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

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DEC - 4 1992

FEDERAL COMMUNICATIONS COMMISSION
OFFICE OF THE SECRETARY

In the Matter of)
)
Amendment of Section 2.106 of the) ET Docket No. ⁹² 90-28
Commission's Rules to Allocate the) RM-7771 PP-29 PP-32
1610-1626.5 MHz and the 2483.5-2500) RM-7773 PP-30 PP-33
MHz Bands for Use by the Mobile-) RM-7805 PP-31
Satellite Service, Including) RM-7806
Non-geostationary Satellites)

COMMENTS

OF

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December 4, 1992

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SUMMARY

Constellation Communications, Inc. ("Constellation") submits these comments in response to the Commission's Notice of Proposed Rule Making Tentative Decision, FCC 92-358 (released September 4, 1992) ("Notice"). In these comments, Constellation notes that many of the technical issues raised in the Notice will also be addressed in the negotiated rulemaking proceeding in CC Docket No. 92-166. Since the purpose of that proceeding is to develop detailed technical rules, Constellation is focusing these comments on the general frequency allocation issues raised by the proposed modifications to Section 2.106 of the Commission's Rules. In particular, Constellation urges the Commission to adopt the primary 1992 WARC MSS allocations in the 1610-1626.5 MHz and 2483.5-2500 MHz bands in order to facilitate the early establishment of multiple LEO systems. Relatedly, Constellation urges the Commission not to implement the secondary downlink allocation in the 1613.8-1626.5 MHz band until such time as it can be demonstrated that this band will not cause harmful interference to those operating facilities on a primary basis in this band. Additionally, Constellation believes that the Commission should not include Radio Regulation ("RR") Nos. 753x, 731x and 733 in the National Table of Frequency Allocations. It believes that clarification is needed of the Commission's application of RR No. 753x and that RR Nos. 731x and 733E are not appropriate for inclusion into columns 4 and 5 of the United States Table of Allocations in their present form. Finally, Constellation urges the Commission to make adequate provisions for feeder links to be used by systems operating in these bands.

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Non-geostationary Satellites)

COMMENTS

Constellation Communications, Inc. ("Constellation"), by its attorneys, submits these "Comments" in response to the Commission's Notice of Proposed Rule Making and Tentative Decision, FCC 92-358 (released September 4, 1992) ("Notice"). The Commission in the Notice is proposing to allocate the bands 1610-1626.5 MHz (L-band) and 2483.5-2500 MHz (S-band) to the mobile satellite service (MSS). These bands are currently allocated to the radiodetermination-satellite service (RDSS). The Commission's proposals are intended to implement the Final Acts of the 1992 World Administrative Radio Conference ("WARC") which provide the international regulatory basis for the early introduction of multiple low-earth orbit ("LEO") satellite systems for personal satellite communications services.

I. Introduction

Constellation is a pending applicant to use these bands for its proposed LEO satellite system to provide voice, data, facsimile and radiodetermination services to

users throughout the world.¹ Constellation has been an active participant in all of the Commission's proceedings to date in this matter, and has participated on the United States delegation to the 1992 WARC. Constellation fully supports the domestic implementation of the 1992 WARC decisions in these bands as set forth below.

In preparing these comments, Constellation notes that many of the technical issues raised in the Notice will also be addressed in the negotiated rule making proceeding in CC Docket No. 92-166.² Since the purpose of that proceeding is to develop detailed technical rules, Constellation is focussing these comments on the general frequency allocation issues raised by the proposed modifications to Section 2.106 of the Commission's rules.³

¹ See application File Nos. 17-DSS-P-91(48) and CSS-91-013. Constellation also submitted a Petition for Rulemaking (File No. RM-7771) to extend the Commission's current licensing rules for radiodetermination-satellite service systems in these bands to cover LEO systems as well.

² See Public Notice, DA 92-1085 (released August 7, 1992).

