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

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FEDERAL COMMUNICATIONS COMMISSION
OFFICE OF SECRETARY

In the Matter of	)	
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Preparation for International Telecommunication Union World Radiocommunication Conferences	)	IC Docket No. 94-31
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To: The Commission

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SUMMARY

In this Second Notice of Inquiry for developing positions in the 1995 World Radiocommunication Conference ("WRC-95"), the Commission proposes allocating the upper 6 GHz (6.525-6.875 GHz), 11 GHz (10.7-11.7 GHz), 18 GHz (17.7-19.7 GHz) and 28 GHz (27.5-29.5 GHz) bands to be used as feeder links for non-geostationary orbit ("NGSO") mobile-satellite service ("MSS") feeder links. Alcatel Network Systems, Inc. ("ANS"), a leading fixed point-to-point microwave manufacturer, as well as the fixed point-to-point microwave industry, strongly oppose this proposal.

The upper 6, 11, 18 and 28 GHz bands are, or are proposed to be, allocated for fixed point-to-point microwave use. They already are heavily used by local exchange carriers, cellular telephone companies, utilities, railroads, petroleum companies, financial institutions, and federal, state and local governments to satisfy myriad telecommunications needs, including provision of essential public health and safety services. Availability of the upper 6 and 11 GHz bands will become even more limited once they start being used by the 2 GHz fixed point-to-point microwave licensees relocated under ET Docket No. 92-9 to clear spectrum for emerging technologies, including personal communications services ("PCS"), and by PCS licensees for backbone networks.

Permitting NGSO MSS feeder links in the upper 6, 11, 18 and 28 GHz bands directly threatens fixed point-to-point microwave users. It is dangerous for fixed point-to-point microwave and NGSO MSS users to share these bands because they would cause each other serious harmful interference. The mobile satellite earth station transmitters for the low earth orbit ("LEO") satellites using the NGSO MSS feeder links would cause excessive interference to fixed point-to-point terrestrial microwave receivers and fixed point-to-point terrestrial microwave transmitters would cause excessive interference to LEO feeder link earth station receivers. This interference results because LEOs can appear anywhere in the sky, which precludes any path coordination with fixed microwave systems and eliminates any other safeguards against interference.

ANS recognizes the important role of the NGSO MSS and supports the Commission's efforts to ensure that NGSO MSS needs are accommodated fully at WRC-95. This support, however, must not be at the expense of the fixed point-to-point microwave industry. Having surrendered valuable spectrum for PCS in ET Docket No. 92-9, fixed point-to-point microwave users already have made their contribution. It is now time for other users to make a similar sacrifice.

To meet the needs of NGSO MSS users, while protecting the needs of fixed point-to-point microwave users, ANS proposes that:

- The upper 6, 11, 18 and 28 GHz bands must not be reallocated for NGSO MSS feeder links.
- The 3.7-4.2 GHz band, currently allocated for fixed point-to-point and for satellite use, would be made available for NGSO MSS feeder links. In addition, the lightly used 3.5-3.7 GHz band, which is allocated on a shared basis for government and non-government uses, also could be used for the NGSO MSS feeder links. Other bands also could be evaluated as candidates for these feeder links.

This is not the first time fixed point-to-point microwave users have been asked to share spectrum with satellite users. As the original occupants of the 3.7-4.2 GHz band, fixed point-to-point users have seen their ability to access these frequencies severely limited by fixed satellite users over the years. History must not, and should not, repeat itself.

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To: The Commission

Pursuant to Section 1.430 of the Commission's Rules,[1] Alcatel Network Systems, Inc. ("ANS"),[2] by its attorney, hereby replies to certain issues raised in the Second Notice of Inquiry in the above-captioned proceeding (released January 31, 1995) ("Second NOI") and in comments thereon.[3]

The Commission, in the Second NOI, seeks public input on several recommendations for the 1995 World Radiocommunication Conference ("WRC-95"). Among these recommendations are allocating specific candidate bands for non-geostationary orbit ("NGSO") mobile-satellite service ("MSS") feeder links. The Commission considers it "critical that sufficient suitable spectrum be

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[1]47 C.F.R. Section 1.430 (1994).

