

**Before the
Federal Communications Commission
Washington, D.C. 20554**

In the Matter of)
)
Policies Regarding Mobile Spectrum Holdings) WT Docket No. 12-269

**Declaration of
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November 26, 2012**

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I. QUALIFICATIONS AND SUMMARY OF OPINIONS

1. My name is Allan L. Shampine. I am a Senior Vice-President of Compass Lexecon, an economic consulting firm. I received a B.S. in Economics and Systems Analysis *summa cum laude* from Southern Methodist University in 1991, an M.A. in Economics from the University of Chicago in 1993, and a Ph.D. in Economics from the University of Chicago in 1996. I have been with Compass Lexecon (previously Lexecon) since 1996. I specialize in applied microeconomic analysis and have done extensive analysis of network industries, including telecommunications and payment systems. I am the editor of the book *Down to the Wire: Studies in the Diffusion and Regulation of Telecommunications Technologies*, and I have published a variety of articles on the economics of telecommunications and network industries and on antitrust issues. I am an editor of the American Bar Association journal *Antitrust Source*. In addition, I have previously provided economic testimony on telecommunications issues on a variety of matters before the United States Federal Communications Commission and state public utility commissions, including in the 2000 Biennial Regulatory Review of Spectrum Aggregation Limits. A copy of my curriculum vitae is provided as Exhibit 1.

2. I have been asked by counsel for Verizon Wireless to respond to the Federal Communication Commission's ("the Commission") Notice of Proposed Rulemaking in the Matter of Policies Regarding Mobile Spectrum Holdings with respect to the proper regulatory approach to analyzing and evaluating spectrum aggregation.¹ I have reached the following conclusions:

- The Commission has long recognized that market forces generally direct the development of markets better than regulation and has moved from

1. Federal Communications Commission, *Notice of Proposed Rulemaking in the Matter of Policies Regarding Mobile Spectrum Holdings*, WT Docket No. 12-269, released September 28, 2012 (hereinafter *NPRM*).

administratively assigning spectrum to embracing a free market approach through auctions and a secondary market in spectrum. The Commission wishes to balance competition concerns with encouraging innovation and efficiency, but a policy addressed at competition concerns can in and of itself distort the market. A spectrum screen setting forth a “safe harbor” with case-by-case analysis of transactions above the screen strikes a reasonable balance.

- A spectrum screen should be designed to allow the secondary market to operate as efficiently as possible by reducing regulatory uncertainty and the number of unproductive case-by-case analyses the Commission and parties to proposed transactions must undertake. Thus, spectrum transactions below the screen are within the safe harbor and not subject to further spectrum-related review.
- As for spectrum transactions that exceed the screen, many are likely to be procompetitive and the Commission should address them on their merits. In fact, the Commission should recognize that a freely operating secondary market in spectrum can produce significant benefits for consumers, and that some of the largest benefits may come from transactions that exceed the spectrum screen. In particular, the firms whose services are most highly demanded by consumers will require the most spectrum to meet that demand. Policies which make it more difficult for such firms to obtain additional spectrum will have the impact of reducing the quality of those firms’ services or limiting their output.
- A simple, transparent, regularly updated screen setting a safe harbor at the current level of at least one third of the total amount of suitable and available spectrum is a reasonable and effective means of providing regulatory certainty and

encouraging efficiency in the secondary market for spectrum while addressing competition concerns and preserving flexibility for the Commission.

- The Commission should not reinstitute a spectrum cap. Such caps are inefficient, inflexible and distortive.

II. GOALS FOR A SPECTRUM SCREEN

3. Before examining how a spectrum aggregation policy should be structured, it is useful to think about what such a policy is intended to accomplish. Historically, the Commission distributed spectrum administratively.² The problems with such command and control approaches are well known and do not require extensive discussion here.³ Since then, the Commission has been steadily and successfully moving towards “the flexible, exclusive, and freely transferrable rights that are needed for the efficient operation of markets” for spectrum.⁴ The premise of a free market is that firms which can make the best use of the spectrum will pay the most for it. That is, the free market helps assign “licenses to the parties that value them most...”⁵ This price mechanism is how the “invisible hand” of the free market operates.⁶ The

2. Evan Kwerel, Jonathan Levy, Robert Pepper, David Sappington, Donald Stockdale and John Williams, “Economic Issues at the Federal Communications Commission,” *Review of Industrial Organization* 21 (2002) (hereinafter *Kwerel, et al.*), p. 345.

3. For further discussion, see Mark Armstrong and David Sappington, “Recent Developments in the Theory of Regulation,” in *Handbook of Industrial Organization*, M. Armstrong and R. Porter (eds), 2007.

4. *Kwerel, et al.*, p. 345.

5. *Kwerel, et al.*, p. 346.

