

**Before the
Federal Communications Commission
Washington, DC 20554**

In the Matter of)	
)	
Use of Spectrum Bands Above 24 GHz for)	GN Docket No. 14–177
Mobile Radio Services)	
)	
Amendment to Parts 1, 22, 24, 27, 74, 80,)	WT Docket No. 10-112
90, 95, and 101 To Establish Uniform)	
License Renewal, Discontinuance of)	
Operation, and Geographic Partitioning and)	
Spectrum Disaggregation Rules and Policies)	
for Certain Wireless Radio Services)	

COMMENTS OF SAMSUNG ELECTRONICS AMERICA

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COMMENTS OF SAMSUNG ELECTRONICS AMERICA, INC.

Samsung Electronics America, Inc. (“Samsung”) submits these comments in response to the above-captioned *Third Further Notice*¹ and *Fourth Further Notice*.² Samsung applauds the commitment of the Federal Communications Commission (“Commission”) to accelerate the provision of fifth generation (“5G”) wireless services and devices operating in spectrum bands above 24 GHz. By making additional millimeter wave (“mmWave”) spectrum available under a flexible regulatory framework, the Commission’s proposals will help to expedite the transition to 5G and encourage continued innovation in technologies that utilize mmWave spectrum.

¹ *Use of Spectrum Bands Above 24 GHz For Mobile Radio Services*, Third Report and Order, Memorandum Opinion and Order, and Third Further Notice of Proposed Rulemaking, FCC 18-73 (rel. June 8, 2018) (“*Third Further Notice*”).

² *Use of Spectrum Bands Above 24 GHz For Mobile Radio Services*, Fourth Further Notice of Proposed Rulemaking, FCC 18-110 (rel. Aug. 3, 2018) (“*Fourth Further Notice*”).

I. INTRODUCTION AND SUMMARY

5G technologies will revolutionize wireless services and connected devices. With blazing speed, ultra-low latency, and massive connectivity, these technologies will enable a world of connected devices, working seamlessly together for consumers to make life more manageable, safer, and a whole lot more fun. Drawing on its long legacy of innovation, Samsung is leading the way to develop these transformative 5G solutions.

Samsung, which recently celebrated its 40th anniversary in America, has a proven track record of delivering consumers bold and innovative products.³ During the last four decades, Samsung's relentless customer-centered approach has led to a string of industry "firsts" and has empowered American consumers to do what was previously thought impossible. Samsung introduced Americans to the digital TV, MP3-capable mobile phone, Blu-Ray DVD player, Smart Curved UHD TV, and countless other groundbreaking products.

Samsung is leveraging this experience – and its deep relationships with industry and research partners – to accelerate the transition to 5G. For the better part of the last decade, Samsung has been on the leading edge of research and development of 5G technologies.⁴ As an early proponent of 5G mmWave technologies, Samsung presented one of the first briefings on the use of mobile broadband technology on mmWave spectrum to the Commission's Technological Advisory Committee,⁵ provided substantial funding for early research of 5G

³ See Tim Baxter, *Celebrating Forty Years in America*, Samsung Newsroom (Aug. 6, 2018), <https://news.samsung.com/us/celebrating-forty-years-america/>.

⁴ See, e.g., Comments of Samsung Electronics America, Inc. and Samsung Research America, GN Docket No. 14-177 & RM-11664, at 9 (Jan. 15, 2015).

