Before the
**FEDERAL COMMUNICATIONS COMMISSION**
Washington, DC 20554

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| Wireless Telecommunications Bureau Seeks Comment on Spectrum Needs for the Implementation of the Positive Train Control Provisions of the Rail Safety Improvement Act of 2008 | ) ) ) ) ) ) | WT Docket No. 11-79<br>DA 11-838 |

To: The Commission

**AMTRAK COMMENTS**


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**COMMENTS**

National Railroad Passenger Corporation ("Amtrak") hereby responds to the Wireless Telecommunications Bureau's May 5, 2011 Public Notice[1] seeking comment on the rail industry's spectrum needs for implementing the positive train control ("PTC") provisions of the Rail Safety Improvement Act of 2008 ("RSIA").[2] Acquiring access to adequate spectrum remains one of the primary obstacles to the rail industry's – and in particular the passenger rail carriers' – ability to timely and successfully implement PTC by the December 31, 2015 PTC deployment deadline established by Congress.[3] Amtrak – America's largest passenger rail carrier – is attempting to implement this critical safety tool on a more expeditious basis but lacks the spectrum to do so. Amtrak thus welcomes this opportunity to assist the FCC in its efforts to determine whether new spectrum allocations and/or rule modifications should be undertaken now to "facilitate an effective, efficient, and timely process for railroads to acquire spectrum to comply with [ ] PTC implementation requirements . . . ."[4]

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[1] Wireless Telecommunications Bureau Seeks Comment on Spectrum Needs for the Implementation of the Positive Train Control Provisions of the Rail Safety Improvement Act of 2008, Public Notice, DA 11-838 (WTB rel. May 5, 2011) ("Public Notice").

[2] Rail Safety Improvement Act of 2008, Pub. L. No. 110-432, 122 Stat. 4848 (2008).

[3] *Id.*

[4] Public Notice at 1.

## INTRODUCTION AND SUMMARY

PTC is an integrated communications technology that utilizes a sophisticated combination of fixed wireline and mobile wireless networks to gather and disseminate data used by rail carriers to monitor and control rail traffic on their rail lines from a centralized location. PTC allows carriers to better administer traffic on their rail lines; no less importantly, it reduces the potential for human errors that could result in accidents creating significant property damage and loss of life. Specifically, PTC systems use real-time data to issue movement authorities and set speed limits to each of the trains operating within their jurisdiction, thus helping to reduce the potential for "train-to-train collisions, over-speed derailments, incursions into established work zones, and the movement of trains through switches left in the wrong position."[5]

Because major rail lines are typically owned by one carrier, but shared with multiple other carriers, PTC systems must be interoperable among the rail carriers that will use those lines. In other words, not only must Amtrak have the ability to control its own trains on its own lines, but the system must have the ability to control the rail traffic of other carriers transiting Amtrak's lines as well. Similarly, other rail carriers' systems must have the ability to control Amtrak's trains travelling over their lines. As a result, the spectrum that any one licensee may need for a PTC system to cover its rail lines within a particular geographic area must be sufficient to accommodate a peak traffic load that includes traffic created by other rail carriers transiting its lines.

After significant study and consideration of the costs and timely availability of equipment, Amtrak has chosen to implement an Advanced Civil Speed Enforcement System

[5] Public Notice at 1 (citations omitted).

("ACSES")[6] as its PTC solution for implementation along the rail lines on its Northeast Corridor ("NEC") and connecting corridors.[7] The ACSES system chosen by Amtrak has many benefits that would facilitate expeditious implementation, such as the availability of "off-the-shelf" radio equipment for implementation (rather than requiring an entirely new design and development of the basic infrastructure) and the ability to operate on 12.5 kHz channels for greater spectrum efficiency. Timeliness of equipment availability was particularly important to Amtrak because it is committed to completing its PTC deployment in the NEC well before the RSIA-imposed deadline due to the importance of PTC to rail safety. Indeed, Amtrak's objective, which is to have the system implemented by December 31, 2012,[8] has been jeopardized by the lack of available spectrum.

Spectrum in the range of 217-222 MHz has emerged as the *de facto* home of PTC operations for both the freight and passenger rail segments of the industry.[9] Despite its best efforts over the past 18 months, Amtrak has been unable to obtain spectrum in these bands. The lack of suitable spectrum has become a roadblock to PTC deployment in the NEC.

