density operation. The 30 MHz channelization is a departure from the traditional 40 MHz "DE" plan. ANS' innovative plan reflects the efficiency of today's digital technology, which makes 40 MHz channels obsolete. As with the lower bands, 30 MHz is adequate for typical high density channel requirements.

4. Specific rule amendments must be adopted to implement ANS' plan.

ANS' proposed reallocation of the 3.6 to 3.7, 4, 6, 10 and 11 GHz bands necessitates rule changes under Parts 2, 21, 25 and 94 of the Commission's Rules. These proposed changes are detailed in Attachment 1, Section 4.0.

V. THE COMMISSION IS OBLIGATED TO ADOPT THE PETITION AND INITIATE A RULEMAKING FOR POTENTIALLY DISPLACED 2 GHZ USERS

In proposing to reallocate the 2 GHz band for emerging technologies, the Commission decided not to propose specific rules governing how the displaced fixed microwave users would operate in bands above 3 GHz. This decision by the Commission, to postpone proposing rules for the displaced users, deprives the public an opportunity to assess the reallocation based upon all relevant information regarding its full implementation.

A. THE COMMISSION CANNOT POSTPONE A RULEMAKING ADDRESSING OPERATING RULES FOR POTENTIALLY DISPLACED 2 GHZ USERS

As it has done with the issue of providing spectrum for the displaced fixed microwave users, the Commission has the "discretion to defer resolution of issues raised in a rulemaking so long as the issues decided are not 'inextricably related to the issues deferred.'"[49] With respect to postponing a rulemaking addressing operating rules for potentially displaced 2 GHz users, such discretion does not exist.

The analytical framework for determining if the Commission permissibly exercises such discretion involves evaluating competing factors: (1) enabling a regulatory agency to

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[49] Neighborhood TV Co., Inc. v. F.C.C., 742 F.2d 629, 642 (D.C. Cir. 1984) quoting ITT World Communications, Inc. v. F.C.C., 725 F.2d 732, 754 (D.C. Cir. 1984).

act in a rapidly changing environment; and (2) the need to ensure that the interests of all parties involved would not be adversely affected:

> The requisite judgment is in essence a pragmatic one. In an ideal world, of course, agencies would act only after comprehensive consideration of how all available alternatives comported with a well-defined policymaking objective, and in some circumstances, statutes indeed mandate that agencies proceed by only such a course. But administrative action generally occurs against a shifting background in which facts, predictions, and policies are in flux and in which an agency would be paralyzed if all the necessary answers had to be in before any action at all could be taken. We have therefore recognized the reasonableness of the Commission's decision to engage in incremental rulemaking and to defer resolution of issues raised in a rulemaking even when those issues are "related" to the main ones being considered. See, e.g., Western Union International, Inc. V. FCC, 673 F.2d 539, 543 (D.C. Cir. 1982). At the same time, the Commission cannot "restructure [an] entire industry on a piecemeal basis" through a rule that utterly fails to consider how the likely future resolution of crucial issues will affect the rule's rationale. ITT World Communications, Inc. v. FCC, 725 F.2d 732 at 754 (D.C. Cir. 1984).[50]

As a threshold matter, the agency's decision to postpone a related rulemaking must be "plausible and [must] flow from the factual record compiled...."[51] This determination must be made in the context of the nature and magnitude of the unresolved issue.[52]

> [P]ostponement will be most easily justified when an agency acts against a background of rapid technical and social change and when the agency's initial decision as a practical matter is reversible should the future proceedings yield drastically unexpected results. In contrast, an incremental approach to agency decision making is least justified when small errors in

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[50] National Ass'n of Broadcasters v. F.C.C., 740 F.2d 1190, 1210 (D.C. Cir. 1984) (citations and quotations omitted) [hereinafter "NAB"].

[51] NAB, 740 F.2d at 1210.

[52] NAB, 740 F.2d at 1211.

> predictive judgments can have catastrophic effects on the public welfare or when future proceedings are likely to be systemically defective in taking into account certain relevant interests.[53]

Based upon this "calculus of deferral,"[54] the Commission's decision, in the NPRM, to delay proposing necessary specific rules for fixed microwave users, is unacceptable.

First, the Commission did not make this decision based upon an adequate record. The OET Study is limited in its scope. Scant consideration is given to the availability of alternative bands for fixed microwave users or for emerging technologies.[55]

Second, the Commission's initial decision to forebear from proposing specific operational rules for the displaced fixed microwave users is not "reversible should [any] future proceedings yield drastically unexpected results."[56] Until the Commission develops a record demonstrating that the bands above 3 GHz would accommodate the displaced fixed microwave users, there is no basis to assume that the Commission's proposal would be feasible. Otherwise, once the Commission relocates the fixed microwave users, the barn door will be opened, the horse will be gone, and no usable spectrum will be available.

Third, if the Commission's assumption that bands above 3 GHz would work for fixed microwave users is erroneous, there could be "catastrophic effects on the public welfare...."[57] Over 29,000 fixed microwave users provide essential backbone and other telecommunications services to several vital segments of the U.S. economy, including utilities, railroads, banks, and energy providers. Without careful, prudent and deliberate

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[53] NAB, 740 F.2d at 1211.

[54] Neighborhood TV Co., 742 F.2d at 642.

[55] See UTC Further Petition.

[56] NAB, 740 F.2d at 1211.

[57] NAB, 740 F.2d at 1211.

consideration of how these users will operate, migrating them to other bands could cause major disruptions in service.

