



# PUBLIC NOTICE

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DA 13-1540  
Released: July 15, 2013

## AUCTION OF H BLOCK LICENSES IN THE 1915-1920 MHz AND 1995-2000 MHz BANDS; COMMENT SOUGHT ON COMPETITIVE BIDDING PROCEDURES FOR AUCTION 96

AU Docket No. 13-178

Comment Date: August 5, 2013  
Reply Comment Date: August 16, 2013

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## I. INTRODUCTION

1. By this Public Notice, the Wireless Telecommunications Bureau (“Bureau”) announces its intention to hold an auction of licenses in the 1915-1920 MHz (“Lower H Block”) and 1995-2000 MHz (“Upper H Block”) bands (collectively, the “H Block”),<sup>1</sup> and seeks comment on the procedures to be used for this auction. The staff will be prepared to conduct this Auction, which will be designated Auction 96, by or as early as January 14, 2014.

2. The Commission is offering the licenses in Auction 96 pursuant to the Middle Class Tax Relief and Job Creation Act of 2012 (“Spectrum Act”).<sup>2</sup> The Spectrum Act requires, among other things, that the Commission allocate for commercial use and license spectrum in the H Block using a system of competitive bidding no later than February 23, 2015.<sup>3</sup>

## II. LICENSES TO BE OFFERED IN AUCTION 96

### A. Description of Licenses

3. In the *H Block Report and Order*, the Commission concluded that licenses for H Block spectrum should be awarded on an Economic Areas (EA) basis in all areas, including the Gulf of Mexico.<sup>4</sup> Auction 96 will offer one license for each of the 176 EAs. The Lower H Block and Upper H Block frequencies will be licensed as paired 5 megahertz blocks, with each license having a total bandwidth of 10 megahertz; 1915-1920 MHz for mobile and low power fixed (*i.e.*, uplink) operations and

<sup>1</sup> Service Rules for the Advanced Wireless Services H Block—Implementing Section 6401 of the Middle Class Tax Relief and Job Creation Act of 2012 Related to the 1915-1920 MHz and 1995-2000 MHz Bands, WT Docket No. 12-357, *Report and Order*, FCC 13-88 (rel. Jun. 27, 2013) (*H Block Report and Order*). All references to the Part 27 rules adopted by the Commission in the *H Block Report and Order* and cited herein will become effective on the dates announced in the Federal Register Notice regarding the *H Block Report and Order*.

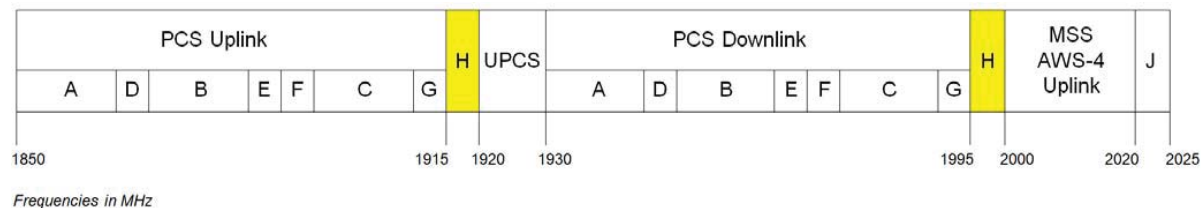
<sup>2</sup> See Middle Class Tax Relief and Job Creation Act of 2012, Pub. L. No. 112-96, 126 Stat. 156 (2012) (Spectrum Act).

<sup>3</sup> Spectrum Act, § 6401(b), codified at 47 U.S.C. § 1451(b). The Commission concluded in the *H Block Report and Order* that both blocks of the H Block spectrum are already allocated for non-Federal Fixed and Mobile use on a primary basis, with their present spectrum pairing, and that no further action to allocate the frequencies in the H Block bands for commercial use is necessary to meet the Spectrum Act’s allocation requirements. See *H Block Report and Order* at ¶ 14. See also Amendment of Part 2 of the Commission’s Rules to Allocate Spectrum Below 3 GHz for Mobile and Fixed Services to Support the Introduction of New Advanced Wireless Services, including Third Generation Wireless Systems, ET Docket No. 00-258, RM-9498, RM-10024, *Third Report and Order, Third Notice of Proposed Rulemaking and Second Memorandum Opinion and Order*, 18 FCC Rcd 2223, 2238 ¶ 28 (2003); Amendment of Part 2 of the Commission’s Rules to Allocate Spectrum Below 3 GHz for Mobile and Fixed Services to Support the Introduction of New Advanced Wireless Services, Including Third Generation Wireless Systems, ET Docket No. 00-258, IB Docket No. 99-81, *Sixth Report and Order, Third Memorandum Opinion and Order and Fifth Memorandum Opinion and Order*, 19 FCC Rcd 20720, 20722 ¶ 1 (2004).

<sup>4</sup> See *H Block Report and Order* at ¶¶ 37, 45.

1995-2000 MHz for base station and fixed (*i.e.*, downlink) operations.<sup>5</sup> Figure 1 shows the H Block band plan, and Table 1 contains summary information regarding H Block frequencies, total bandwidth, and geographic area type.

**Figure 1: H Block Band Plan**



**Table 1: H Block License Summary**

Block	Frequencies (MHz)	Bandwidth	Pairing	Area Type	Licenses
H	1915-1920/1995-2000	10 MHz	2 x 5 MHz	EA	176

4. A complete list of the licenses offered in Auction 96 is available in Attachment A to this Public Notice.

#### **B. Cost-Sharing Obligations**

5. As noted in the *H Block Report and Order*, the spectrum in the Lower H Block and the Upper H Block is subject to cost-sharing requirements related to the past clearing and relocation of incumbent users from these bands.<sup>6</sup> Consistent with its long-standing policy that cost-sharing obligations for both the Lower H Block and the Upper H Block be apportioned on a *pro rata* basis against the relocation costs attributable to the particular band,<sup>7</sup> the Commission adopted cost-sharing rules in the *H Block Report and Order* that require H Block licensees to pay a *pro rata* share of expenses previously incurred by UTAM, Inc. (“UTAM”) and by Sprint Nextel, Inc. (“Sprint”) in clearing incumbents from the Lower H Block and the Upper H Block, respectively.<sup>8</sup>

6. Under the cost sharing formula adopted in the *H Block Report and Order*, the reimbursement amount owed (“RN”) to UTAM with respect to the 1915-1920 MHz band will be determined by dividing the gross winning bid (“GWB”) for an H Block license by the sum of the gross winning bids for all H Block licenses won in Auction 96 and then multiplying that result by \$12,629,857—the total amount owed to UTAM for clearing the Lower H Block.<sup>9</sup> The cost-sharing formula for the Lower H Block is as follows:

<sup>5</sup> See *id.* at ¶¶ 28-29.

<sup>6</sup> See *H Block Report and Order* at Section II.B (Cost Sharing Obligations). For background information related to past clearing of Lower H Block incumbents, see *id.* at ¶¶ 157-58. For background information related to past clearing of the Upper H Block incumbents, see *id.* at ¶ 159.

<sup>7</sup> See, e.g., *H Block Report and Order* at ¶ 157 n.483, citing *Emerging Technologies* proceeding.

<sup>8</sup> See *id.* at ¶¶ 167-73. The Commission made clear in the *H Block Report and Order* that winning bidders in the first auction offering H Block licenses may not seek reimbursement from other H Block licensees, including for licenses awarded in subsequent auctions. *Id.* at ¶ 168.

<sup>9</sup> See 47 C.F.R. § 27.102(a). See also *H Block Report and Order* at ¶¶ 167-73. The Commission noted that \$12,629,857 is the amount UTAM has identified as the amount collectively owed to UTAM by future Lower H Block licensees for UTAM’s clearing of the 1910-1930 MHz band; that is, this amount represents one-fourth of (continued....)

$$RN = \left( \frac{\text{EA GWB}}{\text{Sum of GWBs}} \right) \times \$12,629,857$$

7. The *H Block Report and Order* adopted the same cost-sharing formula for the Upper H Block (1995-2000 MHz band) related to Sprint's clearing costs of \$94,875,516.<sup>10</sup>

$$RN = \left( \frac{\text{EA GWB}}{\text{Sum of GWBs}} \right) \times \$94,875,516$$

8. Winning bidders are required to pay UTAM and Sprint, as applicable, the reimbursement amounts owed within thirty days after the grant of the winning bidders' long-form license applications.<sup>11</sup>

9. The Commission also adopted a contingency plan in the *H Block Report and Order* that will be triggered in the unlikely event that licenses won in this auction cover less than forty percent of the U.S. population.<sup>12</sup> If such an event occurs, winning bidders—in this auction and in subsequent H Block auctions—will be required to timely pay UTAM and Sprint, respectively, their *pro rata* share calculated by dividing the population of the individual EA by the total U.S. population and then multiplying this quotient by \$12,629,857 for UTAM and by \$94,875,516 for Sprint.<sup>13</sup>

10. The cost-sharing rules and contingency plan adopted in the *H Block Report and Order* are designed to ensure that UTAM and Sprint receive full reimbursement after this auction by effectively apportioning the reimbursement costs associated with any unsold H Block licenses among the winning bidders, except in cases where the above-described contingency plan is triggered or a successful bidder's long-form application is not filed or granted. If any of the licenses won in this auction are not awarded, the license at issue will be deemed to have triggered a reimbursement obligation that will be paid by the licensee acquiring the license in a subsequent auction.

### III. DUE DILIGENCE

11. Each potential bidder is solely responsible for investigating and evaluating all technical and marketplace factors that may have a bearing on the value of the licenses that it is seeking in this auction. Each bidder is responsible for assuring that, if it wins a license, it will be able to build and operate facilities in accordance with the Commission's rules. **The Commission makes no representations or warranties about the use of this spectrum for particular services. Each applicant should be aware that a Commission auction represents an opportunity to become a Commission licensee, subject to certain conditions and regulations. A Commission auction does not constitute an endorsement by the Commission of any particular service, technology, or product, nor does a Commission license constitute a guarantee of business success.**

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UTAM's total reimbursable clearing costs for the entire 1910-1930 MHz band. See *H Block Report and Order* at ¶ 158 n. 491.

<sup>10</sup> See 47 C.F.R. § 27.1031(a). See also *H Block Report and Order* at ¶¶ 158-59. The Commission noted that Sprint has stated that the *pro rata* share of the overall Broadcast Auxiliary Service (BAS) relocation costs attributable to each five megahertz of relocated BAS spectrum amounts to \$94,875,516. See *H Block Report and Order* at ¶ 159 n.496.

<sup>11</sup> See 47 C.F.R. §§ 27.2021(e), 27.1031(e), 27.1041(b). See also *H Block Report and Order* at ¶¶ 170-73.

<sup>12</sup> See *H Block Report and Order* at ¶¶ 163, 168. In such a scenario the population would be measured using 2010 Census data, which is the most recent decennial census data. *Id.* at ¶ 168 n. 528.

<sup>13</sup> See 47 C.F.R. §§ 27.1021(b)-(c), 27.1031(b)-(c). See also *H Block Report and Order* at ¶¶ 163, 168.

12. An applicant should perform its due diligence research and analysis before proceeding, as it would with any new business venture. Each potential bidder should perform technical analyses and/or refresh any previous analyses to assure itself that, should it become a winning bidder for any Auction 96 license, it will be able to build and operate facilities that will fully comply with all applicable technical and regulatory requirements. We strongly encourage each applicant to inspect any prospective transmitter sites located in, or near, the geographic area for which it plans to bid; confirm the availability of such sites; and familiarize itself with the Commission's rules regarding the National Environmental Policy Act.<sup>14</sup>

13. We strongly encourage each applicant to conduct its own research prior to Auction 96 in order to determine the existence of pending administrative, rulemaking, or judicial proceedings that might affect its decisions regarding participation in the auction.

14. We strongly encourage participants in Auction 96 to continue such research throughout the auction. The due diligence considerations mentioned in this Public Notice do not constitute an exhaustive list of steps that should be undertaken prior to participating in this auction. As always, the burden is on the potential bidder to determine how much research to undertake, depending upon the specific facts and circumstances related to its interests.

#### **IV. BUREAU SEEKS COMMENT ON AUCTION PROCEDURES**

15. Consistent with the provisions of section 309(j)(3)(E)(i) of the Communications Act of 1934, as amended, and to ensure that potential bidders have adequate time to familiarize themselves with the specific rules that will govern the day-to-day conduct of a given auction, the Commission directed the Bureau, under its existing delegated authority, to seek comment on a variety of auction-specific procedures prior to the start of each auction.<sup>15</sup> We therefore seek comment on the following issues relating to the conduct of Auction 96.

