

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

In the Matter of)
)
Facilitating Shared Use in the 3.1-3.55 GHz Band) WT Docket No. 19-348

To: The Commission

**COMMENTS OF ARRL
THE NATIONAL ASSOCIATION FOR AMATEUR RADIO**

The American Radio Relay League, the national association for Amateur Radio (“ARRL” or “League”), hereby submits Comments on the Commission’s Notice of Proposed Rulemaking (“NPRM”) in opposition to the Commission proposal to delete the secondary amateur allocation in the 3.3-3.5 GHz band and relocate amateur radio operations to other (unspecified) spectrum.¹

Summary

As detailed below, for many decades Radio Amateurs have successfully co-existed with the federal government primary users in the 3.3-3.5 GHz band. Federal uses include stationary and mobile radar applications such as shipborne Navy radar; land-based high-power Army transportable radar; land-based and airborne Air Force station keeping equipment; and Department of Defense airborne radar.²

¹ See Notice of Proposed Rulemaking, WT Docket No. 19-348, FCC 19-130, 85 Fed. Reg. 3579 (Jan. 22, 2020).

² See U.S. Department of Commerce, NTIA, Quantitative Assessment of Spectrum Usage (Nov., 2016). Link: <https://www.ntia.doc.gov/report/2016/quantitative-assessments-spectrum-usage> (last viewed Feb. 21, 2020).

Many of the opportunistic purposes for which Radio Amateurs put this spectrum to use on a secondary, non-interfering basis are set forth in the record of this proceeding by the users themselves and summarized below. The value that they place on secondary access to this spectrum is evidenced by the concerns that they express in the more than three hundred comments already filed in this proceeding. The individual Radio Amateurs and Radio Amateur organizations in their comments explain the uses to which they put this spectrum and the impact upon their activities were they to lose secondary access.

Deletion of Secondary Status and Relocation Would be Premature and Waste Scarce Spectrum Resources

There is no reason suggested by the Commission, or known to us, why the secondary status for Amateur Radio operations should not be continued for the indefinite future. We understand that secondary commercial users are less flexible than Radio Amateur users and may desire to relocate to protect continued provision of services and service quality. Radio Amateurs, by contrast, benefit from having technical knowledge and no customer demands for continuous service quality; more flexibility to make adjustments; and often have the technical abilities necessary to design and implement the means to co-exist compatibly with the signals of primary users.

The nature of the Amateur Radio service, even in primary allocations, generally is to have no specific assigned channels. Instead, Radio Amateurs often acquire spectrum expertise as required and take pride in developing methods to operate without creating or suffering interference in what sometimes are challenging RF environments. This technical sophistication has been a mainstay of the Amateur Service and a point of pride for over a century, beginning when the Service was relegated to what was then viewed as “worthless”

spectrum at 200 meters and down following World War I.³

Radio Amateurs have decades-long experience observing and experimenting with radio wave propagation in the 3.3-3.5 GHz spectrum range that is at issue in this proceeding. For example, propagation at this frequency usually is thought of as being limited to local or short-range line of sight, but amateurs have demonstrated that communications over thousands of miles is possible. For example, using the 3.4 GHz frequencies, Radio Amateurs have bounced signals off the moon to communicate between two points thousands of miles apart here on earth. One Radio Amateur even has communicated with 38 countries using this secondary spectrum!⁴

Another example of scientific experimentation and inquiry led Radio Amateurs to discover that radio waves at this frequency may bend above the earth to enable extremely long distance communication. Two Amateurs communicated directly over a 2,500 mile path between Hawaii and California, discovering that tropospheric propagation exists in this frequency range. One of them reports plans to continue his propagation research in the Atlantic Ocean area.⁵

This pre-existing knowledge and lack of commercial service restraints has the potential to develop spectrum-sharing techniques and opportunities in this band to co-exist with new primary users. Radio Amateurs have a proven history of making good use of spectrum in sharing situations such as this because, unlike primary users and commercial

³ See Clinton B. DeSoto, *200 Meters and Down, The Story of Amateur Radio* (ARRL, 1936, reprinted 1981 and 2001); Richard A. Bartlett, *The World of Ham Radio, 1901-1950, A Social History* (2007).

⁴ See Comments of Al Ward (filed Feb. 5, 2020). Mr. Ward has succeeded in establishing two-way communication with 38 different countries around the world using the 3.4 GHz secondary allocation by bouncing signals off the moon.

⁵ See Comments of Wayne Overbeck (filed Feb. 19, 2020). Mr. Overbeck states that he has spent over \$10,000 of his own funds for 3.4 GHz equipment over the past 20 years. See also Comments of the San Bernardino Microwave Society at para. 6 (filed Feb. 18, 2020).

operations, Radio Amateurs have flexibility and employ resources to experiment with new technologies and to provide public service communications that are in the public interest. In doing so they often employ spectrum that otherwise would go unused and be wasted. We cannot think of any good reason to let spectrum sit unused that otherwise could be used on a non-interference, secondary basis.

