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National Telecommunications and Information Administration

U.S. Department of Commerce

1401 Constitution Avenue NW, Room 4725

Washington, DC 20230

> **Re:** **Request for Comment on the Benefits, Challenges, and Potential Roles for the Government in Fostering the Advancement of the Internet of Things (IOT RFC 2016)**

The Wireless Infrastructure Association ("WIA")[1], formerly PCIA, welcomes the opportunity to provide comment to National Telecommunications and Information Administration ("NTIA") on Benefits, Challenges, and Potential Roles for the Government in Fostering the Advancement of the Internet of Things ("IoT"). Wireless infrastructure plays an important role in enabling IoT; therefore, WIA appreciates NTIA's efforts to address barriers to broadband deployment.[2] Reducing these impediments and duplicating effective broadband deployment practices will help ensure individuals and businesses realize the benefits afforded by greater connectivity. We encourage NTIA to work with the relevant stakeholders beyond the release of its "green paper" to implement the policies and practices addressed here. We appreciate your consideration of these comments and look forward to continuing this conversation.

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[1] The Wireless Infrastructure Association is the principal organization representing the companies that build, design, own and manage telecommunications facilities throughout the world. Its over 230 members include carriers, infrastructure providers, and professional services firms.

[2] Wireless Infrastructure Association, Featured Video, http://wia.org/video/wireless-infrastructure-association-video-presentation/.

General

3. With respect to current or planned laws, regulations, and/or policies that apply to IoT:

a. Are there examples that, in your view, foster IoT development and deployment, while also providing an appropriate level of protection to workers, consumers, patients, and/or other users of IoT technologies?

To ensure IoT technology is developed and deployed across the United States, laws, regulations, and policies must be in place that allow for streamlined deployment of wireless infrastructure. As our nation experiences an exponential increase in connected devices, industry must be afforded the ability to site more wireless infrastructure in a timely fashion to keep pace with increasing demands on the network. WIA has found that policies that promote (1) timely responses to siting applications; (2) long lease terms and renewal expectancy; (3) collocation of wireless infrastructure on existing support structures; (4) responsible access to rights-of-way, conduits, and poles; (5) reasonable and streamlined historic and environmental reviews; and (6) access to federal lands best incentivize the investment necessary to foster technological development and deployment.

Laws that require the timely review of wireless infrastructure siting applications—so-called application "shot clocks"—promote increased broadband deployment for IoT development. Efficient and timely application review process encourage the rapid infrastructure deployment necessary to meet the growing data demands advanced technologies place on existing networks. Additionally, given the extensive capital investment of long-lived assets required for the installation of wireless infrastructure, agreements that include long lease terms and renewal expectancy encourage the investment of infrastructure providers and manufacturers and incentivize increased deployment.

WIA has also found that streamlined wireless facility siting review processes that encourage collocation of equipment on existing support structures lead to increased

wireless broadband deployment. Collocation has been the preferred deployment strategy for providers for a number of reasons. Collocation maximizes the use of existing facilities, reducing visual clutter and minimizing communities' aesthetic concerns. Collocation is the expressed preference of communities throughout the country and has been supported in federal law,[3] Federal Communications Commission ("FCC") policy and regulation,[4] and relevant historic preservation and environmental protection principles.[5] Moreover, collocation enhances competition in the wireless industry by lowering a significant barrier to entry for new mobile wireless service providers and other tenants.

Jurisdictions also foster IoT development and deployment when offering a process for responsible and safe utilization of a jurisdiction's rights-of-way is offered for the deployment of small cell and distributed antenna system ("DAS") facilities. Small wireless facilities can assist in meeting capacity needs to provide short-range coverage, which IoT devices require.[6]

Additionally, policies that streamline historic and environmental review of wireless facility siting foster IoT development and deployment. WIA supports the FCC's efforts to

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[3] *See* Middle Class Tax Relief and Job Creation Act of 2012 § 6409(a), 112 Pub. L. 96, 126 Stat. 232, *codified at* 47 U.S.C. § 1455(a) (mandating approval for the collocation, modification, or removal of transmission equipment on an existing tower or base station that does not substantially change the physical dimensions of the facility). Section 6409(a) encourages collocation on existing facilities by removing additional rounds of burdensome zoning review for minor changes.

