



July 30, 2015

Via ECFS

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

Re: *Ex Parte Presentation*
GN Docket No. 12-268, AU Docket No. 14-252

Dear Ms. Dortch:

Although the assignment phase of the forward auction has not received as much attention as certain other issues in these proceedings, the undersigned are highly concerned that the current proposals for this component of the incentive auction will frustrate this rare opportunity to free up a large swath of valuable low-band spectrum for next-generation mobile broadband services. As the Commission has recognized, given the significant interdependence of the various components of the incentive auction process, an ill-informed decision regarding any one piece of this complex puzzle could negatively impact every other piece.¹ Specifically, for the reasons detailed herein, the Commission's proposal to incorporate bidding procedures into the assignment phase of the forward auction would unnecessarily risk decreasing the amount of revenue generated during the crucially important clock phase of the forward auction.² As a result, assignment phase bidding could delay

¹ See *Expanding the Economic and Innovation Opportunities of Spectrum Through Incentive Auction*, Notice of Proposed Rulemaking, 27 FCC Rcd 12357, 12359 (2012); see *id.* at 12557 (Statement of Commissioner Ajit Pai Approving in Part and Concurring in Part) ("If we at the Commission make the right decisions, each piece of the puzzle will fit together seamlessly. ... If, on the other hand, we do not get this right, we could end up with a Rube Goldberg contraption that will produce a failed auction.").

² See, e.g., Philip A. Haile, *Comments on U.S. Cellular's Assignment Phase Proposals*, p. 1 (attached to Letter from Christopher Shenk, Sidley Austin LLP, Counsel for AT&T, to Marlene H. Dortch, Secretary, FCC, GN Docket No. 12-268, AU Docket No. 14-252 (May 15, 2015)) ("*AT&T Paper*") ("[T]he proposed revenue-generating assignment phase could substantially suppress bidding in the clock phase of the auction ... because bidders in the clock phase would anticipate a need to make substantial payments in the assignment phase in order to avoid poor allocations.").

satisfaction of the final stage rule and cause the incentive auction to move to another stage with a lower spectrum clearing target.³

United States Cellular Corporation (“U.S. Cellular”) previously provided a detailed example demonstrating the negative impact the Commission’s proposed Vickrey-style assignment phase bidding procedures could have on clock phase revenue.⁴ Under those procedures, the “losing” assignment phase bidders would pay nothing and be assigned their least-preferred blocks. While the “winning” bidders would be assigned their preferred blocks, these bidders could end up paying so much for those assignments that they would be no better off than if they had been assigned their least-preferred blocks at no additional cost. In other words, every bidder could end up with essentially no retained value.

While this would be an optimal outcome in a typical auction, it would be inappropriate for the assignment phase because bidders will already be committed to the amounts they bid during the clock phase for generic licenses. Thus, unlike in a typical auction, bidders will not be able to simply walk away from the assignment phase having neither paid nor received anything. As a consequence, during the earlier clock phase, bidders would value a category of generic licenses in a PEA based on the valuation they attach to their least-preferred block within that category because they would rationally assume that they will ultimately be assigned those blocks unless they pay additional sums in the assignment phase.⁵

Stated differently, during the clock phase, a bidder will only bid up to the value it attaches to a license *less* its anticipated assignment round bid for that license. As noted, if the Commission adopts the proposed Vickrey-style bidding procedures, each bidder will reasonably anticipate that it will need to pay the *full difference* between the value it attaches to its least-preferred block in a category and its most-preferred block in the same category. As a result, bidding in the clock phase will reflect the values bidders attach to their least-preferred blocks. Otherwise, their total bids (*i.e.*, their combined clock and assignment phase bids) would exceed the valuations they attach to the licenses.⁶

Notably, there is no record support for the Commission’s proposed assignment phase bidding procedures,⁷ while various commenters expressly opposed any form of bidding in the

³ See, e.g., *id.* at 4 (“Because it is the clock phase bids that determine satisfaction or failure of the final stage rule, these defects threaten to cause failures of clearing targets that would have succeeded under alternative rules...”).

⁴ See Reply Comments of U.S. Cellular, AU Docket No. 14-252, GN Docket No. 12-268, pp. 8-17 (Mar. 13, 2015).

⁵ See Comments of AT&T Inc., GN Docket No. 12-268, p. 42 (Jan 25, 2013) (explaining that, if the Commission puts an emphasis on bidding in the assignment phase, bidders “could be expected in the first bidding phase to set their bids on the basis of the least valuable license in each imprecisely defined ‘generic’ category”).

⁶ See *AT&T Paper* at 3-4 (“No bidder will pursue a strategy that it expects to result in it paying more (in total) for a license than it is worth. ... Thus, USCC is correct in pointing out that the Commission’s current combination of proposals is likely to result in clock phase revenues that fall well short of the value that the spectrum would bring to the wireless market.”).

