

FCC FACT SHEET*

Elimination of the Baud Rate Limitation in Applicable Amateur Radio Bands

Report and Order and Further Notice of Proposed Rulemaking

WT Docket No. 16-239, RM-11708 (terminated)

Background: This *Report and Order*, if adopted, would eliminate the baud rate limitation in certain amateur radio bands and instead set a bandwidth limitation in those bands. These rule changes would incentivize innovation and experimentation in the amateur radio bands by providing amateur service licensees with the flexibility to use modern digital emissions. The changes would enable the amateur radio community to operate more efficiently, including in support of emergency situations when appropriate. The *Further Notice of Proposed Rulemaking*, if adopted, would seek comment on changes to other amateur bands that have a baud rate limitation.

What the *Report and Order* Would Do:

- Removes the baud rate limitation—the rate at which the carrier waveform amplitude, frequency, and/or phase is varied to transmit information—for data emissions applicable to certain amateur radio bands.
- Implements a 2.8 kHz bandwidth limitation in place of the baud rate limitation in the applicable amateur radio bands.

What the *Further Notice of Proposed Rulemaking* Would Do:

- Proposes to remove the baud rate limitation in the 2200 meter and 630 meter bands, which the Commission allocated for amateur radio use after it released the Notice of Proposed Rulemaking in 2016.
- Proposes to remove the baud rate limitation in the VHF and UHF bands.
- Seeks comment on the appropriate bandwidth limitation for the 2200 meter band, the 630 meter band, and the VHF/UHF bands.

* 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 WT Docket No. 16-239, 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)
)
Amendment of Part 97 of the Commission's) WT Docket No. 16-239
Amateur Radio Service Rules to Permit Greater)
Flexibility in Data Communications)
) RM-11708 (terminated)
)

REPORT AND ORDER AND FURTHER NOTICE OF PROPOSED RULEMAKING*

Adopted: []

Released: []

By the Commission:

TABLE OF CONTENTS

Heading Paragraph #
I. INTRODUCTION..... 1
II. BACKGROUND..... 3
III. REPORT AND ORDER 7
IV. FURTHER NOTICE OF PROPOSED RULEMAKING 20
V. PROCEDURAL MATTERS..... 24
VI. ORDERING CLAUSES..... 30

I. INTRODUCTION

1. In this Report and Order (Report and Order) and Further Notice of Proposed Rulemaking (FNPRM), we amend part 97 of the Commission's rules regarding technical standards applicable to data communications that may be transmitted in the Amateur Radio Service. Specifically, we remove limitations on the symbol rate (also known as baud rate)—the rate at which the carrier waveform amplitude, frequency, and/or phase is varied to transmit information¹—applicable to data

* This document has been circulated for tentative consideration by the Commission at its November 15, 2023 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.

¹ "The symbol rate of a digitally-modulated carrier wave is the rate at which the carrier waveform amplitude, frequency, and/or phase is varied to transmit information." Comprehensive Review of Licensing and Operating (continued....)

emissions in certain amateur bands.² The amateur radio community can play a vital role in emergency response communications, but is often unnecessarily hindered by the baud rate limitations in the rules.

2. Today, we remove this outdated restriction to allow the amateur radio community to operate more efficiently, including in support of emergency situations when appropriate. In place of the baud rate, we set a bandwidth limitation of 2.8 kilohertz in these amateur bands, consistent with our treatment of other wireless radio services, which also have service-specific bandwidth limitations. This bandwidth limitation will promote continued sharing in these amateur bands. We believe that these rule changes will provide amateur service licensees the flexibility to use modern digital emissions, thereby better fulfilling the purposes of the amateur service to promote innovation and experimentation. We take no further action on other issues pending in the docket at this time.³ In the *FNPRM*, we propose to remove the baud rate limitation in the 2200 meter band and 630 meter band, which the Commission allocated for amateur radio use after it released the *NPRM* in 2016,⁴ and in the very high frequency (VHF) bands and the ultra-high frequency (UHF) bands. Additionally, we seek comment on the appropriate bandwidth limitation for the 2200 meter band, the 630 meter band, and the VHF/UHF bands.

II. BACKGROUND

3. Most amateur bands below 450 MHz are divided between radioteletype (RTTY)/data subbands and phone/image subbands.⁵ The purpose of separating emission types into groups is to relegate the transmission of certain inharmonious emission types to different segments of amateur service frequency bands,⁶ while still allowing great flexibility in the types of emissions that may be transmitted by amateur stations.⁷ Additional standards and limitations applicable to each band or subband are set forth in section 97.307(f) of the Commission's rules.⁸

4. The limitations on RTTY and data transmissions below 450 MHz vary depending on the

Rules for Satellite Services, IB Docket No. 12-267, Notice of Proposed Rulemaking, 27 FCC Rcd 11619, 11661, n.177 (2012); *see also* 47 CFR § 101.3 (defining symbol rate as “[m]odulation rate in bauds,” and noting, “[t]his rate may be higher than the transmitted bit rate as in the case of coded pulses or lower as in the case of multilevel transmission”).

² *See* 47 CFR § 97.305(c). Bands with a 300 baud rate limitation that we eliminate in this *Report and Order* are: 160 meter band; 80 meter band; 40 meter band segments 7.000–7.100 MHz and 7.100–7.125 MHz; 30 meter band; 20 meter band segment 14.00–14.15 MHz; 17 meter band segment 18.068–18.110 MHz; 15 meter band segment 21.0–21.2 MHz; 12 meter band segment 24.89–24.93 MHz. The 10 meter band segment 28.0–28.3 MHz has a 1200 baud rate limitation that we eliminate in this *Report and Order*.

³ *See, e.g., Wireless Telecommunications Bureau Seeks Comment on New York University Petition for Declaratory Ruling Regarding Amateur Radio Communications*, WT Docket No. 16-239, 34 FCC Rcd 9916 (WTB 2019).

⁴ In 2017, the Commission amended its part 97 rules to provide for amateur service use of the 135.7–137.8 kHz (2200 meter) and 472–479 kHz (630 meter) bands. *See Amendment of Parts 2, 15, 80, 90, 97, and 101 of the Commission's Rules Regarding Implementation of the Final Acts of the World Radiocommunication Conference (Geneva, 2012)(WRC-12), Other Allocation Issues, and Related Rule Updates*, ET Docket No. 15-99, Report and Order, 32 FCC Rcd 2703, 2708, para. 13 (2017) (*WRC-12 R&O*) (adopting service rules for the amateur radio service in the 135.7–137.8 kHz (2200 meter) and 472–479 kHz (630 meter) bands).

