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# SPECTRUM MANAGEMENT

# Agencies Should Strengthen Collaborative Mechanisms and Processes to Address Potential Interference

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Madam Chairwoman Johnson, Ranking Member Lucas, and Members of the Committee:

I am pleased to be here today as you examine spectrum needs for science applications. Regulating and managing the diverse uses of spectrum are complex and challenging tasks that involve accommodating the growing needs of emerging spectrum-dependent technologies, protecting existing uses from harmful interference, and balancing the concerns of various spectrum users to promote the most efficient and effective use of the spectrum resource in the public interest.

Within the U.S., these responsibilities are shared between two agencies. The Federal Communications Commission (FCC) regulates and manages spectrum for nonfederal public and private uses, such as wireless services provided over commercial mobile networks. And the Department of Commerce's (Commerce) National Telecommunications and Information Administration (NTIA) regulates and manages spectrum use for federal users, including agencies operating satellites like the National Oceanic and Atmospheric Administration (NOAA) within Commerce, and the National Aeronautics and Space Administration (NASA). Internationally, the International Telecommunication Union (ITU)—a United Nations specialized agency responsible for matters related to information and communication technologies—regulates the global use of spectrum and hosts international conferences, known as World Radiocommunication Conferences (WRC), to update the global treaty establishing the international regulations.

Recent domestic and international spectrum-management activities have focused on making spectrum available for fifth-generation (5G) mobile communications. Domestically, FCC has begun allocating spectrum that could be used for 5G, including through a rulemaking proceeding known as Spectrum Frontiers. Internationally, as part of the 2019 WRC proceedings, the ITU invited technical studies related to how 5G networks may operate compatibly with existing spectrum uses in certain portions of the spectrum. During the U.S.'s preparatory work for the 2019 WRC, efforts by FCC, NTIA, NOAA, and NASA to agree on which U.S. studies and positions to present internationally on this matter were highly contentious, and disputes among agencies generated significant public attention from stakeholders, the press, and Congress. A key area of disagreement was how to protect instruments on weather satellites from interference from 5G wireless signals in the 24 GHz spectrum band. Consequently, the U.S. did not reach agreement on key technical contributions to submit to international technical meetings for the

conference, creating challenges for the U.S.'s ability to present either a unified position or an agreed-upon technical basis for the conclusions the U.S. ultimately supported.

My statement is based on our June 2021 report, released publicly yesterday, entitled *Spectrum Management: Agencies Should Strengthen Collaborative Mechanisms and Processes to Address Potential Interference.*[1] Like the report, this statement addresses (1) the extent to which the cognizant federal agencies follow leading practices in collaborating on potential interference effects on weather forecasting; (2) how, and the extent to which, NOAA and NASA identify and raise concerns regarding potential interference to their satellite instruments; and (3) the cognizant agencies' processes, requirements, and capabilities to conduct and review technical interference studies. In preparing the report, we reviewed documentation and interviewed officials from FCC, NTIA, NOAA, and NASA; analyzed how various agency mechanisms and processes were implemented during recent domestic and international spectrum-management activities; and compared agencies' efforts to leading collaboration practices as well as applicable federal internal-control standards and key elements of a sound research process.[2] Our report includes more detailed information on scope and methodology. We conducted our work in accordance with generally accepted government auditing standards.

## Collaboration among Agencies

With respect to collaboration, to address potential interference among proposed uses of spectrum, FCC, NTIA, NOAA, and NASA, employ various coordination mechanisms, which reflect some key collaboration practices but do not fully reflect others. Practices that the agencies' mechanisms did not fully reflect include, for example, clarifying roles and responsibilities and developing written guidance and agreements. For instance, by statute, FCC and NTIA are required to meet, at least twice a year, to conduct joint spectrum planning with respect to various enumerated issues[3] and maintain a memorandum of understanding that serves as the main mechanism that guides their overall coordination on

[1]GAO-21-474 (Washington, D.C.: June 29, 2021). In addition to the report this testimony is based on, we have ongoing work examining NTIA's spectrum management.
[2]GAO, *Managing For Results: Key Considerations for Implementing Interagency Collaborative Mechanisms*, GAO-12-1022 (Washington, D.C.: Sept. 27, 2012); *Standards for Internal Control in the Federal Government*, GAO-14-704G (Washington, D.C.; September 2014); *Employment and Training Administration: More Actions Needed to Improve Transparency and Accountability of Its Research Program*, GAO-11-285 (Washington, D.C.: Mar. 15, 2011).
[3]47 U.S.C. § 922.

spectrum management. For domestic matters, the agencies coordinate through an NTIA-led committee that provides input to FCC's spectrum proceedings. For U.S. participation in the ITU's WRCs, agencies coordinate via a preparatory committee that provides input used to develop U.S. positions that the Department of State (State) submits to a regional body or directly to the WRC. A *General Guidance Document* establishes the expectations and process by which the committee operates.

