

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 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)	

COMMENTS OF ERICSSON

Mark Racek
SR. DIRECTOR, SPECTRUM POLICY
ERICSSON
1776 I Street, NW
Suite 240
Washington, DC 20006
Telephone: (202) 824-0110

September 10, 2018

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Ericsson submits these comments in response to the Commission’s Third Further Notice of Proposed Rulemaking (“*Third FNPRM*”) in the above-captioned proceeding, in which the Commission seeks comment on making additional bands of millimeter wave (“mmW”) spectrum available for 5G, Internet of Things, and other advanced spectrum services.¹

I. INTRODUCTION AND SUMMARY.

Ericsson commends the Commission for propelling the United States forward in the global race to 5G. As the Commission rightly observes, “[o]ur efforts in this proceeding to make mmW spectrum available for wireless uses is vital to ensuring continued American leadership in wireless broadband.”² The Commission’s actions, moreover, are more timely than ever: the June 2018 Ericsson Mobility Report found that total mobile data traffic in North America is

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

² *Third FNPRM* ¶ 2.

expected to exceed 19 exabytes per month in 2023 (roughly eight times last year's traffic), at which point more than 48 percent of all mobile subscriptions in North America are forecast to be 5G.³ To meet this demand, 5G service providers will need to secure additional spectrum, and the *Third FNPRM* brings 5G providers another step closer to achieving this objective.

Ericsson is committed to doing its part to make 5G a reality for American consumers and to that end, Ericsson is boosting its U.S. investments in R&D and manufacturing to support accelerated 5G deployments.⁴ Through its Austin ASIC Design Center in Austin, TX that focuses on 5G base stations and a new software development center that will focus on the baseband needed for 5G, Ericsson is speeding the timeline to make 5G products available in the United States. And Ericsson will begin manufacturing in United States and the first next-generation radios will be produced before the end of 2018.⁵ This series of strategic initiatives will allow Ericsson to operate even closer to its customers, meeting the growing demand for 5G in the United States and globally.

As the Commission knows well, the economic stakes of the race to 5G are high. Per a recent report by CTIA, 5G will create three million new jobs, generate \$275 billion in new investment, and produce \$500 billion of economic growth in the United States.⁶ Accelerating 5G deployment by even just one year is projected to add \$100 billion to the U.S. GDP within the

³ Ericsson, *Ericsson Mobility Report* at 11, 15 (June 2018), <https://www.ericsson.com/assets/-/local/mobility-report/documents/2018/ericsson-mobility-report-june-2018.pdf>.

⁴ See Press Release, Ericsson, *Ericsson increasing US investments to support accelerated 5G deployments*, Ericsson (Aug. 10, 2018), <https://mb.cision.com/Main/15448/2589865/889576.pdf>.

⁵ *Id.*

⁶ CTIA, *The Global Race to 5G*, at 2 (Apr. 2018), <https://api.ctia.org/-/wp-content/uploads/2018-/04/Race-to-5G-Report.pdf>.

next three years.⁷ Accordingly, Ericsson commends the Commission for scheduling the 28 GHz auction for November, to be followed immediately by the 24 GHz auction.⁸ And, Chairman Pai has announced that the Commission will auction the Upper 37 GHz, 39 GHz, and 47 GHz bands in 2019.⁹ As discussed below, the Commission should include the 42 GHz band in that 2019 auction as well.

Ericsson urges the Commission to maintain its aggressive approach to identifying, allocating, and auctioning new spectrum for 5G and, where necessary, to clarify its rules for existing 5G spectrum.¹⁰ Ericsson thus supports the Commission's continuation of these efforts via the *Third FNPRM*, subject to the recommendations set forth below.

26 GHz Band. Ericsson strongly urges the Commission to act swiftly to enable wireless broadband in the 26 GHz band (25.25-27.5 GHz) and make it available at auction. There is already substantial international interest in using the 26 GHz band for 5G (or, in ITU parlance, IMT-2020), presenting an opportunity to globally harmonize the band. Moreover, the 26 GHz band is within the tuning range of the 24 GHz and 28 GHz bands, allowing for economies of scale and a reduction in equipment costs. The Commission should make the 26 GHz band

⁷ Accenture, *Accelerating Future Economic Value From the Wireless Industry*, at 7 (2018), <https://api.ctia.org/wp-content/uploads-/2018/07/Accenture-Strategy-Wireless-5G-Accelerating-Economic-Value-POV-July-2018.pdf>.

