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OVER AND OUT: EXAMINING HOW COGNITIVE RADIO WILL AFFECT FIRST AMENDMENT RESTRICTIONS ON BROADCAST MEDIA

I. INTRODUCTION

Freedom of speech is an inalienable right, deeply rooted in the United States Constitution.¹ Moreover, many consider free speech to be the driving force behind democracy.² The ability "[t]o debate and vote, to assemble and protest, to worship, to ensure justice for all . . . relies upon the unrestricted flow of speech and information."³

The First Amendment provides that "Congress shall make no law . . . abridging the freedom of speech, or of the press."⁴ This statement is somewhat misleading, however, because freedom of speech is not an absolute and unrestricted right.⁵ Under certain circumstances, the First Amendment may not protect speech, or even if speech is protected, the government may still regulate it.⁶ Speech is regulated according to the medium through which the communication is disseminated.⁷


² See id. (suggesting democracy is communication). “Freedom of speech and expression is the lifeblood of any democracy.” Id.

³ Id.

⁴ U.S. CONST. amend. I.

⁵ See DANIEL FARBER, THE FIRST AMENDMENT 1 (Foundation Press 1998) (2003) (noting "[a]lmost all of these few words are in some respect misleading," in part because First Amendment was never "unconditional absolute" without restrictions).

⁶ See id. (explaining First Amendment does not bar any governmental restriction on speech); see also STUART BIEGEL, BEYOND OUR CONTROL? CONFRONTING THE LIMITS OF OUR LEGAL SYSTEM IN THE AGE OF CYBERSPACE 328-38 (MIT Press 2001) (specifying ten types of unprotected speech: (1) obscenity; (2) child pornography; (3) fighting words; (4) incitement to imminent lawless conduct; (5) defamation; (6) invasion of privacy; (7) harassment; (8) true threats; (9) copyright infringement; (10) another recognized tort or crime).

The Federal Communications Commission ("FCC") regulates broadcast media. 8 It confers licenses on broadcasters and regulates "as public convenience, interest, or necessity requires," because the amount able to be broadcast over the airwaves is limited by the amount of spectrum available. 9 As a result, the government places heightened restrictions on broadcast media in order to ensure these communications are within the public interest. 10

First Amendment standards concerning broadcast media are distinct from those standards surrounding print media. 11 Print media is a virtually inexhaustible resource and can therefore be published in abundant quantities. 12 Heightened restrictions imposed on broadcast media are subject to lower standards of review than restrictions placed on print media. 13 As a result, the same restriction placed on broadcast and print media may be declared unconstitutional for print media, but upheld for broadcast media. 14

Nevertheless, the advent of new technology brings with it the ability to unshackle broadcast media from the current limits of spectrum scarcity. 15 "Cognitive radio" is the technology that can

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11. See Jonathan W. Emord, The First Amendment Invalidity of FCC Ownership Regulations, 38 Cath. U. L. Rev. 401, 433 (1989) ("Premised solely upon the supposedly limited nature of unusable [sic] spectrum, the Supreme Court has permitted federal governmental restraints upon the rights of broadcasters to communicate via the radio wave.").

12. See id. ("[T]he Supreme Court has permitted federal governmental restraints upon the rights of broadcasters to communicate via the radio wave[s] . . . By contrast [sic], the Court broadly prohibits governmental restraints on journalists' use of the print medium.").

13. See Ryan, supra note 7, at 836 ("Historically, regulations affecting the content of broadcast media have not been held to the strict scrutiny standard of review applicable to content-based regulations of print media.").

14. See id. (showing how differences in transmission medium affect regulations government may place on particular forms of speech).

make this possible. Cognitive radio technology uses software that allows a kind of "self-awareness," enabling it to identify available frequencies and quickly switch on and off of them to avoid interference. In fact, cognitive radio's utilization of digital signal processors will provide nearly limitless channels for broadcasting, resulting in "virtually infinite programmability." As a result of cognitive radio, heightened restrictions on First Amendment speech should no longer encumber broadcast media and rather, broadcast media should be subject to the same standard of review as print media when evaluating restrictions of free speech.

This Comment explores the effect cognitive radio could have on broadcasters' First Amendment rights. Specifically, this Comment describes various aspects of a cause action against the government, including: the allegation that heightened restrictions on

16. See Steven Ashley, Cognitive Radio: Smart Radios and Other New Wireless Devices Will Avoid Transmission Bottlenecks by Switching Instantly to Nearby Frequencies That They Sense are Clear, Sci. Am. Mag., Mar. 2006, at 66 (specifying cognitive radio is kind of technology that can "avoid transmission bottlenecks by switching instantly to nearby frequencies that . . . [it senses] . . . are clear"). "[C]ognitive radio technology should enable nearly any wireless system to locate and link to any locally available unused radio spectrum to best serve the consumer." Id.; see also Carlson & Baynes, supra note 15, at 607 (explaining cognitive radio has capability to provide much more efficient spectrum use).

17. See Ashley, supra note 16, at 66.

18. Introduction to Digital Signal Processing, http://www.dsptutor.freeuk.com/intro.htm (last visited Feb. 13, 2008) (defining digital signal processing as "the processing of signals by digital means . . . by performing numerical calculations"); see also Fette, General Dynamics Decision Systems: SDR Technology Implementation for the Cognitive Radio 5 (2003), ftp://ftp.fcc.gov/pub/Bureaus/Engineering_Technology/Documents/cognitive_radio/fcc_cognitive_radio_fette_v8.ppt. With software defined radios, such as cognitive radio, "[a]ll functions, modes and applications can be configured and reconfigured by software." Id. at 3. The digital processors used by software defined radios allow virtually unlimited programmability. See id. at 5; see also Digital Signal Processing, http://www.ieee-virtual-museum.org/collection/tech.php?aid+&id=2345887&lid=1 (last visited Feb. 12, 2008) ("[A]nalogue . . . signals are carried by continuously varying quantities, and digital . . . signals are restricted to a finite set of discrete values (often just two, symbolized by 0 and 1"). Furthermore, digital signals are often preferred to analog signals because, first, they "can be reproduced exactly," as long as "a zero doesn't get turned into a one or vice versa." Id. Second, because the digital signal is simply a sequence of zeros and ones, digital signals can be manipulated very easily. See id. By using digital signal processing, an individual is able to "filter out unwanted parts of the signal, such as noise[,] . . . build in error detection and error correction . . . make the signal longer . . . [so] . . . that any distortion of the signal during transmission or recording can be detected and corrected. . . . [and] . . . compress the signal, so that it can be transmitted more rapidly." Id.

19. See Ashley, supra note 16, at 66 (explaining why government can no longer justify heightened restrictions for broadcast media if airwaves no longer pose limitation).
broadcast media are unconstitutional;\textsuperscript{20} the standard of review;\textsuperscript{21} the arguments the claimant would assert in advocating the unconstitutionality of heightened First Amendment regulations;\textsuperscript{22} and the arguments the government would provide in support of heightened First Amendment regulations.\textsuperscript{23}

Section II presents the background for First Amendment rights surrounding broadcast and print media; the differences between these two forms of media; how the government treats them differently; and the nature of cognitive radio.\textsuperscript{24} Furthermore, Section II describes the requisite standing and standards of review applicable to a claim alleging the unconstitutionality of heightened restrictions on broadcast media.\textsuperscript{25}

Section III analyzes the effect cognitive radio could have on broadcasters' rights.\textsuperscript{26} It further applies First Amendment case law and regulations to a hypothetical First Amendment claim, detailing likely arguments from both parties and how a court might rule.\textsuperscript{27} Finally, Section IV concludes the Comment by suggesting that cognitive radio has the ability to transform the scarce broadcast media spectrum into a virtually limitless spectrum, making First Amendment rights surrounding broadcast media analogous to those surrounding print media.\textsuperscript{28}

\textsuperscript{20} For a further discussion of the cause of action, see \textit{infra} notes 134-37 and accompanying text.
\textsuperscript{21} For a further discussion of the standard of review, see \textit{infra} notes 138-41 and accompanying text.
\textsuperscript{22} For a further discussion of the claimant's arguments, see \textit{infra} notes 142-60 and accompanying text.
\textsuperscript{23} For a further discussion of the government's arguments, see \textit{infra} notes 161-72 and accompanying text.
\textsuperscript{24} For a further discussion on the background of First Amendment rights and cognitive radio, see \textit{infra} notes 29-68 and accompanying text.
\textsuperscript{25} For a further discussion on the background of a potential claim, see \textit{infra} notes 81-91 and accompanying text.
\textsuperscript{26} For a further discussion on the effect cognitive radio will have on broadcasters' rights, see \textit{infra} notes 92-127 and accompanying text.
\textsuperscript{27} For a further discussion and analysis of a hypothetical claim, see \textit{infra} notes 128-202 and accompanying text.
\textsuperscript{28} For a further discussion of cognitive radio's potential impact on First Amendment rights, see \textit{infra} notes 203-11 and accompanying text.
II. BACKGROUND

A. History of First Amendment Free Speech

Although ratified in 1791, the First Amendment began to receive significant judicial attention only a century ago. For the first half of the twentieth century, the test for regulating the First Amendment right to free speech was the “clear and present danger” standard. This meant that the government could only suppress speech if the speech in question created an immediate societal danger. During the late 1950s and early 1960s, however, the civil rights era began to blossom and so followed changes to the regulation of free speech. A more “protective attitude” toward free speech developed, particularly with regard to subversive speech. Since the 1960s, courts have continued to broaden the definition of free speech with increasingly more protective interpretations.

