Before the
NATIONAL TELECOMMUNICATIONS AND INFORMATION ADMINISTRATION
Washington, DC 20230

In the Matter of	)	
	)	
The Benefits, Challenges, and Potential Roles for	)	Docket No. 17010523-7023-01
the Government in Fostering the Advancement of	)	RIN 0660-XC033
the Internet of Things	)	

COMMENTS OF WI-FI ALLIANCE

Wi-Fi Alliance®[1/] submits these comments in response to the National Telecommunications and Information Administration ("NTIA")'s Request for Comment seeking input on its *Green Paper*[2/] in the above referenced proceeding and the proposed approach and next steps for government efforts to foster the advancement of the Internet of Things ("IoT").[3/] Wi-Fi Alliance commends NTIA's efforts to promote IoT. NTIA and other government agencies should generally allow industry to drive the development of IoT. Nevertheless, Wi-Fi Alliance urges NTIA to continue to work with, among others, the Federal Communications Commission ("FCC") to identify and allocate unlicensed spectrum that will be necessary to connect devices that comprise the IoT.

1/ Wi-Fi®, the Wi-Fi logo, the Wi-Fi CERTIFIED logo, Wi-Fi Protected Access® (WPA), WiGig®, the Wi-Fi ZONE logo, the Wi-Fi Protected Setup logo, Wi-Fi Direct®, Wi-Fi Alliance®, WMM®, and Miracast® are registered trademarks of Wi-Fi Alliance. Wi-Fi CERTIFIED™, Wi-Fi Protected Setup™, Wi-Fi Multimedia™, WPA2™, Wi-Fi CERTIFIED Passpoint™, Passpoint™, Wi-Fi CERTIFIED Miracast™, Wi-Fi ZONE™, WiGig CERTIFIED™, Wi-Fi Aware™, Wi-Fi HaLow™, the Wi-Fi Alliance logo and the WiGig CERTIFIED logo are trademarks of Wi-Fi Alliance.

2/ Dep't of Commerce, *Fostering the Advancement of the Internet of Things* (Jan. 2017) ("*Green Paper*"), *available at* https://www.ntia.doc.gov/files/ntia/publications/iot_green_paper_01122017.pdf; *The Benefits, Challenges, and Potential Roles for the Government in Fostering the Advancement of the Internet of Things*, 82 Fed. Reg. 4313 (Jan. 13, 2017); *see also The Benefits, Challenges, and Potential Roles for the Government in Fostering the Advancement of the Internet of Things*, 81 Fed. Reg. 19956 (Apr. 16, 2016) ("Initial Request for Comments").

3/ *See* 82 Fed. Reg. 4313 (Jan. 13, 2017).

I. INTRODUCTION AND BACKGROUND

Wi-Fi Alliance is a global, non-profit industry association of over 700 leading companies from dozens of countries devoted to connecting everyone and everything everywhere. With technology development, market building, and regulatory programs, Wi-Fi Alliance has enabled widespread adoption of Wi-Fi® worldwide, certifying thousands of Wi-Fi products each year. The mission of Wi-Fi Alliance is to provide a highly effective collaboration forum for Wi-Fi matters, grow the Wi-Fi industry, lead industry growth with new technology specifications and programs, support industry-agreed standards, and deliver greater product connectivity through interoperability, testing, and certification.

Wi-Fi Alliance has been an active participant in this proceeding and in other federal proceedings advocating for additional unlicensed spectrum, which is critically important to the wireless ecosystem.[4/] In its comments in response to NTIA's Initial Request for Comments, Wi-Fi Alliance stressed the importance of unlicensed spectrum to the development of IoT.[5/] Wi-Fi Alliance also acknowledged the efforts by Congress, the FCC, and NTIA to make additional spectrum available for unlicensed use.[6/] Nevertheless, Wi-Fi Alliance recommended that Congress, the FCC, and NTIA prioritize making more spectrum available for unlicensed operations in order to support IoT applications.[7/]

[4/] In the past year alone, Wi-Fi Alliance has filed numerous comments in various federal proceedings. *See, e.g.*, Comments of Wi-Fi Alliance, FCC GN Docket No. 14-177 et. al (filed Oct. 31, 2016); Comments of Wi-Fi Alliance, FCC ET Docket No. 13-49, (filed July 22, 2016); Comments of Wi-Fi Alliance, NTIA Docket No. 160331306-6306-01, RIN 0660-XC024 (filed June 2, 2016); Comments of Wi-Fi Alliance, FCC ET Docket No. 16-56 (filed May 6, 2016).

[5/] Comments of Wi-Fi Alliance, NTIA Docket No. 160331306-6306-01, RIN 0660-XC024 at 2-3 (filed June 2, 2016).

[6/] Comments of Wi-Fi Alliance, NTIA Docket No. 160331306-6306-01, RIN 0660-XC024 at 6-7 (filed June 2, 2016).

[7/] Comments of Wi-Fi Alliance, NTIA Docket No. 160331306-6306-01, RIN 0660-XC024 at 9 (filed June 2, 2016).

