



NEW AMERICA
FOUNDATION

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Issue Memo:

**No Child Left Unconnected:
*Unlicensed Spectrum Use in K-12 Schools***

Summary: Unlicensed spectrum serves a crucial role in bringing broadband Internet to public schools across the country. This is especially true for large, urban schools with higher percentages of economically disadvantaged and minority students. Unlicensed wireless networks have been a crucial technology to help these schools bridge the digital divide.

Background:

- **Wireless connections are especially important to the more than 90,000 public schools in the U.S. because:**
 - Students from economically disadvantaged families -- African American and Spanish speaking families in particular -- are likely to only have access to computers and the Internet at school.¹
 - Poorer schools and urban schools are more likely to rely on wireless broadband Internet than wealthier, suburban schools who are more likely to have wired connections.²
 - Twenty-three percent of public schools with Internet access used wireless Internet connections in 2002 – approximately 20,000 public schools.
 - As schools grow and construct trailer classrooms, the fastest and least expensive way to connect temporary, mobile classrooms to the Internet is with unlicensed wireless connections.
 - Schools are beginning to rely on unlicensed wireless for internal safety and security communications – walkie-talkies, VoWLAN phones, and security cameras.³

Unlicensed Spectrum Serves a Vital Role in Our Nation's Most Disadvantaged Schools

Recent Statistics:

- In 2002 approximately 20,000 public schools in the United States used wireless technologies to provide or distribute access within schools.⁴

¹ *Internet Access in U.S. Public Schools and Classrooms: 1994–2002*, U.S. Department of Education, October 2003
<http://nces.ed.gov/pubs2004/2004011.pdf>

² *Ibid.*

³ http://www.businesssolutionsmag.com/Articles/2003_09/030911.htm

⁴ *Internet Access in U.S. Public Schools and Classrooms: 1994–2002*, U.S. Department of Education, October 2003
<http://nces.ed.gov/pubs2004/2004011.pdf>

- Large schools were more likely than medium-sized and small schools to use wireless Internet connections (37 percent compared with 23 percent and 17 percent, respectively).⁵
- Of the schools using wireless Internet connections, 88 percent indicated that they used broadband wireless Internet connections.⁶
- In 2002, 15 percent of all public school instructional rooms had wireless Internet connections.⁷
- Schools in urban areas with economically poorer student bodies and higher percentages of minorities are more likely to rely on unlicensed spectrum for their broadband Internet access.⁸
- In 2002, 100% of all “City” schools with Internet connections used wireless broadband connections.⁹

A sampling of just a few of the 20,000 public schools in the U.S. that rely on unlicensed spectrum for broadband Internet access:

Battle Creek Michigan Schools, Michigan

http://www.cisco.com/warp/public/cc/pd/witc/ao340ap/profiles/battl_cp.htm

- Broadband Wireless Internet access to five middle schools in Battle Creek School System in Michigan.

Calhoun County High School, South Carolina

http://www.cisco.com/warp/public/cc/pd/witc/ao340ap/profiles/calho_cp.htm

- Calhoun County High School and John Ford Middle School in St. Matthews, South Carolina – 900 students now have wireless access in their class rooms

Cincinnati Country Day School, Ohio

http://www.cisco.com/warp/public/cc/pd/witc/ao340ap/prodlit/cinci_cp.htm

- Cincinnati Country Day School installed unlicensed wireless access points for 550 students in grades 5-12 and 100 teachers.

Wake County Public School System, North Carolina

http://www.cisco.com/warp/public/cc/general/profile/wakec_cp.htm

- Uses unlicensed wireless spectrum to connect the 525 mobile classrooms in the school system to the Internet

Union Endicott School District, New York

http://www.cisco.com/warp/public/cc/pd/witc/ao340ap/profiles/union_cp.htm

⁵ *Ibid.*

⁶ *Ibid.*

⁷ *Internet Access in U.S. Public Schools and Classrooms: 1994–2002*, U.S. Department of Education, October 2003 <http://nces.ed.gov/pubs2004/2004011.pdf>

⁸ See “Emerging Technology Report: A Guide to Wireless LANs in K-12 Schools,” Consortium for School Networking, November 2003. Available at: http://www.cosn.org/emerging_technologies/press_110403.html. As this report suggests, unlicensed WLANs offer great economic value to poorer schools without existing or pervasive wired infrastructure, providing economically disadvantaged students with what is most likely their only Internet access.

⁹ *Internet Access in U.S. Public Schools and Classrooms: 1994–2002*, U.S. Department of Education, October 2003 <http://nces.ed.gov/pubs2004/2004011.pdf>

- An unlicensed spectrum wireless network that connects six elementary schools, an administration building, the local high school, a middle school, and a bus garage.

Independence High School, San Jose, California,

<http://www.oblivion.net/forums/viewtopic.php?t=128>

- An unlicensed wireless network was installed and sophomores were assigned laptops to use for the school year... "It really has expanded the amount of time they really can be learning," said Principal Cari Vaeth. "The work they're doing is in greater depth and has involved more critical thinking and research."

Douglas County School System

http://www.wcai.com/pdf/2003/p_naviniJuly8b.pdf

- "The Navini-based wireless network will be used to give Douglas County families at-home access to individualized instructional programming, diagnostic and skills-building tools, school based email accounts, parent-teacher communications and a school-filtered Internet portal according to Derek Welch, chief technology officer, Douglas County Schools."

York County School System, York, Pennsylvania

<http://www.alvarion-usa.com/RunTime/Materials/KnowledgePoolFiles/York%20PA%20temp.pdf>

- School administrators and municipal leaders connected **forty area schools** and other organizations to Internet services at broadband speeds of 10Mbps or more, with an immediate savings at each location on the order of 50% over leased line services.

Additional School Districts with Notable Unlicensed W-LAN Usage:¹⁰

- Kearney Public Schools in Nebraska
- Clark County School District in Georgia
- Amarillo Independent School District in Texas
- Cache County School District in Utah
- Hampton City Schools in Virginia
- Poway Unified School District in California
- Henry County Public Schools in Virginia
- Westside Community Schools in Nebraska

¹⁰ As reported in "Emerging Technologies Report: A Guide to Wireless LANs in K-12 Schools," November 2003. http://www.cosn.org/emerging_technologies/press_110403.html. *Also see* http://www.cosn.org/emerging_technologies/wireless.html