##### **A. Auction Design**

###### **1. Simultaneous Multiple-Round Auction — With or Without Package Bidding**

16. The Bureau proposes to conduct Auction 96 using a simultaneous multiple-round (SMR) auction format.<sup>16</sup> As described further below, an SMR auction offers every license for bid at the same time and consists of successive bidding rounds in which eligible bidders may place bids. Typically, bidding remains open on all licenses until bidding stops on every license.

17. The Bureau additionally proposes to incorporate provisions for a simple form of package bidding into the simultaneous multiple-round auction. In particular, we propose to use a form of package bidding called hierarchical package bidding (HPB) in which, in addition to being able to bid on individual

<sup>14</sup> 47 C.F.R. Chapter 1, Part 1, Subpart I.

<sup>15</sup> 47 U.S.C. § 309(j)(3)(E)(i). See Amendment of Part 1 of the Commission's Rules—Competitive Bidding Procedures, WT Docket No. 97-82, *Third Report and Order and Second Further Notice of Proposed Rule Making*, FCC 97-413, 13 FCC Rcd 374, 447-49 ¶¶ 124-25 (1997) (*Part 1 Third Report and Order*) (directing WTB to seek comment on specific mechanisms related to day-to-day auction conduct including, for example, the structure of bidding rounds and stages, establishment of minimum opening bids or reserve prices, minimum acceptable bids, initial maximum eligibility for each bidder, activity requirements for each stage of the auction, activity rule waivers, criteria for determining reductions in eligibility, information regarding bid withdrawal and bid removal, stopping rules, and information relating to auction delay, suspension or cancellation). See also 47 C.F.R. § 0.131; Amendment of Part 1 of the Commission's Rules—Competitive Bidding Proceeding, WT Docket No. 97-82, *Order, Memorandum Opinion and Order and Notice of Proposed Rule Making*, FCC 97-60, 12 FCC Rcd 5686, 5697-98 ¶ 16 (1997) (*Part 1 Order*).

<sup>16</sup> See Implementation of Section 309(j) of the Communications Act—Competitive Bidding, PP Docket No. 93-253, *Second Report and Order*, FCC 94-61, 9 FCC Rcd 2348, 2360-75 ¶¶ 68-159 (1994) (*Second Report and Order*) for a general discussion of competitive bidding design.

licenses, bidders would also be able to bid on certain tiered, non-overlapping packages of licenses. The Commission concluded in the *H Block Report and Order* that the H Block spectrum should be licensed on an EA basis. Consistent with that conclusion, we propose that the basic bidding tier under HPB be individual EA licenses. The *H Block Report and Order* also noted that the decision to license at the EA level would facilitate aggregations at the larger Major Economic Area (MEA) and Regional Economic Area Grouping (REAG) levels.<sup>17</sup> We therefore seek comment on the use of predefined packages of EAs in MEAs and potentially larger packages such as REAGs, as well as a package comprising all markets in the contiguous 48 states. Below we describe and seek more detailed comment on our proposals and on various alternatives.

18. By permitting only non-overlapping packages at each tier (for example, a given EA could be included in only one MEA, which in turn could be included in only one REAG), HPB considerably simplifies bidder strategy and computational complexity compared to some other forms of package bidding. The pricing rules used with HPB are transparent and make it clear to bidders how package bids are evaluated relative to individual bids, hence making it easier than in more complex package bidding formats for bidders interested in individual licenses to compete with bidders interested in packages. As a result of these and other advantages, HPB and similar packaging formats have performed well in tests of overall auction efficiency.<sup>18</sup> Auction 96 is the first H Block auction and a single complete set of nationwide EA licenses is available. Consequently, offering predefined packages might allow for significant economies of scale that may well correspond to a variety of business plans. Bidders that wish smaller or more tailored aggregations than the allowable predefined packages would be able to bid on individual EAs instead of or in addition to the predefined packages.

19. The Bureau used a variant of HPB in Auction 73 under considerably different circumstances. Most notably, in Auction 73 we implemented SMR bidding across the five available blocks of licenses and determined that package bidding would be permitted in only one of the blocks. Further, if the aggregate reserve price that was applicable to the package bidding block in Auction 73 was not met, the performance and public interest requirements pertaining to the licenses in the block would change significantly. As a result, special procedures were needed to allow bidders to shift their bidding across the multiple available blocks, the rest of which were subject to a different bidding format.<sup>19</sup> Those complicating factors—and their implications for bidder strategies—are not present in Auction 96, which includes only a single block of licenses. Hence, the bidding rules implementing HPB would be considerably simpler than those for Auction 73.

20. Briefly, HPB as proposed for Auction 96 could be implemented as follows. We would determine the predefined packages according to a non-overlapping hierarchical structure, with an initial tier consisting of individual EA licenses. We could adopt a two-tier structure composed simply of the initial tier of EAs and MEA packages. Any subsequent tiers could consist of non-overlapping packages of the licenses in the initial tier and all subsidiary tiers. For example, if we were to adopt MEA, REAG, and nationwide packages, these packages would all nest accordingly (e.g., EAs nest to MEAs, MEAs nest

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<sup>17</sup> See *H Block Report and Order* at ¶¶ 37-39, 42, 45.

<sup>18</sup> See, e.g., Goeree, J. K. and C. A. Holt, "Hierarchical Package Bidding: A Paper & Pencil Combinatorial Auction," *Games and Economic Behavior* 70(1), September 2010, 146-169; Rothkopf, M. H., A. Pekeć, and R. M. Harstad, "Computationally Manageable Combinatorial Auctions," *Management Sciences*, 44(8), August 1998, 1131-1147; T. Scheffel, G. Ziegler, and M. Bichler, "On the impact of package selection in combinatorial auctions: an experimental study in the context of spectrum auction design," *Experimental Economics*, 15(4), December 2012, 667-692. Bichler, M., Goeree, J.K., Mayer, S., and Shabalin, P., "Spectrum Auction Design: Simple Auctions For Complex Sales," working paper (June 2013) (viewable at <http://www.esei.ch/people/jacob-goeree/working-papers>).

<sup>19</sup> See Auction of 700 MHz Band Licenses Scheduled for January 24, 2008; Notice and Filing Requirements, Minimum Opening Bids, Upfront Payments and Other Procedures for Auction 73 and 76, *Public Notice*, 22 FCC Rcd 18141 ¶¶ 248-68 (2008).

to REAGs, and REAGs nest to the national package). The winning set of bids could consist of bids from various tiers, as long as each license is included in only one winning bid. That is, in the four-tier construct described above, the winning set could potentially include individual licenses in one part of the country, MEA packages in other areas, and potentially REAG packages as well, provided the value of all of these individual and package bids exceeds a bid on a nationwide package. A bidder may place bids on any combination of individual licenses or packages.

21. After each round, the Commission would determine the combination of package and/or single license bids that yields the highest gross amount, and those bids would become provisionally winning. When determining provisionally winning bids, the FCC Auction System would consider each bidder's highest bid on each license or package placed up to that point in the auction, regardless of whether the bids were provisionally winning after the rounds in which they were placed. Considering these bids from previous rounds makes it possible for new bids on individual licenses to combine with other bids in order to compete with bids on packages.<sup>20</sup> The provisionally winning bids would be determined by comparing aggregate gross bid amounts, at each tier, for various combinations of package and individual license bids.<sup>21</sup>

22. We seek comment generally on our proposed simultaneous multiple-round auction format with hierarchical package bidding. Would HPB, as discussed, balance aggregation needs with tractability, transparency, and simplicity? We seek comment also on what packages should be available for various tiers. Should we allow a simple structure of EAs and MEAs, or some other set of tiers of MEAs, REAGs, and/or a nationwide package? Alternatively, would our standard SMR auction format without package bidding sufficiently accommodate economies of scale or other complementarities? If we do not implement package bidding for Auction 96, we propose to conduct the auction using standard SMR procedures.

23. *Alternative Auction Format.* In the alternative, we propose to conduct Auction 96 as a single round sealed bid auction. While not as common for spectrum auctions as the SMR format, we have previously used the single round sealed bid format. We propose this alternative because Auction 96 offers licenses in only a single spectrum block and a single round auction may simplify the process for bidders and reduce the costs of auction participation. In a single round format we could also offer one or more tiers of non-overlapping packages as discussed above for HPB. We seek comment on any design features of the sealed bid format (e.g., first-price or second-price). We seek comment on this alternative proposal and on any other auction formats we should consider for Auction 96.

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<sup>20</sup> This set of considered bids for licenses and packages would likely include many bids with very little likelihood of ever becoming provisionally winning. Bidders will be able to assess the chances that a considered bid from a previous round will become provisionally winning in a later round by comparing it to the considered bids and to prevailing prices.

<sup>21</sup> Packages do not overlap within a tier. That is, a license cannot be included in more than one package in a given tier. Consequently, comparing aggregate gross bid amounts at each tier does not require combinatorial optimization. See Attachment B for a more detailed discussion. See also Rothkopf, M. H., A. Pekeč, and R. M. Harstad, "Computationally Manageable Combinatorial Auctions," *Management Sciences*, 44(8), August 1998, 1131-1147. A more complex combinatorial optimization process to determine provisionally winning bids is required in some other package bidding designs, including SMR-PB, the design on which the FCC sought comment for Auction 66. See Auction of Advanced Wireless Services Licenses Scheduled for June 29, 2006; Comment Sought on Reserve Prices or Minimum Opening Bids and Other Procedures, *Public Notice*, DA 06-238, 21 FCC Rcd 794, 797-98 (2006) (*Auction 66 Comment Public Notice*).

## 2. Anonymous Bidding

24. In several prior Commission auctions, the Bureau has adopted procedures to limit the disclosure of certain bidder-specific information until after the auction.<sup>22</sup> Consistent with that practice, the Bureau proposes to adopt certain procedures for limited information disclosure or “anonymous bidding” for Auction 96. Specifically, the Bureau proposes to withhold, until after the close of bidding, public release of (1) bidders’ license selections on their short-form applications (FCC Form 175), (2) the amounts of bidders’ upfront payments and bidding eligibility, and (3) information that may reveal the identities of bidders placing bids and taking other bidding-related actions.

25. Under these proposed limited information procedures, the amount of every bid placed and whether a bid was withdrawn (if withdrawals are permitted) would be disclosed after the close of every round, but the identities of bidders placing specific bids or withdrawals (if permitted) and the net bid amounts would not be disclosed until after the close of the auction.

26. Bidders would have access to additional information about their own bids. For example, bidders would be able to view their own level of eligibility, before and during the auction, through the FCC Auction System.<sup>23</sup>

27. Moreover, for the purpose of complying with section 1.2105(c), the Commission’s rule prohibiting certain communications between applicants (formerly referred to as the “anti-collusion rule”), applicants would be made aware of other applicants with which they will not be permitted to cooperate, collaborate, or communicate—including discussing bids, bidding strategies, or post-auction market structure.<sup>24</sup> Specifically, the Bureau would notify separately each applicant with a short-form application on file for participation in Auction 96 whether applicants with short-form applications to participate in a pending auction, including but not limited to Auction 96, have applied for licenses in any of the same or overlapping geographic areas as that applicant.

28. After the close of bidding, bidders’ license selections, upfront payment amounts, bidding eligibility, bids, and other bidding-related actions would be made publicly available.

29. The Bureau seeks comment on the details of its proposal for implementing anonymous bidding in Auction 96. The Bureau also seeks comment on alternatives to the use of anonymous bidding procedures for Auction 96. When the Commission originally proposed limited information disclosure procedures, it did so in response to analysis suggesting that under certain circumstances the competitiveness and economic efficiency of a simultaneous multiple-round auction may be enhanced if such information is withheld until after the close of the auction.<sup>25</sup> The Bureau encourages parties to provide information about the benefits and costs of complying with limited information procedures as compared with the benefits and costs of alternative procedures that would provide for the disclosure of more information on bidder identities and interests in the auction. If commenters believe that the Bureau should not adopt procedures to limit the disclosure of certain bidder-specific information until after the auction, they should explain their reasoning.

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<sup>22</sup> See, e.g., Auction of 700 MHz Band Licenses Scheduled for January 24, 2008; Notice and Filing Requirements, Minimum Opening Bids, Reserve Prices, Upfront Payments, and Other Procedures for Auctions 73 and 76, *Public Notice*, DA 07-4171, 22 FCC Rcd 18141, 18181-85 ¶¶ 145-56 (WTB 2007); Auction of Advanced Wireless Services Licenses Scheduled for June 29, 2006; Notice and Filing Requirements, Minimum Opening Bids, Upfront Payments and Other Procedures for Auction No. 66, *Public Notice*, FCC 06-47, 21 FCC Rcd 4562, 4600-05 ¶¶ 140-57 (2006) (*Auction 66 Procedures Public Notice*); Auction of 700 MHz Band Licenses Scheduled for July 19, 2011; Notice and Filing Requirements, Minimum Opening Bids, Upfront Payments, and Other Procedures for Auction 92, *Public Notice*, DA 11-420, 26 FCC Rcd 3342, 3372-73 ¶¶ 126-29 (WTB 2011).

