



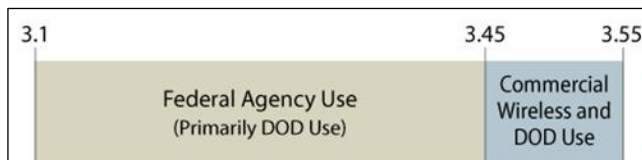
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Repurposing 3.1-3.55 GHz Spectrum: Issues for Congress

Wireless technologies use radio waves, or frequencies, to transmit and receive voice and data signals. The radio spectrum is the range of frequencies used for wireless mobile, satellite, television, AM and FM radio, military radar, and aviation communications. Increases in wireless technology use have led to increased demand for spectrum. Since it is a limited resource, the U.S. government promotes spectrum sharing and the use of spectral efficiency technologies to increase access for new wireless technologies, while accommodating incumbent users.

This CRS In Focus discusses the 3.1-3.55 gigahertz (GHz) radio spectrum band, including the reallocation and auction of the 3.45-3.55 GHz segment, and congressional proposals to reallocate the 3.1-3.45 GHz segment (Figure 1). The Department of Defense (DOD) uses the 3.1-3.45 GHz segment for radar systems. The DOD Chief Information Officer (CIO) acknowledged the potential for shared federal and nonfederal use but stated that DOD cannot fully vacate the segment without significant operational impact.

Figure 1. 3.1-3.55 GHz Band



Source: Congressional Research Service.

Notes: The graphic shows general use of the 3.1-3.45 GHz band and 3.45-3.55 GHz band in March 2023. DOD = Department of Defense.

The 117th Congress enacted legislation (P.L. 117-58, §90008) providing DOD funds to study its use of the 3.1-3.45 GHz band to make spectrum available for shared federal and nonfederal use and allowing DOD to determine frequencies that may be shared with nonfederal users. The House then passed legislation (H.R. 7624) that would have repealed Section 90008 and provided funds for any affected agency operating in the band to conduct studies to make the band available for nonfederal, shared federal and nonfederal, or combination use. This meant a portion could be reallocated for exclusive commercial use, which some DOD officials do not support. Similar legislation was introduced in the Senate (S. 4117). Neither was enacted. Senator Cantwell offered an amendment (S.Amdt. 6585) to the Consolidated Appropriations Act, 2023 (P.L. 117-328), that included, among many things, a study of the band for nonfederal, shared federal and nonfederal, or combination use, with protections for DOD. The amendment did not advance.

In the 118th Congress, debate has centered on whether to make all or a portion of the band available for nonfederal use or shared use and the role of DOD in the process. A

potential challenge for Congress may be finding a solution that protects DOD operations, supports expansion of wireless services, and maximizes spectrum use and value.

3.1-3.55 GHz Band Background

The reallocation of segments of the 3.1-3.55 GHz band has been considered since 2010. This section provides a timeline of key actions taken during these considerations.

March 2010: Federal Communications Commission (FCC) issued National Broadband Plan.

In the 2010 National Broadband Plan, the FCC, which manages nonfederal spectrum use, recommended the U.S. government make 500 megahertz (MHz) of spectrum available for mobile use within the next 10 years.

June 2010: President Obama called on agencies to make spectrum available for broadband.

President Obama signed a memorandum that called on the National Telecommunications Information Administration (NTIA), which manages federal spectrum use, to coordinate with the FCC to make 500 MHz of spectrum available for wireless broadband use within 10 years.

October 2010: NTIA 10-Year Plan.

NTIA published a 10-year plan to make 500 MHz of spectrum available for wireless broadband use. NTIA identified more than 20 potential bands for repurposing. The 3.1-3.5 GHz segment was one of the largest identified.

March 2018: Congress directed NTIA to study the entire 3.1-3.55 GHz band.

In the MOBILE NOW Act of 2018 (P.L. 115-141, §605), Congress required the Secretary of Commerce, through NTIA and in consultation with the FCC and the head of each affected federal agency, to submit a report by March 23, 2020, evaluating the feasibility of allowing commercial wireless services to share use of the 3.1-3.55 GHz segment. The report (described below), published in July 2020, assessed federal use, the impact of nonfederal users on federal operations, actions to avoid interference, and frequencies most conducive to sharing.

July 2020: NTIA report on the 3.1-3.55 GHz band.

In response to the MOBILE NOW Act, NTIA conducted technical studies and, in July 2020, released a feasibility report on the 3.1-3.55 GHz band. It found (1) the 3.45-3.55 segment is suitable for potential spectrum sharing and (2) some spectrum sharing below 3.45 GHz may be possible, but additional analysis was necessary to address specific challenges. First, there are classified and unclassified federal operations below 3.45 GHz, which could make sharing challenging. Second, if federal operations in 3.45-

3.55 GHz segment are shifted into the 3.1-3.45 GHz segment, it may become congested.

August 2020: President Trump announced the availability of the 3.45-3.55 GHz segment for 5G.

On August 10, 2020, a White House fact sheet stated that at the President's direction, in coordination with DOD, the 3.45-3.55 GHz segment would be available for 5G services.

December 2020: Congress required the FCC to auction the 3.45-3.55 GHz segment.

