Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, DC 20554

In the Matter of	)	
	)	
Use of Spectrum Bands Above 24 GHz For Mobile Radio Services	)	GN Docket No. 14-177
	)	
Establishing a More Flexible Framework to Facilitate Satellite Operations in the 27.5-28.35 GHz and 37.5-40 GHz Bands	)	IB Docket No. 15-256
	)	
Petition for Rulemaking of the Fixed Wireless Communications Coalition to Create Service Rules for the 42-43.5 GHz Band	)	RM-11664
	)	
Amendment of Parts 1, 22, 24, 27, 74, 80, 90, 95, and 101 To Establish Uniform License Renewal, Discontinuance of Operation, and Geographic Partitioning and Spectrum Disaggregation Rules and Policies for Certain Wireless Radio Services	)	WT Docket No. 10-112
	)	
Allocation and Designation of Spectrum for Fixed-Satellite Services in the 37.5-38.5 GHz, 40.5-41.5 GHz and 48.2-50.2 GHz Frequency Bands; Allocation of Spectrum to Upgrade Fixed and Mobile Allocations in the 40.5-42.5 GHz Frequency Band; Allocation of Spectrum in the 46.9-47.0 GHz Frequency Band for Wireless Services; and Allocation of Spectrum in the 37.0-38.0 GHz and 40.0-40.5 GHz for Government Operations	)	IB Docket No. 97-95

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I. Introduction and Summary

With more than 1.5 billion people worldwide using Facebook on a monthly basis, Facebook is committed to its mission of giving people the power to share and making the world more open and connected. In today's knowledge-based global economy, connectivity matters more than ever. The ability to access, develop, and share ideas drives economic growth, job creation, and productivity. But the power of the knowledge economy remains untapped in many parts of the world. Currently, nearly 60% of world's population has yet to connect to the Internet.[1] Unsurprisingly, the unconnected are disproportionately located in developing countries—82.2% of the population of the developed world is online compared with just 35.3% in emerging markets.[2] To address this problem, Facebook created Internet.org, a Facebook-led initiative with the goal of bringing Internet access and connectivity to the two-thirds of the world that does not have them.

Pro-connectivity spectrum policy—that is, spectrum policy that supports making the world more connected—is essential to this mission. There is very little greenfield spectrum left. Improving connectivity in the United States and around the world means pursuing spectrum policy that maximizes the utilization of this limited resource.

Pro-connectivity spectrum policy means three things. *First*, it should make the most of our finite spectrum by making it available to a variety of users and platforms—including mobile. *Second*, it should support the balance between licensed and unlicensed spectrum that currently fuels wireless innovation and connectivity around the world. And *third*, it should require those who hold spectrum licenses to put their licensed frequencies to use or otherwise be required to

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1 International Telecommunication Union, ICT Facts and Figures (May 2015), available at http://www.itu.int/en/ITU-D/Statistics/Pages/facts/default.aspx.

2 *Id.*

share them by establishing effective and enforceable performance requirements.

Facebook does not provide, and currently has no plans to provide, connectivity solutions in the United States. However, Facebook's mission to make the world more connected is affected by the Commission's decisions in this proceeding. By promoting "a flexible regulatory environment for the next generation of wireless services," the Commission is paving the way for the United States to lead 5G network deployment.[3] And even more is at stake. The Commission's decisions here will have continuing impact worldwide. Many national telecommunications regulatory bodies around the world look to the Commission as a leader in spectrum policy development and innovation.

For these reasons, Facebook supports the Commission's proposals in this *Notice of Proposed Rulemaking* to make the 28 GHz, 37 GHz, and 39 GHz bands available for mobile use while also promoting sharing among a variety of users and platforms—both those that exist today and those that have yet to be invented.[4] In addition, Facebook supports the Commission's proposal to authorize unlicensed operation in 64-71 GHz band under its Part 15 rules.[5] Finally, Facebook supports the Commission's proposals to motivate licensees of the new Upper Microwave Flexible Use Service to use this spectrum promptly and efficiently through a use-or-share performance requirement.[6]

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3 *Use of Spectrum Bands Above 24 GHz for Mobile Radio Services*, Notice of Proposed Rulemaking, 30 FCC Rcd. 11878 at 11880-81 ¶ 1 (2015) ("*Spectrum Frontiers NPRM*").

4 *Id.*

5 *Id.* at 11899-90 ¶ 59.

