

FCC FACT SHEET*

Expanding Use of the 12.7-13.25 GHz Band for Mobile Broadband or Other Expanded Use Notice of Inquiry and Order – GN Docket No. 22-352

Background: The Notice of Inquiry would recognize the need to identify spectrum that can support faster speeds and wider coverage, which are key to delivering the promise of providing nationwide 5G services, 6G, and beyond. The Notice of Inquiry would seek information on the current use of the 12.7 to 13.25 GHz band, how the Commission could encourage more efficient and intensive use of the band, and whether the band is suitable for mobile broadband or other expanded use. Given existing incumbent operations in the band, the Notice of Inquiry would seek comment on whether and how to provide opportunities for new uses while protecting the investments made by incumbents and avoiding disruption to their operations. The Order would extend the temporary freeze on applications in the 12.7 GHz band.

What the *Notice of Inquiry* would do:

- Ask questions about potential spectrum access methods in the 12.7 GHz band, including whether to use or require devices to access a database or other spectrum management system similar to those used or under development in other bands
- Inquire whether any incumbent services in the 12.7 GHz band should be sunset, remain in their current form, or relocated, and whether to adopt cost-sharing procedures to apportion any relocation costs among the new entrants
- Seek comment on what licensing approach would facilitate the deployment of new mobile broadband or other expanded use in the 12.7 GHz band
- Request information on the level of protection that any new 12.7 GHz band operators would have to provide to incumbent services in the lower and upper adjacent bands
- Invite comment on the costs and benefits associated with the various approaches discussed in the Notice of Inquiry to open the 12.7 GHz band to mobile broadband or other expanded use
- Ask for public comment on how various approaches may promote or inhibit advances in diversity, equity, inclusion, and accessibility

What the *Order* would do:

- Extend the temporary freeze on applications in the 12.7 GHz band
- Clarify that the Bureaus retain jurisdiction to modify the freeze

* This document is being released as part of a “permit-but-disclose” proceeding. Any presentations or views on the subject expressed to the Commission or its staff, including by email, must be filed in GN Docket No. 22-352, which may be accessed via the Electronic Comment Filing System (<https://www.fcc.gov/ecfs/>). Before filing, participants should familiarize themselves with the Commission’s *ex parte* rules, including the general prohibition on presentations (written and oral) on matters listed on the Sunshine Agenda, which is typically released a week prior to the Commission’s meeting. See 47 CFR § 1.1200 et seq.

Before the
Federal Communications Commission
Washington, D.C. 20554

In the Matter of
Expanding Use of the 12.7-13.25 GHz Band for
Mobile Broadband or Other Expanded Use
GN Docket No. 22-352

NOTICE OF INQUIRY AND ORDER*

Adopted: []

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Comment Date: 30 days following release date
Reply Comment Date: 60 days following release date

By the Commission:

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* This document has been circulated for tentative consideration by the Commission at its October 27, 2022 open meeting. The issues referenced in this document and the Commission’s ultimate resolution of those issues remain under consideration and subject to change. This document does not constitute any official action by the Commission. However, the Chairwoman has determined that, in the interest of promoting the public’s ability to understand the nature and scope of issues under consideration, the public interest would be served by making this document publicly available. The FCC’s ex parte rules apply and presentations are subject to “permit-but-disclose” ex parte rules. See, e.g., 47 C.F.R. §§ 1.1206, 1.1200(a). Participants in this proceeding should familiarize themselves with the Commission’s ex parte rules, including the general prohibition on presentations (written and oral) on matters listed on the Sunshine Agenda, which is typically released a week prior to the Commission’s meeting. See 47 CFR §§ 1.1200(a), 1.1203.

I. INTRODUCTION

1. Mid-band spectrum offers an ideal blend of capacity and coverage, and deploying mid-band spectrum at scale is key to delivering on the promise of providing nationwide 5G services, 6G, and beyond. Accordingly, we have been taking action to make more mid-band spectrum available particularly in the 3 GHz range.¹ We also recognize that spectrum that is higher in the mid-band range is similarly critical for widespread next generation service deployments, and we open this inquiry to explore how we can expand the use of one of these bands—the 550 megahertz between 12.7-13.25 GHz (12.7 GHz band).

2. In this *Notice of Inquiry (NOI)*, we broadly seek information on the current use of the 12.7 GHz band, how the Commission could encourage more efficient and intensive use of the band, and whether the band is suitable for mobile broadband or other expanded use. Given existing incumbent operations in the band, we seek comment on whether and how we may provide opportunities for new uses while protecting the investments made by incumbents and avoiding disruption to their operations. Specifically, we explore sharing approaches that could promote coexistence in the band and minimize the potential for harmful interference. We also consider whether we should relocate some or all of the current incumbents to provide a clean slate for more intensive use of some or all of the band, as well as whether there may be opportunities to incentivize accelerated relocation or repacking of incumbent licensees to make this spectrum more rapidly available for new uses. We expect that this inquiry is the first step in providing for more intensive use of the 12.7 GHz band, unlocking a significant expanse of valuable mid-band frequencies that can provide spectrum for mobile broadband or other expanded use.

II. BACKGROUND

A. Need for Additional Mobile Broadband Spectrum

3. As highlighted by the COVID-19 pandemic, the need for broadband access for Americans continues to grow unabated and the Commission endeavors to make additional, specifically mid-band, spectrum available. Mid-band spectrum in the 12.7 GHz frequency range combines favorable propagation characteristics and considerable capacity and opportunity for channel reuse, as well as superior building penetration and reduced clutter loss as compared to high-band spectrum. As noted by commenters in other proceedings, the 12.7 GHz band is ideal for the Commission to consider for mobile broadband use as it is already allocated for terrestrial mobile services on a primary basis domestically.² Moreover, while there are a number of incumbent uses, as described below, overall the band appears to be lightly used. Taken together, these factors make it appropriate to examine whether these frequencies may be made available for mobile broadband or other expanded use.

B. Current uses of the 12.7-13.25 GHz (12.7 GHz) Band

1. Allocations

4. In the United States, the 12.7 GHz band is allocated on a primary basis for non-Federal use to the Fixed Service (FS), the Fixed Satellite Service (FSS) (Earth-to-space), and the Mobile Service

¹ See, e.g., *Facilitating Shared Use in the 3100-3550 MHz Band*, WT Docket No. 19-348, Second Report and Order, Order on Reconsideration, and Order of Proposed Modification, 36 FCC Rcd 5987 (2021); *Auction of Flexible-Use Service Licenses in the 3.45–3.55 GHz Band Closes, Winning Bidders Announced for Auction 110*, Public Notice, DA 22-39 (OEA, WTB Jan. 14, 2022); *FCC Starts 5G Mid-Band Spectrum Auction, First-of-Its-Kind Overlay Auction of 2.5 GHz Licenses Offers Opportunity to Fill in the Spectrum Gaps in Rural Wireless Coverage*, News Release (Jul. 29, 2022), <https://docs.fcc.gov/public/attachments/DOC-385771A1.docx>.

² See e.g., CTIA Reply, ET Docket No. 13-115, at 6 CTIA Reply Comments at 6 (filed Sept. 10, 2021) at 6 (urging the FCC, among other things, to evaluate expanded terrestrial use in the [12.7] GHz band) (citing T-Mobile Comments, ET Docket No. 13-115, at 4-5 (Aug. 11, 2021)).

(MS).³ In the Fixed Service, use of the band by television translator relay stations is secondary to other stations in the Television Broadcast Auxiliary Service.⁴ In the FSS, both geostationary (GSO) and non-geostationary (NGSO) satellite systems operate; NGSO satellite systems cannot claim protection from GSO satellite networks,⁵ GSO (Earth-to-space) use of the band is limited to international systems,⁶ and NGSO satellite systems are limited to individually licensed earth stations, i.e., NGSO blanket earth station licensing is not permitted.⁷ Within a 50-kilometer radius of 100 major television markets, the 13.15-13.2 GHz portion of the band is reserved for television pickup stations and cable television relay service (CARS) pickup stations, while outside these 100 markets television pickup stations, CARS pickup stations, and NGSO gateway earth stations operate on a co-primary basis.⁸ Similarly, within a 50-kilometer radius of these 100 major television markets, the 13.2-13.2125 GHz portion of the band is reserved for television pickup stations on a primary basis and CARS on a secondary basis, while outside these markets, television pickup stations and NGSO gateway earth stations operate on a co-primary basis and CARS stations operate on a secondary basis.⁹

5. In the International Table, the 12.75-13.25 GHz portion of the band mirrors the United States allocations with primary Fixed Service, Fixed Satellite Service (Earth-to-space), and Mobile Service allocations in all regions.¹⁰ In addition, the 12.75-13.25 GHz portion of the band is allocated internationally on a secondary basis to the Space Research Service (deep space) (space-to-Earth).¹¹ The international allocations for the 12.7-12.75 GHz portion of the band vary by region.¹² In Region 1, this band is allocated only to the Fixed Satellite Service (space-to-Earth) and (Earth-to-space) on a primary basis.¹³ In Region 2, it is allocated to the Fixed Service, Fixed Satellite Service (Earth-to-space) and Mobile Service (except aeronautical mobile) on a primary basis.¹⁴ In Region 3, it is allocated to the Fixed Service, Fixed Satellite Service (space-to-Earth), Mobile Service (except aeronautical mobile), and Broadcasting Satellite Service.¹⁵

6. In the United States the 12.75-13.25 GHz band has only limited Federal use.

³ 47 CFR § 2.106. The international and domestic allocations are similar for the 12.75-13.25 GHz band in most respects. However, space-to-Earth transmissions are permitted at 12.7-12.75 GHz in ITU Regions 1 and 3 but not in Region 2. 47 CFR § 2.106, International Table.

⁴ 47 CFR § 2.106, n.NG118.

⁵ 47 CFR § 2.106, n.5.441.

⁶ 47 CFR § 2.106, n. NG52.

⁷ 47 CFR § 2.106, n. NG57. NGSO gateway uplink transmissions in the 13.15-13.2125 GHz portion of the band are limited to an effective isotropically radiated power of 3.2 dBW towards 0 degrees on the radio horizon. 47 CFR § 2.106 n.NG53(d).

