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

In the Matter of
Comprehensive Review of Licensing and Operating Rules for Satellite Services  IB Docket No. 12-267

COMMENTS OF IRI DIUM CONSTELLATION LLC

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Iridium Constellation LLC (“Iridium”) hereby replies to the comments that were submitted in response to the Further Notice of Proposed Rulemaking in the above-captioned proceeding (the “FNPRM”). Iridium supports the positions taken in the reply comments of the Satellite Industry Association (“SIA”), of which it is a member. Iridium is submitting these comments to present its views on matters not addressed by SIA and to emphasize its support for certain SIA positions.

SUMMARY

In these reply comments, Iridium:

- Supports having a separate proceeding to consider the regulatory treatment of small satellites. Suggestions by two parties to address small satellite issues in this proceeding should be rejected because there was not sufficient notice of these issues in the FNPRM to give interested parties a proper opportunity to comment or to develop a complete record.

- Reiterates that the two-degree policy needs to be retained, rather than replaced by a system tied to ITU priority, for the 29.25-29.5 GHz band. Coordination in the 29.25-29.5 GHz band is governed by Section 25.258 of the Commission’s rules, which is based on FCC filing priority, not ITU priority.

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- Notes that even if a certification system is adopted for two-degree compliance, it would remain necessary under Section 25.203(k) of the rules for GSO FSS applicants for 29.25-29.5 GHz frequencies to show, case-by-case, that they either have coordinated with NGSO MSS feeder links or will not interfere with NGSO MSS feeder links.

- Opposes Inmarsat’s proposal that the cross-polarization isolation requirement be relaxed from 30 dB to 25 dB instead of eliminated. There is no evidence that 25 dB isolation is needed, and many satellite systems (including Iridium’s) already operate without incident on a waiver basis with significantly less isolation.

- Opposes various proposals that would have the Commission apply its service rules to earth station operations that are secondary or non-conforming. The technical sufficiency of proposals to operate on a secondary or non-conforming use basis needs to be evaluated case-by-case, and not by reference to service and technical rules that were adopted with primary services in mind. Otherwise secondary and non-conforming earth station operations would improperly be elevated to quasi-primary status.

- Reiterates its initial view that parties should be required to file a full FCC application within six months of ITU submission. A six-month filing period would provide ample time for developing a full application and would avoid opportunities for warehousing spectrum that longer filing periods would afford.

- Opposes Boeing’s proposal that inert propellants would have to be vented at end-of-life by relieving pressure vessels to no more than five percent of the system burst pressure. That figure is too low, because it would make it necessary for satellite systems such as Iridium’s to continue to seek waivers even though their spacecraft have proven safety records and waivers have been granted as a matter of course.

- Opposes the suggestion by EchoStar that it be left to satellite manufacturers, in consultation with their customers, to determine the level of stored energy source risk that is acceptable at end-of-life. The Commission needs to continue to take part in developing and implementing U.S. and international safety standards.

- Refutes the suggestion by Spire Global that small satellites pose less of an orbital debris risk than conventional satellites. If a small satellite and a conventional satellite are in the same orbit, all things being equal they will take about the same amount of time to deorbit. And small satellites pose additional risks of collision because of the large numbers in which they are deployed.

- Opposes Inmarsat’s proposal that the Commission adopt a one-year shot clock for coordination under Section 25.258. The system is working, and there is no need to attempt to “fix” it with an arbitrary shot clock.

- Opposes EchoStar’s proposal that the Commission delete the reference in Section 25.258(b) of the rules to “planned” NGSO MSS feeder link earth station complexes. NGSO MSS operators need the flexibility to add feeder link earth station locations as circumstances warrant, and planned feeder link locations are
routinely taken into account, subject to Section 25.258 procedures, in Iridium’s coordination discussions with GSO FSS operators.

- Asks that the 29.25-29.5 GHz band be carved out from EchoStar’s proposals to liberalize the rules for what can be filed as minor modifications. EchoStar incorrectly assumed that the FSS operates on an “exclusive and primary basis” in the 29.25-29.5 GHz band. In fact, the FSS shares that portion of the band on a co-primary basis with NGSO MSS feeder link earth stations.

- Urges the Commission, if it modifies its milestone and bond requirements for space stations, to strive for simplicity and to retain at least one interim milestone.

1. **The Commission should initiate a proceeding to consider the regulatory issues posed by small satellite networks**

In its initial comments, Iridium supported the suggestion by SIA that the Commission initiate a separate proceeding to consider the regulatory treatment of small satellites. Iridium also identified issues that could be considered in a small satellite proceeding.²

Two companies have suggested that the Commission address small satellites issues in this proceeding.³ There was not sufficient notice of these issues in the *FNPRM*, however, to give interested parties a proper opportunity to comment or to develop a complete record. The appropriate course of action is to initiate a separate proceeding in which a full examination of small satellite matters can be conducted.