Closing the loop and proposing rules for fixed microwave user operation above 3 GHz at this time is a necessary condition precedent to reallocation of the 2 GHz band for emerging technologies. As the U.S. Court of Appeals for the District of Columbia Circuit admonished:

> Until the FCC has considered and determined the widespread effects that the [related issues involving displaced users] will have on the industry structure ... neither the FCC nor this court can determine rationally which policy will best serve the public interest. Consequently, we hold that the FCC has abused its discretion by implementing [a reallocation plan] prior to considering the issues [involving affected incumbent users].[58]

The answer to this problem is simple. Adopt ANS' Petition and promptly commence a rulemaking proceeding. As the Commission itself noted when it required the displacement of ITFS point-to-point licensees to provide spectrum for wireless cable,

> [I]nvoluntary migration of point-to-point facilities will only be permitted if the substitute spectrum is, at a minimum licensable by [the displaced] operators on a primary basis and provides a signal that is equivalent to the prior signal in ... quality and reliability.[59]

ANS's Petition provides this solution.

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[58] ITT World Communications, 725 F.2d at 754-55.

[59] Amendment of Parts 21, 43, 74, 78, and 94 of the Commission's Rules Governing Use of the Frequencies in the 2.1 and 2.5 GHz Bands, 6 FCC Rcd 6792, 6798 (1991).

CONCLUSION

Provision of spectrum for emerging technologies is necessary and should be implemented. Yet, provision of spectrum for fixed microwave users also is imperative.

The Commission and the public need an answer to this conflict. Expedited grant of ANS' Petition and prompt issuance of a Notice of Proposed Rulemaking would solve this problem by accommodating both the need to provide for emerging technologies and for fixed microwave users.

Respectfully submitted,

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May 22, 1992

110609.03-67269/2

Alcatel Network Systems, Inc.

Proposed

Rules for Frequency

Reallocation

Composed by
Alcatel Network Systems, Inc.
Technical Staff

1.0 ANS proposes specific band reallocations.

Spectrum is needed for emerging technologies, especially personal communications services. To provide such spectrum, the Commission proposes[1] reallocation of portions of the 2 GHz band for emerging technologies and a phased migration of existing 2 GHz fixed microwave users to bands above 3 GHz. It also limits prospective 2 GHz fixed microwave users to operating on a secondary basis.

Notwithstanding the Commission's interest in migrating users to the frequency bands above 3 GHz, specific technical and operational rules are needed for all displaced 2 GHz and all new fixed microwave users relocated to bands above 3 GHz. Without specific rule changes, controlled and orderly migration is not possible.

Alcatel Network Systems (ANS) has developed a plan to facilitate this reallocation. Consistent with the Commissioners' solicitation of "any additional proposals that might accommodate the competing demands for this important spectrum,"[2] ANS proposes the following specific technical and operational rules for fixed microwave users in bands above 3 GHz.

1.1 Introduction

ANS' proposals consist of the following (see Figures 1 and 2):

- ANS proposes reallocation and channelization of the 3.6 to 3.7 GHz Fixed Satellite allocation for fixed point-to-point use on a co-primary basis. This band would continue to be shared with the government.

- ANS proposes that the 100 MHz of spectrum in the 10.5 GHz band currently designated for point-to-multipoint systems be redesignated for fixed point-to-point systems. This band will be rechannelized appropriately and be shared by common carrier and private op-fixed users on a co-primary basis as is the case for the rest of the 10.5 GHz band.

- ANS proposes reallocation and rechannelization of the 10.7 to 11.7 GHz band so common carrier and private op-fixed users

will share on a co-primary basis.

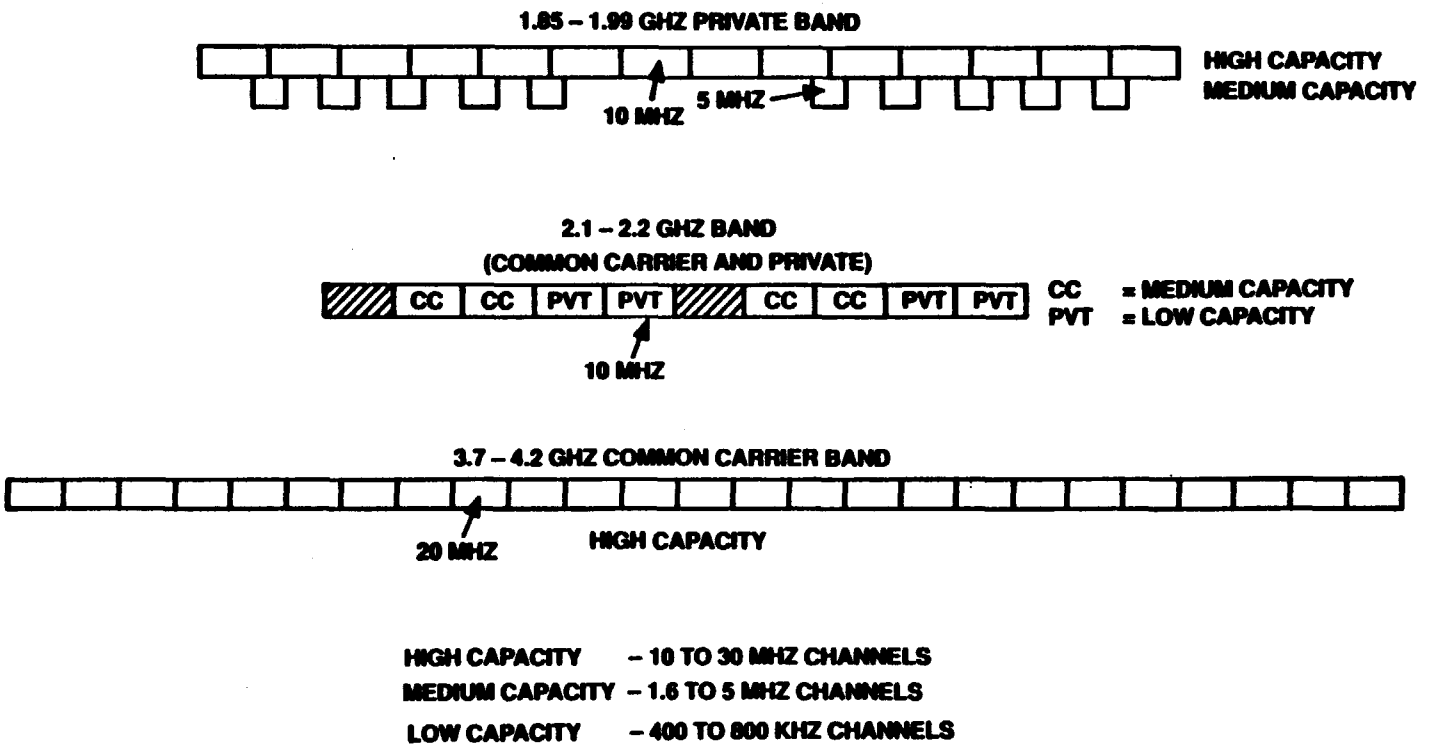
- ANS proposes reallocation and rechannelization of the 3.7 to 4.2 GHz (4 GHz) common carrier band so private and common carriers can use it on a co-primary basis for medium and low capacity traffic in addition to the current high density channelization. In an effort to modernize this band, specific preferred channel pairs and the introduction of go/return channels are proposed. Additionally, over a 15 year transition period, 40 MHz at each band edge would be reallocated on a primary basis for point-to-point microwave and on a secondary basis for satellite operation. This reallocation would solve the current difficulty in implementing point-to-point systems due to the interference with existing 4 GHz satellite receive stations. Due to this problem, unless ANS' proposed reallocation is adopted, this band is essentially useless for new point-to-point systems.