⁸ 47 CFR § 2.106, n.NG53(a) (citing 47 CFR § 76.51, which lists 100 major TV markets). In the 13.15-13.25 GHz portion of the band, fixed television auxiliary stations licensed pursuant to applications accepted for filing before September 1, 1979, may continue to operate. 47 CFR § 2.106, n.NG53(c).

⁹ 47 CFR § 2.106 footnote NG53(b).

¹⁰ 47 CFR § 2.106. The International Telecommunications Union's Table of Frequency Allocations—i.e. the "International Table"—is included in 47 CFR § 2.106 for informational purposes only. 47 CFR § 2.104(a).

¹¹ 47 CFR § 2.106.

¹² The International Telecommunication Union has divided the world into three regions for the allocation of frequencies. 47 CFR § 2.104(b).

¹³ 47 CFR § 2.106, International Table.

¹⁴ 47 CFR § 2.106, International Table.

¹⁵ 47 CFR § 2.106, International Table.

Specifically, the National Aeronautical Space Administration (NASA) operates a receive-only earth station for its Deep Space Network (DSN) at Goldstone, California that is authorized to receive transmissions across the entire 12.75-13.25 GHz band.¹⁶ The NASA DSN is an international network of antennas that support interplanetary spacecraft missions and radio and radio astronomy observations for exploring the solar system and the universe.¹⁷ The DSN consists of three communications facilities spaced strategically approximately 120 degrees of longitude apart around the world—at Goldstone, CA; near Madrid, Spain; and near Canberra, Australia—to permit spacecraft to be constantly observed as the Earth rotates.¹⁸ Radio astronomy observatories operated by the National Science Foundation (NSF) make opportunistic observations in this and other bands, including geodetic VLBI stations, used as a calibration aid for the radionavigation satellite service.

2. Licensed Services

7. The 12.7 GHz band is shared among Fixed Microwave Services (FS – part 101), Broadcast Auxiliary Services (BAS – part 74), Cable Television Relay Services (CARS – part 78), and Fixed Satellite Services (FSS – part 25).¹⁹ Based on the Commission’s licensing records,²⁰ these services in the 12.7 GHz band include approximately 1936 terrestrial service call signs that authorize a total of approximately 2165 fixed point-to-point paths, and approximately 453 licenses that authorize mobile TV pickup operations. There are also 27 call signs for FSS space stations and 43 call signs for FSS earth stations. Terrestrial and space services in the 12.7 GHz band are subject to prior-coordination requirements to avoid interference.²¹

a. Fixed Point-to-Point Links

8. *Parts 74 & 78.* Spectrum in the 12.7 GHz band is licensed for Broadcast Auxiliary Service (BAS)²² and Cable Television Relay Service (CARS)²³ for fixed point-to-point transmission of television signals, such as between television studios and transmitters and cable television headends.²⁴ Based on the Commission’s licensing records, there are approximately 1697 call signs for approximately 1,172 fixed BAS paths in the 12.7 GHz band.²⁵ There are also approximately 15 licenses used for fixed

¹⁶ 47 CFR § 2.106 & n.US251 (“The band 12.75-13.25 GHz is also allocated to the space research (deep space) (space-to-Earth) service for reception only at Goldstone, CA (35°20’ N, 116°53’ W).”).

¹⁷ See NASA, *What is the Deep Space Network* (Mar. 30, 2020), https://www.nasa.gov/directorates/heo/scan/services/networks/deep_space_network/about. NASA’s Deep Space Network “is the largest and most sensitive scientific telecommunications system in the world.” *Id.*

¹⁸ See *id.*

¹⁹ See 47 CFR pt. 25 (§§ 25.101-25.702), pt. 74 (§§ 74.600-74.690), pt. 78 (§§ 78.1-78.115), pt. 101 (§§ 101.1-101.1527).

²⁰ We remind licensees that they must maintain the accuracy of their data in the Commission’s licensing systems as required by the Commission’s rules. See, e.g., 47 CFR §§ 1.947, 1.953.

²¹ See 47 CFR §§ 25.115(a)(6)(i), 101.21(f). The administrative aspects of the coordination process are set forth in 47 CFR § 101.103 for coordinating terrestrial stations with earth stations, and in 47 CFR § 25.203 for coordinating earth stations with terrestrial stations. See also 47 CFR § 25.251(a). The coordination procedures specified in 47 CFR § 101.103 and § 25.203 are applicable for coordinating between earth stations and fixed microwave links and the information provided during coordination is set forth in 47 CFR § 25.203(c)(2) and 101.103(d)(2)(ii).

²² See generally 47 CFR §§ 74.601(b), (c), (d), (f) (classes of fixed TV BAS stations).

²³ See generally 47 CFR §§ 78.5 (b), (c) (definitions of fixed CARS stations).

²⁴ See 47 CFR §§ 74.602, 78.18(a) (frequency assignments).

²⁵ For the 12.7 GHz band, there are approximately 485 licenses for approximately 491 TV studio-transmitter links (TS), 1,179 licenses for 1,188 TV intercity relay stations (TI), 32 licenses for TV translator relay stations (TT), and one license for an aural intercity relay station (AI).

point-to-point CARS, which includes local distribution service (LDS) stations, and CARS studio to headend link stations.²⁶ Most BAS/CARS links are using a one-way, 25-megahertz (or less) channel assignment. Some broadcast auxiliary related services, such as television studio transmitter links, television inter-city relay links, and television translator relay links, are primarily one-way (not duplex) point-to-point links.²⁷ BAS fixed links are concentrated mostly in major cities along the coasts.

9. *Part 101.* Spectrum in the 12.7 GHz band allocated for fixed use is licensed for point-to-point microwave links, and includes approximately 224 call signs that authorize a total of approximately 437 paths. These links support a variety of critical services, such as public safety (including backhaul for police and fire vehicle dispatch), control of natural gas and oil pipelines, regulation of electric grids, and backhaul for commercial wireless providers (including traffic between cellular base stations and wireline networks).²⁸ Fixed point-to-point microwave operations provide connectivity for private data networks, public safety communications, long-distance telephone service, and the Local Television Transmission Service (LTTS).²⁹ Most of these fixed links are using two-way (duplexed), 50 megahertz by 50 megahertz channel assignments. In the 12.7-13.125 GHz band, fixed service links, except for LTTS, are restricted from intersecting with the service areas of television pick up stations,³⁰ which effectively limits the use of the band by common carrier and operational fixed point-to-point microwave services.³¹ Common Carrier and Operational Fixed Services (OFS) are concentrated in the West Coast cities and states. The maps below shows BAS, common carrier OFS and POFS point-to-point links.

²⁶ See 47 CFR § 78.5.

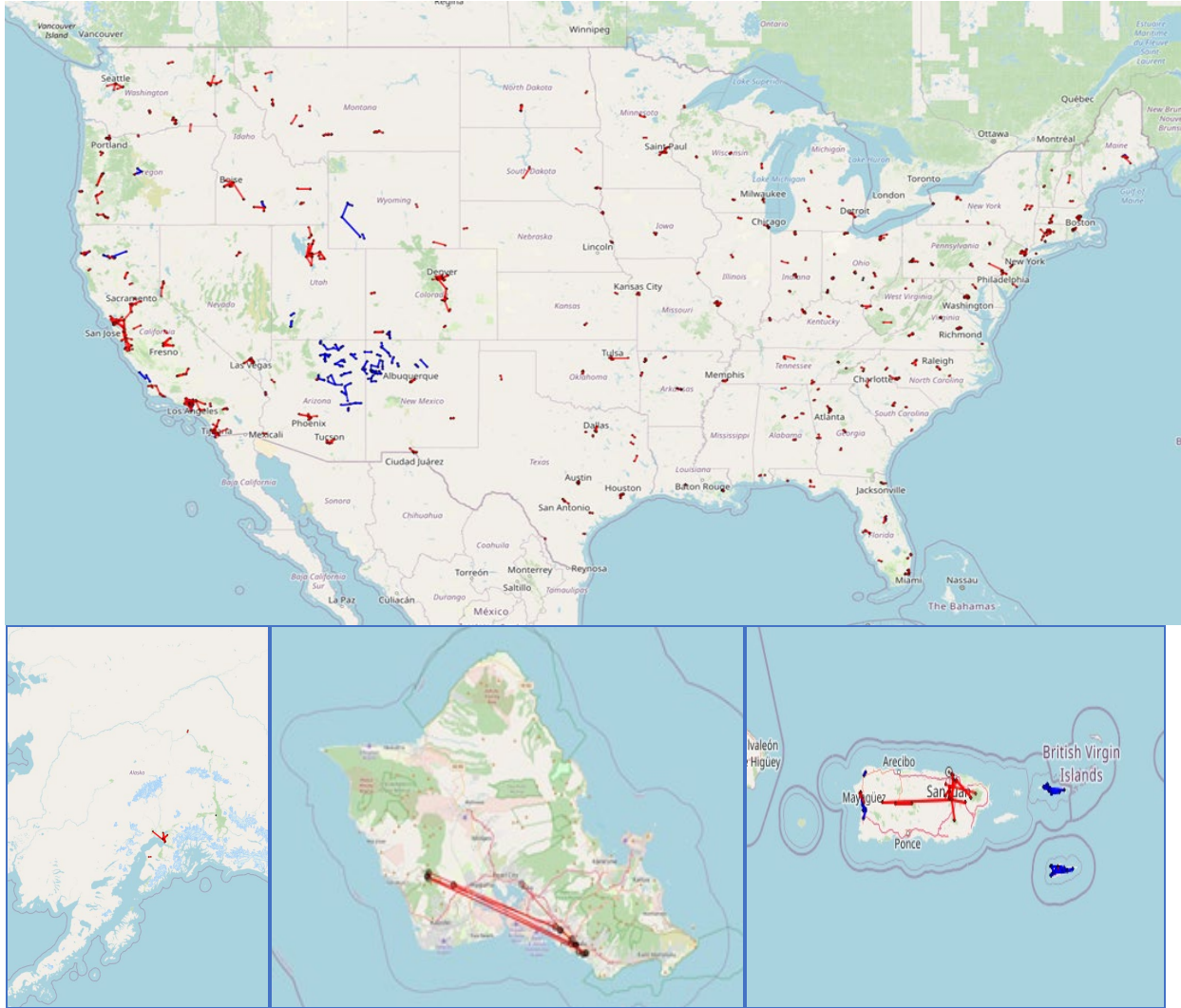
²⁷ 47 CFR § 74.631 and review of ULS TV Studio Transmitter (TS), TV Intercity Relay (TI), and TV Translator Relay (TT) licenses.

