capable of transporting no more than four DS-1s (about 6 mbps) using approximately 15 MHz of the paired 50 MHz channel. That is equivalent to about 1 bit per every 3 Hertz. Even the DS-3 radios, which will transport 45 MHz over the 50 MHz channel, will fall slightly short of the proposed efficiency goal of 1 bps/Hz. Accordingly, imposing a 1bps/Hz would instantly obsolete perfectly functional, practically brand new, unamortized equipment at great and unnecessary cost.[22]

Furthermore, it is likely that there will be applications and 38 GHz transceivers for which the highest use would be at a lower bit per Hertz ratio. ART, and some of the manufacturers with whom it is working, are considering using Code Division Modulation ("CDM") for future generations of radios. CDM could be more efficient overall and certainly more tolerant of interference. CDM would appear to be the right choice as the number of links and licensees increases. However, CDM, by its nature, would be incompatible with the 1bps/Hz standard. In addition, with the introduction within the next several years of radios that are compatible with Asynchronous Transfer Mode ("ATM") operations, transmitting high speed packets of data, the very concept of "channels" becomes increasingly amorphous and obsolete.

Finally, much of the early demand is, and will continue to be, for four or fewer DS-1s. Thus, regardless of the capacities of the radios, the amount of traffic in the early years and over many of the paths will fall short of one bit per Hertz.

ART knows of no approach to the "full loading" issue that is feasible. The

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[22] For this reason, if the Commission nonetheless decides to impose a system efficiency of 1 bps/Hz then it must grandfather existing equipment, whether in the field, in the warehouse or in production, for the useful life of the equipment.

industry does not lend itself to requirements phrased in terms of number of customers or circuits over a given channel. In order to penetrate the market and because the early adopters are more likely to be requesting DS-1s (1.544 mbps) than multiple DS-1s or DS-3s, the majority of the first sales will be of DS-1s. The initial installations then *necessarily* will, in many cases, be a single or several DS-1s operating within an entire paired 50 MHz channel. Although the 38 GHz provider has all of the incentive necessary to pump more channels down the same wireless pipe, it has no control over when such demand will materialize as to a given link.

In fact, it is this very incentive that is the reason that there is no need to impose an "efficiency" standard. The economics of the 38 GHz industry are a sufficient driver to ensure that each link is utilized as efficiently as demand permits. Each radio represents a substantial fixed cost that is a wasting asset. The 38 GHz provider will be more than sufficiently motivated to send as much traffic as possible down the same channel and the same link. Once the radios are installed, the need to amortize their cost as quickly as possible, will drive the licensee to route as much traffic through them as it can.

In fact, there are radios under development, which should be available within the next three to five years that will exceed the proposed standard of 1bps/Hz. When they become available the licensees will have all of the incentive needed to upgrade as rapidly as the need to amortize their existing equipment dictates.

In short, this is a classic case in which the marketplace is a sufficient, and certainly the most efficient, regulator. Consequently, consistent with the Commission's general recent approach -- one that ART urges be applied to all technical questions

regarding 38 GHz -- the Commission should not impose an *a priori* efficiency standard.

Concerns Over Technological Stagnation Are Unavailing. The suggestion has been made that stringent construction requirements would lock 38 GHz providers into outmoded technology. This is an oft-repeated refrain that experience teaches is misplaced.

It is certainly true, as we noted above,[23] that 38 GHz technology is evolving rapidly and that the millimetric wave industry is extraordinarily dynamic. But this is endemic to the entire wireless industry. Rapid technological advancements are also characteristic of the LMDS, PCS, SMR and satellite industries; yet, the Commission imposed significant construction requirements in each of those cases. [24] The argument that the evolution of equipment should counsel against a construction requirement has no end -- wireless technology will continue to evolve rapidly. To refuse to impose a construction requirement on this rationale would ensure that no such requirement could ever be imposed. In any event, the approach that ART has suggested -- the gradual phase-in of the construction requirement over five years -- grants more than sufficient latitude to introduce new technologies on a market-driven schedule.

A "Substantial Service" Standard Would Be Insufficient. The *NPRM* notes the auction legislation requirement that the Commission include "performance requirements, such as appropriate deadlines and penalties for performance failures" for channels awarded by auction.[25] The *NPRM* suggests, nonetheless, that, instead of a quantitative standard, the

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[23] *Supra* at pp. 7-9.

