

channels and 4 unpaired channels.⁵⁹ This is similar to the channeling plan at 39 GHz, except for the addition of the unpaired channels. Apparently the rationale for the unpaired block is the recommendation of TIA that a "need exists for unpaired frequencies that would be available to portable and fixed services for broadband video or digital applications, for one-way point-to-point or portable point-to-point use."⁶⁰

ART urges the Commission to adopt its tentative proposal to use the same 50 MHz channelization plan at 37 GHz as at 39 GHz. Adoption of any other plan, such as, for instance, the amended TIA plan to include a mix of narrower channels, would run a serious risk of interfering with the highest and best use of this spectrum. The Commission has sensibly moved away from *a priori* determinations of what types of services and channel plans are appropriate, preferring to leave that decision to the marketplace. There is no reason for the Commission to depart from its recent trend in this instance. Quite the opposite, there are even more reasons to stay with broad channels here.

As we have shown above, the most prevalent use of the entire 38 GHz band will be for broadband channels. The current generation of radio equipment capable of transmitting a DS-3, which will be deployed shortly, uses the entire 50 MHz channel to send the 45 mbps bit stream. Furthermore, one of the primary demands in the forthcoming months will be for wireless transmissions of SONET circuits, requiring the transmissions at at least 155 mbps. State of the art compression techniques will allow this transmission

⁵⁹ *NPRM* at paras. 16-20 and Appendix A, proposed rule Section 21.701(j)(1), as amended.

⁶⁰ *Id.* at para. 16.

speed through a 50 MHz channel. It should be evident then that the narrowest channel that should be mandated is a 50 MHz channel.

ART does not oppose setting aside four unpaired 50 MHz channels. And ART agrees with the Commission's rejection of the TIA proposal to restrict subdivided channels to 1.25 MHz increments "because [the Commission] believes that, due to the relatively short propagation distances at these frequencies, the lack of a subchannelization plan is unlikely to cause any significant coordination problems in this band."⁶¹ The TIA subchannelization proposal should be rejected not only because coordination should not be a problem, but also in order to harmonize the rules at 37 and 39 GHz.

X. 37 GHZ SHOULD BE LICENSED ON A BTA BASIS.

The *NPRM* (paras. 21-24) proposes to license the 37 GHz band on a Basic Trading Area ("BTA") basis. The Commission notes that using BTAs will lead to "a more orderly structure for the licensing process"⁶² than the current structure which allows each applicant to design its own area within broad parameters. ART agrees.

Uniform license areas are particularly necessary if the Commission uses auctions, which require that the bidders be able to accurately gauge the area for which they are bidding. And BTAs are the most logical division.

The Commission inquires whether, instead of or in addition to BTAs, it should use some combination of regional or national channels. It points out that adding a mix of

⁶¹ *Id.* at para. 19.

⁶² *NPRM* at para. 22.

larger service areas could significantly reduce the number of available licenses and possibly expedite the licensing process.⁶³ Although this scheme might accelerate the process, it is not a sound approach and should be rejected.⁶⁴

Regional or national channels are inconsistent with the primary uses of 38 GHz microwave. It is a local service. Most of the customers will be using 38 GHz services for local wireless loops. The other significant use, as mobile backhaul or backbone, also suggests use of BTAs, or at least not national channels.⁶⁵

XI. AUCTION THE 37 GHz BAND AT THE SAME TIME AS THE "WHITE AREAS" AT THE 39 GHz BAND.

The pertinent issues then are: (a) how much and what 37 GHz spectrum should be auctioned now; (b) in what order should the auctions for 37 and 39 GHz be held; (c) what changes, if any, from previous auctions are necessary here?

(a) The Commission asks if it has "[i] overestimated demand and, thus [ii] whether a portion of the [37 GHz] band should be held in reserve for future services."⁶⁶

We are convinced that the answer to the first question is [i] "no, at least not in the long

⁶³ *Id.* at para. 22 and note 30.

⁶⁴ Licensing areas larger than BTAs would create a higher risk of a discrimination against the pioneers at 39 GHz. Their service areas are, for the most part, smaller than the BTAs. This means that they will be handicapped even by the award of BTAs at 37 GHz. If the Commission grants the incumbents at 39 GHz an opportunity to enlarge their service areas to be coextensive with BTAs, this artificial handicap might be mitigated. However, it would more difficult for the incumbents to overcome the size barrier presented by the use of larger service areas, particularly national service areas.

⁶⁵ PCS licenses were awarded on a BTA and MTA basis.