[4] *See, e.g.*, Federal Communications Commission, *Acceleration of Broadband Deployment by Improving Wireless Facilities Siting Policies*, Report and Order, 29 FCC Rcd 12865, ¶ 1 (2014) ("[O]ur actions are intended to encourage deployments on existing towers and structures—rather than entirely new towers—in recognition that collocations almost always result in less impact or no impact at all.").

[5] *See* Nationwide Programmatic Agreement for Collocation of Wireless Antennas, codified at 47 C.F.R. Part 1, Appendix B. *See also* Wireless Telecommunications Bureau Seeks Comment on Proposed Amended Nationwide Programmatic Agreement for the Collocation of Wireless Antennas, *Public Notice*, WT Docket No. 15-180, DA 16-519 (rel. May 12, 2016) (incentivizing collocation by providing higher volumetric limits for deployments capable of hosting multiple providers).

[6] *See In the Matter of Use of Spectrum Bands Above 24 GHz for Mobile Radio Services*, GN Docket No. 14-177, Notice of Proposed Rulemaking, FCC 15-138 (rel. Oct. 23, 2015) at ¶¶ 99-100 ("*Above 24 GHz NPRM*").

exclude wireless infrastructure that minimally impacts historic properties from historic review.

Lastly, current efforts to increase access to federal lands and properties for wireless infrastructure siting will enable IoT. The federal government owns or administers nearly thirty percent of all land in the United States, including thousands of buildings, and funds state and local transportation infrastructure. WIA applauds recent policies that attempt to standardize siting applications and shorten the review time of applications submitted to certain federal agencies. Nevertheless, more needs to be done to better serve the demands the exponentially growing IoT market places on networks and the underlying infrastructure.

b. Are there examples that, in your view, unnecessarily inhibit IoT development and deployment?

Policies that unnecessarily burden the deployment of wireless infrastructure will, as a result, inhibit IoT development and deployment. Such examples include time-limited zoning or use permits; delayed, and otherwise burdensome, local and federal siting practices; and tribal review fees that are disproportionate with the reviews performed.

Another example of regulations that inhibit IoT are rules that authorize or require the issuance of zoning or use permits for wireless facilities that expire after a period of years. WIA discourages the use of time-limited zoning or use permits because they undermine the viability of capital investment in wireless infrastructure and could reduce service coverage and reliability. Time-limited permits jeopardize infrastructure investment dollars by failing to provide the required certainty that these sites will remain in place beyond a short time frame. Furthermore, these permits make new and existing wireless sites—and the communications networks they underpin—more vulnerable to decommissioning or removal and may result in service interruptions for consumers and businesses. Certainty and continuity of service are necessary to support IoT services.

These barriers to wireless infrastructure siting have the effect of stifling the investment necessary to build out the networks that support IoT. We encourage NTIA to use its expertise to inform the deliberations of other government entities that impact the development and deployment of IoT.[7]

Technology

The Department recognizes that technology is "at the heart of IoT and its applications." It emphasizes the importance of identifying technological hurdles and how the government can mitigate these challenges. (p. 19958)

6. What technological issues may hinder the development of IoT, if any?

   a. **Examples of possible technical issues could include:**
      i. **Interoperability**
      ii. **Insufficient/contradictory/proprietary standards/platforms**
      iii. **Spectrum availability and potential congestion/interference**
      iv. **Availability of network infrastructure**
      v. **v. Other.**
   b. **What can the government do, if anything, to help mitigate these technical issues? Where may government/private sector partnership be beneficial?**

Availability of network infrastructure is integral to the development of IoT. Spectrum is a finite resource and the licensing process is not expedient. In addition to finding innovative ways to make additional spectrum available for expanded uses, government should prioritize reducing barriers to siting the infrastructure that will support new spectrum bands to power these ubiquitous networks. Industry will continue to develop technologies that improve spectral efficiencies and provide innovative broadband infrastructure solutions to handle the exponential growth in data demand.

