

# Communication Architecture

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TO: The Federal Communications Commission

Re: Reply comments for WT Docket No. 11-79, in the matter of Spectrum Needs for the Implementation of the Positive Train Control Provisions of the Rail Safety Improvement Act of 2008.

## Comments

In alignment with my submission of June 20, 2011 regarding WT Docket No. 11-79, I am providing reply comments below on several of the submissions that were made by several organizations. To show the contrast to what I submitted and those comments that have been submitted by others, I first list the point that I made followed by quotations from other submissions that I believe are confusing, if not in conflict with my point, followed by my reasoning.

1. I explained that PTC is only an enforcement system that provides a relatively simple part of complex advanced traffic control systems that have been pursued in the U.S. in the past, and that are being used or plan to be used in other areas across the globe, most importantly Europe. No comparison can legitimately be made between PTC and those advanced systems that require extensive wireless throughput, reliability, and coverage far beyond the requirements of PTC.

### PTC-220

- o Page 8 – 9: **Comments regarding “Positive Train Separation”, “North American Joint Positive Train Control”, and “Global System for Mobile – Radios”**

While the comments regarding the three systems are primarily correct, they are not applicable to a discussion on PTC. All of these systems involve advanced traffic control systems, as well as traffic management systems, with enforcement being a minimal challenge as to the wireless requirements. Any wireless data models that were developed for those systems would be inappropriate for evaluating the wireless data requirements for PTC.

2. The term PTC is both a generic term for enforcement systems as well as a particular type of enforcement system being deployed by freight railroads and those passenger operations that operate over their tracks. The ACSES system that is deployed on the Northeast Corridor by Amtrak is also a PTC system generically, but differs substantially as to its wireless requirements from the PTC requirements for freight railroads.

#### MTA

- Page 11: **“each of the railroads on the North East Corridor has agreed to utilize the Advanced Civil Speed Enforcement System (ACSES).”**

Any analyses made of wireless requirements for ACSES are not at all applicable to the deployment of PTC across the freight and associated passenger railroads. The timeliness, throughput, and reliability of wireless requirements for ACSES and PTC are significantly different, with PTC being substantially simpler.

3. PTC, an enforcement system, is not the same as *Precision* Train Control™ (PTC™). that failed to be deployed on Union Pacific a decade or so ago. PTC™ was to be a combination of the ultimate traffic control, traffic management, and enforcement systems whose wireless data requirements could not be cost-effectively achieved at that time. Again, the data requirements for PTC™ were substantially different than that now required of PTC. The key point here is that PTC™'s data model and UP's experiences with that system are not applicable to deploying PTC.

#### PTC-220

- Page 9: **“Electronic Train Management System”**

ETMS is a PTC system that is now approved by the FRA for deployment on BNSF. The communication platform of choice for ETMS, at least until the PTC mandate and the requirement for interoperability, was the Meteorcomm platform in the 44 MHz range. The additional statement in the same paragraph regarding this wireless platform **“lacking in meeting the Interoperable Train Control (ITC) (radio) specifications”**, is somewhat confusing to me. It may be possible that ITC has a data model for PTC, in which case they should have the ability to readily determine data requirements. However, it may be that the data model and/or the other specifications that were used to evaluate the Meteorcomm 44 MHz platform, are inappropriately carried over from PTC™ (a.k.a. PTS) and / or NAJPTC.

4. I noted that I knew of no studies being made of PTC data throughput requirements.

#### PTC-220

- Page 3: **“In January of this year, PTC-220 contracted with Transportation Technology Center to perform a spectrum analysis (by building a model)”**  
While I agree that such a model should be provided, I am confused as to why it has not yet been delivered after 6 months. The necessary Operations Research (OR) tools and personnel are readily available in the market to provide such a tool with sufficient credibility for evaluating spectrum within several months. My concern is that an inappropriate data model, again such as PTC™ or NAJPTC, is being used as the basis for the model. I am willing to identify such resources should the FCC or others be so interested.
- Page 3: **“However, PTC-2209 has performed an initial evaluation of potential congested areas ...”**  
The cities named are recognized across the industry as being quite congested as to rail traffic. However, that recognition does not provide any quantification of the data requirements which is the true point upon which to request and be granted wireless spectrum.
- Page 4: **“PTC-220 is now engaged in analysis the theoretical requirements for reuse design (based upon simplex channels of 25 KHz width)”**  
This is indeed a critical analysis to be performed to evaluate the channel requirements in congested areas, such as those identified by PTC-220. However, I question why the radio design by Meteorcomm is to use 25KHz channels. Such a requirement seems to place an unnecessary burden on the amount of spectrum required. Again, this may relate to a data model from PTC™ and/or NAJPTC.
- Page 6: **“Ribbon licenses would likely be an acceptable solution for additional spectrum that may be made available for PTC use.”**  
While I agree with the point that ribbon licenses make sense along the major portion of the railroads’ operations, i.e., other than metropolitan areas, *IF* spectrum is required, the underlying point is that I believe that any reasonable data analysis will show that no additional spectrum is required for PTC outside of major metropolitan areas.

#### MTA

- Page 13: **“The MTA Railroads have spent over a year in attempting to obtain useable spectrum, without success. Our significant needs and the number of channels available limit the possible solutions.”**  
I was not aware of MTA’s efforts in that my focus to date has been on the freight railroads. Reading through MTA’s submission, I was impressed at the effort that they have made reportedly as to their requirements. Indeed, MTA’s requirements

may need to be met with additional spectrum it seems. However, relative to the freight railroads, the MTA analyses provide no bearing on the requirements for PTC for freights in that MTA is deploying ACSES, with the differences between the two discussed above. I am not suggesting that metropolitan areas for freight railroads will not require additional spectrum, 220 band or other, but that the MTA analyses are not applicable to freight railroads.

### **Peninsula Corridor Joint Powers Board**

- **Page 3: “rough estimates suggest a need for 8 to 12 channels”**

I do agree that the estimate is rough, quite rough in fact, given that no one has pinned down the data requirements and channel reuse possibilities. My rough analysis based upon my understanding of PTC is at most half of what they are suggesting.

5. There is neither a mandate requirement nor any technically critical reason to use any particular spectrums, individually or collectively.

### **PTC-220**

- **Page 6: “The licenses currently used for Advanced Train Control Systems (ATCS) ...”**

Perhaps this is a simple misunderstanding by some, but ATCS was never deployed. The wireless protocol developed for ATCS, referred to as ATCS-900, is used on the 900 MHz spectrum that was given to the railroads by the FCC to use for ATCS. However, that spectrum is now used for codeline information and work order.

### **APTA**

- **Page 1: The spectrum must be in the 217-220 MHz range.**

There is no technical reason for this, and I doubt that there is even a practical reason as well. As to the lack of a technical reason, I quote the FRA-mandated requirement for a *PTC Development Plan (PTCDP)* for one version of freight PTC referred to as V-PTC: “The Communications Segment will be deployed with multiple wireless networks ... including 220 MHz ... Wi-Fi ... Cellular and satellite.” Additionally, having seen the on-board equipment architecture for a Class I, it is clear that they have the intent of using 220 MHz, Wi-Fi, AT&T cellular, and/or Verizon cellular. As to a practical reason why APTA’s members are locked into 220, I can simply state that Software Defined Radio (SDR) and perhaps other technologies can provide substantial flexibility in dealing with a single on-board radio platform, if indeed that is APTA’s concern.

In closing, the Skybridge Spectrum Foundation is willing to sponsor the use of my services to formally or informally meet with FCC to further discuss any of the points provided in this submission, including the attachments.

Sincerely

Ronald A. Lindsey