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

RE: RM-8004

ORIGINAL
FILE

Dear Ms. Searcy:

Transmitted herewith on behalf of Harris Corporation - Farinon Division are an original and nine copies of its Comments on the above-referenced Petition for Rule Making filed by Alcatel Network Systems, Inc.

Respectfully submitted,



Barry Lambergerman
Counsel for
Harris Corporation -
Farinon Division

BL/es
Enclosure

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BEFORE THE

Federal Communications Commission

WASHINGTON, D.C. 20554

In the Matter of)
)
Amendment of Parts 2, 21, 25 and 94)
of the Commission's Rules to) RM - 8004
Accommodate Common Carrier)
and Private Op-Fixed Microwave)
Systems in Bands Above 3 GHz)

COMMENTS OF HARRIS CORPORATION - FARINON DIVISION

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July 2, 1992

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SUMMARY

The groundwork laid in the Alcatel Petition provides a good starting point for the development of the technical rules needed to enable common carrier and private operational-fixed users to migrate from the 2 GHz band to the bands above 3 GHz should that become necessary. However, Harris-Farinon does not believe the Commission must or should proceed to rule making at this time. Rather than rush to rule making now, Harris believes it is preferable at this time to form an industry advisory committee, consisting of user, manufacturer and government representatives, to develop industry consensus on technical standards and other rules. By temporarily holding the Alcatel Petition in abeyance, an industry advisory committee will be able to forge an industry consensus on many of the issues raised by the Petition as well as related issues which Alcatel does not fully address. Harris-Farinon identifies some of these issues in these Comments. In the long run, the use of an industry advisory committee will result in a less contentious and shorter rule making proceeding. Further, the negotiation and compromise that can take place in an industry advisory committee setting is an effective means of ensuring that the standards ultimately proposed in a rule making proceeding adequately accommodate the needs of both common carrier and private operational-fixed user groups and that the transition to a co-primary sharing environment is implemented in an equitable manner.

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and Private Op-Fixed Microwave)
Systems in Bands Above 3 GHz)

To: The Commission

COMMENTS OF HARRIS CORPORATION - FARINON DIVISION

Harris Corporation - Farinon Division ("Harris"), by its attorneys, hereby submits its Comments in response to the above-captioned Petition for Rule Making filed by Alcatel Network Systems, Inc.

Harris is a Florida corporation with its headquarters located in Melbourne, Florida. Through its Farinon Division, located in San Carlos, California, Harris designs, develops and manufactures microwave equipment for terrestrial fixed microwave systems. Harris offers both analog and digital product lines with bandwidths ranging from 800 kHz to 10 MHz and above. As a leading manufacturer of microwave equipment used by both private operational-fixed and common carrier users, Harris is interested in ensuring that any migration of displaced 2 GHz band users to the bands above 3 GHz takes place in an orderly and sensible fashion and that the transition from "gerrymandered" private and common carrier bands to a co-primary sharing environment is implemented in an equitable manner.

I. AN INDUSTRY ADVISORY COMMITTEE SHOULD BE FORMED BEFORE PROCEEDING TO RULE MAKING

As an initial matter, Harris applauds Alcatel for taking the initiative to start the process of developing the rules necessary to effect a migration plan, should one become necessary. As Harris noted in its Comments in response to the Commission's NPRM in ET Docket No. 92-9, while the Commission's proposed migration plan identifies spectrum which private and common carrier microwave users should be able to share, it does not specify how that sharing would be accomplished, that is, it does not include the technical rules needed to make this transition workable (e.g., coordination procedures, channelization plans, and standards governing minimum channel loading, path length, frequency modulation efficiency, and antenna design).¹

The groundwork laid in the Alcatel Petition provides a good starting point for the establishment of the necessary technical rules. However, while the establishment of such rules should precede final action in ET Docket No. 92-9, or at least proceed on a parallel track to that proceeding, Harris does not believe that the Commission must or should proceed to rule making at this time.² Rather than rush to rule making now, Harris believes it

¹ Comments of Harris Corporation--Farinon Division, ET Docket No. 92-9, filed June 8, 1992, at 9-10.