²⁸ For the 12.7 GHz band, there are approximately 112 common carrier fixed point-to-point microwave (CF) licenses that authorize a total of approximately 217 paths, and 89 private operational fixed microwave licenses that authorize a total of approximately 197 paths (28 Public Safety Pool (MW) licenses for a total of 50 paths and 61 Industrial/Business Pool (MG) licenses for a total of 147 paths). There are also 23 licenses for Local Television Transmission Service (CT).

²⁹ See generally 47 CFR pt. 101, subpts. C, (Technical Standards), H (Private Operational Fixed Point-to-Point Microwave), I (Common Carrier Fixed Point-to-Point Microwave), J (Local Television Transmission Service).

³⁰ TV pick up stations are discussed *infra* in Section II.B.2.b, Mobile Use.

³¹ 47 CFR § 101.147(a), n.34 (“In the band [] . . . 12,700-13,150 MHz, links shall not intersect with the service areas of television pickup stations.”).



Notes: BAS Fixed links (in red) are concentrated mostly in major cities in the East and West Coasts. Common Carrier and OFS (in blue) are concentrated in the West coast cities and states.

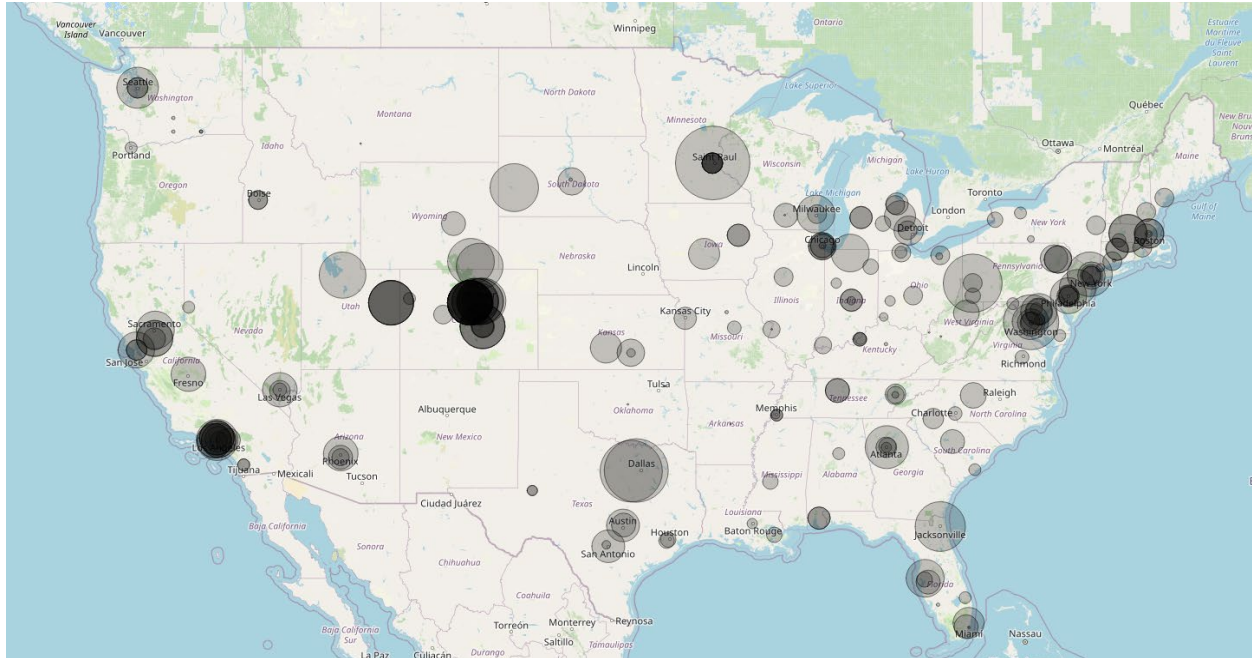
b. Mobile Use

10. Mobile operations are permitted in the 12.7 GHz band as mobile subclasses of the part 74 BAS and part 78 CARS services, with CARS operating with similar uses and technical requirements as BAS.³² part 101 services have no identified mobile presence in the band. The Commission’s 12.7 GHz band licensing records contain 403 BAS call signs and approximately 50 CARS call signs that authorize land mobile television pickup stations. These stations are used to transmit programming material from special events or remote locations, including electronic news gathering, back to the studio or other central receive locations.³³ Transmitters in the television pickup service are often licensed to operate over an area

³² Compare 47 CFR § 74.601(a) (“A land mobile station used for the transmission of TV program material and related communications from scenes of events occurring at points removed from TV station studios to a TV broadcast, Class A TV or low power TV station or other purposes as authorized in § 74.631.”), with *id.* § 78.5(d) (“A land mobile CARS station used for the transmission of television signals and related communications from the scenes of events occurring at points removed from cable television studios to cable television studios or headends.”). Compare 47 CFR § 74.636 (Power limitations), 74.637(a)(1) (Emissions limits), 74.641 (Antenna systems), with *id.* § 78.101 (Power limitations), 78.103(b)(1) (Emissions and emission limitations) 78.105 (Antenna systems).

³³ See 47 CFR § 74.631.

defined by a point-radius or other wide-area basis (including nationwide) and across the entire frequency band to allow maximum flexibility for coordinating and sharing the spectrum among multiple licensees in any given area.³⁴ While the LTTS can be authorized to provide fixed links on a common carrier basis under part 101, either on a permanent or temporary fixed/mobile basis across the entire sub-band for large areas of operation to facilitate flexibility in coordinating operations,³⁵ there are no mobile subclasses of LTTS at 12.7 GHz. The map below shows the approximate operating areas for the BAS mobile authorizations.



Notes: Darker shade indicates there are overlapping licensees.
Several county/state-wide BAS and CARS licenses are not depicted.

c. Satellite Service

11. In the United States and ITU Region 2 (Western Hemisphere), the 12.7 GHz band encompasses an uplink band at 12.75-13.25 GHz, which is utilized with the Extended Ku downlink bands in the 10.7-11.7 GHz range.³⁶ In ITU Regions 1 and 3, the lower 50 megahertz of the 12.7 GHz band (12.7-12.75 GHz) is part of the downlink band below 12.7 GHz.³⁷ According to our records, 27 space stations' records specify use of the 12.7 GHz band with all 27 specifying downlink (space-to-Earth) in the 12.7-12.75 GHz band, 20 specifying uplink (Earth-to-space) in all or a segment of the 12.75-13.25 GHz band, and four specifying uplink (Earth-to-space) in the 12.7-12.75 GHz band and in all or a segment of the 12.75-13.25 GHz band. More generally, of the total number of GSO satellites, only 8 of the 23 space stations are in the arc of 132.85 WL to 30 WL. Of the 4 satellite records associated with three non-geostationary orbit (NGSO) systems, the one operational system does not have any U.S. earth stations

³⁴ 47 CFR § 74.631 and review of ULS TV pickup license frequencies and areas of operation.

³⁵ See 47 CFR § 101.803(a) n.1 (permitting mobile or fixed operations), 101.815 (authorizations permitted on a temporary or permanent basis).

³⁶ See 47 CFR § 25.103 (the Extended Ku-band includes “the 10.95-11.2 GHz (space-to-Earth), 11.45-11.7 GHz (space-to-Earth), and 13.75-14.0 GHz bands (Earth-to-space) FSS frequency bands.”). Non-Federal FSS earth stations and space stations are authorized under part 25 of our rules. See 47 CFR pt. 25. The 12.75-13.25 GHz band is also allocated for Federal use, specifically limited to a single receive-only earth station. See *supra* para. 6.

³⁷ 47 CFR § 2.106, International Table.

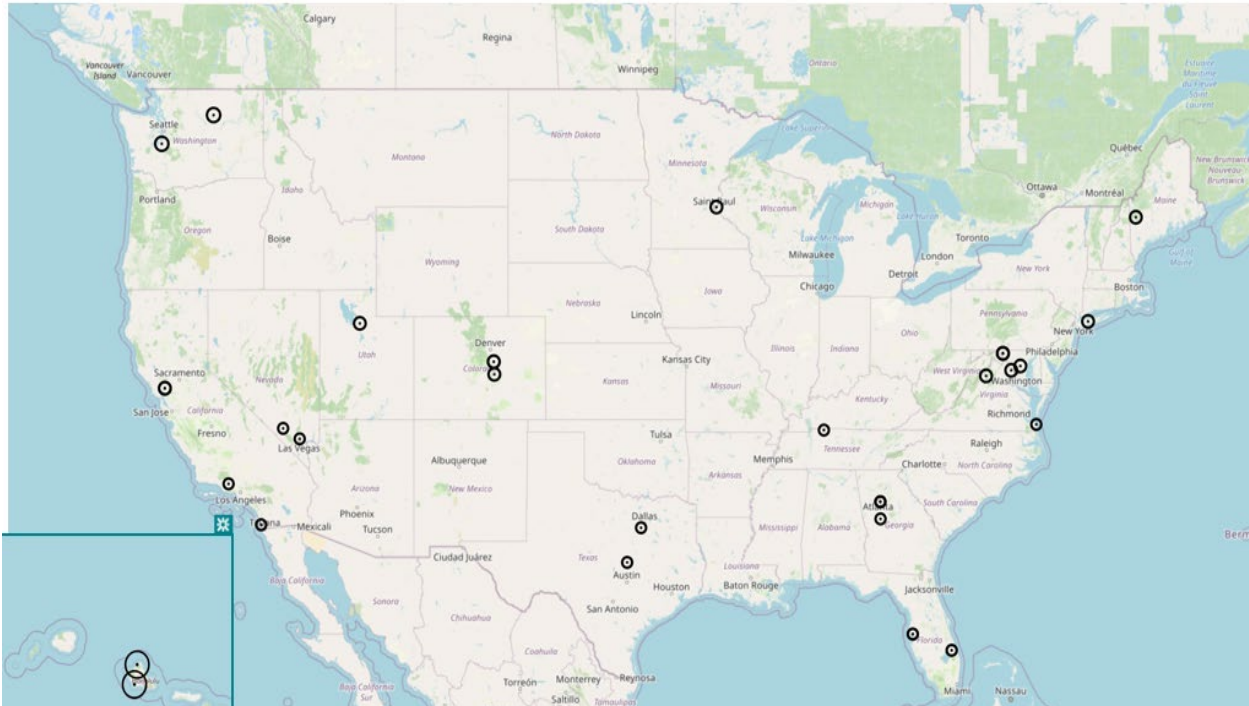
licensed in this band, another system is not operational, and a third has surrendered the Ku-band portion of the grant. There are 43 earth station authorizations in the 12.7-13.25 GHz band with 20 authorized for downlink (space-to-Earth) in the 12.7-12.75 GHz band³⁸ and 23 authorized for uplink (Earth-to-space) in the 12.75-13.25 GHz band. None are authorized for uplink (Earth-to-space) in both the 12.7-12.75 band and the 12.75-13.25 GHz band. Because the 12.7-13.25 GHz band is allocated to the FSS only in the Earth-to-space direction in the United States, any stations that would operate in the space-to-Earth direction in 12.7-12.75 GHz in the United States would be on a non-interference basis and have no right to protection from harmful interference.³⁹ The map below shows 27 locations associated with the 43 earth stations. There are eight earth station authorizations for ESIM or temporary fixed operations that do not specify a specific set of geographic coordinates.⁴⁰ Of the 35 remaining earth stations, there are eight instances of co-location with other earth stations, resulting in the 27 locations shown in the map. In addition, the Department of Defense (DoD) leases commercial satellite services in the 12.7-13.25 GHz band as end users. Such use is subject to FCC rules and regulations.⁴¹