While future developments cannot be guaranteed, history indicates that Radio Amateurs are likely to develop the means and methods necessary to share the spectrum for at least some types of Amateur communication purposes in harmony with new primary entrants. Even in areas of intense build-out, under the best of circumstances it will be a lengthy period before the spectrum can be re-allocated, spectrum blocks auctioned within geographic areas, licenses issued, and construction begun. During this transition period Radio Amateurs will have an opportunity to assess the new systems and design ways to share the spectrum without causing interference.

The Commission staff in 2010 determined that the process to reallocate spectrum historically has taken between 6 and 13 years, and this did not include the time necessary for auctions and licensing that must be completed before construction begins.⁶ For example, the neighboring 3550-3650 MHz band, which includes spectrum for 5G purposes, was re-allocated on a shared basis in 2015 but has yet to be auctioned, licenses issued, and build-outs begun.⁷ Also, experience in similar situations suggests that at the end of the transition process construction is unlikely to occupy all of the licensed channels in substantial

⁶ FCC, Connecting America: National Broadband Plan at p.79, Exhibit 5-C. Link: <https://tinyurl.com/npccjyt>.

⁷ 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 (2015); Auction of Priority Access Licenses for the 3550-3650 MHz Band, Draft Public Notice, AU Docket No. 19-244 (released Feb. 7, 2020).

geographic areas – especially far suburban and rural – where some Radio Amateurs could and would continue their experimentation and operations without risk of interference to the primary licensee holder(s).

If it turns out that sufficient sharing opportunities cannot be developed within the 200 megahertz secondary allocation in specific circumstances, access to additional spectrum on a secondary basis may be requested if studies indicate that its use on a non-interference basis would be feasible for the needed purposes. But at this time, it is premature to remove the current secondary allocation for Part 97 Radio Amateur uses.⁸

Radio Amateurs operating in this spectrum over many years already have proven their flexibility and ability to employ good spectrum management techniques to avoid interference with primary users. While changes in primary use undoubtedly will present new situations, it must be emphasized that secondary status, by definition, means that the primary licensee – whether federal government or non-federal commercial enterprise – has priority and the Radio Amateur operations must protect that user.

We note the uncertainty about what spectrum within the broader 3.1-3.55 GHz band may be re-allocated on a primary basis to commercial or license-free services, and whether any re-allocation will be on an exclusive primary basis to non-Federal users or be made on a co-primary basis to be shared with existing and future primary federal government users.

The report that Congress mandated in Section 605(a) of the MOBILE NOW Act by the National Telecommunications and Information Administration of the Department of

⁸ The 3.1-3.3 GHz band may be a possibility to consider for some Amateur purposes, but that band also is being considered for re-allocation, as noted by Commissioner O’Rielly in his statement issued with the NPRM in this Docket. Similarly, Amateurs may be able to productively use the guard band proposed at 3.98-4.0 GHz in GN Docket No. 18-122. But moving equipment to either of these different bands would require substantial personal investment by the Radio Amateurs involved and should not be required unless and until it appears that continued secondary operation within the existing 3.3-3.5 GHz band is no longer feasible for some Amateur operations. In any event, neither band would fully accommodate the work being done within the current allocation.

Commerce (“NTIA”) “evaluating the feasibility of allowing commercial wireless services, licensed or unlicensed, to share use of frequencies between 3100 and 3550 megahertz” is slated to be submitted only in late March, most likely after the deadline for Reply Comments in this proceeding.⁹ Only after this Report is released will it be practical to begin evaluating specific possible sharing scenarios.

Thus, if allocation changes are implemented on a flash-cut basis before new commercial operations commence in the geographic areas of Amateur operations, the spectrum would lie unused and its value lost. Re-purposing spectrum takes years from start to finish, and when feasible, the spectrum should continue to be used during the transition. Given the success since the 1940’s of Amateur Radio operators exploring and using 3.4 GHz spectrum without interfering with primary federal government operations, we at least should have a chance to continue our secondary operations until the facilities of new primary users are put into service, and then to be able to explore ways to share without causing harmful interference. The Radio Amateurs ask no more than to be given a chance to use their considerable technical skills to work around whatever future uses may be implemented in this spectrum.

For all of the reasons enumerated above, the ARRL believes that the Commission’s proposal to delete the secondary allocation for Radio Amateur use is premature. This spectrum should not be removed from the Radio Amateur secondary allocation and left unused. Only at a later time may an informed assessment of sharing opportunities be made in the specific spectrum slated for re-allocation, as discussed above. This depends upon the

⁹ See Consolidated Appropriations Act, 2018, P.L. 115-141, Div. P, Repack Airwaves Yielding Better Access for Users of Modern Services (RAY BAUM’S) Act, Title VI, Making Opportunities for Broadband Investment and Limiting Excessive and Needless Obstacles to Wireless (MOBILE NOW) Act, § 605(a), 132 Stat. 348 at 1100 (2018).