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[6] The ACSES system differs significantly from the system currently under development for PTC-220, LLC ("PTC-220") the major freight rail venture that is implementing PTC in the 220 MHz Service spectrum. Amtrak is advised that PTC 220 is working with radio design vendor Meteorcomm LLC ("Meteorcomm") on a system that will require 25 kHz channels, while the ACSES system operates on 12.5 kHz channels. While the two systems will be designed to avoid adjacent channel interference between them (as they are likely to be deployed in close proximity to each other over most rail rights of way), they are not directly compatible.

[7] The NEC encompasses the Washington-Boston route. Amtrak owns most of the rail lines along this corridor.

[8] Simultaneously, Amtrak is expanding its existing Incremental Train Control System ("ITCS") to satisfy PTC requirements on its Michigan Line (between Porter, IN and Kalamazoo, MI).

[9] *See* Comments of the Association of American Railroads, WT Docket No. 11-27 at 3 (filed Mar. 11, 2011) ("The AAR member railroads are currently working to implement PTC in the 220 MHz band throughout the country. Because of these massive deployment plans, 220 MHz has become the *de facto* center of spectrum for communications for PTC") (citations omitted); Comments of PTC-220, LLC, WT Docket No. 11-27 at 2 (filed March 11, 2011) (noting that the four largest freight railroads have decided to deploy PTC in the 220 MHz band); Comments of the Southern California Regional Rail Authority in WT Docket No. 11-27 at 3 (filed Mar. 14, 2011) ("Amtrak will need to deploy 220 MHz radios on its lines in order to be interoperable with the freight railroads").

A number of larger freight carriers and a few passenger rail carriers have obtained spectrum to satisfy most of their short term needs. Even these carriers, however, have geographic areas in which spectrum shortages will severely hamper their efforts to meet the statutory PTC implementation deadlines.

Amtrak believes that most rail carriers, and certainly a substantial majority of the passenger rail carriers, are experiencing similar difficulties in obtaining spectrum in the secondary market. Indeed, much of the spectrum in the 217-222 MHz band is either (a) already licensed to the large freight carriers, who will need it to satisfy their own long-term obligations, (b) licensed to other entities who have not shown any willingness to enter into reasonable secondary market transactions with the rail industry, (c) awaiting FCC re-auction, or (d) otherwise encumbered in a way that makes it effectively unavailable.[10]

Although this situation is somewhat bleak, Amtrak believes that there are steps the Commission can take now to provide a long-term solution to this situation, at least as to some of the spectrum in the 217-222 MHz band. As discussed below, in order to ensure the availability of spectrum for implementation of PTC by the mandated deadline, the Commission should reallocate spectrum in the 217-222 MHz band for PTC use. The best approach would be to reallocate, at a minimum, the fallow spectrum in the 218-219 MHz band and the 220 MHz radio

[10] Amtrak issued a widely-available Request for Proposal seeking spectrum in the band. MCLM, Inc, which holds large amounts of spectrum in the AMTS band (217-218 MHz, and 219-220 MHz), made a viable offer to sell Amtrak partitioned portions of its AMTS licenses covering the NEC. As the Commission is aware, however, these licenses are currently subject to a hearing as to the licensee's qualifications to hold them, so they are essentially unavailable as a short-term solution and, depending upon the outcome of that hearing and ancillary proceedings arising out of the hearing, may not be available for PTC for several years, if at all. *See* Order to Show Cause, Hearing Designation Order, and Notice of Opportunity for Hearing ("HDO"), FCC 11-64, (rel. Apr. 19, 2011). Consequently, Amtrak's ability to secure spectrum pursuant to that RFP is in doubt. Other efforts to purchase spectrum from other licensees in the AMTS band have also not proven fruitful. Amtrak also investigated the acquisition of spectrum from PTC-220, either by way of purchase or even lease for a relatively short period of time, but these efforts have proven unsuccessful. PTC-220 determined that the potential technical differences between its planned network and AMTRAK's ACSES network would make adjacent channel operation impractical. Thus, Amtrak finds itself with very few, if any options, for acquiring spectrum from existing licensees in the secondary market in the 217-222 MHz band.

service that was intended for re-auction in Auction No. 89. This spectrum should be awarded to qualified applicants pursuant to a one-time filing window. Given the public safety nature of PTC, competitive bidding should not be used to award the spectrum. Finally, the Commission also should make the necessary modifications to the technical and licensing rules associated with this spectrum to ensure that it can be utilized for PTC.

