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January 9, 2007

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VIA ELECTRONIC FILING

Ms. Marlene H. Dortch, Esq.
Secretary
Federal Communications Commission
445 12th Street, SW, Room TWA325
Washington, DC 20554

Re: Notice of Ex Parte Presentation in WT Docket No. 06-150

Dear Ms. Dortch:

On January 9, 2007, SpectrumCo LLC ("SpectrumCo") representative David Don, economic consultant Dr. Coleman Bazelon, and I met with Angela Giancarlo, legal advisor to Commissioner Robert McDowell, and John Branscome, legal advisor to Commissioner Michael Copps, to discuss the above-captioned 700 MHz proceeding.

During the meetings, SpectrumCo's representatives discussed the attached *ex parte* letter and the attached economic analysis provided by Dr. Coleman Bazelon filed in this docket. Specifically, SpectrumCo discussed the benefits of its proposed 700 MHz band plan, featuring a mix of geographic area licenses similar to the "building block" model used in the FCC's successful Advanced Wireless Service auction.

Please contact me if there are any questions regarding this filing.

Sincerely,

/s/ Michele C. Farquhar

Michele C. Farquhar
Attorney for SpectrumCo LLC

Attachments

cc: Angela Giancarlo
John Branscome

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January 8, 2007

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VIA ECFS

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Secretary
Federal Communications Commission
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Washington, DC 20554

Re: Ex Parte Communication
WT Docket No. 06-150
Service Rules for the 698-746, 747-762 and 777-792 MHz Bands

Dear Ms. Dortch:

SpectrumCo LLC ("SpectrumCo")[1], by its attorneys, submits this *ex parte* letter and accompanying analysis to provide further support for the adoption of (1) a mix of geographic service areas, and (2) a mix of spectrum blocks in the upcoming auction of the remaining spectrum in the 700 MHz (698-746, 747-762 and 777-792 MHz) band. The attached white paper prepared by Dr. Coleman Bazelon – which includes a detailed analysis of the recently completed Advanced Wireless Service ("AWS") auction, an explanation of auction theory, and economic analysis supporting this position – bolsters the strong record in this proceeding and the overwhelming support for a reduction in size of both the geographic service areas and spectrum blocks in the 700 MHz auction.[2]

Overview

As an active and successful participant in the Commission's recent AWS auction, SpectrumCo is familiar with the benefits of a "building block" approach to assembling a national wireless network by winning multiple licenses covering smaller markets. During the AWS auction, SpectrumCo bid on many different licenses of interest, but ultimately aggregated a nationwide footprint through its high bids on 137 Economic Area ("EA") licenses. SpectrumCo's experience in the AWS auction – as well as sound economic theory,

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[1] SpectrumCo is a Delaware limited liability company, managed by C Spectrum Investment, LLC, a subsidiary of Comcast Corporation. Class B equity owners of SpectrumCo are C Spectrum Investment, LLC; Time Warner Cable LLC, a subsidiary of Time Warner Inc.; Cox Wireless, Inc., a subsidiary of Cox Enterprises, Inc.; and Bright House Networks, LLC.

[2] Coleman Bazelon, "The Economics of License Sizes in the Upcoming 700 MHz Band Auction" ("Bazelon").

Congressional auction mandates, precedent established in successful Commission auctions for similar spectrum, and changed circumstances since the Commission established the initial 700 MHz band plan – clearly demonstrate the rationale and the necessity for auctioning spectrum in smaller geographic areas and block sizes, particularly focusing on mid-sized EA licenses. As explained in Dr. Bazelon's white paper, smaller licenses facilitate a bidder's ability to meet its demand through the auction by allowing bidders to determine the optimal service area sizes and the most efficient spectrum configurations for their business purposes.[3] Bidders can thereby reduce post-auction transaction costs, which will promote faster deployment of wireless services and provide related consumer benefits. Also, auctions that include a mixture of license sizes should generate a greater number of interested bidders and promote buildout in rural areas. SpectrumCo's proposed band plan would help to accomplish these vital policy goals while facilitating strong demand for 700 MHz spectrum among incumbent carriers of different sizes as well as new entrants, fostering competition and providing consumers more choices and lower prices.

SpectrumCo Band Plan Proposal for Diversifying License Sizes in the 700 MHz Band

As summarized in the *Notice of Proposed Rulemaking*,[4] the Commission's current band plan divides previously unauctioned 700 MHz spectrum into five blocks on the basis of six very large, super-regional geographic service areas throughout the entire United States (using only Economic Area Groupings, or "EAGs"). Specifically, the present band plan divides the unauctioned portions of the Upper 700 MHz band into one 10 MHz block (the C Block) and one 20 MHz block (the D Block), with both blocks scheduled to be auctioned on an EAG basis. The unauctioned portions of the Lower 700 MHz band include two 12 MHz blocks (the A and B Blocks) and one 6 MHz block (the E Block), all three of which are also slated for auction on an EAG basis.

As described herein and in the white paper, a band plan containing nothing but extremely large licenses forces even large, well-financed entities to buy more spectrum than they may need and diminishes the flexibility to determine the best configuration of licenses for their planned wireless service. Inflexible auction design choices force inefficient outcomes and lead to the potential warehousing of undesired spectrum by license holders unwilling or unable to bear the transaction costs of partitioning and selling spectrum rights in secondary markets.[5] Moreover, the assignment of all available licenses into EAG-wide, super-regional geographic service areas would likely foreclose participation in the upcoming auction by all but the largest incumbent carriers and exceedingly well-financed companies – shutting out numerous potential new entrants as well as regional and rural wireless carriers that could neither use nor likely afford licenses covering such a large potential service territory.[6] Instead, the Commission should reconfigure the 700 MHz band plan to provide an additional 10 MHz block and a mix of geographic service areas that conform with the service areas offered in the recent AWS auction

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[3] *See id*. at 4-7.

[4] *See* Service Rules for the 698-746, 747-762 and 777-792 MHz Bands, *Notice of Proposed Rulemaking*, FCC 06-114, ¶¶ 10-15 (rel. Aug. 10, 2006) ("*Notice of Proposed Rulemaking*").

[5] *See* Bazelon at 3-4.

[6] *See* Service Rules for Advanced Wireless Services in the 1.7 GHz and 2.1 GHz Bands, *Order on Reconsideration*, 20 FCC Rcd 14058, ¶ 10 (2005) ("*AWS Reconsideration Order*") ("Specifically, we find . . . that a 30 megahertz REAG block is too large for most bidders and should be broken into smaller components that could be aggregated, and that offering an additional block licensed on an EA basis would help enhance the mixture of large and small geographic area licenses available to applicants.").

and that allow aggregation opportunities with adjacent bands. Doing so would allow licensees like SpectrumCo to augment their spectrum holdings in a more tailored fashion, while still allowing bidders to aggregate large-sized spectrum blocks.

Proposed Band Plan: Therefore, in the Upper 700 MHz band, the Commission should divide the 20 MHz block into two 10 MHz blocks for the auction. The resulting three 10 MHz blocks in the Upper 700 MHz band will increase the number of bidding opportunities in each market, while still enabling bidders to combine two or three of these blocks where larger aggregations of spectrum are desired. The Commission should auction all three of these 10 MHz blocks on the basis of mid-sized EA licenses rather than super-regional EAG geographic areas. The mid-sized EA geographic service areas can be used effectively by very small and very large bidders alike, as demonstrated in the AWS auction, and will facilitate aggregation of 700 MHz and AWS spectrum by licensees. As the Commission noted in reconfiguring the AWS band plan, "[i]ncreasing the amount of spectrum licensed on an EA basis will offer applicants the option of combining spectrum blocks and service areas to suit their business plans," noting commenters' suggestions that the EA spectrum blocks are optimally sized to be aggregated with other EA licenses as well as with larger or smaller-sized spectrum blocks.[7]

In the Lower 700 MHz band, the Commission should auction the A Block on an EA basis, the B Block on a Cellular Market Area ("CMA") basis (facilitating aggregation opportunities with the adjacent C Block in the Lower 700 MHz band, which has already been auctioned on a CMA basis), and the E Block on a Regional Economic Area Grouping ("REAG") basis (similar to the adjacent D Block, auctioned on an EAG basis). This "building block" approach would ensure the availability of a mix of geographic areas for potential bidders, preserving some larger-area licenses while creating smaller-area licenses that winning bidders could either use on a local basis or aggregate into a larger footprint. In addition, as the Commission stated in revising the AWS band plan, "by placing spectrum blocks with the same type of geographic area licenses adjacent to one another, we enable licensees to employ a variety of aggregation possibilities."[8]

SpectrumCo also respectfully requests that the Commission use REAGs rather than EAGs as the largest-sized areas to be auctioned in the 700 MHz band, to ensure consistency with the licenses auctioned in the AWS auction.[9] Doing so would ensure that AWS licensees have opportunities to add spectrum without unnecessary overlap with existing holdings.[10] Currently, the six super-regional EAGs for the 700 MHz band do not match any of the license areas in the AWS auction (REAGs, EAs, and CMAs), which will make it difficult for carriers to efficiently expand capacity and broaden local, regional, and national coverage.

The charts below illustrate the Upper 700 MHz and Lower 700 MHz band plans proposed by SpectrumCo:

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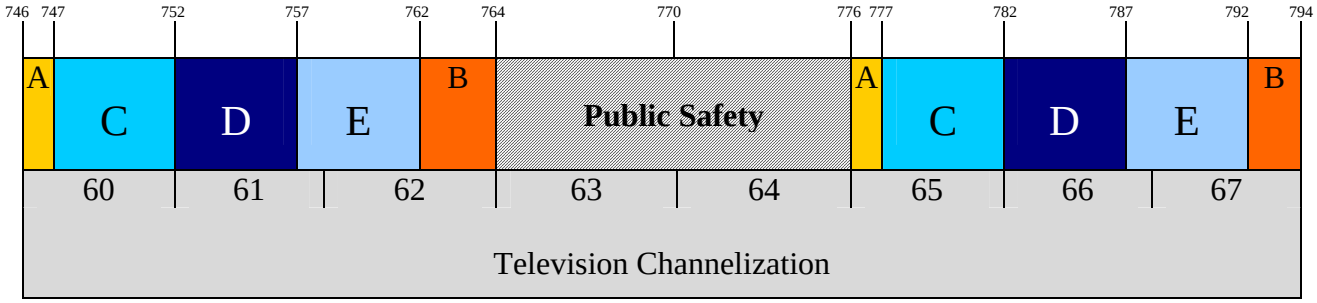
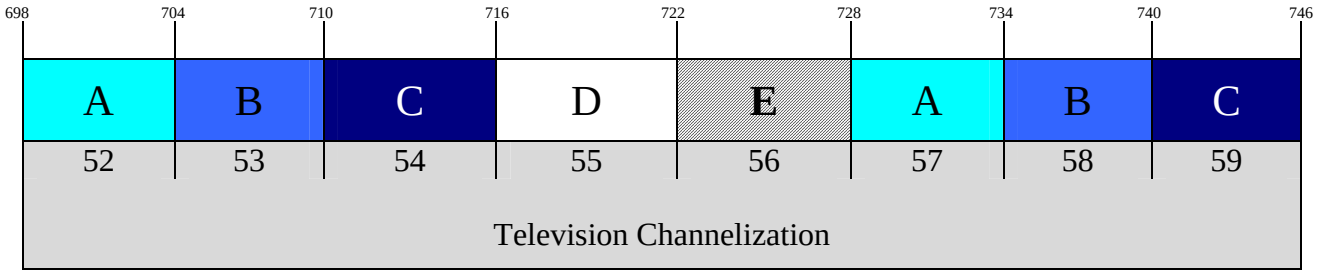
[7] *Id.*, ¶ 18; *see also* Ex Parte Communication of Verizon Wireless, WT Docket No. 02-353, at 1-2 (filed May 27, 2005) (proposing revisions to the AWS band plan to include "a variety of geographic and frequency blocks, allowing for efficient aggregation of spectrum" and specifically urging the Commission to "provide[ ] more flexibility for prospective licensees" by revising the AWS band plan in order "to place contiguously the EAs and REAGs, or spectrum 'building blocks,' permitting both efficient geographic and frequency aggregation").
[8] *AWS Reconsideration Order*, ¶ 18.
[9] *See id.*, ¶ 20.
[10] *See* Bazelon at 5 (discussing demand in the AWS auction from bidders seeking to fill in coverage areas in existing networks).

