Before the
DEPARTMENT OF COMMERCE
National Telecommunications and Information Administration

In the Matter of	)	
	)	
The Benefits, Challenges, and Potential Roles for the Government in Fostering the Advancement of the Internet of Things	)	Docket No. 160331306-6306-01

COMMENTS OF CTIA

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CTIA[1] welcomes this opportunity to respond to the National Telecommunications and Information Administration ("NTIA") Request for Public Comment on "the benefits, challenges, and potential roles for the government" in advancing the Internet of Things ("IoT").[2] CTIA commends NTIA's thoughtful, holistic approach to IoT and identifies ways for government to pursue a forward-looking policy framework and foster the tremendous benefits of IoT. These include the following recommendations:

- Existing policy frameworks should inform but not mandate policy in the IoT context. Generally, new IoT-specific regulation is unnecessary and could hamper the development of IoT technologies. While current policy should serve as a starting point, it is critical

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1 CTIA® (www.ctia.org) represents the U.S. wireless communications industry. With members from wireless carriers and their suppliers to providers and manufacturers of wireless data services and products, the association brings together a dynamic group of companies that enable consumers to lead a 21st century connected life. CTIA members benefit from its vigorous advocacy at all levels of government for policies that foster the continued innovation, investment and economic impact of America's competitive and world-leading mobile ecosystem. The association also coordinates the industry's voluntary best practices and initiatives and convenes the industry's leading wireless tradeshow. CTIA was founded in 1984 and is based in Washington, D.C.

2 *The Benefits, Challenges, and Potential Roles for the Government in Fostering the Advancement of the Internet of Things*, NTIA Docket No. 160331306-6306-01, 81 Fed. Reg. 19,956 (Apr. 6, 2016) ("*Request for Comment*").

that government not simply straightjacket IoT in legacy regulation but instead take a thoughtful approach that accounts for the dynamism of IoT and particular circumstances.

- A light touch, flexible regulatory framework will best enable innovation and foster rapid adoption of IoT. Where regulation is needed, policymakers should adopt "smart policies" that take into account the developing IoT ecosystem and refrain from across-the-board approaches that impose unnecessary requirements.

- Government can and should play a critical role in ensuring that adequate spectrum resources are available to fuel IoT. A fully-connected world, however, rests in large part upon a densification of mobile infrastructure – and that depends on the removal of barriers to cell site and antenna deployment.

- Consumers and enterprises will embrace IoT only if they trust companies to protect their security and privacy. Industry is incorporating security and privacy by design into engineering and product development processes, and government can and should foster such practices. Voluntary, collaborative initiatives, industry-led efforts, and best practices are key.

- The U.S. government should work cooperatively with other nations to advance globally consistent IoT policies, including industry-driven standards development.

With these principles in mind, NTIA can approach policy in the IoT era in a thoughtful way that will foster IoT innovation and growth.

I. INTRODUCTION

Today, the IoT ecosystem is dramatically improving lives and enhancing our nation's productivity, from implantable health devices to home automation to inventory tracking and much, much more. IoT is wide-ranging, from consumer to industrial, from public to private, from device-to-device to human interfacing. As the *Request for Comment* observes, "[t]he potential health, safety, environmental, commercial, and other benefits of IoT are enormous"[3] – with IoT, the promise of our "connected life" is boundless.

[3] *Id*. at 19,957.

The marked growth in IoT network connections across multiple industry sectors illustrates just how IoT is changing the world. Verizon reported a 58 percent gain in energy/utility IoT connections from 2014 to 2015, a 50 percent gain in home monitoring, 49 percent in transportation, 43 percent in smart cities, 33 percent in agriculture, and 26 percent in healthcare/pharmaceutical.[4] Similarly, over the last 24 months, AT&T experienced a 250 percent increase in data usage from IoT customers.[5] And the connected car market is now growing ten times faster than the traditional automobile market.[6] These trends will only expand. Cisco estimates that by 2020, IoT will grow to 50 billion devices, up from 12 billion in 2015.[7]

The following examples show how mobile innovation is driving the IoT revolution and redefining how we connect with the world around us:

- **AT&T's** Smart City Initiative is helping cities like Atlanta, Dallas, and Chicago to connect utility meters, street lights, and water systems, remotely monitor infrastructure, provide near real-time traffic updates, and alert law enforcement when and where shootings occur. AT&T is also developing a digital dashboard that gives

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[4] *See* Verizon, *State of the Market: Internet of Things*, 3 (Apr. 2016), available at https://www.verizon.com/about/sites/default/files/state-of-the-internet-of-things-market-report-2016.pdf.

[5] *See* AT&T, *What You Need to Know About the Internet of Things*, 8 (2016), available at https://www.business.att.com/content/whitepaper/what-you-need-to-know-about-IoT.pdf.

[6] *See* CTIA President & CEO Meredith Atwell Baker Testimony at *Wireless Broadband and the Future of Spectrum Policy: Hearing Before the S. Comm. On Com., Sci., & Transp.*, 114th Cong., 3 (July 29, 2015), available at http://www.commerce.senate.gov/public/index.cfm/2015/7/wireless-broadband-and-the-future-of-spectrum-policy.