B. Governmental Regulation of Airwaves

Before 1927, no government-regulated means of allocating airwaves existed. Instead, “the allocation of frequencies was left entirely to the private sector, and the result was chaos.” Reflecting upon the disorganization and frequent interruption of broadcast signals, the government determined that broadcast frequencies represented a scarce resource requiring and warranting governmental regulation. Soon after, Congress enacted the Radio Act of 1927 and the Communications Act of 1934.

29. See Farber, supra note 5, at 1 (discussing First Amendment developments).
30. See id. (explaining clear and present danger standard was originally devised as justification for censorship during times of war, particularly World War I and World War II).
31. See id. (explaining "evolving judicial role" surrounding First Amendment).
32. See id. (describing progressive changes in court interpretations of First Amendment rights during Civil Rights movement).
33. See id. (specifying increased protection of First Amendment rights for "libel suits brought by public officials against the press . . . the publishers of erotic literature . . . civil rights demonstrators and anti-war protestors.")
34. See id. (explaining Court's interest in defining rules that govern speech cases, leading to First Amendment laws with complicated multipart tests resembling legal code).
36. Id. at 375.
37. See id. (explaining initial concern regarding need for regulation).
The Communications Act of 1934 created a system of free broadcast service and ordered communications facilities nationwide to be licensed in a "'fair, efficient, and equitable' manner." Further, it established and authorized the FCC to confer licenses on broadcasters and to regulate the broadcast spectrum as public "'convenience, interest, or necessity' requires." In Red Lion, the Court illustrated the nature of the "chaos" that gave rise to the FCC's regulations and allocation of airwaves. The Court explained that:

If 100 persons want broadcast licenses but there are only 10 frequencies to allocate, all of them may have the same 'right' to a license; but if there is to be any effective communication by radio, only a few can be licensed and the rest must be barred from the airwaves.

In order to divide the airwaves among its many users, the FCC assigns specific frequencies of the radio spectrum to the highest bidders. To better understand the FCC's means of allocating airwaves, imagine a large plot of land up for sale. Instead of selling this piece of land as a whole, it is broken down into many divisions, with each division auctioned off by the FCC to the highest bidder. Each airwave licensee "rents" a swatch of the spectrum and no other user may "trespass" on that licensee's swatch without permission.

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41. See id. at 375 (explaining potential problem of having more demand for broadcast transmissions than available airwave supply).
42. Id. at 388-89.
43. See Ashley, supra note 16, at 68, 71 (explaining how FCC allocates frequencies).
45. See Kim Hart, How to Sell the Airwaves?, WASH. POST, July 13, 2007, at D01, (explaining FCC's role in auctioning last remaining portions of spectrum).
46. See id. (describing how FCC auctions spectrum to licensees).
C. Differences in Print and Broadcast Media

For almost a century, courts have held that the nature of broadcast media is distinct from that of print media because the volume of disseminated broadcast transmissions is inherently limited by the amount of airwaves available, whereas print media has no such limitation. This limitation on broadcast transmissions results from "spectrum scarcity." Spectrum scarcity refers to the premise that broadcast transmissions travel over the airwaves, and because the airwaves are a finite resource, not all broadcasts may be transmitted simultaneously. As a result of this limitation, broadcast media is subject to more restrictions and a heightened standard of review.

In Nat'l Broad. Co. v. U.S., National Broadcasting Company ("NBC") and Columbia Broadcasting System ("CBS") sought to enjoin the enforcement of certain FCC broadcasting restrictions under the theory that these restrictions violated their First Amendment right to free speech. The Court, however, rejected the peti-


48. Emord, supra note 11, at 402.


50. See Emord, supra note 11, at 433 (specifying distinction in regulation among broadcast and print media is due to inherent limitation of broadcast transmission medium).

51. 319 U.S. 190 (1943).

52. See id. at 194 (defining FCC restrictions). The restrictions in question are as follows:

[T]he number of stations licensed to or affiliated with networks, and the amount of station time used or controlled by networks; the contractual rights and obligations of stations under their agreements with networks; the scope of network agreements containing exclusive affiliation provisions and restricting the network from affiliating with other stations in the same area; the rights and obligations of stations with respect to network advertisers; the nature of the program service rendered by stations licensed to networks; the policies of networks with respect to character of programs, diversification, and accommodation to the particular requirements of the areas served by the affiliated stations; the extent to which affiliated stations exercise control over programs, advertising contracts, and related matters; the nature and extent of network program duplication by stations serving the same area; the extent to which particular networks have exclusive coverage in some areas; the competitive practices of stations engaged in chain broadcasting; the effect of chain broadcasting upon stations not licensed to or affiliated with networks; practices or
tioners’ arguments. Instead, the Court held that because broadcast media was not inherently available to all, “unlike other modes of expression, it is subject to governmental regulation.” In doing so, the Court reasoned that as long as the FCC’s regulations were in the “public interest, convenience, or necessity,” the regulations were constitutional. Elaborating on this principle, the Court in Turner Broad. Sys. v. FCC stated that broadcast television was unique from any other form of media because in broadcast television, “there are more would-be broadcasters than frequencies available in the electromagnetic spectrum.” Specifically, the Court in Red Lion Broad. Co. v. FCC determined that the FCC had the ability to treat a broadcast licensee as “a proxy” for the community, obligated to give adequate time and attention to matters of public concern.

In contrast, virtually no limit exists as to the amount of print media able to be disseminated at any given time. Thus, there is no justification for the government to apply heightened restrictions. The difference in treatment between broadcast and print media was further exemplified in Miami Herald Publ’g Co. v.

agreements in restraint of trade, or in furtherance of monopoly, in connection with chain broadcasting; and the scope of concentration of control over stations, locally, regionally, or nationally, through contracts, common ownership, or other means.

Id.

53. See id. at 226-27 (“Freedom of utterance is abridged to many who wish to use the limited facilities of radio.”).

54. Id. at 226.


57. Id. at 637 (1994); see also Bolger v. Youngs Drug Prods. Corp., 463 U.S. 60, 74 (1983) (“Our decisions have recognized that the special interest of the federal government in regulation of the broadcast media does not readily translate into a justification for regulation of other means of communication.”).

58. See Red Lion Broad. Co. v. FCC, 395 U.S. 367, 374-75 (1969) (highlighting FCC order requiring radio station to provide person attacked in broadcast with tape, transcript, or summary of broadcast, as well as opportunity to respond).

59. See Miami Herald Publ’g Co. v. Tornillo, 418 U.S. 241, 254 (1974) (explaining unlimited medium available for print media). “The power of a privately owned newspaper to advance its own political, social, and economic views is bounded by only two factors: first, the acceptance of a sufficient number of readers — and hence advertisers — to assure financial success; and, second, the journalistic integrity of its editors and publishers.” Id. But see Jack Shafer, The Incredible Shrinking Newspaper: Newspapers are dying, but the news is thriving, SLATE, June 24, 2006, http://www.slate.com/id/2144201/ (last visited February 24, 2008) (suggesting many newspapers are falling out of use).

The Court held that a Florida statute violated the First Amendment because it required a newspaper, which attacked a political candidate’s character, to afford free space for the candidate to reply. The Court explained that this was a violation of the First Amendment’s guarantee of a free press. This holding contrasts starkly with the holding in Red Lion, which required a broadcast radio station to provide a person attacked on-air with a record of the broadcast and an opportunity to respond.

The Court reaffirmed the distinctiveness of broadcast media in FCC v. League of Women Voters of Cal. by specifying that “the absolute freedom to advocate one’s own positions without also presenting opposing viewpoints – a freedom enjoyed, for example, by newspaper publishers – is denied to broadcasters.”

