DOCKET FILE COPY
ORIGINAL
FCC MAIL SECTION

Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

FCC 92-437
OCT 20 8 49 AM '92
RECEIVED BY

In the Matter of	)	
	)	
Redevelopment of Spectrum to	)	ET Docket No. 92-9
Encourage Innovation in the	)	
Use of New Telecommunications	)	RM-7981
Technologies	)	RM-8004

First Report and Order and Third Notice of Proposed Rule Making

Adopted: September 17, 1992; Released: October 16, 1992

Comment Date: January 13, 1993
Reply Comment Date: February 12, 1993

By the Commission: Commissioners Barrett and Duggan issuing separate statements.

I. INTRODUCTION

1. By this action, the Commission is providing for the redevelopment of 220 MHz of spectrum in the 1.85 to 2.20 GHz band for future communications services that employ emerging technologies. This action will make possible the operation of a broad range of new communications services that employ emerging technologies. The new services expected to operate on these frequencies will provide the American public with enhanced personal access to communications services and enable businesses to realize increases in productivity. The opportunity to develop these new services also will promote the ability of American industry to maintain its competitive leadership position in global telecommunications markets. We also are proposing a plan that will provide for fair and equitable sharing of the 2 GHz frequencies by new services and the existing fixed microwave services that currently use this spectrum and/or relocation of existing 2 GHz facilities to other spectrum. The transition plan for sharing and relocation that we are proposing herein is consistent with approaches suggested by both commenting parties and the Congress, and is intended to prevent disruption of existing 2 GHz services and minimize the economic impact on the licensees of those services.

II. BACKGROUND

2. Advancements in digital technology and signal processing have increased possibilities for the development of a broad range of new radio communications services. Since the advent of cellular service nearly a decade ago, advances in mobile and portable technologies have increased the potential service offerings that could use these technologies. Interested parties are developing new applications such as advanced digital cellular and personal communications services (PCS). Similarly, for the business community, communications providers are developing new applications such as mobile facsimile, wireless private branch exchange, and wireless local area networks. These technical advances have increased the need for additional spectrum to foster the growth and development of new services.[1] These "emerging technologies" also need spectrum to ensure the future competitiveness of the United States' communications industry in international markets.

3. Accordingly, in the Notice of Proposed Rule Making (Notice) in this proceeding, we proposed to redevelop spectrum for emerging technologies.[2] Specifically, we proposed to establish 220 MHz of spectrum in the bands 1.85-1.99, 2.11-2.15, and 2.16-2.20 GHz for emerging technologies. This spectrum currently is used by private and common carrier fixed microwave services. We also proposed options for transition and relocation of the current microwave licensees operating in this spectrum to the 4, 6, 11, 12, and 18 GHz fixed microwave bands.

4. This proposal was based on a study of the possibilities for creating emerging technologies bands by the Commission's Office of Engineering and Technology (Spectrum Study).[3] This study concluded that frequencies in the 1.85-1.99, 2.11-2.15, and 2.16-2.20 GHz bands were the best candidates for accommodating the demand for new services and technologies. The Spectrum Study also explored the feasibility of relocating the existing 2 GHz microwave operations to higher frequency bands, or to alternative media such as satellites and fiber optics.

---

[1] As the development of new electronic devices and applications has increased, the number of requests for spectrum to accommodate new services made feasible by these developments has increased. For example, in the case of PCS, the Commission has granted over 150 experimental authorizations and received 96 requests for pioneer's preference.

[2] Notice of Proposed Rule Making, ET Docket No. 92-9, adopted January 16, 1992, 7 FCC Rcd 1542 (1992).

[3] See "Creating New Technology Bands for Emerging Telecommunications Technology," OET/TS 92-1, January 1992.

5. In the Notice, we recognized the important and vital services currently being provided by the existing 2 GHz fixed microwave facilities. We therefore indicated our intention to reaccommodate those facilities in higher fixed microwave bands in a manner that would be most advantageous to those licensees, be least disruptive to the services they provide the public, and foster the introduction of emerging technologies services.[4] To accomplish this, we proposed a transition plan consisting of three elements: 1) conserving vacant 2 GHz spectrum by granting licenses for new fixed microwave facilities on a secondary basis only;[5] 2) allowing current 2 GHz fixed microwave licensees to continue operating on a co-primary basis with new services for some fixed period after which they would be reduced to secondary status (with the exception of state and local government licensees that would be co-primary), or for an indefinite period; and 3) encouraging early access to 2 GHz spectrum by allowing providers of new services to negotiate financial arrangements for reaccommodation of 2 GHz fixed microwave licensees.[6] We requested comment on whether 2 GHz spectrum should be made available in phases,[7] and on whether and how the availability of government spectrum might affect our transition proposals.[8]

6. In response to the Notice, the Utilities Telecommunications Council (UTC) and Alcatel Network Systems, Inc. (Alcatel) filed petitions requesting that the Commission consider specific reallocation and rechannelization plans and technical rules to govern access to higher fixed microwave bands

---

[4] See Notice, supra, at para. 22.

[5] We also stated that licenses for new 2 GHz facilities in the proposed emerging technologies bands would be granted on a secondary basis only, if the application was filed after the Notice. In May, the staff issued a "2 GHz Licensing Policy Statement," in which it clarified that this policy does not apply to applications for modification of facilities licensed prior to the date of the Notice. The staff concluded that, conditional on a valid showing of need for the facilities, secondary status should not be applied in certain situations where the licensee may require additional links. See "2 GHz Licensing Policy Statement," Public Notice, Mimeo No. 23115, May 14, 1992.

[6] See Notice, supra, at paras. 23-26.

[7] Id. at para. 27.

[8] We requested comment on the feasibility of using government spectrum in the 1.71-1.85 GHz band for relocation of existing 2 GHz operations, noting that the Spectrum Study did not examine the availability or suitability of government spectrum for relocation of existing 2 GHz operations. See Notice, supra, at paras. 21 and 27.

by 2 GHz licensees.[9] On August 5, 1992, the Commission adopted a Further Notice of Proposed Rule Making (Further Notice) proposing to restructure the higher frequency fixed microwave bands generally consistent with the UTC and Alcatel petitions.[10]

Related Matters

7. The PCS Proceeding. On July 16, 1992, the Commission adopted a Notice of Proposed Rule Making (PCS Notice) in GEN Docket No. 90-314 that, among other things, proposed that between 80 and 140 MHz of 2 GHz spectrum proposed for emerging technologies in this docket be allocated for PCS services. Our final action in the PCS proceeding is conditioned on the outcome of the instant proceeding.[11]

8. WARC-92. Internationally, efforts also are under way to authorize and develop new mobile technologies. In March 1992, the World Administrative Radio Conference (WARC-92) recognized that worldwide 2 GHz spectrum likely will be used for future public land mobile telecommunications systems (FPLMTS), which are similar to PCS in concept. The conference maintained the primary fixed and mobile allocations at 2 GHz in Region 2; added mobile-satellite service (MSS) allocations in the 1930-2010 and 2120-2200 MHz bands; and adopted a footnote stating that FPLMTS are expected to use the 1885-2025 MHz and 2110-2200 MHz on a worldwide basis.[12]

---

[9] See UTC Petition for Rule Making (RM-7981) (filed March 31, 1992), and Alcatel Petition for Rule Making (RM-8004) (filed May 22, 1992).

