Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the Matter of	)	
	)	
Draft Eligible Services List for the Schools and Libraries Universal Service Program	)	CC Docket No. 02-6
	)	GN Docket No. 09-51
	)	WC Docket No. 13-184
Modernizing the E-rate Program for Schools and Libraries	)	
	)	

REPLY COMMENTS OF ERICSSON

Ericsson is pleased to offer these Reply Comments to the Wireline Competition Bureau's Public Notice seeking comment on the Eligible Services List ("ESL") for the 2015 funding year[1] in support of the Federal Communications Commission's goal of ensuring affordable access to high speed broadband to the nations' schools and libraries.[2] Ericsson shares the Commission's goal of ensuring access to affordable high-speed broadband and the many benefits such access can offer to the nation's schools and libraries.

I. Introduction

As a leader in the ICT industry, our aim is to provide significant and measureable contributions to a sustainable Networked Society, a world where everyone, everything and everywhere will be connected in real time. Ericsson believes that education is a cornerstone for reducing poverty, enabling development, and fostering better lives. As an example of our commitment to education, we are proud to be a lead technology partner in Connect To Learn, an

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[1] *See Wireline Competition Bureau Seeks Comment on Draft Eligible Services List for Schools and Libraries Universal Service Programs*, Public Notice, DA 14-1130 (rel. Aug. 4, 2014) ("*Draft ESL*").

[2] *Modernizing the E-rate Program for Schools and Libraries*, Report and Order and Further Notice of Proposed Rulemaking, WC Docket No. 13-184, Order, FCC 14-99 (rel. Jul. 23, 2014) ("*E-rate Modernization Order*").

initiative of Columbia University's Earth Institute and Millennium Promise, with specific focus on benefitting girls and their education needs.[3]

Below, Ericsson addresses two specific aspects of the Wireline Competition Bureau's request for comment on the schools and libraries *Draft ESL*. We first describe how caching, specifically caching of video, can reduce costs and improve the learning experience in schools. Second, we address how a school system can utilize microwave links to provide an alternative to wired connections among individual schools and libraries located on a campus.

II. Video Caching Provides Demonstrable Benefits to Schools and Libraries.

We are pleased that the Commission has included caching equipment and services among the Category Two services available for schools and libraries.[4] The Wireline Competition Bureau specifically requested comment on how to define caching, including what equipment the E-rate program should support, and whether it should treat caching as a service.[5] At the outset, Ericsson notes that caching requires management of infrastructure, and thus caching management ought to be treated as an eligible service (*i.e.*, delivery node and management node).

Ericsson agrees wholeheartedly with the New York City Department of Education's statement that "[c]aching is critical in providing school with fast access to learning materials, content, and programs. Caching assists with the effective management of networks without

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[3] *See* Technology For Good: Ericsson Sustainability and Corporate Responsibility Report 2013, *available at* http://www.ericsson.com/res/thecompany/docs/corporate-responsibility/2013-corporate-responsibility-and-sustainability-report.pdf.

[4] *See Draft ESL* at Appendix p. 4.

[5] *See Draft ESL* at 2.