In sum, courts permit heightened federal restrictions on broadcast transmissions while disallowing such restrictions on print media. Because the radio spectrum is a scarce resource, restrictions on free speech will be upheld as long as the restrictions are in the “public interest, convenience, or necessity.” Moreover, broadcasters are treated as proxies for the community at large.

61. See Tornillo, 418 U.S. at 248-49 (specifying differences in treatment for print and broadcast media).
62. See id. at 243 (explaining newspaper does not have to provide room for reply because newspaper is not governed by same rules as broadcast media).
63. See id. (commenting that placing restrictions on print media such as requisite room for reply is unconstitutional).
65. 468 U.S. 364, 380 (1984) (explaining that restrictions are upheld only when they further substantial government interest). The Court recognized that Public Broadcasting Act prohibited “any ‘noncommercial educational broadcasting station receiving a grant from the Corporation’ [Corporation for Public Broadcasting] to ‘engage in editorializing.’” Id. at 366 (citing 47 U.S.C. § 399). The Court held unconstitutional Section 399 of The Public Broadcasting Act of 1967 because it prohibited broadcasters from engaging in editorializing, thereby denying them the right to address their audience on matters of public importance. See id. at 398-99.
66. See Ryan, supra note 7, at 836 (explaining differences in the regulation of broadcast and print media).
68. See Red Lion, 395 U.S. at 389 (“There is nothing in the First Amendment which prevents the Government from requiring a licensee to share his frequency with others and to conduct himself as a proxy . . . .”).
D. Cognitive Radio and How It Could Change the Allocation of Airwaves

Currently, the FCC assigns specific frequencies of the spectrum to various users. These frequencies include AM and FM radio stations, VHF and UHF for television channels, and other frequencies used for cell phones, cordless phones, GPS devices, radio-controlled toys and much more. Because each user occupies a specific frequency, communication problems ensue when frequencies overlap; radio stations get interference and cell phone calls get dropped. Presently, the only real option for the radio station listener or phone call receiver is to wait for the interference to subside.

With the advent of new technology, however, airwaves may become virtually inexhaustible and free from interference. Such technology would make broadcast media as limitless as print media. Cognitive radio is the new technology that can make this possible. Cognitive radio technology uses software that allows a kind of “self-awareness,” enabling it to identify “its . . . environment and location and then alter its power, frequency, modulation and other operating parameters so as to dynamically reuse whatever spectrum

69. See Ashley, supra note 16, at 68 (explaining how FCC allocates frequencies).

70. See id. (specifying kinds of devices that utilize airwaves).

71. See id. (describing how interference among broadcasters occurs); see also Philip J. Weiser & Dale N. Hatfield, Policing the Spectrum Commons, 74 FORDHAM L. REV. 663, 674 (2005) (explaining how interference may be caused even once cognitive radio is implemented).

72. See Weiser & Hatfield, supra note 71, at 666, 68-69 (explaining current solutions to broadcast interference).

73. See generally Ashley, supra note 16 (introducing cognitive radio technology as solution to spectrum scarcity because it “enable[s] nearly any wireless system to locate and link to any locally available unused radio spectrum to best serve the consumer.”); see also Symposium, The Telecommunications Act of 1996: A Case of Regulatory Obsolescence, 13 COMM L. CONSPECTUS 1, 8-9 (2005) [hereinafter Symposium, The Telecommunications Act of 1996] (explaining with implementation of cognitive radio “[t]here is no theoretical limit to how finely the spectrum can be divided.”).

74. See Carlson & Baynes, supra note 15, at 607 (explaining inefficiencies of current licensing system, giving rise to new technology that could impact broadcasters’ rights).

75. See id. (suggesting cognitive radio will help avoid broadcast interference problems); see also In the Matter of Facilitating Opportunities for Flexible, Efficient, and Reliable Spectrum Use Employing Cognitive Radio Technologies, 20 F.C.C.R. 5486, 5487 (2005) [hereinafter Facilitating Opportunities] (explaining cognitive radio technology could improve efficiency, speed, and volume of transmissions).
is available." In fact, cognitive radio’s digital signal processors enable the utilization of virtually limitless broadcasting channels.

Under this model, the “plot of land” analogy becomes inappropriate because the spectrum would not be auctioned-off. Instead, all users could share the spectrum because cognitive radio software constantly searches for available frequencies and automatically switches frequencies when necessary. With this software-based design, a single portion of spectrum “real-estate” could be made exponentially more efficient.

E. Background for a Hypothetical Claim: Requirements for Standing and Standard of Review

1. Standing

Federal courts are prohibited from issuing opinions in response to hypothetical situations because Article III, Section 2, Clause 1 of the Constitution limits federal jurisdiction to actual

76. Ashley, supra note 16, at 69.
77. See Digital Signal Processing, supra note 18 (defining digital signal processing as "the processing of signals by digital means . . . by performing numerical calculations"); see also FETTE, supra note 18, at 5 (explaining digital processors used by software defined radios allow virtually unlimited programmability).
78. See Goodman, supra note 44, at 270-71 (introducing property rights regime for spectrum); see also Yochai Benkler, Overcoming Agoraphobia: Building the Commons of the Digitally Networked Environment, 11 Harv. J.L. & Tech. 287, 394 (1998) (“Providing an appropriate regulatory space for unlicensed wireless operations is the only available option for allowing the development of unowned information infrastructure.”).
79. See FETTE, supra note 18, at 5 (explaining many benefits associated with cognitive radio, including elimination of sense of artificial scarcity). For instance, under the current model, if X wishes to transmit to Y, but A is already transmitting to B on that frequency, X will have to wait. See Natasha Devroye, Patrick Mitran & Vahid Tarokh, Topics in Radio Communication: Limits on Communications in a Cognitive Radio Channel, IEEE COMM. MAG., June 2006, at 44, available at http://people.seas.harvard.edu/~ndevroye/research/Devroye_Cognitive_COMMAG.pdf (explaining difference in how broadcast transmissions will function with implementation of cognitive radio). With the new model, A can continue to transmit to B and a cognitive radio device will switch X onto a different, unused frequency so that it can concurrently transmit to Y. See id.; see also Gerald R. Faulhaber, Wireless Telecommunications: Spectrum as a Critical Resource, 79 S. CAL. L. REV. 537, 539 (2006) (explaining benefits of spectrum with little or no property rights, eliminating division of spectrum for exclusive use). But see Abhijit Sur, Sharing Spectrum: Can a “Commons” Approach Help Maximize Spectrum Use? http://findarticles.com/p/articles/mi_m0NUH/is_9_37/ai_107124045 (last visited Feb. 26, 2008) (noting proponents of exclusive property rights believe lack of limits on power regulations may cause interference).
80. See Ashley, supra note 16, at 68-69 (describing lack of efficiency under current broadcast system).
"cases" and "controversies." Therefore, to file a claim against the government, which challenges the heightened restrictions surrounding broadcast media, the claimant must have standing to assert the claim. In the case of broadcast media, the claimant would most likely be a broadcaster who has been censored by the FCC as "public interest, convenience, or necessity" requires.

2. Standard of Review

The standard of review will depend on the nature of the First Amendment challenge: whether the FCC's broadcast regulations are "content-neutral" or "content-based." A content-neutral regulation "appl[ies] to all categories of speech and do[es] not expressly prohibit any particular subject matter of expression." In contrast, a content-based regulation "prohibit[s] some categories of expression while allowing others."