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² See Comments of Iridium at 1-2.
³ See Comments of Planet Labs Inc. at 1; Comments of Spire Global Inc. at 1.
2. The Commission should retain its two-degree spacing policy for the 29.25-29.5 GHz band and retain the requirement that 29.25-29.5 GHz GSO FSS applicants show they can protect, or have coordinated with, NGSO MSS feeder links

a. Two-degree spacing policy

In the FNPRM, the Commission sought comment “on a broader recommendation from Intelsat to eliminate the two-degree spacing policy and instead rely on ITU filing priority as the basis for protection rights and coordination requirements as between GSO FSS systems licensed by the Commission or authorized for U.S. market access.”\(^4\) In its initial comments, Iridium opposed this proposal as it would apply to the 29.25-29.5 GHz band.\(^5\)

In light of Intelsat’s continued support in its comments for replacing the two-degree policy with a policy that is based on ITU filing priority,\(^6\) and given that Intelsat did not limit its support to particular bands, Iridium reiterates here why the two-degree policy needs to be retained for the 29.25-29.5 GHz band. Under the Commission’s Ka-band frequency plan, which differs from international allocations, in the United States GSO FSS stations and NGSO MSS feeder links are co-primary in the 29.25-29.5 GHz band and must coordinate under the U.S. domestic coordination procedures established by Section 25.258 of the Commission’s rules. U.S. domestic coordination procedures are based on FCC filing priority, not ITU filing priority. It would be inappropriate, therefore, to apply ITU filing priority to U.S. domestic coordination between GSO FSS earth stations and NGSO MSS feeder links that operate in the 29.25-29.5 GHz band.

\(^4\) FNPRM, ¶ 35.
\(^5\) See Comments of Iridium at 3-4.
\(^6\) See Comments of Intelsat License LLC at 19-23.
b. Required GSO FSS showing

EchoStar and Hughes (collectively, “EchoStar”), in their joint comments, support modification of the two-degree policy so that compliance could be certified to rather than be the subject of an interference analysis and operators would be able to enter into coordination agreements that may not be in precise alignment with the two-degree policy. Any such certifications and coordination agreements for two-degree purposes should not replace the requirement in 25.203(k) that GSO FSS applicants for 29.25-29.5 GHz frequencies show either that they have coordinated with NGSO MSS feeder links or that they will not interfere with NGSO MSS feeder links. Compliance with this requirement cannot be certified to; it needs to be demonstrated on a case by case basis so that NGSO MSS licensees have an opportunity to review and comment on the basis on which GSO FSS applicants propose to protect NGSO MSS feeder links.

3. The cross-polarization isolation requirement should be eliminated

In its initial comments, Iridium supported the Commission’s proposal to eliminate the requirement in Section 25.210(i)(1) of the rules that space station antennas used for FSS operation provide cross-polarization isolation of at least 30 dB within the primary coverage area. Inmarsat has proposed that the isolation requirement be relaxed from 30 dB to 25 dB instead of eliminated.

Iridium opposes Inmarsat’s proposal. Inmarsat offers no technical support for the 25 dB figure, and there is no evidence that 25 dB isolation is needed. To the contrary, many satellite systems (including Iridium’s) already operate without incident on a waiver basis with

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7 Comments of EchoStar Satellite Operating Corporation and Hughes Network Systems, LLC at 31.
8 See Comments of Iridium at 4.
9 See Comments of Inmarsat at 5.
significantly less isolation. Inmarsat’s proposal would defeat a principal purpose of the proposed elimination by requiring these systems to continue requesting waivers even though the Commission routinely grants the waivers.

Inmarsat also argues that maintaining the cross-polarization isolation requirement could facilitate coordination between satellite networks. Iridium disagrees. Cross-polarization isolation generally has no bearing on inter-system interference, and in Iridium’s experience the requirement never has been helpful in coordination. For all of these reasons, the requirement should be eliminated.

4. The Commission should not adopt service rules for operations that are secondary or non-conforming

Various proposals in this proceeding (see below) would have the Commission apply its service rules to earth station operations that are secondary or non-conforming. Iridium opposes these proposals. The technical sufficiency of proposals to operate on a secondary or non-conforming use basis needs to be evaluated case-by-case, and not by reference to service and technical rules that were adopted with primary services in mind. If the same service rules apply to primary earth station operations and secondary and non-conforming earth station operations, then secondary and non-conforming earth stations will improperly be elevated to quasi-primary status. Iridium, therefore, opposes the following proposals:

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10 Id.
- Viasat’s proposal to revise Section 25.115(e) of the rules to permit blanket licensing in all parts of the Ka-band for which blanket licenses have been issued, including bands in which GSOs are secondary or non-conforming.11
- EchoStar’s proposal to include the 27.5-28.35 GHz band, in which FSS is secondary, in the 20/30 GHz band definition.12
- EchoStar’s proposal to expand the definition of “two-degree compliant space station” that the FCC is proposing to add to include bands in which the FSS is secondary or non-conforming.13
- EchoStar’s proposal to apply auto grant procedures and use of Form 312EZ for all applications that are eligible for routine processing,14 to the extent that the proposal covers secondary or non-conforming operations.
- EchoStar’s proposal to remove the requirement to report the number of terminals in operation at renewal time, to the extent that the proposal covers secondary or non-conforming operations.15

5. Any rules permitting GSO FSS ITU submissions before a full space station application is filed should apply to NGSO FSS and NGSO MSS, too, and parties should have six months to file a full space station application

In the FNPRM, the Commission made various proposals for submitting Advance Publication Information and Coordination Requests for GSO FSS space stations to the International Telecommunication Union (“ITU”) before full license applications are filed with the Commission.16 In its initial comments, Iridium (i) supported the proposal in SIA’s comments that any rule changes in this area should extend to NGSO FSS and NGSO MSS space stations as well as GSO FSS space stations; and (ii) proposed instead that parties be required to file a full FCC application within six months of the submission of Advance Publication and Coordination Request information to the ITU.

11 Comments of Viasat, Inc. at ii, 10-11.
12 Comments of EchoStar Satellite Operating Corporation and Hughes Network Systems, LLC at 46.
13 Id. at 48.
14 Id. at 53.
15 Id. at 61.
16 See NPRM at 4-8, ¶¶ 5-18.
No party has opposed including NGSO FSS and NGSO MSS space stations in any rule changes in this area. If rule changes are adopted, therefore, they should encompass NGSO FSS and NGSO MSS space stations in addition to GSO FSS space stations.

The parties have offered differing opinions as to the details of implementing a regime for submitting materials to the ITU before full license applications are filed with the Commission. Iridium reiterates its initial view that parties should be required to file a full FCC application within six months of ITU submission. A six-month filing period would provide ample time for developing a full application and would avoid opportunities for warehousing spectrum that longer filing periods would afford.

6. **Inert propellants should have to be vented at end-of-life to no more than 20 percent of the system burst pressure; small satellites should be held to end-of-life standards at least as stringent as those for conventional satellites**

In the *FNPRM*, the Commission requested comment on refinements to the requirement in Section 25.283 of the rules that all stored energy sources be discharged at end-of-life. Iridium proposed a modified requirement under which excess reactive propellants would have to be vented at end-of-life to the minimum residuals reasonably possible and inert propellants would have to be vented at end-of-life by relieving pressure vessels to no more than 20 percent of the system burst pressure.

Boeing proposes a residual pressure requirement of no more than five percent of the system burst pressure. That figure is too low, because it would make it necessary for satellite systems such as Iridium’s to continue to seek waivers even though their spacecraft have proven safety records and waivers have been granted as a matter of course. For the reasons stated in

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17 *FNPRM* at 57-58, ¶ 199.
18 See Comments of Iridium at 7.
19 Comments of The Boeing Company at 15.
Iridium’s initial comments, the Commission safely could change the requirement to no more than 20 percent of the system burst pressure. Iridium also would find it acceptable, however, to make a change to no more than 15 percent of the system burst pressure.

Iridium opposes the suggestion by EchoStar that it be left to satellite manufacturers, in consultation with their customers, to determine the level of stored energy source risk that is acceptable at end-of-life.\footnote{See Comments of EchoStar Satellite Operating Corporation and Hughes Network Systems, LLC at 65-66.} U.S. and international safety standards play a critical role in maintaining a proper orbital environment, and the Commission needs to continue to take part in developing and implementing these standards.

Iridium strongly disagrees with the suggestion by Spire Global that small satellites pose less of an orbital debris risk than conventional satellites.\footnote{See Comments of Spire Global, Inc. at 3.} Orbital decay rate is a function of altitude and ballistic coefficient (“BC”), \textit{i.e.}, the ratio of mass to cross sectional area of an object. The truncated life span some small satellites have is a function of their low orbit. There is no inherent reason for a small satellite’s orbit to decay more quickly than a large satellite’s orbit. Rather, if a small satellite and a conventional satellite are in the same orbit, all things being equal they will take about the same amount of time to deorbit. Moreover, small satellites pose additional risks of collision because of the large numbers in which they are deployed. Small satellites, therefore, should be held to end-of-life disposal standards that are at least as stringent as those for conventional satellites.
7. **Proposals for revising Section 25.258 should be rejected**

Section 25.258 of the Commission rules specifies procedures for sharing and coordination between NGSO MSS feeder link stations and GSO FSS stations in the 29.25-29.5 GHz band. In their comments, Inmarsat and EchoStar made suggestions, which Iridium opposes, for revising Section 25.258.