Proposed Upper 700 MHz Band Plan



Block	Frequencies (MHz)	Bandwidth	Pairing	Geographic Area Type	No. of Licenses
A (Guard Band)	746-747, 776-777	2 MHz	2 x 1 MHz	Major Economic Areas	52
B (Guard Band)	762-764, 792-794	4 MHz	2 x 2 MHz	Major Economic Areas	52
C	747-752, 777-782	10 MHz	2 x 5 MHz	Economic Areas	176
D	752-757, 782-787	10 MHz	2 x 5 MHz	Economic Areas	176
E	757-762, 787-792	10 MHz	2 x 5 MHz	Economic Areas	176

Proposed Lower 700 MHz Band Plan



Block	Frequencies (MHz)	Bandwidth	Pairing	Geographic Area Type	No. of Licenses
A	698-704, 728-734	12 MHz	2 x 6 MHz	Economic Areas	176
B	704-710, 734-740	12 MHz	2 x 6 MHz	MSA/RSA (CMAs)	734
C	710-716, 740-746	12 MHz	2 x 6 MHz	MSA/RSA (CMAs)	734
D	716-722	6 MHz	unpaired	700 MHz EAG	6
E	722-728	6 MHz	unpaired	700 MHz REAG	12

SpectrumCo's AWS Auction Experience Demonstrates the Value of Including Smaller License Areas in the 700 MHz Auction

SpectrumCo's AWS auction experience demonstrates that large spectrum blocks and large geographic service area licenses are not necessary for bidders to acquire a nationwide spectrum footprint. As detailed in the attached white paper, SpectrumCo was successful in purchasing enough licensed spectrum to obtain a nationwide footprint. Several parties filing comments in response to the *Notice of Proposed Rulemaking* noted that the availability of EA-sized licenses in the AWS auction enabled SpectrumCo (and potentially other new entrants) to

obtain a nationwide footprint,[11] despite the active bidding of several large incumbent wireless carriers. Therefore, it is incorrect for commenters in this proceeding to argue that EAG-sized blocks or even a single nationwide license are necessary or preferable to provide nationwide opportunities in the 700 MHz band.[12]

The AWS auction was widely considered a success for bidders of all sizes, and for incumbents and new entrants alike.[13] New entrant SpectrumCo was the third highest bidder in this auction and, as described below, successfully aggregated a nationwide footprint through its high bids on 137 EA licenses. The AWS auction also allowed incumbent national carriers and other larger providers to fill gaps in existing networks by obtaining and aggregating EA-sized licenses. Regional and smaller carriers also successfully added new markets and expanded their coverage in existing markets. In fact, the Rural Cellular Association ("RCA") reported that 70 of the 104 winning bidders in the auction were rural carriers or small businesses.[14]

As the white paper demonstrates, of the 168 eligible bidders in the AWS auction, 153 bidders that represented 200 million upfront bidding units, and that ultimately purchased 355 licenses for $220 million, likely would not have entered the AWS auction if only large REAG licenses had been available. These 153 bidders never placed a bid on an REAG-sized spectrum block during the AWS auction, and 152 of them did not have enough initial eligibility to purchase even the smallest of the continental REAG licenses.[15] Yet, as the white paper illustrates, this group of bidders placed bids on licenses in every state in the continental United States and in license areas almost covering the entire country – and they succeeded in winning licenses in almost all of the areas where they placed bids.[16] It is fair to conclude, therefore, that had the AWS auction only included super-regional REAG licenses, the auction may not have turned out to be "the biggest, most successful wireless auction in the Commission's history."[17]

In the AWS auction, SpectrumCo first bid on REAG licenses, but eventually focused its bidding on EA licenses. Using this approach, SpectrumCo won 137 licenses covering 260.5 million people at a total price of almost $2.4 billion.[18] SpectrumCo's successful aggregation strategy proves that the auction of smaller spectrum blocks and smaller geographic area licenses does not inhibit the creation of very large and even nationwide footprints. As the white paper explains, smaller spectrum blocks provide efficient optionality to bidders – meaning that bidders intent on purchasing a national package of licenses can do so by using aggregation strategies that minimize the risk of failed aggregations, while bidders that demand smaller service areas and spectrum blocks can bid on licenses of optimal size for their less expansive coverage needs. The same cannot be said of larger EAG license areas.

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[11] *See, e.g.*, Reply Comments of the Rural Telecommunications Group at 1-6 (filed Oct. 20, 2006); Erratum to the Comments of MetroPCS Communications, Inc. at 5-6 (filed Sept. 29, 2006); Reply Comments of MetroPCS Communications, Inc. at 2 (filed Oct. 20, 2006).

[12] *See, e.g.*, Joint Comments of DIRECTV, Inc. and EchoStar Satellite L.L.C. at 3-7 (filed Sept. 29, 2006); Comments of AT&T Inc. at 4-10 (filed Oct. 5, 2006); Comments of Cingular Wireless LLC at 5-9 (filed Oct. 5, 2006); Comments of Verizon Wireless at 4-5 (filed Sept. 29, 2006); Comments of Motorola, Inc. at 6-8 (filed Sept. 29, 2006); Comments of Qualcomm Incorporated at 16-17 (filed Sept. 29, 2006).

[13] *See* Bazelon at 1-3.

[14] *Id*. at 3.

[15] *See id*. at 9.

[16] *See id*. at 10-11, Figures 3 and 4.

[17] *Id*. at 1 (quoting Chairman Martin's statement as reported in Kathryn Balint, *Wireless firms win spectrum auction; S.D. companies NextWave, Leap bid successfully*, San Diego Union-Tribune, Sept. 20, 2006, at C-1).

[18] *Id*. at 8-9, Figure 2.

Economic and Auction Theory Support Use of a Mix of License Sizes in the 700 MHz Band

As demonstrated below and in the white paper, large spectrum blocks and geographic areas serve a narrow interest, affording only the largest incumbent carriers or large new entrants able to finance a national strategy with a realistic opportunity to bid and acquire these licenses.[19] Although some of the proponents of larger spectrum blocks argue that post-auction disaggregation through secondary market transactions will meet the needs of carriers that have smaller demands for spectrum,[20] this claim concedes that there is demand for smaller licenses. These proponents simply prefer secondary markets to an auction as the means to satisfy that demand, ignoring the substantial and unnecessary transaction costs associated with these after-auction options[21] and the potential for large amounts of spectrum to lay fallow if secondary market transactions do not occur. Moreover, relying on secondary markets permits incumbent licensees to determine whether there will be additional entry and to select the entities, if any, to which they will transfer spectrum.[22]

The attached white paper explains, however, that there is significant value in designing auctions that allow bidders to purchase licenses that are specifically tailored to their business plans and/or complementary to their existing spectrum holdings or other assets, thereby allow auction participants to bid flexibly in order to obtain spectrum necessary to filling coverage holes or serving particular regions of the country.[23] Indeed, a number of state agencies filing joint comments in this proceeding have cited the "serious public policy issue" created by wireless coverage gaps in their states, and have called for smaller license areas to promote service in rural markets.[24] As noted by Dr. Bazelon, "[o]nly by starting with reasonably small building blocks can bidders have the flexibility to configure the set of licenses that best meets their needs."[25]

Auctioning the remaining 700 MHz spectrum exclusively in a few massive EAG-sized license blocks would fail to recognize the bidder-specific nature of demand for new spectrum, and would reduce potential interest in the available spectrum by severely limiting bidders' ability to define and bid on the packages of licenses they value most. The Commission should not ignore the efficiency of allowing bidders to choose which grouping of licenses they most desire, something which is not possible with larger licenses.[26]

To maximize economic efficiency as well as flexibility, the 700 MHz auction should include some smaller spectrum blocks, and these should align with the EA and CMA geographic service areas used in the AWS auction.[27] As stated in the white paper, the use of the AWS band

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[19] *See, e.g.*, Comments of United States Cellular Corporation at 8-9 (filed Sept. 29, 2006) (describing the "formidable burden" that even larger regional carriers would face in bidding for EAG-sized licenses).
[20] *See* Comments of Cingular Wireless LLC at 8; Comments of AT&T Inc. at 10-11.
[21] *See* Comments of United States Cellular Corporation at 9 (noting that secondary markets play an important role in the efficient allocation of spectrum but arguing that these mechanisms "cannot replace the primary marketplace opportunities afforded by spectrum auctions including smaller license areas, fairly contested for in an open and competitive bidding process").
[22] *See* 47 U.S.C. § 310(d) (prohibiting the FCC from determining, in reviewing transfer of control or assignment applications, whether the public interest would be served by a different entity rather than the proposed transferee or assignee).
[23] *See* Bazelon at 4-7.
[24] Comments of Vermont Dept. of Public Service *et al*. at 1-5 (filed Sept. 29, 2006).
[25] Bazelon at 6.
[26] *See id.* at 5-6.
[27] *See id*. at 11-12.

plan model in the 700 MHz auction is likely to be even more successful than in the AWS auction because of the numerous licensees that now have licenses covering REAG, EA, and CMA areas. The 104 winners from the AWS auction will have demands that will most efficiently be met by 700 MHz licenses of the same geographic scope as those obtained in the AWS auction.[28]

SpectrumCo's Band Plan Proposal is Supported by Congressional Auction Mandates and Commission Auction Precedent, and Will Not Delay the 700 MHz Auction

A decision to create smaller geographic service areas and spectrum blocks would be more faithful to Congressional auction mandates and Commission precedent than preserving the extremely large service areas in the present 700 MHz band plan. Long-standing statutory mandates, including provisions in Section 309(j) of the Communications Act,[29] require the Commission to design competitive bidding processes that promote "an equitable distribution of licenses and services among geographic areas,"[30] and "avoid[ ] excessive concentration of licenses . . . by disseminating licenses among a wide variety of applicants, including small businesses, rural telephone companies, and businesses owned by members of minority groups and women."[31] Over the past 12 years, the Commission has achieved these mandates in its auction policies by making smaller license areas and blocks available, attracting a wide variety of applicants and spurring explosive growth in consumer use of wireless services. If smaller service areas and spectrum blocks are not offered in the 700 MHz band plan, these goals likely will not be achieved in this auction.

In addition, Commission experience using smaller geographic areas and spectrum blocks in major auctions of spectrum suitable for mobile services, particularly the PCS and AWS auctions, counsels in favor of using smaller areas and blocks in the 700 MHz band.[32] By contrast, the current 700 MHz band plan would force the Commission to embark upon the untested experiment of offering only very large geographic areas for prime mobile spectrum that is highly sought after by a wide range of potential bidders. The 700 MHz band is too valuable, and interest in the spectrum is too great, to justify such an experiment.

Furthermore, proponents of the current band plan drastically overestimate the delays that might be associated with revising the 700 MHz band plan, particularly given the Commission's experience with smaller sizes in earlier auctions for similar spectrum. When faced with similar circumstances in the AWS auction, the Commission adjusted the AWS band plan in August 2005 to create smaller geographic areas and provide more opportunity for small and rural bidders.[33] Although these changes were made just ten months before the planned start of the auction, the AWS auction proved to be the Commission's most successful auction in history. With a year to go before the start of the 700 MHz auction, there is no reason why a similar result could not occur here.

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[28] *Id*. at 11.
[29] *See* 47 U.S.C. § 309(j)(3), (j)(4)(C), (j)(4)(D).
[30] *Id*. § 309(j)(4)(C).
[31] *Id*. § 309(j)(3)(B).
[32] *See, e.g.*, Implementation of Section 309(j) of the Communications Act – Competitive Bidding, *Fifth Report and Order*, 9 FCC Rcd 5532, ¶¶ 5-7 (1994) ("*PCS Auction Order*") (establishing initial auction procedures for broadband PCS licenses); *see also AWS Reconsideration Order*, ¶ 17.
[33] *See AWS Reconsideration Order*, ¶¶ 15, 17.

Notably, one commenter, Cingular, asserts without any substantiation that utilizing smaller license sizes and increasing the number of licenses auctioned will result in a longer auction.[34] There is no necessary link, however, between the number of licenses in an auction and the length of time the auction takes, and a more relevant factor could be, for example, the minimum opening bids and bidding increments set by the Commission.[35] Even accepting as true Cingular's argument, however, there is no basis to conclude that the increase in the number of licenses advocated in SpectrumCo's band plan proposal would significantly slow the pace of the auction or extend the time it takes to conclude the auction. The AWS auction opened on August 9, 2006, and concluded on September 18, 2006 – ending after five-and-a-half weeks.[36] The six blocks offered in the AWS auction were partitioned into 1,122 licenses. If the Commission were to adopt SpectrumCo's proposal for the remaining 700 MHz band spectrum – partitioning the spectrum into six blocks with a license configuration of one REAG block, four EA blocks, and one CMA block – the 700 MHz auction would include a total of 1,450 licenses. Even if one assumed that there would be a proportional increase in auction time relative to the five-and-a-half week AWS auction (although such a proportional increase is not supported by past Commission auction data), this would still result in the 700 MHz auction concluding in under two months.

Changed Circumstances Provide Further Support for Revising the 700 MHz Band Plan

The wireless marketplace has changed a great deal since the Commission first adopted the 700 MHz band plans. These changes, and the policies that guided the Commission's successful AWS auction, strongly favor adopting the AWS model for the 700 MHz band. The factors arguing in favor of improved access to spectrum for multiple carriers in the AWS band apply with equal or greater force here, as industry consolidation and other pressures continue to make spectrum suitable for deployment of mobile services harder to obtain. Likewise, a mix of licenses in the 700 MHz band can facilitate demand, spur deployment in underserved areas, and promote competition among existing carriers and new entrants, thereby benefiting consumers and the public interest.

The Commission developed its band plans for the Upper and Lower 700 MHz bands in 2000 and 2002, respectively, in a very different stage in the development of wireless service and without the benefit of the wide range of commenters that responded to the *Notice of Proposed Rulemaking* in the present proceeding.[37] At the time of the Upper 700 MHz band plan decision, for example, the demand for mobile voice service was exploding as a result of the introduction of large-bucket mobile calling plans, and national carriers were desperate to add spectrum to large

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[34] Reply Comments of Cingular Wireless LLC at 7 (filed Oct. 20, 2006).

[35] Past FCC auction data demonstrates that auction timing is not proportionally related to the number of licenses auctioned. For example, in Auction 65, where only two 800 MHz air-ground licenses were awarded, the bidding lasted 144 rounds. *See* Wireless Telecommunications Bureau Auction 65 summary, *available at* http://wireless.fcc.gov/auctions/default.htm?job=auction_summary&id=65 (last visited Jan. 7, 2007). By comparison, 1,087 licenses were won in Auction 66, yet the bidding lasted only an additional 17 rounds, representing a 12% increase in the number of rounds despite the award of 543 times as many licenses.

[36] *See* Wireless Telecommunications Bureau Auction 66 summary, *available at* http://wireless.fcc.gov/auctions/default.htm?job=auction_summary&id=66 (last visited Dec. 28, 2006).

[37] *See generally* Service Rules for the 746-764 and 776-794 MHz Bands, and Revisions to Part 27 of the Commission's Rules, *First Report and Order*, 15 FCC Rcd 476 (2000) ("*Upper 700 MHz First Report and Order*"); Reallocation and Service Rules for the 698-746 MHz Spectrum Band (Television Channels 52-59), *Memorandum Opinion and Order*, 17 FCC Rcd 11613 (2002) ("*Lower 700 MHz MO&O*").

areas within their growing footprints. At the same time, the CMRS spectrum cap continued to apply to non-700 MHz mobile spectrum (it was not eliminated until 2002),[38] and the AWS auction was still several years away.

