Exhibit 1: Description of Modification

O3b Limited ("O3b") seeks modifications to the license for its earth station at Haleiwa, Hawaii (the "Hawaii Gateway") to add frequency ranges specified in the updated O3b space station market access grant issued by the Commission last year.[1]

O3b operates a U.K.-authorized, non-geostationary orbit ("NGSO") satellite system that is authorized to provide Ka-band fixed-satellite service ("FSS") and mobile-satellite service ("MSS") in the United States. O3b has sixteen satellites in orbit. Additional satellites in the O3b network, including four satellites scheduled for launch in March of 2019, will be capable of operating in new frequencies permitted under the Market Access grant.

As the Commission directed in the Market Access Grant,[2] O3b is requesting a modification of its Hawaii Gateway license to add frequency bands. Currently the license authorizes operations in the 27.6-28.4 GHz and 28.6-29.1 GHz uplink frequencies and the 17.8-18.6 GHz and 18.8-19.3 GHz downlink frequencies. O3b now seeks to add the 27.5-27.6 GHz, 28.4-28.6 GHz, and 29.1-30.0 GHz uplink bands and the 19.3-20.2 GHz downlink band included in the O3b Market Access Grant.[3] As demonstrated herein, grant of the requested modification will serve the public interest and is consistent with Commission rules and policies.

Public Interest Statement

The Commission has determined that permitting the O3b system to serve the United States using a broader range of Ka-band frequencies will promote the public interest,[4] and modifying the Hawaii Gateway license to encompass these additional bands is necessary to ensure these benefits can be achieved. The modification builds on O3b's proven success in providing high-throughput and low-latency NGSO satellite services in Ka-band frequencies and will allow even more innovative and affordable services to customers in the future. O3b provides large data capacity and enables real-time applications to users on land, in the air, and at sea, including in areas where fiber access is limited or non-existent, driving demand from both the civilian and military arms of the U.S. government and from a wide range of commercial customers. Allowing the Hawaii Gateway to access the additional frequencies being deployed on O3b's new satellites will enable O3b to respond to customer requirements and to compete

[1] *O3b Limited*, Order and Declaratory Ruling, 33 FCC Rcd 5508 (2018) (the "Market Access Grant").
[2] *See id.* at ¶ 44.
[3] *See id.* at ¶ 46.
[4] *See id.* at ¶ 11.

more effectively, propelling the development of more advanced, cost-effective services and increasing the options available to customers throughout the O3b system's footprint.

O3b Operations in Shared Bands

Uplink

27.5-27.6 GHz –Sharing with primary terrestrial stations

In the 27.5-28.35 GHz band, the Upper Microwave Flexible Use Service ("UMFUS") has a primary allocation, and FSS operations are permitted on a secondary basis. Pursuant to Section 25.136(a), an earth station licensee may be authorized to operate in this band without providing interference protection to UMFUS stations if certain requirements are met.[5] The Hawaii Gateway license authorizing operations in the 27.6-28.35 GHz band was issued in 2012,[6] well before adoption of the UMFUS rules. As a result, the earth station is entitled to grandfathered status, and does not need to provide interference protection to future UMFUS stations in the 27.6-28.35 GHz band segment.[7]

This modification proposes to add the 27.5-27.6 GHz frequencies to the Hawaii Gateway license. As discussed below, O3b seeks any necessary waiver of the provisions of Section 25.136(a) to extend grandfathered status to operations of the Hawaii Gateway using the 27.5-27.6 GHz band segment, so that O3b would be exempt from a requirement to protect future UMFUS stations from interference throughout the 27.5-28.35 GHz frequencies.

27.5-27.6 GHz, 28.4-28.6 & 29.5-30 GHz – GSO FSS priority bands

O3b requests authority for the Hawaii Gateway to transmit in the 27.5-27.6 GHz, 28.4-28.6 GHz and 29.5-30 GHz frequency bands, in which geostationary orbit ("GSO") FSS systems have priority over NGSO FSS networks. O3b will take the necessary steps to ensure that transmission in these band segments does not cause harmful interference to protected GSO operations.