⁶⁶ *NPRM* at para. 13.

run" and to [ii] "unknown."

ART has no doubt that the demand for wireless local loops will be substantial and that, eventually, most, if not all, of the 38 GHz spectrum will be consumed by wireless broadband local loop services, and to some extent by mobile infrastructure links. The unknown, and perhaps unknowable, question is when. Accordingly, unless additional information is produced in the next two rounds of comments, ART suggests that the Commission, preferably, await the further buildout of the systems at 39 GHz or, alternatively, auction only one-half of the 37 GHz band at this time.

Although there has been a floodtide of applications at 39 GHz, when the business, family and personal relationships are taken into account, there are barely more than a half dozen applicants with significant multiple holdings. ART fully expects that the number of surviving and operating licensee groups out of this initial cadre will be significantly winnowed by a combination of the realities of the marketplace and whatever interim processing rules and construction requirements the Commission chooses to adopt.

The 38 GHz industry is largely an incremental business – the majority of the equipment, the radios, is installed where and when there is demand. Only a comparatively small percentage of the infrastructure needs to be in place in advance. The single and critical exception is roof rights. If the 38 GHz provider is to achieve significant market penetration, it must line up these rights well in advance. This requires substantial capital and human resources, as well as time. When this resource constraint is added to the substantial investment required in equipment purchases to build out in dozens of markets simultaneously, it is clear that the provision of service in 50 or more markets over an 18

month period requires a large effort and significant resources. ART expects that this reality will winnow down the number of current permittees that achieve financial viability.

On the other hand, potentially counterbalancing these anticipated reductions in demand (and more) will be the newcomers. Their ranks are largely unknown, except for the newcomers with pending applications, such as several Ameritech operating companies and AT&T. These companies obviously have the financial resources to build and meet reasonable construction requirements. Whether they will choose to do so and how many more of them will enter either by acquisition or auction cannot be foretold at this juncture. The rounds of comments in this proceeding may significantly clarify the situation.

Another factor that needs to be taken into account in deciding the question of how much spectrum should be awarded over the next twelve months is the impact of bandwidth compression breakthroughs that appear to be just around the corner. Equipment manufacturers, using other millimetric wave frequencies, already are pumping three DS-3s down 60% of the bandwidth of the paired 50 MHz channel that is the standard channelization at 38 GHz. ART's joint development projects have convinced it that it is entirely possible that, within a few years if not months, up to three to five DS-3s may be able to be transmitted over a single paired 50 MHz channel at 38 GHz. This might reduce greatly the amount of bandwidth required by each 38 GHz operator to meet the present demand. On the other hand, ART projects that the amount of bandwidth necessary to serve demand developing over the same time frame, and later, will increase substantially. As the initial adopters become convinced that they can transfer the bulk of their traffic to 38 GHz without troubling outages, they will increase their capacity appetite from one or

two DS-1s to multiple DS-1s, then to DS-3s and multiple DS-3s.

Whether these contrasting trends in spectrum needs over the next few years cancel each other out, or, if not, which one will prevail, cannot be foretold. When this unknown is added to the unknown of how much of the 38 GHz spectrum currently being sought ripens into use, it becomes clear that the Commission simply is unable to reliably determine at this point when the entire 3000 MHz at 38 GHz needs to be made available. Whether the comments anticipated over the next several months lends clarity is unknown.

These considerations lead to the following conclusions:

- (1) The Commission needs additional evidence before it decides to auction all of the available 38 GHz spectrum at this time.
- (2) The appropriate amount of spectrum that should be auctioned is difficult to determine.
- (3) The surest means of reaching a reasonably reliable projection of the auctionable amount would be to withhold auctions at 37 GHz until the Commission had awarded sufficient spectrum to the incumbents to enable them to complete their business plans. (In ART's case, as well apparently as some others, the business plan that was most attractive to its investors calls for delivery of service to every pocket of demand for wireless local loops located at any point within the United States.) Admittedly, because the buildout of the pioneer's systems will be an on-going process, it is difficult to project when it would appropriate, from a regulatory viewpoint, to declare that the buildout was completed and the amount of auctionable spectrum reasonably determinable. ART

believes, however, that a much clearer picture could be gained over the next twelve months, as it becomes evident as to how many other permittees will commence their operations. A more accurate gauge would be obtained by awaiting the first eighteen month construction benchmark under the new more stringent rules.

(4) If the Commission proves unwilling to await further developments and no firmer evidence is forthcoming in the rulemaking comments, ART suggests that the Commission auction half of the 37 GHz spectrum -- eight paired 50 MHz channels -- and hold the remainder of the 37 GHz in abeyance pending significant utilization of the auctioned channels.

