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Before The
FEDERAL COMMUNICATIONS COMMISSION
Washington, DC 20554

FEDERAL COMMUNICATIONS COMMISSION
OFFICE OF SECRETARY

In re Application of)
)
L/Q LICENSEE, INC.)
)
)
For Authority to Construct, Launch)
and Operate Globalstar™, a Low-Earth)
Orbit Satellite System to Provide)
Mobile-Satellite Services in the)
1.6/2.4 GHz Bands)
_____)

File Nos. 88-SAT-WAIV-96
and 90-SAT-ML-96

Received

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Satellite Policy Branch
International Bureau

CONSOLIDATED RESPONSE

L/Q Licensee, Inc. (LQL), by its undersigned attorneys, hereby responds to the comments of TRW Inc. and Constellation Communications, Inc., on its above-referenced Application and its Request for Waiver of the U.S. Table of Frequency Allocations. In these pleadings, LQL sought authority to modify its authorization for the Globalstar™ low-earth orbit Mobile-Satellite Service (MSS) system¹ to obtain unconditional assignment of feeder links in the 5091-5250 MHz (earth-to-space) and 6875-7055 MHz (space-to-earth) bands and to operate these feeder links in conformance with the international allocations adopted at the 1995 World Radiocommunication Conference (WRC-95).²

¹ Loral/QUALCOMM Partnership, L.P., 10 FCC Rcd 2333 (1995).

² LQL's Application also updated information regarding certain system parameters, and described the anticipated operational power flux density (p.f.d.) limits which will conform to the technical standards adopted at WRC-95.

TRW and Constellation were the only commenters on LQL's Application and Request for Waiver. Neither opposed grant of the application or the waiver request. Accordingly, LQL urges the Commission to grant its Application and Request for Waiver expeditiously. Rapid grant will facilitate completion of the Globalstar™ system on its current schedule of satellite launches in the second half of 1997 and full constellation operation by January 1, 1999, and thus fulfill the Commission's statutory and public interest objective "of bringing new and innovative services to the public at the earliest possible time." Amendment of the Commission's Rules to Establish Rules and Policies Pertaining to a Mobile-Satellite Service in the 1610-1626.5 MHz and 2483.5-2500 MHz Frequency Bands, 9 FCC Rcd 5936, 5953 (1994) ("Big LEO Report and Order").

I. THE COMMENTS RAISE NO MATERIAL ISSUES RELATED TO LQL'S REQUESTS, AND THEREFORE, THE APPLICATION AND WAIVER REQUEST SHOULD BE GRANTED FORTHWITH.

Neither Constellation nor TRW oppose grant, but instead focus on intersystem coordination issues. (However, as discussed below, TRW's ostensible concerns with LQL's Application reflect an attempt to excuse TRW from coordination obligations.) As both companies are aware, the Commission has directed CDMA licensees to conduct intersystem coordination, and to seek the Commission's intervention only if the parties cannot reach an agreement. See Big LEO Report and Order, 9 FCC Rcd at 5962-63; see also Memorandum Opinion and Order, FCC 96-54, at ¶ 39 (released Feb. 15, 1996). At this point in time, the

intersystem coordination process is progressing; grant of LQL's requests will, if anything, facilitate completion of the process.

A. TRW. TRW's "observations" on LQL's proposed system are a transparent attempt to establish an excuse for TRW not to complete intersystem coordination with Globalstar™.³ In short, TRW claims that a reduction in average payload power of the Globalstar™ satellites results in a loss of capacity and the need for greater interference protection from TRW's MSS Above 1 GHz system. From this, TRW concludes that LQL may seek to impose more constraints on operation of TRW's system during intersystem coordination.

TRW's analysis is wrong. TRW misinterprets the materials on which its comments are based, and invokes a comparison which is inconsistent with basic principles of satellite system analysis. Given the flawed premises of TRW's comments, there is simply no reason to give any credence to its "observations" or to excuse TRW from fulfilling its coordination obligations.

At the outset it should be noted that TRW's observations are based, in part, on an incorrect figure in Table 2 of LQL's March 1996 modification application. As LQL recently informed the Commission, the figure for average payload power in Table 2 should read 550 Watts (instead of 346 Watts).⁴ Even with this

³ Because TRW's comments reveal concerns regarding its own ability to fulfill intersystem coordination requirements, they should be considered relevant to TRW's modification application, not LQL's. See File Nos. 155-SAT-ML-95, 33-SAT-AMEND-96; LQL Comments (filed Feb. 23, 1996).

