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PACIFIC  **TELESIS**
Group - Washington

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FEDERAL COMMUNICATIONS COMMISSION
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June 5, 1992

Donna R. Searcy
Secretary
Federal Communications Commission
1919 M Street, N.W., Room 222
Washington, D.C. 20554

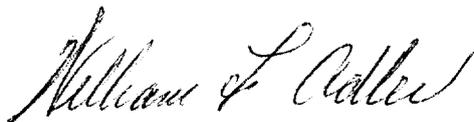
Dear Ms Searcy:

Re: *ET Docket No. 92-9 / Redevelopment of Spectrum to Encourage Innovation in the Use of New Telecommunications Technologies*

On behalf of Pacific Telesis Group, please find enclosed an original and six copies of its "*Comments*" in the above proceeding.

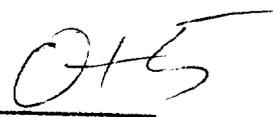
Please stamp and return the provided copy to confirm your receipt. Please contact me should you have any questions or require additional information concerning this matter.

Sincerely,



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Before the
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Washington, D.C. 20554

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In the Matter of)

Redevelopment of Spectrum to)
Encourage Innovation in the)
Use of New Telecommunications)
Technologies)
_____)

ET Docket No. 92-9

COMMENTS OF PACIFIC TELESIS GROUP

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Date: June 5, 1992

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SUMMARY

Pacific Telesis Group recommends that the spectrum bands from 1850 to 1990 MHz be made available for new uses, and the bands from 2100 to 2200 MHz be held in reserve.

The Commission should protect the rights of existing microwave users as follows: New users would be required to submit a comprehensive accommodation plan to current users in the same spectrum band. This plan could involve changes to existing operations (such as equipment upgrades) or relocation. The new user would be required to pay all costs under the plan; relocation costs would include the costs of new sites, engineering, equipment, compliance with applicable regulations, and increased operating costs for a stated period. The existing user would be required to agree to this plan, if it was reasonable. Disputes would be submitted to arbitration.

Our proposal encourages spectrum sharing, since the new user would have a financial incentive to pay only for upgrades necessary to accomplish sharing, rather than the higher cost of relocation. The Commission could also encourage sharing by giving preference in the license process to new users who plan to share spectrum.

Under our proposal, the bands could be occupied immediately (as soon as the accommodation plans could be put into effect), yet the rights of current users are fully protected.

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COMMENTS OF PACIFIC TELESIS GROUP

In response to the Federal Communications Commission's Notice of Proposed Rule Making on the Redevelopment of Spectrum ("NPRM"), released February 7, 1992, Pacific Telesis Group ("Telesis") files the following comments.

Telesis is particularly qualified to comment on this subject, in view of its expertise in radio communications, its current usage of microwave facilities in some of the designated spectrum bands, and its pioneering work in developing Personal Communications Services ("PCS"), one of the new services which would use the spectrum bands designated in the NPRM. Two of Telesis's subsidiaries, Pacific Bell and PacTel Corporation, have recently filed separate proposals for PCS Pioneer's Preferences, both based in part on the pioneering work under experimental licenses of a third Telesis subsidiary, Telesis Technologies Laboratory ("TTL"), but each taking a different approach to applying TTL's technological insights into the

creation of a PCS proposal. In short, Telesis's comments will reflect the viewpoints both of current spectrum users and of potential future providers of new services using the designated spectrum bands.

I. THE SPECTRUM BANDS FROM 1850 TO 1990 MHZ SHOULD BE MADE AVAILABLE FOR NEW USES

The spectrum bands from 1850 to 1990 MHz which the Commission designated in the NPRM should be made available for new uses, as the Commission proposes. The common carrier bands from 2100 to 2200 MHz should be kept in reserve for future use if needed.

Our studies show that there is a growing demand for new wireless services. Exciting new developments are being made in wireless technology and new service concepts; in particular, PCS proposals will be explored in an NPRM which the Commission is expected to issue in the near future. Telesis and its subsidiaries, TTL, Pacific Bell and PacTel Corporation, are committed to participating in the development of PCS.

