# "TOO LEGIT TO QUIT:" FREE SPEECH CLAUSE PROTECTION FOR FREQUENCY HOPPING SPREAD SPECTRUM BROADCASTERS

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## I. INTRODUCTION

Unlike other types of media, broadcasters do not enjoy full First Amendment protection against government restraints on speech.[1] The government's authority to restrain broadcast speech derives from the intrinsic limitations of early radio signal modulation technology.[2] Early radios were designed to communicate with each other by decrypting radio signals that were broadcasted over a single radio frequency.[3] Interference with the per frequency operation of radios impeded early listeners' abilities to hear speech from competing broadcasters and contributed to a perceived scarcity of broadcast frequencies (i.e., broadcast spectrum) for delivering free speech.[4] Amid such perceived scarcity and due to the competition for access to the airwaves between broadcasters and the listening public interest, government restraints on broadcasters

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[1] For a discussion of conclusions of the Supreme Court of the United States regarding the competing free speech interests of speakers and members of the listening public, see *infra* notes 71-77 and accompanying text.

[2] For a discussion of the technological limitations of early radio receivers, see *infra* notes 31-39 and accompanying text.

[3] For a discussion of technological limitations of early radio receivers, see *infra* note 31-39 and accompanying text.

[4] *See* Red Lion Broad. Co. v. Fed. Commc'n Comm'n, 395 U.S. 367, 388 (1967) (discussing interference problem that prompted government's regulation of electromagnetic spectrum).

Interference is "[t]he effect of unwanted energy due to one or a combination of emissions, radiations, or inductions upon reception in a radiocommunication system, manifested by any performance degradation, misinterpretation, or loss of information which could be extracted in the absence of such unwanted energy." 47 C.F.R. § 2.1 (2008). In plain English, interference is "any unwanted radio frequency signal that prevents you from . . . listening to your radio . . . Interference may prevent reception altogether, may cause only a temporary loss of a signal, or may affect the quality of the sound or picture produced by your equipment." FCC Consumer Facts: Interference: Defining the Source, http://www.fcc.gov/cgb/consumerfacts/interference.html (last visited Oct. 9, 2008). For a discussion of interference considerations concerning frequency hopping spread spectrum radio devices and spectrum management policy, see *infra* notes 31, 52 and 163.

developed concomitantly with lowered First Amendment protection for broadcasters.[5] Since then, broadcasters must apply for costly government-issued licenses to speak over the airwaves, and unlicensed broadcasters face sanctions.[6]

Tension persists between unlicensed broadcasters and the government's licensing requirements. This time, the tension is technology-based. Radio modulation technology has advanced beyond the technological limitations that perpetuated the interference problem and perceived spectrum scarcity.[7] In particular, frequency hopping spread spectrum ("FHSS") modulation is one form of radio technology that could reduce the risk of interference with licensed radio broadcasts, and therefore reduce or eliminate the tension.[8]

This article argues that a FHSS broadcaster could defeat the constitutionality of certain government restraints on broadcast speech on an as applied basis because FHSS devices marginally, if at all, interfere with licensed per frequency broadcasts. Without a significant risk of interference, the free speech interests of speaker and public align against government restraints on speech and support a narrow exception to the government's constitutional authority to restrain the speech FHSS broadcasters.[9] Part II

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[5] *See Red Lion Broad. Co*., 395 U.S. at 388 (holding that interference with public's ability to receive broadcast signals justifies lower standard of First Amendment protection for broadcasters).

[6] For a discussion of section 301 requirements, see *infra* notes 42-46 and accompanying text.

[7] For a discussion of advances in radio modulation technology, see *infra* notes 107-131 and accompanying text.

[8] For a discussion of frequency hopping spread spectrum ("FHSS") technology, see *infra* notes 107-131 and accompanying text. For a discussion of proposed regulatory structures over FHSS technology, see *infra* notes 132-148 and accompanying text.

[9] For a discussion of how the free speech interests of speaker and public align against government restraints on speech, see *infra* notes 149-199 and accompanying text.

provides an overview of the constitutional framework that governs broadcast as a speech medium.[10] This Part briefly describes the history of broadcast regulation and Supreme Court holdings that support government restraints on broadcast speech.[11] It discusses FHSS radio modulation technology within the context of governmental restraints on broadcast speech.[12] Finally, this Part introduces the spectrum commons model as a possible regulatory model for spectrum management policy.[13] Part III then argues that an unlicensed broadcaster operating a FHSS device could successfully challenge the validity of governmental restraints on broadcast speech because the use of FHSS technology aligns the free speech interests of speaker and public in a manner distinct from early broadcast technology.[14] This Part contends that broadcasters using FHSS devises should be treated distinctly from broadcasters using per frequency devices within the Supreme Court's interest balancing test.[15] Moreover, this Part introduces some of the reasons why

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[10] For a discussion of the constitutional framework, see *infra* notes 18-55 and accompanying text.

[11] For a discussion of the history of broadcast regulation, see *infra* notes 57-77 and accompanying text.

[12] For a discussion of frequency hopping spread spectrum modulation, see *infra* notes 107-131 and accompanying text.

[13] "Spectrum commons" refers to the public ownership of spectrum and the decentralization of access to the spectrum. *See* Philip J. Weiser & Dale N. Hatfield, *Policing the Spectrum Commons*, 74 FORDHAM L. REV. 663, 673-680 (2005). Under a spectrum commons model of spectrum management, any broadcaster could broadcast on radio spectrum. *See id.* FCC would impose certain technical standards controlling the power output on particular devices to mitigate the effects of interference. *See id.* The technical standard would be enforced through a certification requirement on device manufacturers. *See id.* For a discussion of the spectrum commons model for broadcast regulation, see *infra* notes 141-148 and accompanying text.

[14] For a discussion of a hypothetical as applied challenge to the FCC licensing regime, see *infra* notes 149-199 and accompanying text.

[15] For a discussion of how broadcasters using FHSS devises should be treated distinctly from broadcasters using per frequency devices, see *infra* notes 155-167 and accompanying text.

members of the listening public who use, or would use, FHSS devices should be considered distinctly within the Supreme Court's analytic framework.[16] Finally, Part IV concludes that the Supreme Court should reconsider the alignment of Free Speech interests under its interest-balancing test when unlicensed FHSS broadcasters speak.[17]

## II. BACKGROUND: REGULATING BROADCAST AS A SPEECH MEDIUM

### *A. Broadcast Speech Within the Free Speech Framework*

The Free Speech Clause[18] guarantees open and democratic communication that is essential to self-government and social order.[19] For constitutional purposes, speech may be classified into two categories: protected and unprotected. A governmental restraint on protected speech generally must satisfy a heightened standard of review: a narrowly tailored, compelling governmental interest must justify the government's restraint on speech.[20] Conversely, unprotected speech receives no First Amendment protection.[21]

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[16] For a discussion of why members of the listening public who use, or would use, FHSS devices should be considered distinctly within the Supreme Court's analytic framework, see *infra* notes 168-173 and accompanying text.

[17] For a discussion of summary of the argument why frequency hopping spread spectrum broadcasts could defeat the constitutionality of section 301 on an as applied basis, see *infra* Part IV.

[18] U.S. CONST. AMEND. I, cl. 3 ("Congress shall make no law . . . abridging the freedom of speech . . . .").

[19] *Red Lion*, 395 U.S. at 390 ("It is the purpose of the First Amendment to preserve an uninhibited marketplace of ideas in which truth will ultimately prevail"); *see also* Gregory P. Magarian, *The Jurisprudence of Colliding First Amendment Interests: From the Dead End of Neutrality to the Open Road of Participation-Enhancing Review*, 83 NOTRE DAME L. REV. 185, 187 (2007) (discussing purpose of Free Speech Clause as advancing social order and self-government); *see generally* William J. Brennan, Jr., *The Supreme Court and the Meiklejohn Interpretation of the First Amendment*, 79 HARV. L. REV. 1 (1965) (commenting on history of Supreme Court decisions adhering to self-governance role of First Amendment).

[20] *See, e.g.*, Reno v. ACLU, 521 U.S. 844, 870 (1997) (applying heightened standard of review to regulation of Internet users); Turner Broad. Sys., Inc. v. Fed. Commc'n Comm'n, 512 U.S. 622, 639 (1994) (applying heightened standard of review to regulation

Protected speech transmitted over a broadcast medium, however, differs from other types of speech transmitted over other types of media that receive full First Amendment protection.[22] When broadcast speech is involved, the Court balances the competing free speech interests of speaker (broadcaster) and listener (public).[23] Instead of deciding free speech challenges under an immutable structural framework, the Court has generally found that the public's interest in receiving speech is weightier than the broadcaster's interest in transmitting speech due to technological realities.[24] In the context of government regulation over broadcasters' speech, the public's interest outweighs the speaker's interest.[25]

Distinctly, broadcast as a speech medium receives a lower standard of First Amendment scrutiny than other types of free speech media.[26] The exact scope of the

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of cable television operators); Sable Commc'n of Cal., Inc. v. Fed. Commc'n Comm'n, 492 U.S. 115, 126 (1989) (requiring government showing of compelling interest, narrow tailoring and least restrictive means to ban outright on indecent and obscene interstate commercial telephone messages); Buckley v. Valeo, 424 U.S. 1, 15 (1976) (holding that First Amendment requires strict scrutiny review when government limits political contributions); Miami Herald Publ'g Co. v. Tornillo, 418 U.S. 241, 256 (1974) (subjecting regulations of print media to heightened standard of review).

[21] *See, e.g.*, Miller v. California, 413 U.S. 15, 23 (1973) ("Obscene material is unprotected by the First Amendment.").

[22] *Compare* Reno v. Am. Civil Liberties Union, 521 U.S. 844, 870 (1997) (applying heightened standard of review to regulation over Internet users), *with* Turner Broad. Sys., Inc. v. Fed. Commc'n Comm'n, 512 U.S. 622, 637-639 (1994) (holding physical characteristics of broadcast medium justifies lower standard of scrutiny).

[23] *See, e.g.*, *Red Lion*, 395 U.S. at 386-98 (balancing interests of speaker and listening public in context of broadcast regulation).

[24] *See id.*

[25] *See id.* at 390 ("It is the right of the public to receive suitable access to social, political, esthetic, moral, and other ideas and experiences which is crucial here. That right may not constitutionally be abridged either by [the government].").

[26] *Compare Reno*, 521 U.S. at 870 (applying heightened standard of review to regulation over Internet users), *with Turner*, 512 U.S. at 637-639 (holding physical characteristics of broadcast medium justifies lower standard of scrutiny).

"public interest" standard remains undefined, but it bounds between intermediate scrutiny and an elevated level of rational basis review.[27] The Court carved out a broadcast exception to its customary Free Speech Clause jurisprudence because broadcast is a unique and pervasive speech medium.[28]

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[27] *See Turner*, 512 U.S. at 639 (discussing application of "more relaxed standard of scrutiny" for broadcast regulation and rejecting relaxed standard of scrutiny and strict scrutiny review for cable television operators); *cf.* Denver Area Educ. Telecommc'n Consortium v. Fed. Commc'n Comm'n, 518 U.S. 727, 814 (1996) (Thomas, J., dissenting in part) (arguing for strict scrutiny review because history of cable operator cases indicates that Supreme Court "ha[s] drawn closer to recognizing that cable operators should enjoy the same First Amendment rights as nonbroadcast media").

Under the First Amendment, content-based regulations over speech are subject to strict scrutiny review, whereby the government must show that a governmental regulation is narrowly tailored to further compelling state interest. *See, e.g.*, *Turner*, 512 U.S. at 680. By contrast, intermediate scrutiny review applies to government regulations of commercial speech and content-neutral government regulations of speech. *See, e.g.*, Cent. Hudson Gas & Elec. Corp. v. Pub. Serv. Comm'n of N.Y., 447 U.S. 557, 566 (1980) (applying intermediate scrutiny standard of review to government regulation of commercial speech); *Turner*, 512 U.S. 642 (applying intermediate standard of review to content-neutral government regulation of speech). To sustain a free speech challenge of a governmental regulation of commercial speech concerning lawful activity, the government must show that the regulation: (1) "directly advances" a substantial governmental interest and (2) is narrowly tailored to the point where the regulation is no more extensive than necessary to serve the asserted governmental interest. *See Cent. Hudson*, 447 U.S. at 566. To sustain a free speech challenge against a governmental regulation of non-commercial speech, the government must show that the regulation: (1) furthers a substantial governmental interest; (2) is unrelated to the suppression of free expression; and (3) is narrowly tailored, although the regulation need not be the least speech-restrictive mean of furthering the governmental interest. *See Turner*, 512 U.S. at 662 (applying *O'Brien* test). Free Speech claims are not subject to rational basis review, whereby the government must show a rational relation between governmental and end. *See, e.g.*, Romer v. Evans, 517 U.S. 620, 631 (1996) (applying rational basis review under Equal Protection claim).

[28] The Court noted that the "unique physical limitations of the broadcast medium" necessitate a lower threshold of protection than with other speech mediums. *Turner*, 512 U.S. at 637.