- ANS proposes reallocation and rechannelization of the 5.925 to 6.425 (lower 6 GHz) common carrier band so private and common carriers may use it on a co-primary basis. The eight 29.65 MHz channel pairs in this band would be converted to eight 30.00 MHz channels to be consistent with all other current domestic and international frequency plans. In addition, two frequency pairs would be used primarily for medium capacity traffic and six frequency pairs would be used for high capacity traffic. Low capacity traffic channelization also would be accommodated. Specific preferred channel pairs are proposed.

- ANS proposes reallocation and rechannelization of the 6.525 to 6.875 GHz (upper 6 GHz) private op-fixed band so private and common carriers could use it on a co-primary basis. Existing 800 KHz channels at band edges would be subdivided into 400 KHz channels and 5 MHz channels would be subdivided into 1.6 MHz channels.

- ANS proposes additional specific amendments to Parts 2, 21, 25, and 94 to accommodate this reallocation. These amendments would include provisions for eligibility, channel loading, minimum path lengths, modulation efficiency, and antenna standards.

CURRENT CHANNELIZATION

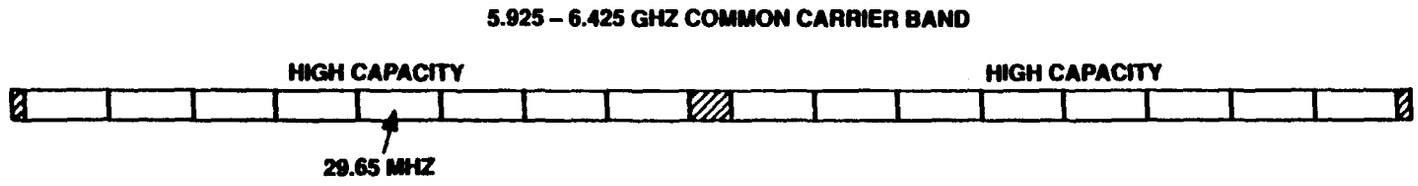


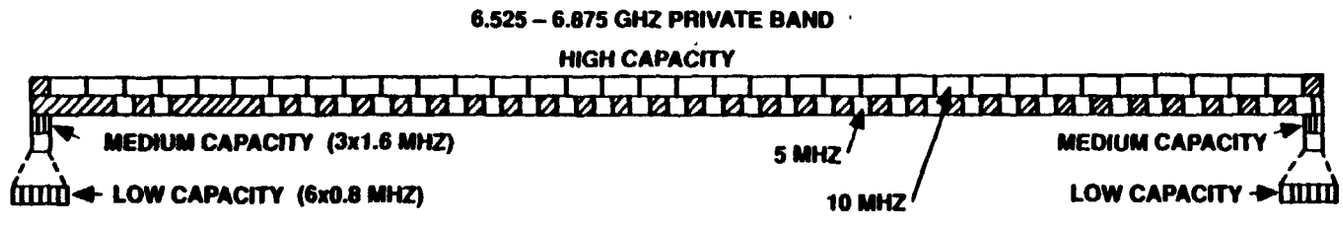
HIGH CAPACITY – 10 TO 30 MHZ CHANNELS
MEDIUM CAPACITY – 1.6 TO 5 MHZ CHANNELS
LOW CAPACITY – 400 TO 800 KHZ CHANNELS

NOT DRAWN TO SCALE

Figure 1 - Current Channelizations

CURRENT CHANNELIZATION (CONT)





