

## Narrative Statement

### **A. Introduction and Background**

Pursuant to Section 5.3(e), (j), and (k) and Section 5.54(a)(1) of the Commission's rules,<sup>1</sup> (2012), BNSF Railway Company ("BNSF") respectfully requests an experimental radio license for a term extending through December 31, 2015, so that it may conduct tests of a system operating in the 220-222 MHz band to support the implementation of Positive Train Control ("PTC") technology as mandated by Congress.

In addition, BNSF respectfully requests expedited treatment of this request, so that it may commence tests as soon as possible, and no later than April 15, 2014. Justification for such action is attached separately in the "Request for Expedited Treatment" accompanying this application.

The following information is provided in support of BNSF's application for an experimental license:

### **B. Company Background and Proposed PTC System**

BNSF Railway is one of North America's leading freight transportation companies, with a 32,500-mile rail network covering the western two-thirds of the United States (28 states) as well as portions of Canada (two provinces) and key Mexican gateways.<sup>2</sup>

PTC is a communications-based traffic control system mandated by the U.S. Congress for all of the largest U.S. railroads, including BNSF, pursuant to the Rail Safety Improvement Act of 2008, 49 U.S.C. § 20157, and implementing regulations of the Federal Railroad Administration (FRA), 49 C.F.R. § 236.1001 *et seq.* PTC is designed to prevent train-to-train collisions, over-speed derailments, incursions into established work zones, and unintended movements of trains through switches. Such events jeopardize the safety of not only railroad personnel, but also passengers and the public. PTC will be required on lines over which intercity or commuter rail passenger transportation is regularly provided and on lines over which hazardous materials, including such everyday chemicals as chlorine used for drinking water, may be transported. Effectively, PTC technology must be implemented throughout much of each railroad's network.

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<sup>1</sup> 47 C.F.R. §§ 5.3(e), (j), (k), 5.54(a)(1).

<sup>2</sup> See BNSF Railway, *The Engine that Connects Us* (last accessed Mar. 18, 2014), [http://www.bnsf.com/about-bnsf/pdf/fact\\_sheet.pdf](http://www.bnsf.com/about-bnsf/pdf/fact_sheet.pdf); see also BNSF Railway, *The History of BNSF: A Legacy for the 21<sup>st</sup> Century* at 4 (last accessed Mar. 18, 2014), <http://www.bnsf.com/about-bnsf/our-railroad/company-history/overview/#/3/>.

Congress has mandated that PTC be implemented by December 31, 2015. The FRA is overseeing and monitoring the progress of each railroad in implementing PTC. PTC technology is a highly complex and largely untried system that has required (i) the development of new communications equipment and software, (ii) acceptability and functionality testing through pilot programs, (iii) interoperability testing among all of the railroads' PTC systems, and (iv) FRA certification. Thus, the deadline for its required completion is demanding and one that cannot be met if implementation is unduly delayed.

The key components of the PTC system are (1) base stations (the four base stations here range from 20 to 32.92 meters above ground level); (2) wayside stations (all planned wayside stations here are 13.72 meters above ground level); and (3) mobile units located on locomotives. Among other things, these system components monitor and confirm the status of track switches and trackside signals and convey that information to a centralized location using radio transmissions in the 220 MHz frequency band. Those transmissions will occur via facilities located along railroad tracks. BNSF is in the midst of working to construct (in compliance with applicable historic preservation and environmental rules) many such radio-hosting facilities to implement PTC by the mandated deadline. Thus, BNSF is subject to a tight implementation schedule and a narrow window to conduct tests due to weather considerations and the need to reserve free track-time without interfering with the activity of an operating railroad.

### **C. Purpose and Scope of Experimentation**

Industry research and development in PTC technology has reached a stage that now requires “real-world” field tests, operational trials, and proof of concept evaluations to determine the acceptability and reliability of PTC communications capabilities. In the long term, these capabilities will be provided by PTC systems licensed under Part 90 of the FCC’s rules. In the meantime, however, BNSF proposes to test and analyze the functionality of PTC technology to meet industry needs under the authority requested herein.

Specifically, BNSF proposes to conduct experimental operations along 120 miles of its track rights-of-way (“ROW”) in Washington State, near the US-Canadian border.<sup>3</sup> These proposed operations are particularly important because they will test PTC operations along the US-Canada border. A large portion of the track involved in this experiment will fall within the border zone – 120 kilometers within the US-Canada border. At all times, PTC operations will remain in compliance with the relevant treaties,<sup>4</sup> U.S. rules,<sup>5</sup> and any conditions of its experimental license.

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<sup>3</sup> See *Map of Experimental Area* (attached to this application).