² The Commission should not proceed with either ET Docket No. 92-9 or the rule making proposed by Alcatel until it fully considers all alternatives to the 1.85-2.2 GHz band, such as the 2.5 GHz band. For example, as UTC noted in its petition filed on May 1, 1992, requesting that the Commission adopt a further notice of proposed rule making in this ET Docket No. 92-9 to consider that band for emerging technologies, whereas the 2 GHz

is preferable at this time to form an industry advisory committee, consisting of user, manufacturer and government representatives, to develop industry consensus on technical standards and other rules to govern the future use of the bands in question.

Assuming that co-primary sharing between common carrier and private operational-fixed licensees should be the cornerstone of any new rules governing the use of the bands above 3 GHz, it is essential that changes to Parts 21 and 94 adequately accommodate the needs of both groups of users. Harris believes this can best be accomplished by an industry advisory committee at which common carriers, private microwave users and other industry and government representatives meet face-to-face and develop the necessary technical and coordination criteria to facilitate sharing and efficient use of those bands. Indeed, Alcatel recognizes the need for industry-developed sharing criteria in noting that "[s]tandards are being developed by industry groups that will facilitate this band sharing." Alcatel Petition at 17.

Another reason an industry advisory committee should be convened prior to proceeding to rule making is that there has not been sufficient time to fully analyze the numerous and diverse proposals contained in the Alcatel Petition or to develop

band contains approximately 29,000 facilities, the 2.5 GHz band has only about 3,500 multichannel multipoint distribution service, instructional television fixed service, and operational-fixed service licensees. UTC also noted that whereas the cost of relocating incumbent 2 GHz band licensees would be on the order of \$4 billion, the cost of relocating existing 2.5 GHz band users would be only about \$500 million.

possible alternative channelization plans. Moreover, as explained below, there are a number of issues which Alcatel does not fully address as well as a number of specific proposals for which Harris suggests modifications. Undoubtedly, other variations on Alcatel's proposals will be offered by other commenters. Although these commenters can provide input on given issues in the context of a rule making proceeding, Harris believes that the give and take of an informal industry forum is preferable to more formal and legalistic notice and comment procedures. Moreover, by considering these additional issues and suggested modifications within the context of an industry advisory committee, an industry consensus can be forged and, consequently, the rule making will be less contentious and will take less time in the long run.

II. ADDITIONAL ISSUES WHICH NEED TO BE ADDRESSED BY AN INDUSTRY ADVISORY COMMITTEE AND SUGGESTED MODIFICATIONS TO SOME OF ALCATEL'S PROPOSALS

A. The Potential Imbalance in Spectrum Availability Between Private Operational-Fixed and Common Carrier Users Must Be Addressed; Possible Solutions Include Retaining Exclusive Private Operational-Fixed Access to the Upper 6 GHz Band And/Or Co-Primary Sharing of Part 74 Frequencies

The need for industry coordination is particularly important in light of the potential inequities that can result from the proposed reallocation and co-primary sharing. Specifically, it must be borne in mind that if the Commission adopts its proposals in ET Docket No. 92-9, Part 94 users will lose four and one-half times more spectrum than Part 21 users (i.e., 180 MHz versus 40

MHz).³ When coupled with the fact that the cellular industry is the fastest growing segment of point-to-point microwave users, it is apparent that the potential exists for creating an imbalance in terms of the spectrum available for common carrier versus private operational-fixed usage.

One way in which this imbalance can be addressed is by excluding the upper 6 GHz band from co-primary sharing and allowing it to remain an exclusive Part 94 allocation. Alternatively, if cellular operators believe that they will not have access to a sufficient number of 6 GHz narrowband frequencies if they are denied access to the upper portion of the band, then the possibility of allowing Part 94 users to share the spectrum available under Part 74 on a co-primary basis should be considered. Harris believes that such co-primary sharing is feasible because as digital microwave equipment continues to be implemented on a widespread basis, more spectrum will be freed up and because system compatibility will become less of a concern. Nevertheless, Harris recognizes that the different bandwidths and interference criteria involved in video transmission pose potential obstacles to such sharing, but, again, these can be addressed by an industry advisory committee.

³ Even if all existing 2 GHz band users are not displaced, there will be much less spectrum available for new users than exists today. Therefore, Harris believes it is important that eligibility rules governing use of the bands above 3 GHz be sufficiently broad to allow new as well as displaced users to be licensed in those bands.