### *B. Government Regulation of Broadcast Speech*

Regulations over broadcast speech arose because, in the absence of governmental regulation, broadcasters interfered with one another.[29] Interference produced chaos for the listening public because broadcasters effectively jammed each other's signals.[30] Interference occurred because (per frequency) radio technology depended upon powerful, clear signals broadcast to produce intelligible sound.[31] Moreover, early radio receiver

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[29] *Red Lion*, 395 U.S. at 388 (recounting reason for Congress's enactment of Radio Act of 1927 and Communications Act of 1934); *see also* Nat'l Broad. Co. v. United States, 319 U.S. 190, 213 (1943) ("[T]he radio spectrum simply is not large enough to accommodate everybody. There is a fixed natural limitation upon the number of stations that can operate without interfering with one another."). For a discussion of FCC's definition of interference, see *supra* note 4.

[30] *See, e.g.*, *Red Lion*, 395 U.S. at 388 (recounting history of and justification for government regulation of broadcast).

[31] *See* Ellen P. Goodman, *Spectrum Rights in the Telecosm to Come*, 41 SAN DIEGO L. REV. 269, 279-80 (2004) (describing operation of per frequency radio). Goodman observed:

> Radio communication ends with the receiver. Once emitted into the atmosphere, a radio signal will interact with any receiving antenna in its path that is tuned to the relevant frequency range. Ideally, only those receivers that are designed to respond to the given radio signal will accept it, and the rest will reject the signal as unwanted noise. Unfortunately, radio signals cannot be contained within a target band of frequencies. The power radiated by a transmitter will attenuate over a range of frequencies, inevitably spilling over into adjacent bands. Many receivers will be unable to reject the unwanted signals as noise without the use of expensive filters and digital processing devices, and even with these devices, many receivers will be unable to eliminate unwanted signals entirely. Instead, users will experience the unwanted signals as interference, which either interrupts or disrupts the desired service. Thus, radio signals transmitted on the same or adjacent frequencies, within the same general area, and at the same time tend to interfere with one another. It is the allocation of entitlements to cause this interference, or the obligation to bear or avoid it, that is at the core of spectrum law.

*Id.; see also Red Lion*, 395 U.S. at 387-88.

technology could only modulate signals traveling over one frequency.[32] On the receiver side of the broadcast, a user would tune the radio to a particular frequency to receive a broadcast; the user's identification of the radio signal was accomplished entirely through the act of tuning.

Per frequency signal identification had several implications. First, per frequency modulation required that one, and only one, broadcaster broadcast over any given radio frequency within a certain geographic area without causing significant interference for listeners.[33] Second, early per frequency modulation technology necessitated an absence of broadcasters on immediately adjacent frequencies in the same geographic area to provide clarity and prevent jamming.[34] Finally, primitive radio receivers could only modulate radio signals from one frequency at a time.[35]

These limitations produced a problematic result: the number of radio broadcasters quickly surpassed the available frequencies, and broadcasters began to interfere with each other's radio signals.[36] A chaotic environment ensued and harmed the listening public's ability both to receive protected speech and fully utilize broadcast as an effective speech medium.[37] Congress concluded that demand for broadcast frequencies would outstrip the

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[32] *See id.* Modulation refers to "changing the characteristics of a radio wave of a given frequency." *See* Philip J. Weiser & Dale N. Hatfield, *Spectrum Policy Reform and the Next Frontier of Property Rights*, 15 GEO. MASON L. REV. 549, 556 (2008). "Frequency modulation" ("FM") refers to the method of "vary[ing] the carrier frequency in proportion to the amplitude of the modulating signal." Fed. Commc'n Comm'n, Glossary of Telecommunications Terms, http://www.fcc.gov/glossary.html (last visited Oct. 5, 2008).
[33] *See* Goodman, *supra* note 31, at 280.
[34] *Cf. id.*
[35] *Cf. id.*
[36] *See Red Lion*, 395 U.S. at 388.
[37] *See id.*

supply of available frequencies.[38] It responded by passing comprehensive legislation to regulate the airwaves.[39]

Congress' first successful regulatory regime over the airwaves was the Communications Act of 1934 ("Act").[40] The Act established the Federal Communications Commission ("FCC") to regulate access to broadcasting equipment and access to radio spectrum.[41] Section 301 of the Act and FCC regulations restrain broadcast speech by outlawing the operation of any device that could broadcast intra- or

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[38] *See id.* at 386 (describing Congress' purpose for regulating electromagnetic spectrum).
[39] *See id.* (holding that technology necessitated government regulation over its use).
[40] *See* Communications Act of 1934, Pub. L. No. 73-416, 48 Stat. 1064 (1934) (codified as amended at 47 U.S.C. §§ 151-614 (2006)).

The government first attempted to regulate comprehensively the electromagnetic spectrum with the Radio Act of 1927. *See* 47 U.S.C. §§ 81-83 (1927) (repealed 1934) (replacing Radio-Communications Act of 1912, 47 U.S.C. §§ 51-63 (1912) (repealed 1927), which did not regulate electromagnetic spectrum comprehensively). Under the Radio Act of 1927, Congress delegated the authority to regulate the airwaves to the Department of Commerce ("DOC"). Radio Act of 1927, Pub. L. No. 69-632, 44 Stat. 1162-74 (repealed 1934) (forbidding operation of broadcast device without license from Secretary of Commerce and creating regulatory regime for broadcast spectrum). The delegation of authority over the electromagnetic spectrum produced immediate problems because DOC could not adequately regulate either the broadcast licensing procedures or access to radio spectrum. First, there were insufficient frequencies allocated for private broadcasters. *See, e.g.*, Nat'l Broad. Co. v. United States, 319 U.S. 190, 212 (1943). Thus, many broadcasters continued to broadcast on unassigned frequencies and interfere with licensed broadcasts. *See id.* Second, the regulatory regime was not scalable, so it could not accommodate the growing popularity of radio. *See id.* Finally, the Secretary of Commerce was not permitted to deny applicants' broadcasting licenses. *See id.* Congress replaced the Radio Act of 1927 with the Communications Act of 1934. *See* Pub. L. No. 73-416, 48 Stat. 1064 (1934).

The lack of adequate top-down regulation created tumultuous market conditions that made broadcasting at least inconvenient and at most impractical for commercial enterprises. *See id.* Further, courts found several defects in the authorizing act, invalidated them and reduced the DOC's effectiveness in regulating the radio spectrum. *See id.* Consequently, DOC's regulations proved untenable and were abandoned. *See id.*
[41] The Federal Communications Commission replaced its Radio Act predecessor, the Federal Radio Commission. *See* 47 U.S.C. § 151 (2006).

interstate radio signals except pursuant to a FCC issued license.[42] The Act asserted government control over the radio spectrum for the "public convenience, interest, or necessity."[43] Under section 301, FCC's regulatory activities must encourage "the larger and more effective use of radio in the public interest."[44] For that purpose, FCC may divide the electromagnetic spectrum into specific frequencies and licensed portions of the spectrum to individual users.[45] FCC essentially makes content-based decisions about which types of speech the public may access over the airwaves.[46]

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[42] *See* 47 U.S.C. § 301 (2006) ("No person shall use or operate any apparatus for the transmission of energy or communications or signals by radio . . . except under and in accordance with this chapter and with a license in that behalf granted under the provisions of this chapter"); 47 U.S.C. § 302a(a) (2006) ("The Commission may, consistent with the public interest, convenience, and necessity, make reasonable regulations . . . governing the interference potential of devices which in their operation . . . cause harmful interference to radio communications"); 47 U.S.C. § 510 (2006) (providing that "[a]ny electronic, electromagnetic, radio frequency, or similar device, or component thereof, used, sent, carried, manufactured, assembled, possessed, offered for sale, sold, or advertised with willful and knowing intent to violate section 301 or 302a of this act, or rules prescribed by the Commission under such sections, may be seized and forfeited.")

[43] *See* 47 U.S.C. §§ 302a, 303 (2006) (describing public interest standard under which FCC may regulate).

[44] 47 U.S.C. § 303(g) (2006).

[45] *See* 47 U.S.C. § 303(y) (2006).

[46] *See* 47 U.S.C. § 303(a)-(f) (2006); Red Lion Broad. Co., Inc. v. Fed. Commc'n Comm'n, 395 U.S. 367, 394 (1969) (upholding "Fairness Doctrine"); *see also* Ellen Goodman, *No Time for Equal Time: A Comment on Professor Magarian's Substantive Media Regulation in Three Dimensions*, 76 GEO. WASH. L. REV. 897, 900-03 (2008) (describing substantive decision-making process underlying application of fairness doctrine and arguing against plausibility of revived regulations over substantive speech). *But see* Gregory P. Magarian, *Substantive Media Regulation in Three Dimensions*, 76 GEO. WASH. L. REV. 845 (2008) (arguing for revival of substantive regulations over speech, as component of access rights, to preserve open, public and democratic debate underlying right to free speech). For a discussion of the fairness doctrine, see *infra* note 58.

FCC may restrain broadcast speech pursuant to the public interest.[47] The Court determined that the standard unambiguously refers to the "interests of the listening audience in 'the larger and more effective use of radio.'"[48] Broadcast licensees therefore serve the listening public's interests.[49] Because FCC may restrain broadcast speech only under the public interest, the standard serves as a narrow limitation on government restraints of broadcast speech.

Undeniably, some government restraints of speech may be justified under the public interest standard.[50] Restraints on broadcast speech may be justified because of the unique and pervasive nature of broadcast technology.[51] Certain radio technology is particularly prone to waste, and interference is a persistent problem for certain types of radio devices.[52]

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[47] *See* 47 U.S.C. §§ 302a, 303; *see also Red Lion*, 395 U.S. at 389 ("[T]o deny a station license
because 'the public interest' requires it 'is not a denial of free speech.").

[48] Nat'l Broad. Co., Inc. v. United States, 319 U.S. 190, 216 (1943) (quoting 47 U.S.C. § 309(g)).

[49] *See id.*

[50] *See Red Lion*, 395 U.S. at 388 (describing era of chaos, in which public was unable to receive broadcast speech, without government regulation of electromagnetic spectrum).

[51] *See* Fed. Commc'n Comm'n v. League of Women Voters of Cal., 468 U.S. 364, 379-81 (1984) (justifying broadcast regulation on scarcity and, alternatively, on pervasive nature of broadcast); Fed. Commc'n Comm'n v. Pacific Found., 438 U.S. 726, 748-49 (1979) (justifying broadcast regulation on scarcity and, alternatively, on protection of children from pervasive and accessible nature of broadcast).

[52] *See Nat'l Broad. Co.*, 319 U.S. at 216. For example, per frequency listeners located close to radio transmission towers may experience the impaired reception of other stations due to the power and proximity of the listener to the broadcast tower. *See* Fed. Commc'n Comm'n, *The Public and Broadcasting: How to Get the Most Service from Your Local Station* (Jul. 2008), *available at* http://www.fcc.gov/mb/audio/decdoc/public_and_broadcasting.html#_Toc202587518. Interference may also derive from the sophistication of the device used by a listener. *See, e.g.*, FCC Consumer Facts: Interference: Defining the Source, http://www.fcc.gov/cgb/consumerfacts/interference.html (last visited Oct. 5, 2008). For a

Section 301 addressed these issues by delegating to FCC the authority to restrain speech pursuant to the public interest.[53] FCC determined that the licensing requirement—a restraint on speech—was the most effective manner to ensure that the public could access speech without the risk of interference.[54] FCC therefore licenses specific frequencies for exclusive use by select broadcasters.[55] In imposing per frequency exclusivity on licenses, FCC created order from chaos in furtherance of the public's interest in receiving broadcast speech.[56]

### *C. Developing the Scarcity Rationale*

An early and significant challenge to FCC regulatory power arrived in *Red Lion Broadcasting Co. v. Federal Communications Commission*.[57] There, the Supreme Court recognized that FCC could impose additional requirements on broadcasters' licenses,

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discussion of the chaos that reigned in the predominance of early radio receivers, see *supra* note 40 and accompanying text. Nevertheless, some evidence exists that advances in wireless technologies will not diminish the persistence or presence of interference. *See* Thomas W. Hazlett, *A Law & Economics Approach to Spectrum Property Rights: A Response to Weiser and Hatfield,* 15 GEO. MASON L. REV. 975, 992 (2008) [hereinafter Hazlett, *Law & Economics*]. One commentator notes that a corollary to Cooper's Law, which postulates that wireless communications capacity doubles each 2.5 years, is that demand also increases in proportion to capacity. *See id.* (describing how each bandwidth innovation serves as incentive for creation of additional wireless applications to take advantage of additional bandwidth). Thus, with each innovation in wireless bandwidth capacity, conflicts inevitably develop because demand correspondingly increases. *See id.* Such a relationship presents a structural conflict that engineering or innovation may or may not be able to eliminate. *See id.*

[53] *See* 47 U.S.C. § 301 (2006) ("No person shall use or operate any apparatus for the transmission of energy or communications or signals by radio . . . except under and in accordance with this chapter and with a license in that behalf granted under the provisions of this chapter.").

[54] *See* Red Lion Broad. Co. v. Fed. Commc'n Comm'n, 395 U.S. 367, 388 (1969) (holding that FCC allocation of spectrum was most efficient means to preserve free speech).

[55] See *Nat'l Broad. Co., Inc.*, 319 U.S. at 216; *see also* 47 C.F.R. § 2.100-108 (2008).