The Commission also faced tight Congressional deadlines for auctioning this spectrum (giving the Commission limited time to deliberate the appropriate license area and block sizes), and needed to account for the uncertain timing as to when broadcast incumbents would transition from the band. Since then, elimination of the spectrum cap, consolidation in the wireless industry and completion of the AWS auction have allowed national and regional wireless carriers to acquire significant amounts of additional spectrum. Furthermore, increased certainty regarding the Digital Television transition has made the 700 MHz band a far more valuable investment than it was during previous 700 MHz Auctions 44 and 49, which took place in 2002 and 2003.[39] As reflected by the multitude of comments in this proceeding, the 700 MHz band is now more attractive to a wider range of potential bidders, including both existing carriers and new entrants.

In the *Notice of Proposed Rulemaking*, the Commission recounts the following reasons for establishing predominantly larger geographic areas in the original 700 MHz band plans: facilitating construction of a nationwide footprint by providers; allowing existing technologies to grow while also encouraging development of new technologies; providing economies of scale; addressing problems associated with incumbent TV stations; and facilitating completion of the auction in a timely manner.[40] As explained more fully below, these reasons, while perhaps valid in their time, no longer justify continued use of the EAG license boundaries. Therefore, SpectrumCo urges the Commission to take into account the changed circumstances and the current wireless marketplace in reevaluating the merits of utilizing only EAG-sized licenses for the upcoming 700 MHz auction.

The highly successful (and highly aggregated) mobile wireless industry was built on blocks of CMAs, BTAs and MTAs,[41] rather than nationwide or super-regional licenses. Accordingly, in light of the nationwide footprint and national service plans established by large incumbent carriers using CMA, BTA, and MTA-sized spectrum blocks, it is unreasonable for certain commenters favoring the current band plan to suggest that economically practicable deployment of nationwide service or the realization of economies of scale depends on national spectrum licenses.[42] SpectrumCo's experience in the AWS auction also clearly demonstrates

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[38] *See* 47 C.F.R. § 20.6(f) (noting that the CMRS spectrum cap ceased to be effective January 1, 2003).

[39] The DTV Transition is now mandated by law to end on February 17, 2009. *See* 47 U.S.C. § 309(j)(14). The 700 MHz band auction will end by the Spring of 2008, meaning that there will be less than one year between the conclusion of the auction and the date on which the spectrum will be fully available to 700 MHz licenses. *See Notice of Proposed Rulemaking*, ¶ 9 (noting that 47 U.S.C. § 309(j)(15)(C)(v) requires the Commission to commence the auction of recovered analog broadcast spectrum in the 700 MHz band by January 28, 2008, and to deposit the auction's proceeds by June 30, 2008).

[40] *Notice of Proposed Rulemaking*, ¶ 28 n.106.

[41] CMAs divide the U.S. into 734 distinct geographic markets; BTAs divide the U.S. into 493 distinct geographic markets; MTAs divide the U.S. into 51 distinct geographic markets. *See* Implementation of Section 6002(b) of the Omnibus Budget Reconciliation Act of 1993, Annual Report and Analysis of Competitive Market Conditions with Respect to Commercial Mobile Services, *Eleventh Report*, 21 FCC Rcd 10947, ¶¶ 14 n.26, 62, 63 n.131 (2006).

[42] *See* Comments of AT&T Inc. at 2; Comments of Cingular Wireless LLC at 17; Comments of Qualcomm Incorporated at 17; Comments of Verizon Wireless at 4; Comments of Motorola, Inc. at 3-6; Joint Comments of DirecTV, Inc. and EchoStar Satellite L.L.C. at 3-7.

that it is possible for a new entrant to acquire at auction an essentially national footprint by bidding on mid-sized EA licenses.[43]

Moreover, a mix of geographic service areas, as proposed by SpectrumCo, will allow existing technologies to grow while also encouraging development of new technologies. Given the bidder-specific nature of demand for spectrum, a range of license sizes will enable proponents of new technologies to tailor their bidding strategy to their deployment needs and to obtain sufficient spectrum without needing to bid on and win one particular-sized license. Those opposed to smaller geographic service areas and spectrum blocks overstate the stimulus effect that super-regional and nationwide licenses have on buildout and deployment of services.[44] These proponents of the current band plan tend to ignore the fact that a mix of larger and smaller licenses will allow for both expansion of existing service and introduction of service using new technologies, thus spurring development of equipment for the band.

Most significantly, the incumbent TV station issues driving the Commission's initial 700 MHz band plans have since been addressed by Congress. Initially, the Commission anticipated auctioning all of the 700 MHz band licenses well before the conclusion of the Digital Television Transition.[45] It was further anticipated that the more lightly encumbered Upper 700 MHz band would contain sufficient spectrum prior to the completion of the DTV Transition for wireless carriers to commence some commercial operations while broadcasters continued to operate in the band.[46] Under these conditions, larger licenses would have increased the likelihood that a licensee would have large amounts of usable spectrum in its license area prior to the conclusion of the DTV Transition. This concern is no longer germane. The DTV Transition is now mandated by law to end on February 17, 2009,[47] and the 700 MHz band auction will end in early 2008.[48] With less than one year between the conclusion of the auction and the full availability of the licensed spectrum, this reason for larger license blocks no longer exists.

Given all of the circumstances that have changed since the release of the *700 MHz Orders* in 2000 and 2002, the public interest now strongly favors a mix of license sizes including smaller licenses in the 700 MHz band auction.

The Majority of Commenters Support Smaller Geographic Areas in the 700 MHz Band

The overwhelming majority of commenters in the 700 MHz proceeding support smaller geographic areas, including nationwide wireless carrier T-Mobile and large equipment

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[43] *See* Bazelon, App. 2. Other AWS auction participants also acquired significant spectrum by aggregating smaller licenses. For example, T-Mobile spent $1.3 billion and Cingular spent $837 million on non-REAG licenses. *Id.*; *see also Lower 700 MHz MO&O*, ¶ 89 n.256 (noting, in discussing the benefits of geographic area licensing, that this approach "facilitates aggregation by licensees of smaller service areas into seamless regional and national service areas, allows development of strategic and regional business plans, provides licensees with greater build-out flexibility and is efficient for the Commission to administer").

[44] *See, e.g.*, Joint Comments of DIRECTV, Inc. and EchoStar Satellite L.L.C. at 2 (asserting that "the satellite industry's track record over the last decade suggests that nationwide players can often serve – and spur competition in – rural America better than their local and regional competitors" while neither substantiating the claim nor explaining how experiences providing video service using a small number of geostationary satellites may be relevant in the context of delivering wireless spectrum-based services on a local basis).

[45] *See, e.g.*, Congressional Budget Office, *Completing the Transition to Digital Television*, at Summary (Sept. 1999).

[46] *Id*. at 13-15.

[47] 47 U.S.C. § 309(j)(14).

[48] *See supra* note 39.

manufacturer Intel, as well as the Small Business Administration, several state government parties (representing Vermont, North Dakota, Nebraska, and Maine), consumer groups, and many regional and smaller wireless carriers.[49] In its reply comments, for example, T-Mobile urges the Commission to revise the 700 MHz band plan "so as to provide reasonable opportunities for entities of all sizes to bid for and win the spectrum they need."[50] United States Cellular Corporation supports smaller license sizes in order to provide opportunities for regional and rural carriers but also because the availability of smaller licenses "provid[es] all carriers, large and small, with the flexibility they need to construct 700 MHz footprints that are tailored to their needs for capacity and coverage."[51] These comments reflect strong demand for 700 MHz spectrum among different-sized carriers and new entrants, as well as a recognition of the benefits of smaller licenses by regulators and consumer advocacy groups.

SpectrumCo's proposal is similar to the band plans advocated by many proponents in this proceeding, including the Balanced Consensus Proposal supported by twenty-one different entities. SpectrumCo notes, however, that the plan described in this letter fosters greater benefits by incorporating additional mid-sized EA geographic service areas that are well-suited for new entrants, smaller carriers, and nationwide providers alike. SpectrumCo's proposal also includes licenses to be auctioned in smaller CMA-sized and larger REAG-sized blocks, affording bidders flexibility in defining the package of licenses most tailored to their business needs or suitable for complementing their existing holdings.

Conclusion

For all these reasons, and on the basis of the detailed analysis provided in the attached white paper prepared by Dr. Bazelon, SpectrumCo respectfully submits that the public interest would be served by revising the current 700 MHz band plan to adopt the band plan described in this letter. Should you have any questions concerning this submission, kindly contact the undersigned.

Sincerely,

/s/ Michele C. Farquhar

Michele C. Farquhar
Attorney for SpectrumCo, LLC

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[49] Commenters favoring smaller license areas include the supporters of the Balanced Consensus Proposal (including Alltel Corporation, Aloha Partners, Blooston Rural Carriers, C&W Enterprises, ConnectME Authority, Corr Wireless Communications, Dobson Communications Corporation, Leap Wireless, Maine Office of the Chief Information Officer, MetroPCS Communications, NTCA, Nebraska PSC, North Dakota PSC, Rural Cellular Association, Rural Telecommunications Group, Union Telephone Company, United States Cellular Corporation, Vermont Department of Public Service, Vermont Office of the Chief Information Officer, Vermont Public Services Board, and Vermont Telephone Company), and T-Mobile USA, OPASTCO, Consumer Federation of America, NextWave Broadband, Frontier Communications, Milky Way Broadband, Council Tree Communications, Doug Howard and Farooq Javed, and Access Spectrum.

[50] Reply Comments of T-Mobile USA, Inc. at 2 (filed Oct. 20, 2006).

[51] Comments of United States Cellular Corporation at 4.

cc: Chairman Kevin J. Martin, Federal Communications Commission
Commissioner Jonathan S. Adelstein
Commissioner Michael J. Copps
Commissioner Robert M. McDowell
Commissioner Deborah Taylor Tate
Barry Ohlson, Senior Legal Advisor to Commissioner Adelstein
Bruce Liang Gottlieb, Legal Advisor to Commissioner Copps
John Branscome, Legal Advisor to Commissioner Copps
Angela E. Giancarlo, Legal Advisor to Commissioner McDowell
Aaron Goldberger, Legal Advisor to Commissioner Tate
Fred Campbell, Bureau Chief, Wireless Telecommunications Bureau
Jim Schlichting, Deputy Chief, Wireless Telecommunications Bureau
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The Economics of License Sizes in the FCC's 700 MHz Band Auction

January 8, 2007

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Vice President
Analysis Group, Inc.

My name is Coleman Bazelon. I am a Vice President at Analysis Group, Inc. ("Analysis Group"), a consulting firm that provides microeconomic, financial, and strategy consulting services. My business address is 1899 Pennsylvania Avenue, NW, Suite 200, Washington, DC 20006. Analysis Group has offices in Boston, MA; Washington, DC; New York, NY; Chicago, IL; Denver, CO; Dallas, TX; Los Angeles, Menlo Park, and San Francisco, CA; and Montreal, QB Canada. Analysis Group has approximately 375 employees. I have been employed by Analysis Group since August 2001. During that time, my consulting engagements have included regulatory, litigation, and arbitration matters in the wireless, wireline, and video sectors. Prior to joining Analysis Group, I was a principal analyst in the Microeconomic and Financial Studies Division of the Congressional Budget Office, where I was responsible for telecommunications and auction issues.

I received an M.S. and Ph.D. in Agricultural and Resource Economics from the University of California at Berkeley in 1989 and 1995, respectively. I earned a Diploma in Economics in 1987 from the London School of Economics and Political Science.

I have filed several declarations before the FCC. My curriculum vitae is attached as Appendix 1.

I have been asked by SpectrumCo LLC ("SpectrumCo") to comment on the economics of license sizes as they relate to the upcoming 700 MHz Band auction. The analysis presented herein demonstrates that the optimal coverage area for wireless services should be determined by the FCC's auction process which avoids the transaction costs of secondary markets and demonstrates that an efficient outcome can best be achieved if the license blocks are of relatively small or mixed size.

A SUCCESSFUL AUCTION

FCC Chairman Kevin Martin referred to the recently completed Advanced Wireless Services ("AWS") auction as "the biggest, most successful wireless auction in the commission's history."[1] The auction was a success not only in terms of total revenue raised for the U.S. Treasury, but also in terms of its ability to meet the strategic goals of a multitude of bidders.

The AWS auction, or Auction 66, generated $13.7 billion in net high bids, close to the higher end of the pre-auction revenue expectations of between $8 billion and $15 billion.[2] As of the beginning of November 2006, the FCC had awarded licenses with a value totaling $12.2 billion, an amount close to the total proceeds from all prior auctions.[3] Unlike some other auctions, bidders in the AWS auction perceived that these proceeds reflected fair market value

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1 Kathryn Balint, *Wireless firms win spectrum auction; S.D. companies NextWave, Leap bid successfully*, San Diego Union-Tribune, Sept. 20, 2006, at C-1.

2 *FCC AWS Auction 66 Ends Raising $13.7B*, Prudential Equity Group, LLC, Sept. 18, 2006 ("Prudential Equity Group"), at 1.