HIGH CAPACITY – 10 TO 30 MHZ CHANNELS

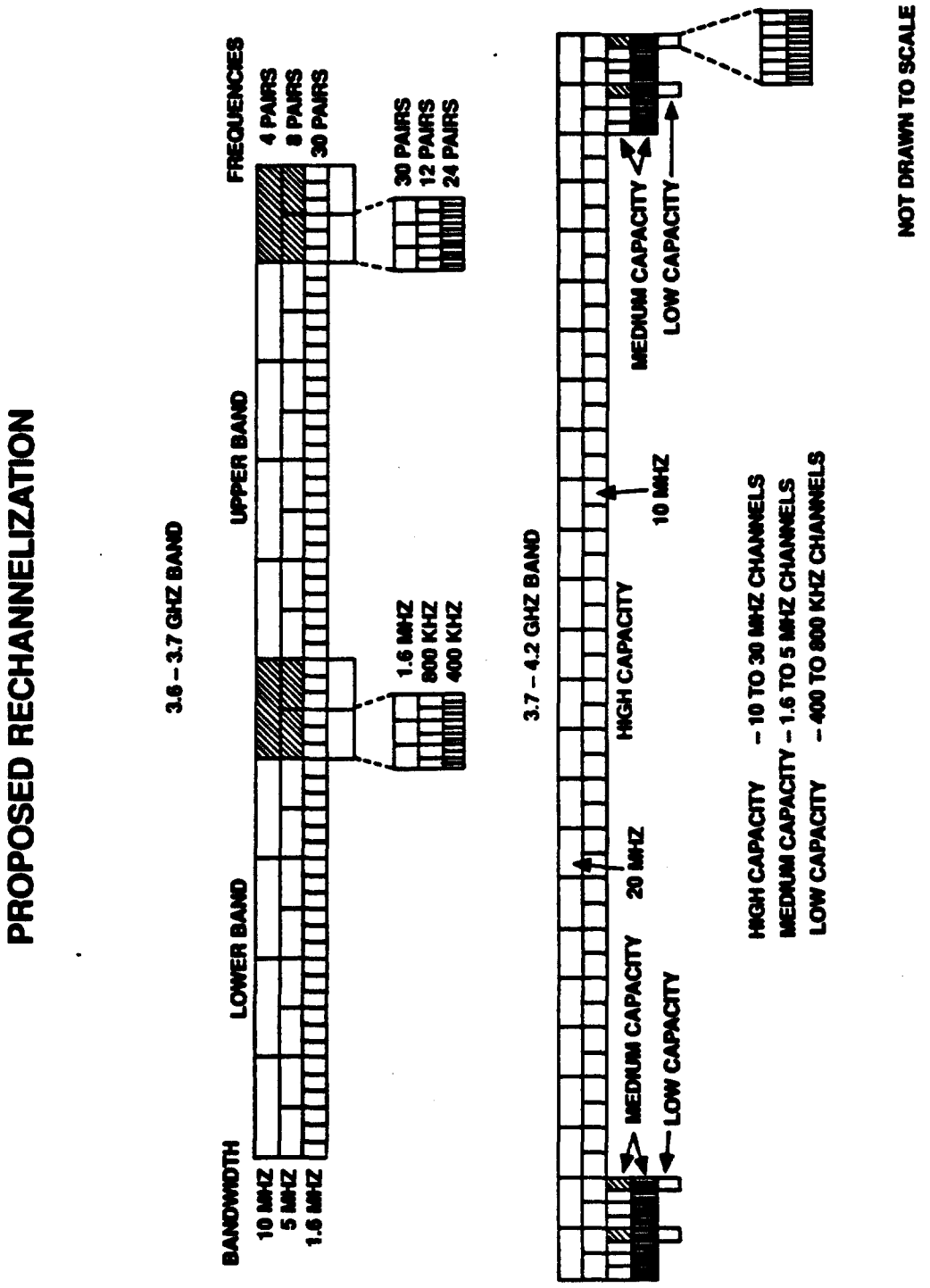
MEDIUM CAPACITY – 1.6 TO 5 MHZ CHANNELS

LOW CAPACITY – 400 TO 800 KHZ CHANNELS

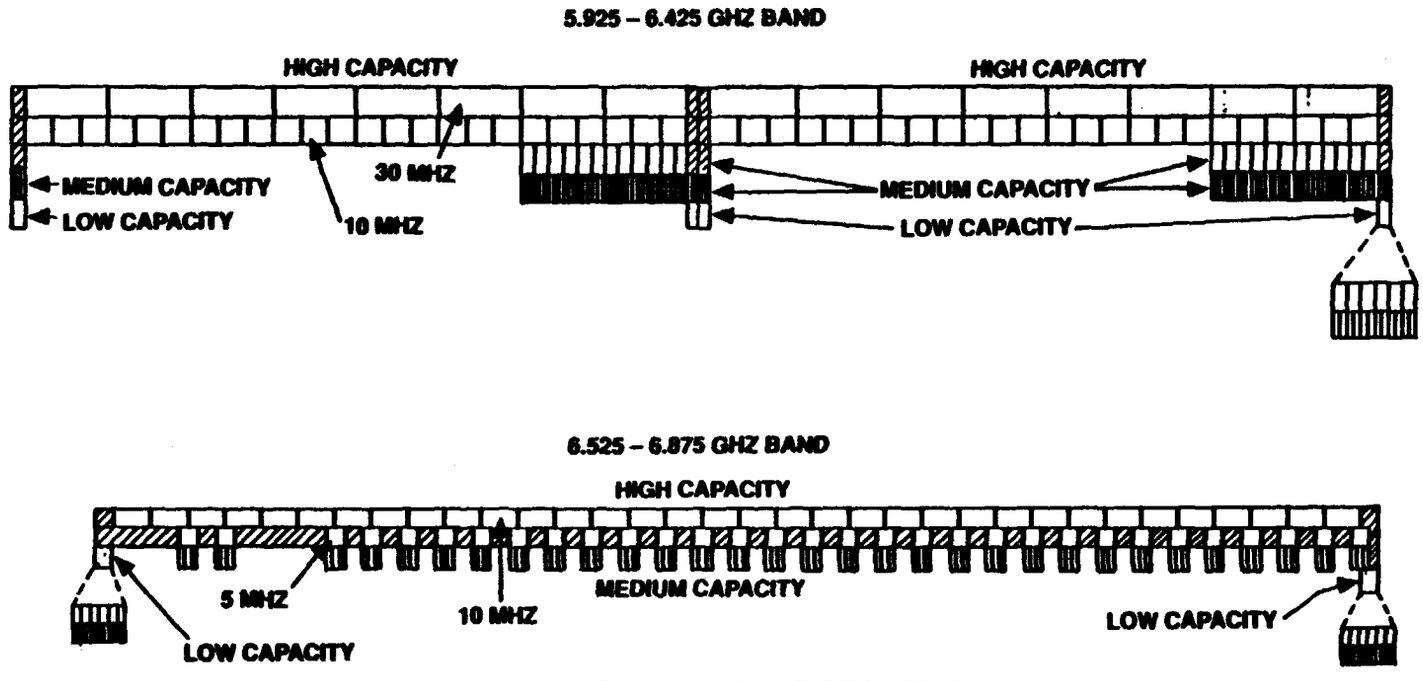
NOT DRAWN TO SCALE

Figure 1 - Current Channelizations (Cont.)

Figure 2 - Proposed Rechannelization



PROPOSED RECHANNELIZATION (CONT)



HIGH CAPACITY – 10 TO 30 MHZ CHANNELS

MEDIUM CAPACITY – 1.6 TO 5 MHZ CHANNELS

LOW CAPACITY – 400 TO 800 KHZ CHANNELS

NOT DRAWN TO SCALE

Figure 2 - Proposed Rechannelization (Cont.)

1.2 ANS' proposal provides for efficient use of spectrum.

This proposal provides for efficient use of spectrum by modifying existing rules to be more in concert with today's market needs. It subdivides existing channels according to need. For the first time, fixed bands will be allocated based upon utilization rather than upon an arbitrary type of user, which is the criterion now used. Bands would be rechannelized so that low, medium, and high capacity systems would use only the spectrum needed. For example, compare Figures 1 and 2 to see how the band is channelized to accommodate systems with different capacity requirements.

1.3 ANS' proposal makes more spectrum available to users.

In its proposed rulemaking, the Commission shows interest in common carrier and private op-fixed users sharing their respective bands with each other to maximize the use of available spectrum. In accordance with this implied direction, ANS has developed an overall plan whereby these users will share the spectrum remaining above 3 GHz after 2 GHz is reallocated. Both private op-fixed and common carriers would gain access to additional spectrum. In return, each of these users would be sharing the spectrum with other types of users. ANS' channelization plan ensures compatibility among such users. The flexibility afforded by this method would permit the more effective use of this resource. (See Table 1).

TABLE 1

AVAILABLE SPECTRUM IN EACH FREQUENCY BAND (IN MHz)

	COMMON CARRIER		PRIVATE SERVICE	
	current	proposed	current	proposed
2 GHz	40	0	80	0
3.6 GHz	0	100 (*)	0	100 (*)
4 GHz	500	500 (*)	0	500 (*)
L6 GHz	500	500 (*)	0	500 (*)
U6 GHz	0	350 (*)	350	350 (*)
10 GHz	30(*)	130 (*)	30(*)	130 (*)
11 GHz	1000	1000 (*)	0	1000 (*)
Total	2070	2580 (*)	460	2580 (*)

Note (*) - Shared by common carrier and private services