Wi-Fi Alliance supports NTIA's continued efforts to encourage the growth of the digital economy and "ensure that the Internet remains an open platform for innovation."[8/] Wi-Fi Alliance looks forward to further opportunities to partner with NTIA as it continues to examine the government's role in the evolution of IoT, and it is pleased to have this opportunity to submit the following comments in support of NTIA's efforts.

II. COMMENTS

A. Making Sufficient Spectrum Available Should Be the Top Governmental Priority for IoT.

Since NTIA's Initial Request for Comments, the FCC has allocated more spectrum for unlicensed operations,[9/] acknowledging that unlicensed applications would make use of the spectrum in the near future.[10/] Yet, that spectrum will not be sufficient to support IoT growth. According to Cisco, by 2020 the number of connected devices in the United States will reach 4.1 billion and globally connected devices will reach 26 billion.[11/] The *Green Paper* states that "the sheer magnitude of IoT devices connected will impose significant challenges for the current

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8/ 82 Fed. Reg. 4313 (Jan. 13, 2017).

9/ *See Use of Spectrum Bands Above 24 GHz For Mobile Radio Services; Establishing a More Flexible Framework to Facilitate Satellite Operations in the 27.5-28.35 GHz and 37.5-40 GHz Bands; Petition for Rulemaking of the Fixed Wireless Communications Coalition to Create Service Rules for the 42-43.5 GHz Band; Petition for Rulemaking of the Fixed Wireless Communications Coalition to Create Service Rules for the 42-43.5 GHz Band; 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*, Report and Order and Further Notice of Proposed Rulemaking, 31 FCC Rcd. 8014 (2016) ("*Spectrum Frontiers Report and Order*" and *"Spectrum Frontiers Further Notice of Proposed Rulemaking*").

10/ *Spectrum Frontiers Report and Order* ¶130.

11/ *Green Paper* at 4 (citing Cisco, *VNI Complete Forecast Highlights Tool* (2016), http://www.cisco.com/c/m/en_us/solutions/service-provider/vni-forecast-highlights.html ("Global" and "United States" selected)).

infrastructure."[12/] Moreover, the *Green Paper* acknowledges that "IoT applications will leverage exciting technological advances, such as those associated with 5th generation (5G) wireless technologies, innovative unlicensed use of spectrum, low-power connectivity protocols, and others."[13/] Indeed, the proliferation of services that use Wi-Fi continues to expand dramatically.[14/]

Therefore, in order for NTIA to best "encourage growth of the digital economy and ensure that the Internet remains an open platform for innovation" – which it identified as a top priority[15/] – there must be sufficient access to unlicensed spectrum. The versatile nature of Wi-Fi technology means that it is well suited to meet a range of needs. In fact, Wi-Fi is ideal for IoT,[16/] with the potential to connect many IoT devices and applications. However, part of the success of Wi-Fi, to date, has been premised on access to sufficient unlicensed spectrum. Accordingly, the government's *most* important role in fostering IoT is to identify and allocate more spectrum to support IoT and ensure global spectrum harmonization. NTIA's next steps should therefore prioritize working with Congress and the FCC to allocate more unlicensed spectrum that can support IoT devices and applications. Without the capacity that additional spectrum resources will provide, the full potential of IoT will not be realized and innovation will be stifled.

B. The Industry Should Have the Latitude to Be Innovative.

NTIA explained that it has a longstanding approach to encouraging innovation in new technologies and that with respect to the development of the Internet, for example, it approached

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12/ *Green Paper* at 4.

13/ *See Green Paper* at 17.

14/ Comments of Wi-Fi Alliance, FCC GN Docket No. 14-177 et. al at 3 (filed Oct. 31, 2016).

15/ 82 Fed. Reg. 4313.

16/ *See* WI-Fi Alliance, *Connect Your Life: Wi-Fi And The Internet of Everything* 5 (Jan. 2014), *available at* http://www.wi-fi.org/downloads-registered-guest/wp_Wi-Fi_Internet_of_Things_Vision_20140110.pdf/7995.

emerging trends with restraint and permitted the market to react to new entrants and technologies before intervening. It concluded that those principles would be appropriate to apply to the IoT landscape as well.[17/] NTIA also determined that the government should pursue policies that foster IoT growth, but it questioned the specific role that government should play in crafting national IoT policies.[18/] It found that many commenters stressed the importance of the government creating globally consistent and predictable policies based on interagency coordination, collaboration, and engagement. NTIA should not read into those responses an industry appetite for government-led IoT development. To the contrary, commenters argued that the government should avoid over-regulation, which could stifle IoT growth and innovation.[19/]

Wi-Fi Alliance agrees. The best approach to advancing IoT is through industry-led solutions unencumbered by unnecessary government and regulatory intervention. In order for IoT to reach its full potential, a number of elements must merge. For example, the market must be permitted to react to emerging technologies and new entrants prior to any regulatory action. Wi-Fi Alliance has created the protocols that enable interoperability among Wi-Fi devices, a process that can be replicated to support IoT. The following are examples of the industry-led work in which Wi-Fi Alliance is engaged and which can be the basis of future industry-led IoT work:

- ***Passpoint™ Products*.** Wi-Fi CERTIFIED Passpoint permits access to hotspots and enables "a seamless connection between hotspot networks and mobile

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17/ *See Green Paper* at 15.