[10] See Further Notice of Proposed Rule Making, ET Docket No. 92-9, FCC 92-357.

[11] See Notice of Proposed Rule Making, GEN Docket No. 90-314, FCC 92-333 at para. 31.

[12] See International Telecommunication Union, Final Acts of the World Administrative Radio Conference (WARC-92) and Addendum and Corrigendum to the Final Acts of the World Administrative Radio Conference, Malaga-Torremolinos (1992). WARC-92 also allocated spectrum for MSS in the band 1610-1626.5 MHz (Earth-to-space) on a worldwide primary basis. An additional worldwide allocation in the band 1613.8-1626.5 MHz (space-to-Earth) was made on a secondary basis for MSS as well as an additional primary allocation in the band 1675-1710 MHz for Region 2. A new primary MSS allocation in the band 1626.5-1631.5 MHz (Earth-to-space) also was made for Regions 2 and 3. In the 2 GHz portion of the spectrum, Region 2 received a primary allocation for MSS in the bands 1970-2010 (Earth-to-space) and 2160-2200 MHz (space-to-Earth) and a secondary allocation in the bands 1930-1970 (Earth-to-space) and 2120-2160 MHz (space-to-Earth).

III. DISCUSSION

Allocation Issues

9. Need for Spectrum Redevelopment. Most of the commenting parties support the Commission's proposal to redevelop spectrum for emerging technologies. Many parties agree with our initial conclusion that there is a pressing need for spectrum to accommodate emerging technologies. They submit that this spectrum is essential for operation of new digital and mobile services that make use of technological advances. Many parties also state that spectrum must be made available now for emerging technologies if the United States is to remain competitive in the international telecommunications market. For example, American Personal Communications (APC) notes that U.S. competitors in Europe and the Far East already have allocated spectrum to enable implementation of new technologies. Ameritech agrees that it is important to designate spectrum for emerging technologies, so that U.S. enterprise is not left out of worldwide developments.

10. A number of incumbent users of the 2 GHz fixed microwave spectrum agree with our initiative to redevelop 2 GHz fixed microwave spectrum for emerging technologies, provided that relocation of existing users is taken adequately into account. For example, Baltimore Gas and Electric (BG&E), a 2 GHz fixed microwave licensee, states that in an age of proliferating information services it is vital to provide spectrum for emerging technologies. BG&E contends that the many recent requests for spectrum for new services the Commission received subsequent to proposing emerging technologies bands demonstrates that spectrum redevelopment is in the public interest.[13] The City of San Diego, which operates nine 2 GHz microwave paths as the backbone of its Public Safety Radio system, supports our reallocation proposal, provided market based negotiations are allowed as a means of voluntarily relocating existing users.[14] San Diego Gas and Electric Company, an investor-owned utility, also supports our proposal, provided that existing users be fairly compensated for any relocation.

11. Several parties believe that the 220 MHz the Commission proposes to reallocate for emerging technologies is insufficient. Motorola, Inc. states that its analysis indicates that over 300 MHz of spectrum will be needed to accommodate identified emerging technologies. Similarly, AMSC Subsidiary Corporation (AMSC) and Tel/Logic submit that the proposed 220 MHz of spectrum should be considered only the start of spectrum redevelopment.

---

[13] See BG&E's comments at 1-2.

[14] The City of San Diego also submits that as an active member of the Associated Public Safety Communications Officers (APCO) it recently supported APCO's opposition to the Commission's proposal, but that it would accept reallocation to higher frequencies provided it is compensated adequately.

AMSC requests that the Commission reallocate a total of 130 MHz for new mobile-satellite services.[15]

12. A number of parties oppose the Commission's reallocation proposal and question the analysis contained in the Spectrum Study. UTC and American Petroleum Institute (API) question the initial determination to fully analyze only frequencies between 1-3 GHz as candidates for emerging technologies. Others, among them API, Association of American Railroads (AAR) and Consolidated Edison Company of New York, Inc., argue that the study did not consider adequately the feasibility of relocating the multipoint distribution service (MDS) and broadcast auxiliary service (BAS), which also operate in the 2 GHz range. The American Public Power Association, Centel Corporation, and McCaw Cellular Communications, Inc. contend that the Spectrum Study underestimates the cost of relocating 2 GHz fixed microwave users to higher bands. UTC, AAR, the American Gas Association, and the Public Safety Microwave Committee, among others, claim that the study has not thoroughly analyzed the cost and practicality of fixed microwave operations switching to alternative media such as fiber optic cable or satellites. Finally, UTC and several others question the study's findings with regard to the methodology used to determine fixed microwave use of the 2 GHz band, the path lengths of communications links in 2 GHz fixed microwave networks, and the practicality of moving those networks to higher bands.

13. Some parties representing existing 2 GHz fixed microwave interests also argue that the Commission did not make the proper public interest analysis in selecting the 2 GHz band for accommodation of emerging technologies. These parties state that the Commission's actions imply that it considers incumbent 2 GHz fixed microwave operations to be less in the public interest than potential emerging technologies that would operate in the same bands. Others, such as Alascom, Inc., Telephone Utilities of Eastern Oregon, Inc., and Telephone Utilities of Washington, Inc., oppose any action that would impair or disrupt the essential telephone services they provide. Many utilities also oppose reallocation of 2 GHz fixed microwave spectrum for similar reasons. Finally, some parties contend that any reallocation action would be premature until the Commission defines more precisely the exact services using emerging technologies that would operate in the 2 GHz band.[16]

---

[15] AMSC also contends that for MSS, sharing with other services is not likely to be feasible.

