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

In the Matter of	)	
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World Radiocommunication Conference Advisory Committee for WRC-27	)	OIA Docket No. 24-30
	)	
Office of International Affairs Seeks Comment on Recommendations Approved by the World Radiocommunication Conference Advisory Committee	)	Public Notice DA 24-774

COMMENTS OF CTIA

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CTIA[1] respectfully submits these comments in response to the Federal Communications Commission's ("FCC" or "Commission") Public Notice seeking comment on draft recommendations provided by the World Radiocommunication Conference Advisory Committee ("WAC") for U.S. preliminary views on items of the agenda to the 2027 World Radiocommunication Conference ("WRC-27" or "Conference").[2]

I. INTRODUCTION AND SUMMARY.

CTIA commends the Commission for continuing to work collaboratively with industry and government stakeholders and urges the Commission to advance U.S. preliminary views for WRC-27 agenda items that promote the availability of spectrum needed to accelerate the 5G

[1] CTIA – The Wireless Association® ("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 providers, 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.

[2] *Office of International Affairs Seeks Comment on Recommendations Approved by the World Radiocommunication Conference Advisory Committee*, OIA Docket No. 24-30, Public Notice, DA 24-774 (rel. Aug. 6, 2024) ("Public Notice").

Economy and maintain U.S. global competitiveness and national security. Through International Mobile Telecommunications ("IMT") identifications, WRC-27 can enable the expansion of innovative and affordable commercial wireless services and associated use cases, benefiting a host of industries including agriculture, energy, healthcare, manufacturing, and transport.

New identifications for IMT use in the lower mid-band range offer the greatest capacity and coverage capabilities to meet the growing demand for additional 5G deployments by wireless operators. The 7.125-8.4 GHz ("7/8 GHz") band is now the global harmonization target for expanding mobile capacity for 5G and beyond. Here at home, the 7/8 GHz band is a centerpiece of the Administration's National Spectrum Strategy ("NSS") and its efforts to secure a spectrum pipeline for mobile broadband. By targeting the 7/8 GHz band for global harmonization, the 2023 World Radiocommunication Conference ("WRC-23") created an incredible opportunity for the United States to close its widening deficit of licensed spectrum, create economies of scale with other countries' 6 GHz mobile deployments, and ensure that the U.S. leads in both licensed and unlicensed technologies.

Establishing U.S. leadership on Agenda Item 1.7 is critical to enabling the U.S. to advance 5G spectrum proposals that could become regional proposals, in turn securing the necessary flexibility to domestically establish a 5G pipeline and address the significant spectrum deficit for full-power, licensed commercial spectrum. An urgent, consistent, and unified position advocating for additional wireless spectrum is also essential to promote American leadership in the development of spectrum policy around the world for the next decade-plus, furthering the economic and national security benefits that the U.S. has enjoyed as a global leader in 4G and the early days of 5G.

To facilitate these efforts, the Commission should prioritize and lead studies that position WRC-27 to identify more IMT spectrum. Other countries have recognized the benefit of making spectrum available on an exclusively licensed basis, situating them to be global leaders for next-generation applications and services using 5G technologies and beyond. By leading key studies and advocating for global harmonization, the U.S. can renew its leadership in the supply chain and benefit from the resulting momentum that will drive innovation, investment, reduction in deployment costs, and availability of trusted vendors. It is therefore critical that the U.S. positions itself to lead the International Telecommunication Union ("ITU") process that identifies new wireless spectrum and promotes international harmonization of additional bands for IMT, both now and in the future. At the same time, many WRC-27 Agenda Items seek to study frequency bands used and targeted for use by terrestrial mobile services. Accordingly, the U.S. must ensure that the introduction of new services into bands currently used or potentially targeted for 5G services in the U.S. does not cause harmful interference to, or preclude the development of, critical mobile broadband operations.