After implementation of this plan, the available spectrum would be more usable to all parties. Access to the spectrum is optimized because private and common carriers would be able to select from among several bands to engineer systems based upon applicable path length, propagation, equipment characteristics, antenna characteristics and other criteria.

Of the bands shown in Table 1, Part 21 coordination rules currently apply to all except the Upper 6 GHz band (6.525 to 6.875 GHz). The Upper 6 GHz band currently is governed by Part 94 coordination rules. ANS proposes that the coordination requirements of Part 21 be used for all bands. Part 21 coordination requirements are currently used in the shared Common Carrier/Private bands of 10.5 GHz, 18 GHz and 23 GHz. Additionally, ANS proposes that major industry organizations, such as NSMA (which currently concerns itself primarily with Part 21 coordination issues) and TIA (which currently concerns itself with Part 94 coordination issues) jointly develop specific criteria for coordination of all users in these bands.

2.0 Technical analysis of the Commission's relocation plan

2.1 The Commission's proposed relocation does not address system capacity requirements.

In its rulemaking, the Commission proposes relocating users in the following bands:[1]

TABLE 2

CHARACTERISTICS OF BANDS TO BE REALLOCATED

Frequency Range (MHz)	Type of Service	Number of Channels	Channel Bandwidth
1850 - 1990	Private	6 pairs + 2	10 MHz (*)
		5 pairs	5 MHz (*)
2110 - 2130	Common	6 pairs	3.5 MHz (*)
2160 - 2180	Carrier	6 pairs	3.2 MHz (*)
		12 pairs	1.6 MHz (*)
2130 - 2150	Private	11 pairs	1.6 MHz (*)
2180 - 2200		24 pairs	800 KHz (*)

Notes (*) - Overlaps channels of different bandwidths in this frequency range

Based upon a technical study[3] conducted by its Office of Engineering and Technology (OET), the Commission concludes that the following bands have radio propagation characteristics and path lengths similar to the 2 GHz band. OET also concludes that these bands have available capacity to handle most of the relocated traffic:

TABLE 3

BANDS AVAILABLE FOR 2 GHz USER REALLOCATION

3.700 - 4.200 GHz	Common Carrier
5.925 - 6.425 GHz	Common Carrier
6.525 - 6.875 GHz	Private

On short and medium length paths, OET proposes that higher bands be used (10 GHz and above). Based on this recommendation, the Commission proposes that a "blanket waiver" of eligibility requirements be issued allowing all existing 2 GHz users, common carrier and private op-fixed, to relocate to any common carrier or private band above 3 GHz. The technical rules and coordination procedures currently applicable to each band still would apply, however.