⁵ RTTY emissions are narrow-band direct printing. *See* 47 CFR § 97.3(c)(7). Data emissions are telemetry, telecommand, and computer communications. *See* 47 CFR § 97.3(c)(2). Phone emissions are speech and other sounds. *See* 47 CFR § 97.3(c)(5). Image emissions are facsimile and television. *See* 47 CFR §§ 97.3(c)(3), 97.305. Additional emission types are permitted in higher frequency bands. *See* 47 CFR §§ 97.3(c), 97.305.

⁶ *See Reorganization and Deregulation of Part 97 of the Rules Governing the Amateur Radio Services*, PR Docket No. 88-139, Notice of Proposed Rule Making, 3 FCC Rcd 2076, 2078, para. 19 (1988).

⁷ *See Reorganization and Deregulation of Part 97 of the Rules Governing the Amateur Radio Services*, PR Docket No. 88-139, Report and Order, 4 FCC Rcd 4719, 4720, para. 9 (1989).

⁸ *See* 47 CFR § 97.307(f).

frequency band, and on whether the digital code used to encode the transmitted signal is one of the codes specified in section 97.309(a) of the Commission's rules—Baudot,⁹ AMTOR,¹⁰ and ASCII¹¹ (the “specified digital codes”). Sections 97.307 and 97.305 of the Commission's rules limit the symbol rate for the specified digital codes, and the bandwidth for unspecified digital codes, as follows: the specified digital codes may be used with a symbol rate not exceeding 300 bauds for frequencies below 28 MHz (except 60 meter (5.3305–5.4064 MHz band¹²)), and 1200 bauds in the 10 meter (28.0–28.3 MHz) band;¹³ in the 6 meter (50–54 MHz) and 2 meter (144–148 MHz) bands, the specified digital codes may be used with a symbol rate not exceeding 19.6 kilobauds, and unspecified digital codes may be used with a bandwidth not exceeding 20 kilohertz;¹⁴ in the 1.25 meter (219–225 MHz) and 70 centimeter (420–450 MHz) bands, the specified digital codes may be used with a bandwidth not exceeding 100 kilohertz and a baud rate limitation not exceeding 56 kilobauds.¹⁵ The baud rate limits were adopted in 1980, when the Commission amended the rules to specify ASCII as a permissible digital code.¹⁶ The Commission adopted the limits so that ASCII signals would occupy no more spectrum than traditional radioteleprinter signals associated with the use of Baudot code.¹⁷

5. In 2013, the National Association for Amateur Radio (ARRL) filed a petition for rulemaking to modify sections 97.305 and 97.307 of the Commission rules.¹⁸ Specifically, ARRL asked the Commission to “delete all references to symbol rate from section 97.307(f) of the Commission's rules; to create a conforming amendment to section 97.305(c) of the rules; and to establish a bandwidth limitation of 2.8 kilohertz for amateur data emissions below 29.7 MHz.”¹⁹ The petition argued that the baud rate is an outdated restriction that hampers or precludes amateur radio experimentation with modern high frequency (HF) and other data transmission protocols.²⁰

6. In 2016, the Commission released a *Notice of Proposed Rulemaking* that sought comment on eliminating the baud rate limit and amending part 97 of the Commission's rules accordingly.²¹ The *NPRM* also tentatively concluded that a 2.8 kilohertz bandwidth limitation for RTTY and data emissions in the MF/HF bands was not necessary, and sought comment on this conclusion.²² The Commission has received over 1200 comments in WT Docket No. 16-239.²³

⁹ See 47 CFR § 97.309(a)(1).

¹⁰ See 47 CFR § 97.309(a)(2).

¹¹ See 47 CFR § 97.309(a)(3).

¹² See 47 CFR § 97.307(f)(14).

¹³ See 47 CFR § 97.307(f)(3),(4).

¹⁴ See 47 CFR § 97.307(f)(5).

¹⁵ See 47 CFR § 97.307(f)(6), (13).

¹⁶ See *Deregulation of Part 97 of the Rules Regarding Emissions Authorized in the Amateur Service*, Docket No. 20777, Third Report and Order, 45 Fed. Reg. 8990, 8991, para. 4 (1980) (*ASCII Report and Order*).

¹⁷ *Id.*

¹⁸ Petition of the National Association for Amateur Radio for Rulemaking, WT Docket No. 16-239, at 1 (filed Nov. 15, 2013), <https://www.fcc.gov/ecfs/document/6017477458/1> (ARRL Petition).

¹⁹ *Id.*

²⁰ *Id.*

²¹ *Amendment of Part 97 of the Commission's Amateur Radio Service Rules to Permit Greater Flexibility in Data Communications*, WT Docket No. 16-239, Notice of Proposed Rulemaking, 31 FCC Rcd 8485 (2016) (*NPRM*).

²² *Id.* at 8489, para 10.

²³ The docket includes comments to the *NPRM* and other, unrelated petitions.

III. REPORT AND ORDER

7. In this *Report and Order* we find that it is in the public interest to adopt the Commission's tentative conclusion in the *NPRM* to remove the limitation on the baud rate applicable to certain data emissions in the amateur bands below 29.7 MHz.²⁴ In addition, consistent with comments in the record, we impose a bandwidth limitation. Specifically, we find a 2.8 kilohertz bandwidth limitation, as proposed in the ARRL petition, best achieves the goals in this proceeding of promoting innovation, more efficient use of the radio spectrum currently allocated to the amateur service, and the ability of the amateur service to support public safety efforts in the event of an emergency.²⁵

8. *Baud Rate Limitations.* Consistent with the Commission's tentative conclusion in the *NPRM*, we find that it is in the public interest to remove the baud rate limitation in section 97.307(f) of the Commission's rules.²⁶ As the Commission observed in 1993, "as technology progresses, the rules may become unnecessarily restrictive, particularly with regard to the permissible baud rate."²⁷ Such is the case here. Based on the record in this proceeding, we find that the baud rate limitation has become outdated and hampers, rather than promotes, innovation and robust use of the amateur bands.²⁸ For example, ARRL argues, the current baud rate limits permit, if not actually encourage, inefficient spectrum utilization.²⁹ Similarly, as the Texas Department of Public Safety maintains, eliminating the baud rate limitation will allow messages to "be transmitted at almost twice the speed in the same occupied bandwidth."³⁰ We find that elimination of the baud rate limitation will promote more efficient use of the radio spectrum currently allocated for amateur services and thus amend section 97.307(f) by eliminating the baud rate as proposed in the *NPRM*.³¹

9. Eliminating the baud rate limitation has wide support in the record.³² Many commenters emphasize the public safety benefits that will result from removing the baud rate limitation. For example, several state public safety organizations emphasize that they rely "on effective amateur radio communications to provide critical initial information in areas severed from traditional modes of communication."³³ Commenters explain that amateur radio operators volunteer during natural disasters

²⁴ We do not remove the baud rate limitation in the 2200 meter band, the 630 meter band or in the VHF and UHF bands. In the *FNPRM*, we propose to remove the baud rate limitation in the 2200 meter band and 630 meter band, which the Commission allocated for amateur radio use after it released the *NPRM* in 2016, and in the very high frequency (VHF) bands and the ultra-high frequency (UHF) bands.