[7] *See* Cisco, *Cisco IoT System Security: Mitigate Risk, Simplify Compliance, and Build Trust*, 1 (Oct. 2015), available at http://www.cisco.com/c/dam/en/us/products/collateral/se/internet-of-things/iot-system-security-wp.pdf.

city officials the ability to track things like power outages, water leaks, and traffic issues all from one location.[8]

- **Ericsson's** Connected Mobility Arena project is finding solutions to improve mass transportation. With Driver Assistance, bus drivers will be instructed in real time how long to wait to pick up passengers, and passengers can be instructed which bus to take and when. The resulting efficiencies will lower costs for consumers and reduce environmental impacts. In addition, semi- and fully automated vehicles will be able to use "vehicle platooning" to have vehicles coordinate braking and acceleration, reducing traffic congestion.[9]

- **Intel** and the Michael J. Fox Foundation for Parkinson's Research are using smart watches and movement sensors to collect and analyze movement measurements in real-time, improving Parkinson's progression detection and symptom management.[10]

- **Qualcomm** is partnering with pharmaceutical company Novartis to improve clinical trials and provide connectivity for future Novartis products. Novartis will improve the convenience and accuracy of clinical trials by collecting and aggregating bio-metric data from medical devices.[11]

- **Samsung's** SmartThings products allow consumers to remotely control and monitor lights, temperature, cameras, and more from their mobile devices.[12] The Family Hub refrigerator, the first IoT appliance, connects to the Internet and mobile devices so that users can order groceries, stream music, and view the contents of their fridge from anywhere.[13]

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[8] *See* Press Release, AT&T, AT&T Launches Smart Cities Framework with New Strategic Alliances, Spotlight Cities, and Integrated Vertical Solutions (Jan. 5, 2016), http://about.att.com/story/launches_smart_cities_framework.html.

[9] *See* Leonid Mokrushin, *5G for Improving Urban Transport*, Ericsson Research Blog (Nov. 17, 2015), https://www.ericsson.com/research-blog/5g/5g-for-improving-urban-transport.

[10] *See* Intel, *Using Wearable Technology to Advance Parkinson's Research* (2015), available at http://www.intel.com/content/www/us/en/big-data/wearable-technology-parkinsons-research.html.

[11] *See* Aditi Pai, Novartis, *Qualcomm Life to Develop Connected Inhaler for COPD*, MobiHealthNews (Jan. 6, 2016), http://mobihealthnews.com/content/novartis-qualcomm-life-develop-connected-inhaler-copd.

[12] *See generally* Samsung, Samsung SmartThings, http://www.samsung.com/us/smart-home (last visited June 1, 2016)

[13] *See generally* Samsung, Samsung Family Hub, http://www.samsung.com/us/explore/family-hub-refrigerator (last visited June 1, 2016).

- **Sprint** is developing industry-specific IoT connectivity and software integration to allow its existing enterprise customer base to implement intelligent devices and sensors into their business processes, both in the U.S. and globally.[14]

- **T-Mobile's** unique approach to cross-border communication is making it easy for companies to embrace the mobile-to-mobile ("M2M") revolution. T-Mobile's eSIM is a ready-to-use SIM card for connected devices that eliminates the issue of international roaming charges between the U.S. and Canada.[15]

- **Verizon** has created applications that will help modernize the agriculture industry. Wireless sensors allow farmers to remotely monitor water usage, soil moisture, and soil temperature to optimize water usage and improve crop yield.[16]

These are but a few examples of IoT initiatives already underway. While the private sector will drive IoT, policymakers will play a key role in the future of IoT. As one think tank recently noted:

> Smart public policies that proactively support innovation – or carefully avoid doing harm by restraining from the impulse to regulate or if needed, regulating with a light touch – have been integral to the success of major technological developments such as the Internet, global positioning systems, and supercomputers. Smart policies can foster the growth of the Internet of Things, too.[17]

The *Request for Comment* creates the opportunity to develop smart policies for IoT.

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[14] *See* Press Release, Prodapt, Prodapt and Sprint Partner to Power the Global IoT Ecosystem (Jan. 26, 2016), http://www.prnewswire.com/news-releases/prodapt-and-sprint-partner-to-power-the-global-iot-ecosystem-566543701.html.

[15] *See* Press Release, T-Mobile, T-Mobile Announces New eSIM, Eliminates International Travel Costs for Machines (Feb. 18, 2014), https://newsroom.t-mobile.com/news-and-blogs/t-mobile-announces-new-esim-eliminates-international-travel-costs-for-machines.htm.

[16] *See* Verizon, Agricultural Innovation Reinvents Farming, https://solutionslab.vzw.com/article/mbi-102-agricultural-innovation-reinvents-farming (last visited June 1, 2016).