[2]ANS is a wholly-owned subsidiary of Alcatel Alsthom ("Alcatel"), one of the world's largest corporations (with annual sales in excess of $30 billion) and the world's largest manufacturer and supplier of telecommunications equipment. In particular, Alcatel is the world's largest independent manufacturer and supplier of microwave radios. Formerly Collins Radio and Rockwell International, ANS, with over $750 million in annual sales, is a world leader in manufacturing microwave and light wave transmission systems. ANS' equipment is used for a wide range of services, including short, medium and long-haul voice, video and data transmission. Its microwave customers include all the Bell Operating Companies, most major independent telephone companies, cellular operators, power and other utility companies, oil companies, railroads, industrial companies, and state and local government agencies.

[3]The deadline for filing reply comments on the Second NOI was extended from March 21, 1995, to April 14, 1995. Order (DA 95-421, released March 6, 1995).

identified and made available for use for NGSO MSS feeder links" in order "to implement [such] systems currently proposed in the United States and elsewhere . . . ."[4] Such frequencies include channels in the upper 6 GHz (6.525-6.875 GHz), 11 GHz (10.7-11.7 GHz), 18 GHz (17.7-19.7 GHz) and 28 GHz (27.5-29.5 GHz) bands.[5] These bands currently are allocated, or proposed to be allocated, for fixed point-to-point microwave use. As detailed herein, ANS strongly opposes reallocation of these bands for NGSO MSS feeder links.

If the Commission's proposal is adopted, currently allocated use of these bands by fixed point-to-point microwave licensees would be seriously restricted or totally foreclosed. Having fixed point-to-point microwave transmitters/receivers and NGSO MSS earth station transmitters/receivers share the same bands would cause chaos because of serious harmful inter-system interference. The current marginal ability of fixed point-to-point microwave users to share spectrum in the 4 GHz (3.7-4.2 GHz), lower 6 GHz (5.925-6.425 GHz), 11 GHz and 18 GHz bands with geostationary or fixed satellite ("FSS") users would not be possible in the upper 6, 11, 18 and 28 GHz bands with the introduction of non-geostationary MSS users.

History should not be allowed to repeat itself as fixed point-to-point users, which were the original occupants of the 4 GHz band, were forced to share this band with FSS users. This sharing has resulted in fixed point-to-point users effectively losing the 4 GHz band because of interference problems. Indeed, given this totally unacceptable scenario, the fixed point-to-point microwave industry joins ANS in opposing this reallocation.[6]

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[4]Second NOI at para. 53.

[5]Second NOI, Table 2.

[6]In reply comments to be filed on the Second NOI, the Fixed Point-to-Point Communications Section, Network Equipment Division of the Telecommunications Industry Association ("TIA"), vehemently opposes the Commission's proposal for NGSO MSS feeder links. TIA is the principal industry association representing fixed point-to-point microwave radio manufacturers. TIA members serve, among others, companies licensed by the Commission to use the 2 GHz private and common

FIXED POINT-TO-POINT MICROWAVE USERS PROVIDE ESSENTIAL SERVICES ON THE NGSO MSS FEEDER LINK CANDIDATE BANDS

The assault on fixed point-to-point microwave users must stop. While uninhibited development of MSS technology is in the public interest, protection of fixed point-to-point users is equally important. These users provide critical existing telecommunications services and are irreplaceable building blocks for PCS and other emerging technologies that, ironically, will be complemented by MSS.

Fixed point-to-point users provide telecommunications services for local exchange carriers, cellular telephone companies, utilities, railroads, petroleum companies, financial institutions, and federal, state, and local government agencies. Essential public health and safety services are delivered over fixed point-to-point microwave networks.

The upper 6 GHz band is used by common carriers and private carriers primarily for narrowband (10 MHz or less channel bandwidths) long-haul microwave systems. For example, cellular carriers use this band to interconnect their sites.

The 11 GHz band is used for high capacity (30-40 MHz channel bandwidth), short-haul systems. Two band segments, from 10.95-11.2 GHz and from 11.45-11.7 GHz, are shared with geostationary satellite downlinks (space-to-earth). Terrestrial operators typically use the 11 GHz band where the Commission's EIRP rules restrict the use of the lower 6 GHz band (which is also channelized for high capacity systems), or where no frequencies are available in the lower 6 GHz band due to congestion. Such congestion in the lower 6 GHz band may be caused by other terrestrial systems or by interference from a satellite earth station.