In examining these and other related coordination activities, we found that while the documents that guide coordination between FCC and NTIA and the preparatory committee emphasize reaching consensus whenever possible, there are no clearly defined and agreed-upon processes for resolving matters when agencies cannot do so. Additionally, neither the memorandum of understanding nor the *General Guidance Document* has been updated in almost 20 years, though agency officials said conditions regarding spectrum management activities have changed in that time. Our review of U.S. participation in ITU's 2019 WRC shows that these issues affected collaboration. For example, as noted above, disputes among the agencies and the inability to reach agreement on U.S. technical contributions challenged the U.S.'s ability to present an agreed-upon basis for decisions or a unified position.

## NOAA and NASA Procedures

Regarding how NOAA and NASA identify and raise potential interference concerns—both agencies rely on external events to initiate internal reviews about potential interference. According to NOAA and NASA officials, for domestic spectrum proceedings, they rely on notification from the NTIA-led committee to initiate review and identification of proposed FCC actions that may affect their satellite instruments. Similarly, for WRCs, they rely on ITU actions—specifically, when the agenda for an upcoming WRC is established—to initiate internal review and identification of activities that may affect their satellite instruments. After review and upon identifying any issues, for domestic proceedings, NOAA and NASA would submit their comments and concerns to FCC through the NTIA-led committee. For WRCs, NOAA and NASA staff participate directly in the U.S. preparatory committee process by conducting appropriate studies and reviewing others' studies.

However, at the time of the FCC Spectrum Frontiers proceeding, we found that both NOAA and NASA lacked written procedures (although NASA subsequently developed written procedures) to clearly guide internal processes and delayed raising potential interference concerns during the proceeding. For example, while FCC requested comments on

actions it was considering related to the 24 GHz spectrum band as early as 2014, when the proceeding began, neither NOAA nor NASA submitted comments through the NTIA-led committee until several years later. By the time the two agencies provided comments—well after FCC was requesting comments on its proposed actions—FCC had already decided to take action. By not providing comments in a timelier manner through the appropriate channel, NOAA and NASA missed opportunities to ensure that FCC received and considered their input when it was promulgating rules.

## Technical Interference Studies

Finally, with regard to the agencies' work on technical interference studies, NOAA and NASA conduct and FCC and NTIA review these types of studies on a case-by-case basis. When originating from ITU activities, the agencies conduct or review technical interference studies through participation in international technical meetings and the preparatory committee process. However, the agencies' lack of consensus on study design and, within the U.S. process, specific procedures to guide the design of these types of studies hampered U.S. efforts to prepare for the 2019 WRC. For example, the U.S. did not submit its studies on certain key issues to the final technical meeting, resulting in some stakeholders questioning whether the corresponding U.S. positions were technically rooted. Agreed-upon procedures could help guide U.S. efforts to design these studies and consider tradeoffs between what is desirable versus practical, to mitigate the possibility of protracted disagreements in the future.

## Conclusions

In conclusion, regulating and managing spectrum is a complex and challenging task. While mechanisms exist that facilitate collaboration between FCC and NTIA—the U.S. spectrum managers—and federal users like NOAA and NASA, gaps also exist. In this case, these gaps may have also contributed to hampering NOAA's and NASA's efforts to protect their satellite instruments from potential interference. In the future, these gaps could contribute to challenges in managing spectrum for other uses. In our report, we made recommendations to FCC, NTIA, and NOAA to address these gaps. Specifically, we made a total of 11 recommendations, including five recommendations each to both the Chair of FCC and the NTIA Administrator to:

- establish clearly defined and agreed-upon processes for making decisions on spectrum-management activities that involve other agencies, particularly when consensus cannot be reached (in consultation with each other and—as appropriate—State);

- clarify and further identify shared goals or outcomes for spectrum-management activities that involve collaboration and ways to monitor and track progress (in consultation with each other and—as appropriate—State);
- update the FCC-NTIA memorandum of understanding to address identified gaps (such as the lack of clearly defined goals and agreed-upon processes for making decisions) and develop a means to continually monitor and update this agreement (in consultation with each other);
- request that State initiate a review of the *General Guidance Document* (a document that guides U.S. preparation for WRCs)—in consultation with each other and other relevant participants—and update and develop a means to continually monitor and update this document; and
- establish procedures to help guide the design (including selection of acceptable assumptions and methodologies) of spectrum-sharing and potential-interference studies intended as U.S. contributions to WRC technical meetings (in consultation with each other, State, and other federal participants of the U.S. technical preparatory process).

Additionally, we made one recommendation to the NOAA Administrator to clarify and document NOAA's internal processes for identifying and raising concerns about potential interference to NOAA satellite instruments. FCC broadly agreed to work collaboratively with NTIA and State to respond to our recommendations. Commerce agreed with our recommendations to NTIA and agreed to implement our recommendation to NOAA.

Madam Chairwoman Johnson, Ranking Member Lucas, and Members of the Committee, this completes my prepared statement. I would be pleased to respond to any questions that you may have at this time.

## GAO Contact and Staff Acknowledgments

If you or your staff have any questions about this testimony, please contact Andrew Von Ah at (202) 512-2834 or vonaha@gao.gov. Contact points for our Offices of Congressional Relations and Public Relations may be found on the last page of this statement. GAO staff who made key contributions to this testimony are Andrew Huddleston, Assistant Director; Nalylee Padilla, Analyst-in-Charge; Frederick K. Childers; Karen L. Howard; Schuyler Janzen; and Krishana Routt-Jackson.