³⁸ Of the 20 earth station authorizations for uplink (space-to-Earth) in the 12.7-12.75 GHz band, eight are for Earth Stations in Motion (ESIMs) and may or may not involve operations in these frequencies in the United States. ESIMs is the collective designation for three types of earth stations that the Commission authorizes to transmit while in motion -- Earth Stations on Vessels (ESVs), Vehicle-Mounted Earth Stations (VMESs), and Earth Stations Aboard Aircraft (ESAAs) -- using frequencies allocated to the FSS. Broadly stated, ESVs refer to earth stations that communicates with a satellite or satellites while located on maritime vessels such as boats, cargo ships, or cruise ships, whereas VMES and ESAAs refer to earth stations that communicate with a satellite or satellites while located on land-based vehicles or on aircraft, respectively. *See* 47 CFR § 25.103. Given the limited coverage of the United States by satellites operating in the 12.7-12.75 GHz band, it can be expected that most such uses are for operations outside of the contiguous United States (CONUS). It should also be noted that, while some such licenses list CONUS as a service area for the earth station, this listing is likely to reflect operations with satellites operating in other frequency bands, rather than in the 12.7-12.75 GHz band.

³⁹ *See Application of Fugro-Chance, Inc.*, 10 FCC Rcd 2860, 2860, para. 2 (1995) (waiver of U.S. Table of Frequency Allocations appropriate “when there is little potential for interference into any service authorized under the Table of Frequency Allocations and when the non-conforming operator accepts any interference from authorized services.”).

⁴⁰ An ESIM is operated by remote control from a ground-based network and monitoring center that is specified in the authorization. *See* 47 CFR § 25.271.

⁴¹ *See* NTIA, Manual of Regulations and Procedures for Federal Radio Frequency Management, § 7.23 (Federal Government Agencies as End Users or Customers of FCC-Licensed Services), https://www.ntia.doc.gov/files/ntia/publications/7_21_1.pdf. *See also* 47 CFR § 300.1(b)(1).



Notes: 27 unique earth station locations are shown (for 35 callsigns) (each with a 50km radius for visibility).

III. DISCUSSION

12. This *NOI* explores the potential for broadening the use of the 12.7 GHz band to support terrestrial mobile broadband or other expanded use. Specifically, we seek comment broadly on the current use of the 12.7 GHz band and on how the licensing and authorization framework and service rules governing the band could be modified to promote mobile broadband or other expanded use, stimulate investment, and encourage intensive use of and deployment in the band. Given the existing incumbent uses of the band, the *NOI* explores two potential options for making some or all of the band available for mobile broadband and other expanded use: new entrants could share the band with incumbent users, or incumbent users could relocate to other spectrum or technologies. We seek comment on the costs and benefits that should be considered in deciding whether to promote new service opportunities in the band through sharing or relocation, as well as whether we should consider some combination of these methods. We also seek comment on whether, if the Commission makes changes to the licensing, authorization, or service rules governing the band, such changes should be geographically limited to CONUS or should apply to non-contiguous states, territories, and possessions.

13. We note that section 303(y) authorizes the Commission to provide for flexible-use operations if: “(1) such use is consistent with international agreements to which the United States is a party; and (2) the Commission finds, after notice and an opportunity for public comment, that (A) such an allocation would be in the public interest; (B) such use would not deter investment in communications services and systems, or technology development; and (C) such use would not result in harmful interference among users.”⁴² We seek comment on whether permitting wireless broadband or other expanded use in the 12.7 GHz band is consistent with this provision.

⁴² Balanced Budget Act of 1997, Pub. L. No. 105-33, 111 Stat 251, 268-69 sec. 3005 Flexible Use of Electromagnetic Spectrum (codified at 47 U.S.C. § 303(y)).

A. Potential Methods for Sharing the Band

14. We seek detailed proposals for innovative and effective approaches to promote coexistence or sharing between potential new entrants and existing users. What methods of sharing could suit the ecosystem of the band and best minimize the potential for harmful interference between existing and potential licensees? We invite comment whether there are new technological advancements, including recent or anticipated equipment features or other alternative technologies, that could facilitate mobile broadband or other expanded use and minimize the potential for harmful interference with incumbent operations?

15. In the paragraphs below, we seek comment on several sharing methodologies, including approaches that the Commission has adopted for other bands made available for mobile broadband or other expanded use. In particular, we invite comments based on experience with a sharing methodology(s) used in other bands. How well has that sharing worked to enable all services to coexist? Which aspects of those rules have worked as anticipated and which rules governing these services presented specific challenges to incumbents or new licensees? In hindsight, which rules should be modified, and how, to better accommodate coexistence among shared services? What are the key lessons learned from these existing spectrum sharing efforts? How can those lessons be applied in the context of the 12.7 GHz band? Would certain incumbent services such as mobile operations pose a particular challenge to spectrum sharing? Should we consider restricting such services to a portion of the 12.7 GHz band, or are there alternative approaches to promoting sharing with such operations?

16. *Sharing Methodologies.* Would static sharing, in frequency, time domain, and/or geography, work for mobile broadband or other expanded use in the 12.7 GHz band? If static sharing would not be effective, should the Commission consider a dynamic sharing model, in which entities share spectrum in time, frequency, and geography? Is there a combination of both static and dynamic spectrum sharing that the Commission should consider for the 12.7 GHz band? The Commission also seeks comment broadly on how we would consider sharing between licensed and unlicensed uses in the 12.7 GHz band, if appropriate. In addition, we seek comment on which particular sharing approaches are most appropriate for co-existence with particular incumbent uses, based on the characteristics of such uses.

17. One specific means of sharing would be to use a database or other spectrum management system similar to those used or under development for devices in the part 96 Citizens Broadband Radio Service or for part 15 unlicensed white space and 6 GHz devices.⁴³ While all three of these models use an automated system for determining operating frequency availability for devices, we note that there are certain important differences between them. For example, under the white space and 6 GHz unlicensed rules, devices must query a database system for a list of available frequencies and permissible operating power on a periodic basis, e.g., once per hour or once per day, and a device may select any available operating frequency and permissible power level from a list provided by the database.⁴⁴ The Citizens Broadband Radio Service Spectrum Access System administrators have greater interactivity with devices and may require devices to change frequency or power level or to cease operation within 60 seconds as necessary to prevent interference to incumbent services or devices with a higher spectrum access

⁴³ 47 CFR §§ 96.53-96.66 (Spectrum Access System for the Citizens Broadband Radio Service); *id.* §§ 15.713-15.715 (White space database); *id.* § 15.407(k) (Automated Frequency Coordination (AFC) system for 6 GHz devices). No AFC system operators have yet been designated by the Commission.

⁴⁴ 47 CFR § 15.711(h)(1)-(h)(2) (requiring fixed and Mode II personal/portable white space devices operating in the TV bands, excluding narrowband devices, to check the database at least once every 60 minutes, and requiring narrowband and fixed and Mode II personal/portable devices operating outside the TV bands to check the database at least once per day); *id.* § 15.407(k)(8)(iv) (requiring 6 GHz standard power access points and fixed client devices to check the AFC system at least once per day).

priority.⁴⁵

18. We seek comment on whether we should require devices to access a database or spectrum management system to protect incumbent services and enable sharing of the 12.7 GHz band. If so, what should be the structure and capabilities of such a system? Should it follow a centralized model where all protected entity data and computations of available frequencies and permissible power levels are in a central location or in the cloud? Or should the system's architecture follow a de-centralized model where a device maintains and regularly updates a local copy of a database and performs the necessary computations to determine which frequencies and power levels are permissible? What data should be contained in the system and what methodology should the system use to determine frequency availability and power levels? Can all necessary data be obtained from Commission databases or would it be necessary for licensees to provide certain information such as the locations of temporary fixed links? To what extent would it be possible for a database system to protect incumbent mobile operations if these operations remain in the band? Would it be feasible to restrict incumbent mobile licensees to a portion of band and adopt a sharing mechanism for access to the partitioned remainder? How would the complexity of spectrum sharing in the 12.7 GHz band compare with spectrum sharing using the current 3.5 GHz Spectrum Access Systems, the white space database, or with the 6 GHz AFC systems that are currently under development? Would device registration in a 12.7 GHz database or with a 12.7 GHz spectrum management system administrator be necessary and would a registration requirement increase cost or complicate design and operations of devices and the system? If the Commission were to consider and adopt rules related to a sharing regime, we seek comment on whether the database or spectrum management system should be administered in a Commission system or by private administrators.