[24] 47 CFR §§24.103, 24.203; 60 Fed. Reg. 48,913 (1995), 78 RR 2d 1641, 1652; 9 FCC Rcd 5936, 6008-9, 76 RR 2d 202, 240.

[25] *NPRM* at para. 98, quoting Section 309(j)(4)(B), The Communications Act of 1934.

Commission might be better advised to adopt a "substantial service" standard.[26] This is not an efficacious proposal.

Regardless of the extent of satisfaction with a "substantial service" standard in other situations, it would be largely impotent here. It would suffer from the same kind, albeit perhaps not the same degree, of ambiguity as does the present "operational" standard. Due its generality and ambiguity, the present "operational" standard is effectively unenforceable. So too would be a "substantial service" standard -- unless the Commission defined "substantial service" to the same degree of detail as the specific-number-of links-per-area-and-time that ART is proposing as a substitute for "substantial service." In the latter case, the Commission might as well adopt the strict standard directly.

In summary, the prophylactic steps needed here must be stronger if the Act's admonitions and the public interest in putting the 38 GHz frequencies to work to satisfy the immediate demand are to be served.

The Same Construction Standard Should Be Applied To Auctioned Channels As Non-Auctioned Channels. As noted above, the *NPRM* concludes that construction standards are mandated by the Act for auctioned channels. However, by mentioning only the "substantial service" standard, the *NPRM* appears to conclude that a lesser construction standard could be adopted in the case of auctioned channels.[27] ART strongly disagrees and

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[26] The *NPRM* raised this possibility in its discussion of buildout requirements for auctions. *Id.* at text accompanying note 121.

[27] There is no cross reference between the auction section discussion of buildout standards and the discussion of buildout requirements in the 39 GHz section. *Compare*

urges the Commission to adopt the exact same construction standard for auctioned channels as channels not obtained by auction, whether by application or transfer.

Granted, the Commission can have much greater confidence that those who pay for licenses in an auction will build as rapidly as their business plan and demand permits. If there were no competing licensees with construction requirements, an ambiguous, easily-satisfied construction standard might be appropriate. In an auction context, the Commission would not need to be overly concerned with enforcement.

In these circumstances, however, the competition between the auctioned and non-auctioned licensees requires the Commission to impose the same construction requirements on each group. If the auctioned licensees were to enjoy a more lenient standard, the non-auctioned licensees would face an intolerable handicap. The latter, including the current 39 GHz permittees and licensees, would have a substantially harder time raising capital in the public and private markets. This would not only severely injure the existing pioneers it would dampen the very competition that the Commission seeks. Accordingly, the same buildout requirements need to be applied across the entire 38 GHz spectrum regardless of the means by which the licensee obtains its channels.

Conclusion. ART submits that the record is clear that a much stiffer construction requirement is necessary to avoid warehousing of spectrum and to make channels available to those who have the means and the intent to put the spectrum to its highest and best use at their earliest opportunity. The ART proposal, outlined above, meets the twin criteria of (1) a sufficiently strict standard to deter warehousing while (2) easily obtainable by serious

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NPRM para. 98 *with id.* at paras. 106-107.

operators with a sound game plan.

V. A SPECTRUM CAP IS INAPPROPRIATE.

*A*RT agrees that the Commission should take steps to ensure that "there are an adequate number of licenses available to meet the need of broadband PCS licensees" as well as others.[28] ART does not agree that a spectrum cap is necessary either to satisfy the infrastructure needs of PCS licensees or to prevent an oligopoly that would drive up prices and otherwise have anti-competitive effects. As we demonstrate below, not only will the market of which 38 GHz services are a part (the local exchange market) be more than sufficiently competitive, a spectrum cap could severely handicap 38 GHz providers in their competitive activities against the established LECs.

PCS Licensees Will Have Sufficient Access To Backhaul Links. First, as to whether the broadband PCS licensees will have an adequate number of infrastructure licensees available, they have, and will have, multiple means of satisfying their needs. Initially, it needs to be pointed out, that many of the PCS providers could have applied for 38 GHz licenses before the freeze, if ownership of a 38 GHz license was central to their plans. In fact, a number of PCS licensees and prospective licensees did just that.[29]

The PCS licensees who missed out on the first rounds of grants will have more

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[28] *NPRM* at para. 112.

