

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

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

REPLY COMMENTS OF MOBILE FUTURE

Mobile Future submits these reply comments in response to the Federal Communications Commission’s Notice of Proposed Rulemaking (“NPRM”) promoting uses of spectrum above 24 GHz for commercial purposes.¹ The Commission must move quickly in this proceeding to

¹ *Use of Spectrum Bands Above 24 GHz for Mobile Radio Services*, Notice of Proposed Rulemaking, 30 FCC Rcd 11878 (2015) (“NPRM”).

establish rules in the spectrum bands above 24 GHz that will ensure U.S. victory in the global race to 5G. Consistent with Mobile Future’s initial comments and the broad agreement reflected in the record, the Commission should:

- Move forward as quickly as possible to repurpose the 28 GHz and 39 GHz bands for flexible use, including mobile broadband;
- Combine the 37 GHz and 39 GHz bands subject to the same rules, and reject the hybrid licensing scheme proposed for the 37 GHz band;
- Make the 64-66 GHz band available for unlicensed use and make the 67-71 GHz band for licensed use;
- Allocate licenses in the 28 GHz and 39 GHz bands by geographic areas consistent with their existing license areas, and license the 37 GHz band on an Economic Area basis;
- Adopt 10-year, renewable license terms with performance requirements, if any, that are flexible to accommodate the wide variety of use cases that may develop in the band, and reject the use-or-share proposal; and
- Apply standard competitive bidding procedures and secondary market rules to the 28 GHz, 39 GHz, and 37 GHz bands, and decline to adopt spectrum aggregation limits.

The Commission must also continue to work to make additional low- and mid-band spectrum available for mobile use, as a diversity of spectrum bands will be critical to the speed and scope of 5G success in the United States and globally.

I. THE UNITED STATES MUST MAINTAIN ITS LEADERSHIP POSITION IN THE RACE TO 5G

The United States remains the clear world leader in 4G, with nearly ubiquitous 4G deployment and world-leading investment and adoption. 4G LTE mobile broadband networks cover nearly every American and 98 percent of consumers have access to multiple providers.² The transition to 4G networks occurred extremely rapidly in the United States, with providers

² *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*, Eighteenth Report, DA 15-1487, ¶ 38, Chart III.A.3 (WTB rel. Dec. 23, 2015).

deploying 4G LTE service covering 98.5 percent of the U.S. population in a span of just three and a half years – an deployment rate virtually unprecedented in the history of technology in the United States.³ Providers invested nearly \$150 billion in building out wireless networks since 2010, and more than \$31 billion in 2014 alone. While the United States has just five percent of total global wireless users, American wireless providers’ investment represents 24 percent of total global wireless investment.⁴ LTE penetration is at nearly 50 percent in the U.S. as of 2014, with 158 million LTE connections among the population of 318 million.⁵ In contrast, LTE penetration is just 21 percent in Western Europe and 14 percent in the Asia Pacific region.⁶

But as Commissioner Rosenworcel recently highlighted, the race to 5G is on and the world’s wireless economies are busy planning for 5G service.⁷ Senator John Thune (R-SD)

³ *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*, Seventeenth Report, 29 FCC Rcd 15311, 15336, 15340 ¶¶ 51, 59 (2014); *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*, Fifteenth Report, 26 FCC Rcd 9664, 9720 ¶ 70 (2011).

⁴ CTIA, Press Release, CTIA’s Annual Survey Says US Wireless Providers Handled 3.2 Trillion Megabytes of Data Traffic in 2013 for a 120 Percent Increase Over 2012 (June 17, 2014), <http://www.ctia.org/resource-library/press-releases/archive/ctia-annual-survey-2013>.

⁵ 4G Americas, Year-End 2014: Nearly Half a Billion LTE Connections Worldwide (Mar. 11, 2015), <http://www.4gamericas.org/en/newsroom/press-releases/year-end-2014-nearly-half-billion-lte-connections-worldwide/>.

⁶ 4G Americas, 1Q2015: LTE connections Worldwide Increase by 150 Percent (June 5, 2015), <http://www.4gamericas.org/en/newsroom/press-releases/1q2015-lte-connections-worldwide-increase-150-percent/>.