⁴ See Letter to William F. Caton from William D. Wallace (dated April 24, 1996). This letter also noted that the figure for the total system average power in

correction, however, TRW's analysis is inaccurate because it attempts to draw a conclusion about the capacity of the system based on a comparison of the peak power for one satellite component with the average satellite payload power. The comparison used by TRW is inappropriate without regard to the numbers available to it, and so, its conclusions cannot be credited as filed or if recalculated with the corrected numbers.

In its comments, TRW claims to have found some significance in the reduction in the average payload power from the figure of 660 Watts projected for the system in November 1994. See Globalstar System Amendment, at 14, Table 4-1 (dated Nov. 15, 1994). As noted above, the current projection for average payload power is 550 Watts. This reduction in average payload power represents a substantial improvement in the design of GlobalstarTM satellites as a result of a more efficient power system. The reduction from 660 Watts to 550 Watts was made possible through an improvement in the efficiency of the C-band amplifier (described in the Mitsubishi Electric paper referenced in TRW's comments) and a redesigned L-band filter to reduce the power drawn by the C-band amplifiers when not in use. The combination of these improvements resulted in a downward projection for average payload power while maintaining the net output power available to the S-band amplifiers, RF power output and peak power generation of

Table 2 of the March 1996 filing should be corrected to read 752 Watts (instead of 548 Watts).

the satellites. The overall effect is a more efficient satellite with the same projected capacity.

TRW's speculation regarding the effect of the power reduction is erroneous from premise to conclusion. Citing the Mitsubishi Electric paper describing the Globalstar satellite C-band amplifier, TRW notes that these amplifiers are "capable of delivering 25 Watts of multicarrier RF output power at a DC power consumption of approximately 120 Watts." TRW Comments, at 3 (footnote omitted). TRW claims that the satellite will operate at the peak 240 Watts (for two amplifiers on board the satellite) for C-band feeder link transmissions. TRW's "analysis" consists of subtracting the peak power figure for the C-band amplifiers from the (incorrect) 346 Watts of average payload power, concluding that 106 Watts of power are left for the S-band user link amplifiers. TRW performs the same calculation for Globalstar's 1994 figure of 660 Watts of average payload power, and concludes that there was a 75% reduction in power available for the S-band user links between the 1994 and 1996 power budgets (according to TRW, 420 Watts in 1994 vs. 106 Watts in 1996).

TRW has misinterpreted the description of the C-band amplifier. As the Mitsubishi Electric paper makes clear, the 25 Watt figure is the peak power of the C-band amplifier.⁵ TRW apparently did not bother to read the text of the paper

⁵ Globalstar uses two amplifiers in parallel developing 50 Watts of RF power at peak. The DC power of these amplifiers varies from a small value up to 240 Watts.

which explains how the amplifier operates linearly, to minimize average power drawn, and that the average power will be substantially less than the peak power.

Moreover, the average payload power of the satellite is exactly that: the average power used by a satellite when making many orbits of the earth. As the satellite orbits, it spends much of its time over oceans, land masses at night, and low traffic areas, interspersed with traffic peaks for short periods of time. Operating during all these scenarios is factored into the average payload power. Accordingly, average payload power is not a figure comparable to the peak power for the C-band amplifiers.

Despite the irrelevancy of the comparison, TRW subtracted the peak power of the C-band amplifier from the average payload power to reach its conclusion. An engineer reviewing TRW's observations⁶ would have realized that it is simply inappropriate (and misleading) to subtract the peak power of a C-band satellite-to-gateway amplifier from the average payload power to obtain a conclusion that there has been a 75% reduction in power for the S-band amplifier-to-user link.⁷

⁶ TRW's alleged "analysis" of certain technical aspects of Globalstar satellites does not include an affidavit attesting to the accuracy of the observations, as contemplated by Section 25.154(a)(4) of the Commission's Rules.

⁷ It is surprising that a satellite manufacturer such as TRW would fall victim to such an elementary error. It is also surprising that after being provided with descriptions of the GlobalstarTM system filed at the Commission since the original application was filed on June 3, 1991, and additional descriptions provided during the intersystem coordination process that TRW would not ask LQL for an explanation of the payload power reduction before filing its flawed comments.

