Broadcast Engineers, Inc. (SBE) that we should not resolve the parties' non-service link requests in this proceeding if such resolution would pre-ordain the outcome of related, pending proceedings.[200] Therefore, this *Report and Order* only identifies the bands we believe will be available for 2 GHz MSS non-service links. Specific issues such as the amount of spectrum each system will be assigned in the relevant band will be decided in the subsequent 2 GHz MSS authorization instruments, and through inter-system coordination.

70. In the *Notice*, we sought comment as to what weight, if any, we should give to non-service link potential delaying factors in developing authorization methods and service rules for the 2 GHz MSS service links, especially with regard to system implementation milestones.[201] We agree with the majority of commenters that we should award 2 GHz MSS licenses as quickly as possible, and thus, the Commission's milestone schedules should commence on the service link grant date.[202] Of the nine system proponents, only Boeing proposes deferral of milestone schedules for 2 GHz MSS operators until the Commission finalizes all critical spectrum allocation decisions.[203] Boeing observes that satellite operators have limited influence over the ITU Radiocommunication Bureau's satellite coordination procedure,[204] or the pace at which the Commission makes non-service link assignments.[205] On the other hand, commenters observe that system proponents could use these inherent delays to warehouse service link spectrum until such time as requested non-service link spectrum is allocated and assigned.[206] We believe that it is the responsibility of the system operators to seek unencumbered non-service link spectrum, and milestones will provide the necessary incentive for system operators to seek attainable non-service links in a reasonable time or risk the loss of service link spectrum. We find that the benefits to the public of expediting implementation of 2 GHz MSS outweigh the burden this requirement may place on system operators to design systems in accordance with the proposed milestone rules. Therefore, we will initiate milestones upon authorization of service link spectrum, irrespective of the non-service link issues extant.[207]

71. We intend to allow 2 GHz MSS system proponents to modify their non-service link proposals if it becomes apparent, based on the outcome of the relevant rulemakings and proceedings, that the frequencies (or substantial portions of those frequencies) for which they have sought assignment will

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98-206, Notice of Proposed Rule Making, 14 FCC Rcd 1131 (1999) (*NGSO FSS Notice*); *Amendment of the Commission's Rules with Regard to the 3650-3700 MHz Government Transfer Band*, ET Docket No. 98-237, Notice of Proposed Rulemaking and Order, 14 FCC Rcd 1295 (1998) (*3650-3700 MHz Notice*).

200 *See* SBE Comments at 3 & Reply at 1 (requesting that we shelve all feeder link requests as premature pending completion of allocation rulemakings); PanAmSat Reply at 7 (also requesting that our decisions in this docket do not complicate the resolution of NGSO/GSO sharing issues).

201 *Notice*, 14 FCC Rcd at 4865, 4883 ¶¶ 49, 83.

202 Globalstar Comments at 26; IUSG Comments at 38-39; TMI Comments at 10. *See also* Iridium Comments at 36 & Reply at 25-26.

203 Boeing Comments at 25-27 (also arguing that precedent supports its view).

204 *Id.* at 26.

205 Boeing Reply at 20.

206 IUSG Reply at 39 (citing Iridium Comments at 36 (initiating milestones upon authorization of service link spectrum will encourage applicants to pursue presently attainable non-service links, and discourage attempts to delay milestones through the selection of non-service link frequencies that will require lengthy proceedings to resolve)).

207 For a discussion of the milestones that 2 GHz MSS systems must meet, see Section III.C.3., *infra*.

not be available for timely non-service link use.[208] Furthermore, we will treat such modifications as minor modifications, provided that the alternative frequency band will expedite deployment of that system's service (*i.e.*, the spectrum is usable for non-service links without further administrative proceedings, and the addition of those non-service links to the band will not cause unnecessary congestion, make it difficult to obtain coordination, or otherwise increase the potential for interference to other systems in the frequency bands selected for non-service links).[209] System proponents that do not amend their applications or LOIs so as to utilize accessible non-service link frequencies are advised that they proceed at their own risk that the regulatory issues surrounding their request may delay implementation,[210] resulting in a missed milestone and cancellation of its authorization. Contrary to Globalstar's suggestion,[211] we do not contemplate approval of requests for waiver of milestones based on a system's inability to access non-service link frequencies.

### 1. Feeder Links

72. As a general rule, because MSS feeder links operate with gateway stations at fixed locations, feeder links use frequencies allocated to the FSS.[212] We tentatively concluded in the *Notice* that there is sufficient feeder link spectrum currently or imminently available to accommodate the spectrum needs of the 2 GHz MSS system proponents.[213] The comments we received on this issue generally support this conclusion.[214] Although the record is inconclusive with regard to any *calculable* relationship between service link spectrum and feeder link spectrum,[215] a relationship does exist.[216] Therefore, in light of the band arrangement we adopt today, which authorizes the 2 GHz MSS systems

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208 *See also Big LEO Reconsideration*, 11 FCC Rcd at 12876 ¶ 42.

209 *Id.* Accordingly, we delegate authority to the International Bureau to waive 47 C.F.R. § 25.116, consistent with this decision.

210 *Accord* Globalstar Comments at 26.

211 *Id.*

212 *See Big LEO Reconsideration*, 11 FCC Rcd at 12875 n.30; *Big LEO Report & Order*, 9 FCC Rcd at 5997 ¶ 163; *accord* Celsat Comments at 24 & n.28 & Reply at 24 & n.44 (MSS feeder links are by definition a type of FSS, citing 47 C.F.R. § 2.1).

213 *See Notice*, 14 FCC Rcd at 4866 ¶ 51 (regarding NGSO MSS feeder links); *id.* at 4868 ¶ 54 (regarding GSO MSS feeder links).

214 *See* PanAmSat Comments at 1 (existing allocations are sufficient to satisfy the feeder link spectrum requirements of the 2 GHz NGSO MSS applicants); GE American Communications, Inc. (GE Americom) Reply at 3 (same); *accord* Globalstar Comments at 27 (there is sufficient spectrum in the 15.43-15.63 GHz and 6700-7075 MHz bands to accommodate those applicants that desire feeder links in these frequency ranges). *See also* Inmarsat Comments at 14 (with respect to the proposed GSO MSS systems, there is sufficient amount of feeder link spectrum to accommodate all proposals).

215 *See* Constellation Comments at 22 (it is premature for the Commission to consider formulas or algorithms to relate service link assignments with feeder link assignments); Globalstar Comments at 25 & n.26 (an algorithm to scale back feeder link requests is impractical since applicants should be able to assess their feeder link needs after reviewing the service link plan).

216 Hughes and Globalstar acknowledge some quantitative relationship between service link spectrum and the spectrum needed for feeder links. *See* Hughes Comments at 7; Globalstar Comments at 25. *Cf.* Boeing Comments at 23-25 (a reduction in service link spectrum may not warrant a comparable reduction in feeder link requirements); Constellation Reply at 9 (satellite system architectures are too complex to draw a simple relationship between feeder link and service link spectrum requirements).

for significantly less service link spectrum than each has requested, we affirm our finding that there is sufficient feeder link spectrum for the 2 GHz MSS system proponents to provide commercial service. Given our past reliance on MSS operators to coordinate conflicting frequency uses in shared feeder link bands,[217] and based on the record before us,[218] we require the 2 GHz MSS operators, and their associated gateway earth station licensees, to comply with the coordination requirements of Section 25.203(k) of the Commission's rules.[219] This requirement should further enhance the 2 GHz MSS providers' ability to access adequate feeder link spectrum to provide service.