[56] *See Red Lion* 395 U.S. at 376-77.

[57] 395 U.S. at 386 (1969).

such as a right of reply for certain individuals (the now-defunct FCC "Fairness Doctrine"), pursuant to FCC's authority to regulate the public interest.[58] Importantly, the Court applied a lower standard of protection under the First Amendment for otherwise protected broadcast speech.[59] Such lower protection contrasts with the heightened

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[58] *See id.* at 400-01. The Fairness Doctrine required licensed broadcasters to cover issues of importance to the licensee's community and provide a reasonable opportunity for contrasting viewpoints to be heard. *See* Magarian, *supra* note 46, at 845-46; Charles W. Logan, Jr., *Getting Beyond Scarcity: A New Paradigm for Assessing the Constitutionality of Broadcast Regulation*, 85 CAL. L. REV. 1687, 1694 (1997). The two elements of the fairness doctrine are the personal attack rule and the political editorial rule. *See* Logan, *supra*, at 1688. The personal attack rule provides:

> When, during the presentation of views on a controversial issue of public importance, an attack is made upon the honesty, character, integrity or like personal qualities of an identified person or group, the licensee shall . . . transmit to the persons or group attacked: (1) [n]otification of the date, time and identification of the broadcast; (2) [a] script or tape (or an accurate summary if a script or tape is not available) of the attack; and (3) [a]n offer of a reasonable opportunity to respond over the licensee's facilities.

47 C.F.R. § 76.1612(a) (2008). The political editorial rule provides:

> Where a licensee, in an editorial, (1) [e]ndorses or, (2) [o]pposes a legally qualified candidate or candidates, the licensee shall . . . transmit to, respectively, (i) [t]he other qualified candidate or candidates for the same office or, (ii) [t]he candidate opposed in the editorial, (A) [n]otification of the date and the time of the editorial, (B) [a] script or tape of the editorial and (C) [a]n offer of reasonable opportunity for the candidate or a spokesman of the candidate to respond over the licensee's facilities.

47 C.F.R. § 76.1613 (2008). FCC has since held that the fairness doctrine violates the First Amendment. *See* In re Complaint of Syracuse Peace Council Against Television Station WTVH, 2 F.C.C.R. 5043, 5052 (1987), *aff'd sub nom.* Syracuse Peace Council v. Fed. Commc'n Comm'n, 867 F.2d 654 (D.C. Cir. 1989).

[59] *Red Lion*, 395 U.S. at 386 (holding that broadcast media are subject to lower level of scrutiny than other mediums of speech).

scrutiny standards applied to other speech media.[60] The Court rationalized the necessity of lower free speech protection for broadcast speech because of a perceived limitation in the supply of broadcast spectrum.[61] The Court applied a lower standard of First Amendment protection because several important differences exist between broadcast and other speech media.

First, the Court found that interference ultimately hinders the public interest in receiving information.[62] Radio waves reached farther than the human voice.[63] Consequently, a single broadcaster's signal (speech) posed a high risk of interfering with another broadcaster's signal (speech).[64] Therefore, regulation was needed to preserve the effectiveness of radio as a speech medium.[65] Second, the Court found that FCC's division of the electromagnetic spectrum preserved the public's ability to access radio by decreasing the possibility that listeners would encounter interference when listening to a licensed frequency.[66] Radio technology depended on powerful, clear signals from

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[60] *See id.* For a discussion of the application of strict scrutiny to other speech mediums, see *supra* note 20 and accompanying text. For a discussion of the distinction between the strict scrutiny, intermediate scrutiny and rational basis standards of review, see *supra* note 27 and accompanying text.

[61] *See id.* at 386 (determining that (1) broadcasting is medium affected by First Amendment interests and (2) technological limitations in broadcasting speech medium necessitate different standard of First Amendment protection than other speech mediums).

[62] *See id.*

[63] *See id.* at 388 (distinguishing broadcast communication from face-to-face communication between two individuals). For a description of the interference problem, see *supra* notes 4, 31, 52 and *infra* note 163.

[64] *See id.* ("[O]nly a tiny fraction of those with resources and intelligence can hope to communicate by radio at the same time if intelligible communication is to be had.").

[65] *See id.* (holding that division and subdivision of radio spectrum enabled allocation of particular frequencies for particular uses, such as emergency personnel use, military use and public use).

[66] *See id.*

individual frequencies.[67] Correspondingly, FCC's regulations necessarily limited the aggregate amount of radio spectrum available for public use to provide for powerful, clear signals from licensed broadcasters.[68] Because of perceived scarcity in the number of frequencies on which to broadcast, the "Scarcity Rationale" developed and distinguished broadcast media from other speech media.[69]

The Court also identified and distinguished between the free speech interests of broadcaster (speaker) and listening public.[70] It ultimately found that the two free speech interests competed with each other in the context of broadcast regulation.[71] Therefore, the Court balanced the interests of speaker and listening public to determine which interest should garner First Amendment protection.[72] The Court held that the public's interest in receiving speech outweighs broadcasters' interests in speaking.[73] Broadcasters act as "proxies for the entire community, [and are] obligated to give suitable time and attention to matters of great public concern."[74] Through broadcast speech, the public accesses "social, political, esthetic, moral, and other ideas and experiences."[75] Such access, the Court reasoned, contributes to a marketplace of ideas that facilitates the

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[67] *See id.; cf.* Goodman, *supra* note 31 at 279-80.
[68] *See id.* (noting that frequency allocation program used by government to regulate broadcast speech limits aggregate availability of frequencies for broadcast).
[69] *See id.* (holding that scarcity of broadcast frequencies created exception in context of broadcast for First Amendment's ordinarily heightened standard of review).
[70] *See id.*
[71] *See generally id.*
[72] *See id.*
[73] *See id.* at 390 ("It is the rights of viewers and listeners, not the right of broadcasters, which is paramount."). The Court also determined that broadcasters have no constitutional right to hold a broadcast license or exclude private or public actors from a licensed frequency. *See id.* at 389 (discussing privileges conferred by broadcast license).
[74] *Id.* at 394 (discussing role of broadcasters in regulated broadcast spectrum market).
[75] *Id.* (analyzing right of public that may not be infringed upon by government).

public's search for truth.[76] Under this rationale, FCC's restraints on speech, in the form of licensing restrictions and requirements, comported with the public's weighty interest in receiving speech.[77]

### *D. Criticism of the Scarcity Rationale*

The Scarcity Rationale has been criticized on many fronts. First, the physical assumptions upon which the Scarcity Rationale is based are flawed.[78] The Scarcity Rationale assumes that there is an actual, physical scarcity of spectrum.[79] The electromagnetic spectrum, however, does not have a physical existence apart from electromagnetic radiation produced by a broadcast signal.[80] Speech that is transmitted

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[76] *See id.* (holding that marketplace of ideas should prevail under FCC licensing scheme rather than yielding monopolization of market by public or private actors).

[77] *See id.* at 390 (holding that in system of scarcity FCC may restrain licensees, in favor of other viewpoints, to facilitate public's right to experience free speech).

[78] *See, e.g.*, John W. Berresford, *The Scarcity Rationale for Regulating Traditional Broadcasting: An Idea Whose Time Has Passed* 8-9 (Media Bureau Staff Research Paper No. 2005-2), at, *available at* http://hraunfoss.fcc.gov/edocs_public/attachmatch/DOC-257534A1.pdf (discussing scientific flaws of physics assumption upon which Scarcity Rationale based).

[79] *See Red Lion*, 395 U.S. at 376 (arguing that broadcast frequencies are a scarce resource).

[80] *See* Berresford, *supra* note 78, at 9 (discussing improper labeling used by Supreme Court in Scarcity Rationale series of cases in determining that electromagnetic spectrum was scarce); *see also* Glen O. Robinson, *The Electronic First Amendment: An Essay for the New Age*, 47 DUKE L.J. 899, 912 (1998) (explaining that it is disingenuous to describe electromagnetic spectrum as public property). Broadcast signals entail the movement of electrons, which produces radiation. *See* Berresford, *supra* note 78, at 9 (discussing physical properties of broadcast spectrum). "Spectrum" measures a broadcast signal's physical result. *See id.* (explaining physical result of radio signal transmission and explaining implication and absurdity of Scarcity Rationale when applied to other forms of electromagnetic transmission, such as telephone signaling). A common analogy used to describe this process is the creation of a wave in water. *See, e.g.*, *id.* Under that analogy, a broadcast signal would be an activity on the surface of the water like a wave, but it is no the water itself. *See id.* at 9 (explaining process of creating radio wave). The Court in *Red Lion* improperly characterized the electromagnetic spectrum as the water itself. *See id.*

through the air is as equally scarce as speech transmitted by wire.[81] Therefore, the Court's assumption concerning spectrum scarcity was disingenuous to the physical properties of broadcast signals.[82]

Actual scarcity derives from radio's early technological limitations, in accordance with which FCC restricted speech.[83] Congress and the courts assumed that only one speaker could broadcast on a single frequency at one time—a state of technology that was subject to change.[84] The command-and-control approach was perhaps appropriate for the then-existing radio receiver technology, which required powerful, clear signals for the modulation process to operate properly.[85] Modern radio transmitters and receivers have

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[81] *See id.* (noting dangerous consequences of Scarcity Rationale because of ready application to other means of communication employing use of radiation).

[82] For a discussion of criticism of the Scarcity Rationale based upon physical scarcity, see *supra* notes 78-81 and accompanying text.

[83] *See* Paul Baran, Keynote Address at Eighth Annual Conference on Next Generation Networks, *Visions of the 21st Century Communications: Is the Shortage of Radio Spectrum for Broadband Networks of the Future a Self Made Problem?*, ¶ 1, ¶¶ 29-32 (Nov. 9, 1994), *available at* http://w2.eff.org/Infrastructure/Wireless_cellular_radio/false_scarcity_baran_cngn94.transcript (criticizing property rights-influenced regulatory framework of electromagnetic spectrum); *see also* Weiser & Hatfield, *supra* note 32, at 549 ("The scarcity of wireless spectrum reflects a costly failure of regulation. In practice, large swaths of spectrum are vastly underused or used for low value activities . . . ."); Berresford, *supra* note 78, at 11-12 ("'[S]carcity' is largely the result of decisions by government, not an unavoidable fact of nature."). Berresford noted that the government's policy decisions regarding "spectrum allocation (especially for traditional broadcasting), channel bandwidth, interference protection, local coverage and other technical matters" affected the availability of broadcast licenses. *See id.* (criticizing regulatory framework governing spectrum on economic grounds). Moreover, FCC policies granted free use of broadcast licenses skewed market supply for broadcast licenses. *See id.* (criticizing government policies of granting free licenses to certain broadcasters).

[84] *See* Baran, *supra* note 83, ¶ 29 (discussing property rights influence upon FCC broadcast licenses).

[85] *See id.* (noting limitations in early broadcast technology). The ability to exclude other broadcasters from unlicensed frequencies therefore became a paramount concern of licensees and the government. *See id.* (recounting development of property rights

advanced beyond those early technological limitations.[86] Such recent developments reveal scarcity as an artificial creation lingering from an outmoded understanding of radio technology.[87]

Moreover, spectrum abundance, rather than scarcity, has prevailed since *Red Lion*.[88] Spectrum abundance proliferated because the Scarcity Rationale and subsequent government regulation preserved a system of overly cautious broadcast license distribution.[89] Some commentators criticize the rationale because scarcity exists for all modes of communication.[90] Particularly, one commentator observed that much of the

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influence in FCC broadcast licensing because of paramount need to exclude other broadcasters from certain frequencies to ensure clarity and strength of broadcast signal).

[86] *See id.* ¶¶ 29-32 (criticizing current regulatory framework over broadcast signals). For a discussion of frequency hopping spread spectrum radio technology, see *infra* notes 107-131 and accompanying text.

[87] *See id.*

[88] *See, e.g.*, *id.* ¶¶ 12-13, 15-16, 41 (discussing value of digital data transmission and reception for wireless network optimization and myth of UHF spectrum scarcity); *see also id.* ¶ 41 ("A counter hypothesis . . . is that there is really no real shortage and what we are seeing is a manifestation of a self made problem that would go away if we made better use of our present known technology.").

[89] *See* Baran, *supra* note 83, ¶ 30 (criticizing property rights influence on broadcast regulation, which resulted in significant barriers to enter broadcast market for potential broadcasters, and noting that advances in technology abrogate need for property rights model of spectrum regulation). Baran observed "the lawyers' real estate model of frequencies is but a zero sum game; while the communications engineer views it as a game where many more can win." *Id.*

[90] *See, e.g.*, Berresford, *supra* note 78, at 10 (discussing how Scarcity Rationale assumes that electromagnetic spectrum is finite and noting that everything, in that sense, is finite); Weiser & Hatfield, *supra* note 32 (criticizing Scarcity Rationale from economic perspective and promoting spectrum commons model for spectrum management policy); Philip J. Weiser & Dale N. Hatfield, *Property Rights in Spectrum: A Reply to Hazlett*, 15 GEO. MASON L. REV. 1025 (2008) (responding to critics of spectrum commons model that promote property rights model for spectrum management policy). *But see* Hazlett, *Law & Economics*, *supra* note 52 (criticizing spectrum commons model for electromagnetic spectrum and advocating for property rights model from economic perspective); Thomas W. Hazlett, *A Rejoinder to Weiser and Hatfield on Spectrum Rights*, 15 GEO. MASON L.

electromagnetic spectrum is underutilized.[91] Indeed, FCC concluded that "portions of the radio spectrum are not in use for significant periods of time."[92] Both weak and silent signals represent "spectrum gaps" of underused spectrum that represent forever-wasted

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REV. 1031 (2008) (criticizing specific examples used to advocate for spectrum commons model).