Content-neutral regulations on broadcast media are usually evaluated under the lowest standard of review, which is most deferential to the government, rational basis. In contrast, content-neutral regulations on other forms of media are evaluated using

82. U.S. Const. art. III, § 2, cl. 1.
83. See Calvin Massey, American Constitutional Law: Powers and Liberties 72 (Aspen Publishers 2005) ("A person has standing if he or she has sufficient stake in the controversy that he or she ought to be recognized as an appropriate party to assert the claim.").
85. See Richard E. Wiley & Rosemary C. Harold, Communications Law 2003: Changes and Challenges, 2003 Prac. L. Inst. 275, 425 n.119 (citing Red Lion Broad. Co. v. FCC, 395 U.S. 367 (1969), which explained broadcast ownership rules should be subject to lower level scrutiny because of spectrum scarcity). For content-neutral broadcast regulations "the 'rational' basis standard articulated in cases such as Red Lion Broad. Co. v. FCC remains the correct constitutional standard to apply to its broadcast ownership rules." Id. at 361; see also FCC v. League of Women Voters of Cal., 468 U.S. 364, 375-79 (1984) (specifying that because regulation against broadcasters is content-based, level of review falls somewhere between strict scrutiny and rational basis: intermediate scrutiny).
87. Id.
88. See Wiley & Harold, supra note 85, at 425 (describing Red Lion standard of review); see also Danielle Diviaio, The Government is Establishing Your Child's Curfew, 21 St. John's J. Legal Comment. 797, 811 (2007) (stating that rational basis review is "lowest level of scrutiny and hardest for a plaintiff to overcome . . ."); Kenneth A. Klukowski, Armed by Right: The Emerging Jurisprudence of the Second Amendment, 18 Geo. Mason U. Civ. Rts. L.J. 167, 183 (2008) (explaining regulation evaluated using rational basis standard of review "presumes the challenged state action valid, and upholds it so long as it is rationally related to a legitimate state interest.")
intermediate scrutiny, which lies somewhere between rational basis and the highest standard of review, strict scrutiny. 89

Content-based regulations on broadcast media are usually reviewed under an intermediate level of scrutiny. 90 Alternatively, content-based regulations placed on other forms of media are evaluated using strict scrutiny. 91

III. Analysis

A. Cognitive Radio Has the Ability to Change How Broadcast Media is Regulated

The First Amendment provides that "Congress shall make no law . . . abridging the freedom of speech, or of the press." 92 Nevertheless, heightened restrictions are placed on broadcast media because it is transmitted over an inherently limited medium: airwaves. 93 With the arrival of cognitive radio technology, however,

89. See Turner Broad. Sys. v. FCC, 512 U.S. 622, 662 (1994) (holding that for cable television "intermediate level of scrutiny [is] applicable to content-neutral restrictions that impose an incidental burden on speech."); see also League of United Latin Am. Citizens v. Perry, 548 U.S. 399, 475 (2006) (stating that where strict scrutiny applies state must justify regulation "by establishing that it was narrowly tailored to serve a compelling state interest . . .").

90. See Women Voters, 468 U.S. at 375-79 (describing intermediate standard of review used with content-based regulation on broadcast media); see also Klukowski, supra note 88, at 187 (stating regulation under intermediate standard of review is presumptively valid and "will be upheld so long as it is narrowly tailored to further a substantial state interest.").

91. See United States v. Playboy Entm't Group, Inc., 529 U.S. 803, 806 (2000) (holding that § 505 of 1996 Telecommunications Act which "requires cable television operators who provide channels 'primarily dedicated to sexually-oriented programming' either to 'fully scramble or otherwise fully block' those channels or to limit their transmission to hours when children are unlikely to be viewing" is content-based regulation that can "stand only if it satisfies strict scrutiny."); see also Ryan, supra note 7, at 836 (explaining content-based regulations on print media are held to strict scrutiny standard of review). "Historically, regulations affecting the content of broadcast media have not been held to the strict scrutiny standard of review applicable to content-based regulations of print media." Id.; see also Davidson v. Wash. Educ. Ass'n, 127 S. Ct. 2372, 2375 (2007) (explaining "content-based speech regulations are presumptively invalid" under strict scrutiny standard of review). But see Women Voters, 468 U.S. at 376 (specifying Court has "never gone so far as to demand that . . . regulations serve 'compelling' governmental interests" when broadcast media regulations are in question).

92. Farber, supra note 5, at 1.

93. See Women Voters, 468 U.S. at 377 (describing broadcast media's inherent limitation). "Spectrum scarcity" is the phrase used in reference to the premise that broadcast transmissions travel over the airwaves, and these airwaves are a finite resource through which a limited number of broadcasts may be transmitted. See id. at 375.
the spectrum may not be as limited as it once was. Without limits on the amount of information that can be broadcast, broadcast media begins to look almost identical to print media, in that a nearly limitless amount of information can be transmitted. If cognitive radio creates the opportunity for a virtually unlimited use of spectrum, the restrictions surrounding broadcast media should be lifted so that broadcast media is treated the same as print media.

1. Cognitive Radio and the Commons Approach to Spectrum Licensing

Presently, the airwaves are like a large, divisible plot of land, with the FCC auctioning portions off until it is completely sold. Under this current model, little spectrum is actually used. With cognitive radio, however, "there is no theoretical limit to how finely the spectrum can be divided." According to some experts in the

94. See Facilitating Opportunities, supra note 75, at 5487 (explaining possible differences in efficiency, speed, and volume with implementation of cognitive radio).

95. See Symposium, The Telecommunications Act of 1996, supra note 73, at 8-9 (describing cognitive radio's potential impact on spectrum). Committee notes stated:

There is no theoretical limit to how finely the spectrum can be divided. The faster the chip, the better are the new applications, and the more efficient are the smart antennas, cognitive radios and transmitters, and ultrawideband technologies which will allow more efficient use of the spectrum and attract capital. The result of greater efficiencies should be less regulation.

Id.

96. See Carlson & Baynes, supra note 15, at 607 (noting similarities between print and broadcast media if no limitation on airwave spectrum exists).

97. See id. (explaining advancements in cognitive radio technology should result in decreased regulation).

98. See Hart, supra note 45, at DOI (explaining FCC's role in auctioning off last remaining portions of spectrum).

99. See Symposium, The Telecommunications Act of 1996, supra note 73, at 8 (explaining FCC's current mode of licensing creates highly inefficient use of spectrum). Continuing with the land use analogy, if Sender 1 on Plot A wants to transmit a message, but the plot is already being used to transmit a different message by Sender 2, Sender 1 must wait. See Devroye, supra note 79 at 44 (explaining how broadcast transmissions would function differently with cognitive radio). Even though neighboring Plot B is not currently being used, Sender 1 cannot transmit the message using Plot B because Sender 1 does not have a license to use Plot B. See id. If cognitive radio were being used, it would detect free space in Plot B and would automatically switch sender 1's signal from Plot A to Plot B. See id. Furthermore, cognitive radio interprets digital, as opposed to analog signals, meaning various signals may run on the same frequency, but as long as each is encoded with a distinct pattern of zeros and ones, cognitive radio can sort out the desired digital signal. See Ferre, supra note 18, at 3 ("All functions, modes and applications can be configured and reconfigured by software.").

field, the efficiency of the spectrum will increase as cognitive radio technology becomes more advanced; such efficiency would make content-based regulations, premised on spectrum scarcity, unjustified.101

In order to reach this point, however, the FCC's means of allocating spectrum must be changed dramatically; users must be able to switch freely on and off of available bands within the spectrum and without interference.102 One potential solution, which would allow users to move about the spectrum freely, is called the "commons approach."103 The commons approach to spectrum allocation proposes a spectrum with little or no property rights; the commons approach is a system that eliminates the division and allocation of the spectrum for exclusive use.104 According to advocates of the commons approach, "spectrum is not like physical property susceptible to division into parcels. Rather, like air — indeed as air — spectrum is a medium for communications that is theoretically limitless, depending on the capabilities of the systems that use it."105 Instead of the FCC auctioning off portions of the spectrum to a single user, under the commons approach, exponentially more users will be able to take advantage of the airwaves without interference or delay.106 If cognitive radio is implemented in conjunction with the commons approach, then a sweeping change regarding the First Amendment rights of broadcasters must occur.

2. Cognitive Radio: Changing the Standard of Review and Permissible Level of Regulations Imposed on Broadcast Media

The regulations surrounding print media are minimal and provide that "[t]he power of a privately owned newspaper to advance

101. See id. (suggesting constitutional implications cognitive radio might create).
102. See Faulhaber, supra note 79, at 5 (highlighting commons approach as means of allocating spectrum).
103. Id.
104. See id. (explaining potential benefits of commons approach).
105. Goodman, supra note 44, at 272 (setting forth principles of commons approach). This is in opposition to Ronald Coase's proposition to allocate the spectrum using a "property rights regime." Id. at 271-72. Furthermore, many commons approach theorists support the thesis of this comment, suggesting that "[a]s the capabilities of radio systems improve . . . the carrying capacity of the airwaves will dramatically expand and, conversely, the scarcity value of spectrum used to justify private property rights will dramatically decline." Id. at 272.
106. See Faulhaber, supra note 79, at 539 (explaining utility of shared spectrum versus auctioning off portions so that no other user can take advantage of it). But see Sur, supra note 79 (noting proponents of exclusive property rights believe lack of limits on power regulations may cause interference).
its own political, social, and economic views is bounded by only two factors: first, the acceptance of a sufficient number of readers, and hence advertisers, to assure financial success; and, second, the journalistic integrity of its editors and publishers."\textsuperscript{107} In contrast, the regulations surrounding broadcast media are comparatively broad and provide that the FCC may regulate broadcast media as it sees fit, as long as the regulations are tied to the "public interest, convenience, or necessity."\textsuperscript{108}

Furthermore, regulations of non-broadcast media are analyzed for their constitutionality using higher levels of scrutiny than those used for broadcast media regulations.\textsuperscript{109} For example, if the FCC imposes a content-neutral regulation on cable television or on print media, the regulation will be reviewed using intermediate scrutiny.\textsuperscript{110} In contrast, a content-neutral regulation on broadcast media will be reviewed using a rational basis standard of review, which imposes the lowest level of scrutiny.\textsuperscript{111} Similarly, a content-based regulation on non-broadcast media will be reviewed using strict scrutiny, which imposes the highest level of scrutiny, whereas a content-based regulation on broadcast media will be reviewed using intermediate scrutiny.\textsuperscript{112}

Case law has established restrictions that the government can impose upon broadcasters.\textsuperscript{113} For example, the FCC has required


\textsuperscript{109} See Wiley & Harold, supra note 85, at 361 (explaining variation in how regulations are reviewed depending on type of media used).