⁷ Remarks of Commissioner Jessica Rosenworcel, “Five Ideas for the Road to 5G,” Leadership Forum on 5G: The Next Generation of Wireless (Feb. 9, 2016), http://transition.fcc.gov/Daily_Releases/Daily_Business/2016/db0209/DOC-337655A1.pdf.

similarly warned that while the rest of the world knows they cannot catch up to the United States in 4G, they are working hard to leapfrog the United States to take the lead in 5G.⁸

Some key members of Congress are working to help clear the path to 5G. Senator Thune and Senator Bill Nelson (D-FL) recently unveiled the bipartisan MOBILE NOW Act, legislation recognizing the urgent need for both more spectrum and streamlined infrastructure deployment processes in the race to 5G. Industry is also moving full steam ahead toward 5G. AT&T announced this month that it will begin testing 5G solutions in 2Q 2016 and could make some services commercially available by the end of the year,⁹ while Verizon announced last year that it would conduct 5G field trials in 2016 and have limited commercial availability in 2017.¹⁰

Time is of the essence, and the move to 5G cannot afford to be delayed. The FCC must make sure that spectrum is available promptly for the development and deployment of 5G networks in the United States.

⁸ Remarks of Senator John Thune, “Future of 5G Wireless,” Leadership Forum on 5G: The Next Generation of Wireless (Feb. 9, 2016), <http://www.commerce.senate.gov/public/index.cfm/2016/2/thune-remarks-on-future-of-5g-wireless>.

⁹ AT&T Press Release, AT&T Unveils 5G Roadmap Including Trials in 2016 (Feb. 12, 2016), http://about.att.com/story/unveils_5g_roadmap_including_trials.html; John Brodtkin, *AT&T Trialling 5G, Promises Speeds 10 to 100 Times Faster Than LTE*, ArsTechnica (Feb. 15, 2016), <http://arstechnica.com/information-technology/2016/02/att-trialling-5g-promises-speeds-10-to-100-times-faster-than-lte/>.

¹⁰ Roger Cheng, *Verizon to Be First to Field-Test Crazy-Fast 5G Wireless*, CNET (Sept. 8, 2015), <http://www.cnet.com/news/verizon-to-hold-worlds-first-crazy-fast-5g-wireless-field-tests-next-year/>; News Release, Verizon, *Verizon sets roadmap to 5G technology in U.S.; Field trials to start in 2016* (Sept. 8, 2015), <http://www.verizon.com/about/news/verizon-sets-roadmap-5g-technology-us-field-trials-start-2016>.

II. THE COMMISSION SHOULD MOVE AS QUICKLY AS POSSIBLE TO ESTABLISH A REGULATORY FRAMEWORK THAT ENABLES A WIDE VARIETY OF SERVICES

A. The Commission Should Grant Flexible Use Rights to Existing Licensees in the 28 GHz and 39 GHz Bands and Auction the Remaining Spectrum

The record overwhelmingly supports the Commission’s proposal to create a new, flexible use service in the 28 GHz and 39 GHz bands quickly to allow licensees to provide any form of fixed or mobile service within licensed geographic areas.¹¹ Commenters also broadly support reissuing licenses to existing licensees in the 28 GHz and 39 GHz bands.¹² The Commission should auction the remaining spectrum in the 28 GHz and 39 GHz bands using existing auction procedures.¹³ As the Consumer Technology Association notes, “Granting new licenses that provide new flexible rights to operate in a licensed geographic area and include the same spectrum, with authorization for both fixed and mobile operations, to current 28 GHz and 39 GHz licensees will enable the fastest transition to expanded use of the band.”¹⁴

¹¹ 4G Americas Comments at 3-4; AT&T Comments at 3; Cisco Comments at 5; CTA Comments at 10; CTIA Comments at 11-14; Ericsson Comments at 5-6; Huawei Comments at 11-12; ITI Comments at 4; Intel Comments at 3, 7-8; Nokia Comments at 4, 15-16; Qualcomm Comments at 6-12; Samsung Comments at 11-13; Skyriver Comments at 3; Straight Path Comments at 5, 14-16; TIA Comments at 6-7, 15; T-Mobile Comments at 9; Verizon Comments at 2-6; XO Communications at 17-18.

¹² 4G Americas Comments at 3-4; Cisco Comments at 5; CTA Comments at 10; CTIA Comments at 11; Huawei Comments at 11-12; ITI Comments at 4; Nokia Comments at 15; Qualcomm Comments at 10; Straight Path Comments at 14-16; TIA Comments at 15;

¹³ 4G Americas Comments at 3-4; Cisco Comments at 5; CTA Comments at 10; CTIA Comments at 14; Ericsson Comments at 5-6; ITI Comments at 4; Nokia Comments at 15-16; Qualcomm Comments at 12; Straight Path Comments at 14-16; TIA Comments at 15; Verizon Comments at 2; XO Comments at 18.

¹⁴ CTA Comments at 10.