⁸ See Public Notice, *Auctions of Upper Microwave Flexible Use Licenses for Next-Generation Wireless Services*, FCC 18-43 (rel. Apr. 17, 2018), <https://docs.fcc.gov/public/attachments-/FCC-18-43A1.pdf>.

⁹ Chairman Ajit Pai, *Coming Home*, FCC Blog (July 11, 2018, 1:35 pm) ("Pai Blog Entry"), <https://www.fcc.gov/news-events/blog/2018/07/11/coming-home>.

¹⁰ See, e.g., Comments of Ericsson, ET Docket No. 18-21, at 1-3 (filed May 2, 2018); Comments of Ericsson, GN Docket No. 17-183, at 3-5 (filed Oct. 2, 2017).

available via exclusive geographic licensing under the Part 30 UMFUS rules, with no unlicensed operations in the spectrum.

42 GHz Band. The 42 GHz band (42.0-42.5 GHz) offers advantages similar to those in the 26 GHz band, notably the opportunity for U.S. consumers and enterprises to benefit from global harmonization and the fact that the 42 GHz spectrum is within a larger tuning range (the 37 GHz and 39 GHz bands). The record in this proceeding already shows that commercial wireless services in the 42 GHz band can co-exist with Radio Astronomy Service (“RAS”) operations in the adjacent 42.5-43.5 GHz band.¹¹ The Commission should make the 42 GHz band available via exclusive geographic licensing under the UMFUS rules, with no unlicensed operations permitted in the spectrum. Also, to avoid compromising the 42 GHz auction, the Commission should *not* add a primary Federal allocation for Fixed and Mobile services in the 42 GHz band.

Lower 37 GHz Band. The Commission should use the 70/80 GHz database framework as the foundation of its coordination / sharing framework for the Lower 37 GHz band (37.0-37.6 GHz) band. The Commission should also adopt a professional installation requirement to ensure that coordination mechanisms are working and to facilitate bi-lateral sharing negotiations between licensees in adjacent or overlapping service areas. In addition, the Commission should refrain from adopting a Federal aeronautical allocation in the Lower 37 GHz band, as aeronautical mobile facilities have diffuse areas of coverage that would severely restrict commercial use of the spectrum.

50 GHz Band. The Commission should expeditiously conduct a rulemaking so it may adopt its earlier proposal to authorize the larger 50.4-52.6 GHz band in accordance with the

¹¹ See *Third FNPRM* ¶ 56.

UMFUS rules. Ericsson does not oppose the Commission's proposal to permit licensing of individual FSS earth stations in the 50 GHz band (50.4-51.4 GHz) using the criteria identical to those applicable in the 24.75-25.25 GHz band.

In sum, the *Third FNPRM* adds to the foundation the Commission has been building for 5G over the past several years. Ericsson looks forward to working with the Commission on this and other 5G-related initiatives in the future.

II. DISCUSSION.

A. The 26 GHz Band.

1. The Commission Should Adopt its Proposal to Make the 26 GHz Band Available for Flexible Fixed and Mobile Use.

Ericsson strongly urges the Commission to make the 26 GHz band a top priority band for 5G and other advanced spectrum services by taking prompt action to adopt a non-Federal Fixed and Mobile allocation and incorporate the band into the UMFUS rules. The 26 GHz band offers many significant benefits described here.

First, the 26 GHz band is primed to serve as a globally harmonized band, and U.S. consumers and industry should derive the benefits of it. As the Commission observes, “there is a growing international consensus that terrestrial mobile services should be authorized in the broader 24.25-27.5 GHz band.”¹² Indeed, throughout Europe efforts are underway to make the 24.25-27.5 GHz band a “clear priority” for harmonization of 5G services and to promote it for worldwide harmonization at WRC-19.¹³

¹² *Id.* ¶ 75 (footnote omitted).