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[7] *See, e.g., Latta and Welch Launch Bipartisan Internet of Things Working Group*, U.S. HOUSE ENERGY & COMMERCE COMM. (Mar. 24, 2016), https://energycommerce.house.gov/news-center/press-releases/latta-and-welch-launch-bipartisan-internet-things-working-group.

Coverage and capacity are both important to ensure there are sufficient and high-quality signals for IoT devices to communicate. To meet our nation's coverage and capacity needs, both macro towers and small facilities must be sited. Advances in technologies, such as small cells, provide solutions will be integral to our nation's 5G and IoT development. While the small cell market is worth $1 billion annually,[8] analysts and equipment manufacturers have reported slower than anticipated purchase and use of small cells.[9] Some point to regulatory uncertainty as a hindrance to increased investment in the technology. With network densification a priority for wireless service providers,[10] it is imperative that government regulations make it easier to responsibly site small cells. Access to cloud-based services, smart homes, and other IoT applications requires an always-on, always-present connection. As these devices come to market, wireless providers will need to continue investing in the expansion of wireless capacity to support these additional connections.

Infrastructure

Infrastructure investment, innovation, and resiliency will further rapid growth of IoT.

8. How will IoT place demands on existing infrastructure architectures, business models, or stability?

Wireless infrastructure needs to be expanded and reinforced to support the growth in coverage and capacity. One deployment solution is DAS, a widely used technology inside medium to large venues and in targeted outdoor areas. With the increasing demand for data usage with IoT, especially in high-traffic areas where consumers congregate, like

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[8] *Small Cell Market Work $1B*, CTIA (Mar. 3, 2016), http://www.ctia.org/resource-library/facts-and-infographics/archive/small-cell-market, *citing* Market status statistics Feb 2016 - Mobile Experts, Small Cell Forum (Feb. 2016), http://scf.io/en/documents/050_-_Market_status_report_Feb_2016_-_Mobile_Experts.php.

[9] Jeff Moore, *Analysts: Small cell growth declines in 2015*, Fierce Installer (Jun. 12, 2015), http://www.fierceinstaller.com/story/analysts-small-cell-deployments-decline-2015/2015-06-12.

[10] Don Bishop, *Why the Tower Business could see a Growth Uptrend*, AGL Magazine 58-59 (Mar. 2016), *available at* http://www.mydigitalpublication.com/publication/?i=300498&p=58#{"page":58,"issue_id":300498}.

stadiums, hospitals, and shopping malls, we expect additional venues will seek to enhance wireless coverage using systems like DAS. DAS deployments enable IoT enhancements such as new connected devices to maximize workforce efficiency at stadiums (connected trash cans to notify staff when full); connected medical devices in hospitals; smart city technology (connected traffic lights and parking meters); and smart buildings that incorporate a number of IoT solutions (connected thermostats, appliances, and business equipment).

9. Are there ways to prepare for or minimize IoT disruptions in these infrastructures? How are these infrastructures planning and evolving to meet the demands of IoT?

We are seeing the densification of networks through the siting of small wireless facilities. Studies show that small cells are important to the densification of networks and "can support next-generation 5G wireless technologies, delivering faster speeds, providing higher device density, enabling massive connectivity for billions of sensors, wearables, and devices, and unlocking new services and applications."[11] Those currently testing 5G technology envision it will enable application and industry innovation in the areas of healthcare, home and office automation, wearables, autonomous driving cars, and other IoT applications.[12] These technologies will require the deployment of robust wireless infrastructure networks providing the foundation necessary for broadband-connected services.

10. What role might the government play in bolstering and protecting the availability and resiliency of these infrastructures to support IoT?

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[11] Thomas K. Sawanobori, THE NEXT GENERATION OF WIRELESS: 5G LEADERSHIP IN THE U.S., CTIA (Feb. 9, 2016), *available at* http://www.ctia.org/docs/default-source/default-document-library/5g_whitepaper-web.pdf.