3 Revenue transferred to the U.S. Treasury from all previous FCC auctions combined totaled approximately $14 billion. *FCC Grants First Advanced Wireless Services Licenses Won in Auction No. 66*, FCC Press Release, Nov. 29, 2006; *see also Expect Familiar Faces, Purses in 700 MHz, Analysts Say*, Satellite Week, Dec. 4, 2006.

for the spectrum licenses. As one T-Mobile executive said, "[s]ome … auctions in the past were characterized by either irrational exuberance in terms of pricing or irrational depression. This one seemed to get it right."[4]

Incumbent national wireless carriers were among the largest bidders and largest winners in the auction.[5] They have indicated that the auction was a success[6] and that they intend to use their increased spectrum holdings to launch new wireless broadband services or to expand network capacity.[7] One month after the AWS auction closed, the single largest bidder, T-Mobile, announced it would begin deploying UMTS technology across its network in early 2007.[8]

Not all large bidders were incumbent wireless operators. In terms of total winning bids, SpectrumCo, a consortium including the largest cable multiple system operators ("MSOs") in the country, was the third largest bidder in Auction 66. Commenters in the 700 MHz proceeding have referred to SpectrumCo's ability to purchase sufficient EA licenses to create a nationwide wireless service footprint as a success not only for SpectrumCo, but for the structure of the AWS auction as a whole.[9]

Bidders with smaller demands also successfully participated in the AWS auction. According to one industry observer, "[a]lthough much of the attention from the recent Advanced Wireless Services spectrum auction was focused on T-Mobile's $4.2 billion payout for 3G licenses, dozens of other operators gained valuable chunks of spectrum. In fact, while the large carriers went after the high-value spectrum such as metro areas and regional licenses, the majority of the megahertz up for bid went to smaller operators, many of them gaining the spectral holdings to fuel substantial expansions."[10] One such bidder, Leap Wireless International, stated that "[w]e believe the results from this auction will allow Leap to continue to grow and will allow us to develop a more robust competitive position in our existing markets. In addition to horizontal growth, the new licenses increase our licensed spectrum in our existing markets which we expect will allow us to expand and enhance our services, including our data services."[11] Metro PCS also expanded its coverage in its existing markets, and moved into new ones,[12] while other smaller bidders have indicated that they will use spectrum purchased in the AWS auction to make technological network upgrades.[13] The success of these smaller operators is expected to increase choice for consumers in the areas served by these bidders.[14]

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4 Howard Buskirk, *Retune 800 MHz Police Radios Faster, Motorola Says*, Communications Daily, Dec. 15, 2006 ("Buskirk, 2006").

5 Prudential Equity Group, at 1.

6 Buskirk, 2006.

7 *The AWS Auction: With The Bill Almost Due, A Look At The Future*, Telecom Policy Report, Vol. 4 No. 37 (2006).

8 Kelly Hill, *T-Mobile talks UMTS, but pushes off HSDPA*, RCR Wireless News, Oct. 9, 2006.

9 *See, e.g.*, Reply Comments of The Rural Telecommunications Group, at 4-5 (filed Oct. 20, 2006); Comments of MetroPCS Communications, Inc., at 5-6 (filed Sept. 29, 2006).

10 Kevin Fitchard, *No winner-take-all for AWS*, Telephony, Oct. 23, 2006 ("Fitchard, 2006").

11 *Leap and Denali Tout Success in FCC's Auction*, Wireless News, Sept. 20, 2006.

12 Fitchard, 2006.

13 *See, e.g.*, Comments of Union Telephone Company, indicating that "Union anticipates that it will be able to use the AWS spectrum to upgrade its network with advanced technologies in order to deploy both high-

Although some industry observers have indicated disappointment that more licenses did not go to Designated Entities ("DEs")[15] and rural carriers,[16] these types of service providers successfully participated in the AWS auction as well. The Rural Cellular Association indicated that the use of a variety of license areas in the AWS auction made participation more attractive to rural carriers: "The availability of 734 comparatively more affordable CMA licenses undoubtedly helped attract rural carriers and other small businesses to the AWS auction . . . by RCA's count, 70 of the 94 winning bidders . . . were rural carriers or small businesses."[17] Despite the fact that DEs represented only 4 percent of the dollar value of winning bids in Auction 66,[18] DE participation was high—over half the bidders with provisionally winning bids were DEs.[19]

As described in detail below, a major factor in the success of the AWS auction was the mix of license sizes offered, encompassing large, mid-sized, and small geographic license areas. The AWS auction band plan was designed to maximize bidder-specific demand, to facilitate bidder aggregation strategies, and to achieve related efficiencies by incorporating smaller license areas.

GETTING THE INITIAL DISTRIBUTION OF OWNERSHIP RIGHT ENHANCES EFFICIENCY

Ronald Coase famously asserted, in what has become known as the Coase Theorem, that the initial distribution of rights is immaterial as long as transaction costs are sufficiently low.[20] Taking Coase's assumption—insignificant transaction costs—as valid for the moment, the implication of the Coase Theorem for license sizes is that it doesn't matter how the FCC distributes licenses because the secondary market will efficiently find the appropriate ownership pattern for those licenses.

It is worth noting that even under the assumptions necessary for the Coase Theorem to hold, the ownership of licenses can be affected by the initial distribution of licenses if many producers are equally efficient in the market. With licensed, flexible use spectrum in limited supply, a licensee of 700 MHz Band spectrum licenses *may* have an incentive to deny competitors access to this scarce resource. However, as long as the retail market for spectrum-based services is competitive, spectrum licensees should not be able to harm consumers by

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quality voice services and even more innovative data services." Comments of Union Telephone Company, at 4 (filed Sept. 29, 2006).

14 *Special Focus: AWS Auction*, Stifel Nicolaus, Sept. 22, 2006, at 1.

15 Comments of Council Tree Communications, Inc., at 6-11 (filed Sept. 29, 2006).

16 Caressa Bennet, interview in Telephony, Nov. 6, 2006.

17 *Rural Carriers to FCC: Sell Some 700 MHz Spectrum in Small Licenses*, Communications Daily, Oct. 3, 2006.

18 Jeffrey Silva, *DEs: Rule changes justify throwing out auction results*, RCR Wireless News, November 6, 2006.

19 Jeffrey Silva, *Appeals court cautioned not to throw out Auction 66*, RCR Wireless News, Oct. 23, 2006.

20 Ronald Coase, *The Problem of Social Cost*, 3 Journal of Law and Economics 1-44 (1960); *see also* Declaration of Dr. Gregory L. Rosston and Dr. Scott Wallsten at 8, filed as an attachment to Comments of Access Spectrum, LLC, Columbia Capital III, LLC, Pegasus Communications Corporation and Telcom Ventures, LLC (filed Sept. 29, 2006).

sustaining retail price increases.[21] Although this potential behavior may not cause economic harm to consumers, it could have adverse effects on other goals established by Congress for the FCC, including the diversity of license ownership. The competitive nature of mobile voice communications is well established[22]—the competitiveness of future services using the 700 MHz Band spectrum has yet to be proven.

Of course, Coase's Theorem likely does not hold for the initial distribution of 700 MHz Band licenses because transaction costs are not immaterial. Massive aggregation of spectrum licenses has occurred over the past two decades.[23] Some spectrum licenses have also been partitioned.[24] These aggregations and disaggregations, however, come with some cost. This cost could be avoided if the initial assignment of spectrum licenses for the 700 MHz Band was made to those who would ultimately use the licensed spectrum, instead of relying on the secondary market to sort it out. An FCC auction provides a low transaction cost environment for sorting out efficient ownership. In fact, getting it right the first time is the reason so much effort is expended on auction design.

THE EFFICIENT COVERAGE OF LICENSED SPECTRUM IS NOT KNOWN PRIOR TO THE AUCTION

Given that the initial distribution of spectrum licenses matters, the questions become: what is the most efficient aggregation of spectrum and who should hold the licenses to use it? It is now well established that the second question—who should hold spectrum licenses—should be answered using a competitive bidding process. This was not always the case. Initial cellular licenses were either granted to incumbent wireline carriers or distributed through comparative hearings in which the FCC considered evidence as to the suitability of each applicant and then decided who was best able to provide service.[25] Recognizing the inherent inefficiencies of this process, lotteries, in which no attempt was made to discern the most suitable licensee, were later employed.[26] The use of lotteries relied entirely on the secondary market to ensure that the license ended up in the hands of the operator who valued it the most. It is now well understood that through the process of competitive bidding the potential spectrum licensee that values a license the most can credibly communicate (through a high bid) that it should be the one to provide service over that license.

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21 Thomas W. Hazlett, *Mobile Roaming and Rate Regulation: An Economic Analysis*, Jan. 26, 2006, at 11-12, filed as an attachment to Reply Comments of Cingular Wireless LLC, WC Docket No. 05-265 (filed Jan. 26, 2006).

22 Annual Report and Analysis of Competitive Market Conditions with Respect to Commercial Mobile Services, *Eleventh Report*, 21 FCC Rcd 10947, at 4-5 (2006) ("CMRS 11th Competition Report").

23 Thomas W. Hazlett, *Is Federal Preemption Efficient in Cellular Phone Regulation?*, 56 Federal Communications Law Journal 155-237 (2003), at 194.

24 Facilitating the Provision of Spectrum-Based Services to Rural Areas and Promoting Opportunities for Rural Telephone Companies to Provide Spectrum-Based Services, *Notice of Proposed Rulemaking*, 18 FCC Rcd 20802, 20834-35 (2003). It is unclear from this source how much of the partitioning is in the geographic dimension and how much in the spectrum dimension. This matters because, for example, dividing a 30 MHz MTA license into two 15 MHz MTA licenses does not address the issue created by entities that have small geographic demands.

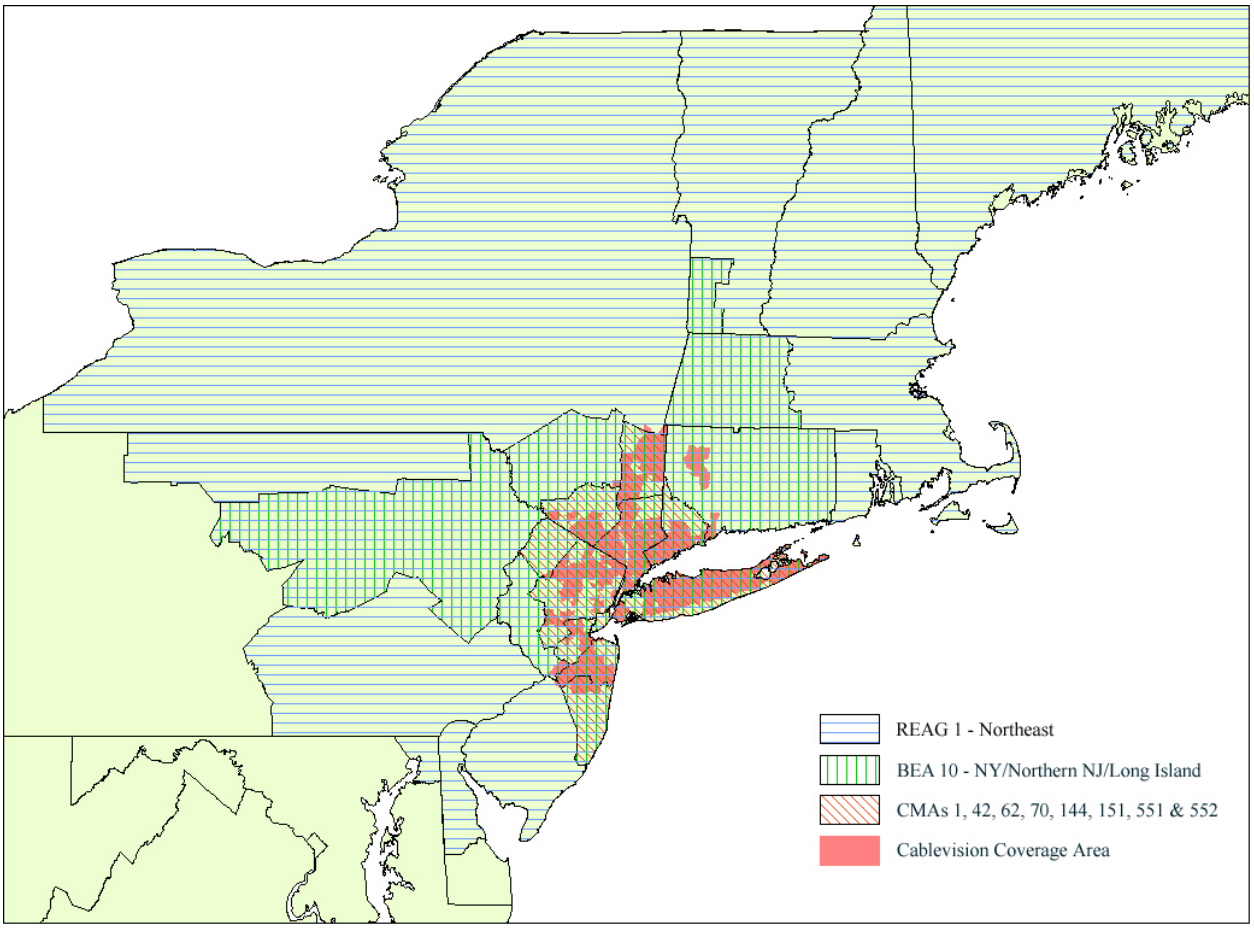
25 CMRS 11th Competition Report, at footnote 127.

26 *Id*.

Almost every potential bidder in the upcoming 700 MHz Band auction will have its own preference for the most valuable license configuration. There are many reasons for this. For example, an incumbent licensee may use an auction to fill holes in coverage or to add spectrum in existing service areas with high demand for service. In the AWS auction, for instance, T-Mobile purchased spectrum in New York and California—both areas that were described as the "company's key spectrum bottlenecks."[27]

Demand for spectrum licenses can also come from other characteristics of a particular bidder, unrelated to any existing spectrum license holdings. For example, many rural telephone companies have expressed an interest in providing wireless-based services in the service areas of their wireline network. Cable companies can provide yet another example. As Figure 1 demonstrates, Dolan Family Holdings, LLC ("Dolan") bid on licenses of all sizes in the AWS auction, but all covered the area of the Dolan-owned Cablevision networks.