## I. SPECTRUM REQUIREMENTS

The total amount of spectrum needed to operate a basic PTC system will depend on the number of PTC-equipped trains travelling through any particular area at a given time. Areas with high levels of rail traffic will require more spectrum for PTC than areas with lower levels of traffic. Spectrum needs also will vary by time of day and day of the week, as the volume of rail traffic fluctuates.

Moreover, rail and freight carriers are likely to have different requirements. Although PTC systems will be designed for interoperability among carriers utilizing the same lines, there is not likely to be a "one-size-fits-all" solution in any given area of the country that will allow all rail lines – passenger and freight – to operate on a single PTC system.

The good news is that PTC requires comparatively little bandwidth in which to operate. Based on announced plans to date, which include a wide variety of technologies to provide PTC, it appears that, at most, a single 25 kHz channel per fixed location will be necessary to provide basic PTC functionality in any given area.[11] Given the freight carriers' success in satisfying some of their spectrum needs in the secondary market, Amtrak believes that the allocation of an

[11] Some systems may be able to operate on even narrower bandwidth channels.

*additional* 500 kHz of spectrum nationwide should be sufficient to satisfy basic PTC requirements in all but the most extraordinary cases.[12]

As discussed above, the 217-222 MHz band has emerged as the *de facto* band of choice for PTC in order to ensure interoperability and manage interference across a variety of platforms being implemented by freight and passenger carriers over shared rail facilities. While it might be possible to deploy PTC across various other bands, such an approach would likely require more expensive (if not entirely separate) radio equipment, thus increasing the complexity and cost of PTC systems. As a consequence, Amtrak respectfully submits that deploying PTC networks in bands outside of the 217-222 MHz band is *not* a practical alternative at this time.

With these parameters in mind, Amtrak strongly believes that the Commission should take the steps necessary to allocate a specific group of channels for PTC use by the rail industry. To this end, Amtrak has identified a number of spectrum sources that the Commission could reasonably consider as appropriate for PTC purposes.

The best approach would be to reallocate spectrum in the 218-219 MHz band and the 220 MHz radio service for PTC. As noted in the Commission's June 15, 2010 public notice, there are 1,868 authorizations currently available in the 218-219 MHz service and the Phase II 220 MHz service.[13] This spectrum was intended to be included in Auction No. 89 and covers a significant percentage of markets in which the rail industry requires spectrum. The bulk of these licenses are in the 218-219 Radio Service (formerly IVDS).

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[12] The unmet needs lie principally in the passenger rail sector, since the major freight carriers have merged their interest in PTC 200, and obtained a significant amount of spectrum in the secondary market from licensees in the 220 MHz radio service. While Amtrak does not foreclose the possibility that other freight carriers may require additional spectrum, and even that PTC 220 may not be able to satisfy its requirements in highly congested areas with its existing licenses, Amtrak calculates that 500 kHz of additional spectrum dedicated to PTC should be sufficient to initially satisfy the PTC spectrum needs of passenger carriers in most suburban and urban areas.

[13] Auction of 218-219 MHz Service and Phase II 220 MHz Service Licenses Scheduled for December 7, 2010, Public Notice, DA 10-849, AU Docket No. 10-107 (WTB rel. May 24, 2010)

Based on a review of the Commission's Universal Licensing System, it appears that there are only 48 active licenses in the entire 218-219 MHz radio service: 18 active A-block licenses, and 30 active B-block licenses. More significantly, in all but seven out of the 734 market areas use for licensing in the service, at least 500 kHz is available for assignment for PTC; indeed, in all but 34 markets, the full 1 MHz of spectrum in the 218-219 Radio Service remains unassigned. Moreover, an additional 448 Phase II licenses are available in the 220 MHz radio service. Amtrak believes that a simple repurposing of this spectrum for PTC purposes would generally satisfy – at least with respect to initial deployments – the spectrum requirements for PTC.