<sup>23</sup> The FCC Auction System is also known as the “Integrated Spectrum Auction System” or “ISAS.”

<sup>24</sup> See 47 C.F.R. § 1.2105(c).

<sup>25</sup> *Auction 66 Comment Public Notice*, 21 FCC Rcd at 799.



**B. Auction Structure****1. Bidding Rounds**

30. Under our proposal to use an SMR format, Auction 96 will consist of sequential bidding rounds. The initial bidding schedule will be announced in a public notice to be released at least one week before the start of the auction.

31. The Commission will conduct Auction 96 over the Internet using the FCC Auction System. Bidders will also have the option of placing bids by telephone through a dedicated, toll-free Auction Bidder Line. The toll-free telephone number for the Auction Bidder Line will be provided to qualified bidders prior to the start of the auction.

32. The Bureau proposes to retain the discretion to change the bidding schedule in order to foster an auction pace that reasonably balances speed with the bidders' need to study round results and adjust their bidding strategies. Under this proposal, the Bureau may change the amount of time for bidding rounds, the amount of time between rounds, or the number of rounds per day, depending upon bidding activity and other factors. The Bureau seeks comment on this proposal. Commenters on this issue should address the role of the bidding schedule in managing the pace of the auction, specifically discussing the tradeoffs in managing auction pace by bidding schedule changes, by changing the activity requirements or bid amount parameters, or by using other means.

**2. Stopping Rule**

33. The Bureau has discretion to establish stopping rules before or during multiple round auctions in order to complete the auction within a reasonable time.<sup>26</sup> For Auction 96, under our SMR proposal, we propose to employ a simultaneous stopping rule approach. Using a simultaneous stopping rule means all licenses remain available for bidding until bidding stops on every license. More specifically, bidding will close on all licenses and packages after the first round in which no bidder submits any new bids, applies a proactive waiver, or withdraws any provisionally winning bids (if withdrawals are permitted).<sup>27</sup> Thus, under our SMR proposal, unless we announce alternative stopping procedures, the simultaneous stopping rule will be used in this auction, and bidding will remain open on all licenses until bidding stops on every license, regardless of whether bids are placed on individual licenses or packages of licenses. Consequently, it is not possible to determine in advance how long Auction 96 will last.

34. Further, we propose to retain the discretion to exercise any of the following options during Auction 96:

- a) Use a modified version of the simultaneous stopping rule. The modified stopping rule would close the auction for all licenses after the first round in which no bidder applies a waiver, withdraws a provisionally winning bid, or places any new bids on a license or package for which it is not the provisionally winning bidder. Thus, absent any other bidding activity, a bidder placing a new bid on a license or package for which it is the provisionally winning bidder would not keep the auction open under this modified stopping rule.
- b) Use a modified version of the simultaneous stopping rule that would close the auction for all licenses after the first round in which no bidder applies a waiver, withdraws a provisionally winning bid, or places any new bids on a license or package that is not FCC-held. Thus,

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<sup>26</sup> 47 C.F.R. § 1.2104(e).

<sup>27</sup> Provisionally winning bids are bids that would become final winning bids if the auction were to close in that given round. They are discussed in Section IV.C.6. (Provisionally Winning Bids). Proactive waivers are described in Section IV.C.3. (Activity Rule Waivers and Reducing Eligibility), and bid withdrawals are described in Section IV.C.8. (Bid Withdrawal) below.

absent any other bidding activity, a bidder placing a new bid on a license that does not already have a provisionally winning bid (an “FCC-held” license) would not keep the auction open under this modified stopping rule.

- c) Use a modified version of the simultaneous stopping rule that combines (a) and (b) above.
- d) Declare that the auction will end after a specified number of additional rounds (“special stopping rule”). If the Bureau invokes this special stopping rule, it will accept bids in the specified final round(s), after which the auction will close.
- e) Keep the auction open even if no bidder places any new bids, applies a waiver, or withdraws (if withdrawals are permitted) any provisionally winning bids. In this event, the effect will be the same as if a bidder had applied a waiver. The activity rule will apply as usual, and a bidder with insufficient activity will either lose bidding eligibility or use a waiver.

35. We propose to exercise these options only in certain circumstances, for example, where the auction is proceeding unusually slowly or quickly, there is minimal overall bidding activity, or it appears likely that the auction will not close within a reasonable period of time or will close prematurely. Before exercising these options, we are likely to attempt to change the pace of the auction by, for example, changing the number of bidding rounds per day and/or the minimum acceptable bids. We propose to retain the discretion to exercise any of these options with or without prior announcement during the auction. We seek comment on these proposals.

### 3. Information Relating to Auction Delay, Suspension, or Cancellation

36. For Auction 96, we propose that the Bureau may delay, suspend, or cancel the auction in the event of a natural disaster, technical obstacle, administrative or weather necessity, evidence of an auction security breach or unlawful bidding activity, or for any other reason that affects the fair and efficient conduct of competitive bidding.<sup>28</sup> We will notify participants of any such delay, suspension or cancellation by public notice and/or through the FCC Auction System’s announcement function. If the auction is delayed or suspended, we may, in our sole discretion, elect to resume the auction starting from the beginning of the current round or from some previous round, or cancel the auction in its entirety. Network interruption may cause the Bureau to delay or suspend the auction. We emphasize that we will exercise this authority solely at our discretion, and note that the exercise of our authority in this regard is not intended to be a substitute for situations in which bidders may wish to apply their activity rule waivers. We seek comment on this proposal.

## C. Auction Procedures

### 1. Upfront Payments and Bidding Eligibility

37. The Bureau has delegated authority and discretion to determine an appropriate upfront payment for each license being auctioned, taking into account such factors as the efficiency of the auction process and the potential value of similar licenses.<sup>29</sup> An upfront payment is a refundable deposit made by each bidder to establish its eligibility to bid on licenses. Upfront payments that are related to the specific licenses being auctioned protect against frivolous or insincere bidding and provide the Commission with a source of funds from which to collect payments owed at the close of the auction.<sup>30</sup> For Auction 96, we propose to make the upfront payments equal to the proposed minimum opening bids, which are

<sup>28</sup> 47 C.F.R. § 1.2104(i).

<sup>29</sup> See *Part 1 Order*, 12 FCC Rcd at 5697-98 ¶ 16. See also *Part 1 Third Report and Order*, 13 FCC Rcd at 425 ¶ 86; *Second Report and Order*, 9 FCC Rcd 2377-79 ¶¶ 169-75.

<sup>30</sup> See *Second Report and Order*, 9 FCC Rcd at 2377-79 ¶¶ 169-76.

established as described in Section IV.C.4., below. The upfront payments for each license are set forth in Attachment A to this Public Notice. We seek comment on this proposal.

38. The Bureau further proposes that the amount of the upfront payment submitted by a bidder will determine its initial bidding eligibility in bidding units. We propose to assign each license a specific number of bidding units, equal to one bidding unit per dollar of the upfront payment proposed for the license. The specific bidding units for each license are set forth in Attachment A to this Public Notice. The number of bidding units for a given license is fixed and does not change during the auction as prices change. A bidder's upfront payment is not attributed to specific licenses or packages of licenses. Rather, a bidder may place bids on any combination of the licenses it selected on its short-form application (FCC Form 175), provided that the total number of bidding units associated with those licenses does not exceed its current eligibility. Table 2 below provides an example of how this process operates. A bidder cannot increase its eligibility during the auction; it can only maintain its eligibility or decrease its eligibility. Thus, in calculating its upfront payment amount and hence its initial bidding eligibility, an applicant must determine the maximum number of bidding units on which it may wish to bid (or hold provisionally winning bids) in any single round and submit an upfront payment amount covering that total number of bidding units. We request comment on these proposals.

**Table 2: Upfront Payments, Bidding Eligibility, and Bidding Flexibility Example**

License	Market Name	Bidding Units	Upfront Payment
AH-BEA009-H	State College PA	212,000	\$212,000
AH-BEA068-H	Champaign-Urbana IL	109,000	\$109,000

If a bidder wishes to bid on both licenses in a round, it must have selected both on its FCC Form 175 and purchased at least 321,000 bidding units (212,000 + 109,000) of bidding eligibility. If a bidder only wishes to bid on one, but not both, purchasing 212,000 bidding units would meet the eligibility requirement for either license. The bidder would be able to bid on either license, but not both at the same time. If the bidder purchased only 109,000 bidding units, it would have enough eligibility for the Champaign-Urbana license but not the State College license.

39. Under HPB procedures, the number of bidding units for a package equals the sum of the bidding units for the licenses in that package. The bidding units for a license and a package including that license will be counted only once in determining bidding eligibility. Thus, when an applicant calculates its upfront payment amount by determining the maximum number of bidding units on which it may wish to bid in any single round (in addition to its current provisionally winning bids), it should count the bidding units associated with each license only once even if it may wish to bid on an individual license and a package containing that license. We seek comment on these proposals.

## 2. Activity Rule

40. In order to ensure that an SMR auction closes within a reasonable period of time, an activity rule requires bidders to bid actively throughout the auction, rather than wait until late in the auction before participating. A bidder's activity in a round will be the sum of the bidding units associated with any licenses upon which it places bids during the current round and the bidding units associated with any licenses for which it holds provisionally winning bids placed in previous rounds. The bidding units associated with a given license will be counted only once in a bidder's activity calculation for the round, even if the bidder places multiple bids including the license—for example, places a bid on a license and a bid on a package including that license. Bidders are required to be active on a specific percentage of their current bidding eligibility during each round of the auction. Failure to maintain the requisite activity level

will result in the use of an activity rule waiver, if any remain, or a reduction in the bidder's eligibility, possibly curtailing or eliminating the bidder's ability to place additional bids in the auction.<sup>31</sup>

41. The Bureau proposes to divide the auction into at least two stages, each characterized by a different activity requirement.<sup>32</sup> The auction will start in Stage One. The Bureau proposes to advance the auction to the next stage by announcement during the auction. In exercising this discretion, the Bureau will consider a variety of measures of auction activity, including but not limited to the percentage of bidding units associated with licenses on which there are new bids,<sup>33</sup> the number of new bids, and the increase in revenue. The Bureau seeks comment on these proposals.

42. The Bureau proposes the following activity requirements, while noting again that the Bureau retains the discretion to change stages unilaterally by announcement during the auction:

**Stage One:** In each round of the first stage of the auction, a bidder desiring to maintain its current bidding eligibility is required to be active on bidding units associated with licenses representing at least 80 percent of its current bidding eligibility, counting the bidding units associated with a bid on an individual license and a package including that license only once. Failure to maintain the required activity level will result in the use of an activity rule waiver or a reduction in the bidder's bidding eligibility for the next round of bidding. During Stage One, a bidder's reduced eligibility for the next round will be calculated by multiplying the bidder's current round activity by five-fourths (5/4).

**Stage Two:** In each round of the second stage, a bidder desiring to maintain its current bidding eligibility is required to be active on 95 percent of its current bidding eligibility. Failure to maintain the required activity level will result in the use of an activity rule waiver or a reduction in the bidder's bidding eligibility for the next round of bidding. During Stage Two, a bidder's reduced eligibility for the next round will be calculated by multiplying the bidder's current round activity by twenty-nineteenths (20/19).

43. The Bureau requests comment on these activity requirements. Under this proposal, the Bureau will retain the discretion to change the activity requirements during the auction. For example, the Bureau could decide to add an additional stage with a higher activity requirement, not to transition to Stage Two if it believes the auction is progressing satisfactorily under the Stage One activity requirement, or to transition to Stage Two with an activity requirement that is higher or lower than the 95 percent proposed herein.<sup>34</sup> If the Bureau exercises this discretion, it will alert bidders by announcement in the FCC Auction System.

### 3. Activity Rule Waivers and Reducing Eligibility

44. When a bidder's eligibility in the current round is below the required minimum level, it may preserve its current level of eligibility through an activity rule waiver. An activity rule waiver applies to an entire round of bidding, not to a particular bid. Activity rule waivers, which can be either

<sup>31</sup> See Section IV.C.3. (Activity Rule Waivers and Reducing Eligibility) below.

<sup>32</sup> See 47 C.F.R. § 1.2104(f).

<sup>33</sup> For example, when monitoring activity for determining when to change stages, the Bureau may consider the percentage of bidding units of the licenses receiving new provisionally winning bids, excluding any FCC-held licenses. In past auctions, the Bureau has generally—but not always—changed stages when this measure was approximately twenty percent or below for three consecutive rounds of bidding.

