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

In the Matter of	)	
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Inquiry Concerning the Deployment of Advanced Telecommunications Capability to All Americans In a Reasonable and Timely Fashion, and Possible Steps to Accelerate Such Deployment Pursuant to Section 706 of the Telecommunications Act of 1996, as Amended by the Broadband Data Improvement Act	)	GN Docket No. 15-191

To: The Commission

COMMENTS OF O3B LIMITED

O3b Limited ("O3b") welcomes the opportunity to submit these comments in response to the Commission's Eleventh Broadband Progress Notice of Inquiry ("NOI").

I. BACKGROUND

O3b is a global broadband satellite system in medium Earth orbit ("MEO") that operates a constellation of twelve non-geostationary ("NGSO") satellites that offers satellite capacity and high speed connectivity to Internet Service Providers, telecom operators, large enterprises and governments, to enable fast, flexible and affordable broadband connectivity in locations unserved or underserved by other broadband services. O3b provides middle mile capacity to large service providers that use O3b's satellite capacity to provide service to end users, utilizing the 27.6-28.4 and 28.6-291. GHz band for its uplink and 17.8-18.4 and 18.6-19.1 GHz band for its downlink.[1] O3b's MEO orbital altitude[2] and high power, spot-beam design allows the satellite system to use Ka-band frequencies to deliver very high-speed, low-latency broadband connectivity to large service providers and entities. In fact, the latency

[1] O3b does not sell directly to end users.
[2] O3b's satellites orbit the Earth at 8062 km while geosynchronous satellite systems orbit at 36000 km. This lower altitude enables the O3b system to provide high speed, low latency services.

and data speeds provided over the O3b satellite system are comparable to terrestrial fiber services. O3b has been in full commercial service around the globe for one year: customer demand for O3b's high speed broadband services has exceeded business expectations so much that it requires the expansion of space capacity.[3]

II. O3B'S LATENCY PERMITS IT TO SUPPORT REAL-TIME BROADBAND APPLICATIONS THAT ARE PART OF THE COMMISSION'S DEFINITION OF ADVANCED TELECOMMUNICATIONS CAPABILITY

The Commission asks for comment on the state of lower orbit satellites and whether the latencies for such systems can support interactive communications services such as VOIP.[4] O3b's MEO system allows end users to fully enjoy interactive broadband applications due to a reliable latency between 120 ms and 150 ms.[5] With this latency level, O3b's customers have demonstrated high customer satisfaction for key real-time broadband applications, including VOIP, cloud-based services, video and voice conferencing, video streaming, and real-time multiplayer video games.[6]

Because of its success in delivering broadband applications with a latency of 120-150 ms, O3b suggests that if the Commission decides to establish a latency benchmark, it should establish one that is higher than 100 ms. The Commission should base its latency threshold on the real world needs of advanced telecommunications applications. Systems with latencies higher than 100 ms can support real time advanced telecommunications applications and the Commission should not undermine the provision of quality service in order to impose an artificial threshold. For example, in its NOI, the

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[3] Caleb Henry, *New Satellites*, *New Antennas on the Horizon for O3b Networks*, August 18, 2015, *available at* http://www.satellitetoday.com/telecom/2015/08/18/new-satellites-new-antennas-on-the-horizon-for-o3b-networks/.

[4] *In the Matter of Inquiry Concerning the Deployment of Advanced Telecommunications Capability to All Americans in a Reasonable and Timely Fashion, and Possible Steps to Accelerate Such Deployment Pursuant to Section 706 of the Telecommunications Act of 1996, as Amended by the Broadband Data Improvement Act*, Tenth Broadband Progress Notice of Inquiry ("NOI"), GN Docket No. 14-126, FCC 14-113, ¶ 37.

[5] *See* "What is Network Latency and Why Does It Matter?", http://www.o3bnetworks.com/whitepaper-latency-matters/ (last accessed September 8, 2015).

[6] O3b customers have successfully demonstrated that the O3b satellite system supports cloud-based services such as Citrix and Sharepoint, video and voice conferencing services such as Skype and Blue Jeans, video streaming services such as Netflix and YouTube, and multi-player video games such as Halo and Call of Duty.