¹³ *Id.* See also Global mobile Suppliers Association (GSA), *Spectrum for Terrestrial 5G Networks: Licensing Developments Worldwide*, at 6-12 (July 2018) (“GSA 5G Report”), <https://gsacom.com/paper/spectrum-terrestrial-5g-networks/> (listing countries that are planning to make 26 GHz available for 5G or that are otherwise considering 26 GHz as a home for 5G).

Globally harmonized spectrum remains integral to the continued growth of the mobile industry and should be the touchstone for identifying spectrum for 5G. Global harmonization results in a broader ecosystem for technology, equipment, and engineering expertise, leading to economies of scale, lower costs for deployment, more rapid roll-out of new services, and enhanced competition among suppliers to the U.S. and global markets. This broader ecosystem spurs innovation at the application level and creates a platform for transformation. The *Third FNPRM* recognizes these benefits, noting that “the international momentum presents [the Commission] with an opportunity to consider whether the 26 GHz band would be suitable for flexible fixed and mobile use.”¹⁴

Second, the 26 GHz band has considerable value due to the amount of spectrum within the band – 2250 MHz. 5G services’ higher peak data rates and capacity will require wider channelization, and Ericsson anticipates that aggregate bandwidth demands of 10 GHz to 15 GHz or more (implemented over time) will be required for 5G services.¹⁵ The 26 GHz band is thus a perfect fit for 5G.

The European Commission has noted the mobile industry’s support for consideration of 24.25-27.5 GHz as a pioneer band for implementation of 5G above 24 GHz in Europe. 09 November 2016, RSPG16-032 FINAL, RADIO SPECTRUM POLICY GROUP, STRATEGIC ROADMAP TOWARDS 5G FOR EUROPE, Opinion on spectrum related aspects for next-generation wireless systems (5G), at 3 (Nov. 9, 2016), http://rspg-spectrum.eu/wp-content/uploads/2013/05/RPSG16-032-Opinion_5G.pdf. In addition, Europe has identified the 32 GHz band, not the 26 GHz band, for backhaul services. 30 January 2018, RSPG18-005 FINAL, RADIO SPECTRUM POLICY GROUP, STRATEGIC SPECTRUM ROADMAP TOWARDS 5G FOR EUROPE, RSPG Second Opinion on 5G networks, at 23 (Jan. 30, 2018), https://circabc.europa.eu/sd/a/fe1a3338-b751-43e3-9ed8-a5632f051d1f/RSPG18-005final-2nd_opinion_on_5G.pdf.

¹⁴ *Third FNPRM* ¶ 76.

¹⁵ *Ericsson Mobility Report* at 31.

And third, the 26 GHz band is of significant interest due to its proximity to spectrum already allocated for mobile service, *i.e.*, the 24 GHz band and the 28 GHz band. As pointed out in the *Third FNPRM*, the 26 GHz band is in a tuning range that includes the 24 GHz and 28 GHz bands.¹⁶ This presents opportunities for economies of scale and international roaming capability.¹⁷

Ericsson therefore supports the Commission's proposal to make the 26 GHz band available for commercial flexible fixed and mobile use.¹⁸ In addition, Ericsson agrees that wireless services in the 26 GHz band should be regulated under the Commission's UMFUS rules, and that the spectrum should be geographically licensed on an exclusive basis.¹⁹ Ericsson also supports the adoption of 100 megahertz channel bandwidths for the 26 GHz band, as it would promote competitive entry and provide additional flexibility for uses that require less spectrum.²⁰

¹⁶ *Third FNPRM* ¶ 77 (footnote omitted).

¹⁷ See *Ericsson Mobility Report* at 30 ("Countries may not always be able to use the exact same frequency bands within a certain spectrum band. The mobile industry is trying to solve this deficiency by establishing technical 'tuning ranges.' These are frequency ranges where the industry is able to technically mitigate that bands are being deployed differently in different countries, while still being able to develop handsets and devices that can roam between countries and be used transparently from a consumer point of view. Keeping frequency allocations within these tuning ranges would greatly benefit the industry as a whole. It would allow economies of scale to be captured for network infrastructure, mobile broadband devices and IoT devices.").

