



U.S. Department
of Transportation

**Federal Railroad
Administration**

1200 New Jersey Avenue, SE
Washington, DC 20590

VIA E-MAIL ONLY

September 20, 2024

Mr. Devon Parsons
Director – Equipment Engineering, Locomotives
Amtrak
Devon.Parsons@amtrak.com

Re: Docket Number FRA-2023-0095

Dear Mr. Parsons:

This letter is in response to the October 17, 2023, request from Amtrak to the Federal Railroad Administration (FRA) for a waiver of compliance from certain provisions of the Federal railroad safety regulations contained in Title 49 Code of Federal Regulations (CFR) Part 229, Railroad Locomotive Safety Standards, relating to clearance above top of rail (ATR). FRA assigned the request Docket Number FRA-2023-0095.

Specifically, Amtrak requested a waiver from 49 CFR § 229.71, *Clearance above top of rail*, to implement the locomotive-mounted Track Circuit Assister Shunt Enhancer (TCA SE). Section 229.71 states that no part or appliance of a locomotive (excepting “the wheels, flexible nonmetallic sand pipe extension tips, and trip cock arms”) may be within 2.5 inches from the top of rail. Amtrak seeks to install the shunt enhancer on its fleet of Siemens Charger SF4 locomotives. Amtrak explained that under conditions of worn wheels and dynamic profiles, the mechanical and electrical hardware of the TCA SE could protrude below 2.5 inches from the top of rail.

Amtrak stated it has been investigating passenger-consist shunt effectiveness and actively participating in an industry-led Loss of Shunt (LOS) committee to understand contributing factors to equipment shunt profiles. Preliminary results of testing are now complete, and the LOS committee has determined that a locomotive-mounted TCA SE reliably demonstrates improvement of a vehicle’s interaction with the wayside track circuits. However, this device presents the potential to conflict with § 229.71, under certain conditions.

The Brotherhood of Railroad Signalmen (BRS) and Brotherhood of Locomotive Engineers and Trainmen (BLET) filed comments in opposition to Amtrak’s request for relief. The Transportation Trades Department, AFL-CIO (TTD) commented on the request, encouraging FRA to consider the concerns expressed by BRS and BLET, but TTD was not in opposition to the approval of the waiver, if appropriately conditioned. All three organizations requested additional information from Amtrak relating to the LOS events, the root-cause of these events,

the design and installation parameters relating to the shunt enhancer, and how the proposed shunt enhancer would mitigate the potential for LOS, noting that labor organizations have not been invited to participate in the LOS committee. BRS requested access to testing data to be able to meaningfully provide comments regarding the shunt enhancer technology. BLET provided feedback from Amtrak locomotive engineers regarding the frequency and potential causes of LOS, referencing higher frequencies in the extreme northern areas, along the coast where salt content is higher and where there is excessive vegetation along the track, and pointed to several likely causes of LOS including adverse track conditions, wheel profile, and contaminants on the track, all of which may impede wheel/rail contact. TTD requested that if the waiver is approved, the approval be conditioned upon Amtrak conducting a detailed analysis following any LOS incident and Amtrak establishing a reporting procedure for employees witnessing or experiencing a LOS event following installation of the equipment.

FRA appreciates the detailed comments and recommendations received from BRS, BLET, and TTD. FRA understands that recently Amtrak has engaged with labor organizations providing responses to many of the questions posed in the docket, including further details regarding the LOS committee testing and the design and installation of the TCA SE. FRA also notes that the waiver petition seeks relief from ATR requirements in § 229.71 in order to install the shunt enhancer, to enable further testing of the equipment. The LOS committee plans to document the results of the testing of the TCA SE to include a recommendation regarding its use. Amtrak's waiver petition pertains to the installation of the TCA SE on Amtrak's Siemens Charger SF4 locomotive fleet, to enable further testing of the TCA SE on the planned routes of operation. Any testing or use of the TCA SE in revenue service would require Amtrak to perform and document testing, including confirmation that the TCA SE does not interfere with the signaling system, in accordance with 49 CFR §§ 234.209, 236.4 and 238.105(e).