The 18 GHz band is currently shared by Part 21 common carriers and Part 94 private operators. The band segment from 18.8-19.7 GHz is shared with geostationary satellite downlinks

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carrier bands for provision of important and essential telecommunications services.

(space-to-earth). The 18 GHz band is heavily used in metropolitan areas for short microwave paths (e.g., less than 5 miles). Typical terrestrial users are cellular providers and industrial operators which provide remote local area networks among buildings. In the future, PCS providers will use 18 GHz for microcell connections.

Proposals are pending to channelize the 28 GHz band for fixed point-to-point use.[7] However, this band also is subject to competing proposals for FSS and Local Multipoint Distribution Systems.[8]

Congestion in the upper 6, 11, 18 and 28 GHz bands already exists.[9] To clear spectrum for PCS and other emerging technologies, fixed point-to-point microwave licensees in the 2 GHz band are being forced to use the upper 6 and 11 GHz bands.[10] Demand for these bands by relocating 2 GHz users and by developing wireless network operators (e.g., PCS microcell interconnects, industrial parks, back-up data transfer circuits), will tax these limited resources even further.

Most of these displaced 2 GHz users are long-haul, low capacity systems, which will gravitate to the upper 6 GHz band because of its narrowband channelization. Unfortunately, these channels would not be available to fixed microwave users if NGSO MSS feeder links share the band. Pressure also will be felt in the lower 6 GHz band (5925-6425 MHz) during this migration of 2 GHz users

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[7]See Joint Petition for Rulemaking, filed February 9, 1995, by Harris Corporation-Farinon Division and Digital Microwave Corporation, to reallocate the 28 GHz band for fixed point-to-point microwave users.

[8]See Notice of Proposed Rulemaking, Tentative Decision and Order on Reconsideration, CC Docket No. 92-297, 8 FCC Rcd 557 (1993).

[9]The 6525-6875 MHz band already has over 11,000 microwave links in the U.S. The 6 GHz band already supports the next greatest utilization for fixed point-to-point microwave after the 2 GHz band. Frequencies are difficult to find in many metropolitan areas. This level of usage obviously will grow considerably as the 2 GHz band migration evolves.

[10]Redevelopment of Spectrum to Encourage Innovation In the Use of New Telecommunications Technologies, Second Report and Order, ET Docket No. 92-9, 8 FCC Rcd 6495, 6519-20 (1993), modified, Memorandum Opinion and Order, 9 FCC Rcd 1943 (1994).

because that band is channelized for high capacity systems. Even before the 2 GHz users relocate, it is quite difficult to coordinate lower 6 GHz paths in urban areas due to congestion. The similar attributes of the 11 GHz band make it a valuable option for high capacity users which can not access the lower 6 GHz band, but this safety valve also would be eliminated if sharing with NGSO MSS feeder links is required. Thus, sharing the upper 6, 11, 18 and 28 GHz bands with NGSO MSS feeder links clearly would threaten these services.

FIXED POINT-TO-POINT MICROWAVE LINKS AND NGSO MSS FEEDER LINKS CAN NOT SHARE THE SAME FREQUENCY BANDS

In ET Docket No. 92-9, the Commission began the process of redeveloping the 2 GHz spectrum for new telecommunication technologies. The outcome of that process was to reallocate 200 MHz of the 2 GHz band for PCS use. After much work, the fixed microwave industry developed the rules necessary to allow the higher frequency bands (upper and lower 6 GHz and 10/11 GHz) to accept the migration of existing 2 GHz users out of that band. Rules allowing the 4 GHz band to be used for this migration could not be developed due to significant concern by FSS users that increased utilization of that band would harm satellite earth station receivers. Unfortunately, now the Commission proposes to put incompatible NGSO MSS users in the very bands needed to support PCS.

Requiring satellite users and fixed point-to-point microwave licensees to share spectrum is like tilting at windmills. Currently, fixed point-to-point microwave systems share frequency allocations with fixed satellite systems in the 4 GHz, lower 6 GHz, 11 GHz and 18 GHz bands. Such sharing currently is possible only because geostationary satellites are involved. These synchronous satellites are positioned along a broad arc that extends across the middle of the sky. Most paths between earth stations and satellites are too far above the horizon to affect terrestrial paths, which are parallel to the ground. With the exception of two points on the horizon (southeast and southwest in North

America), fixed system transmitters will not be pointed toward satellites and earth station transmitters will not be pointed toward fixed microwave receivers. In practice, these interference cases are avoided in all but a few cases by making sure that all fixed point-to-point paths avoid the two critical terrestrial paths.