19. For proponents of a database or spectrum access system type sharing regime, we seek comment on how such a system could work with licenses authorized through competitive bidding. In the various systems the Commission has authorized to date, the spectrum is shared either by unlicensed devices in the case of white spaces and 6 GHz U-NII devices or through a multi-tiered licensing scheme where specific frequencies are not assigned by the Commission to any user in the case of the Citizens Broadband Radio Service. Are there modifications to these existing systems or alternatives that could be used where licensees who obtain licenses through competitive bidding could use a database enabled sharing regime and have more certainty in the spectrum they have access to? How would any alternative be able to provide such certainty when an incumbent may also have spectrum access needs? Would spectrum and/or geographic areas need to be cleared, in whole or in part to provide all spectrum users – incumbent and new entrants – spectrum access when needed? What are the costs and benefits of any type of spectrum sharing system that parties propose?

20. Could another possible candidate for a sharing mechanism be the nationwide, nonexclusive licensing system used in the 70/80/90 GHz bands?⁴⁶ In the 70/80/90 GHz bands, the Commission adopted a “licensed-light” approach to allow for FS to enter a band encumbered by Federal operations.⁴⁷ Under this system, entities would be required to apply for a nationwide non-exclusive license for the entire band, after which they would be required to register individual links through a third-party administrator, with first-in-time priority for successfully registered links relative to subsequently

⁴⁵ See 47 CFR § 96.39(c)(2). Devices must also report their received signal strength and operating frequencies to the Spectrum Access System. See *id.* § 96.39 (d)-(e).

⁴⁶ See *Allocations and Service Rules for 71-76 GHz, 81-86 GHz and 92-95 GHz Bands*, WT Docket No. 02-146, Report and Order, 18 FCC Rcd 23318, 23339, para. 45 (2003) (*70/80/90 GHz Report and Order*).

⁴⁷ *Id.* The Commission adopted a flexible and innovative regulatory framework for the 71-95 GHz bands that does not require traditional frequency coordination among non-Federal users. Under this approach, the Commission will issue an unlimited number of non-exclusive, nationwide licenses to non-Federal Government entities for the 12.9 GHz of spectrum allocated for commercial use. See, e.g., *Wireless Telecommunications Bureau Announces Permanent Process for Registering Links in the 71-76 GHz, 81-86 GHz, and 92-95 GHz Bands*, Public Notice, 20 FCC Rcd 2261 (WTB 2005).

registered links.⁴⁸ Would a “licensed-light” database registration approach be viable in the 12.7 GHz band or would the adoption of such a model preclude or present an obstacle to potential mobile use of the band? Would broadband mobile or other expanded use of the band require a system capable of dynamically calculating and enforcing protections among the new and varied incumbents in the band? Would the benefits of exclusive license assignments outweigh the benefits of nonexclusive license assignments in terms of avoiding interference? What would be costs and benefits of using such a licensed-light approach in the 12.7 GHz band?

21. Finally, could sharing be facilitated by application of a long-term sensing technology, as proposed in the Lower 37 GHz proceeding?⁴⁹ This sharing methodology permits various services to coexist by granting each licensee a primary license to a channel in a band in which it is guaranteed a baseline quality of service, while providing licensees with opportunity to use the remaining channels of the entire band on a secondary basis. We seek comment on whether such a system could be applied to the ecosystem of the 12.7 GHz band.

22. Are there alternate sharing approaches that could better address the unique ecosystem of the 12.7 GHz band? Commenters should also consider whether partitioning the 12.7 GHz band into sub-bands could aid coexistence, with each sub-band based on the prevalence and characteristics of the incumbent services that operate in the spectrum.

23. The goal of adopting a sharing methodology would be to enable the introduction of new terrestrial mobile broadband or other expanded use into the band while protecting incumbent licensees. However, the deployment of new services could be more intensive if future expansion of the existing services is limited. Should licensing new earth stations, space stations, fixed point-to-point links, BAS, and CARS stations in the 12.7 GHz band be limited in some way in order to maximize the potential for sharing with new mobile broadband or other expanded use?⁵⁰

24. A unique consideration in this band is NASA’s operation of a receive-only DSN earth station at Goldstone, California that is authorized to receive transmissions across the entire 12.75-13.25 GHz frequency range.⁵¹ The DSN earth station cannot be relocated and must be protected from harmful interference by new entrants, regardless of the licensing regime we adopt. This DSN earth station is located in the remote Mojave Desert and operates with highly sensitive receivers and high gain antennas to receive very weak signals from distant transmissions and is therefore extremely susceptible to interference. In 2010, the Commission adopted rules to permit Wireless Communications Services (WCS) to operate within 145 kilometers of the DSN earth station subject to more stringent technical rules than otherwise applicable and the requirement that, prior to operation, a WCS must achieve a mutually satisfactory coordination agreement with NASA.⁵² We seek comment on whether a similar approach

⁴⁸ *70/80/90 GHz Report and Order*, 18 FCC Rcd at 23339-40, para. 49. In the 70/80/90 GHz bands, registrations are filed with a third-party administrator that coordinates the registrations with NTIA to determine the potential for interference with Federal operations. *See id.* at 23339-40, para. 45; *see also Wireless Telecommunications Bureau Announces Permanent Process for Registering Links in the 71-76 GHz, 81-86 GHz, and 92-95 GHz Bands*, Public Notice, 20 FCC Rcd 2261 (WTB 2005).

⁴⁹ *See* Letter from John. W. Kuzin, Vice President, Spectrum Policy and Regulatory Counsel, Qualcomm, to Marlene H. Dortch, Secretary, FCC, GN Docket No. 14-177 et al., at 2 (filed Mar. 18, 2022) (Qualcomm *Ex Parte*).

⁵⁰ *See generally infra* Section IV, Order (extending freeze on new applications for incumbent services pending the outcome of the instant proceeding).

⁵¹ *See* 47 CFR § 2.106 & n.US251 (“The band 12.75-13.25 GHz is also allocated to the space research (deep space) (space-to-Earth) service for reception only at Goldstone, CA (35°20’ N, 116°53’ W).”).

⁵² *See Amendment of Part 27 of the Commission’s Rules to Govern the Operation of Wireless Communications Services in the 2.3 GHz Band et al.*, WT Docket 07-293 et al., Report and Order and Second Report and Order, 25 FCC Rcd 11710, 11778-79, paras. 166-67 (2010); *see also* 47 CFR §§ 2.106 & footnote US97(b); 27.73(b). The Commission also required any WCS licensee(s) receiving a complaint of harmful interference to NASA’s DSN earth

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should be taken with respect to new mobile broadband or other expanded use in the 12.7 GHz band, whether we could adopt technical rules applicable to new wireless operations that would be sufficient to protect the DSN earth station, or if we should use a combination of both of these approaches. Are there are other options to allow for new entrants to operate in this area while providing adequate protection to the DSN earth station?

B. Sunset of Incumbent Services, Relocation and Cost-Sharing for New Services

25. We inquire whether any incumbent services should be sunset,⁵³ with existing operations relocated from all or part of the band. Would sunseting incumbent services serve the public interest, either because sharing would be infeasible or because clearing or repacking would maximize the potential for more intensive use of the band for mobile broadband or other expanded use by new entrants? Are there specific incumbent uses within the band that should be relocated? Are there specific segments of the 12.7 GHz band that are so intensively used by incumbents that they would preclude co-existence with new entrants? Should any new rules and services be limited to CONUS due to intensive use of the spectrum by incumbents outside CONUS or for other reasons? In general, we seek comment on the intensity of spectrum use by band segment, service and geographic license area. Should some or all incumbent uses be restricted or transitioned to specific segments of the 12.7 GHz band to permit new entrants to provide more intensive wireless broadband in the band? Would it be best to repack some or all incumbent services within a portion of the 12.7 GHz band to make some 12.7 GHz band spectrum available for new mobile broadband or other expanded use? Could more spectrum be made available for expanded use through investments in additional network infrastructure or better compression? Alternatively, should some incumbent operations be relocated to alternative frequencies or alternative technologies, such as fiber, in order to accommodate new uses? Is there suitable spectrum available for such relocation? Would adjacent bands be suitable for relocation purposes for some services because they would require less costly modifications to existing operations?

26. If the findings in this proceeding demonstrate that any incumbent 12.7 GHz band authorizations should be sunset to make all or some of the 12.7 GHz band available for new entrants, should we assign new exclusive, geographic-area-licenses on an overlay basis with a requirement to protect or relocate incumbent operations until the sunset date? If we were to adopt an exclusive-use licensing regime for new entrants, what procedures should apply for the relocation of FS, mobile, and FSS incumbents operating in the 12.7 GHz band? Can relocation procedures based on the Commission's well-established policies for emerging technologies be appropriately adapted to apply here?⁵⁴ We note

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station to take all practicable steps to immediately eliminate the interference no matter the distance from DSN earth station. See 47 CFR § 27.73(c).

⁵³ The sunset is the date by which all incumbent operations cease to be protected from interference by new entrants. See, e.g., 47 CFR §§ 27.1253(a); 101.79(a).

⁵⁴ The Emerging Technologies policies evolved over decades-long Commission experience in successfully clearing spectrum bands by requiring new entrants and incumbents to negotiate in good faith for the provision of comparable facilities in exchange for the incumbent vacating the band or permitting new entrants to involuntarily relocate the incumbents if negotiations fail. See, e.g., *Expanding Flexible Use of the 3.7 to 4.2 GHz Band*, GN Docket No. 18-122, Report and Order and Order of Proposed Modification, 35 FCC Rcd 2343 (2020) (*3.7 GHz Band Report and Order*), *aff'd PSSI Global Services v. FCC*, 983 F.3d 1 (D.C. Cir. 2020) (permitting accelerated relocation of incumbent FSS space and earth stations by new wireless entrants); *Improving Public Safety Communications in the 800 MHz Band*, WT Docket 00-55, Report and Order, Fifth Report and Order, Fourth Memorandum Opinion and Order, and Order, 19 FCC Rcd 14969 (2004) (relocation of BAS, CARS, and LTTS incumbents by new, nationwide wireless entrant); *Redevelopment of Spectrum to Encourage Innovation in the Use of New Telecommunications Technologies*, ET Docket No. 92-9, First Report and Order and Third Notice of Proposed Rulemaking, 7 FCC Rcd 6886 (1992) (relocation of FS incumbents by new wireless entrants). See also *infra* notes 56, 61. The D.C. Circuit has upheld the Commission's authority to require new entrants to relocate incumbent systems to comparable facilities. See, e.g., *Teledesic LLC v. FCC*, 275 F.3d 75, 84-87 (D.C. Cir. 2001); see also *Ass'n of Public Safety*

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that the Commission has taken a flexible approach in applying the Emerging Technologies framework, tailoring the particular obligations on incumbents and new licensees to suit the circumstances.⁵⁵ Would the relocation procedures need to differ for one or more incumbent uses? How would these procedures and obligations differ depending on whether only a portion of the 12.7 GHz band is licensed to new entrants? For each type of incumbent service in the 12.7 GHz band, what relocation deadline(s) would strike a fair and appropriate balance between bringing 12.7 GHz spectrum to market and ensuring that incumbents have the necessary time to complete a transition in a careful, fair, and cost-effective manner?⁵⁶

27. Are there other characteristics of incumbent uses that warrant further variations of our relocation rules? For example, as noted above, the 12.7 GHz band is home to approximately 450 BAS and CARS call signs that authorize land mobile television pickup stations.⁵⁷ These are effectively mobile news gathering technologies that operate over an area defined by a point-radius or other wide-area basis,⁵⁸ making them the most likely to potentially interfere with or receive interference from any new mobile broadband co-channel entrants. While these land mobile pickup transmitter licensees coordinate with each other and share the spectrum among multiple licensees in any given area, if they are unable to coordinate with new mobile broadband or other expanded use, could they be relocated to a portion of the band or else to a different band or technology? Could these applications be migrated to more efficient technology that either uses less spectrum or enables more intensive sharing within the service to free up spectrum for other uses?