⁵ See FCC, Technical Advisory Council, Spectrum Frontiers Working Group, at 7 (June 13, 2013), <https://transition.fcc.gov/bureaus/oet/tac/tacdocs/meeting61313/TAC-meeting-summary-6-13-13.pdf> (noting that Samsung briefed the Technological Advisory Committee's Spectrum Frontier Working Group on mobile broadband technology at 30 GHz in May 2013).

mmWave technologies,⁶ and has partnered with companies throughout the world to test and trial 5G technologies.⁷ Samsung's leadership role in this technological revolution is further reflected in the company's numerous contributions to accelerate the global standardization of 5G.⁸

Today, Samsung's vision of 5G is fast becoming a reality. Samsung received the first ever regulatory approval for 5G mmWave equipment earlier this year when the Commission authorized Samsung's 5G Commercial Radio Access Network products.⁹ Later this year, these Samsung products will be deployed by Verizon in Sacramento, California in the first commercial offering of 5G service in the United States.¹⁰ AT&T is also using Samsung 5G products, both in the carrier's 5G-ready Citizens Broadband Radio Service network and its nationwide 5G network.¹¹ Moreover, just last month, Samsung unveiled the world's first 5G modem.¹²

⁶ See *Use of Spectrum Bands Above 24 GHz For Mobile Radio Services*, Notice of Inquiry, 29 FCC Rcd 13020, 13025 ¶ 12 (2014) (noting that Samsung was one of a handful of companies who provided "substantial funding to academic centers investigating millimeter-wave wireless mobile.") (citation omitted).

⁷ See, e.g., *id.* at 13024 ¶ 11 (noting some of the early trials Samsung conducted using mmWave spectrum); News Release, Samsung, *Samsung Brings Network Innovation to AT&T's New Fixed 5G Trials* (Aug. 30, 2017), <https://news.samsung.com/us/samsung-brings-network-innovation-atts-new-fixed-5g-trials-%e2%80%a8/>.

⁸ See, e.g., Samsung representatives currently holds five chair or vice chair positions within the 3rd Generation Partnership Program ("3GPP"), and Samsung holds more essential 5G standard patents declared to the European Telecommunications Standardization Organization than any other 3GPP member company. See News Release, Samsung, *Samsung Electronics Holds the Final Conference in Korea Completing 5G Standards for Commercialization* (May 21, 2018), <https://news.samsung.com/global/samsung-electronics-holds-the-final-conference-in-korea-completing-5g-standards-for-commercialization>.

⁹ See News Release, Samsung, *Samsung Unveils the World's First 5G FWA Commercial Solutions at MWC 2018* (Feb. 26, 2018), <https://news.samsung.com/global/samsung-unveils-the-worlds-first-5g-fwa-commercial-solutions-at-mwc-2018>.

¹⁰ See News Release, Samsung, *Verizon Selects Samsung for 5G Commercial Launch* (Jan. 3, 2018), <https://news.samsung.com/us/verizon-5g-commercial-launch/>. And next year, Verizon will use Samsung's 5G FWA products for its commercial offering in Houston.

¹¹ See News Release, AT&T, *AT&T Makes World's First Standards-Based Mobile 5G Millimeter Wave Connection* (Sept. 10, 2018), https://about.att.com/story/2018/5g_cities_2018_2019.html; News Release, (continued)

Looking ahead, Samsung is uniquely positioned to continue to lead the transition to 5G. Samsung makes all of the parts integral to 5G – chips, network equipment, and devices – all with industry-leading security. And no other company in the world can provide this end-to-end ecosystem of 5G solutions over a trusted global supply chain.

It is with this perspective that Samsung respectfully responds to the *Third Further Notice* and the *Fourth Further Notice*. To continue ongoing innovation and investment in 5G mmWave technologies and to expedite the deployment of 5G services, Samsung urges the Commission to:

- Authorize fixed and mobile service operations in the 25.25-27.5 GHz (“26 GHz”), 42-42.5 GHz (“42 GHz”), and 50.4-51.4 GHz (“50 GHz”) bands under the Part 30 Upper Microwave Flexible Use (“UMFUS”) rules;
- Complete its examination of the 38.6-40 GHz (“39 GHz”) band and move forward on an expedited basis to expand the use of the 37-40 GHz band; and
- Employ a flexible licensing framework that promotes 5G in the 37.6-38.6 GHz (“37 GHz”), 39 GHz, and 47.2-48.2 (“47 GHz”) bands as well as any future UMFUS bands.