6. Like the Commission, antitrust law in the United States has focused on using free markets rather than command and control approaches. See, for example, Einer Elhauge, “Defining Better Monopolization Standards,” *Stanford Law Review* 56 (2003), p. 330 (“If we lived in a world where information was costless, antitrust judges and juries weighed procompetitive benefits and anticompetitive costs with perfect accuracy, and firms could predict what judges and juries would do with similarly perfect accuracy, it would be best to have the law on exclusionary conduct simply be that ‘defendant conduct is illegal only when condemning it enhances social welfare.’ Indeed, with such omniscience, that could be the law on every topic. Nor would we need business managers or markets at all because omniscient judges

Commission has expressed concerns about possible competitive effects in the market, but the Commission should exercise caution in how it addresses such concerns since a policy intended to protect against competitive harm to a market can itself distort the market by discouraging or prohibiting procompetitive transactions.

4. As a general matter, the Commission should exercise caution in setting its spectrum aggregation policy to avoid distorting prices, reducing output, or lowering service quality in the market it has worked so hard to create. Society is best served in this situation by encouraging the free market in spectrum to operate as efficiently as possible. It is important to remember how valuable for society a free market in spectrum can be. From the very beginning of the Commission's efforts to create a free and vital market for spectrum, it has been clear that spectrum aggregation is valuable. The Commission has repeatedly allowed firms to obtain additional spectrum because it found that the spectrum would be efficiently and procompetitively used. This is appropriate and consistent with the economics of the industry. In particular, the firms whose services are most highly demanded by consumers will require the most spectrum to meet that demand. Policies which make it more difficult for such firms to obtain additional spectrum will have the impact of reducing the quality of those firms' services or limiting their output. The consumer harms of such policies are clear and can be very large. Firms which cannot obtain sufficient spectrum to meet the demand by consumers for their services must ration their services by increasing price, reducing quality to stretch existing capacity further, or inefficiently substituting capital for spectrum, increasing costs and again raising the long-run

(...continued)

and juries could simply dictate every investment and production decision to maximize social welfare. But the real world is notably different, which is why antitrust law generally prefers to instead rely on a market process rather than substantive case-by-case judgments by antitrust judges and juries...”).

competitive price. The price increases and reduced quality will impact not only the firm's own customers but wireless consumers generally.

5. A spectrum screen setting forth a safe harbor for transactions with case-by-case analysis of transactions above the screen is the best policy to accomplish these goals.

A. SETTING A "SAFE HARBOR"

6. Where there are procompetitive benefits to many transactions, as is the case with spectrum transfers, a "safe harbor" is often used where transactions below the screen are not examined further but transactions above the screen are subject to case-by-case analysis.⁷ In general, such screening systems "should be designed to minimize the total costs of (1) anticompetitive practices that escape condemnation; (2) competitive practices that are condemned or deterred; and (3) the system itself."⁸ As explained by Professor Dennis Carlton, a member of the Antitrust Modernization Commission:

Choosing the appropriate safe harbors is an exercise that should depend on the frequency with which a practice is used in ways that harm society compared to the frequency of use in ways that benefit society, the ability of courts to identify the two uses, the harms from incorrect identifications, and the benefits from correct identifications.⁹

7. See, for example, the Federal Trade Commission and U.S. Department of Justice's *Antitrust Guidelines for Collaborations Among Competitors*, April 2000, p. 25 ("Because competitor collaborations are often procompetitive, the Agencies believe that 'safety zones' are useful in order to encourage such activity. ... The Agencies emphasize that competitor collaborations are not anticompetitive merely because they fall outside the safety zones. Indeed, many competitor collaborations falling outside the safety zones are procompetitive or competitively neutral. The Agencies analyze arrangements outside the safety zones...").

8. Frank Easterbrook, "The Limits of Antitrust," *Texas Law Review* 63:1 (1984), p. 16. See also Bruce Kobayashi, "The Law and Economics of Predatory Pricing," in *Antitrust Law and Economics* (Keith N. Hylton ed., 2010), p. 129, for a partial bibliography.

9. Dennis Carlton, "Market Definition: Use and Abuse," *Competition Policy International*, Spring 2007, note 12.

1. SAFE HARBORS ENCOURAGE EFFICIENT TRANSACTIONS

7. One of the great benefits of a safe harbor is that it provides firms with assurance as to how particular transactions will be treated. Uncertainty about whether a particular transaction will be approved, when it will be approved, or under what conditions it will be approved, serves to deter otherwise efficient transactions to the detriment of the industry and consumers.¹⁰ More specifically, uncertainty about whether any particular proposed investment or transaction will be challenged raises the expected cost of the transaction (since the firms are uncertain whether they will need to devote the resources required for a full-blown competitive analysis, and potentially for resulting litigation) and lowers the expected benefits (since the firms must account for the possibility that the transaction will be denied, delayed, reduced in scope, and/or have unanticipated conditions attached). Larger transactions in particular are likely to draw comments and challenges from regulators and/or third parties, increasing the uncertainty associated with the most economically significant transactions.