[17] Joshua New & Daniel Castro, Center for Data Innovation, *Why Countries Need National Strategies for the Internet of Things*, 1-2 (Dec. 16, 2015), available at http://www2.datainnovation.org/2015-national-iot-strategies.pdf ("*CDI Article*").

II. CTIA COMMENDS NTIA FOR LAUNCHING THIS POLICY INITIATIVE TO FOSTER IoT INNOVATION AND GROWTH

As a first principle, public policy in the IoT era should seek to facilitate the development and delivery of new and better services for American consumers and the nation's economy. Assistant Secretary for Communications and Information and NTIA Administrator Lawrence E. Strickling summed this view up well, stating that this *Request for Comment* "is aimed at ensuring the continued growth and innovation of IoT for the benefit of consumers, society and the economy."[18]

From the White House to Congress, key policymakers have expressed a broad commitment to enabling this nascent but dynamic market through the following policy insights:

- The White House Office of Science Technology Policy has said the White House looks at IoT "from a lens of playing a supportive role."[19]
- Senate Commerce Committee Chairman John Thune (R-SD) has advocated for "the same light touch" treatment that "caused the Internet to be such a great American success story," and against reactionary, "government knows best" IoT regulation.[20]
- Senate Commerce Committee Ranking Member Bill Nelson (D-FL) has assured that "no one is talking about 'overregulating'" IoT.[21]

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[18] Press Release, U.S. Department of Commerce Seeks Comment on Potential Policy Issues Related to Internet of Things (Apr. 5, 2016), https://www.commerce.gov/news/press-releases/2016/04/us-department-commerce-seeks-comment-potential-policy-issues-related.

[19] Daniel Correa, Senior Advisor, Office of Science and Technology Policy, White House, *quoted in* Darren Samuelson, *What Washington Really Knows About the Internet of Things*, Politico (June 29, 2015), http://www.politico.com/agenda/story/2015/06/internet-of-things-caucus-legislation-regulation-000086#ixzz49DqAY1BW.

[20] Senate Commerce Committee Chairman John Thune Majority Statement, *The Connected World: Examining the Internet of Things: Hearing Before the S. Comm. On Com., Sci., & Transp.*, 114th Cong. (Feb. 11, 2015), available at http://www.commerce.senate.gov/public/index.cfm/hearings?Id=D3E33BDE-30FD-4899-B30D-906B47E117CA&Statement_id=F58152BF-3E3B-4B28-A10B-5C4A13793473.

[21] Senate Commerce Committee Ranking Member Bill Nelson Minority Statement, *The Connected World: Examining the Internet of Things: Hearing Before the S. Comm. On Com., Sci., & Transp.*, 114th Cong. (Feb. 11, 2015), available at

- House Energy and Commerce Committee Chairman Fred Upton (R-MI) has touted IoT as an area of "great growth for our economy," adding that government "must exercise great caution to avoid the slippery slope of the Internet of Things evolving into the Internet of Regulation."[22]

- More broadly, the Congressional Caucus on Internet of Things and the newly-formed Bipartisan Internet of Things Working Group reflect lawmakers' widespread interest in promoting IoT "while avoiding regulations that will undercut the industry."[23]

Moreover, the Administration has already taken important steps to advance the development of IoT for the public sector. Last year, it launched the Smart Cities Initiative, harnessing IoT to solve key challenges facing local communities, such as reducing traffic congestion and improving access to public services.[24] The $160 million investment spans multiple federal agencies and funds innovative programs like the Global City Teams Challenge, which encourages applications like smart metering and traffic management and establishes IoT research test beds.[25]

Against this backdrop, CTIA believes NTIA has a great opportunity to help establish a national policy perspective to foster IoT development and growth.

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http://www.commerce.senate.gov/public/index.cfm/hearings?Id=D3E33BDE-30FD-4899-B30D-906B47E117CA&Statement_id=7A92BAD8-BC01-4052-9B53-AFE0810F2A35.

[22] Press Release, House Energy and Commerce Committee, Upton and Burgess Respond to Internet of Things Report (Jan. 27, 2015), https://energycommerce.house.gov/news-center/press-releases/upton-and-burgess-respond-internet-things-report.

[23] Press Release, House Energy and Commerce Committee, Latta and Welch Launch Bipartisan Internet of Things Working Group (May 24, 2016), https://energycommerce.house.gov/news-center/press-releases/latta-and-welch-launch-bipartisan-internet-things-working-group.

[24] *See* Press Release, The White House, FACT SHEET: Administration Announces New "Smart Cities" Initiative to Help Communities Tackle Local Challenges and Improve City Services (Sept. 14, 2015), https://www.whitehouse.gov/the-press-office/2015/09/14/fact-sheet-administration-announces-new-smart-cities-initiative-help.

[25] *See id.*

III. EXISTING POLICY FRAMEWORKS SHOULD INFORM BUT NOT MANDATE GOVERNMENT'S APPROACH TO IoT[26]

As a general matter, existing policy frameworks, rather than adoption of new IoT-specific regulation, should serve as the starting point when considering policy in the IoT context. That said, it is important for Government to take a nuanced approach, recognizing that in some circumstances, existing frameworks could needlessly straightjacket the IoT ecosystem and run counter to the government's overall goal of promoting IoT.