Adopting the "blanket waiver" approach, without proscribing specific channelization and open operating requirements, will not work. The 2 GHz band band is composed entirely of narrow (low and medium density) frequency channels. The 4 and lower 6 GHz bands are composed entirely of wide (high density) frequency channels. These two channelizations are incompatible. To use the few high density channels for low density traffic would waste precious spectrum while blocking the bands for use with high density traffic.

2.2 Capacity characteristics of the bands proposed for displaced fixed microwave users vary according to system requirements.

To analyze if the 4 and 6 GHz bands could accommodate the needs of displaced 2 GHz users, the traffic in these bands will be divided into 3 categories:

TABLE 4

CATEGORIES OF DIGITAL TRAFFIC

Category	Bandwidth	Typical Channel Capacity	Voice Channels
High Capacity	10 to 30 MHz	1 to 3 DS3	672 to 2016
Medium Capacity	1.6 to 5 MHz	4 to 12 DSl	96 to 288
Low Capacity	400/800 KHz	1 to 2 DSl	24 to 48

These categories conform approximately to typical high density common carrier, medium density common carrier and private, and low density common carrier and private utilizations. This approximate categorization was needed to ensure adequate channelization of all typical applications.

Figure 3 shows how this channelization might be applied in a hypothetical system after the 2 GHz reallocation is implemented. This example could be a lower 6 GHz cellular radio concentration network. The Mobile Telephone Switching Office (MTSO) would be located at the left of the Figure 3 drawing where the 3 DS-3 radio originates. Using ANS' proposed plan, the entire network could be built in the lower 6 GHz band. If antennas with adequate front-to-back ratios were used and there were no external interference problems, the same frequencies could be used for most of the network. Selected paths could be upgraded in capacity as service requirements increase without changing frequencies or replacing antenna and feeder systems. Several of these systems could be put in the same geographical area using other sets of frequencies. This would be difficult or impossible without the use of the proposed medium and low capacity channels. Thus, under the Commission's proposed blanket waiver approach, this cellular operator would be unable to design and implement its system in such a spectrally efficient and cost effective manner.

6 GHZ NETWORK PLAN

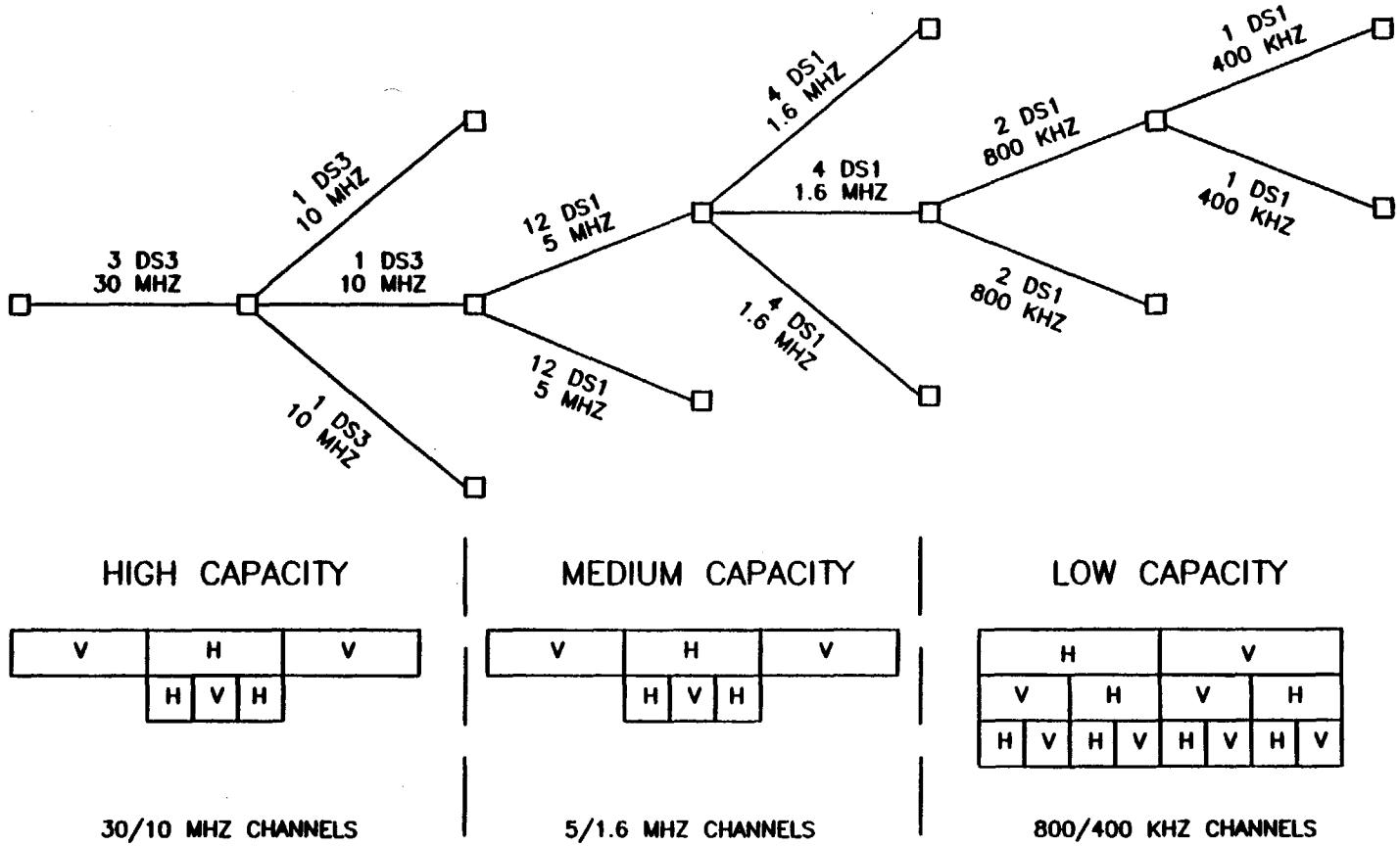


Figure 3 - Hypothetical System

The primary relocation bands have the following characteristics:

TABLE 5

CHARACTERISTICS OF PRIMARY RELOCATION BANDS

Frequency Range (MHz)	Type of Service	Number of Channels	Channel Bandwidth
3700 - 4200	Common Carrier(**)	12 pairs + 1	20 MHz
5925 - 6425	Common Carrier	8 pairs	30 MHz
6525 - 6875	Private	16 pairs + 2	10 MHz (*)
		15 pairs + 1	5 MHz (*)
		3 pairs	1.6 MHz (*)
		5 pairs + 1	800 KHz (*)

Notes (*) - Overlapping channels
(**) - Shared with satellite down-links

The 4 and lower 6 GHz bands are not channelized for low to medium capacity systems. This illustrates the inherent spectral inefficiency in the Commission's proposed blanket waiver approach which would allow low capacity systems to move to these bands.

3.0 ANS' proposed frequency channelization plan

3.1 ANS' plan increases available spectrum for displaced 2 GHz users.

Under ANS' proposal, each type of user will have more spectrum from which to choose. A summary of the current and proposed channelization plans for the various bands is depicted in Table 6:

TABLE 6

AVAILABLE SPECTRUM IN EACH FREQUENCY BAND (IN MHz)

	COMMON CARRIER		PRIVATE OP-FIXED	
	current	proposed	current	proposed
2 GHz	40	0	80	0
3.6 GHz	0	100 (*)	0	100 (*)
4 GHz	500	500 (*)	O	500 (*)
L6 GHz	500	500 (*)	O	500 (*)
U6 GHz	0	350 (*)	350	350 (*)
10 GHz	30(*)	130 (*)	30(*)	130 (*)
11 GHz	1000	1000 (*)	0	1000 (*)
Total	2070	2580 (*)	460	2580 (*)

Note (*) - Shared by common carrier and private services

This table shows the total bandwidth available to the common carrier and private op-fixed services in each frequency band. The overall frequency band allocation for each service would increase, even after losing its 2 GHz frequency band, by sharing frequencies with the other service.

3.2 ANS' criteria for proposed reallocation are based upon fixed microwave users' operating characteristics and spectrum requirements.

Overall, ANS' basic concept is to reallocate, in a benign manner, the high density channelizations in such a way that lower density operation is facilitated. At 4 GHz, a proposal to solve the satellite

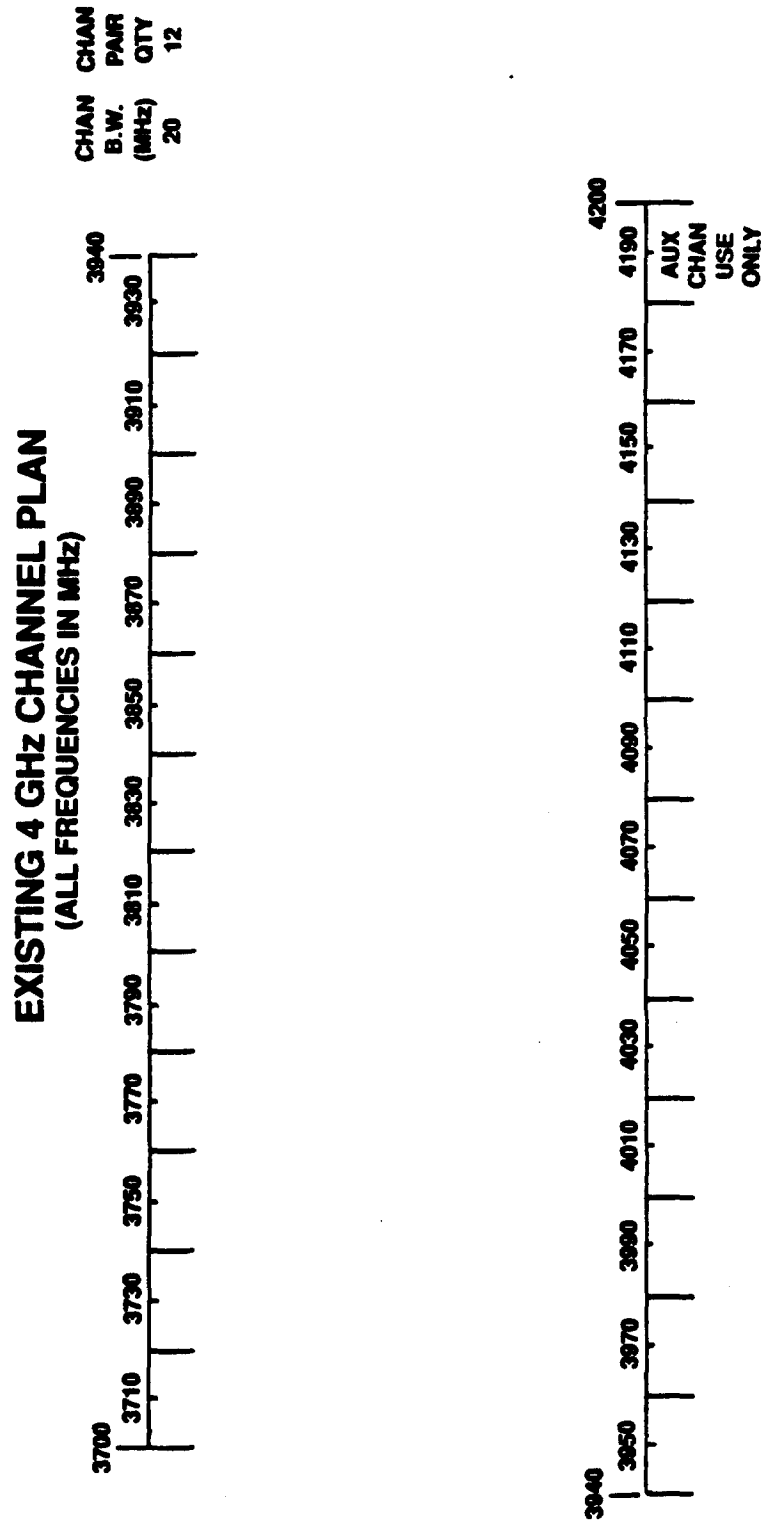
interference problem is proposed. Other changes are made as necessary to modernize the bands. These include establishing preferred frequency pairs, separate go and return groupings at 4 GHz and rechannelizing lower 6 GHz to conform to modern practice. Portions of the higher frequency bands would be rechannelized for low to medium density operation in addition to the current high density applications.