[12] *Above 24 GHz NPRM* at ¶ 6; Comments of Nokia (D/B/A Nokia Solutions and Networks US LLC) on *Use of Spectrum Bands Above 24 GHz for Mobile Radio Services,* GN. Docket No. 14-177 (filed Jan. 15, 2015) at 4; Comments of Qualcomm on *Use of Spectrum Bands Above 24 GHz for Mobile Radio Services,* GN. Docket No. 14-177 (filed Jan. 15, 2015) at 7; *5G Vision*, SAMSUNG (Feb. 2015), *available at* http://www.samsung.com/global/business-images/insights/2015/Samsung-5G-Vision-0.pdf.

Installing new infrastructure requires many steps to gain approval and can be a tedious process. The government should implement policies that enhance the availability of infrastructure by streamlining the siting process as discussed above in greater detail.

Industry recognizes the importance of reliable networks and continuously works to ensure wireless infrastructure is resilient. WIA supports the recent Wireless Network Resiliency Cooperative Framework ("Framework") developed by wireless carriers AT&T, Sprint, T-Mobile, U.S. Cellular, and Verizon as well as CTIA, as detailed in a Public Notice from the FCC's Public Safety and Homeland Security Bureau.[13] WIA believes the Framework's consensus-based approach will help ensure continuity of service for our nation's wireless networks, which will support IoT.

Economy

As IoT has already enabled technological development and innovation, the Department seeks comment on potential economic implications of IoT and how to quantify that impact.

14. What impact (positive or negative) might the growth of IoT have on the U.S. workforce? What are the potential benefits of IoT for employees and/or employers? What role or actions should the government take in response to workforce challenges raised by IoT, if any?

Investment in wireless infrastructure yields dividends for the United States economy as a whole, spurring jobs and economic growth and enabling innovation in burgeoning sectors, like the application economy, and the technology sector as a whole. A WIA-commissioned study indicates projected wireless infrastructure investment of $34 to 36

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[13] Public Safety and Homeland Security Bureau Seeks Comment on Wireless Carriers' Proposal to Increase Resiliency and Enhance Information Sharing During Disasters, *Public Notice*, PS Docket Nos. 13-239, 11-60, DA 16-463 (rel. Apr. 28, 2016). *See* Letter of the Wireless Infrastructure Association on *Public Safety and Homeland Security Bureau Seeks Comment on Wireless Carriers' Proposal to Increase Resiliency and Enhance Information Sharing During Disasters*, PS Docket Nos. 13-239, 11-60 (filed May 31, 2016).

billion per year over a five-year period through 2017 would yield $1.2 trillion in economic development and 1.3 million net new jobs.[14] Wireless network providers have invested $260 billion in mobile infrastructure in the last decade.[15] Another analyst report estimates that mobile's contribution to United States gross domestic product will reach 5% by 2020.[16] The entire wireless industry supplies over 4.6 million jobs.[17] One study shows that the number of occupations that depended on wireless industry in 2011 was 2,523,579 and 4,688,119 in 2014.[18]

The development of IoT contributes greatly to the increased economic growth through wireless infrastructure and the wireless sector. A recent Verizon study found the following IoT network connection growth from 2014 to 2015[19]:

- Healthcare: 26% increase

- Home monitoring: 50% increase

- Energy/Utilities: 58% increase

- Smart cities: 43% increase

[14] ALAN PEARCE ET AL., WIRELESS BROADBAND INFRASTRUCTURE: A CATALYST FOR GDP AND JOB GROWTH 2013-2017 (Sept. 2013), *available at* http://www.pcia.com/images/IAE_Infrastructure_and_Economy2.PDF ("PEARCE STUDY").

[15] Jim Kohlenberger, MOBILIZING AMERICA: ACCELERATING NEXT GENERATION WIRELESS OPPORTUNITIES EVERYWHERE, MOBILE FUTURE 6 (Sep. 2015), *available at* http://mobilefuture.org/wp-content/uploads/2015/09/5G-Paper-1.pdf.