<sup>34</sup> If the Bureau implements stages with activity requirements other than the ones listed above, a bidder's reduced eligibility for the next round will be calculated by multiplying the bidder's current round activity by the reciprocal of the activity requirement. For example, with a 98 percent activity requirement, the bidder's current round activity would be multiplied by 50/49; with a 100 percent activity requirement, the bidder's current round activity would become its bidding eligibility (current round activity would be multiplied by 1/1).

proactive or automatic, are principally a mechanism for a bidder to avoid the loss of bidding eligibility in the event that exigent circumstances prevent it from bidding in a particular round.

45. The FCC Auction System assumes that a bidder that does not meet the activity requirement would prefer to use an activity rule waiver (if available) rather than lose bidding eligibility. Therefore, the system will automatically apply a waiver at the end of any bidding round in which a bidder's activity level is below the minimum required unless (1) the bidder has no activity rule waivers remaining, or (2) the bidder overrides the automatic application of a waiver by reducing eligibility, thereby meeting the activity requirement. If a bidder has no waivers remaining and does not satisfy the required activity level, the bidder's current eligibility will be permanently reduced, possibly curtailing or eliminating the ability to place additional bids in the auction.

46. A bidder with insufficient activity may wish to reduce its bidding eligibility rather than use an activity rule waiver. If so, the bidder must affirmatively override the automatic waiver mechanism during the bidding round by using the "reduce eligibility" function in the FCC Auction System. In this case, the bidder's eligibility is permanently reduced to bring it into compliance with the activity rule described above. Reducing eligibility is an irreversible action; once eligibility has been reduced, a bidder will not be permitted to regain its lost bidding eligibility, even if the round has not yet closed.

47. Under the proposed simultaneous stopping rule, a bidder may apply an activity rule waiver proactively as a means to keep the auction open without placing a bid. If a bidder proactively applies an activity rule waiver (using the "apply waiver" function in the FCC Auction System) during a bidding round in which no bids are placed or withdrawn, the auction will remain open and the bidder's eligibility will be preserved. An automatic waiver applied by the FCC Auction System in a round in which there are no new bids, withdrawals (if permitted), or proactive waivers will not keep the auction open. A bidder cannot apply a proactive waiver after bidding in a round, and applying a proactive waiver will preclude it from placing any bids in that round.<sup>35</sup> Applying a waiver is irreversible; once a proactive waiver is submitted, it cannot be unsubmitted, even if the round has not yet closed.

48. Consistent with recent Commission auctions, the Bureau proposes that each bidder in Auction 96 be provided with a total of three activity rule waivers that may be used as set forth above at the bidder's discretion during the course of the auction. The Bureau seeks comment on this proposal.

#### **4. Reserve Price and Minimum Opening Bids**

49. Section 309(j) calls upon the Commission to prescribe methods for establishing a reasonable reserve price or a minimum opening bid amount when Commission licenses are subject to auction, unless the Commission determines that a reserve price or minimum opening bid amount is not in the public interest.<sup>36</sup> Consistent with this mandate, the Commission has directed the Bureau to seek comment on the use of a minimum opening bid amount and/or reserve price prior to the start of each auction.<sup>37</sup>

50. Normally, a reserve price is an absolute minimum price below which an item or items will not be sold in a given auction. If a reserve price is utilized, the specific amount of the reserve price may be disclosed or undisclosed.<sup>38</sup> A minimum opening bid, on the other hand, is the minimum bid price set at the beginning of the auction below which no bids are accepted. It is generally used to accelerate the competitive bidding process. It is possible for the minimum opening bid and the reserve price to be the same amount.

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<sup>35</sup> In general, once a bidder places a proactive waiver during a round, the FCC Auction System does not allow the bidder to take any other bidding-related action in that round, including placing bids or withdrawing bids.

<sup>36</sup> 47 U.S.C. § 309(j)(4)(F). See also 47 C.F.R. § 1.2104(c) and (d).

<sup>37</sup> *Part 1 Third Report and Order*, 13 FCC Rcd at 454-56 ¶ 141. See also 47 C.F.R. § 1.2104(c).

<sup>38</sup> See 47 C.F.R. § 1.2104(c). See also *Part 1 Third Report and Order*, 13 FCC Rcd at 455 ¶ 140.

51. Among other factors the Bureau must consider in deciding whether to employ either or both of these mechanisms is the amount of spectrum being auctioned, levels of incumbency, the availability of technology to provide service, the size of the geographic service areas, the extent of interference with other spectrum bands, and any other relevant factors that could have an impact on the spectrum being auctioned.<sup>39</sup>

**a. Reserve Price**

52. The Commission is statutorily obliged to consider and balance a variety of public interests and objectives when establishing service rules and licensing procedures with respect to the public spectrum resource. These objectives include promoting recovery for the public a portion of the value of that resource.<sup>40</sup> With respect to the H Block licenses being offered in Auction 96, the Spectrum Act specifically directs that proceeds from an auction of H Block spectrum be deposited into the Public Safety Trust Fund and be used for, among other things, funding (or reimbursement to the U.S. Treasury for the funding) of the nationwide, interoperable public safety broadband network by the First Responder Network Authority.<sup>41</sup> In view of the various public interest objectives we must consider, we propose to establish a reserve price for the H Block licenses offered in Auction 96. We further propose to utilize an aggregate reserve price based on the aggregate of the gross bids for the H Block licenses, rather than license-by-license reserve prices. We seek comment on these proposals.

53. We seek comment on the implementation of a reserve price. What factors should we consider in determining the amount of the reserve? Should we disclose the amount of the reserve price publicly prior to the auction, or should the reserve price amount remain undisclosed? We also seek comment on how to evaluate unsold licenses in determining whether an aggregate reserve price has been met. We encourage commenters to address any additional specific issues related to the use of reserve prices. We ask that commenters describe in detail the specific factors that lead them to their conclusions.

**b. Minimum Opening Bids**

54. In light of section 309(j)'s requirements, the Bureau proposes to establish minimum opening bid amounts for Auction 96. The Bureau believes a minimum opening bid amount, which has been used in other auctions, is an effective bidding tool for accelerating the competitive bidding process.<sup>42</sup>

55. For Auction 96 the Bureau proposes to calculate minimum opening bid amounts on a license-by-license basis using a formula based on bandwidth and license area population,<sup>43</sup> similar to our approach in many previous spectrum auctions. We propose to use a calculation based on \$0.07 per megahertz of bandwidth per population (per "MHz-pop"). Additionally, we propose to incorporate pricing information from previous auctions to tailor the results of our calculation to the relative prices for each EA. For this we propose to create an index of the relative price of each EA using the winning bid amounts for the EA licenses of paired spectrum from Auctions 66 and 73. This modification to the use of

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<sup>39</sup> *Part 1 Third Report and Order*, 13 FCC Rcd at 454-56 ¶ 141.

<sup>40</sup> 47 U.S.C. § 309(j)(3)(C).

<sup>41</sup> Spectrum Act, §§ 6401(c)(4), 6413, codified at 47 U.S.C. §§ 309(j)(8)(F), 1457; *see also* Spectrum Act, § 6202(a), codified at 47 U.S.C. § 1422(a).

<sup>42</sup> *See, e.g.*, Auction of 800 MHz SMR Upper 10 MHz Band, Minimum Opening Bids or Reserve Prices, *Order*, DA 97-2147, 12 FCC Rcd 16354 (1997); Auction of the Phase II 220 MHz Service Licenses, Auction Notice and Filing Requirements for 908 Licenses Consisting of Economic Area (EA), Economic Area Grouping (EAG), and Nationwide Licenses, Scheduled for September 15, 1998, Minimum Opening Bids and Other Procedural Issues, *Public Notice*, DA 98-1010, 13 FCC Rcd 16445 (1998).

<sup>43</sup> All population figures are from the 2010 U.S. Census, U.S. Department of Commerce, Bureau of the Census. *See* Census 2010 Summary File 1 (SF1) and Island Areas: 2010 Census Summary File (covering the U.S. Virgin Islands, Guam, the Northern Mariana Islands, and American Samoa).

\$0.07 per MHz-pop results in amounts ranging from less than \$0.01 per MHz-pop to \$0.16 per MHz-pop. We further propose a minimum of \$1000 per license. For the license covering the Gulf of Mexico we propose to set the minimum opening bid at \$20,000. The minimum opening bid amount for a package will equal the sum of the minimum opening bid amounts for all of the licenses in that package.

56. The proposed minimum opening bid amount for each H Block license available in Auction 96, calculated pursuant to the procedures described above, is set forth in Attachment A. For packages we propose that the minimum opening bid amount of a package will equal the sum of the minimum opening bid amounts for all of the licenses in that package.

57. The Bureau seeks comment on all of the above proposals concerning minimum opening bids. If commenters believe that these minimum opening bid amounts will result in unsold licenses, or are not reasonable amounts, they should explain why this is so and comment on the desirability of an alternative approach. If a commenter requests a lower minimum opening bid amount for a specific license, it should justify the requested change in detail. If commenters disagree with our proposed use of \$0.07 per MHz-pop, our approach to tailoring minimum opening bid amounts to account for relative prices among the EAs in past auctions, or our selection of which past results to consider, we ask commenters to support their claims with valuation analyses and suggested minimum opening bid amount levels or formulas.

58. In establishing minimum opening bid amounts, we particularly seek comment on factors that could reasonably have an impact on valuation of the licenses being auctioned, including the amount of spectrum being auctioned, levels of incumbency, the availability of technology to provide service, the size of the service areas, the size of the geographic service areas, issues of interference with other spectrum bands and any other relevant factors. The Bureau also seeks comment on whether, consistent with section 309(j), the public interest would be served by having no minimum opening bid amount.

59. Commenters may also wish to address the general role of minimum opening bids in managing the pace of the auction. For example, commenters could compare using minimum opening bids—e.g., by setting higher minimum opening bids to reduce the number of rounds it takes licenses to reach their final prices—to other means of controlling auction pace, such as changes to bidding schedules or activity requirements.

## 5. Bid Amounts

60. The Bureau proposes that, in each round, an eligible bidder will be able to place a bid on a given license or package using one or more pre-defined bid amounts.<sup>44</sup> Under this proposal, the FCC Auction System interface will list the acceptable bid amounts for each license and package. The Bureau proposes to calculate bid amounts as described below.

### a. Minimum Acceptable Bids

61. The first of the acceptable bid amounts is called the minimum acceptable bid amount. The minimum acceptable bid amount for a license will be equal to its minimum opening bid amount until there is a provisionally winning bid on the license itself or on a package that includes the license. The minimum acceptable bid amount for a package will be the sum of the minimum acceptable bid amounts for the licenses in the package. The Bureau proposes to calculate minimum acceptable bids based on “current price estimates” and an activity-based formula.

62. *Current Price Estimates.* After there is a provisionally winning bid covering a license, the FCC Auction System will determine a current price estimate (“CPE”) for each license in each round as a basis for calculating minimum acceptable bids. The CPE is the provisionally winning bid for the license, or—if the provisionally winning bid covering the license is a package bid—a proxy for an

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<sup>44</sup> Bidders must have sufficient eligibility to place a bid on the particular license. See Section IV.C.1. (Upfront Payments and Bidding Eligibility) above.

individual license bid calculated as a share of the provisionally winning package bid.<sup>45</sup> The proposed mechanism for determining CPEs in an HPB auction format is described in more detail in Attachment B.

63. *Activity-Based Formula.* Once CPEs are calculated, minimum acceptable bids are then determined for each license as the amount of the CPE plus a percentage of the CPE. The percentage is calculated using the activity-based formula described below. In general, the percentage will be higher when many bidders are bidding on a license, or on a package containing a license, than when few bidders are bidding on a license.

64. The percentage of the CPE used to establish the minimum acceptable bid amount is calculated based on an activity index at the end of each round. The activity index is a weighted average of (a) the number of distinct bidders placing a bid on the license, including package bids, in that round, and (b) the activity index from the prior round. Specifically, the activity index is equal to a weighting factor times the number of bidders placing a bid covering the license in the most recent bidding round plus one minus the weighting factor times the activity index from the prior round.<sup>46</sup> The additional percentage is determined as one plus the activity index times a minimum percentage amount, with the result not to exceed a given maximum. The additional percentage is then multiplied by the CPE amount to obtain the minimum acceptable bid for the next round.<sup>47</sup> The Bureau proposes initially to set the weighting factor at 0.5, the minimum percentage at 0.1 (10%), and the maximum percentage at 0.25 (25%). Hence, at these initial settings, the minimum acceptable bid for a license will be between ten percent and twenty-five percent higher than the CPE, depending upon the bidding activity covering the license. Equations and examples are shown in Attachment C. We seek comment on whether to use this activity-based formula or a different approach. For example, should we use a fixed percentage above the CPE?

