



Mr. Ronald T. Repasi
Acting Chief, Office of Engineering and Technology
Federal Communications Commission
445 12th Street, SW
Washington, DC 20554

JAN 22 2020

Mr. Donald Stockdale Jr.
Chief, Wireless Telecommunications Bureau
Federal Communications Commission
445 12th Street, SW
Washington, DC 20554

RE: Promoting Investment in the 3550-3700 MHz Band (GN Docket No. 17-258)¹

Dear Messrs. Repasi and Stockdale:

The National Telecommunications and Information Administration (NTIA) and the Department of Defense (DOD) have worked closely with the Federal Communications Commission (FCC) as it implements the rules governing Citizens Broadband Radio Service (CBRS) in the 3550-3700 MHz (3.5 GHz) band. The 3.5 GHz mid-band spectrum is especially commercially valuable, including for 5G, because of its potential to support high data volumes and signal penetration into buildings. This spectrum sharing effort demonstrates how collectively we can move toward more dynamic sharing, even while continuing to protect key government systems that are vital for national security and other public services. The collaborative approach to make this sharing in the 3.5 GHz band possible points toward a promising future for managing our nation's limited spectrum resources in a way that promotes commercial investment.

In this letter, NTIA identifies protection requirements for ground-based radar systems operating below 3500 MHz in order to protect these systems from experiencing harmful interference from non-federal operations in the 3550-3650 MHz band. There are eleven of these ground-based sites that require protection as outlined in Table 1 of Enclosure B.² To provide greater buildout flexibility for CBRS deployments, the ground-based radar locations can be protected using always-activated Dynamic Protection Areas (DPAs) (instead of static exclusion zones as NTIA originally had identified).³

¹ See Promoting Investment in the 3550-3700 MHz Band, GN Docket No. 17-258, Notice of Proposed Rulemaking and Order Terminating Petitions, FCC 17-134 (Oct. 24, 2017).

² NTIA, working with the DOD, reduced the estimated number of these ground-based radar locations that require protection from the 40 initially identified to the 11 identified herein (a 73 percent reduction).

³ There are four remaining exclusion zones: Nellis Air Force Base, NV; St. Inigoes, MD; Pensacola, FL; and Pascagoula, MS. There remain three protected quiet zones as defined in 47 C.F.R. Section 1.924.

BACKGROUND

NTIA's October 2010 *Fast Track Report* identified the 3.5 GHz band as potentially suitable for commercial broadband use.⁴ In 2015, the FCC established CBRS in the 3.5 GHz band and created a three-tiered framework to coordinate its shared federal and non-federal use. NTIA has worked closely with the FCC and the DOD to make the band suitable for commercial operation while protecting federal incumbent systems.

In 2015, NTIA, working in collaboration with the FCC and the DOD, performed an analysis to re-evaluate the exclusion zone distances needed to protect federal shipborne and ground-based radar systems.⁵ That effort significantly reduced large exclusion zones along the coastlines and around selected ground-based radar sites through the creation of DPAs.⁶ DPAs, along with the Spectrum Access System (SAS) that tracks locations of CBRS base stations and controls their operation, and an Environmental Sensing Capability (ESC) that detects the presence of radar signals, are poised to deliver an innovative spectrum sharing framework intended to maximize the potential for new commercial broadband services and other wireless services while protecting essential incumbent federal operations.

GROUND-BASED RADAR DESCRIPTION

As discussed in the NTIA *Fast Track Report*, there are two mobile ground-based radars operating below 3500 MHz, referred to as Ground Based Radar 1 (GB-1) and Ground Based Radar 3 (GB-3).⁷ The installation locations of GB-1 and GB-3 were specified in the *Fast Track Report*.⁸ In 2015, NTIA updated the list of GB-1 and GB-3 locations; the number of GB-1 locations increased to 27 and the number of GB-3 locations was decreased to 13.⁹

NTIA's ground-based radar exclusion zone analysis was based on Category A CBRS base stations with a maximum equivalent isotropic radiated power (EIRP) of 30 dBm/10 MHz, and in

⁴ U.S. Department of Commerce, National Telecommunications and Information Administration, *An Assessment of the Near-Term Viability of Accommodating Wireless Broadband Systems in the 1675-1710 MHz, 1755-1780 MHz, 3500-3650 MHz, and 4200-4220 MHz, 4380-4400 MHz Bands* (Nov. 15, 2010) (*Fast Track Report*), available at http://www.ntia.doc.gov/reports/2010/FastTrackEvaluation_11152010.pdf.

⁵ See Letter from Paige R. Atkins, Assoc. Admin., Office of Spectrum of Spectrum Mgt., NTIA, to Julius P. Knapp, Chief, Office of Eng. and Tech. (Mar. 24, 2015) (*NTIA 2015 Letter*) available at https://www.ntia.doc.gov/files/ntia/publications/ntia_letter_docket_no_12-354.pdf.