Commission cites to an ITU study that states that consumers are very satisfied with the quality of VOIP calls with a mouth-to-ear latency above 200 ms.[7] The Commission is right to consider the effects of latency for the purpose of benchmarking advanced telecommunications capability but the Commission should not exclude systems that can support real time broadband applications by imposing latency thresholds that are not truly necessary to enable high quality service to end users.

In O3b's view, the Commission would be in error if it established 100 ms latency as the benchmark when higher latencies are fully capable of supporting advanced telecommunications capability. O3b has demonstrated that commercial satellite systems can successfully deliver interactive broadband applications to the satisfaction of end users. If the Commission is to set a latency threshold, it must be based on latencies that impact the delivery of service, and demonstrated customer satisfaction.

III. O3B SEES CONTINUED GROWTH IN THE MARKET FOR LOW LATENCY SATELLITE SERVICE AND PLANS TO ADD ADDITIONAL SPACE CAPACITY IN THE NEAR FUTURE

To further address the Commission's request for information on the state of lower earth orbit satellite systems, O3b is happy to provide an update on the state of its business after a year of commercial service. O3b has seen tremendous growth due to the high market demand for the unique services provided by the O3b system.

O3b is already the leading satellite provider of capacity in the Pacific, providing 5 Gbps of capacity to Pacific Island nations.[8] In the Pacific, where fiber access is limited, the O3b system's ability to deliver large amounts of low latency capacity to remote islands has been a tremendous accelerator of broadband access in this region.[9]

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[7] *See NOI* at n. 77. International Telecommunication Union, *Telecommunication Standardization Sector, Series G: Transmission Systems and Media, Digital Systems and Networks*, *G.114 3* at 12. Available at: http://www.itu.int/rec/T-REC-G.114-200305-I (last visited Sept. 7, 2015).

[8] Total capacity contracted in the Pacific now 5Gbps, http://www.o3bnetworks.com/total-capacity-contracted-in-the-pacific-now-5gbps/ (last accessed Sept. 8, 2015).

[9] *See UNITECH enhances their educational opportunities with O3b internet,* https://www.youtube.com/watch?v=dMirp8eimc8 (last accessed Sept. 8, 2015); Telecom Cook Islands-O3b, http://www.telecom.co.ck/content/page/o3b/m/4/ (last accessed Sept. 8, 2015); *See Also* Norfolk Telecom goes

Further demonstrating the unique value that O3b brings to its customers, nine of O3b's first ten customers have either increased their orders for capacity or accelerated their introduction service schedule. O3b's combination of fiber speed and low latency with satellite reach provides a service that has been a game-changer for its enterprise customers, and the early customer feedback, particularly from mobile operators using O3b as a 3G/4G enabler, has proven that demand for such service will only continue to rise. For example, mobile operator Digicel, which uses O3b capacity to support its 3G mobile networks in the Pacific region, has increased its capacity to 550% of its original order while contracting for O3b service in a growing number of countries.

In response to this overwhelming demand, O3b plans to increase its Ka-band capacity in space in the near future while also working on plans to further develop its constellation beyond its next set of satellites.[10] The O3b system was designed to be scalable and is designed so that O3b can continue to launch more capacity to meet the rising global demand for data.

IV. O3B'S ROLE IN THE TELECOMMUNICATIONS ECOSYSTEM IN THE U.S. AND ABROAD

O3b operates key components of its terrestrial infrastructure in the U.S., including two of its nine gateways and its Network Operations Center. O3b uses these facilities to serve customers domestically and abroad.

The technical characteristics of the O3b system allow it to be flexible and serve many different types of customers with the same satellite constellation. In the U.S., a variety of customers with different needs have benefitted from the unique qualities of the O3b system. In American Samoa, O3b provides

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live on O3b satellite network, https://www.o3bnetworks.com/norfolk-telecom-goes-live-on-o3b-satellite-network/ (last accessed Sept. 8, 2015).