The spectrum bands designated by the Commission are suitable for these services. There is an adequate amount of spectrum for initial development of these services from 1850 to 1990 MHz. These bands are not fully occupied at present, and existing fixed microwave users in these bands can be relocated or accommodated more easily than the current users of the common carrier bands. Recent technological progress in

developing new wireless services, including PCS, has focused on these bands. The spectrum is compatible with that identified for mobile use in WARC-92. We agree with the recommendations concerning the 1850 to 1990 MHz bands in the Commission study mentioned in the NPRM (footnote 10), "Creating New Technology Bands For Emergency Telecommunications Technology."

The spectrum bands from 2100 to 2200 MHz should be kept in reserve for later use if needed for the new services. These bands are being more efficiently used than the bands from 1850 to 1990 MHz. They are more fully occupied (i.e., there are more channels per band), and they are more heavily loaded (i.e., there are more circuits in use per channel). Because of these factors, it will be more difficult and more expensive to move the fixed microwave common carrier users in these bands than it will be to move those with fixed microwave in the 1850 to 1990 MHz bands. Thus these common carrier users should only be moved when new services are well-established, demand for them has been proven, and their revenues can be used to pay for the costs of moving the current users.

The Commission invited comment on the feasibility of using nearby government spectrum, either for new services or for relocation. See NPRM, para. 21, 27. A recent NTIA Spectrum Resource Assessment¹ provides a description of

¹This Assessment has been released in draft form, dated March, 1992. A final version is expected to be released in August, 1992.

current Federal Government spectrum use of the 1710-1850 MHz and 2200-2290 MHz bands and an estimate of Federal Government investment in those bands. (However, only unclassified information was used to prepare the Assessment.) This Spectrum Resource Assessment is an important first step in determining the extent and efficiency of current utilization of these bands. Telesis recommends further analysis of Federal Government use; if the spectrum is not being fully and efficiently used, it should be made available.²

II. THE RIGHTS OF CURRENT SPECTRUM USERS MUST BE PROTECTED

A. Current Users Provide Valuable Services

All current users of the spectrum bands identified in the NPRM provide valuable services to the public. While Telesis will only comment on its own uses, railroads, energy utilities, other utilities and government agencies also use this spectrum for valuable purposes.

The Telesis subsidiaries that use these spectrum bands are Pacific Bell, Nevada Bell, PacTel Cellular, and PacTel Paging.

²See Petition for Issuance of Further Notice of Proposed Rulemaking, filed May 1, 1992, by Utilities Telecommunications Council ("UTC"); Motion for Extension of Time, filed March 16, 1992, by American Petroleum Institute on behalf of itself, UTC, the Association of American Railroads, and the Large Public Power Council, page 7.

1. Local Exchange Companies

Pacific Bell and Nevada Bell use 2 GHz microwave to provide facilities between central offices over lightly loaded routes, predominantly in rural areas. 2 GHz microwave also is used to provide loop extension from the end of cable facilities to clusters of customers in remote areas, to provide all types of telephone service. For example, a loop extension from one remote mountain top radio site (Turtleback Dome) to another (Sentinel Dome) in Yosemite National Park furnishes telephone service to Park Rangers, public telephones and the concessionaire; long (43 miles) radio hops provide telephone service into remote areas of the Mojave Desert. Both of these are environmentally sensitive areas.

2. Cellular And Paging Companies

The Telesis cellular and paging companies use microwave facilities to link mobile facilities, and to connect mobile facilities to the landline local exchange network. In many cases, these links provide the most economic and efficient means to interconnect mobile facilities, as well as to route traffic to the public switched telephone network.

B. The Costs Of Relocation Will Be High

The costs of relocating existing microwave facilities to other spectrum bands, or converting to other media to perform the same functions, will be high. In many cases, relocation or conversion would be quite expensive because of such factors as compliance with zoning ordinances and other

regulations, difficult terrain, cost of acquiring new sites, additional equipment costs (such as repeaters), higher operating costs, etc.

Regulation of environmentally-sensitive areas will make relocation particularly difficult and expensive. Regulations reflecting environmental concerns may mean that we cannot install fiber optic cable in certain areas; at the same time, microwave path lengths may be too short at the proposed alternative frequencies to provide cost-effective substitutes for a few of our current 2 GHz paths. This may make relocation of microwave paths which cross coastal areas, wetlands, deserts, State and National Parks, and other wilderness areas difficult, if not impossible.