#### b. Additional Bid Amounts

65. The Bureau proposes to calculate any additional bid amounts using the minimum acceptable bid amount and a bid increment percentage—more specifically, by multiplying the minimum acceptable bid by one plus successively higher multiples of the bid increment percentage. If, for example, the bid increment percentage is 5 percent, the calculation of the first additional acceptable bid amount is (minimum acceptable bid amount) \* (1 + 0.05), rounded, or (minimum acceptable bid amount) \* 1.05, rounded; the second additional acceptable bid amount equals the minimum acceptable bid amount times one plus two times the bid increment percentage, rounded, or (minimum acceptable bid amount) \* 1.10, rounded; etc. The Bureau will round the results using the Commission's standard rounding procedures for auctions.<sup>48</sup> The Bureau proposes initially to set the bid increment percentage at 5 percent.

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<sup>45</sup> If a bid on an individual license is provisionally winning, the CPE for that license will be the provisionally winning bid amount. If a package bid is provisionally winning, the CPEs for individual licenses in the package will be constructed by scaling up the bids on individual licenses so that the sum of the license CPEs equals the provisionally winning package bid. Bids are scaled up by adding "shares" to the highest bid received so far in the auction for each license in the package. These shares are proportional to the bidding units associated with each license relative to the total number of bidding units in the package. See Goeree, J. K. and C. A. Holt, "Hierarchical Package Bidding: A Paper & Pencil Combinatorial Auction," *Games and Economic Behavior* 70(1), September 2010, 146-169.

<sup>46</sup> For Round 1 calculations, because there is no prior round (i.e., no round 0), the activity index from the prior round is set at 0.

<sup>47</sup> The Bureau will round the result using our standard rounding procedures: results above \$10,000 are rounded to the nearest \$1,000; results below \$10,000 but above \$1,000 are rounded to the nearest \$100; and results below \$1,000 are rounded to the nearest \$10.

<sup>48</sup> See note 47 (concerning rounding), above.



66. For Auction 96 the Bureau proposes to begin the auction with three acceptable bid amounts per license (the minimum acceptable bid amount and two additional bid amounts) and one acceptable bid amount per package (the minimum acceptable bid amount and no additional bid amounts). More acceptable bidding amounts are proposed for licenses than for packages to help ensure that bids on individual licenses or on smaller packages can compete with bids on larger packages, even when there may not be active competition on all the separate components of the large package.

**c. Bid Amount Changes**

67. The Bureau retains the discretion to change the minimum acceptable bid amounts, the additional bid amounts, the number of acceptable bid amounts, and the parameters of the formulas used to calculate minimum acceptable bid amounts and additional bid amounts if the Bureau determines that circumstances so dictate. Further, the Bureau retains the discretion to do so on a license-by-license and package-by-package basis. The Bureau also retains the discretion to limit (a) the amount by which a minimum acceptable bid for a license may increase compared with the corresponding CPE, and (b) the amount by which an additional bid amount may increase compared with the immediately preceding acceptable bid amount. For example, the Bureau could set a \$10 million limit on increases in minimum acceptable bid amounts over CPEs. Thus, if the activity-based formula calculates a minimum acceptable bid amount that is \$20 million higher than the CPE on a license, the minimum acceptable bid amount would instead be capped at \$10 million above the CPE. The Bureau seeks comment on the circumstances under which we should employ such a limit, factors we should consider when determining the dollar amount of the limit, and the tradeoffs in setting such a limit or changing other parameters—such as changing the minimum acceptable bid percentage, the bid increment percentage, or the number of acceptable bid amounts. If the Bureau exercises this discretion, it will alert bidders by announcement in the FCC Auction System.

68. The Bureau seeks comment on the above proposals. If commenters disagree with the proposal to begin the auction with three acceptable bid amounts per license and one per package, they should suggest an alternative number of acceptable bid amounts to use at the beginning of the auction, an alternative number to use later in the auction, and whether the same number of bid amounts should be used for both licenses and packages. Commenters may wish to address the role of the minimum acceptable bids and the number of acceptable bid amounts in managing the pace of the auction and the tradeoffs in managing auction pace by changing the bidding schedule, activity requirements, or bid amounts, or by using other means.

**6. Provisionally Winning Bids**

69. Provisionally winning bids are bids that would become final winning bids if the auction were to close in that given round. At the end of a bidding round, the FCC Auction System determines which combination of individual and package bids together yields the highest aggregate gross bid amount, taking into consideration each bidder's highest bid on each license or package submitted up to that point in the auction.<sup>49</sup> These bids become the provisionally winning bids for the round.

70. If identical high bid amounts are submitted on a license or package in any given round (i.e., tied bids), the FCC Auction System will use a random number generator to select a single provisionally winning bid from among the tied bids. (The Auction System assigns a random number to each bid when the bid is entered. The tied bid with the highest random number wins the tiebreaker.<sup>50</sup>)

<sup>49</sup> Consequently, an individual license or package bid that does not become a provisionally winning bid at the conclusion of the round in which it was placed may become a provisionally winning bid at the conclusion of a subsequent round. This may occur even if the bidder does not have the bidding eligibility to cover the newly-provisionally winning bid, a situation that would not occur under the FCC's usual SMR auction procedures. In such cases, bidding eligibility will not be increased.

<sup>50</sup> With package bidding, in the event of ties among bids that generate the highest aggregate gross bid amount, the set of bids with the highest sum of random numbers becomes provisionally winning.

The remaining bidders, as well as the provisionally winning bidder, can submit higher bids in subsequent rounds. However, if the auction were to end with no other bids being placed, the winning bidder would be the one that placed the provisionally winning bid.

71. The set of provisionally winning bids is determined after every round in which new bids are submitted. As stated above, the provisionally winning bids at the end of the auction become winning bids provided that any applicable reserve prices have been met. We remind bidders that provisionally winning bids count toward activity for purposes of the activity rule.<sup>51</sup>

#### **7. Bid Removal**

72. For Auction 96, the Bureau proposes the following bid removal procedures. Before the close of a bidding round, a bidder has the option of removing any bid placed in that round. By removing a selected bid in the FCC Auction System, a bidder may effectively “undo” any bid placed within that round. Once a round closes, a bidder may no longer remove a bid. We seek comment on this bid removal proposal.

#### **8. Bid Withdrawal**

73. Under our proposal to use SMR with HPB procedures, the Bureau proposes not to permit any bids, provisionally winning or otherwise, to be dropped or withdrawn from consideration in Auction 96. The benefits that bidders may realize from withdrawing bids in a typical SMR auction are minimized under the proposed package bidding format. In addition, in an SMR auction with package bidding there are significant risks associated with bid withdrawals that are not present in an SMR auction without package bidding. In the *Part 1 Third Report and Order*, the Commission explained that under its typical SMR auction format without package bidding, allowing bid withdrawals facilitates efficient aggregation of licenses and the pursuit of backup strategies as information becomes available during the course of an auction.<sup>52</sup> The Commission noted, however, that in some instances bidders may seek to withdraw bids for improper reasons. The Bureau, therefore, has discretion in managing the auction to limit the number of withdrawals to prevent any bidding abuses.

74. Under the HPB auction format that we propose for Auction 96, the potential benefits of withdrawn or dropped bids in facilitating aggregations are far lower than they would be in a typical SMR auction. While the predetermined packages may not coincide with the “all or nothing” aggregation needs of all bidders, the hierarchical packages should significantly reduce the overall risk that bidders will win only some of the licenses in a desired set. Therefore, to the extent that package bids allow bidders to avoid such risk, withdrawals are less useful to bidders. Further, because the licenses available in Auction 96 consist of a single frequency block, bidders will not need to use withdrawals to pursue backup strategies in other blocks, as they sometimes have in other Commission spectrum auctions conducted with SMR procedures. At the same time, in an auction with package bidding, dropping bids from consideration can have negative effects that would not arise in a typical SMR auction. Withdrawals by one bidder on licenses subject to package bidding can be more disruptive to the bidding strategies of others than withdrawals on licenses not subject to package bidding. In a non-package bidding auction, whether a bid on a license becomes provisionally winning depends only upon the bids submitted for that license. In contrast, whether a bid becomes provisionally winning on a license subject to package bidding depends upon the bids submitted for that license, the bids submitted for the packages containing that license, and the bids submitted for other licenses in those packages. Consequently, a withdrawn bid on a license subject to package bidding has the potential to alter the composition of the provisionally winning set of bids, and may adversely affect other bidders. Moreover, because bidders interested in single licenses or smaller packages need their bids to combine with the bids by other bidders in order to be competitive with bids on larger packages, having even non-provisionally winning bids withdrawn from

<sup>51</sup> See Section IV.C.2. (Activity Rule) above.

<sup>52</sup> *Part 1 Third Report and Order*, 13 FCC Rcd at 459-60 ¶ 150.

consideration can adversely affect their ability to compete. In addition, because CPEs for a license depend in part on package bids including the license, the process for determining current price estimates is more stable—and less subject to undesirable manipulation—if bids cannot be withdrawn from consideration. Hence, because of the potential under the proposed package bidding auction format for withdrawn bids, provisionally winning or not, to affect auction dynamics and the bidding strategies of other bidders, we propose not to allow any bids to be withdrawn after the round in which they were placed has closed.

75. We seek comment on this proposal not to allow bids to be withdrawn or removed from consideration under our proposed HPB auction procedures. If bidders disagree with this proposal, we ask them to support their arguments by taking into account the structure of the H Block inventory, the impact on auction dynamics and the pricing mechanism, and the effects on the bidding strategies of other bidders. In the event we do not utilize HPB procedures with an SMR format, should we allow bid withdrawals? In the past, when we have allowed bid withdrawals in SMR auctions, we have typically limited withdrawn bids to a maximum of three rounds, and sometimes set a lower limit on the number of withdrawal rounds. What would be the appropriate number of rounds in Auction 96 if we permit bid withdrawals?

#### **D. Post-Auction Payments**

##### **1. Apportioning Package Bids**

76. In package bidding, when a bidder places an all-or-nothing bid on a package of licenses, there will be no identifiable bid amounts on the individual licenses that compose the package. However, the Commission's competitive bidding rules and procedures assume that the amount of each bid on an individual license always is known. For example, rules for calculating the amount of small business, new entrant, or tribal land bidding credits presume that the winning bid on the license is known.<sup>53</sup> Similarly, in determining the amount of a default or withdrawal payment, which involves a comparison between the withdrawing or defaulting bidder's bid and a subsequent bid, the rules assume that there are bid amounts for individual licenses.<sup>54</sup> Accordingly, the Commission adopted a rule providing that, in advance of each auction with package bidding, the Commission shall establish a methodology for determining how to estimate the price or bid on an individual license included in a package of licenses.<sup>55</sup>

77. We propose that under our HPB procedures, we will use final CPEs as an estimate of the price or bid on an individual license for the purpose of later apportioning package bids. Therefore, when regulatory calculations require individual license bid amounts, we will divide the package bid amount among the licenses composing the package in proportion to the final round CPEs for the licenses. We seek comment on this proposal.

##### **2. Interim Withdrawal Payment Percentage**

78. In conjunction with our proposal to use HPB procedures, we seek comment on not permitting any bids, provisionally winning or otherwise, to be withdrawn or dropped from consideration in Auction 96. Hence, under our proposal, we would have no need to determine an appropriate interim withdrawal payment percentage.

79. The Bureau seeks comment, however, on the appropriate interim withdrawal payment percentage to apply if we allow withdrawals under procedures for an SMR auction without package bidding for Auction 96. Specifically, we seek comment on the percentage of a withdrawn bid that should

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<sup>53</sup> 47 C.F.R. § 1.2110(f). Knowing the size of a small business bidding credit on an individual license may be necessary in order to calculate a small business bidding credit unjust enrichment obligation on a license won as part of a package.

<sup>54</sup> 47 C.F.R. § 1.2104(g).