73. The *Notice* also generated considerable comment from the Fixed Wireless Communications Coalition (FWCC) and its membership regarding allocation of MSS feeder links in frequencies that are heavily used by the fixed services.[220] FWCC advocates that, should the Commission license MSS feeder links in FS bands, it must promulgate sharing and coordination rules that adequately protect FS operation and expansion.[221] United Telecom Council (UTC), perceiving a spectrum shortage faced by fixed users, recommends that the Commission initiate a new rulemaking to identify additional spectrum for FS.[222] In response, Inmarsat objects to FWCC's coordination suggestions as being biased

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217 *Notice*, 14 FCC Rcd at 4868 ¶ 55 (citing, *e.g.*, 47 C.F.R. § 25.203(k)).

218 *See* Globalstar Comments at 25 n.27 (47 C.F.R. § 25.203(k) provides sufficient guidance for coordination of feeder link conflicts); Constellation Comments at 22 (2 GHz MSS space station operators should be included within the purview of 47 C.F.R. § 25.203(k)'s requirement to coordinate gateway earth station uses).

219 "An applicant for an earth station that will operate with a geostationary satellite or non-geostationary satellite in a shared frequency band in which the non-geostationary system is (or is proposed to be) licensed for feeder links, shall demonstrate in its applications that its proposed earth station will not cause unacceptable interference to any other satellite network that is authorized to operate in the same frequency band, or certify that the operations of its earth station shall conform to established coordination agreements between the operator(s) of the space station(s) with which the earth station is to communicate and the operator(s) of any other space station licensed to use the band." 47 C.F.R. § 25.203(k).

220 *See* FWCC Comments at 2-7, Reply at 1-4 & Supplemental Comments at 2-3; Association of American Railroads (AAR) Comments at 3-5 & Reply at 1-3; American Petroleum Institute (API) Comments at 4-6; Association of Public-Safety Communications Officials-International, Inc. (APCO) Comments at 2; United Telecom Council (UTC) Comments at 2-3 & Supplemental Comments at 4-5.

221 FWCC Comments at 3. FWCC's sharing proposals include: (a) limiting total numbers of feeder link earth stations; (b) co-locating MSS feeder link earth stations; (c) locating feeder link earth stations away from high-concentration FS areas; (d) requiring feeder link earth stations to use the largest feasible antenna; (e) shielding feeder link earth stations so as to permit FS operations in closer proximity; and (f) setting standards for earth station spectrum efficiency. *Id.* at 4-5. FWCC's coordination proposals include: (a) where there is significant overlap between MSS designations and FS, requiring feeder link earth stations to specify half of the overlap to be left available for FS growth; (b) not requiring FS operators to coordinate within unused azimuths; and (c) once an earth station accepts interference that exceeds the desired objective when coordinating, then allowing a future FS station located in the same area to coordinate at that same higher level. *Id.* at 5-7. *Accord* API Reply at 5; UTC Supplemental Comments at 5.

In addition to supporting FWCC's proposals, AAR recommends that the Commission (a) define "feeder link gateway" narrowly, so that MSS operators cannot deploy gateways that are the functional equivalent to subscriber terminals; and (b) limit the number of gateways for which any single MSS operator may be licensed to no more than six. AAR Comments at 4-5 & Reply at 2; *accord* API Reply at 5. Inmarsat states that its gateway plans are compatible with AAR's proposal limiting the number of gateway earth stations per MSS system. Inmarsat Reply at 16 n.42.

222 UTC Comments at 4 & Supplemental Comments at 5-6. *Accord* API Reply at 6.

on the side of FS,[223] and claims that there is no need to impose spectrum efficiency standards on MSS because the MSS operators are aware of spectrum scarcity, and it is in their best interest to use spectrum as efficiently as technically feasible.[224] Globalstar states that FWCC's proposals regarding protection for terrestrial systems from MSS feeder links in these bands are inappropriate for this proceeding,[225] as are requests to find allocations of additional spectrum for FS.[226] We agree that the allocation and technical matters FWCC and its members raise are not appropriate for this authorization and service rules proceeding, and are more appropriate for discussion in pending proceedings addressing MSS feeder link allocations in FS spectrum,[227] and in a proceeding initiated by FWCC, designated RM-9649.[228]

**a. Extended C-band**

74. Inmarsat seeks GSO MSS feeder links in the extended C-band frequencies.[229] In the *Notice*, we stated that Inmarsat's requested feeder downlinks in the United States would be limited to potentially available spectrum between 3600-3650 MHz, because the 3550-3600 MHz band is not allocated in the United States for FSS, and the 3650-3700 MHz band is proposed to be reallocated from FSS to FS in an ongoing proceeding.[230] Inmarsat believes that it should be able to access the 3650-3700 MHz band for its feeder links because the reallocation is not yet final, and in any case, its feeder link use of that spectrum would be fully compatible with any new FS services in the band, and its maximum of two gateways in the United States would make terrestrial coordination feasible.[231] Should Inmarsat pursue extended C-band feeder downlinks in the 3650-3700 MHz band, its earth station receive sites must be within close proximity (*i.e.*, 10 miles or less) of an existing extended C-band earth station receive site authorized to use these frequencies.[232] We also reiterate that FSS operations in the United States in the 3600-3700 MHz band are limited by footnote US245 to the U.S. domestic table of

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223 Inmarsat Reply at 17.

224 *Id.* at 16.

225 Globalstar Reply at 8-13. *Accord* Iridium Reply at 40 (adding that FWCC can also raise these issues in coordination negotiations); Inmarsat Reply at 16 (although FWCC's spectrum sharing suggestions could be employed successfully in order to promote greater spectrum efficiency, FS/MSS feeder link interference matters are better handled on a case-by-case basis during good faith coordination discussions among the parties).

226 Globalstar Reply at 8 n.18.

227 *See, e.g., 5, 7, 15 GHz Allocation NPRM*, 13 FCC Rcd 17107; *NGSO FSS Notice*, 14 FCC Rcd 1131.

228 In its Request for Declaratory Ruling on Partial-Band Licensing of Earth Stations in the Fixed Satellite Service that Share Terrestrial Spectrum and Petition for Rulemaking to Set Loading Standards for Earth Stations in the Fixed Satellite Service that Share Terrestrial Spectrum (filed May 5, 1999), FWCC seeks changes to the FCC's rules and coordination procedures toward what it believes to be "more equitable sharing" between terrestrial FS and satellite services generally. The Commission designated FWCC's filing as RM-9649. *See* Public Notice, Report No. 2334, Mimeo No. 93716 (rel. June 11, 1999).

