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

FEDERAL COMMUNICATIONS COMMISSION
OFFICE OF THE SECRETARY

In the Matter of
Redevelopment of Spectrum to
Encourage Innovation in the
Use of New Telecommunications
Technologies

ET Docket No. 92-9

ORIGINAL
FILE

REPLY COMMENTS OF
TELESCIENCES, INC.

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SUMMARY

Telesciences supports the development of new, innovative radio based technologies and applauds the Commission's efforts to facilitate the introduction of such technologies. As Telesciences stated in the opening round of comments, however, it believes that the Commission should not reallocate the 2.1-2.2 GHz band to emerging technologies for several important public interest reasons. In the alternative, Telesciences proposes a phased allocation approach in which the most heavily used portions of the 2.1-2.2 GHz band would be allocated last. Telesciences also requests that the Commission amend its rules to authorize point-to-point operations on the underutilized 10.5 GHz Digital Termination Service frequencies to provide needed capacity for 2 GHz replacement spectrum.

Many parties commenting on the Commission's reallocation proposal stated positions consistent with or supportive of Telesciences' views. In particular, a number of commenters strongly agree that the 2.1-2.2 GHz frequencies raise separate and distinct considerations. Carriers demonstrated that the 2.1-2.2 GHz portion of the 220 MHz targeted for the emerging technologies reserve band is heavily used for landline and cellular telephone operations. Cellular operations currently provide critical communications transmission capacity in support of commercial businesses, state and local government activities, public safety and emergency services. Cellular telephone

services have also proved essential to delivering high quality telephone service to remote, rural areas.

The comments also revealed a strong consensus that the Commission should examine the underutilized government bands as a possible source of spectrum for emerging technologies or as replacement spectrum. The widespread agreement on this issue and the likely adverse effects of displacing existing users requires that the Commission investigate underutilized government and nongovernment spectrum before making a reallocation decision in this proceeding. Several parties also share Telesciences' belief that the Commission should not oust existing, established operations from the 2 GHz band until it has more clearly defined the emerging technologies that will replace the 2 GHz operations.

As stated in its comments, Telesciences urges the Commission to adopt a phased approach to reallocating spectrum if it should decide that reallocation is necessary. Under that approach, the 2.1-2.2 GHz band should be reallocated in the final phase. Such an approach would avoid unnecessary disruption to existing uses while permitting the introduction of emerging technology services. Regardless of the reallocation approach adopted by the Commission, Telesciences continues to believe that the public interest would be served by expanding the uses of the currently underutilized 10.5 DTS frequencies to include point-to-point operations.

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**REPLY COMMENTS OF
TELESCIENCES, INC.**

Telesciences, Inc. ("Telesciences"), hereby submits its reply comments in response to the opening comments filed in the above-captioned proceeding.^{1/} Consistent with Telesciences' comments, a number of parties recognized that the 2.1-2.2 GHz frequencies should not be reallocated away from common carrier and private microwave operations to an emerging technologies reserve band.

In its initial comments, Telesciences urged the Commission to consider the separate and distinct considerations that apply to the Commission's proposal to reallocate portions of the 2.1-2.2 GHz band.^{2/} This band is heavily used by a broad range of

^{1/} Redevelopment of Spectrum to Encourage Innovation in the Use of New Telecommunications Technologies, Notice of Proposed Rulemaking, ET Docket No. 92-9, FCC 92-20 (released February 7, 1992).

^{2/} As Telesciences stated in its opening comments, much of the spectrum debate in the industry and at the Commission has centered on the proposed reallocation of the 1.8-1.9 GHz band. In both Telesciences' comments and these reply comments, Telesciences urges the Commission to give serious consideration

(continued...)

common carrier and private microwave users, including as an integral link in rural and other cellular systems. Based on these considerations, Telesciences specifically urged the Commission to refrain from reallocating the 2.1-2.2 GHz band to an emerging technologies reserve band until market and technical tests of emerging technologies are complete to determine whether spectrum sharing is possible. Such test data should prove valuable to the Commission in assessing whether clearing the 2.1-2.2 GHz band ultimately will be necessary.