The Commission has granted O3b U.S. market access in Ka-band uplink spectrum in which GSO FSS has priority status based on O3b's demonstration that its NGSO operations are

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[5] 47 C.F.R. § 25.136(a). *See also Use of Spectrum Bands Above 24 GHz For Mobile Radio Services,* Report and Order and Further Notice of Proposed Rulemaking, 31 FCC Rcd 8014 (2016) (the "Spectrum Frontiers Order") at Appendix A.
[6] *See* IBFS File No. SES-LIC-20100723-00952, granted Sept. 25, 2012.
[7] *See* 47 C.F.R. § 25.136(a)(2) (FSS earth stations authorized prior to July 14, 2016 are not required to protect UMFUS stations from interference).

not likely to cause harmful interference to GSO networks[8] and subject to conditions specifying that the O3b operations are not entitled to protection from interference caused by GSO systems.[9] O3b's request to modify the Hawaii Gateway license to include the 27.5-27.6 GHz, 28.4-28.6 GHz and 29.5-30 GHz band segments is consistent with these provisions and other applicable Commission requirements.

Pursuant to Sections 25.115(f)(1) and 25.146(a)(2) of the Commission's rules, O3b hereby certifies that the earth station operations proposed herein will comply with the applicable equivalent power flux-density ("EPFD") levels in Article 22, Section II, and Resolution 76 of the ITU Radio Regulations. The Commission has recognized that any NGSO system that complies with these international EPFD limits "is considered as having fulfilled its obligation . . . not to cause unacceptable interference to any GSO network."[10] Moreover, O3b will not claim protection from interference from U.S.-licensed GSO FSS networks in the 27.5-27.6 GHz, 28.4-28.6 GHz and 29.5-30 GHz band segments.

29.1-29.5 GHz – Sharing with co-primary MSS feeder links and terrestrial stations

As required in the Market Access Grant and under Section 25.250 of the Commission's rules,[11] O3b will coordinate its MSS feeder link operations in the 29.1-29.5 GHz frequency band with previously authorized NGSO MSS systems. Specifically, O3b will coordinate with Iridium prior to commencing operations in the 29.1-29.3 GHz band segment Iridium uses. O3b will also comply with the requirements of Section 25.261 regarding sharing the 29.1-29.5 GHz frequency bands with other NGSO FSS operators.[12]

Under the Commission's Ka-band Plan, terrestrial Local Multipoint Distribution Service ("LMDS") is co-primary with NGSO MSS feeder links in the 29.1-29.25 GHz band segment, but no party holds an active LMDS authorization in the state of Hawaii.[13]

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[8] *See, e.g.,* IBFS File No. SAT-AMD-20161115-00116, Technical Annex at 13-19.
[9] *See* Market Access Grant at ¶¶ 13-16, 46.
[10] *Update to Parts 2 and 25 Concerning Non-Geostationary, Fixed-Satellite Service Systems and Related Matters,* Report and Order and Further Notice of Proposed Rulemaking, 32 FCC Rcd 7809 (2017) (the "NGSO Order") at 7820, ¶ 32 (footnote omitted). *See also* 47 C.F.R. § 25.289.
[11] Market Access Grant at ¶¶ 23, 46(c); 47 C.F.R. § 25.250.
[12] 47 C.F.R. § 25.261.
[13] *See* Call Sign E140107, IBFS File No. SES-LIC-20141022-00809, Annex 4, granted June 5, 2015. A search of the Commission's Universal Licensing Service confirms that no terrestrial system is licensed in the 29.1-29.5 GHz frequencies in Hawaii. Accordingly, O3b requests any necessary waiver of the requirements of Section 25.203 regarding coordination of earth station operations with terrestrial systems.

29.25-29.5 GHz – Sharing with co-primary GSO FSS systems

O3b requests authority for the Hawaii Gateway to transmit in the 29.25-29.5 GHz frequency band, in which GSO FSS systems are co-primary with NGSO MSS feeder link networks.

