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Winston E. Himsworth
President

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May 28, 1992

Ms. Donna L. Searcy, Secretary
Federal Communications Commission
1919 M Street, N.W.
Washington, D.C. 20554

Dear Ms. Searcy:

Enclosed are five copies (original and four duplicates) of Tel/Logic's comments in the Matter of Redevelopment of Spectrum to Encourage Innovation in the Use of New Telecommunications Technologies — ET Docket No. 92-9.

Sincerely,



Winston E. Himsworth

/abm

Enclosures

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FEDERAL COMMUNICATIONS COMMISSION
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Before the
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Federal Communications Commission

Washington, D.C. 20554

Comments in the Matter of
Redevelopment of Spectrum to
Encourage Innovation in the
Use of New Telecommunications
Technologies

ET Docket No. 92-9

Tel/Logic Inc.
51 Shore Drive
Plandome, NY 11030

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Executive Summary

In its Notice of Proposed Rule Making, ET Docket No. 92-9, the Federal Communications Commission has developed a proposal which addresses the praiseworthy goal of identifying “a relatively wide band of frequencies that can be made available with a minimum of impact on existing users and that can also provide suitable operating characteristics for new, primarily mobile, services.”

Tel/Logic believes that the proposal represents an important first step in establishing spectrum for emerging mobile services and that the transition mechanism specified does in fact minimize the impact on existing users — perhaps too much so. Indeed, Tel/Logic’s analysis indicates that the transition costs calculated in the FCC’s companion study, *Creating Technology Bands for Emerging Telecommunications Technology*, may be significantly overstated.

Tel/Logic is particularly concerned with the issue highlighted in Commissioner Barrett’s separate statement regarding “the adequacy of the spectrum band proposed in this Notice with respect to the spectrum needs of emerging technologies.” Tel/Logic’s concern, however, is not so much with the absolute amount of spectrum identified. The 220 MHz, while less than the total spectrum requests already before the FCC, still represents a substantial increment to supply in the crowded bands below 3 GHz. A more practical concern is whether this 220 MHz of spectrum, **when combined with the proposed transition rules**, will provide sufficient capacity to initiate an array of new services on a co-primary basis and to expand them over time at a pace consistent with the transition of existing users out of the bands.

This concern can be addressed only in light of expectations as to how many services the FCC plans to accommodate within the redeployed spectrum and the nature of the frequency assignments. Studies of the 1850-1990 MHz band by Tel/Logic and American Personal Communications, for example, found ample unused spectrum (somewhere within the band) for new PCN services at almost any given location within a number of major urban centers. Were PCN services assigned a much smaller and fixed allocation, however, the probability of finding adequate unused spectrum at a given location would decline precipitously.

The transition process incorporated in the current 220 MHz spectrum “redevelopment” proposal represents a major difference from the 115 MHz “reallocation” action taken in the early 1970s. To the extent that the transition period extends over a long period of time or, even more problematical, does not apply to some body of existing users, less actual spectrum will be redeployed for emerging services. Further, since actual spectrum availability may vary from locale to locale, different parts of the country may have access to new mobile services much earlier or later than others. Even within a given locale, different frequency assignments for competing new service providers may result in different levels of market access. It therefore behooves the FCC to develop rules to encourage an extensive and rapid transition process. Tel/Logic concludes its comments with a number of transition rule suggestions dealing with:

- Transition period horizons;
- Frequency assignment of redeployed spectrum; and
- Negotiation process.

Introduction

In its Notice of Proposed Rule Making, ET Docket No. 92-9, the Federal Communications Commission has taken a much needed first step to provide suitable spectrum for emerging telecommunications services. The Commission's objective in this rule making is fully consistent with its mandate to "... encourage the provision of new technologies and services to the public and encourage the larger and more effective use of radio for the public interest." Additionally, as also noted in the NPRM, the action would complement the FCC's recent Pioneer's Preference rules that were similarly "... intended to foster the development of new technologies and services."

New technological developments and the demand for new, primarily mobile, radio services continue to aggravate a real shortage of suitable spectrum under 3 GHz. Supply may always fall short of demand, forcing the FCC to ration spectrum and to continually balance emerging needs with existing usage. Although current requests for new spectrum exceed 370 MHz, the FCC is to be commended for moving judiciously to identify and redeploy 220 MHz of spectrum for new services rather than awaiting the uncertain fate of other proposals to reallocate some government frequencies to commercial use.