[16] In addition, pending are seven identical petitions to hold administrative hearings filed by the Metropolitan Water District of Southern California and Questar Service Corporation on June 24, 1992; Commonwealth Edison Company, Montana Power Company, and Public Service Electric and Gas Company on June 29, 1992; Seattle City Light on August 17, 1992; and Takoma Public Utilities (sic) on August 19, 1992. These utilities argue

14. We continue to believe that the public interest will be served best by making spectrum in the 2 GHz band available for emerging technologies. There is an immediate need for additional spectrum to sustain the growth of services made possible through new technologies. As indicated in the Notice, we now have pending requests for approximately 400 MHz of spectrum for new services that include PCS, data PCS, MSS, and low-Earth orbit satellites.[17] These services are expected to provide the public with enhanced personal access to communications services and to enable businesses to realize increases in productivity. We also observe that the uncertain current and future availability of spectrum is a major obstacle to the development of emerging technologies and implementation of services using these technologies.[18] Further, access to 2 GHz spectrum by emerging technology proponents will promote the ability of American industry to maintain their competitive leadership position in global telecommunications markets.

15. We also continue to believe that the 2 GHz bands proposed in the Notice are the appropriate locations for this redevelopment. As we indicated in the Notice, it is important that the emerging technology bands be able to meet the requirements of a significant number of new services and to support the operation of mobile, as well as fixed, operations. No information submitted in this proceeding demonstrates any material flaw in the analyses used in the Spectrum Study. We continue to believe that the study provides a sound basis for spectrum redevelopment and that the staff's initial decision to target spectrum between 1-3 GHz is appropriate.[19] Frequencies below 1 GHz are used principally for broadcast and mobile services that would be difficult to relocate or consist of narrow, scattered bands that aggregated would not provide

---

that the procedures provided for notice and comment rule making by the Administrative Procedure Act, 5 U.S.C. §§ 151 et. seq., are insufficient "to engage the agency in a meaningful discussion of the complex issues involved," and therefore request that we hold "administrative hearings." Contrary to the assertion of these petitioners, we believe that the more than 160 written comments and reply comments filed in this proceeding fully discuss the issues raised by this proceeding, and that written responses are more helpful than oral presentations in this particular case because complex detailed technical issues are involved. We also note that this is an non-restricted proceeding, and therefore that interested parties are free to discuss these issues with Commissioners and staff as provided by our ex parte rules, 47 C.F.R. §§ 1.1200 et seq. Accordingly, we deny these seven petitions.

[17] See Notice, supra, at para. 4.

[18] Id. at para. 7.

[19] See Spectrum Study, supra, at 2.

sufficient spectrum for emerging technologies. Frequencies above 3 GHz were eliminated from consideration primarily because propagation characteristics in this range make such spectrum less practical for mobile operations -- 3 GHz is the upper operating limit for state-of-the-art equipment for mobile use. In addition, other countries are allocating spectrum in the 1-3 GHz range for the kinds of services and systems that we are contemplating.

16. We also remain convinced that exclusion of the 2 GHz BAS and MDS bands is correct. As the staff noted in the Spectrum Study, the BAS bands are used for both fixed and mobile operations in support of television programming.[20] The only candidate band for relocation of BAS operations -- 6.875-7.125 GHz -- already is allocated to BAS and likely would not be able to accommodate substantial numbers of 2 GHz operations. Also, according to the Society of Broadcast Engineers, Inc., many 2 GHz fixed broadcast auxiliary links have voluntarily relocated to higher bands, thus freeing spectrum for difficult to relocate mobile 2 GHz BAS operations (e.g., electronic news gathering). Further, as noted by the National Association of Broadcasters, the Association for Maximum Service Television, Inc., and others, the expected implementation of advanced television service will increase substantially the demand for BAS spectrum.

17. With regard to the spectrum currently used for MDS operations, we note that MDS is a developing service with over 24,000 applications pending.[21] The Wireless Cable Association International, Inc. (WCA) states that currently there are 100 MDS operations that serve 500,000 subscribers. WCA expects that many more systems will initiate service as the Commission acts on the backlog of applications. We agree with WCA, Texas Wired Music, Inc., and others that, given the substantial demand for MDS evidenced by the number of pending applications, it should be afforded sufficient time to develop.[22] Also, there are no frequency allocations above 3 GHz that could readily support the requirements of MDS, which are wide-area and point-to-multipoint in nature.[23]

---

[20] Id. at 10.

[21] Id. at 11.

[22] We observe that the 2.160-2.162 MHz band is used by MDS systems for the upper end of channel 2 in certain locations. See 47 C.F.R. § 21.901(c). Our proposal was to allocate this 2 MHz to emerging technologies. We are adopting this proposal, and any authorization of additional stations to use this 2 MHz for MDS applied for after January 16, 1992 (the date of adoption of the Notice) shall be secondary to its use for emerging technologies.

[23] UTC filed a Petition for Issuance of Further Notice of Proposed Rule Making on May 1, 1992, in which it argues that the Commission's choice of candidate bands is flawed, that it didn't

18. With regard to commenters' concerns that the costs of relocation were underestimated, the Spectrum Study attempted to make fair estimates of necessary equipment costs and the economic impact upon microwave users of relocation from the 2 GHz bands. These estimates were intended to indicate a reasonable scale of such expenses, rather than the actual cost associated with specific conversions.[24] However, to the extent that our proposed regulatory scheme would require new users to pay costs of relocation as a condition of obtaining exclusive use of 2 GHz spectrum, discussed below, it is unnecessary to consider the degree of accuracy of the estimated costs.

19. UTC, AAR, and others argue that alternative media such as fiber optics and satellites are not suitable alternatives to 2 GHz fixed microwave systems. Their objections may be based upon a misinterpretation of the Spectrum Study's findings. The study did not recommend, as UTC states, "use of fiber optics as a wholesale replacement for 2 GHz microwave." Rather, the study merely suggests that fiber optics and satellites are possible replacement options for some existing 2 GHz fixed microwave communications.[25] In this regard, we note that fiber optic and satellite systems already are used by UTC and AAR members. For example, BG&E states that it uses fiber optics for some voice and data requirements. Similarly, in the PCS proceeding, AAR states: "While the microwave links are the backbone of the system, fiber is used when it is practically and economically feasible to do so. Thus, the railroads are not opposed to the use of fiber when practical; and, they will continue to do so increasingly."[26] We continue to believe that fiber optics and satellites are viable alternatives to spectrum for some systems and encourage their consideration where practicable. However, we are not requiring any system to convert to alternative media, but rather, have

---

properly consider MDS and BAS spectrum, and that its interim licensing policy should be modified. As indicated above, the first two issues were discussed in the Notice and have been fully considered herein. The remaining issue, our interim licensing policy, also was discussed in the Notice, clarified in a Public Notice issued on May 14, 1992, supra note 5, and is fully considered herein. Accordingly, we dismiss as moot UTC's petition. However, the petition is accepted as a comment and the issues it raises are addressed herein.