II. A ROBUST SPECTRUM PIPELINE IS NECESSARY TO KEEP PACE WITH DEMAND FOR DATA AND REALIZE THE FULL POTENTIAL OF 5G.

The U.S. wireless marketplace has spurred record levels of investment to build the world's leading 5G networks, resulting in rigorous competition and significant consumer benefits. In 2022 alone, the U.S. wireless industry invested $39 billion to grow, improve, and run their networks, marking the fifth straight year of increased investment and an increase of nearly twelve percent from 2021.[3] Over its history, the wireless industry has invested over $675

[3] CTIA, 2023 Annual Survey Highlights, at 4 (July 25, 2023), https://api.ctia.org/wp-content/uploads/2023/07/2023-Annual-Survey-Highlights.pdf ("CTIA 2023 Annual Survey").

billion into its networks, with nearly $160 billion of that investment occurring since the launch of 5G just five years ago.[4]

These investments have resulted in technological advancements that benefit consumers in new and different ways and will continue to facilitate the development of innovative new uses in the future. Indeed, wireless data traffic has soared in the last decade, from 3.2 trillion megabytes ("MB") in 2013 to 42.2 trillion MB in 2020, to a staggering 73.7 trillion MB in 2022.[5] As of year-end 2022, nearly 162 million 5G devices were active in the U.S.—almost double the number from 2021 and nearly an 11-fold increase since just 2020.[6] By some estimates, North American mobile data traffic could more than triple by 2029[7] and potentially grow six-fold by 2033.[8]

The wireless industry, and 5G in particular, continues to drive significant economic benefits. In 2020 alone, the U.S. wireless industry contributed $825 billion in GDP to America's economy.[9] Wireless-enabled jobs grew to 20.4 million by the end of the last decade—accounting for one out of every six U.S. jobs, making wireless the largest job contributor across all industries.[10] And the 5G economy is projected to drive $1.4 trillion in GDP growth this

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[4] *Id.*

[5] *Id.* at 3.

[6] *See* CTIA 2023 Annual Survey at 5.

[7] Ericsson, Ericsson Mobility Report, at 39 (June 2024), https://www.ericsson.com/49ed78/assets/local/reports-papers/mobility-report/documents/2024/ericsson-mobility-report-june-2024.pdf.

[8] Coleman Bazelon & Paroma Sanyal, *How Much Licensed Spectrum is Needed to Meet Future Demands for Network Capacity?*, BRATTLE GROUP, at 7-9 (Apr. 17, 2023), https://api.ctia.org/wp-content/uploads/2023/04/Network-Capacity-Constraints-and-the-Need-for-Spectrum-Brattle.pdf.

[9] Aren Megerdichian, *The Importance of Licensed Spectrum and Wireless Telecommunications to the American Economy*, COMPASS LEXECON, at 3 (Dec. 7, 2022), https://api.ctia.org/wp-content/uploads/2022/12/Compass-Lexecon-Licensed-Spectrum-Report.pdf.

[10] *The 4G Decade: Quantifying the Benefits*, RECON ANALYTICS, at 3, 6 (July 29, 2020), https://api.ctia.org/wp-content/uploads/2020/07/The-4G-Decade.pdf.

decade and add 4.5 million new jobs.[11] These growth trends underscore the need for the U.S. to ensure a spectrum pipeline to support rapidly growing demand and to capture 5G's potential to bring solutions that will drive the economy and benefit U.S. consumers through innovative services.

5G is already delivering in the U.S., expanding digital inclusion, economic growth, job creation, smart cities, and facilitating improvements to public safety, education, health care, and our environment, which are all predicated on the availability of spectrum. As the Commission has recognized,[12] mid-band spectrum is the backbone of the world's 5G strategy, as this spectrum offers both the capacity and coverage necessary to enable the benefits of 5G. A robust spectrum pipeline that includes additional mid-band spectrum for licensed operations will be crucial to ensuring wireless providers can usher in the 5G economy with its resulting job creation and economic growth. Yet, the U.S. is falling behind other nations in making spectrum available for licensed use.[13] Despite record-setting growth year after year, low- and mid-band spectrum

[11] Enrique Duarte Melo, et al., *5G Promises Massive Job and GDP Growth in the US*, BOSTON CONSULTING GROUP, at 3 (Feb. 2021), https://api.ctia.org/wp-content/uploads/2021/01/5G-Promises-Massive-Job-and-GDP-Growth-in-the-US_Feb-2021.pdf.