Radio, until recently, has remained relatively stagnant in developing as a speech medium. *See* Berresford, *supra* note 78, at 10 (arguing economic waste of Scarcity Rationale when contrasted with innovations on certain unregulated bands); *see also* Goodman, *supra* note 31, at 366 (arguing that today's radios are "dumb" because their hardware operates on narrow range of frequencies with limited abilities to distinguish between desirable and undesirable emissions or "noise"); Rob Frieden, *Balancing Equity and Efficiency Issues in the Management of Shared Global Radiocommunication Resources*, 24 U. PA. J. INT'L ECON. L. 289, 314 (2003) (identifying recent trends in signal processing and arguing for revision of spectrum management policy).

Conversely, unregulated Industrial Scientific and Medical bands (commonly known as "garbage bands") have produced new communicative devices such as WiFi access points and wireless telephones. *See* Baran, *supra* note 83, ¶ 45 (discussing innovations on unregulated garbage bands). These devices have produced new speech mediums and offer nearly unlimited access for speakers.

Commentators also dispute the legitimacy of scarcity under an economic analysis. For example, paper has been in short supply at various points throughout American history, but the government never used scarcity to justify restraint on the speech of newspapers through a licensing requirement. *See* Berresford, *supra* note 78, at 10. In other contexts, recent reports project that Internet bandwidth itself has become scarce. *See, e.g.*, Steve Lohr, *Video Road Hogs Stir Fear of Internet Traffic Jam*, N.Y. TIMES, Mar. 13, 2008, *available at http://www.nytimes.com/2008/03/13/technology/13net.html* (reporting growing chorus of concern that increased data traffic on Internet will slow or otherwise impede users' abilities to use Internet). Increased data transfers could breed a scarcity of bandwidth and impede users' ability to transmit and receive data—much like the early days of unregulated radio broadcasts. *See id.* (reporting how demand for bandwidth in United States is outstripping supply and projecting that there could be certain classes of information that Internet users would not be able to transmit or receive over Internet). Nevertheless, no proposals suggest restraining the Internet as a speech medium under a scarcity analysis.

[91] *See* Baran, *supra* note 83, ¶ 12-13 (discussing how advanced signal processing technology could use weak or silent UHF signals).

[92] FED. COMMC'N COMM'N, SPECTRUM POLICY TASKFORCE REPORT 10 (2002), *available at* http://hraunfoss.fcc.gov/edocs_public/attachmatch/DOC-228542A1.pdf [hereinafter SPECTRUM TASK FORCE REPORT] (finding much radio spectrum underutilized and advocating transition to spectrum commons model).

spectrum and exist primarily because FCC restrains speech in accordance with primitive radio technology.[93]

A second consideration concerning *Red Lion* is that radio no longer serves as a primary medium for information dissemination.[94] The Court's balancing analysis accounted for radio technology's ability to "supplant[] atomized, relatively informal communication with mass media as a prime source of national cohesion and news."[95] Therefore, FCC regulation was appropriate because it accommodated the (1) great need for information, attainable primarily from radio broadcasts, in support of marketplace of ideas theory underlying the notion of free speech, and (2) potential for more informative speakers to be drown out in an unregulated spectrum.[96] Nevertheless, other forms of media now serve the role of primary information disseminator that radio once had.[97]

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[93] *See* Baran, *supra* note 83, ¶ 14. (discussing waste resulting from inefficient use of UHF band of television frequencies)*; see also* SPECTRUM TASK FORCE REPORT, *supra* note 92, at 10-11 (noting that signal weakness and silence derive from limitations in early radio reception technology).

[94] The Court in *Red Lion* held that FCC could regulate the content of broadcasters' signals, an exception to the First Amendment, because broadcasters held a privileged status as licensees of a scarce public resource. *See* 395 U.S. at 394 (holding that FCC could regulate content of broadcasters signals because broadcasters serve as "proxies for the entire community").

[95] *Red Lion*, 395 U.S. at 387 n.15 (discussing debate over potential dangers of mass media for control of information).

[96] *See id.* at 376, 388, 390 (recounting history of chaos during period of unregulated broadcast spectrum and discussing marketplace of ideas theory underlying First Amendment).

[97] For example, data indicate that about fifty-eight percent of households having at least one television in the United States subscribe to cable television. *See* National Cable & Telecommunications Association, Cable Industry Statistics, http://www.ncta.com/Statistic/Statistic/Statistics.aspx (last visited March 9, 2008) (reporting cable television penetration of households having a television in United States). A significant number of television households subscribe to satellite television. *See* Satellite Broadcasting and Communications Association, Facts and Figures: Domestic DTH Numbers, Satellite Subscribers History, http://www.sbca.com/index.asp

Furthermore, some commentators argue that section 301 has frustrated the dissemination of novel or controversial ideas.[98] FCC's licensing regime created market realities that cater to well-established and non-controversial ideas.[99] Such market realities limited potential opportunities for the dissemination of novel or controversial ideas to a discretionary decision-making process whereby government as licensor or broadcast stations as licensees select ideas for insemination into the public realm.[100]

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(last visited Mar. 9, 2008) (reporting number of subscribers of satellite service). Importantly, the Internet offers near limitless opportunities to communicate, whether by blog or vlog, low cost radio and video broadcast, message board posting, email, instant message, personal web page, RSS and others. Blogs are a growing medium for unencumbered communication. *See, e.g.*, Posting of Candace Lombardi, NEWS Blog, (June 28, 2007 2:36 PM PDT) http://www.news.com/8301-10784_3-9737081-7.html?tag=blog.4 (discussing growing importance of prevalence of blogs on Internet).

[98] *See, e.g.*, Gregory P. Magarian, *Market Triumphalism, Electoral Pathologies, and the Abiding Wisdom of First Amendment Access Rights*, 35 HOFSTRA L. REV. 1373, 1373-82 (2007) (explaining conceptual framework for First Amendment access rights); Marjorie Heins & Eric M. Freedman, *Foreword: Reclaiming the First Amendment: Constitutional Theories of Media Reform*, 35 HOFSTRA L. REV. 917, 919-22 (2007) (summarizing Jerome Barron theory of media access under First Amendment); *see generally* Jerome A. Barron, *Access to the Press—A New First Amendment Right*, 80 HARV. L. REV. 1641 (1967). The quintessential media access rights position argues that the First Amendment grants individuals—particularly those of underrepresented viewpoints—the opportunity to access private media outlets. *See* Heins & Freedman, *supra*, at 920-21. Such rights would vest either through legislative, administrative or direct court action. *See id.* at 920. Invoking *Red Lion*'s holding supported by the Scarcity Rationale, they argue that the Court went from *National Broadcasting*'s narrow holding to articulate a general public interest or right in receiving information. *See id.* at 923. Such a right could support public media access rights. *See id.* at 923-24. Media access rights advocates have been frustrated by ruling such as *Tornillo*. *See id.* at 927-28.

[99] *See, e.g.*, Stuart Minor Benjamin, *The Logic of Scarcity: Idle Spectrum as a First Amendment Violation*, 52 DUKE L.J. 1, 14-22 (2002) (discussing negative implications of FCC broadcast licensing regime).

[100] *See* Heins & Freedman, *supra* note 98, at 919-20 (discussing mass media's reluctance to discussing novel or controversial ideas because such ideas are "bad for business"). FCC regularly issues cease and desist orders and raids unlicensed ("pirate") radio stations. *See, e.g.*, *Longest-Standing Pirate Radio Station Free Radio Santa Cruz Shut Down by FCC*, DEMOCRACY NOW, Sept. 30, 2004, http://www.democracynow.org/2004/9/30/longest_standing_pirate_radio_station_free

Therefore, the Scarcity Rationale has undermined the very public interest that it intended to preserve.[101]

A final consideration concerning *Red Lion* is that scarcity is an unprecedented government restraint on speech.[102] Generally, the First Amendment affords the highest

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(describing FCC raid of radio station that broadcasted in open violation of FCC broadcast license regulations as protest against such regulations); Richard Brenneman, *FCC Threatens Berkeley Liberation Radio*, BERKELEY DAILY PLANET, June 21, 2005, http://www.berkeleydailyplanet.com/issue/2005-06-21/article/21650?headline=FCC-Threatens-Berkeley-Liberation-Radio-By-RICHARD-BRENNEMAN (asserting that microbroadcaster licenses have been distributed principally to religious-based microbroadcasters to the detriment of formerly pirate liberal microbroadcasters); Julien Barnes, *Neighborhood Report: Crow Heights: A Pirate Radio Station's Crusade Is Stepping on the Jazz*, N.Y. TIMES, Aug. 15, 1999, at A10 (describing liability of pirate radio station to FCC cease and desist order); Michael O'Malley, *Hispanics Fight to Return to Airwaves: Pirate Radio Stations Had Loyal Listeners*, CLEV. PLAIN DEALER, Aug. 30, 1998, at B1 (describing FCC shutdown of five twenty-four-hour-per-day Spanish radio stations in Cleveland that aired public service announcements, informed listeners about community events and connected listeners with Latino news and events worldwide); Joseph Berger, *Off L.I., a Pirate Radio Station Defies F.C.C.*, N.Y. TIMES, July 27, 1987, at A1 (describing joint FCC, U.S. Customs and U.S. Coast Guard operation to stop pirate radio broadcast protesting of mainstream rock and roll).

[101] *See* Benjamin, *supra* note 99, at 14-22.

[102] *See* Heins & Freedman, *supra* note 98, at 927-28 (discussing tension between *Red Lion* and *Tornillo* and indicating lack of precedent concerning Scarcity Rationale). *But see* Reno v. ACLU, 521 U.S. 844, 868 (1997) (recognizing special justifications for regulation of broadcast media); Se. Promotions, Ltd. v. Conrad, 420 U.S. 546, 557 (1975) ("Each medium of expression, of course, must be assessed for First Amendment purposes by standards suited to it, for each may present its own problems."). One commentator noted the unusual nature of FCC's licensing regime with a hypothetical scenario:

> You are at a crowded party. As is typical of parties, many people are carrying on conversations at once, and the air is full of noise. In fact, you are having trouble hearing what other people are saying due to the din. Suddenly, the door opens, and several federal agents appear, badges in hand. "Your attention please," their leader says sternly. "Because so many people are talking too loud, causing others to have trouble hearing their own conversations, the newly-established Federal Speech Commission will now exercise its plenary authority to regulate conversations. Since some of you are having trouble hearing each other, we decree that in order for anyone to have a conversation for the rest of

level of protection for protected speech.[103] For example, the government does not license speech with respect to an individual's ability to commence production of a newspaper or blog entry.[104] Each of these media enjoys the protection of a heightened scrutiny review whenever the government restrains speech.[105] With the lone exception of broadcast, scarcity has not been used by any other medium to restrain speech under a lower standard of First Amendment protection.[106]

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> the night, you must first get our permission—and we will base our permission on whether you can convince us that your planned conversational topic is indeed worthy of discussion (after all, sound waves are scarce, and we wouldn't want anyone wasting perfectly good sound waves on chit-chat). Furthermore, we will not allow any improper language, and we would appreciate your efforts to talk about serious subjects such as philosophy, politics or foreign affairs. Thank you for your attention, and you can begin lining up to get permission to talk.

Stuart Buck, *Replacing Spectrum Auctions with a Spectrum Commons*, 2002 STAN. TECH. L. REV. 2, ¶1 (advocating spectrum commons model for broadcast regulation in place of command-and-control or private auction). The spectrum commons decentralizes access to spectrum by jettisoning the broadcast license spectrum access requirement, enforcing certification requirements on device manufacturers to restrict power levels and preventing interference by enforcing proactively spectrum standards. *See* Weiser & Hatfield, *supra* note 13, at 126-132. For a discussion of the spectrum commons model for broadcast regulation, see *infra* notes 141-148 and accompanying text.

[103] For a discussion of heightened standards of review applied to other speech mediums, see *supra* notes 20, 26 and 27 and accompanying text.

[104] *See, e.g.*, Reno v. ACLU, 521 U.S. at 870 (applying heightened standard of review to regulation over Internet users); Miami Herald Publ'g Co. v. Tornillo, 418 U.S. 241, 256 (1974) (subjecting government's right of access to print media to heightened standard of review).

[105] *See*, *e.g.*, Reno v. ACLU, 521 U.S. at 870 (applying heightened standard of review to regulation over Internet users); *Tornillo*, 418 U.S. at 256 (applying heightened standard of review over restraints on print media speech).

[106] *See* Reno v. ACLU, 521 U.S. at 868 (citing only *Red Lion* and *Pacifica* in discussing how different standards of First Amendment protection apply depending on the type of speech medium).

