



Federal Communications Commission
Washington, D.C. 20554

September 14, 2022

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1800 M Street, NW, Suite 800N
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DA 22-955

RE: **National Railroad Passenger Corporation (Amtrak), Springfield Line, Call Sign WRAI793**

Dear Mr. Cohen:

The Mobility Division (Division) of the Wireless Telecommunications Bureau (Bureau) hereby grants Amtrak's License Modification Application for permanent authority to operate nine positive train control (PTC) wireless radio base stations under Automated Maritime Telecommunications System (AMTS) license WRAI793.¹ Today's action enables Amtrak to deploy a Congressionally-mandated PTC safety system on its Springfield Line, which extends from New Haven, Connecticut to Springfield, Massachusetts.² Amtrak has operated the nine base stations since 2018 under a grant of special temporary authority (STA).³ This grant of permanent (non-STA) operating authority is subject to certain conditions adopted below.

BACKGROUND

Positive Train Control. The *Rail Safety Improvement Act of 2008*, as amended by the *Positive Train Control Enforcement and Implementation Act of 2015* (together, the Rail Safety Act), required most U.S. freight, passenger, and commuter railroads to install and operate interoperable PTC systems by December 31, 2018.⁴ Four railroads timely met this deadline.⁵ As the Rail Safety Act permits, the remaining railroads subject to the PTC mandate, including Amtrak, requested up to a 2-year extension, until December 31, 2020, to implement PTC.⁶ The FRA found that these railroads met the statutory

¹ ULS File No. 0008720376 (filed July 11, 2019, and amended June 14, 2022) (License Modification Application).

² ULS File No. 0008720376, Request for License Modification (filed July 11, 2019) (Request for License Modification).

³ ULS File No. 0008387339, WRCJ454 (STA granted Oct. 18, 2018). The Bureau most recently renewed the STA on January 21, 2022. ULS File No. 0009607838.

⁴ *Rail Safety Improvement Act of 2008*, Pub. L. No. 110-432, § 104, 122 Stat. 4848, 4857 (2008), amended by the *Positive Train Control Enforcement and Implementation Act of 2015*, Pub. L. No. 114-73, § 1302, 129 Stat. 568, 576 (2015). The Federal Railroad Administration (FRA) is responsible for approving each railroad's PTC system, including design, testing, and implementation and for ensuring compliance with the Rail Safety Act and FRA regulations implementing that statute. Positive Train Control (PTC) Information (R&D), Federal Railroad Administration (last updated Nov. 13, 2019), <https://www.fra.dot.gov/Page/P0152> (last visited July 11, 2022).

⁵ Statement on Positive Train Control Implementation, U.S. Department of Transportation (last updated Dec. 31, 2018), <https://www.transportation.gov/briefing-room/statement-positive-train-control-implementation> (last visited July 11, 2022).

⁶ *Id.*

criteria necessary to qualify for an extended implementation schedule and, subsequently, found that these railroads met their extended deadlines.⁷

PTC systems are designed to reduce the risk of human-error rail accidents, by “prevent[ing] train-to-train collisions, over-speed derailments, incursions into established work zone limits, and the movement of a train through a switch left in the wrong position.”⁸ The U.S. rail industry has chosen to implement PTC through wireless networks that use radio spectrum. These networks have the capacity to enable real-time information sharing between trains, rail wayside devices, and “back office” applications, regarding train movement authorities, speed restrictions, train position and speed, and the state of signal and switch devices.