³ Constellation also filed a request for pioneer's preference which was tentatively denied by the Commission. (Notice at paragraphs 34-36 and 50-51.) Rather than prolong controversy over this question, Constellation urges the Commission to devote its efforts to the CC Docket No. 92-166 proceedings in order to establish licensing rules that will permit multiple LEO systems to be licensed in the RDSS bands. Nevertheless, Constellation reserves its right to request full reconsideration of the Commission's tentative denial of its pioneer's preference request to the extent that any other of the parties pursue such a course of action.

II. The Commission Should Adopt the Primary 1992 WARC MSS Allocations in the 1610-1626.5 MHz And 2483.5-2500 MHz Bands in Order to Facilitate the Early Establishment of Multiple LEO Systems

The current applications for non-geostationary satellite systems in the RDSS bands are directed at the provision of personal satellite communications services, including voice, data, facsimile and position determination. Use of low earth orbits allow such services to be provided today on a global basis with current technology and at an affordable price. While geostationary satellite systems may someday be capable of providing personal satellite communications, the technical risks and costs of erecting the physically large spacecraft antennas necessary to serve handheld terminals put the implementation of such systems into the distant future. Constellation fully supports the Commission's preference for multiple systems operating in the RDSS bands, and believes that the provisions of 1992 WARC Resolutions COM5/8 and COM5/11 provide the international framework under which the United States can promptly implement multiple LEO systems in the RDSS bands.

Geostationary MSS systems already have access to over twice the spectrum that is available in the RDSS bands. The 1525-1559 MHz⁴ space-to-Earth band and the 1626.5-1660.5 MHz bands provide a total of 68 MHz of conventional MSS L-band spectrum for geostationary systems, while there is only a total of 33 MHz available in the RDSS bands proposed to be used by the current LEO applicants. Moreover,

⁴ The 1992 WARC allocated the 1525-1530 MHz band to MSS in order to rectify the previous imbalance between uplink and downlink spectrum.

the American Mobile Satellite Corporation ("AMSC") has already been assigned 28 MHz out of this 68 MHz on an exclusive basis within the United States⁵, and most of the remaining portion of this spectrum will be available for assignment to AMSC and/or additional geostationary MSS systems upon the completion of the allocation proceedings in GEN Docket No. 90-56.⁶

While there may be coordination difficulties between geostationary MSS systems in these conventional MSS L-bands, use of the RDSS bands by geostationary systems is neither a practical nor desirable way of solving them. If multiple geostationary MSS satellite systems serving the United States can not be accommodated in the 68 MHz of conventional MSS L-band, it is difficult to see how providing access to the 33 MHz in the RDSS bands will solve this problem and still permit the establishment of multiple LEO systems.⁷

⁵ See Memorandum Opinion, Order and Authorization, FCC 89-183 (released August 4, 1989), in GEN Docket No. 84-1234 and applications File Nos. 1629-DSS-P/L-85 et al.

⁶ See Notice of Proposed Rule Making, FCC 90-63 (released March 5, 1990), and AMSC applications File Nos. 7/8/9-DSS-MP/ML-90 et al.

⁷ While the Commission may conclude that it currently does not have enough information to evaluate the relative merits of CDMA vs. FDMA-TDMA with regard to sharing, Constellation believes that use of spread spectrum techniques is the only practical technique to allow multiple satellite systems to operate in the RDSS bands on a compatible basis with the other services to which the bands are allocated. However, Constellation believes that this issue is one that will be treated in more technical detail in the licensing proceedings in CC Docket No. 92-166.

III. The Commission Should Not Implement The Secondary Downlink Allocation at 1613.8-1626.5 MHz at this Time

The use of the 1613.8-1626.5 MHz band for space-to-Earth transmissions will cause harmful interference under a wide range of circumstances to Earth-to-space operations being conducted on a primary basis in this band. This interference includes: (1) main beam-to-backlobe interference, (2) main beam-to-main beam interference, and (3) user terminal-to-user terminal interference. Since operations under a secondary allocation must cease if they cause harmful interference to under the primary allocation, no purpose would be served by adopting a secondary downlink allocation in this band if it can not be implemented in practice.