The Commission study, "Creating New Technology Bands for Emerging Telecommunications Technology," discussed relocation costs in Section 6.0, "Economic Feasibility," and concluded that they would be fairly low (\$87,500 to \$108,000 per facility; Section 6.4). However, we believe the approach used in this study is flawed. First, we believe it is appropriate to use a replacement cost approach, since this is what would actually be required to move the existing user. The Commission study, in contrast, used a "useful life" (depreciated cost) approach, which would be appropriate for ratemaking or other purposes but not here; when the current users must move, they will incur certain costs, and those are the costs that should be considered in a discussion of how to

handle the moving process. Second, the Commission study did not take into account certain very significant costs, such as the costs of complying with zoning and environmental regulation, costs of acquiring additional sites, increased operating costs, and the costs of additional necessary equipment, e.g., repeaters, at other frequencies. In other words, the Commission study looked primarily at the current users' existing equipment investment, and did not consider that, if these users were forced to relocate, they would have many significant expenses other than the straight replacement of the existing equipment.

C. If Current Users Are Required To Make Changes Or To Move, Their Costs Should Be Covered

The Commission has recognized the rights of current users in its proposed transition plan. As discussed below, Telesis recommends even greater protection for current users. The full costs to current users of accommodating the new services, including any equipment modifications or relocation, should be borne by those proposing new services or those needing additional spectrum for these services. These costs should include all factors discussed above, such as equipment, sites, engineering, regulatory and environmental compliances, and increased operating costs for a period to be established by the Commission.

III. TELESIS'S PIONEERING WORK SHOWS HOW THE TRANSITION CAN BE EASED

By requiring efficient use of spectrum by both current and proposed new users, and by encouraging spectrum sharing, the Commission can mitigate hardships to current users during the transition from current uses to the new uses. TTL's pioneering work under its experimental licenses shows that wholesale overnight relocation of current users will not be necessary. Instead, our tests show that spectrum can be and should be shared during the initial period of a new PCS (although eventually, as demand for PCS grows, clear spectrum will be needed).

TTL's tests show not only the feasibility of sharing but also ways to facilitate sharing. Requiring and facilitating sharing is the ideal way to provide new services to the public while respecting the rights of current spectrum users. The Fifth Experimental License Progress Report filed by TTL on June 1, 1992, contains an excellent short summary of TTL's tests and findings on spectrum availability and sharing.

First, TTL summarized its earlier work:

TTL's initial experimentation, conducted in 1991, included radio frequency field propagation tests, spectrum usage studies, and field spectrum sharing measurements.

The spectrum usage studies helped identify the 1850-1990 MHz band as a likely candidate for spectrum sharing with existing users. The spectrum sharing field measurements indicated that spectrum sharing may be more feasible with a narrow band (<5MHz) PCS system than with a broadband system.

Based on the analysis of these test results, TTL focused subsequent efforts to determine the extent to which PCS providers can share spectrum with current microwave users in the 1850-1990 MHz band.

The field propagation tests and spectrum sharing feasibility tests provided the foundation for TTL to develop a rigorous computer model to determine the amount of spectrum available for PCS on a spatial basis in a given area. (Fifth Progress Report, p. 8; emphasis added.)

Next, TTL applied this model to three areas, San Francisco, Los Angeles, and Dallas, to determine the amount of available spectrum, and drew the following conclusions:

- o All three locations offer large areas with substantial amounts of available spectrum. However, there are areas or pockets with less spectrum available.
- o There is more available spectrum for a greater percentage of the area for the lower PCS transmit powers.
- o With a narrower PCS system bandwidth, the availability of spectrum rises for a greater percentage of the area.
- o Using a narrower PCS system bandwidth gains more spectrum for higher PCS transmit powers.
- o The gain in spectrum by moving to a narrower PCS system bandwidth varies significantly between the three different areas. (Fifth Progress Report, pp. 9-10; emphasis added.)

Finally, TTL examined band sharing techniques:

Since two dissimilar services, PCS and fixed microwave, may share all, or a portion of, the 1850-1990 MHz band, TTL examined methods that may make available additional spectrum, as required, to accomplish this sharing. The methods considered by TTL are upgrading fixed microwave antennae, changing fixed microwave links to digital modulation, and relocating fixed microwave links out of the band. Additionally, TTL is planning to use high gain directional antennae for PCS base stations in order to divert energy away from existing microwave users.