Amtrak Spectrum Authorization. Amtrak acquired spectrum to implement PTC on the Springfield Line, by disaggregation and partition from Automated Maritime Telecommunications System (AMTS) station WQYQ749, resulting in Amtrak Call Sign WRAI793.⁹

Special Temporary Authorization. Amtrak has deployed PTC on the Springfield Line since October 2018 under STA Call Sign WRCJ454, using the same sites, spectrum, and technical parameters for which it requests permanent operating authority.¹⁰ Amtrak reports that it “has not received a single complaint of interference regarding any of its PTC operations.”¹¹

License Modification Application. Although AMTS geographic licensees generally are authorized to place base stations anywhere within their licensed geographic service areas, section 80.215(h)(2) of the Commission’s rules requires individual licensing of AMTS base stations located less than 169 kilometers (105 miles) from a channel 13 TV station, or less than 129 kilometers (80 miles) from a channel 10 TV station.¹² Amtrak seeks to modify license WRAI793 to be individually authorized, on a permanent (non-STA basis), and subject to the applicable license terms, to operate nine PTC base stations, and asserts that the base stations meet the individual station licensing criteria in section 80.215(h)(2) of the Commission’s rules.¹³

Engineering Study. Amtrak retained Pericle Communications Company (Pericle), an engineering firm, to perform an engineering study, which addresses the potential number of channel 10 and 13 over-the-air (OTA) TV households that could be affected by operation of Amtrak’s nine PTC base stations.¹⁴ We address the study’s findings below.

⁷ Positive Train Control (PTC), U.S. Department of Transportation (last updated Sept. 9, 2021), <https://railroads.dot.gov/train-control/ptc/positive-train-control-ptc> (last visited July 11, 2022).

⁸ 49 U.S.C. § 20157(i)(5).

⁹ ULS File No. 0008003915 (WRAI793), Notice of Consummation (filed Nov. 21, 2017).

¹⁰ STA Call Sign WRCJ454.

¹¹ ULS File No. 0008720376, Amtrak Amendment at 1 (filed June 14, 2022) (Amtrak June 14, 2022 Amendment).

¹² 47 CFR § 80.215(h)(2); 47 CFR § 80.475(a)(1).

¹³ Request for License Modification.

¹⁴ ULS File No. 0008720376, AMTS Channels 10 and 13 Television Interference Study for Amtrak Springfield Line, dated November 11, 2021 (filed June 14, 2022) (Pericle Study).

Interference Mitigation Plan. As required by Commission rule section 80.215(h)(2),¹⁵ Amtrak filed a plan to limit potential interference from operation of its nine PTC base stations to OTA television reception (Interference Mitigation Plan).¹⁶

Broadcaster Notification. Pursuant to Commission rule section 80.475(a)(2),¹⁷ Amtrak provided written notice of the filing of its License Modification Application to potentially affected broadcasters.¹⁸ No broadcast station or other party has opposed the License Modification Application.

DISCUSSION

We have carefully reviewed Amtrak's License Modification Application, the Pericle Study, Amtrak's Interference Mitigation Plan, and all other filings in the record before us and find that the public interest in rail safety will be served by granting Amtrak permanent authority to operate the nine PTC base stations at effective radiated power levels up to 86.7 watts.¹⁹

Interference Analysis. As required by Commission rule section 80.215(h)(2),²⁰ the Pericle Study addresses the potential for interference from the proposed operation of Amtrak's nine PTC base stations to OTA channel 10 and channel 13 stations within section 80.215(h)(2)'s distance criteria.²¹ Pericle identified two channel 10 TV stations located less than 129 kilometers (80 miles) from one or more of the PTC base stations: WTNH, New Haven, Connecticut, and WWDP, Norwell, Massachusetts.²² Pericle identified two channel 13 TV stations located less than 169 kilometers (105 miles) from one or more of the PTC base stations: WGBY, Springfield, Massachusetts; and WKOB-LD, New York, New York.²³ Below we separately address the potential impact of Amtrak's operations to these channel 10 and channel 13 broadcast stations.

Channel 10 Broadcast Stations. The transition to digital television has resulted in a lack of criteria to assess the potential for interference from AMTS transmitters to channel 10 television receivers. OET Bulletin No. 74, Supplement A, issued in 2017, establishes "a set of best practices to consider when evaluating the potential of PTC systems to cause harmful interference to television receivers . . ."²⁴

¹⁵ 47 CFR § 80.215(h)(2).