The "redemption" of 220 MHz, however, is significantly different than the "reallocation" accomplished in the early 1970s. Unless it is ultimately determined that spread spectrum technologies permit new services to co-exist at the same frequencies and locations of current services, redeployment will not assure unimpeded access to the new spectrum for emerging services. The proposed transition rules to move existing users to alternative frequency bands or to secondary status could delay the consistent development of new radio services for a decade or more. In large part, the constraining impact of the transition rules can be adequately assessed only in light of expectations as to how many services the FCC plans to accommodate within the redeployed spectrum and the nature of the frequency assignments — two issues not addressed in Docket No. 92-9.

Tel/Logic's comments in this filing, therefore, will concentrate on the transition plan aspects of the NPRM from the prospective of a personal communications (and particularly PCN) services operator and with specific

reference to the redeployment of spectrum in the 1850–1990 MHz band where PCN is likely to reside. Tel/Logic concludes its comments with a number of suggestions for rules that could provide added encouragement for an extensive and rapid transition process.

Transition Costs Estimates

In its study, *Creating Technology Bands for Emerging Telecommunications Technology*, the FCC's Office of Engineering and Technology estimated that the total incremental impact to transition all 30,000 2 GHz fixed microwave facilities, at the end of current equipment life cycles, to frequencies above 3 GHz would be \$750 million (assuming \$25,000 each for frequency coordination and related antenna expenses). Viewed as the cost of implementing the proposed redeployment rules, Tel/Logic believes this estimate is substantially overstated. There are several mitigating factors.

1. On a present value basis, the cost of a full transition would be less than half the undiscounted estimate. Using a modest 10% discount rate and the FCC's estimates of remaining useful equipment life, the following calculations apply:

<u>Type</u>	<u>Facilities</u>		<u>Incremental Transition Costs</u>	
	<u>Number¹</u>	<u>Useful Life</u>	<u>@ \$25K each</u>	<u>P.V. @ 10%</u>
Private	23,000	7.5 yrs.	\$ 575 Mil.	\$ 281 Mil.
Common Car.	<u>7,000</u>	10.0	<u>175</u>	<u>67</u>
Total	30,000		\$ 750 Mil.	\$ 348 Mil.

¹ Approximate numbers used to match the FCC's calculations. Using the actual number of facilities (29,116 total) shown elsewhere in the FCC study and in the table below, the present value cost would total only \$338 Mil.

2. The proposed rules do not require the transition of local government facilities. As shown below, such facilities constitute over 20% of the total, reducing estimated transition costs by a comparable amount.

<u>Band(s)</u>	<u>Number of Facilities</u>		<u>% Gov't. Facilities</u>
	<u>Total</u>	<u>Gov't.</u>	
1850-1990 MHz	9,258	2,011	21.7
2110-2130 and 2160-2180 MHz	6,823	0	0.0
2130-2150 and 2180-2200 MHz	<u>13,035</u>	<u>4,052</u>	31.1
Total	29,116	6,063	20.8

3. Although not as easily quantified, other factors that could reduce or mitigate transition costs include: (i) many non-governmental facilities, particularly those not located in or around urban centers, may continue to operate indefinitely on a secondary basis in their existing bands; (ii) upgrades to modern digital microwave systems in new bands may lower operating costs, more than offsetting amortized transition costs; and (iii), replacement of existing facilities with microwave- or fiber-based carrier services could avoid transition costs altogether while lowering total operating costs.

Taking all these factors into account, Tel/Logic believes that the practical, present value transition cost of the spectrum redeployment rules proposed by the FCC totals approximately \$250 million — about one-third of the FCC estimate — or less than \$10,000 per existing microwave facility. Tel/Logic further believes that under the negotiation provisions encouraged by the FCC's proposed rules, the majority of the transition expenses will be borne by the new service providers rather than the existing users.

Tel/Logic concludes that the FCC's proposal represents an important first step in establishing spectrum for emerging mobile services, and that the transition mechanism specified does in fact minimize the impact on existing users. Indeed, given the importance of emerging mobile services to the nation's users and manufacturers, perhaps the transition proposal is weighted too heavily in favor of existing users who, themselves, stand to benefit from the emerging services.

