Comments of

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In the Matter of

Modernizing the E-rate Program for Schools and Libraries

WC Docket No. 13-184

September 16, 2013

In the 1996 Telecommunications Act, Congress created a cluster of Universal Service Programs to ensure that schools, libraries, high-cost areas and the poorest Americans are connected to the telecommunications networks. As those networks have been transformed by technological change, those subsidy programs have become increasingly disconnected from the reality of modern communications technologies. The Commission's Notice of Proposed Rulemaking on modernizing E-rate marks the next administrative step towards crafting a new framework for the USF program.

No one doubts the need for modernization, but sensible modernization requires ensuring that taxpayer dollars are used efficiently to achieve clearly conceived and effective goals. In particular, that means rigorously justifying any bandwidth "targets" in terms of actual needs, pedagogical efficacy, and tradeoffs.

Key Recommendations

- **Leave broadband speeds to the marketplace**: The FCC has not justified the ambitious, and expensive, bandwidth targets proposed in the NPRM. The FCC should ***collect more data and carefully consider it before setting any minimum bandwidth levels***.
- **Avoid perverse incentives and concentrated disbursements**: Institutions that receive larger discounts have less incentive to spend their dollars efficiently. For example, a school receiving a 90% discount pays only $1 for each $9 it receives from the E-rate program. This disparity has historically led to schools with a 90% discount requesting about twice as much from E-rate as schools receiving up to a 79% discount. When schools have little skin in the game, they are prone to request much more than they need and to spend it carelessly, which means other schools may receive little or no subsidies. The FCC should ***focus on facilitating basic broadband connectivity at schools and libraries*** by better spending existing E-rate funds to ensure broader distribution where funds are most needed. The Commission should avoid aiming for grandiose, arbitrary speed or bandwidth targets that do not actually reflect the needs of schools and libraries and would likely further centralize disbursements.
- **Maintain transparency and accountability**: There is currently no mechanism to monitor how schools and libraries use their funding, nor whether the disbursed funds are connected to desirable educational outcomes. The FCC should ***require E-rate recipients to publicly report exactly how they are using their funding*** so taxpayers and the Commission can curb waste, fraud and abuse in the program. The FCC

should itself ***undertake to assess the empirical connection between its E-rate program design and educational outcomes*** and it should use this data to determine the optimal program structure, permitting recipients to use funds to achieve the best possible outcomes rather than to comply with arbitrary program targets.

● **Re-prioritize technologies**: E-rate still prioritizes traditional telephone services, even paging, ahead of broadband connectivity for classrooms. The fact that Priority Two services are fulfilled only after Priority One funds are dispersed means that 80% of requests for actually bringing broadband into classrooms are denied. The FCC should ***adjust the E-rate program so that it no longer funds traditional landline telephone service or other obsolete technologies***, and instead focuses on connecting students to the Internet via broadband connections, which can more cheaply deliver Internet-based services like VoIP telephony. It should also ***collapse the Priority One/Priority Two distinction***. Bottlenecks and architecture limitations are as or more likely to arise on internal networks as on external ones. Schools and libraries should be able to use E-rate funds to support infrastructure improvements wherever they are most cost effective.

Broadband Speeds Should Be Left to the Marketplace

Shifting E-rate's focus away from outdated telecommunications technologies to broadband makes sense. But focusing E-rate funding on essentially arbitrary speed targets does not. Meeting those targets means dictating to schools and libraries that they should spend limited resources on broadband connections that they may not actually need or use, rather than address their real technological needs. The additional E-rate funding that would be necessary to meet these goals will come from imposing higher taxes (or so-called "user fees") on all Americans — a particularly regressive tax, paid by all users.