These actions will help facilitate investment and innovation in 5G mmWave technologies and will expedite the deployment of 5G services and devices to American consumers.

II. THE COMMISSION SHOULD CONTINUE TO PRIORITIZE 5G BY AUTHORIZING FIXED AND MOBILE SERVICE OPERATIONS IN THE 26 GHz, 42 GHz, AND 50 GHz BANDS UNDER THE PART 30 UMFUS RULES

Samsung applauds the Commission’s continued efforts to identify additional mmWave spectrum for 5G services.¹³ In particular, the Commission should expand the Part 30 UMFUS

(footnote continued)

AT&T, *AT&T to Begin Testing 5G-Ready CBRS Equipment* (Sept. 10), https://about.att.com/story/2018/5g_cbrs_equipment.html.

¹² See News Release, Samsung, *Samsung Announces Exynos Modem 5100, Industry’s First 5G Modem Fully Compliant with 3GPP Standards* (Aug. 15, 2018), <https://news.samsung.com/global/samsung-announces-exynos-modem-5100-industrys-first-5g-modem-fully-compliant-with-3gpp-standards>.

¹³ *Third Further Notice* ¶¶ 47-96.

rules to the 26 GHz band in light of the anticipated benefits of 5G deployment in this band.

Samsung also supports applying the Part 30 UMFUS rules to the 42 GHz and 50 GHz bands.

A. Applying the Part 30 UMFUS Rules to the 26 GHz Band Presents a Number of Benefits and Can Be Accomplished While Both Protecting Incumbents and Supporting Robust Deployment of 5G Services by UMFUS Licensees

Samsung strongly supports the expansion of the Part 30 UMFUS rules to the 26 GHz band.¹⁴ The global momentum towards deploying 5G services in the 26 GHz band, and the adjacency of the 26 GHz band to other bands that already have been authorized for mobile services, makes the 26 GHz band one of the most promising near-term homes for 5G services. Moreover, Samsung believes that incumbent users can be protected with compatibility safeguards that will result in a minimal impact on UMFUS licensees.

As acknowledged in the *Third Further Notice*, the 26 GHz band presents a number of opportunities for 5G. First, the 26 GHz band likely can be globally harmonized with other regions of the world. As the Commission notes, “in regional and international forums leading to the World Radiocommunication Conference 2019 ..., the frequency range from 24.25-27.5 GHz has emerged as the leading candidate for 5G services.”¹⁵ For example, the European Conference of Postal and Telecommunications Administrations identified the 26 GHz band for early European harmonization,¹⁶ and the United Kingdom,¹⁷ France,¹⁸ Germany,¹⁹ and Italy,²⁰ among

¹⁴ See Comments of Samsung Electronics America, Inc. and Samsung Research America, GN Docket No. 14-177 et al. (Jan. 26, 2016) (“Samsung Jan. 2016 Comments”).

¹⁵ *Third Further Notice* ¶ 76.

¹⁶ See European Conference of Postal and Telecommunications Administrations, Spectrum for Wireless Broadband for 5G, CEPT, <https://www.cept.org/ecc/topics/spectrum-for-wireless-broadband-5g> (last visited Sep. 3, 2018).

¹⁷ See Ofcom, Update on 5G spectrum in the UK, at 15 (Feb. 8, 2017), https://www.ofcom.org.uk/__data/assets/pdf_file/0021/97023/5G-update-08022017.pdf.

other European nations, are exploring or planning to use the 26 GHz band for 5G. Asia is also actively planning to use the 26 GHz band for 5G. For example, Hong Kong is in the process of determining how to allocate 4100 MHz of spectrum in the 26 GHz and 28 GHz bands for the provision of 5G services,²¹ and Chinese network operators are conducting tests in the 26 GHz band.²² Other countries around the globe, including Australia and India, also have expressed support for using the 26 GHz band for 5G.²³

The Commission frequently has highlighted international harmonization of spectrum as a key policy goal and should seize this opportunity in the 26 GHz band.²⁴ Harmonization will facilitate roaming, create economies of scale that lower device costs for consumers and network operators, speed deployment, and reduce the potential for interference near international borders. All of these actions will benefit consumers.