Telesciences also urged the Commission to consider substituting for the 2.1-2.2 GHz band the other frequencies designated by the World Administrative Radio Conference ("WARC") (1700-2690 MHz) under the same criteria as that applied by the Commission to the targeted 2 GHz band. High priority should be given to investigating the potential uses of government spectrum at the 1710-1850 MHz and 2200-22990 MHz band, the broadcast auxiliary band at 1990-2110 MHz, and the 2500-2690 MHz band for emerging technologies.

If the Commission nevertheless decides to reallocate these frequencies, as a reasonable alternative to immediate reallocation of the full 220 MHz proposed in the Notice,

^{2/}(...continued)

to the unique industry and user issues raised by its proposal to reallocate the 2.1-2.2 GHz band. Thus, consistent with Telesciences' initial comments, these reply comments address primarily the impact of the Commission's reallocation proposal on the 2.1-2.2 GHz band and, unless otherwise stated, do not address the Commission's reallocation proposal as it may apply to other targeted frequencies.

Telesciences outlined a plan in its comments whereby the Commission would implement spectrum reallocation in stages with the most heavily used portion of the 2.1-2.2 GHz band being reallocated in the final stage.

Many other commenters expressed views consistent with or supportive of Telesciences' position. As discussed below, the comments in this proceeding demonstrate that the Commission should not disturb the existing extensive operations using the 2.1-2.2 GHz band to create reserve spectrum for emerging technologies. The Commission instead should look to other alternatives including particularly underutilized government spectrum. Indeed, the wealth of comments calling for a thorough examination of the government spectrum at the 1.7-1.8 GHz band demands that the Commission reconsider this alternative before rendering a reallocation decision in this docket.

The comments support Telesciences' view that the manufacturing and service industry, as well as the user community, would benefit from the adoption of Telesciences' approach to the 2.1-2.2 GHz band. Telesciences' approach is fully consistent with the Commission's public interest objectives to promote the rapid and efficient introduction of emerging technologies in the United States.

I. Reallocation of the 2.1-2.2 GHz Frequencies Would Adversely Affect Important Existing Uses

The initial comments in this proceeding support Telesciences' view that the Commission should not adopt that part of its proposal that would reallocate the 2.1-2.2 GHz band to emerging technology uses. As a major manufacturer of 2 GHz equipment, the release of the Commission's proposal to reallocate the 2.1-2.2 GHz frequencies came with little advance notice to the manufacturing industry and the user community. To date, most of the spectrum-related debate (and field trials) within the industry and at the Commission has centered on other frequencies proposed for use by emerging technologies, such as personal communications services ("PCS"). In Telesciences' experience, neither the manufacturing community nor the users of the 2.1-2.2 GHz band anticipated that the existing extensive use of the 2.1-2.2 GHz band would be entirely supplanted by a reserve band for emerging technologies. It is Telesciences' position that the Commission presented its proposal without adequate inquiry into the nature and extent of the current uses of the 2.1-2.2 band or the practical impact of reallocating these frequencies.

Several other parties expressed similarly strong concerns regarding this aspect of the Commission's proposal. Indeed, Southwestern Bell Corporation also states that "compelling reasons justify completely excluding the 2.11-2.20 GHz common carrier band from the proposed allocation."^{2/}

^{2/} Southwestern Bell Corporation Comments at 10.

2 GHz microwave is used heavily in landline telephone and cellular radio systems.^{4/} McCaw Cellular Communications, Inc., an extensive user of 2 GHz spectrum in its cellular systems, details in its comments the cellular industry's substantial reliance on fixed microwave operations at the 2.1-2.2 GHz band to provide critical radio transmission services.^{5/} Common carrier microwave provides essential links between mobile telephone switching offices ("MTSOs") and cell sites and between cell sites.^{6/}

The Commission's 2.1-2.2 GHz reallocation proposal, if adopted, would substantially undermine the important services which rely on cellular systems by eliminating a critical transmission medium used in existing cellular services. Common carrier cellular services play a significant role in providing flexible services and necessary redundancy to commercial business operations. NYNEX Mobile indicates that it relies on 2 GHz point-to-point microwave to exercise greater control over

^{4/} See, e.g., Century Telephone Enterprises, Inc. Comments at 2; Southwestern Bell Corporation Comments at 12.

^{5/} McCaw Cellular Communications, Inc. Comments at 11-19; see also Bluegrass Cellular, Inc. Comments at 1-2 (rural cellular carriers rely on microwave); Century Telephone Enterprises, Inc. Comments at 4, n.3 (describing widespread cellular carrier reliance on 2 GHz microwave).