[10] Caleb Henry, *New Satellites*, *New Antennas on the Horizon for O3b Networks*, August 18, 2015, *available at* http://www.satellitetoday.com/telecom/2015/08/18/new-satellites-new-antennas-on-the-horizon-for-o3b-networks/.

1.2 Gbps of capacity to the American Samoa Telecommunications Authority ("ASTCA"). O3b's bandwidth more than doubles American Samoa's backhaul and internet capacity.[11]

The National Oceanic and Atmospheric Agency ("NOAA") has, through SES Government Services, purchased O3b capacity to support the National Weather Service Office ("WSO") in Pago Pago, American Samoa.[12] The WSO supports the National Weather Service's mission to provide weather, water, and climate data, forecasts and warnings for the protection of life and property. O3b's high speed, low latency connection is essential for NOAA to update forecast models and issue safety warnings in near real-time, allowing the WSO to quickly transmit critical big data files to NOAA for rapid analysis.

The U.S. Navy recently engaged the O3b system for a Limited Objective Experiment designed to identify new and innovative technologies, which will enable more effective naval operational capabilities.[13] O3b delivered 600 Mbps (200 Mbps of uplink, 400 Mbps of downlink) of capacity to the U.S.S. Fort Worth while it was at sea. O3b capacity allowed the crew of the Fort Worth to live stream a tour of the ship.[14]

O3b's first customer in the U.S., Royal Caribbean Cruise Lines, uses O3b to provide high speed internet connectivity to its passengers and crew. Royal Caribbean continues to expand the number of ships in its fleet with the O3b service, and those ships have more bandwidth individually than the rest of

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[11] Caleb Henry, *O3b Sees Contract Surge, Targets New Markets*, June 19, 2015, *available at* http://www.satellitetoday.com/telecom/2015/06/19/o3b-sees-contract-surge-targets-new-markets/.

[12] Veronica Magan, *SES GS, NOAA Sign Agreement for O3b High Throughput Solution*, August 18, 2015, *available at* http://www.satellitetoday.com/telecom/2015/08/18/ses-gs-noaa-sign-agreement-for-o3b-high-throughput-solution/.

[13] O3b Networks Successfully Participates in U.S. 7th Fleet Trident Warrior 2015 Exercises, http://www.o3bnetworks.com/o3b-networks-successfully-participates-in-u-s-7th-fleet-trident-warrior-2015-exercises/ (last accessed September 8, 2015).

[14] The U.S. Navy posted a recording of the tour on Youtube. *See* https://www.youtube.com/watch?v=svlf9_BM1fg.

the cruise industry combined.[15] Royal Caribbean has been an important backbone to O3b's maritime service, which now accounts for approximately 30 percent of O3b's backlog.[16]

As a global service provider, O3b also provides broadband services to customers across five continents, connecting otherwise unconnected communities, enabling 3G/4G mobile services, supporting higher learning in remote locations and helping to serve the growing needs of the energy industry.

In Papua New Guinea, O3b has partnered with Digicel to enhance its national mobile broadband network for both businesses and consumers.[17] O3b's network enables 3G connectivity on an island of over 7 million people and Digicel has now increased its O3b capacity in Papua New Guinea by nearly 150% of its initial service order.

In Colombia, O3b is providing capacity to SkyNet's mobile network in order to support commercial plans for MNO and enterprise customers, and will soon be enabling 4G/LTE services.[18] O3b also brings broadband connectivity to Leticia, a city in the middle of the jungle along the Amazon River. SkyNet hopes to use the O3b service to bring similar capacity to other rural communities in Colombia in the near future.[19] Using a similar plan in Somalia, O3b provides trunking service in the capital city of Mogadishu while supporting mobile connectivity in the central and southern regions of the country. [20]