President Obama has declared that his ConnectED initiative would "within five years, connect 99 percent of America's students, through next-generation broadband [at speeds no less than 100Mbps and with a target of 1Gbps] to, and high-speed wireless within, their schools and libraries."[3] Commissioner Rosenworcel has proposed providing every school with access to 100 Megabits per 1000 students by 2015; by 2020, every school should

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[3] ConnectED: President Obama's Plan for Connecting All Schools to the Digital Age 1 (June 6, 2013), http://www.whitehouse.gov/sites/default/files/docs/connected_fact_sheet.pdf.

have access to 1 Gigabit per 1000 students.[4] The NPRM proposes "bandwidth targets" of "at least 100 Mbps per 1,000 students and staff (users) by the 2014-15 school year and at least 1 Gbps Internet access per 1,000 users by the 2017-18 school year"[5] and "a minimum of 1 Gbps Internet connectivity by 2020" for libraries.[6]

The NPRM cites only two sources for these numbers:

- The State Educational Technology Directors Association (SETDA) report, "The Broadband Imperative: Recommendation to Address K-12 Educational Infrastructure Needs," which the FCC cites as saying that, "in order to have sufficient broadband access for enhanced teaching and learning, K-12 schools will need Internet connections of at least 100 Mbps per 1,000 students and staff (users) by the 2014-15 school year and at least 1 Gbps Internet access per 1,000 users by the 2017-18 school year."[7]
- An ex parte with the Gates Foundation asserting that the State Library of Kansas has developed a broadband capacity tool that "recommends that all libraries have a minimum of 1 Gbps Internet connectivity by 2020."[8]

The "quantitative" support for SETDA's recommendations boils down to a single chart:[9]

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[4] Remarks of Commissioner Jessica Rosenworcel, Washington Education Technology Policy Summit 4 (Apr. 11, 2013), http://hraunfoss.fcc.gov/edocs_public/attachmatch/DOC-320122A1.pdf.

[5] Notice of Proposed Rulemaking, *In the Matter of Modernizing the E-rate Program for Schools and Libraries*, FCC 13-100, at ¶ 23 [hereinafter "NPRM"], *available at* http://transition.fcc.gov/Daily_Releases/Daily_Business/2013/db0723/FCC-13-100A1.pdf.

[6] *Id.* at ¶ 25.

[7] *Id.* at ¶¶22-23; report available at http://www.setda.org/web/guest/broadbandimperative.

[8] NPRM, at ¶ 25 & n.52.

[9] SETDA Report at 21.

Activity	Recommended Download speeds
Email and Web Browsing	500 Kbps[44]
Download a 1 MB digital book in 5.3 seconds	1.5 Mbps[45]
Online Learning	250 Kbps[46]
HD-quality Video Streaming	4 Mbps[47]
Skype Group-Video Session, 7+ people	8 Mbps[48]
Download a 6144 MB Movie in 8 minutes	100 Mbps[49]
Current Generation Multiple Choice Assessments	64 Kbps/student[50]

* Averages are indicated for single users

The Report asserts that "The increasing demands of preparing all students for college and careers will require additional bandwidth in many, if not most, K-12 districts in this country over the next few years" — and then arrives, without analysis, at the recommendation of 100 Mbps per 1,000 students/staff by 2014-15 and 1 Gbps by 2017-18.[10]

This isn't a sufficient basis for steering E-rate funds toward a particular speed level because neither the Report nor the NPRM:

- Assesses current or future *actual* broadband speed and bandwidth needs;
- Addresses the connection between broadband speed and desirable educational outcomes;
- Explains the trade-offs between spending more on funding wide area broadband connectivity at these levels and meeting other potential needs (like internal infrastructure improvements);
- Accounts for the cost effectiveness of this level of broadband in schools without a broader pedagogical plan to *make use of* high-speed broadband;
- Defends growing the size of the E-rate program, and thus raising taxes on all Americans; or
- Accounts for basic variations among school types, geographies, student bodies or the like.

