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To:	BOCrfc2015
Subject:	Broadband Opportunities Council Comments
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Please contact the undersigned with any questions about this submission.

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June 10, 2015

Via e-mail

National Telecommunications and Information Administration
U.S. Department of Commerce
1401 Constitution Avenue, NW, Room 4626
Washington D.C. 20230
Attention: Broadband Opportunity Council
BOCrfc2015@ntia.doc.gov

Re: Broadband Opportunity Council Notice and Request for Comment,
Docket No. 1540414365-5365-01

O3b Limited ("O3b") is pleased to submit comments in response to the Broadband Opportunity Council's Notice and Request for Comment. O3b supports the Council's efforts to facilitate broadband deployment and adoption in the United States and looks forward to working with NTIA, the RUS, and the agencies in the Broadband Opportunity Council ("the Federal Agencies") to deploy competitive and innovative broadband services throughout the United States.

Background

O3b is a global satellite company operating a 12-satellite worldwide broadband system of non-geostationary ("NGSO") satellites in an equatorial Medium Earth Orbit ("MEO"). O3b's constellation is designed to connect the "other 3 billion" people who do not currently have adequate broadband access to the Internet, by enabling very high speed, low latency, and affordable broadband connectivity via Internet Service Providers, telecom operators, large enterprises and governments.

The O3b satellite network operates its uplinks worldwide today in the 27.6-28.4 GHz and 28.6-29.1 GHz frequency bands and its downlinks in the 17.8-18.6 GHz and 18.8-19.3 GHz bands. Each of O3b's twelve satellites features 10 targeted, steerable spot beams that can be directed nearly anywhere in the Continental United States ("CONUS"). Each spot beam is capable of providing data rates up to 1.6 Gbps per beam (providing up to 800 Mbps in each direction). O3b's orbital location, which is much closer to the Earth than geostationary satellite systems, and its high power, spot-beam design allow O3b to provide this capacity with a latency between 120-150 milliseconds. It is this latency that allows O3b's MEO satellites to provide a true broadband experience, supporting real time applications such as Skype, cloud services and real time gaming over connections offering fiber-like performance.

Founded in 2007, O3b commenced its global operations in mid-2013 and commercial service provision in September 2014. O3b is already providing ground-breaking satellite broadband connectivity to the U.S., Caribbean, Latin America, Africa, Asia Pacific, and the Middle East. In the United States, two of O3b's key gateway earth stations supporting these global operations are located in Vernon, Texas and Sunset Beach, Hawaii. The Hawaii earth station also provides TT&C control functions for the O3b satellite constellation. In addition to these licenses, the Federal

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Communications Commission ("FCC") has granted O3b market access to the U.S. market[1] as well as several other authorizations to O3b for earth station operations across O3b's full frequency spectrum.[2]

Because the latency and data speeds provided over the innovative O3b satellite system are comparable to terrestrial fiber services, the market for O3b's unique capabilities is developing in unanticipated ways. The customer adoption of the O3b Ka-band satellite service across all of its frequency bands has been a resounding success, notably for end users who now experience high speed Internet services like they never have before. A significant portion of O3b's have accelerated their planned uptake or ordered additional capacity in the first year in service. O3b is already planning to add satellites to its constellation.

As an active incumbent satellite operator, O3b is pleased to submit recommendations and proposed actions that the federal government can take to promote broadband deployment, adoption and competition, including discussion on regulatory barriers that unduly impede investment in and deployment of broadband services in the United States.

A. Overarching Questions

1. How can the federal government promote best practices in broadband deployment and adoption? What resources are most useful to communities? What actions would be most helpful to communities seeking to improve broadband availability and use?

The federal government can promote best practices in broadband deployment and adoption by supporting policies that foster a diversified marketplace based on different types of communications technologies, and not focus primarily on a single technology, such as terrestrial mobile services. This lack of balance is a particular risk in the civil and federal management of frequency spectrum for mobile, fixed, and satellite services. Advancing broadband deployment to all citizens may not be achievable if the U.S. federal government's spectrum policies do not recognize that:

- Satellite services are well established and are providing essential broadband connectivity today;
- The satellite industry is currently in an expansion mode (particularly in the Ka-band where O3b operates today);
- Satellites inherently have advantages that other technologies do not have;
- Satellite services are complementary to and compatible with many terrestrial services; and
- Satellite services form an integral part of the nation's communications infrastructure for the provision of broadband services – today and tomorrow.

[1] *See* O3b Limited, Call Sign S2935, File No. SAT-LOI-20141029-00118 (granted Jan. 22, 2015) ("O3b PDR").
[2] The FCC has also granted operational and experimental earth station authorizations to O3b service partners (e.g., SES Government Solutions and American Samoa Telecommunications Authority) and manufacturing partners (e.g., Kymeta, AvL and Harris Caprock).

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Spectrum policy drives investment, innovation and competitive offerings, if there is regulatory certainty. In order to expand its investment, innovation and competitive offerings in broadband services, the Fixed-Satellite Service ("FSS") industry, of which O3b is a part, requires that the federal government

- Reinforce the U.S.' commitment to spectrum that has been allocated to the FSS;
- Consider ways in which the U.S. can better harmonize its spectrum allocations for FSS with those of the ITU and other countries, particularly in the Ka-band; and
- Ensure that satellite systems can access sufficient bandwidth in the future to support next-generation satellite innovation and applications.

