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July 15, 1996

CERTIFICATE OF SERVICE

I, Cheryl Tomlinson, do hereby certify that copies of Comments of Microsoft have been served on the parties listed below via hand delivery (or as otherwise indicated) on this 15th day of July, 1996.


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