[12] *See Expanding Flexible Use of the 3.7 to 4.2 GHz Band*, Report and Order and Order of Proposed Modification, 35 FCC Rcd 2343, 2345, ¶ 3 (2020) ("One important part of advancing U.S. leadership in next generation 5G networks is making additional mid-band spectrum available for 5G services. Mid-band spectrum is essential for 5G buildout due to its desirable coverage, capacity, and propagation characteristics."); *see also* Keynote Address of Chairwoman Jessica Rosenworcel to Mobile World Congress, at 2 (Feb. 27, 2023), https://www.fcc.gov/document/chairwoman-rosenworcel-keynote-address-mobile-world-congress.

[13] Janett Stewart, Chris Nickerson, & Juliette Welham, *Comparison of Total Mobile Spectrum in Different Markets*, ANALYSYS MASON, at 11 (Sept. 2022), https://api.ctia.org/wp-content/uploads/2022/09/Comparison-of-total-mobile-spectrum-28-09-22.pdf.

availability has increased only moderately since 2012,[14] and existing licensed spectrum allocations are insufficient to meet continuing consumer demand.

Conversely, other countries have outpaced the U.S. in recent years by making significant amounts of licensed spectrum available to support continued deployment of 5G and the next generation of wireless services and positioning themselves to lead on global spectrum policy issues. On average, these countries have made 202 megahertz more mid-band spectrum available for commercial wireless use, with this deficit projected to nearly triple by 2027.[15] Relative to consumer demand, the U.S. deficit is even greater, with commercial mobile providers projected to require over 1,400 additional megahertz of licensed, full-power spectrum just to meet demand for data in the U.S. over the next ten years.[16] Regarding the availability of licensed, wide-area commercial spectrum in particular, Ericsson projects a deficit of up to 2,200 megahertz by 2030.[17]

To support continued growth and innovation in the wireless technology that consumers and government users depend upon and ensure that the U.S. remains at the forefront driving global spectrum policy, the U.S. must be a leader in promoting WRC proposals that identify new wireless spectrum for mobile and fixed wireless use and enable international harmonization of additional bands for IMT. By making more licensed, full-power spectrum available for

[14] Val Elbert, et al., *Accelerating the 5G Economy in the US*, BOSTON CONSULTING GROUP, at 6 (Apr. 17, 2023), https://www.bcg.com/publications/2023/accelerating-the-5g-economy-in-the-us ("BCG April 2023 Report").

[15] *Advancing US Wireless Excellence: The Case for Global Spectrum Harmonization*, ACCENTURE, at 4 (Jan. 2024), https://api.ctia.org/wp-content/uploads/2024/01/Advancing-US-Wireless-Excellence-Global-Harmonization.pdf. ("Accenture 2024 Report").

[16] *Id.*

[17] Eliane Semaan et al., *6G Spectrum – Enabling the Future Mobile Life Beyond 2030*, ERICSSON, at 10 (Mar. 2023), https://www.ericsson.com/4953b8/assets/local/reports-papers/white-papers/6g-spectrum.pdf.

commercial mobile use, U.S. policymakers can "fuel the supply side of the 5G ecosystem" and support ongoing innovation, taking full advantage of 5G's potential.[18] Notably for the work of the WAC, a spectrum pipeline that includes the 4.4-4.8 GHz ("4 GHz") and 7/8 GHz bands will foster such investment, innovation, and U.S. competitiveness. And as discussed below, WRC-27 provides the opportunity to allocate new mobile service uses to these bands, while ensuring the protection of critical federal systems.

III. THE COMMISSION SHOULD ADVANCE AGENDA ITEM 1.7 TO FURTHER GLOBAL HARMONIZATION AND DOMESTIC OPPORTUNITY FOR COMMERCIAL MOBILE SERVICE.

Certain bands, particularly in the low mid-band, present clear opportunities to support globally harmonized use for 5G and beyond while ensuring the U.S. does not fall further behind other countries. Agenda Item 1.7 identifies key mid-band spectrum for IMT for study in crucial bands, including the 4 GHz band and 7/8 GHz band.[19]

These bands represent a unique opportunity for the U.S. to address its spectrum deficit and secure ongoing leadership at the same time: they have significant potential to support 5G and beyond but, so far, have not been widely allocated globally.[20] Indeed, successfully harmonizing the 4 GHz and 7/8 GHz bands would offer an estimated economic benefit of $200 billion over

[18] BCG April 2023 Report at 11.