Even without the incorrect average payload power figure in the initial LQL filing, TRW's observations are inaccurate.

Given its flawed engineering analysis, TRW's comments on CDMA intersystem coordination are irrelevant to LQL's Application. Because there has been no change in the power available to the S-band amplifiers, LQL is not seeking "extra protection" for its satellites during intersystem coordination. Cf. TRW Comments, at 4.

Similarly, LQL is not seeking to impose "additional regulatory limitations on other CDMA MSS systems." Cf. id. at 3. As LQL pointed out in its comments on TRW's modification application, downlink p.f.d., the parameter which concerns TRW, was identified as a "key interference parameter" in resolving CDMA system coordination in the "Final Report of the Majority of the Active Participants of Informal Working Group 1 to Above 1 GHz Negotiated Rulemaking Committee," at Section 3.1.1 (Apr. 6, 1993), a report to which TRW is a signatory. As explained therein, the CDMA coordination p.f.d. value should be specified "as the maximum PFD spectral density that is permitted at any point in the service area from the aggregate of all satellites in the interfering system." Id. (emphasis supplied). In its comments on TRW's system p.f.d., LQL simply requested that TRW follow the coordination parameters to which all CDMA systems in the current processing group agreed three years ago.

B. Constellation. Constellation noted that LQL has committed to work toward reaching an intersystem coordination agreement for both the MSS Above 1

GHz user links and the 5/7 GHz feeder links. Constellation Comments, at 2. LQL remains committed to fulfill the Commission's mandate on intersystem coordination, and to work with other MSS Above 1 GHz licensees which are willing to negotiate in good faith to reach a coordination agreement. Therefore, this is not an issue which needs further consideration.

II. CONCLUSION

As noted above, no oppositions were filed to grant of LQL's modification Application and its Request for Waiver. LQL is ready, willing, and able to finish construction and then launch and operate the Globalstar™ system. Accordingly, LQL requests that the Commission act expeditiously to grant LQL an unconditional license for the Globalstar™ system, and that it be granted

unconditional assignment of feeder links at 5091-5250 MHz (earth-to-space) and 6875-7055 MHz (space-to-earth) as requested in its Application and Request for Waiver.

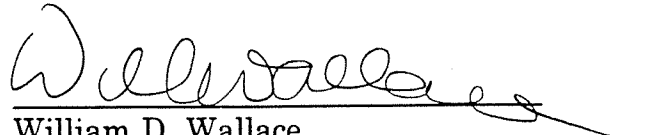
Respectfully submitted,

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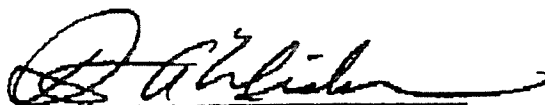
Date: May 2, 1996

DECLARATION

1. I, Robert A. Wiedeman, am the Vice President for Engineering of Loral/QUALCOMM Partnership, L.P., and Globalstar, L.P.
2. I have been working on the technical design of the Globalstar™ satellite system for over six years.
3. I am familiar with the original Globalstar™ application filed with the Federal Communications Commission on June 3, 1991, and the amendments to this application filed on November 16, 1994, and March 8, 1996. I am also familiar with Parts 2 and 25 of the Commission's Rules and the rules and policies adopted for the MSS Above 1 GHz service in the Report and Order released October 14, 1994.
4. I have reviewed the foregoing "Consolidated Response," and the facts stated therein regarding the Globalstar™ system are accurate.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Signed this 2nd day of May 1996 in San Jose, California.



Robert A. Wiedeman
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CERTIFICATE OF SERVICE

I, William D. Wallace, hereby certify that I have on this 2nd day of May 1996, caused copies of the foregoing Consolidated Response to be delivered via hand delivery (indicated with *) or by U.S. mail, postage prepaid, to the following:

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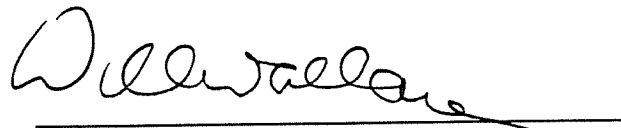
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