[24] See Spectrum Study, supra, at 31.

[25] Id. at 29.

[26] AAR Comments in GEN Docket No. 90-314 at 15 (October 1, 1990).

provided sufficient spectrum to accommodate those 2 GHz licensees that relocate to higher frequencies.[27]

20. Finally, the Spectrum Study sought to analyze the general feasibility of relocating existing 2 GHz fixed microwave users to higher frequency bands. The purpose of this study was not to identify specific relocation schemes for individual facilities.[28] While some commenters question the methodology of the study, they fail to offer alternative analyses. Other parties support its conclusion. For example, Comsearch, an entity that coordinates frequencies and provides engineering support for the design of microwave systems, states that it generally agrees with the results of the Spectrum Study and that the key to relocating stations is proper frequency engineering. We agree with Comsearch's comments and continue to believe that, where necessary to accommodate emerging technologies, most existing 2 GHz microwave facilities could be relocated to higher frequency bands with the same high degree of reliability.[29]

21. Throughout this proceeding we have recognized the important and essential functions, such as public safety and utility management communications, that 2 GHz fixed microwave operations now provide and indicated our intention to minimize the impact of our spectrum redevelopment plan on those services.[30] We disagree with those parties who argue that our reallocation and transition proposals would impair essential 2 GHz fixed microwave services and would result in a significant economic burden to 2 GHz licensees. We believe that the transition plan we are proposing, as presented below, will minimize the impact on existing 2 GHz licensees and ensure that the important services they now provide will not be threatened. We also disagree with those parties that contend that any reallocation action would be premature until we identify the specific new services that would operate in the 2 GHz band. The intent of this redevelopment is to provide spectrum to meet the needs of new services currently under development and of future

---

[27] See Notice, supra, at para. 20. The Commission proposed a "blanket" waiver of eligibility for 2 GHz licensees to use other common carrier and private fixed microwave bands under the technical rules and coordination procedures applicable to each band. We will grant such waivers pending the outcome of the Further Notice proposing to restructure the higher fixed microwave bands (see note 10, supra).

[28] See Spectrum Study, supra, at 12.

[29] The FCC, in cooperation with the National Telecommunications and Information Administration (NTIA), would consider for relocation to the 1710-1850 MHz government band those few parties that cannot reliably use higher frequencies, see paras. 32-36, infra.

[30] See Notice, supra, at paras. 19 and 22-27.

technologies. Therefore, we are allocating the 1850-1990, 2110-2150, and 2160-2200 MHz bands for the development and implementation of emerging technologies on a shared basis with the fixed service. The use of these allocations will be developed in ongoing and future proceedings that will address particular emerging technology services. When specific services are allocated in these bands we will adopt specific interference standards to allow for the sharing of this spectrum. These standards will protect operations of incumbent licensees from harmful interference caused by operations of emerging technology licensees.[31]

Accommodation of 2 GHz Fixed Microwave Services

22. Most fixed microwave interests opposed our proposal to make existing 2 GHz microwave operations secondary after a fixed date. Both UTC and Telocator submitted alternative plans for accommodating the transition of existing fixed microwave users to higher frequency bands. While UTC supports indefinite co-primary status for incumbent 2 GHz licensees, it recognizes that eventual transition of 2 GHz fixed microwave licensees may be necessary and suggests a ten year voluntary negotiation period followed by involuntary negotiations with the new users responsible for all relocation costs. Telocator's plan addresses many of the issues addressed by UTC's transition plan but does not propose a cut-off date for voluntary negotiations. Finally, the U.S. Senate passed an amendment to the bill making appropriations to the Commission that would have statutorily required a voluntary transition period of eight years.[32] The proposed UTC and Telocator transition plans and the Senate amendment are summarized at Appendix C.

23. We believe that the proposals contained in the Senate amendment and suggested by UTC and Telocator provide an appropriate transition framework for treating and reaccommodating incumbent 2 GHz operations. Accordingly, we are adopting most aspects of these alternatives and seek comment on other aspects. As more fully discussed below, we are adopting rules that define the requirements for an emerging technology licensee to involuntarily relocate an incumbent fixed microwave licensee and request comment on the length of the transition period and on how the Commission should resolve any disputes over involuntary relocation. We believe that the transition plan adopted herein will provide opportunity for the development of services using

---

[31] For example, in its Notice of Proposed Rule Making in GEN Docket No. 90-314, supra at paras. 109-113, the Commission proposed sharing criteria designed to protect fixed microwave operations from PCS interference with the same level of protection as they currently have from each other.

[32] This amendment was not included in the final appropriations bill.

emerging technologies while preventing disruption of the service provided by the existing 2 GHz fixed microwave operations.

24. At any time beginning with the effective date of this First Report and Order, existing fixed microwave licensees will be permitted to negotiate voluntary relocation agreements and we will accommodate any agreed move to other bands consistent with our rules, see note 27, supra.[33] We emphasize, however, that such agreements will not be required. After an initial transition period, all existing fixed microwave licensees will retain co-primary status.[34] Such a transition period would commence upon the effective date of the Report and Order on the Further Notice of Proposed Rule Making in this docket dealing with re-channelization of the higher frequency microwave bands. If an emerging technology provider needs an incumbent's frequency, the Commission encourages the parties to negotiate a voluntary relocation agreement. Should that fail, the emerging technology service provider could request involuntary relocation of the incumbent. However, in that case, the emerging technology service provider must guarantee payment of all relocation expenses, build the new microwave facilities at the relocation frequencies, and demonstrate that the new facilities are comparable to the old as follows:

(1) The emerging technology service provider must guarantee payment of all relocation costs. This includes all engineering, equipment, site and FCC fees, as well as any reasonable, additional costs that the relocated fixed microwave licensee may incur as a result of operation in a different fixed microwave band or migration to other media.
(2) The emerging technology service provider must complete all activities necessary for implementing the new facilities, including engineering, frequency coordination and cost analysis of the complete relocation procedure. This also includes identifying and obtaining, on the incumbents' behalf, new microwave frequencies or other facilities where applicable.[35]
(3) The emerging technology service provider must build the new microwave system (or alternative) and test it for comparability to the existing 2 GHz system. The 2 GHz microwave licensee would not be required to relocate until

---

[33] Any agreement entered into in advance of an allocation for an emerging technology service will not create any preference in the subsequent licensing process.