Figure 1: AWS Auction Bids and Cable Holdings of Dolan



The fundamental point about bidder-specific demand is that any choice of a given FCC configuration—say, a license block that covers the eastern seaboard—precludes some other configuration—say, a New York-focused strategy. Those two configurations are mutually

[27] Deutsche Bank, *Retrospective: Week 38:06*, Sept. 22, 2006, at 14.

exclusive and if the regulator chooses the larger license, the smaller one is no longer available to a bidder. The reverse, however, is not true—if the regulator chooses smaller license configurations, a bidder with larger demands can aggregate smaller licenses. Of course, a bidder interested in a smaller area could purchase a larger license that includes a significant amount of area that the bidder is not interested in and then sell or lease the extra licensed spectrum in the secondary market, adding unnecessary risk to the bidder's strategy. Only by starting with reasonably small building blocks can bidders have the flexibility to configure the set of licenses that best meets their needs.

SMALLER LICENSES WILL LEAD TO EFFICIENT ALLOCATION OF SPECTRUM

Many auction theorists believe that an efficient way to deal with the problem of bidder-specific complementarities is to employ a combinatorial auction design in which bidders are allowed to place single bids for packages of licenses.[28] One of the salient points to be drawn from the interest in combinatorial auctions is that *there are efficiencies in allowing bidders to choose which grouping of licenses they most desire, and that these efficiencies would not be possible with larger licenses.*

This value is not only recognized for large combinations of licenses. One significant issue with combinatorial bidding is the computational complexity involved in allowing package bids to be submitted for even a small number of licenses.[29] One proposed solution to this problem is to impose lower limits on allowable package sizes (so as to limit the computational burden). However, it has been noted that such a structure would have the drawback that "the lower limit on package size prevents the bidders from expressing complementarities that arise from smaller packages."[30] In other words, there is value in small bidder-defined groupings of licenses.

The value identified in the combinatorial bidding literature of allowing bidders to define the packages they value most still exists in a Simultaneous Multiple Round ("SMR") auction absent combinatorial bidding. The concern expressed with using the SMR auction format without combinatorial bidding is that the value created by complementarities may not be fully realized. However, exclusively using large license blocks *assures* that most of those complementary values will not be realized.

The only theoretical argument left against using smaller license blocks in an SMR auction without combinatorial bidding is that the risk of a failed aggregation will cause significant amounts of demand to go unsatisfied. As a practical matter, we saw no evidence of

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28 *See, e.g.*, Paul Milgrom, *FCC-SIEPR-NSF Wye Woods Conference: Lessons plus a Simple Proposal*, May 7, 2000, at 2-3; David Porter, et al., *Combinatorial Auction Design*, June 17, 2003.

29 *See, e.g.*, Jeffrey Banks, et al., *Theory, Experiment and the Federal Communications Commission Spectrum Auctions*, Oct. 2001; Charles River Associates Incorporated and Market Design, Inc., *Report 2: Simultaneous Ascending Auctions with Package Bidding*, Mar. 1998, at 1; Aleksandar Pekec and Michael H. Rothkopf, *Ex Parte Comments on Auction No. 31: Now There is Time for Serious Consideration of the Novel Auction Rules*, Aug. 1, 2000, at 2.

30 Charles River Associates Incorporated and Market Design, Inc., *Report 2: Simultaneous Ascending Auctions with Package Bidding*, Mar. 1998, at 9.

aggregation risk thwarting aggregations in the AWS auction. SpectrumCo successfully aggregated a near-national footprint despite the aggregation risk it faced.

The SMR auction format provides sufficient information to bidders during the auction to allow them to manage the risk of a failed aggregation. It is well known that certain licenses will likely sell for more or less than other licenses. By paying close attention to the licenses that are expected to cost the most, and with some understanding of relative license valuations, a bidder can gauge, at any point in time, what a given aggregation of licenses is likely to ultimately cost. With this information a bidder can tell if it is likely to stay within its budget. Also, as long as the bidder avoids bidding more for the less expensive licenses than their relative value would justify given the current bids on the most expensive licenses, the bidder can minimize the risk that it will be stuck purchasing or withdrawing from licenses in a failed aggregation. This strategy does not eliminate aggregation risk, but significantly reduces it.

The strategy for managing aggregation risk described above rests on the ability of a bidder to predict the final relative license prices with some degree of confidence. It is worth observing that the prediction becomes increasingly difficult when the number of licenses needed to cover the U.S. grows. Any effort to predict relative license valuations will have some degree of uncertainty. To the extent that predicting the relative prices of 734 CMA licenses is more uncertain that predicting the relative prices of 176 EA licenses, then the CMA licenses will have more aggregation risk than the EA licenses. Smaller licenses are needed for bidders with smaller demands, but bidders that are trying to aggregate larger bundles of licenses will face less unmanaged aggregation risk if the licenses are not too small. Consequently, care should be taken in choosing the size of the building blocks (or in selecting a mix of license sizes to be used as potential building blocks) in order to avoid creating unnecessary aggregation risk by creating too many very small licenses.

Notably, one bidder with apparent national aspirations failed to secure licenses in the AWS auction: Wireless DBS. It claims that it was faced with the "exposure problem" and this caused it "to bid less for AWS spectrum than [it] otherwise would have if the spectrum were available on a nationwide basis."[31] The facts belie this claim. In Wireless DBS's last round of activity, the average price per MHz-pop for REAGs was $0.38—little more than half of the final REAG prices. In that round, bidding on the REAGs was still very robust, with an average of 6.7 bids per continental REAG license area. Consequently, at the time Wireless DBS stopped bidding it was unlikely to be stuck with only partial coverage of the nation—there were many more rounds to go before there was a real risk of "exposure" to a failed aggregation. It is much more likely that prices simply were too high given the auction budget of Wireless DBS.

There is no reason to believe that managing aggregation risk would be any more difficult in the 700 MHz Band auction than it was in the AWS auction. The key features of the AWS auction that allowed aggregation risk to be managed—larger licenses settling before smaller licenses and a sense of relative license prices—will almost certainly be true in the 700 MHz Band auction.

[31] Joint Comments of DirecTV, Inc. and EchoStar Satellite LLC, at 5 (filed Sept. 29, 2006).

THE FCC'S AUCTION FORMAT PERMITS EFFICIENT SPECTRUM AGGREGATION

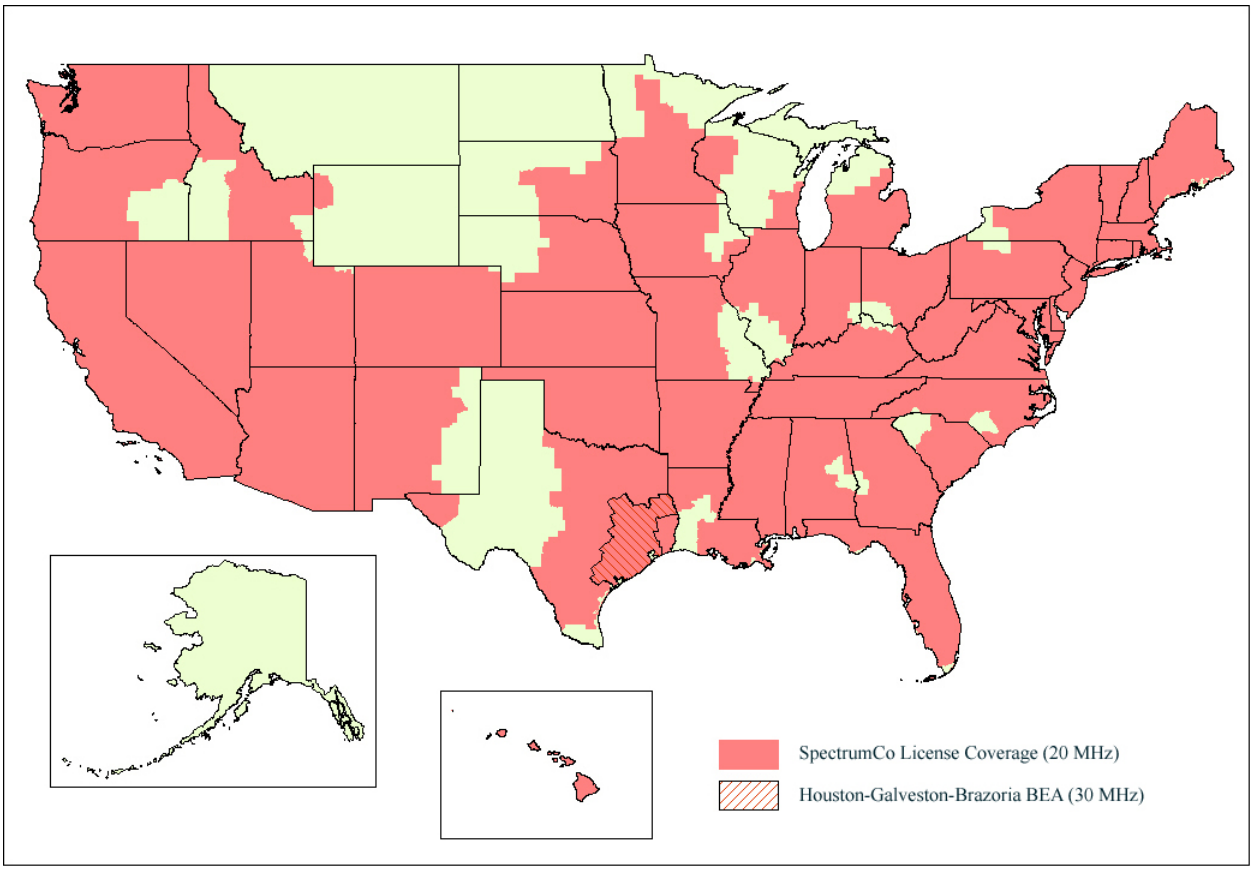
In addition to the mix of geographic license sizes available, a large part of the AWS auction's success can be attributed to the FCC's implementation of the SMR auction format. In an SMR auction, bidders may bid on all licenses until the auction closes. This allows bidders to assemble groups of licenses that satisfy their demands at a price they are willing to pay. Initially, demand for licenses exceeds the supply of licenses.[32] As prices for individual licenses rise, bidders reduce their demands until the remaining demand is satisfied. At that point bidding stops and the auction closes. The FCC has used the SMR auction format in dozens of auctions since 1994 and continually refines the rules and procedures for each subsequent auction.

Several bidders, including SpectrumCo, were able to assemble significant packages of licenses using smaller licenses as building blocks. These successes attest to the ability of the SMR auction format to allow bidders to define the license coverage areas most valuable to them. The one drawback identified by auction theorists to auctioning many smaller licenses—the exposure or failed aggregation problem described above—turned out in practice not to be overly burdensome. As explained in more detail below, the exposure problem was less detrimental than anticipated because bidders, such as SpectrumCo, found innovative ways to reduce the risks associated with a failed aggregation.

In the AWS auction, SpectrumCo effectively purchased a nationwide package of 20 MHz licenses in the continental U.S. Initially, SpectrumCo placed bids on a national set of REAG licenses. In round 11, SpectrumCo began transferring its bids to EA licenses. Ultimately, SpectrumCo successfully purchased 137 licenses that covered 260.5 million people for approximately $2.4 billion. *See* Figure 2.

[32] In the AWS auction, the initial eligibility was 3.14 times the total amount of licensed spectrum available. *See* http://wireless.fcc.gov/auctions/66/upfronts66_QB.xls and http://wireless.fcc.gov/auctions/66/charts/66market.xls (both accessed January 2, 2007) for total initial eligibility and total bidding units data.

Figure 2: SpectrumCo Winning Bids



SOME AWS DEMAND WOULD HAVE BEEN LOST BUT FOR SMALLER LICENSES

In the AWS auction, most non-REAG licenses were purchased by bidders that also bid on REAG licenses. While it is impossible to say exactly how the AWS auction would have turned out if all of the spectrum blocks had been licensed as REAGs, it is possible to identify the bidders in the AWS auction that never placed a bid on a continental REAG license.[33] Of the 168 eligible bidders in the auction, 153 never placed a bid on a continental REAG license. In fact, all but one of these bidders did not have enough initial eligibility to purchase even the smallest continental REAG.[34] These bidders were responsible for winning 355 licenses. Those licenses covered 72 million people in total. The non-REAG bidders also had almost 200 million units of initial eligibility and ultimately purchased over $220 million in licenses. *See* Appendix 2 and Appendix 3.

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33 I limit this analysis to REAG licenses 1 through 6 (continental U.S.) because REAG licenses 7 through 12 (non-continental U.S.) only contained one EA each and, therefore, the EAs were perfect substitutes for REAGs.

34 CenturyTel Broadband Wireless LLC was the one non-REAG bidder that had sufficient eligibility to bid on REAGs. *See* Appendix 3.

Most of the 153 non-REAG bidders purchased only a few licenses, but in total they represented widely distributed demand throughout the country. Figure 3 represents the coverage of the CMA and EA licenses that the 153 non-REAG bidders bid on during the AWS auction; Figure 4 represents the coverage of the licenses that they won.