(footnote continued)

¹⁸ See David Abecassis, Chris Nickerson, and Janette Stewart, *Global Race to 5G – Spectrum and Infrastructure Plans and Priorities*, at 20, ANALYSYS MASON (Apr. 2018), https://api.ctia.org/wp-content/uploads/2018/04/AnalysysMason-Global-Race-To-5G_2018.pdf.

¹⁹ *Id.* at 38.

²⁰ *Id.* at 18.

²¹ Office of the Communications Authority, Proposed Allocation of the 26 GHz and 28 GHz Bands to Mobile Service and the Associated Arrangements for Spectrum Assignment and Spectrum Utilisation Fee, Consultation Paper (July 26, 2018), <https://www.gov.hk/en/residents/government/publication/-consultation/docs/2018/Spectrum26.pdf>.

²² Global mobile Suppliers Association, Spectrum for 5G: Plans, Licences and Trials, at 3, 6 (Jan. 2018), <https://www.sata-sec.net/downloads/GSA/180110-GSA-5G-Spectrum-Report-January-2018.pdf>.

²³ See Ministers for Communications and the Arts, Remarks by Senator the Hon. Mitch Fifield, <https://www.minister.communications.gov.au/minister/mitch-fifield/speeches/commsday-unwired-revolution-2018> (last visited Sept. 3, 2018); see also Muntazir Abbas, *India to seek 26 GHz spectrum band for 5G rollout* (Apr. 5, 2018), <https://telecom.economictimes.indiatimes.com/news/india-to-seek-26-ghz-spectrum-band-for-5g-rollout/63628094>.

²⁴ See, e.g., *Amendment of the Commission's Rules with Regard to Commercial Operations in the 1695-1710 MHz, 1755-1780 MHz, and 2155-2180 MHz Bands*, Report and Order, 29 FCC Rcd 4610, 4630-31 ¶ 42 (2014).

In addition, the adjacency of the 26 GHz band to bands that are already authorized for 5G presents an opportunity to speed deployment at reduced costs. The 26 GHz band is being integrated into a tuning range that includes frequencies immediately above and below the 26 GHz band. Specifically, both 3GPP standards²⁵ and radio development have matured in a manner that includes the 26 GHz band frequencies with bands above and below.²⁶ This integration offers device manufacturers opportunities to capture economies of scale and accelerate the equipment ecosystem in these bands. These opportunities will stimulate 5G deployment, giving network operators and consumers more choice at lower prices.

To realize the benefits of mobile services in the 26 GHz band, the Commission must both protect incumbent operations in the 26 GHz band and allow for intensive terrestrial mobile use.²⁷ The Commission can accomplish this by taking a number of discrete actions.

First, the Commission should utilize coordination zones to facilitate sharing with incumbent non-Federal Earth exploration-satellite service (“EESS”) operations and non-Federal Space Research service (“SRS”) stations. Coordination zones can offer incumbent EESS and SRS users the certainty of a defined coordination process to ensure the continuity of their existing operations while providing new entrants the opportunity to efficiently deploy services throughout their service area. Additionally, to promote the efficient utilization of spectrum resources, new earth stations should be constructed in remote areas to the greatest extent practicable. Such an approach will promote efficient use of the spectrum and minimize the need

²⁵ See 3GPP, Specification 38.101, <https://portal.3gpp.org/desktopmodules/Specifications/Specification-Details.aspx?specificationId=3201> (last visited Sept. 3, 2018).

²⁶ See Niviuk, NR frequency band, Band Class N258, http://niviuk.free.fr/nr_band.php (last visited Sept. 3, 2018).