229 Specifically, Inmarsat requests the 6425-6575 MHz band for feeder uplinks and the 3550-3700 MHz band for feeder downlinks. *See Notice*, 14 FCC Rcd at 4865 ¶ 50 (feeder link table).

230 *Notice*, 14 FCC Rcd at 4869 ¶ 58 (citing *3650-3700 MHz Notice*, 14 FCC Rcd 1295).

231 Inmarsat Comments at 14-15.

232 *See Amendment of the Commission's Rules With Regard to the 3650-3700 MHz Government Transfer Band*, ET Docket No. 98-237, Memorandum Opinion and Order, FCC 00-181, at ¶ 4 & Appendix A (rel. May 22, 2000).

allocations,[233] which restricts FSS to international, inter-continental systems, subject to a case-by-case electromagnetic compatibility analysis.[234]

75. Inmarsat's requested feeder uplinks in the United States may also be limited because it potentially would share the 6425-6525 MHz portion of the band on a primary basis with the Local Television Transmission Service (LTTS).[235] Commenters generally object to allowing MSS feeder links in the LTTS band.[236] Inmarsat replies that since its system proposes to use a maximum of two gateways in the United States, it would be feasible to find appropriate locations, with proper shielding if necessary, from which to operate the feeder uplinks without mutual interference.[237] We need not address these issues here. Inmarsat will have the opportunity to make such a showing when applying for its U.S.-based gateway earth station licenses, which require coordination under Part 25 of our rules.

**b. 5, 7 and 15 GHz bands**

76. The Commission has a pending proceeding proposing to allocate the 5091-5250 MHz ("5 GHz"), 6700-7075 MHz ("7 GHz") and 15.43-15.63 GHz ("15 GHz") frequency bands to NGSO MSS feeder links (the *5, 7, 15 GHz Allocation Proceeding*).[238] Constellation, Globalstar and MCHI already hold authorizations to operate Big LEO feeder links in these same bands, although Constellation and Globalstar seek different feeder link frequencies for their 2 GHz MSS systems than those authorized for their respective Big LEO systems.[239] Thus, the only 2 GHz MSS system seeking feeder link access in these bands for the first time is ICO.[240] In the *Notice*, we sought comment on whether we could accommodate all of these systems in the potential 5, 7 and 15 GHz feeder link spectrum, as well as other authorized satellite users of the band.[241] Globalstar agrees with the Commission that at least two systems

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233 *See Notice*, 14 FCC Rcd at 4869 n.115.

234 47 C.F.R. § 2.106 n.US245.

235 47 C.F.R. § 2.106. LTTS is similar to BAS insofar as TV stations and independent mobile services set up microwave facilities for news gathering, coverage of live events, and program distribution. BAS and cable television relay services licensees share the LTTS spectrum. *See* paragraph 6, *supra*.

236 Century OCN Programming, Inc. Comments at 1-2 (MSS feeder links will exacerbate existing frequency coordination and interference problems in already crowded spectrum); SBE Comments at 2 (Inmarsat's proposal could conflict with the existing LTTS allocation); SBC Comments at 2 (LTTS services have no alternative frequency bands in which to operate). *Cf.* Tim Lynch Comments at 1 (MSS providers will not be inclined to prior coordinate with the LTTS incumbents).

237 Inmarsat Reply at 16.

238 *See 5, 7, 15 GHz Allocation NPRM*, 13 FCC Rcd 17107.

239 Specifically, Constellation requests 2 GHz MSS feeder uplinks in the 5 and 15 GHz bands and 2 GHz MSS feeder downlinks in the 7 GHz band, while its Big LEO feeder links are in the 5 and 7 GHz bands. Globalstar requests 2 GHz MSS feeder uplinks in the 15 GHz band and 2 GHz MSS feeder downlinks in the 7 GHz band, while its Big LEO feeder links are in the 5 and 7 GHz bands. MCHI requests 2 GHz MSS feeder uplinks in the 15 GHz band and 2 GHz MSS feeder downlinks in 7 GHz band, while its Big LEO feeder links are in the same bands. *See Notice*, 14 FCC Rcd at 4869 ¶ 59 (citing Big LEO authorizations) and 4865-66 ¶ 50 (feeder link table).

240 ICO requests feeder uplinks in 5 GHz band and feeder downlinks in 7 GHz band. *See Notice*, 14 FCC Rcd at 4865 ¶ 50 (feeder link table).

241 *Notice*, 14 FCC Rcd at 4870 ¶ 60 & n.122 (citing two DARS systems authorized in the upper portion of the 7 GHz band). WCS Radio, Inc. withdrew an application for a DARS license to use these bands. *See* Public Notice, Report No. SAT-00020, Mimeo No. 94323, at 3 (rel. July 22, 1999).

can coordinate with each other to share spectrum for co-directional feeder link transmissions.[242] MCHI states that it can coordinate its requested 2 GHz MSS feeder links with all other authorized Big LEO feeder links, including its own, but is concerned that additional feeder link sharing would require it to incur high costs to prevent interference.[243] Similarly, Constellation requests that Big LEO systems be given priority when accommodating 2 GHz systems in feeder link spectrum.[244] In response, ICO proffers that it is already coordinating its feeder links with other NGSO MSS systems and has encountered no claims that its feeder links cannot be accommodated.[245] Globalstar states that it is premature for the Commission to judge feeder link intersystem sharing issues at least until all of the Big LEO systems are operational.[246] In light of the unresolved issues with the use of these bands, we expect all operational MSS systems proposing feeder links in the 5, 7 and 15 GHz bands to coordinate use of feeder link spectrum,[247] subject to the outcome of any allocation and licensing proceedings related to these frequencies.[248]

77. The National Telecommunications and Information Administration (NTIA) is the Federal spectrum manager and the principal Executive Branch advisor on telecommunications policy. NTIA requests that NGSO MSS feeder uplink and TT&C authorizations in the 5 GHz and 15 GHz bands be conditioned to protect aeronautical radionavigation services (ARNS).[249] The Commission has proposed such protections in the *5, 7, 15 GHz Allocation Proceeding*,[250] and therefore, we will address NTIA's request in that proceeding. In addition, NTIA requests that gateways using the 5 GHz and 15 GHz bands be subject to coordination through the Frequency Assignment Subcommittee (FAS) of the Interdepartment Radio Advisory Committee (IRAC) to ensure that harmful interference between the MSS feeder links and government operations is minimized.[251] IRAC coordination is standard procedure in such circumstances. Thus, if feeder link earth stations are authorized to operate in the 5 GHz or 15 GHz bands, IRAC coordination would be required. NTIA also recommends that, to the extent practicable, any 2 GHz MSS operator using the 5091-5150 MHz band for feeder links locate its TT&C signal at the upper edge of the band, to reduce the likelihood of interference to the adjacent International Civil Aviation

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242 Globalstar Comments at 27 (citing *Notice*, 14 FCC Rcd at 4869 ¶ 59).

243 MCHI Comments at 25.

244 Constellation Comments at 21-22.

245 ICO Reply at 19.

246 Globalstar Reply at 9 n.21.

247 *See* Constellation Comments at 21 & Reply at 9 (recommending "suitable" or "appropriate" coordination agreements); MCHI Comments at 25 n.62 (suggesting "a good faith coordination negotiation requirement").