Congressionally-mandated NTIA studies of sharing or relocation options that have yet to be completed and, if all or part of this spectrum is re-allocated, the nature and location of build out by the non-federal users.

Amateur Radio Uses of the 3300-3500 MHz Band

The National Telecommunications and Information Administration (“NTIA”) placed the entire 3100-3550 MHz band first in its priorities for quantification of spectrum usage¹⁰ and its report is slated to be released in late March as mandated by Congress.¹¹ We propose that the Radio Amateur secondary allocation be continued on a non-interference basis for the foreseeable future so that Amateurs can continue to use the spectrum for beneficial purposes, including those that have been described by many individual commenters in the record of this proceeding.

Amateur Radio operators have built substantial stations at significant personal cost and are engaged daily in operating them in furtherance of the objectives of the amateur radio service – especially as it pertains to providing emergency communications networks for the American public. Literally hundreds of individual Radio Amateurs already have commented in this proceeding on their use of this spectrum and the benefits therefrom that accrue directly to the public.

It is to be emphasized that all of the below activities using this spectrum have been on a secondary, non-interfering basis with the federal government operations noted above.

Radio Amateurs are engaged in the following activities within the 3.3-3.5 GHz band.

¹⁰ See U.S. Department of Commerce, NTIA, Review of Current Frequency Assignments and Quantification of Spectrum Usage, Memorandum from the Acting Assistant Secretary of Commerce for Communications and Information, to Executive Branch Departments and Agencies (Aug. 1, 2019).

¹¹ *Supra* note 9.

- Construction of and experimentation with innovative “mesh networks”, including portable networks capable to being deployed on short notice to disaster areas or used in place during local emergencies or public events requiring additional communications capabilities (such as racing marathons, parades, and other similar public activities).¹²
- Amateur Television Networks, used for public safety purposes such as to track the California wild fires.¹³
- Weak signal point-to-point communications that test and experiment with various propagation characteristics at 3.4 GHz.¹⁴
- Studies of the propagation characteristics of the 3.4 GHz through the use of beacons.¹⁵
- Using the moon as a reflector (“moon bounce”, also known as “Earth-Moon-Earth” or “EME”) to communicate between two points on earth that can be thousands of miles apart.¹⁶
- Amateur satellite communications.¹⁷

Conclusion

As detailed above, for many decades Radio Amateurs have successfully co-existed in the 3.3-3.5 GHz band with the federal government primary users that include land-based stationary and land-based, sea-based, and airborne mobile high power radar applications. It is premature at this time to begin evaluation of sharing prospects and opportunities with the proposed new primary uses of this band. The NTIA Report addressing the 3.1-3.55 GHz spectrum is not expected to be released until late March. Consequently, we do not yet know how much spectrum below and above the Amateur secondary allocation may be re-allocated to non-federal users and what opportunities may exist or be developed to share the spectrum with the new systems that may be authorized on a primary basis.

¹² See Comments of the Amateur Radio Emergency Data Network (AREDN) (filed Feb. 12, 2020).

¹³ See Comments of Amateur Television Network (filed Feb. 20, 2020).

¹⁴ *Supra* Note 5.

¹⁵ See Comments of the San Bernardino Microwave Society at para. 5 (filed Feb. 18, 2020).

¹⁶ *Supra* Note 4.

¹⁷ The Amateur Satellite Service is allocated secondary spectrum at 3.40-3.41 GHz, *see* 47 C.F.R. § 97.207(c)(2).

Radio Amateur activities in the current 3.3-3.5 GHz band are conducted solely at the personal cost to the individual and carried out on a non-interfering, secondary basis. As we understand it, it is most likely that new future users will obtain licenses by auction and have primary status, and therefore priority to use the spectrum on a non-interference basis. As explained above, it is too early in the process to determine whether sharing will continue to be possible or other spectrum opportunities would be preferable.

The secondary allocation for Part 97 Radio Amateur uses therefore should not be deleted. Doing so would not affect the value of the spectrum in an auction for primary users and would leave the spectrum vacant for a considerable amount of time needlessly wasting the valuable public resource. Even if suitable new spectrum could be found for the existing amateur uses – which is difficult before the spectrum musical chairs activity is concluded -- the costs to Radio Amateurs would be significant and be borne with no countervailing public benefit.

Accordingly, for the reasons stated above, the ARRL respectfully requests that the Commission not adopt its proposal to delete the secondary amateur allocation in the 3.3-3.5 GHz band. If the advent of new primary licensees forecloses some types of secondary operations, the Amateur community will re-evaluate the situation when some certainty exists.

Respectfully submitted,

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By:

A handwritten signature in blue ink that reads "DR Siddall". The initials "DR" are written in a stylized, cursive font, followed by the name "Siddall" in a similar cursive script.

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