8. The costs of a failed transaction can be substantial. As I discussed above, spectrum transfers can produce significant benefits for consumers. Those benefits are lost if a procompetitive transaction is deterred. A transaction that is attempted and then fails also directly impacts the firms involved, wasting time, money and managerial attention, and creating an

10. Several commenters have complained to the Commission about uncertainty associated with the current process, particularly when the screen applied is changed during the transaction. *NPRM*, ¶¶9-10. Similar concerns are often expressed in related settings. See, for example, Dennis Carlton, “Does Antitrust Need to be Modernized?” *Journal of Economic Perspectives* 21:3 (2007), p. 160 (“The recognition that a legal process has costs and can commit error implies that we would not want courts to engage in a detailed investigation of every pricing or marketing decision of a firm. For example, imagine that every decision of a firm to reduce prices could be challenged as potentially anticompetitive ‘predatory pricing.’ Firms might decide to minimize all price-cutting behavior out of a fear that a court might find them guilty of predatory pricing. This fear could chill price competition among firms. ... Even though one can easily construct theoretical models of above-cost predatory pricing, antitrust authorities treat above-cost pricing decisions as a safe harbor, not to be challenged.”)

opportunity cost with respect to delay in alternatives to the transaction which can also impact consumers. If, for example, a firm is trying to obtain spectrum to roll out a new service, a failed transaction will likely delay the roll out. Delays in the introduction of new services can cause great harm to consumers.¹¹ The process of attempting to obtain approval for a transaction can also reveal strategic plans and valuations of the firms involved, which may have competitive significance for those firms. These effects work to reduce incentives to make any investment in the first place, and, in an auction context, to reduce the prices offered for spectrum. Divestitures and transaction conditions also raise the possibility of *ex post* expropriation of returns on prior investments, which can have further chilling effects on investment.¹²

2. SAFE HARBORS REDUCE THE BURDEN OF CASE-BY-CASE ANALYSES

9. A safe harbor can significantly reduce the administrative burden of case-by-case analyses by reducing the number of such analyses conducted. Performing case-by-case analyses for every transaction imposes substantial costs and consumes significant resources from both the Commission and the parties to the transactions. As the Commission has noted, “a case-by-case approach is time- and resource-intensive, and has been criticized for creating uncertainty as to whether a particular transaction will be approved.”¹³ The Commission staff has also noted the importance of screens in making efficient use of its limited staff resources, noting that “[s]uch screening allows for much more efficient use of analytic resources available at the FCC, which is

11. For further discussion and examples, see Robert Crandall and Charles Jackson, “The \$500 Billion Opportunity: The Potential Economic Benefit of Widespread Diffusion of Broadband Internet Access,” in Allan Shampine (ed.), Down to the Wire: Studies in the Diffusion and Regulation of Telecommunications Technologies, Nova Science Press, 2003.

12. For examples of how regulatory uncertainty can have profound impacts on investment and industry structure, see Brian Levy and Pablo Spiller (eds.), Regulations, Institutions and Commitment, Cambridge University Press, 1996.

13. *NPRM*, ¶18.

important given the large number of markets that are involved in mergers of major carriers.”¹⁴ A safe harbor removes the burden of case-by-case review where such review would be unproductive.

B. CASE-BY-CASE ANALYSIS ABOVE THE SCREEN PRESERVES FLEXIBILITY

10. While the Commission should provide as much regulatory certainty as it can and minimize the burden of case-by-case analyses on all parties, it should not do so by prohibiting transactions above the screen. Rather, using case-by-case analysis for transactions above the screen will allow the Commission flexibility to adjust to changes and to recognize circumstances specific to a proposed transaction. The screen threshold is not a “bright-line” above which all transactions are clearly harmful to competition. To the contrary, many above-screen transactions are likely to be procompetitive, and the Commission should address them on their merits. As I discussed above, consumers’ exploding demand for wireless services may well result in an increasing number of such transactions as the most successful firms try to expand to meet the demand from their customers without raising prices or reducing the quality of their services. There should not be a presumption that such transactions are harmful to competition. To the contrary, the primary reason for instituting a free secondary market for spectrum was that the market is better at allocating spectrum than policy-makers. Thus, if there is not clear evidence that a proposed transaction will harm competition, then the market should be allowed to operate. Case-by-case analysis above the screen can allow procompetitive transactions to proceed, while a cap would inefficiently prohibit them, harming consumers. And, providing spectrum to firms to meet the demand of their customers directly increases consumer welfare by providing

14. Michelle Connolly and James Prieger, “Economics at the FCC, 2008-2009: Broadband and Merger Review,” *Review of Industrial Organization* 35 (2009), p. 402.

significant benefits to those customers. The Commission’s desire to encourage such transactions was one of the primary reasons it eliminated its former spectrum cap.

11. The Commission asks also about a hybrid approach of “a bright-line threshold that, if exceeded, would trigger a heightened burden on the applicants to demonstrate that approval of the proposed transaction would be in the public interest.”¹⁵ This approach appears to contemplate case-by-case analysis below the threshold and the same analysis above the threshold but with a strong presumption against approval. Such an approach is inappropriate for the reasons I have discussed above because it does not set a safe harbor. However, even if transactions below the threshold were to fall in a safe harbor, the Commission should be wary about imposing a strong presumption against approval above the threshold. The existence of case-by-case analysis above a threshold implies a level of concern, but a strong presumption against approval would operate in similar fashion to a hard cap and would share the same problems. For example, the Commission’s prior spectrum cap could be waived, but I am unaware of any instance where a firm sought to purchase spectrum at auction that would have required a waiver.