The reasoning supporting lower free speech protection for broadcasters under the Scarcity Rationale prevails today. *See, e.g.*, Ashcroft v. ACLU, 535 U.S. 564, 595 (2002) (Kennedy, J. concurring) (arguing that *Red Lion*'s justification for different levels of First

Amendment protection should apply within context of Child Online Protection Act). Nevertheless, *Red Lion* did not foreclose the possibility of reversing the Scarcity Rationale should technological circumstances necessitate a change. *See, e.g.*, Fed. Commc'n Comm'n v. League of Women Voters, 468 U.S. 364, 376 n.11 (1984) (noting that Court would be unlikely to reconsider Scarcity Rationale until Congress or FCC first signaled that technology necessitated change in such rationale); Colum. Broad. Sys., Inc. v. Democratic Nat'l Comm., 412 U.S. 94, 102 (1973) ("[T]he broadcast industry is dynamic in terms of technological change; solutions adequate a decade ago are not necessarily so now, and those acceptable today may well be outmoded 10 years hence."); Red Lion Broad. Co. v. Fed. Commc'n Comm'n, 395 U.S. 367, 388 (1969) ("[O]nly a tiny fraction of those with resources and intelligence can hope to communicate by radio at the same time if intelligible communication is to be had, even if the entire radio spectrum is utilized in the present state of commercially acceptable technology"). In a prelude to a potential review of the Scarcity Rationale, in *Federal Communications Commission v. League of Women Voters of California*, 468 U.S. 364 (1984), the Court conditioned its reconsideration of the Scarcity Rationale on "signals" from Congress or FCC that advances in technology necessitated a move away from the low standard of First Amendment protection afforded to broadcasters. *See id.* at 376 n.11 (1984) (noting that Court would be unlikely to reconsider Scarcity Rationale until Congress or FCC first signaled that technology necessitated change in such rationale). In that case, the Supreme Court declined, however, to define the specific nature of such signals. *See id.* (declining to define what constitutes signal requisite to reconsider Scarcity Rationale). Since then, arguably, both Congress and FCC have signaled. First, Congress has mandated that FCC more efficiently use broadcast spectrum. *See* Digital Television Transition and Public Safety Act of 2005, Pub. L. No. 109-171, §§ 3001-13, 120 Stat. 4, 21-27 (2006) (commanding FCC to transition television (i.e., ultra-high frequency, or UHF) from analogue to digital mode of transmission); DTV Delay Act, Pub. L. No. 111-4, §§ 1-2, 123 Stat. 112 (2009) (delaying transition from analogue to digital mode of transmission from February 17, 2009 to June 12, 2009 to address ditigal-to-analogue transition funding and logistical concerns). Congress' mandate acknowledged that modern technology supports different methods of broadcasting favoring an operational environment open to more speakers. *See* 47 U.S.C. 309(j)(14)(A) (2006) (as amended by Pub. L. No. 111-4 (2009)) (commanding FCC to facilitate analogue-to-digital transition). Second, FCC has not promulgated any content-based regulations over speech conducted on garbage bands, indicating a willingness to adjust its content-based restraints on speech when advanced technology can overcome the technological limitations that create significant risks of interference in contravention of the public interest. Third, FCC has explicitly disclaimed the Scarcity Rationale as a justification for government regulation of the broadcast spectrum in adjudicative decisions, white papers and public statements. *See, e.g.*, In re Complaint of Syracuse Peace Council Against Television Station WTVH, 2 F.C.C. 2d 5043, 5055, 5058 (1987) (disclaiming as irrelevant Scarcity Rationale in analyzing proper First Amendment standard to be applied to broadcast regulation)*; see also*, Berresford, *supra* note 78. This indicates FCC's acknowledgement that technological changes necessitate a move away from the Scarcity Rationale and lower protection for broadcast

### *E. Rethinking the Interference Problem: Frequency Hopping Spread Spectrum Modulation*

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as a speech medium. *See* Michael K. Powell, Comm'r, Fed. Commc'n Comm'n, Address Before the American Bar Association (Apr. 5, 1998), *available at* http://www.fcc.gov/Speeches/Powell/spmkp806.html (acknowledging lack of practical difference between broadcast and non-broadcast technology for First Amendment purposes within context of public interest of each). Commissioner Powell stated:

> I think too often in public interest debates people hide behind the First Amendment. Rather than tackle whether a policy is warranted or not[,] they take solace on one side or the other of the constitutional question. Just because a policy is constitutionally permissible does not make it a sound one. Thus, even if one is convinced that the Constitution is not a bar to developing a policy, one must nevertheless consider whether the regulatory policy actually provides greater benefit to the public than it imposes costs or harm.
>
> I want to also say of the First Amendment standard that I personally believe there is only one of them. I do not believe that the growing convergence of technology will allow us to continue to maintain two First Amendment standards, one for broadcasting and one for every other communications medium. I sincerely question how long we can continue to maintain in the face of technological convergence that broadcasting is uniquely undeserving of full First Amendment protection. *Technology has evaporated any meaningful distinctions among distribution medium, making it unsustainable for the courts to segregate broadcasting from other medium for First Amendment purposes. It is just fantastic to maintain that the First Amendment changes as you click through the channels on your television set*.

*Id.* (emphasis added) (debunking notion that broadcast should be subject to lower standard of First Amendment protection on technology grounds).

Such indications imply FCC's implicit acknowledgement that technological changes necessitate a move away from the Scarcity Rationale and that brand of Free Speech Clause protection over broadcast speech. Importantly, new developments, such as Wireless Fidelity ("Wi-Fi") broadcasts on garbage bands and have not been subject to significant Congressional or FCC regulation. *See* WI-FI ALLIANCE, ENABLING THE FUTURE OF WI-FI PUBLIC ACCESS 1 (2004), *available at* http://www.wi-fi.org/files/wp_2_Future%20of%20Wi-Fi%20Public%20Access_1-2-04.pdf [hereinafter WI-FI PUBLIC ACCESS] (identifying 2.4 GHz spectrum as operational spectrum of Wi-Fi and asserting that Wi-Fi is pervasive).

Modern radio technology promises to increase the public's access to the electromagnetic spectrum and effect its purpose as a publicly available free speech medium. Since the *Red Lion* decision, broadcast technology has evolved beyond analogue transmitters and receivers.[107] For example, advanced signals processing using

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[107] *See, e.g.*, Baran, *supra* note 83, ¶ 12-13, 15-16 (contrasting analogue broadcasts with digital and spread spectrum broadcasts); Josephine Soriano, *The Digital Transition and the First Amendment: Is It Time to Reevaluate* Red Lion's *Scarcity Rationale?*, 15 B.U. PUB. INT. L.J. 341, 344 (2006) (discussing developments in broadcast technology).

Wi-Fi has been a major development in broadcast technology, and has changed accessibility of speech for millions of people throughout the world. *See* WI-FI PUBLIC ACCESS, *supra* note 106, at 1. Wi-Fi devices use radio signals to broadcast and receive voice, video, and other data. For example, voice over Wi-Fi is the ability to make and receive telephone calls over a Wi-Fi network. *See* Wi-Fi Alliance, Delivering the Best User Experience with Voice Over Wi-Fi, http://www.wi-fi.org/knowledge_center_overview.php?docid=4541 (last visited Feb. 20, 2009) (discussing application of voice over Wi-Fi) [hereinafter Best User Experience]. Wi-Fi is nearly as pervasive and publicly available as television broadcasts. Wi-Fi is available in homes, businesses, and public spaces. *See, e.g.*, WI-FI ALLIANCE, *supra* note 106, at 1 (describing consumer uses for WiFi); McDonald's Corp., Worldwide Wireless Connectivity Locations, http://www.mcdonalds.com/wireless/find_hotspot.html (last visited Mar. 12, 2008) (listing over 15,000 publicly accessible Wi-Fi enabled restaurant worldwide); Noah Bierman, *Wi-Fi Gets Trial Run on Commuter Trains*, B. GLOBE, Jan. 28, 2008, at 2B (discussing public transportation authority's plan to introduce free wireless access points service on commuter rail line). One source estimates that there are over three hundred fifty million Wi-Fi users worldwide. *See* Best User Experience, *supra* (providing data on Wi-Fi usage worldwide). Early networks using the 802.11b access points could broadcast in a circumferential range of approximately 100 to 300 feet. *See* WI-FI PUBLIC ACCESS, *supra* note 106, at 3 (discussing properties of older 802.11b wireless access points). Wi-Fi is so pervasive that battles have erupted between businesses and organizations that compete for wireless users. *See, e.g.*, Peter Howe, *Sides Chosen in Logan WiFi Battle, Wireless and Airport Lobbies Join Dispute*, B. GLOBE, Jan. 6, 2006, at D1 (discussing battle between Boston's Logan International Airport, which charged users eight dollars per twenty-four hour period for WiFi access, and airline terminal operators, which permitted free use of WiFi access points). Many of these WiFi networks are "open" and do not authentication or encryption technology. *See* Paul Boutin, *How to Steal Wi-Fi, And How to Keep the Neighbors from Stealing Yours*, SLATE, Nov. 18, 2004, http://www.slate.com/id/2109941/ (indicating how pervasive WiFi access is)*; cf.* Alex Leary, *Wi-Fi Cloaks a New Breed of Intruder*, ST. PETERSBURG TIMES, July 4, 2005, at 1A (discussing ease with which unauthorized user could access an unprotected WiFi network). Some websites have created databases listing free WiFi

digital modulation in transmitting and receiving broadcast signals enables a receiver to process more signals over the same portion of spectrum.[108] Digital per frequency modulation in radio and television broadcasts permits the transmission and reception of many more signals than analogue modulation allowed.[109] That modulation technique could also permit the transmission and reception of multiple broadcasts on a single frequency.[110] Digital modulation in radio is one mode to accommodate new technology within the section 301 licensing framework.

Frequency hopping spread spectrum modulation is another mode of technology that could shield broadcasters from lower First Amendment protection, increase the public's access to speech and work in harmony with the section 301 licensing regime.[111]

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hotspots. *See, e.g.*, The Abington Group, The Wi-Fi-Freespot™ Directory, http://www.wififreespot.com/ (last visited Mar. 12, 2008) (cataloguing free Wi-Fi hotspots). Theoretically, any child could access any of the content freely available over the Internet over a free public Wi-Fi network. Moreover, Wi-Fi and other technologies operating on unlicensed spectrum, particularly Bluetooth, provide a "push" function from which one device (*i.e.*, a computer or cellular device) may push content from one user to another. *See, e.g.*, Upside-Down-Ternet, http://www.ex-parrot.com/pete/upside-down-ternet.html (last visited Oct. 5, 2008) (providing individual Internet user's code to interfere with unauthorized users of WiFi network).

[108] *See* Baran, *supra* note 83, ¶ 12-13 (discussing potential of digital broadcast technology).

[109] *See id*. ¶ 16 (discussing application of digital modulation to cable television industry with result of increased television signals over same bandwidth capacity as analogue modulation).

[110] Federal Communications Commission Office of Engineering and Technology, Digital Television Consumer Information, http://www.fcc.gov/Bureaus/Engineering_Technology/Factsheets/dtv9811.html (last visited February 8, 2009) (discussing impact of shift from analog to digital television broadcasts).

[111] The FCC defines spread spectrum technology as:

> [A]n information bearing communications system in which: (1) Information is conveyed by modulation of a carrier by some conventional means, (2) the bandwidth is deliberately widened by means of a spreading

> function over that which would be needed to transmit the information alone. (In some spread spectrum systems, a portion of the information being conveyed by the system may be contained in the spreading function).

47 C.F.R. § 2.1 (2008).

Spread spectrum technology comes in two modulation varieties: direct sequence and frequency hopping. *See* Goodman, *supra* note 31, at 362 n.291; *see generally* Raymond L. Pickholtz, Donald I. Schilling & Laurence B. Milstein, *Theory of Spread-Spectrum Communications—A Tutorial*, 30 IEEE TRANSACTIONS COMMC'N 855 (May 1982), *available at* http://pdos.csail.mit.edu/decouto/papers/pickholtz82.pdf. Direct sequence modulation occurs when:

> [A] pseudo-random noise generator creates a high-speed pseudo-noise code sequence. This sequence is transmitted at a maximum bit rate called the chip rate. The pseudo-random code sequence is used to directly modulate the narrow-band carrier signal; thus, it directly sets the transmitted radio frequency (RF) bandwidth. The chip rate has a direct correlation to the spread of the information. The information is demodulated at the receiving end by multiplying the signal by a locally generated version of the pseudo-random code sequence. While direct sequence is a very popular form of spread spectrum transmission, it is not by any means the only method available. Another popular from of implementing spread spectrum takes an entirely different approach to spreading then that of direct sequencing.
>
> Frequency Hopping is a form of spread spectrum in which spreading takes place by hopping from frequency to frequency over a wide band. The specific order in which the hopping occurs is determined by a hopping table generated with the help of a pseudo-random code sequence. The rate of hopping is a function of the information rate. The order of frequencies that is selected by the receiver is dictated by the pseudo-random noise sequence. While the transmitted spectrum of a frequency-hopping signal is quite different from that of a direct sequence signal, it is sufficient to note that the data is spread out over a signal band larger than is necessary to carry it. In both cases, the resultant signal appears noise-like and the receiver utilizes a similar technique to the one employed in transmitting in order to recover the original signal.