(5) Regardless of how much 37 GHz spectrum is auctioned or when, it is imperative, from both a public interest perspective and a fairness perspective, that the Commission take adequate steps to ensure that the pioneers at 39 GHz have an equal opportunity to compete. The licensees at 39 GHz can only have a fair opportunity to compete if they can obtain access, within the same time frame, to the same amount of spectrum as is awarded to the newcomers at a 37 GHz auction. Because the 37 GHz bidders will have the opportunity to bid for entire BTAs, which will often be larger than the incumbent 389 GHz provider and to aggregate BTAs across the country, the only way that parity can be achieved is to allow *the "white areas" at 39 GHz to be auctioned at the same time as the first 37 GHz auctions.*

XII. CONCLUSION

In deliberating the proposals in the *NPRM* the Commission should bear in mind that 38 GHz is one of its more notable success stories and that the success of 38 GHz is premised upon the Commission's liberal rules and policies. 38 GHz, if properly nurtured, promises to bring much needed alternatives to the traditional wired local loops and to foster a substantial increase in the viability of competitive alternatives to the Incumbent Local Exchange Carriers.

The basic premises of the *NPRM* are consistent with achievement of these goals. ART, therefore, supports the principal *NPRM* proposals including:

- (1) dismissal of applications pending at the time of the November freeze that were not then "clear," *provided* that the Commission allow interim licensing of discrete paths for actual customers;
- (2) stringent buildout requirements, based upon ART's alternative proposal;
- (3) no limits on transfers or holdings (at least in the early years);
- (4) even more liberal technical rules than proposed by the *NPRM*, including no frequency stability requirement and no *a priori* standardization of antenna designs (a maximum EIRP and industry coordination procedures are sufficient);
- (5) use of BTAs rather than regional or national channels;
and
- (6) use of auctions to award present and future channels where mutual exclusivity exists (auctions at 39 GHz must be held simultaneously with auctions at 37 GHz).

ART urges the Commission to conclude this rulemaking expeditiously so that it and others can gain access to the additional spectrum that they need to fulfill the promise of 38 GHz.

Respectfully Submitted,



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March 4, 1996

ATTACHMENT A

**DEFINING THE RELEVANT MARKET
FOR 37-39 GHz SERVICES**

STATEMENT OF

**LARRY F. DARBY
DARBY ASSOCIATES
WASHINGTON, D.C.**

**IN SUPPORT OF
ADVANCED RADIO TELECOM CORP.**

Defining the Relevant Market for 37-39 GHz Services

Statement of

Larry F. Darby
Darby Associates
Washington, D.C.

In Support of

Advanced Radio Telecom Corp.

In the Matter of:

*Amendment of the Commission's Rules Regarding the 37.0-38.6 GHz and 38.6-40.0 GHz Bands
(ET Docket No. 95-183; RM-8553);*

*Implementation of Section 309(j) of the Act -- Competitive Bidding 37.0-38.6 and 38.6-40.0 GHz
(PP Docket No. 93-253)*

March 4, 1996

INTRODUCTION AND SUMMARY

In its December 1995 Notice of Proposed Rulemaking and Order on Matters related to the rules for implementing communications services in the 37.0-38.6 and 38.6-40.0 GHz Bands, the Commission inquired and requested comment on several related issues.¹ Some Commission concerns are relevant to determining the need for imposing spectrum block ownership conditions in furtherance of its public interest goals and particular policies with respect to fostering competition. In this context the Commission specifically asked three questions:

- a) whether the 37 and 39 GHz service represents a discrete market;
- b) whether the relevant market includes other substitutable

¹ Notice of Proposed Rulemaking and Order, In the Matter of Amendment of the Commission's Rules Regarding the 37.0-38.6 and 38.6-40.0 GHz Bands, ET Docket 95-183, RM-8553; Implementation of Section 309(j) of the Communications Act -- Competitive Bidding, 37.0-38.6 and 38.6-40.0 (PP Docket No. 93-253). Hereinafter, 37-39 GHz Notice.

spectrum; and,
c) whether the relevant market includes other substitutable technologies such as fiber optics.