[16] JULIO BEZERRA ET AL., THE MOBILE REVOLUTION: HOW MOBILE TECHNOLOGIES DRIVE A TRILLION-DOLLAR IMPACT, BCG PERSPECTIVES CH. 3 (2015), *available at* https://www.bcgperspectives.com/content/articles/telecommunications_technology_business_transformation_mobile_revolution/?chapter=3#chapter3_section2.

[17] Roger Entner, THE WIRELESS INDUSTRY: REVISITING SPECTRUM, THE ESSENTIAL ENGINE OF US ECONOMIC GROWTH, RECON ANALYTICS 18 (Apr. 2016), *available at* http://www.ctia.org/docs/default-source/default-document-library/entner-revisiting-spectrum-final.pdf.

[18] *Id.* at 22.

[19] STATE OF THE MARKET: INTERNET OF THINGS, VERIZON 3 (2016), *available at* http://www.verizonenterprise.com/verizon-insights/state-of-market-internet-of-things/2016/.

- Agriculture: 33% increase

- Transportation/Distribution: 49% increase

Investment in wireless infrastructure powers not only numerous direct effects—better, faster wireless service and additional telecommunications jobs—but also propels other positive, indirect effects, such as improving efficiency and enhancing productivity of existing businesses and enabling new businesses to provide novel, innovative services.[20]

This expansion of wireless infrastructure deployment drives a need for increased training and education on proper infrastructure siting techniques. WIA supports collaboration between industry and government agencies, such as the Department of Labor, to execute programs that educate and train the wireless workforce on the deployment of new technologies that support IoT.[21] WIA also encourages the development of initiatives that focus on increasing interest in infrastructure technology fields.

International Engagement

The Department seeks input on how to monitor and engage in international fora to foster the growth and development of the digital economy.

23. Are there policies that the government should seek to promote with international partners that would be helpful in the IoT context?

When the government is engaging international partners on telecommunications and new technology topics, it should remind regulators in other countries of the importance of reducing barriers to wireless infrastructure deployment. Infrastructure siting often takes a backseat in these discussions, yet industry faces similar, and sometimes more challenging, hurdles when trying to site wireless facilities in various countries. The U.S.

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[20] *See* PEARCE STUDY at 2.

[21] *Building the Wireless Workforce of the Future*, Wireless Infrastructure Association, http://wia.org/industry-initiatives/education/ (last visited Jun. 2, 2016).

government should encourage other governments to streamline their broadband infrastructure siting processes. Reducing these barriers will promote increased investment in building the networks that will allow continued development and deployment of IoT globally. Global harmonization increases investment from companies that have international businesses and wish to scale.

Additional Issues

25. Are there IoT policy areas that could be appropriate for multistakeholder engagement, similar to the NTIA-run processes on privacy and cybersecurity?

Wireless infrastructure deployment requires collaboration amongst multiple stakeholders. Federal, state, and local governments; Tribes; and various industry components (infrastructure providers, carriers, equipment manufacturers) all play an integral role in ensuring that wireless networks are built and designed as necessary to provide wireless services and capabilities. As such, WIA encourages NTIA to explore platforms for multistakeholder engagement to promote the streamlining of broadband infrastructure siting, which will support IoT.

27. How should government and the private sector collaborate to ensure that infrastructure, policy, technology, and investment are working together to best fuel IoT growth and development?

The government and the private sector should be careful to recognize that infrastructure, policy, technology, and investment are intertwined and must all function effectively to best fuel IoT growth and development. Policies have the ability to encourage or discourage private investment in infrastructure and technological innovation. Likewise, technological advancement has the ability to shape new policies. We encourage both the government and the private sector to be transparent in their respective developments. Such collaborations between industry and government entities create an environment for innovative solutions to achieve the common goal of efficient and effective broadband deployment. WIA encourages government entities to

coordinate public-private action groups to both highlight beneficial broadband policy for development and to implement effective, recommended policies.

We appreciate your consideration of these comments and look forward to working together to foster the deployment of necessary IoT infrastructure.

Sincerely,

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