The Commission should take all steps necessary to make the spectrum available for 5G applications as soon as possible. Mobile Future agrees with Chairman Wheeler and Commissioner Rosenworcel that the United States should not be deterred by the failure of WRC-15 to include the 28 GHz band in the list of bands under consideration for IMT at WRC-19.¹⁵ Instead, as the United States moves forward in the 28 GHz band, the rest of the world will likely see the benefits and may well follow suit. Additionally, the Commission should reject calls to make the 28 GHz and 39 GHz bands available for unlicensed or opportunistic use while licensees are readying their deployments. Potential licensees will need certainty that they will have access to the licensed spectrum as soon as possible without interference from unlicensed or opportunistic users during the critical phase of 5G development and deployment. Moreover, the substantial investment for 5G networks should not be jeopardized by the speculative benefits of spectrum “squatters.”

B. The Commission Should Combine the 37 and 39 GHz Bands Subject to the Same Rules

As the record shows, the 37 GHz and 39 GHz bands should be combined to form a single, uniform band that can be auctioned for licensed use.¹⁶ Licensing the 37 GHz band on an exclusive basis will provide the certainty necessary for investment in developing and deploying 5G technologies. Further, combining the 37 GHz and 39 GHz bands capitalizes on the rare

¹⁵ FCC, Statement of Tom Wheeler, Chairman, Presentation on the outcomes of the International Telecommunication Union’s World Radio Conference that took place in November 2015 (rel. Dec. 17, 2015); FCC, Statement of Jessica Rosenworcel, Commissioner, International Bureau Presentation on World Radiocommunication Conference 2015 (WRC-15) (rel. Dec. 17, 2015); *see also* Cisco Comments at 4.

¹⁶ AT&T Comments at 15; Ericsson Comments at 7-9; Nokia Comments at 2; Qualcomm Comments at 8; Samsung Comments at 13; Straight Path Comments at 5-6; TIA Comments at 30; T-Mobile Comments at 13; Verizon Comments at 6-9.

opportunity to create a wide, 3 GHz band comprised of uniform channels to support the expected benefits of 5G – high throughput, low latency and massive IoT.

Commenters resoundingly reject the hybrid proposal for the band that would automatically license by rule indoor operating rights to “premises occupants.”¹⁷ The hybrid proposal is untested and unreasonably complex, and the FCC should not forgo the opportunity to create a 3 GHz band of contiguous spectrum from 37 GHz to 40 GHz on an experiment that may not work or may not have sufficient real world demand.

C. The Commission Should Make the 64-66 GHz Band Available for Unlicensed Use and Should Make the 67-71 GHz Band Available for Licensed Use

Several commenters support making a significant amount of additional spectrum available for unlicensed use in the 60-70 GHz band.¹⁸ If the Commission indeed makes the 64-66 GHz band available for unlicensed use, a contiguous 9 GHz of spectrum from 57-66 GHz would then be available. Unlicensed spectrum has an important social and economic role to play in U.S. spectrum policy, and the Commission should commit an additional 2 GHz of spectrum for unlicensed use here and continue to look for new ways to make additional unlicensed spectrum available in other high spectrum bands.

The Commission should make the 67-71 GHz band available for licensed use, which would provide opportunities for licensed and unlicensed spectrum use consistent with the

¹⁷ 4G Americas Comments at 14; AT&T Comments at 16; CTA Comments at 10-11; CTIA Comments at 11, 15-17; Echostar Comments at 31-32; Ericsson Comments at 7-8; HTSC Comments at 6; ITI Comments at 5; Intel Comments at 13-14; NCTA Comments at 13-14; Nokia Comments at 1-4; PCIA Comments at 10-11; Qualcomm Comments at 6-10; Samsung Comments at 11-13; TIA Comments at 18; T-Mobile Comments at 12; Verizon Comments at 6-9.

¹⁸ CTIA Comments at 17-19; Ericsson Comments at 19; Nokia Comments at 17-18; T-Mobile Comments at 15; Verizon Comments at 13.

Commission's goals in the proceeding.¹⁹ Further, the 66-71 GHz band has been designated for further study based on the recommendations of WRC-15, and would thus create an opportunity for international harmonization.

D. The Commission Should Issue Geographic Area Licenses Based on Existing License Areas

Commenters strongly favor geographic area licenses based on existing license sizes for the 28 GHz and 39 GHz bands, and Economic Area (“EA”)-based geographic licenses in the 37 GHz band.²⁰ Geographic area licensing is well suited for licenses that will include both fixed and mobile services, and is consistent with Commission practice for flexible use licenses. To facilitate the most rapid path forward, the Commission should license the bands based on their existing license areas – Basic Trading Areas (“BTAs”) in the 28 GHz band and EAs in the 39 GHz band. The Commission should reject the proposal to issue county-sized licenses, which would be administratively burdensome both for the Commission and for licensees and would hamper the ability of licensees to aggregate spectrum across geographic areas.²¹

¹⁹ CTIA Comments at 17-19; Ericsson Comments at 19; Nokia Comments at 17-18; T-Mobile Comments at 15; Verizon Comments at 13.