[34] In disputes involving interference between co-primary emerging technology and fixed microwave licensees, the facility first licensed will be afforded interference protection from the offending facility.

[35] These frequencies could be higher in the spectrum, or for difficult cases, within the Government 1.710-1.850 GHz band, see paras. 32-36, infra.

the comparable alternative facilities are available to it for a reasonable time to make adjustments and ensure a seamless handoff. If within one year after the new facilities are in operation, they are demonstrated by the 2 GHz microwave licensee to be not comparable to the former facilities, the emerging technology service provider must remedy any deficiencies or pay to relocate the microwave licensee back to the former 2 GHz frequencies.

25. We solicit comment on how to define comparable alternative facilities. Specifically, we seek comment on whether a negotiated rule making might be beneficial in this process. This would give parties in this proceeding an opportunity to directly negotiate and recommend rules or guidelines to the Commission for resolving comparable facility issues. Further, we seek comment on dispute resolution processes in the event disputes arise over involuntary relocation, or disputes over the comparability of service on new microwave facilities in relocation bands. Thus, we seek comment on alternatives such as mediation and arbitration, in addition to the possible use of negotiated rule making for determining definitions of comparability.

26. Finally, we will exempt existing 2 GHz fixed microwave operations licensed to the public safety and special emergency radio services -- including state and local governments, police, fire, and medical emergency communications -- from any involuntary relocation. Again we encourage those licensees to engage in voluntary relocation negotiations. Applications for new public safety microwave facilities in the 2 GHz band will be treated as any other request for new facilities. (See paragraph 31 below.)

Transition Period

27. We solicit comment on the length of the transition period that the Commission should adopt. The transition period should allow for the introduction of new services and provide for the relocation of the incumbents without undue disruption of services. As stated above, the Senate amendment would have required an eight year period and UTC has suggested a ten year period. Tentatively, we believe that the transition period should not be less than three years or more than ten years.[36] The transition period would commence on the adoption date of the Commission's Report and Order that addresses issues concerning

---

[36] Commenters should provide a comparative analysis of the specific economic and technical factors that justify the particular transition period(s) that they support. For example, commenters should clarify the estimated costs and time involved in any relocation action. We also seek comment on whether different transition periods may be appropriate for certain areas (i.e., urban areas versus rural) or due to certain technical considerations (i.e., length of links, coastal effects, etc...).

the channeling of the higher fixed microwave bands available for the relocation of incumbent 2 GHz fixed microwave licensees, raised in the Further Notice of Proposed Rule Making in this proceeding. In addition, we seek comment on whether no transition may be appropriate in some instances, particularly in the case of unlicensed devices or services covered by blanket licenses which may operate in these bands. In such cases, we request comment on whether affected fixed users should be given priority access to government spectrum or other 2 GHz spectrum if they cannot be accommodated in higher bands.

28. In order to ensure that an incumbent licensee would not be faced with a sudden or unexpected request for involuntary negotiations, we seek comment on whether it would be appropriate to also provide a minimum time period for voluntary negotiations after the grant of a license to an emerging technology service provider. For example, in the case of a three year transition period, it is possible that licensees for a particular service may be assigned near the end of or even after the transition period. In that case, should we provide a one year minimum period for voluntary negotiations between the parties? This would ensure that an incumbent licensee would not be faced with a precipitous demand for involuntary negotiations after the three year period. We also question whether in the case of a more lengthy transition period, in those few geographic areas where there may be little or no spectrum available, waiting for voluntary negotiations may frustrate the introduction of services using new technologies. We request comment on whether in such cases a shorter transition period, but no less than three years, should be observed to address these situations if it can be shown that the voluntary negotiations have not succeeded.

29. We will encourage spectrum sharing between emerging technologies services and incumbent 2 GHz fixed microwave users whenever technically feasible. As the commenters point out, the feasibility of spectrum sharing between new services and fixed microwave services has not been fully determined and will depend on the technical design of individual new systems and services.[37] Further, as commenters also note, we have not determined the specific services that will be permitted to operate on 2 GHz emerging technologies frequencies. We are hopeful, however, that spectrum sharing techniques for some services, such as those being developed by PCS proponents such as APC and Millicom, Inc. may prove workable. The success of those techniques could allow co-primary operation of some emerging technologies with existing fixed microwave services on a non-interference basis without the need for any relocation agreements. We note that spectrum sharing and interference standards that relate to PCS are being addressed in the PCS

---

[37] We note that in some instances sharing between fixed microwave and new services may be difficult. For example, AMSC and Apple Computer, Inc. indicate that sharing may not be feasible with MSS and unlicensed data-PCS, respectively.

Notice.[38] As other future services that use emerging technologies develop, sharing by those will be addressed in subsequent rule making proceedings.

Fixed Microwave Licensing Policy

30. In the staff's May 14, 1992, Public Notice, see note 5, supra, the kinds of modifications and expansions by existing microwave licensees that would not affect their status with respect to emerging technology licensees were set forth. We are faced, however, with two divergent objectives. On the one hand, we want to minimize the effect of our reallocation on existing microwave users. Existing licensees must be allowed to operate without devaluing the usefulness of their 2 GHz facilities. On the other hand, we must provide emerging technology licensees with a stable environment in which to plan and implement new services.

31. As stated in the Public Notice, new facilities will be licensed only on a secondary basis.[39] Existing 2 GHz fixed facilities, licensed before January 16, 1992, can make certain modifications and minor extensions and retain primary status.[40] Major extensions or expansions would be considered secondary, unless a special showing of need is made to justify primary status. This policy gives fixed microwave licensees significant flexibility, and together with our voluntary/involuntary agreement provisions, appropriately balances and satisfies our divergent objectives.

---

[38] See note 11, supra.

[39] Century Telephone Enterprises, Inc. (Century) filed a Petition for Reconsideration on March 20, 1992, requesting that the Commission continue to license new 2 GHz microwave systems on a primary basis. Similarly, in a Petition for Clarification filed on March 23, 1992, AAR requested that we clarify that new 2 GHz microwave systems may be granted on a primary basis. The issues raised by Century's and AAR's petitions were clarified in a Public Notice issued on May 14, 1992, supra note 5, and also are discussed herein. Accordingly, these two petitions are dismissed as moot but are accepted as comments and have been considered in this proceeding.