12. The overall framework should be designed bearing in mind that the goal is to allow and encourage a free market in spectrum. Concerns about harm to competition should be addressed, but the costs of doing so should be kept firmly in mind. As I explain in the next section, the Commission should balance these factors through a well-structured spectrum screen.

III. SPECTRUM SCREEN STRUCTURE

13. A screen specifying a safe harbor below which firms can assume the transactions will not be subject to scrutiny, and above which transactions will be subject to case-by-case

15. *NPRM*, ¶22.

analysis, is a common and effective means of addressing competitive concerns while still encouraging the operation of the free market and the associated benefits.¹⁶

A. THE SCREEN SHOULD BE SIMPLE, WITH REGULAR UPDATES

14. Simple screens are easy to implement and provide transparency and clarity for all parties. Complicating factors can and should be addressed in case-by-case analyses above the screen threshold rather than in the screen itself. As Justice Breyer has noted, “[r]ules that seek to embody every economic complexity and qualification may well, through the vagaries of administration, prove counter-productive, undercutting the very economic ends they seek to serve.”¹⁷

15. Commenters in previous Commission proceedings have proposed a variety of possible complications to the existing screen, such as having different thresholds for spectrum above and below 1 GHz, using book values of spectrum rather than amount of spectrum held, or weighting spectrum bands.¹⁸ Attempting to interject these variables makes the screen highly situation specific and thus not useful as a clear policy to provide consistent guidance in the secondary market for spectrum. For example, the accuracy of book values may depend on if and when the spectrum was auctioned or the circumstances under which the spectrum most recently

16. To be clear, in my discussions here I am referring to spectrum only transactions. Broader transactions such as mergers or business acquisitions raise additional issues to be considered. The spectrum screen should still serve its role setting a safe harbor with respect to spectrum aggregation concerns, but other aspects of the transaction may impact the Commission’s review.

17. As quoted in Antitrust Modernization Commission, *Recommendations*, 2007, p. 87. See also Bruce Kobayashi, “The Law and Economics of Predatory Pricing,” in *Antitrust Law and Economics* (Keith N. Hylton ed., 2010), p. 129 (“Uncertainty in the application of a nuanced standard can dramatically increase both the direct costs associated with it, raising both the frequency and cost of litigation, and the total error costs involved in enforcing such a standard. As a result, it is often the case that optimal legal rules ignore potential or speculative harms because any attempt to address them would result in an increase of direct costs far in excess of any benefit from the reduction in error costs.”).

18. *NPRM*, ¶¶35-39.

changed hands. These factors will vary from area to area and over time. Similarly, the relative values of spectrum bands to a particular carrier seeking to acquire new spectrum may depend upon the physical environment in a given geography, the types of services in demand by consumers in that area, the types of services focused on by that carrier, and the nature of that carrier's other spectrum holdings. While these factors can be taken into account in a full blown case-by-case analysis, one of the primary goals of a spectrum screen is to avoid having to undertake such an analysis for every potential and proposed transaction. Attempting to build situation specific factors into the spectrum screen itself will unnecessarily complicate the screen, moving it away from a screening device and back towards a pure case-by-case analysis. Furthermore, to the extent that there is ambiguity about how some of the features should be applied, which is likely to be the case for many of the proposals, the screen will also fail to provide certainty for parties contemplating potential transactions, again moving back towards a pure case-by-case analysis. As I discussed above, one of the intended benefits of safe harbors is to "provide clear and relatively simple rules to guide business executives."¹⁹ More complex rules have higher administrative costs and are less useful in providing guidance to the industry, thus raising the costs for otherwise efficient transactions.

16. Next, the spectrum screen must balance the need for regulatory certainty against the need to stay current with technological and industry changes. The Commission asks whether it should "consider a regular review of our policies and guidelines to keep pace with changing marketplace conditions" and whether it should "adopt a regular process to add or remove existing or newly allocated spectrum bands for purposes of assessing spectrum concentration."²⁰

19. Carl Shapiro, "Exclusionary Conduct," Testimony Before the Antitrust Modernization Commission, September 29, 2005, p. 4.

20. *NPRM*, ¶¶18, 27.

I believe the Commission should do both.²¹ The Commission should establish a regular and transparent procedure for reviewing and updating the screen. In particular, the Commission should review the screen whenever it undertakes another proceeding examining whether particular spectrum should be usable for mobile telephony or broadband services. The Commission should also set a schedule for reviews if no such triggering proceeding occurs (*i.e.*, if the Commission has not examined the spectrum screen for some period of years, it may wish to do so even absent a specific event such a new spectrum auction). The Commission may vary the timing of such reviews to reflect periods of greater or lesser change in the industry.

17. Transactions should be evaluated, wherever possible, under the version of the screen in place when the transaction is submitted for review. That is, it should not be changed mid-transaction. If the Commission were to regularly undertake case-by-case analyses of transactions that do not trigger the screen, or regularly change the screen being applied to a particular transaction, then the screen would not be serving any useful function. Firms would still be uncertain about whether a transaction would be challenged and what the final terms of any proposed transaction would be, and the Commission and the other parties would still incur the costs of a full blown analysis despite a transaction meeting the screen. As noted by Professors Carlton and Waldman, “it is unclear what the point of a safe harbor test is if it requires a full blown analysis of competitive effects.”²² Using a screen consistently between regular reviews is a reasonable way to balance regulatory certainty and flexibility.