^{6/} McCaw Cellular Communications, Inc. Comments at 13-16 (microwave is a mainstay of the cellular radio telecommunications service); Century Telephone Enterprises, Inc. Comments at 4, n.3 (microwave links cells to MTSOs).

cellular system operations and maintenance.^{7/} Southwestern Bell and Centel Corporation describe the importance of the 2 GHz frequencies to delivering high quality telephone service to remote, rural areas and providing needed connectivity in cellular systems.^{8/} Southwestern Bell also states that the 2.1-2.2 GHz band is essential to its wide area paging services serving, among other user groups, emergency service providers.^{9/}

The comments also show that state and local governments are increasingly relying on common carrier cellular services to provide critical transmission services for police, fire, utility and other essential government ^{10/} Several parties confirm that the 2.1-2.2 GHz common carrier band is currently devoted to efficient uses and which will be relatively expensive to relocate.^{11/} NYNEX Mobile urges the Commission to undertake further analysis before compelling relocation of 2 GHz microwaves which will be "costly and disruptive to the efficient provision

^{7/} NYNEX Mobile Communications Company Comments at 2.

^{8/} Southwestern Bell Corporation Comments at 11-13; Centel Corporation Comments at 6-7; see also Bluegrass Cellular, Inc. Comments at 1-2 (microwave is most cost effective technology for rural cellular).

^{9/} Southwestern Bell Corporation Comments at 9-12.

^{10/} McCaw Cellular Communications Inc. Comments at 12; Southwestern Bell Corporation Comments at 11-13.

^{11/} See, e.g., Pacific Telesis Comments at 2-3; Centel Corporation Comments at 18-20. Centel argues that the Commission has underestimated the cost of relocating 2 GHz microwave users. According to Centel, relocation costs could be prohibitive in rural areas.

of cellular service," and ultimately "profoundly impact the development of this country's telecommunications infrastructure."^{12/}

Other parties also share Telesciences' concern that reallocation of the 2 GHz frequencies would cause substantial loss of investment in relatively new microwave facilities. Reallocation of the 2 GHz frequencies would not only impair the substantial manufacturing resources invested to address the recently expanding demand for high quality 2 GHz equipment, but also cellular operators and other 2.1-2.2 GHz band users would be unable to recover their substantial investments in 2 GHz microwave networks.^{13/} Telocator states that because many cellular and paging operators are still in the process of building out their networks, most narrowband microwave equipment is relatively new. Replacement of such equipment therefore will be costly.^{14/} Century Telephone Enterprises similarly states that it will lose substantial investment in microwave radios installed less than two years ago unless the Commission reverses or modifies its secondary status decision.^{15/}

^{12/} NYNEX Mobile Comments at 2.

^{13/} See, e.g., Telocator Comments at 13-14; Century Telephone Enterprises, Inc. Comments at 4-5; Alltel Telephone Companies Comments at 4.

^{14/} Telocator Comments at 13; Century Telephone Enterprises, Inc. Comments at 2.

^{15/} Century Telephone Enterprises, Inc. Comments at 4. The Commission should ensure that its proposal in this proceeding
(continued...)

II. Many Commenters Agree That The Commission Should Explore Alternative Spectrum Bands Before Disrupting Existing Operations

Many parties urged the Commission to look to other spectrum bands that potentially could, if used, avoid the need to disrupt important and established fixed microwave operations.^{16/} These commenters all share Telesciences' view that the public interest would be served by examining other possible spectrum sources, particularly bands that may be currently underutilized.

The comments specifically contained strong, widespread support for examining the 1.7-1.8 GHz band currently allocated for government uses as a candidate for part of the emerging technologies reserve band or as replacement spectrum for displaced users.^{17/} Other commenters also urged the Commission

^{15/} (...continued)

does not entirely nullify existing investment in microwave networks and effectively paralyze the system expansion plans of cellular carriers and other 2 GHz microwave users. See Sooner Cellular Comments at 3 (FCC proposal would preclude expansion of existing 2 GHz systems). These operators require microwave expansions to meet customer demand and maintain high quality services. See Century Enterprises, Inc. Comments at 4. Accordingly, Telesciences supports the Commission's action in the May 14, 1992 Public Notice "Two Gigahertz Fixed Microwave Licensing Policy", Mimeo 2315, which permits carriers to expand or modify their microwave networks as necessary. See also Bluegrass Cellular, Inc. Comments at 4 (supporting FCC modification policy).