A light touch, flexible regulatory framework will best enable innovation and foster rapid adoption of IoT. Use of the multi-stakeholder process and voluntary, collaborative initiatives will help develop a thoughtful direction for IoT practices that address policy issues, informed by policymakers, the private sector, interest groups, and consumers. Where regulation is needed, "smart policies" should be proportionate and address particular circumstances, rather than across-the-board approaches that impose unnecessary requirements. Regulatory restraint, not reflexive adherence to legacy regulation, will allow IoT to flourish.

Agencies have begun to grapple with discrete policy issues in the IoT context. Recent examples demonstrate some approaches that foster IoT and some that unnecessarily inhibit it, as follows:

- *FDA treatment of mobile medical apps*. In 2015, the Food and Drug Administration ("FDA") took a balanced, platform-neutral, risk-based approach to enforcement under the Federal Food, Drug, and Cosmetic Act, examining its existing regulatory authority and finding that the majority of lower-risk health and wellness apps would be exempt from enforcement oversight.[27]

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[26] *See Request for Comment* at 19,958, Questions 1, 3.

[27] *See* Food and Drug Administration, Guidance, *Mobile Medical Applications – Guidance for Industry and Food and Drug Administration Staff*, 23-26 (Feb. 9, 2015), http://www.fda.gov/downloads/MedicalDevices/DeviceRegulationandGuidance/GuidanceDocuments/UCM263366.pdf.

- *FDA treatment of emerging technologies in clinical trials.* More recently, the FDA has sought comment on the role of innovative technologies in clinical trials.[28] In that proceeding, CTIA commended the FDA for its finding that mobile health technology could "enhance the ability of clinical study sponsors to understand the safety and effectiveness of drugs, biologics, and medical devices; increase additional meaningful data gathering; minimize missing data; and maximize trial participation and retention."[29]

- *NHTSA proposal to impose recalls on mobile devices and apps*. In contrast, a current proposal put forward by National Highway Traffic Safety Administration ("NHTSA") would impose recalls and other enforcement mechanisms for safety-related defects on emerging technologies including mobile devices and apps.[30] The proposal would extend enforcement to mobile devices and apps that are not incorporated in the motor vehicle but can affect the car through a remote connection. In that proceeding, CTIA observed that industry initiatives, such as the newly established Auto Information-Sharing and Assurance Center (ISAC), offer a far better course to address safety-related issues associated with the connected car and emerging automotive technologies.[31]

The FDA's light-touch approach, combined with its thoughtful consideration of how mobile IoT technology can enhance clinical research and patient engagement, allows for a policy landscape that can accommodate nascent advances in mobile health. In contrast, NHTSA's attempt to shoehorn new devices and applications into regulatory categories intended for existing physical-mechanical systems could limit the potential for IoT technologies to increase automotive safety and efficiency.

Looking ahead, CTIA is deeply concerned that the promise and opportunity of IoT and the innovative services that IoT could potentially deliver will be undercut by the FCC's Open

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28 *See Using Technologies and Innovative Methods To Conduct Food and Drug Administration-Regulated Clinical Investigations of Investigational Drugs; Establishment of a Public Docket*, Docket No. FDA–2015–N–3579, 80 Fed. Reg. 66,543 (Oct. 29, 2015).

29 *Id.* at 66,544.

30 *See Request for Public Comments on NHTSA Enforcement Guidance Bulletin 2016-02; Safety-Related Defects and Emerging Automotive Technologies,* Docket No. NHTSA-2016-0040, 81 Fed. Reg. 18,935 (Apr. 1, 2016).

31 *See* Comments of CTIA, Docket No. NHTSA-2016-0040 (filed May 2, 2016).

Internet regime. IoT will produce use cases that no one has imagined, from latency-sensitive medical devices that enable immediate adjustments in patient care to airport lounge hotspots that can download movies very quickly just prior to boarding. But overly prescriptive rules – requiring providers to treat all traffic the same, or restricting pricing discounts – threaten to skew or discourage such advances. The United States runs the very real risk that policies derived from 20th Century statutes will bar cutting-edge 21st Century innovation from U.S. shores, to the detriment of U.S. consumers and U.S. competitiveness.

As government agencies confront the interplay between existing policies and the advent of IoT, a deliberate and measured regulatory approach will result in far better outcomes for consumers and the nation's economy. CTIA commends NTIA for initiating this proceeding and seeking a thoughtful policy approach in the IoT era.

IV. A ROBUST SPECTRUM PIPELINE IS CRITICAL FOR IoT[32]

Government can and should play a critical role in ensuring that adequate spectrum resources are available to fuel IoT. The spectrum market has witnessed an explosion in demand as more and more Americans find more and more ways to use mobile broadband. Here in the United States, annual mobile traffic grew threefold from 2013 to the end of 2015.[33] Americans now use more than 11.1 billion megabytes of mobile data every day, and traffic is expected to grow six-fold – to 2.9 exabytes per month – by the end of the decade.[34] IoT will be a major

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[32] *Request for Comment* at 19,959, Question 6.