The inability of fixed microwave systems to exploit the 4 GHz band is a prime example of this problem. The proliferation of licensed satellite earth stations, especially in urban areas, the co-primary status of FSS and fixed microwave users for the entire 3.7-4.2 GHz band, and the acute sensitivity of these receivers to fixed point-to-point microwave transmissions, all contribute to making coordination of fixed microwave paths in the 4 GHz band virtually impossible.

These problems have been less severe in the lower 6, 11 and 18 GHz bands. Unlike the 4 GHz band, these other bands have been partitioned between frequencies assigned to FSS users and to fixed point-to-point users. This partitioning makes it somewhat easier to share. In addition, the 4 GHz band has more satellite earth stations than the other bands, and these satellite earth stations are quite susceptible to interference from fixed point-to-point transmitters.[11]

What the Commission proposes in the Second NOI would be to add non-geostationary, mobile satellite earth station transmitters and receivers in the upper 6 GHz and 11 GHz bands and earth station transmitters in the 18 GHz band.[12] Of course, the earth station receivers would limit fixed microwave expansion severely, as is currently the case in the 4 GHz band. Unlike fixed satellite earth station transmitters, mobile satellite earth station transmitters for low earth orbit ("LEO") satellites would cause excessive interference to fixed point-to-point terrestrial microwave receivers. Likewise, fixed point-to-point terrestrial microwave transmitters could interfere with LEO earth station receivers.

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[11]For example, the 11 GHz band is used sparingly by satellite licensees.

[12]See attached chart which depicts this proposed allocation.

This undesirable situation occurs because the LEOs, unlike synchronous satellites, can appear anywhere in the sky (and will appear at all points of the compass as they go over the horizon). Mutual satellite/terrestrial system interference would occur regardless of the orientation of the terrestrial path. Thus, the Commission's proposal to add non-geostationary, mobile earth station satellite transmitters and receivers to terrestrial fixed point-to-point microwave bands would adversely affect the use of these bands by their current primary users, terrestrial fixed point-to-point microwave users.

The Commission's specific proposed reallocation of the upper 6, 11, 18 and 28 GHz bands to accommodate NGSO MSS feeder links must not be adopted. As detailed below, these problems compel further Commission study.

The Commission proposes that the 6.725-6.875 GHz segment of the upper 6 GHz band be used for geostationary satellite uplinks (earth-to-space), and that the 6.825-6.875 segment be used for NGSO downlinks (space-to-earth). If the Commission's proposal is adopted, frequency coordination between satellites and terrestrial systems will be extremely difficult due to the large number of narrow channel bandwidths defined in Parts 21 and 94 of the Commission's Rules (i.e., 400 and 800 KHz, 1.25, 2.5, 3.75, 5 and 10 MHz bandwidths). In ET Docket No. 92-9, satellite interests were totally opposed to rechannelization of the 4 GHz band into narrower channel bandwidths due to the difficulty of frequency coordination with wide satellite transponder bandwidths. In addition, earth stations tracking NGSO satellites would receive interference from a much larger number of terrestrial stations than a fixed earth station, since the earth station would be pointed in different directions. Consequently, it is more likely that a NGSO earth station will block the frequency coordination of a terrestrial station. This blockage may prevent a 2 GHz system from relocating to the upper 6 GHz band and correspondingly may impede clearing the 2 GHz band for PCS.

The Commission proposes that the entire 10.7-11.7 GHz band be shared between geostationary satellites downlinks (space-to-earth) and terrestrial point-to-point microwave systems. It also proposes that two segments of the band, from 10.7-10.95 GHz and from 11.2-11.45 GHz, be shared with NGSO satellite uplinks (earth-to-space). This proposal will create a situation similar to the situation that currently exists in the 4 GHz band, where the entire band is shared between satellite downlinks and point-to-point microwave systems. Due to the acute sensitivity of the earth stations to terrestrial interference, it will become increasingly difficult or impossible to coordinate terrestrial paths in the 11 GHz band.[13]

For the 18 GHz band, the Commission proposes allocating the 18.9-19.2 GHz band segment for NGSO downlinks (space-to-earth). This allocation will make it very difficult for fixed microwave systems to operate in the 18 GHz band. It would affect the availability of 24 pairs of 10 MHz bandwidth channels, which amounts to 35% of the total available channels for Part 21 and Part 94 licensees. The 10 MHz channels also are the most heavily used in the 18 GHz band.