²⁵ *NPRM*, 31 FCC Rcd at 8488, para 8.

²⁶ *Id.*

²⁷ *Allocation of the 219–220 MHz Band for Use by the Amateur Radio Service*, ET Docket No. 93-40, Notice of Proposed Rulemaking, 8 FCC Rcd 2352, 2356, para. 30 (1993).

²⁸ See Janis Carson Comments at 1 (Sept. 1, 2016) (stating that the baud rate limit is obsolete).

²⁹ ARRL Petition at 3.

³⁰ Letter to Jessica Rosenworcel, Chairwoman, Federal Communications Commission, from Karla Jurren, Statewide Interoperability Coordinator, Texas Department of Public Safety, WT Docket No. 16-239, (filed July 10, 2023) (Texas Department of Public Safety *Ex Parte*).

³¹ *NPRM*, 31 FCC Rcd at 8488, para. 8.

³² "There is no technical reason for the symbol rate limit in 2019." Letter from Paul C. Steinhardt, Amateur Radio Safety Foundation Inc., to Marlene H. Dortch, Secretary, FCC, Docket No. 16-239, (filed Nov. 06, 2019) (ARSFI Nov. 6, 2019 *Ex Parte*). "We are the only country in the world that limits the symbol rate of amateur digital signals in this manner." Letter from David R. Siddall, Counsel to ARRL, to Marlene H. Dortch, Secretary, FCC, WT Docket No. 16-239, attached Letter from Roger Lord, Florida Statewide Interoperability Coordinator, Florida Division of Emergency Management, to Jessica Rosenworcel, Chairwoman, FCC, at 2 (filed on July 18, 2023) (ARRL July 18, 2023 *Ex Parte*).

³³ ARRL July 18, 2023 *Ex Parte* at 2.

and removing the baud rate will allow for faster emergency communications.³⁴ As ARRL states, “[i]ncreasing speed is especially important when amateurs voluntarily assist during and after hurricanes, forest fires, and other disasters.”³⁵ Commenters also espouse the benefits of removing the baud rate limitation to promote continued innovation in the amateur bands.³⁶ ARRL, for example, contends that eliminating the baud rate limitation will “incentivize innovation by allowing more data to be transmitted within each signal without increasing bandwidth from that currently used.”³⁷ For these reasons, we agree with commenters that the baud rate limitation should be eliminated and adopt the proposal in the *NPRM*.

10. A few commenters oppose any rule change, arguing that the existing rules should be retained in order to protect access to amateur bands by Morse code and other narrowband transmissions.³⁸ While we recognize that there are varying uses for the amateur bands, our decision today does not restrict or promote any particular use. Amateur licensees engaging in Morse code transmissions will continue to be able to use the amateur bands for such transmissions. However, amateur frequencies are not assigned for the exclusive use of any station.³⁹ Rather, each station licensee and each control operator must cooperate in selecting transmitting channels and in making the most effective use of the amateur service frequencies.⁴⁰ Thus, our existing rules will continue to promote sharing in the bands and ensure that wideband emissions do not exclude narrowband emission modes such as Morse code.⁴¹ Consistent with the support of most commenters in the record, our decision to eliminate the baud rate limitation provides amateur licensees with increased flexibility to engage in the innovation and experimentation that are the hallmarks of the amateur radio service.

11. We also note that the Wireless Telecommunications Bureau’s Mobility Division has issued waivers of section 97.307 allowing amateur operators directly involved with disaster relief efforts to exceed the baud rate limitation in the interest of public safety.⁴² ARRL argues that a waiver approach

³⁴ See e.g., Mark Williams Comments (Dec. 16, 2019); Howard Evans Comments (Dec. 14, 2019); Texas Department of Public Safety *Ex Parte*.

³⁵ Letter from David R. Siddall, Counsel to ARRL, to Marlene H. Dortch, Secretary, FCC, WT Docket No. 16-239, at 2 (filed on July 2, 2023) (ARRL July 2, 2023 *Ex Parte*).

³⁶ “Given advancement in radio technology, [baud rates] no longer make sense, and they stifle innovation and experimentation by amateurs.” Michael Adams Comments at 1 (Aug. 31, 2016).

³⁷ Letter from David R. Siddall, Counsel to ARRL, to Marlene H. Dortch, Secretary, FCC, WT Docket No. 16-239, at 2 (filed on July 24, 2023) (ARRL July 24, 2023 *Ex Parte*).

³⁸ See, e.g., Nickolaus E. Leggett Comments at 2 (Aug. 1, 2026) (arguing that before changing the rules, the Commission should allow the amateur community to conduct on-air testing to demonstrate that broader bandwidth digital communications will not displace narrowband emissions); Dan White Comments at 7 (Aug. 8, 2016) (arguing that wideband unlimited data emissions “will overwhelm and eliminate the ability of current narrow band operators to enjoy the Amateur Radio Service”). Many comments filed during the *NPRM* comment/reply period were submitted under the rulemaking number for one or both of the ARRL rulemaking petitions instead of or in addition to the docket number for the *NPRM*. Our citations to comments identify the proceeding(s) in which they were filed.

³⁹ 47 CFR § 97.101(b) (“Each station licensee and each control operator must cooperate in selecting transmitting channels and in making the most effective use of the amateur service frequencies. No frequency will be assigned for the exclusive use of any station.”); 47 CFR § 97.101(d) (“No amateur operator shall willfully or maliciously interfere with or cause interference to any radio communication or signal.”).

⁴⁰ 47 CFR §§ 97.101(b), 97.101(d).

⁴¹ See, e.g., 47 CFR § 97.101(b); 47 CFR § 97.307 (“No amateur station transmission shall occupy more bandwidth than necessary for the information rate and emission type being transmitted, in accordance with good amateur practice.”); 47 CFR § 97.113 (amateur licensees must not transmit communications, on a regular basis, which could reasonably be furnished alternatively through other radio services).