[33] CTIA, *CTIA Annual Survey Report* (May 23, 2016), available at http://www.ctia.org/resource-library/press-releases/archive/americans-data-usage-more-than-doubled-in-2015.

[34] *See* Thomas K. Sawanobori & Dr. Robert Roche, CTIA, *Mobile Data Demand: Growth Forecasts Met: Significant Growth Projections Continue to Drive the Need for More Spectrum*, 3

demand driver, as the vast majority of IoT connections will depend on wireless technology, both licensed and unlicensed.

Today's 4G LTE wireless networks support the introduction of IoT, but the next generation of wireless, 5G, will be a game-changer. 4G LTE networks are fast – with peak speeds approaching 100 megabits per second – but 5G promises to deliver break-neck speeds potentially in excess of one gigabit per second.[35] To put this in perspective, a 5G user could download a 3-D movie in about 6 seconds, several minutes faster than 4G LTE, or an hour faster than 3G.[36] Beyond speeds, 5G will provide the scale needed for wireless networks to support 100 times more devices, enabling massive connectivity for billions of sensors, wearables, and devices, and unlocking new services and applications.[37] Finally, 5G will minimize delays in network responses (otherwise known as latency) and enable a host of benefits and applications not possible today. For example, it is estimated that a 5G-enabled self-driving car traveling at 60 miles per hour will move just over one inch from the time it identifies an obstacle to the time when the braking command is executed. By contrast, the same car, using a 4G technology under the same conditions, would move 4.6 feet before braking commences.[38] These are just a few examples of the numerous IoT use cases that only 5G is capable of delivering.

(June 22, 2015), available at http://www.ctia.org/docs/default-source/default-document-library/062115mobile-datademands-white-paper-new.pdf; CTIA, *US Mobile Data Traffic Will Grow 6-Fold from 2015 to 2010* (Feb. 16, 2016), http://www.ctia.org/your-wireless-life/how-wireless-works/wireless-quick-facts/us-mobile-data-traffic-will-grow-6-fold-from-2015-to-2020.

35 *See The Next Generation of Wireless* at 5.

36 *See id.* at 6.

37 *See id.* at 7.

38 *See id.* at 11.

This Administration has taken a deep-rooted interest in spectrum, recognizing the importance of wireless broadband to the nation. Early on, this Administration committed to make 500 megahertz of spectrum newly available for wireless broadband by 2020.[39] To that end, the Administration supported the Spectrum Act of 2012 and its inclusion in the Middle Class Tax Relief and Job Creation Act of 2012,[40] making important swaths of spectrum available for commercial wireless use. And in 2013, the Administration issued a second Presidential Memorandum calling on federal agencies to identify additional spectrum for potential sharing or clearing and requesting that agencies "use the minimum spectrum reasonably necessary to most effectively meet mission requirements."[41] In the AWS-3 spectrum band and elsewhere, the Department of Defense ("DoD") and other federal agencies committed to new sharing paradigms to create more spectrum opportunities for wireless broadband. CTIA commends the Administration, NTIA, DoD, and other federal agencies for the significant work in this regard, and urges continued efforts.

At the FCC, action is expected this summer on the *Spectrum Frontiers* proceeding to make high-band spectrum available for 5G and IoT uses in a timely manner.[42] Additional low-

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[39] *See* Memorandum for the Heads of Executive Departments and Agencies, *Unleashing the Wireless Broadband Revolution*, 75 Fed. Reg. 38,387, 38,388 (July 1, 2010) (directing the Secretary of Commerce, working through the NTIA, to collaborate with the FCC to identify and make available 500 megahertz of spectrum by 2020 for commercial mobile broadband use).

[40] Middle Class Tax Relief and Job Creation Act of 2012, Pub. L. No. 112-96, 126 Stat. 156 (codified in various sections of Title 47 of the U.S. Code).

[41] Memorandum for the Heads of Executive Departments and Agencies, *Expanding America's Leadership in Wireless Innovation*, 78 Fed. Reg. 37,431, 37,433 (June 20, 2013).

[42] *See Use of Spectrum Bands Above 24 GHz for Mobile Radio Services,* Notice of Proposed Rulemaking, 30 FCC Rcd 11878 (2015) ("*Spectrum Frontiers NPRM*"); FCC Chairman Wheeler Remarks at 19th Annual Satellite Leadership Dinner (Mar. 7, 2016),

and mid-band spectrum will support 5G – and IoT – throughout wide coverage areas.[43] To that end, the FCC is engaged in the first-ever incentive auction to repurpose 600 MHz spectrum from broadcast to mobile broadband, and last year it conducted the AWS-3 auction after NTIA, federal agencies, and industry developed sharing arrangements to enable the repurposing of federal spectrum.