⁷ See, e.g., Reply Comments of Verizon and Verizon Wireless, GN Docket No. 12-268, p. 49 (Mar. 12, 2014) (“[T]he full value of the 5 MHz spectrum blocks should be reflected in the generic bids to the extent possible.”);

assignment phase.⁸ Moreover, numerous commenters (including carriers of all sizes) have stressed that they would feel obligated to reserve a portion of their fixed budgets for the assignment phase if the Commission adopts its proposal.⁹ Given that these very carriers likely will be responsible for a significant portion of forward auction revenue, their unanimous view on this issue must not be ignored. Simply put, if these carriers believe assignment phase bidding requires them to withhold funds during the clock phase, there is a high likelihood that course of action will be the dominant strategy in the forward auction if the Commission adopts its proposal.¹⁰

While it is possible that the funds bidders' set aside for the assignment phase would not be substantial enough to cause a stage of the auction to fail that otherwise would have satisfied the final stage rule, this cannot be known with any level of certainty. For instance, although it has been noted that only a small portion of the total revenue generated by Australia's 700 MHz auction came from the assignment phase, the results of that auction cannot be reasonably relied upon to make predictions concerning the incentive auction. Specifically, unlike here, the Australian auction involved only nationwide licenses.¹¹ As a result, the licensees were already guaranteed geographic-contiguity. In addition, only two bidders sought (and thus won) licenses in the Australian auction, and combined they acquired only six of the nine licenses offered in the auction.¹² Consequently, the bidders were also already guaranteed that all of their licenses would be spectrally contiguous.

Comments of AT&T Inc., GN Docket No. 12-268, p. 42 (Jan 25, 2013) (“[T]he Commission should structure the overall auction to avoid reliance on such supplemental bidding in order to satisfy the closing conditions.”).

⁸ See, e.g., Reply Comments of T-Mobile USA, Inc., GN Docket No. 12-268, p. 50 (Mar. 12, 2013) (“T-Mobile NPRM Reply Comments”) (“A random or quasi-random assignment process found strong support in the initial comment round.”); Reply Comments of the Rural Wireless Association, Inc. and NTCA – The Rural Broadband Association, AU Docket No. 14-252, GN Docket No. 12-268, p. 5 (Mar. 13, 2015) (“RWA/NTCA PN Reply Comments”) (“[N]early every commenter that addressed this issue in the underlying rulemaking proceeding urged the Commission to rely on random or quasi-random procedures rather than bidding in the assignment phase”).

⁹ See, e.g., T-Mobile NPRM Reply Comments at 56 (“Bidders facing two auctions rather than one will reduce their primary forward auction bids based on their expected activity in the follow-on auction.”); Comments of Competitive Carriers Association, AU Docket No. 14-252, GN Docket No. 12-268, p. 38 (Feb. 20, 2015) (“CCA PN Comments”) (warning that assignment phase bidding “could limit forward-auction revenues because participants would necessarily hold back capital to secure preferred spectrum blocks in the assignment phase”); Comments of Cellular South, Inc., AU Docket No. 14-252, GN Docket No. 12-268, p. 6 (Feb. 20, 2015) (“Cellular South PN Comments”) (warning that assignment phase bidding “could encourage bidders to reduce their forward-auction bids in order to preserve capital resources for the pursuit of ‘better’ spectrum blocks in the assignment round.”).

¹⁰ See *Comment Sought on Competitive Bidding Procedures for Broadcast Incentive Auction 1000, Including Auctions 1001 and 1002*, Public Notice, 29 FCC Rcd 15750, 15915 (2014) (“*Auction Procedures PN*”) (Dissenting Statement of Commissioner Michael O’Rielly) (cautioning that additional bidding rounds “means bidders may hold back funds because it’s unknown whether they will need to contribute more”).

¹¹ See Australian Communications and Media Authority, *Notice for the Digital Dividend Auction* (available at <http://www.acma.gov.au/Industry/Spectrum/Digital-Dividend-700MHz-and-25Gz-Auction/Reallocation/notice-for-the-digital-dividend-auction>).

¹² Specifically, Telstra won four 5x5 MHz paired licenses and Optus Mobile won two 5x5 MHz paired licenses. See Australian Communications and Media Authority, *Figure 3: Frequency Ranges Assigned to Successful Bidders*

Also significant is the fact that the licenses in the Australian auction sold for the reserve price.¹³ In other words, the bidders paid the minimum they could have during the clock phase, and thus had no ability to hold back funds in anticipation of the assignment phase without foregoing licenses that were being offered at the absolute minimum price established for the auction. Finally, unlike here, the Australian auction did not offer licenses with permanent impairments. As AT&T has explained, the “allocative distortion and suppression of clock phase bids might be small in auctions where there is little inherent license heterogeneity. In such cases, bidders’ interests in the assignment phase ... may involve relatively little conflict.”¹⁴ With respect to the incentive auction, however, the Commission proposes to include licenses with varying levels of impairment within the same generic category.¹⁵ Moreover, as numerous commenters have explained, while necessary and beneficial, the Commission’s proposed linear discounts would fail to adequately compensate bidders that end up with more impaired licenses.¹⁶