¹⁸ See *Third FNPRM* ¶ 78.

¹⁹ *Id.* ¶ 89.

²⁰ *Id.* ¶ 91. Ericsson does not, however, oppose channel bandwidths of 200 megahertz for the 26 GHz band, since 200 megahertz carriers may be a future option for aggregating large bandwidths (*e.g.*, more than 800 MHz). *Id.*

In contrast, Ericsson does not support introducing unlicensed operations in the band.²¹ The Commission has already made ample unlicensed spectrum available in the mmW spectrum. Just last year the Commission noted that “we have already made a further seven gigahertz of spectrum available for use by unlicensed devices in the 64-71 GHz band, and we are not convinced that additional unlicensed spectrum is needed in the mmW bands at this time.”²² We see no basis to conclude otherwise.

2. The Commission Should Reject Elefante’s Proposal To Keep UMFUS Out of the 26 GHz Band.

In view of the international consensus that the 26 GHz band should be used for 5G, it would make no sense for the Commission to reverse field and instead make the band available for airborne platform systems (including high-altitude platform stations (“HAPS”)), as Elefante Group, Inc. (“Elefante”) calls for. The Commission should reject Elefante’s proposal.²³

Ericsson agrees with Elefante view that mobile deployments cannot share the band with unaffiliated stratospheric communications systems absent an extremely high degree of dynamic coordination and information sharing, and this complicated and unnecessary scheme does not make sense for the 26 GHz band.²⁴ As such, the Commission should prohibit such airborne systems in the band.²⁵

²¹ *Id.* ¶ 89 (requesting comment on whether the Commission should consider different licensing approaches in different parts of the band).

²² *See 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, 10998-99 ¶ 30 (2017).

²³ *Third FNPRM* ¶ 85.

²⁴ *Id.*

²⁵ *Id.* ¶ 87.

B. The 42 GHz Band.

1. The Commission Should Adopt its Proposal to Authorize Fixed and Mobile Licensed Operations in the 42 GHz Band.

The Commission already has developed a strong record in support of authorizing 5G and other advanced spectrum services in the 42 GHz band under its UMFUS rules.²⁶ Ericsson shares the Commission's view that the UMFUS rules "provide the best opportunity to provide commercial wireless broadband service to the public in [the 42 GHz] band."²⁷ The Commission should adopt its proposal to license the spectrum geographically on an exclusive-use basis.²⁸ In addition, Ericsson supports the Commission's proposal to license the 42 GHz band as 100 MHz channels to promote technical flexibility and maximize competitive entry.²⁹

Like the 26 GHz band, there is substantial international interest in making the 42 GHz band available for mobile service.³⁰ Action here will allow U.S. consumers and enterprises to benefit from global harmonization of the band.³¹

²⁶ *Id.* ¶ 54 ("Commenters have thus far generally supported applying the existing [Part 30] licensing and technical rules to the 42 GHz band.").

²⁷ *Id.* ¶ 52.

²⁸ *Id.* ¶ 54.

²⁹ *Id.* ¶ 57.

³⁰ *See, e.g., id.* ¶ 49 ("CTIA, Ericsson, Intel, and Samsung, among others, point to the ITU's WRC-19 identification of the entire 37-42.5 GHz band as a candidate to study for mobile services, and they argue for similar treatment domestically."); GSA 5G Report at 7 ("China is also expected to use the 24.75-27.5 band and the 37-43.5 GHz band and has recently initiated a stakeholder consultation on these bands.") and at 8 (noting that India's 5G High Level Forum has recommended 37-43.5 GHz, among other bands, as spectrum for 5G).

³¹ *See supra* Section II.A.1; *Third FNPRM* ¶ 50 ("Various commenters view the global harmonization of [the 42 GHz] band, and 5G spectrum generally, as an important step towards greater manufacturing efficiencies and more rapid development and deployment of services.") (footnote omitted).

Furthermore, the 42 GHz band is within the tuning range of the 37 and 39 GHz bands, generating economies of scale and thus reducing equipment costs. We note that in 3GPP there have been discussions to extend the frequency range from band n260 (37-40 GHz) to 43.5 GHz. And here in the United States, interference protection for adjacent bands is manageable, and with unwanted emission requirements set at -13 dBm/MHz, Ericsson sees no issues with tuning a radio over the full frequency span of 37-42.5 GHz.