We will show that the set of services made available by 37 and 39 GHz licensees is in no meaningful economic sense a discrete and relevant market. Further, we will establish, sufficiently for the Commission's purposes in this proceeding, that the relevant market is a large and substantial one that clearly embraces services provided by carriers using other parts of the spectrum and other non-radio technologies such as copper, coaxial cable and fibre optic links. Our understanding of the plans of potential licensees and analysis of principles of relevant market definition from the competition policy arena make clear that services provided by licensees in the subject bands will have to contend in a vigorously competitive marketplace with experienced, well capitalized and otherwise competent rivals.

Furthering the line of inquiry set out by these three questions, the Commission also solicited comments on "spectrum caps" and "spectrum cap formulas" that might be used to impose limitations on spectrum ownership in the subject bands. The proposed ownership limitations would be structured by defining the size and number of channel blocks granted to each licensee. Anticipating its evaluation of the comments responsive to the above questions and its subsequent findings, the Commission conditionally proposed to impose such limitations and solicited comments on its proposal. Specifically, the Commission requests comments on the following contingencies:

- a) In the event it finds that the 37 and 39 GHz service represents a discrete market, the Commission solicits comments on its proposal to impose a specific ownership cap limiting each licensee to six of the 28 paired channel blocks and to two of the four unpaired channel blocks in each BTA in the combined 37-40 GHz band; and,
- b) In the event it finds that the relevant market is defined to include substitutes (from services based on other technologies or from use of other parts of the spectrum), the Commission solicits comments on the appropriate level (and structure) of any spectrum cap designed to limit ownership and force multiple ownership within the band.

Thus, the Commission has set forth a two stage inquiry for determining whether and to what extent it should impose ownership restrictions on licensees in the band. The first stage requires specification of the "relevant" market and the second examines the need for, or public benefits from, imposing different forms of spectrum ownership caps. For purposes of determining the relevant market; determining whether it should impose ownership limitations; and determining the structure of such limitations, the Commission notes that its goal is to "meet the needs of broadband PCS licensees, as well as the needs of other competitors in the wireless marketplace."

The purpose of this statement is to set forth economic principles and analyses responsive to the Commission's two stage inquiry: a) define the relevant market and b) determine the need for ownership limits, as set forth above. In what follows we shall:

- a) Summarize current guidelines and methods for determining the "relevant" market in the context of the broad requirements of competition policy;
- b) Assess the extent, intensity and likely "effectiveness" of competition in the relevant market without proposed ownership restrictions; and,
- c) Assess the impact of ownership restrictions on "effective" competition and the rate of investment and infrastructure development.

We will develop the basis for concluding that the market already provides, and will in the future provide even more, relatively close substitutes for the services planned by current and prospective 37-39 GHz licensees and, accordingly, there is no sufficient reason for the Commission to impose rigorous and counterproductive ownership restrictions. Doing so is not necessary and may well dampen the development of service in these bands by increasing investment risk, the cost of capital to potential licensees and the cost to users of obtaining these services.

II. RELEVANT MARKET -- COMPETITION POLICY PRINCIPLES

The text of the Commission's Order indicates, at least indirectly, that its interest in correctly defining the relevant market is derived from a broader, contingent concern it has about the adequacy of market competition, under different licensing regimes, to protect consumers of services provided by 37-39 GHz licensees. Specifically, the Commission expressed that its goal:

"...is to ensure that there are an adequate number of licenses available to meet the needs of broadband PCS licensees, as well as the needs of other licensees in the wireless marketplace.²

We have taken this general expression of concern for assuring an "adequate number of licenses" to reflect a more specific Commission objective of assuring that there is sufficient competition to guarantee fulfillment of user needs; and, that the sufficiency of competition can be approximately measured in the first instance by considering the number and strength of sellers in the relevant market.

² 37-39 GHZ Notice, p. 54, para, 112.

It has long been established in the relevant economics literature and in both regulatory and antitrust policy proceedings that the central element of the definition of the relevant market is product [service] substitutability as perceived by users.³ Firms producing products [services] that are closely substitutable are regarded as strong competitors, while firms producing those that are not closely substitutable are regarded as weakly competitive. The relevant product market includes all products that are reasonably close substitutes and excludes those that are not. Producers of goods [services] in the same relevant market are regarded as effective competitors and effectively not competitive with those outside the relevant market.

The concept of substitutability of one service for another, and the resulting intensity (and effectiveness) of market competition, is both relative and somewhat subjective. In a very important sense, every service competes with every other service for the limited budgets of potential consumer and business buyers. In another sense, every service is unique. In between is a range of substitutability among products that is sufficiently close to warrant their being included, for competition policy purposes, in a "relevant" market.