Stuart Buck et al., *Spread Spectrum: Regulation in Light of Changing Technologies*, 12 (Fall 1998) (unpublished manuscript), *available at* http://groups.csail.mit.edu/mac/classes/6.805/student-papers/fall98-papers/spectrum/whitepaper.html.

Wi-Fi is a common application of direct sequence spread spectrum technology. *See* Goodman, *supra* note 31, at 362 n.291; In re Implementation of Section 6002(b) of

This technology has several features that distinguish it from other types of radio modulation technologies, such as those in use when the Court created the Scarcity Rationale.

First, FHSS modulation devices broadcast radio signals over a range of frequencies.[112] This means that a listener could receive out-of-band transmissions.[113] The devices locate weak or silent frequencies of the spectrum to transmit a signal.[114] In

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the Omnibus Budget Reconciliation Act of 1993; Annual Report and Analysis of Competitive Market Conditions With Respect to Commercial Mobile Services, 17 F.C.C.R. 12985, 13062 (2002) [hereinafter FCC Annual Report]. Bluetooth technology is a common application of frequency hopping spread spectrum technology. *See* FCC Annual Report, *supra*, at 13061-13062. Bluetooth technology establishes wireless connectivity, at a range of up to ten meters, between electronic broadcast devices. *See id.*

[112] *See* IR. J. MEEL, SPREAD SPECTRUM 4 (De Nayer Institut 1999), *available at* http://sss-mag.com/pdf/Ss_jme_denayer_intro_print.pdf; Weiser & Hatfield, *supra* note 13, at 109 (explaining spread spectrum technology); Goodman, *supra* note 31, at 362 n.291.

[113] *See* PAUL FLIKKEMA, SPREAD SPECTRUM SCENE, OVERVIEW OF MODULATION TECHNIQUES FOR WIRELESS 11 (Univ. S. Fla. Dept. of Elec. Eng'r. 1995), http://sss-mag.com/pdf/1mod_intro.pdf [hereinafter MODULATION TECHNIQUES] (explaining different techniques to deploy RF digital modulation technology and evaluating constant-envelope method of digital modulation).

[114] *See id.*; *see also* Adapt4, Dynamic Frequency Selection and Avoidance, http://www.adapt4.com/technology/dynamic-frequency-selection.php (last visited Oct. 5, 2008) [hereinafter adapt4] (describing advanced radio method of operation that reduces interference with licensed broadcasts by using proprietary signals processing to ensure that radio does not broadcast on FCC licensed frequency); *cf.* Weiser & Hatfield, *supra* note 83, at 109. Some sophisticated radios employ software to identify "silent" or unused frequencies. *See id.* The radio creates a roster of unused frequencies and automatically broadcasts on a channel or channels from that list. *See id.* The radio may broadcast over forty channels at once. *See id.* Such sophisticated radios also have the capability of downloading a predetermined list of channels that are licensed to individual broadcasters. *See id.* The radio's software can avoid these channels during the transmitter's broadcast. *See id.*

this manner, the technology avoids broadcasting radio signals on strong broadcast signals, which decreases opportunities for interference.[115]

Next, FHSS devices typically use low power when broadcasting on any given frequency.[116] Lower power transmission limits the effective range of radio signals.[117] This means that more broadcasters could transmit signals on the radio spectrum while decreasing the risk of interference by virtue of range limitations.[118] The devices also "modulate[] a radio frequency carrier that quickly moves from frequency to frequency in concert with a receiver."[119] This means that the transmitter and receiver operate concomitantly to communicate radio signals on a variety of frequencies.[120] One commentator described the interaction in terms of transmitter and receiver surfing frequencies together, where each uses software to determine from which frequency or frequencies the next signal will arrive.[121] The practical effect of FHSS technology is that any given radio signal does not exist on any given frequency for a long period of time.[122]

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[115] *See* adapt4, *supra* note 114. Advanced communications devices can held users mitigate the risk of interference by modulating the frequencies in a dynamic manner. *See* Weiser & Hatfield, *supra* note 32, at 557.

[116] *See* Goodman, *supra* note 31, at 361 n.291; In re Amend. of Part 15 of Comm'n Rules Regarding Spread Spectrum Devices, 17 F.C.C.R. 10,755, 10,756 (2002) (second report and order) (describing operation of spread spectrum technology)*; see also* Weiser & Hatfield, *supra* note 13, at 110 (discussing promulgation of technical standards regulating power output for devices on 2.4 GHz frequency band).

[117] *See* Goodman, *supra* note 31, at 361 n.291.

[118] *Cf. id. But see* Hazlett, *Law & Economics*, *supra* note 52, at 992 (arguing that interference problem is structural problem that cannot be overcome by engineering or innovation).

[119] In re Amendment of Part 15, 17 F.C.C.R. at 10,756*; see also* MEEL, *supra* note 112, at 4; Goodman, *supra* note 31, at 361 n.291.

[120] *See* Goodman, *supra* note 31, at 361 n.291.

[121] *See id.*

[122] *See* In re Amendment of Part 15, 17 F.C.C.R. at 10,756*; see also* Goodman, *supra* note 31, at 361 n.291.

Finally, an independent pseudo-noise signal is broadcast that "spreads" the data contained in any given radio signal over a bandwidth that is greater than the signal information bandwidth.[123] Receivers "despread" the signals using a decoder synchronized to the pseudo-noise codes.[124] Spreading and despreading enables the radio transmitter and receiver to communicate with each other.[125]

Together, these modulation features enable FHSS technology devices to avoid frequencies with the highest risk of interference.[126] Spread spectrum technology does not eliminate interference, but it does change the nature of interference.[127] Depending upon the circumstances, interference could still inhibit FHSS broadcasts.[128] Indeed, with each additional radio signal, the potential for interference increases.[129] Nevertheless, the nature of the technology, including frequency hopping modulation and low power transmission could mitigate the harmful effect of inference by localizing interference geographically.[130] Moreover, there is no evidence that users of FHSS modulation would sufficiently saturate a geographic area to interfere absolutely with the public's ability to receive an intelligible FHSS modulated radio signal. Specific rules or guidelines could

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[123] *See* MEEL, *supra* note 112, at 4.
[124] *See id.*
[125] *See id.*
[126] *See* Weiser & Hatfield, *supra* note 13, at 109.
[127] *See* Charles Jackson, Raymond Pickholtz & Dale Hatfield, *Spread Spectrum Is Good—But It Does Not Obsolete* NBC v. U.S., 58 FED. COMMC'N L.J. 245, 250 (2006).
[128] *See id.* at 251.
[129] *See id.* at 256.
[130] *See* Baran, *supra* note 83, ¶¶ 23-29. For a discussion of technical standards that FCC could enforce under a commons spectrum management policy, see *infra* notes 132-148 and accompanying text.

substantially mitigate the potential for interferences.[131] For reasons articulated in Part III, such limitations should not undermine the Court's reconsideration of the free speech interests first balanced in *Red Lion*.

### *F. Accommodating Frequency Hopping Spread Spectrum Devices Within the Section 301 Licensing Framework*

Proponents of the widespread use of spread spectrum radio modulation technology envision a spectrum commons framework for radio broadcasts.[132] The spectrum commons model reserves groups of frequencies on the electromagnetic spectrum that any member of the public may access according to predetermined guidelines.[133] In a commons paradigm, the government would not make content-based restraints on speech in a form consistent with the access or licensing requirement of section 301.[134] No licensing requirement would exist for any user desiring to broadcast on the spectrum commons.[135] Although no licensing requirement would exist, FCC could promulgate technical standards with which users' devices would be required to

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[131] *See* Jackson, Pickholtz & Hatfield, *supra* note 127, at 251; Baran, *supra* note 83, ¶¶ 23-29.

[132] *See* Weiser & Hatfield, *supra* note 13; Goodman, *supra* note 31; Kevin Werbach, *Supercommons: Toward a Unified Theory of Wireless Communication*, 82 TEX. L. REV. 863 (2004); Buck, *supra* note 102; Lawrence Lessig, *Commons and Code*, 9 FORDHAM INTELL. PROP. MEDIA & ENT. L.J. 405 (1999); Yochai Benkler, *Overcoming Agoraphobia: Building the Commons of the Digitally Networked Environment*, 11 HARV. J.L. & TECH., 287 (1998). Conversely, some commentators propose a regulatory regime inspired by property rights influenced theories. *See, e.g.*, R.H. Coase, *The Federal Communications Commission*, 2 J.L. & ECON. 1 (1959). Such schemes typically involve government auctions of individual frequencies of frequency bands. *See id.*

[133] *See* Weiser & Hatfield, *supra* note 13, at 109.

[134] *See id.*

[135] *See id.*

comply.[136] The technical standards would enforce group rights to access the spectrum rather than individual rights to exclude other speakers from a particular frequency or frequency band.[137] FCC could enforce such technical standards through a certification program with product manufacturers.[138] The cost to users for equal and unrestrained access would be in the form of users' loss of government-guaranteed, unimpeded access to the airwaves.[139] In other words, users would have no guarantee against interference.[140]

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[136] *See id.* FCC could regulate under its existing authority to regulate under the public interest under section 301 *et seq.* For example, FCC already establishes maximum broadcast power requirement for devices or mandates the use of technology to reduce the probability of interference. *See id.* at 101-09 (describing private market's development of wireless broadband standards for devices operating in 2.4 GHz frequency band and noting commercial success of Wi-Fi devices due to standards)*; see also* Office of Engineering and Technology, Presentation at FCC Meeting: Federal Communications Commission Trends in Unlicensed Spread Spectrum Devices (May 10, 2001), *available at* http://www.fcc.gov/Bureaus/Engineering_Technology/News_Releases/2001/net0104a.ppt (describing general regulatory framework under which WiFi and Bluetooth technologies developed). One commentator described an analogous commons framework in the following terms:

> A state government assigns and protects group rights, enforces restrictions on group membership, and protects boundaries from incursions by outsiders. That is, the state governs relationships between common property regimes, provides external legitimacy for the group of resource users within regimes, but does not support any particular form of governance within regimes. At the community level, the users having exclusive rights to the resource may develop any type of resource management institution that they identify as being appropriate.

Brent M. Swallow & Daniel W. Bromley, *Co-management or No Management: The Prospects for Internal Governance of Common Property Regimes Through Dynamic Contracts*, 22 OXFORD DEV. STUDIES 3, 5 (1994).

[137] *See* Swallow & Bromley, *supra* note 136.

[138] *See id.*

[139] *See id.*

[140] *See id.*

Proposals for regulatory structures designed to increase access and decrease interference range from informal communicative norms[141] to formal regulatory apparatuses under FCC.[142] Proponents of spectrum commons favor modeling spectrum management regulations on existing regulations over the garbage band of frequencies.[143] The 2.4 GHz frequency band, on which Wireless-Fidelity ("Wi-Fi"), Bluetooth and other wireless devices operate, have been commercially successful.[144] A prominent feature of systems on garbage bands is decentralized network architecture, low cost of entry and

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[141] For example, Paul Baran suggested several guidelines for the use of spread spectrum devices:

> Rule #1. Keep away from the big bullies in the playground. (Avoid the strongest signals.)
>
> Rule #2. Share your toys. (Minimize your transmitted power. Use the shortest hop distances feasible. Minimize average power density per Hertz.)
>
> Rule #3. If you have nothing to say, keep quiet.
>
> Rule #4. Don't pick on the big kids. (Don't step on strong signals. You're going to get clobbered.)
>
> Rule #5. If you feel you absolutely must beat up somebody, be sure to pick someone smaller than yourself. (Now this is a less obvious one, as weak signals represent far away transmissions; so your signals will likely be attenuated the same amount in the reverse direction and probably not cause significant interference.)
>
> Rule #6. Don't get too close to your neighbor. Even the weakest signals are very strong when they are shouted in your ear.
>
> Rule #7. Lastly, don't be a cry baby. (If you insist on using obsolete technology that is highly sensitive to interfering signals, don't expect much sympathy when you complain about interfering signals in a shared band.)

Baran, *supra* note 83, ¶¶ 23-29 (suggesting guidelines for devices using spread spectrum mode of broadcast).

[142] *See generally* Weiser & Hatfield, *supra* note 13.

[143] *See id.* at 102.

[144] *See id.* at 109-10.

rapid deployment timeframes for new communicative technologies.[145] There is no evidence that the commercial success of the commons model as applied to the 2.4 GHz frequency band could not be replicated on other frequency bands.[146] Applied to radio frequencies, the architecture therefore would create a democratic speech environment free of the substantive burdens imposed by a licensing requirement.

Spectrum commons would represent a substantive shift from the command-and-control system currently in effect for radio broadcasters.[147] Moreover, the proposed system departs from the property-rights paradigm most closely associated with the current regulatory framework.[148] An important consideration is whether unlicensed broadcasters could get to a spectrum commons model without top-down decision-

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[145] *See id.*; Goodman, *supra* note 31, at 359-60.

