

**Before the  
FEDERAL COMMUNICATIONS COMMISSION  
Washington, D.C. 20554**

In the Matter of:	)	
	)	
Competitive Bidding Procedures for Auction	)	AU Docket No. 18-85
101 (28 GHz) and Auction 102 (24 GHz)	)	
	)	

**COMMENTS OF CTIA**

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May 9, 2018

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CTIA<sup>1</sup> respectfully submits these comments in response to the Public Notice seeking comment on competitive bidding procedures for the proposed auction of high-band spectrum.<sup>2</sup>

**I. INTRODUCTION AND SUMMARY.**

CTIA has long advocated in favor of making additional spectrum available for terrestrial wireless services given the continued consumer demand for wireless connectivity and critical role that spectrum plays in fostering wireless innovation. By bringing millimeter wave bands to market this year, the Commission will help facilitate the development and deployment of 5G technologies and services across the country to the benefit of the nation’s economy, businesses, and consumers. As recent research indicates, the United States currently trails both China and South Korea in 5G-readiness, based on an assessment of spectrum and infrastructure policies, industry investment, and overall government support. Moving forward expeditiously to auction millimeter wave spectrum in Auctions 101 and 102 will help the U.S. to close this gap and ensure the economic benefits of wireless leadership are retained.

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<sup>1</sup> CTIA® (www.ctia.org) represents the U.S. wireless communications industry and the companies throughout the mobile ecosystem that enable Americans to lead a 21st century connected life. The association’s members include wireless carriers, device manufacturers, suppliers as well as apps and content companies. CTIA vigorously advocates at all levels of government for policies that foster continued wireless innovation and investment. The association also coordinates the industry’s voluntary best practices, hosts educational events that promote the wireless industry and co-produces the industry’s leading wireless tradeshow. CTIA was founded in 1984 and is based in Washington, D.C.

<sup>2</sup> *Competitive Bidding Procedures for Auction 101 (28 GHz) and Auction 102 (24 GHz)*, Public Notice, AU Docket No. 18-85, FCC 18-43 (rel. Apr. 17, 2018) (“*High-Band Auctions Public Notice*”).

CTIA therefore urges the Federal Communications Commission (“Commission”) to move forward with its proposed auction of the 28 GHz band in Auction 101 starting in November. CTIA also supports an expeditious auction of the 24 GHz band through Auction 102, and urges the Commission to explore auctioning additional millimeter wave band spectrum for licensed terrestrial wireless use in this auction. Specifically, CTIA recommends that the Commission auction the 37/39 GHz and 47 GHz bands alongside the 24 GHz band, to the extent that doing so would not cause substantial delay. Not only have these bands been the focus of standards and technology development, but the Commission already has adopted technical and licensing rules for these bands, making them ripe for auction as soon as possible.

Additionally, the Commission should adopt its alternative proposal to schedule the Auction 102 application window to occur after the close of bidding in Auction 101. This approach will balance the interests of the Commission in ensuring a successful auction with the those of industry in not running afoul of the Commission’s anti-collusion rules.

Finally, the Commission can provide certainty to the wireless industry by ensuring there is a clear pipeline for spectrum to support next-generation connectivity. To do so, CTIA recommends that the Commission develop and release a calendar that outlines the Commission’s plans for auctioning additional high- and mid-band spectrum that will provide the needed inputs to allow U.S. companies to keep pace in the race for 5G.

## **II. ENSURING U.S. 5G LEADERSHIP WILL RESULT IN CONTINUED ECONOMIC GROWTH.**

### **A. The U.S. Wireless Industry Continues To Experience Tremendous And Accelerating Growth.**

The growth of smartphone adoption among consumers, coupled with the availability of high-quality, ubiquitous 4G LTE services, has fueled a meteoric rise in mobile broadband usage. As the Commission’s most recent wireless competition report demonstrates, more than 99

percent of the U.S. population has access to 4G LTE wireless service.<sup>3</sup> As a result, total U.S. wireless data traffic totaled 13.72 trillion MBs in 2016, an increase of 4.07 trillion MBs over 2015 and 35 times greater than data traffic in 2010.<sup>4</sup> This robust growth in data traffic shows no signs of slowing, as projections indicate that global mobile data traffic will grow at a compound annual growth rate of 46 percent from 2016 to 2021.<sup>5</sup> Indeed, global mobile data traffic is expected to grow twice as fast as fixed broadband traffic in that same period.<sup>6</sup>

The transition to 5G networks and services will accelerate this growth as consumers and businesses adopt Internet of Things (“IoT”) applications and uses, which will result in billions of new connections in the near future. At year-end 2016, an estimated 67 million cellular IoT connections linked industrial and consumer devices in the U.S. and Canada.<sup>7</sup> Ericsson estimates that cellular IoT connections will reach 213 million by 2022, consisting of more than 30 percent of all cellular connections.<sup>8</sup> Through new devices and services, 5G networks will drive radical improvements in how we communicate, travel, learn, and receive medical care, and will also unlock new industries and generate billions in economic growth.