248 *See* paragraph 69, *supra*. *Accord* SBE Comments at 2-3 (the proposals to operate feeder downlinks in the 7 GHz band could impact the 6875-7125 MHz TV BAS band, and need to await resolution of the *5, 7, 15 GHz Allocation Proceeding*).

249 NTIA Comments at 6-9. *Accord* ICO Reply at 20. ARNS is a radionavigation service intended for the benefit and for the safe operation of aircraft. *See* 47 C.F.R. § 87.5.

250 *5, 7, 15 GHz Allocation NPRM*, 13 FCC Rcd at 17115 ¶ 16.

251 NTIA Comments at 7-8. The Commission submits non-Government frequency assignment applications for consideration by the FAS, a subcommittee of IRAC. IRAC is an advisory committee within NTIA composed of the 20 most active Federal users of Federal spectrum and a liaison member from the Commission. The primary functions of IRAC are to assist in assigning frequencies to Government spectrum users and in developing and executing policies, programs, procedures and technical criteria pertaining to the allocation, management, and use of the spectrum.

Organization (ICAO) Standard Microwave Landing System (MLS) operations at 5030-5091 MHz.[252] Assuming that MSS operators are authorized to operate feeder links in the 5 GHz band, they likely would choose TT&C frequencies in accordance with NTIA's recommendation on their own accord, to ease coordination with MLS operations and reduce constraints placed on feeder link earth station transmissions. Therefore, we do not need to regulate placement of the TT&C signal in the 5 GHz band at this time.

#### c. Ku-band

78. *NGSO MSS Feeder Links.* The "conventional Ku-band" refers to the Earth-to-space (uplink) frequencies at 14.0-14.5 GHz and the corresponding space-to-Earth (downlink) frequencies at 11.7-12.2 GHz. The "lower Ku-band" refers to the space-to-Earth (downlink) frequencies at 10.7-11.7 GHz.[253] Boeing requests NGSO MSS feeder links in these bands,[254] and the Commission has a pending proceeding proposing to allocate these bands to NGSO FSS systems.[255] In the *Notice*, we sought comment as to whether NGSO MSS feeder links would be an efficient use of the proposed Ku-band NGSO FSS spectrum.[256] Boeing claims it has demonstrated that its proposed NGSO feeder links would not cause unacceptable interference to GSO satellites and terrestrial networks in the band, and that it can operate its feeder links on a shared basis with other proposed NGSO FSS systems.[257] PanAmSat and GE American Communications, Inc. (GE Americom) express concern over the feasibility of NGSO/GSO sharing in the Ku-band.[258] In addition, PanAmSat suggests there is no need to act on Boeing's feeder link request at least until the NGSO/GSO sharing issues are resolved, because fundamental policy questions pertaining to Boeing's proposed AMS(R)S service likely will delay Boeing's ability to operate in the 2 GHz band.[259] We agree that Boeing's feeder link request is intertwined with the issue of whether NGSO FSS links can operate co-frequency with GSO FSS and terrestrial systems in these Ku-band frequencies.

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252 NTIA Comments at 9. The ICAO Standard MLS is an all-weather precision approach and landing system that will eventually replace the Instrument Landing System as the international standard. MLS operates on 200 channels in the 5030-5091 MHz band. A MLS station supports navigation and guidance for suitably-equipped aircraft out to a range of 43 kilometers (23 nautical miles) and an altitude of 6096 meters (20,000 feet).

253 The 10.7-11.7 GHz band is allocated domestically to the FSS on a co-primary basis with the terrestrial FS, and allocated internationally to the FSS, FS, and mobile services. *See* 47 C.F.R. § 2.106. The Commission's rules permit FSS use of this portion of the band on an international basis only. 47 C.F.R. § 25.202(a)(1), n.2 ("[u]se of this band by the fixed-satellite service is limited to international systems, *i.e.*, other than domestic systems"). *See also* 47 C.F.R. § 2.106, NG104.

254 Specifically, Boeing requests its feeder links in the upper-most portions of the bands, *i.e.*, 14.391-14.5 GHz and 11.591-11.7 GHz. *See Notice*, 14 FCC Rcd at 4865 ¶ 50 (feeder link table).

255 *See NGSO FSS Notice*, 14 FCC Rcd 1131; Public Notice, Report No. SAT-00013, Mimeo No. 92541 (rel. March 23, 1999) (accepting NGSO FSS Ku-band applications for filing).

256 *Notice*, 14 FCC Rcd at 4871 ¶ 61.

257 Boeing Comments at 22-23 & Reply at 13-14.

258 PanAmSat Comments at 4; GE Americom Reply at 4.

259 PanAmSat Comments at 5 & Reply at 2.

Therefore, as proposed in the *Notice*,[260] we will address Boeing's feeder link request in the pending rulemaking and application proceedings addressing the NGSO/GSO sharing issue.[261]

79. *GSO MSS Feeder Links.* As the Commission has indicated, GSO MSS feeder links operating on frequencies and at orbital locations that are extensively used could preclude conventional FSS services and inhibit the use of these GSO locations for future FSS assignments.[262] Consequently, the Commission has determined that GSO MSS operators should seek to operate feeder links at frequency bands other than those "conventional" bands that are heavily used for domestic and international FSS services.[263] Nevertheless, the Commission reserves the option of considering GSO MSS feeder link requests in FSS bands on a case-by-case basis, using such factors as existing use of spectrum, orbital locations, potential adverse impact on FSS operations, and the benefits of successfully using these assignments to introduce new and needed satellite services to the public.[264] In the *Notice*, we sought comment on whether we should consider granting authority for MSS feeder links in the frequencies allocated for FSS where, for example, a 2 GHz MSS system proponent reaches an agreement with an existing FSS licensee to use its licensed spectrum, or if the requested location is in an uncongested portion of the arc.[265]

80. Globalstar is the only 2 GHz MSS applicant that seeks to use "conventional" FSS spectrum for GSO MSS feeder links. Specifically, Globalstar seeks authority to operate GSO MSS feeder links in the conventional Ku-band FSS frequencies from four GSO satellites, including one at the 80° W.L. orbital location.[266] Under our case-by-case analysis, we note numerous obstacles to this request. First, FSS already uses the conventional Ku-band intensively.[267] Second, Globalstar does not indicate how it plans to access its suggested Ku-band orbital locations, whether it be through a

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260 *Notice*, 14 FCC Rcd at 4871 ¶ 61.

261 *See NGSO FSS Notice*, 14 FCC Rcd 1131; Public Notice, Report No. SAT-00013, Mimeo No. 92541 (rel. March 23, 1999) (accepting NGSO FSS Ku-band applications for filing). *See also* National Academies' Committee on Radio Frequencies Comments at 4 (requesting that the Commission protect Radio Astronomy Service (RAS) and Earth Exploration-Satellite Service (EESS) users at 10.6-10.7 GHz from MSS feeder downlink operations at 10.7-11.7 GHz through out-of-band emission limitations similar to those proposed by the Commission for NGSO FSS gateway downlinks in the *NGSO FSS Notice*, 14 FCC Rcd at 1173-74 ¶ 82).