[29] American Personal Communications, now part of Sprint Spectrum, applied, *before the PCS auction was conducted,* in several markets, including Richmond, Charlotte, Washington, D.C. and Philadelphia, in which it thought it might prevail at the auction, GTE applied in many areas throughout the country citing possible use for mobile infrastructure, though it later withdrew its applications. AT&T applied in multiple major markets evidently for mobile uses.

than sufficient opportunity to obtain access to 38 GHz channels in any number of ways. (1) They can purchase their own 38 GHz licenses in the forthcoming auctions. (2) They can purchase existing 38 GHz licensees in the secondary, private market. (3) Or they can enter into channel leasing, joint sharing or similar arrangements with existing licensee. At the present time and most likely until the construction requirement deadlines become applicable in two or more years, there are multiple unbuilt facilities in all of the markets. These facilities should be a ready source of for a multiplicity of affordable and attractive arrangements for the PCS winners. Perhaps most importantly, because the 38 GHz existing licensees are common carriers, they are obligated to provide service to the PCS licensees on a first-come, first-served basis at reasonable and non-discriminatory rates. Finally, there are other frequencies that are suitable candidates for PCS infrastructure in some instances as well as wireline alternatives. The combination of these alternative spectrum acquisition routes is more than sufficient to satisfy legitimate PCS needs.[30]

The 38 GHz Marketplace, Properly Defined To Include Other Local Loop Providers, Will Be Strongly Competitive. Nor is a spectrum cap necessary to ensure that there is a competitive market structure among 38 GHz licensees competing in local

[30] In its discussion of an Alternative Licensing Proposal to auctions, paragraph 103 of the *NPRM* discusses a set aside for broadband PCS. The reasons set forth in this paragraph demonstrating why there is no need for a spectrum cap to protect access to 38 GHz spectrum for PCS backhaul apply equally to the alternative proposed set aside for PCS. In addition, any aside for PCS would raise the question of set asides for other users, creating the possibility of an untoward fragmentation of the spectrum, and would run counter to the Commission's laudable trend toward allowing the marketplace and the licensees to determine the services to be provided.

exchange services.[31] In analyzing this issue, as the Commission notes, the first step is to define the market, and the principal line of inquiry is what, if any, services are substitutable for 38 GHz wireless local loops. The principal thread of analysis is from the demand side of the equation -- that is, which services the customers perceive to be substitutable.[32]

Unfortunately, this analysis is very difficult to undertake at this time, given the present immature development of the market. The market is nascent, with the two operating 38 GHz providers (ART and WinStar) having just begun operations and having penetrated but a fraction of their target markets. ART and WinStar are still experimenting with their range of service offerings and their pricing. Any determination of the boundaries and characteristics of the relevant market at this juncture most likely would be inaccurate.

Nonetheless, were the Commission to undertake a relevant market determination

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[31] The Commission suggests that it might impose a spectrum cap in order to "ensure" an "adequate number of licenses available" for "other competitors" in 38 GHz. *Id.* at para. 112. The Commission does not further illuminate this suggestion. It is impossible to determine whether the Commission had a specific number of service providers in mind. There is no way, other than to leave the resolution to the marketplace or to resort to the traditional antitrust structural analysis, to reach such a determination. In any event, given the one-to-a-market application policy (*see* the Public Notice of September 1994, Mimeo No. 44787 and *NPRM* at para. 111), particularly if enforced, the private marketplace will ensure that there are more than adequate numbers available. Furthermore, as we note below, the amount of usable spectrum available almost certainly will increase significantly in the near term because of advances in band compression techniques.

[32] *See* Statement of Larry F. Darby, Attachment A hereto, March 4, 1996, and citations therein, pp. 3-6 ("Darby Statement"). Dr. Darby quotes with approval the DOJ/FTC market definition guidelines: "Market definition focuses solely on demand substitution factors -- ie., possible consumer responses." *Id.* at p. 6.

at this time, it necessarily would have to conclude that the relevant market for structural analysis of 38 GHz includes all of the other providers and potential providers of one or more local exchange services, as well as the providers of substitutes for point-to-point services. As the operations of ART and WinStar and the pending applications of the vast majority of 38 GHz providers conclusively demonstrate, the principal market is not, as the Commission implies,[33] PCS infrastructure, but broadband local loops.[34] The relevant market then must include all services and service providers that supply, and can supply, local loops that are substitutable under one or more scenarios for 38 GHz local loops.

ART commissioned Dr. Larry Darby, a former chief of the Common Carrier Bureau, to address the Commission's requests relative to the spectrum cap issue. A copy of Dr. Darby's Statement is Attachment A hereto. Dr. Darby states:

> [I]t 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 the 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.[35]

Dr. Darby further finds that the fact that a service is provided over a different technology does not prevent it from being considered a substitute for market definition purposes.[36] Dr.