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<sup>3</sup> *Implementation of Section 6002(b) of the Omnibus Budget Reconciliation Act of 1993; Annual Report and Analysis of Competitive Market Conditions With Respect to Mobile Wireless, Including Commercial Mobile Services*, Twentieth Report, 32 FCC Rcd 8968, ¶ 77, Chart III.D.4 (2017).

<sup>4</sup> *Wireless Snapshot 2017*, CTIA (May 9, 2017), <https://api.ctia.org/docs/default-source/default-document-library/ctia-wireless-snapshot.pdf>.

<sup>5</sup> See *Visual Networking Index: Forecast and Methodology, 2016–2021*, CISCO, at 2 (June 6, 2017), <https://www.cisco.com/c/en/us/solutions/collateral/service-provider/visual-networking-index-vni/complete-white-paper-c11-481360.pdf>.

<sup>6</sup> *Id.*

<sup>7</sup> See *Ericsson Mobility Report*, ERICSSON, at 33 (June 2017), <https://www.ericsson.com/assets/local/mobility-report/documents/2017/ericsson-mobility-report-june-2017-north-america.pdf>.

<sup>8</sup> *Id.*

**B. The Economic Benefits Of Retaining Our Wireless Leadership Cannot Be Overstated.**

U.S. leadership on 4G development and deployment resulted in huge economic gains for the country, and the Commission should ensure its policies will foster the nation’s continued leadership in the next generation of wireless connectivity. The American wireless industry contributes \$475 billion to the economy annually, accounting for 2.6 percent of total U.S. Gross Domestic Product (“GDP”) in 2016.<sup>9</sup> By way of comparison, in 2011, prior to the U.S. taking the reins on 4G, wireless industry GDP totaled \$195.5 billion.<sup>10</sup> Only three years later, when 4G reached 40 percent penetration in the U.S., that number increased to \$332.9 billion, with U.S. 4G leadership directly accounting for \$43.6 billion of this growth.<sup>11</sup> By 2016, U.S. leadership in 4G had accounted for a nearly \$100 billion increase in annual GDP.<sup>12</sup>

The launch of 4G in the U.S. had a similar direct impact on employment, increasing total wireless-related jobs by 84 percent from 2011 to 2014.<sup>13</sup> As a result, the wireless industry currently supports 4.7 million U.S. jobs, with each direct wireless job resulting in a total employment multiplier effect of 7.7x.<sup>14</sup> American companies also reaped huge benefits from U.S. 4G leadership—estimates indicate that more than \$125 billion in revenue to these companies may have gone to companies in other countries had the U.S. not led the way on 4G

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<sup>9</sup> See *How the Wireless Industry Powers the U.S. Economy*, ACCENTURE STRATEGY, at 3 (Apr. 2018), <https://api.ctia.org/wp-content/uploads/2018/04/Accenture-Strategy-Wireless-Industry-Powers-US-Economy-2018-POV.pdf> (“*Wireless Powers the U.S. Economy*”).

<sup>10</sup> See *How America’s 4G Leadership Propelled the U.S. Economy*, RECON ANALYTICS, at 9 (Apr. 16, 2018), <https://api.ctia.org/wp-content/uploads/2018/04/Recon-Analytics-How-Americas-4G-Leadership-Propelled-US-Economy-2018.pdf> (“4G Leadership Report”).

<sup>11</sup> *Id.*

<sup>12</sup> *Id.*

<sup>13</sup> *Id.* at 10.