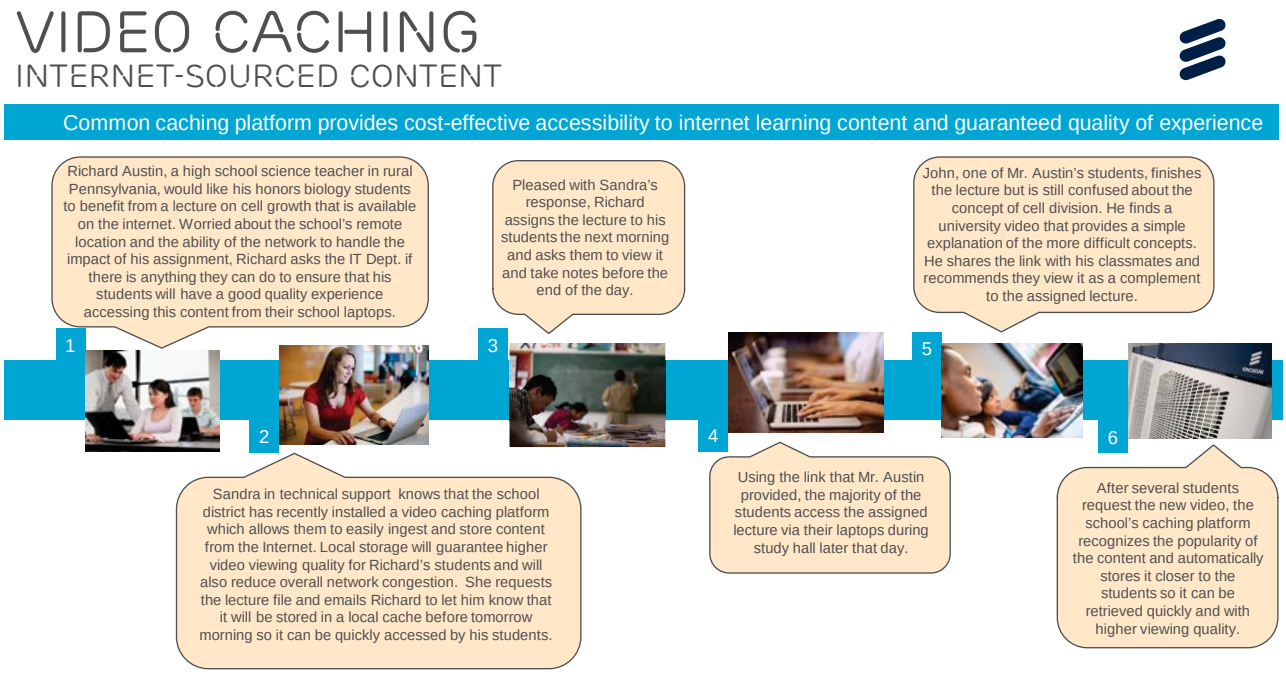
having to continually increase bandwidth, thereby reducing costs in the long run." [6] In particular, we see that schools and school districts are adopting video to teach, learn, and train workforces. Increasingly students and teachers expect video to be a part of the educational experience. Ericsson believes that a caching infrastructure is the most efficient method to support the use of video in schools and libraries. Below, Ericsson outlines two use cases illustrating the benefits of local/school-district video caching.

In the first case, suppose that multiple students across a large school district request the same online lecture as part of a science assignment. Without caching, the delivery of that content will be inefficient and will degrade not only their own experiences, but also the ability of other students to access the Internet. This potential negative impact is even more pronounced in schools with smaller pipes to the Internet and in rural schools that are far from a peering point.

Caching, however, addresses this problem by placing content closer to the students, saving both bandwidth and cost, and freeing up scarce resources for other users. Ericsson's video products and services can address this situation in multiple ways. For unmanaged content, our products can detect a popular piece of content and cache it locally to save bandwidth and cost as described above. Each subsequent request is then delivered from the local cache rather than over the school system's pipe to the Internet. Alternatively, if a school system knows that students will be accessing the same piece of content, Ericsson's products can pre-position that content prior to usage, resulting in even greater bandwidth and cost savings.

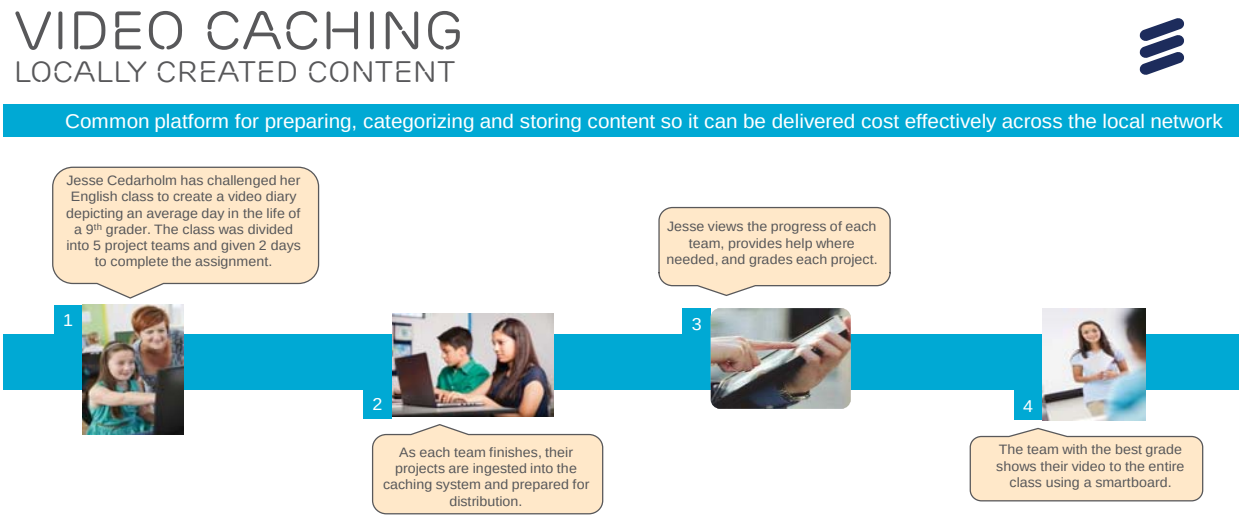
[6] Comments of New York City Department of Education, *Draft Eligible Services List for Schools and Libraries Universal Service Program*, CC Docket 02-6 (filed Sept. 3, 2014) at 2-3.

