

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

In the Matter of)	
)	
Use of Spectrum Bands Above 24 GHz for Mobile Radio Services)	GN Docket No. 14-177
)	
Establishing a More Flexible Framework to Facilitate Satellite Operations in the 27.5-28.35 GHz and 37.5-40 GHz Bands)	IB Docket No. 15-256
)	
Petition for Rulemaking of the Fixed Wireless Communications Coalition to Create Service Rules for the 42-43.5 GHz Band)	RM-11664
)	
Amendment of Parts 1, 22, 24, 27, 74, 80, 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)	WT Docket No. 10-112
)	
Allocation and Designation of Spectrum for 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)	IB Docket No. 97-95
)	

**COMMENTS OF SAMSUNG ELECTRONICS AMERICA, INC. AND SAMSUNG
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**COMMENTS OF SAMSUNG ELECTRONICS AMERICA, INC. AND SAMSUNG
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I. INTRODUCTION AND SUMMARY

Samsung applauds the Commission’s commitment to accelerating the provision of Fifth-
Generation (5G) mobile services in spectrum bands above 24 GHz.¹ 5G holds tremendous

¹ Use of Spectrum Bands Above 24 GHz for Mobile Radio Services, *Report & Order & Further Notice of Proposed Rulemaking*, FCC 16-89 (“*Report & Order*” or “*FNPRM*”). For

potential to support groundbreaking applications, enable the “Internet of Things” (“IoT”), and profoundly improve how mobile services enrich daily life. In the *Further Notice of Proposed Rulemaking*, the Commission seeks to build on the success of the *Report and Order* by proposing additional ways to facilitate access to spectrum, maximize flexibility, and encourage wireless innovation in certain millimeter wave (“mmW”) bands above 24 GHz.

As a leading innovator in 5G technology, Samsung offers several recommendations for the Commission’s consideration. First, the Commission should continue to make additional spectrum – particularly spectrum near the existing 28 GHz and 37-40 GHz allocations – available for mobile use. Second, when adopting service and technical rules for any additional spectrum bands, the Commission should promote flexibility and not overburden users with onerous and unnecessary requirements. Similarly, the Commission should tailor any performance requirements for the additional bands to reflect the characteristics and likely use of the spectrum for IoT applications. Third, the Commission should refine its interoperability requirements to make clear that the development of equipment for the 37-40 GHz band should not be delayed while the sharing framework in adjacent bands is finalized. Finally, the Commission should not extend sharing requirements from the lower band segment of the 37 GHz band into the upper band segment. Instead, the Commission should provide for exclusive use licenses, as doing so will encourage investment, provide certainty to users of the band, and foster deployment of 5G services.

purposes of these comments, “Samsung” refers to Samsung Electronics America, Inc. and Samsung Research America, collectively.

II. THE COMMISSION SHOULD CONTINUE ITS EFFORTS TO MAKE DEPLOYMENT OF THE 5G ECOSYSTEM A PRIORITY BY ADOPTING SERVICE RULES IN ADDITIONAL BANDS.

The Commission proposes to adopt service rules allowing flexible fixed and mobile uses in several additional bands: 24.25-24.45 GHz and 24.75-25.25 GHz (“24 GHz band”), 31.8-33.4 GHz (“32 GHz band”), 42-42.5 GHz (“42 GHz band”), 47.2-50.2 GHz (“47 GHz band”), 50.4-52.6 GHz (“50 GHz band”), 71-76 GHz, and 81-86 GHz (“70/80 GHz bands”).² Samsung applauds the Commission’s efforts to unleash additional mmW spectrum for 5G networks and services, which will revolutionize consumers’ mobile experience. Looking forward, the Commission should also ensure that the United States’ spectrum efforts align with related efforts around the globe. The *FNPRM* will build upon the progress already initiated in the *Report & Order* to cement the United States’ role as a leader in advanced wireless communications services.

Additional spectrum will help spur deployment of innovative 5G services, significantly improving the mobile experience for consumers. 5G services will offer many benefits: (1) unprecedented data rates, (2) lower latency, (3) spectrum and energy efficiency, and (4) unprecedented mobility for consumers.³ 5G will be a critical input for next-generation applications, such as virtual reality viewing of live events, which will need to leverage high bandwidth mobile services and require significant data rates. To achieve this vision, mobile service providers will need more spectrum to enable the seamless evolution from LTE to 5G.

The migration to 5G is a global effort. Both in the United States and internationally, several researchers and companies have embarked on efforts to develop technological solutions

² *FNPRM* ¶ 373.

³ Comments of Samsung, GN Docket No. 14-177 at 4-7 (filed Jan. 26, 2016) (“January 2016 Samsung Comments”).

to enable 5G.⁴ Given the progress made by the industry thus far, it is essential that U.S. regulators keep pace with the development of technology. For 5G services to go live in the next couple of years, stakeholders—including the Commission—must maintain focus on the development of 5G technologies, services, standards, and regulations. The United States must strive to continue its leadership in identifying and allocating additional spectrum for next generation mobile services.