<sup>14</sup> See *Wireless Powers the U.S. Economy* at 3.

development and deployment.<sup>15</sup> This includes more than \$40 billion in application store revenue flowing directly to U.S. companies and application developers.<sup>16</sup>

Given the overwhelming benefits associated with the growth of 4G in the U.S., it is imperative that the nation retains its wireless leadership as the transition to 5G networks occurs. Recent research indicates that China and South Korea have already moved ahead of the U.S. in the race to 5G, and other countries have identified 5G leadership as a priority.<sup>17</sup> South Korea already successfully trialed the use of millimeter wave band spectrum for 5G during the Winter Olympics and will be auctioning spectrum in the 28 GHz band in June.<sup>18</sup> In addition, China has launched a consultation regarding the planning and use of millimeter wave spectrum for 5G<sup>19</sup> and anticipates conducting 5G trials in more than 100 cities in 20 provinces.<sup>20</sup> The European Union is considering millimeter wave band spectrum for commercial 5G deployments in 2020,<sup>21</sup>

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<sup>15</sup> See 4G Leadership Report at 11.

<sup>16</sup> *Id.* at 1.

<sup>17</sup> *The Global Race to 5G*, CTIA, at 3, (Apr. 2018), <https://api.ctia.org/wp-content/uploads/2018/04/Race-to-5G-Report.pdf>.

<sup>18</sup> See, e.g., Elaine Ramirez, *In The Race For 5G, South Korea Shows Off Its Tech Prowess At The Winter Olympics*, FORBES (Feb. 23, 2018), <https://www.forbes.com/sites/elaineramirez/2018/02/23/in-the-race-for-5g-south-korea-shows-off-its-tech-prowess-at-the-winter-olympics/#2078bcc62853>; Cho Mu-Hyun, *South Korea's 5G spectrum auction to start at \$3 billion*, ZDNET (Apr. 20, 2018), <https://www.zdnet.com/article/south-koreas-5g-spectrum-auction-to-start-at-3-billion/>.

<sup>19</sup> See Fiona Chau, *China launches consultation on 5G spectrum*, TELECOMASIA.NET (June 9, 2017), <https://www.telecomasia.net/content/china-launches-consultation-5g-spectrum>.

<sup>20</sup> See, e.g., Dylan Bushell-Embling, *China plans 5G trials in over 100 cities*, TELECOMASIA.NET (Oct. 6, 2016), <https://www.telecomasia.net/content/china-plans-5g-trials-over-100-cities>; Fiona Chau, *China Mobile to begin large-scale 5G trials in 2019*, TELECOMASIA.NET (Mar. 1, 2017), <https://www.telecomasia.net/content/china-mobile-begin-large-scale-5g-trials-2019>.

<sup>21</sup> European Commission Radio Spectrum Committee, Opinion of the RSC pursuant to Advisory Procedure under Article 4 of Regulation 182/2011/EU and Article 4.2 of Radio Spectrum Decision 676/2002/EC (rel. Dec. 8, 2016), [https://circabc.europa.eu/sd/a/448dc765-51de-4fc8-b6e0-56ed6a1d0bca/RSCOM16-40rev3%205G%20draft\\_mandate\\_C](https://circabc.europa.eu/sd/a/448dc765-51de-4fc8-b6e0-56ed6a1d0bca/RSCOM16-40rev3%205G%20draft_mandate_C).

while Ofcom has sought input on use of millimeter wave band spectrum for 5G service in the UK.<sup>22</sup>

Ensuring that spectrum deployment keeps pace with growing consumer demands is critical in maintaining the United States' position as the world's foremost wireless leader. America's wireless companies stand ready to invest \$275 billion into building next-gen 5G networks, potentially resulting in significant economic benefits for the U.S., including up to three million new jobs and boosting GDP by \$500 billion.<sup>23</sup> Moreover, these benefits will accrue not only for wireless consumers and businesses, but for other industries as well. Research suggests, for example, that Smart City solutions facilitated by 5G and applied to the management of vehicle traffic and electrical grids could produce \$160 billion in benefits and savings through reductions in energy usage, traffic congestion and fuel costs.<sup>24</sup> And, self-driving cars could reduce emissions, cut travel times and delays, and save tens of thousands of lives per year.<sup>25</sup>

**C. The Commission Must Ensure That Providers Have The Necessary Spectrum Resources To Support 5G Networks And Services.**

CTIA and its members share the Commission's goal of advancing the next generation of wireless services and unleashing the 5G revolution. Securing and maintaining U.S. leadership, however, will require the Commission to prioritize auctioning new millimeter wave band

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<sup>22</sup> OfCom, Consultation: Fixed Wireless Spectrum Strategy (Dec. 7, 2017), [https://www.ofcom.org.uk/data/assets/pdf\\_file/0027/108594/Fixed-Wireless-SpectrumStrategy.pdf](https://www.ofcom.org.uk/data/assets/pdf_file/0027/108594/Fixed-Wireless-SpectrumStrategy.pdf).