In sum, there is a widely-acknowledged likelihood that bidders will reserve at least some portion of their budgets for the assignment phase if the Commission implements bidding procedures. Moreover, the amounts bidders ultimately would hold back during the clock phase cannot be known with any level of certainty. Accordingly, the Commission should decline to adopt bidding procedures for the assignment phase because doing so could undermine the overarching objectives of the incentive auction. This is especially true given that non-monetary procedures exist that would accomplish all of the Commission’s assignment phase objectives.

Specifically, the undersigned strongly urge the Commission to adopt the assignment phase proposal previously presented to the Commission by U.S. Cellular and T-Mobile USA, Inc. (the “Joint Proposal”), under which the Commission would utilize a “deferred acceptance algorithm,” or more properly, a “serial priority-assessment algorithm,” in order to assign bidders

(available at <http://165.191.2.87/Industry/Spectrum/Digital-Dividend-700MHz-and-25Gz-Auction/Reallocation/digital-dividend-auction-results>).

¹³ See *id.* (“Demand in Clock Round 1 of the auction led to three unsold lots in the 700 MHz band.”).

¹⁴ *AT&T Paper* at 3.

¹⁵ See *Auction Procedures PN*, 29 FCC Rcd at 15912 (Dissenting Statement of Commissioner Ajit Pai) (“The spectrum blocks offered in the forward auction are not going to be generic.”); *id.* at 15915 (Dissenting Statement of Commissioner Michael O’Rielly) (“[T]he Commission’s generic license blocks are no longer truly fungible.”).

¹⁶ See Reply Comments of Sprint Corporation, AU Docket No. 14-252, GN Docket No. 12-268, p. 11 (Mar. 13, 2015) (“[T]he Commission’s proposed post-clock impairment discount does not effectively resolve underlying variability between blocks...”); Comments of CTIA – The Wireless Association, AU Docket No. 14-252, GN Docket No. 12-268, p. 13 (Feb. 20, 2015) (“[T]he value of an impaired license does not decline linearly as the degree of impairment rises.”); Verizon Reply Comments, AU Docket No. 14-252, GN Docket No. 12-268, p. 9 (Mar. 13, 2015) (“[A] particular level of impaired pops does not translate linearly ... into the same percentage reduction in a market’s value.”); Reply Comments of AT&T, AU Docket No. 14-252, GN Docket No. 12-268, p. 14 (Mar. 13, 2015) (“[T]he one percent refund for impairment ... does not account for the true reduction in value caused by the resulting impairments.”).

frequency-specific licenses.¹⁷ Deferred acceptance algorithms are well accepted and have been used in many different settings around the world. As a result, this approach to the assignment phase would be less risky than other possible mechanisms, including assignment phase bidding procedures, that have undergone far fewer practical tests and applications. Most importantly, the Joint Proposal would not cause bidders to withhold funds during the crucial clock phase of the forward auction, which would increase the odds of satisfying the final stage rule during a given stage of the auction, and thereby increase the likelihood of repurposing additional spectrum for next-generation wireless broadband networks.

Under the Joint Proposal, the Commission would begin by having all of the winning bidders from the clock phase of the forward auction prioritize all of the PEAs in which they won generic licenses based on the importance they attach to being assigned particular blocks in those PEAs. The auction system would then randomly rank-order all of the bidders, 1...N, and select Bidder 1's highest priority PEA for the first assignment round. Once all of the bidders with generic licenses for that PEA have prioritized their possible block assignments, the auction system would assign Bidder 1 its highest priority block (or combination of blocks) in the PEA that remains feasible after optimizing for the three spectral-contiguity objectives proposed by the Commission.¹⁸ Next, the auction system would again turn to the randomly selected rank-order of bidders and assign Bidder 2 its highest priority block(s) from among the unassigned blocks that satisfy the spectral-contiguity objectives. If Bidder 2 did not win any generic licenses for this PEA, the auction system would proceed to the next highest ranked bidder that holds a generic license for the PEA. This process would continue in descending rank-order of the bidders that hold generic licenses for the PEA until every block is assigned.

The auction system would then proceed to the second round, which would assign licenses for the currently unassigned PEA given the highest priority by Bidder 2. In that PEA, Bidder 2's block preferences (to the extent feasible) would be honored first, followed by Bidder 3's block preferences, and so on, with Bidder 1 following Bidder N if necessary. In other words, because Bidder 1 had its block preferences honored first in round one, its block preferences would be honored last in the second round. When this round-by-round process reaches Bidder N, the remaining PEA given the highest priority by Bidder N would be selected, and Bidder N's block preferences for that PEA would be honored first. Bidder 1's block preferences would be honored second in that PEA, followed by Bidder 2, etc.