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[33] *See, e.g., NPRM* at paras. 1, 112.

[34] *See, supra*, pp. 7-9.

[35] Darby Statement at 6.

[36] *Id.* at pp. 7-8.

Darby then concludes that:

> [b]ased upon 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 local markets. 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.[37]

Thus, substitutable services include one or more of those provided by: LECs; CLECs;[38] interexchange carriers who provide their own fiber or wireless connections from their Points of Presence to their customers; cable companies (to an increasing extent);[39] and private microwave licensees. There is simply no way when all of these substitutable services are taken into account that the Commission can reach a conclusion that there is any near term danger that the 38 GHz market can display any monopolistic tendencies. As Dr. Darby states,

> 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

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[37] *Id.* at p. 10.

[38] 38 GHz services will compete principally against the copper plant of the incumbent LECs. In the early years, they will compete to a substantially lesser extent with the CLECs. In many cases the CLECS will be carrier customers of the 38 GHz licensees. 38 GHz wireless services have several advantages over fiber optic cables and will increasingly be used by fiber optic operators to extent the reach of their services to "off-net" customers (ie. to locations where their fiber has not yet been deployed). Compared to fiber optic lines that have yet to be installed, 38 GHz service: (1) is often far less costly to deploy, (2) can be deployed in substantially less time; (3) is readily redeployable without the loss of cognizable amounts of capital; and (4) delivers acceptable telephone quality standards.

[39] *See* Darby Statement at p. 10, first full paragraph.

services will be constrained by effective "intermedia" competition.[40]

Furthermore, it is clearly unnecessary to impose a spectrum cap at this time. Although only two 38 GHz service providers have commenced operations, there are multiple permit holders. Even when the number of independent applicants is reduced by grouping together those applicants who have a personal or business affiliations, there are at least six groups with substantial authorizations and "clear" applications[41] who could form additional operating groups capable of competing effectively against ART and WinStar.

Additionally, it appears likely that the amount of usable bandwidth will expand substantially in the near term. Several startup, as well as existing, manufacturers, are designing 38 GHz radios that use newly-developed compression techniques to increase the effective throughput by a factor of two or three, with further increases likely.[42] Thus, the amount of capacity, which currently is one DS-3 for each paired 50 MHz channel, should increase substantially in the next several years. This increases the likelihood of additional

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[40] *Id.* at p. 10.

[41] The principal groups are: (1) ART (including ART West, Extended, some of DCT Communications and Telecom One); (2) WinStar; (3) Biztel (which has a relationship through options and family or business relationships with more than a dozen applicants); (4) Commco (which has a business or personal relationship with several other applicants); (5) Thomas Domencich and his company Milliwave; (6) Bachow; and (7) Columbia Capital and Columbia Milliwave (in some of which Biztel has an option). GHz Equipment has a number of licenses and applications but these are mostly confined to the western part of the United States. This list omits those authorization holders who have, will have or have evinced an interest in obtaining substantial regional holdings, including at least one RBOC (PacTel), a CLEC (the Intelcom Group through Bay Area Teleport) and AT&T, all of whom are substantial companies in their own right.

[42] An example of advanced microwave technology microwave devices that are on the horizon are is glimpsed in the Harris/Farinon SONET radio, which provides 155 mbps of throughput over a 30 MHz channel in the 6 MHz band.

entrants and increases the options available for specialized licensees such as the PCS providers.

Finally, as Dr. Darby notes:

> there may be costs to imposing [spectrum] 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 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.[43]

We have shown that, given the most likely market definition, combined with the number of applicants and emerging increases in capacity, there is little chance that the 38 GHz market will display monopolistic tendencies in the near term. There is then no reason to impose a spectrum limitation, particularly in light of the associated tangible and intangible costs. If, at some time in the future, the market should trend toward concentration, there is more than sufficient time for the Commission to impose spectrum limits through the rulemaking process and enforce them through the transfer process.

