



BRIEFING: FEBRUARY 16, 2016 BOARD MEETING AGENDA ITEM #5

TO: Chairman Richard and Board Members

FROM: Frank Vacca, Chief Program Manager

DATE: February 16, 2016

RE: Consider Providing Approval to Execute Purchase Agreements for Radio Spectrum Rights for the Statewide System

Background

Modern rail systems, including high-speed, use radio systems for key functions such as: transmission of voice and data to allow for communication based signaling; real-time reporting of anomalies experienced onboard the trainsets arising from continuous conditional monitoring; secure train-to-shore voice communications; and, public safety agency communications. Radio systems are also required for communication between the Operational Control Center (OCC) and the trainset crews for both normal operations and emergency conditions (including allowing the OCC to monitor real-time video of onboard situation), and communication with maintenance personnel. Finally, radio systems will be used for the implementation of Positive Train Control (PTC), a required key safety mechanism for high-speed operations. As such, California High-Speed Rail Authority (Authority) staff has been evaluating the ultimate need for radio systems and the available marketplace.

Radio systems for electronic communications require a block of radio spectrum (i.e. frequencies) to support the data signals. Signals transmitted at various frequencies behave in different ways, which is of great import when operating trains at speeds at speeds up to 220 mph. Radio spectrum is divided into bands of frequencies that have different properties and characteristics. Blocks and channels are allocated within these bands. Allocation of radio spectrum for non-Federal use is controlled by the Federal Communications Commission (FCC), but licensees can sell acquired spectrum on the open market subject to various conditions.

To avoid excess expense and complexity, it is critical to obtain a suitable radio frequency band whose properties match the application at reasonable prices. In Europe, national governments have set aside frequencies for the railroads' use. These types of frequencies have not been set aside for use in the United States. The bands that exist for public purpose have already been allocated for a many specific and important uses (e.g. military, air traffic control, GPS etc.) and are not available for use by the Authority. Accordingly, the FCC advised the Authority through its consultants that it did not have spectrum available for its use and that it must be obtained through private owners.

Given these facts, useful radio spectrum is difficult to obtain, as willing sellers must be identified with channels that are available across a wide geographical area at frequencies that meet the Authority's intended purpose of high-speed train operation.

Over the last several years, the Authority has conducted an exhaustive search and investigation utilizing highly-qualified industry consultants as to suitable radio spectrum and potential willing sellers. Many obstacles were identified, including the lack of willing sellers in the same bands over large geographic areas, prohibitive costs in certain bands, large utility companies vying for the same frequencies and technological difficulties. After this thorough search, the Authority has located suitable radio spectrum that meets all of the criteria required by the Authority through two owners.

Authority staff now seeks approval to enter into two contracts with Access 700, LLC and BPC Spectrum LLC to purchase radio spectrum FCC licenses at 757-758 and 787-788 MHz (Spectrum Rights), which covers Phases I and II of the alignment.. Subsequent to Authority Board approval, the parties will execute License Purchase Agreements and then the transactions will be completed once the FCC consents to the assignment of the partitioned licenses to the Authority (usually a 30 to 60 days approval process). The License Purchase Agreement with Access 700, LLC is in the amount of \$32,780,241.00 and the License Purchase Agreement with BPC Spectrum LLC totals \$21,076,151.00.

Discussion

The Authority may enter into agreements with private and public entities for design, construction and operation of high-speed rail trains, including all tasks and segments thereof pursuant to California Public Utilities Code Section 185036. Additional authority for a state agency to enter into these Agreements includes but is not limited to, Public Contract Code Sections 10335, et seq. The Spectrum Rights are required for train operation.