Impact of Frequency Allocations on Service Availability

Tel/Logic is particularly concerned with the issue highlighted in Commissioner Barrett's separate statement regarding "the adequacy of the spectrum band proposed in this Notice with respect to the spectrum needs of emerging technologies." One concern is that the 220 MHz identified in the NPRM is less than the requests already before the FCC for 370 MHz of spectrum, and that subsequent frequency allocations will, therefore, represent some implicit rationing of spectrum among proposed new services.

Tel/Logic's primary concern, however, is not so much with the absolute amount of spectrum identified. Indeed, 220 MHz, while less than the total spectrum requests already before the FCC, still represents a substantial increment to supply in the crowded bands below 3 GHz. A more practical concern is whether this 220 MHz of spectrum, **when combined with the proposed transition rules**, will provide sufficient capacity to initiate an array of new services on a co-primary basis and to expand them over time at a pace consistent with the transition of existing users out of the bands.

This concern can be addressed only in light of expectations as to how many services and/or service providers the FCC plans to accommodate within the redeployed spectrum and the nature of the frequency assignments — **two key issues not addressed by the FCC's NPRM.**

To illustrate the nature of this concern, it is useful to review the detailed frequency study of 1850–1990 MHz usage in the Pittsburgh area incorporated in Tel/Logic's Progress Report to the FCC of November 30, 1991. The study analyzed the operating characteristics of each private microwave system operating within the band and, by estimating receiver and transmitter exclusions zones around each OFS (Operational Fixed Service) facility, calculated the availability of unused spectrum for PCN use. Specifically, Tel/Logic found:

- Only eight 2 GHz OFS microwave systems are located within a 25 mile radius of Pittsburgh's reference coordinates.
- The transmission paths of all eight systems are under six miles in length, and two are less than one mile.

- 20 MHz of contiguous spectrum is completely unused in the middle of the 1850–1990 MHz band throughout the **entire** area, and at least 60 MHz of spectrum is available at the most congested point.
- Calculated exclusion zones represent only 3.28% of the total geographic-spectrum available within the study area.

Tel/Logic concluded that PCN service could be initiated immediately on a co-primary basis in the 1850–1990 MHz band without adversely affecting the existing OFS users and that, as the demand for PCN spectrum increases, the same OFS users could, from a technical standpoint, be easily migrated to other bands. Tel/Logic’s study paralleled and expanded upon a well documented report by American Personal Communications (“APC”) that also indicated that there is enough unused spectrum in the 1850–1990 MHz band to allow the initiation of PCS services with current technology in and around at least the largest eleven cities in the U.S. (including Dallas/Fort Worth, where Tel/Logic holds its second experimental license).

The conclusions of the Tel/Logic and APC studies are compatible with the FCC’s proposed spectrum redeployment rules, however, only under the assumption that PCN service providers are granted access on a co-primary basis to the **entire** 1850–1990 MHz band. If the FCC subsequently decides to allocate only a portion of the band to PCN services and, perhaps, decides to further subdivide that portion into public and private use and/or into specific assignments for individual PCN service providers, then early initiation of service becomes problematical. The ability of any given PCN provider to begin immediate service on a co-primary basis would depend on:

- Specific frequency assignment
- Existing OFS usage in and around that frequency assignment for that specific geographic location
- Type of OFS users (governmental or non-governmental)
- Remaining useful life of OFS equipment
- Negotiating posture of PCN provider and OFS users

Figures 1 and 2 illustrate the nature of the potential problems in Tel/Logic’s two licensed cities. In Pittsburgh, the 20 MHz of unused spectrum is

