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CAN SCHOOLS USE NANOTECHNOLOGY TO PREVENT CELL PHONES FROM RINGING?

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Introduction

Not only have cell phones become a major part of our lives, but they have presented new problems for school administrators who must combat students using their phones to cheat and distract themselves during class.¹ The problem has grown so much that some school districts, like New York City, have completely banned cell phones from school premises.² As a result of criticism directed at the all out ban policies, some school districts have reconsidered and are moving toward allowing cell phone possession.³ Nonetheless, allowing cell phone possession has not alleviated the challenges presented to school administrators.⁴ Teachers report that they feel as if they are “cell phone cops” rather than educators.⁵ Educators frequently confiscate cell phones for improper use⁶ and risk exposing schools to liability if an educator should mishandle the phone.⁷

Some school administrators are considering turning to technology to partially solve their dilemma.⁸ School administrators and other members of the public are thinking about utilizing

¹ Matt Richtel, *Schools Relax Cellphone Bans, Nodding to Trend*, N.Y. TIMES, Sept. 29, 2004, available at <http://www.nytimes.com/2004/09/29/national/29cellphone.html>.

² See *Price v. New York City Bd. of Educ.*, 51 A.D.3d 277 (N.Y. App. Div. 2008).

³ Ellen R. DeLisio, *Crafting a Workable Cell Phone Policy*, EDUC. WORLD, June 9, 2007, http://www.education-world.com/a_admin/admin/admin393.shtml.

⁴ Anna Scott, *Student Cell Phones Ring in Debate in Fla.*, THE LEDGER (Lakeland, Fla.), Apr. 29, 2007, available at <http://www.theledger.com/apps/pbcs.dll/article?AID=/20070429/NEWS/704290430/1039>.

⁵ *Id.*

⁶ Richtel, *supra* note 1.

⁷ For a discussion of constitutional issues behind cell phone confiscation, see E-Brief 2: Unreasonableness of Searching Student Cell Phone Contents.

⁸ Jon Van, *New Technology Could Block Cell Phone Calls*, FSVIEW & FLORIDA FLAMBEAU (Fla. State. Univ.), Mar. 30, 2006, available at <http://media.www.fsunews.com/media/storage/paper920/news/2006/03/30/Lifestyles/New-Technology.Could.Block.Cell.Phone.Calls-2354286.shtml>.

jamming devices and new developments in nanotechnology to prevent cell phone signals from entering the building.⁹ However, school administrators should exercise caution before implementing some of these control mechanisms. The Federal Communications Commission (FCC)¹⁰ specifically regulates some of these devices, while it is unclear if nanotechnology is regulated. A battle over FCC regulations of nanotechnology is being waged between nanotechnology developers and the cell phone industry.¹¹ This article will explore the application of nanotechnology to FCC regulations.

I. Cell Phone Jamming Devices Are Not a Possibility

Before using jamming devices to prevent student communication, administrators and teachers should consider the potential penalties. A cell phone works by communicating with a mobile phone tower.¹² A jammer operates by emitting a frequency that will “collide and then cancel” the cell phone signal out, thus preventing cell phone communication.¹³

In the past decade, jamming devices have become very popular throughout the world.¹⁴ For example, in 2001 Canadian officials invited public comment on whether cell phone jammers should be legalized.¹⁵ Also, Japan allows jamming devices as does India which has installed them in their government buildings to prevent cell phones from constantly ringing.¹⁶

⁹ Sam Lubell, *Block that Ring Tone!*, N.Y. TIMES, Apr., 8, 2004, available at <http://www.nytimes.com/2004/04/08/technology/block-that-ring-tone.html>.

¹⁰ “The FCC was established by the Communications Act of 1934 and is charged with regulating interstate and international communications by radio, television, wire, satellite and cable.” Fed. Commc’ns Commission, About the FCC, <http://www.fcc.gov/aboutus.html> (last visited Oct. 31, 2008).

¹¹ *Blocking System for Cell Phones, Pagers Being Developed*, CHICAGO TRIBUNE, Feb. 28, 2006, available at <http://www.tmcnet.com/viewette.aspx?u=http%3a%2f%2fwww.tmcnet.com%2fusubmit%2f2006%2f02%2f28%2f1417944.htm&kw=3> [hereinafter *Blocking System*]

¹² S. Robert Carter, III, *The Sound of Silence: Why and How the FCC Should Permit Private Property Owners to Jam Cell Phones*, 28 RUTGERS COMPUTER & TECH. L.J. 343, 349 (2002).

¹³ *Id.*

¹⁴ Bruce Stewart, *Technology for Blocking Wireless Signals Spreads*, CNN.COM, Mar. 19, 2001, <http://archives.cnn.com/2001/TECH/industry/03/19/blocking.wireless.idg>.