6 *See id.* at 11935 ¶ 193.

II. Promoting Robust Connectivity in the U.S. and Around the World Means Making Spectrum Available to a Wide Variety of Users and Platforms

Facebook fully supports the Commission's proposals to make the 28 GHz, 37 GHz, and 39 GHz bands available for mobile use while also promoting sharing among a variety of users and platforms. The Commission's pro-connectivity proposals "to establish a flexible regulatory framework that accommodates as wide a variety of services as possible" could boost connectivity both here in the U.S. and abroad.[7]

Connecting the unconnected will require a wide variety of technical solutions. For example, in dense urban areas, wireless terrestrial systems can efficiently serve end users and support backhaul links. In less dense areas, such as rural areas, where broadband infrastructure must be deployed over wide areas, using high altitude solar-powered aircraft to provide backhaul-type links to terrestrial aggregation points may be part of the optimal solution. And, in remote, sparsely populated areas, where there are significant gaps in infrastructure and the economic barriers of installing that infrastructure are considerably higher, satellite services may provide the most efficient means to connect. So while it will take a mix of technical solutions to connect the world's unserved and underserved areas, each of these solutions will require access to spectrum—the oxygen of wireless networks.

For this reason, to maximize connectivity, spectrum policy should maximize use across a variety of platforms—including mobile. Mobile connectivity is a key on-ramp to the Internet, both in the United States and around the world. In the U.S., groups that have traditionally been on the other side of the digital divide are increasingly using smartphones to go online.[8] And

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[7] *Id.* at 18888 ¶ 23.

[8] Kathryn Zickuhr & Aaron Smith, Digital Differences, Pew Internet at 2, 19 (April 13, 2012) *available at* http://www.pewinternet.org/files/old-media//Files/Reports/2012/PIP_Digital_differences_041312.pdf.

around the world, growth in mobile broadband subscriptions far outpaces growth in fixed broadband subscriptions particularly in developing nations.[9] As Cisco projects global mobile data traffic to increase tenfold by 2019,[10] it makes sense for the Commission to add mobile allocations to the 28 GHz, 37 GHz, and 39 GHz bands, which may be well suited to adding capacity to mobile networks through small cells and other innovations.

At the same time, Facebook fully agrees with the Commission's recognition that "much is unknown about all future uses of the [millimeter wave] bands," and as such "it is important to establish a flexible regulatory framework that accommodates as wide a variety of services as possible."[11] As the International Telecommunication Union ("ITU") also considers new mobile allocations, Facebook believes that the Commission's flexible approach can accommodate the coexistence of these new mobile allocations with existing fixed allocations in these bands as well as those that have been identified by the ITU for further study. For example, Facebook's Project Aquila has been testing remotely-piloted, solar-powered aircraft that would station-keep in the stratosphere to enable high capacity backhaul for mobile operators and other service providers. Facebook is currently in the process of studying spectrum bands that were agreed upon at the ITU's 2015 World Radiocommunication Conference for HAPS, including the 38-39.5 GHz band, which was identified for study on a global level.[12] Despite the overlap between these

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9 International Telecommunication Union, ICT Facts and Figures (May 2015), available at http://www.itu.int/en/ITU-D/Statistics/Pages/facts/default.aspx.

10 Cisco Visual Networking Index: Global Mobile Data Traffic Forecast Update 2014-2019 White Paper, *available at* http://www.cisco.com/c/en/us/solutions/collateral/service-provider/visual-networking-index-vni/white_paper_c11-520862.html.

11 *Spectrum Frontiers NPRM*, 30 FCC Rcd, at 11888 ¶ 23.

12 World Radiocommunication Conference (WRC-15), Provisional Final Acts, Resolution COM6/21-4, at 427-429 (Nov. 2-27 2015). While the 27.9-28.2 GHz portion of the 28 GHz band is also identified for HAPS in many countries around the world, that identification does not extend to the U.S.

bands and the bands the Commission is proposing to allocate for mobile use, Facebook believes that the Commission's flexible approach will allow accommodation of both uses.

In addition, Facebook recognizes the important role that satellite plays in improving and expanding connectivity. As such, Facebook supports facilitating sharing between satellite operators and users of the new Upper Microwave Flexible Use service that will allow for the coexistence of satellite earth stations without harm to new mobile deployments in the millimeter wave bands.