<sup>55</sup> See 47 C.F.R. § 1.2103(b), as amended by the *CSEA/Part 1 Report and Order*. *CSEA/Part 1 Report and Order*, 21 FCC Rcd at 906 ¶ 39.

be assessed as an interim withdrawal payment in the event that a final withdrawal payment cannot be determined at the close of the auction. In general, the Commission's rules provide that a bidder that withdraws a bid during an auction is subject to a withdrawal payment equal to the difference between the amount of the withdrawn bid and the amount of the winning bid in the same or subsequent auction(s).<sup>56</sup> If a bid is withdrawn and no subsequent higher bid is placed and/or the license is not won in the same auction, the final withdrawal payment cannot be calculated until after the close of a subsequent auction in which a higher bid for the license (or the equivalent to the license) is placed or the license is won.<sup>57</sup> When that final payment cannot yet be calculated, the bidder responsible for the withdrawn bid is assessed an interim bid withdrawal payment, which will be applied toward any final bid withdrawal payment that is ultimately assessed.<sup>58</sup> Section 1.2104(g)(1) of the Commission's rules requires that the percentage of the withdrawn bid to be assessed as an interim bid withdrawal payment be between three percent and twenty percent and that it be set in advance of the auction.<sup>59</sup>

80. The Commission has determined that the level of the interim withdrawal payment in a particular auction will be based on the nature of the service and the inventory of the licenses being offered.<sup>60</sup> The Commission has noted that it may impose a higher interim withdrawal payment percentage to deter the anti-competitive use of withdrawals when, for example, bidders likely will not need to aggregate the licenses being offered in the auction, such as when few licenses are offered that are on adjacent frequencies or in adjacent areas, or when there are few synergies to be captured by combining licenses.<sup>61</sup> However, as we have discussed in connection with our proposal to use package bidding for Auction 96, we believe that there may be significant benefits for some bidders from aggregating EA licenses. Hence, if we do not use package bidding, withdrawals may be useful to protect bidders against incomplete aggregations in Auction 96. Balancing the potential need for bidders to use withdrawals to avoid winning incomplete combinations of licenses with the Bureau's interest in deterring undesirable strategic use of withdrawals, the Bureau proposes a percentage below the maximum twenty percent permitted under the current rules but above the three percent previously provided by the Commission's rules. Specifically, the Bureau proposes to establish an interim bid withdrawal payment of fifteen percent of the withdrawn bid for this auction. The Bureau seeks comment on this proposal.

### 3. Additional Default Payment Percentage

81. Any winning bidder that defaults or is disqualified after the close of an auction (i.e., fails to remit the required down payment within the prescribed period of time, fails to submit a timely long-form application, fails to make full and timely final payment, or is otherwise disqualified) is liable for a default payment under 47 C.F.R. § 1.2104(g)(2). This payment consists of a deficiency payment, equal to the difference between the amount of the Auction 96 bidder's winning bid and the amount of the winning bid the next time a license covering the same spectrum is won in an auction, plus an additional payment equal to a percentage of the defaulter's bid or of the subsequent winning bid, whichever is less.

82. The percentage of the bid that a defaulting bidder must pay in addition to the deficiency will depend on the auction format ultimately chosen for a particular auction. In auctions with package

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<sup>56</sup> See 47 C.F.R. § 1.2104(g)(1). The withdrawal payment amount is deducted from any upfront payments or down payments that the withdrawing bidder has deposited with the Commission. No withdrawal payment is assessed for a withdrawn bid if either the subsequent winning bid or any of the intervening subsequent withdrawn bids equals or exceeds that withdrawn bid. *Id.*

<sup>57</sup> *Id.*

<sup>58</sup> *Id.*

<sup>59</sup> See *id.*, as amended by *CSEA/Part 1 Report and Order*, 21 FCC Rcd at 901-04 ¶¶ 27-32.

<sup>60</sup> See *CSEA/Part 1 Report and Order*, 21 FCC Rcd at 903-04 ¶ 31.

<sup>61</sup> See *id.* at 904 n.57.

bidding, as we propose to use in Auction 96, the additional payment is set, pursuant to section 1.2104(g)(2)(ii), at 25 percent of the applicable bid. This higher level reflects the fact that a defaulted winning bid in an auction with package bidding may affect multiple licenses and perhaps all of the other licenses being offered.<sup>62</sup>

83. In non-package auctions, the amount can range from three percent up to a maximum of twenty percent, established in advance of the auction and based on the nature of the service and the inventory of the licenses being offered,<sup>63</sup> and so, we seek comment on an appropriate additional default payment percentage in the event we do not conduct Auction 96 with package bidding procedures. As noted in the *CSEA/Part 1 Report and Order*, defaults weaken the integrity of the auction process and may impede the deployment of service to the public, and an additional default payment of up to 20 percent will be more effective in deterring defaults than the three percent used in some earlier auctions.<sup>64</sup> At the same time, we do not believe the detrimental effects of any defaults in Auction 96 are likely to be unusually great. Balancing these considerations, we propose to establish an additional default payment for Auction 96 of fifteen percent of the applicable bid. The Bureau seeks comment on this proposal.

## V. DEADLINES AND FILING PROCEDURES

84. Comments are due on or before August 5, 2013, and reply comments are due on or before August 16, 2013. All filings related to procedures for Auction 96 must refer to AU Docket No. 13-178. Comments may be submitted using the Commission's Electronic Comment Filing System ("ECFS") or by filing paper copies.<sup>65</sup> We strongly encourage interested parties to file comments electronically.

85. *Electronic Filers:* Comments may be filed electronically using the Internet by accessing the ECFS at <http://www.fcc.gov/cgb/ecfs>. Filers should follow the instructions provided on the website for submitting comments. In completing the transmittal screen, filers should include their full name, U.S. Postal Service mailing address, and the applicable docket number, AU Docket No. 13-178. To get filing instructions, filers should send an e-mail to [ecfs@fcc.gov](mailto:ecfs@fcc.gov), and include the following words in the body of the message: "get form." A sample form and directions will be sent in response.

86. *Paper Filers:* Parties who choose to file by paper must file an original and four copies of each filing. Filings can be sent by hand or messenger delivery, by commercial overnight courier, or by first-class or overnight U.S. Postal Service mail. All filings must be addressed to the Commission's Secretary Attn: WTB/ASAD, Office of the Secretary, Federal Communications Commission.

- The Commission's contractor will receive hand-delivered or messenger-delivered paper filings for the Commission's Secretary at the FCC Headquarters building located at 445 12<sup>th</sup> Street, SW, Room TW-A325, Washington, DC 20554. The filing hours at this location are 8:00 a.m. to 7:00 p.m. Eastern Time (ET). All hand deliveries must be held together with rubber bands or fasteners. Any envelopes must be disposed of before entering the building.
- Commercial overnight mail (other than U.S. Postal Service Express Mail and Priority Mail) must be sent to 9300 East Hampton Drive, Capitol Heights, MD 20743.
- U.S. Postal Service first-class, Express, and Priority mail must be addressed to 445 12th Street, SW, Washington DC 20554.

<sup>62</sup> 47 C.F.R. § 1.2104(g)(2)(ii); *see also* Service Rules for the 746-764 and 776-794 MHz Bands, and Revisions to Part 27 of the Commission's Rules, *Second Memorandum Opinion and Order*, 15 FCC Rcd 21070, 21079-80 ¶¶ 17-18 (2000) (adopting 25% additional default amount for package bidding auctions).

<sup>63</sup> *See CSEA/Part 1 Report and Order*, 21 FCC Rcd at 903-04 ¶¶ 30-31.

<sup>64</sup> *Id.* at 902-04 ¶ 29-31.

<sup>65</sup> *See* Electronic Filing of Documents in Rulemaking Proceedings, GC Docket No. 97-113, *Report and Order*, FCC 98-56, 13 FCC Rcd 11322 (1998).

87. *Auction 96 E-mail Box*: We also request that a copy of all comments and reply comments be submitted electronically to the following address: [auCTION96@fcc.gov](mailto:auCTION96@fcc.gov).

88. Copies of comments and reply comments will be available for public inspection between 8:00 a.m. and 4:30 p.m. ET Monday through Thursday, or 8:00 a.m. to 11:30 a.m. ET on Fridays, in the FCC Reference Information Center, Room CY-A257, 445 12th Street, SW, Washington, DC 20554, and will also be accessible through the search function on the ECFS web page at <http://www.fcc.gov/cgb/ecfs>.

89. This proceeding has been designated as a “permit-but-disclose” proceeding in accordance with the Commission’s *ex parte* rules.<sup>66</sup> Persons making oral *ex parte* presentations are reminded that memoranda summarizing the presentations must contain summaries of the substance of the presentations and not merely a listing of the subjects discussed. More than a one or two sentence description of the views and arguments presented is generally required. Other provisions pertaining to oral and written *ex parte* presentations in permit-but-disclose proceedings are set forth in section 1.1206(b) of the Commission’s rules.<sup>67</sup>

90. To request materials in accessible formats (Braille, large print, electronic files, audio format) for people with disabilities, send an e-mail to [fcc504@fcc.gov](mailto:fcc504@fcc.gov) or call the Consumer and Government Affairs Bureau at (202) 418-0530 or (202) 418-0432 (TTY).

## VI. CONTACTS

91. For further information concerning this proceeding, contact the offices listed below:

### **Broadband Division, Wireless Telecommunications Bureau**

For H Block service rule questions: Matthew Pearl (legal) or Janet Young (technical), at (202) 418-2487

### **Auctions and Spectrum Access Division, Wireless Telecommunications Bureau**

For general auction questions: Jeff Crooks at (202) 418-0660 or Linda Sanderson at (717) 338-2868

For auctions legal questions: Valerie Barrish at (202) 418-0660

### **Office of Communications Business Opportunities**

For questions concerning small business inquiries: (202) 418-0990

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<sup>66</sup> 47 C.F.R. §§ 1.1200(a), 1.1206.

<sup>67</sup> The Commission substantially revised its *ex parte* rules in 2011. These revised rules require for example, that an *ex parte* notice must be filed for each oral *ex parte* presentation, not just for those presentations that involve new information or arguments not already in the record. Further, a filer typically must submit an *ex parte* notice electronically in machine-readable format. A filer may not submit a PDF image created by scanning a paper document, except in a situation in which a word processing version of the document is not available. See Amendment of the Commission’s *Ex Parte* Rules and Other Procedural Rules, GC Docket No. 10-43, *Report and Order and Further Notice of Proposed Rulemaking*, FCC 11-11, 26 FCC Rcd 4517 (2011).

**ATTACHMENT A**

**Licenses to Be Auctioned**

This page was intentionally inserted as a placeholder for Attachment A, which is available as a separate file.