⁶ See Letter from Paige R. Atkins, Assoc. Admin., Office of Spectrum Mgt., NTIA, to Julius P. Knapp, Chief, Office of Eng. and Tech. and Donald K. Stockdale, Jr., Chief, Wireless Telecom. Bureau, FCC (May 17, 2018) (*NTIA 2018 Letter*), available at https://www.ntia.doc.gov/files/ntia/publications/ntia_3.5_ghz_band_dpa_letter_-_gn_dkt_no._17-258-05172018.pdf.

⁷ *Fast Track Report* at 3-32.

⁸ *Id.* at 3-33.

⁹ U.S. Department of Commerce, National Telecommunications and Information Administration NTIA Technical Report TR-15-517, 3.5 GHz Exclusion Zone Methodology (June 2015) (*NTIA TR-15-517*), available at <http://www.its.bldrdoc.gov/publications/2805.aspx>.

2015 NTIA notified the FCC of the Category A base station ground-based radar exclusion zones.¹⁰ To provide greater buildout flexibility, the FCC modified its rules to allow Category B CBRS base stations with an EIRP of 47 dBm/10 MHz.¹¹ The higher-power Category B base stations, however, significantly increase the size of the exclusion zones needed to protect ground-based radar systems. In 2018, the FCC's Wireless Telecommunications Bureau (WTB) and the Office of Engineering and Technology (OET) issued a conditional waiver of certain rules to, among other things, facilitate the operation of Category B CBRS base stations by use of DPAs.¹² In this letter, NTIA identifies further requirements necessary to protect these ground-based radar systems.

GB-1 Protection

GB-1 operates in the electromagnetic spectrum below the 3.5 GHz CBRS band. This radar has a built-in capability to reject out-of-band interference; therefore, additional protection from CBRS base stations is not necessary. NTIA will maintain a list of the GB-1 locations in the Government Master File frequency assignments on NTIA's website for CBRS SAS operators to access, making them aware of current and future radar operations. The current GB-1 locations are provided in Enclosure A.¹³

GB-3 Protection

NTIA has updated its analysis of the exclusion zones for Category A and Category B base stations, taking into account the higher EIRP for Category B CBRS base stations. The results show that the increase in EIRP for Category B CBRS base stations would require static exclusion zones around GB-3 operations that would significantly constrain CBRS deployment. In an effort to maximize CBRS buildout flexibility while fully protecting critical federal radar systems, NTIA has identified as a solution the use of DPAs that are always activated to protect GB-3 locations (provided in Enclosure B). This "always activated" DPA protection is based on limiting the maximum aggregate received power level from the CBRS devices at the location of the radar antenna aperture. For each GB-3 location provided in Enclosure B, NTIA will provide the information necessary to protect the GB-3 radar using the always-activated DPAs, which includes the radar location, CBRS channel-specific radar protection criteria (adjusted for antenna gain), radar antenna height, radar 3 dB antenna beamwidth, and the CBRS device Category A and Category B neighborhood distances.¹⁴

¹⁰ The Category A ground-based radar exclusion zones are specified in Enclosure 2 of the *NTIA 2015 Letter*, available at https://www.ntia.doc.gov/files/ntia/publications/docket_no_12-354_letter_enclosure_2.pdf.

¹¹ 47 CFR Section 96.41 (b). Category B base stations were always part of the CBRS rules but the FCC decided to allow greater power in non-rural areas to promote more flexible deployments.

¹² See *Promoting Investment in the 3550-3700 MHz Band*, GN Docket No. 17-258, Order, DA 18-538, 33 FCC Rcd 4987 (WTB/OET 2018) (*2018 DPA Waiver*).

¹³ The GB-1 locations are also available at <https://www.ntia.doc.gov/fcc-filing/2015/ntia-letter-fcc-commercial-operations-3550-3650-mhz-band>.

¹⁴ The neighborhood distances define the area around the radar where the deployment of CBRS devices is taken into consideration when calculating the CBRS devices that need to be turned off to protect the radar. The CBRS channel-specific protection criteria reduces the size of the neighborhood distance as the frequency separation between the radar and CBRS device increases.

This DPA information will be available on NTIA's website.¹⁵ In addition, a list of locations where GB-3 can be deployed in the future is provided in Enclosure B.