The majority of links in all three areas studied use standard or low performance antennae. Replacing these standard or low performance antennae with a high performance antennae in the spectrum availability model led to these general conclusions:

- o Upgrading antennae increases the amount of available spectrum in all areas.
- o The gain in spectrum is more pronounced for the higher PCS transmit powers. In the three cities studies, spectrum availability gains varied from very limited gain to as much as 10-12 MHz, depending on PCS transmit power, bandwidth, and location.
- o When antennae are upgraded, the improvements are more pronounced away from the microwave terminals.

In addition to antenna upgrade, upgrading the microwave equipment to digital modulation was investigated. TTL applied the spectrum availability model with all microwave terminal radio equipment upgraded to digital modulation in the cities under study. The results show these general conclusions:

- o For all PCS power levels, there is an advantage to employing a digital radio, as opposed to an analog radio, up to a crossover point. After the crossover point, spectrum availability decreases.
- o Generally, upgrading receiver equipment to digital is advantageous in areas close to microwave terminals.
- o The improvements from upgrading radio equipment are more pronounced for higher PCS transmit powers. Spectrum availability gains as high as 10-12 MHz were demonstrated in the three cities studied, depending on PCS transmit power, bandwidth, and location.

TTL applied the upgrades described above for antennae and radio equipment together in order to examine the effect of the combination. These results show that:

- o The gains separately achieved by upgrading antennae and radio equipment are additive when both upgrades are implemented.
- o The advantages gained locally by upgrading radio equipment and the advantages gained at a distance from the microwave terminal by upgrading antennae are

combined to improve the spectrum availability over the entire area.

- o In the three areas studied, spectrum availability gains up to 20 MHz and greater were noted, again depending on PCS transmit power, bandwidth, and location. (Fifth Progress Report, pp. 10-11; emphasis added.)

These findings provide the basis for a smooth transition from existing uses of the designated spectrum bands to new uses. The Commission should encourage existing users and new service providers to work together to facilitate sharing in the early years of new services. With cooperation and careful planning, the cost of accommodating the new services can be minimized. As we will discuss below, we believe that these costs should be borne by the new service provider.

IV. COMMENTS ON THE COMMISSION'S TRANSITION PLAN

The Commission's proposed Transition Plan has much merit. However, we believe that the costs of accommodating the new services should be borne by the new service providers, not by the existing users, to better protect current users. This requirement will not delay or hinder the introduction of new services, since the sharing techniques described above can be used in the early years of the new service. There should be no artificial deadline imposed for requiring PCS licensees to pay the full cost of relocating microwave in the 2 GHz band; instead, any current user should always be protected and should

be entitled to have costs of accommodation covered, whether these costs are for upgrading equipment or relocating to a new spectrum band or medium. We discuss these points in more detail below.

A. Summary Of The Commission Plan

The Commission transition plan has three basic elements:

(1) While current fixed users of the spectrum are protected by being given primary status, new applicants for fixed use will be granted on a secondary basis only. (Para. 23, NPRM). Telesis supports this "freeze," as clarified by the Commission's Public Notice. See discussion below, Section F.

(2) Current fixed users would be able to continue spectrum use on a co-primary basis for a fixed period of time (10 or 15 years). After that time, if their uses interfered with new services, they would be required to eliminate the interference, negotiate an arrangement with the new operator, or cease operation in that band. (Para. 24, NPRM). The Commission also suggests that negotiation and financial arrangements with current users could encourage them to vacate the spectrum bands at an earlier time. (Para. 26). Telesis recommends that current fixed users be permanently protected. However, if a reasonable accommodation plan is presented to them, including the payment of all costs, they would be required to agree to it. See Section C below.

(3) The Commission plan would exempt state and local government agencies from the requirement of moving their spectrum uses to other spectrum bands or media, even after the 10 or 15-year period. (NPRM, Para. 25). Telesis suggests that most government users be treated the same as other current users; these agencies should be required to move if their expenses are paid. Public safety users, however, might be able to remain. See discussion in Section G.

B. The Transition Plan Should Encourage Spectrum Sharing

Sharing should be strongly encouraged during the initial period of a new service. As discussed above, TTL's pioneering work under our experimental licenses has shown how upgrades and adjustments by existing users can facilitate sharing. Relocation of existing users may not be necessary; other accommodations can often be made, especially in the early years of PCS or other new services. Sharing can be encouraged in the following ways:

1. Special preference in the licensing process should be given to new service applicants who could demonstrate the feasibility of sharing within the frequency bands they are applying for and who propose to use methods which make sharing possible, e.g., narrowband service, digital service, CDMA, TDMA, and self-regulating channel selection.