⁴² ARRL July 2, 2023 *Ex Parte* at 2; *American Radio Relay League, Inc. Emergency Request for a Temporary Waiver of Section 97.307(f) of the Commission’s Rules*, Order, 35 FCC Rcd 10393, 10393 para. 1 (WTB 2020)

is inadequate because it does not allow amateurs who voluntarily assist during and after hurricanes, forest fires, and other disasters to use and train with the faster modes outside of any waiver period.⁴³ Absent a rule change, ARRL maintains that “the effectiveness of responses are impaired during the first hours and days when most critical as many volunteers must download or update the software that enables the faster speeds and solve any system problems that result.”⁴⁴ We agree that an ad hoc waiver approach is not a substitute for amending our rules to eliminate the baud rate limitation in amateur radio bands and we amend part 97 of the Commission’s rules accordingly.⁴⁵

12. *2.8 Kiloherz Bandwidth Limitation.* ARRL’s petition requested that the Commission amend its rules by replacing the baud rate limitation with a 2.8 kilohertz bandwidth limitation.⁴⁶ The *NPRM* tentatively concluded that a specific bandwidth limitation for RTTY and data emissions in the amateur radio service bands was not necessary. However, the *NPRM* observed that a 2.8 kilohertz bandwidth would accommodate HF data emissions that were in common use at that time⁴⁷ and which, we note, remain in use today. The *NPRM* sought comment on its tentative conclusions.⁴⁸ Based on our review of the record, we now agree with ARRL and other commenters that a 2.8 kHz bandwidth limit strikes the right balance between operational flexibility and spectrum reuse. Accordingly, we adopt a 2.8 kilohertz bandwidth limitation in place of the baud rate limitation applicable to the following amateur radio bands: 160 meter band; 80 meter band; 40 meter band, segments 7.000–7.100 MHz and 7.100–7.125 MHz; 30 meter band; 20 meter band, segment 14.00–14.15 MHz; 17 meter band, segment 18.068–18.110 MHz; 15 meter band segment 21.0–21.2 MHz; 12 meter band segment 24.89–24.93 MHz; and 10 meter band, segment 28.0–28.3 MHz.⁴⁹

13. Although the Commission tentatively concluded not to adopt a bandwidth limitation in the *NPRM*, commenters generally disagree with that tentative conclusion. Most commenters argue that if there is no baud rate limit and no bandwidth limit, a few wideband emissions could consume the bands and make sharing of the band more difficult during times of heavy use.⁵⁰ We agree. We are persuaded by the weight of the record in this proceeding that, without a baud rate or bandwidth limit, data stations using a large amount of spectrum for a single emission could do so to the detriment of simultaneous use by other stations using narrowband emission modes. For example, ARRL states that “ARRL and most

(granting a temporary waiver “to permit amateur data transmissions at a higher symbol rate than currently is permitted by section 97.307(f) of the Commission’s rules, in order to facilitate hurricane and wildfire relief communications within the United States and its territories”); see also *American Radio Relay League, Inc. Emergency Request for a Temporary Waiver of Section 97.307(f) of the Commission’s Rules*, Order, 33 FCC Rcd 8758 (WTB 2018); *American Radio Relay League, Inc. Emergency Request for a Temporary Waiver of Section 97.307(f) of the Commission’s Rules*, Order, DA 22-1011 (WTB 2022); *American Radio Relay League, Inc. Emergency Request for a Temporary Waiver of Section 97.307(f) of the Commission’s Rules*, Order, 32 FCC Rcd 7428 (WTB 2017); *American Radio Relay League, Inc. Emergency Request for a Temporary Waiver of Section 97.307(f) of the Commission’s Rules*, Order, 35 FCC Rcd 9924 (WTB 2020); *American Radio Relay League, Inc. Emergency Request for a Temporary Waiver of Section 97.307(f) of the Commission’s Rules*, Order, 34 FCC Rcd 7956 (WTB 2019).

⁴³ ARRL July 2, 2023 *Ex Parte* at 2.

⁴⁴ *Id.*

⁴⁵ *Id.*

⁴⁶ ARRL Petition at 1.

⁴⁷ *NPRM*, 31 FCC Rcd at 8489, para. 10.

⁴⁸ *Id.*

⁴⁹ 47 CFR § 97.305.

⁵⁰ See, e.g. Dan Zeitlin Comments, at 1 (Nov. 10, 2016) (Zeitlin Comments); Chuck Crisler Comments at 3 (Oct. 18, 2016); Dan White Comments, 1 (Aug. 8, 2016); David Jaksa Comments (Oct. 12, 2016); Jory McIntosh Comments at 2 (Aug. 8, 2016); Richard Cochran Comments at 1 (Aug. 31, 2016); ARRL July 24, 2023 *Ex Parte* at 2.

stakeholders favor both deleting the symbol rate and replacing it with a 2.8 kHz individual signal bandwidth limit.”⁵¹ Based on the record, we conclude that it is in the public interest to set a specific bandwidth limitation in certain amateur radio bands to better promote sharing among amateur licensees in these bands.

14. The few commenters that support the removal of the baud rate limit with no bandwidth limitation argue that doing so will facilitate experimentation in the amateur service.⁵² As discussed above, however, the benefit of such wideband experimentation could come at the cost of significantly limiting the wide variety of uses in the amateur bands, which is a hallmark of these bands. We thus find that a bandwidth limitation is in the public interest and should be adopted here.

15. We further conclude that 2.8 kilohertz is the appropriate bandwidth limitation that effectively accomplishes our goals in this proceeding of innovation, efficient spectrum use, and aid to public safety, and strikes a balance among differing uses in the amateur bands. In its comments to the *NPRM*, ARRL stated “[a]n occupied bandwidth limit of 2.8 kilohertz is wide enough that it will permit to continue those data emissions currently permitted by the existing rules, and it will permit additional data emissions that are now prohibited because the symbol rate limit of 300 baud applicable to the HF bands below 28 MHz precludes them.”⁵³ In addition to being wide enough to allow adequate emissions for amateur radio use, a 2.8 kilohertz bandwidth limitation will also prevent users from usurping large portions of a subband. As ARRL notes, “a 2.8 kilohertz bandwidth limit is sufficiently narrow that it limits the ability of any given Amateur station using data emissions of that bandwidth or less to usurp overly large portions of the limited, crowded and shared RTTY/data subbands.”⁵⁴ We agree with ARRL that a 2.8 kilohertz bandwidth limitation will allow for additional emissions currently prohibited under the baud rate limitations while providing sufficient protections in the shared RTTY/data subbands.

16. We find that a 2.8 kilohertz bandwidth limitation is in the public interest because it is already used by a range of technologies common in the amateur bands.⁵⁵ As ARRL states, “[a]mateurs worldwide have informally adopted the 2.8 kHz bandwidth for popular types of digital data transmission on HF frequencies at least in part because all amateur HF transceivers with voice capabilities already are equipped with the filters and/or software for this bandwidth.”⁵⁶ A 2.8 kilohertz bandwidth limitation is also commonly used bandwidth for both data and voice transmissions.⁵⁷ Moreover, a 2.8 kilohertz bandwidth is consistent with the existing 60 meter band’s 2.8 kilohertz bandwidth limitation and applying

⁵¹ ARRL July 2, 2023 *Ex Parte* at 2.

⁵² See e.g., Michael Peak Comments at 1.

⁵³ ARRL Comments at 6 (Oct. 11, 2016).