262 *See Notice*, 14, FCC Rcd at 4866 ¶ 52. *See also Establishment of Rules and Policies for the Digital Audio Radio Satellite Service in the 2310-2360 MHz Frequency Band*, IB Docket No. 95-91, Notice of Proposed Rulemaking, 11 FCC Rcd 1, 22 ¶ 71 (1995) (citing *Amendment of Parts 2, 22 and 25 of the Commission's Rules to Allocate Spectrum for and to Establish Other Rules and Policies Pertaining to the Use of Radio Frequencies in a Land Mobile Satellite Service for the Provision of Various Common Carrier Services*, GEN Docket No. 84-1234, Memorandum Opinion, Order and Authorization, 4 FCC Rcd 6041, 6050 ¶¶ 61-62 (1989) (*AMSC Order*), *tentative decision on remand*, 6 FCC Rcd 4900 (1991), *final decision on remand*, 7 FCC Rcd 266 (1992), *aff'd sub nom.*, *Aeronautical Radio, Inc. v. FCC*, 983 F.2d 275 (D.C. Cir. 1993)).

263 *Id.* at 4866 n.99. The "conventional" bands used to provide FSS in the United States are the 3700-4200 MHz/5925-6425 MHz bands (C-band) and the 11.7-12.2 GHz/14.0-14.5 GHz bands (Ku-band).

264 *See, e.g.*, *AMSC Order*, 4 FCC Rcd at 6052-53 ¶¶ 76-78.

265 *Notice*, 14 FCC Rcd at 4866 ¶ 52.

266 Globalstar 2 GHz MSS Application at 30-31.

267 PanAmSat and GE Americom argue that the Commission should not allow 2 GHz MSS systems to operate GSO feeder links in the conventional Ku-band because these bands are already congested, with more congestion imminent from NGSO FSS systems seeking access to GSO FSS spectrum and the inherent difficulties involved in NGSO/GSO sharing. *See* PanAmSat Comments at 1-3 & Reply at 4; GE Americom Reply at 3.

processing round,[268] or an agreement with an existing FSS licensee.[269] Most significantly, Globalstar's proposed feeder link operations at the 80° W.L. orbital location are not in conformance with the Commission's GSO orbit location two-degree spacing policy.[270] Therefore, we expect Globalstar to explain how it intends to coordinate the proposed Ku-band GSO MSS feeder links with existing FSS operations, and the public interest benefit of such an assignment, before we would further entertain this request. If Globalstar cannot provide an adequate showing in this regard, we expect it to seek alternative feeder link spectrum.[271]

**d. Ka-band**

81. The Ka-band refers to the Earth-to-space (uplink) frequencies at 27.5-30.0 GHz (the "28 GHz band") and the corresponding space-to-Earth (downlink) frequencies at 17.7-20.2 GHz (the "18 GHz band"). These bands have been segmented for, and shared by, several types of communications systems, including NGSO MSS feeder links, terrestrial FS, FSS, and the Local Multipoint Distribution Service (LMDS), pursuant to an extensive rulemaking proceeding and the efforts of a negotiated rulemaking committee.[272] We recently modified the sharing arrangements in the 18 GHz band.[273]

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[268] *See* GE Americom Reply at 6 (claiming that Globalstar cannot be awarded a Ku-band orbital location outside a processing round).

[269] GE Americom believes that the Commission should permit such agreements, since the FSS provider could determine whether it could accommodate MSS feeder link capacity consistent with other FSS traffic on the satellite. *Id.* On the other hand, PanAmSat believes the Commission should not allow such agreements, as it would allow FSS licensees to "convert the public benefit of FSS spectrum to private gain." PanAmSat Comments at 3. *But see id.* at n.7 (should the Commission allow such private agreements between FSS licensees and MSS operators, the Commission "should require that (i) the MSS proponent reaches agreement with an existing FSS licensee to use its licensed spectrum; (ii) the MSS proponent can operate on a non-interference basis with respect to all other FSS users and facilities, both terrestrial and in-orbit; and (iii) the MSS system's operations will not unreasonably constrain the future development of FSS networks (including VSAT networks).").

[270] GE Americom's Ku-band GE-5 satellite is assigned to 79° W.L., and Nahuelsat, S.A. intends to use the 81° W.L orbit location pursuant to authority granted by the Comision Nacional de Communicaciones of the Republic of Argentina. *See* GE Americom Reply at 6; Letter from Thomas S. Tycz, Chief, Satellite and Radiocommunication Division, to Karis A. Hastings, Esq., Hogan & Hartson L.L.P. (March 28, 2000). For more information regarding the Commission's two-degree spacing policy, see *Licensing Space Stations in the Domestic Fixed-Satellite Service*, 48 Fed. Reg. 40233, 54 Rad. Reg. 2d (P&F) 577 (1983) and *Televisa International, LLC.*, Order and Authorization, 13 FCC Rcd 10074, 10076-77 ¶¶ 7-9 (Int'l Bur. 1997).

[271] Globalstar states that its requested feeder link requirements can be accommodated in the alternative GSO MSS feeder link spectrum suggested by the Commission, with a caveat that it could modify its feeder links if the Ku-band feeder links are available. Globalstar Comments at 28-29. *See also* PanAmSat Reply at 4.

[272] *See Rulemaking to Amend Parts 1, 2, 21, and 25 of the Commission's Rules to Redesignate the 27.5-29.5 GHz Frequency Band, to Reallocate the 29.5-30.0 GHz Frequency Band, to Establish Rules and Policies for Local Multipoint Distribution Service and for Fixed Satellite Services*, CC Docket No. 92-297, First Report and Order and Fourth Notice of Proposed Rulemaking, 11 FCC Rcd 19005 (1996) (*Ka-Band First Report and Order*).

[273] *See Redesignation of the 17.7-19.7 GHz Frequency Band, Blanket Licensing of Satellite Earth Stations in the 17.7-20.2 GHz and 27.5-30.0 GHz Frequency Bands, and the Allocation of Additional Spectrum in the 17.3-17.8 GHz and 24.75-25.25 GHz Frequency Bands for Broadcast Satellite-Service Use*, IB Docket No. 98-172, Report and Order, FCC 00-212 (rel. June 22, 2000) (*18 GHz Report and Order*). U.S. Government satellite systems also operate in the 17.8-20.2 GHz band, and the standard process of coordination between Government and non-Government operations continues to remain in effect. *See id.* at ¶ 4; NTIA Comments at 20. The U.S. Government systems operate in accordance with footnote US334 in the United States Table of Frequency Allocations, 47 C.F.R.