While Samsung fully supports the Commission’s efforts to identify and allocate more spectrum for 5G, it is vitally important to ensure that the U.S. efforts are aligned internationally. The Commission already identified international harmonization as one of its four main criteria for evaluating the suitability of mmW bands for mobile use, noting that “substantial international harmonization would help promote development of mmW mobile service by reducing development and equipment costs and promoting a unified world market.”⁵ International harmonization will enable licensees and their vendors to rapidly deploy innovative new services while still ensuring sufficient economies of scale and scope.

To facilitate the deployment of 5G services, spectrum near the 28 GHz and 37-40 GHz bands already allocated within the mmW range will be particularly useful. The spectrum in the 24 GHz, 32 GHz, and 42 GHz bands proposed in the *FNPRM* are in fairly close proximity to the 27.5-28.35 GHz (“28 GHz band”), 37-38.6 GHz (“37 GHz band”), and 38.6-40 GHz (“39 GHz band”) bands already identified and allocated by the Commission for future mobile broadband services.⁶ Samsung believes that this proximity will accelerate technology development. It will

⁴ January 2016 Samsung Comments 7-9.

⁵ Use of Spectrum Bands Above 24 GHz for Mobile Radio Services, *Notice of Proposed Rulemaking*, 30 FCC Rcd 11878 ¶ 21 (2015).

⁶ *Report & Order* ¶ 4.

also minimize the number of bands user equipment will need to support—which is key due to global activity around identification of bands at the 2019 ITU World Radio Conference.

Samsung does not object to other bands also being allocated by the Commission.

It is imperative that the Commission continue moving forward to make spectrum available to unleash the limitless potential of 5G services. Wireless licensees will require access to significant amounts of mmW spectrum to meet the growing demand for high speed, low latency mobile broadband services.

III. ANY SERVICE AND TECHNICAL RULES ADOPTED IN THE ADDITIONAL BANDS MUST PROMOTE FLEXIBLE AND EFFICIENT SPECTRUM USE.

The Commission seeks comment on the appropriate service rules to allow flexible fixed and mobile use in the additional bands.⁷ Generally speaking, the Commission should ensure that licensing, service, and technical rules in these bands mesh with those adopted in the 28 GHz, 37 GHz, and 39 GHz bands. These rules must be carefully calibrated to promote the proliferation of 5G technologies: enabling flexible spectrum use while also providing an interference-free environment.

The additional mmW bands should be licensed under consistent rules as those adopted for the 28, 37, and 39 GHz bands. A consistent licensing approach will enable the robust deployment of 5G services. First, the spectrum block size for additional spectrum bands should generally be 200 MHz, with some exceptions in constrained spectrum blocks. The Commission already determined that the license block size for spectrum in the 37 GHz and 39 GHz bands would be 200 MHz.⁸ Adopting a consistent spectrum block size in the additional bands, where feasible, will foster robust deployment of 5G services. In bands with less available spectrum

⁷ *FNPRM* ¶ 369.

⁸ *Report & Order* ¶¶ 95, 111.

(smaller overall blocks), 100 MHz frequency blocks could also be an acceptable outcome.

Second, geographic area licensing should be the preferred licensing approach. Geographic area licensing will provide users of the bands with flexible, exclusive use licenses. Third, Samsung supports the use of Partial Economic Areas (“PEAs”) for the licensing area—which is consistent with the license areas for the 39 GHz band and the upper band segment in the 37 GHz band spectrum.⁹ Maintaining consistency of the key characteristics among the already authorized mmW bands and the additional bands will enable the most effective use of the spectrum.

Consistency will also be key with respect to the technical rules for the additional bands. Samsung supports adoption of the conducted out of band emission (“OOBE”) limit of $43+10\log(P)$ per MHz (or an absolute power of -13 dBm/MHz) for the additional mmW spectrum bands. The Commission imposed the same OOBE limits for the 27, 37, and 39 GHz bands.¹⁰ Samsung also supports the Commission’s proposal to adopt antenna height and power limits similar to those in the Commission’s Part 27 rules.¹¹ This proposal would be consistent with how other wireless technology services are regulated, with base station transmit power reduced for antenna heights above 305 meters. In addition, the Commission should extend the power limits adopted for the 28, 37, and 39 GHz bands—55 dBm/100 MHz for transportable stations and 43 dBm/100 MHz for mobile stations—to the additional bands proposed in the *FNPRM*.¹² Finally, the Commission has asked if it should consider a bandwidth scaling factor for mobile and transportable stations that are operating with bandwidths less than 100 megahertz

⁹ *Report & Order* ¶¶ 82, 116.

¹⁰ *Report & Order* ¶ 304.

¹¹ *FNPRM* ¶ 506.

