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January 13, 1994

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

In re: GEN Docket No. 90-314
Reply To Oppositions To Petition For Reconsideration
The Ericsson Corporation

Dear Mr. Caton:

Pursuant to the provisions of Section 1.429 of the Commission's rules, transmitted herewith on behalf of The Ericsson Corporation is an original and eleven copies of the "Reply Of The Ericsson Corporation To Oppositions To Petitions For Reconsideration" for filing in the above-referenced proceeding.

In addition, The Ericsson Corporation requests a waiver of Section 1.429(g) of the Commission's rules which limits a reply pleading to 10 pages in length. Good cause exists to grant the waiver since the document is only a few lines longer than the specified limit. Also, in view of the numerous issues involved in the PCS debate, the length of this pleading will not place a burden on the Commission or other parties participating in this proceeding.

Should there be any questions with regard to this matter, kindly communicate directly with the undersigned.

Very truly yours,

David C. Jatlow
Counsel for The Ericsson Corporation

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FEDERAL COMMUNICATIONS COMMISSION
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Before The
Federal Communications Commission
Washington, D.C. 20554

In the Matter of	)	
	)	
Amendment of the Commission's Rules to Establish New Personal Communications Services	)	Gen Docket No. 90-314
	)	RM-7140, RM-7175, RM-7168
	)	
	)	
	)	

To: The Commission

Reply of The Ericsson Corporation to Oppositions to Petitions for Reconsideration

The Ericsson Corporation ("Ericsson"), by its attorney and pursuant to the provisions of Section 1.429 of the Commission's rules, hereby submits its reply to various oppositions to petitions for reconsideration filed with respect to the *Second Report and Order* in Gen Docket No. 90-314.[1] In support thereof Ericsson states as follows:

I. Licensed PCS Issues

A. PCS-to-PCS Interference Issues

A number of parties filing petitions for reconsideration and oppositions have requested that the FCC specify interference limits between PCS licensees in adjacent frequency blocks.[2]

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[1] *Second Report and Order* in Gen Docket No. 90-314, Amendment of the Commission's Rules to Establish New Personal Communications Services, FCC 93-451, 8 FCC Rcd 7770 (adopted September 23, 1993, released October 22, 1993).

[2] See, for example, Motorola's *Petition For Reconsideration And Clarification of PCS Second Report And Order*, pp. 10-11 ("Motorola Petition") and Telocator's *Petition for Reconsideration of Telocator*, pp. 9-10 ("Telocator Petition").

Ericsson agrees that the Commission should reconsider its rules in that regard so licensed PCS services can develop in an efficient manner. To accommodate a wide variety of technologies in the licensed PCS band is not, however, an easy task since interference levels depend on a variety of factors, including but not limited to, the bandwidth of a system, the power level of base stations and subscriber terminals, the particular technology of a system and the relative position of base stations and subscriber terminals to one another.

Since the FCC's *Second Report and Order* does not preclude the use of any technology in the licensed PCS band, rules are needed to minimize interference which could otherwise cause unreliable service. Ericsson supports the proposals of Motorola and Northern Telecom which would require the use of the lower part of the paired band for subscriber terminal transmit and the upper part of the paired band for base station transmit, when FDD technology is used.

In addition, the FCC should specify that the power levels permitted by any transmitter in the lower part of a paired band should be limited to the maximum allowable power for subscriber terminals.

In order to protect PCS licensees in adjacent bands, emission masks which offer sufficient protection from interference must also be adopted. Ericsson agrees with Motorola and Telocator that Section 99.234 of the Commission's rules should be revised to govern the attenuation of emissions outside

the PCS band as well as emissions outside the licensee's own frequency block. Furthermore, Ericsson also agrees with Northern Telecom and Telocator that Section 99.234 of the rules should be modified (1) to make clear that power is to be measured in watts and (2) to specify that emissions should be measured in a bandwidth equal to 1% of the signal bandwidth. Making it clear that transmit power "P" shall be measured in watts and a 1% measurement bandwidth shall be used, will enable manufacturers to determine that devices meet the appropriate emission mask.

Ericsson believes that Section 99.234 is sufficient to protect against unacceptable interference between adjacent PCS bands in the situation in which subscriber terminals transmit in the lower part of the paired band and base stations transmit in the upper part of the paired band. However, Section 99.234 is not sufficient to prevent all cases of interference. Of particular importance is handset-to-handset interference. Subscriber terminals which use different technologies must be able to co-exist when they are located in close proximity to one another. Since the emission mask of Section 99.234 is not sufficient in all cases to avoid unacceptable interference between such terminals, Ericsson asserts that Section 99.234 should be modified further by adding a rule which requires subscriber terminals transmitting in the upper part of the paired band to comply with the emission mask set out in Section 15.321

for unlicensed PCS devices.[3]

In addition to the foregoing, Section 99.234 also needs to be modified to prevent unacceptable interference which may be caused by licensed PCS transmissions into the unlicensed PCS band. This situation can be resolved by adopting the following additional emission mask[4] for licensed PCS devices:

> The power emitted in the unlicensed spectrum block by a licensed device shall be measured with a 1.25 MHz measurement bandwidth. The measured power shall be attenuated relative to the emitted power of the licensed device by at least: 30 dB within 0-1.25 MHz and 50 dB within 1.25-2.5 MHz from each edge of the unlicensed spectrum block, and 60 dB

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[3] For example, an FDD handset receiver with a 30 kHz bandwidth (based on IS-54) can withstand approximately -115 dBm of interference in its receive band. Assuming a distance of two meters between handsets, the propagation loss will be approximately 45 dB. A body loss in the order of 10 dB is also a reasonable assumption. Thus, the tolerable emission from an interfering device is -60 dBm (-115 dBm + 45 dB + 10 dB). Assuming the interfering device transmits at 1 watt, Section 99.234 would result in an interference level of -13 dBm in 1% of the transmit spectrum. Further assuming the interfering device is using a 1.25 MHz bandwidth, the resulting interference level in a 12.5 kHz measurement bandwidth will be -13 dBm, corresponding to approximately -9 dBm in 30 kHz. Thus, in such a situation, Section 99.234 will permit the interfering device to emit -9 dBm, where the tolerable level for the interfered receiver is -60 dBm. Hence, the requirement of Section 99.234 needs to be 51 dB more stringent in this case. Using the spectrum mask for unlicensed PCS devices implies -40 dBm in a 1.25 MHz bandwidth at frequencies 2.5 MHz or more off the band edge. This corresponds to -56 dBm in 30 kHz, which is close to the tolerable level of -60 dBm.

[4] This emission mask is related to the emitted power and not to a fixed level which is the case in Section 15.321. This difference is required because of the variety of licensed devices and will also provide required properties. Thus, low powered devices which can be used in close proximity to unlicensed devices are required to radiate less than high powered devices which by their nature are installed at some distance.

elsewhere within the unlicensed spectrum block.

B. Use of Increased Power

A number of parties have requested that the Commission allow PCS licensees to use higher power base stations and subscriber terminals. Ericsson does not object to such proposals. Indeed, Ericsson believes the use of higher power base stations and subscriber terminals, in certain circumstances, will serve the public interest.

However, Ericsson also believes the Commission did not intend for the licensed PCS service to be a high power service exclusively. Accordingly, though Ericsson supports increased power levels for licensed PCS services, Ericsson requests the Commission specifically clarify that operation of low power devices is allowed. Furthermore, the FCC should encourage the use of low power devices where practicable.

This is important since the use of low power subscriber terminals will also serve the public interest. Among the benefits that will be realized through the use of low power subscriber terminals are significantly better "talk" time and reduced device size resulting in greater portability. Perhaps the most important benefit to be derived by the use of conveniently sized subscriber terminals will be greater initial consumer acceptance resulting in a more rapid deployment of licensed PCS services on a wide scale basis. This, in turn, will create additional demand for service and result in lower costs

for consumers.

III. Unlicensed PCS Issues

A. WINForum's Comments

In its comments to the petitions for reconsideration, WINForum asserts as a general matter that changes which conform to the Commission's unlicensed PCS rules to the WINForum Etiquette should be adopted and those changes which would modify the WINForum Etiquette should be rejected. Without any factual or technical support for its conclusions, WINForum states that the process of adopting its Etiquette represented an industry consensus and those who try to improve upon the Etiquette are only attempting to deploy their own proprietary technologies to the exclusion of other competitors.[5]

The WINForum Etiquette does not represent the "consensus" of the unlicensed community in many respects. As to certain critical issues now before the Commission on reconsideration, especially band segmentation, WINForum's process was not open. Indeed, as expressed previously by Ericsson, LACE, SpectraLink, Rolm, Rockwell, Omnipoint, Apple and others, many WINForum members believe band segmentation for the isochronous band is inappropriate.[6] Despite repeated formal and informal attempts to have fixed segmentation eliminated from the Etiquette, the

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[5] See, *Wireless Information Networks Forum Comments on Petitions For Reconsideration*, p. 3.

[6] See, also, *Petition For Reconsideration And/Or Clarification* of Apple Computer, Inc.

WINForum Board did not act on the request. No technical reason for the lack of action was ever provided.

In fact, that many parties in this reconsideration proceeding who also participated in WINForum proceedings have suggested numerous improvements to the unlicensed PCS rules is a clear indication that overwhelming consensus for the results of the WINForum process was lacking on many issues.

The claims by WINForum that Ericsson "cannot accept the need to make compromises to ensure a level playing field for all companies" and companies like Ericsson want to "...ensure their own ability to deploy their own proprietary products"[7], are incorrect for a number of reasons.

First, insofar as it is concerned, the issue of whether Ericsson will or will not introduce "proprietary products" is irrelevant to the development of unlicensed PCS rules whose express purpose is supposed to be a set of rules which will allow fair access to a limited amount of spectrum for a wide variety of radio access technologies. The critical issue for Commission consideration is whether Ericsson's proposed improvements upon WINForum's Etiquette will further that goal. As set forth in its Petition for Reconsideration and Opposition, Ericsson's proposed improvements do that.