82. *NGSO MSS Feeder Links.* In the *Ka-Band First Report and Order*, the Commission adopted a band sharing arrangement that designates spectrum for NGSO MSS system feeder links.[274] In the 28 GHz band, the Commission established a co-primary allocation for NGSO MSS feeder uplinks at 29.1-29.5 GHz, subject to the special sharing requirements set forth in Sections 25.257 and 25.258 of the rules.[275] In the 18 GHz band, the Commission designated 19.3-19.7 GHz for NGSO MSS feeder downlinks on a co-primary basis with FS,[276] subject to site and frequency coordination.[277] Globalstar proposes to operate NGSO MSS feeder uplinks on a reverse-band working basis in the 19.3-19.6 GHz band segment, as an alternative to its NGSO MSS feeder uplink request in the 15 GHz band.[278] The Commission stated in the *Ka-Band First Report and Order*, that requests for reverse-band working operation in this band would be examined on a case-by-case basis.[279] We are not changing any policies concerning this band at this time. In the *Ka-Band First Report and Order*, the Commission further stated that the 19.3-19.7 GHz band should be able to accommodate at least two systems' feeder links.[280] Therefore, this band may be available to alleviate congestion in other NGSO MSS feeder link bands.

83. *GSO MSS Feeder Links.* Celsat seeks GSO MSS feeder link bandwidth anywhere in the Ka-band.[281] Although the Commission has not specifically designated Ka-band spectrum for GSO MSS feeder links, we tentatively concluded in the *Notice* that the GSO FSS designations in the Ka-band are appropriate for GSO MSS feeder link use.[282] GE Americom, Hughes Communications Galaxy,

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§ 2.106 n.US334. *See generally Amendment of Part 2 of the Commission's Rules to Allocate Spectrum for the Fixed-Satellite Service in the 17.8-20.2 GHz Band for Government Use*, Memorandum Opinion and Order, 10 FCC Rcd 9931 (1995).

274 *Ka-Band First Report and Order*, 11 FCC Rcd at 19023-38 ¶¶ 41-81.

275 47 C.F.R. §§ 25.257, 25.258.

276 We retained the NGSO MSS and FS co-primary designation in the 19.3-19.7 GHz band in the *18 GHz Report and Order*, FCC 00-212, at ¶¶ 53-54.

277 47 C.F.R. § 2.106.

278 *See Notice*, 14 FCC Rcd at 4865 ¶ 50 (feeder link table); *id.* at 4872 ¶ 65. Reverse-band working involves authorizing satellite communications links in a direction opposite to the direction for which the band is allocated. Thus, in the 19.3-19.6 GHz band, which is allocated for downlinks, uplinks would operate on a "reverse-band working" basis.

279 *Ka-Band First Report and Order*, 11 FCC Rcd at 19031-32 ¶ 63.

280 *Id.* at 19037 ¶ 80.

281 *See* Celsat Reply at 22; Celsat Amendment to Application, IBFS File No. SAT-AMD-19980123-00009, File No. 88-SAT-AMEND-98 (filed January 23, 1998); Public Notice, Report No. SAT-00012 (rel. March 16, 1999).

282 *Notice*, 14 FCC Rcd at 4872 ¶ 64. GSO FSS systems may operate uplinks in the following 28 GHz sub-bands:
27.50-28.35 GHz (850 MHz, secondary with respect to LMDS);
28.35-28.60 GHz (250 MHz, exclusive primary);
28.60-29.10 GHz (500 MHz, secondary with respect to NGSO FSS);
29.25-29.50 GHz (250 MHz, co-primary with respect to NGSO MSS feeder links); and
29.50-30.00 GHz (500 MHz, exclusive primary).
*See Rulemaking to Amend Parts 1, 2, 21, and 25 of the Commission's Rules to Redesignate the 27.5-29.5 GHz Frequency Band, to Reallocate the 29.5-30.0 GHz Frequency Band, to Establish Rules and Policies for Local Multipoint Distribution Service and for Fixed Satellite Services*, CC Docket No. 92-297, Third Report and Order, 12 FCC Rcd 22310, 22326-27 ¶¶ 40-42 (1997).

Inc./Hughes Communications, Inc. (Hughes), PanAmSat, and Pegasus Development Corporation (Pegasus) request that the Commission reverse its tentative conclusion in the *Notice* and not accommodate GSO MSS feeder links within what they call the "core," "conventional" or "primary" GSO FSS Ka-band spectrum.[283] PanAmSat states that the Ka-band faces the same problems of spectrum and orbital location scarcity as do the conventional C- and Ku-bands.[284] Pegasus adds that GSO MSS feeder link use of this spectrum would be a highly inefficient use of the Ka-band orbital resource in the CONUS arc.[285] In addition, Hughes asks us to reject those portions of the 2 GHz MSS applications that are inconsistent with the 28 GHz band plan and Hughes' licensed and proposed Spaceway systems.[286] Celsat claims that the concerns surrounding GSO MSS feeder link use of the conventional C- and Ku-band FSS allocations are not present in the Ka-band, because the Ka-band is not currently heavily used for FSS services.[287] Hughes and PanAmSat reject Celsat's argument, claiming it ignores the near-future roll-out of broadband GSO FSS service, and thus, does not justify Commission departure of precluding feeder link use of conventional FSS spectrum.[288]

84. We see no reason to adopt any rules or policies prohibiting GSO MSS feeder links in Ka-band GSO FSS spectrum in this *Report and Order*. At this time, the Ka-band does not carry the same heavy level of FSS traffic that the conventional C- and Ku-bands carry. As to Celsat, however, we highlighted in the *Notice* that Celsat's use of the Ka-band spectrum for feeder links depends on its ability to obtain successfully an appropriate GSO orbital location in the domestic arc, many of which already are assigned.[289] Commenters suggest that Celsat use portions of the GSO FSS allocation where no geostationary orbital slots are currently occupied by first-round Ka-band licensees,[290] or attempt to coordinate the 111° W.L. orbital position with the Canadian administration, which has an ITU filing at

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In the recently-released *18 GHz Report and Order*, we eliminated all secondary designations in the 18 GHz band, and thus, GSO FSS systems may operate downlinks in the following 18 GHz sub-bands on a primary or co-primary basis:

18.30-18.58 GHz (280 MHz, co-primary with respect to FS);
18.58-18.80 GHz (220 MHz, exclusive primary); and
19.70-20.20 GHz (500 MHz, exclusive primary).

*See 18 GHz Report and Order*, FCC 00-212, at ¶ 28.

283 GE Americom Reply at 6; Hughes Comments at 6 & Reply at 2; PanAmSat Comments at 6 & Reply at 5; Pegasus Comments at 3-4. Although not specified in its filings, we believe Hughes is referring to the pairing of 19.7-20.2 GHz and 29.5-30.0 GHz as the "core" GSO FSS spectrum. Hughes Comments at 5 (citing *Ka-Band First Report and Order*, 11 FCC Rcd at 19036 ¶ 78).

284 PanAmSat Comments at 6 & Reply at 5. *See also* Hughes Comments at 2-3 & Reply at 4-5.

285 Pegasus Comments at 3 (Ka-band GSO FSS will provide more ubiquitous services directly to consumers vs. feeder link service to limited number of gateways); *accord* GE Americom Reply at 7.

286 Hughes Comments at 2. *Accord* PanAmSat Comments at 6 (reject any application that proposes a frequency use that deviates from the Ka-band plan).