Main beam-to-backlobe interference occurs when the secondary transmitting satellite is located between the primary receiving satellite and the earth's surface. In this case, the secondary transmitting satellite is much closer to the receiving satellite than the ground terminals in the primary path and appears in the main beam (or close-in sidelobe) of the receiving satellite. A large amount of satellite antenna discrimination has to be provided on board the secondary transmitting satellite to protect the low signal levels being received from the ground user terminals.⁸

Interference can also occur when there is a line-of-sight path between an

⁸ If the secondary transmitting satellite is higher in altitude than the primary receiving satellite, then it is the main beam of the secondary transmitting satellite that causes interference into the backlobe of the lower altitude primary receiving satellite and the secondary satellite will have to cease emissions whenever a primary receiving satellite is between it and the earth's surface in order to protect the primary Earth-to-space path.

antenna beam on a secondary transmitting satellite that is pointed at the earth's limb and an antenna beam on a primary receiving satellite. In this case, the secondary transmitting satellite must cease transmissions on such beams to protect the primary uplink operations.

Finally, the user terminals receiving signals from the secondary downlink will also receive interference from the primary uplink user terminals if the distance separating them is small. Where such interference occurs, it is likely to do so for the duration of the interfering call.

No technical analyses have been submitted to demonstrate that these interference cases are in fact solvable. In fact, where a similar bidirectional use of a band was proposed for mobile satellite communications, the Commission rejected that proposal as being infeasible.⁹ The Commission should therefore defer adoption of a secondary allocation for space-to-Earth transmissions in the 1613.8-1626.5 MHz band until a convincing technical showing has been made that secondary MSS downlinks can be operated in this band without causing harmful interference to primary uplinks and without imposing unworkable constraints on primary uplinks to protect reception at the secondary downlink user terminals.

⁹ See Notice Of Proposed Rule Making, FCC 90-63 (released March 5, 1990) in GEN Docket No. 90-56 at paragraph 29.

IV. The Commission Should Not Include Certain International Footnote Provisions in the National Table of Frequency Allocations

A number of footnotes are included in the international table of frequency allocations for the 1610-1626.5 MHz and 2483.5-2500 MHz bands. Three of these provisions (i.e., Radio Regulation (RR) Nos. 753X, 731X and 733E) deal with sharing with other services in the band in an international context. However, Constellation believes that clarification is needed of the Commission's application of RR No. 753X and that RR Nos. 731X and 733E are not appropriate for inclusion in columns 4 and 5 of the United States table of allocations in their current form. Moreover, the national implementation of these footnote provisions should be reserved for the proceedings to establish service rules in these bands.

In RR No. 753X, the 1992 WARC adopted a coordination trigger in the 2483.5-2500 MHz band using the power flux density (PFD) limits given in RR No. 2566. If these values are exceeded, RR No. 753X requires coordination with other countries under the procedures of 1992 WARC Resolution COM5/8. The Commission's position in paragraph 24 of the Notice is confusing because it both "requires" LEO systems to conform to this PFD limit and recognizes the need for coordination if the PFD limit is exceeded.¹⁰

The Commission should license satellite systems to operate in the 2483.5-2500 MHz band at PFD levels that maximize the opportunities for multiple entry, even if

¹⁰ Notice at paragraph 24.

they exceed the PFD levels specified in RR No. 2566. The Commission should therefore clarify its position that it will not "require" LEO systems to conform to the PFD levels specified in RR No. 2566. Of course, any licenses issued by the Commission for LEO systems which exceed these limits will be subject to the completion of international coordination pursuant Resolution COM5/8.¹¹

Constellation believes that the -15 dBW/4 kHz EIRP density limit adopted at the 1992 WARC in RR No. 731X is sufficient to permit sharing of the band by MSS and satellite systems operating in accordance with RR No. 732 (i.e. the Glonass system). However, Constellation also believes that the wording of the final sentence of RR No. 731X, which requires MSS operating under a primary allocation not to cause harmful interference to another primary service, is contradictory to the allocation of the band to MSS on a primary basis, and will cause implementation difficulties if incorporated into the national table.