Indeed, given the extremely light use of this band, the Commission may want to consider reallocating the entire 218-219 MHz service for PTC use. Such action could ensure that even in the most congested areas of the country, where even the freight rail carriers are concerned about the adequacy of their current spectrum holdings, PTC requirements can be satisfied. Given that only 500 kHz generally will be needed for PTC purposes, the incumbent licensee either will not be affected at all or it may be easily moved to the portion of the band that is not currently occupied or to unlicensed channels in the 220 MHz Radio Service band.[14] In fact, a closer audit of the existing licensees' use of their spectrum in the 218-219 MHz band may reveal very little active operation within the band, further reducing the potential cost to PTC applicants of relocating incumbent licensees.[15]

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[14] With less than 50 active licenses in the entire radio service, it also should not be unduly burdensome to relocate incumbent licensees in the few instances where the entire 1 MHz is required for PTC.

[15] Amtrak assumes that, consistent with precedent in other bands, the Commission would adopt procedures to compensate incumbent licensees who are actually operating in the band for the costs involved in relocating operations to other channels. It may also be appropriate for the Commission to consider accelerating construction requirements for licensed spectrum in the 217-222 MHz band that is underutilized, or not utilized at all. Rather than allowing this spectrum to remain fallow, as Amtrak suspects is most often the case, the Commission could consider whether reclaiming such spectrum, or imposing mandatory leasing requirements for PTC purposes, would serve a higher public interest purpose.

Amtrak also supports other approaches that would make spectrum available in the 217-222 MHz band for PTC use. For example, to the extent that any licenses are forfeited, revoked or automatically terminated in the AMTS, 218-219 MHz, or 220 MHz Radio Services, those licenses should become available for PTC use instead of relicensing pursuant to existing rules. This approach should govern even in those radio services in which, for example, the geographic area covered by a site-based license would otherwise revert to the holder of a later-awarded geographic license. Although this approach would require further rulemaking proceedings, the public safety issues associated with a complete implementation of PTC justifies such action.

## II. LICENSING ISSUES

The Bureau also seeks comment regarding the coverage area that will be needed by the railroad industry for PTC implementation. Amtrak maintains that the Commission should adopt an efficient licensing scheme that would distribute licenses fairly among rail carriers who need spectrum for PTC implementation. Because "a freight or passenger rail would not require spectrum solutions outside a certain distance from a track line,"[16] licensing on the basis of large geographic markets may not be an efficient approach. On the other hand, licensing on an overly narrow geographic basis may create undue complications for rail carriers whose lines crisscross relatively broad geographic markets. Given the high level of security and interference-free operation that PTC systems will require, the licensing scheme ultimately adopted must provide sufficient geographic separation between systems to ensure that co-channel interference between systems will not occur.

To help achieve this objective, Amtrak suggests that the Commission may want to adopt a site-based approach to licensing, utilizing a "PTC Zone" around each rail line that is subject to

[16] Public Notice at 3.

the PTC requirements of RSIA in which PTC operations would be the primary use. Amtrak believes that the Commission, in consultation with the FRA, can establish such a PTC Zone using, for example, a corridor centered on each line. Within that corridor, the re-allocated spectrum in the 218-219 MHz and 220-220 MHz bands would be available for licensing only to rail carriers for use in a PTC network, with priority provided to rail passenger carriers owning any lines located within the Zone – given to the significant spectrum already licensed to the freight rails for PTC – during the first twelve months after licenses are available. By creating these PTC Zones, the Commission would be able to reserve this spectrum for other uses in areas where rail carriers will not need the spectrum for PTC, thus assuring efficient use of this currently unused band in all areas of the country.

Once the PTC Zones have been established, passenger rail carriers could apply for a site-based license[17] at any geographic location along their owned rail line; this site based license would allow the licensee an area of protection from co-channel interference within a certain radius centered on the designated site. Licensed carriers would be allowed to deploy facilities anywhere within the protected coverage from their designated station location as long as the effective radiated power at the coverage area boundary did not create co-channel interference to neighboring systems. Through frequency coordination, channel planning with neighboring licensees, and appropriate field strength limits at each licensed area boundary, Amtrak is confident that the occurrence of any interference among co-channel systems will be effectively eliminated.