21. Regular reviews for screens are commonly observed and appropriate. The Department of Justice and Federal Trade Commission, for example, have regularly updated their published screens. See also Dennis Carlton, “Market Definition: Use and Abuse,” *Competition Policy International*, Spring 2007, note 12 (“As experience with the effect of an act accumulates, the safe harbors should be adjusted.”).

22. Dennis Carlton and Michael Waldman, “Safe Harbors for Quantity Discounts and Bundling,” *George Mason Law Review* 15:5 (2008), note 34.

B. MAINTAINING THE CURRENT SCREEN'S 1/3 THRESHOLD WOULD BE CONSERVATIVE

18. The Commission asks whether one-third should continue to be the appropriate threshold level.²³ With the one third screen currently used, the Commission has noted that would imply, at a minimum, “at least three competitors having access to approximately the same amount of suitable spectrum for providing mobile wireless broadband service.”²⁴ In practice, operation of the screen has not come close to that result. Roughly 90 percent of the U.S. population is still served by five or more firms.²⁵

19. The amount of spectrum reserved for other firms by the screen has increased significantly as more spectrum has become available for mobile services. While the original cellular blocks consisted of only 50 MHz of spectrum in total, the Commission’s current screen reserves roughly 300 MHz of spectrum in areas where both AWS-1 and BRS spectrum were available.²⁶ The Commission is currently working on auctions for additional spectrum, and is considering including other existing bands of spectrum.²⁷ The National Broadband Plan calls for the Commission to make 300 MHz newly available for mobile use within five years and 500 MHz for broadband use within ten years.²⁸ While the precise timing of such efforts is still unclear, the Commission is clearly putting great effort towards these goals.

23. *NPRM*, ¶34.

24. *NPRM*, ¶34.

25. Federal Communications Commission, *Fifteenth Report, Annual Report and Analysis of Competitive Market Conditions With Respect to Mobile Wireless, Including Commercial Mobile Services*, WT Docket No. 10-133, released June 27, 2011 (hereinafter *Fifteenthth CMRS Report*), ¶45.

26. Federal Communications Commission, *Memorandum Opinion and Order and Declaratory Ruling In the Matter of Applications of Cellco Partnership d/b/a Verizon Wireless and SpectrumCo LLC*, WT Docket Nos. 12-4 and 12-175, released August 23, 2012, note 177.

27. See, for example, *Fifteenth CMRS Report*, ¶¶270-277.

28. Federal Communications Commission, *Connecting America: The National Broadband Plan*, Chapter 5: Spectrum, p. 75.

20. A related consideration is that new entrants can expand output disproportionately to their spectrum share. This is because older carriers generally have large bases of customers using legacy technologies which are less spectrally efficient than newer technologies. Thus, a carrier supporting 2G, 3G and 4G customer bases simultaneously will have less capacity for the same amount of spectrum and infrastructure investment than a carrier operating only 3G and 4G, or only 4G.²⁹ An entrant can thus focus only on the most spectrally efficient technology available and offer more capacity per MHz than the average capacity per MHz for the legacy carrier. This leads to the carriers serving such legacy customers needing more spectrum than more recent entrants. As I discussed earlier, firms' need for spectrum continues to grow with customers demanding ever increasing amounts of capacity. This problem is particularly acute with respect to the firms most successful at attracting customers, as these are also the firms from whom customers are demanding the most capacity.

21. As the Commission makes more spectrum available to all firms, the threshold could be increased while preserving the same amount, or more, of spectrum for other firms. Leaving the percentage screen at the same level would, however, be a conservative approach. I have not seen any evidence that would suggest the percentage screen should be lowered, and there is certainly no justification for lowering the absolute level of spectrum allowed under the screen as total spectrum available is increased.

22. As discussed above, the appropriate threshold is a function of the likelihood and magnitude of any potential harm to competition relative to the likelihood and benefits of procompetitive effects. Since the Commission has embraced the benefits of the free market in

29. I use 2G, 3G and 4G only as illustrative terms. The terms are often used in a marketing context and do not correspond precisely to particular sets of technologies. However, as a rule of thumb, technologies characterized as belonging to later generations tend to be more spectrally efficient than those in earlier generations.

allocating spectrum and in wireless generally, to great effect, it should allow that market to operate as freely and efficiently as possible. Free markets are generally very efficient at allocating resources to their highest valued use. However, increasing the difficulty and uncertainty of transactions raises transaction costs, which makes it more difficult for a free market to efficiently allocate resources. Against that, there is the theoretical possibility of strategic action such as warehousing, or that competitors might have so little spectrum as to be unable to expand output sufficiently to constrain other firms' prices. (It is worth noting that, whatever the Commission decides, antitrust laws will continue to provide protection against any potential competitive concerns.)