Figure 3: Non-REAG Bidders Total Bidding Coverage

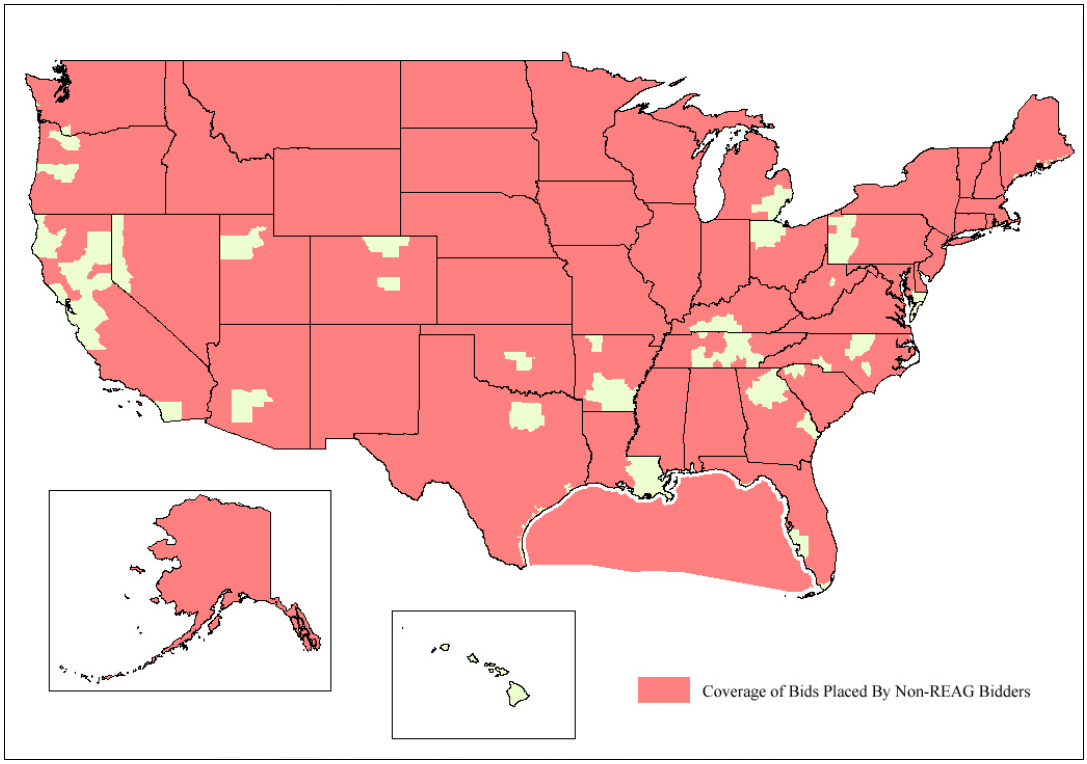
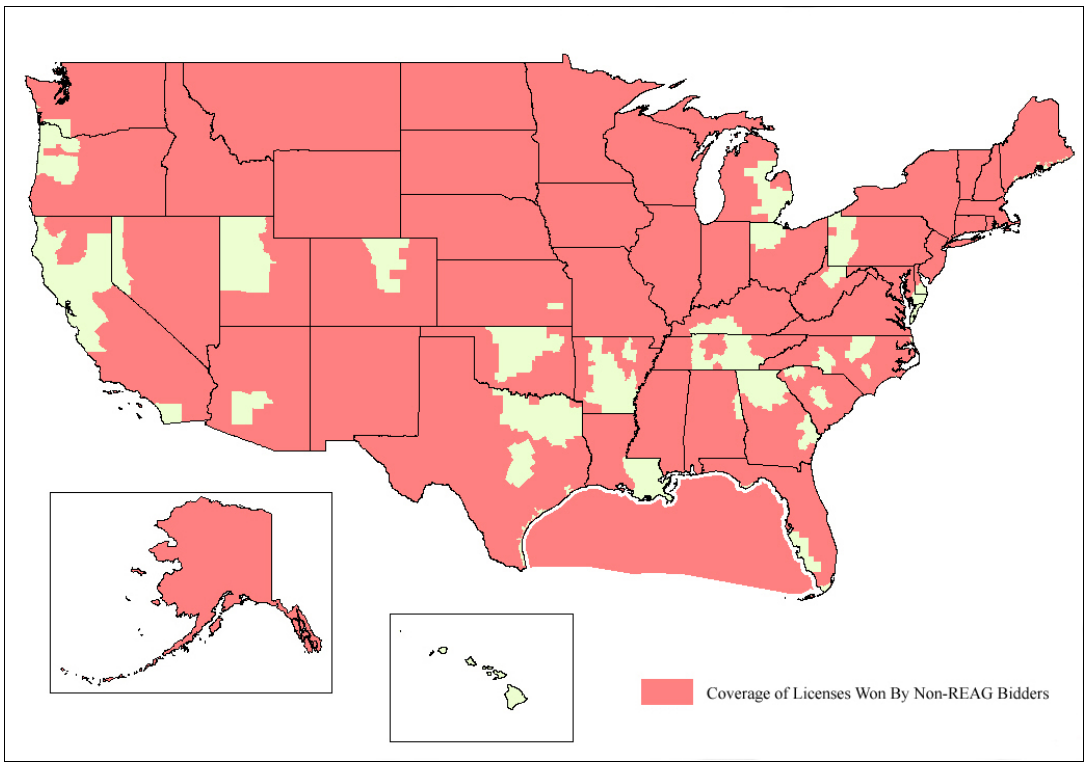


Figure 4: Non-REAG Bidders Winning Bid Coverage



The experience of the non-REAG bidders clearly demonstrates that the SMR auction format, combined with smaller license sizes, is effective in allowing bidders with smaller demands to successfully participate in FCC auctions. Absent smaller licenses, these bidders would only be able to satisfy their demands through secondary market transactions.

ADOPTING THE AWS BAND PLAN MODEL, WITH A MIX OF LICENSE SIZES, WILL ENSURE A MORE SUCCESSFUL 700 MHZ AUCTION

The mix of license sizes—REAGs, EAs and CMAs—in the AWS auction was one of that auction's keys to success. The building block approach allows bidders to find the grouping of licenses most suited to their needs. Bidders that wish to aggregate relatively large geographic areas face some risk of failing to get the grouping they desire. As discussed above, this aggregation risk can be managed, but a trade-off exists between the number of licenses and the amount of aggregation risk bidders face. SpectrumCo's experience in the AWS auction demonstrates that EA licenses strike a proper balance between granularity of licenses and ability to aggregate those licenses over a large geographic area.

Moreover, the use of the AWS band plan model in the 700 MHz auction is likely to be even more successful than it was in the AWS auction because of the numerous licensees that now have licenses covering REAG, EA and CMA areas. The 104 winners from the AWS auction will have demands—whether from adding additional bandwidth in already licensed markets or expanding into new market areas—that will most efficiently be met by 700 MHz licenses of the same geographic scope as those of the AWS auction. This point is particularly

true for EA licenses because the large number of winners of EA licenses (31 of 104 total AWS winners) creates many licensees with potential demand in the 700 MHz auction that is complimentary to the EA license geography.

SUMMARY

We have long since moved away from a regime in which the FCC tries to pick who should hold particular spectrum licenses. Given that the demand for license coverage can vary significantly by bidder, the FCC should not try to predetermine the optimal license coverage either. Rather, it should let the optimal coverage be determined by the auction process. Relying on a secondary market to disaggregate spectrum is much less efficient than using the auction process to permit efficient aggregation of licenses in sizes valued most by bidders. This outcome can only be achieved if most of the license blocks are of a relatively small size.

Appendix 1

COLEMAN D. BAZELON, Ph.D.
Vice President

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Dr. Bazelon joined Analysis Group to expand the firm's telecommunications practice area. His past telecommunications consulting engagements include litigation, regulatory, and arbitration experience in the wireless, wire line and video sectors. Dr. Bazelon also has experience with intellectual property valuation and damages analysis. He formerly was a principal analyst in the Microeconomic and Financial Studies Division of the Congressional Budget Office. In this position, Dr. Bazelon covered telecommunications issues and developed extensive expertise in all aspects of radio spectrum license auctions. His responsibilities also included researching reforms of radio spectrum management; estimating the budgetary and private sector impacts of spectrum-related legislative proposals; and advising on auction design and privatization issues for all research at CBO. He is also an expert on the federal government's use of discount rates for policy and regulatory analysis.

EDUCATION

Ph.D. in Agricultural and Resource Economics, University of California at Berkeley, 1995.
Dissertation: *The Political Economy of California Water*.

M.S. in Agricultural and Resource Economics, University of California at Berkeley, 1989.

Diploma in Economics, London School of Economics and Political Science, 1987.

B.A., College of Social Studies, Wesleyan University, Middletown, CT, 1986.

PROFESSIONAL EXPERIENCE

2001-Present Vice President, Analysis Group, Washington, D.C.

1995-2001 Principal Analyst, Congressional Budget Office, Washington, D.C.

PUBLICATIONS

Michael H. Rothkopf and Coleman Bazelon, "Interlicense Competition: Spectrum Deregulation Without Confiscation or Giveaways," in *Obtaining the Best from Regulation and Competition*, Michael A. Crew and Menahem Spiegel, eds., Kluwer Academic Publishers (2005), pp. 135-159.

Thomas W. Hazlett, Coleman Bazelon, John Rutledge, and Deborah Allen Hewitt, *Sending the Right Signals: Promoting Competition Through Telecommunications Reform: A Report to the U.S. Chamber of Commerce*, September 22, 2004.

Michael H. Rothkopf and Coleman Bazelon, "Interlicense Competition: Spectrum Deregulation Without Confiscation or Giveaways," New America Foundation, *Spectrum Series Working Paper #8*, August, 2003.

Review of *Discounting and Intergenerational Equity*, by Paul Portney and John Weyant, Resources for the Future (1999), in the Society of Government Economists Newsletter, Volume 34, No. 10, November 2002.

"Next Generation Frequency Coordinator," *Telecommunications Policy* 27 (2003), pp. 517-519.

Coleman Bazelon and Kent Smetters, "Intergenerational Discounting," *Loyola of Los Angeles Law Review*, Vol. 35, Issue I, November 2002.

Coleman Bazelon and Kent Smetters, "Discounting Inside the Washington D.C. Beltway," *Journal of Economic Perspectives*, Fall 1999.

Completing the Transition to Digital Television, Congressional Budget Office, September 1999.*

Two Approaches for Increasing Spectrum Fees, Congressional Budget Office, November 1998 (Coauthored with David Moore*).

Where Do We Go From Here? The FCC Auctions and the Future of Radio Spectrum Management, Congressional Budget Office, April 1997 (Coauthored with Perry Beider and David Moore*).

"The Movement of Markets," *Wesleyan Economic Journal*, Spring 1986.

"Is the Psychogenic Theory of History Scientific?" *Journal of Psychohistory*, Fall 1985.

* CBO publications do not cite authors' names.

SEMINARS AND PRESENTATIONS

Municipal WiFi: The Reality, Information Economy Project Mini Conference: "Innovation, Technology, and Spectrum Policy," National Center for Technology and Law, Arlington, VA, November 2006.

Licensed vs. Unlicensed Spectrum: A New Economic Model for Determining the Trade-offs, 34th Telecommunications Policy Research Conference, Arlington, VA, September 2006.

Accelerating the Digital Television Transition, COMPTEL Executive Business & Policy Summit, Washington, D.C., December 2005.

Regulated Unbunding of Telecommunications Networks: A Stepping Stone to Facilities Based Competition? Telecommunications Policy Research Conference, Arlington, VA, September 2005.

Sending the Right Signals: Promoting Competition Through Telecommunications Reform: A Report to the U.S. Chamber of Commerce, presentation of report to the US Chamber of Commerce, October 6, 2004.

Telecommunications Reform, presentation to the US Chamber of Commerce's Technology Policy Committee, April 29, 2004.

Interlicense Competition, Telecommunications Policy Research Conference, Arlington, VA, September 2003.

Marketing & Legal Strategies: Hope, Hype & Crash Landings, WCAI 2003, Washington, D.C., July 10, 2003.

Spectrum Policy Task Force Interference Recommendations, Manhattan Institute Conference, Washington, D.C., February 13, 2002.

FCC License Auctions, Society of Government Economists Conference, Washington, D.C., November 22, 2002.

Spectrum Management Panel, CTIA Wireless 2002, Orlando, FL, March 18, 2002.

A Note on Correlation, ASSA Annual Meetings, Atlanta, GA, January 6, 2002.

Regulatory Forbearance, Powerline Communications Conference, Washington, D.C., December 13, 2001.

Spectrum License Valuations, CTIA Wireless Agenda 2001, Dallas, TX, May 2001.

Old Spectrum in the New Economy, with David Moore, invited paper, Society of Government Economists Conference "The New 'Economy': What Has Changed and Challenges for Economic Policy," Washington, D.C., November 2000.

Discounting Inside the Washington D.C. Beltway, Energy Information Agency Seminar Series, Washington, D.C., March 2000.

Discounting Inside the Washington D.C. Beltway, Congressional Budget Office Seminar Series, Washington, D.C., November 1999.

Completing the Transition to Digital Television, Telecommunications Policy Research Conference, Arlington, VA, September 1999.

Digital Television Transition, Congressional Budget Office Seminar Series, Washington, D.C., April 1999.

The Budgetary Treatment of Asset Sales, briefing for the staff of the Senate Budget Committee, Washington, D.C., February 1997.

The Value Added from Multilateral Bargaining Theory for Applied Research, with Greg Adams, Selected Paper, AAEA Annual Meeting, Baltimore, MD, August 1992.

The Importance of Political Markets in Formulating Economic Policy Recommendations, Selected Paper, AAEA Annual Meeting, Manhattan, KS, August 1991.

LD.C. Debt and Policy Linkages in the Determination of World Commodity Prices, with Gordon Rausser, Selected Paper, AAEA Annual Meeting, Vancouver, B.C., Canada, August 1990.

TESTIMONY AND DECLARATIONS

"Rebuttal Report of Dr. Coleman Bazelon," Level 3 Communications, LLC, v. City of St. Louis, Missouri, United States District Court for the Eastern District of Missouri, Eastern Division, Consolidated Case No. 4:04-CV-871 CAS, June 17, 2005.

"Affidavit of Dr. Coleman Bazelon," *Informed Communications Systems, Inc. v. Intelogistics Corp., d/b/a Prosodie Interactive*, United States District Court, Southern District of Florida, Miami Division, Case No.: 04-61245 CIV Huck/Turnoff (October 12, 2004).

"Declaration of Thomas W. Hazlett, Ph.D., Prof. Arthur M. Havenner, and Coleman Bazelon, Ph.D.," In the Matter of Review of the Commission's Ruling Regarding the Pricing of Unbundled Network Elements and the Resale of Service by Incumbent Local Exchange Carriers (WC Docket No. 03-173), December 16, 2003.

"Declaration of Thomas W. Hazlett, Ph.D., Arthur M. Havenner, Ph.D., and Coleman Bazelon, Ph.D.," In the Matter of Petition for Forbearance From the Current Pricing Rules for the Unbundled Network Element Platform (WC Docket No. 03-157), September 2, 2003.