In the following round, the ordering of the bidders would reverse with respect to both PEA selection and the assignment of preferred blocks. As a result, Bidder N's PEA-ranking would *again* determine which PEA the auction system selects, and Bidder N's block preferences for that PEA would be honored first. As noted, the ordering for purposes of honoring block preferences also would reverse. Thus, rather than honor Bidder 1's block preferences next, the auction system would honor the preferences of Bidder N-1, followed by Bidder N-2, and so on.

¹⁷ Attachment A hereto is a bullet-point-formatted summary of the Joint Proposal, and Attachment B hereto provides a detailed example of the Joint Proposal in operation.

¹⁸ See *Auction Procedures PN*, 29 FCC Rcd at 15815.

In the subsequent round, the PEA-ranking of Bidder N-1 would determine which PEA the auction system selects, and the block preferences of Bidder N-1 would be honored first. The auction system would then honor the block preferences of Bidder N-2, followed by Bidder N-3, etc., until every block is assigned.

The process would continue in this manner until Bidder 1's PEA-ranking determines the next PEA. After that, the ordering would again reverse (*i.e.*, the original ordering of the bidders would start all over again). Thus, for the next round, Bidder 1's PEA-rankings would again determine the PEA selected by the auction system, and the auction system would again honor the block preferences of Bidder 1 first, followed by Bidder 2, and so on. In this way, the proposal mimics the "snake drafts" often used by fantasy football leagues, and would ensure that each bidder has a fair share of high and low "picks" as the assignment phase winds its way back and forth through the randomly selected rank-order of bidders.

Although the Joint Proposal may at first appear rather complicated, in reality, it is quite similar to the Commission's proposed procedures in most respects. For instance, as noted, the auction system would only honor bidders' block preferences to the extent they remain feasible after optimizing for the three spectral-contiguity objectives proposed by the Commission. If a bidder's highest priority block (or combination of blocks) fails to satisfy those objectives, the auction system would continue moving down the bidder's list of block preferences until a specified block (or combination of blocks) does satisfy all three objectives. Also like the Commission's proposed procedures, under this joint proposal, the assignment rounds would be sequenced in order to allow "bidders to incorporate frequency assignments from previously-assigned areas into their bid preferences for other areas," which would provide an opportunity for bidders to benefit from having "contiguous blocks across adjacent PEAs."¹⁹

Significantly, to the extent the Joint Proposal does vary from the Commission's proposed procedures, the Joint Proposal would make participation in the assignment phase far less complicated and time consuming for bidders. For instance, bidders would simply need to rank their feasible block assignments in each PEA. On the other hand, with bidding, in addition to ranking their possible block assignments, bidders would need to attach dollar amounts to each possible assignment based on the degree of preference they attach to each such assignment. These valuation decisions would be especially complex and uncertain given that the Commission has never before conducted this type of auction, and thus bidders lack any basis on which to value the potentially large number of possible block assignments they could be assigned in each PEA.

At the same time, unlike a random or quasi-random assignment process, but similar to the Commission's proposed procedures, the Joint Proposal would permit bidders to express their preferences for particular blocks in each PEA for which they hold generic licenses, which the

¹⁹ *Id.* at 15814; *see* Comments of T-Mobile USA, Inc., AU Docket No. 14-252, GN Docket No. 12-268, p. 47 (Feb. 20, 2015) ("Assigning the same channel in geographically adjacent markets offers several benefits."); CCA PN Comments at 40-41.

Commission noted should permit more confident bidding in the clock phase.²⁰ The Joint Proposal, however, would not have the unintended effect of also decreasing clock phase revenue. Moreover, the Joint Proposal would offer a reasonable opportunity for non-dominant bidders, who will have paid the same amount as the largest bidders for generic license rights, to acquire their preferred blocks. In contrast, various commenters have warned that assignment phase bidding “could disadvantage small and rural wireless carriers and risk relegating them to the most impaired licenses in each PEA.”²¹

In turn, this bias against smaller bidders could have a further detrimental impact on clock phase revenues. Because a smaller bidder is more likely to have a firmly-fixed budget, if it reasonably expects that it will not be able to outbid the other generic license holders in the assignment phase, the bidder will be forced to cease bidding once the clock price reaches the value it assigns to the most impaired license in a generic category in a given PEA. If the continued participation of this bidder determined whether there was excess supply for that category of licenses, its decision to drop out would effectively set the clock price for those licenses. As a result, if the bidder dropped out earlier than it would have if not faced with additional bidding in the assignment phase, this decision would reduce the clock price that the other bidders would need to pay for the licenses.