²⁰ Cisco Comments at 11; CTA Comments at 11; Ericsson Comments at 9-10; Intel Comments at 8-9; Nokia Comments at 18-19; Qualcomm Comments at 7-9; Skyriver Comments at 7; Straight Path Comments at 18; TIA Comments at 22-23; Verizon Comments at 10-13; XO Comments at 20.

²¹ 4G Americas Comments at 5-9; AT&T Comments at 4, 17-19; CTA Comments at 11; Ericsson Comments at 9-10; Fixed Wireless Communications Coalition Comments at 4-5; ITI Comments at 4; Intel Comments at 8-9; Nokia Comments at 18-19; Qualcomm Comments at 7-9; Skyriver Comments at 7; Straight Path Comments at 18; TIA Comments at 22-23; Verizon Comments at 10-13; XO Comments at 20.

E. The Commission Should Adopt License Terms and Performance Requirements, If Any, That Encourage Investment

The record overwhelmingly supports the adoption of 10-year, renewable license terms for the 28 GHz, 37 GHz, and 39 GHz bands.²² Many existing licensees in the 28 GHz and 39 GHz bands are already subject to 10-year license terms and it makes sense to extend the same license terms to the new licenses as well. Ten-year license terms with renewal expectancies are also consistent with the license terms of other flexible use spectrum bands and will create the certainty and stability necessary to justify investing in mmW technologies in the band.

Commenters agree that if the Commission decides performance requirements are necessary in the mmW bands, the requirements must be flexible to facilitate a wide variety of use cases.²³ Because mmW technology is still developing and the bands create unique challenges for licensees, the Commission should not adopt rigid performance requirements that could prevent licensees from deploying innovative technologies in the bands. Commenters addressing the issue also widely oppose the “use-or-share” proposal.²⁴ The proposal would restrict licensees’ opportunities to explore different uses and technologies, could hinder 5G development, and should be rejected.

²² AT&T Comments at 4, 20; CTIA Comments at 22-23; Cisco Comments at 10; HTSC Comments at 4; Intel Comments at 23; Nokia Comments at 5, 19; PCIA Comments at 11; Qualcomm Comments at 11; TIA Comments at 25; Verizon Comments at 2-3, 10. XO Communications supports an even longer license term of 15-years or more. XO Comments at 22.

²³ 4G Americas Comments at 9-11; AT&T Comments at 22-23; Cisco Comments at 12-14; CTA Comments at 14; CTIA Comments at 23-26; Ericsson Comments at 10-11; Intel Comments at 20-22; Nokia Comments at 19-20; Qualcomm Comments at 12-13; TIA Comments at 25-27; T-Mobile Comments at 18; Verizon Comments at 18-22.

²⁴ AT&T Comments at 22-23; CTIA Comments at 26-28; Intel Comments at 20-22; Nokia Comments at 20; Qualcomm Comments at 14; Verizon Comments at 18-22; XO Comments at 29.

F. The Commission Should Apply Standard Competitive Bidding Procedures and Secondary Market Rules and Decline to Impose Spectrum Aggregation Limits

Commenters agree that the Commission should apply its standard competitive bidding procedures and secondary market rules for the 28 GHz, 37 GHz, and 39 GHz bands.²⁵ Applying the longstanding rules will provide certainty regarding the licensing process, will facilitate investment in the band and will speed the licenses to market. Applying the Commission's standard secondary market rules will provide ample opportunities for a range of parties to obtain the spectrum either at auction or on the secondary market, and will ensure the spectrum is put to its highest and best use. Commenters addressing the issue unanimously agree that spectrum aggregation limits are not appropriate in the mmW bands.²⁶ Adopting any such limits now would be arbitrary and could inhibit the development of 5G services in these bands.

III. CONCLUSION

Mobile Future fully supports the Commission's efforts to make spectrum above 24 GHz rapidly available for commercial mobile use and pave the way for our nation's evolution to 5G technology. The Commission must utilize proven regulatory tools to provide the certainty necessary to facilitate the investment necessary to develop and deploy 5G technologies. The Commission must also continue to make additional low- and mid-band spectrum available for mobile consumers, as such spectrum will also be critical to the success of 5G.

²⁵ Cisco Comments at 11; CTA Comments at 14; Ericsson Comments at 6; FiberTower Comments at 8; HTSC Comments at 4-5; Intel Comments at 25; Nokia Comments at 5, 24; Qualcomm Comments at 8; TIA Comments at 31; Verizon Comments at 13-14; XO Comments at 23.

²⁶ Ericsson Comments at 6; TIA Comments at 28; Verizon Comments at 14-15; XO Comments at 18-19.

Respectfully submitted,

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