Without any evidentiary support and without acknowledgement of these analytical lapses, there is no rational basis for basing distribution of E-rate funds on these arbitrary targets, and there is some reason to think that, even without the limitations suggested above, the

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[10] *Id.*

target may be too high. 100 Mbps/1000 students amounts to "an average of 100 Kbps per person or a download of 37.5 Mbytes for each one during a 50-minute period. Given that all students will not be on the Internet in every class for every day, that is a rather high estimate."[11]

Of course 100Mbps/1000 students *may* be appropriate. It may even be insufficient to meet future demand. But the FTC has cited no study, no data, no evidence to support those conclusions. We have no idea how schools are using these resources today, how they would use them if they were improved, nor what effect they would have on educational outcomes.

It's unlikely that there's one right mix for the entire country, that the FCC can design that mix today, or that it can expeditiously adjust the mix as technology changes. So rather than attempt to design the perfect digital connectivity program, the FCC should leave this up the administrators of schools and libraries themselves. Smarter subsidies would boost the buying power of the program's recipients, rather than try to steer their choices towards what technocrats in Washington, D.C. think is best.

Improving E-rate requires rational goals

The FCC's proposed speed targets are laudable goals, but what are they based on? Why not *2Gbps* per 1000 students in *2015*? Why is it better to spend limited E-rate funds reaching essentially arbitrary speed thresholds rather than on training teachers, subsidizing device purchases, promoting better digital, or any of the other things proposed by the Administration?

The E-rate modernization NPRM is slightly more agnostic about specific goals than the sources it cites. While beginning with the presumption that E-rate needs to be modernized — which certainly implicates broadband improvements of some sort — it refrains from pigeonholing "high-capacity broadband." Instead the NPRM notes that "[w]e use the term 'high-capacity broadband' in this NPRM to describe the evolving level of connectivity schools and libraries need as they increasingly adopt new, innovative digital learning

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[11] Harry Keller, *Is the LEAD Commission Right About Education Technology*, Educ. Tech. & Change Journal (Jun. 17, 2013), http://etcjournal.com/2013/06/17/is-the-lead-commission-right-about-education-technology/.

strategies."[12] While perhaps difficult to implement, the reference to an "evolving level of connectivity" is appropriate.

Unfortunately, the NPRM goes on to cite the SETDA benchmarks, as if they are empirically supported, framing its request for comments around these proposed standards rather than asking first *how* the FCC should determine what standards to promote.

Thus the NPRM states:

> We seek comment on adopting the SETDA target of ensuring that schools have 100 Mbps per 1,000 users increasing to 1 Gbps per 1,000 users. SETDA also recommends that a school within a district have Wide Area Network (WAN) connectivity to other schools within their district of at least 10 Gbps per 1,000 students and staff by 2017-2018. We also seek comment on adopting that target for WAN connectivity.

> More specifically, we seek comment on whether the SETDA targets are appropriate for all schools, or whether we should set some other minimum levels of broadband speed necessary to meet our proposed goal, and what those levels should be.

Instead of asking whether there might be any basis for limited *deviation* from the SETDA standards at *some schools*, the FCC should be asking what basic standards are appropriate in the first place.

Ironically, the FCC knows this to be the case. But it is only in the section on measurement (not goals) that the NPRM finally asks, "Is there a way to measure how success in the classroom is affected by access to E-rate funding or services supported by E-rate?"[13] One would think the FCC would want to know the answer to this *first*, before adopting goals that may or may not have any bearing on classroom success. And in the same paragraph the NPRM goes on to note that:

> A 2006 study by Austan Goolsbee and Jonathan Guryan found that E-rate support substantially increased the investment of some public schools in Internet and communications technologies, **but did not find a statistically significant effect on**

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[12] NPRM, at ¶ 1, n.2.

[13] *Id.* at ¶ 40.

student test scores. Have more recent studies suggested otherwise? We also seek comment on whether the Commission should adopt educational-outcome measurements. Is it appropriate for the Commission to do so, given that educational outcomes are outside the agency's core competence? Are there any legal or jurisdictional issues with doing so?[14]

The FCC should not adopt the SETDA goals unless and until it has collected evidence that these goals are appropriate. That specific speeds may facilitate measurement and provide an easy metric is no reason to adopt them; *any* specific targets would provide these benefits.