Figure 1

Existing 1850–1990 MHz OFS Usage in Pittsburgh

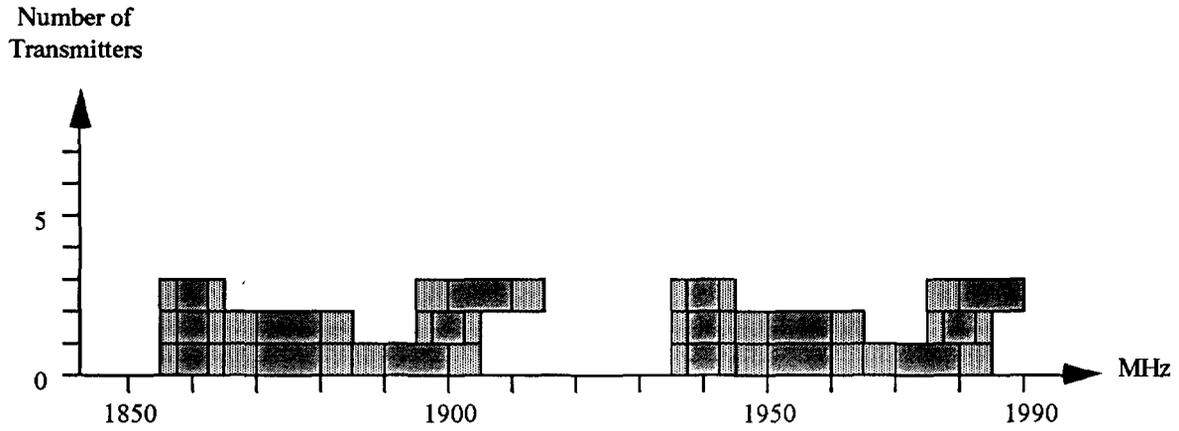
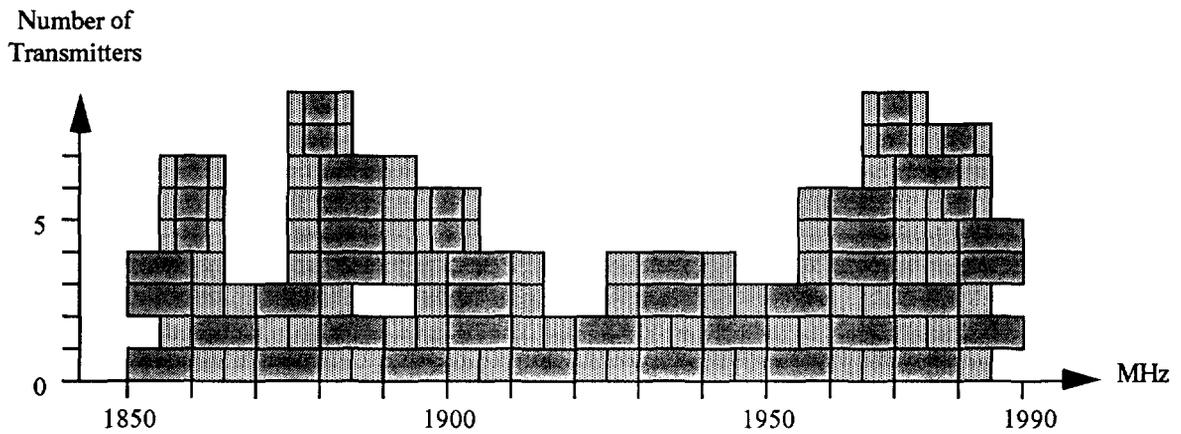


Figure 2

Existing 1850–1990 MHz OFS Usage in Dallas



Key:  Operating channel
 Allowance for adjacent channel interference

Source: Micronet Communications, Inc.

shown between 1915–1935 MHz. Note that if the user of the transmitter currently operating at a center frequency of 1905 MHz can be induced to make an in-band downward shift to 1895 MHz, which does not appear to create any coordination problem, then there would be 30 MHz of completely unused spectrum in the 25 mile radius around downtown Pittsburgh. A PCN operator assigned 20–30 MHz of spectrum in the middle of the 1850–1990 MHz band could initiate service (utilizing CDMA with medium bandwidth spreading) immediately. Any other frequency assignment in Pittsburgh would require transition negotiations with 1–3 existing users before complete coverage could be assured.

OFS usage in and around Dallas is almost three times greater than in Pittsburgh. There are currently 44 transmitters operating in the 1850–1990 MHz band within a 25 mile radius of central Dallas. The APC study found that, across the entire band, there was at least 10 MHz of spectrum available throughout Dallas and at least 100 MHz available in over 90% of the area. The pattern of usage, shown in Figure 2, is similar to Pittsburgh in that the greater number of transmitters are operating in the upper and lower portions of the band. No portion of the band, however, is completely unused. While spectrum allocation in the middle of the band would provide PCN operators with the best opportunity to begin service immediately, narrow bandwidth assignments might require transition negotiations with 2–9 existing users before complete coverage could be assured.