¹² *Report & Order* ¶¶ 283, 286.

as was adopted for base stations.¹³ Samsung supports applying a similar scaling factor for mobile and transportable stations, utilizing the same bandwidth scaling limits that were adopted by base stations.¹⁴

The Commission also seeks comment on whether it should require a digital identification for the mmW band systems under consideration in this proceeding.¹⁵ A digital ID requirement is unnecessary and should not be required. Other similarly situated services (including cellular, PCS, and AWS) are not subject to a digital ID requirement, indicating there is no need to establish such a requirement for mmW licensees. Additionally, the Commission removed any station identification requirements from its rules for cellular services and future CMRS licensing in 1994, finding that such station identification requirements were unnecessary because exclusive use licensees are readily identifiable in the Commission's licensing database.¹⁶ In the intervening 22 years, there has been no need for station identification and the Commission's licensing database records have been improved steadily, allowing for ready identification of exclusive use licensees in a market.

IV. THE COMMISSION SHOULD CLARIFY ITS REQUIREMENTS ON OPERABILITY IN THE 37-40 GHZ BAND.

In light of the uncertain date of resolution of the final rules for the 37-37.6 GHz Lower Band Segment sharing framework announced in the *Report & Order*,¹⁷ the Commission should consider the impact of its requirement that any mobile or transportable device designed to

¹³ *Report & Order* ¶ 508.

¹⁴ *See* 47 C.F.R. §30.202(a). *See also Report & Order* ¶ 277.

¹⁵ *FNPRM* ¶ 503.

¹⁶ Implementation of Sections 3(n) and 332 of the Communications Act, Regulatory Treatment of Mobile Services, *Third Report and Order*, 9 FCC Rcd 7988 ¶ 216 (1994).

¹⁷ *Report & Order* ¶ 111.

operate in the 37 GHz and 39 GHz bands be capable of operating at all frequencies within those bands (37 GHz-40 GHz).¹⁸ The Commission should clarify that equipment developed for the rest of the 37-40 GHz band in advance of the final rules on the sharing requirements in the Lower Band Segment (and any other sharing requirements ultimately imposed) should not be held up while those sharing requirements are developed and finalized. Specifically, the operability requirement should be clarified to explicitly state that any mobile or transportable device will meet the 37-40 GHz operability requirement if it is tunable across the 37-40 GHz range on each air interface it uses to operate in the 37-40 GHz range.

This clarification to the requirement meets the spirit of “operating across the entirety of [37-40 GHz],”¹⁹ but does not delay the deployment of equipment outside the shared bands while awaiting certainty on the impact of the sharing requirements on operability. In addition, the Commission should clarify that mobile and transportable devices will not be prevented from receiving Commission equipment approval if rules are adopted for such devices specific to operations in the 37-37.6 GHz band. Ultimately, this means that any technical rules for sharing in the 37-37.6 GHz band will have to be implemented at the base station level and not the device level. Samsung and its wireless provider customers are moving rapidly towards deploying new technology in the 37.6-40 GHz band based on the new Commission rules for this spectrum. In the interim, it appears that the full technical rules for the 37-37.6 GHz shared spectrum band are still uncertain. This issue should not foreclose vendors from receiving equipment authorization for the spectrum with finalized rules (37.6-40 GHz) while awaiting a determination from the Commission on the 37-37.6 GHz band. These clarifications will ensure that development of equipment can proceed without delay.

¹⁸ *Report & Order* ¶ 322.

¹⁹ *Report & Order* ¶ 323.

V. SHARING SHOULD BE LIMITED SOLELY TO THE 37-37.6 GHZ BAND.

The Commission seeks comment on adopting methods for shared (Federal and non-Federal) access of the Upper Band Segment in the 37 GHz band, 37.6-38.6 GHz.²⁰ The Commission should not extend sharing requirements from the 37 GHz Lower Band Segment into the Upper Band Segment. The Commission has already limited the amount of mmW spectrum available for exclusive, licensed use by permitting sharing of the Lower Band Segment instead of allowing for a unified licensing framework for the entire 37-40 GHz band. Samsung does not believe the sharing framework should be extended.

Moreover, mandating sharing in the Upper Band is unnecessary. Other options already exist to accommodate entities who want to share. The Commission has established coordination zones around three Space Research Service sites and 14 military sites that apply across the entire 37 GHz band.²¹ Federal government users should be able to enter into traditional coordination agreements with the UMFUS license holder if they desire to provide services in the 37.6-38.6 GHz band. Rather than require sharing, Samsung recommends that the Commission enable a dedicated 37.6-40 GHz spectrum band for exclusive, licensed use that will permit parties to invest and deploy new 5G services with the certainty needed.

VI. CONCLUSION

Samsung appreciates the opportunity to provide input on the Commission's proposal to permit mobile use of additional mmW bands. Samsung is enthusiastic about the tremendous potential of 5G networks and services and urges the Commission to continue to take a leading role in bringing these services to market. By tailoring its regulatory approach to facilitate

²⁰ *FNPRM* ¶ 447.

²¹ *Report & Order* ¶ 116.

flexible and efficient use of the spectrum, the Commission will foster a smooth and successful transition to the next generation of wireless services.

Respectfully Submitted,

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