Although the NPRM and other commenters point out that broadband speeds and bandwidth alone are not the only relevant technological issues in ensuring connectivity, there seems to be very little (if any) understanding of where the real technological needs of schools and libraries lie.   We need to determine where, even in the technology infrastructure, resources are most needed. Before subsidizing significant spending on broadband access, we should ensure that institutions can take advantage of that access once they get it, and that there aren't more cost-effective means of improving connectivity. Among other things, we need to know:

- How many students at any given time will be using the Internet and for what purposes?
- What does typical usage look like and what does peak usage look like?
- How well are broadband usage limitations managed by the institution? Does it defer large data transfers until the middle of the night? Does it effectively manage network access?
- How much time must be spent actually downloading media?
- Can media be downloaded centrally and cached (*e.g.,* downloading the same textbook or educational video once)?
- How much does the institution's own LAN limit access? Is broadband access the most significant bottleneck?
- Does the institution use local servers and wired connections to maximize LAN efficiency?

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[14] *Id.* (emphasis added).

● How fast are the institution's wireless routers, and do they have enough routers to manage typical usage?

As one analyst suggested:

> How about a different approach. Put those bandwidth-intensive media on the school's server, either by licensing them from vendors or by caching them for reuse. If these files are available locally, then the Internet (wide-area network) speeds can be much lower. The internal (local-area network) speeds must be quite high, but that is true even without local storage.[15]

And importantly, for purposes of ensuring institutions have a "21st Century broadband that supports digital learning," considerably more than WAN speed is essential, and many institutions would benefit most from support for the purchase of products and services like servers, firewalls, and video equipment that does not contribute directly to broadband speeds or bandwidth.[16] An effective E-rate program should take account of these needs and incorporate a better understanding of their importance in its program design.

(Or perhaps the FCC don't need to know these things. Rather, program recipients are likely to know better than the FCC where resources are most needed, and thus the FCC should ask potential recipients to assess their own needs, and E-rate subsidies should be tied to their determinations.)

Commissioner Rosenworcel does recognize that data is important to "tracking our progress," but she has it backward. Instead of starting with the data to determine appropriate goals for the program, she recommends *starting* with unsupported goals and then collecting data as a tool for supporting her specific goals. Commissioner Rosenworcel notes:

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[15] Harry Keller, *Broadband for Schools: Do We Need Gbps Bandwidth?*, Educ. Tech. & Change Journal (Aug. 3, 2013), http://etcjournal.com/2013/08/03/broadband-for-schools-do-we-need-gbps-bandwidth/.

[16] The Eligible Services List contemplates support for these, of course, but because Priority 2 products and services are lower priority, funding for these is much harder to come by. *See* Schools and Libraries Universal Service Support Mechanism Eligible Services List for Funding Year 2012, http://www.usac.org/_res/documents/sl/pdf/ESL_archive/EligibleServicesList-2012.pdf.

Here's what I propose. By the 2015 school year, every school should have access to 100 Megabits per 1000 students. Before the end of the decade, every school should have access to 1 Gigabit per 1000 students. Libraries, too, will need access on par with these capacity goals. I think Gigabit to anchor institutions like schools and libraries is the ticket to Gigabit cities, and the ticket to digital education and economic growth.

But to reach these capacity goals we also need more data collection. That is why I propose that we update our E-rate forms. Going forward, every E-rate application should collect information from applicants about their existing capacity and projected needs. Armed with clear data about what schools and libraries are using, we can track our progress. We can better understand what is needed and where. That way we can steer this program more effectively toward the capacity goals we establish.[17]

There can be little doubt that what that means is tracking progress in an effort to build support for more funding to reach specific goals rather than to influence which goals are appropriate in the first place.

Even the National Broadband Plan recognizes the importance of a "data first" approach:

Minimum service goals for schools and libraries should not be set based on speed and quality of service alone. Factors including the number of peak active users as well as the type and quantity of broadband services consumed should be factored into defining these minimum service goals.