## Attachment A

DA 13-1540

## Auction 96 — H Block

License	Market Name	Market	Bandwidth (MHz)	Population *	MOB \$/MHz-pop**	Bidding Units	Upfront Payment	Minimum Opening Bid
AH-BEA001-H	Bangor ME	BEA001	10	543,767	\$0.0081	44,000	\$44,000	\$44,000
AH-BEA002-H	Portland ME	BEA002	10	784,594	\$0.0321	251,000	\$251,000	\$251,000
AH-BEA003-H	Boston-Worcester MA-NH-RI-VT	BEA003	10	8,228,930	\$0.1097	9,027,000	\$9,027,000	\$9,027,000
AH-BEA004-H	Burlington VT-NY	BEA004	10	625,288	\$0.0212	133,000	\$133,000	\$133,000
AH-BEA005-H	Albany-Schenectady-Troy NY	BEA005	10	1,222,542	\$0.0222	272,000	\$272,000	\$272,000
AH-BEA006-H	Syracuse NY-PA	BEA006	10	1,922,300	\$0.0226	434,000	\$434,000	\$434,000
AH-BEA007-H	Rochester NY-PA	BEA007	10	1,509,579	\$0.0234	353,000	\$353,000	\$353,000
AH-BEA008-H	Buffalo-Niagara Falls NY-PA	BEA008	10	1,460,584	\$0.0078	114,000	\$114,000	\$114,000
AH-BEA009-H	State College PA	BEA009	10	808,730	\$0.0263	212,000	\$212,000	\$212,000
AH-BEA010-H	NYC-Long Is. NY-NJ-CT-PA-MA-VT	BEA010	10	26,663,330	\$0.1409	37,580,000	\$37,580,000	\$37,580,000
AH-BEA011-H	Harrisburg-Lebanon-Carlisle PA	BEA011	10	1,244,058	\$0.0151	187,000	\$187,000	\$187,000
AH-BEA012-H	Phil.-Atl. City PA-NJ-DE-MD	BEA012	10	7,735,541	\$0.1203	9,306,000	\$9,306,000	\$9,306,000
AH-BEA013-H	Wash.-Balt. DC-MD-VA-WV-PA	BEA013	10	9,515,921	\$0.1132	10,774,000	\$10,774,000	\$10,774,000
AH-BEA014-H	Salisbury MD-DE-VA	BEA014	10	419,355	\$0.0063	27,000	\$27,000	\$27,000
AH-BEA015-H	Richmond-Petersburg VA	BEA015	10	1,636,548	\$0.0381	623,000	\$623,000	\$623,000
AH-BEA016-H	Staunton VA-WV	BEA016	10	360,886	\$0.0058	21,000	\$21,000	\$21,000
AH-BEA017-H	Roanoke VA-NC-WV	BEA017	10	882,328	\$0.0156	138,000	\$138,000	\$138,000
AH-BEA018-H	Greensboro-Winston-Salem NC-VA	BEA018	10	2,037,966	\$0.0482	982,000	\$982,000	\$982,000
AH-BEA019-H	Raleigh-Durham-Chapel Hill NC	BEA019	10	2,307,548	\$0.0422	974,000	\$974,000	\$974,000
AH-BEA020-H	Norfolk-Virginia Beach VA-NC	BEA020	10	1,835,870	\$0.0819	1,504,000	\$1,504,000	\$1,504,000
AH-BEA021-H	Greenville NC	BEA021	10	930,805	\$0.0079	74,000	\$74,000	\$74,000
AH-BEA022-H	Fayetteville NC	BEA022	10	571,898	\$0.0076	43,000	\$43,000	\$43,000
AH-BEA023-H	Charlotte-Gastonia NC-SC	BEA023	10	2,546,100	\$0.0431	1,098,000	\$1,098,000	\$1,098,000
AH-BEA024-H	Columbia SC	BEA024	10	1,059,254	\$0.0312	331,000	\$331,000	\$331,000
AH-BEA025-H	Wilmington NC-SC	BEA025	10	1,054,975	\$0.0469	495,000	\$495,000	\$495,000
AH-BEA026-H	Charleston-North Charleston SC	BEA026	10	703,499	\$0.0392	276,000	\$276,000	\$276,000
AH-BEA027-H	Augusta-Aiken GA-SC	BEA027	10	658,679	\$0.0100	66,000	\$66,000	\$66,000
AH-BEA028-H	Savannah GA-SC	BEA028	10	796,055	\$0.0260	207,000	\$207,000	\$207,000
AH-BEA029-H	Jacksonville FL-GA	BEA029	10	2,217,013	\$0.0594	1,317,000	\$1,317,000	\$1,317,000
AH-BEA030-H	Orlando FL	BEA030	10	4,562,642	\$0.0708	3,230,000	\$3,230,000	\$3,230,000
AH-BEA031-H	Miami-Fort Lauderdale FL	BEA031	10	6,291,880	\$0.0661	4,161,000	\$4,161,000	\$4,161,000
AH-BEA032-H	Fort Myers-Cape Coral FL	BEA032	10	940,274	\$0.0280	263,000	\$263,000	\$263,000
AH-BEA033-H	Sarasota-Bradenton FL	BEA033	10	897,121	\$0.0318	286,000	\$286,000	\$286,000
AH-BEA034-H	Tampa-St. Petersburg FL	BEA034	10	2,783,243	\$0.1524	4,243,000	\$4,243,000	\$4,243,000
AH-BEA035-H	Tallahassee FL-GA	BEA035	10	801,642	\$0.0253	203,000	\$203,000	\$203,000
AH-BEA036-H	Dothan AL-FL-GA	BEA036	10	358,396	\$0.0496	178,000	\$178,000	\$178,000
AH-BEA037-H	Albany GA	BEA037	10	496,206	\$0.0128	64,000	\$64,000	\$64,000
AH-BEA038-H	Macon GA	BEA038	10	844,429	\$0.0178	151,000	\$151,000	\$151,000
AH-BEA039-H	Columbus GA-AL	BEA039	10	532,508	\$0.0280	149,000	\$149,000	\$149,000
AH-BEA040-H	Atlanta GA-AL-NC	BEA040	10	6,690,595	\$0.0679	4,541,000	\$4,541,000	\$4,541,000
AH-BEA041-H	Greenville-Spartanburg SC-NC	BEA041	10	1,392,816	\$0.0239	333,000	\$333,000	\$333,000
AH-BEA042-H	Asheville NC	BEA042	10	512,200	\$0.0355	182,000	\$182,000	\$182,000
AH-BEA043-H	Chattanooga TN-GA	BEA043	10	797,154	\$0.0476	379,000	\$379,000	\$379,000
AH-BEA044-H	Knoxville TN	BEA044	10	1,106,120	\$0.0480	531,000	\$531,000	\$531,000
AH-BEA045-H	Johnson City-Kingsport TN-VA	BEA045	10	609,299	\$0.0344	210,000	\$210,000	\$210,000
AH-BEA046-H	Hickory-Morgantown NC-TN	BEA046	10	558,291	\$0.0146	81,000	\$81,000	\$81,000
AH-BEA047-H	Lexington KY-TN-VA-WV	BEA047	10	1,936,486	\$0.0294	569,000	\$569,000	\$569,000
AH-BEA048-H	Charleston WV-KY-OH	BEA048	10	1,191,822	\$0.0169	201,000	\$201,000	\$201,000
AH-BEA049-H	Cincinnati-Hamilton OH-KY-IN	BEA049	10	2,315,121	\$0.0594	1,376,000	\$1,376,000	\$1,376,000
AH-BEA050-H	Dayton-Springfield OH	BEA050	10	1,122,314	\$0.0413	463,000	\$463,000	\$463,000
AH-BEA051-H	Columbus OH	BEA051	10	2,594,734	\$0.0351	911,000	\$911,000	\$911,000
AH-BEA052-H	Wheeling WV-OH	BEA052	10	312,837	\$0.0081	25,000	\$25,000	\$25,000



## Attachment A

DA 13-1540

License	Market Name	Market	Bandwidth (MHz)	Population *	MOB \$/MHz-pop**	Bidding Units	Upfront Payment	Minimum Opening Bid
AH-BEA053-H	Pittsburgh PA-WV	BEA053	10	2,912,497	\$0.0306	892,000	\$892,000	\$892,000
AH-BEA054-H	Erie PA	BEA054	10	513,834	\$0.0058	30,000	\$30,000	\$30,000
AH-BEA055-H	Cleveland-Akron OH-PA	BEA055	10	4,583,408	\$0.0257	1,177,000	\$1,177,000	\$1,177,000
AH-BEA056-H	Toledo OH	BEA056	10	1,279,418	\$0.0149	190,000	\$190,000	\$190,000
AH-BEA057-H	Detroit-Ann Arbor-Flint MI	BEA057	10	6,827,726	\$0.0824	5,625,000	\$5,625,000	\$5,625,000
AH-BEA058-H	Northern Michigan MI	BEA058	10	265,125	\$0.0058	15,000	\$15,000	\$15,000
AH-BEA059-H	Green Bay WI-MI	BEA059	10	687,392	\$0.0420	289,000	\$289,000	\$289,000
AH-BEA060-H	Appleton-Oshkosh-Neenah WI	BEA060	10	469,566	\$0.0394	185,000	\$185,000	\$185,000
AH-BEA061-H	Traverse City MI	BEA061	10	303,041	\$0.0074	22,000	\$22,000	\$22,000
AH-BEA062-H	Grand Rapids-Muskegon MI	BEA062	10	1,962,250	\$0.0445	872,000	\$872,000	\$872,000
AH-BEA063-H	Milwaukee-Racine WI	BEA063	10	2,343,622	\$0.0716	1,679,000	\$1,679,000	\$1,679,000
AH-BEA064-H	Chicago-Gary-Kenosha IL-IN-WI	BEA064	10	10,758,118	\$0.1551	16,686,000	\$16,686,000	\$16,686,000
AH-BEA065-H	Elkhart-Goshen IN-MI	BEA065	10	954,029	\$0.0117	112,000	\$112,000	\$112,000
AH-BEA066-H	Fort Wayne IN	BEA066	10	748,680	\$0.0123	92,000	\$92,000	\$92,000
AH-BEA067-H	Indianapolis IN-IL	BEA067	10	3,335,590	\$0.0438	1,462,000	\$1,462,000	\$1,462,000
AH-BEA068-H	Champaign-Urbana IL	BEA068	10	644,865	\$0.0170	109,000	\$109,000	\$109,000
AH-BEA069-H	Evansville-Henderson IN-KY-IL	BEA069	10	878,433	\$0.0102	89,000	\$89,000	\$89,000
AH-BEA070-H	Louisville KY-IN	BEA070	10	1,558,777	\$0.0441	687,000	\$687,000	\$687,000
AH-BEA071-H	Nashville TN-KY	BEA071	10	2,856,296	\$0.0635	1,813,000	\$1,813,000	\$1,813,000
AH-BEA072-H	Paducah KY-IL	BEA072	10	230,924	\$0.0073	17,000	\$17,000	\$17,000
AH-BEA073-H	Memphis TN-AR-MS-KY	BEA073	10	2,001,223	\$0.0891	1,784,000	\$1,784,000	\$1,784,000
AH-BEA074-H	Huntsville AL-TN	BEA074	10	1,105,409	\$0.0472	522,000	\$522,000	\$522,000
AH-BEA075-H	Tupelo MS-AL-TN	BEA075	10	633,772	\$0.0190	120,000	\$120,000	\$120,000
AH-BEA076-H	Greenville MS	BEA076	10	214,872	\$0.0184	39,000	\$39,000	\$39,000
AH-BEA077-H	Jackson MS-AL-LA	BEA077	10	1,484,806	\$0.0332	493,000	\$493,000	\$493,000
AH-BEA078-H	Birmingham AL	BEA078	10	1,692,233	\$0.0559	945,000	\$945,000	\$945,000
AH-BEA079-H	Montgomery AL	BEA079	10	507,613	\$0.0425	216,000	\$216,000	\$216,000
AH-BEA080-H	Mobile AL	BEA080	10	724,956	\$0.1005	729,000	\$729,000	\$729,000
AH-BEA081-H	Pensacola FL	BEA081	10	684,856	\$0.0785	537,000	\$537,000	\$537,000
AH-BEA082-H	Biloxi-Gulfport-Pascagoula MS	BEA082	10	411,066	\$0.0477	196,000	\$196,000	\$196,000
AH-BEA083-H	New Orleans LA-MS	BEA083	10	1,622,143	\$0.0339	550,000	\$550,000	\$550,000
AH-BEA084-H	Baton Rouge LA-MS	BEA084	10	835,783	\$0.0433	362,000	\$362,000	\$362,000
AH-BEA085-H	Lafayette LA	BEA085	10	638,768	\$0.0422	270,000	\$270,000	\$270,000
AH-BEA086-H	Lake Charles LA	BEA086	10	555,838	\$0.0403	224,000	\$224,000	\$224,000
AH-BEA087-H	Beaumont-Port Arthur TX	BEA087	10	460,666	\$0.0131	60,000	\$60,000	\$60,000
AH-BEA088-H	Shreveport-Bossier City LA-AR	BEA088	10	591,759	\$0.0317	188,000	\$188,000	\$188,000
AH-BEA089-H	Monroe LA	BEA089	10	338,416	\$0.0180	61,000	\$61,000	\$61,000
AH-BEA090-H	Little Rock AR	BEA090	10	1,719,570	\$0.0271	467,000	\$467,000	\$467,000
AH-BEA091-H	Fort Smith AR-OK	BEA091	10	356,101	\$0.0400	142,000	\$142,000	\$142,000
AH-BEA092-H	Fayetteville AR-MO-OK	BEA092	10	527,374	\$0.0412	217,000	\$217,000	\$217,000
AH-BEA093-H	Joplin MO-KS-OK	BEA093	10	280,505	\$0.0093	26,000	\$26,000	\$26,000
AH-BEA094-H	Springfield MO	BEA094	10	987,431	\$0.0496	490,000	\$490,000	\$490,000
AH-BEA095-H	Jonesboro AR-MO	BEA095	10	311,312	\$0.0074	23,000	\$23,000	\$23,000
AH-BEA096-H	St. Louis MO-IL	BEA096	10	3,690,263	\$0.0669	2,468,000	\$2,468,000	\$2,468,000
AH-BEA097-H	Springfield IL-MO	BEA097	10	520,982	\$0.0167	87,000	\$87,000	\$87,000
AH-BEA098-H	Columbia MO	BEA098	10	406,350	\$0.0512	208,000	\$208,000	\$208,000
AH-BEA099-H	Kansas City MO-KS	BEA099	10	2,693,265	\$0.0604	1,626,000	\$1,626,000	\$1,626,000
AH-BEA100-H	Des Moines IA-IL-MO	BEA100	10	1,755,021	\$0.0386	678,000	\$678,000	\$678,000
AH-BEA101-H	Peoria-Pekin IL	BEA101	10	534,159	\$0.0175	94,000	\$94,000	\$94,000
AH-BEA102-H	Davenport-Moline IA-IL	BEA102	10	559,935	\$0.0220	123,000	\$123,000	\$123,000
AH-BEA103-H	Cedar Rapids IA	BEA103	10	426,881	\$0.0313	134,000	\$134,000	\$134,000
AH-BEA104-H	Madison WI-IL-IA	BEA104	10	1,019,465	\$0.0479	488,000	\$488,000	\$488,000
AH-BEA105-H	La Crosse WI-MN	BEA105	10	257,376	\$0.0661	170,000	\$170,000	\$170,000
AH-BEA106-H	Rochester MN-IA-WI	BEA106	10	341,710	\$0.0166	57,000	\$57,000	\$57,000