<sup>23</sup> See *Smart Cities: How 5G Can Help Municipalities Become Vibrant Smart Cities*, ACCENTURE STRATEGY, at 1 (Jan. 2017), <https://api.ctia.org/docs/default-source/default-document-library/how-5g-can-help-municipalities-become-vibrant-smart-cities-accenture.pdf>.

<sup>24</sup> *Id.* at 1; see also *Wireless Connectivity Fuels Industry Growth and Innovation in Energy, Health, Public Safety, and Transportation*, DELOITTE (Jan. 2017), [https://api.ctia.org/docs/default-source/default-document-library/deloitte\\_2017011987f8479664c467a6bc70ff0000ed09a9.pdf](https://api.ctia.org/docs/default-source/default-document-library/deloitte_2017011987f8479664c467a6bc70ff0000ed09a9.pdf) ("Deloitte Wireless Connectivity Report").

<sup>25</sup> See, e.g., Deloitte Wireless Connectivity Report at 11-12.

spectrum to keep pace with the rest of the world. With wireless services growing more advanced and spectrum becoming increasingly scarce, auctioning millimeter wave bands for mobile services is essential.<sup>26</sup> America’s wireless providers and equipment vendors already have conducted dozens of 5G trials across the country, but additional spectrum resources are needed to unlock the full potential of the innovative services and technologies that 5G can enable. Diligent and expedient action in 2018 can help drive the U.S. back into the lead for 5G.

### **III. THE COMMISSION SHOULD ADOPT PROCEDURES THAT RESULT IN ROBUST AUCTION PARTICIPATION.**

#### **A. The Commission Should Expeditiously Auction Additional Millimeter Wave Spectrum Bands.**

CTIA applauds the Commission for scheduling an auction for the 28 GHz band starting in November. Given the urgent need for millimeter wave spectrum to support 5G deployment, the Commission’s actions to bring this band to market this year will help facilitate the development of these innovative technologies and services. Auction 101 is an excellent first step towards ensuring that the U.S. wireless industry has the spectrum resources necessary to lead the world on 5G.

To provide access to a robust supply of spectrum, CTIA urges the Commission to accelerate the process for auctioning additional millimeter wave spectrum licenses. Specifically, the Commission should include the 37/39 GHz and 47 GHz bands along with the 24 GHz band in Auction 102, to the extent that doing so would not cause substantial delay. Each of these

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<sup>26</sup> As Commissioner Carr has noted, the Commission already knows the “winning playbook” for leading on 5G: “As with 4G, we have to focus on two things: spectrum and infrastructure.” Remarks of Commissioner Brendan Carr at CTIA’s Race to 5G Summit, “Next Steps on the Path to 5G” (Apr. 19, 2018), [https://transition.fcc.gov/Daily\\_Releases/Daily\\_Business/2018/db0420/DOC-350348A1.pdf](https://transition.fcc.gov/Daily_Releases/Daily_Business/2018/db0420/DOC-350348A1.pdf). Commissioner Rosenworcel similarly recently observed that, “[i]f we want to lead, we need a pipeline of both millimeter wave and mid-band spectrum for 5G.” *High-Band Auctions Public Notice* (Statement of Commissioner Jessica Rosenworcel).

bands has been the focus of millimeter wave standards and technology development, which will enable providers to more quickly deploy the spectrum for 5G.<sup>27</sup> The Commission also already has adopted licensing and technical rules for these bands, making them ripe for auction.<sup>28</sup>

Moreover, all of these bands are complementary and should be assigned during the same auction process, as auctioning additional bands together would increase the efficiency of the auction, for both the agency and auction participants. As T-Mobile has observed, an auction that includes multiple spectrum bands “would provide potential bidders with sufficient information (e.g., a better understanding of price levels and license differences across bands), to allow tradeoffs between the spectrum bands.”<sup>29</sup> Auctioning additional spectrum in Auction 102, coupled with the auction of the 28 GHz band and the Commission’s reforms to wireless infrastructure siting policies,<sup>30</sup> can facilitate the deployment of next-generation innovations and help the U.S. better compete in the global race to 5G.

**B. The Commission Should Schedule The Auction 102 Application Window To Occur After The Close Of Bidding In Auction 101.**

CTIA is concerned about the implications for the agency and auction participants if the Commission adopts its proposal to apply the anti-collusion rules across two auctions and include

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<sup>27</sup> See e.g., *Spectrum Landscape for Mobile Services*, 5G AMERICAS, at 28 (Nov. 2017), [http://www.5gamericas.org/files/4915/1519/8618/5G\\_Americas\\_Whitepaper\\_Spectrum\\_Landscape\\_For\\_Mobile\\_Services\\_1.5.pdf](http://www.5gamericas.org/files/4915/1519/8618/5G_Americas_Whitepaper_Spectrum_Landscape_For_Mobile_Services_1.5.pdf).