¹⁶ ULS File No. 0008720376, Interference Mitigation Plan (filed July 11, 2019).

¹⁷ 47 CFR § 80.475(a)(2).

¹⁸ ULS File No. 0008720376, Certificates of Service (filed July 11, 2019, and June 14, 2022).

¹⁹ Pericle Study, Table A.4 (Amtrak Springfield Line Base Station Site Data). Amtrak is authorized to operate at the specified power levels consistent with sections 80.215(h)(1) and (h)(2) of the Commission's rules. 47 CFR §§ 80.215(h)(1)&(2).

²⁰ 47 CFR § 80.215(h)(2).

²¹ *Id.*; Pericle Study.

²² Pericle Study at 3 (Table 1).

²³ *Id.*

²⁴ Longley-Rice Methodology for Predicting Inter-Service Interference to Broadcast Television from Mobile Wireless Broadband Services in the UHF Band (2015), Supplement A – Guidance for Predicting Inter-Service Interference to Broadcast Television in the VHF Band from Positive Train Control (PTC) Systems, OET Bulletin No. 74, Supplement A at 1 (Sept. 18, 2017), <https://transition.fcc.gov/oet/info/documents/bulletins/oet74/OET74a-PTC.pdf> (OET-74 Supplement A).

Supplement A explains that section 80.215(h)(2)'s requirement to assess the potential for interference from AMTS transmitters to channel 10 receivers was "written to protect analog TV receivers from intermodulation effects, which can be caused by the mixing of signals transmitted on 'taboo' channels."²⁵ Supplement A explains that for "digital TV reception, OET Bulletin No. 69 and our DTV protection rules (see 47 CFR § 73.623 (c)(2)) do not contain interference criteria to account for potential intermodulation interference such as that caused by transmissions on 'taboo' channels."²⁶

OET-74 Supplement A advises that to "assert compliance with the protection and mitigation requirements in [section 80.215(h) of] our rules regarding potential interference to channel 10, PTC applicants intending to operate in the AMTS band should briefly explain [1] that the transition to digital TV results in a lack of criteria to assess potential interference to channel 10, [2] that harmful interference to TV Channel 10 is unlikely, and [3] that if such interference is caused by PTC operations, it will be cured at the applicant's expense."²⁷

Consistent with OET-74 Supplement A, Amtrak states that harmful interference to channel 10 receivers is unlikely and, should any occur, Amtrak would remedy it without charge.²⁸ Amtrak commenced PTC operations on the Springfield Line in 2018 under STA Call Sign WRCJ454—using the same technical parameters as those specified in its License Modification Application—and reports that it "has not received a single complaint of interference regarding any of its PTC operations."²⁹ Based on Amtrak's years-long history of PTC operations without any reported interference and its commitment to remedy interference should it occur, we find that Amtrak has met section 80.215(h)'s protection and mitigation requirements. We emphasize that if Amtrak's PTC operations were to interfere with reception of any channel 10 receiver, Amtrak must cure such interference as required by section 80.215(h)(4) and the interference mitigation conditions we adopt below.³⁰

In addition to Amtrak's filings, which comply with OET-74 Supplement A, Pericle attempted to estimate the potential for intermodulation interference from Amtrak's proposed PTC operations to channel 10 receivers.³¹ It was unnecessary for Pericle to undertake this analysis and we do not address it here.³²

²⁵ *Id.* at 5 (emphasis in original). Taboos are channels more than plus or minus one channel away from the channel on which a station is operating.

²⁶ OET-74 Supplement A at 5 (emphasis in original).

²⁷ *Id.*

²⁸ *Id.*; Interference Mitigation Plan at 3.

²⁹ Amtrak June 14, 2022 Amendment at 1.

³⁰ 47 CFR § 80.215(h)(4).