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[15] O3b Connects Royal Caribbean "Smart Ship" Anthem of the Seas in the Mediterranean, https://www.o3bnetworks.com/o3b-connects-royal-caribbean-smart-ship-anthem-of-the-seas-in-the-mediterranean/ (last accessed September 8, 2015).
[16] *Id*.
[17] Kate Nesbitt, *O3b Constellation Lets Digicel Meet Explosive Demand in Papua New Guinea*, June 15, 2015, *available at* http://www.prweb.com/releases/2015/06/prweb12787799.htm.
[18] Skynet Goes Live on O3b Networks Delivering High Speed Broadband Services to Rural Colombia, September 2, 2015, http://www.marketwatch.com/story/skynet-goes-live-on-o3b-networks-delivering-high-speed-broadband-services-to-rural-colombia-2015-09-02 (last accessed September 8, 2015).
[19] *Id*.
[20] Hormuud Telecom, Somalia Inc. Among First to Deploy O3b Cellular Backhaul in Africa, http://www.o3bnetworks.com/hormuud-telecom-somalia-inc-among-first-to-deploy-o3b-cellular-backhaul-in-africa/ (last accessed September 8, 2015).

O3b's flexible service has also found customers in higher education, with O3b providing connectivity to the Papua New Guinea University of Technology ("UNITECH"). Once on the O3b system, Unitech was able to utilize cloud computing services and move to Google education applications. As an extra benefit, the university's students will gain on hands on technical experience as they play a role in installing, maintaining and running the local O3b system.[21]

O3b's system is perfectly situated to serve the growing data demands of the energy industry as well. O3b already serves energy customers in Africa[22] and the Middle East.[23] As the energy industry's demands for data increase, O3b is ideally suited to provide its high speed, low latency capacity to additional providers.

V. O3B NEEDS STABLE ACCESS TO PROTECTED SPECTRUM IN ORDER TO CONTINUE TO THRIVE AND GROW

O3b uses the 27.6-28.4 and 28.6-29.1 GHz band for its uplink and 17.8-18.6 and 18.8-19.3 GHz band for its downlink. Portions of O3b's uplink band have been identified in a recent FCC proceeding as a potential band for the next generation of mobile services.[24] In order for O3b to continue to develop its technology and meet the customer demand for its one-of-a-kind services, O3b will need reliable, protected access to its operating spectrum.

O3b has already found a promising role in the U.S. and O3b expects that role to expand domestically and abroad as it enters its second year of service. O3b was founded in order to deploy broadband connectivity to the underserved and unserved populations of the world and is well suited to advance the

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[21] O3b Satellite Network Brings Digital Parity to First University Customer, http://www.o3bnetworks.com/o3b-satellite-network-brings-digital-parity-to-first-university-customer/ (last accessed September 8, 2015).
[22] O3b Networks and Hermes Datacomms are changing the face of Energy communications in Africa, https://www.o3bnetworks.com/hermes-datacomms-and-o3b-changing-the-face-of-energy-communications-in-africa/ (last accessed September 8, 2015).
[23] Veronica Magan, O3b, MEOSAT to Provide High Speed Connectivity to Oilfields in Southern Iraq, April 14, 2015, *available at* http://www.satellitetoday.com/telecom/2015/04/14/o3b-meosat-to-provide-high-speed-connectivity-to-oilfields-in-southern-iraq/.
[24] *Use of Spectrum Bands Above 24 GHz For Mobile Radio Services*, GN Docket No. 14-177, et al., Notice of Inquiry, FCC 14-154 (rel. Oct. 17, 2014).

goals of the Commission in this NOI. But O3b's advanced transformative broadband satellite system will need protected access to spectrum, and co-primary status in its uplink bands, if it is to meaningfully deploy its services to the U.S. market.

VI. CONCLUSION

O3b's orbital altitude and high capacity spot beams allow it to provide a low latency service (as low as 120 ms) that fully enables broadband applications and advanced telecommunications capabilities in the U.S. as well as the most remote regions of the world. O3b encourages the Commission to contemplate innovative new telecommunications systems, such as O3b's satellite network, when developing policies and strategies for addressing the disparity between broadband deployment to urban and to rural and tribal communities. O3b is ideally suited to meet rising data needs domestically and abroad, using spectrum allocated today to Fixed Satellite Service, and has already shown tremendous growth in only a year of service. O3b appreciates the Commission's efforts to determine whether advanced telecommunications capability is being deployed to Americans in a reasonable and timely fashion and hopes to play a role in furthering that deployment.

Respectfully submitted,

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