The following graphic outlines how caching of Internet content can deliver a quality learning experience:



In another case, a teacher assigns a project to a group of students to create a video diary. This locally created content is prepared, categorized, and stored on the school's network via a local server. When other students or a teacher wishes to access the content, it can be delivered over the school's internal network to multiple locations and even screen types (*e.g.*, smart boards, mobile devices, or televisions). The following graphic illustrates how locally created

content can be delivered across a local network using video caching technology:



In both of the examples above, the same infrastructure is used to enable local storage and delivery of content. Thus, schools and libraries will realize greater cost savings by leveraging common infrastructure.

There are three major components of a caching infrastructure: media processing, media delivery, and media access. Within each component are the following features:

- Media processing:
  - Ingest and capture of "live" media content;
  - Media optimized storage;
  - Video optimized caching and storage including but not limited to Transparent Internet Caching ("TIC") for external (*i.e.*, Internet) content as well as Content Delivery Network ("CDN") capability for local created and distributed content;
  - Just-in-time transcoding to transform live video content as well as file based content to various required formats across multiple devices;
  - Adaptive bit rate ("ABR") packaging for preparing content for delivery;
  - Digital Rights Management/Encryption;
  - Wi-Fi video optimization;

- Content Workflow Management systems to manage, process, and transform content and metadata, enabling automated processing and distribution of media; and
- Post product tools to prepare media for end user use.

- Media delivery:

  - Multiprotocol media aware CDN;
  - TIC for efficient media distribution;
  - Analytics and reporting;
  - HTTP and other streaming capability;
  - Policy control and enforcement; and
  - Dynamic site acceleration.

- Media access including:

  - Client portal and user experience to access media;
  - Subscriber management to control and regulate access to media;
  - Media catalogue capability;
  - AV pipe resource engine;
  - Content rights management;
  - Analytics and reporting; and
  - Management portal for configuring and controlling client portal.

III. Microwave Technology Offers a Highly Reliable and Efficient Solution For Connecting Buildings on a School Campus.

The *Draft ESL* notes that Category Two connections are limited to broadband connections for educational services "within, between or among instructional buildings that comprise a school campus or library branch."[7] It lists access points used in a wireless LAN environment and wireless LAN controllers as eligible for Category Two funding. Ericsson would like to highlight that wireless fiber (microwave) can be used to connect buildings on a campus, and wants to ensure that the Commission allows schools and libraries to make use of this technology for campus-wide connections.

[7] *Draft ESL* at Attachment p. 4.

School campuses require affordable, efficient, and reliable transport networks to support distance learning (including video streaming), general communications, and the IT needs of staff and students. These systems also help ensure that campus security operations run flawlessly. Although fiber is available in some settings, wireless fiber can be a more cost-effective and scalable solution to accommodate campus and curriculum growth.

Wireless fiber within a school campus can be deployed quickly (setup time can be as short as two weeks) and is simple for a school's IT department to manage. The total cost of ownership for wireless fiber—particularly in areas without ready access to OC-3 or multiple T-1 circuits—can be more cost effective than traditional solutions. Wireless fiber is engineered for "six 9s" reliability in diverse conditions, and is built to scale quickly. Bandwidth can be increased from 25 Mbps per radio to up to 2 Gbps, and this reprovisioning of capacity can be handled remotely.

The technology is proven and was used recently to restore service to a school after Hurricane Sandy hit in 2012. Deployed in conjunction with a cable provider, Ericsson was able to discretely (an antenna was installed behind an internal building window) restore connectivity within a school campus quickly and reliably.

We therefore request that the Bureau clarify that the Category Two service allow for microwave technology to be listed as an eligible service for connections among instructional buildings on a school campus or library branch.

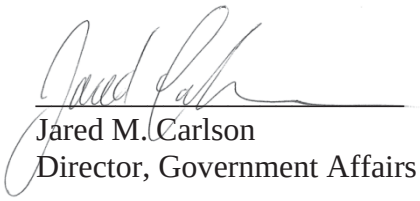
IV. Conclusion

When a video infrastructure is deployed within schools and libraries, it creates a platform to support both current use cases and as yet unimagined services. Innovative wireless technologies, such as wireless fiber, can deliver reliable and efficient connections within a

campus even in challenging rural environments. Ericsson, as a leading infrastructure and solutions provider, has the building blocks necessary to help schools and libraries realize the greatest benefits to teachers, students, librarians, and administrators.

Respectfully submitted,

ERICSSON

By: 

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September 18, 2014