Transition Process Optimization

The transition process incorporated in the current 220 MHz spectrum “redevelopment” proposal represents a major difference from the 115 MHz “reallocation” action taken in the early 1970s. To the extent that the transition period extends over a long period of time or, even more problematical, does not apply to some body of existing users, less actual spectrum will be redeployed for emerging services. Further, since actual spectrum availability may vary from locale to locale, different parts of the country may have access to new mobile services much earlier or later than others. Even within a given locale, different frequency assignments for competing new service providers may result in differing levels of market access.

If the Commission is to fulfill its mandate to “... encourage the provision of new technologies and services to the public and encourage the larger and more effective use of radio for the public interest,” therefore, it will behoove the FCC to develop rules to encourage the most extensive and rapid transition process. The NPRM proposes or suggests some ways this can be done including: (i) “blanket” waivers of eligibility requirements for OFS users transitioning to new bands; (ii) use of tax certificates to partially compensate OFS users for transitions costs; (iii) limits on the time horizon over which OFS users would be protected on a co-primary basis; (iv) grants of new OFS licenses in the redeployment bands on a secondary basis only; and (v), permission for new service operators to negotiate accelerated transition arrangements with existing OFS users.

Tel/Logic concurs with the thrust of these proposals, but would suggest a number of other rules that might make the transition more efficient. Many of these suggestions are directed at issues upon which the FCC requested specific comment in the NPRM.

Transition Period Horizon

- Time horizons for OFS facility transitions should be set individually to reflect estimated remaining equipment life — no more than 15 years from the date of the original facility installation or, if documented, from the date of the last major equipment upgrade.
- Modifications of an OFS facility licensed prior to January 16, 1992, should be allowed without triggering conditional secondary status, but should not be allowed to serve as the basis for an extension of the facility's transition period.
- Additional 2 GHz links required to complete a network, or new 2 GHz facilities and/or frequencies operationally connected to a system licensed prior to January 16, 1992, should be allowed without triggering conditional secondary status, but only when the applicant makes a valid showing of its need for such facilities **in the 2 GHz band**. If transition periods are to be applied on a link-by-link basis, the transition period of a newly authorized link should not exceed the average of the transition periods for the network links licensed prior to January 16, 1992. If transitions periods are to be applied on a total network basis, no extension of a period should be permitted as the result of a newly authorized link.
- For OFS facilities involving path lengths less than 15 km, no horizon should be set exceeding 15 years from the date the FCC established minimum path length guidelines on 2 GHz fixed microwave systems.
- More stringent transition rules and horizons should be adopted in urban areas where alternative transmission facilities are more available and where there will be a greater requirement for spectrum for new services.
- Entry by common carriers, or any other existing users of redeployed spectrum, into any resulting new technologies should be conditioned upon shortened transition period horizons for their facilities.
- Use of tax certificates to partially compensate existing OFS users should likewise be conditioned upon shortened transition period horizons for their facilities.

Frequency Assignment of Redeployed Spectrum

- Frequency assignments for PCN services, which are likely to experience the broadest public demand of any of the proposed new technologies, should span the center frequency of the 1850–1990 MHz band where there should be fewer transition conflicts.
- Although the FCC has already received spectrum requests aggregating more than the 220 MHz identified for redeployment, the FCC may wish to reserve a portion of the 1850–1990 MHz band for a limited period of time (e.g., 5 years) that might be used to accommodate in-band frequency shifts by existing OFS users to help resolve interim transition conflicts elsewhere in the band. Establishing the reserve at the lower end of the 1850–1990 MHz band, adjacent to the 1710–1850 MHz government band that might ultimately be made available for commercial use, may provide the FCC with additional flexibility in that eventuality.
- Related to the preceding suggestion, the FCC might consider proposing an interim compromise opening selected governmental bands, including 1710–1850 MHz, to use on a co-primary basis by local government and public safety users. This would permit the FCC to eliminate the transition exclusion proposed for local government OFS users within the redeployed spectrum.

Negotiation Process

- The FCC transition rules should explicitly state that negotiations for accelerated transition arrangements with existing OFS users are not only permitted but are expected to be entered into by existing OFS users (including local governments) on a good faith basis. A mandatory arbitration process should be established to resolve extended negotiation disputes.
- Negotiated settlements should be reported to the FCC to monitor potential windfall issues and to build an experience base for evaluating the reasonableness of settlements for arbitration purposes.