On December 27, 2020, in the Consolidated Appropriations Act, 2021 (P.L. 116-260), Congress required the FCC to commence competitive bidding (i.e., auction) of the 3.45-3.55 GHz segment no later than December 31, 2021.

March 2021: 3.45-3.55 GHz auction.

In March 2021, the FCC adopted rules giving nonfederal entities use of the 3.45-3.55 GHz segment, stipulating that federal systems may not cause interference to nonfederal users except in certain areas where incumbent federal systems will remain in this segment. The auction began October 5, 2021, and ended January 4, 2022, resulting in over 4,000 licenses and generating over \$22 billion.

November 15, 2021: The Infrastructure Investment and Jobs Act (IIJA) provided funds for DOD to study shared use in the 3.1-3.45 GHz segment.

IIJA (P.L. 117-58), Section 90008, provided DOD \$50 million to study, analyze, and plan for making spectrum in the 3.1-3.45 GHz segment available for shared federal and nonfederal use, in order to identify frequencies for auction.

April 28, 2022: Bills to repeal IIJA, Section 90008.

On April 28, 2022, H.R. 7624 and S. 4117 were introduced. The bills would have repealed Section 90008 of P.L. 117-58 and funded affected agencies to study the potential for nonfederal, shared federal and nonfederal, or combination use, meaning all or a portion of the 3.1-3.45 GHz segment could be reallocated for exclusive nonfederal use. H.R. 7624 passed the House on July 28, 2022, but neither bill, nor a compromise bill, was enacted.

September 2022: DOD officials reiterated the importance of the band to military operations.

At a September 2022 NTIA Spectrum Policy Symposium, DOD's CIO noted, "We have many radars [in the 3.1-3.45 GHz segment] ... that are critical for our service members to train on before they deploy into harm's way overseas, and also to protect our homeland." He stressed the need to share rather than relinquish spectrum, noting, "it would take us two decades and hundreds of billions of dollars to be able to refactor and move those radars out of there."

December 2022: Senate Amendment 6585.

On December 20, 2022, Senator Cantwell offered an amendment (S.Amdt. 6585) to the Consolidated Appropriations Act, 2023 (Act). It would have provided agencies funds to study nonfederal, shared federal and nonfederal, or combination use in the 3.1-3.45 GHz segment; directed the Secretary of Commerce to identify frequencies for auction; and given DOD authority to elevate concerns about reallocation to the President. Members

seeking to preserve DOD's access to the band opposed the amendment. It was not included in the Act.

Sharing Models

Spectrum may be shared by multiple users, through roaming or leasing agreements; use of the same frequencies but in different locations to avoid interference; and use of frequency coordination. DOD works with federal partners through Emerging Mid-Band Radar Spectrum Sharing (EMBRSS), an initiative to develop ways to share the 3.1-3.45 GHz segment. It works with industry and academia through Partnering to Advance Trusted and Holistic Spectrum Solutions (PATHSS) under the National Spectrum Consortium, an organization of industry experts that supports the government in developing new spectrum initiatives to develop ways to share the 3.1-3.45 GHz band.

The FCC instituted a sharing model in the 3.55-3.7 GHz band (known as the Citizen Broadband Radio Service, or CBRS) that created a three-tiered approach for sharing among federal and nonfederal users. Tier 1 users—incumbent federal users—continue to operate in the band. Tier 2 users—commercial providers with auctioned rights for specific frequencies in certain locations—hold Priority Access Licenses (PAL) but cannot interfere with Tier 1 users. Tier 3 users—General Authorized Access (GAA) users—can use the band at no charge, when frequencies are not in use. Tier 3 users cannot interfere with Tier 1 or Tier 2 users and may be subject to interference from them. An automated frequency coordinator, known as a Spectrum Access System (SAS), manages spectrum use.

Some spectrum users view the CBRS model as an effective approach for protecting federal users and enabling commercial access. Most commercial wireless providers prefer licenses that grant exclusive use of spectrum. Hence, auctions of exclusive use licenses often generate more revenue than auctions for shared use. Thus, while the CBRS auction generated over \$4.5 billion, the C-band auction (3.7-4.2 GHz) of exclusive use licenses yielded \$81 billion.

Congressional Considerations

One congressional option is to keep IIJA, Section 90008, allowing DOD to complete its study and determine the frequencies it can share with nonfederal users. This could protect DOD operations but may not make enough spectrum available for providers to meet wireless demands or generate the maximum in auction revenues for deficit reduction or public interest programs (e.g., 9-1-1). Another option could be legislation such as H.R. 7624, S. 4117, or S.Amdt. 6585, requiring DOD to study the potential to make the 3.1-3.45 GHz segment available for nonfederal use. In a March 5, 2023, letter to committee chairs and ranking members, the Secretaries of Defense and Commerce supported S.Amdt. 6585, provided any decision to make the segment available for commercial use be contingent on a thorough study of potential impact on federal operations. While an auction of the segment for commercial use could drive wireless expansion and generate significant revenues, technical experts assert that reallocation of the band from federal to nonfederal use would require complex and high-cost modifications to DOD systems and would affect DOD operations.

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