287 Celsat Comments at 24-25 (citing *Notice*, 14 FCC Rcd at 4872 ¶ 64).

288 Hughes Comments at 4 & Reply at 3; PanAmSat Reply at 5 n.17.

289 *See Notice*, 14 FCC Rcd at 4872 ¶ 64; *see also* GE Americom Reply at 7 (claiming that all Ka-band orbital locations in the range identified by Celsat have been assigned).

290 Hughes Comments at 7; Celsat Reply at 23 n.43.

that location.[291] This issue, and thus, the related authorization of Celsat's feeder links, will need to be resolved in the context of the Ka-band second processing round.[292]

85. We note that Celsat is committed to cooperating with all interested parties in the Ka-band second processing round to develop an agreeable orbital assignment plan that will accommodate its feeder link request.[293] Furthermore, Celsat's spectrum choices for its feeder links must be consistent with the limitations and related coordination requirements adopted to resolve Ka-band spectrum sharing issues. Thus, should Celsat seek feeder uplink spectrum in the 27.5-28.35 GHz sub-band (designated as primary to LMDS),[294] it only could do so on an unprotected, non-interference basis to LMDS,[295] with LMDS priority applied in all respects to any existing or future use of the band as currently allocated,[296] and no requirement that LMDS licensees coordinate use of this band for MSS feeder links.[297] Should Celsat seek its feeder downlink spectrum in the 18.3-18.58 GHz sub-band (co-primary with FS operators), it only could do so subject to coordination.[298] Finally, should Celsat seek feeder uplink spectrum in the 29.25-29.5 GHz sub-band (designated as co-primary with NGSO MSS feeder links), it would need to comply with the spectrum sharing and coordination rules set forth at Section 25.258 of the Commission's rules.[299]

### 2. Non-U.S.-Based Gateway Operations

86. In *DISCO II*, the Commission concluded that systems serving the United States using foreign satellites must meet the same technical requirements as systems using U.S.-licensed satellites.[300] TMI presents a unique situation among the nine 2 GHz MSS systems proponents. Specifically, TMI proposes to serve the United States from a Canadian-licensed satellite, using a Canadian gateway for feeder links and TT&C operations.[301] By contrast, the other system proponents intend to use at least one

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291 Hughes Comments at 8 & n.25; *but see* KaStar Satellite Communications Corp. Reply at 3-4 (Hughes' suggestion does not comply with the Commission's two-degree spacing requirements for GSO satellites).

292 *Accord* Globalstar Comments at 26 n.28 (Commission should defer Celsat's feeder link requests until resolution of the Ka-band second processing round).

293 Celsat Reply 24.

294 Celsat Comments at 25; Hughes Comments at 6; Pegasus Comments at 4.

295 WinStar Communications, Inc. (WinStar) Comments at 2-4 & Reply at 1-3; Bosch Telecom, Inc. Comments at 1; Personal Communications Industry Association Comments at 2-3; Wireless Communications Association International, Inc. (WCA) Reply at 5.

296 WinStar Comments at 3 and Reply at 4 (MSS operator would have to turn off its feeder link even if the LMDS licensee installs equipment after a MSS provider begins operations); *accord* WCA Reply at 5.

297 WinStar Reply at 4; FWCC Comments at 6 n.15.

298 Hughes Comments at 6-7; Pegasus Comments at 4-5.

299 47 C.F.R. § 25.258.

300 *See DISCO II Order*, 12 FCC Rcd at 24161 ¶ 156.

301 *See* TMI 2 GHz MSS LOI, at Attachment 2, Table 1. TMI's proposed GSO feeder link frequencies are subject to Appendix 30B of the ITU Radio Regulations, which contains a GSO FSS plan allotting the given frequency bands to each Administration at specific orbital locations. We note that Canada has completed the Appendix 30B procedures for an orbital location at 106.5° W.L., where TMI proposes to locate its 2 GHz MSS system. TMI states that should a U.S.-located gateway be contemplated, it will complete the required Appendix 30B procedures to accommodate feeder link stations in the United States being able to access TMI's satellite. *See* TMI Comments at 8.

U.S. gateway for feeder links and TT&C. TMI plans to use frequencies outside its proposed feeder links for TT&C operations,[302] a system design that does not comport with Section 25.202(g) of the Commission's rules.[303] PanAmSat argues that, to be authorized in the United States under the *DISCO II* LOI process, TMI must comply with the Commission's Part 25 technical rules applicable to U.S.-licensed systems, including Section 25.202(g).[304] Because we do not have jurisdiction over system operations wholly outside of the United States, the *DISCO II* rule regarding technical requirements only applies to specific system components that operate in the United States. Thus, because TMI's feeder link and TT&C operations will be limited to transmissions between TMI's Canadian-licensed satellite and a Canadian gateway, and will not operate in the United States, the *DISCO II* rule regarding technical requirements does not apply to TMI's feeder links and TT&C transmissions.[305] Notwithstanding the foregoing, any system proposing to handle communications originating or terminating from mobile terminals in the United States via gateways located outside the United States may need to address law enforcement and national security concerns before licensing or spectrum authorization can be effected.[306]

87. TMI's system design prompted our proposal to require that 2 GHz MSS operators perform TT&C operations within their assigned feeder link frequencies, or within bands allocated to space operations, pursuant to Section 25.202(g) of the Commission's rules.[307] Commenters generally support this proposal,[308] and we adopt this requirement with regard to all 2 GHz MSS operators performing TT&C operations from control centers located in the United States. Should TMI seek Commission authority to operate TT&C from a U.S.-based earth station control center, we would require TMI to perform TT&C operations in compliance with Section 25.202(g).[309]

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302 Although space station applicants generally seek TT&C frequencies within their requested feeder link bands, TMI describes its Canadian-licensed MSS system as using feeder links within the 10.7-10.95 GHz, 11.2-11.45 GHz, and 12.75-13.25 GHz bands, and TT&C links within the 11.7-11.75 GHz, 12.15-12.2 GHz, 14.0-14.05 GHz and 14.45-14.5 GHz bands. *See* TMI 2 GHz MSS LOI, at Attachment 2, Table 1.

303 Section 25.202(g) states that TT&C functions for U.S. domestic satellites "shall be conducted at either or both edges of the allocated band(s)," *i.e.*, at either or both edges of a frequency band assigned to a satellite licensee for communication. 47 C.F.R. § 25.202(g).

304 PanAmSat Reply at 6.

305 For the same reason, we have no jurisdiction to address NTIA's requests to adopt power and out-of-band emission limits on TMI's potential use of the 10.7-10.95 GHz and 11.2-11.45 GHz bands for MSS feeder downlinks, or TMI's potential use of the 12.75-13.25 GHz band for MSS feeder uplinks. *See* NTIA Comments at 19-20 & 21-22.

306 *See, e.g.*, *SatCom Systems, Inc. and TMI Communications and Company, L.P.*, Order and Authorization, 14 FCC Rcd 20798, 20823-24 ¶¶ 55-58, 20829-45 Appendix A (1999); *Airtouch Communications, Inc. and Vodafone Group, PLC.*, Memorandum Opinion and Order, DA 99-1200, 16 Communications Reg. (P&F) 125, at ¶¶ 20-24 & Appendix A (WTB 1999).