Upon application for a site based license, individual channel assignments would be made by a designated frequency coordinator (most likely the Association of American Railroads,

[17] While all the spectrum under consideration has previously been licensed through a spectrum auction, use by rail carriers of this spectrum for PTC clearly satisfies the "critical infrastructure" and "public safety" exceptions to the Commission's auction obligation. *See* 47 U.S.C. § 309(j)(2).

which already serves as a coordinator for rail licensees). Licensees would initially be limited to no more than 100 kHz of spectrum covering any particular geographic area. To the extent additional spectrum is needed, the applicant should be required to submit (for Commission approval) a detailed showing of need, as well as a demonstration that the licensee is making substantial use of the frequencies previously assigned (*i.e.*, loading requirements).

Amtrak believes that a specific filing window should be created once the reallocation of spectrum has been completed. Applications would be accepted outside the filing window only if spectrum remains unassigned in an area after all timely applications have been processed. In the event of mutual exclusivity among timely filed applicants, Amtrak would urge that first preference should be given to carriers subject to RSIA PTC requirements that do not already hold licenses covering the area requested. If mutual exclusivity remained thereafter, the parties, in conjunction with the frequency coordinator, should be required to cooperate to ensure that – to the extent technically possible – all PTC requirements can be satisfied through spectrum sharing, short-spacing, or other engineering means. Only if a conflict remained would the Commission be obligated to engage in a spectrum auction among the conflicted applicants to determine which rail carrier will be awarded the spectrum.

## III. TECHNICAL ISSUES

While the 217-222 MHz band is well suited for PTC use, the rules governing the various radio services that occupy this band (*i.e.*, AMTS, the 218-219 MHz and 220 MHz Radio Services) are not. As a result, the Bureau appropriately granted PTC 220 a number of technical rule waivers so that PTC 220 could begin PTC deployment in the 220 MHz band. Similarly, the Southern California Regional Rail Authority and Amtrak have petitioned the Commission for waivers of rules governing AMTS in order to facilitate PTC implementation in the AMTS

band.[18] Waivers of a similar nature will be needed to permit PTC implementation in the 218-219 MHz band.

To avoid addressing PTC implementation requirements on a piecemeal basis, Amtrak proposes that PTC operations in the entire 217-222 MHz band be governed by the following technical restrictions/limitations:

- Channelization: Channels should be designated on a paired basis of 12.5 kHz bandwidth, with the option by any licensee to aggregate bandwidth for greater capacity of up to 50 kHz upon a showing of need.

- Spectrum Aggregation: for the first two years following initial licensing, no licensee should be able to aggregate more than 200 kHz covering any particular geographic area.

- Antenna Height: 100 feet for fixed terminal base stations, and 50 feet for fixed wayside stations.

- Transmitter Power Limitations (fixed stations): 75 watts for terminal base stations, and 50 watts for wayside stations.

- Transmitter Power Limitations (mobile stations): 50 watts.

- Out-of-band Emissions: Existing limits should be maintained except to the extent the Commission decides to reallocate the entire 218-219 MHz band for PTC purposes, in which case a new standard would be warranted.

Although any of these limitations would be subject to waiver by the Commission upon a showing of need, Amtrak submits that adoption of these technical limits, which are consistent with the waivers already granted or requested, will help balance the needs for successful PTC deployment with the interference protection interest of licensees operating in adjacent areas and bands.

[18] Amtrak appreciates the Bureau's prompt action in placing Amtrak's January 3, 2011 request to waive certain Part 80 technical rules so as to allow Amtrak to operate a PTC system in the in the event it should acquire spectrum in the AMTS band. *See* Wireless Telecommunications Bureau Seeks Comment on National Railroad Passenger Corporation (Amtrak) Request for Waiver of Certain Part 80 Automated Maritime Telecommunications System (AMTS) Rules to Implement Positive Train Control, Public Notice, DA 11-322, WT Docket No. 11-27 (WTB rel. Feb. 18, 2011).

## CONCLUSION

In order to ensure the availability of spectrum for implementation of PTC by the mandated deadline, the Commission should reallocate spectrum in the 217-222 MHz band for PTC use. The best approach would be to reallocate, at a minimum, the fallow spectrum in the 218-219 MHz band and the 220 MHz radio service that was intended for re-auction in Auction No. 89. This spectrum should be awarded to qualified applicants pursuant to a one-time filing window. Given the public safety nature of PTC, competitive bidding should not be used to award the spectrum. Finally, the Commission also should make the necessary modifications to the technical and licensing rules associated with this spectrum to ensure that it can be utilized for PTC.

Respectfully Submitted,

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