The practical task of defining the relevant market is one of making certain that the definition is broad enough to include reasonably close substitutes, the presence of which will create competitive pressures and prevent firms from earning "supernormal" profits, while excluding those services that are insufficiently substitutable and thereby fail to exert discipline on other producers and prices of other services in the market.

In previous evaluations of the competitiveness of different telecommunications markets, the Commission has had several occasions to review principles for determining the relevant market and to apply these principles in making rules to promote the public interest. A directly pertinent recent expression of its views on the relevant market can be found in the Commission's directions for defining the relevant market for local exchange carrier services in the very same geographic areas to be served by 37-39 GHz services providers. There the Commission's views of relevant market definitions were drawn from the approach relied on by U.S. antitrust

³ For a good treatment of the historical development of "reasonable interchangeability" by users of products/services as the bedrock of the standard for relevant market definition, see J.J. Simons and M.A. Williams, "The Renaissance of Market Definition", *Antitrust Journal*, Winter 93, vol. 38, no. 4 (pp. 805-20). While the discussion there focuses on landmark Supreme Court cases and standards, it is cast clearly in the language of economic analysis as well. The theme of the discussion is expressed by the following view expressed by the Supreme Court:

"For every product, substitutes exist. But a relevant market cannot meaningfully encompass that infinite range. The circle must be drawn narrowly to exclude any other product to which, within reasonable variations in price, only a limited number of buyers will turn; in technical terms, products whose cross-elasticities are small. (Times-Picayune Publishing Co. v. United States, 345 U.S. 594, at 612, n. 31.)

enforcement agencies -- the Department of Justice and the Federal Trade Commission -- and guidelines jointly published by those agencies.⁴

The DOJ/FTC market definition guidelines recognize the existence of a continuum of product [service] substitutability ranging from very close substitutes (virtually identical products) to very poor ones. The guidelines imply that firms within the relevant market will recognize the extent to which the products of other suppliers may be substituted should they choose to raise price. In the words of the guidelines, as cited (in a slightly different form) by the Commission, a relevant market is defined as:

"[The smallest] group of products, and in a geographic area in which it is produced, such that a hypothetical profit-maximizing firm...that was the only present and future producer or seller of products in that market likely would impose at least a 'small but significant nontransitory increase in price'.⁵

To provide further guidance applying this not all together bright guideline, the Commission elaborated somewhat and noted: "...several of our proposals may require us to evaluate the competitiveness of specific markets. To make such determinations, it is necessary to define "the relevant market". The Commission then drew on traditional economic analysis of relevant markets and observed that: "A relevant market is typically defined to encompass commodities that are easily substituted for each other and may be verified by measuring the cross-elasticity of demand."⁶

⁴ See, Second Further Notice of Proposed Rulemaking in CC Docket No. 94-1, Further Notice of Proposed Rulemaking in CC Docket No 93-124, and Second Further Notice of Proposed Rulemaking in CC Docket No. 93-107, pp. 52-57. (Hereinafter, LEC Price Cap Review). The antitrust approach to defining the relative market is spelled out in the Department of Justice/Federal Trade Commission Horizontal Merger Guidelines. These are reprinted in 4 Trade Reg. Rep. (CCH) beginning at paragraph 13,104. Hereinafter, DOJ/FTC Merger Guidelines. See also references in LEC Price Cap Review, p. 53.

⁵ LEC Price Cap Review, p. 53. The guidelines ultimately relate to the substitutability of services included in the relevant market. The task is to include "close" substitutes and to exclude "poor" ones. The guidelines, as set forth by the Commission here, express this somewhat obliquely, but nonetheless authoritatively: "If the alternatives were [in the original relevant market definition], in the aggregate, sufficiently attractive at their existing terms of sale, an attempt to raise prices would result in a reduction of sales large enough so that the price increase would not prove profitable, and the tentatively identified product group would be too narrow."

⁶ LEC Price Cap Review, p. 52. Coefficients of cross elasticity of demand measure the responsiveness of changes in the quantity demanded of a certain good [service] to changes in the price of another. Substantial sensitivity implies high cross elasticity and closeness of substitutability by users of one service for the other. The Commission noted that the relevant market can be defined by either reliance on expert judgment or on formal econometric studies that measure the long cross-elasticities of

The key point in the Commission's discussion in the matter related above is its focus on the demand side of the market for indicators of substitutability and clues for inclusion of different services in the relevant market. There is no mention of supply side factors. This approach follows standard practice closely. As of the DOJ/FTC market definition guidelines stated the principle crisply and without ambiguity: "Market definition focuses solely on demand substitution factors -- i.e., possible consumer responses."⁷ This is the correct standard for determining the relevant market in which services will be provided by 37-39 GHz licensees. But, before applying the standard to the questions raised by the Commission, it is important first to specify accurately what services will be provided by these licensees.