307 *Notice*, 14 FCC Rcd at 4873 ¶ 67.

308 NTIA Comments at 8-9; Globalstar Comments at 30; PanAmSat Comments at 6.

309 *Cf. U.S. Electrodynamics, Inc.*, Order and Authorization, DA 99-1249, at ¶ 18 (Int'l Bur. rel. June 24, 1999) (provisionally allowing TT&C communications in the United States for ICO's proposed 2 GHz MSS system in frequency bands well inside the bands specified for feeder links, rather than at the edges of the band, to facilitate ICO's global TT&C operations and coordination with Globalstar's Big LEO system also operating in the band).

### 3. Inter-Satellite Service (ISS) Links

88. Section 25.279 of the Commission's rules sets forth the obligation to coordinate proposed commercial use of the ISS bands with Government agencies in bands co-allocated to Government and non-Government use, as well as existing non-Government permittees and licensees.[310] In the *Notice*, we proposed that Section 25.279 would apply to the 2 GHz MSS system proponents.[311] NTIA and Globalstar support of our proposal,[312] and we received no objections. We therefore adopt this proposal, so that all parties cooperate fully and make every reasonable effort to resolve technical problems and conflicts that may inhibit effective and efficient use of the radio spectrum. Globalstar notes that Section 25.279 refers to ISS links between only NGSO satellites and other space stations,[313] and should be amended to apply to communications between any space stations.[314] The Commission promulgated Section 25.279 in the *Big LEO Report & Order*,[315] a processing round limited to NGSO satellites.[316] Since that time, satellite systems are being designed to include inter-satellite communications between GSO satellites,[317] or between satellites in a system incorporating GSO and NGSO architectures.[318] Therefore, we revise Section 25.279 so that it will apply to any space station communicating with another space station using frequencies in the ISS bands.

89. Globalstar seeks ISS links in the 59-64 GHz bands.[319] Currently, the 59-64 GHz bands are available for Government and non-Government ISS.[320] In July 1999, however, we proposed deleting the non-Government ISS allocation from the 59-64 GHz bands, and allocating the 65-71 GHz band for exclusive non-Government ISS use.[321] We made these proposals because there is a well-established and pressing demand for commercial inter-satellite link spectrum and because NTIA asserts that Government ISS operations in the 59-64 GHz bands are not compatible with proposed commercial ISS users of this

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310 47 C.F.R. § 25.279(b). Pursuant to Section 25.279, we require all relevant entities to cooperate fully and make every reasonable effort to coordinate and resolve technical problems and conflicts that may inhibit effective and efficient use of the radio spectrum. *Id.* § 25.279(b)(2).

311 *Notice*, 14 FCC Rcd at 4874 ¶ 70.

312 *See* NTIA Comments at 17. *See also* Globalstar Comments at 30 (stating its willingness to coordinate use of its ISS links with Government and non-Government users).

313 47 C.F.R. § 25.279(a) ("Any non-geostationary satellite communicating with other space stations may use frequencies in the inter-satellite service as indicated . . . .").

314 Globalstar Comments at 30.

315 *See Big LEO Report & Order*, 9 FCC Rcd at 6000 ¶ 170.

316 *Id* at 5945 ¶ 15.

317 *See, e.g.*, *Lockheed Martin Corporation*, Order and Authorization, 12 FCC Rcd 23014, 23021-22 ¶ 24 (Int'l Bur. 1997) (Astrolink, a Ka-band satellite system, plans to use inter-satellite links between adjacent GSO satellites).

318 *See, e.g.*, Globalstar 2 GHz MSS Application at 37.

319 Globalstar 2 GHz MSS Application at 31.

320 47 C.F.R. §§ 25.203, 101.103.

321 *See Amendment of Part 2 of the Commission's Rules to Allocate Additional Spectrum to the Inter-Satellite, Fixed, and Mobile Services and to Permit Unlicensed Devices to Use Certain Segments in the 50.2-50.4 GHz and 51.4-71.0 GHz Bands*, ET Docket No. 99-261, Notice of Proposed Rule Making, 14 FCC Rcd 12473, 12481-82 ¶¶ 9-10 (1999) (*Millimeter Wave Notice*).

band.[322] In the event that we adopt these proposals in an upcoming order, Globalstar may amend its proposed ISS frequencies to operate consistent with the U.S. allocation.[323]

### 4. Radionavigation Frequencies

90. In addition to requesting service and feeder link spectrum for its 2 GHz MSS system, Boeing seeks Commission authority to use the 1565.42-1585.42 MHz band (the "GPS L1 band") to provide a Navigation Augmentation Service (NAS) for aircraft utilizing the Global Positioning System (GPS).[324] In the *Notice*, we sought comment on Boeing's proposed use of this band, which is allocated for the Radionavigation Satellite Service (RNSS) and used by the Government for its GPS system within NTIA's jurisdiction.[325] NTIA states that "[d]etailed discussion of the technical parameters of the proposed system will be necessary" with the Department of Defense and the Federal Aviation Administration to ensure protection of GPS "before NTIA could concur on the Boeing proposal."[326] Boeing therefore requests that the FCC authorize its proposed GPS augmentation service conditioned on the agreement of U.S. government users of the band.[327]

91. Boeing's ability to provide MSS is not dependent on receipt of authorization to use the GPS L1 band.[328] There are multiple technical and national policy issues to be resolved before we could authorize any GPS augmentation service in the RNSS. For example, NTIA requests that the Commission conform its rules to reflect the fact that the bandwidth for GPS has been amended to 1563.42-1587.42 MHz,[329] and Boeing asks the Commission to adopt rules requiring that any RNSS operating in the GPS L1 band must provide global coverage.[330] We will address these issues, as well as a similar application submitted by Lockheed Martin Corporation,[331] in a future action.

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322 *Id* at 12481 ¶ 9. *See also* NTIA Comments at 17 (requesting that, within the 54.25-71 GHz range, the Commission require that NGSO ISS links be limited to the 65-71 GHz bands).

323 Globalstar Comments at 30.

324 Boeing 2 GHz MSS Application at 3-6 & Attachment Two.

325 *Notice*, 14 FCC Rcd at 4873 ¶ 68.

326 NTIA Comments at 19. *Accord* Iridium Comments at 30 (opposing operations of any kind that would compromise the integrity and accuracy of the GPS system).

327 Boeing Reply at 12

328 *See also* Iridium Comments at 30 (arguing that Boeing's GPS augmentation request is beyond the scope of this proceeding). Indeed, Boeing describes its proposed NAS system separately from its proposed 2 GHz MSS system. *See* Boeing 2 GHz MSS Application, Attachment 1 (description of proposed 2 GHz MSS system) and Attachment 2 (description of proposed NAS system).

329 NTIA Comments at 4-6 (citing, *e.g.*, 47 C.F.R. § 25.213(b)).

330 Boeing Comments at 14.

331 Application of Lockheed Martin Corporation, File Nos. SAT-LOA-19990427-0045 through SAT-LOA-19990427-0050 (filed April 27, 1999). *See* Public Notice, Report No. SAT-00018 (rel. May 27, 1999).