³¹ Pericle Study at 7, citing R. Eckert, FCC/OST Technical Memorandum 82-5, "Guidance for Evaluating the Potential for Interference to TV from Stations of Inland Waterways Communications Systems" (July 1982) (FCC/OST TM 82-5). Pericle, using a D/U value of -31 dB for protection of OTA TV channel 10 stations, estimates that operation of Amtrak's nine PTC base stations has the potential to affect up to 8,549 WTNH channel 10 households; this number drops to 121 households when a commercially-available notch filter is applied at the victim receiver. Pericle Study, Table A.2.2. Pericle also included WWDP channel 10 (Norwell, Massachusetts) in its analysis but found no impact on the station. Pericle Study, Table A.2.1.

³² *National Railroad Passenger Corporation (Amtrak) Call Sign WRAP937*, Letter Order, 34 FCC Red 2181, 2185 (WTB MD 2019) (finding that, consistent with OET-74 Supplement A, Amtrak properly excluded two channel 10

We now address Pericle's analysis of the potential for Amtrak's proposed PTC operations to interfere with channel 13 receivers.

Channel 13 Broadcast Stations. Pericle identified two channel 13 TV stations located less than 169 kilometers (105 miles) from one or more of Amtrak's proposed PTC base stations: WGBY, Springfield, Massachusetts; and WKOB-LD, New York, New York.³³ Using proprietary software, Pericle applied the Longley-Rice radio propagation model³⁴ to predict the number of channel 13 television households that potentially could be affected by operation of Amtrak's nine PTC base stations.³⁵ Consistent with OET-74 and the guidance provided in OET-74 Supplement A, Pericle calculated the number of potentially affected channel 13 households using a threshold D/U signal ratio of -33 dB.³⁶ Pericle used a matrix of square tiles (75 meters per side)³⁷ to identify the tiles with insufficient D/U ratio inside each television station's service area and the number of potential households within those tiles that potentially could be affected by the proposed PTC operations.³⁸

Based on the foregoing, Pericle predicts that Amtrak's proposed operation of the PTC base stations has the potential to impact up to 17,341 WGBY channel 13 households and, after interference mitigation measures are taken, up to 286 of those households.³⁹ Pericle further predicts that Amtrak's proposed operation of the PTC base stations has the potential to impact up to 7,519 WKOB-LD channel 13 households; Pericle states that after interference mitigation measures are taken, no WKOB-LD households would be impacted.⁴⁰

Section 80.215(h)(3) of the Commission's rules provides different criteria for licensing of AMTS base stations potentially affecting fewer than 100 households each and those potentially affecting 100 or more households each.⁴¹ We apply these criteria below.

stations from an analysis of the potential for its proposed PTC operations using AMTS spectrum to cause interference to those stations' viewers).

³³ Pericle Study at 3 (Table 1).

³⁴ Longley-Rice Methodology for Evaluating TV Service Coverage and Interference, OET Bulletin No. 69 (2004), <https://transition.fcc.gov/oet/info/documents/bulletins/oet69/oet69.pdf> (OET-69); Longley-Rice Methodology for Predicting Inter-Service Interference to Broadcast Television from Mobile Wireless Broadband Services in the UHF Band, OET Bulletin No. 74 (2015), <https://www.fcc.gov/bureaus/oet/info/documents/bulletins/oet74/OET74.pdf> (OET-74).

³⁵ Pericle Study at 10.

³⁶ *Id.* at 12.

³⁷ OET-74 Supplement A recommends, but does not require, applicants to use a study tile size of two kilometers per side. OET-74 Supplement A at 2. See *National Railroad Passenger Corporation (Amtrak) Call Signs WQVQ770-WQVQ773*, Letter Order, 31 FCC Rcd 7219, 7223 (WTB MD 2016) (permitting Amtrak's use of 75-meter tiles to estimate the potential for interference from PTC base stations, using AMTS spectrum, to channel 13 television receivers).

³⁸ Pericle Study at 11.