VI. RESTRICTIONS ON TRANSFERS ARE UNNECESSARY.

The Commission does not propose to impose limits on the transfer of control or assignment of licenses, except in some instances, not germane here, where licenses are obtained by auction. In paragraph 121, the *NPRM* "stress[es]" that the Interim Licensing Policy will not apply to the transfer or assignment of applications, which "will continue to

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[43] Darby Statement at p. 11.

be processed under existing procedures." And in the auction discussion, the Commission states:

> We also believe that license transfer restrictions may reduce the ability of licensees to put this spectrum to its highest valued use and therefore are not proposing such requirements, except for small businesses receiving the benefits of our proposed bidding credits and installment payments.[44]

Transfer Restrictions Would Be Counterproductive. There is no reason to restrict transfers otherwise. It is important that the private marketplace continue to function rationally. This requires freedom to transfer, merge, enter joint operating agreements, lease channels on a unilateral or reciprocal basis among licensees, etc. Unrestricted transfers, acted upon quickly, are necessary in order to ensure that the previous licensing process, bereft of the discipline of auctions, does not interfere with the highest and best use of the 38 GHz licenses.

Transfer Restrictions Would Further Penalize Those Who Abided By The Spirit And The Letter Of The Commission's Rules. This freedom to transfer without regulatory interference is particularly important in view of the reactions of some of the applicants to the Commission's rules and policies. Their behavior had the effect of unfairly skewing the grant process. Those who abided by the spirit and letter of the Bureau's September 1994 Policy Statement and the coordination process in Section 21.100 of the Rules received substantially fewer grants than those who did not and who carefully coordinated filings by "friends and family" so as to receive multiple grants in the same markets.

Because of the unexpected floodtide of applications, those operators, such as

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[44] *NPRM* at para. 97.

ART, who were following carefully-crafted plans to gradually build out their networks extending over time from the major urban areas where they believed demand would develop first to the less commercially dense areas, have been frozen out of a number of markets in which they have present demand. In many cases, channels became unavailable in major part because of applications for multiple channels and multiple applications by related entities.

ART, and some of the other applicants, such as Milliwave, reduced the number of channels they had coordinated and filed for from what they believed might be required by future demand in response to the Bureau's September 1994 Policy Statement. The Policy Statement stated that "[n]ormally, only one channel block will be authorized per applicant per geographic area."[45] Several other groups did not reduce the number requested. Their applications are still pending. In some of these cases, the applications are not mutually-exclusive with other timely-filed applications and therefore may be grantable despite the Policy Statement.

In a large number of cases, applicant groups reacted to the Policy Statement by filing other applications in the same market through spouses, relatives, business associates and investors and their associates. These applications were carefully coordinated through a central entity so as not be mutually-exclusive with each other, even though in most cases they proved to be mutually-exclusive with one or more third parties. ART, and others, were unable to apply for an "open" channel in many markets because these filing groups had occupied all of the "open" channels. As a primary result of this coordinated filing by

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[45] *See NPRM* at para. 111, quoting the Policy Statement.

"affinity" groups, ART has over sixty pending applications, most of which are for markets below the fifty largest, which are mutually-exclusive with one or more other applicants and therefore not grantable under the Interim Processing Policy.

ART has considered the most efficient means of solving the situation created by the multiple filers and the affinity group filings. As we stated above, the imposition of stiff construction requirements should free up for auction a number of the channels filed by these groups. However, the impact of a new construction requirements would not be realized for at least twenty-four months, considering the delay until adoption of the new rules. In the meantime, in order to progress their market plans, the existing operators, as well as those on the threshold, need the freedom to quickly, and with minimal transactional costs, effect various private party transactions. The answer is to allow the free play of the secondary market, aided by expeditious Commission approvals.

VII. THE COMMISSION SHOULD ADOPT LIBERAL AND FLEXIBLE TECHNICAL RULES.

There are two overriding reasons that argue for adoption of the fewest technical rules that are consistent with interference-free operations. First, is the well-proven difficulty that the Commission has in devising technical rules that are not rendered obsolete the moment the ink is dry. Increasingly in recent years, the Commission has come to the realization that it must not impede technological advances that by their nature cannot be foreseen, and that the only way to do this is to impose only those few regulations on design and operations that are the minimum necessary to control

interference.[46] At the same time, the Commission has recognized that, in interference matters, it is best to delegate the first line of enforcement to private negotiations shepherded by industry forums.[47]

Second, the more detailed the technical rules for a given service, the greater the impediment to innovation. This is nowhere more true than in millimetric microwave services. Although, as we discussed earlier, there have been astounding developments in the art of millimetric microwave in recent years, we believe the best is yet to come. Given the nature of millimetric microwave and the on-going miniaturization and technical breakthroughs in related electronic components, there is every reason to expect an order of magnitude reduction in price and increases in functionality over the next three to five years. The effect upon the marketplace and the availability and affordability of wireless broadband services should be dramatic. But these developments are dependent, to a very large extent, upon maximum leeway in the Commission's technical constraints.