III. SERVICES PROVIDED BY 37-39 GHZ LICENSEES

The Commission's Notice appears to expect that the principal use of the bands will be for point-to-point microwave operations in support of mobile radio applications (cellular, PCS and other commercial or private mobile services). The Commission noted in particular use of the bands to support provision of "backhaul" and "backbone" communications infrastructure linking cell sites with mobile switching offices and connecting mobile switching offices to each other or with a telco central office.⁸

To assure that the relevant market is correctly defined, it is critical to recognize that the Commission's current conception of the markets to be addressed and services to be offered by 37-39 GHz licensees is much narrower than indicated by the business plans and expectations of licensees. Potential licensees anticipate that the bands will be used for provision of a broad array of local services and will not be limited to mobile (PCS and cellular) trunking infrastructure. Indeed proponents indicate that the end uses and end users being targeted are those now identified as "broadband" local loops capable of supporting various voice, video and data transmissions.

Thus, proponents should be regarded as potential entrants into the local communications market and considered as providers of a variety of "last mile" services in direct competition with several incumbents and prospective entrants who will be providing trunking and/or local distribution services to other carriers for resale and directly to end users on a retail basis.

supply or demand. Several factors weigh against the use of formal econometric studies in this proceeding, including several very difficult conceptual issues related to measuring cross elasticities for services with little or no market history. Thus, the Commission will very likely find itself obliged to exercise its own expert judgment about the likely substitutability of the subject services with others now and in future likely to be in the marketplace.

⁷ DOJ/FTC Merger Guidelines, (mimeo), p. 3.

⁸ 37-39 GHz Notice, p. 2, para. 1.

Such services will include short-haul radio transmission of DS-1 and T-1 circuits (and fractionals or multiples) to incumbent local exchange companies (LECs), new entrants CLECs (competitive local exchange companies), private entities (so-called bypassers), interexchange carriers and cellular services providers. In addition to these trunking type services, proponents anticipate providing communications capacity and services directly to end users and may, as market demand materializes, connect them to the public switched network. While the composition of output of 37-39 GHz licensees and the relative importance of trunking and local loop type services remains to be determined by market forces, the intention of these licensees appears to be to compete vigorously to win sales in submarket for both types of services.

IV. RELEVANT MARKET PRINCIPLES APPLIED TO 37-39 GHZ LICENSEES

Given the context spelled out above in the discussion of the principles of relevant market definition and the services planned to be offered by prospective licensees, we are now prepared to address the three specific "relevant market definition" issues by the Commission.

Question 1. Does the 37 and 39 GHz service represent a discrete market?⁹ The answer is unambiguously no. The DOJ/FTC guidelines correctly point out it is ultimately the attitude of users that determines the substitutability of one service for another. The guidelines are expressly clear on this point.

Market definition focuses solely on demand substitution factors -- i.e., possible consumer responses.¹⁰

It has long been recognized in the antitrust literature, in previous antitrust guidelines and the Commission's own policy rationales that services provided by different technologies may nevertheless be in the same market for purposes of defining the relevant market. The test applied either formally or informally by the Commission is whether end users regard the services as substitutable.

Question 2. Does the relevant market include other substitutable spectrum? Yes, of course. The rationale is similar to that spelled out above. The relevant market includes all services which users consider reasonably close substitutes. To the extent that services made available from other spectrum based, radio technologies are perceived by users to be substitutes for the subject services, they are in the same market and their provision provides a check on the market behavior of other providers.

⁹ In its discussion of possible ownership limitation, the Commission refers to both a "discrete" market and to a "relevant" market. We take these to be synonymous, fully interchangeable terms and will use the latter consistent with the economics and antitrust policy literature.

¹⁰ DOJ/FTC Merger Guidelines, (mimeo), p. 3.

There are numerous examples on this point. Satellite services provided by systems assigned to different bands are not generally regarded as being noncompetitive with each other by virtue of their differentiated location in the spectrum. Satellite services users perceive value in the use of the service and not the frequencies being used. While there may be cost and service quality differences resulting from use of different bands, this fact does not prevent users from evaluating the differences at the margin in the context of their own needs and making choices among the alternatives. In a similar fashion, the spectrum base of many other services -- both terrestrial and satellite -- are transparent to end users who are interested in any event only in the ability of the service to meet current business needs or consumer preferences. Like commercial radio listeners who are largely indifferent to the location on the spectrum of different licensed broadcast stations, users more generally of spectrum-based telecommunications services consider their value without reference to spectral location of the transmitters.