ALTERNATIVE BANDS FOR NGSO MSS FEEDER LINKS MUST BE CONSIDERED

Before rushing to judgment, the Commission must examine fully all options for NGSO MSS feeder links. Allocation of spectrum for these feeder links must not result in displacement of other users due to interference problems. Handicapping one service to promote another does not serve the public interest. Thus, Commission, at this stage of developing strategies for WRC-95, must consider and study all options.

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[13]Currently, only part of the 11 GHz band is shared between satellite and terrestrial users (i.e., in two band segments, 10.95-11.2 GHz and 11.45-11.7 GHz). When there is a frequency coordination problem between satellite and terrestrial users, it is usually possible for the terrestrial operator to find an alternate frequency in the unshared portion of the band. Under the Commission's proposal, however, it will be impossible to avoid the earth station interference by shifting to another frequency within the band.

Based upon the record of this proceeding, it appears that approximately 200 MHz is needed to accommodate demand for NGSO MSS feeder links. Instead of endangering fixed point-to-point user access to the upper 6, 11, 18 and 28 GHz bands, the Commission, for example, could examine the 3.5-4.2 GHz band.

This band is a prime candidate for NGSO MSS feeder links. The 3.7-4.2 GHz band is allocated on a co-primary basis for common carrier and private fixed and for fixed-satellite (downlink) use. It is used primarily by licensed satellite and unlicensed receive-only earth stations. In addition, the 3.5-3.7 GHz band also could be considered. It is allocated on a shared basis for government and for non-government uses. The Commission, at a minimum, should consider this band for NGSO satellite uplinks (earth-to-space) instead of using the 11 GHz band.

CONCLUSION

Until now, the Commission and the public, in this inquiry for WRC-95, have been silent regarding the potential negative impact on fixed point-to-point users. The stakes are too high for the microwave industry to remain silent.

Implementation of the Commission's proposed reallocation of the upper 6, 11, 18 and 28 GHz bands for NGSO MSS feeder links would be disastrous for the fixed point-to-point microwave industry. Important public services, PCS support networks, and utility operations would be threatened or shut-down. Thus, the Commission must change course, eliminate the upper 6, 11, 18

and 28 GHz bands as candidates for the NGSO MSS feeder links, and evaluate the 4 GHz and other bands to provide such needed capacity.