[19] *See* Document WAC-27/011 (Aug. 2, 2024); World Radiocommunication Conference 2027 (WRC-27), Agenda Item 1.7, To consider studies on sharing and compatibility and develop technical conditions for the use of International Mobile Telecommunications (IMT) in the frequency bands 4 400-4 800 MHz, 7 125-8 400 MHz (or parts thereof), and 14.8-15.35 GHz taking into account existing primary services operating in these, and adjacent, frequency bands, in accordance with Resolution 256 (WRC-23), https://www.itu.int/en/ITU-R/study-groups/rcpm/Pages/wrc-27-studies.aspx ("WRC-27 Agenda Item 1.7").

[20] *See* Accenture 2024 Report at 33-34, 36.

the next ten years, leveraging economies of scale across the wireless value chain and fueling new sources of growth and innovation.[21]

Spectrum harmonization enables standardized—and simplified—network equipment and wireless device production, resulting in accelerated deployment, improved network performance, and lower costs for consumers.[22] For instance, across the network equipment value chain, spectrum harmonization enables standardization of network equipment, which leads to economies of scale in equipment production, reduction in equipment cost, and faster and less expensive deployment—all while improving performance for consumers, promoting economic growth through new use cases and innovation, and helping to reduce the digital divide.[23] The associated economies of scale from network equipment, improved network deployment, and wireless device development present an estimated value for businesses and consumers ranging between $23 billion and $44 billion over the next ten years.[24] Moreover, U.S. leadership in guiding the harmonization these bands will enable it to pioneer innovations that become the global standard, unlocking economic expansion and bolstering national security by securing trusted network equipment vendors.[25]

As demonstrated by U.S. leadership on 4G, first-mover countries are positioned at the center of new generations of hardware and software ecosystems and are, thereby, empowered to shape technical standards and regulations for emerging technologies.[26] As China strives to lead

[21] *Id.* at 2, 8.

[22] *See id.* at 41.

[23] *See id.* at 43-47.

[24] *Id.* at 59.

[25] *See id.* at 39.

[26] *See id.* at 56.

harmonization efforts in 5G and beyond, the U.S. risks its ability to drive emerging technical standards and regulations to realize the resulting benefits from domestic innovation, industry expansion, and export demand.[27] In addition to significantly enhancing U.S. national security, the economic benefit of 5G leadership is projected to outpace the growth that the U.S. experienced as a leader in the 4G era, with an approximate value of $125 billion to $155 billion over the next decade.[28] On the domestic side, establishing a robust spectrum pipeline with definitive timelines for allocation of these bands will simultaneously position the U.S. to enjoy first-mover advantage in the global ecosystem for these bands, allow providers to efficiently plan and design their networks, and provide predictability for manufacturers.

The U.S. should therefore move swiftly to identify characteristics of incumbent services and conduct transparent sharing studies, which will enable the U.S. to make timely allocations in the 4 GHz and 7/8 GHz bands for commercial wireless use and ensure the protection of critical existing services. This will also align with the ongoing implementation of the NSS, which has identified the 7.125-8.4 GHz band for study for wireless broadband use, and allow the U.S. to lead and complete the international studies in these frequency bands in time for WRC-27.[29] Building off the progress of the NSS, the U.S. can demonstrate leadership through the ITU process that will facilitate technological innovation, boost industrial competition, ensure the adoption of secure networks, foster scientific advancements, and promote digital equity and inclusion.

[27] *Id.* at 57-59.

[28] *Id.* at 56-57.

[29] *See National Spectrum Strategy*, THE WHITE HOUSE, at 6 (Nov. 13, 2023), https://www.ntia.gov/sites/default/files/publications/national_spectrum_strategy_final.pdf.

One such technological innovation is the development of 6G wireless technology. There is considerable foundational research and work ongoing to develop 6G, also known as IMT-2030, and U.S. operators and manufacturers are taking a global leadership role in defining the requirements of immersive, hyper-reliable, low-latency communication.[30] Leadership in next-generation standards and research and development will also require close coordination will allies on available spectrum resources. WRC-27 will be at a critical juncture to identify the bands of spectrum best situated for the capacity and coverage requirements of both 5G and 6G applications. The U.S. ability to lead in 6G—as it has with prior wireless generations—will be dependent on a defined spectral strategy built off a globally harmonized pipeline of commercial wireless spectrum.