Radio Bands

Public Safety Radio Systems and Commercial Two-Way Radio Systems use the following bands:

- 30-50 MHz Widespread interference issues
- 150-170 MHz Heavy use; Very limited availability
- 217-222 MHz Used for PTC by freights; Limited capacity; Vague Ownership and availability
- 450-512 MHz Very limited availability; Piecemeal - many small licensees
- 700 MHz Band (698-806 MHz) Available end-to-end; 2 licensees – both willing to sell to the Authority
- 800 MHz Band (806-869 MHz) Extensive interference; Site-specific licenses; Does not meet geographic requirements
- Satellite Bands Limited capacity; Not suitable in tunnels

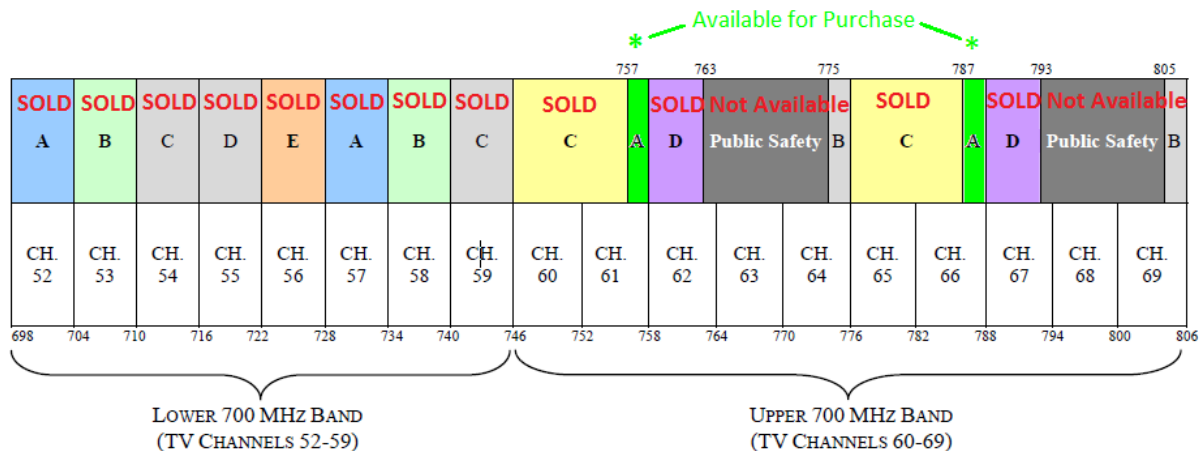
Radio spectrum is also needed to establish a secure communication system controlled by the Authority, as opposed to other technologies that are not secure such as cellular data.

700 MHz Band

The newly available 700 MHz Band Spectrum Rights are an obvious choice for the Authority for a number of reasons:

- Clean, newly available spectrum (following the vacation of TV channels 52-69)
- Available end-to-end, not shared; suitable for critical infrastructure
- No historical licensees with familial ownership; avoids difficult/protracted negotiations
- Geographical spectrum; 2 licensees with rights for most of California and willing to sell wholesale
- Avoids difficulty of acquiring approximately 800 miles of spectrum on a patchwork site-by-site basis and the need for elongated engineering effort to have site power levels approved by the FCC
- Support for narrowband and broader band systems
- Adequate bandwidth available; meets operational needs with a single acquisition by two contracts
- Predictable costs through two contracts, as opposed to numerous piecemeal negotiations if locate willing sellers
- It is not susceptible to inadvertent interference from nearby bands

The 700MHz Band has been split in two (Upper 700MHz and Lower 700MHz) and each further split into various ‘paired’ and ‘unpaired’ blocks by the FCC. All of the Lower 700MHz spectrum and Blocks C and D of the Upper blocks have been auctioned off by the FCC and are now controlled by various companies such as Verizon, AT&T and Qualcomm.