23. The industry's performance to date under the Commission's spectrum screen set at a one-third threshold indicates that the Commission's screen has worked well and that harm to competition through spectrum aggregation appears unlikely. The premise of spectrum "warehousing" claims and other claims of competitive harm from spectrum aggregation seems to be that the larger carriers (*i.e.*, carriers with larger spectrum holdings) are using spectrum inefficiently, or not all.³⁰ We can, at a broad level, look to see whether such distortions appear to be prevalent. If spectrum aggregation in the industry under the spectrum screen policy has resulted in economically significant amounts of warehousing or similar strategic action, one would expect to find that smaller carriers are using their spectrum very intensely (*i.e.*, serving

30. Such claims generally come in two types. Claims of "warehousing" involve deliberate efforts by firms to deny other firms access to spectrum. Alternatively, even without deliberate intent, the Commission has expressed concern that spectrum aggregation may leave little spectrum for entrants or competitors. This discussion is rooted in the trade-off between spectrum and infrastructure. Firms can generally increase output by investing in either spectrum or infrastructure, but there are diminishing returns to investing in infrastructure. The Commission has noted this problem in a variety of contexts. See, for example, *Fifteenth CMRS Report*, ¶ 267 ("In the absence of sufficient spectrum, network providers must turn to costly alternatives such as cell splitting, often with diminishing returns.").

many customers per MHz per covered population, made possible through intense capital investment), while larger carriers which were “warehousing” some spectrum would, on average, be using spectrum less intensely since some of that spectrum would be lying fallow or being underused. While such metrics are, at best, rough guides to spectrum use, if warehousing were a significant concern, one would expect some evidence of it at this level.

24. Verizon Wireless has calculated customers per MHz pop figures in the following manner. Verizon Wireless has taken publicly reported subscriber figures from each of the carriers listed below, as of third quarter 2012.³¹ It has taken spectrum MHz holdings by county from the Commission’s database, following the Commission’s current attribution rules, and county population data from EGS Technologies. MHz pops are equal to the county spectrum holdings (as currently included in the Commission’s spectrum screen) times the county population, summed across all counties where the carrier holds spectrum.³² The customers per MHz pop figure is then calculated simply as the total number of reported customers (in millions) divided by the total MHz pops (in billions).³³ The results are sorted from highest intensity of use to lowest:

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31. Clearwire has reported that it is servicing roughly nine and a half million Sprint customers. Those customers are counted as Clearwire customers and not Sprint customers (*i.e.*, they are subtracted from the Sprint total as they are being supported by the Clearwire network). If the customers are also counted on the Sprint network, the Sprint figure would increase from 2.73 to 3.30.
 32. Only 55.5 MHz of Clearwire’s spectrum holdings are currently included in the screen. If the remainder of what Clearwire is using or has access to were included, Clearwire’s customers (M) per MHz pops (B) would fall from 0.64 to 0.27.
 33. Verizon Wireless has included transmitting devices where those are reported (*i.e.*, machine to machine subscriptions).

Customers (M) per MHz Pop (B)

3.53	AT&T without pending transactions
3.33	Verizon Wireless
3.20	MetroPCS
2.99	AT&T with pending transactions
2.73	Sprint
2.34	US Cellular
1.94	Leap
1.94	NTelos
1.90	T-Mobile USA
1.60	CSpire
0.64	Clearwire

25. Again, if warehousing were occurring and having significant economic impact, one would expect that firms with (claimed) large amounts of fallow spectrum would be serving relatively fewer subscribers per MHz on average than the firms claimed to be disadvantaged, while the most spectrum constrained firms would be serving the largest number of subscribers per MHz, having substituted capital for spectrum. In fact, the large national carriers, while holding, in general, more spectrum than other carriers, also appear to be making intensive use of that spectrum, even with their legacy networks. These figures do not demonstrate evidence of anticompetitive warehousing by larger carriers.

26. Concerns that, going forward, firms may accumulate so much spectrum that there is not enough left for competitors to enter or expand output sufficiently to provide competitive constraints are appropriately addressed through the level of the spectrum screen. Even if a firm held up to one third of the available spectrum in an area, that would leave sufficient spectrum for a number of other competitors to operate and pose competitive threats, as the market experience under the spectrum screen has clearly demonstrated. Also, as I discussed earlier, the Commission is introducing new spectrum, and entrants typically require less spectrum to expand output than older firms. Finally, as just shown, carriers with relatively smaller spectrum

holdings today often seem to be using that spectrum less intensively than larger carriers, on average.

27. In sum, a public, transparent screen providing a safe harbor for spectrum transactions is a useful regulatory tool which can help reduce regulatory uncertainty while still preserving flexibility for the Commission.

IV. THE COMMISSION SHOULD NOT RETURN TO A SPECTRUM CAP

28. The Commission has asked whether it should reimpose a spectrum cap.³⁴ The Commission should not do so. Such caps can raise providers' costs and diminish the quality of their services by decreasing innovation, increasing prices, and delaying introduction of new services and technologies.³⁵

A. SPECTRUM CAPS ARE INFLEXIBLE AND PROHIBIT TRANSACTIONS WHICH WOULD BENEFIT CONSUMERS

29. A hard cap would flatly prohibit an entire category of transactions, many of which are likely to be procompetitive and provide benefits to consumers by allowing firms to optimally allocate spectrum and use the most efficient mix of spectrum and infrastructure. As I have described in my previous declarations, the result is likely to be higher prices, lower quality and delayed introduction of new services and technologies. Moreover, a hard cap is particularly unsuitable for a dynamic industry like telecommunications. The Commission asks how it could

34. *NPRM*, ¶20. I will use the terms “cap” and “hard cap” interchangeably.