It is therefore critical that the Commission support the sharing and compatibility studies called for in Resolution 256 (WRC-23) with a view to ensure the protection of radio services to which the frequency bands are allocated on a primary basis. Based on the results of studies to protect primary allocated services, the Commission should support actions by WRC-27 to identify additional mid-band frequencies in the 4.4-4.8 GHz and 7.125-8.4 GHz ranges for the terrestrial component of IMT. In particular, CTIA urges the Commission to adopt the view provided in Alternative 1 as presented in Document 11 at the second WAC meeting.[31] As discussed in the Informal Working Group ("IWG-2"), this consensus proposal was accepted by nearly all members of IWG-2 except for one member, who offered an alternative view that

[30] *See, e.g.*, Francesco Pica & Dr. Lola Awoniyi-Oteri, *Path to 6G: Envisioning Next-Gen Use Cases for 2030 and Beyond*, QUALCOMM (June 27, 2024), https://www.qualcomm.com/news/onq/2024/06/path-to-6g-envisioning-next-gen-use-cases-for-2030-and-beyond.

[31] *See* Document WAC-27/011, at 2 (Aug. 2, 2024).

confuses procedures available domestically with the international spectrum regulatory provisions defined in the Radio Regulations for cross-border protection and coordination.[32]

IV. THE COMMISSION SHOULD ENSURE THAT OTHER WRC PROPOSALS DO NOT CAUSE INTERFERENCE TO EXISTING TERRESTRIAL SERVICES.

The U.S. must ensure that aspirational use cases proposed for study do not cause harmful interference into bands currently or potentially used for mobile wireless services, impede the continued development of critical mobile broadband operations, or inhibit innovation.

Agenda Item 1.1.[33] Commission support for Agenda Item 1.1, which considers studies on the use of the 47.2-50.2 GHz (Earth-to-space) and 50.4-51.4 GHz (Earth-to-space) bands by aeronautical and maritime earth stations in motion ("ESIM") in the fixed satellite service ("FSS"), should reflect the reality that the 47.2-50.2 GHz and 50.4-51.4 GHz bands are paired with the 37.5-42.5 GHz FSS (space-to-Earth) frequency band, and the impact that additional use would have on incumbent services, including 5G.[34] Importantly, the 37.5-42.5 GHz band will be used by transmitting satellites to downlink information to aeronautical and maritime ESIM. While the protection for mobile and other terrestrial services was established over 25 years ago through Radio Regulations provision No. **21.16.4**, the applicability of those limits was limited to NGSO FSS systems operating 99 or fewer satellites in the 37.5-40 GHz and 40.5-42.5 GHz

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[32] *See Informal Working Group 1, Informal Working Group 2, Informal Working Group 3, and Informal Working Group 4 of the World Radiocommunication Conference Advisory Committee Schedule Their Meetings*, OIA Docket No. 24-30, Public Notice, DA 24-173 (rel. May 17, 2024).

[33] *See* Document WAC-27/013 (Aug. 2, 2024); World Radiocommunication Conference 2027 (WRC-27), Agenda Item 1.1, To consider the technical and operational conditions for the use of the frequency bands 47.2-50.2 GHz and 50.4-51.4 GHz (Earth-to-space), or parts thereof, by aeronautical and maritime earth stations in motion communicating with space stations in the fixed-satellite service and develop regulatory measures, as appropriate, to facilitate the use of the frequency bands 47.2-50.2 GHz and 50.4-51.4 GHz (Earth-to-space), or parts thereof, by aeronautical and maritime earth stations in motion communicating with geostationary space stations and non-geostationary space stations in the fixed-satellite service, in accordance with Resolution 176 (Rev.WRC-23), https://www.itu.int/en/ITU-R/study-groups/rcpm/Pages/wrc-27-studies.aspx.

[34] *See* Public Notice at 10.

bands. As highlighted by the ITU in its Report to WRC-19, the Director of the Radiocommunications Bureau acknowledged that such study was overdue and raised the alarm that nearly every NGSO FSS system registered in these frequencies contains more than 100 satellites—and in most cases thousands of satellites.[35] As more of these satellite systems are being authorized to operate in these frequency bands, the Commission should ensure that studies under Agenda Item 1.1 also include the incomplete studies from WRC-2000 to ensure the protection of terrestrial services from the aggregate impact of NGSO FSS space-to-Earth transmissions in the 37.5-42.5 GHz, in addition to the interference studies caused by transmitting aeronautical and maritime ESIM into stations of other services with primary allocations in the 47.2-50.2 GHz and 50.4-51.4 GHz bands.