Question 3. Does the relevant market include other substitutable technologies such as fiber optics? For reasons discussed above, the relevant market need not, and usually should not, be limited to a particular set of technologies. Again, the test is not production technique or the identity of particular inputs, but the substitutability of the services in uses valued and specified by customers.

The Commission has widely considered the outputs of alternative technologies and suppliers as effectively competitive. Cable television, direct broadcast satellite video services, "wireless" cable systems are perceived by many consumers and by the Commission to be substitutable services and therefore part of the relevant local video distribution market. To be sure, the services availed by different technologies are not identical and may not carry the same price. But, that is not required if business or residential users evaluate the differences at the margin and after relating those difference to their own needs and preferences they them closely substitutable.

Traditional market definition analysis requires that services from different technologies be included in the relevant market for purposes of competitive analysis, absent a finding that the "bundle" constituted by the combination of price and service characteristics availed by a particular technology is so different that users do not regard it as substitutable for the price/service "bundle" from another technology. Again, the test is substitution in use, not substitution in production method or input choices.¹¹

¹¹ In this context we call attention to the fact that for purposes of determining competition in the long distance telecommunications market over which it has jurisdiction, the Commission has adopted "all interstate, domestic interexchange service" as the definition for the relevant market. In doing so it has made no supply-side distinctions among such services that may be provided by different radio technologies and spectrum locations, nor among wireline- and wireless-based services. Moreover, in that market, the Commission determined that AT&T lacked "market power". Having found such, the Commission moved to eliminate the bulk of its traditional "monopoly" regulations. See, In the

V. ALTERNATIVE SERVICES AND SUPPLIERS IN THE RELEVANT MARKET

We have used the guidelines to establish that the relevant market, for purposes of the issues in this proceeding, should include substitute services provided by market suppliers using other parts of the radio spectrum and other non-radio technologies. It remains though to determine which particular services and which particular firms should be included in the relevant market. The Commission's discussion in the LEC Price Cap Review proceeding is helpful in this regard. There, the Commission suggested continued use of the guidelines to identify the firms that are to be included in the relevant service market.

"Under the Guidelines, once a properly-defined market is identified, current market participants are identified. To this list are added 'uncommitted entrants', or firms which would be likely to enter within one year and without significant expenditure of significant sunk costs of entry or exit in response to a small but significant and nontransitory price increase.¹²

Thus, the guidelines, and the Commission's interpretation of them, require identification of firms providing substitutable services included in the relevant market, as well as potential entrants that might be induced to enter, should incumbents in the relevant market attempt to exercise market power by raising prices.

In attempting to apply the guidelines and the Commission's interpretation of them and as discussed above, we can find no basis in competition policy or economic theory for excluding from the definition of the relevant market services produced from other radio technologies with different spectral locations, nor for excluding services using non-radio, wireline technologies. Thus, current market participants in the relevant market under consideration here must be taken to include both current and prospective (likely to enter within one year) firms that do or will produce the types of services projected by the business plans of licensees. As indicated above, these services include both trunking and local distribution services over digital paths to residence, business and institutional customers.

Based on competition policy principles and past Commission practice, it appears that the relevant market, for purposes of this proceeding, will embrace and include providers of telecommunications trunking services and distribution services in

Matter of Motion of AT&T Corp. to be Reclassified as a Non-Dominant Carrier, FCC 95-27; Adopted October 12, 1995; Released October 23, 1995; p. 1.

¹² LEC Price Cap Review, p. 53.

the local market.¹³ As such, the relevant market includes trunking services provided by interexchange carriers, incumbent local exchange carriers, competitive access providers (competitive local exchange companies, or CLECs), and assorted other specialized or private providers of trunking services. For local loop type services, the relevant market includes the local distribution services of the local exchange companies and CLECs.¹⁴

These companies and the services they provide appear to be sufficiently close substitutes for the services to be provided by 37-39 GHz licensees to energize users to react to "small but significant nontransitory increase[s] in price[s]" for voice and data services charged by the licensees. Similarly, the existence of cable television providers, wireless cable providers, broadcasters and other participants in the local video marketplace should be sufficient to exert substantial market discipline on prices for video distribution services offered by licensees.