The United States also needs a strong unlicensed spectrum policy. To do so, the FCC should return to its practice of allowing permissionless innovation in the unlicensed bands. The wireless industry has devoted significant time and many resources over the last several years to offer two new FCC Part 15 technologies in unlicensed spectrum, LTE-Unlicensed (LTE-U) and Licensed Assisted Access (LAA). LTE-U and LAA technologies will provide enhanced performance in unlicensed bands, all without negatively impacting existing Wi-Fi operations. For decades, the FCC wisely applied a light touch and avoided unnecessary regulation of unlicensed technologies. Those policies have been eroded under this FCC, stalling the deployment of innovative, spectrum-efficient, consumer-friendly services that have heretofore been the hallmark of unlicensed spectrum. Going forward, the FCC should allow the wireless industry to manage the coexistence of unlicensed LTE, Wi-Fi, and other Part 15 operations. This will ensure continued growth and innovation in unlicensed, to the ultimate benefit of consumers. On the positive side, the government is moving toward identifying additional spectrum for unlicensed, including in the 5 GHz band.

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https://apps.fcc.gov/edocs_public/attachmatch/DOC-338135A1.pdf (FCC will act "this summer").

[43] *See The Next Generation of Wireless* at 14.

As CTIA President & CEO Meredith Attwell Baker has said, "[t]he right spectrum strategy is an all-of-the-above strategy."[44] Only this broad and aggressive strategy will maintain U.S. leadership in mobile and ensure we are well positioned to support the explosion in IoT. In its role as steward of federal spectrum policy, NTIA should continue to work with the FCC, federal agencies, Congress, and industry to ensure all stakeholders take advantage of all opportunities to make additional spectrum available.

In addition to sound spectrum policy, government can advance IoT by pursuing other important wireless policies. First, to ensure our limited spectrum resources are used effectively and efficiently, government should maintain a flexible use policy that allows the market and consumers, not regulators, to determine the highest and best use of the spectrum – be it mobile or fixed, voice or data or video, or IoT. CTIA supports a strong, flexible-use policy and reiterates that there is no need for IoT-specific spectrum policy.

Spectrum, however, is only part of the equation; when and how we transition to a fully-connected mobile world rests, in large part, upon a densification of mobile infrastructure – and that depends on the removal of barriers to the deployment of cell sites and antennas.[45] As the FCC has recognized, explosive demand for mobile broadband is "driving an urgent and growing need for additional infrastructure deployment and new infrastructure technologies."[46] To enable

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44 CTIA President & CEO Meredith Attwell Baker Remarks to ISART (May 14, 2015), http://www.ctia.org/docs/default-source/default-document-library/isart-speech-public.pdf.

45 *See* FCC Chairman Tom Wheeler Remarks at Distributed Antenna Systems & Small Cell Solutions Workshop (May 3, 2016), https://www.fcc.gov/news-events/events/2016/05/distributed-antenna-systems-and-small-cell-workshop (commenting that "if we can site 5G, we can be the world leaders in 5G"); *The Next Generation of Wireless* at 13.

46 *Acceleration of Broadband Deployment by Improving Wireless Facilities Siting Policies*, Report and Order, 29 FCC Rcd 12865, 12878 ¶ 29 (2014).

these deployments, policymakers should continue to adopt reasonable, predictable siting processes. Most recently, CTIA has urged the FCC "to move as quickly as possible to streamline the small cell/DAS siting process to ensure that these facilities can be efficiently integrated into high-band spectrum," which is crucial to the deployment of 5G and IoT.[47] CTIA has highlighted in particular the need for expedited antenna siting processes on Tribal and federal land,[48] and the Administration's Broadband Opportunity Council is revising policies to help service providers obtain the necessary permits and permissions to build out broadband networks, including expanding use of towers.[49]

V. POLICYMAKERS SHOULD ENGAGE EXISTING FRAMEWORKS, INCLUDING VOLUNTARY, COLLABORATIVE INITIATIVES, TO ADDRESS CYBER THREATS AND PROTECT PRIVACY[50]

Consumers and enterprises will embrace IoT only if they trust companies to protect their security and privacy. Consumers, enterprises, the IoT ecosystem, and government thus have a shared interest in the IoT ecosystem staying ahead of cyber threats and providing for appropriate and consistent privacy protection. To succeed, industry is incorporating security and privacy by design into engineering and product development processes. Government can and should foster such practices. Voluntary, collaborative initiatives, industry-led efforts, and best practices are

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47 Scott Bergmann, CTIA, *Statement on FCC Small Cell/DAS Workshop* (May 3, 2016), http://www.ctia.org/resource-library/press-releases/archive/ctia-statement-on-fcc-small-cell-das-workshop.

48 *See* Comments of CTIA, Broadband Opportunity Council Docket No. 150414365-5365-01, 26 (filed June 10, 2015).