Some schools and libraries need help making the transition to broadband. Data from the Universal Service Administrative Company (USAC) funding year 2009 show the E-rate program, received at least 200 requests for funding for dial-up access to the Internet. The FCC should investigate the reasons behind those funding requests. For example, the FCC should explore whether those schools and libraries lack access to the physical infrastructure necessary for broadband, whether it is simply

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[17] Remarks of Commissioner Jessica Rosenworcel, Washington Education Technology Policy Summit 4 (Apr. 11, 2013), http://hraunfoss.fcc.gov/edocs_public/attachmatch/DOC-320122A1.pdf.

an issue of funding and/or whether they lack the other resources, such as hardware, to make the best use of faster connectivity speeds.[18]

The E-rate program should follow this course and seek data first.

Lack of Data on Educational Impact

The FCC itself recognizes the lack of data on the question of education impact measurements. In paragraph 40 of the NPRM, as noted above, the FCC cites to a 2006 study by Austan Goolsbee and Jonathan Guryan, which found that, while E-rate support substantially increased the investment of some public schools in Internet and communications technologies, there was not a statistically significant effect on student test scores.[19]

Perhaps in recognition of the paucity of supportive data, the President's ConnectED proposal points to three anecdotes, including this one from Mooresville, North Carolina:

> The Mooresville Graded School District distributes one device per student (grades 3-12) and uses predominantly digital curriculum content. All teachers are trained on how to integrate technology into their teaching. Since beginning the shift to greater use of technology, learning in Mooresville has changed... In the classroom, students now collaborate in small groups rather than listening to lectures. They are using individualized software that functions like a personal tutor, adapting to their pace of learning. Teachers receive immediate feedback on students' progress and can better direct their lessons and their teaching to meet each student's needs... There has been strong evidence of success in Mooresville. The district's graduation rate was 91 percent in 2011, up from 80 percent in 2008.[20]

While the success of Mooresville is laudable, it is very difficult to determine how much of the improvement in graduation rates was due to technology investments. Graduation rates

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[18] *Chapter 11: Education*, National Broadband Plan: Connecting America, *available at* http://www.broadband.gov/plan/11-education/#r11-15.

[19] Austan Goolsbee & Jonathan Guryan, *The Impact of Internet Subsidies in Public Schools*, 88 Rev. of Econ. & Statistics 336 (April 2005), *available at* http://faculty.chicagobooth.edu/austan.goolsbee/research/erate.pdf.

[20] ConnectED, *supra* note 3, at 4.

improved statewide from 70% to 83% between 2008 and 2013.[21] Over the same time period, Mooresville's graduation rates improved from 80% to 93% — almost perfectly in line with the statewide trend.[22]

As one analysis of the "Mooresville Miracle" notes,

> In addition to ditching pencils for keyboards, the district made dramatic adjustments to other central elements, including instruction, management, data-use, and professional development. What's more, Mooresville Superintendent Mark Edwards vows that a critical aspect of the conversion lies in the team-oriented culture and shared vision he has been able to establish among faculty, staff, students, and the community. As Edwards explains, "If the focus is on the devices, it's misunderstood."[23]

Considerably more than merely expanded bandwidth or increased speed is necessary to improve educational outcomes.

The point is this: the FCC should make sure to gather and analyze sufficient data on this question *before* specifying targets and increasing E-rate funding.

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[21] *Cf.* http://accrpt.ncpublicschools.org/app/2008/cgr/ with http://accrpt.ncpublicschools.org/app/2013/cgr/.

[22] *Cf.* http://accrpt.ncpublicschools.org/app/2008/cgr/ with http://accrpt.ncpublicschools.org/app/2013/cgr/.

[23] Taryn Hochleitner, Obama's ConnectED won't guarantee Mooresville miracle for all, AEI (June 14, 2013), *available at* http://www.aei-ideas.org/2013/06/obamas-connected-wont-guarantee-mooresville-miracle-for-all/.