18/ *Green Paper* at 10.

19/ *Green Paper* at 11.

devices."[20/] It also supports data offload with instant network detection, selection, and authentication.[21/]

- ***ac Products.*** Wi-Fi CERTIFIED™ ac is the latest generation of Wi-Fi. It is dual-band, interoperable, high-performing and Wi-FI CERTIFIED™ ac products operate in both the 2.4 GHz and 5 GHz bands. It supports Ultra HD and 4K video application and rapid file transfer on a range of devices.[22/]

- ***Wi-Fi Aware Products*.** Wi-Fi CERTIFIED Wi-Fi Aware™ is a "new Wi-Fi Alliance certification program that extends Wi-Fi's capabilities." Devices enabled by the certification program can "discover other devices and services within Wi-Fi range" without a GPS, cellular or hotspot connection.[23/]

- ***Device Provisioning Protocol***. Wi-Fi Alliance's Device Provisions Protocol will provide a simple, secure, and consistent method to on- and off-board any type of device on a Wi-Fi network.[24/] This is particularly useful to the IoT landscape as users continue to add a diverse set of devices to their Wi-Fi networks.

C. Wi-Fi Alliance Supports NTIA's Proposed Approach for Action.

In order to foster IoT advancement, NTIA proposed the following policy principles that would guide its actions: (i) lead efforts to ensure the IoT environment is inclusive and widely accessible; (ii) recommend policy that supports a stable IoT environment; (iii) advocate and defend a globally connected, open, and interoperable IoT environment; and (iv) encourage IoT growth and innovation by encouraging expanding markets and removing barriers to new entrants.[25/] Wi-Fi Alliance supports NTIA's proposed principles, particularly when viewed

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[20/] *See Wi-Fi Certified Passpoint*, http://www.wi-fi.org/discover-wi-fi/wi-fi-certified-passpoint (last visited Feb. 8, 2017).

[21/] *See Wi-Fi Certified Passpoint*, http://www.wi-fi.org/discover-wi-fi/wi-fi-certified-passpoint (last visited Feb. 8, 2017).

[22/] *See Wi-Fi Certified ac*, http://www.wi-fi.org/discover-wi-fi/wi-fi-certified-ac (last visited Feb. 8, 2017).

[23/] *See Wi-Fi Aware*, http://www.wi-fi.org/discover-wi-fi/wi-fi-aware (last visited Feb. 8, 2017).

[24/] *See Current Work Areas*, http://www.wi-fi.org/who-we-are/current-work-areas (last visited Feb. 17, 2017).

[25/] *Green Paper* at 2.

through the priorities discussed above – making spectrum available, promoting global harmonization and otherwise generally allowing industry to lead the development of IoT.

NTIA also identified four broad areas of engagement to advance its proposed principles. Wi-Fi Alliance generally agrees that by enabling infrastructure availability and access, crafting balanced policies, promoting standards, and encouraging markets, NTIA will advance its proposed principles. However, as noted above, NTIA's efforts should not be focused on doing what the industry does best – creating technological solutions, including operability standards. In particular, Wi-Fi Alliance observes that NTIA proposes that one proposed area of engagement is to craft balanced policies and build coalitions around the area of cybersecurity.[26/] Wi-Fi Alliance agrees that creating appropriate security is a critical goal for connected devices. However, industry is best able to create and impose security protocols. Since 2006, devices that are Wi-FI CERTIFIED™ have incorporated Wi-Fi Protected Access version 2 ("WPA2™"). WPA2 is based upon the IEEE 802.11 standard, including the Advanced Encryption Standard ("AES"), which is "government-grade" data encryption developed by the U. S. National Institute of Standards and Technology. A Wi-Fi network using WPA2 provides both security (it controls who connects) and privacy (transmissions cannot be read by others) for communications as they travel across a network.[27/] Wi-Fi Alliance therefore strongly supports NTIA's conclusion that "[m]arket forces will undoubtedly shape IoT development and innovation [and that] an industry-led, bottom-up, consensus-based approach to standards development is necessary to realize the benefits of the technology."[28/]

III. CONCLUSION

[26/] *Green Paper* at 24-30.

[27/] *See Security*, http://www.wi-fi.org/discover-wi-fi/security (last visited Feb. 27, 2017).

[28/] *Green Paper* at 46.

Wi-Fi Alliance commends NTIA's efforts to facilitate IoT innovation. The best approach to advancing IoT is through industry-led solutions – market forces will best create IoT technological solutions and standards. Because the success of the IoT will require sufficient unlicensed spectrum to ensure that IoT devices can communicate without undue delay or congestion, NTIA can best facilitate IoT growth through making unlicensed spectrum available domestically and fostering cooperation for globally harmonized spectrum rules.

Respectfully submitted,

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March 13, 2017