Moreover, as CCA previously explained, the “Commission has proposed no [] competitive safeguard to prevent the dominant carriers from herding non-dominant carriers into the least desirable, most heavily encumbered blocks available for licensing in the assignment round.”²² For instance, the existence of the spectrum reserve would not help to address this harm related to assignment phase bidding for the vast majority of non-nationwide carriers. For example, in those PEAs that will be the focus of most, if not all, non-nationwide carriers in the incentive auction, at least two, and in many cases three, of the four nationwide carriers will be reserve-eligible. In addition, even in markets where there are fewer reserve-eligible nationwide carriers, smaller bidders would not benefit from the spectrum reserve during the assignment phase given that the Commission proposes “not to differentiate in the assignment rounds between licenses that were reserved for certain eligible bidders ... and unreserved blocks.”²³

²⁰ See *Expanding the Economic and Innovation Opportunities of Spectrum Through Incentive Auctions*, Report and Order, 29 FCC Rcd 6567, 6779 (2014) (“*Incentive Auction Order*”) (“Knowing that the assignment mechanism will enable them to express preferences for frequency-specific licenses, bidders will be able to bid more confidently for generic licenses in the clock rounds.”).

²¹ RWA/NTCA PN Reply Comments at 4; see Cellular South PN Comments at 6 (noting its concern “that current proposals for the assignment round will expose smaller, regional carriers to strategies that will undermine wireless competition”) (internal citation omitted); Reply Comments of Competitive Carriers Association, AU Docket No. 14-252, GN Docket No. 12-268, p. 15 (Mar. 13, 2015) (“[T]he proposed assignment round process could expose smaller, regional carriers to foreclosure by the two dominant carriers that could undermine competition.”); Reply Comments of T-Mobile USA, Inc., AU Docket No. 14-252, GN Docket No. 12-268, pp. 31-32 (Mar. 13, 2015) (“Several commenters recommend that the Commission should amend its proposed assignment round process to avoid systematically disadvantaging smaller carriers and depressing clock phase revenues.”).

²² CCA PN Comments at 34-35.

²³ *Auction Procedures PN*, 29 FCC Rcd at 15814

Further, it is highly unlikely that the Commission's proposed "extended round" procedures would sufficiently address the negative impact assignment phase bidding likely would have on clock phase revenue, and thus would not prevent the auction from unnecessarily moving to a new stage with a lower clearing target. In particular, for several reasons, the Commission's proposal "to conduct extended round bidding only for Category 1 blocks in the 'high-demand' PEAs with no excess supply" will limit the potential revenue impact from this additional round of bidding.²⁴ For instance, because bidding for the largest markets typically reaches near-final prices much sooner than in other markets,²⁵ it is unlikely that the bid increases for these PEAs during the extended round would be sufficient to overcome more than a minimal revenue shortfall with respect to satisfying the final stage rule. This would be especially so if bidders know they will need to expend additional sums during the assignment phase.

In addition, while satisfaction of the "price component" of the final stage rule will hinge only on the prices for the Category 1 licenses in high-demand PEAs that would be included in any extended round,²⁶ satisfaction of the independent "cost component" of the final stage rule requires that the *overall* proceeds of the forward auction be sufficient to cover specific costs, including payments to winning reverse auction bidders.²⁷ As a result, particularly at high clearing targets, the price component may be satisfied well before the cost component,²⁸ for which any shortfall in clock phase revenue would be even less likely to be remedied by an extended round. While satisfaction of the cost component hinges on the total forward auction revenues and will require sufficient proceeds to make payments to *every* winning reverse auction bidder, as well as reimburse the repacking costs of *every* other eligible broadcaster, the extended round only has the potential to increase the revenue generated for a subset of the total PEAs.²⁹

In sum, while assignment phase bidding would unnecessarily risk harm to the overall incentive auction process, use of the procedures set forth in the Joint Proposal would allow the Commission to accomplish all of its stated goals for the assignment phase, but without a negative impact on clock phase revenue. In other words, while there is much to lose, it appears as if there is little or nothing to be gained from the use of assignment phase bidding procedures. Given that the incentive auction presents "a once-in-a-lifetime opportunity to expand the benefits of mobile wireless coverage and competition to consumers across the Nation,"³⁰ Chairman Wheeler has "repeatedly stated" that the Commission needs to "get it right," and that the Commission "will do

²⁴ *Id.* at 15810.

²⁵ *See id.*

²⁶ *See id.* at 15770-71.

²⁷ *See id.* at 15771.

²⁸ *See, e.g.,* Letter from Lawrence R. Krevor, Vice President, Legal and Government Affairs, Sprint Corporation, to Marlene H. Dortch, Secretary, FCC, GN Docket No. 12-268, AU Docket No. 14-252, p. 3 (May 20, 2015) ("A high clearing target (requiring more payments to reverse auction participants) or broadcaster reluctance to accept lower descending clock prices will result in an FSR 'cost component' that is a substantial portion of license values.").