28. Similarly, we note that, according to our records, there are 27 FSS satellite records that specify downlinks (space-to-Earth), uplinks (Earth-to-space), or both in the 12.7 GHz band. Can these satellites be relocated to a portion of the 12.7 GHz band or else to a different band? Are there sensitive

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Communications Officials-Int'l, Inc. v. FCC, 76 F.3d 395, 400 (D.C. Cir. 1996) (upholding elimination of an exemption for public safety incumbents from a relocation regime in which new licensees would pay all costs associated with relocating incumbents to comparable facilities).

⁵⁵ See, e.g., *Amendment of Part 2 of the Commission's Rules to Allocate Spectrum Below 3 GHz for Mobile and Fixed Services to Support the Introduction of New Advanced Wireless Services, Including Third Generation Wireless Systems*, ET Docket No. 00-258, Ninth Report and Order and Order, 21 FCC Rcd 4473, 4484 para. 19 (2006) (requiring new entrants to relocate incumbents system-by-system rather than link-by-link due to the unique operations of incumbents' systems); *3.7 GHz Band Report and Order*, 35 FCC Rcd at 2416, para. 182. Some transitions were based on rules that called for negotiations when an ET licensee proposed to operate a base station before the sunset date that would interfere with an incumbent's operation. See, e.g., 47 CFR §§ 101.69-101.81. Other transitions had relatively short sunset dates. See, e.g., 47 CFR §§ 101.83-101.97. In the Broadcast Incentive Auction Transition and for the 3.7-4.2 GHz (3.7 GHz band) Transition, the Commission established cost catalogs for relocation expenses. See *Expanding the Economic and Innovation Opportunities of Spectrum Through Incentive Auctions*, GN Docket No. 12-268, 29 FCC Rcd. 6567, 6820, para. 619 (2014) (delegating authority to the Media Bureau "to ...develop a final Catalog of Eligible Expenses, and make other determinations regarding eligible costs and the reimbursement process."); see also *Wireless Telecommunications Bureau Seeks Comment on Preliminary Cost Category Schedule for 3.7-4.2 GHz Band Relocation Expenses*, Public Notice, DA 20-457, 35 FCC Rcd 4440 (WTB May 12, 2020).

⁵⁶ Based on the unique record presented, the Commission determined that a five-year relocation deadline struck "a fair and appropriate balance between bringing [3.7 GHz band] spectrum to market and ensuring space station operators, earth station operators, and other stakeholders have the necessary time to complete this transition in a careful, fair, and cost-effective manner." *3.7 GHz Band Report and Order*, 35 FCC Rcd at 2410, para. 160. For the relatively limited point-to-point Fixed Service use of the 3.7 GHz band, the Commission determined that incumbents would have three years to self-relocate their links out of the band. *3.7 GHz Band Report and Order*, 35 FCC Rcd at 2463-64, para. 323.

⁵⁷ See *supra* para. 10.

⁵⁸ See 47 CFR § 74.631.

Telemetry, Tracking and Control (TT&C) operations in the 12.7 GHz band for satellites in orbit or scheduled to launch? How can we ensure that TT&C operations are protected for the lifespan of those satellites? Also, should FSS earth stations be treated differently depending on whether they transmit or receive in the band? Satellite earth station receivers tend to be more sensitive to harmful interference than transmitting earth stations. While most earth stations are authorized for uplink (Earth-to-space) in the band, 20 earth stations are authorized for downlink (space-to-Earth) in the lower 50 megahertz of the band (*i.e.*, 12.7-12.75 GHz), in many instances together with other frequencies in the lower-adjacent Ku-band. How many of these earth stations are currently in operation in the United States? How should we address any earth station receive sites in the United States?

29. Should we adopt cost-sharing procedures in this band to apportion relocation costs among those new entrants that would benefit? New entrants often have to relocate an incumbent from a larger frequency range or greater geographic area than where the new entrant will operate, thereby clearing the incumbent for the benefit of others. In such cases, the Commission has developed cost sharing requirements so that all licensees who derive a benefit share the relocation costs regardless of whether they are first to deploy their system or deploy after other licensees have already deployed and incurred spectrum clearing costs.⁵⁹ How should we apportion the expenses of a relocation among those new entrants that benefit from the relocation? What type of formula should be applied? Would that formula differ for FS, mobile, or FSS? Would there be a need to designate one or more clearinghouses to administer the cost-sharing plan and calculate the amount of each beneficiary's reimbursement obligation in accordance with any formula that would be set forth in our rules?⁶⁰ Are there opportunities to incentivize the relocation of some or all types of incumbents on an accelerated basis?⁶¹ Would some form of the accelerated relocation payment approach such as was used for the 3.7-4.2 GHz band (3.7 GHz band) or an incentive auction similar to the approach used for reorganizing the 38.6-40 GHz band (39 GHz band) be appropriate to accelerate clearing some or all incumbent services out of some or all of the 12.7 GHz band?⁶²

⁵⁹ *3.7 GHz Band Report and Order*, 35 FCC Rcd at 2445, para. 250; *Service Rules for Advanced Wireless Services H Block—Implementing Section 6401 of the Middle Class Tax Relief and Job Creation Act of 2012 Related to the 1915-1920 MHz and 1995-2000 MHz Bands*, WT Docket No. 12-357, Report and Order, 28 FCC Rcd 9483, 9548, para. 167 (2013); *Amendment of Part 2 of the Commission's Rules to Allocate Spectrum Below 3 GHz for Mobile and Fixed Services to Support the Introduction of New Advanced Wireless Services, Including Third Generation Wireless Systems*, ET Docket No. 00-258, Ninth Report and Order, 21 FCC Rcd 4473, 4478, para. 8 (2006); *Amendment to the Commission's Rules Regarding a Plan for Sharing the Costs of Microwave Relocation*, WT Docket No. 95-157, Memorandum Opinion and Order on Reconsideration, 15 FCC Rcd 13999, 14004, para. 10 (2000).

⁶⁰ A cost-sharing clearinghouse is a third-party(s) that is typically designated by the Wireless Telecommunications Bureau pursuant to delegated authority. *See Expanding Flexible Use of the 3.7 to 4.2 GHz Band*, GN Docket 18-22, Public Notice, 35 FCC Rcd 11859 (WTB 2020); *Wireless Telecommunications Bureau Designates Clearinghouses That Will Administer the 2 GHz PCS Relocation Cost-Sharing Plan*, Public Notice, 11 FCC Rcd 10634 (WTB 1996); *see also Wireless Telecommunications Bureau Finds CTIA and PCIA Qualified to Administer the Cost-Sharing Plan for Licensees in the 2.1 GHz Bands*, WT Docket 02-353, Public Notice, 21 FCC Rcd 11265 (WTB 2006).

⁶¹ Based on the unique record presented for the 3.7 GHz band, the Commission adopted two Accelerated Relocation Deadlines—a one year Phase I deadline and a three-year Phase II deadline—“for incumbent space station operators that voluntarily relocate on an accelerated schedule (with additional obligations and incentives for such operators).” *3.7 GHz Band Report and Order*, 35 FCC Rcd at 2413, para. 168.

⁶² *See 3.7 GHz Band Report and Order*, 35 FCC Rcd at 2413-14 paras. 168-72 (accelerated relocation); *Use of Spectrum Bands Above 24 GHz For Mobile Radio Services*, GN Docket No. 14-177, Fourth Report and Order, 33 FCC Rcd 12168, 12179, paras. 33-34 (2018) (incumbents were given the options of not participating in the auction and accepting a reconfiguration of their holdings, or else relinquishing their licenses in exchange for incentive payments and the opportunity to bid on new licenses in the auction); *see also* 47 U.S.C. § 309(j)(8)(G) (providing

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30. While the Emerging Technologies framework generally allows private negotiations, we seek comment on whether in the context of the specific incumbencies here, the Commission could rely on the incentives of the parties in private negotiations for transition of the band to allow new entrants. Specifically, is there an opportunity to adopt a negotiation-based framework that would rely on private agreements between new entrants and incumbents for the relocation or protection of incumbents, similar to the broadband segment of the 900 MHz band?⁶³ If we were to adopt an approach similar to that used in the 900 MHz band, would we need to partition the band to reserve separate dedicated spectrum for new entrants and incumbents, similar to how the 900 MHz broadband segment was developed? How would the negotiation-based private agreements differ for FS, mobile, or FSS in such a context? Alternatively, is there some reason to think there could be hold out problems or other issues that require an additional mechanism beyond relying on solely a negotiation-based framework as we did in 900 MHz, such as accelerated relocation payments or some other tool?