For the most part the *NPRM*'s proposals are consistent with this paradigm. The Commission sensibly rejects most of the straightjacket that the Telecommunications Industry Association ("TIA") petition, as amended, would have placed around the nascent

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[46] *In the Matter of Amendment of Parts 2 and 22 of the Commission's Rules to Permit Liberalization of Technology and Auxiliary Service Offerings in the Domestic Public Cellular Radio Telecommunications Service*, 3 FCC Rcd 7033, 7035-36 (1988), [hereinafter *Cellular Permit Liberalization*]; Reed E. Hundt, Remarks at Hearing Aid Compatibility Summit (January 3, 1996) (transcript available from Commission) [hereinafter *Remarks*]; *LMDS, supra* note 15, at paras. 118-121; *NPRM* at para. 115.

[47] *Cellular Permit Liberalization, supra* note 38, at 7035-36; *LMDS, supra* note 15, at paras. 118-121; *Remarks, supra* note 38;

38 GHz providers.[48] The Commission's tentative conclusion is that "only those technical rules required to minimize interference between channel blocks and between service areas are needed."[49]

ART wholeheartedly endorses this approach. It is firmly grounded in the wisdom that the Commission has gained after sixty years of trying to pre-structure advances in technology. Unfortunately, the Commission's proposals are not entirely consistent with its preamble.[50]

There Is No Need To Specify Frequency Tolerance Limits. The Commission does correctly propose to shy from specifying a maximum transmitter power or directional antenna standards. It nevertheless proposes to regulate frequency stability and to reduce the current frequency tolerance limits. The *NPRM* would limit the frequency tolerance to 0.001%, significantly stricter than the present limit of 0.03%.[51]

ART's operational equipment does satisfy the proposed limit. Nevertheless, ART recommends that the Commission not adopt the more stringent requirement. Indeed, ART is convinced that the industry would be best served by not specifying any frequency tolerance limits.

A frequency tolerance limit is not necessary from an interference protection

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[48] *See NPRM* at paras. 113-115.

[49] *Id.* at para. 115.

[50] ART addresses the issue of system efficiency in Section IV, *infra*. ART urges the Commission not to adopt the 1 bps/Hz standard, but, if it does, to grandfather the existing equipment and operations, which do not meet that standard.

[51] *NPRM* at para. 115.

standpoint and could be unnecessarily inhibiting to technological advances. This is another example of an area in which there are sufficient incentives for industry self-policing to be effective, and at much lower administrative and "opportunity" costs. The customer will insist that the providers' equipment operate at a sufficiently high level of reliability, availability and circuit quality to ensure a very low level of frequency drift.

The Commission Should Not Require Standard A Antennas. The *NPRM* would continue to permit the Commission to require a licensee at 38 GHz to replace its non-standard antenna with a Standard A antenna,

> upon a showing that said antenna causes or is likely to cause interference to (or receive interference from) any other authorized or proposed antenna whereas an antenna meeting performance Standard A is not likely to involve such interference. [quoting from Section 21.109(b) of the Commission's Rules].[52]

ART urges the Commission not to apply this rule to 38 GHz.

The current rule seems innocuous. It supposedly is not invoked until there is a real threat of interference. But, however efficacious and non-injurious this rule might be in the traditional point-to-point microwave situation, it is fraught with problems for the 38 GHz industry.

The genius in the Commission's innovative policies for 38 GHz lies in its geographic footprint licensing. This cellular-type approach allows the 38 GHz provider to avoid the administrative delays that have consigned traditional microwave service to occasional customers in special circumstances. Geographic licensing permits the 38 GHz provider to respond in days to service requests. Absent this ability, the 38 GHz

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[52] *Id.* at para. 116. The Commission proposes to give the licensee of a grandfathered link six months to replace its Standard B antenna.

provider cannot compete effectively in the local exchange arena.

Yet Section 21.109(b)[53] threatens to interdict the ability of 38 GHz providers to respond quickly, would multiply costs and would likely impede the full development of the potential of 38 GHz. The first difficulty is created by the inherent ambiguities and generalities in the language of Section 21.109(b). For instance, what type of showing is required? When is a Standard B antenna to be deemed "likely" to cause interference? When is a Standard A antenna to be deemed "not likely" to cause interference?