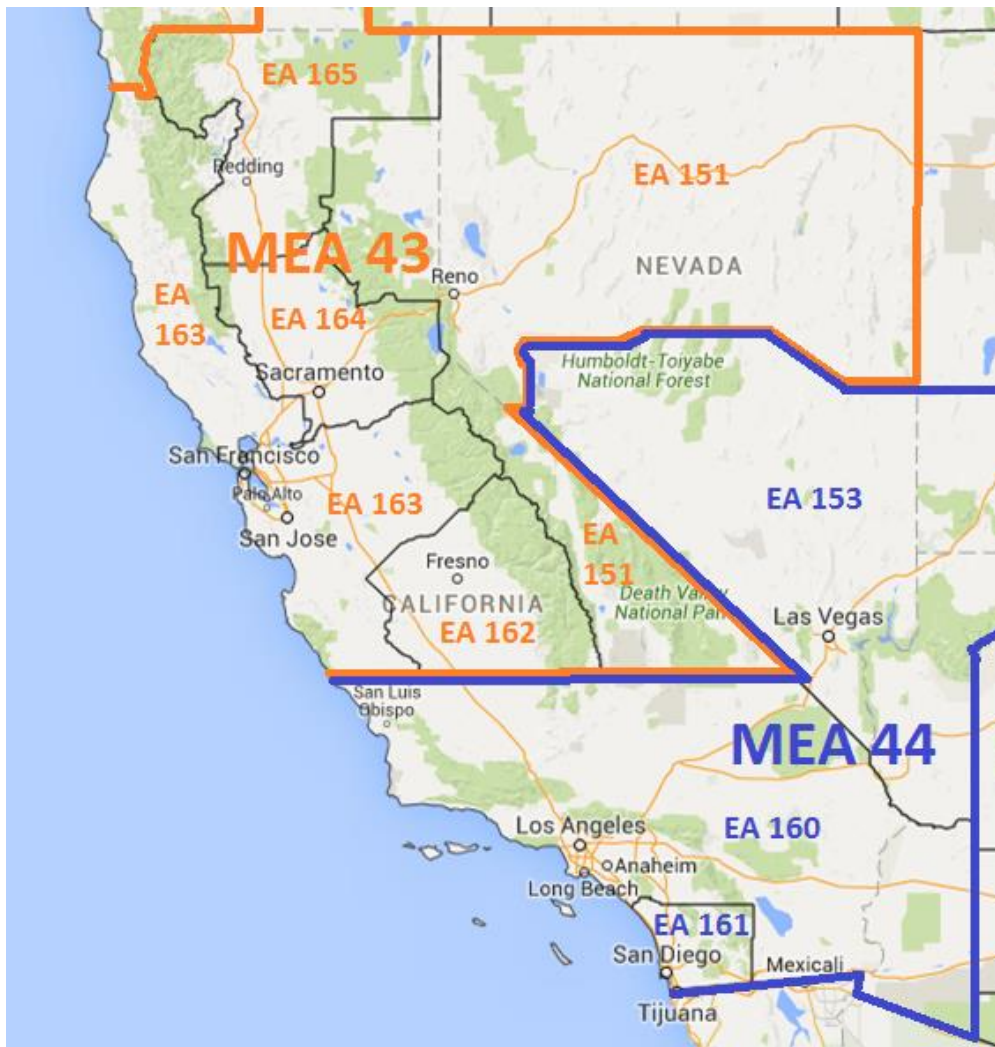
In the Upper 700MHz Band A Block, the characteristics required by the Authority are as follows:

- Largely underutilized across the country presently but being actively marketed
- Good spectrum characteristics: broad coverage and good building penetration
- Comprises 757-758 & 787-788 MHz paired spectrum

- Split into 52 geographic areas called Major Economic Areas (MEAs) – see below
 - Each MEA further broken into several Economic Areas (EAs) – see below
- Licenses held nationwide by just three entities, who are actively marketing their holding:
 - Access 700, LLC (28 licenses);
 - Beach Point Capital/BPC Spectrum LLC (23 licenses)
 - Columbia Capital (1 license)
- For Authority end-to-end coverage, the following areas are required:
 - EA 160, 161 in MEA 43 – controlled by BPC Spectrum LLC
 - EA 162, 163, 164 in MEA 44 – controlled by Acc

The acquisition of radio spectrum can be viewed as broadly analogous to real estate acquisition. The map below shows the Upper 700 A Block Geographical Areas. The following features of the map are of particular importance:

- The Authority requires EA 160 to 164 for Phases I and II
- A power company is acquiring EA 165 and, to the north, 166 and 167 for their service area.
- There is a well substantiated rumour that a major utility company is actively interested in acquiring 160, 161, 162 and part of 151.