3. What federal regulations and/or statutes could be modernized or adapted to promote broadband deployment and adoption?

O3b's low latency and high capacity make it the ideal option to provide true broadband service where it has not yet been deployed, and to dramatically improve broadband connectivity to other areas. An open and certain market would boost O3b's ability to sell its capacity to rural ISPs and to offer backhaul services to local and regional mobile providers. However, O3b will need protected access to its full operating spectrum in order to grow its service in the U.S.

The satellite industry is experiencing strong demand for its Ka-band services, and is bringing significant amounts of capacity to market near-term to meet that demand. Most of the satellite operators around the world have either already launched or are developing Ka-band satellite systems, including operators that serve the United States. The Ka-band is highly important to the industry as capacity constraints and other services pressure satellite services out of lower bands. Ka-band satellites are offering competitive options to terrestrial-based networks for some applications, and for many applications – including remote broadband services – satellites offer the only means for broadband connectivity. Ka-band broadband satellite services are emerging as completely market-driven networks, employing a range of business models to succeed in a wide range of markets, including in competition with, in collaboration with, and in the absence of terrestrial wireless broadband services.

However, the current U.S. spectrum allocations restrict satellite services in the Ka-band, where O3b and other cutting edge, High-Throughput Satellite ("HTS") systems operate. These restrictions occur in bands that are globally allocated for satellite services, such as the 27.5-28.35 GHz band and the 17.8-18.3 GHz band.

Although those bands are allocated to Fixed Satellite Service ("FSS") on a co-primary basis internationally, the FCC has made Local Multi-point Distribution Services primary in the 27.6-28.35 band and fixed service primary in the 17.8-18.3 GHz band. As a result, the current U.S. federal spectrum scheme relegates FSS to secondary status in more than half of O3b's service bands. The O3b system has successfully shared spectrum with the primary services in these bands. If protection from harmful interference in those bands were afforded to the FSS, O3b and other HTS systems would be able to offer expanded broadband capacity to more U.S. markets that lack broadband access. In 2015, O3b offers market ready solutions for service providers targeting underserved

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populations in the U.S. If the Federal Agencies are looking for additional means to promote broadband adoption for these populations, they should strongly consider resetting the Ka-band allocations and allocating the FSS to operate on a primary basis in the 27.5-28.35 and 17.8-18.3 GHz bands so that HTS systems like O3b can expand broadband availability to more of the U.S. public.

More troubling is that the FCC has recently initiated a proceeding[3] to consider the nationwide allocation of these bands to future mobile services that may be best suited to serve high density urban populations.[4] Although numerous satellite operators, including O3b, are currently utilizing the 27.6-28.35 band, the proceeding highlights the risk that broadband satellite access to this spectrum will be further marginalized in favor of a mobile technology that will deploy sometime in the next decade and will likely offer few, if any, solutions to the U.S. non-urban markets that do not already have 4G broadband access.

If the federal government is committed to providing the best possible broadband access to rural and underserved markets, it must expand, and not further restrict, spectrum access for the services best suited to serve those populations, such as FSS.

5. How can the federal government best collaborate with stakeholders (state, local, and tribal governments, philanthropic entities, industry, trade associations, consumer organizations, etc.) to promote broadband adoption and deployment?

It is important for the federal government to recognize and acknowledge in its policies and broadband program tenders that some solutions for broadband deployment to underserved populations may require a combination of services (i.e. satellite providing backhaul capacity for a rural mobile services provider). FSS can provide standalone broadband services, and the flexibility offered by satellite technology allows FSS to play a key role in a multi-service broadband network architecture as well. The federal government should endorse and encourage broadband network solutions that use different technologies to complement and extend each other to provide timely, advanced broadband solutions to these communities.

B. Addressing Regulatory Barriers to Broadband Deployment, Competition, and Adoption

8. What inconsistences exist in federal interpretation and application of procedures, requirements, and policies by Executive Branch agencies related to broadband deployment and/or adoption, and how could these be reconciled? One example is the variance in broadband speed definitions.

O3b believes that the focus of Executive Branch should be on deploying the best broadband services available to communities that lack broadband access. Federal agencies should consider broadband speed as one of several relevant factors in broadband deployment rather than as a bright line metric for program requirements or funding. Whether these services meet an arbitrary

[3] *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) (hereafter, "NOI").
[4] NOI, ¶10.

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benchmark is less relevant to serving these communities than the overall focus on allowing residents in these communities to take part in the global digital community. Similarly, to the extent the prevailing policy and regulatory environment has prioritized on modality, mobile services, over other spectrum-based services for broadband service delivery, it overlooks opportunities for using multiple technologies to complement each other and to extend broadband networks into rural and other underserved communities.