\textsuperscript{110} See Turner Broad. Sys. v. FCC, 512 U.S. 622, 662 (1994) (explaining content-neutral regulations placed on cable television or print media will be evaluated using intermediate scrutiny); see also Klukowski, supra note 88, at 187 (defining intermediate scrutiny). In order for a regulation to be upheld under an intermediate scrutiny standard of review, it must be "narrowly tailored to further a substantial state interest." Id.

\textsuperscript{111} See Wiley & Harold, supra note 85, at 425 (specifying broadcast media content-neutral regulations are reviewed using lowest level scrutiny); see also Klukowski, supra note 88 (stating rational basis standard of review “presumes the challenged state action valid, and upholds it so long as it is rationally related to a legitimate state interest.”).

\textsuperscript{112} See Ryan, supra note 7, at 836 (explaining non-broadcast media regulations are evaluated using highest level of review, strict scrutiny); see also FCC v. League of Women Voters of Cal., 468 U.S. 364, 374 (1984) (explaining content-based regulations on broadcast media are subject to intermediate scrutiny).

\textsuperscript{113} See Red Lion Broad. Co. v. FCC, 395 U.S. 367, 375-79 (1969) (setting forth requirement that radio station must give attacked individual opportunity to respond); see also FCC v. Pacifica Found., 438 U.S. 726, 741 (1978) (holding FCC can prohibit indecent speech transmitted via broadcast media); Nat’l Ass’n of Indep. Television Producers and Distrib. v. FCC, 516 F.2d 526, 531 (2d Cir.
broadcast television stations to allocate a certain amount of airtime for programming that "encourage[s] diverse sources of programming and, incidentally, diversity of programming." Furthermore, the FCC may restrict some broadcasts that contain profanities to certain times of the day. If broadcast media was no longer subject to heightened restrictions and lower-level standards of review, courts would have difficulty justifying such regulations.

With the Communications Act of 1934, "Congress created a system of free broadcast service and directed that communications facilities be licensed across the country in a 'fair, efficient, and equitable' manner." As time passed, Congress' intentions to create such a "fair, efficient, and equitable" broadcast system remained the same in spite of advancing technology.

The implementation of cognitive radio will create the fairest, most efficient and most equitable broadcasting system possible. With this change, however, come consequences that will affect the nature of the First Amendment. As a result of cognitive radio, the amount of information able to be transmitted via broadcast media will be virtually limitless.

1975) (explaining prime time access rule requiring television stations set aside time for diverse programming).

114. Indep. Television Producers, 516 F.2d at 528.

115. See Pacifica, 438 U.S. at 731 (describing how FCC can regulate George Carlin's "Seven Dirty Words" radio segment broadcast during daytime because 18 U.S.C. § 1464 gives FCC power to regulate broadcasting by forbidding "any obscene, indecent, or profane language by means of radio communications . . . .").

116. See Ashley, supra note 16, at 66 (suggesting government cannot justify heightened restrictions on broadcast media where airwaves are no longer limited).


118. Id.

119. See Symposium, The Telecommunications Act of 1996, supra note 73, at 8-9 (explaining how cognitive radio has ability to change current inefficiencies underlying FCC's current approach to allocating portions of spectrum); see also Faulhaber, supra note 79, at 539 (describing immense utility of commons approach).

120. See Facilitating Opportunities, supra note 75, at 5487 (suggesting most effective and efficient way to utilize spectrum is using commons approach paired with cognitive radio); see also Emord, supra note 11, at 442 (citing FCC v. League of Women Voters of Cal., 468 U.S. 364 (1984)).

121. See Emord, supra note 11, at 442-44 (specifying how broadcast media may become, for First Amendment purposes, identical to print media). Because the rationale behind broadcast media's heightened regulations and lower standard of review is spectrum scarcity, cognitive radio would eliminate this rationale, and with it, the ability for the FCC to impose heightened regulations reviewed under lower levels of scrutiny. See id.
The rationale behind the heightened broadcast restrictions is spectrum scarcity. If cognitive radio and the commons approach are implemented, spectrum scarcity would cease to exist. Without spectrum scarcity, it would be a violation of the First Amendment to restrict broadcast media any more than print media. Similarly, it would be a violation to evaluate these restrictions using a lower standard of review than that used for print media. Specifically, the FCC should not be able to impose restrictions on broadcast media as “public interest, convenience, or necessity” requires. The regulations and standards of review applicable to broadcast media must mirror those of print media.

B. One Broadcaster Could Change First Amendment Scrutiny: A Hypothetical Claim

Once cognitive radio comes into widespread use, the way in which regulations implicating the First Amendment are evaluated and applied should be changed to mirror those of non-broadcast media. Specifically, broadcast media should no longer be regulated as “public convenience, interest, or necessity” requires. Instead, broadcast media, like print media, should be limited by only two factors: first, the acceptance of a sufficient number of viewers or

122. See id. at 439-69 (explaining “regulatory construct that the [scarcity] rationale supports” as well as possibility that technological advances could reduce spectrum scarcity rationale, eliminating need for increased restrictions on speech).
123. See id. (setting forth implications of commons approach).
124. See id. (suggesting print and broadcast media should be regulated in same way).
125. See Emord, supra note 11, at 442 (discussing scarcity rationale and new technology). In FCC v. League of Women Voters, the Court again expressed its willingness to reassess its traditional acceptance of Red Lion’s scarcity rationale if Congress or the FCC sent a “signal . . . that technological developments have advanced so far that some revision of the system of broadcast regulation may be required.” Id. In Syracuse Peace Council, the Commission sent the Court just such a signal. Persuaded by extraordinary growth in mass media outlets since 1969, the Commission concluded that Red Lion’s lessened degree of constitutional scrutiny could no longer be justified. Id.
127. See Emord, supra note 11 at 441-42 (noting advancements in technology as well as decrease in number of print media sources should result in same degree of restrictions for broadcast and print media).
128. For further discussion of why First Amendment protections for broadcast should mirror those of print, see supra notes 107-27 and accompanying text.
129. Communications Act of 1934, 47 U.S.C. §§ 307(a), (d), 309(a), 310, 312.
listeners—and hence advertisers—to assure financial success and, second, the integrity of its editors and producers.\textsuperscript{130}

The following hypothetical claim assumes cognitive radio and the commons approach have been implemented and are in relatively widespread use.\textsuperscript{131} It outlines the nature of the claim, which challenges the constitutionality of a content-based broadcast media regulation.\textsuperscript{132} Specifically, it analyzes the standard of review, the arguments the claimant asserts in advocating the unconstitutionality of the regulation and the arguments the government provides in support of heightened First Amendment restrictions.\textsuperscript{133}

1. The Claim

Claimant is a radio broadcaster that owns and operates a station based out of Utah.\textsuperscript{134} The Utah-Colorado border is only ten miles from Claimant’s broadcasting location, and the majority of the station’s listeners reside in Colorado. Claimant wishes to use a portion of its airtime each week to broadcast a show called “Colorado Currency.” On this show, several issues are discussed, including the benefits of Colorado’s state lottery.