⁵⁴ *Id.*

⁵⁵ ARRL July 24, 2023 *Ex Parte* at 1.

⁵⁶ “Employing this bandwidth for digital signals eliminated any need to purchase costly new transceivers and facilitated the rapid deployment of the newer digital technologies on HF.” *Id.* “The ARRL digital guide ‘Get on the Air with HF Digital’ advises that the ‘most popular HF digital modes use wide receive-audio bandwidths for reception . . . of about 2.8 kHz. All SSB transceivers meet this requirement.’” *Id.*

⁵⁷ See e.g., 47 CFR § 80.205 (bandwidth limitations in the maritime bands); 47 CFR § 97.303(h) (“Amateur operators shall ensure that their emission do not occupy more than 2.8 kHz centered on each of these center frequencies” in the 60 meter band); ARRL July 24, 2023 *Ex Parte* at 1 (“Amateurs worldwide have informally adopted the 2.8 kHz bandwidth for popular types of digital data transmission on HF frequencies at least in part because all amateur HF transceivers with voice capabilities already are equipped with the filters and/or software for this bandwidth. Employing this bandwidth for digital signals eliminated any need to purchase costly new transceivers and facilitated the rapid deployment of the newer digital technologies on HF.”); ARRL July 24, 2023 *Ex Parte* at 1 (“The ARRL digital guide ‘Get on the Air with HF Digital’ advises that the ‘most popular HF digital modes use wide receive-audio bandwidths for reception . . . of about 2.8 kHz. All SSB transceivers meet this requirement.’”).

a common bandwidth limitation across adjacent bands is consistent with Commission precedent.⁵⁸ We also note that a 2.8 kilohertz bandwidth limitation is in line with the international community.⁵⁹

17. We note that some commenters argue for a rigid band plan that would allot portions of the bands for narrowband techniques with bandwidths such as 200 hertz or 500 hertz to protect and promote the use of narrowband operating modes.⁶⁰ While there is little consensus among these commenters on what the optimal bandwidth limit should be, a number of commenters express concern that without bandwidth limits specifically catered to narrowband applications, wider bandwidth digital modes will interfere with spectrally efficient narrowband modes.⁶¹ These commenters argue that bandwidths in the RTTY/data subbands should be considerably narrower than the 2.8 kilohertz suggested by ARRL to avoid interference to narrowband signals.⁶² We decline to adopt a rigid band plan. We set a bandwidth limitation of 2.8 kilohertz as a cap on emissions, which accommodates a wide variety of uses while not precluding narrowband uses. Our approach encourages experimentation and innovation, and permits the use of existing technologies available in other services.⁶³ Moreover, we note that ARRL maintains a voluntary band plan that outlines suggested portions of the bands for certain applications as well as specifies limitations contained in our rules.⁶⁴ We find that a community-driven, voluntary band plan that can rapidly be adjusted as technology changes and is consistent with our rules requiring

⁵⁸ See *Amendment of Parts 1, 2, 15, 90 and 95 of the Commission's Rules to Permit Radar Services in the 76–81 GHz Band*, Report and Order, 32 FCC Rcd 8822, 8832, n.70 (2017) (adopting a single emissions limit for amateur stations in the 4 mm band rather than a sliding scale based on distance to the nearest road); see also, e.g., *Amendment of the Commission's Rules with Regard to Commercial Operations in the 1695–1710 MHz, 1755–1780 MHz, and 2155–2180 MHz Bands*, Report and Order, 29 FCC Rcd 4610, 4642, para. 82 (2014) (“The Commission typically adopts the same rules for similar adjacent band services, and we see no compelling reason to do otherwise here.”).

⁵⁹ See International Telecommunication Union Recommendation ITU-R M.1732-2, “Characteristics of systems operating in the amateur and amateur-satellite services for use in sharing studies,” at Table 3A (01/2017) (using 2.7 kilohertz as the necessary bandwidth for representative amateur data, digital voice, and multimedia systems in the MF and HF bands).

⁶⁰ See, e.g., Samuel Leslie Comments, at 7 (Sept. 13, 2016) (suggesting splitting amateur bands in to three segments); David Jaksa Comments (Oct. 12, 2016) (suggesting an HF data bandwidth in 97.307(f)(3) of 500 Hz with no limit on symbol rate); Chuck Crisler Comments at 1 (Sept. 21, 2016) (“Amateurs should be encouraged to innovate with narrowband technology, 1.0 Khz. Or less, not the 2.8 Khz. That was suggested by ARRL.”).

⁶¹ See, e.g., Michael Adams Comments, RM-11708, at 2 (Aug. 8, 2016); Arthur C. Peters, RM-11708, Comments at 1–2 (Aug. 16, 2016); Samuel Leslie Comments at 5 (Sept. 14, 2016); Salvatore Irato Comments at 4 (Aug. 22, 2016) (noting commercial wider bandwidth modems do not have the ability to recognize any other signal than the one transmitted by a similar or complementary signal, i.e., a data signal); Letter from Janis Carson, Ron Kolarik, Lee McVey, and Dan White to Nellie Foosaner, Senior Attorney Advisor, Mobility Division, Federal Communications Commission, WTB Docket No. 16-239 at 2 (filed July 28, 2023) (Carson July 28, 2023 *Ex Parte*) (arguing that digital mode FT8 with a bandwidth of 50 Hz has become more popular than all other digital modes combined).

⁶² See, e.g., Theodore Rappaport Comments at 3 (proposing that the lowest 100 kHz of every HF band for emissions less than 500 Hz); Dan White Comments at 2 ((Aug. 8, 2016); and David Rogers Comments at 2 (Sept. 16, 2016) (proposing a 200 Hz bandwidth limit on the bottom 50 KHz and a 500 Hz bandwidth limit on the bottom 100 KHz portion of every HF and MF band); Samuel Leslie Comments at 7; J. Douglas Reid Comments, WT Docket No. 16-239, RM-11708, at 1 (filed Oct. 5, 2016). See generally *Petition of Janis Carson for Rulemaking/Comments and Informal Request in the Nature of Rulemaking* (filed Aug. 20, 2016, amended Sept. 6 and Nov. 10, 2016). Because this petition raises issues that are substantially the same as those addressed in the *NPRM* and was filed during the comment period, we treat it as a comment in WT Docket No. 16-239.

⁶³ *NPRM*, 31 FCC Rcd at 8488, para 3.

⁶⁴ ARRL, *Band Plan*, <http://www.arrl.org/band-plan> (last visited Oct. 17, 2023).

cooperation and efficiency⁶⁵ is preferable to a FCC rule-based mandatory band plan that requires regulatory action to adjust. Thus, we decline to adopt a mandatory band plan here.