49 *See* Broadband Opportunity Council, *Broadband Opportunity Council Report and Recommendations: Pursuant to the Presidential Memorandum on Expanding Broadband Deployment and Adoption by Addressing Regulatory Barriers and Encouraging Investment and Training* (Aug. 20, 2015), available at https://www.ntia.doc.gov/files/ntia/publications/broadband_opportunity_council_report_final.pdf.

50 *See Request for Comment* at 19,959, Questions 16, 17.

already part of the security and privacy oversight fabric, and where possible, government should use these established security and privacy frameworks to address IoT issues.

Voluntary industry guidelines and codes of conduct, including those developed through a consensus-driven multi-stakeholder processes, provide a framework to protect security and privacy for new kinds of connected devices. This approach has several advantages. *First*, it allows companies to implement best practices in a way that comports with each company's technology and business model while protecting users. *Second*, it is more likely to identify and address real harms while accounting for the varying roles and responsibilities of different participants in the ecosystem. The IoT ecosystem involves a large number of players and data of varying sensitivity, but all players should be held to the same rules. Industry guidelines and codes of conduct can reflect these differences and allocate responsibilities accordingly. *Third*, industry self-regulation can move more quickly to adapt to the rapidly-developing IoT market. Fortunately, sound models are in place to apply this approach to the IoT ecosystem.

The National Institute of Standards and Technology Cybersecurity Framework ("NIST Framework"), for example, serves as a useful template because it gives industry the flexibility to improve security and user trust while allowing innovation, consistent with NTIA's stated goal. In particular, the NIST Framework refrains from imposing "one-size-fits-all" solutions and instead set forth a voluntary, flexible framework that can be scaled to companies' different needs, allowing them to take into account their particular business models, assets, and other variables.[51] It also enables companies to adapt to an ever-changing, dynamic environment as it evolves.

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[51] *See* National Institute of Standards and Technology, *Framework for Improving Critical Infrastructure Cybersecurity*, Version 1.0, at 2, 6 (Feb. 12, 2014), available at

The NIST Framework provides the common language for industry groups, companies and government agencies to use in defining how information sharing can work to advance cybersecurity and protect privacy in a growing threat environment. The wireless industry, and the communications sector more broadly, is fully engaged in the collaborative framework developed for cybersecurity.[52]

CTIA members can attest to the value of the NIST Framework approach. The communications sector used the NIST Cybersecurity Framework to develop cybersecurity guidelines and practices for five telecommunications industry segments: wireless, wireline, broadcast, cable, and satellite.[53] Communications providers now have a series of guidelines and best practices tailored to their specific business sectors, even while maintaining consistency with the broader industry. Through CTIA's Cybersecurity Working Group, representatives from across the entire mobile ecosystem engage in research and collaboration with private sector and government entities. With these resources, CTIA members are vigilant in protecting their networks and the customers; security and privacy by design are not just watchwords – they are part of the wireless world.

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http://www.nist.gov/cyberframework/upload/cybersecurity-framework-021214-final.pdf ("NIST Framework").

[52] For example, CTIA members participate in structured cybersecurity information sharing, for example, in the Communications ISAC, the National Cybersecurity and Communications Integration Center, DHS' Communications Sector Coordination Council, and the National Security Telecommunications Advisory Committee.

[53] *See* FCC Communications Security, Reliability, and Interoperability Council ("CSRIC") IV, Working Group 4, *Cybersecurity Risk Management and Best Practices: Final Report*, 4 (Mar. 2015), available at https://transition.fcc.gov/pshs/advisory/csric4/CSRIC_IV_WG4_Final_Report_031815.pdf.

Further, as the Federal Trade Commission ("FTC") noted in its 2015 Staff Report, *Internet of Things: Privacy & Security in a Connected World*, "self-regulatory programs designed for particular industries would be helpful as a means to encourage the adoption of privacy- and security-sensitive practices."[54] In combination with such industry-led efforts, CTIA encourages the FTC to continue to apply existing policy guidelines in a technology-neutral manner and use its enforcement tools as appropriate, as it has done effectively thus far to protect consumers who use connected devices. CTIA therefore encourages the FTC to take a cautious approach as it wisely did in the 1990's when the commercial Internet began to take hold.

Existing FTC privacy policy frameworks provide appropriate guidance for incorporating privacy protections into new technology and enabling consumers to make informed decisions about how their personal data is used. For example, the wireless industry has adopted and published guiding principles to promote transparency, choice, respect for context, and data security to provide for consumer privacy in all contexts.[55] The privacy issues that IoT vendors must consider are the same as those that vendors of other products and services face today.

In contrast, the FCC's recently proposed privacy rules would affect only ISPs.[56] The FCC's proposed rules, which diverge significantly from the FTC framework through which online data has been regulated for all entities, including ISPs, will harm and confuse consumers

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54 Federal Trade Commission, Staff Report, *Internet of Things: Privacy & Security in a Connected World*, 49 (Jan. 2015), available at https://www.ftc.gov/system/files/documents/reports/federal-trade-commission-staff-report-november-2013-workshop-entitled-internet-things-privacy/150127iotrpt.pdf.