The Commission has granted O3b U.S. market access in this Ka-band uplink spectrum in which MSS feeder links and GSO FSS networks are co-primary status based on O3b's demonstration that its NGSO operations are not likely to cause harmful interference to GSO networks.[14] O3b's request to modify the Hawaii Gateway license to include the 29.25-29.5 GHz band segment is consistent with these provisions and other applicable Commission requirements.

Pursuant to Sections 25.258 of the Commission's rules, O3b hereby certifies that the earth station operations proposed herein will comply with the applicable coordination requirements between its NGSO MSS feeder link operations and co-primary GSO operations.

Downlink

19.3-19.7 GHz – Sharing with other co-primary NGSO MSS feeder links and GSO FSS stations

O3b requests authorization for the Hawaii Gateway to receive in the 19.3-19.7 GHz band. As required in the Market Access Grant, O3b will comply with Section 25.250 regarding coordinating use of these frequencies with other NGSO MSS feeder links.[15] O3b will coordinate with U.S. Federal systems and co-primary GSO FSS stations.

19.7-20.2 GHz – GSO FSS priority bands

O3b requests authority for the Hawaii Gateway to receive in the 19.7-20.2 GHz frequency band, in which GSO FSS systems have priority over NGSO. O3b's operations in these bands will comply with applicable requirements designed to protect GSO FSS systems. As specified in the Market Access Grant, O3b's satellite transmissions to the Hawaii Gateway will conform to "the applicable power flux-density and equivalent power-flux density limits contained in Section 25.208, 47 C.F.R. § 25.208, and Articles 21 and 22, as well as Resolution 76 of the ITU Radio Regulations."[16] O3b will also cooperate with other NGSO operators to ensure that all O3b's "authorized operations, including MSS operations in the 19.7-20.2 GHz band, jointly comport with the applicable limits for aggregate EPFD in the space-to-Earth direction (EPFD down) contained in Article 22 of the ITU Radio Regulations, as well as

[14] *See, e.g.,* IBFS File No. SAT-AMD-20161115-00116, Technical Annex at 13-19.
[15] Market Access Grant at ¶ 46(c); 47 C.F.R. § 25.250.
[16] Market Access Grant at ¶ 46(a).

Resolution 76 of the ITU Radio Regulations."[17] Moreover, O3b recognizes that its MSS operations in the 19.7-20.2 GHz frequencies must not cause harmful interference to, and are not entitled to interference protection from, FSS operations in this band segment.[18] O3b will also conform to the terms of its current and future coordination agreements with U.S. Federal systems in the 19.7-20.2 GHz frequency bands.[19]

Request for Waiver of Section 25.136(a)

As discussed above, FSS earth stations are secondary to UMFUS stations in the 27.5-28.35 GHz band, but an earth station can operate without the requirement to protect future UMFUS operations if it meets the criteria set forth in one of the subsections of Section 25.136(a) of the Commission's rules. O3b seeks any necessary waiver of Section 25.136(a) to extend to the 27.5-27.6 GHz band segment the same grandfathered treatment applicable to the Hawaii Gateway's use of the 27.6-28.35 GHz frequencies. Grant of this waiver is consistent with Commission policy:

> The Commission may waive a rule for good cause shown. Waiver is appropriate if special circumstances warrant a deviation from the general rule and such deviation would better serve the public interest than would strict adherence to the general rule. Generally, the Commission may grant a waiver of its rules in a particular case if the relief requested would not undermine the policy objective of the rule in question and would otherwise serve the public interest.[20]

In adopting Section 25.136(a), the Commission's goal was to "create rules that allow for continued and expanded sharing between terrestrial operations and FSS earth stations in the 28 GHz band."[21] Recognizing that "FSS operators rely on [the 27.5-28.35 GHz] band for gateway connectivity and have invested significant capital in the band,"[22] the Commission grandfathered all earth stations licensed prior to the adoption date of the Spectrum Frontiers Order, including the O3b Hawaii Gateway.[23] The Commission also extended grandfathered status to earth stations for which applications were pending as of the Order's effective date and put in place measures to allow the deployment of new FSS earth stations that would not be