Given this tuning range, Ericsson urges the Commission to auction the 42 GHz band along with the Upper 37 GHz band (37.6-38.6 GHz) and the 39 GHz band, provided that this would not delay existing auction plans. Licenses in the 42 GHz band should be considered as like-spectrum with Upper 37 GHz license and 39 GHz licenses and should be part of the same auction “product” group.

With regard to interference protection, there is agreement in the record that there are means by which 42 GHz UMFUS operations can protect Radio Astronomy Service (“RAS”) facilities in the adjacent 42.5-43.5 GHz band.³² Notably, coordination zones around RAS facilities may be an appropriate means of ensuring that the requisite protection is provided, particularly because RAS sites are generally in remote locations.³³

³² *Third FNPRM* ¶ 56.

³³ See, e.g., 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. 14-177 *et al.* (Oct. 2, 2017) (submitting study demonstrating that “5G deployments in the 32 GHz, 47 GHz, and 50 GHz bands can coexist with existing radio astronomy services (“RAS”) . . .”). The T-Mobile RAS sharing study for the 32/47/50 GHz bands would apply to protection zone calculations for RAS sites operating adjacent to the 42 GHz band.

Finally, as with the 26 GHz band, the Commission should not permit unlicensed operations in the 42 GHz band.³⁴ As noted above, ample unlicensed spectrum is already available in the millimeter wave bands.³⁵

2. The Commission Should Refrain from Adding a Federal Allocation for Fixed or Mobile Services to the 42 GHz Band.

Ericsson opposes the proposal to add a primary allocation for Federal Fixed and Mobile services to the 42 GHz band.³⁶ Introducing a co-primary Federal allocation into a spectrum band that will be licensed via auction injects significant uncertainty into the auction process (and is precisely the issue the Commission must confront in the 26 GHz band in light of the existing Federal allocation in that band). Any such action would reduce commercial interest in the band and lower auction proceeds, as bidders would need to account for the impact that future Federal operations would have on their ability to optimize use of their licensed spectrum. Ultimately, a Federal allocation would add further complexity to this proceeding and would forestall the availability of the 42 GHz band for 5G services.

C. The Lower 37 GHz Band.

1. The Commission's Licensing and Coordination Framework Should Enable Robust Commercial Use in the Lower 37 GHz Band.

Given that the Lower 37 GHz band is allocated on a primary basis for Federal and non-Federal Fixed and Mobile services,³⁷ it is important that the Commission's licensing and

³⁴ *Third FNPRM* ¶ 52.

³⁵ *See supra* note 22. Proponents of unlicensed uses or sharing of the band between various types of operations should bear the burden of providing technical studies demonstrating how such operations can coexist. *Third FNPRM* ¶ 52.

³⁶ *Third FNPRM* ¶ 53.

³⁷ *Id.* ¶ 58.

coordination rules provide clarity and certainty of investment and operations. Ericsson offers the following comments on the appropriate framework.

First, the Commission should adopt the database approach it has already implemented successfully for the 70/80 GHz bands.³⁸ A dynamic spectrum access database is neither necessary nor recommended. Second, site licenses should be defined by polygons. Also, Ericsson anticipates that enterprises and utilities will likely be interested in the Lower 37 GHz band for a variety of use cases. Ericsson has investigated local licensing and therefore is also open to exploring opportunities for property site licensing, and looks forward to providing and reviewing further information that may be submitted in the record. In addition, the Commission should adopt a professional installation requirement to ensure that coordination mechanisms are working and facilitate bi-lateral sharing negotiations between licensees in adjacent or overlapping service areas.

With regard to sharing with Federal users, Ericsson agrees with the *Third FNPRM* that non-Federal users should not be required to agree to coordination requests that would carry a significant risk of harmful interference.³⁹ This is a prerequisite for successful commercial operation in the Lower 37 GHz band. There are, however, other sharing rules that are equally important to commercial operation. For example, the Commission should use EIRP as part of its criteria for determining whether interference between Federal and non-Federal sites is harmful. The Commission should refrain from reserving part of the Lower 37 GHz band for Federal

³⁸ The Commission also should not adopt its proposal that registered non-Federal sites be put into service within seven days of coordination. *Id.* ¶ 60. This time period may prove too short, especially given unforeseen circumstances that may delay operation.