35. I and Professor Robert Gertner have previously addressed the concerns with a spectrum cap in the 2000 Biennial Regulatory Review. *Declaration of Robert H. Gertner and Allan L. Shampine, 2000 Biennial Regulatory Review Spectrum Aggregation Limits for Commercial Mobile Radio Services*, WT Docket No. 01-14, April 13, 2001 (hereinafter *Shampine Declaration*). *Reply Declaration of Robert H. Gertner and Allan L. Shampine, 2000 Biennial Regulatory Review Spectrum Aggregation Limits for Commercial Mobile Radio Services*, WT Docket No. 01-14, May 14, 2001 (hereinafter *Shampine Reply Declaration*).

adopt a cap that would still preserve the Commission’s flexibility.³⁶ I do not believe it can. A hard cap is inherently inflexible. As the Commission has noted, a cap provides greater regulatory certainty than a screen or case-by-case analysis, but at the cost of limiting “the Commission’s flexibility to consider individualized circumstances and to respond swiftly to the changing needs of the mobile wireless industry and consumers.”³⁷ Regulatory certainty is useful when it reduces regulatory inefficiencies in the operation of the free market. However, prohibiting a large class of transactions, many of which are likely to be procompetitive, may provide certainty but it does not aid the operation of the free market. Rather, it introduces even greater inefficiencies. As I discussed earlier, it is important to bear in mind that the goal is a well functioning free market for spectrum. A spectrum screen is a better choice for promoting an efficient free market in spectrum as it provides regulatory certainty through a safe harbor for some transactions while still allowing firms to pursue other transactions if they are sufficiently important to justify the costs of a case-by-case analysis.

30. Hard caps are also less able to accommodate industry change than spectrum screens. The Commission has questioned whether a hard cap would allow it “to respond swiftly to the changing needs of the mobile wireless industry and consumers.”³⁸ As I discussed above, a hard cap is, by its very nature, inflexible. Even with regular reviews, a cap may lag behind the industry. A spectrum screen may also lag, but the fact that a spectrum screen is not binding – firms can still pursue transactions that do not fall into the safe harbor – means that the distortionary effects from a lag in updating a screen will be smaller than with a hard cap.

36. *NPRM*, ¶20.

37. *NPRM*, ¶20.

38. *NPRM*, ¶20.

B. SPECTRUM CAPS DISPROPORTIONATELY AND INEFFICIENTLY IMPACT THE MOST SUCCESSFUL FIRMS

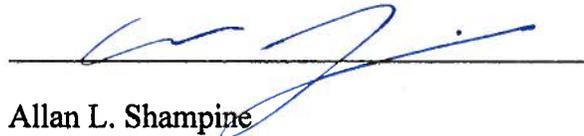
31. This analysis also highlights how a spectrum cap would not only constrain the output of those carriers that have been most successful in attracting customers and offering new services, but would constrain many of the very firms that have most aggressively invested in spectrum conservation. Some parties have claimed that large carriers are paying “too much” for spectrum, and that other carriers should be able to obtain the spectrum instead at a lower price. As I discussed earlier, the Commission has moved to a free market for spectrum largely to escape the distortions and inefficiencies that were coming from substituting policy judgments for market outcomes. As a general matter, scarce inputs should be allocated to their best use – where they will produce the greatest welfare for society – and free markets do so through the “invisible hand” of market pricing. In wireless, that means spectrum will generally be most productively used in the networks willing to pay the most for it. Distorting the competitive allocation of the free market impacts not only carriers but consumers as well. If firms are forced to expand capacity through more infrastructure when efficiency dictates that they do so with spectrum, then their total costs must be equal to or higher than the competitive outcome, and the long-term competitive price must therefore be inefficiently higher as well.

V. CONCLUSION

32. A simple, transparent, regularly updated screen setting a safe harbor at least at the current level of one third of the total amount of suitable and available spectrum is a reasonable and effective means of providing regulatory certainty and encouraging efficiency in the secondary market for spectrum while addressing competition concerns and preserving flexibility for the Commission. Such a screen should allow the secondary market to operate as efficiently as possible by reducing regulatory uncertainty and the number of unproductive but required case-

by-case analyses the Commission and parties to a proposed transaction must undertake while still addressing the Commission's concerns.

33. The Commission should not reinstitute a spectrum cap. Such caps are inefficient, inflexible and distortive. The Commission should recognize that a freely operating secondary market in spectrum can produce significant benefits for consumers, and that some of the largest benefits may come from transactions that exceed the spectrum screen. Proposals which would limit the ability of spectrum constrained firms to purchase spectrum will also distort the market and risk inefficient allocation of spectrum.