[17] *Id.* at ¶ 46(b).
[18] *Id.* at ¶ 46(d).
[19] *Id.* at ¶ 46(h).
[20] *PanAmSat Licensee Corp*., 17 FCC Rcd 10483, 10492 (Sat. Div. 2002) (footnotes omitted).
[21] Spectrum Frontiers Order at ¶ 45.
[22] *Id.* at ¶ 51.
[23] *Id.* at ¶¶ 59, 46. *See also* 47 C.F.R. § 25.136(a)(2).

required to protect future UMFUS stations.[24] The Commission determined that these measures, taken together, would have "little impact on terrestrial use" of the 27.5-28.35 GHz frequencies.[25]

The terms of Section 25.136(a) do not make clear whether the grandfathering for the Hawaii Gateway applies throughout the 27.5-28.35 GHz or is limited to the 27.6-28.35 GHz band segment that was licensed prior to the adoption of the Spectrum Frontiers Order.[26] To the extent the Commission determines that only the 27.6-28.35 GHz is eligible for grandfathered status, O3b seeks waiver of Section 25.136(a) to extend that status to transmissions in the 27.5-27.6 GHz frequencies as well. Such an outcome is consistent with the policy underlying the rule, as it will provide certainty for O3b's use of spectrum with no significant impact on possible terrestrial use by future UMFUS operations.

The Hawaii Gateway PFD contour in the 27.5-27.6 GHz band will be identical to the PFD contour in the 27.6-28.35 GHz band, and prospective UMFUS licensees therefore must already have taken into account the Hawaii Gateway's operations in bidding for spectrum rights within this area. Moreover, it is unlikely that gaining access to only 100 MHz of the 28 GHz band spectrum on a protected basis would be attractive to a potential UMFUS licensee. The Commission adopted 425 MHz block sizes for UMFUS operations in the 28 GHz band and permitted licensees to acquire both blocks to provide a large amount of contiguous spectrum suitable for high-speed service.[27] The desire by prospective UMFUS operators for wide spectrum bandwidths suggests that an UMFUS deployment limited to the 27.5-27.6 GHz band within the Hawaii Gateway's PFD contour is quite improbable.

In contrast, because O3b already has rights to employ the 27.6-28.35 GHz frequencies at the Hawaii Gateway without regard to future UMFUS stations, it can make effective use of the additional 27.5-27.6 GHz frequencies. By extending grandfathered status to the Hawaii Gateway's operations in the 27.5-27.6 GHz band segment, the Commission will support expansion of the O3b system's capacity without impairing any realistic chance that UMFUS facilities would be deployed nearby. Accordingly, the Commission should grant any necessary

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[24] Spectrum Frontiers Order at ¶¶ 50-60; 47 C.F.R. § 25.136(a)(3) & (4). The provisions for new FSS earth stations were liberalized in some respects on reconsideration. *See Use of Spectrum Bands Above 24 GHz For Mobile Radio Services,* Second Report and Order, Second Further Notice of Proposed Rulemaking, Order on Reconsideration, and Memorandum Opinion and Order, 32 FCC Rcd 10,988 (2017) ("Second Spectrum Frontiers Order") at ¶¶ 132-139.
[25] Spectrum Frontiers Order at ¶ 47.
[26] The Second Spectrum Frontiers Order (at ¶¶ 140-41) discusses how adding an antenna at a grandfathered earth station site will be considered under Section 25.136(a), but does not address the implications of adding frequencies to a grandfathered earth station license.
[27] Spectrum Frontiers Order at ¶¶ 70-72.

waiver of Section 25.136(a) to permit the Hawaii Gateway to transmit in the 27.5-27.6 GHz band without a requirement to protect future UMFUS operations in those frequencies.

Conclusion

For the reasons stated herein, the Commission should modify the Hawaii Gateway license to permit O3b to use additional frequencies to communicate with the new satellites authorized in the Market Access Grant.