²⁷ *Third Further Notice* ¶ 79.

for coordination zones. Further, the Commission should identify the location of incumbent operations to promote further analysis of how to minimize the impact incumbent operations would have on mobile services.²⁸

Second, sharing between (1) Federal fixed and mobile operations and (2) non-Federal systems should be enabled via coordination between the licensee and the Federal government operators. Samsung supports the Commission's commitment to work with NTIA to allow use of the 26 GHz band by UMFUS users while preserving the ability of Federal users to develop and deploy new technologies.²⁹ Samsung thus urges the Commission and NTIA to develop such a framework that would enable such shared operations.

Finally, the Commission should reject Elefante's proposal to permit the deployment of stratospheric-based communications in the 26 GHz band.³⁰ As Elefante acknowledges, the coordination and/or sharing between UMFUS and stratospheric systems will be technically difficult due the large geographic area that would be covered by a stratospheric station.³¹ The 26 GHz band is a critical band for the deployment of 5G services, and Elefante's proposal should not be permitted to prohibit or "impede the progress" toward making 5G service available in this band.³² Samsung thus urges the Commission to reject Elefante's petition.

²⁸ The Commission also might explore whether the 26 GHz band is a candidate for utilizing market mechanisms to relocate incumbent EESS and SRS users.

²⁹ *Third Further Notice* ¶ 84.

³⁰ *Id.* ¶ 85.

³¹ See Petition of Elefante Group, Inc., GN Docket No. 14-177 et al. (May 31, 2018).

³² Opposition of CTIA, RM-11809, at 5 (July 11, 2018). Furthermore, as T-Mobile has observed, "[t]he need and demand for stratospheric communications is speculative, compared to the demonstrated requirement for additional millimeter wave spectrum to support 5G operations." See Reply Comments of T-Mobile USA, Inc., GN Docket No. 14-177 et al., at 13-14 (Feb. 22, 2018).

B. The Commission Should Authorize Fixed and Mobile Service Operations in the 42 GHz and 50 GHz Bands under the Part 30 UMFUS Rules

Samsung urges the Commission to authorize fixed and mobile service operations in the 42 GHz and 50 GHz bands under the Part 30 UMFUS rules.³³ To ensure the continued innovation and deployment of 5G technologies, the Commission must continue to identify new mmWave spectrum to refuel the spectrum pipeline. According to GSMA projections, the United States will have 100 million 5G connections by 2023 and 190 million 5G connections by 2025.³⁴ As the number of 5G connections continue to grow, the Commission must continue to identify additional mmWave spectrum for commercial use to support this demand. Samsung therefore urges the Commission to finalize rules for these bands and to announce an anticipated schedule for their availability. Providing this information in the near term will allow manufacturers and carriers to design equipment and networks that will utilize these additional spectrum bands.

III. THE COMMISSION SHOULD COMPLETE ITS EXAMINATION OF THE 39 GHz BAND AND MOVE FORWARD ON AN EXPEDITED BASIS TO EXPAND USE OF THE 37-40 GHz BAND FOR 5G SERVICES

Samsung supports the expanded use of the 37-40 GHz band for 5G. The Commission can accelerate expanded use by expeditiously completing its examination of the 39 GHz band.³⁵ As Samsung previously has noted, the 39 GHz band is one of the most promising near-term homes for 5G services.³⁶ While 5G equipment for the entire 37-40 GHz band is in development, specifications cannot be finalized until there are clear, final rules for this entire band, including

³³ *Third Further Notice* ¶ 47, ¶ 92.

³⁴ See Jeremy Horwitz, *GSMA: U.S. will 'pioneer' 5G, boast 190 million connections by 2025*, VentureBeat (Mar. 26, 2018), <https://venturebeat.com/2018/03/26/gsma-u-s-will-pioneer-5g-boast-190-million-connections-by-2025/>.