³⁹ Pericle Study, Table A.2.3.

⁴⁰ Pericle Study, Table A.2.4.

⁴¹ 47 CFR § 80.215(h)(3).

Authorization to Operate Four Base Stations (potentially affecting fewer than 100 households each). Rule section 80.215(h)(3) provides for approval of an AMTS base station where fewer than 100 households are within the interference contour of the base station and a station's analog Grade B contour (here, Pericle used the stations' noise-limited service contours).⁴² According to Pericle, Amtrak's operation of its Midland and Hayden base stations will impact up to 12 and 30 WGBY channel 13 households, respectively,⁴³ while Amtrak's operation of its Field and Sweeney base stations is not expected to impact any WGBY households.⁴⁴ Because none of the four base stations has the potential to impact 100 or more households, we hereby grant Amtrak permanent (non-STA) authority, consistent with the terms of its license, to operate the four base stations under WRAI793. We emphasize that if Amtrak's PTC operations interfere with the reception of any channel 13 station, Amtrak must remediate such interference as required by Commission rule section 80.215(h)(4) and the interference mitigation conditions we adopt below.⁴⁵

Authorization to Operate Five Base Stations (potentially affecting 100 or more households each). Pericle has identified five Amtrak PTC base stations, the operation of which could affect 100 or more households each. Pericle predicts that Amtrak's operation of its Cedar, Holt, Willow, Wood, and Hart, Connecticut, PTC base stations has the potential to affect 7,001, 8,948, 678, 317, and 355 WGBY channel 13 households, respectively.⁴⁶ Pericle also predicts that Amtrak's operation of its Cedar, Connecticut, PTC base station has the potential to affect up to 7,518 WKOB-LD channel 13 households.⁴⁷

Under section 80.215(h)(3)(i)-(iii) of the Commission's rules, we may approve an AMTS base station where its operation could impact 100 or more households provided that the applicant: (1) shows that the proposed site is the only suitable location (at the application stage, it is sufficient to establish that the site is especially well-suited to provide the proposed service); (2) develops a plan to control any interference caused to TV reception from its operations; and (3) agrees to make adjustments to TV receivers to eliminate interference caused by its operations.⁴⁸

⁴² *Id.* Historically, the Commission analyzed the potential for interference according to a TV station's analog Grade B predicted contour. To account for the conversion to digital television, the Commission developed the noise-limited service contour (NLSC) to approximate the same probability of service as the analog Grade B contour. The NLSC is defined using the F(50,90) field strength contour, the area in which at least fifty percent of the locations can be expected to receive a signal that exceeds a specified field strength value at least ninety percent of the time. *See Establishment of a Model for Predicting Digital Broadcast Television Field Strength Received at Individual Locations*, Notice of Proposed Rule Making and Further Notice of Proposed Rule Making, 25 FCC Rcd 10474, 10485, para. 25 (2010). *See also Avista Corporation*, Order, 27 FCC Rcd 263, 266-67, paras. 6-7 (WTB MD 2012) (Longley-Rice propagation model and NLSC used to predict potential interference to DTV station by AMTS licensee), *subsequent history omitted*.

⁴³ Pericle Study, Table A.2.3.

⁴⁴ *Id.* Pericle predicts that operation of the four base stations would not impact any WKOB-LD channel 13 households. Pericle Study, Table A.2.4.

⁴⁵ 47 CFR § 80.215(h)(4).

⁴⁶ Pericle Study, Table A.2.3.

⁴⁷ Pericle Study, Table A.2.4. Pericle predicts that operation of Amtrak's remaining eight PTC base stations has the potential to impact only one WKOB-LD channel 13 household. Pericle Study, Table A.2.4.

⁴⁸ 47 CFR § 80.215(h)(3)(i)-(iii).