²⁹ By our calculations, the high-demand (*i.e.*, top-40) PEAs cover only about 58% of the nationwide population.

³⁰ *Incentive Auction Order*, 29 FCC Rcd at 7031 (Statement of Chairman Tom Wheeler).

whatever it takes to make sure [they] get it right.”³¹ Adoption of the Joint Proposal would be a simple, as well as non-controversial, way to help ensure that the Commission does, in fact, “get it right.”

This ex parte presentation is being filed electronically in the above-referenced dockets pursuant to Section 1.1206 of the Commission’s rules.

Respectfully submitted,

| | | |
|----------------------------------|---------------------------------|-------------------|
| Bluegrass Cellular, Inc. | Cellcom | Chat Mobility |
| HTC, Inc. | SI Wireless dba MobileNation | Nex-Tech Wireless |
| Public Service Wireless, Inc. | Union Wireless | Viaero Wireless |
| VTel Wireless | U.S. Cellular | |

Enclosures

cc (via email): Chairman Tom Wheeler (Thomas.Wheeler@fcc.gov)
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³¹ *Auction Procedures PN*, 29 FCC Rcd at 15907 (Statement of Commissioner Tom Wheeler).

Attachment A

Assignment Phase Proposal
“Serial Priority-Assessment Algorithm”

- **Prioritizing PEAs & Ranking Bidders**
 - Each winning bidder from the clock phase of the forward auction prioritizes all of the PEAs in which it won generic licenses based on the importance it attaches to being assigned particular blocks in those PEAs.
 - Auction system then randomly rank-orders all of the bidders, 1...N.

- **Round One**
 - Auction system selects Bidder 1's highest priority PEA for the first assignment round.
 - Bidders with generic licenses for this PEA prioritize their possible block assignments.
 - Auction system assigns Bidder 1 its highest priority block (or combination of blocks) in the PEA that remain feasible after optimizing for the three spectral-contiguity objectives.
 - Throughout the proposed process, the assignments made by the auction system are constrained by the three spectral-contiguity objectives.
 - Auction system then assigns Bidder 2 its highest priority block(s) from among those that remain unassigned.
 - If Bidder 2 did not win any generic licenses for this PEA, the auction system would proceed to the highest ranked bidder that does hold generic licenses for this PEA.
 - Auction system continues to honor, in descending rank-order of the bidders, the block preferences of bidders with generic licenses for this PEA until every block is assigned.

- **Round Two**
 - Auction system selects the PEA given the highest priority by Bidder 2 for which licenses have not already been assigned.
 - Bidders with generic licenses for this PEA prioritize their possible block assignments.
 - Auction system assigns Bidder 2 its highest priority block(s) in the PEA.
 - Auction system then assigns Bidder 3 its highest priority block(s) from among those that remain unassigned.
 - Auction system continues to assign blocks for this PEA in descending rank-order of the bidders until every block is assigned.
 - Because Bidder 1 had its block preferences honored first in Round One, if Bidder 1 holds a generic license for this PEA, its preferences would be honored last (*i.e.*, after Bidder N or the next lowest ranked bidder holding a generic license for this PEA).

- **Round N**
 - At this point, the PEA priorities of every bidder but N (the lowest ranked bidder) will have determined the PEAs that were selected for the preceding assignment rounds.
 - Thus, in this round, the auction system selects the remaining PEA given the highest priority by Bidder N, and assigns Bidder N its highest priority block(s) in that PEA.

- o Auction system then honors the block preferences of Bidder 1, followed by Bidder 2, etc., until every block is assigned.
- **Subsequent Round – Order Reverses**
 - o Bidder N’s PEA-ranking *again* determines which PEA the auction system selects, and Bidder N’s block preferences are *again* honored first.
 - o Auction system then honors the block preferences of Bidder N-1, followed by Bidder N-2, etc., until every block is assigned.
- **Following Round**
 - o The PEA-ranking of Bidder N-1 determines the PEA, and the block preferences of Bidder N-1 are honored first.
 - o Auction system then honors the block preferences of Bidder N-2, followed by Bidder N-3, etc., until every block is assigned.
- **Back to Bidder 1**
 - o The process continues in the manner described above until Bidder 1’s PEA-ranking determines the next PEA.
 - o Auction system then honors Bidder 1’s block preferences for that PEA, followed by those of Bidder N, then Bidder N-1, etc., until every block is assigned.
 - o The original ordering then starts over again.
 - In other words, for the next round, Bidder 1’s PEA-ranking *again* determines which PEA is selected, and Bidder 1’s block preferences are *again* honored first.
 - Auction system then honors the block preferences of Bidder 2, followed by Bidder 3, etc., until every block is assigned.
- **“Snake Draft”**
 - o The proposal mimics the “snake drafts” often used by fantasy football leagues.
 - o This ensures that every bidder has a fair share of high and low “picks” as the assignment phase winds its way back and forth through the randomly selected rank-order of bidders.