18. Many commenters express concern that allowing wider data transmissions will encourage the transmission of prohibited communications. We remind licensees that section 97.113 of our rules prohibits amateur stations from transmitting, *inter alia*, communications in which the station licensee or control operator has a pecuniary interest, communications intended to facilitate a criminal act, or regular transmission of communications that could reasonably be furnished through other radio services.⁶⁶ Moreover, section 97.101 requires amateur licensees to operate in accordance with good amateur practice and to cooperate in selecting transmitting channels and making the most effective use of amateur spectrum.⁶⁷ The changes we make herein to the technical rules do not modify any of these operating rules. As the Commission concluded when it amended its rules to permit PACTOR 3 in the 60 meter band, careful operating practices, sound judgment, and dissemination of information to the amateur community can minimize any potential disruption that the new emission types could cause.⁶⁸

19. We also take this opportunity to make non-substantive edits to the two rule sections we are otherwise revising, sections 97.305 and 97.307, to conform to the current stylistic requirements of the Federal Register Document Drafting Handbook.⁶⁹

IV. FURTHER NOTICE OF PROPOSED RULEMAKING

20. There are multiple bands in the amateur radio service that have baud rate limitations and were not discussed in the *NPRM*. Two bands—135.7–137.8 kHz (2200 meter) and 472–479 kHz (630 meter)—were allocated for use in the amateur radio service after the Commission released the *NPRM* in 2016. There are also multiple very high frequency (VHF) bands⁷⁰ and one ultra-high frequency (UHF) band⁷¹ that have baud rate limitations. In this *Further Notice of Proposed Rulemaking (FNPRM)* we propose to remove the baud rate limitation in the two bands allocated for amateur radio use after the Commission released the *NPRM* in 2016 and in the VHF/UHF bands. Additionally, we seek comment on the appropriate bandwidth limitation for the 2200 meter and 630 meter bands, and propose to maintain the existing bandwidth limitations in the Commission’s rules for VHF/UHF bands.⁷²

21. In 2016, the Commission released the *NPRM* seeking comment on eliminating the baud rate limit in certain amateur bands and amending part 97 of the Commission’s rules accordingly.⁷³ The *NPRM* also tentatively concluded that a 2.8 kilohertz bandwidth limitation for RTTY and data emissions

⁶⁵ Amateur licensees must cooperate in the selection of frequencies and make the most efficient use of the amateur frequencies. See 47 CFR § 97.101(b). Amateur transmissions may not occupy more bandwidth than necessary for the information rate and emission type being transmitted. See 47 CFR § 97.307(a).

⁶⁶ See 47 CFR § 97.113(a)(3)–(5).

⁶⁷ See 47 CFR § 97.101(a), (b).

⁶⁸ See *Amendment of Parts 2 and 97 of the Commission’s Rules to Facilitate Use by the Amateur Radio Service of the Allocation at 5 MHz*, Report and Order, 26 FCC Rcd 16551, 16659, paras. 26–27 (2011).

⁶⁹ Office of the Federal Register, National Archives and Records Administration, *Document Drafting Handbook* (Aug. 2023 Edition, rev. 2, dated Aug. 2023), available at <https://www.archives.gov/files/federal-register/write/handbook/ddh.pdf> (last visited Oct. 4, 2023); Office of the Federal Register, National Archives and Records Administration, *Incorporation by Reference Handbook* (June 2023 Edition, ed. Rev. Aug. 28, 2023), available at <https://www.archives.gov/files/federal-register/write/handbook/ibr.pdf> (last visited Oct. 4, 2023).

⁷⁰ 6 meter band (50.1–51.0 MHz), (51.0–54.0 MHz); 2 meter band (144.1–148.0 MHz); 1.25 meter band (222–225 MHz). 47 CFR § 97.305(c).

⁷¹ 70 centimeter band (420–450 MHz). 47 CFR § 97.305(c).

⁷² 47 CFR § 97.307(5)–(6).

⁷³ *NPRM*, 31 FCC Rcd 8485.

in the MF/HF bands was not necessary, but sought comment on this conclusion.⁷⁴ The *NPRM* did not seek comment on eliminating the baud rate limit in the VHF or UHF bands allocated for amateur radio service. In 2017, the Commission adopted rules permitting fixed amateur radio operations in 135.7–137.8 kHz (2200 meter) and 472–479 kHz (630 meter) bands.⁷⁵ These bands are allocated to the amateur radio service on a secondary basis.⁷⁶ Consistent with the part 97 rules in effect for other amateur bands at that time, the Commission adopted a 300 baud rate limitation for both the 2200 meter band and the 630 meter band.⁷⁷

22. For the reasons outlined in the *Report and Order* adopted today, we tentatively conclude that we should eliminate the baud rate limitation in the 2200 meter and 630 meter bands as well as the VHF and UHF amateur radio bands. These bands present the same technological opportunities for experimentation and innovation as the amateur radio service bands that are the subject of the *Report and Order* and likewise will be limited if a baud rate limitation is allowed to remain for these bands. Concomitantly, we seek comment on the appropriate bandwidth limitation for the 2200 meter band and the 630 meter band as well as on maintaining the bandwidth limitations already in the VHF and UHF bands. We specifically seek comment on these proposals. Commenters should focus their comments on the VHF and UHF bands and the 2200 meter band and the 630 meter band that were allocated for amateur radio service after the release of the *NPRM*. We do not seek comment on other, unrelated issues in the docket at this time.

23. *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 benefits (if any) that may be associated with the proposals and issues discussed herein. Specifically, we seek comment on how our proposals may promote or inhibit advances in diversity, equity, inclusion, and accessibility, as well the scope of the Commission’s relevant legal authority.

V. PROCEDURAL MATTERS

24. *Regulatory Flexibility Certification*. The Regulatory Flexibility Act of 1980, as amended (RFA)⁸⁰ requires that an agency prepare a regulatory flexibility analysis for notice and comment rulemaking, unless the agency certifies that “the rule will not, if promulgated, have a significant

⁷⁴ *Id.* at 8489, para 10.

⁷⁵ See *WRC-12 R&O*, 32 FCC Rcd at 2708, para. 13.

⁷⁶ *Id.*

⁷⁷ 47 CFR § 97.305; 47 CFR § 97.303(f)(3).

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).