¹⁵ *Id.*

¹⁶ *Id.*

Although jammer popularity is growing in the United States, it remains illegal except for government use.¹⁷ Despite the illegality of jamming devices, American citizens and businesses have purchased these devices to block cell phone calls.¹⁸ One foreign producer of jammers even admitted that his largest client base was in the United States.¹⁹ When the popularity of these devices rose, the FCC issued a public notice reaffirming their position on jamming devices.²⁰ In 2005, the Commission issued a public notice declaring that these jammers fell under the Communications Act of 1934 which states that it is “unlawful for any person to willfully or maliciously interfere with the radio communications of any station licensed or authorized under the Act or operated by the U.S. Government.”²¹ The Commission specifically named “cellular jammers” and “cell phone jammers” as devices that violate the statute.²² Noncompliance with the statute carries severe penalties even for first time offenders including criminal prosecution and fines up to \$11,000 per offense.²³ Teachers and administrators should be discouraged from using these devices because of the clear statutory prohibition and the unforgiving stance the FCC takes against cell phone jammers.

II. Nanotechnology, a Legal Option

A. What Is Nanotechnology?

Nanotechnology is the “emerging science of harnessing submicroscopic organisms for everyday uses.”²⁴ Nanotechnology is used in a variety of products including sunscreens and

¹⁷ *Id.*

¹⁸ Lubell, *supra* note 9.

¹⁹ *Id.*

²⁰ Public Notice: Sale or Use of Transmitters Designed to Prevent, Jam or Interfere with Cell Phone Communications Is Prohibited in the United States, 20 F.C.C.R. 11134, 2005 WL 1505985 (June 27, 2005).

²¹ *Id.* (citing 47 U.S.C.A. § 333).

²² *Id.*

²³ *Id.* (citing 47 U.S.C.A. § 501-510).

²⁴ *Blocking System, supra* note 11.

pesticides.²⁵ It is even responsible for stain-proof pants and the cultured diamond.²⁶

Nanotechnology is currently breaking into the cell phone industry.²⁷ A company, NaturalNano has found a way to incorporate nanotechnology into paint which when applied will block radio signals.²⁸ This call-free zone is accomplished by using nanotubes which are mined from halloysite clay.²⁹ The company is able to fill the molecular size tubes with copper, combine it with paint, and apply it to a surface.³⁰ In combination with a “radio-filtering device” the paint acts to filter different types of radio signals from entering the space protected by the paint.³¹

The legality of nanotechnology is currently being debated by the cell phone industry and the creators of nanotechnology and businesses who wish to use it in their establishments.³² The Wireless Association argues that “any scheme to selectively block calls is illegal.”³³ Conversely, the creators of the shield and filtering device argue that it is not illegal under the FCC’s regulations because it does not qualify as an active cell phone jammer.³⁴ Who is correct? Should nanotechnology fall under the FCC regulations? A review of the purpose of the FCC’s regulations suggests that nanotechnology is not what the FCC intended to control.

B. Nanotechnology Does Not Have a “Spill-over” Effect

One concern presented by jammers is the possibility of “spill over.”³⁵ Jammers emit a signal which prevents individuals from using their cell phones.³⁶ Although intended to only

²⁵ Kevin Maney, *Nanotechnology’s Everywhere*, May 31, 2005, USA TODAY, available at http://www.usatoday.com/money/industries/technology/maney/2005-05-31-nanotech_x.htm.

²⁶ *Id.*

²⁷ *Id.*

²⁸ *Blocking System*, *supra* note 11.

²⁹ *Id.*

³⁰ *Id.*

³¹ *Id.*

³² *Id.*

³³ *Id.*

³⁴ *Id.*

³⁵ Carter, *supra* note 12, at 364.

³⁶ *See id.*

reach a certain distance, these signals may “spill over” into an unintended area.³⁷ Small jammers can reach up to thirty feet while larger jammers can reach up to 100 feet.³⁸ However these distances are not precise.³⁹ The FCC was particularly concerned that these devices would present problems for people who accidentally ending up in a “spill-over” area.⁴⁰ The FCC wanted people to be able to make ordinary phone calls as well as calls in case of an emergency.⁴¹

Because of the difference in mechanics,⁴² nanotechnology does not present the same spill over effect.⁴³ Rather than emitting a signal outward without a barrier, nanotechnology paint creates a built-in barrier.⁴⁴ With nanotechnology, there would seemingly be no “spill-over” effect and therefore the intended cell-free zone would be contained.

C. Nanotechnology Does Not Have the Emergency Concerns of Jammers

Unlike cell phone jammers, nanotechnology radio filters can discriminate between which signals are blocked and which signals can come into the building.⁴⁵ Therefore, all emergency radio communications could pass through the building.⁴⁶

However, some school parents and students are concerned about being unable to use their cell phones in case of an emergency to call for help.⁴⁷ This problem could possibly be solved in two ways: through the technology itself or through the use of other devices. First, NaturalNano, a nanotechnology company which developed the blocking paint, claims that they are able to shut

³⁷ *Id.*

³⁸ *See id.*; David S. Bennahum, *Hope You Like Jamming, Too*, Dec. 5, 2003, WASHINGTONPOST.NEWSWEEK INTERACTIVE CO., <http://www.slate.com/id/2092059>.