VI. NEED AND BASIS FOR OWNERSHIP RESTRICTIONS (SPECTRUM CAPS)

In order to address the need for ownership caps and to respond to the Commission's solicitation of views under various potential definitions of the relevant market, it is helpful first to distinguish between "intermedia" and "intramedium" competition. The foregoing discussion indicates clearly that services provided by other carriers, using other technologies, are likely to be sufficiently close substitutes for the subject services -- using the 37-39 GHz technologies -- that providers of subject services will be constrained by effective "intermedia" competition. This implies that a given supplier of services using the 37-39 GHz technologies may be sufficiently constrained by other substitutable services provided by firms using other technologies, so that it is not necessary to structure the rules to ensure a large number of suppliers using 37-39 GHz technologies and thereby ensuring strong "intramedium" competition.

The Commission solicited comments on its proposal to impose a specific ownership cap limiting each licensee to six of the 28 paired channel blocks and to two of the four unpaired channel blocks in each BA in the combined 37-40 GHz band, in

¹³ The Commission did not inquire about the relevant geographical market and may have simply assumed as we do that the relevant geographical market is a local access and transport area (LATA) or something close to that. To be sure, the geographic dimension of this market, a services market, is not critical, inasmuch as the services cannot be transported from one local area to another as is the case with products.

¹⁴ In this context, and consistent with the DOJ/FTC Guidelines, we should note that potential entrants into the market should be considered as part of the relevant market. Thus, the Commission must determine whether cable companies provision of voice; telco provision of video; and interexchange carrier provision of local services and other possibilities opened by the new Telecommunications Act of 1996 should be recognized as part of the relevant market.

the event it should find that the 37 and 39 GHz service represents a discrete market. Inasmuch as we have previously concluded that there is no basis for limiting the market definition narrowly to embrace only users of 37-39 GHz technologies, there is no basis in competition policy for the proposed (six paired channel blocks and two unpaired channel blocks) ownership limitation.

The discussion above supports a finding that the relevant market should be defined to include substitute services that may be made available by firms using other non-radio technologies and radio technologies located elsewhere in the spectrum. The Commission anticipated the possibility of such a finding and solicited views on the appropriate level (and structure) of any spectrum cap designed to limit ownership and to force multiple ownership within the band.

Determining whether and what extent such ownership limitations should be imposed requires valuing at the margin associated costs and benefits from doing so. The principal potential benefit from fragmenting ownership in the bands would be the value to users of additional supplier options and intensified competitive pressure from "intramedium" competition. If the Commission should find that "intermedia" competition to 37-39 GHz technology-based suppliers from other carriers -- the IXCs, the LECs, CLECs, and others -- is not sufficient to remove market power; to discipline their pricing and other aspects of market conduct; and, otherwise to protect users, then there may be some value from fragmenting ownership to increase the effectiveness of "intermedia" competition by increasing "intramedium" competition.

However, it is difficult, *a priori*, to make the case that the subject 37-39 GHz technology-based carriers will have market power to raise price sufficiently to earn "supernormal" profits if in fact, as we indicated above, they will be competing with strong established firms providing closely substitutable services. Thus, absent a showing of market power based on limitations of available substitutes as reflected by low cross-elasticities of demand between 37-39 GHz technology-based services and other trunking and distribution services available in the LATA, we are unable to find a basis in competition policy for imposing ownership limitations.

Moreover, there may be costs to imposing such limitations. Ownership limitations of the form suggested by the Commission's Notice will very likely increase the uncertainty and risk associated with investing in the new technology and, accordingly, the cost of capital to entrepreneurs will be higher. The effect will be to slow the rate of technological innovation; diminish the pace of building out new systems; and, increase the cost of service to users. In addition, fragmenting ownership in these blocks may deny potential operators the benefits of economies associated with the scale and scope of start-up operations.

In short, fragmenting ownership of the bands will not clearly provide significant consumer benefits from increased market rivalry and doing so may result in increased costs and foregone efficiencies.

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In 1975 he became Senior Economist in the White House Office of Telecommunications Policy. He subsequently served as Chief Economist and Chief of the FCC's Common Carrier Bureau where he was the architect of Commission orders directing reorganization and reregulation of the telephone industry, satellite businesses, and the telephone equipment sector -- from lowering entry barriers to prescribing market-competitive ratemaking and accounting practices.

After leaving the FCC, and spending two years on Capitol Hill directing a joint Congressional investigation of application of the antitrust laws to the motor carrier industry (Executive Director of the Motor Carrier Ratemaking Study Commission), he went to Wall Street in 1983 to join Lehman Brothers where he was Vice-President in the Telecommunications Investment Banking group.

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