Similarly, the provisions of RR No. 733E appear contradictory to the primary MSS allocation and are likely to complicate and confuse the domestic coordination procedures. Constellation believes that it should therefore not be applied to the domestic columns of the table of allocations.

¹¹ Within the United States, the Commission has not licensed any new terrestrial users in the S-band since July 25, 1985 when it allocated the band to RDSS. See Report and Order in Gen Dockets Nos. 84-689 and 84-690, FCC 85-388 (released September 13, 1985) at paragraph 20 and footnote NG 147 to the United States Table of Frequency Allocations, 47 CFR §2.106.

V. The Commission Should Make Adequate Provisions for Feeder Links

In its application, Constellation proposed to use the 5150-5216 MHz band for its feeder links that is currently allocated for RDSS feeder links on a shared basis with the aeronautical radionavigation service. The Commission is indicating that this band is unavailable for such feeder links based on aeronautical radionavigation use of the band. However, Constellation is unaware of any current use of this portion of the 5000-5250 MHz band, nor of any technical basis for concluding that sharing between MSS feeder links would be impractical. Nevertheless, Constellation is currently evaluating all of the fixed satellite bands between 3 and 30 GHz for use as feeder links in its system, and will amend its application as necessary to specify appropriate feeder link bands at a future time.

In the meantime, the Commission should clarify its statement that RR No. 2613 "was modified at WARC-92 to clarify that non-geostationary satellite operations are secondary to geostationary operations in the fixed-satellite service."¹² While RR No. 2613 was modified at the 1992 WARC to clarify its interpretation, it does not make non-geostationary satellite operations "secondary" to geostationary satellite operations in the allocation sense of the word.

The primary purpose of the 1992 WARC modifications to RR No. 2613 was to clarify an ambiguity in the English language version of the provision as to whether (a) the first condition of RR No. 2613 for non-geostationary satellites to "cease ... their

¹² Notice at paragraph 26, footnote omitted, emphasis added.

emissions ... whenever there is insufficient angular separation ..." applied to all space services and the second condition "whenever there is unacceptable interference" applied only to the fixed-satellite service; or (b) the two conditions applied only to the fixed-satellite service. The 1992 WARC aligned the text of all three languages to clarify that the provisions of RR No. 2613 applied only to the fixed-satellite service.

However, RR No. 2613 should not be interpreted as making non-geostationary satellite operations secondary to geostationary satellite operations in the allocation sense. Instead, Constellation believes that this provision should be interpreted as a sharing criteria between two co-equal users of the spectrum. That is, the operator of a non-geostationary satellite system has the obligation to "cease or reduce to a negligible level their emissions" to avoid causing "unacceptable interference" to geostationary satellite systems, but that the determination of "insufficient angular separation" and "unacceptable interference" is done on the basis of geostationary and non-geostationary systems having co-equal allocation status.

VI . Conclusion

In summary, Constellation supports the Commission's proposals to add primary MSS allocations to the 1610-1626.5 MHz and 2483.5-2500 MHz bands to reflect the results of the 1992 WARC and to provide for the early introduction of LEO satellite systems in these bands. However, serious interference problems are presented by the proposal to use the 1613.8-1626.5 MHz band for space-to-Earth transmissions, even on a secondary basis, and any such secondary allocation should be deferred until

detailed technical operating rules are adopted in the CC Docket No. 92-166 proceedings. Constellation also believes that the provisions of RR Nos. 753X, 731X, 733E and 2613 require clarification and that RR Nos. 731X and 733E may not be appropriate for inclusion in the United States Table of Frequency Allocations in their current form.

Respectfully submitted,

CONSTELLATION COMMUNICATIONS, INC.

A handwritten signature in black ink, appearing to read "Robert A. Mazer". The signature is fluid and cursive, with the first name being the most prominent.

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December 4, 1992

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I, Robert A. Mazer, hereby certify that the copies of the foregoing Comments were served by first-class mail, postage prepaid, this 4th day of December 1992, on the following persons:

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