C. Potential Licensing Approaches, Service, and Technical Rules

31. In connection with our questions above about sharing and relocation, we seek comment on what licensing approach would facilitate the deployment of new mobile broadband or other expanded use in the 12.7 GHz band. Should we assign new licenses on an exclusive-use basis, through the issuance of new geographic-area overlay licenses? Or should we consider other licensing approaches, such as non-exclusive, site-based, or a tiered approach such as that used in the Citizens Broadband Radio Service?⁶⁴ Are there particular licensing frameworks that would more effectively promote investment in the band, or better facilitate the broadest range of services in the band? We seek comment on which licensing framework would maximize competition by a diverse set of operators. We also seek comment on what service and technical rules should be applied in the band. For example, are there particular rule provisions—such as particular channel sizes—that might promote effective coordination and use of the band? Are there pairing opportunities between this band and other spectrum bands for fixed or mobile services? We encourage commenters to discuss how potential modifications to the service and technical rules could promote robust and efficient use of spectrum resources, minimize the potential for harmful interference, and maximize flexibility for licensees to meet the needs of their end users.

32. In addition, are there unique considerations along our borders with Canada and Mexico that could pose additional problems in reaching new or modified cross-border agreements pertaining to the use of this spectrum? Are there any other international issues we need to take into consideration?⁶⁵ What actions would facilitate more international harmonization within the 12.7 GHz band? We seek comment on the costs and benefits of any authorization framework proposed for mobile services considering the incumbent deployments in the band.

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that “the Commission may encourage a licensee to relinquish voluntarily some or all of its licensed spectrum usage rights in order to permit the assignment of new initial licenses subject to flexible-use service rules by sharing with the licensee a portion . . . of the proceeds [from an auction],” with the licensee’s potential share “based on the value of the relinquished rights as determined in the reverse auction,” provided that at least two competing licensees participate in the reverse auction).

⁶³ 47 CFR §§ 27.1500-1510; *Review of the Commission’s Rules Governing the 894-901/935-940 MHz Band*, WT Docket No. 17-200, Report and Order, Order of Proposed Modification, and Orders, 35 FCC Rcd 5183 (2020).

⁶⁴ *See Amendment of the Commission’s Rules with Regard to Commercial Operations in the 3550-3650 MHz Band*, GN Docket No. 12-354, Report and Order and Second Further Notice of Proposed Rulemaking, 30 FCC Rcd 3959, 3962, 3975-80, paras. 4, 45-59 (2015). *See also* 47 CFR pt. 96, subpts. C (Priority Access), & D (General Authorized Access).

⁶⁵ We note that under WRC-23 agenda item 1.15, the International Telecommunications Union is studying the potential use of the frequency band 12.75-13.25 GHz (Earth-to-space) by earth stations on aircraft and vessels communicating with geostationary space stations in the fixed-satellite service.

D. Impact on Adjacent Bands

33. We seek comment on an appropriate protection level that new operations in the 12.7 GHz band would have to provide incumbent services in the lower and upper adjacent bands as further discussed below.

34. The Commission has allocated the 12.2-12.7 GHz lower adjacent band for the Fixed Service (FS), Broadcasting Satellite Service (BSS), and the Fixed Satellite Service (Space-to-Earth) (FSS).⁶⁶ Currently there are three services authorized and operating in the band: DBS providers operating under the primary BSS allocation, Multi-Channel Video and Data Distribution (MVDDS) licensees operating under the fixed allocation, and NGSO FSS licensees. The latter two services operating on a non-harmful interference basis to DBS under their co-primary FS and FSS allocations. While there is an open Commission proceeding considering whether to allocate the band to permit mobile use,⁶⁷ the Commission has accepted and granted NGSO FSS applications and petitions for market access.⁶⁸ There are no primary Federal allocations in the 12.2-12.7 GHz band. For MVDDS services, the Commission's rules specify detailed technical requirements that provide interference protection to DBS and NGSO FSS, including specific out-of-band emission (OOBE), EIRP, power flux density (PFD), and equivalent power flux density (EPFD) limits.⁶⁹

35. In the upper adjacent band, the Commission allocated the 13.25-13.4 GHz band for use by the Aeronautical Radionavigation Service (ARNS) on a primary basis and the Earth Exploration Satellite Service (active) (EESS) and the Space Research Service (SRS) (active) on a secondary basis.⁷⁰

⁶⁶ See 47 CFR § 2.106 & footnote 5.487A. NGSO FSS (space-to-Earth) operations are authorized pursuant to international footnote 5.487A, which provides that the 12.2-12.7 GHz band is additionally allocated in Region 2 to “the fixed-satellite service (space-to-Earth) on a primary basis, limited to non-geostationary systems and subject to application of the provisions of [ITU Radio Regulations] No. 9.12 for coordination with other non-geostationary-satellite systems in the fixed-satellite service.”

⁶⁷ *Expanding Flexible Use of the 12.2-12.7 GHz Band, et al.*, WT Docket No. 20-443, Notice of Proposed Rulemaking, 36 FCC Rcd 606, 610, para. 12 & n.28 (2021) (*12.2 GHz NPRM*) (citing *Petition of MVDDS 5G Coalition Petition for Rulemaking*, RM-11768, filed Apr. 26, 2016).

⁶⁸ See, e.g., *WorldVu Satellites Limited, Petition for Declaratory Ruling Granting Access to the U.S. Market for the OneWeb NGSO FSS System*, Order and Declaratory Ruling, 32 FCC Rcd 5366 (2017); *Space Norway AS, Petition for a Declaratory Ruling Granting Access to the U.S. Market for the Arctic Satellite Broadband Mission*, Order and Declaratory Ruling, 32 FCC Rcd 9649 (2018); *Karousel Satellite LLC, Application for Authority to Launch and Operate a Non-Geostationary Earth Orbit Satellite System in the Fixed Satellite Service*, Memorandum Opinion, Order and Authorization, 33 FCC Rcd 8485 (2018); *Space Exploration Holdings, LLC Application For Approval for Orbital Deployment and Operating Authority for the SpaceX NGSO Satellite System*, Memorandum Opinion Order and Authorization, 33 FCC Rcd 3391 (2018); *Kepler Communications Inc. Petition for Declaratory Ruling to Grant Access to the U.S. Market for Kepler's NGSO FSS System*, Order, 33 FCC Rcd 11453, (2018); *Theia Holdings A, Inc. Request for Authority to Launch and Operate a Non-Geostationary Satellite Orbit System in the Fixed-Satellite Service, Mobile-Satellite Service, and Earth-Exploration Satellite Service*, Memorandum, Opinion and Authorization, 34 FCC Rcd 3526 (2019).

⁶⁹ For example, to accommodate co-primary NGSO FSS earth stations in the 12.2-12.7 GHz band, the PFD of an MVDDS transmitting system must not exceed -135 dBW/m²/4 kHz at distances greater than 3 kilometers from the MVDDS transmitting antenna. See 47 CFR § 101.105(a)(4)(i). To accommodate co-primary DBS earth stations, the Commission has specified four regional equivalent power flux density levels with the highest being -168.4 dBW/m²/4kHz and the lowest being -172.1 dBW/m²/4kHz. See 47 CFR § 101.105(a)(4)(ii)(B). The maximum EIRP for the MVDDS is 14.0 dBm per 24 MHz while incumbent point-to-point stations may use up to 50 dBW. See 47 CFR § 101.113(a) n.11. The mean out-of-band emission power limit of the MVDDS is -13 dBm/MHz, however, this emission mask only applies at the 12.2-12.7 GHz band edges and does not restrict MVDDS channelization bandwidth within the band. See 47 CFR § 101.111(a)(2)(i) & Note.

⁷⁰ See 47 CFR § 2.106.

The Federal allocations in this band are consistent with the non-Federal allocations and include a further stipulation that the Earth Exploration Satellite (active) and Space Research (active) services shall not cause harmful interference to, or constrain the use and development of, ARNS.⁷¹ The radionavigation radars operating in this band are used for aircraft onboard navigation systems.⁷² Military and civilian aircraft use airborne Doppler navigation radar systems in the 13.25-13.4 GHz band to determine ground speed and drift angle of an aircraft with respect to the ground. Unmanned aircraft detect-and-avoid systems are also being developed in this band. We seek information on what measures may be needed to ensure co-existence between Federal services in this adjacent band and potential new non-federal operations in the 12.7 to 13.25 GHz band.

36. The protection level for the aeronautical radionavigation radars is expressed as a ratio of the interfering signal power to radar receiver noise power level (I/N) and ITU-R M.2008 sets this I/N criterion at -10 dB, which represents the aggregate protection level if multiple interferers are present.⁷³

37. The active spaceborne sensors in the 13.25-13.4 GHz band consist of Altimeters, Scatterometers, and Precipitation radars.⁷⁴ The protection levels for active space-borne sensors are also expressed in terms of the ratio of interfering signal power to radar receiver noise power level (I/N), and ITU-R RS.1166-4 sets the criterion of I/N of -3 dB, -5 dB, and -10 dB for Altimeters, Scatterometers, and Precipitation radars, respectively.⁷⁵

38. In the 13.4-13.75 GHz band, military agencies operate shipborne radars, including search radars, tracking radars, and missile and gun fire-control radars. The National Oceanic and Atmospheric Administration (NOAA) operates the JASON series of altimeter satellites. NASA uses this band for active remote sensing, including the future Surface Water and Ocean Topography (SWOT) mission. NASA's Global Precipitation Mission (GPM) and Tracking and Data Relay Satellite (TDRS) system also use this band. The NSF uses this band for continuum and spectral-line research. We seek information on what measures may be needed to ensure compatibility and coordination between these Federal services in this adjacent band and potential new non-federal operations in the 12.7 GHz band. Would time-based sharing tools facilitate coordination?

39. Recognizing the need for services in these adjacent bands to continue providing service, we seek comment on whether provisions beyond the existing 12.7 GHz band fixed service protection levels for adjacent bands would be necessary for mobile broadband or other expanded-use operations in the 12.7 GHz band to prevent harmful interference to operations in those adjacent bands. The fixed services in the 12.7 GHz band are the predominant current use of the 12.7 GHz band in terms of potential interference into the lower and upper adjacent bands. For the fixed services, the Commission's rules specify detailed technical requirements including a maximum EIRP and out-of-band emission (OOBE) limit. The maximum EIRP limit in this band is 50 dBW provided the Fixed Service antenna beam is not directed within 1.5 degrees of the geostationary satellite orbit.⁷⁶ The mean out-of-band emission power limit of the fixed services in the 12.7 GHz band is -13 dBm/MHz.⁷⁷ We note that DBS, MVDDS, and

⁷¹ See 47 CFR § 2.106 & n.5.498A.