⁸⁰ See 5 U.S.C. § 604. The RFA, 5 U.S.C. §§ 601–612, was amended by the Small Business Regulatory Enforcement Fairness Act of 1996 (SBREFA), Pub. L. No. 104-121, Title II, 110 Stat. 857 (1996) (FRFA).

economic impact on a substantial number of small entities.”⁸¹ The RFA generally defines the term “small entity” as having the same meaning as the terms “small business,” “small organization,” and “small governmental jurisdiction.”⁸² In addition, the term “small business” has the same meaning as the term “small business concern” under the Small Business Act.⁸³ A “small business concern” is one which: (1) is independently owned and operated; (2) is not dominant in its field of operation; and (3) satisfies any additional criteria established by the Small Business Administration (SBA).⁸⁴

25. As required by the RFA, an Initial Regulatory Flexibility Certification (IRFC) was incorporated in the *Notice of Proposed Rulemaking (NPRM)* in this proceeding.⁸⁵ In the *NPRM*, we certified that because the proposed amendments to amateur service rules changing a technical rule applicable to data emissions that an amateur radio operator may use in his or her communications with other amateur radio operators applied exclusively to individuals holding certain Commission authorizations, rather than “small entities,” as defined in the RFA, the *NPRM* would not have a significant economic impact on a substantial number of small entities. We sought written public comment on the proposals in the *NPRM* including comment on the IRFC. No comments were filed addressing the IRFC. The two statutorily-mandated criteria to be applied in determining the need for an RFA analysis are: (1) whether the proposed rules, if adopted, would have a *significant economic effect*; and (2) if so, whether the economic effect would directly affect *a substantial number of small entities*.⁸⁶ In the *Report and Order*, we amend the amateur service rules to change the technical rules applicable to data emissions an amateur radio operator may use in his or her communications with other amateur radio operators. The RFA’s definition of “small entities,” does not include a “person” or an individual, as the terms are used in this proceeding. As a result, the rules do not apply to “small entities,” but instead apply exclusively to individuals who hold certain Commission authorizations. Accordingly, based on our application of the statutorily-mandated criteria we conclude, and therefore certify that the rules in this Final Regulatory Flexibility Certification, that the rules adopted in this *Report and Order* will not have a significant economic impact on a substantial number of small entities.

26. In the *FNPRM*, we propose to amend the amateur service rules to change technical rules applicable to data emissions that an amateur radio operator may use in his or her communications with other amateur radio operators in the 135.7–137.8 kHz (2200 meter), 472–479 kHz (630 meter) bands, very high frequency (VHF) bands, and ultra-high frequency (UHF) bands. As discussed above, the RFA’s definition of “small entities” does not include a “person” as the term is used in this proceeding or an individual, as the terms are used in this proceeding. As a result, the proposed rules do not apply to “small entities,” but instead, apply exclusively to individuals who hold certain Commission authorizations. Accordingly, applying the statutorily-mandated criteria we conclude, and, therefore, we certify in this Initial Regulatory Flexibility Certification, that the rules adopted in the *FNPRM* will not have a significant economic impact on a substantial number of small entities.

27. The Commission will send copies of the *Report and Order* and the *FNPRM*, including

⁸¹ 5 U.S.C. § 605(b).

⁸² See 5 U.S.C. § 601(6).

⁸³ See 5 U.S.C. § 601(3) (incorporating by reference the definition of “small business concern” in the Small Business Act, 15 U.S.C. § 632). Pursuant to 5 U.S.C § 601(3), the statutory definition of a small business applies “unless an agency, after consultation with the Office of Advocacy of the Small Business administration and after opportunity for public comment, establishes one or more definitions of such term which are appropriate to the activities of the agency and publishes such definition(s) in the Federal Register.”

⁸⁴ See 15 U.S.C. § 632.

⁸⁵ *Amendment of Part 97 of the Commission's Amateur Radio Service Rules to Permit Greater Flexibility in Data Communications*, WT Docket No. 16-239, Notice of Proposed Rulemaking, 31 FCC Rcd 8485 (2016) (*NPRM*).

⁸⁶ 5 U.S.C. § 603, *et seq.* See also *Mid-Tex Electric Cooperative, Inc., v. FERC*, 773 F.2d 327, 342–343 (D.C. Cir. 1985) (*Mid-Tex Electric*).

copies of the Final Regulatory Flexibility Certification and the Initial Regulatory Flexibility Certification, to the Chief Counsel for Advocacy of the SBA.⁸⁷ The Final Regulatory Flexibility Certification and the Initial Regulatory Flexibility Certification will also be published in the Federal Register.⁸⁸

28. *Paperwork Reduction Act.* This document does not contain proposed information collection(s) subject to the Paperwork Reduction Act of 1995 (PRA), Public Law 104-13. In addition, therefore, it does not contain any new or modified information collection burden for small business concerns with fewer than 25 employees, pursuant to the Small Business Paperwork Relief Act of 2002, Public Law 107-198, *see* 44 U.S.C. 3506(c)(4).

29. *Congressional Review Act.* [The Commission will submit this draft *Report and Order* to the Administrator of the Office of Information and Regulatory Affairs, Office of Management and Budget, for concurrence as to whether this rule is “major” or “non-major” under the Congressional Review Act, 5 U.S.C. § 804(2).] The Commission will send a copy of this *Report and Order* to Congress and the Government Accountability Office pursuant to 5 U.S.C. § 801(a)(1)(A).

VI. ORDERING CLAUSES

30. Accordingly, IT IS ORDERED that, pursuant to Sections 4(i), 5, 303(r), and 403 of the Communications Act of 1934, 47 U.S.C. §§ 154(i), 155, 303(r), and 403 of the Commission’s rules, that this Report and Order and Further Notice of Proposed Rulemaking IS HEREBY ADOPTED. Proceeding RM-11708 is TERMINATED.

31. IT IS FURTHER ORDERED that part 97 of the Commission’s Rules IS AMENDED as set forth in the Appendix, effective 30 days after publication in the Federal Register.

32. IT IS FURTHER ORDERED that the Office of the Managing Director, Performance Program Management, SHALL SEND a copy of this Report & Order in a report to be sent to Congress and the Government Accountability Office pursuant to the Congressional Review Act, 5 U.S.C. § 801(a)(1)(A).

33. IT IS FURTHER ORDERED that the Office of the Secretary, Reference Information Center, SHALL SEND a copy of the Report and Order and Further Notice of Proposed Rulemaking including the Final Regulatory Flexibility Certification and the Initial Regulatory Flexibility Certification, to the Chief Counsel for Advocacy of the Small Business Administration.

⁸⁷ *See* 5 U.S.C. § 605(b).

⁸⁸ *Id.*

APPENDIX A
Final Rules

For the reasons discussed in the preamble, the Federal Communications Commission amends 47 CFR part 97 as follows:

PART 97 – Amateur Radio Service

1. The authority citation for part 97 continues to read as follows:

AUTHORITY: 47 U.S.C. 151-155, 301-609, unless otherwise noted.

2. The table following § 97.305(c) is designated Table 1 to § 97.305(c). In addition, § 97.305 is amended by revising the numeric order of the table and the entry for 28.0–28.3 MHz in the table in paragraph (c) to read as follows:

§ 97.305 Authorized emission types.