We find that Amtrak has satisfied the three requirements of rule section 80.215(h)(3)(i)-(iii) for the five base stations. First, Amtrak certifies that each of its PTC base station locations is especially well-suited to provide the proposed PTC service.⁴⁹ Amtrak explains that “to provide continuous and reliable coverage, [its PTC] base stations must be located at regular intervals along the rail line, as close to the tracks as possible.”⁵⁰ Amtrak states that its ability to relocate these base stations to reduce potential interference is constrained “by necessary system design requirements, as well as by topography and the proximate location of residences.”⁵¹ Regarding the second and third requirements, Amtrak commits to implementing its Interference Mitigation Plan (including free installation of notch filters)⁵² for any household experiencing interference to their OTA reception of channels 10 or 13, which Pericle predicts will eliminate potential interference to all WKOB-LD channel 13 households⁵³ and to all but 286 WGBY channel 13 households.⁵⁴ Accordingly, we find that Amtrak has satisfied the requirements of rule section 80.215(h)(3)(i)-(iii) and hereby grant it permanent authority to operate the Cedar, Holt, Willow, Wood, and Hart, Connecticut base stations under WRAI793, subject to the interference mitigation conditions adopted below.

Interference Mitigation Plan and Conditions. Section 80.215(h)(4) of the Commission’s rules requires AMTS licensees to eliminate interference from their base station operations to viewers’ reception of channels 10 and 13.⁵⁵ Amtrak’s Interference Mitigation Plan describes and establishes a process for Amtrak to comply with section 80.215(h)(4). The plan states that potentially affected broadcast stations have been provided a 24-hour hotline phone number to receive and investigate reports of interference complaints.⁵⁶ Under the plan, if interference mitigation is required, Amtrak has committed to install free of charge commercially-available or custom notch filters for affected viewers, more directional receive antennas, or modify Amtrak’s base station antennas/operations.⁵⁷

Although Commission rule section 80.215(h)(4) provides AMTS licensees up to 90 days to resolve interference issues, Amtrak commits to investigating complaints of interference received from consumers or broadcasters within 30 days, and expects to have any interference complaints resolved by providing the necessary filtering to the affected consumer or modifying the communication parameters of the offending base station(s) within 60 days from receipt of an initial complaint.⁵⁸ Consistent with that commitment, as a condition of today’s grant of permanent authority to operate the nine PTC base stations, we require Amtrak to:

1. Provide each potentially affected broadcaster contact information to report possible interference;

⁴⁹ Interference Mitigation Plan at 2.

⁵⁰ *Id.*

⁵¹ *Id.*

⁵² A notch (band reject) filter attenuates one frequency band and passes both a lower and a higher frequency band.

⁵³ Pericle Study, Table A.2.4.

⁵⁴ Pericle Study, Table A.2.3. Amtrak has committed to taking additional measures to remedy interference if the installation of notch filters is inadequate. Interference Mitigation Plan at 3.

⁵⁵ 47 CFR § 80.215(h)(4).

⁵⁶ Interference Mitigation Plan at 2.

⁵⁷ *Id.*

⁵⁸ *Id.* See also 47 CFR § 80.215(h)(4).

2. Provide a party reporting interference a unique tracking number for each interference report;
3. Investigate any reported interference within 30 calendar days of receiving a report; and
4. Resolve any interference caused by base station operations at its own expense within 60 calendar days of receiving an interference report.⁵⁹

For the reasons stated above, we hereby conditionally grant Amtrak's License Modification Application, ULS File No. 0008720376 (WRAI793).

Action taken pursuant to Sections 1, 4(i), and 303(r) of the Communications Act of 1934, as amended, 47 U.S.C. §§ 151, 154(i), and 303(r), and sections 0.331 and 80.215(h) of the Commission's rules, 47 CFR §§ 0.331 and 80.215(h).

Sincerely,

Roger S. Noel
Chief, Mobility Division
Wireless Telecommunications Bureau

⁵⁹ If Amtrak is unable to remedy interference, Commission rules require it to discontinue use of an offending base station. 47 CFR § 80.215(h)(4).