Attachment B

An Example

The “Ordered Selections” Assignment
Procedure

The Set-Up

There are seven PEAs: $\{A, B, \dots, G\}$.

Each PEA offers four licenses.

There are six bidders, $\{i, j, k, l, m, n\}$, each of whom has won single licenses in one or more of the PEAs.

The Preliminaries

| | <i>i</i> | <i>j</i> | <i>k</i> | <i>l</i> | <i>m</i> | <i>n</i> |
|----------|----------|----------|----------|----------|----------|----------|
| A | 1 | 1 | | 2 | | 4 |
| B | 2 | 2 | | 3 | 2 | |
| C | 3 | 3 | 4 | | | 3 |
| D | 4 | 5 | 1 | 1 | | |
| E | 5 | 7 | 2 | | 1 | |
| F | 6 | 6 | 3 | | | 2 |
| G | 7 | 4 | 5 | | | 1 |

The FCC generates a random ordering of the winning bidders:

It happens to be *i-j-k-l-m-n*.

Each bidder ranks the PEAs in which it has won licenses in order of “assignment importance.”

Each bidder also ranks all of its feasible assignments within each PEA in order of preference (not displayed).

An Iteration

| | <i>i</i> | <i>j</i> | <i>k</i> | <i>l</i> | <i>m</i> | <i>n</i> |
|----------|----------|----------|----------|----------|----------|----------|
| A | 1 | 1 | | 2 | | 4 |
| B | 2 | 2 | | 3 | 2 | |
| C | 3 | 3 | 4 | | | 3 |
| D | 4 | 5 | 1 | 1 | | |
| E | 5 | 7 | 2 | | 1 | |
| F | 6 | 6 | 3 | | | 2 |
| G | 7 | 4 | 5 | | | 1 |

Repeatedly, the rank-1 bidder's top-ranked PEA will be chosen, and that bidder will be given its most-preferred assignment in the chosen PEA. The following bidders will be given, in rank order, their most-preferred assignments in that PEA among all assignments that are still feasible.

Here, the rank-1 bidder is *i*.
The chosen PEA is PEA A.
The order of assignments is *i, j, l, n*.

The Start

| | <i>i</i> | <i>j</i> | <i>k</i> | <i>l</i> | <i>m</i> | <i>n</i> |
|----------|----------|----------|----------|----------|----------|----------|
| A | 1 | 1 | | 2 | | 4 |
| B | 2 | 2 | | 3 | 2 | |
| C | 3 | 3 | 4 | | | 3 |
| D | 4 | 5 | 1 | 1 | | |
| E | 5 | 7 | 2 | | 1 | |
| F | 6 | 6 | 3 | | | 2 |
| G | 7 | 4 | 5 | | | 1 |

The rank-1 bidder is bidder i , and its most-important PEA, A , is chosen.

Bidder i receives its most-preferred feasible assignment in PEA A . Then the assignment preferences of j , l , and n in PEA A are processed in order.

The First Continuation

| | j | k | l | m | n | i |
|---|-----|-----|-----|-----|-----|-----|
| A | 1 | | 2 | | 4 | 1 |
| B | 2 | | 3 | 2 | | 2 |
| C | 3 | 4 | | | 3 | 3 |
| D | 5 | 1 | 1 | | | 4 |
| E | 7 | 2 | | 1 | | 5 |
| F | 6 | 3 | | | 2 | 6 |
| G | 4 | 5 | | | 1 | 7 |

PEA A is now fully assigned. Bidder i moves to the end of the list.

The rank-1 bidder is now bidder j , and its most-important (remaining) PEA, B, is chosen.

The assignment preferences of j , l , m , and i in PEA B are processed in order.

Another Continuation

| | k | l | m | n | i | j |
|---|-----|-----|-----|-----|-----|-----|
| A | | 2 | | 4 | 1 | 1 |
| B | | 3 | 2 | | 2 | 2 |
| C | 4 | | | 3 | 3 | 3 |
| D | 1 | 1 | | | 4 | 5 |
| E | 2 | | 1 | | 5 | 7 |
| F | 3 | | | 2 | 6 | 6 |
| G | 5 | | | 1 | 7 | 4 |

PEA B is now fully assigned. Bidder j moves to the end of the list.

The rank-1 bidder is now bidder k , and its most-important (remaining) PEA, D, is chosen.

The assignment preferences of k , l , i , and j in PEA D are processed in order.

One Bidder is Done

| | l | m | n | i | j | k |
|---|-----|-----|-----|-----|-----|-----|
| A | 2 | | 4 | 1 | 1 | |
| B | 3 | 2 | | 2 | 2 | |
| C | | | 3 | 3 | 3 | 4 |
| D | 1 | | | 4 | 5 | 1 |
| E | | 1 | | 5 | 7 | 2 |
| F | | | 2 | 6 | 6 | 3 |
| G | | | 1 | 7 | 4 | 5 |

PEA D is now fully assigned. Bidder k moves to the end of the list.