Agenda Item 1.10.[36] Agenda Item 1.10 is designed to define international, technical limits for satellite operations in the 71-76 GHz and 81-86 GHz ("70/80 GHz") bands to ensure protection of the terrestrial fixed and mobile services. Wideband integrated access backhaul solutions support ever-increasing wireless data traffic using the optimal characteristics of the 70/80 GHz bands for high-capacity microwave links. As wireless data traffic continues its exponential growth, wireless network deployments will rely on these bands to improve broadband coverage and increase the availability of higher speeds to more subscribers. The Commission should therefore participate in the studies called for in Resolution 775 (WRC-23) to

[35] Director, Radiocommunication Bureau, Applicability of RR Article 21 PFD limits in the 37.5-40 GHz and 40.5-42.5 GHz frequency bands to non-geostationary satellite systems operating with 100 or more satellites, ITU-R WP4A Contribution 66, at 2-3 (Sept. 22, 2020).

[36] *See* Document WAC-27/012 (Aug. 2, 2024); World Radiocommunication Conference 2027 (WRC-27), Agenda Item 1.10, To consider developing power flux-density and equivalent isotropically radiated power limits for inclusion in Article 21 of the Radio Regulations for the fixed-satellite, mobile-satellite and broadcasting-satellite services to protect the fixed and mobile services in the frequency bands 71-76 GHz and 81-86 GHz, in accordance with Resolution 775 (Rev.WRC-23), https://www.itu.int/en/ITU-R/study-groups/rcpm/Pages/wrc-27-studies.aspx.

develop power-flux density and equivalent isotropically radiated power ("EIRP") limits in Article 21 for the FSS, mobile-satellite service ("MSS"), and broadcasting-satellite service that ensure the protection of current and planned fixed and mobile services in the 70/80 GHz bands. In particular, the Commission should ensure studies identify EIRP limits that reflect actual FSS earth station operational parameters and are developed to ensure the necessary protection, while also not limiting the expanded deployment opportunities of terrestrial services to broaden connectivity. Additionally, studies should take into account additional protection necessary for incumbent services in urban centers, where the deployment of integrated access backhaul would have the greatest impact. Finally, all satellite downlink studies should consider the aggregate interference effects on terrestrial services from multiple, co-frequency geostationary satellite orbit networks and non-geostationary satellite orbit systems.

Agenda Item 1.13.[37] Agenda Item 1.13 proposes studies on possible new MSS allocations for direct connectivity between space stations and IMT user handsets to complement coverage from terrestrial IMT networks. CTIA applauds the Commission's leadership in adopting the world's first regulatory framework enabling supplemental coverage from space through collaborations between terrestrial service providers and satellite operators to expand the reach of communications services and offer ubiquitous connectivity directly to consumer handsets.[38] U.S. participation in studies for Agenda Item 1.13 should build upon this leadership,

[37] *See* Document WAC-27/019 (Aug. 2, 2024); World Radiocommunication Conference 2027 (WRC-27), Agenda Item 1.13, To consider studies on possible new allocations to the mobile-satellite service for direct connectivity between space stations and International Mobile Telecommunications (IMT) user equipment to complement terrestrial IMT network coverage, in accordance with Resolution 253 (WRC-23), https://www.itu.int/en/ITU-R/study-groups/rcpm/Pages/wrc-27-studies.aspx.

[38] *Single Network Future: Supplemental Coverage from Space*; *Space Innovation*, GN Docket No. 23-65, IB Docket No. 22-271, Report and Order and Further Notice of Proposed Rulemaking, FCC 24-28 (rel. Mar. 15, 2024).

emphasizing studies that focus on bands identified for the terrestrial component of IMT. Studies should also be limited to the impact of satellite operations in the space-to-Earth direction, as user equipment would remain the same, and regulatory changes to the terrestrial component of IMT are out of scope of the agenda item. Finally, in its framework, the FCC appropriately limited satellite operations to a secondary allocation and required the consent of terrestrial licensees for those operations.[39] Because the relevant space stations operate a complementary service to existing terrestrial operations, any regulatory considerations for the MSS under this agenda item should likewise be on a secondary basis.