^{16/} See, e.g., AT&T Communications, Inc. Comments at 2; Telocator Comments at 9; Harris Corporation-Farion Division Comments at 8-9; United Telephone Companies Comments at 4; Southwestern Bell Corporation Comments at 14, Pacific Telesis Comments at 4.

^{17/} See, e.g., AT&T Communications, Inc. Comments at 2, 14-17; Communications Satellite Corporation Comments at 24; Vanguard
(continued...)

to consider the upper 2 GHz frequencies (2500-2699 MHz).^{18/} Although the National Telecommunications and Information Administration ("NTIA") questions whether the government band is suitable for emerging technology operations,^{19/} the critical importance of the Commission's allocation decision in these proceedings warrants a close and rigorous analysis of all reasonable possibilities.^{20/} Telesciences urges the Commission to respond to widespread support in the comments for reviewing the potential use of government and other alternative spectrum.

III. Existing Spectrum Users Should Not be Displaced Until The Commission More Clearly Defines the Emerging Technologies That Will Use the Spectrum Reserve

Other parties also echoed Telesciences' concern that the Commission should not make significant reallocation decisions that materially affect existing spectrum users until it obtains more definite information regarding the emerging technologies

^{17/} (...continued)

Cellular Systems, Inc. Comments at 2-3, 6-7; Institute of Electrical and Electronic Engineers ("IEEE") Comments at 2; American Personal Communications, Inc. Comments at 19.

^{18/} See Coastal Corporation Comments at 5; Vanguard Cellular Systems, Inc. at 17.

^{19/} The NTIA states that the 1710-1850 MHz band may be inappropriate for nongovernment operations based on the diverse uses of spectrum by federal agencies and the number of transmitters in the 2 GHz band. NTIA Comments at 4, 18-19.

^{20/} Telesciences agrees with the IEEE that the difficulties and costs of relocating 2 GHz users calls for a "thorough examination of all possibilities." IEEE Comments at 2.

that will use the reserve band.^{21/} Elemental features of the emerging technologies cited by the Commission are still only loosely defined. PCS, for example, is the subject of numerous proposals with diverse technical and licensing features, including broadband and narrowband spread spectrum features, frequency hopping features, wireless PBX applications, wireless local area network applications, etc. Further, the specific demand for the various forms of PCS and other emerging technologies has not been clearly established.^{22/}

Given that emerging technologies are, by definition, still evolving, Telesciences and other parties urge the Commission to proceed cautiously in rendering its reallocation decision in this proceeding. The public interest would not be served if the Commission decides to oust existing 2 GHz operations, which provide much needed efficient and reliable communications services, only to allow that spectrum to be underutilized while waiting for emerging technologies to develop sufficiently to permit implementation.^{23/}

^{21/} See, e.g., Southwestern Bell Corporation Comments at 6-7 (Commission should obtain more demand and technical data before displacing current licensees with existing, proven uses).

^{22/} See Southwestern Bell Corporation Comments at 3-4.

^{23/} See also McCaw Cellular Communications Comments at 37.

IV. The 2.1-2.2 GHz Band Should Be Released, If At All, at the End of a Phased Reallocation Plan

Based on the factors discussed above and as supported in the opening comments, the public interest would be best served if the Commission refrained from reallocating the 2.1-2.2 GHz frequencies to the emerging technologies reserve band. If the Commission nevertheless decides to reallocate these frequencies, Telesciences urges the Commission to defer allocation of the 2.1-2.2 GHz band.^{24/} Consistent with Telesciences' position, Pacific Telesis proposes that the common carrier band at 2100-2200 MHz should be held in reserve for future use, if needed. Pacific Telesis comments at 2-3.

Telesciences specifically recommends that the Commission adopt a phased implementation approach if reallocation of the 2.1-2.2 GHz band is determined to be necessary. As outlined in its initial comments, the Commission should first look to underutilized 1.7-1.8 GHz government spectrum to house an emerging technologies reserve band. After suitable government spectrum is exhausted, Telesciences recommends that the Commission then reallocate the 1.8-1.9 GHz band to emerging technologies.