"Spectrum Deregulation Without Confiscation or Giveaways," with Michael Rothkopf, Comment in the Matter of Issues Related to the Commission's Spectrum Policies (ET Docket No. 02-135), January 9, 2003.

Thomas W. Hazlett, Coleman Bazelon and Arthur Havenner, "Forecast of Toll Free Number Demand: 2002-2004," Attachment A, SMS/800 Transmittal No. 22, F.C.C. Tariff No. 1, November 15, 2002.

"Comments of Coleman D. Bazelon and T. Christopher Borek Relating to Arthur D. Little, Inc.'s Assessment of the Impact of DTV on the Cost of Consumer Television Receivers," Ex Parte Communication to the Federal Communications Commission in the Matter of Review of the Commission's Rules and Policies Affecting the Conversion to Digital Television (MM Docket 00-39), August 1, 2002.

"Use Administrative Law Judges to Adjudicate Interference Disputes Between Licensees," Comment in the Matter of Issues Related to the Commission's Spectrum Policies (ET Docket No. 02-135), July 8, 2002.

REVIEWER

- *American Journal of Agricultural Economics*
- *Congressional Budget Office Reports*
- *Telecommunications Policy*

EXPERT DESIGNATIONS

- *Touch America, Inc. v. Qwest Communications International, Inc.*
    - Designated as an expert in Arbitration (June 2003)
- *Informed Communications Systems, Inc. v. Intelogistics Corp., d/b/a Prosodie Interactive*
    - Filed affidavit (October 12, 2004)
- *Level 3 Communications, LLC v. City of St. Louis, Missouri*
    - Filed Rebuttal Report (June 17, 2005)
    - Deposition (July 14, 2005)

SELECTED CONSULTING PROJECTS

- *Litigation*
    - Assessed the capital adequacy of the US branch of a foreign bank
    - Assessed changes in contributions to the Cable Royalty Fund on behalf of Sports Claimants in a Copyright Arbitration Royalty Panel (CARP) proceeding
    - Assessed damages associated with infringement of patents used in DNA fingerprinting applications
    - Examined the business case asserted for a small wireless reseller in a breach of contract litigation
    - Assessed a bankruptcy sale proposal for a national tier 1 broadband backbone provider
    - Assessed the market for Competitive Local Exchange Carriers in an SEC fraud case
    - Researched the basis for generally optimistic beliefs about the telecommunications sector in the late 1990s in a 10-b securities litigation

- Researched the basis for generally optimistic forecasts of broadband deployment in the later 1990s and early 2000s in an anti-trust litigation
- Estimated damages in a breach of contract case involving the sale of a fibre optic network
- Valued digital television radio spectrum in St. Louis in the pre-litigation phase of a breach of contract dispute
- Assessed basis for guidance of a large telecommunications firm in a 10-b securities litigation
- Assessed damages associated with infringement of patents used to provide Voice over Internet Protocol (VoIP)
- Provided written testimony estimating the value of a surety bond in a contract dispute involving toll free phone numbers used in an enhanced service application
- Estimated Loss of Use damages for a severed fiber optic cable
- Assessed commonality issues of physicians for class certification of RICO action against a set of health insurance companies
- Analyzed the economic underpinnings of an exclusivity clause of a mobile phone affiliation agreement
- Estimated cost of delay in granting local cable franchise
- Estimated recoverable data costs for two pesticides

- *Regulatory Proceedings*
  - Provided written testimony of a forecast of toll free number demand for the toll free number administrator, SMS/800, in a rate case proceeding
  - Provided written testimony that assessed the validity of an analysis of the costs of a DTV tuner mandate
  - Assessed the degree of market overlap of two food service firms for purposes of merger review
  - Examined the impact of irreversible investments in the local telephone network on the TELRIC pricing methodology
  - Estimated the adjustment to the TELRIC pricing formula to account for irreversible investment in the local telephone network

- Provided written testimony examining the effects of unbundling regulations on capital spending in the telecommunications sector
- Provided written testimony refuting analysis purporting to show a positive relationship between UNE-P and telecom network investment
- Assessed the impact on consumers of California's Telecommunications Consumer Bill of Rights proposal
- Examined and refuted arguments suggesting that the California Telecommunications Consumer Bill of Rights was an appropriate response to market failures
- Examined federalism issues related to mobile telephony regulation
- Examined the relative merits of licensed versus unlicensed radio spectrum and the effects of "underlay" licenses on existing commercial licensees
- Analyzed economic ramifications of à la carte cable channel pricing on consumers and the cable and television programming industries
- Developed and assessed Indian spectrum management proposals
- Analyzed impact of local franchise requirements on competition in the video marketplace
- Assessed proposed regulation of mobile phone roaming rates

- *Other*
  - Examined the effects of unbundling regulations on broadband penetration internationally
  - Assessed the business cases for IRU swaps of a large international fiber optic network owner
  - Coauthored a report to the US Chamber of Commerce on the economic effects of telecommunications deregulation
  - Coauthored a report on the value of a portfolio of patents used to provide Voice over Internet Protocol (VoIP)
  - Analyzed proposed accelerated digital television transition impacts on society and the federal budget
  - Valued proposals to re-band the Upper 700 MHz Band of radio spectrum
  - Analyzed cable franchising requirements

- Analyzed Universal Service Fund expenditures
- Provided framework to estimate impact of the effect of designation of TV white spaces as unlicensed on 700 MHz auction receipts
- Advised bidder in AWS spectrum license auction

APPENDIX 2
AUCTION 66 RESULTS: LICENSES EXCLUDING CONTINENTAL US REAGs

Bidder	Bidder's Licenses Excluding Continental US REAGs			Bidder's Auction Total		
	Net Winning Bids	Population*	Bidding Units	Net Winning Bids	Population*	Bidding Units
SpectrumCo LLC	$2,377,609,000	267,387,437	240,719,000	$2,377,609,000	267,387,437	240,719,000
T-Mobile License LLC	$1,329,969,000	145,457,925	119,336,000	$4,182,312,000	474,718,308	310,231,000
Cingular AWS, LLC	$836,899,000	108,425,074	73,600,000	$1,334,610,000	198,768,198	115,384,000
Cricket Licensee (Reauction), Inc.	$587,930,000	77,458,879	55,761,000	$710,214,000	117,802,839	73,924,000
MetroPCS AWS, LLC	$482,990,000	44,487,148	21,355,000	$1,391,410,000	144,544,402	68,853,000
AWS Wireless Inc.	$115,503,000	60,498,394	36,385,000	$115,503,000	60,498,394	36,385,000
Atlantic Wireless, L.P.	$75,294,000	35,803,110	17,646,000	$75,294,000	35,803,110	17,646,000
American Cellular Corporation	$65,880,000	23,266,510	16,398,000	$65,880,000	23,266,510	16,398,000
Barat Wireless, L.P.	$47,763,750	10,274,201	9,329,000	$127,140,000	41,601,174	22,394,000
Cincinnati Bell Wireless LLC	$37,071,000	7,045,544	5,068,000	$37,071,000	7,045,544	5,068,000
Cellular South Licenses, Inc.	$33,025,000	7,663,365	4,780,000	$33,025,000	7,663,365	4,780,000
Cable One, Inc.	$22,148,000	4,795,074	3,523,000	$22,148,000	4,795,074	3,523,000
Cavalier Wireless, LLC	$14,957,250	13,313,269	9,414,000	$14,957,250	13,313,269	9,414,000
Iowa Telecommunications Services, Inc.	$11,473,000	1,930,909	1,519,000	$11,473,000	1,930,909	1,519,000
Daredevil Communications LLC	$10,080,750	6,555,503	3,393,000	$10,080,750	6,555,503	3,393,000
Cellco Partnership d/b/a Verizon Wireless	$9,861,000	2,807,298	2,381,000	$2,808,599,000	192,047,611	172,815,000
Centennial Michiana License Company LLC	$9,134,000	1,321,895	1,322,000	$9,134,000	1,321,895	1,322,000
Red Rock Spectrum Holdings, LLC	$7,466,000	5,481,709	3,586,000	$7,466,000	5,481,709	3,586,000
Public Service Wireless Services, Inc.	$5,480,000	1,497,994	1,177,000	$5,480,000	1,497,994	1,177,000
Central Texas Telephone Investments, LP	$4,940,000	986,130	792,000	$4,940,000	986,130	792,000
Carolina West Wireless, Inc.	$4,621,000	2,194,313	1,703,000	$4,621,000	2,194,313	1,703,000
Plateau Telecommunications, Inc.	$4,200,000	687,085	413,000	$4,200,000	687,085	413,000
Hill Country Telephone Cooperative, Inc.	$3,995,000	422,086	254,000	$3,995,000	422,086	254,000
Palmetto Rural Telephone Cooperative, Inc.	$3,810,550	750,298	670,000	$3,810,550	750,298	670,000
LL License Holdings II, LLC	$2,919,750	1,323,902	617,000	$2,919,750	1,323,902	617,000
Vermont Telephone Company, Inc.	$2,474,350	988,002	502,000	$2,474,350	988,002	502,000
Triad AWS, Inc.	$2,394,750	4,728,900	2,346,000	$2,394,750	4,728,900	2,346,000
MTPCS License Co., LLC	$2,348,000	909,026	655,000	$2,348,000	909,026	655,000
KTC AWS Limited Partnership	$2,331,000	754,844	557,000	$2,331,000	754,844	557,000
NTELOS Inc.	$2,295,000	1,260,397	981,000	$2,295,000	1,260,397	981,000
MTA Communications, Inc.	$2,251,000	1,052,507	839,000	$2,251,000	1,052,507	839,000
Nsighttel Wireless, LLC	$2,099,000	1,269,645	732,000	$2,099,000	1,269,645	732,000
Cross Telephone Company	$2,082,500	789,927	700,000	$2,082,500	789,927	700,000
Chequamegon Communications Cooperative, Inc.	$2,056,150	346,146	305,700	$2,056,150	346,146	305,700
Smithville Spectrum, LLC	$2,011,000	491,435	295,000	$2,011,000	491,435	295,000
Union Telephone Company	$1,948,200	1,113,947	494,200	$1,948,200	1,113,947	494,200

Bidder	Bidder's Licenses Excluding Continental US REAGs			Bidder's Auction Total		
	Net Winning Bids	Population*	Bidding Units	Net Winning Bids	Population*	Bidding Units
Command Connect, LLC	$1,878,500	1,372,514	885,000	$1,878,500	1,372,514	885,000
FMTC Wireless, Inc.	$1,867,450	172,152	104,000	$1,867,450	172,152	104,000
Manti Telephone Company	$1,815,750	439,181	263,000	$1,815,750	439,181	263,000
Mediapolis Telephone Company	$1,794,000	352,858	212,000	$1,794,000	352,858	212,000
Spotlight Media Corp	$1,644,000	1,527,031	655,000	$1,644,000	1,527,031	655,000
Blackfoot Telephone Cooperative, Inc.	$1,528,300	750,347	502,000	$1,528,300	750,347	502,000
Atlantic Seawinds Communications, LLC	$1,477,000	233,450	233,000	$1,477,000	233,450	233,000
West Carolina Piedmont Bidding Consortium	$1,395,700	483,802	357,000	$1,395,700	483,802	357,000
FTC Management Group, Inc.	$1,380,000	320,245	243,000	$1,380,000	320,245	243,000
Fidelity Communications Company	$1,275,850	1,053,820	805,000	$1,275,850	1,053,820	805,000
Hemingford Cooperative Telephone Company	$1,245,000	1,067,114	507,000	$1,245,000	1,067,114	507,000
CTC Telcom, Inc.	$1,195,950	117,992	71,000	$1,195,950	117,992	71,000
Wittenberg Telephone Company	$1,139,250	1,107,942	509,000	$1,139,250	1,107,942	509,000
3 Rivers Telephone Cooperative, Inc.	$1,066,000	411,476	311,000	$1,066,000	411,476	311,000
Sandhill Communications, LLC	$1,002,150	222,349	133,000	$1,002,150	222,349	133,000
NEIT Wireless, LLC	$986,250	666,103	371,000	$986,250	666,103	371,000
Chester Telephone Company	$935,000	139,940	84,000	$935,000	139,940	84,000
Horry Telephone Cooperative, Inc.	$925,000	287,892	173,000	$925,000	287,892	173,000
Agri-Valley Communications, Inc.	$888,250	844,158	506,000	$888,250	844,158	506,000
SKT, Inc.	$774,000	175,105	105,000	$774,000	175,105	105,000
18th Street Spectrum, LLC	$638,350	1,061,898	710,000	$638,350	1,061,898	710,000
Pine Cellular Phones, Inc.	$601,000	154,729	93,000	$601,000	154,729	93,000
Telephone Electronics Corporation	$559,000	551,242	331,000	$559,000	551,242	331,000
Space Data Spectrum Holdings, LLC	$582,750	128,275	117,000	$582,750	128,275	117,000
Blue Valley Tele-Communications, Inc.	$533,250	182,553	109,000	$533,250	182,553	109,000
Bend Cable Communications, LLC	$528,000	292,957	176,000	$528,000	292,957	176,000
Southeastern Indiana Rural Telephone Coop., Inc.	$493,500	147,985	89,000	$493,500	147,985	89,000
Lynch AWS Corporation	$485,000	454,539	177,000	$485,000	454,539	177,000
Hancock Rural Telephone Corporation	$471,750	133,358	133,000	$471,750	133,358	133,000
CenturyTel Broadband Wireless LLC	$468,000	629,699	378,000	$468,000	629,699	378,000
LCDW Wireless Limited Partnership	$385,500	240,003	144,000	$385,500	240,003	144,000
Midwest AWS Limited Partnership	$366,750	212,896	128,000	$366,750	212,896	128,000
Paul Bunyan Rural Telephone Cooperative	$329,000	221,052	171,000	$329,000	221,052	171,000
Alenco Communications, Inc.	$327,750	104,010	104,000	$327,750	104,010	104,000
Mutual Telephone Company	$312,000	103,341	62,000	$312,000	103,341	62,000
Comporium Wireless, LLC	$295,000	225,965	136,000	$295,000	225,965	136,000
Stayton Cooperative Telephone Company	$293,250	347,214	347,000	$293,250	347,214	347,000
James Valley	$279,750	82,608	50,000	$279,750	82,608	50,000
Ligtel Communications, Inc.	$271,150	371,246	296,000	$271,150	371,246	296,000
BEK Communications Cooperative	$234,000	142,737	124,000	$234,000	142,737	124,000
Chariton Valley Communication Corporation, Inc.	$227,800	160,846	97,000	$227,800	160,846	97,000