³⁹ *Id.*

⁴⁰ Carter, *supra* note 12, at 364.

⁴¹ *Id.*

⁴² The mechanics of nanotechnology were explained *supra*.

⁴³ *Blocking System*, *supra* note 11.

⁴⁴ *See id.*; Carter, *supra* note 12.

⁴⁵ *Blocking System*, *supra* note 11.

⁴⁶ *Id.*

⁴⁷ National School Safety and Security Services, http://www.schoolsecurity.org/trends/cell_phones.html. (last visited Sept 25, 2008).

down the system for scenarios like an intermission for a play.⁴⁸ If their technology can be shut down easily during intermission, then a system could probably also be shut down if it was necessary to use the cell phones in the building. Second, other technological equipment could be installed in the classrooms and other school areas where students could be trapped during an emergency. Things like land line telephones and emergency buttons, similar to those used banks or on alarm systems could be activated that immediately inform authorities in the event of an emergency. These options, and particularly land line phones, would require a small expense compared to the overall benefit nanotechnology could provide for a school environment.

D. Nanotechnology Is Not Property Theft

In addition to the emergency and spill-over concerns raised by opponents of jammers, there are also property right concerns.⁴⁹ During the early nineties, the FCC claimed that the commercial enterprises controlling cell phone signals had a property interest in the radio waves.⁵⁰ The FCC concluded that jammers would effectively take away the ability for radio waves carrying the cell signal to pass through and therefore deprive these companies of their purchased property interest.⁵¹

However, this argument should fail when applied to the capabilities of nanotechnology in schools. Jamming via nanotechnology is no more destructive of the property rights of commercial enterprises than most schools current cell phone policies. Several schools ban talking on cell phones during class.⁵² Nanotechnology is just a tool for schools to utilize in enforcing their policies by disallowing cell phone use in the classroom. An argument favoring a company's right to have students be able to use their cell phones during a time designated for

⁴⁸ *Blocking System, supra* note 11.

⁴⁹ Bennaham, *supra* note 38.

⁵⁰ *Id.*

⁵¹ *Id.*

⁵² *See DeLisio, supra* note 2.

their education lacks force. Perhaps this argument would have more weight in a more public venue, but because of the “passive” characteristics of nanotechnology discussed it would most likely fail in a non-educational environment as well.

E. Nanotechnology Is More Comparable to Other Forms of “Passive” Technologies

In addition to nanotechnology not meeting the policy concerns of the FCC, it also should fall within the realm of construction techniques that have not been regulated by the FCC.

Architectural techniques were presented as an alternative to cell phone jammers near the beginning of the millennium when cell phone jammers began to gain popularity.⁵³ Deterred by the potential penalties for using illegal jamming devices, companies turned to architectural techniques like embedding copper wire mesh into walls when constructing new buildings.⁵⁴

Architects also used metal shielding into order to block cell phone calls from coming in which is legal because it is a way to passively block as opposed to actively interfering with radio signals.⁵⁵

Nanotechnology should not only fall within in this category, but should be considered a better option than other forms of passive devices. If the FCC has chosen not to regulate the permanent, passive structures which can not be turned on or off, then a passive structure such as nanotechnology that can alter the types of signals it filters presents an even safer alternative to active blocking devices.⁵⁶ Nanotechnology presents a temporary option as well as one that can be applied to existing buildings through the paint medium.⁵⁷

⁵³ Carter, *supra* note 12, at 360.

⁵⁴ *Id.* at 361.

⁵⁵ *Id.*

⁵⁶ *See supra* Part II.A.

⁵⁷ *Id.*

III. Future Regulations for Nanotechnology

Nanotechnology should be considered in the passive category and therefore a legal means to block cell phone signals in the United States. However, the FCC should take action to state clearly the Commission's opinion on the technology. Even though individuals may assume the technology is legal, the FCC should make an official ruling now. Predicted to be this generation's plastic, nanotechnology is booming.⁵⁸ As of 2005, 3800 nanotechnology patents have been issued and 1777 patents are currently pending.⁵⁹ The FCC should take steps to reexamine current policies and consider if regulation is in the public's interest. As nanotechnology becomes fully marketable for cell phone blocking, it is safe to assume that school administrators will turn to this a means to prevent cell phone communications between students.⁶⁰ Therefore the time has arrived, for the FCC to take a stand on nanotechnology.

Conclusion

Nanotechnology presents a cost-effective solution to cell phone problems plaguing schools. Nanotechnology should not be regulated in the same manner as active cell phone jammers because of its controlled range, filtering system, and passive characteristics. Nanotechnology is no more than a twenty-first century innovation in the realm of architecture and building techniques. Schools should be able to utilize this technology in order to provide a better educational environment for students. The FCC has not regulated passive devices in the past and should continue this tradition of restraint by refraining from including nanotechnology within their regulations.

⁵⁸ Maney, *supra* note 25.

⁵⁹ *Id.*

⁶⁰ See *Blocking System*, *supra* note 11.