Agenda Item 1.15.[40] Regarding Agenda Item 1.15, which considers studies to support future development of communications on the lunar surface and between lunar orbit and the lunar surface ("lunar orbit-to-surface"), CTIA continues to urge the Commission to work toward a sequential framework based on the near-term, mid-term, and long-term needs for these missions rather than an unmanageable "do everything" approach.[41] An organized approach will ensure the U.S. achieve its ambitious lunar goals, without interrupting the current regulations defined for communications on and around Earth. To that end, studies under Agenda item 1.15 should (1) consider procedures for the notification and coordination of space stations on the lunar surface and lunar orbit-to-surface and (2) prioritize near-term mission needs while avoiding disruption to the current allocations listed in Resolution 680 (WRC-23). Importantly, studies should begin by considering needed regulatory definitions and provisions to support

[39] *See id.* at ¶ 50.

[40] *See* Document WAC-27/021 (Aug. 2, 2024); World Radiocommunication Conference 2027 (WRC-27), Agenda Item 1.15, To consider studies on frequency-related matters, including possible new or modified space research service (space-to-space) allocations, for future development of communications on the lunar surface and between lunar orbit and the lunar surface, in accordance with Resolution 680 (WRC-23), https://www.itu.int/en/ITU-R/study-groups/rcpm/Pages/wrc-27-studies.aspx.

[41] *See* Comments of CTIA, ICFS File No. SAT-LOA-20230315-00060 (filed June 5, 2023).

communications on the lunar surface and lunar orbit-to-surface. The Radio Regulations do not yet include specific provisions allowing for these uses, and do not address the terminals or stations that would transmit and receive those communications on the lunar surface. Studies should therefore look toward developing a new Article in the Radio Regulations to support this new spectrum management regime, rather than imposing new spectrum allocations in Article 5. Such an approach would ensure that the success of lunar communications would not come at the cost of disrupting the table of frequency allocations built around spectrum use on Earth.

Additionally, the Commission should ensure that any technical studies remain within the scope of Agenda item 1.15 and Resolution 680 (WRC-23) and are not expanded to include proposals for additional use of the 7/8 GHz band for Earth-to-lunar, lunar-to-Earth, or Earth-to-space communications. As noted previously, the 7/8 GHz band is critical mid-band spectrum with unique and valuable capabilities for 5G and future mobile broadband services. Earth-to-lunar surface and Earth-to-space transmissions would require incredibly high-power emissions to overcome the 238,000 miles of path loss between the Earth and lunar surface. Such high-power emissions, which are limited to only a few locations today, would preclude 5G and future mobile systems that need access to the 7/8 GHz band.

Agenda Item 1.19.[42] Finally, the Commission should not support Agenda Item 1.19, which considers two new primary allocations in the 4.2-4.4 GHz and 8.4-8.5 GHz bands to complement existing, non-allocated passive measurements over oceans in the 6 GHz band. A similar proposal for new passive spectrum allocations in these bands was made at WRC-23 and

[42] *See* Document WAC-27/025 (Aug. 2, 2024); World Radiocommunication Conference 2027 (WRC-27), Agenda Item 1.19, To consider possible primary allocations in all Regions to the Earth exploration-satellite service (passive) in the frequency bands 4 200-4 400 MHz and 8 400-8 500 MHz, in accordance with Resolution 674 (WRC-23), https://www.itu.int/en/ITU-R/study-groups/rcpm/Pages/wrc-27-studies.aspx.

the Conference decided no allocation was justified in large part due to U.S. advocacy that rejected the technical justification for additional spectrum for these services. Looking ahead toward WRC-27, the proposal under Agenda Item 1.19 risks being infeasible at the global level. Any studies must therefore first evaluate the feasibility of introducing passive Earth-exploration satellite services ("EESS") in, and adjacent to, frequencies heavily used by active radio services without claiming protection from these active services, as noted in the Agenda Item.