[146] In 2008, for example, multiple wireless carriers bid nearly twenty billion dollars each for the right to use 62 MHz of spectrum in the 700 MHz band of frequencies. *See* Weiser & Hatfield, *Spectrum Policy Reform and the Next Frontier of Property Rights*, *supra* note 32, at 549. *But see* Hazlett, *Law & Economics*, *supra* note 52, at 985-89 (proposing reallocation of spectrum using hybrid property rights model based upon cellular telephone regulation, which employs geographically and spectrally large licenses in combination with open auctions to create institutional mechanisms that facilitate efficiency and prevent waste). Although the auction's form resembled closely the traditional per frequency allocation used in other areas of broadcast, a novel new condition on the winning party's use of the licensed spectrum is that the frequency band be open to wireless devices of any manufacturer. *See* Federal Communications Commission, Auction 73: 700 MHz Band Fact Sheet, http://wireless.fcc.gov/auctions/default.htm?job=auction_factsheet&id=73 (last visited Oct. 5, 2008).

[147] The spectrum commons model focuses on decentralized access radio spectrum. *See* Weiser & Hatfield, *supra* note 13, at 126-132. Rather than regulate access to spectrum, the spectrum commons model contemplates strict enforcement of certain standards by which all users of spectrum must comply. *See id.* In 2.4 GHz band of frequencies, certification standards arose under which device power outputs have been restricted to reduce the possibility of interference. *See id.* at 121-132 (proposing FCC standard-setting regulation to avoid common problem of "cheating" under commons model).

[148] *See* Goodman, *supra* note 31, at 280-85.

making. If technology were to reduce the probability of interference, could a bottom-up approach create a commons model within the command-and-control licensing model?

## III. An Argument for a Narrow Exception to Section 301 for Unlicensed Frequency Hopping Spread Spectrum Broadcasters

Technological advances necessitate a reevaluation of the Scarcity Rationale. Nevertheless, challenging the constitutionality of section 301 of the Communications Act of 1934 seems improbable. First, the Supreme Court has repeatedly upheld the legitimacy of the Scarcity Rationale.[149] The Court has found that FCC's licensing regime is a legitimate and constitutional exercise of government regulatory authority that is justified by the public interest in receiving speech.[150] The broadcast licensing regime substantively protects the public interest in receiving speech via broadcast.[151] Moreover, FCC's regulatory framework entrenched per frequency modulation and similar communicative technologies as the dominant modes of radio technology. Consumers generally have access only to per frequency radio modulation technology. This means that most of the listening public is locked into the fixed frequency model prevailing under

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[149] *See* Nat'l Broad. Co. v. United States, 319 U.S. 190 (1943) (differentiating broadcasting's unique technological differences from other speech mediums for free speech analysis under First Amendment); Red Lion Broad. Co. v. Fed. Commc'n Comm'n, 395 U.S. 367 (1969) (articulating lower First Amendment protection for broadcast speech due to Scarcity Rationale and holding that public's interest is "paramount"); Fed. Commc'n Comm'n v. Pacifica Found., 438 U.S. 726 (1978) (distinguishing broadcasting from other speech mediums for First Amendment protection); Turner Broad. Sys., Inc. v. Fed. Commc'n Comm'n, 512 U.S. 622 (1994) (same).

[150] *See, e.g.*, *Turner*, 512 U.S. at 636-38 (upholding special, lower level of First Amendment protection for broadcast speech and permitting more intrusive government regulation of broadcast speech).

[151] *See Red Lion*, 395 U.S. at 390 (holding that public's interest in receiving information is "paramount").

the present regulatory framework. The listening public therefore depends upon this type of technology to receive information. Even with the analogue-to-digital modulation transition, broadcasters will continue to broadcast on a per frequency basis.[152] Because most consumer radios rely on antiquated modulation technology, any challenge to FCC's regulatory regime would probably fail under *Red Lion*'s public interest standard. Therefore, invalidating the Scarcity Rationale without careful consideration for the prevailing state of radio modulation technology could substantially burden the listening public as presently composed.

Nevertheless, an unlicensed broadcaster using FHSS modulation technology might successfully challenge section 301 on an as applied basis.[153] Using FHSS modulation, an unlicensed broadcaster could transmit protected speech via radio signals. Under section 301, the broadcaster would be sanctioned for the broadcast.[154] Assuming that FCC successfully adjudicated the broadcaster liable under section 301, the broadcaster could challenge the constitutionality of FCC's determination on an as applied basis. The challenger could assert that the Act's broadcast licensing requirement should not apply to an individual broadcaster using a FHSS broadcast device, because such devices only marginally, if at all, interfere with licensed per frequency broadcasts.

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[152] *See* FCC Consumer Facts, Digital Radio—The Sound of the Future, http://www.fcc.gov/cgb/consumerfacts/digitalradio.html (last visited Mar. 9, 2008) (describing potential benefits to consumers of analogue-to-digital transition in terms of improved quality of sound).

[153] Under a facial challenge, a plaintiff must establish that the government regulation would not be valid under any set of circumstances. *See, e.g.*, United States v. Salerno, 481 U.S. 739, 745 (1987). Under an as applied challenge, a plaintiff must establish that a government regulation would not be valid as applied to a particular plaintiff under a particular set of circumstances. *See, e.g.*, Fed. Election Comm'n v. Wisc. Right to Life, Inc., 127 S.Ct. 2652 (2007).

[154] *See* Communications Act of 1934, 47 U.S.C. §§ 301, 333 (2008).

### *A. Identifying Appropriate Interests to Balance Under the Public Interest Standard*

The Court has recognized that the First Amendment protects the public interest in receiving speech.[155] The public has a "right . . . to receive suitable access to social, political, esthetic, moral, and other ideas."[156] This interest supports the use of protected speech to promote good self-governance and to search for truth.[157] Therefore, one side of the Court's balancing analysis must account for the public interest in receiving information.

In considering the public interest in receiving information, two groups emerge with a distinction resting upon the types of technology being used. The first group consists of listening public members who use analogue or digital per frequency modulation technology. Per frequency devices rely on powerful, clear signals on individual frequencies.[158] Such devices can modulate one signal per frequency.[159] The second group consists of listening public members who use FHSS modulation.[160] FHSS

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[155] *See Red Lion*, 395 U.S. at 390 (holding that public interest in receiving information is "paramount").
[156] *Id.*
[157] *See id.*
[158] *Cf.* Goodman, *supra* note 31, at 279-80 (discussing basic operation of radio).
[159] *See id.*
[160] For a discussion of frequency hopping spread spectrum technology, see *supra* notes 107-131 and accompanying text. Currently, there are no market mechanisms in place to quantify the number of FHSS listeners; therefore, there is no way to quantify this market for the purpose of the Court's analysis. Nevertheless, the existence of a FHSS can be construed by analogy to the listening audience of licensed low power FM ("LPFM") broadcasters. FCC created the LPFM broadcast license in 2000. *See* Low Power FM Broadcast Radio Stations, http://www.fcc.gov/lpfm (last visited Oct. 5, 2008). LPFM broadcast licenses are only authorized for noncommercial educational broadcasting, public safety organizations, and transportation organizations. *See id.* They operate on low power with an approximate maximum range of 3.5 miles. *See id.* LPFM broadcasters are not protected from any interference from licensed broadcasts. *See id.* Some LPFM broadcasters are former unlicensed "pirate" broadcasters. *See* Jason

devices do not rely on powerful, clear signals in the same way that per frequency broadcasts do because of the modulation technique used to spread and despread radio signals.[161]

The Court should distinguish between these two groups because both compete for protection under the same First Amendment interest. In accessing broadcast speech with FHSS modulation, the FHSS listening public necessarily interferes with the reception of speech by per frequency public.[162] Arguably, FHSS technology may produce the same, more or even less interference than per frequency broadcasts.[163] For its balancing

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Silverman, *Stealing Back the Airwaves*, WIRED (May 17, 2004), http://www.wired.com/entertainment/music/news/2004/05/63343. Currently, there are 860 licensed LPFM broadcast stations. *See* Federal Communications Commission, LPFM Reports, http://www.fcc.gov/lpfm (search for LPFM licensed stations in all U.S. states) (last visited Oct. 5, 2008). An additional forty-four stations have applications pending before FCC. *See id.* (search database for LPFM pending applications in all U.S. states). FCC largely restricts the issuance of LPFM licenses to major media markets in the United States. *Cf.* Federal Communications Commission, LPFM Licensed Coverage Maps (as of June 28, 2006), http://www.fcc.gov/ftp/Bureaus/MB/Databases/fm_tv_service_areas/regional/20060628-LowPowerFMLicensedCoverage-ContinentalUSA.pdf (listing LPFM coverage by geographic region)*; see also* Silverman, *supra* (reporting on media concentration and high barriers to entry effectively curtail First Amendment free speech rights for LPFM broadcasters.

[161] For a discussion of frequency hopping spread spectrum technology, see *supra* notes 107-131 and accompanying text.

[162] For a discussion of the ways in which frequency-hopping spread spectrum technology interferes with traditional broadcast mediums, see *supra* notes 111-125 and accompanying text.

[163] *See* Jackson, Pickholtz & Hatfield, *supra* note 127, at 251.

Radio signals are difficult to predict because they broadcast in multiple directions at once. *See* Weiser & Hatfield, *supra* note 32, at 580*; see also* Hazlett, *Law & Economics, supra* note 52, at 975 (describing how radio emissions are "probabilistic rather than precise). Radio emissions also have differing propagation characteristics and may refract when they encounter physical obstacles. *See* Goodman, *supra* note 31, at 279. Radio devices are able to detect low frequency radio emissions at a greater distance away from the emission source than high frequency radio emissions. *See id.* Because low frequency emissions can penetrate many physical obstacles, such as water and

analysis, the Court should assume that the per frequency public would experience at least some degree of interference.

In contrast to the per frequency public's experience of some interference, FCC essentially bans FHSS technology as a speech medium for the listening public. Section 301 acts as a government-imposed restraint of speech within the 520 kHz—1,610 kHz

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structures, ninety percent of electromagnetic spectrum emissions take place on one percent of the useable frequencies (i.e., frequencies below 3.1 GHz). *See id.*

> One commentator noted that the traditional spectrum management model:
> [R]elies upon overly conservative and generally unrealistic predictive models of how radio waves propagate and how radio receiving systems operate (or could operate if proper incentives were applied), thereby unduly restricting the development of new services and new entry. In particular, the legacy system is technically inefficient because it models the transmission and reception of radio signals based on a set of unrealistic planning factors. It ignores, for example, a number of limitations of the primary licensee's service, including the level of sophistication and complexity of the signal itself, the type of transmission equipment, and the relevant receivers.

Weiser & Hatfield, *supra* note 32, at 562. This means that new technologies do not even have the opportunity to be applied to the interference problem. *See id.* The spectrum management policy imported a property rights-based theory that is incompatible with the actual operation of radio transmission and reception. *See id.* Within FCC's per frequency spectrum management policy, two factors complicate the design of a spectrum policy: geographic boundaries and adjacent channel spillover. *See id.* at 569-75. "Geographic boundaries" refers to the physical presence of radio waves. *See id.* Radio waves are strongest at their source and grow weaker as they progress outward from the source. *See id.* It is nearly physically impossible to stop a radio signal at a specified boundary. *See id.* "Adjacent channel spillover" refers to "(1) a transmitter emitting radio energy outside the licensee's assigned bandwidth and into an adjacent band; (2) a receiver that inadequately filters out the energy in an adjacent band even when the transmitter in that adjacent band emits without spilling over; or (3) a combination of the two." *See id.* at 571. Adjacent channel spillover may occur over a band of frequencies as well. *See id.* Under a property rights theory, the "victim" of a "trespass" has the right to expel the "trespasser." Under a commons model, maximum spectrum efficiency may be achieved by the victim of the trespass changing its behavior. *See id.* Thus, a spectrum policy must account for the physical behavior of the radio wave over space and time to address fully the problem of interference. *See id.*

and 87.8—108.0 MHz frequency bands.[164] Because FCC does not issue licenses to broadcasters using FHSS modulation on those bands, the government effectively bans the public's reception of speech medium from that medium.

Per frequency and FHSS listeners compete for First Amendment protection despite sharing a paramount First Amendment interest in receiving speech.[165] Though each group within the listening public utilizes different means to access broadcast speech, the overarching protection is the same—access to the speech.[166] Each group has a right to receive access to broadcast speech, and the government may not infringe this right without justifiable reasons.[167] Nevertheless, full First Amendment protection of either group necessarily limits the paramount protection that each is entitled to under the First Amendment. Therefore, to balance properly the public interest in receiving speech, the Court should separately consider the competing First Amendment interests of per frequency and FHSS listeners.

The Court should also consider broadcasters' free speech interests. *Red Lion* identified broadcasters as speakers who also have First Amendment free speech interests.[168] As important as broadcasters' interests are, however, the Court in *Red Lion* subordinated broadcasters' free speech interests to the public's interest in receiving speech.[169] This subordination supported the lower threshold of First Amendment

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[164] *See* 47 U.S.C. § 301 (2006).
[165] *See* Red Lion Broad. Co. v. Fed. Commc'n Comm'n, 395 U.S. 367, 390 (1969).
[166] *See id.*
[167] *See id.*
[168] *See id.* at 387 (identifying broadcasters as speakers with First Amendment right to free speech).
[169] *See id*. at 387, 390 (holding public interest in receiving information as "paramount" to other First Amendment free speech interests).

protection articulated in *Red Lion*. Regardless, the Court should assign broadcasters' free speech interests at least some value in its balancing analysis because broadcasters also have a free speech interest at stake.