[40] This includes facilities licensed on a primary basis in accordance with the staff's May 14, 1992, Public Notice. Acceptable modifications include: minor modifications, changes in antenna azimuth, antenna beamwidth, antenna height, authorized power, channel loading, emission, station location, and ownership or control; reduction in authorized frequencies; or addition of frequencies not in the 2 GHz band.

Use of Government Spectrum for Relocation

32. In the Notice, we requested comment on the feasibility of using government spectrum in the 1.71-1.85 GHz band for relocation of existing 2 GHz operations, noting that the Spectrum Study did not examine the availability or suitability of government spectrum for relocation of existing 2 GHz operations.[41] Subsequently we requested comment on a March 1992 NTIA report entitled "Federal Spectrum Usage of the 1710-1850 and 2200-2290 MHz Bands."[42] In that report, NTIA notes that, in addition to fixed microwave links, government uses of this band include tracking, telemetry and command uplink and downlink for military satellites; fixed and mobile military tactical communications; radio astronomy; and telemetry and timing signals for advanced weapons development. NTIA also states that many additional uses are classified, and therefore not accounted for in calculations of government usage.

33. NTIA also notes that Federal use of the 1.71-1.85 GHz and 2.20-2.29 GHz bands have increased at 15% and 4% per year, respectively. It further states that approximately 63% of the assignments in the upper band are for mobile and space services. NTIA concludes that the potential to use 2 GHz government spectrum for non-government fixed microwave communications is limited, but possible in some instances, and that it will work with the Commission to determine if some access can be provided.[43] NTIA emphasizes that the Commission should not delay reallocating spectrum for emerging technologies pending establishment of access procedures.

34. Parties addressing use of government spectrum generally state that the 1.71-1.85 GHz band should be made available for relocation of existing 2 GHz non-government fixed microwave licensees, or alternatively, for use by 2 GHz emerging technologies.[44] Some parties, such as API, state that government bands could support non-government fixed operations on a co-primary basis. Pacific Telesis Group states that additional study is needed, but argues that Government spectrum should be made available to new users if it is not fully occupied. Rolm Systems maintains that at least the longer microwave links that cannot be relocated to higher frequencies should be given access to government spectrum.

---

[41] See Notice, supra, at para. 21.

[42] NTIA Report 92-285.

[43] See also letter of May 4, 1992, from Thomas J. Sugrue, Acting Assistant Secretary for Communications and Information, U.S. Department of Commerce, to Alfred C. Sikes, FCC Chairman.

[44] Many parties, both incumbent 2 GHz fixed microwave interests, and emerging technologies proponents, suggest that the Commission actively pursue access to the 1.71-1.85 GHz band.

35. On August 11, 1992, NTIA released an additional report entitled, "Feasibility of Relocating Non-Government Fixed Systems into the 1710-1850 MHz Band" ("NTIA Feasibility Report").[45] This report responds to questions raised regarding the possible use of 2 GHz government spectrum for reaccommodation of non-government 2 GHz fixed microwave operations. The "NTIA Feasibility Report" contains three main conclusions: First, the 1710-1850 MHz band is used intensely by government operations; second, there is sufficient spectrum in most parts of the United States to accommodate a limited number of 2 GHz microwave links in the 1710-1850 MHz band; and third, in most geographic areas, fixed microwave links at 6 GHz can be engineered to be as reliable as links at 2 GHz.[46] NTIA states that it will cooperate with the Commission to provide spectrum in the 1710-1850 MHz band for relocating fixed microwave links that cannot be re-engineered to operate reliably at 6 GHz.[47] NTIA further states that it will cooperate with the Commission to establish technical rules and coordination procedures necessary to identify such links, evaluate the feasibility of relocation in the 1710-1850 MHz band, and if feasible, implement such relocation.[48]

36. We have instructed the staff to develop, with NTIA, a process to accommodate in the 2 GHz government band those non-government 2 GHz fixed microwave facilities that technically cannot be accommodated in higher bands. Consistent with our transition plan, we would expect this process to be used on a case-by-case basis, as services using emerging technologies grow and need more spectrum. This process will provide a safety net for those licensees operating difficult communications paths in areas where demand for new services exceeds that which can be supplied without displacing any existing licensees.[49]

---

[45] NTIA Report 92-286. This report was placed in the ET Docket No. 92-9 file in August.

[46] In this regard, the "NTIA Feasibility Report" at 43 estimates that only 2% of the 30,000 2 GHz fixed microwave facilities could not operate reliably in higher microwave bands.

[47] See Letter dated August 11, 1992, from Gregory F. Chapados, Assistant Secretary for Communications and Information, U.S. Department of Commerce, to Alfred C. Sikes. This letter accompanied the "NTIA Feasibility Report."

[48] Id.

[49] AAR, the Large Public Power Council, and API filed a Petition to Suspend Proceeding on April 10, 1992, in which they request that this proceeding be suspended until: 1) the Commission requests access to government spectrum and receives a response from NTIA; 2) the Commission's Office of Engineering and Technology (OET) evaluates the 2 GHz government fixed band using the same criteria it used to evaluate the 2 GHz non-government fixed band; and, 3) interested parties have an opportunity to

Tax Certificates

37. In our Notice, we raised the possibility of issuing tax certificates as a means of encouraging current fixed microwave licensees to migrate. Our transition plan now places responsibility for all costs to be borne either (1) as voluntarily agreed to by the parties, or (2) by the emerging technology licensee, if the relocation is involuntary. Under this approach, no existing fixed microwave licensee would be required to pay relocation costs. Some commenters state that tax certificates, if used to encourage migration both to other bands and other media, could remove a potential financial disincentive to relocation where a 2 GHz fixed user may receive a capital gain due to a shift in its operations to another band or to a non-spectrum alternative.[50] They suggested that, under those circumstances, tax certificates could be used to defer the payment on such a gain and thus allow the fixed user to relocate in a more expeditious manner. Accordingly, we request more specific comment on how tax certificates could be used under the transition plan adopted herein. We also seek comment on whether the negotiated rule making process could be used to develop specific guidelines and legal justifications for using the tax certificate in this context.

Use of Emerging Technologies Bands

38. Many commenters point out that the extent to which spectrum needs to be set aside, the degree to which sharing could occur, and estimates on the extent of relocation of 2 GHz incumbents, will depend on the specific services designated to use the emerging technologies bands. These parties argue that the Notice overlooks this aspect and therefore the Commission should issue a Further Notice of Proposed Rule Making that addresses specific services and their associated service rules.