The host of the show is a passionate advocate of the Colorado state lottery and actively encourages the show’s listeners to participate in the lottery. Congress has, however, enacted federal lottery legislation that prohibits a broadcaster in a non-lottery state, such as Utah, from broadcasting any program that actively and regularly

\textsuperscript{130} See Miami Herald Publ’g Co. v. Tornillo, 418 U.S. 241, 255 (1974) (referencing Columbia Broad. Sys., Inc. v. Democratic Nat’l Comm., 412 U.S. 94, 117 (1973)). Regarding print media, \textit{Columbia Broadcasting} provides “[t]he power of a privately owned newspaper to advance its own political, social, and economic views is bounded by only two factors: first, the acceptance of a sufficient number of readers—and hence advertisers—to assure financial success; and, second, the journalistic integrity of its editors and publishers.” 412 U.S. at 117.

\textsuperscript{131} For a further discussion of the hypothetical claim, see \textit{infra} notes 134-37 and accompanying text.

\textsuperscript{132} For a further discussion of the First Amendment considerations, see \textit{infra} notes 134-37 and accompanying text.

\textsuperscript{133} See \textit{infra} notes 138-202 and accompanying text.

\textsuperscript{134} This hypothetical is largely based on the proceedings in United States v. Edge Broad. Co., 509 U.S. 418 (1993). \textit{Edge Broadcasting} provides that a North Carolina-based radio station, near the North Carolina-Virginia border, may not broadcast lottery advertisements in violation of 18 U.S.C. § 1307, despite the fact that approximately ninety percent of the radio station’s listeners reside in Virginia, a state that sponsors a lottery. \textit{See id.} at 421-24. Only ten percent reside in North Carolina, which does not sponsor a state lottery. \textit{Id.} at 431-32. The Court uses an intermediate standard of review in finding no violation of the First Amendment because “[s]tates have long viewed [lotteries] as a hazard to their citizens and to the public interest, and have long engaged in legislative efforts to control this form of gambling.” \textit{Id.} at 421.
promotes lottery participation in another state, such as Colorado, because it is a hazard to Utah’s citizens and to the public interest.\textsuperscript{135}

The FCC fined Claimant because Claimant’s station hosts “Colorado Currency,” which actively and regularly promotes lottery participation. As a result, Claimant is filing an action alleging that Congress’ content-based regulation violates its First Amendment rights.\textsuperscript{136} Claimant contends it should no longer be subject to regulations as “public interest, convenience, or necessity” requires because cognitive radio and the commons approach have drastically altered the nature of the radio spectrum.\textsuperscript{137}

2. The Standard of Review

Currently, content-based broadcast media regulations are analyzed using an intermediate level of scrutiny, so that content-based regulations are not necessarily presumed unconstitutional, as they would be using strict scrutiny.\textsuperscript{138} Instead, as long as the state has a “substantial” interest in imposing the regulation, it will pass First Amendment muster.\textsuperscript{139} Where regulations are placed on non-broadcast media, however, an attempt by the government to impose content-based regulations that suppress speech is presumed unconstitutional.\textsuperscript{140} Only a content-based regulation, narrowly tailored to serve a compelling state interest, can be deemed constitutional.\textsuperscript{141}

\textsuperscript{135} See id. ("States have long viewed [lotteries] as a hazard to their citizens and to the public interest . . .").


\textsuperscript{137} Nat’l Broad., 319 U.S. at 194 (quoting Communications Act of 1934, 47 U.S.C. §§ 307(a), (d), 309(a), 310, 312).

\textsuperscript{138} See Women Voters, 468 U.S. at 375-79 (explaining content-based regulations on broadcast media are subject to intermediate scrutiny).

\textsuperscript{139} See Klukowski, supra note 88, at 187 (defining intermediate scrutiny).

\textsuperscript{140} See Biegel, supra note 6, at 328-38 (specifying that content-based regulations on non-broadcast speech are generally unconstitutional "unless the regulation falls within some recognized exception or some other related rule of law."). There are ten established exceptions, whereby content-based regulations can be constitutionally placed on speech because these particular kinds of speech are unprotected under the First Amendment: (1) obscenity; (2) child pornography; (3) fighting words; (4) incitement to imminent lawless conduct; (5) defamation; (6) invasion of privacy; (7) harassment; (8) true threats; (9) copyright infringement; and, (10) another recognized tort or crime. See id.

\textsuperscript{141} See Ryan, supra note 7, at 836 (explaining non-broadcast media regulations are evaluated using highest standard of review: strict scrutiny).
3. Arguments from the Claimant

Claimant first contends that the heightened regulations surrounding broadcast media are premised on spectrum scarcity. Spectrum scarcity is simply a malleable "function of technology and design architecture that inventors and entrepreneurs" create. The better the technology, the less "scarce" the airwaves are. Without spectrum scarcity, the rationale for heightened regulations surrounding broadcast media is inapplicable.

Next, Claimant asserts that even though content-based regulations for broadcast media are usually evaluated using intermediate scrutiny, as in F.C.C. v. League of Women Voters, the FCC's recent adoption of cognitive radio technology and a commons approach to licensing requires a different, heightened standard of review. Heightened restrictions evaluated under low levels of scrutiny are no longer justified because cognitive radio and the commons approach have eliminated spectrum scarcity, thus eliminating the rationale for the restrictions. Specifically, Claimant maintains the nature of the regulations imposed on broadcast media and the standard of review used should parallel those of print media.

142. See Women Voters, 468 U.S. at 376 (defining spectrum scarcity as inherent limit on broadcast transmissions). Also, Women Voters specifies that the level of review for content-based broadcast regulations falls somewhere between strict scrutiny and rational basis: intermediate scrutiny. Id. at 380.

143. Shafer, New Wave, supra note 49.

144. Id.

145. See Facilitating Opportunities, supra note 75, at 5487 (explaining cognitive radio's effect on spectrum scarcity has First Amendment implications).

146. See id. (noting advances in technology have potential to free spectrum from inherent scarcity). Specifically:

[C]ognitive radio capabilities are advancing to the point where spectrum is no longer scarce. Multiple speakers can broadcast their views simultaneously with little, if any, degradation to either's voice. This radically changes the constitutional analysis. There is no justification for the Commission to silence anyone's voice by assigning or selling the right to use swaths of spectrum. There is certainly no constitutionally forgivable justification for selling a corresponding right to exclude others [sic] voices where technology could allow all voices to flourish on a non-discriminatory basis.

Id.

147. See Red Lion Broad. Co. v. FCC, 395 U.S. 367, 394 (1969) (explaining government holds broadcasters to higher standards than other First Amendment speakers because of limits inherent in spectrum scarcity). The court found there was "chaos" amongst unregulated airwaves, which gave rise to the FCC's regulations. Id. at 375. "Without government control, the medium would be of little use because of the cacophony of competing voices, none of which could be clearly and predictably heard." Id. at 376; see also Women Voters, 468 U.S. at 375 (defining spectrum scarcity as inherent limitation on broadcast transmissions).

148. See BIEGEL, supra note 6, at 328-29 (explaining limitations on speech regulations that regulate). Specifically, "statutes and policies designed . . . to regulate
Claimant argues that if the regulation is evaluated using strict scrutiny, it cannot be upheld simply because it meets the "public interest, convenience, or necessity" standard.149 The Utah broadcaster cannot be treated as a proxy for the Utah community as a whole, representing its interests and values.150 Strict scrutiny generally presumes the governmental regulation is unconstitutional and requires the state to justify the regulation "by establishing that it was narrowly tailored to serve a compelling state interest . . . ."151 Claimant contests that the state interest does not rise to the level of "compelling" and should not rise to the level of "substantial."152

The Court in United States v. Edge Broadcasting, Claimant argues, analyzed a federal regulation banning non-lottery states from advertising out-of-state lotteries over broadcast radio.153 Although the regulation was ultimately upheld using intermediate scrutiny, Claimant notes that the dissent was highly skeptical that a state could find even a substantial interest in discouraging lottery participation, which is seen by some as a "vice" activity.154 Specifically the dissent suggested "it does not necessarily follow that [the state's] interest is 'substantial' enough to justify an infringement on constitutionally protected speech, especially one as draconian as the regul-
speech are unconstitutional if vague or overbroad." Id. at 328. Further, "speech cannot generally be regulated on the basis of its content, unless the regulation falls within some recognized exception or some other related rule of law." Id. at 328-29.