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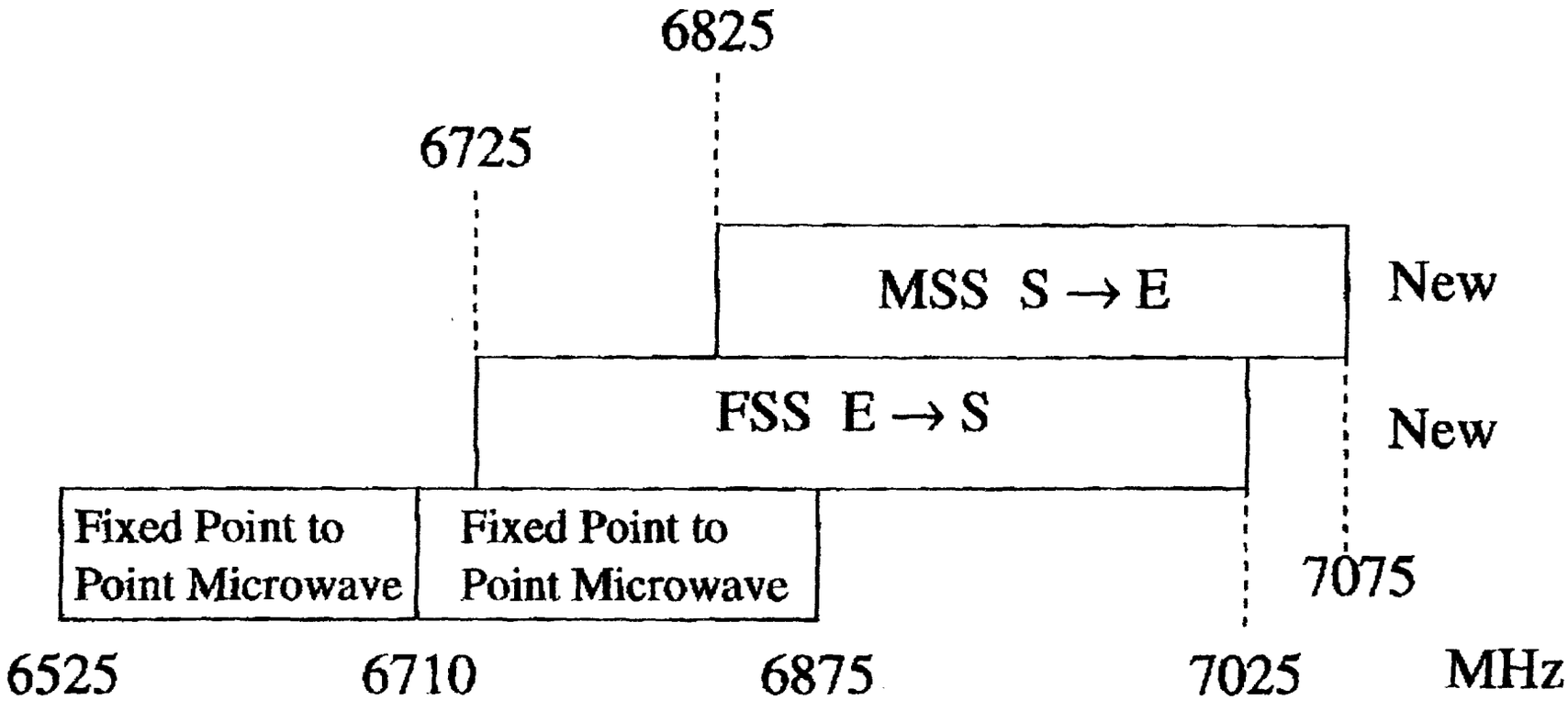
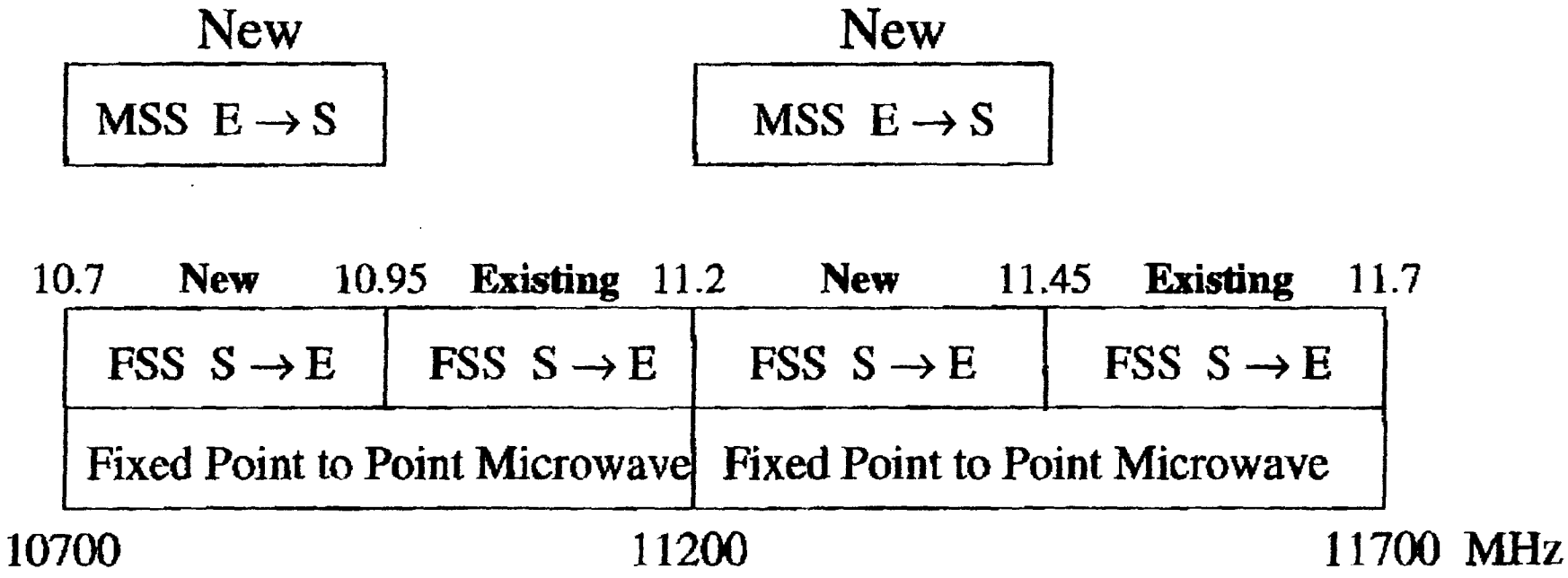
Upper 6 GHz
(Part 21/94)