Authority staff stresses that there is no guarantee that this type of spectrum will become available again over the next few decades. It is therefore important to conclude negotiations and acquire the Spectrum Rights with Access 700, LLC and BPC Spectrum LLC as soon as possible.

Spectrum Pricing

Access 700, LLC and BPC Spectrum LLC are offering their Spectrum Rights for sale at \$0.75/MHz-POP (population), which is the customary calculation for these transactions. (See <http://www.accessspectrum.com/700%20MHz%20UTC%20Q2%202015.pdf>)

Using 2010 census information for California, EA 160-164 have a population of 38.8 million people. The Upper A Block calculation is 2 x 1MHz paired. For both Spectrum Rights the cost calculation is: 38,800,000 x 2 x 0.75 = \$58.2 million. Through negotiations, the Authority has an agreement with the two companies at the reduced price of \$53,856,392.00. This amount is within budget as provided below.

The fact that the required Upper 700 A Block of spectrum has only two owners will avoid complex and difficult negotiations. For instance, it has been estimated that a similar acquisition in the less attractive 450MHz Band could cost the Authority in excess of \$100 million if all potential sellers are willing ones and numerous negotiated transactions will be necessary. In this band, a major utility company was an unwilling seller but also actively competing for spectrum. The Authority met with six of these radio spectrum holders in 2015 and it was clear that obtaining the requisite bands over the necessary geographic areas would be difficult, if not impossible to purchase.

Budget

This purchase is consistent with the cost projections contained in the 2014 Business Plan. The budgeted amount for radio spectrum acquisition was \$55 million for Phase I of the project. With the two contracts, the Spectrum Rights acquisition totals \$53,856,392.00 for Phase I and II, which is under budget for the entire statewide program. Through this purchase, operational communications needs can be addressed for any type of operation over the statewide system. That would include the potential for other passenger rail operations over the initial construction segment in the Central Valley, a provision in the federal funding agreement. The federal funding agreement also includes a requirement that PTC be implemented for interim and full Phase I service.

Non-Competitively Bid Acquisition

A competitive procurement is not required for the purchase of the Spectrum Rights, which is broadly analogous to real estate acquisition for property in the sky as opposed to land. As outlined above, the Spectrum Rights are granted by the FCC through licenses owned and operated by various companies or individuals throughout the state. As the radio spectrum is owned by licensees, the purchase is analogous to a “sole source” transaction. The spectrum is not a good or service that can be procured through the competitive bidding process as are the typical

state procurements, and often available spectrum is only on the market for a short period of time. Additionally, the FCC must approve all sales of licenses, which is also not conducive to a competitive bidding process.

For the reasons set forth above, the two private sellers are the only source known to be able to provide the radio spectrum that meets the Authority's needs. Staff made exhaustive efforts to identify suitable frequencies and met with owners to determine the ability of acquiring radio spectrum from private owners. In all cases, bands were not suitable or a geographic area of contiguous bands was not available for purchase by the Authority.

Pursuant to California Public Contract Code Section 3400, a state agency may obtain a necessary item that is only available from one source. As detailed in this memo, the purchase of the suitable Spectrum Rights is only available from the two willing sellers. Additionally, California Public Utilities Code Section 185036 provides the Authority with broad contractual rights related to the operation of high-speed trains. As provided herein, the Spectrum Rights are required for the operation of the program's trains and communication systems.

Authority staff now seeks the Board's approval to negotiate and execute contracts for statewide Spectrum Rights with Access 700, LLC and BPC Spectrum LLC in the total amount of \$53,856,392.00.

Recommendation

It is the recommendation of Authority staff that the Board authorize the CEO to take all steps necessary to negotiate and enter into License Purchase Agreement contracts with Access 700, LLC in the amount of \$32,780,241.00 and BPC Spectrum LLC in the sum of \$21,076,151.00.

Attachment

– Draft Resolution #HSRA 16-06