<sup>28</sup> See generally *Use of Spectrum Bands Above 24 GHz For Mobile Radio Services, et al.*, Report and Order and Further Notice of Proposed Rulemaking, 31 FCC Rcd 8014 (2016); *Use of Spectrum Bands Above 24 GHz for Mobile Radio Services, et al.*, Second Report and Order, Second Further Notice of Proposed Rulemaking, Order on Reconsideration, and Memorandum Opinion and Order, 32 FCC Rcd 10988 (2017).

<sup>29</sup> Letter from Steve B. Sharkey, Vice President, Government Affairs – Technology and Engineering Policy, T-Mobile USA, Inc., to Marlene H. Dortch, Secretary, Federal Communications Commission, GN Docket No. 17-258, *et al.*, at 3-4 (filed Apr. 23, 2018).

<sup>30</sup> See, e.g., *Accelerating Wireless Broadband Deployment by Removing Barriers to Infrastructure Investment*, Second Report and Order, WT Docket No. 17-79, FCC 18-30 (rel. Mar. 30, 2018).

applicants in both.<sup>31</sup> Given the ambiguity of the Commission's anti-collusion rules, longer application of the rules could have a chilling effect on the wireless industry's ability to conduct non-auction related business negotiations, as providers traditionally have shied away from any such discussions to avoid the appearance of impropriety.

Additionally, extending the anti-collusion rules across Auctions 101 and 102 may undermine the ability of bidders interested solely in participating in Auction 102, as these participants will not know the results of Auction 101 before having to determine whether to participate in Auction 102. Since the Commission has suggested that these two auctions be separated, parties may want to revisit financing or other agreements following the conclusion of Auction 101, but would have imperfect information on the result of that auction prior to Auction 102.

CTIA therefore urges the Commission to adopt its alternative proposal to schedule the Auction 102 application window to occur after the close of bidding in Auction 101.<sup>32</sup> By decoupling the anti-collusion periods for the two auctions, affected parties will be able to receive bidding results from Auction 101 prior to competing in Auction 102. In addition, entities that may not wish to participate in both auctions will not be affected by a prolonged anti-collusion quiet period, but instead will only be subject to the period associated with the auction in which they are bidding. Finally, should interested bidders need an opportunity to enter into new financial arrangements, bidding consortia, or other market negotiations, allowing a period of time between Auctions 101 and 102 without the anti-collusion rules in effect would allow for those activities.

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<sup>31</sup> *High-Band Auctions Public Notice* ¶ 22. See also 47 C.F.R. § 12105(c).

<sup>32</sup> *High-Band Auctions Public Notice* ¶¶ 13, 23.

#### **IV. THE COMMISSION SHOULD ESTABLISH A CALENDAR FOR MAKING ADDITIONAL BANDS AVAILABLE FOR AUCTION.**

In addition to scheduling the auctions for the millimeter wave bands discussed above, the Commission should develop and release a calendar of upcoming auctions, including for remaining millimeter wave bands and for mid-band spectrum. Such a timeline would provide potential auction participants and investors with information to assess current and future needs, facilitate robust participation in future spectrum license auctions, and ensure there is a pipeline for spectrum to support next-generation connectivity. Understanding the spectrum inputs that will be made available and a specific plan for holding future auctions will provide stakeholders confidence that their network implementation plans will be possible and allow them to obtain any financing necessary. Furthermore, establishing dates for auctions for mid-band and millimeter wave spectrum licenses would signal that the U.S. intends to lead the world on 5G, as it has done for 4G.

#### **V. CONCLUSION.**

CTIA appreciates the Commission's continued efforts to identify further spectrum opportunities for terrestrial wireless services. Next-generation wireless will require a mix of low-, mid-, and high-band spectrum, and getting millimeter wave spectrum into the hands of wireless providers is an integral step to ensuring our 5G future. CTIA therefore supports the Commission's proposal to auction the 28 GHz band starting in November, and encourages the Commission to rapidly move to auction additional high band spectrum, as well as to move forward aggressively to provide more mid-band spectrum opportunities. With myriad economic and social benefits at stake, taking action this year is critical to ensuring that the U.S. crosses the 5G finish line ahead of its global competitors.

Respectfully Submitted,

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