---

comment on the OET evaluation. In view of the recent "NTIA Feasibility Report" and NTIA's agreement to cooperate with the Commission in identifying and relocating those few 2 GHz non-government fixed microwave links that can not operate reliably in bands above 3 GHz, we are dismissing this petition as moot. The petition is treated as a comment and the issues it raises are addressed herein.

[50] See comments of Alcatel at 25; American Personal Communications at 20-21; Baltimore Gas & Electric at 4; CTIA at 5; Centerior Energy Corporation at 5; COMSEARCH at 8-9; Edison Electric Institute at 23-24; GTE Services at 19-22; NYNEX Mobile at 6; OCUM Corporation at 19-20; OPASTCO at 9; Rochester Telephone at 4; Rocky Mountain Telephone Association at 19-21; Southern Natural Gas at 2; Telocator at 12-13; Southwestern Bell at 23-25; US WEST at 14-15; Vanguard Cellular at 12-14; and Williams Natural Gas at 3. Cf. American Public Power Association at 18-19.

39. As discussed in paragraph 21, supra, we do not believe it necessary to identify the exact services that would be permitted to operate in the emerging technologies bands prior to making a general spectrum allocation. The rationale for our action making spectrum available for emerging technologies is to accommodate rapidly new services as the technology advances and these services become feasible. These could be additional PCS, or even future MSS, if they can co-exist with other users of the 2 GHz band.[51] We believe that demand, not our predictions, should dictate what services eventually operate in the bands we are reallocating in this proceeding. We do not want to predefine all services and specific technologies that might operate in these bands, as we believe this would defeat our goal of conserving suitable spectrum to foster development of new technologies that will allow U.S. industry to move quickly and keep pace with telecommunications developments throughout the world. We note, too, that service rules for the most developed of emerging technologies, PCS, are being addressed concurrently in GEN Docket 90-314.

IV. CONCLUSION

40. This First Report and Order is the initial phase in our effort to redevelop spectrum so that emerging technologies can be implemented. This plan should result in no disruption to 2 GHz fixed microwave operations and should result, particularly in the case of fixed microwave users that engage in voluntary negotiations, in no unacceptable impact to incumbent users. Subsequent actions in this and other proceedings will complete the rechannelization of the higher frequency fixed microwave bands to accommodate any relocated 2 GHz operations and develop service rules. We also have requested comment in the Third Notice of Proposed Rule Making portion of this item on the appropriate transition period to emerging technologies and on whether new fixed microwave systems should be licensed on a primary or secondary basis.

V. ORDERING CLAUSES

41. Accordingly, IT IS ORDERED, that the petitions filed by Century Telephone Enterprises, Inc. on March 20, 1992, Association of American Railroads on March 23, 1992, Utilities Telecommunications Council on May 1, 1992, and Association of American Railroads, Large Public Power Council, and American Petroleum Institute on April 10, 1992, ARE DISMISSED; and the petitions filed by Metropolitan Water District of Southern California and Questar Service Corporation on June 24, 1992, Commonwealth Edison Company, Montana Power Company, and Public Service Electric and Gas Company on June 29, 1992, Seattle City

---

[51] AMSC suggests that emerging technologies spectrum be set aside for MSS.

Light on August 17, 1992, and Takoma Public Utilities on August 19, 1992, ARE DENIED.

42. Also, IT IS ORDERED, that Parts 2, 21, 22, and 94 of the Commission's Rules and Regulations ARE AMENDED as specified below, effective 90 days after publication in the Federal Register. This action is taken pursuant to Sections 4(i), 7(a), 303(c), (g), and (r), of the Communications Act of 1934, as amended, 47 U.S.C. Sections 154(i), 157(a), 303(c), (g), and (r).

VI. PROCEDURAL MATTERS

First Report and Order: Final Regulatory Flexibility Analysis

43. Pursuant to 5 U.S.C. Section 603, an initial Regulatory Flexibility Analysis was incorporated in the Notice of Proposed Rule Making in ET Docket No. 92-9. Written comments on the proposals in the Notice, including the Regulatory Flexibility Analysis, were requested.

44. Need for and Objective of Rules. Our objective is to provide spectrum for the development and implementation of new innovative technologies and services, while preventing disruption to current users of that spectrum. Providing spectrum for emerging technologies is necessary in order to bring new services to the public, and to foster U.S. competitiveness in the global telecommunications marketplace.

45. Issues Raised by the Public in Response to the Initial Analysis. Many parties supported reallocating spectrum to accommodate emerging technologies. Although most suggested modifications to specific proposals set forth in the Notice, they did not suggest modifications specifically to the initial regulatory flexibility analysis. As a result, we have modified our proposals as appropriate. For example, in the Notice we had proposed to grant applications for new facilities on a secondary basis; we now feel that it would be less disruptive to existing 2 GHz fixed microwave licensees if applications for new facilities that modify or expand existing facilities in some instances are granted on a primary basis.

46. Any Significant Alternative Minimizing Impact on Small Entities and Consistent with Stated Objectives. We have reduced burdens wherever possible. The regulatory burdens we have retained are necessary in order to ensure that the public receives the benefits of innovative new services in a prompt and efficient manner. We will continue to examine alternatives in the future with the objectives of eliminating unnecessary regulations and minimizing any significant economic impact on small entities. The Secretary shall send a copy of this First Report and Order and Third Notice of Proposed Rule Making to the Chief Counsel for Advocacy of the Small Business Administration.

Third Notice of Proposed Rule Making: Regulatory Flexibility Analysis

47. Pursuant to the Regulatory Flexibility Act of 1980, the Commission finds as follows:

A. Reason For Action

This rule making proceeding is initiated to obtain comment regarding the appropriate transition period to emerging technologies in the 2 GHz band and how to resolve any disputes should they arise over involuntary relocation of incumbent 2 GHz fixed microwave operations.

B. Objective

The objective of this proposal is to ensure that a timely and equitable transition between fixed microwave and emerging technologies uses takes place in the 2 GHz band.

C. Legal Basis

The proposed action is authorized by Sections 4(i), 303(c), 303(g), and 303(r) of the Communications Act of 1934, as amended, 47 U.S.C. Sections 154(i), 303(c), 303 (f), 303(g)

D. Description, Potential Impact, and Number of Small Entities Affected

Depending upon the length of the transition period, this proposal would potentially impact between several hundred and several thousand existing private and common carrier fixed microwave users in the 2 GHz band. This proposal may provide new opportunities for radio manufacturers and suppliers of radio equipment, some of which may be small businesses, to develop and sell new equipment. We are unable to quantify other potential effects on small entities. We invite specific comments on this point by interested parties.