<sup>4</sup> See Interim Sharing Arrangement between the Canadian Department of Industry, the National Telecommunications and Information Administration, and the Federal Communications Commission Concerning the Use of the Band 220 to 222 MHz Along the United States-Canada Border (Dec. 12, 1999), *available at* <http://transition.fcc.gov/ib/sand/agree/files/can-nb/220fin.pdf>.

To obtain statistically valid engineering results, BNSF must conduct experimental operations with a sufficient number of facilities to mirror real world operations. Accordingly, BNSF respectfully requests authority to operate up to 100 fixed base stations (currently, we anticipate 61 wayside stations and 4 base stations) and up to 50 mobile units in connection with its pilot program. BNSF also notes that these numbers represent only a small fraction of the facilities that will ultimately be constructed for the PTC system.

BNSF anticipates that most if not all of these fixed units will be incorporated into its ultimate PTC system, and BNSF confirms that it will obtain all necessary FCC authority prior to such permanent operations.

#### **D. Technical Specifications**

**Application Type/Classification:** XD (Experimental Developmental)

**Frequencies:** 220.125-220.150 MHz  
220.425-220.450 MHz  
220.725-220.750 MHz  
220.750-220.775 MHz

**Modulation:** 4FM and  $\pi/4$ DQPSK

**Bandwidth/Emissions Designators:** 17K8DXW, 8K90DXW

BNSF seeks to employ various modes of modulation, bandwidth and data rates. Nevertheless, none of these modes of operation would extend beyond the limits set forth for 220-222 MHz band

#### **Power Limits:**

All transmitters (Fixed base stations, fixed wayside stations, and mobile units) will comply with the power limits in Part 90 of the Commission's Rules<sup>5</sup> and with the US-Canada Interim Sharing Arrangement.

##### *Base Stations*

Transmitter Power Output (TPO): Adjustable 10 to 75 Watts

Effective Radiated Power (ERP): up to 500 Watts Peak Envelope Power (PEP)

##### *Wayside Stations*

TPO: up to 50 Watts PEP                      ERP: up to 160 Watts PEP

##### *Mobile Stations*

TPO: Adjustable 10 to 50 Watts    ERP: 50 Watts PEP

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<sup>5</sup> 47 C.F.R. § 90.701 *et seq.*

<sup>6</sup> *See* 47 C.F.R. § 90.729.

## **E. Operational Safeguards**

BNSF recognizes that its experimentation must not cause harmful interference to authorized facilities. BNSF does not anticipate that such interference will occur, however, as it will operate only on channels approved by and coordinated with PTC-220, LLC, the existing licensee in the geographic areas covered by the pilot program. Indeed, BNSF expects that certain aspects of its experimentation will be conducted with the cooperation of PTC-220.

Should interference occur, however, BNSF will immediately take steps to resolve the interference, including, if necessary, discontinuing operation.

## **F. Responses to Form 442**

Form 442 asks “Would a commission grant of this application come within Section 1.1307 of the FCC Rules, such that it may have a significant environmental impact?” BNSF has answered “No” to this question because: (i) facilities authorized under an experimental radio license are excluded from review pursuant to the *Nationwide Programmatic Agreement Regarding Section 106 (NHPA)*,<sup>7</sup> and (ii) BNSF will place these transmitters on existing facilities within the railroad ROW, so it does not expect to encounter environmental issues. BNSF understands, however, that it must comply with FCC rules and regulations governing environmental and historic preservation matters and confirms that it will do so before commencing permanent operations.

Another question on the Form 442 asks, “Will the antenna extend more than 6 meters above the ground, or if mounted on an existing building, will it extend more than 6 meters above the building, or will the proposed antenna be mounted on an existing structure other than a building?” BNSF has responded “No” to this question, because it is only mounting the antennas on existing structures (*i.e.*, it is not constructing new towers or poles for purposes of this experiment). The antennas deployed under this experimental authority will not extend more than 6 meters above the height of a locomotive or 6 meters above the height of a building or existing structure. All antennas will be installed in accordance with FAA and FCC rules and regulations. Moreover, BNSF again acknowledges that it will comply with all FCC rules and regulations regarding environmental and historic preservation matters before commencing permanent operations.

## **G. Public Interest Statement**

Granting BNSF’s requested experimental license will serve the public interest, convenience, and necessity because it will enable the company to implement PTC technology for

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<sup>7</sup> *Nationwide Programmatic Agreement Regarding Section 106*, Report and Order, 20 FCC Rcd 1073 ¶ 47 (Oct. 5, 2004).

the public safety and public benefit, as envisioned by Congress. Granting this request in an expeditious manner, moreover, will help ensure that BNSF can start realizing the benefits of PTC as soon as possible and that BNSF can meet its Congressionally-mandated deadline of December 31, 2015.

## **H.     Contacts for Inquiries**

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