55 *See* Comments of CTIA to FTC, Privacy and Security Implications of the Internet of Things, 6-7 (filed Jan. 10, 2014), available at http://www.ctia.org/docs/default-source/fcc-filings/final-ctia-iot-comments-jan-10-2014.pdf?sfvrsn=0.

56 *See Protecting the Privacy of Customers of Broadband and Other Telecommunications Services*, Notice of Proposed Rulemaking, 31 FCC Rcd 2500 (2016).

by creating inconsistent standards for consumer data. In addition, like the Open Internet regime described above, the proposed privacy rules are overly prescriptive and do not provide the flexibility the IoT marketplace needs in order to innovate and evolve. By not harmonizing its privacy framework with that at the FTC and as recommended in several Administration reports, the FCC is moving in the wrong direction, and the effects of a misstep will be felt throughout the Internet economy, in particular in the burgeoning IoT space.[57]

The FTC should continue to apply existing policy guidelines and use its enforcement tools in a technology-neutral manner, including for the IoT ecosystem, as it has done effectively so far.

VI. THE U.S. SHOULD PURSUE GLOBALLY CONSISTENT IoT SOLUTIONS, WHILE CONTINUING TO LEAD INTERNATIONALLY[58]

As NTIA recognizes in the *Request for Comment*, country-specific approaches "threaten the possibility of a global patchwork" of IoT policies and regulations that vary from country to country, and CTIA shares NTIA's concern that such a global regulatory patchwork will increase costs, delay new service and product launches, and dampen investment.[59] CTIA thus urges the U.S. government to work cooperatively with other nations, intergovernmental organizations, and IoT stakeholders to advance globally consistent IoT policies and regulations whenever possible. A key element of that approach is for all nations to allow standards bodies to develop industry-driven technical standards that will produce economies of scale and minimize deployment costs.

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57 *See* Comments of CTIA, WC Docket No. 16-106 (filed May 27, 2016).

58 *See Request for Comment* at 19,959-60, Questions 20-24.

59 *See id.* at 19,957.

The U.S., however, should also take the lead in pursuing new IoT strategies that have not been adopted by other countries, but that ultimately may receive international acceptance over time.

CTIA urges the government to oppose IoT-specific regulation or requirements that will only serve to restrict investment and diminish the IoT marketplace. In 2015, for example, India adopted an IoT roadmap containing provisions that in fact would limit IoT growth.[60] These provisions called for requiring import licenses for certain connected devices, among other requirements. They also included counterproductive "India first" policies that restrict access to foreign products and require that servers used with connected devices be located within India's borders. Such data localization requirements raise data sovereignty issues and may constrain the ability of U.S. companies to provide IoT services globally. Similarly, Singapore's M2M licensing procedures impede innovation and timely service offerings. The U.S. IoT framework should reject measures that will limit IoT growth.

In contrast, the United States should promote policies that will advance global IoT. For example, the government should call for continued use of U.S. telephone numbers extraterritorially in the IoT context. Other nations should permit extra-territorial use of numbers to advance global IoT products and services.

Spectrum is another area where international harmonization is important, as such efforts promote economies of scale and enable global roaming, thereby reducing equipment design complexity nation-to-nation.[61] At the same time, the United States should be free to pursue

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[60] *See CDI Article* at 11; *see also* Government of India, Ministry of Communications & Information Technology, Department of Telecommunications, *National Telecom M2M Roadmap*, 29-30 (May 2015), available at http://www.dot.gov.in/sites/default/files/u10/National%20Telecom%20M2M%20Roadmap.pdf.

[61] *See Spectrum Frontiers NPRM* at 11886 ¶ 17 (2015) (noting benefits of internationally harmonized spectrum).

forward thinking and innovative use of spectrum even though it may not be currently under consideration for international harmonization for that purpose. Indeed, the current FCC proceeding to identify and provide additional spectrum above 24 GHz for 5G use is a good example of U.S. leadership in developing new technology in a new band, including pursuing 5G use of certain spectrum that the International Telecommunication Union to date has not given priority for consideration for such use.[62]

[62] *See* FCC Chairman Tom Wheeler Statement, *Presentation on the Outcomes of the International Telecommunication Union's World Radio Conference That Took Place in November 2015* (Dec. 17, 2015), https://apps.fcc.gov/edocs_public/attachmatch/DOC-336917A1.pdf ("It would have been far better if [WRC-15] had agreed to study the 28 GHz band among the bands they agreed to consider for 5G, but the U.S. and other leaders in the 5G arena will go forward with our own studies. And I am fully confident that, as we and others move forward with 28 GHz, an international consensus will develop."). The FCC International Bureau presentation on which Chairman Wheeler commented notes that eight countries in addition to the United States plan to study the 28 GHz band.

VII. CONCLUSION

CTIA appreciates the opportunity to provide input on key areas of the IoT policy and technological landscape and looks forward to further engagement as NTIA considers government's role the advancement of the IoT.

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