SUMMARY

NTIA, working closely with the DOD, has significantly reduced the ground-based radar protection zones while maintaining incumbent protection. DOD, working closely with NTIA, conducted a detailed operational assessment that has reduced the number of sites requiring protection from CBRS operations. Follow-on analysis such as this demonstrates our continuing commitment to make the 3.5 GHz band available for the next generation of wireless services. With this reasonable follow-on analysis, NTIA herein has identified further appropriate protection criteria for maximizing CBRS buildout flexibility while fully protecting critical federal radar systems. Accordingly, we request that the WTB and OET take additional measures consistent with the Commission's rules and the authority delegated to them under Sections 0.331(f) and 0.241(j), respectively, of the Commission's rules as may be necessary to effectuate such protection.¹⁶

NTIA will continue working in collaboration with the Commission, DOD, and industry to protect the federal 3.5 GHz band radar systems while minimizing the impact to CBRS operations. Should you have any questions, please contact me or Edward Drocella, Chief, Spectrum Engineering and Analysis Division, Office of Spectrum Management, at edrocella@ntia.gov or (202) 482-2608.

Sincerely,



Charles Cooper
Associate Administrator
Office of Spectrum Management

Enclosures

¹⁵ A Keyhole Markup Language (KML) file with the GB-3 Category A and Category B activated DPA information is available at <https://www.ntia.doc.gov/fcc-filing/2015/ntia-letter-fcc-commercial-operations-3550-3650-mhz-band>.

¹⁶ See 47 CFR §§ 0.331(f), 0.241(j); see also Amendment of the Commission's Rules with Regard to Commercial Operations in the 3550-3650 MHz Band, Report and Order and Second Further Notice of Proposed Rulemaking, 30 FCC Rcd 3959, 4067, para. 369 (2015); 2018 DPA Waiver, 33 FCC Rcd at 4990, para. 5. To the extent considered necessary, such additional measures could employ links to NTIA webpages identified herein.

ENCLOSURE A

Table 1 provides a list of locations where Ground-Based Radar 1 (GB-1) can be deployed.

Table 1. Potential GB-1 Deployment Locations

Aberdeen Proving Ground, MD
Blue Grass Airport, KY
Center Strafford, NH
Camp Grayling, MI
Camp Guernsey, WY
Camp Ripley, MN
Camp Sherman, OH
Camp Smith, NY
Dugway Proving Ground, UT
Eglin, FL
Ethan Allen RG, VT
Fort Benning, GA
Fort Bragg, NC
Fort Campbell, KY
Fort Carson, CO
Fort Chaffee, AR
Fort Dix, NJ
Fort Drum, NY
Fort Greely, AK
Fort Hood, TX
Fort Indiantown Gap, PA
Fort Lewis, WA
Fort Pickett, VA
Fort Polk, LA
Fort Richardson, AK
Fort Riley, KS
Fort Sill, OK
Fort Stewart, GA
Fort Wainwright, AK
Hooksett, NH
Letterkenny Army Depot, PA
McGregor Range, NM
Morristown, NJ
Orchard Training Area, ID
Patuxent River, MD
Pinon Canyon, CO
Pohakuloa, HI
Riverton, UT
San Nicolas Island, CA
Schofield Barracks, HI
Tupelo, MS
Webster Field, MD
White Sands Missile Range, NM
Yakima Firing Center, WA
Yukon Range, AK
Yuma Proving Ground, AZ

ENCLOSURE B

Table 1 provides the locations where Ground-Based Radar 3 (GB-3) is protected using always activated Dynamic Protection Areas (DPAs). Table 2 provides a list of locations where GB-3 are or can be deployed with no DPA protection.

Table 1. GB-3 Locations Protected by Always-Active DPA

Fort Sill, OK
Marine Corps Air Ground Combat Center Twentynine Palms, CA
Marine Corps Air Station Beaufort, SC
Marine Corps Air Station Miramar, NC
Marine Corps Air Station Yuma, AZ
Marine Corps Base Camp Lejeune, NC
Marine Corps Base Camp Pendleton, CA
Naval Air Station Joint Reserve Base Ft. Worth, TX
Tobyhanna Army Depot, PA
Marine Corps Air Station Cherry Point (Alf Bogue), NC
Marine Air Station Oceana (Dam Neck Annex), VA

Table 2. GB-3 Deployment Locations with No DPA Protection

White Sands Missile Range, NM
Naval Reserve (San Nicolas Island), CA
Aberdeen Proving Ground, MD
Naval Base Ventura County (Naval Air Station Point Mugu), CA
Naval Air Station Patuxent River, MD
Yuma Proving Ground, AZ
Naval Reservation San Clemente Island, CA
Fort George G Meade, MD (Linthicum, MD)
Naval Surface Warfare Center Dahlgren Mainside, VA
Naval Air Warfare Center China Lake, CA
Eglin Air Force Base, FL
Chocolate Mountains Aerial Gunnery Range, CA
Barry M Goldwater Air Force Range, AZ (Dateland, AZ)
Volk Field Air National Guard Base, WI
Naval Air Facility El Centro, CA
Eielson AFB, AK
Marine Corps Logistics Base Albany, GA
Marine Corps Air Station New Station, NC
Naval Air Station Pensacola, FL