³⁹ *Id.* ¶ 66.

priority use.⁴⁰ Federal users should in all cases be required to coordinate with non-Federal users in the Lower 37 GHz band. To hold otherwise would compromise the promise of the Lower 37 GHz band.

As to Federal access to the entire 37 GHz band (37.0-38.6 GHz), the Commission notes that it has established coordination zones for 14 military sites and three scientific sites identified by NTIA, and requests comment on “how best to accommodate coordination zones for future Federal operations at a limited number of additional sites.”⁴¹ When studying this issue, the Commission must account for the fact that the 37 GHz band (in particular, the Upper 37 GHz band at 37.6-38.6 GHz) very likely will be deployed for commercial mobile service. Thus, the potential interference impact of new Federal facilities at 37 GHz may be greater than if commercial operations were limited to fixed operations only. Accordingly, if the Commission seeks to accommodate new Federal facilities at 37 GHz, it should establish a process that would permit Federal entities to identify a limited number of additional sites on an as-needed basis and coordinate those facilities with pre-existing non-Federal operations, with full input from the wireless industry as to their interference implications for commercial services, including mobile service. Again, as noted above, non-Federal users should not be required to agree to coordination requests that would carry a significant risk of harmful interference.⁴²

⁴⁰ *Id.* ¶ 68.

⁴¹ *Id.* ¶ 74.

⁴² *Id.* ¶ 66.

2. The Commission Should Not Add a Federal Aeronautical Mobile Allocation to the Lower 37 GHz Band.

As a general matter, non-Federal and Federal users of the Lower 37 GHz band will need to work together in good faith to coordinate new systems in this shared band, but a Federal aeronautical allocation would effectively wipe out commercial access to the band across vast regions.⁴³ Federal aeronautical mobile operations would handicap usage of the Lower 37 GHz band for 5G and undermine its utility as an “innovation band” in the mmW spectrum.⁴⁴

D. The 50 GHz Band.

1. The Commission Should Adopt UMFUS Rules for the 50.4-52.6 GHz Band.

Commercial operations at 50.4-52.6 GHz should be licensed according to the same basic principles as the 26 GHz and 42 GHz bands (*e.g.*, clear interference protection obligations vis-à-vis Federal users, exclusive geographic licensing, etc.), and the sharing mechanism for non-Federal and Federal operations should be as simple as possible. Ericsson also recognizes that the Commission’s technical rules for the 50 GHz band also must provide protection for passive services in the adjacent 50.2-50.4 GHz and 52.6-54.25 GHz bands.

2. The Commission Should Adopt FSS Earth Station Coordination Rules in the 50.4-51.4 GHz Band.

Ericsson does not oppose the proposal to permit licensing of individual FSS earth stations in the 50.4-51.4 GHz band using the criteria identical to those applicable in the 24.75-25.25 GHz band, but it urges the Commission to commence a rulemaking to make the 50 GHz band available for terrestrial wireless service under the UMFUS rules.⁴⁵

⁴³ *Id.*

⁴⁴ *Id.* ¶ 63.

⁴⁵ *Id.* ¶ 94.

III. CONCLUSION.

The Commission's agenda is clear: make spectrum available for 5G and auction that spectrum as soon as possible, so that wireless carriers can aggressively deploy new services in response to market demand. The *Third FNPRM* is the next step in that process, and consumers will be the ultimate beneficiaries. Ericsson therefore supports the *Third FNPRM* and requests that the Commission expeditiously issue a Report and Order consistent with the recommendations set forth above.

Respectfully submitted,

ERICSSON

/s/ Mark Racek

MARK RACEK

SR. DIRECTOR, SPECTRUM POLICY

ERICSSON

1776 I Street, NW

Suite 240

Washington, DC 20006

Telephone: (202) 824-0110

September 10, 2018