Second, if WINForum's reference to "proprietary products" is more properly intended to be a reference to "DECT" technology,

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[7] See, WINForum Comments, p. 3.

WINForum's statement is simply incorrect. DECT is not a proprietary technology. DECT, like CT-2 and the Japanese PHP standard, is a public standard which is available for manufacture by any company.[8]

Third, neither Ericsson, nor to the best of its knowledge the other companies referred to by WINForum, have proposed technologies which exclude others. Indeed, proposals by Ericsson and others to change the rules in Subpart D will have the opposite effect. If the Commission eliminates band segmentation for example, the public will have the benefit of a wide variety of technologies capable of being deployed in the isochronous sub-bands. These technologies include wideband TDMA and CDMA systems as well as narrowband systems. Most importantly the proposals of Ericsson and others to modify the rules of Subpart D of Part 15 do not preclude the use of narrowband technologies. If the FCC does not eliminate segmentation and instead follows WINForum and the narrowband interests without detailed review of the technical aspects of the proposed changes, the only choice the public will have for the isochronous sub-bands is narrowband technology. This clearly will stifle the establishment of a competitive market for isochronous products which will have an adverse impact on businesses and consumers.

B. Band Segmentation Issues

Several petitions for reconsideration or oppositions

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[8] At the present time a number of companies manufacture or have announced their intention to manufacture DECT products.

strongly oppose band segmentation for the unlicensed band. Only WINForum, Northern Telecom and Motorola express support for the concept.

The primary reason expressed in support of fixed 1.25 MHz segmentation for the isochronous sub-bands is that wideband technologies will destroy the ability of narrowband technologies to gain fair access to the spectrum in question. This argument is technically unsound. Though Ericsson has previously provided the Commission with very detailed technical justifications showing why fixed segmentation should be eliminated in Subpart D of Part 15, suffice it to say as a general matter that the proper technical solution to the "alleged problem" of "preventing monopolization" is not an arbitrarily selected "maximum transmission bandwidth".[9]

For devices used in wideband systems, the spectrum occupied is not multiplied by the number of active devices as in narrowband systems. As Omnipoint has clearly indicated in its Opposition, TDMA and CDMA technologies are fully capable, by

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[9] It is true that in a listen-before-talk based etiquette a 5 MHz marker transmission, for example, must be properly regulated. This is accomplished not by forbidding wideband systems but by promulgating rules to accomplish the desired result without destroying the essential goals of a spectrum etiquette and without limiting technology choices. Ericsson fully described such rules in its *Petition for Reconsideration* and *Opposition to Petitions for Reconsideration* submitted in this proceeding. Also, the problem could be minimized by the elimination of any proposed rule that would allow high capacity (30 second) unacknowledged transmissions. Such a proposal makes a spectrum etiquette very inefficient since it destroys the very concept of a spectrum etiquette based on listen-before-talk principles.

using time and code division, of providing simultaneous channel access for a large number of terminals using the same spectrum. Therefore, the rule that is needed to prevent monopolization is a rule which limits the total spectrum occupancy of collocated fixed (base station) devices. Such a rule provides coexistence between neighboring cells from independent systems irrespective of whether the system is a narrowband system or wideband system. To be fully effective, such a rule must be supported by a proper packing rule which will prevent unnecessary spreading of carriers.[10]

In addition, proponents of fixed 1.25 MHz segmentation have argued that it is necessary to improve the channel allocation process. However, as demonstrated above and as previously set forth in Ericsson's *Petition for Reconsideration* and *Opposition to Petitions for Reconsideration,* 1.25 MHz fixed segmentation prohibits wideband TDMA and CDMA technologies from being implemented in the unlicensed band, and yet does absolutely nothing to assist in the channel allocation process. For example, in a narrowband system using 100 kHz channels, 1.25 MHz fixed segmentation will have no impact on where the carriers are located. For systems with transmission bandwidths greater than 400 kHz, 25-50% of the unlicensed spectrum could be unusable and therefore wasted because the segment borders prevent effective packing of such carriers.

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[10] See also, p. 11, infra.

Lastly, Motorola has requested the Commission to adopt rules which would apply fixed 1.25 MHz segmentation in both isochronous sub-bands.[11] Ericsson and others have demonstrated how inefficient fixed segmentation is thereby justifying the complete removal of fixed segmentation. For these reasons, Ericsson submits that Motorola's proposal which is unjustified from technical and policy standpoints, should be summarily rejected.

C. Packing Rules

WINForum supported the elimination of packing rules despite the fact that packing rules serve a very valuable purpose. Stated simply, packing rules serve the public interest because they help to separate narrowband and wideband systems so each type of system can use spectrum as efficiently as possible. Ericsson urges the FCC to adopt packing rules consistent with comments previously submitted by Ericsson.

Respectfully submitted,

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January 13, 1994

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[11] Motorola Petition, p. 11. See also, Northern Telecom, Inc.'s *Comments On The Petitions For Reconsideration*.

CERTIFICATE OF SERVICE

I, Lisa M. Volpe, hereby certify that on this 13th day of January 1994, copies of the foregoing Reply to Oppositions to Petition for Reconsideration were sent by postage-paid first class mail to the following:

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