The 4.2-4.4 GHz and 8.4-8.5 GHz bands are also ill-suited for primary passive EESS use given the likelihood of interference from (1) existing services in the 4.2 GHz band, (2) existing services currently allocated to the adjacent 3.6-4.2 GHz and 4.4-4.8 GHz bands, and (3) future systems planned in adjacent 4.4-4.8 GHz and 7.125-8.4 GHz bands pursuant to WRC-27 Agenda Item 1.7.[43] To date, no validated study has shown an impact of existing and planned operations of the 6 GHz band (e.g. fixed, Wi-Fi or IMT) on existing passive measurements performed over oceans, especially noting these terrestrial systems all operate on land. Passive measurement operations have successfully operated in the 6 GHz band since it was first identified for use, including with intensive terrestrial and satellite use of the same band. In addition, because the 4.2-4.4 GHz band is already allocated to EESS (passive) on a secondary basis, any regulatory upgrade to primary protection status would impose new constraints on transmissions both in the

[43] Currently, the 4.2-4.4 GHz band is allocated to aeronautical radionavigation and aeronautical mobile (R) services on a primary basis. The 8.4-8.5 GHz band is allocated to the fixed, mobile (except aeronautical mobile) and space research services on a primary basis. The adjacent 3.6-4.2 GHz band is allocated to the fixed, mobile, and fixed-satellite services on a primary basis, and the radiolocation service on a secondary basis for 3.6-3.7 GHz in Regions 2 and 3. The adjacent 4.4-4.8 GHz band is allocated to the fixed, mobile, and fixed-satellite (space-to-Earth) and mobile services. The adjacent 4.4-4.8 GHz band is allocated to the fixed, mobile, and fixed-satellite services. The adjacent 7.125-8.4 GHz band includes allocations to the fixed, mobile, fixed-satellite, earth exploration-satellite (active), maritime-mobile satellite, meteorological-satellite, and space research services. *See* ITU, Radio Regulations, Vol. 1, Article 5 (2020); *see also* WRC-27 Agenda Item 1.7, studying the 4.4-4.8 GHz and 7.125-8.4 GHz bands (or parts thereof) for possible IMT identifications, and discussion *supra* at Section III.

band and adjacent to it, including stringent out-of-band emission requirements that would preclude spectrum from future use.

The risk that Agenda Item 1.19 poses to future planned uses of adjacent bands is particularly acute. The adjacent 4.0-4.2 GHz frequency band has been viewed as a viable candidate for use by commercial mobile providers, as it offers a substantial opportunity for the deployment of 5G services in a globally harmonized and contiguous frequency range.[44] Adding a new passive allocation in the adjacent band would definitively foreclose that opportunity. Similarly, WRC-27 Agenda Item 1.7 proposes studies regarding the identification of IMT systems in the adjacent frequency band below 8.4 GHz. As noted in Resolution 674, EESS (passive) would not be able to claim protection from mobile services under the existing primary allocation in the 8.215-8.5 GHz band.

Therefore, just as the U.S. opposed the creation of this new agenda item at WRC-23, the Commission should not support Agenda Item 1.19, and should ensure that any studies under Agenda Item 1.19 account for all existing and potential future sources of interference into this prospective passive band.

V. CONCLUSION.

It is imperative that the Commission develop and support U.S. proposals for WRC-27 that promote the availability of spectrum needed to accelerate the 5G Economy, maintain national security, and promote U.S. global competitiveness. The mid-band spectrum

[44] *See* European Commission, Mandate to CEPT on technical conditions regarding the shared use of the 3.8-4.2 GHz frequency band for terrestrial wireless broadband systems providing local-area network connectivity in the union (Dec. 16, 2021), https://eccwp.cept.org/WI_Detail.aspx?wiid=804. *See also,* European Conference of Postal and Telecommunications Administrations, *Results of the WG FM@107 (Hybrid) Meeting, 03-7 June 2024* (June 18, 2024), https://www.cept.org/ecc/groups/ecc/wg-fm/news/results-of-the-wg-fm107-hybrid-meeting-03-07-june-2024 (approving progress on the mandated draft report and identifying outstanding issues).

opportunities provided under WRC-27 Agenda Item 1.7 present the U.S. with a generational opportunity to define and advance American spectrum policies for 5G and beyond that will ensure a domestic spectrum pipeline while positioning the country to exert ongoing influence upon developing global spectrum policy, standardization efforts, and supply chains. At the same time, the U.S. must ensure that the introduction of new services as considered in other agenda items does not inhibit the development of critical mobile broadband operations.

Respectfully submitted,

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