B. The Need for Additional Spectrum for Terrestrial Fixed Use Must Be Addressed

Even if the rule changes proposed by Alcatel were adopted, that would not obviate the need for additional spectrum for terrestrial fixed services. This is primarily because the primary relocation band will be the 6 GHz band. In many areas, however, the 6 GHz band is already congested and will not be able to accommodate the numerous migrants from the 2 GHz band. Moreover, in those areas where the 6 GHz band is able to accommodate displaced occupants of the 2 GHz band, the effect of that relocation will be to make any expansion of existing microwave systems or the licensing of new systems in the 6 GHz band extremely difficult, if not impossible. In short, the 6 GHz band will soon be saturated.

Although the 3.7-4.2 GHz band would be available under the proposed ET Docket No. 92-9/Alcatel migration plan, the proliferation of TVRO satellite dishes in that band makes it an unattractive relocation option. The widespread use of these unprotected TVRO satellite dishes, particularly in rural and suburban communities, creates a "political" problem in terms of potential microwave interference to these receivers. Interference into these home receivers often results in complaints directed towards executive personnel of the firm supplying the fixed microwave service, thereby making the use of this band unattractive from the standpoint of the microwave operator.

Alcatel offers a partial solution to this problem by

proposing that the primary frequency allocation for the satellite services be narrowed by 40 MHz on each band edge over a 10 to 15 year transition period. Petition at Appendix, p. 23-24. Harris supports this proposal, but would urge consideration of an even more far-reaching solution, namely, the gradual relocation of all 4 GHz satellite licensees to higher satellite bands (i.e., the 11.7-12.2 GHz and 12.2-12.7 GHz bands, depending on whether or not DBS is implemented).⁴

C. All Channelization Plans Should Be In the Rules

Although Alcatel proposes a number of channelization plans, it is unclear whether its intent is to incorporate all of these plans into the rules. At present, whereas most bands available under Part 94 are channelized in the rules, most bands available under Part 21 are not. Harris believes that all channelization plans should be in the rules. The absence of channelization plans in the rules makes it more difficult for manufacturers to design and put equipment on the market because of uncertainty as to channel pairings, bandwidths, channel spacings, etc. In other words, standard channelization plans allow for standard equipment design and economies of scale which, in turn, translates into

⁴ Harris suggests that the Commission also consider the 3.5-3.7 GHz band for reallocation to the terrestrial fixed services. In Canada, the 3.7-4.2 GHz band has been extended down to include the 3.5-3.7 GHz band and is being used for common carrier operations. Harris believes that this band would be potentially useful to the fixed microwave services displaced from the 2 GHz band. The band could be configured into 5, 10 and 20 MHz sub-channels, and be made available to existing and future Part 94 and Part 21 licensees.

lower equipment costs to customers and faster equipment delivery. Certainty as to equipment cost and availability also facilitates user planning.

D. The Treatment of "Splinter" Channels Needs to Be Addressed

When new channelization plans are overlaid on the existing frequency environment, "splinter" channels will be created both in the form of isolated narrow bandwidth channels and broken channel pairs. For example, the assignment of a given transmit channel under an old channelization plan may preclude the assignment of the corresponding return channel under a new channelization plan. In Harris's view, the rules must be flexible enough to enable system planners and coordinators to use a transmit channel from one pair and a return channel from another if circumstances dictate. At the same time, the rules should be specific as to the assignment policies governing the use of such "splinter" channels.

E. Expansion of Existing Systems Licensed Under Current Channelization Plans Must Be Addressed

While it may be assumed that existing systems licensed under old channelization plans will be grandfathered, it is not clear how the expansion of such existing systems would be treated. In Harris's view, such systems should be allowed to expand under current channelization plans without waiver. Although Harris expects that such system expansions would have to be coordinated

under any new coordination procedures that are adopted, the details of such coordination between "old" and "new" systems should be worked out by the industry advisory committee.

F. The Process By Which Growth Channels Are Protected Should Be Formalized

A not uncommon practice in the common carrier industry is the protection of growth channels in the frequency coordination process. For example, a user licensed on a 10 MHz bandwidth channel in the 6 GHz band may have plans to grow into a 30 MHz bandwidth channel as its capacity needs increase. In that instance, the user may seek to have the coordinator "reserve" the adjacent spectrum for this purpose. The problem with this practice is that it is informal and, thus, there are no limits on the period of time for which a given channel can be set aside. Harris believes that this procedure should be formalized with established time limits. This is particularly important when there are multiple categories of users sharing the same spectrum.