E. Reporting, Record Keeping, and Other Compliance Requirements

None.

F. Federal Rules That Overlap, Duplicate, or Conflict With This Rule

None.

G. Significant Alternatives

If promulgated, this proposal will provide a desirable transition between existing and new uses of the 2 GHz band. We solicit comment on the most appropriate transition period and on how to resolve any disputes should they arise over involuntary relocation of incumbent 2 GHz fixed microwave operations.

48. Other Matters. This is a non-restricted notice and comment rule making proceeding. Ex parte presentations are permitted, provided they are disclosed as provided in Commission rules. See generally 47 C.F.R. Sections 1.1202, 1.1203, and 1.1206(a).

49. This action is taken pursuant to Sections 4(i), 303(c), 303(f), 303(g), and 303(r) of the Communications Act of 1934, as amended, 47 U.S.C. Sections 154(i), 303(c), 303(f), 303(g), and 303(r).

50. Pursuant to applicable procedures set forth in Sections 1.415 and 1.419 of the Commission's Rules, interested parties may file comments on or before January 13, 1993, and reply comments on or before February 12, 1993. All relevant and timely comments will be considered by the Commission before final action is taken in this proceeding. To file formally in this proceeding, participants must file an original and four copies of all comments, reply comments, and supporting comments. If participants want each Commissioner to receive a personal copy of their comments, an original plus nine comments must be filed. Comments and reply comments should be sent to Office of the Secretary, Federal Communications Commission, Washington, DC 20554. Comments and reply comments will be available for public inspection during regular business hours in the FCC Reference Center (Room 239) of the Federal Communications Commission, 1919 M Street, N.W., Washington, DC 20554.

51. For further information concerning this rule making proceeding contact Fred Lee Thomas at (202) 653-6204 or Tom Mooring at (202) 653-8114, Office of Engineering and Technology, Federal Communications Commission, Washington, DC 20554.

FEDERAL COMMUNICATIONS COMMISSION

Donna R. Searcy

Donna R. Searcy
Secretary

Appendix A: Final Rules

I. Part 2 of Chapter I of Title 47 of the Code of Federal Regulations is proposed to be amended as follows:

PART 2 - FREQUENCY ALLOCATIONS AND RADIO TREATY MATTERS; GENERAL RULES AND REGULATIONS

1. The authority citation in Part 2 continues to read:

AUTHORITY: Sec. 4, 302, 303, and 307 of the Communications Act of 1934, as amended, 47 U.S.C. Sections 154, 154(i), 302, 303, 303(r), and 307, unless otherwise noted.

2. Section 2.106, the Table of Frequency Allocations is amended as follows:

a. § 2.106 Table of Frequency Allocations

* * * * *

International Table			United States Table		FCC use designators	
Region 1 Allocation MHz	Region 2 Allocation MHz	Region 3 Allocation MHz	Government Allocation MHz	Non-Government Allocation MHz	Rule Part(s)	Special-Use Frequencies
(1)	(2)	(3)	(4)	(5)	(6)	(7)

* * * * *

			1850-1990	1850-1990 FIXED. MOBILE. NG153	PRIVATE OPERATIONAL-FIXED MICROWAVE (94).	EMERGING TECHNOLOGIES
			1990-2110 US90 US111 US219 US222	1990-2110 FIXED. MOBILE. US90 US111 US219 US222 NG23 NG118	AUXILIARY BROADCAST (74). CABLE TELEVISION (78).	
			2110-2200	2110-2150 FIXED. MOBILE. US111 NG23 NG153	DOMESTIC PUBLIC FIXED (21). PUBLIC MOBILE (22). PRIVATE OPERATIONAL-FIXED MICROWAVE (94).	EMERGING TECHNOLOGIES
				2150-2160 FIXED. NG23	MULTIPOINT DISTRIBUTION (21). PRIVATE OPERATIONAL-FIXED MICROWAVE (94).	
			US111 US252	2160-2200 FIXED. MOBILE. NG23 NG153	DOMESTIC PUBLIC FIXED (21). PUBLIC MOBILE (22). PRIVATE OPERATIONAL-FIXED MICROWAVE (94).	EMERGING TECHNOLOGIES

* * * * *

b. NG153 - The 1850-1990 MHz, 2110-2150 MHz, and 2160-2200 MHz bands are reserved for future emerging technologies on a co-primary basis with the fixed and mobile services. Allocations to specific services will be made in future proceedings.

* * * * *

II. Title 47 of the Code of Federal Regulations, Part 21, is amended to read as follows:

1. The authority citation continues to read as follows:

AUTHORITY: Secs. 1, 2, 4, 201-205, 208, 215, 218, 303, 307, 313, 314, 403, 404, 410, 602; 48 Stat. as amended, 1064, 1066, 1070-1073, 1076, 1077, 1080, 1082, 1083, 1087, 1094, 1098, 1102; 47 U.S.C. 151, 154, 201-205, 208, 215, 218, 303, 307, 313, 314, 403, 404, 602; 47 U.S.C. 552.

2. Subpart B of Part 21 is amended by adding § 21.50 to read as follows:

§ 21.50 Transition of the 2.11-2.13 and 2.16-2.18 GHz bands from Domestic Public Fixed Radio Services to emerging technologies.

(a) Licensees proposing to implement services using emerging technologies may negotiate with Domestic Public Fixed Radio licensees in these bands for the purpose of agreeing to terms under which the existing licensees would relocate their operations to other fixed microwave bands or other media, or alternatively, to accept a sharing arrangement with the emerging technology licensee that may result in an otherwise impermissible level of interference to the existing licensee's operations.

(b) Domestic Public Fixed Radio licensees will maintain primary status in these bands until **[Date: end of transition period to be determined in the Second Report and Order]**. After **[Date]** Domestic Public Fixed Radio licensees will maintain primary status in these bands unless and until an emerging technology service licensee requests mandatory relocation of the fixed microwave licensee's operations in these bands. The Commission will amend the operating license of the fixed microwave operator to secondary status if the following requirements are met:

(1) The service licensee using an emerging technology guarantees payment of all relocation costs, including all engineering, equipment, site and FCC fees, as well as any reasonable, additional costs that the relocated fixed microwave licensee might incur as a result of operation in another fixed microwave band or migration to another medium;
(2) The emerging technology service licensee completes all activities necessary for implementing the new microwave facilities, including identifying and obtaining, on the incumbents' behalf, new microwave frequencies, engineering,