The rank-1 bidder is now bidder l .

All of the PEAs where it has won licenses have already been processed. Bidder l can be removed from the table (although we'll keep it, for purposes of the example).

Continuing

| | m | n | i | j | k | l |
|----------|----------|-----|----------|----------|----------|-----|
| A | | 4 | 1 | 1 | | 2 |
| B | 2 | | 2 | 2 | | 3 |
| C | | 3 | 3 | 3 | 4 | |
| D | | | 4 | 5 | 1 | 1 |
| E | 1 | | 5 | 7 | 2 | |
| F | | 2 | 6 | 6 | 3 | |
| G | | 1 | 7 | 4 | 5 | |

Bidder l moves to the end of the list.

The rank-1 bidder is now bidder m , and its most-important (remaining) PEA, E , is chosen.

The assignment preferences of m , i , j , and k in PEA E are processed in order.

Last Step Forward

| | n | i | j | k | l | m |
|---|-----|-----|-----|-----|-----|-----|
| A | 4 | 1 | 1 | | 2 | |
| B | | 2 | 2 | | 3 | 2 |
| C | 3 | 3 | 3 | 4 | | |
| D | | 4 | 5 | 1 | 1 | |
| E | | 5 | 7 | 2 | | 1 |
| F | 2 | 6 | 6 | 3 | | |
| G | 1 | 7 | 4 | 5 | | |

Bidder m moves to the end of the list.

The rank-1 bidder is now bidder n , and its most-important (remaining) PEA, G , is chosen.

The assignment preferences of n , i , j , and k in PEA G are processed in order.

The Flip

| | n | m | l | k | j | i |
|----------|----------|-----|-----|----------|----------|----------|
| A | 4 | | 2 | | 1 | 1 |
| B | | 2 | 3 | | 2 | 2 |
| C | 3 | | | 4 | 3 | 3 |
| D | | | 1 | 1 | 5 | 4 |
| E | | 1 | | 2 | 7 | 5 |
| F | 2 | | | 3 | 6 | 6 |
| G | 1 | | | 5 | 4 | 7 |

Bidder n , the original last-ranked bidder, remains in place. The original rank order is reversed.

The rank-1 bidder is now (again) bidder n , and its most-important (remaining) PEA, F , is chosen.

The assignment preferences of n , k , j , and i in PEA F are processed in order.

Near the End

| | <i>m</i> | <i>l</i> | <i>k</i> | <i>j</i> | <i>i</i> | <i>n</i> |
|---|----------|----------|----------|----------|----------|----------|
| A | | 2 | | 1 | 1 | 4 |
| B | 2 | 3 | | 2 | 2 | |
| C | | | 4 | 3 | 3 | 3 |
| D | | 1 | 1 | 5 | 4 | |
| E | 1 | | 2 | 7 | 5 | |
| F | | | 3 | 6 | 6 | 2 |
| G | | | 5 | 4 | 7 | 1 |

Bidder *n* moves to the end of the list.

Bidders *m* and *l* are already fully assigned.

The End

| | <i>k</i> | <i>j</i> | <i>i</i> | <i>n</i> | <i>m</i> | <i>l</i> |
|---|----------|----------|----------|----------|----------|----------|
| A | | 1 | 1 | 4 | | 2 |
| B | | 2 | 2 | | 2 | 3 |
| C | 4 | 3 | 3 | 3 | | |
| D | 1 | 5 | 4 | | | 1 |
| E | 2 | 7 | 5 | | 1 | |
| F | 3 | 6 | 6 | 2 | | |
| G | 5 | 4 | 7 | 1 | | |

Bidders m , and then l , move to the end of the list.

The rank-1 bidder is now bidder k , and its most-important (remaining) PEA, C , is chosen.

The assignment preferences of k , j , i , and n in PEA C are processed in order.

Summary

| | k | j | i | n | m | l |
|---|-----|-----|-----|-----|-----|-----|
| A | | 1 | 1 | 4 | | 2 |
| B | | 2 | 2 | | 2 | 3 |
| C | 4 | 3 | 3 | 3 | | |
| D | 1 | 5 | 4 | | | 1 |
| E | 2 | 7 | 5 | | 1 | |
| F | 3 | 6 | 6 | 2 | | |
| G | 5 | 4 | 7 | 1 | | |

Bidders i and m get first choice in their top-ranked PEAs, and bidder n gets first choice in its top- and second-ranked PEAs.

Bidder j gets first choice in its second-ranked PEA, and bidder k gets first choice in its top-ranked PEA and a lower-rank PEA.

Bidder l gets to pick second twice and third once in the three PEAs where it won licenses.