To some extent the growth channel issue may be resolved by technology. Specifically, the feasibility of cross-polarization cancellation has been established and such systems have been available from some European manufacturers for several years. Cross-polarization cancellation techniques provide a means of doubling transport capacity on a given channel assignment as well as an alternative means of providing protection. Harris recommends that rules be adopted that are sufficiently flexible to allow system growth through the use of this technology.

G. Spectral Efficiency Limits Should Be Implemented Through A Phased Approach

Harris views the spectrum as a valuable and scarce resource that must be managed in an efficient manner. Thus, Harris supports the need for high spectral efficiency standards and generally agrees with the minimum digital system performance requirements proposed by Alcatel. Petition at Appendix, p. 54. Nevertheless, Harris believes that in making the transition from 2 GHz to higher frequencies the needs of users as well as equipment manufacturers would be better served by a phased approach to implementing minimum spectral efficiency limits for digital transmission for capacities below 44.7 Mb/s. A phased approach would enable manufacturers to continue supplying users with existing products while more spectrum efficient technology is being phased in. Changing over to tighter spectral efficiency limits in one immediate step would impose a severe economic hardship on manufacturers who would be forced to scrap existing inventories and production lines.

Harris proposes that the following implementation schedule for new spectral efficiency limits be adopted for transport capacities from 1 to 16 T1:

<u>Time After Adoption Of Amended Rules</u>	<u>Minimum Spectral Efficiency (Bits per second per Hertz)</u>
0 - 2 years	2.5
2 - 5 years	4.0

After 5 years, Harris recommends that the minimum standards be

reviewed and that a new standard be established if appropriate in light of the prevailing state of technology at that time. If this phased approach were adopted, the channel transport utilization corresponding to the above spectral efficiency rates should be along the following lines:

Efficiency B/s/Hz	T1 MHz	2T1 MHz	4T1 MHz	8T1 MHz	12T1 MHz	16T1 MHz
2.5	0.8	1.6	3.2	5.0	N.A.	N.A.
4.0	0.4	0.8	1.6	3.2	5.0	N.A.

Harris believes that this approach will foster increased spectral efficiency while reducing frequency coordination requirements in that it will encourage users to increase transport capacity in the future by the replacement of signal processing equipment rather than by increasing bandwidth or changing frequencies. Harris does not recommend making any changes to the spectral efficiency limits on DS3/STS-1, 2xDS3/2xSTS-1 and 3xDS3/3xSTS-3/STS-3 transport beyond those proposed by Alcatel.⁵ Nevertheless, Harris does recommend that the spectral efficiency limits on high capacity transport systems be reviewed on a periodic basis.

⁵ Harris does recommend, however, that the language following the spectral efficiency table in proposed Rule Section 21.122(a)(2) (Appendix, p. 57) be revised to include the 10 GHz band as well. Thus, the sentence, as modified, would read: "The minimum capacity for a 10 or 11 GHz digital channel is 12 DS-1 for 10 MHz channel bandwidth and 1 DS-3 for 30 MHz channel bandwidth." The basis for this suggested change is that both bands are similarly affected by rain attenuation and both require higher system gain achievable from wider bandwidths.

H. Channel Stacking Should Be Better Defined and Should Be Incorporated into Part 94 As Well

Alcatel proposes that Section 21.122 be revised to include language permitting the stacking of multiple contiguous channels in all bands as long as the minimum payload capacity requirements are met. Petition at Appendix, p. 57. Harris agrees that such flexibility should be incorporated into all channelization plans, but the scope of such flexibility should be better defined. For example, stacking should be permitted only if a larger bandwidth channel is not available and adequate justification is provided. Otherwise, the availability of narrower bandwidth channels could be exhausted. Assuming larger bandwidth channels are not available, then users should be allowed to stack channels to create channels up to the maximum bandwidth authorized for the band in question. Finally, Harris does not see a parallel stacking provision in the Part 94 rules proposed by Alcatel. Such flexibility should, of course, also be incorporated into new Part 94 channelization plans.