2. The expense of facilitating sharing (for example, by upgrading the existing users' antennae or equipment) will usually be less than the expense of moving an existing user to

another spectrum band or medium. Thus, there will usually be a financial incentive which encourages sharing so long as the new service provider is required to pay the full cost to the current user of any change this user must make. As previously stated, we advocate this approach, to provide the best protection for current users.

C. Procedures For Required Accommodation

The Commission suggests a fixed time period of 10 or 15 years, after which current users would have to move or eliminate interference if they interfere with new uses. We do not agree that a deadline should be given; instead, we recommend that PCS licensees have permanent responsibility to pay accommodation or relocation costs of current users. However, once an existing microwave user receives a transition plan and cost commitment from a PCS licensee, that existing user would lose its primary status. Two limited exceptions would apply: (a) for some government uses (if special circumstances are shown) and (b) in rare situations where no feasible alternative to a 2 GHz link exists. We discuss these exceptions below, Sections E and G.

Our first concern is the protection of current users, who provide valuable public services. We do not agree with the Commission's phased transition plan. Microwave licensees should be required to accommodate or relocate, on an expense-paid basis, as soon as they have been presented with a

reasonable plan. In this way, the interests of both PCS and existing microwave users are protected.

During the initial operating period for PCS or other new service, spectrum sharing will usually be possible, if existing users make certain adjustments and modifications. As previously discussed, TTL's pioneering work has shown the feasibility and desirability of spectrum sharing during the initial stages of PCS operation. The new service provider should be required to prepare an accommodation plan showing what changes must be made to facilitate sharing, such as antennae or equipment improvements, and to cover any costs to the existing user of these changes.

As demand for new services grows, more spectrum will be needed. PCS providers (or other new users) should be able to negotiate with current users to obtain more clear spectrum at any time. First, the rules should require the PCS provider to submit a relocation plan to the current user; this could be a plan for use of different media or different spectrum bands. The plan should be comprehensive, and should include information about the new location, all costs of relocation (including new sites, all equipment, engineering, and compliance with zoning and environmental regulation), what studies provide the basis for the plan, and a reasonable

timetable for relocation.³

Once the parties agreed to the plan, the current user would be required to move. The PCS provider would be responsible for paying all relocation costs listed in the plan. Any increased operating costs for a period specified by the Commission should also be covered. Any disputes--for example, over the costs of relocation or the technical feasibility of the plan--would be submitted to binding arbitration. The Commission could require the filing of a copy of the final plan, as agreed to by both parties.

D. Protection For All Current Users

All current users must be protected. All existing users of the spectrum under consideration provide valuable services to the public and are entitled to fair treatment. New wireless services are desirable, but the public should not suffer the deterioration of valuable existing services because of these new services.

Telesis does propose a different treatment for different spectrum bands. The initial bands used for new services should be 1850-1990 MHz; these are less congested today, so that sharing and/or moving existing users will be

³The rules should provide that the obligation to produce a feasible and reasonable plan is on the new user. However, the parties would be free to make other arrangements, including having the current user draft a proposed plan.

easier and less expensive. Telesis believes that these bands provide adequate spectrum for proposed new services. The more crowded 2100-2200 MHz bands should be held in reserve.

The Commission's proposal of exempting all government users from relocation or other accommodation is unnecessarily broad. Telesis believes that fire, police and public safety uses should be the only uses which might be given an exception from the proposed rules requiring accommodation, and they should only be exempted if they show special circumstances; see discussion below, Section G.

E. A Feasible Alternative Must Be Provided Before Relocation Can Be Required

If there is no reasonable and feasible alternative for an existing user, including non-radio alternatives, the user should not be required to move. The burden of proof would be on the existing user to show why the alternative proposed by the PCS provider was not feasible. Telesis anticipates that the existing users qualifying under this exception would be very few in number, but there are situations--perhaps in National Parks and other environmentally sensitive areas--where there may be no alternative to current microwave links. For example, Pacific Bell has a few 2 GHz links of over 40 miles which cross an environmentally-sensitive area, the Mojave Desert. Obviously fiber optic cable cannot be used over the desert, and the path lengths are so long that using some of the proposed alternative spectrum bands could impair transmission

performance. Telesis believes that the vast majority of users qualifying under this exception would be in rural areas (like the Mojave Desert) where demand for new PCS services would be small enough so that sharing with these existing users would be feasible.