Bidder	Bidder's Licenses Excluding Continental US REAGs			Bidder's Auction Total		
	Net Winning Bids	Population*	Bidding Units	Net Winning Bids	Population*	Bidding Units
ETCOM, LLC	$212,250	134,659	81,000	$212,250	134,659	81,000
La Ward Cellular Telephone Company, Inc.	$204,750	84,088	84,000	$204,750	84,088	84,000
BPS Telephone Company	$193,800	197,383	118,000	$193,800	197,383	118,000
CCTN Bidding Consortium	$193,800	170,291	101,100	$193,800	170,291	101,100
C&W Enterprises Inc.	$192,100	235,315	141,000	$192,100	235,315	141,000
Dakota Wireless Group, LLC	$188,700	164,456	99,000	$188,700	164,456	99,000
Innovative Communication Corporation	$184,000	108,612	65,000	$184,000	108,612	65,000
Big River Telephone Company, LLC	$182,250	220,740	132,000	$182,250	220,740	132,000
Green Hills Area Cellular Telephone, Inc.	$181,050	72,404	43,000	$181,050	72,404	43,000
North Dakota Network Company	$177,000	248,520	149,000	$177,000	248,520	149,000
Mt. Vernon. Net, Inc.	$170,250	335,376	201,000	$170,250	335,376	201,000
City of Ketchikan d/b/a Ketchikan Public Utilities	$157,000	73,082	44,000	$157,000	73,082	44,000
Big Bend Telecom, LTD	$129,000	55,723	34,000	$129,000	55,723	34,000
Volcano Internet Provider	$105,000	148,493	89,000	$105,000	148,493	89,000
Grand River Communications, Inc.	$103,000	171,259	103,000	$103,000	171,259	103,000
Farmers Telecommunications Cooperative, Inc.	$72,250	142,366	85,000	$72,250	142,366	85,000
PetroCom License Corporation	$70,000	0	60,000	$70,000	0	60,000
Reservation Telephone Cooperative, Inc.	$69,000	61,696	37,000	$69,000	61,696	37,000
The S&T Telephone Cooperative Association, Inc.	$61,200	46,559	28,000	$61,200	46,559	28,000
Churchill County Telephone d/b/a CC Communications	$60,000	99,517	60,000	$60,000	99,517	60,000
Route 66 Wireless, LLC	$54,000	120,566	72,000	$54,000	120,566	72,000
Three River Telco	$54,000	29,189	18,000	$54,000	29,189	18,000
AST Telecom, LLC	$34,000	57,291	34,000	$34,000	57,291	34,000
Northwest Missouri Cellular Limited Partnership	$26,000	42,936	26,000	$26,000	42,936	26,000
Northeast Missouri Rural Telephone Company	$23,800	35,481	21,000	$23,800	35,481	21,000
Wue Inc	$6,000	13,346	8,000	$6,000	13,346	8,000
Denali Spectrum License, LLC	$0	0	0	$274,083,750	58,178,304	26,167,000
Total	$3,789,702,150	N/A	652,482,000	$13,700,267,150	N/A	1,160,488,000

Notes & Sources:

* Reflects total of populations for each license won, not unique population covered by the listed bidder.

Data from FCC.

APPENDIX 3
AUCTION 66 BIDDERS WITH NO BIDS ON CONTINENTAL US REAG LICENSES

Bidder	Total Net PWB Amount	Total Number of PWBs	Initial Eligibility
Cincinnati Bell Wireless LLC	$37,071,000	9	7,000,000
Cellular South Licenses, Inc.	$33,025,000	12	7,000,000
Cable One, Inc.	$22,148,000	30	3,531,000
Iowa Telecommunications Services, Inc.	$11,473,000	15	3,102,000
Daredevil Communications LLC	$10,080,750	14	8,888,000
Centennial Michiana License Company LLC	$9,134,000	2	5,000,000
Red Rock Spectrum Holdings, LLC	$7,466,000	42	6,000,000
Public Service Wireless Services, Inc.	$5,480,000	7	4,501,000
Central Texas Telephone Investments, LP	$4,940,000	5	2,567,000
Carolina West Wireless, Inc.	$4,621,000	9	6,000,000
Plateau Telecommunications, Inc.	$4,200,000	4	3,000,000
Hill Country Telephone Cooperative, Inc.	$3,995,000	2	254,000
Palmetto Rural Telephone Cooperative, Inc.	$3,810,550	2	1,242,000
LL License Holdings II, LLC	$2,919,750	8	2,500,000
Vermont Telephone Company, Inc.	$2,474,350	3	563,000
MTPCS License Co., LLC	$2,348,000	4	2,000,000
KTC AWS Limited Partnership	$2,331,000	11	678,000
NTELOS Inc.	$2,295,000	7	2,660,000
MTA Communications, Inc.	$2,251,000	3	1,220,000
Nsighttel Wireless, LLC	$2,099,000	5	1,800,000
Cross Telephone Company	$2,082,500	3	1,049,000
Chequamegon Communications Cooperative, Inc.	$2,056,150	3	1,281,700
Smithville Spectrum, LLC	$2,011,000	2	416,000
Union Telephone Company	$1,948,200	8	800,000
Command Connect, LLC	$1,878,500	5	3,300,000
FMTC Wireless, Inc.	$1,867,450	2	325,000
Manti Telephone Company	$1,815,750	5	563,000
Mediapolis Telephone Company	$1,794,000	2	250,000
Spotlight Media Corp	$1,644,000	2	1,149,000
Blackfoot Telephone Cooperative, Inc.	$1,528,300	4	782,100
Atlantic Seawinds Communications, LLC	$1,477,000	1	233,000
West Carolina Piedmont Bidding Consortium	$1,395,700	3	380,400
FTC Management Group, Inc.	$1,380,000	2	243,000
Fidelity Communications Company	$1,275,850	7	900,000
Hemingford Cooperative Telephone Company	$1,245,000	11	750,000
CTC Telcom, Inc.	$1,195,950	1	220,000
Wittenberg Telephone Company	$1,139,250	3	855,000
3 Rivers Telephone Cooperative, Inc.	$1,066,000	4	821,000
Sandhill Communications, LLC	$1,002,150	1	133,000
NEIT Wireless, LLC	$986,250	3	475,000
Chester Telephone Company	$935,000	1	103,000
Horry Telephone Cooperative, Inc.	$925,000	1	1,012,800
Agri-Valley Communications, Inc.	$888,250	5	2,037,000
SKT, Inc.	$774,000	1	814,000
18th Street Spectrum, LLC	$638,350	4	750,000
Pine Cellular Phones, Inc.	$601,000	2	226,000
Space Data Spectrum Holdings, LLC	$582,750	3	520,000
Telephone Electronics Corporation	$559,000	3	1,338,000
Blue Valley Tele-Communications, Inc.	$533,250	2	109,000
Bend Cable Communications, LLC	$528,000	2	176,000
Southeastern Indiana Rural Telephone Coop., Inc.	$493,500	1	242,400
Lynch AWS Corporation	$485,000	1	1,500,000
Hancock Rural Telephone Corporation	$471,750	1	384,000
CenturyTel Broadband Wireless LLC	$468,000	6	59,098,000

Bidder	Total Net PWB Amount	Total Number of PWBs	Initial Eligibility
LCDW Wireless Limited Partnership	$385,500	1	144,000
Midwest AWS Limited Partnership	$366,750	1	128,000
Paul Bunyan Rural Telephone Cooperative	$329,000	3	620,000
Alenco Communications, Inc.	$327,750	1	325,000
Mutual Telephone Company	$312,000	1	364,000
Comporium Wireless, LLC	$295,000	1	673,000
Stayton Cooperative Telephone Company	$293,250	1	658,000
James Valley	$279,750	1	75,000
Ligtel Communications, Inc.	$271,150	2	296,000
BEK Communications Cooperative	$234,000	2	196,000
Chariton Valley Communication Corporation, Inc.	$227,800	2	131,000
ETCOM, LLC	$212,250	1	81,000
La Ward Cellular Telephone Company, Inc.	$204,750	1	84,000
BPS Telephone Company	$193,800	1	192,000
CCTN Bidding Consortium	$193,800	6	140,100
C&W Enterprises Inc.	$192,100	1	141,000
Dakota Wireless Group, LLC	$188,700	2	100,000
Innovative Communication Corporation	$184,000	2	65,000
Big River Telephone Company, LLC	$182,250	2	250,000
Green Hills Area Cellular Telephone, Inc.	$181,050	1	43,000
North Dakota Network Company	$177,000	3	581,000
Mt. Vernon. Net, Inc.	$170,250	1	291,000
City of Ketchikan d/b/a Ketchikan Public Utilities	$157,000	1	44,000
Big Bend Telecom, LTD	$129,000	2	34,000
Volcano Internet Provider	$105,000	1	89,000
Grand River Communications, Inc.	$103,000	1	103,000
Farmers Telecommunications Cooperative, Inc.	$72,250	1	85,000
PetroCom License Corporation	$70,000	2	60,000
Reservation Telephone Cooperative, Inc.	$69,000	1	37,000
The S&T Telephone Cooperative Association, Inc.	$61,200	2	28,000
Churchill County Telephone d/b/a CC Communications	$60,000	2	60,000
Route 66 Wireless, LLC	$54,000	1	500,000
Three River Telco	$54,000	1	88,000
AST Telecom, LLC	$34,000	1	34,000
Northwest Missouri Cellular Limited Partnership	$26,000	1	128,000
Northeast Missouri Rural Telephone Company	$23,800	1	55,000
Wue Inc	$6,000	1	8,000
ACS Wireless License Sub, Inc.	$0	0	304,000
Advanced Communications Technology, Inc.	$0	0	264,000
Allcom Communications, Inc.	$0	0	368,000
Antares Holdings, LLC	$0	0	21,000,000
Aztech Communications, Inc.	$0	0	93,000
Beehive Telephone Company, Inc.	$0	0	17,000
Bluestreak Wireless LLC	$0	0	1,000,000
Breda Telephone Corp.	$0	0	33,000
Cal-Ore Telephone Co.	$0	0	500,000
Carolina Personal Communications, Inc.	$0	0	286,000
Central Utah Telephone Company	$0	0	500,000
Clay County Rural Telephone Cooperative, Inc.	$0	0	76,000
Clinker LLC	$0	0	20,000
Coleman County Telecommunications, LTD	$0	0	116,000
Craw-Kan Telephone Cooperative, Inc.	$0	0	434,000
Diller Telephone Company	$0	0	101,000
Ellijay Telephone Company	$0	0	154,000
Farmers Mutual Telephone Company	$0	0	43,000
Graceba Total Communications, Inc.	$0	0	138,000
Granite State Long Distance, Inc.	$0	0	381,000
Heart of Iowa Communications Cooperative	$0	0	163,000

Bidder	Total Net PWB Amount	Total Number of PWBs	Initial Eligibility
Iowa Intelegra Consortium, LLC	$0	0	2,000,000
Jefferson Telephone Company	$0	0	150,000
Kingdom Telephone Company	$0	0	300,000
MAC Wireless, LLC	$0	0	154,000
McDonald County Telephone Company	$0	0	67,000
Muenster Telephone Corporation of Texas	$0	0	55,000
Northeast Nebraska Telephone Company	$0	0	302,000
Northern Iowa Communications Partners, LLC	$0	0	200,000
Panhandle Telecommunication Systems, Inc.	$0	0	17,000
Panora Telecommunications, Inc.	$0	0	33,000
Partnership Wireless LLC	$0	0	158,000
Perry-Spencer Rural Telephone Coop., Inc. d/b/a PSC	$0	0	136,000
Plains Cooperative Telephone Association, Inc.	$0	0	64,000
Rainbow Telecommunications Association, Inc.	$0	0	70,000
Roberts County Telephone Cooperative Association	$0	0	41,000
Rodriguez, Marcos	$0	0	195,000
Ropir Communications, Inc.	$0	0	118,000
Salina Spavinaw Telephone Company, Inc.	$0	0	125,000
Shenandoah Mobile Company	$0	0	4,749,000
Shoreline Investments LLC	$0	0	173,000
South #5 RSA Limited Partnership d/b/a Brazos Cell	$0	0	103,000
South Slope Cooperative Telephone Company, Inc.	$0	0	303,000
St. Cloud Wireless Holdings, LLC	$0	0	630,000
The Chillicothe Telephone Company	$0	0	359,000
The Pioneer Telephone Association, Inc.	$0	0	134,000
The Tri-County Telephone Association, Inc.	$0	0	116,000
Tri-Valley Communications, LLC	$0	0	249,000
United Telephone Mutual Aid Corporation	$0	0	35,000
United Wireless Communications Inc.	$0	0	130,000
Van Buren Wireless, Inc.	$0	0	147,000
West Central Communications, LLC	$0	0	536,000
West Central Telephone Association	$0	0	294,000
Western New Mexico Telephone Company, Inc.	$0	0	500,000
Wheat State Telephone, Inc.	$0	0	141,000
WWW Broadband, LLC	$0	0	157,000
XIT Leasing, Inc.	$0	0	210,000
XIT Telecommunication & Technology, Ltd.	$0	0	33,000
Total	$220,260,400	355	198,848,500

Notes & Sources:
Data from FCC.