While satellite services traditionally have difficulty sharing spectrum with mobile services, FSS systems can also play a critical role in the provision of mobile services. In many instances, satellites can provide much needed backhaul capacity for mobile networks expanding or enhancing their networks. Indeed, O3b is already providing backhaul 3G services to mobile operators abroad.[5]

The mobile industry has expressed concerns about an exponential growth in data demand, particularly with the growth of the "Internet of Things."[6] FSS technology couples high capacity with large service areas and can provide the mobile industry with additional capacity to manage this data boom. But if the federal government promotes mobile access to spectrum at the cost of satellite access to spectrum, it risks disrupting the ability of the nation's communications infrastructure to weather the coming data boom, especially in areas where access to broadband services is already limited.

In order to avoid handicapping a key broadband technology, one that is innovating to serve communities that lack high-speed broadband access, the Executive Branch should promote the interest and development of all telecommunications stakeholders in a balanced way rather than focusing on the promotion of one modality of broadband service delivery.

C. Promoting Public and Private Investment in Broadband

12. How can communities/regions incentivize service providers to offer broadband services, either wired or wireless, in rural and remote areas? What can the federal government do to help encourage providers to serve rural areas?

The O3b satellite system provides its bandwidth through steerable spot beams that are 700 KM (for an easy reference in the rural U.S., the distance from South Dakota's southern border to North Dakota's northern border is roughly 660 km) in diameter. This system architecture could allow multiple, widely dispersed communities to secure broadband service from a single spot beam, allowing them to share the cost of broadband access.

The federal government could facilitate broadband coalitions among multiple communities, or, if they already exist, provide a database of existing community groups to better enable service providers to identify and interface with potential customers.

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[5] Caleb Henry, Somali Telcos Tap O3b Networks for HTS Services, Via Satellite, March 24, 2015, http://www.satellitetoday.com/telecom/2015/03/24/somali-telcos-tap-o3b-networks-for-hts-services/.
[6] NOI, ¶7.

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17. Typical barriers to broadband adoption include cost, relevance, and training. How can these be addressed by regulatory changes by Executive Branch agencies?

As noted above, access to sufficient spectrum for FSS is a barrier to broadband deployment and adoption. See O3b's answer to question 3 for how this barrier can be addressed by regulatory changes by Executive Branch agencies.

G. Issues Specific to Rural Areas

24. What federal regulatory barriers can Executive Branch agencies alter to improve broadband access and adoption in rural areas?

Satellite is well suited to provide internet service to isolated or underserved regions and traditional satellite operators already provide broadband service in the United States. Satellite can also provide backhaul capacity for saturated mobile communications networks. O3b's cutting edge, MEO satellite system is particularly well suited to provide both broadband capacity and mobile backhaul services to communities that lack adequate broadband access. With access to sufficient spectrum, O3b's unique combination of low latency and high throughput can allow local ISPs and mobile providers to offer broadband connectivity, even in the most isolated communities.

The federal government can improve broadband access by resisting the urge to regulate in favor of particular technologies. In order to serve the entire U.S. population, and not just the broadband-rich urban and suburban areas of the country, the federal government must consistently implement policies that allow new entrants into the U.S. broadband market and that do not favor one commercial technology over another.

O3b serves many parts of the world that face similar hurdles to acquiring broadband access as many of the underserved rural communities in the U.S. For O3b to be able to serve rural populations in the U.S., it will need regulatory certainty that it will continue to have access to the necessary spectrum bands.

The satellite industry is going through a period of rapid innovation that allows it to better serve rural communities than ever before. Satellite can provide services to the end user, data capacity to ISPs, and backhaul capacity to oversaturated mobile systems. This sort of flexibility is necessary to adequately serve the rural communities in the U.S., which generally face unusual economic or geographic challenges to obtaining broadband access.

In order to facilitate broadband access in rural areas, the Executive Branch must not promote systems that are best suited to be deployed in high density areas of the country over services that could deploy ubiquitously, including rural areas where broadband access is limited.

Compounding these issues, the federal government has recently indicated that it might reduce the satellite industry's access to spectrum rather than to expand it.[7] If the federal government wants to alter regulatory barriers for increasing broadband access, it must not restrict the satellite

[7] NOI, ¶¶ 51-55.

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industry's access to spectrum. Instead, it should evaluate where it can allocate more spectrum for satellite services.

25. Would spurring competition to offer broadband service in rural areas expand availability and, if so, what specific actions could Executive Branch agencies take in furtherance of this goal?

Yes. The Executive Branch should implement balanced policies that allow all communications services to have fair and equal spectrum access in order to allow new technologies to bring greater competition to the US rural market.

H. Measuring Broadband Availability, Adoption, and Speeds

30. How might the federal government encourage innovation in broadband deployment, adoption, and competition?

The Federal government can encourage innovation in broadband services by ensuring access to spectrum for all communications technologies. In a market where new technologies and innovations are constantly changing the caliber and types of services available, the federal government should avoid picking winners and losers based on favored technologies or the considerations unrelated to the goal of broadband for all.

Further, when evaluating new communications technologies, the federal government must ensure that improvements in broadband access are not limited to urban and suburban markets. The federal government must also prioritize solutions that ensure broadband access for rural end users. Satellite services can and will continue to play an important part of the broadband deployment roll-out in the years and decades to come.