I. More Extensive Rule Changes Are Needed To Implement Automatic Transmitter Power Control

Harris agrees with Alcatel that automatic transmitter power control (ATPC) is a desirable feature that increases spectrum efficiency and should be incorporated into the rules. Petition at Appendix, p. 73. Indeed, Harris believes that ATPC should be incorporated into the rules regardless of whether rules are ultimately adopted to allow co-primary sharing in the bands above

3 GHz.

Contrary to Alcatel's assertion, however, it is not clear that use of ATPC is currently permitted under Part 21.⁶ Moreover, Harris believes that additional rule changes to Part 94 beyond those proposed by Alcatel are necessary to implement ATPC.⁷ Accordingly, Harris intends to file a petition for rule making in the near future proposing the rule changes necessary to implement ATPC.

J. Power Mask and Other Obsolete Rules Should Be Reexamined

Current power mask rules, established over 20 years ago, are outdated and need to be reexamined as part of this massive "overhaul" of the rules. Establishing more appropriate power mask rules will allow manufacturers to design more cost-effective radios which provide longer and more reliable path lengths at

⁶ In CC Docket 86-128, the Commission considered a proposal by AT&T to add language to Section 21.107 of its rules to accommodate use of microwave equipment with automatic power control. However, while agreeing that the ". . . interference minimizing equipment holds promise for increasing efficient use of the spectrum . . .", the Commission decided that Docket 86-128 was not the appropriate proceeding to deal with this matter, and that a separate proceeding would be a more appropriate vehicle. Revision of Part 21 of the Commission's Rules, Report and Order, CC Docket 86-128, released September 25, 1987, 2 FCC Rcd 5713, 5728 (1987).

⁷ Harris notes for the record that, in response to a petition for interpretive ruling filed by Harris, the staff of the Private Radio Bureau has stated that while ATPC "may have laudable features," the licensing of microwave systems utilizing ATPC may not be done under the existing Part 94 rules. See Letter of Richard J. Shiben, Chief, Land Mobile and Microwave Division to George Petrutsas, Esquire, dated January 3, 1992, Ref. 7310-03.

higher frequencies without causing additional out-of-band interference. The current power mask rules limit the amount of power manufacturers can obtain from their power amplifier designs. Current advances in signal processing, coding techniques, fading counter-measure techniques, and digital adaptive equalizers have significantly reduced out-of-band interference which the rules were intended to regulate. Not only are current power mask rules not applicable with today's technology, they are inconsistent from band to band. For example, there are two masks for the 10 GHz band (one for point-to-point and one for point-to-multipoint). The mask equations also differ from band to band, e.g., a measurement bandwidth of 4 kHz is used for up to 15 GHz while a measurement bandwidth of 1 MHz is used for above 15 GHz. The international community has simplified its power mask rules by requiring that 99% of the energy stay within the licensed bandwidth. The recommended industry advisory committee could update the power mask rules which would result in more cost-effective radios and better spectrum utilization. Many commenters will undoubtedly identify other rules which should be updated in order to use the spectrum more efficiently. The industry advisory committee should examine all such obsolete rules.

III. CONCLUSION

The Alcatel Petition provides a good starting point for the development of the technical rules needed to enable common

carrier and private operational-fixed users to migrate from the 2 GHz band to the bands above 3 GHz should that become necessary. However, given the complex and comprehensive scope of the regulatory overhaul necessary to accomplish this, Harris believes the most prudent course is to temporarily hold the Alcatel Petition in abeyance while an industry advisory committee considers the many issues raised by the Alcatel Petition as well as the related issues which Alcatel does not fully address. The negotiation and compromise that can take place in an industry advisory committee setting is an effective means of ensuring that the standards ultimately proposed in a rule making proceeding have been thoroughly considered by representatives of the user and industry communities and represent the consensus of those communities.

Respectfully submitted,

HARRIS CORPORATION -
FARINON DIVISION

By: 
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July 2, 1992

CERTIFICATE OF SERVICE

I, Elizabeth Stout, a secretary in the law firm of Fletcher, Heald & Hildreth, do hereby certify that a true copy of the foregoing Comments were mailed this 2nd day of July, 1992, by first-class United States mail, postage prepaid, to the following:

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