150. See Red Lion, 395 U.S. at 389 (explaining broadcasters are currently treated as proxies for community at large, requiring them to provide adequate coverage for matters of public concern).
152. United States v. Edge Broad. Co., 509 U.S. 418, 440 (1993) (Stevens, J., dissenting) ("While a State may indeed have an interest in discouraging its citizens from participating in state-run lotteries, it does not necessarily follow that its interest is 'substantial' enough to justify an infringement on constitutionally protected speech . . . .").
153. See id. at 422 (explaining content-based regulation placed on broadcasters). Just as broadcasting began, the Communications Act of 1934 was enacted, which, in part, prohibited the broadcast of "any advertisement of or information concerning any lottery, gift enterprise, or similar scheme." 18 U.S.C. § 1304. In 1975, however, Congress amended the Act, allowing broadcasters to advertise state-run lotteries if the station is licensed to a state that permits a state-run lottery. See Edge Broad., 509 U.S. at 440 (describing nature of amendment).
154. See Edge Broad., 509 U.S. at 440 (Stevens, J., dissenting) (explaining lotteries are generally no longer seen as vice activities). "[T]he . . . change in public attitudes toward state-run lotteries that this country has witnessed in recent years undermines any claim that a State's interest in discouraging its citizens from participating in state-run lotteries is so substantial as to outweigh respondent's First Amendment right . . . ." Id.
lation at issue in this case." Furthermore, Claimant mentions how the dissent contended that throughout recent history attitudes toward lotteries have become generally positive.

Claimant, therefore, identifies this skepticism about a potential state interest in banning speech in non-lottery states. Claimant further indicates that *Edge Broadcasting* was decided over a decade ago and attitudes toward state lotteries have become increasingly positive over the years. Lastly, Claimant highlights that *Edge Broadcasting* created a heated disagreement and the Court was only evaluating the regulation under intermediate scrutiny. As a result, Claimant purports that even if attitudes toward state lotteries have remained the same over the last fifteen years, *Edge Broadcasting* would not have passed constitutional muster if it was evaluated under strict scrutiny and the regulation cannot be upheld.

4. *Arguments from the Government*

The government first sets forth that signal interference results from the way in which broadcasters use the commons approach. The government suggests that the commons approach gives rise to the "tragedy of the commons" phenomenon, which in this context means that users of the common spectrum increase the performance of their own communications by increasing their transmitter power, but only at the expense of other broadcasters. This boost in transmitter power increases interference and reduces the clarity of other broadcasters' signals.

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155. *Id.*
156. *See id.* at 440-41 (suggesting that unlike past, currently, hostility toward state-run lotteries is rare).
157. *See id.* (describing lack of substantial state interest in regulation).
159. *See id.* at 418 (specifying substantial state interest is required to uphold regulation).
160. *See id.* at 440-41 (suggesting in dissent that regulations should not be upheld under intermediate scrutiny).
161. *See Weiser & Hatfield, supra* note 71, at 674 (explaining how "the tragedy of the commons" relates to commons approach to licensing). For the sake of argument, this Comment assumed that some degree of interference occurs after the implementation of cognitive radio and the commons approach. *See id.* The tragedy of the commons is when "users increase their consumption of the resource without taking care to ensure that they do not overuse the resource." *Id.* It has been suggested that some are hesitant to implement the commons approach to allocating spectrum because the phenomenon of the tragedy of the commons has the potential to cause unwanted signal interference. *See id.*
162. *Id.*
163. *See id.* (describing implications of broadcasters' ability to increase transmission power).
The government further suggests that users faced with diminished performance "retaliate by raising their own transmitter power to compensate for the increased interference," thus giving rise to the tragedy of the commons and unavoidable signal interference. As a result of these limitations, the government finally extends its argument to purport that because the tragedy of the commons effect produces interference, spectrum scarcity still exists. Not all messages will transmit without interference and, therefore, heightened restrictions surrounding broadcast media are justified.

With spectrum scarcity still in place, the government proceeds to evaluate the claim using intermediate scrutiny. The government contends that because the nature of broadcast media remains unchanged, broadcasters are still responsible for broadcasting information as "public interest, convenience, or necessity" requires. Broadcasters should be treated as proxies for the community. Therefore, looking to Edge Broadcasting, which upheld a similar regulation under intermediate scrutiny, the government argues this regulation should be upheld. The state has a substantial interest in restricting this speech because gambling is seen as a "vice" activity that could be, and frequently has been, banned altogether. Therefore, the government maintains that Utah's interest in restricting this kind of speech can be upheld under intermediate scrutiny.

164. Weiser & Hatfield, supra note 71, at 674.
165. See id. (suggesting that without limits on transmission power signal interference will ensue under commons approach).
166. See id. (proposing signal interference will cause messages not to transmit properly).
170. See United States v. Edge Broad. Co., 509 U.S. 418, 426 (1993) (stating Court is "quite sure that the Government has a substantial interest in supporting the policy of nonlottery States, as well as not interfering with the policy of States that permit lotteries").
171. Id.
172. Id. (setting forth appropriateness of intermediate scrutiny).
5. Analyzing the Arguments

Claimant makes a very strong argument because it takes language from previous First Amendment cases and suggests the only reasonable outcome here would be to eliminate the heightened restrictions surrounding broadcast media.\footnote{173} Particularly, Claimant shows that the Court has explicitly stated print media is treated differently because it is not operating under the same scarcity rationale as broadcast media.\footnote{174} Claimant then reasons that if the Court does not place heightened restrictions on print media because the mode of transmission is not scarce, once broadcast media’s mode of transmission is no longer scarce, it too should not be burdened by the imposition of heightened restrictions.\footnote{175} If this regulation is evaluated using strict scrutiny, the government will have a high burden to overcome because the regulation would be presumptively invalid.\footnote{176} The dissent in Edge Broadcasting further bolsters Claimant’s arguments because the dissent suggests that restrictions on lottery-related speech may not be upheld today, even if it were evaluated using intermediate scrutiny.\footnote{177}

The government, in contrast, presents a more contorted argument.\footnote{178} Because the Court specified, on many occasions, that spectrum scarcity is the rationale behind the heightened regulations surrounding broadcast media, the government is challenged to set forth reasons why broadcast media should continue to operate under a different set of rules than print media once spectrum scarcity is eliminated.\footnote{179} The government, therefore, is pressed to

\footnote{173} For a further discussion of Claimant’s arguments, see supra notes 142-60 and accompanying text.

\footnote{174} See Nat’l Broad., 319 U.S. at 226 (explaining broadcast media is unique). “Unlike other modes of expression, radio inherently is not available to all. That is its unique characteristic, and that is why, unlike other modes of expression, it is subject to governmental regulation.” Id. at 226.

\footnote{175} For a further discussion of Claimant’s arguments, see supra notes 142-60 and accompanying text.


\footnote{177} See United States v. Edge Broad. Co., 509 U.S. 418, 440 (Stevens, J., dissenting) (“While a State may indeed have an interest in discouraging its citizens from participating in state-run lotteries, it does not necessarily follow that its interest is ‘substantial’ enough to justify an infringement on constitutionally protected speech . . . .”).

\footnote{178} For a further discussion of the government’s argument, see supra notes 161-72 and accompanying text.

\footnote{179} See FCC v. League of Women Voters of Cal., 468 U.S. 364, 378-79 (1984) (defining spectrum scarcity as inherent limit on broadcast transmissions, giving rise to intermediate scrutiny); see also Red Lion, 395 U.S. at 394 (describing inherent limitation on broadcast transmissions is airwave spectrum).
make the argument that if some degree of signal interference persists, the spectrum is limited. Specifically, as a result of interference not all broadcasts will be transmitted properly, so the spectrum remains in some sense scarce.

Unfortunately for the government, this argument does not hold much weight because some degree of "interference" will likely be present in all forms of media outlets. The bottom line remains, however: as a result of cognitive radio, the spectrum in which broadcast transmissions are cast is no longer "scarce." Exponentially more transmissions are capable of being sent at any given moment, and with the proper regulations on transmission power in place, signal interference should not pose a threat. Nevertheless, the government tries to twist the argument, proposing that the spectrum is still, in some aspects, scarce. If the government's scarcity argument prevails, the rest of its argument will likely succeed under intermediate scrutiny.

6. The Outcome

Many legal commentators recognize that the heightened regulations imposed on broadcast media are somewhat illogical. To

180. See Weiser & Hatfield, supra note 71, at 674 (describing "tragedy of the commons" with regard to commons approach).
181. For a further discussion of the government's argument, see supra notes 161-72 and accompanying text.
182. See Weiser & Hatfield, supra note 71, at 674 (explaining nature of potential signal interference using commons approach).
183. See Carlson & Baynes, supra note 15, at 607 (explaining inefficiencies of current licensing system in addition to how cognitive radio could create more efficient system, impacting First Amendment rights of broadcasters).
184. See Sur, supra note 79 (explaining nature of regulations that can be imposed to limit signal interference under commons approach). See also Weiser & Hatfield, supra note 71, at 674.