By making the 28 GHz, 37 GHz, and 39 GHz bands available to support mobile services while also promoting sharing among satellite, HAPS and other users, the Commission will enhance connectivity across platforms.

III. Facebook Supports Authorizing Unlicensed Spectrum Access in the 64-71 GHz Band under the Commission's Part 15 Rules

Facebook agrees with the Commission that "a balanced approach utilizing licensed, unlicensed, and hybrid mechanisms for authorizing service in the [millimeter wave] bands will best accommodate a wide variety of services, providing multiple opportunities to put the spectrum to use, and encourage the development of different technologies and business models in these bands."[13] In particular, Facebook strongly supports the Commission's proposal to authorize Part 15 operations in the 64-71 GHz band to allow it to be used in conjunction with the adjacent 57-64 GHz band (the "V-Band").[14]

In general, pro-connectivity spectrum policy must support the right balance between licensed and unlicensed spectrum access to drive wireless innovation and expand connectivity. This is what has taken place in the V-Band. More than two decades ago, the Commission

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13 *Spectrum Frontiers NPRM* at 11899-90 ¶ 59.

14 *Id.*

authorized unlicensed access to the V-Band finding that the absorption and scattering caused by water vapor and oxygen in this band limit potential interference and make it particularly suited for unlicensed devices.[15] Since then, new services have developed in this band ranging from outdoor wireless links that extend the reach of fiber networks to personal networking technologies based on the WiGig standards 802.11ad and 802.11ay that deliver multi-Gigabit speeds between devices.[16] And more is yet to come. The huge demand for spectrum capacity is driving investment in V-Band unlicensed technologies for wireless backhaul and other uses, particularly as the technology is evolving to allow for non-line-of-sight applications.[17] Extending unlicensed access to the 64-71 GHz band would only increase such opportunities.

IV. Facebook Supports the Commission's Proposals to Ensure Licensed Spectrum is Used Efficiently through Performance Requirements

Facebook supports the Commission's efforts to "strike an appropriate balance between providing licenses with operational flexibility and ensuring that spectrum does not lie fallow."[18] Reasonable and enforceable buildout or performance requirements are necessary to ensure that those who hold licenses in the new Upper Microwave Flexible Use service are deploying it efficiently and expeditiously. Facebook further supports the Commission's proposal to establish

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15 *Amendment of Parts 2, 15 and 97 of the Commission's Rules to Permit Use of Radio Frequencies Above 40 GHz for New Radio Applications*, First Report and Order and Second Notice of Proposed Rule Making, 11 FCC Rcd. 4481, 4496 ¶ 33 (1995).

16 *See Revision of Part 15 of the Commission's Rules Regarding Operation in the 57-64 GHz Band*, Report and Order, ET Docket 07-113, 28 FCC Rcd. 12517, 12519 ¶ 5 (2013).

17 *See* Mario Giovanni Luigi Frecassetti, ETSI White Paper No. 9, E-Band and V-Band Survey on status of worldwide regulation at 4 (June 2015) *available at* https://www.etsi.org/images/files/ETSIWhitePapers/etsi_wp9_e_band_and_v_band_survey_20150629.pdf; see also Dan Jones, Light Reading, 60 GHz: A Frequency to Watch (July 10, 2014) *available at* http://www.lightreading.com/mobile/backhaul/60ghz-a-frequency-to-watch/d/d-id/709910 (noting investments made in 60 GHz technology driven by WiGig and wireless backhaul).

18 *Spectrum Frontiers NPRM*, 30 FCC Rcd at 11935 ¶ 193.

a "use-or-share" requirement that would require licensees to make available any unused spectrum after five years.[19]

V. Conclusion

Facebook supports the Commission's *Notice of Proposed Rulemaking* because its proposals are pro-connectivity and will ultimately enhance connectivity in the United States and around the world. *First*, the Commission's proposal to make the 28 GHz, 37 GHz, and 39 GHz band available for mobile use as well as other uses and platforms makes the most of our finite spectrum through sharing. *Second*, the Commission's proposal to authorize unlicensed operation in the 64-71GHz band supports the innovation that is already happening in the neighboring V-Band. And finally, the Commission's proposal to require those who hold spectrum licenses in the newly proposed Upper Microwave Flexible Use Service to put it use through a use-or-share performance requirement will help ensure that spectrum is used efficiently.

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[19] *Id.* at 11941 ¶ 215.