In performing a balancing analysis involving per frequency versus FHSS devices, the Court should evaluate broadcasters' interests on one side of its balancing analysis. As with the public's interest, broadcasters' free speech interests should be subdivided to account for the differing technologies in question.[170] Broadcasters using FHSS devices necessarily interfere with the speech of per frequency broadcasters.[171] Full protection of per frequency broadcasters necessarily restrains the speech of FHSS broadcasters.[172] The pervasive nature of the regulation and the extent of the speech restriction—520 kHz—1,610 kHz and 87.8—108.0 MHz frequency bands—effectively bans FHSS devices as a free speech medium.[173] Thus, the Court should distinguish between these two types of broadcasters for the purposes of its balancing analysis.

The Court's balancing analysis should weigh the competing First Amendment free speech interests of public and speaker, as it did in *Red Lion*.[174] To evaluate properly the public's free speech interest, the Court should consider distinctly per frequency and FHSS listeners' free speech interests. To evaluate properly the speaker's free speech interest, the Court should consider whether per frequency or FHSS broadcasters' free

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[170] For a discussion of the distinction between the public interest shared by per frequency and FHSS listeners, see *supra* notes 158-167 and accompanying text.
[171] For a discussion of the ways in which frequency-hopping spread spectrum technology interferes with traditional broadcast mediums, see *supra* notes 111-125 and accompanying text.
[172] *See* 47 C.F.R. §§ 2.100-108 (2008).
[173] *See* 47 U.S.C. § 301 (2006); 47 C.F.R. §§ 2.100-108 (2008).
[174] *See* Red Lion Broad. Co. v. Fed. Commc'n Comm'n, 395 U.S. 367, 379 (1969).

speech interests merit more weight. On balance, the Court should protect both FHSS listeners and broadcasters on an as applied basis.

### *B. Balancing Interests Under the* Red Lion *Public Interest Standard*

Section 301 restrains protected speech; therefore, it must pass the lower level of First Amendment scrutiny known as the public interest standard.[175] Section 301 restrains speech from broadcasters using FHSS devices on certain radio frequency bands. Accordingly, section 301 restrains the listening public from receiving speech from this type of medium. Under the public interest standard, the Court should find that section 301 unconstitutionally restrains the public's interest in receiving speech. Therefore, the Court should hold that section 301, as applied to that group, is invalid.

First, both FHSS and per frequency radio users share a paramount First Amendment interest in receiving speech.[176] FCC's decision to protect one mode of technology should not necessarily exclude the receipt of speech using a different mode of technology because the protected interest is access to the speech, not access to the technological mode.[177] Each group has a paramount right to receive and access speech from the broadcast speech medium.[178] Accordingly, the Court should conclude that both FHSS and per frequency users have the same weight on the public interest side of the balancing analysis concerning their First Amendment free speech interests.

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[175] *See id.* at 379. By contrast, most regulations over speech must pass a compelling interest test. *See, e.g.*, NAACP v. Button, 371 U.S. 415, 438 (1963) ("When a statutory provisions burdens First Amendment rights, it must be justified by a compelling state interest.").
[176] *See Red Lion* 395 U.S. at 390.
[177] *See id.*
[178] *See id.*

Second, the receipt of speech via FHSS broadcasts poses an insubstantial burden on the receipt of speech via per frequency broadcasts. The risk of interfering with other broadcasts varies depending upon the circumstances under which a broadcaster transmits a radio signal.[179] The pseudo-noise signal over a bandwidth larger than the signal information bandwidth could have provided some degree of background noise for per frequency broadcasters.[180] Nevertheless, the size of bandwidth over which FHSS devices broadcast would have ensured that any interference would have been spread among a large spectrum band.[181]

Moreover, other design features of FHSS devices mitigate the risk of interference to licensed per frequency broadcasts. FHSS devices transmit signals over a variety of frequencies during a short period of time, which limits the risk of interfering with per frequency signals.[182] Any direct interference with per frequency radio signals would have ceased immediately due to the regularity of frequency hops.[183] Further, radio signals are transmitted on unoccupied or weak signals and could be programmed to avoid licensed frequencies in a geographic area.[184] Combined, these two measures reduce the

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[179] FHSS modulation technology may pose the same, more or less risk of interference than per frequency modulation devices. *See* Jackson, Pickholtz & Hatfield, *supra* note 127, at 251. For a discussion of the risk of interference with FHSS modulation technology, see *supra* notes 111-125 and accompanying text. For a discussion of FHSS modulation technology in general, see *supra* notes 107-125 and accompanying text.
[180] *See* MEEL, *supra* note 112, at 4.
[181] *See id.*
[182] *See* In re Amendment of Part 15, 17 F.C.C.R. 10,755, 10,756 (2002)*; see also* MEEL, *supra* note 112, at 4; Goodman, *supra* note 31, at 361 n.291.
[183] *See* In re Amendment of Part 15, 17 F.C.C.R. 10,755, 10,756 (2002)*; see also* MEEL, *supra* note 112, at 4; Goodman, *supra* note 31, at 361 n.291.
[183] *See id.*; *cf.* Weiser & Hatfield, *supra* note 13, at 109.
[184] *See* FLIKKEMA, *supra* note 113*; see also* adapt4, *supra* note 114*; cf.* Weiser & Hatfield, *supra* note 13, at 109.

risk of interference to a licensed broadcast and tip the balance of this free speech interest in favor of the FHSS listening public. Consequently, the Court should hold that FHSS have neutral weight in a free speech analysis with respect to per frequency users.

Finally, upholding section 301 poses a substantial burden on the receipt of speech by members of the public who choose to receive information using FHSS devices. Section 301, as enacted and applied, restrains absolutely the public's ability to receive any type of speech using FHSS devices on certain frequencies.[185] FHSS devices offer the opportunity for the public to receive any type of speech without substantially interfering with per frequency broadcasts.[186] Because the FHSS modulation technique could accommodate more users than per frequency broadcasts, section 301 substantially burdens the public's ability to receive speech and directly frustrates the public's paramount interest in receiving speech. Therefore, the Court should hold that FHSS users have a more weighty interest than per frequency radio users.

The Court should also find that the balancing analysis favors FHSS broadcasters over per frequency broadcasters for the second part of the free speech balancing analysis. First, both FHSS and per frequency broadcasters share the same First Amendment

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[185] *See* 47 U.S.C. § 301 (2006). Section 301 bans FHSS devices from the popular 520 kHz—1,610 kHz and 87.8—108.0 MHz frequency bands. *See id.*

[186] FHSS modulation technology may pose the same, more or less risk of interference than per frequency modulation devices. *See* Jackson, Pickholtz & Hatfield, *supra* note 127, at 251. For a complete discussion of the risk of interference considerations concerning frequency hopping spread spectrum radio devices and spectrum management policy, see *supra* notes 31 and 52, *infra* note 163, and accompanying text. For a discussion of FHSS modulation technology in general, see *supra* notes 107-125 and accompanying text. Permitting users of FHSS radios to broadcast on the AM and FM frequency bands could also serve "the larger and more effective use of radio" purpose that Congress sought to effectuate in passing the Communications Act of 1934. *See* 47 U.S.C. § 303(g) (2006).

interest in unrestrained free speech. Broadcasters have a legitimate, though less weighty interest, in First Amendment free speech.[187] Because of this free speech interest, broadcasters deserve some level of First Amendment protection.

Second, section 301 substantially burdens the speech of FHSS broadcasters. Section 301 operates as an effective ban on FHSS broadcast speech because FCC does not issue licenses to non-per frequency broadcasters for certain portions of the spectrum.[188] In limiting the number of speakers, section 301 discourages the dissemination of controversial and novel ideas, which frustrates theories of information dissemination supported by the First Amendment.[189] Accordingly, enabling more broadcasters to transmit their speech provides increased opportunities for novel or unconventional varieties of speech for the listening public. Infusing new and controversial ideas would also serve the anti-majoritarian purposes of the First Amendment.[190] Therefore, section 301 substantially burdens FHSS broadcasts as a speech medium.

Finally, FHSS broadcasts pose an insubstantial burden to per frequency broadcasters. FHSS modulation utilizes technology that changes the nature of interference and could lead to less interference than per frequency broadcasts.[191] Any

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[187] *See* Red Lion Broad. Co. v. Fed. Commc'n Comm'n, 395 U.S. 367, 387 (1969) (identifying broadcasters as speakers with First Amendment right to free speech).
[188] *See* 47 U.S.C. § 301 (2006).
[189] For a discussion of criticism of section 301 concerning the dissemination of novel and controversial ideas, see *supra* notes 98-100 and accompanying text.
[190] *See generally* Robert M. Cover, *The Origins of Judicial Activism in the Protection of Minorities*, 91 YALE L.J. 1287 (1982) (discussing free speech protections under First Amendment in terms of protecting non-majority viewpoints).
[191] For a discussion of the technological distinction between FHSS and per frequency modulation, see *supra* notes 108-131 and accompanying text.

interference that did occur would be limited in time; therefore, it would insubstantially burden per frequency device users.[192] Further, FHSS devices can coexist with per frequency devices under FCC's licensing regime.[193] Thus FHSS broadcasts would not significantly burden per frequency broadcasters. Moreover, the Court should not assign any weight to per frequency licensed broadcasters' economic interests in their licenses. Broadcasters may transmit radio signals pursuant to the public interest.[194] A licensee holds no special constitutional privilege to exclude speech.[195] Broadcasters serve as conduits for the satisfaction of the public interest in receiving speech and have no expectation interest in excluding new types of technology. The public interest in receiving speech is paramount to any broadcaster's interest in speaking and therefore must trump the broadcaster's interest. FHSS broadcasts insubstantially burden per frequency broadcasters in serving the public interest in receiving speech. For this reason,

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[192] For a discussion of the methods in which FHSS technology limits the potential for interference with per frequency broadcasts, see *supra* notes 126-131 and accompanying text.

[193] *See* adapt4, *supra* note 114 ("When another licensed user is sensed, the network stops using that frequency until it again becomes dormant.").

[194] *See* Red Lion Broad. Co. v. Fed. Commc'n Comm'n, 395 U.S. 367, 389 (1969) (holding that license does not grant licensee special First Amendment consideration). The Supreme Court stated:

> [A]s far as the First Amendment is concerned those who are licensed stand no better than those to whom licenses are refused. A license permits broadcasting, *but the lisensee has no constitutional right to be the one who holds the license or to monopolize a radio frequency to the exclusion of his fellow citizens*.

*Id.* (emphasis added).

[195] *See id.*

the Court should hold that FHSS broadcasters have an interest equal to that of per frequency broadcasters in First Amendment protection.

The Court should recognize a narrow exception to section 301 under the First Amendment to accommodate the use of FHSS devices. *Red Lion* held that section 301 protects the free speech interest of the listening public.[196] In that case, the listening public used radio receivers featuring per frequency modulation.[197] The same public interest in receiving free speech predominates the Court's modern jurisprudence.[198] To hold otherwise would deny unnecessarily an interest recognized as paramount to other free speech interests concerning broadcast as a speech medium.

Unlike the Court's *Red Lion* decision, where the government's interest in restraining speech aligned closely with the public interest in receiving speech, the government's interest in restraining FHSS broadcasts now directly and substantially frustrates the public interest in receiving speech. The Court should accommodate the public interest when new broadcast speech media would cause no or insubstantial interference with existing speech media. Moreover, the creation of a narrow exception to section 301 as applied to this select group of broadcasters would require no substantive changes to FCC's licensing regime.[199] Licensed operators could continue to broadcast

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[196] For a discussion of the Court's holding in *Red Lion*, see *supra* notes 57-77 and accompanying text.
[197] For a discussion of per frequency modulation, see *supra* notes 29-39 and 90 and accompanying text.
[198] *See* Fed. Commc'n Comm'n v. Pacifica Found., 438 U.S. 726 (1978) (upholding scarcity as distinction between broadcasting and other speech mediums); Turner Broad. Sys., Inc. v. Fed. Commc'n Comm'n, 512 U.S. 622 (1994) (upholding scarcity distinction).
[199] For a discussion of the spectrum commons model of regulation, see *supra* notes 132-145 and accompanying text.

under FCC-issued licenses without ceding any of the powers granted to them through their government-issued licenses. On balance, the Court should recognize that the speech interests of both the listening public and speakers using FHSS technology have more weighty free speech interest in enabling their speech than per frequency licensed broadcasters have in suppressing or restraining such speech. This vital free speech interest necessitates the Court's invalidation of section 301's applicability to FHSS broadcasters.

## IV. CONCLUSION

From chaos, the government created a regulatory regime that tightly controls access to speech over the electromagnetic spectrum. That system has served the public interest by accommodating the prevailing radio technology and creating order. Despite the past merits of that system, new technology necessitates the reevaluation of the government's application of section 301 to frequency hopping spread spectrum devices. As applied to such technology, FCC's regulatory regime substantially burdens speech by frustrating the public interest in receiving speech. Therefore, the Supreme Court should carve a narrow exception to section 301's application to speakers and the public who uses FHSS devices on the radio spectrum.