³⁵ *Fourth Further Notice* ¶ 1.

³⁶ See Samsung Jan. 2016 Comments at 12-13.

the 39 GHz band. The Commission thus can help industry solidify plans for development and deployment of 5G equipment and services in the 37-40 GHz band by adopting final rules for the 39 GHz band.

IV. SAMSUNG SUPPORTS A FLEXIBLE LICENSING FRAMEWORK THAT PROMOTES 5G IN THE 37 GHz, 39 GHz, AND 47 GHz BANDS AS WELL AS ANY FUTURE UMFUS BANDS

As the Commission examines how best to promote the use of mmWave spectrum for 5G and other advanced services,³⁷ Samsung urges the Commission to employ band plans that reflect global standards and utilize flexible use licensing policies. With respect to band plans, the Commission should make 100 MHz channels the basic building blocks in the 37 GHz, 39 GHz, 47 GHz bands, and in any mmWave bands licensed under the Part 30 UMFUS rules in the future.³⁸ As the Commission notes, a licensing framework that relies on 100 MHz channels will enable device manufacturers and network operators to utilize recently adopted 3GPP 5G specifications, which establish 100 MHz channel sizes.³⁹ Not only will these channel sizes facilitate the global standardization of 5G devices and equipment, they will also help facilitate the repacking process in the 39 GHz band into 14 equally-sized channel blocks. In addition, to support future innovations in 5G technology, the Commission's policies should afford carriers the opportunity to aggregate multiple contiguous channels of mmWave spectrum. Such policies will allow the development of innovative devices that utilize larger channel sizes.

³⁷ See *Third Further Notice* ¶ 1.

³⁸ *Fourth Further Notice* ¶¶ 9-13. Using 100 MHz as the building block allows the 3GPP TS 38-101-2 specification of 50 MHz and 100 MHz channel bandwidths.

³⁹ See 3GPP, Release 15: 3GPP TS 38.101-2 V15.1.0, Section 5.3.5 (Mar. 2018), http://www.3gpp.org/ftp/Specs/archive/38_series/38.101-2/38101-2-f10.zip.

With respect to flexible use licensing policies, Samsung reiterates the importance of using geographic-based licensing in the UMFUS bands.⁴⁰ Geographic area licensing provides users of UMFUS bands with flexible, exclusive use licenses that encourage private sector investment and innovation in mobile services and devices. Moreover, the propagation characteristics of mmWave spectrum, including in the 26 GHz band, will help to minimize the complexity of co-existence between Federal and non-Federal users.⁴¹ While some commenters have proposed using forms of site-based licensing to protect incumbent users, a site-based licensing structure would harken back to earlier restrictive licensing regimes that neither promote flexibility nor intensive spectrum use, particularly by mobile applications.⁴² Therefore, any type of site-based licensing should be soundly rejected in favor of a geographic-based licensing framework that will encourage the development and deployment of mobile services for 5G.

⁴⁰ See *Third Further Notice* ¶ 89 (seeking comment on site-based licensing for the 26 GHz band).

⁴¹ See, e.g., *Use of Spectrum Bands Above 24 GHz For Mobile Services*, Report and Order and Further Notice of Proposed Rulemaking, 31 FCC Rcd 8014, 8020 ¶ 6 (discussing how the propagation characteristics of mmWave spectrum helps to limit interference).

⁴² See e.g., Letter from Virginia Lam Abrams, Starry, Inc., to Marlene H. Dortch, Secretary, FCC, GN Docket No. 14-177 (July 12, 2017).

V. CONCLUSION

Leveraging its rich history of innovation, Samsung is helping to make 5G a reality through the development of end-to-end 5G solutions. To facilitate the ongoing investment and innovation in 5G technologies and devices using mmWave spectrum, the Commission should continue to make additional mmWave spectrum available under the flexible, UMFUS regulatory framework.

Respectfully submitted,

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