⁷² See International Telecommunication Union, Characteristics and protection criteria for radars operating in the aeronautical radionavigation service in the frequency band, 13.25-13.40 GHz, Recommendation ITU-R M.2008-1, at 2 (2014) ("Rec. ITU-R M.2008-1").

⁷³ See Rec. ITU-R M.2008-1 at 2.

⁷⁴ See International Telecommunication Union, Performance and interference criteria for active spaceborne sensors, 13.25-13.40 GHz, Recommendation ITU-R RS.1166-4 at 3, 4, 5 & 8 (2009) ("Rec. ITU-R RS.1166-4").

⁷⁵ See Rec. ITU-R RS.1166-4 at 3.

⁷⁶ See 47 CFR §§ 101.113(a), 101.145(c).

⁷⁷ See 47 CFR § 101.111(a)(2)(i).

NGSO FSS in the lower adjacent band and Aeronautical Radionavigation and Earth exploration satellite services in the upper adjacent bands have coexisted with the fixed operations in the 12.7 GHz band for several years. We seek comment on whether the maximum specified out-of-band emission level of -13 dBm/MHz is sufficient to protect services in the adjacent bands from harmful interference. We also seek comment on whether any particular blocking limit is necessary given that the incumbent services in the 12.7 GHz have a maximum EIRP of 50 dBW.

40. If further consideration is necessary, we ask that commenters include technical details including any and/or all assumptions and parameters. For example, how would the in-band requirements specified in various ITU documents, discussed above, translate to out-of-band requirements in the 12.7 GHz? Is any further information or assumptions necessary, particularly concerning out-of-band receiver blocking performance for receivers in the adjacent bands? We seek detailed information on the receiver, antenna, and operational characteristics for services operating in the adjacent bands, including DBS, NGSO, MVDDS, active spaceborne sensors, and ARNS. We further seek comment on any additional considerations that should be included to provide adequate protection for services in the adjacent bands.

E. Costs and Benefits

41. We invite comment on the costs and benefits associated with the various approaches discussed in this *NOI* to open the 12.7 GHz band to mobile broadband or other expanded use. We recognize that there could be a range of tradeoffs to consider, including different costs and benefits associated with sharing or relocating different types of incumbent services. We invite comment on ways to minimize the costs, optimize the benefits, and otherwise take a balanced approach to permitting mobile broadband or other expanded use of the 12.7 GHz band.

F. Other Possible Approaches and Issues

42. We invite comment on other possible approaches for the Commission's consideration and on the costs and benefits of such approaches. Are there other studies, efforts, analyses that we should consider in this proceeding? If so, we ask that commenters identify them and explain why they should be considered.

43. *Digital Equity and Inclusion.* Finally, the Commission, as part of its continuing effort to advance digital equity for all,⁷⁸ including people of color, persons with disabilities, persons who live in rural or Tribal areas, and others who are or have been historically underserved, marginalized, or adversely affected by persistent poverty or inequality, invites comment on any equity-related considerations⁷⁹ and any potential benefits that may be associated with the various approaches and issues discussed herein. Specifically, we seek comment on how the various approaches that the Commission may consider may promote or inhibit advances in diversity, equity, inclusion, and accessibility, as well the scope of the Commission's relevant legal authority.

⁷⁸ Section 1 of the Communications Act of 1934 as amended provides that the FCC "regulat[es] interstate and foreign commerce in communication by wire and radio so as to make [such service] available, so far as possible, to all the people of the United States, without discrimination on the basis of race, color, religion, national origin, or sex." 47 U.S.C. § 151.

⁷⁹ The term "equity" is used here consistent with Executive Order 13985 as the consistent and systematic fair, just, and impartial treatment of all individuals, including individuals who belong to underserved communities that have been denied such treatment, such as Black, Latino, and Indigenous and Native American persons, Asian Americans and Pacific Islanders and other persons of color; members of religious minorities; lesbian, gay, bisexual, transgender, and queer (LGBTQ+) persons; persons with disabilities; persons who live in rural areas; and persons otherwise adversely affected by persistent poverty or inequality. See Exec. Order No. 13985, 86 Fed. Reg. 7009, Executive Order on Advancing Racial Equity and Support for Underserved Communities Through the Federal Government (January 20, 2021).

IV. ORDER

44. On September 19, 2022, the International, Media, Public Safety and Homeland Security, and Wireless Telecommunications Bureaus announced a temporary, 180-day, freeze, effective as of September 19, 2022, on filing new or modified applications for licenses in the 12.7 GHz band.⁸⁰ The purpose of this freeze was “to preserve the current landscape of authorized operations in the 12.7 GHz band pending the Commission’s consideration of actions that might encourage the larger and more effective use of radio in the public interest.”⁸¹ The Bureaus noted that “[t]he Commission or the Bureaus may extend the freeze if doing so is deemed necessary to avoid undermining the purpose of the freeze.”⁸² In view of our adoption of the instant *Notice of Inquiry*, we order the extension of the temporary freeze pending the outcome of GN Docket No. 22-352. The Bureaus retain jurisdiction to modify the freeze notwithstanding this order.

V. PROCEDURAL MATTERS

45. *Ex Parte Rules.* This proceeding shall be treated as a “permit-but-disclose” proceeding in accordance with the Commission’s *ex parte* rules.⁸³ Persons making *ex parte* presentations must file a copy of any written presentation or a memorandum summarizing any oral presentation within two business days after the presentation (unless a different deadline applicable to the Sunshine period applies). Persons making oral *ex parte* presentations are reminded that memoranda summarizing the presentation must (1) list all persons attending or otherwise participating in the meeting at which the *ex parte* presentation was made, and (2) summarize all data presented and arguments made during the presentation. If the presentation consisted in whole or in part of the presentation of data or arguments already reflected in the presenter’s written comments, memoranda, or other filings in the proceeding, the presenter may provide citations to such data or arguments in his or her prior comments, memoranda, or other filings (specifying the relevant page and/or paragraph numbers where such data or arguments can be found) in lieu of summarizing them in the memorandum. In proceedings governed by rule 1.49(f) or for which the Commission has made available a method of electronic filing, written *ex parte* presentations and memoranda summarizing oral *ex parte* presentations, and all attachments thereto, must be filed through the electronic comment filing system available for that proceeding, and must be filed in their native format (e.g., .doc, .xml, .ppt, searchable .pdf).⁸⁴ Documents shown or given to Commission staff during *ex parte* meetings are deemed to be written *ex parte* presentations and must be filed consistent with Rule 1.1206(b).⁸⁵ Participants in this proceeding should familiarize themselves with the Commission’s *ex parte* rules.

46. *Comment Filing Procedures.* Pursuant to sections 1.415 and 1.419 of the Commission’s rules, 47 CFR §§ 1.415, 1.419, interested parties may file comments and reply comments on or before the dates indicated on the first page of this document. Comments may be filed using the Commission’s Electronic Comment Filing System (ECFS) or by paper.

⁸⁰ See *180-Day Freeze On Applications for New Or Modified Authorizations for the 12.7-13.25 GHz Band*, Public Notice, DA 22-974 (IB, PSHSB, MB, and WTB rel. Sept. 19, 2022) (*Freeze Public Notice*).

⁸¹ *Freeze Public Notice* at 1.

⁸² *Freeze Public Notice* at 1-2.

⁸³ 47 CFR § 1.1200 *et seq.* Although the rules do not generally require *ex parte* presentations to be treated as “permit but disclose” in Notice of Inquiry proceedings, *see id.* § 1.1204(b)(1), we exercise our discretion in this instance, and find that the public interest is served by making *ex parte* presentations available to the public, in order to encourage a robust record. *See id.* § 1.1200(a).

⁸⁴ 47 CFR § 1.49(f).

⁸⁵ 47 CFR § 1.1206(b).

- Electronic Filers: Comments may be filed electronically by accessing ECFS at <https://www.fcc.gov/ecfs>.
- Paper Filers: Parties who choose to file by paper must file an original and one copy of each filing. Filings can be sent by commercial overnight courier, or by first-class or overnight U.S. Postal Service mail. All filings must be addressed to the Commission’s Secretary, Office of the Secretary, Federal Communications Commission.
 - Effective March 19, 2020, and until further notice, the Commission no longer accepts any hand or messenger delivered filings. This is a temporary measure taken to help protect the health and safety of individuals, and to mitigate the transmission of COVID-19.⁸⁶
 - Commercial overnight mail (other than U.S. Postal Service Express Mail and Priority Mail) must be sent to 9050 Junction Drive, Annapolis Junction, MD 20701.
 - U.S. Postal Service first-class, Express, and Priority mail must be addressed to 45 L Street NE, Washington, D.C. 20554.

47. *Availability of Documents.* Comments, reply comments, and *ex parte* submissions will be publicly available online via ECFS. These documents will also be available for public inspection during regular business hours in the FCC Reference Information Center, when FCC Headquarters reopen to the public.

48. *People with Disabilities.* To request materials in accessible formats for people with disabilities (braille, large print, electronic files, audio format), send an e-mail to fcc504@fcc.gov or call the Consumer & Governmental Affairs Bureau at 202-418-0530 (voice), 202-418-0432 (tty).

49. *Further Information.* For additional information on this proceeding, contact Simon Banyai of the Wireless Telecommunications Bureau, at simon.banyai@fcc.gov or (202) 418-1443, or Nick Oros of the Office of Engineering and Technology, at nicholas.oros@fcc.gov or (202) 418-2099.

VI. ORDERING CLAUSES

50. Accordingly, IT IS ORDERED that, pursuant to sections 4(i), 301, 302(a), 303(e), 303(f), and 303(r) of the Communications Act of 1934, as amended, 47 U.S.C. §§ 154(i), 301, 302(a), 303(e), 303(f), and 303(r), this Notice of Inquiry and Order IS ADOPTED and EFFECTIVE upon release.

FEDERAL COMMUNICATIONS COMMISSION

Marlene H. Dortch
Secretary

⁸⁶ See *FCC Announces Closure of FCC Headquarters Open Window and Change in Hand-Delivery Policy*, Public Notice, 35 FCC Rcd 2788 (2020), <https://www.fcc.gov/document/fcc-closes-headquarters-open-window-and-changes-hand-delivery-policy>.