The time taken to settle these ambiguities may not have created difficulties in practice in the past. In the typical situation involving traditional microwave services, due to the regulatory lag consumed by the prior frequency coordination process and the subsequent months of Commission processing, there were significant time delays in any event. But these ambiguities promise to create delay and consume resources that could prove intolerable in the new 38 GHz world where time is of the essence. When the average 38 GHz service area is fully-built, there will be hundreds of links, many of which could be effected by the advent of even a single new outside antenna. The very real possibility of costly and continuous litigation inherent in this situation is magnified by the degree of competition in 38 GHz -- competition that is largely absent in traditional microwave services.

Second, the regulations in Section 21.109(b) assume that the Commission needs to protect the provider from interference from an outside source. If the provider is using an antenna that does not meet the Standard A criteria, the rule would require it

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[53] 47 CFR 21.109(b)

to switch out to prevent it from "receiving" interference generated by a new radiating source. This is contrary to the Commission's hard-earned wisdom that a licensee is in a much better position than the government to determine when it is receiving unacceptable interference and to take appropriate remedial steps.

Whatever validity there may be to the Commission's acting as "big brother" when the consumer has no other choice, there is none when there are myriad choices, as there will be for the customer of a 38 GHz provider. As the new entrant striving for a toehold against the LECs, with deeply ingrained brand loyalties and long-standing reputations for service quality, the 38 GHz provider will be driven, far in advance of the languid pace of government, to ensure there is no interference into its system. Furthermore, the efficient re-use of channel assignments dictates a high degree of antenna efficiency and performance. The marketplace is clearly the more efficient and adept regulator here.

Third, the required use of Standard A antennas wherever and whenever interference "may" be a possibility likely would stifle the potential of 38 GHz. The Standard A antenna is a multi-faceted specification. Antenna side lobe performance and antenna gain are but two components. Side lobe performance is an important criterion for limiting interference caused by radio paths in close proximity along the same plane. However, the 38 GHz licensee is the best judge of when and where there might be a problem.

On the other hand, a specification of minimum gain from the antenna would limit innovation in antennas designs for 38 GHz that are necessary to the full

development of the service as a viable local loop competitor. As the 38 GHz industry moves beyond point-to-point services to multi-point and omni-point services and to indoor systems that can be integrated into the same channels as outdoor systems, it will need to develop and integrate new antenna designs, such as phased arrays, sectorized antennas with broader beam widths and multi-directional common arrays. These new designs are necessary both to reduce costs dramatically and to improve performance. Many of these designs would be incompatible with the Standard A antenna specifications. A 38 GHz licensee should be permitted to use any antenna gain that results in overall performance that satisfies the maximum EIRP limits.

In summary, the rule in Section 21.109(b) could substantially interfere with speedy responses to service requests and embroil the 38 GHz provider in significant administrative delays and endless rounds of paper quarrels, at great expense and injurious opportunity costs. And it almost certainly would thwart the full achievement of the promise of 38 GHz to become a valuable and viable alternative to the traditional local exchange services. The Commission should discontinue application of Section 21.109(b) to 38 GHz and allow the participants to resolve potential interference problems on their own, stepping in only on that rare occasion when informal dispute resolution is unsuccessful.

The Proposed Power Limitation Of +55dBW Maximum EIRP Is Appropriate. ART does support the Commission's proposal to limit Effective Isotropic Radiated Power ("EIRP") to a maximum of +55 dBW. It is necessary to have some objective interference standard. This standard is sufficiently high so as to permit sufficient flexibility for new

radio designs while sufficiently low to limit interference to acceptable levels. In order to exceed this standard, transmitter output power would have to be increased to the point that appears to be well beyond what would be acceptable from a cost standpoint.

A Maximum Field Strength Boundary Limit Is Unnecessary And Counterproductive. The Commission proposes to establish a maximum field strength limit at the boundary of service areas. The Commission admits that it does not have sufficient data to adopt an appropriate power flux density ("PFD") or field strength limit. The Commission further suggests that it might remove all limitations on EIRP if PFD or field strength limits were to be adopted.[54]

ART appreciates that a mechanism must be found for resolving intersystem conflicts. But, for reasons similar to those articulated above with regard to other technical proposals, industry is the best arbiter in this situation as well. Speed of deployment is a critical aspect of 38 GHz operations, as we have pointed out repeatedly. Commission imposition of a standard necessarily requires the Commission not only to be prepared to enforce the standard, but, more troublesome, to be able, and sufficiently motivated, to keep it current with the rapid changes in the state of the art,

For these reasons, ART urges the Commission to stay its hand in this area. The resolution of conflicts among 38 GHz systems should be left to the affected systems themselves. Given the EIRP limit and the existing coordination procedures, supplemented from time to time by new insights from industry forums, private resolution is the best solution.