These proposals are based upon ANS' substantial experience with manufacturing and installing microwave systems. Empirical data were used to formulate the proposed rules. Existing and anticipated equipment design, spectrum utilization requirements, and customer needs were analyzed.

3.3 4 GHz band

The existing and proposed 4 GHz band channelizations are depicted in Figures 4 and 5. This reallocation would involve channelizing two 20 MHz channels at both ends of the band and designating these channels as primarily for medium and low capacity traffic.

Figure 4 - Existing 4 GHz plan



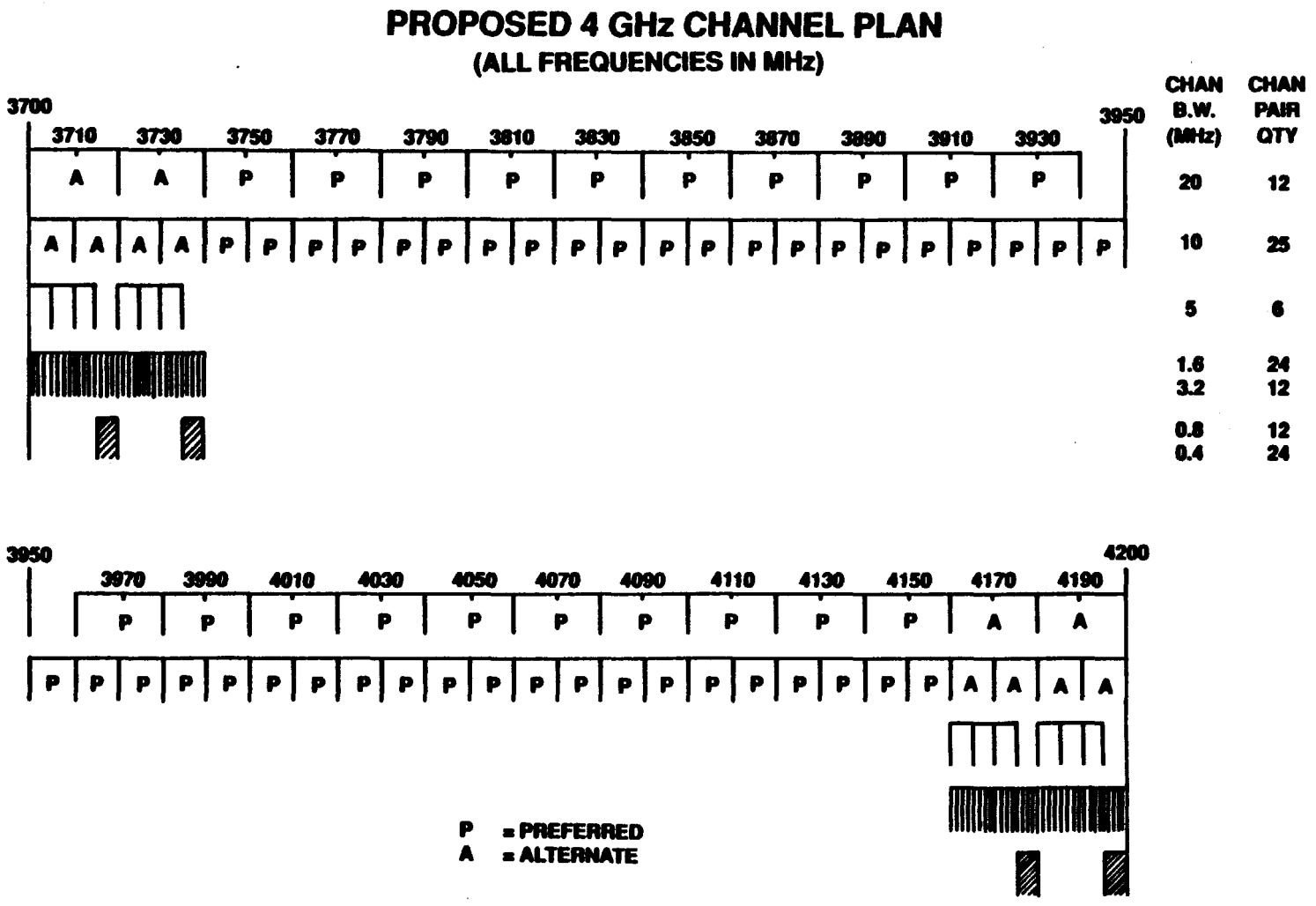


Figure 5 - Proposed 4 GHz plan