* * * * *

(c) A station may transmit the following emission types on the frequencies indicated, as authorized to the control operator, subject to the standards specified in § 97.307(f):

Wavelength band	Frequencies	Emission types authorized	Standards see § 97.307, paragraph(s):
(1) LF:			
(i) 2200 m	Entire band	RTTY, data	(f) (3).
(ii) 2200 m	Entire band	Phone, image	(f) (1), (2).
(2) MF:			
(i) 630 m	Entire band	RTTY, data	(f) (3).
(ii) 630 m	Entire band	Phone, image	(f) (1), (2).
(iii) 160 m	Entire band	RTTY, data	(f) (3).
(iv) 160 m	Entire band	Phone, image	(f) (1), (2).
(3) HF:			
(i) 80 m	Entire band	RTTY, data	(f) (3), (9).
(ii) 75 m	Entire band	Phone, image	(f) (1), (2).
(iii) 60 m	5.332, 5.348, 5.3585, 5.373 and 5.405 MHz	Phone, RTTY, data	(f) (14).
(iv) 40 m	7.000–7.100 MHz	RTTY, data	(f) (3), (9)
(v) 40 m	7.075–7.100 MHz	Phone, image	(f) (1), (2), (9), (11)
(vi) 40 m	7.100–7.125 MHz	RTTY, data	(f) (3), (9)
(vii) 40 m	7.125–7.300 MHz	Phone, image	(f) (1), (2)
(viii) 30 m	Entire band	RTTY, data	(f) (3).
(ix) 20 m	14.00–14.15 MHz	RTTY, data	(f) (3).

Wavelength band	Frequencies	Emission types authorized	Standards see § 97.307, paragraph(s):
(x) 20 m	14.15–14.35 MHz	Phone, image	(f) (1), (2).
(xi) 17 m	18.068–18.110 MHz	RTTY, data	(f) (3).
(xii) 17 m	18.110–18.168 MHz	Phone, image	(f) (1), (2).
(xiii) 15 m	21.0–21.2 MHz	RTTY, data	(f) (3), (9).
(xiv) 15 m	21.20–21.45 MHz	Phone, image	(f) (1), (2).
(xv) 12 m	24.89–24.93 MHz	RTTY, data	(f) (3).
(xvi) 12 m	24.93–24.99 MHz	Phone, image	(f) (1), (2).
(xvii) 10 m	28.0–28.3 MHz	RTTY, data	(f) (3).
(xviii) 10 m	28.3–28.5 MHz	Phone, image	(f) (1), (2), (10).
(xix) 10 m	28.5–29.0 MHz	Phone, image	(f) (1), (2).
(xx) 10 m	29.0–29.7 MHz	Phone, image	(f) (2).
(4) VHF:			
(i) 6 m	50.1–51.0 MHz	MCW, phone, image, RTTY, data	(f) (2), (5).
(ii) 6 m	51.0–54.0 MHz	MCW, phone, image, RTTY, data, test	(f) (2), (5), (8).
(iii) 2 m	144.1–148.0 MHz	MCW, phone, image, RTTY, data, test	(f) (2), (5), (8).
(iv) 1.25 m	219–220 MHz	Data	(f) (13)
(v) 1.25m	222–225 MHz	RTTY, data, test MCW, phone, SS, image	(f) (2), (6), (8)
(5) UHF:			
(i) 70 cm	Entire band	MCW, phone, image, RTTY, data, SS, test	(f) (6), (8).
(ii) 33 cm	Entire band	MCW, phone, image, RTTY, data, SS, test, pulse	(f) (7), (8), and (12).
(iii) 23 cm	Entire band	MCW, phone, image, RTTY, data, SS, test	(f) (7), (8), and (12).
(iv) 13 cm	Entire band	MCW, phone, image, RTTY, data, SS, test, pulse	(f) (7), (8), and (12).
(6) SHF:			
(i) 5 cm	Entire band	MCW, phone, image, RTTY, data, SS, test, pulse	(f) (7), (8), and (12).
(ii) 3 cm	Entire band	MCW, phone, image, RTTY, data, SS, test	(f) (7), (8), and (12).
(iii) 1.2 cm	Entire band	MCW, phone, image, RTTY, data, SS, test, pulse	(f) (7), (8), and (12).
(7) EHF:			

Wavelength band	Frequencies	Emission types authorized	Standards see § 97.307, paragraph(s):
(i) 6 mm	Entire band	MCW, phone, image, RTTY, data, SS, test, pulse	(f) (7), (8), and (12).
(ii) 4 mm	Entire band	MCW, phone, image, RTTY, data, SS, test, pulse	(f) (7), (8), and (12).
(iii) 2.5 mm	Entire band	MCW, phone, image, RTTY, data, SS, test, pulse	(f) (7), (8), and (12).
(iv) 2 mm	Entire band	MCW, phone, image, RTTY, data, SS, test, pulse	(f) (7), (8), and (12).
(v) 1 mm	Entire band	MCW, phone, image, RTTY, data, SS, test, pulse	(f) (7), (8), and (12).
(vi) 1 mm	Above 275 GHz	MCW, phone, image, RTTY, data, SS, test, pulse	(f) (7), (8), and (12).

3. Section 97.307 is amended by deleting the phrase “of this part” wherever it appears, revising paragraph (f)(3), removing and reserving paragraph (f)(4), and designating the table in paragraph (f)(14)(i) as “Table 1 to § 97.307(f)(14)(i).” The revisions read as follows:

§ 97.307 Emission standards.

* * * * *

(f) * * *

(3) Only a RTTY or data emission using a specified digital code listed in § 97.309(a) may be transmitted. The authorized bandwidth is 2.8 kHz except in the 2200 m band and 630 m band. In the 2200 m band and the 630 m band the symbol rate must not exceed 300 bauds, or for frequency-shift keying, the frequency shift between mark and space must not exceed 1 kHz.

(4) [Reserved]

APPENDIX B
Proposed Rules

For the reasons discussed in the preamble, the Federal Communications Commission proposes to amend 47 CFR part 97 as follows:

PART 97 – Amateur Radio Service

1. The authority citation for part 97 continues to read as follows:

AUTHORITY: 47 U.S.C. 151-155, 301-609, unless otherwise noted.

2. Section 97.307 is amended by revising paragraphs (f)(3), (5), and (6) to read as follows:

§ 97.307 Emission standards.

* * * * *

(f) * * *

(3) Only a RTTY or data emission using a specified digital code listed in § 97.309(a) may be transmitted.

* * * * *

(5) A RTTY, data or multiplexed emission using a specified digital code listed in § 97.309(a), or using an unspecified digital code under the limitations listed in § 97.309(b), may be transmitted. The authorized bandwidth is 20 kHz.

(6) A RTTY, data or multiplexed emission using a specified digital code listed in § 97.309(a), or using an unspecified digital code under the limitations listed in § 97.309(b), may be transmitted. The authorized bandwidth is 100 kHz.

* * * * *