MSS	=	Mobile Satellite Service (Non-Geostastionary Satellite Orbit)
FSS	=	Fixed Satellite Service (Geostationary Satellite Orbit)
E → S	=	Earth to Space (earth transmitters)
S → E	=	Space to Earth (earth receivers)

11 GHz
(Part 21/94)



MSS	=	Mobile Satellite Service (Non-Geostastionary Satellite Orbit)
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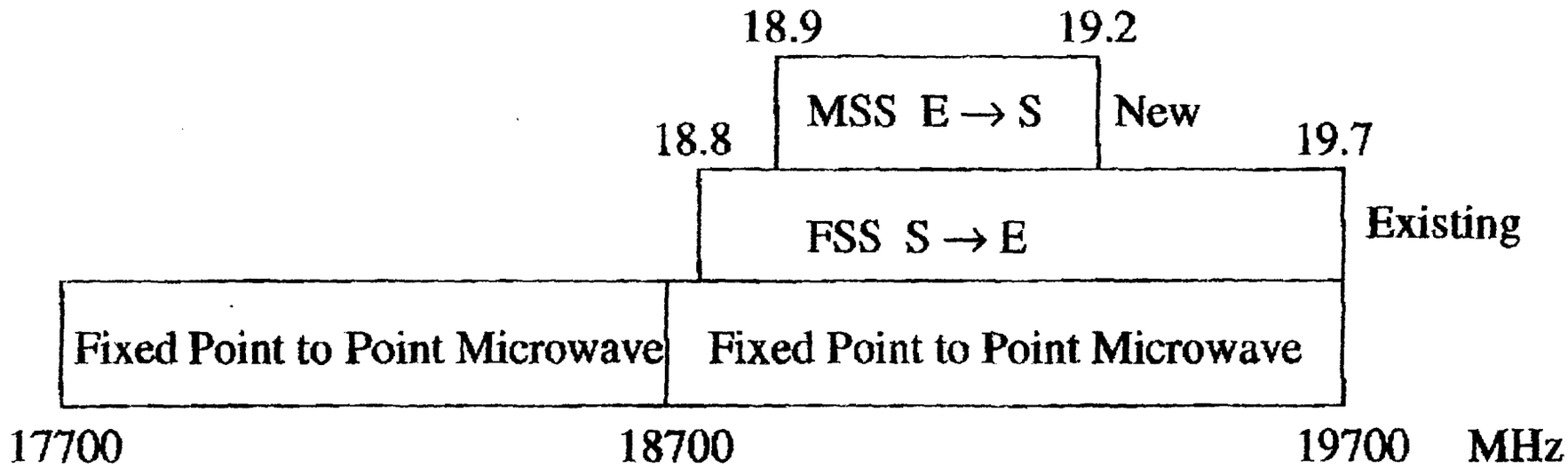
E → S	=	Earth to Space (earth transmitters)
S → E	=	Space to Earth (earth receivers)

18 GHz
(Part 21/94)



MSS	=	Mobile Satellite Service (Non-Geostastionary Satellite Orbit)
FSS	=	Fixed Satellite Service (Geostationary Satellite Orbit)
E → S	=	Earth to Space (earth transmitters)
S → E	=	Space to Earth (earth receivers)

CERTIFICATE OF SERVICE

I do hereby certify that copies of the foregoing Reply Comments, will be served by first class mail, postage prepaid, on the following parties on the 14th day of April, 1995:

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