^{24/} Southwestern Bell similarly argues that common carrier microwave networks support important public uses and that if the Commission decides to reallocate frequencies, spectrum from the private radio band at 1.8-1.9 GHz should be allocated "before the Commission reaches or considers a reallocations of spectrum from within the common carrier band. This could occur in stages." Southwestern Bell at 14, n.27.

As the last stage in Telesciences' suggested phased approach, the Commission should look to the 2.1-2.2 GHz band to provide frequencies for emerging technologies. Telesciences believes that there should be a minimum of eighteen months notice (and preferably longer) to the industry prior to reallocation of frequencies in this last phase. In the 2.1-2.2 GHz band, the Commission should initially release the common carrier and private microwave spectrum bands that currently have the least licensing activity -- the 2130-2150 and the 2180-2200 MHz band. The final reallocation in Telesciences' approach is the 2110-2130 and 2160-2180 MHz band (for which most requests for new fixed microwave facilities are filed.) Reallocation of these frequencies should occur when the Commission identifies the market need and no less than three years after the reallocation of the 2130-2150 and 2180-2200 MHz band.

Telesciences' phased reallocation plan would permit the Commission to devote sufficient spectrum to launch emerging technologies while minimizing the impact on most 2 GHz users. Telesciences agrees with Southwestern Bell that, if reallocation is necessary, the Commission can ensure full spectrum utilization and high efficiency if spectrum is meted out in limited portions rather than in large blocks.^{25/} This approach would provide valuable flexibility while encouraging the development and introduction of emerging technologies.

^{25/} Southwestern Bell Corporation Comments at 15, n.28.

V. The 10.5 GHz Digital Termination Service Frequencies Should Be Made Available to Replace 2 GHz Spectrum

Like Telesciences, a number of commenters also questioned whether the 4 GHz and 6 GHz bands are suitable to accommodate fixed microwave users displaced from the 2 GHz band.^{26/} These commenters identified a number of critical technical and operational issues that must be thoroughly addressed and resolved before the Commission can rely on the 4 GHz and 6 GHz bands to accommodate displaced users.^{27/} Accordingly, the opening comments also revealed a broad consensus that, under current rules, the 4 GHz and 6 GHz spectrum bands are not well-suited to accommodate displaced and new 2 GHz users.^{28/}

Due to the need for additional replacement frequencies for 2 GHz users, Telesciences proposed in its comments that the 10.5 GHz Digital Termination Service Band (10580-10615; 10645-10680 MHz) should be made available for displaced and new private and common carrier fixed microwave users. Consistent with many other parties' views, Telesciences believes that the Commission should look carefully at underutilized portions of the spectrum in

^{26/} See, e.g., Harris Corporation - Farinon Division Comments at 3-4; Southwestern Bell Corporation Comments at 7; Alcatel Network Systems, Inc. Comments at 16-23.

^{27/} The IEEE, for example, stated that congestion at the 4 GHz and 6 GHz band, among other factors, indicates that the best choice for some facilities is to continue operating at the 2 GHz frequencies. IEEE Comments at 4.

^{28/} See, e.g., Alltel Companies Comments at 4; McCaw Cellular Communications, Inc. Comments at 26-30; NTIA Comments at 3; Alcatel Network Systems, Inc. Comments at 26-32.

rendering its reallocation decision in this proceeding.

Telesciences' 10.5 GHz proposal would, if adopted, lead to more efficient use of the currently underutilized 100 MHz DTS band. Indeed, Telesciences believes that the public interest would be served if the 10.5 GHz band were made available regardless of whether all 220 MHz targeted for emerging technologies is reallocated at this time or whether the Commission adopts a phased reallocation approach.

To accommodate point-to-point operations in the 10.5 GHz band, the Commission must revise the existing frequency stability and spectrum mask requirements for the DTS frequencies. Further, the 10.5 GHz DTS frequencies should be made subject to the same channelization and rules for technical operation as those that apply to the 10 GHz point-to-point band (10550-10580, 10615-10645 MHz). Telesciences submits that the public interest would benefit significantly if it permits the greatly underutilized DTS portion of the band to relieve, in part, the current need for 2 GHz replacement spectrum.

CONCLUSION

For the reasons discussed above, Telesciences urges the Commission to adopt Telesciences' recommendations regarding the Commission's spectrum reallocation proposal in ET Docket 92-9.

Respectfully submitted,

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