Notably, regulation can take a variety of forms, including (1) social norms that limit certain types of behavior, (2) market ordering that creates incentives for and against certain types of behavior, (3) technical architectures that limit the range of possible behavior, and (4) traditional law enforcement that punishes certain types of behavior. In general, commons advocates focus on some combination of the first three modes of regulation, often contending that FCC regulation is unnecessary or only minimally necessary to enable the commons model of spectrum management to succeed.

Id.

185. For a further discussion of the government's argument, see supra notes 161-72 and accompanying text.
186. See id.
187. See Shafer, New Wave, supra note 49 (stating FCC "still treats the radio spectrum like a scarce resource that its bureaucrats must manage for the 'public good,' even though the government's scarcity argument has been a joke for half a century or longer.")
day we live in an age where reading newspapers has become increasingly rare.\textsuperscript{188} As a result, many daily newspapers are being retired.\textsuperscript{189} Nevertheless, the number of television stations seems to increase with every passing day.\textsuperscript{190} Therefore, many reformers recognize this contradiction and actively promote the removal of heightened regulations surrounding broadcast media, even without the implementation of the commons approach or cognitive radio.\textsuperscript{191} This increasingly common sentiment combined with advancements in technology should result in the removal of heightened restrictions surrounding broadcast media.\textsuperscript{192}

The government’s argument that the commons approach can, under some circumstances, cause interference and therefore create some form of “scarcity,” is easily remedied.\textsuperscript{193} If at the time the government made its argument no regulations on power limits had been established, the Court should suggest incentives to limit transmission power to a reasonable level or suggest pertinent legislation that would place power limits on all transmissions, thereby avoiding the tragedy of the commons phenomenon.\textsuperscript{194} Some proponents of a commons approach to spectrum allocation have already spoken on the subject.\textsuperscript{195} These proponents suggest a commons model should, in a sense, self-regulate by requiring operators to use the unlicensed spectrum, but only if they comply “with the established ‘technical etiquettes,’ such as power limits on transmission.”\textsuperscript{196}

\textsuperscript{188.} See Shafer, Shrinking Newspaper, supra note 59 (explaining that many newspapers are falling out of use). Even high profile newspapers such as the Washington Post, New York Times, Boston Globe, Los Angeles Times, Chicago Tribune, Philadelphia Inquirer and Newsday have had to downsize much of their staff and trim the contents of their newspapers to stay afloat. See id.

\textsuperscript{189.} See id. (explaining that because newspapers are falling out of use, many are being retired).

\textsuperscript{190.} See National Cable and Telecommunications Association, History of Cable Television, http://www.ncta.com/About/About/HistoryofCableTelevision.aspx (last visited Feb. 24, 2008) (“By 2002, about 280 nationally-delivered cable networks were available, with that number growing steadily.”).

\textsuperscript{191.} See Shafer, New Wave, supra note 49 (highlighting absurdity of FCC’s current broadcast regulations).

\textsuperscript{192.} See Carlson & Baynes, supra note 15, at 607 (explaining current licensing system and how new technology could prove much more efficient, impacting First Amendment rights of broadcasters).

\textsuperscript{193.} See Shafer, New Wave, supra note 37 (providing that implementation of certain practical limitations on transmitter power will prevent tragedy of commons phenomenon without producing significant scarcity of spectrum).

\textsuperscript{194.} See Weiser & Hatfield, supra note 71, at 674 (suggesting multiple solutions for potential broadcaster abuse of transmission power).

\textsuperscript{195.} See Sur, supra note 79 (explaining how regulations limiting power of transmissions can avoid interference problems under commons approach).

\textsuperscript{196.} Id.
The Court hearing this argument should be eager to find a reason to do away with broadcast media’s archaic regulations.\textsuperscript{197} This hearing provides an ideal opportunity because the Court could easily rid broadcast media of its heightened regulations when the government’s argument is weak.\textsuperscript{198} The scarcity the government refers to, when occasional interference exists, is wholly different from the “spectrum scarcity” rationale courts follow today.\textsuperscript{199}

Furthermore, this kind of interference can easily be avoided with the implementation of legislation that regulates the power level at which transmissions can be broadcast.\textsuperscript{200} Following the rationale of previous decisions, Claimant’s argument takes logical steps in showing heightened restrictions will no longer be justified once cognitive radio is introduced and a commons approach to licensing is implemented.\textsuperscript{201} With the Court evaluating Utah’s regulation under a strict scrutiny standard of review, the government is unable to show the regulation is “narrowly tailored to further a compelling state interest.”\textsuperscript{202}

\section*{IV. CONCLUSION}

Cognitive radio has the ability to transform a “scarce” spectrum into a virtually limitless spectrum. Broadcast media will, therefore, become analogous to print media in that both can be distributed in limitless quantities.\textsuperscript{203} The rationale provided for the current differentiation in First Amendment treatment between broadcast and print media is that there is, in fact, a limit to how much an individual can communicate via broadcast media because the airwaves are

\textsuperscript{197}. See Shafer, \textit{New Wave}, supra note 49 (explaining FCC “still treats the radio spectrum like a scarce resource that its bureaucrats must manage for the ‘public good,’ even though the government’s scarcity argument has been a joke for half a century or longer”).

\textsuperscript{198}. For further discussion of the government’s potential arguments, see supra notes 161-72 and accompanying text.

\textsuperscript{199}. See \textit{Women Voters}, 468 U.S. at 374 (explaining inherent limitations on spectrum make airwaves exhaustible resource).

\textsuperscript{200}. See \textit{Sur}, supra note 79 (suggesting transmission power caps pose simple regulatory solution to potential signal interference under commons approach).

\textsuperscript{201}. See \textit{Red Lion Broad. Co. v. FCC}, 395 U.S. 367, 394 (1969) (explaining government may hold broadcasters to higher standards than other First Amendment speakers because of spectrum scarcity). The court found there was “chaos” amongst unregulated airwaves, which gave rise to the FCC’s regulations. \textit{Id.} at 375; see also \textit{Women Voters}, 468 U.S. at 374 (defining spectrum scarcity as inherent limit on broadcast transmissions).


\textsuperscript{203}. See \textit{FETT}, supra note 18, at 5 (explaining how software defined radios, if programmed properly, can harness ability to provide virtually unlimited use of spectrum).
inherently limited. Due to this limitation, the government currently places more restrictions on what an individual can and cannot broadcast, as opposed to what an individual can and cannot publish. With cognitive radio and the commons approach to licensing, however, virtually no limits will exist to the amount able to be broadcast over the airwaves. Therefore, once cognitive radio is fully implemented and a commons approach to licensing is introduced, broadcast media should enjoy the same freedoms print media currently enjoys.

Specifically, as outlined in the hypothetical First Amendment challenge above, content-based broadcast regulations should no longer be reviewed under intermediate scrutiny. Instead, the appropriate standard of review is the standard applicable to content-based restrictions on print media: strict scrutiny. Moreover, although the hypothetical did not directly address content-neutral regulations, following the same rationale, content-neutral broadcast regulations should be reviewed using intermediate scrutiny, because this is the standard currently used to review content-neutral regulations on print media.

In sum, cognitive radio has the ability to drastically change the way the First Amendment operates with regard to broadcast media. Cognitive radio has the ability to free broadcasters from the FCC’s

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204. See Red Lion, 395 U.S. at 394 (describing how spectrum scarcity creates limit on number broadcast transmissions possible).

205. See Women Voters, 468 U.S. at 375 (describing nature of spectrum scarcity making airwaves exhaustible resource in contrast to print media).

206. See FETTE, supra note 18, at 5 (explaining how software defined radios will provide virtually unlimited use of spectrum); see also Symposium, The Telecommunications Act of 1996, supra note 73, at 8-9 (highlighting considerable inefficiencies on behalf of current governmental system regulating spectrum allocation).

207. See Shafer, New Wave, supra note 49 (explaining that broadcast media regulations are already outdated, so with development of new technologies, these restrictions will be without justification).

208. For a further discussion of Claimant’s argument, see supra notes 142-60 and accompanying text.

209. See Shafer, New Wave, supra note 49 (explaining cognitive radio should cause content-based regulations on broadcast media to be evaluated using strict scrutiny).

overreaching imposition of regulations as "public convenience, interest, or necessity" requires.\textsuperscript{211}

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\textsuperscript{211} Nat'l Broad. Co. v. United States, 319 U.S. 190, 194 (1943) (quoting language from Communications Act of 1934, 47 U.S.C. §§ 307(a), (d), 309(a), 310, 312).

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