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11/26/2012

Date

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EDUCATION

- Ph.D. UNIVERSITY OF CHICAGO: Economics, 1996
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- M.A. UNIVERSITY OF CHICAGO: Economics, 1993
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- B.S. SOUTHERN METHODIST UNIVERSITY: Economics and Systems Analysis,
Mathematics Minor, 1991
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PROFESSIONAL EXPERIENCE

Compass Lexecon (formerly Lexecon), Chicago, Illinois: Senior Vice President (2012 – Present)
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Editor for *The Antitrust Source*, American Bar Association (2011 – Present)

PUBLICATIONS

BOOKS

Down to the Wire: Studies in the Diffusion and Regulation of Telecommunications

Technologies, (Editor) Nova Science Press (2003).

(Contributors include Debra Aron, Johannes Bauer, Peter Bernstein, David Burnstein, Robert Crandall, Nicholas Economides, Wayne Fu, Shane Greenstein, Charles Jackson, Junghyun Kim, Donald Kridel, Mercedes Lizardo, Paul Rappoport, Pablo Spiller, Lester Taylor and Steven Wildman)

ARTICLES

- “Testing Interchange Fee Models Using the Australian Experience,” proceedings of the Bank of Canada Economics of Payments VI conference, May 24, 2012
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“The Impact of Technology on the Modern Labor Market,” 11 *Southwestern Journal of Economic Abstracts* 1 (1990).

RESEARCH PAPERS

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“An Evaluation of the Social Costs of Payment Methods Literature” (2012 – SSRN)

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“An Evaluation of Online Investment Bank Research,” with Rajiv Gokhale (2011).

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“A Survey of the Economics of Information, Focusing on Water” (1992).

“Petroleum Price Shocks and Rationality,” B.S. Honors Paper (1991).

OTHER PROFESSIONAL EXPERIENCE

Interviewed by *IEEE Spectrum* for “The High Cost of Taking Your Money” (June 2012).

“Testing Interchange Fee Models Using the Australian Experience,” presented as part of a special session “Interchange Fees: Regulation and Implications” at Economics of Payments VI conference, Bank of Canada, May 24, 2012.

Interviewed by *The Oregonian* for “Those credit card rewards cost us a lot of cash” (July 31, 2010).

Participant in “The Law and Economics of Interchange Fees and Credit Card Markets” symposium sponsored by International Center for Law & Economics (December 8-9, 2009).

“The Evaluation of Social Welfare for Payment Methods,” 2009 Oxford Business & Economics Conference (June 24-26, 2009).

Interviewed by *Cards Insider* for “Payments: Cash Replacement, Anonymity provides lifeline for cash over cards” (January 28, 2008).

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“House of Cards: The Economics of Interchange Fees,” Presentation to the Federal Reserve Bank of New York Conference, *Antitrust Activity in Card-Based Payment Systems: Causes and Consequences* (September 16, 2005), with Alan S. Frankel.

“The Impact of Technology on the Modern Labor Market,” 68th Annual Meeting of the Southwestern Social Science Association (March 29, 1990)

Presented papers on information externalities and technology diffusion at the *Economics and Public Policy Workshop* (3) and *Price Theory Workshop* (1), University of Chicago (1995, 1996)

Coordinated the *Conference on Valuing Non-Market Goods*, University of Chicago (July 21-22, 1995)

Assisted in coordinating the *Conference on Research in Health Economics*, University of Chicago (October 21-22, 1994)

Assisted in organizing the *Economic Policy and Public Finance Workshop*, University of Chicago (1993 - 1996)

Member of the *American Economics Association*

Associate member of the *American Bar Association*

Referee for the *Agricultural and Resource Economics Review*, *American Journal of Agricultural Economics*, *Antitrust Law Journal*, *Journal of Business* and *Journal of Evolutionary Economics*.

Finance Committee (2010 – Present), Vestry (2007-2009), Treasurer (2006), St. Mary’s Episcopal Church, Park Ridge

TESTIMONY

Expert Report to the Australian Competition & Consumer Commission with regards to the regulatory treatment of the National Broadband Network, September 24, 2012 (with Janusz Ordovery).

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Declaration, In Re Bursor & Fisher, P.A., v. Federal Communications Commission, Case No. 1:11-cv-05457-LAK, U.S. District Court, SDNY, August 26, 2011.

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Reply Declaration to the Federal Communications Commission, In the Matter of Special Access Rates for Price Cap Local Exchange Carriers (WC Docket No. 05-25), February 24, 2010 (with Dennis Carlton and Hal Sider).

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and Joint Petition of SBC Communications Inc., AT&T Corporation, Together with its Certificated New York Subsidiaries, for Approval of Merger (CASE 05-C-0237 and CASE 05-C-0242), August 5, 2005 (with Gustavo Bamberger and Dennis Carlton).

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ACADEMIC HONORS

Undergraduate:

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Honor Roll (1987-1991)

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Phi Eta Sigma (honorary society recognizing academic achievement)
Omicron Delta Epsilon (international honor society in economics)
Kappa Mu Epsilon (honor society in mathematics)

Graduate:

Full Scholarship (tuition and stipend)