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[54] *Id.* at para 118.

In this regard, ART notes that the National Spectrum Managers Association ("NSMA"), which is composed of representatives from users, providers, manufacturers, spectrum consultants and regulatory bodies, has been studying coordination procedures for 38 GHz. It is ART's understanding that several members of NSMA are keenly interested in exploring the use of a mileage separation standard as a benchmark for required coordination in 38 GHz. ART suggests that the Commission encourage the use of whatever procedures are developed by NSMA, but not adopt either PFD or field strength limits.

VIII. THE COMMISSION SHOULD NOT RESTRICT THE SCOPE OF SERVICES PROVIDED AT THE 38 GHZ BAND.

The *NPRM* notes the demand for spectrum in the 39 GHz band and the advantages of using the 37 GHz band for PCS backhaul in light of the geographic area licensing rules. The Commission tentatively proposes to make the 37 GHz band available for such point-to-point uses. It asks, however, if all or part of the 37 GHz band should

> be made available for a wider array of fixed services, such as point-to-multipoint systems, whether there is a requirement for mobile operations in the 37 GHz band; and, if so, whether such operations should be on a co-primary or secondary basis to the point-to-point operations; and whether we have overestimated demand and, thus, whether a portion of the band should be held in reserve for future services.[55]

There should be no restriction on the types of services provided at either 37 or 39 GHz. As we have stated above, one of the geniuses in the Commission's recent approach to spectrum licensing has been its willingness to allow licensees the maximum amount of

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[55] *Id.* at para. 13.

freedom to design their services to fit shifting marketplace designs. The public benefits in innovation and efficiency from the maximum amount of flexibility are just as likely to be realized at 37 and 39 GHz as in other bands. Indeed, the continuing increases in functionality and features, and decrease in prices, of millimetric equipment will inevitably lead to a plethora of new services and uses that cannot be anticipated and could only be delayed if not thwarted by pre-ordained decisions by the Commission.

In order to produce the undeniable advantages of flexibility in licensing rules, the Commission should not erect any impediments to any use of the 37 or 39 GHz bands that does not create interference to other operators. Accordingly, the service rules for 38 GHz (39 as well as 37) should permit any application that is consistent with the band's technical rules, including point-to-multipoint and mobile. Until and unless experience demonstrates that there is a significant potential for interference from other than point-to-point operations, there is no need to create a two tier system and relegate point-to-multipoint and mobile to secondary status. All possible services should remain as co-primary until there is a sound reason to change. ART supports the *NPRM*'s proposal to license the spectrum under the General Wireless Communications Service rules until the adoption of new rules pursuant to the proposed Licensed Millimeter Wave Service rules set forth in ET Docket No. 94-124.[56]

Antenna designs, which are in advanced stages of testing, soon will permit point-

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[56] *See* 9 FCC Rcd 7078,7087 (1994)

to-multipoint operation.[57] Point-to-multipoint operations will greatly reduce the cost of broadband local loops and substantially increase the efficiency of the spectrum. With the advent of point-to-multipoint operations at 38 GHz, a single antenna and single radio at one end will be able to communicate with multiple antennas and transceivers, halving the cost per link in many cases.[58]

It clearly is in the public interest for the Commission to foster point-to-multipoint operations. Although there does not appear to be any immediate demand for mobile services in this band at present, they should not be precluded. To the extent that point-to-multipoint or mobile operations require a revisitation of the technical rules, that can be accomplished later when the technical designs to be employed are known. It would be premature to attempt to devise technical rules at this stage. In any event, the rules ART recommends above should be more than adequate to protect against interference to third parties even from mobile operations. In summary, the Commission should not prohibit any application that does not create unacceptable interference, with the burden on those who propose restrictions to demonstrate that such interference is bound to occur.

IX. THE 37 GHZ AND 39 GHZ BANDS SHOULD USE THE SAME 50 MHZ CHANNELING PLAN.

The *NPRM* proposes a 50 MHz channeling plan for 37 GHz, with 14 paired

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[57] As we stated, *supra* at note 7, ART's technical staff would be willing to meet with the Commission staff to brief them on these developments on a confidential basis.

[58] ART is cooperating with developers on the introduction of an antenna with a broader beamwidth that will facilitate point-to-multipoint communications.