**a. There should not be a shot clock for Section 25.258 coordination**

Inmarsat proposed in its comments that the Commission adopt a one-year shot clock for coordination under Section 25.258. Iridium disagrees with Inmarsat’s proposal. There is no way to predict in advance how long coordination will last, and unexpected circumstances can arise that prevent completion of coordination within a year. Given these uncertainties, it would be counter-productive to impose artificial constraints. Satellite operators have an incentive to cooperate with each other because they share the orbital resource, and the vast majority of coordination discussions are completed to everyone’s satisfaction. If one party acts in bad faith in coordination, which would be a rare event, the other party can request FCC intervention. The system is working, and there is no need to attempt to “fix” it with an arbitrary shot clock.

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22 See Comments of Inmarsat at 6.
b. The reference to planned gateway earth station complexes in Section 25.258 should be retained

Section 25.258(b) states that licensed GSO FSS systems should “operate with frequency/polarization selections, in the vicinity of operational or planned NGSO MSS feeder link earth station complexes,” that will “minimize unacceptable interference with reception of GSO FSS and NGSO MSS uplink transmissions in the 29.25-29.5 GHz band.” EchoStar has proposed that the Commission delete the reference in Section 25.258(b) to “planned” NGSO MSS feeder link earth station complexes.

Iridium opposes EchoStar’s proposal. NGSO MSS operators need the flexibility to add feeder link earth station locations as circumstances warrant. In fact, Iridium has added multiple feeder link terminals in recent years. Planned feeder link locations are routinely taken into account, subject to Section 25.258 procedures, in Iridium’s coordination discussions with GSO FSS operators; EchoStar’s proposal would undercut these efforts.

8. EchoStar’s proposal for earth station modifications not requiring prior FCC approval, if it is adopted, should be changed in one respect

Section 25.118(a) of the rules identifies changes that can be made to licensed earth stations without prior FCC authorization. In its comments, EchoStar supports some changes to Section 25.118(a) and opposes others.

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23 The quotations above include language that had been mistakenly deleted from 25.258 and that the Commission proposes in the FNPRM to reinstate. See FNPRM, ¶ 198.
24 See Comments of EchoStar Satellite Operating Corporation and Hughes Network Systems, LLC at 64-65.
25 See Comments of EchoStar Satellite Operating Corporation and Hughes Network Systems, LLC at 54-56.
Some of EchoStar’s Section 25.118(a) positions are band specific. EchoStar argues that “the inclusion of additional parts of the 14.0-14.5 or the band 28.35-28.6, 29.25-30.0 GHz should be available to FSS earth station operators with minimal review by the Commission.”26 In EchoStar’s view, the addition of frequencies in these bands “impacts no other services” because, according to EchoStar, “the FSS operates on an exclusive and primary basis” in the bands.27

EchoStar’s factual assumption is incorrect in one respect. The FSS does not operate on an “exclusive and primary basis” in the 29.25-29.5 GHz portion of the 29.25-30.0 GHz band. Rather, the FSS shares that portion of the band on a co-primary basis with NGSO MSS feeder link earth stations. So adding frequencies in the 29.25-29.5 GHz portion of the band would “impact” another service (i.e., would impact NGSO MSS feeder links), and FSS stations should have to seek FCC authority, rather than just notifying the FCC pursuant to Section 25.118(a), before adding these frequencies.

9. Simplicity should be preserved in the Commission’s bond and milestone requirements; there should be at least one interim milestone

At present, the Commission’s bond and milestone requirements have the benefit of simplicity, which eases their administration. The same bond and milestone requirements apply to all GSO licensees. The same bond and milestone requirements apply to all NGSO licensees. When a milestone comes due, a licensee in all cases must either satisfy the milestone or forfeit its bond.

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26 Id. at 54.
27 Id.
Various proposals have been made in this proceeding to modify the bond and milestone regimes. Some proposals would give licensees the option of satisfying a milestone or becoming subject to a higher bond amount instead. Other proposals would have bond amounts increasing over time rather than, as under the current system, decreasing over time.

Iridium takes no position on the specifics of these proposals. Iridium is concerned, however, that elements of some of the proposals could increase complexity, which would consume precious Commission’s resources in reviewing milestone compliance and could generate confusion. To avoid these consequences, Iridium encourages the Commission to strive for simplicity.

In a related matter, Iridium notes there have been proposals for eliminating some milestones. Iridium opposes these proposals to the extent they would eliminate interim milestones entirely. A single interim milestone would be acceptable to Iridium, and completion of CDR is the logical candidate for a single interim milestone.
CONCLUSION

In view of the foregoing, the Commission should initiate a proceeding to consider the regulatory issues posed by small satellite networks and should make the changes to Part 25 of its rules that are proposed in the initial and reply comments filed by Iridium and SIA.

Respectfully submitted,

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