

March 4, 2014

Ms. Marlene H. Dortch
Secretary
Federal Communication Commission
445 12th Street SW
Washington, DC 20554

Re: Notice of *Ex Parte* Communication, WC Docket No. 13-184

Dear Ms. Dortch:

On February 26, 2014, James Alther and Khanh Pham of the Los Angeles Unified School District (LAUSD) spoke via telephone with Nick Alexander, Soumitra Das, Chas Eberle, Lisa Hone, Mark Nadel, Michael Steffen, David Strickland, and Mark Walker of the Federal Communications Commission. The purpose of the call was to discuss the attached presentation detailing LAUSD's enterprise IT infrastructure modernization.

- *Background.* LAUSD is implementing a district-wide 1:1 device initiative that will provide a table to every one of the district's approximately 650,000 students by September 2015. This project requires that every school have high-density WiFi coverage. Commission staff requested a meeting with LAUSD staff to discuss their network design and maintenance plans and request data on the costs of infrastructure upgrades and local area network (LAN) equipment. Typical class size is 24-39 students for K-6 and 34-43 students for grades 6-12.
- *LAUSD Enterprise Network.* Wide area network (WAN) connections from approximately 1,000 school sites connect to one of four nodes, two of which connect to the public Internet. LAUSD purchases WAN transport from Corporation for Education Network Initiatives in California (CENIC) (60 Gb/s). LAUSD will file an application for additional WAN transport and Internet access service from AT&T (30 Gb/s) to cover anticipated growth.
- *Bandwidth usage.* Per-school bandwidth usage has increased 5x to 10x since the beginning of the 1:1 initiative. This increase has not been problematic for schools with fiber connections but has required schools that still operate on T-1 or slower transmission connections to rely on multiple connections and bandwidth optimizers. LAUSD uses bandwidth optimizers to eliminate redundant of data traffic as well as compress data before transmitting; thus, reduce network congestion and recurring cost of additional bandwidth. LAUSD staff stated that bandwidth optimization and caching should be eligible for E-rate support.

Slide 14 of the attached presentation provides the current and planned WAN bandwidth for different categories of schools based on grade level and enrollment. This is the capacity that will be necessary to support 1:1. LAUSD staff emphasized that they are managing their network growth and increasing bandwidth to schools as necessary rather than simply trying to deliver 1 Gbps/school right now.

- *Network equipment.* The average cost per classroom for high-density WiFi coverage is \$19,000-\$23,000. This includes equipment (25-30%), cabling and labor (40-50%), project management (~10%), and survey and design (~10%). LAUSD staff will share its per classroom cost model. LAUSD purchases network equipment at a 60-75% discount off list price. LAUSD is in the process of upgrading to routers for each school main distribution frame (MDF) as depicted on Slide 4. These Cisco 4451 routers cost LAUSD approximately \$8,500 each, \$12,500 if including bandwidth optimizer. Higher capacity routers for large schools cost \$21,500, including bandwidth optimizer. Individual bandwidth optimizers cost \$10,000-\$15,000 each, or \$7,000-9,000 each if incorporated into a network router.

LAUSD is also upgrading all wireless access points (WAPs), at a cost of ranging from approximately \$330 (Aruba) to \$ 434 (Cisco) per WAP, plus controller and licensing. The district installs two WAPs in every classroom in order to address student high density access. Also, the WAPs must be installed in corners because of district regulations regarding potential radiation exposure. WAPs are also set to lower power levels to alleviate radiation concerns. LAUSD plans on a 7-10 year replacement cycle for most network equipment. The industry rule of thumb for cabling is closer to 15 years. Other California school districts are not able to purchase from LAUSD's equipment contracts.

- *Common areas.* LAUSD staff explained that all common areas require WiFi coverage because student instruction often takes place in common areas. The cost of WiFi coverage for common areas is built into LAUSD's per classroom estimate. Hallways do not have special coverage, the WAPs in adjacent classrooms are typically sufficient. Gymnasiums and auditoriums typically have WiFi capability for 100-120 users. Libraries WiFi coverage is based on seating capacity. School WiFi is accessible after hours.
- *Misc.*
 - LAUSD's 2013 E-rate applications included Priority 2 Network Modernization services (equipment, cabling, labor, management, survey and design). Due to the compressed schedule to prepare for rollout of devices LAUSD is using bond

funding for cabling and pathways and will file 2014 applications for equipment and configuration services.

- LAUSD has two standard school network infrastructure designs;
 - Fiber backbone to the Intermediate Distribution Frame (IDF) / category cabling from the IDF to classrooms.
 - Fiber backbone to data closet (IDF) / secondary fiber backbone from IDF to classrooms / category copper inside classrooms.
- LAUSD continually updates network specifications and design with input from equipment manufacturers, industry leaders, and industry experts.
- FCC staff asked about the total number of classrooms in the district and if LAUSD had a method for calculating total classrooms. LAUSD staff explained that a classroom estimate is included in their cost model and noted that they typically do not have unused classrooms because the district offers available classroom space to charter schools with currently approximately 50 charter schools sharing available space. LAUSD suggested adding a question about total classrooms to USAC forms.
- LAUSD has four network technicians that provide maintenance and support for all schools that are not at the 90% discount level.

Respectfully submitted,

 /s/

Charles Eberle

Attorney-Advisor, Telecommunications Access Policy Division, Wireline Competition Bureau

Attachment