F. Telesis Supports The Proposed Cutoff Date, As Clarified In The Recent Public Notice

The proposed freeze for existing users, with a cutoff date of January 16, 1992, is desirable (any new use after January 16 would have only secondary status, under the Commission proposal). Telesis strongly supports the clarification of this freeze proposal contained in the Commission's Public Notice issued May 14, 1992. The Public Notice made it clear that modifications would not result in secondary status, nor would secondary status result if additional links are needed to complete a communications network. This clarification is needed to protect current users, whose existing networks will require modifications and additions from time to time in order to serve their intended purpose. In short, existing facilities networks would remain fully utilized under the clarified proposal.

G. Rules For Government Users

Telesis proposes the following approach towards government users:

1. So long as expenses of relocation are paid, government users should not be exempted from the rules.

If government users can use other media or can accommodate the PCS use in some other way, and the PCS provider pays all expenses, they should be required to eliminate interference or move on a reasonable timetable.

2. There may be special needs in the public safety area, and special reasons why relocation (even on an expense-paid basis) is not possible or desirable. If these special circumstances are shown, fire, police and other public safety spectrum users would not be required to relocate.

3. The government users may welcome this program, for several reasons. First, it is common knowledge that existing analog radio transmissions are accessible to the general public through scanners which are readily available. This often causes interference with police and fire operations. Under this program, these agencies might well be provided with digital equipment or other means of avoiding this eavesdropping problem. Second, this program can provide other equipment upgrades and improvements which the agencies would be unable to afford otherwise. It might be desirable to reimburse these agencies for additional operating costs over a longer period of time than other current users.

4. This approach has the additional advantage of encouraging more efficient use of spectrum by these agencies.

H. Tax Certificates

Telesis agrees that tax certificates would be desirable, to avoid adverse tax consequences to current users

who relocate and are reimbursed for their costs. While the literal provisions of 26 U.S.C. §1071 would not appear to apply to the surrendering of a microwave license in exchange for payment of relocation expenses, the Commission has broadly interpreted the statute in keeping with its pro-competitive legislative purpose. In Review of Technical Assignment Criteria for the AM Broadcast Service, 6 FCC Rcd 6273, 6472 (1991), the Commission held that §1071 covered the surrendering of radio licenses. And the Commission held that the phrase "with respect to the ownership and control of radio broadcast stations" covered cellular partnership interests as well, in Telocator Network of America, 58 RR2d 1443 (1985), recon. dismissed, 1 FCC Rcd 509 (1986). Here, the phrase would need to be read even more broadly, to cover Commission policy concerning current and future users of the designated spectrum bands. Telesis recommends that the Commission certify that payments to existing license holders to enable them to relocate are in furtherance of the Commission's radio spectrum policy and are therefore eligible for favorable tax treatment by the recipient under 26 U.S.C. §1071.

V. ISSUES CONCERNING ALTERNATIVE PROPOSED SPECTRUM

Licensing issues concerning the proposed alternative spectrum (4, 6 and 11 GHz) should be part of this proceeding. There are certain problems in moving to these bands under current rules, i.e., different channelization and utilization

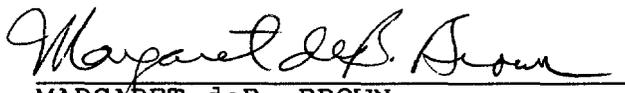
requirements. In order to obtain a smooth transition to the other bands, and to facilitate the preparation of relocation plans for the current 2 GHz users, these issues should be addressed in this docket.

V. CONCLUSION

Pacific Telesis Group recommends (1) that the bands from 1850 to 1990 MHz be made available first, and the bands from 2100 to 2200 MHz be kept in reserve; (2) that the Commission strongly encourage spectrum sharing by the rules it adopts in this proceeding; and (3) that current users be required to relocate or otherwise accommodate new service providers, if technically feasible alternatives are proposed for them and their costs are paid in full by new service providers.

Respectfully submitted,

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Date: June 5, 1992