FRA's field investigation included a visit to Amtrak's facilities and interviews with Amtrak staff. Interviews confirmed that potentially, the TCA SE can get as low as 1.19 inches, with the current design showing 1.21 inches ATR. The TCA SE is made of 3 millimeters of thin copper coated tubing that injects a signal into the rail. The tubing is aligned between the lead and trailing wheelsets of the truck and is protected from physical damage, as it is not extending beyond the plane of the wheel on either side. FRA technical staff concluded that the TCA SE is adequately protected from potential physical damage. When properly installed and the alignment inspected during calendar day inspections, there is no risk of antenna interference with the wheel/rail interface. In the case of damage due to a foreign object or track structure component impact, the TCA SE tubing will potentially deform and deviation of its designed geometry will trigger fault indication on the control box. In the event of a break of the tubing, the loss of signal from the drive box under each truck to shunt assist boxes in the engine room will de-energize the antenna.

FRA's Railroad Safety Board (Board) reviewed the petition, public comments received, the results of FRA's field investigation, and the technical staff findings. The Board determined that granting Amtrak's request is in the public interest and consistent with railroad safety. Accordingly, the Board grants the waiver from § 229.71, subject to the following conditions:

1. Amtrak must finish failure and risk analysis of the design (PFMCA), review the PFMCA with FRA's Office of Railroad Safety, and implement any mitigation measures prior to installation of the TCA SE on the Siemens Charger SF4 locomotive fleet.
2. ATR clearance must not be less than 1.19 inches at any time.
3. The following requirements must be added to Amtrak's inspection requirements for the Siemens Charger SF4 locomotive fleet:
 - a. TCA SE system test, components, and securement elements to the periodic inspection work scope.
 - b. TCA SE visual inspection to the mechanical calendar day inspection requirements.
 - c. TCA SE health indicator light functionality to the mechanical calendar day inspection requirements.
4. Testing of the TCA SE on the Siemens Charger SF 4 on mainline track must be performed with adequate safety protection, including speed restrictions and absolute block protection, until it is confirmed that the TCA SE does not interfere with the governing signaling system and equipped highway-rail grade crossings on the test route(s).
5. Amtrak must submit a report to FRA and the public docket for this waiver that verifies and validates the improvement in shunting performance realized through installation of the TCA SE on the Siemens Charger SF 4 locomotive, including supporting data and test results.
6. Amtrak must submit a report to FRA 30 days prior to commencement of revenue service of an equipped TCA SE Siemens Charger SF 4 locomotive that documents the results of signal and grade crossing interference testing on each route that a TCA SE-equipped Siemens Charger SF 4 locomotive operates, confirming no interference with the normal functioning of the signal and grade crossing systems. Simultaneous with submission to FRA, Amtrak must also upload the report to the public docket for this waiver.
7. Amtrak must demonstrate the overall hardware and software system safety of the TCA SE equipped Siemens Charger SF 4 locomotive in accordance with Amtrak's hardware and software safety program¹ and make the results available to FRA upon request.
8. Amtrak must initiate a formalized reporting procedure² for employees witnessing or experiencing a LOS event following installation of the equipment, conduct a detailed analysis following any LOS incident, and report the findings to FRA's Signal, Train Control and Crossing Division.
9. For any other classes of power on which Amtrak intends to install the TCA SE, Amtrak must first obtain FRA approval for the installation.

¹ 49 CFR § 238.105.

² 49 CFR §§ 233.7 and 234.101.

FRA will continue to participate in the industry-led LOS committee and observe testing. Upon receipt and review of the LOS committee documentation of the results of the testing of the TCA SE and consensus recommendations regarding use of the TCA SE, FRA may adjust the above conditions. FRA recommends that Amtrak continue to engage with labor organizations throughout the TCA SE testing process.

This waiver expires 5 years from the date of this letter. At the conclusion of this period, FRA reserves the right to extend the waiver if the Petitioner has made a written request for an extension at least 6 months prior to the expiration date, and if conditions warrant. Any request for extension must (1) demonstrate the Petitioner's compliance with the above-identified conditions; (2) comply with the requirements of § 211.7, *Filing requirements*, and § 211.9, *Content of rulemaking and waiver petitions*; and (3) be submitted via e-mail to FRAWaivers@dot.gov.

FRA reserves the right to modify or rescind this waiver upon receipt of information pertaining to the safety of railroad operations or in the event of noncompliance with any condition of this waiver. Further, FRA reserves the right to take enforcement action under 49 U.S.C. § 20111 for noncompliance with any condition of this letter or applicable Federal regulations.

In any future correspondence regarding this waiver, please refer to Docket Number FRA-2023-0095. If you have any questions, please contact Carolyn Hayward-Williams, Director, Office of Railroad Systems and Technology, at 202-493-6036 or c.hayward-williams@dot.gov.

Sincerely,

Karl Alexy
Associate Administrator for Railroad Safety
Chief Safety Officer