## Attachment A

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License	Market Name	Market	Bandwidth (MHz)	Population *	MOB \$/MHz-pop**	Bidding Units	Upfront Payment	Minimum Opening Bid
AH-BEA107-H	Minneapolis-St. Paul MN-WI-IA	BEA107	10	4,895,391	\$0.0742	3,634,000	\$3,634,000	\$3,634,000
AH-BEA108-H	Wausau WI	BEA108	10	494,992	\$0.0607	300,000	\$300,000	\$300,000
AH-BEA109-H	Duluth-Superior MN-WI	BEA109	10	354,182	\$0.0288	102,000	\$102,000	\$102,000
AH-BEA110-H	Grand Forks ND-MN	BEA110	10	222,571	\$0.0095	21,000	\$21,000	\$21,000
AH-BEA111-H	Minot ND	BEA111	10	116,439	\$0.0105	12,000	\$12,000	\$12,000
AH-BEA112-H	Bismarck ND-MT-SD	BEA112	10	186,962	\$0.0188	35,000	\$35,000	\$35,000
AH-BEA113-H	Fargo-Moorhead ND-MN	BEA113	10	400,274	\$0.0094	37,000	\$37,000	\$37,000
AH-BEA114-H	Aberdeen SD	BEA114	10	79,541	\$0.0278	22,000	\$22,000	\$22,000
AH-BEA115-H	Rapid City SD-MT-NE-ND	BEA115	10	230,086	\$0.0149	34,000	\$34,000	\$34,000
AH-BEA116-H	Sioux Falls SD-IA-MN-NE	BEA116	10	558,647	\$0.0116	65,000	\$65,000	\$65,000
AH-BEA117-H	Sioux City IA-NE-SD	BEA117	10	252,009	\$0.0255	64,000	\$64,000	\$64,000
AH-BEA118-H	Omaha NE-IA-MO	BEA118	10	1,130,768	\$0.0342	387,000	\$387,000	\$387,000
AH-BEA119-H	Lincoln NE	BEA119	10	410,339	\$0.0123	50,000	\$50,000	\$50,000
AH-BEA120-H	Grand Island NE	BEA120	10	287,927	\$0.0216	62,000	\$62,000	\$62,000
AH-BEA121-H	North Platte NE-CO	BEA121	10	61,592	\$0.0072	4,400	\$4,400	\$4,400
AH-BEA122-H	Wichita KS-OK	BEA122	10	1,210,018	\$0.0301	364,000	\$364,000	\$364,000
AH-BEA123-H	Topeka KS	BEA123	10	476,322	\$0.0185	88,000	\$88,000	\$88,000
AH-BEA124-H	Tulsa OK-KS	BEA124	10	1,478,165	\$0.0414	613,000	\$613,000	\$613,000
AH-BEA125-H	Oklahoma City OK	BEA125	10	1,882,087	\$0.0711	1,338,000	\$1,338,000	\$1,338,000
AH-BEA126-H	Western Oklahoma OK	BEA126	10	142,644	\$0.0232	33,000	\$33,000	\$33,000
AH-BEA127-H	Dallas-Fort Worth TX-AR-OK	BEA127	10	9,092,705	\$0.0943	8,574,000	\$8,574,000	\$8,574,000
AH-BEA128-H	Abilene TX	BEA128	10	225,538	\$0.0153	34,000	\$34,000	\$34,000
AH-BEA129-H	San Angelo TX	BEA129	10	212,086	\$0.0257	54,000	\$54,000	\$54,000
AH-BEA130-H	Austin-San Marcos TX	BEA130	10	1,830,206	\$0.0601	1,100,000	\$1,100,000	\$1,100,000
AH-BEA131-H	Houston-Galveston-Brazoria TX	BEA131	10	6,949,709	\$0.0505	3,513,000	\$3,513,000	\$3,513,000
AH-BEA132-H	Corpus Christi TX	BEA132	10	571,987	\$0.0128	73,000	\$73,000	\$73,000
AH-BEA133-H	McAllen-Edinburg-Mission TX	BEA133	10	1,264,091	\$0.0117	147,000	\$147,000	\$147,000
AH-BEA134-H	San Antonio TX	BEA134	10	2,650,971	\$0.0400	1,060,000	\$1,060,000	\$1,060,000
AH-BEA135-H	Odessa-Midland TX	BEA135	10	426,631	\$0.0235	100,000	\$100,000	\$100,000
AH-BEA136-H	Hobbs NM-TX	BEA136	10	209,606	\$0.0119	25,000	\$25,000	\$25,000
AH-BEA137-H	Lubbock TX	BEA137	10	406,628	\$0.0145	59,000	\$59,000	\$59,000
AH-BEA138-H	Amarillo TX-NM	BEA138	10	511,635	\$0.0140	71,000	\$71,000	\$71,000
AH-BEA139-H	Santa Fe NM	BEA139	10	274,264	\$0.0304	84,000	\$84,000	\$84,000
AH-BEA140-H	Pueblo CO-NM	BEA140	10	291,784	\$0.0137	40,000	\$40,000	\$40,000
AH-BEA141-H	Denver-Boulder CO-KS-NE	BEA141	10	4,685,203	\$0.0437	2,046,000	\$2,046,000	\$2,046,000
AH-BEA142-H	Scottsbluff NE-WY	BEA142	10	91,571	\$0.0101	9,300	\$9,300	\$9,300
AH-BEA143-H	Casper WY-ID-UT	BEA143	10	467,797	\$0.0275	128,000	\$128,000	\$128,000
AH-BEA144-H	Billings MT-WY	BEA144	10	452,040	\$0.0167	75,000	\$75,000	\$75,000
AH-BEA145-H	Great Falls MT	BEA145	10	164,985	\$0.0197	32,000	\$32,000	\$32,000
AH-BEA146-H	Missoula MT	BEA146	10	447,771	\$0.0212	95,000	\$95,000	\$95,000
AH-BEA147-H	Spokane WA-ID	BEA147	10	932,290	\$0.0281	262,000	\$262,000	\$262,000
AH-BEA148-H	Idaho Falls ID-WY	BEA148	10	365,056	\$0.0243	89,000	\$89,000	\$89,000
AH-BEA149-H	Twin Falls ID	BEA149	10	185,790	\$0.0097	18,000	\$18,000	\$18,000
AH-BEA150-H	Boise City ID-OR	BEA150	10	728,993	\$0.0252	184,000	\$184,000	\$184,000
AH-BEA151-H	Reno NV-CA	BEA151	10	786,501	\$0.0269	212,000	\$212,000	\$212,000
AH-BEA152-H	Salt Lake City-Ogden UT-ID	BEA152	10	2,558,128	\$0.0495	1,265,000	\$1,265,000	\$1,265,000
AH-BEA153-H	Las Vegas NV-AZ-UT	BEA153	10	2,403,936	\$0.0851	2,045,000	\$2,045,000	\$2,045,000
AH-BEA154-H	Flagstaff AZ-UT	BEA154	10	474,774	\$0.0127	60,000	\$60,000	\$60,000
AH-BEA155-H	Farmington NM-CO	BEA155	10	221,760	\$0.0182	40,000	\$40,000	\$40,000
AH-BEA156-H	Albuquerque NM-AZ	BEA156	10	1,078,891	\$0.0248	267,000	\$267,000	\$267,000
AH-BEA157-H	El Paso TX-NM	BEA157	10	1,112,036	\$0.0225	250,000	\$250,000	\$250,000
AH-BEA158-H	Phoenix-Mesa AZ-NM	BEA158	10	4,351,644	\$0.0662	2,882,000	\$2,882,000	\$2,882,000
AH-BEA159-H	Tucson AZ	BEA159	10	1,159,029	\$0.0315	365,000	\$365,000	\$365,000
AH-BEA160-H	LA-Riverside-Orange Cnty CA-AZ	BEA160	10	19,800,937	\$0.1154	22,841,000	\$22,841,000	\$22,841,000

## Attachment A

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License	Market Name	Market	Bandwidth (MHz)	Population *	MOB \$/MHz-pop**	Bidding Units	Upfront Payment	Minimum Opening Bid
AH-BEA161-H	San Diego CA	BEA161	10	3,095,313	\$0.0963	2,980,000	\$2,980,000	\$2,980,000
AH-BEA162-H	Fresno CA	BEA162	10	1,676,476	\$0.0375	629,000	\$629,000	\$629,000
AH-BEA163-H	San Fran.-Oakland-San Jose CA	BEA163	10	9,759,108	\$0.0584	5,696,000	\$5,696,000	\$5,696,000
AH-BEA164-H	Sacramento-Yolo CA	BEA164	10	2,722,415	\$0.0417	1,135,000	\$1,135,000	\$1,135,000
AH-BEA165-H	Redding CA-OR	BEA165	10	361,652	\$0.0120	43,000	\$43,000	\$43,000
AH-BEA166-H	Eugene-Springfield OR-CA	BEA166	10	859,318	\$0.0105	91,000	\$91,000	\$91,000
AH-BEA167-H	Portland-Salem OR-WA	BEA167	10	3,311,677	\$0.0577	1,909,000	\$1,909,000	\$1,909,000
AH-BEA168-H	Pendleton OR-WA	BEA168	10	209,568	\$0.0132	28,000	\$28,000	\$28,000
AH-BEA169-H	Richland-Kennewick-Pasco WA	BEA169	10	797,338	\$0.0129	103,000	\$103,000	\$103,000
AH-BEA170-H	Seattle-Tacoma-Bremerton WA	BEA170	10	4,686,669	\$0.0671	3,147,000	\$3,147,000	\$3,147,000
AH-BEA171-H	Anchorage AK	BEA171	10	710,231	\$0.0193	137,000	\$137,000	\$137,000
AH-BEA172-H	Honolulu HI	BEA172	10	1,360,301	\$0.0237	323,000	\$323,000	\$323,000
AH-BEA173-H	Guam-Northern Mariana Islands	BEA173	10	213,241	\$0.0291	62,000	\$62,000	\$62,000
AH-BEA174-H	Puerto Rico-US Virgin Islands	BEA174	10	3,832,194	\$0.0171	657,000	\$657,000	\$657,000
AH-BEA175-H	American Samoa	BEA175	10	55,519	\$0.0018	1,000	\$1,000	\$1,000
AH-BEA176-H	Gulf of Mexico	BEA176	10	-	n/a	20,000	\$20,000	\$20,000
Total	176 Licenses		10	312,846,492		218,755,700	\$218,755,700	\$218,755,700

\* Based on the 2010 decennial census.

\*\* Calculated as \$0.07/MHz-pop multiplied by an index of the relative prices for EA licenses of paired spectrum in Auctions 66 and 73.

## ATTACHMENT B

**Determining Provisionally Winning Bids and Current Price Estimates**

The licenses subject to package bidding in a Hierarchical Package Bidding auction are grouped into non-overlapping, successively larger packages at each level. This attachment discusses a two-tier HPB structure, which is one of the options for Auction 96. In this example, the hierarchical structure has two levels, consisting of 176 individual Economic Area (EA) licenses in the first tier and 52 packages in the second tier. These packages consist of EAs aggregated into Major Economic Areas (MEAs). After each round, all considered bids and minimum opening bids are used to determine the largest bid on each license and on each package.<sup>68</sup> A simple procedure is used to calculate the provisionally winning set of bids and a current price estimate (“CPE”) for each individual license.<sup>69</sup> This appendix describes the winner determination and pricing rules, first in terms of an example and then in more general terms.

**Determining Provisionally Winning Bids**

After each round of bidding, the FCC Auction System determines which combination of bids provides the greatest aggregate gross amount and are therefore provisionally winning. In order to determine the best combination of bids, the system takes the highest bid on each individual license. It then compares the sum of the high bids on individual licenses in a package with the highest package bid at each tier to determine provisionally winning bid(s).

*Example:* Suppose that the highest bids on each license and package are as shown in Table 1 below for a sample configuration of EAs and MEAs. The sum of the highest bids on EA licenses EA1-EA3, 30, exceeds the highest bid on the MEA1 package, 20. The highest bid on the MEA2 package, 32, exceeds the sum of the highest bids on EA licenses EA4 and EA5, 20. Thus, the provisionally winning bids would be the bids on the individual EA licenses EA1-EA3, and the package bid on MEA2.

**Example with High Bids in Parentheses**

<b>Tier 2: Packages</b>	<b>MEA1 (20)</b>			<b>MEA2 (32)</b>	
<b>Tier 1: EAs</b>	<b>EA1 (10)</b>	<b>EA2 (10)</b>	<b>EA3 (10)</b>	<b>EA4 (10)</b>	<b>EA5 (10)</b>

<sup>68</sup> The set of considered bids in a round includes new bids for that given round and each bidder’s highest bid on each license or package, regardless of the round in which it was placed. For a description of how tied bids are broken, see Section IV.C.6. (Provisionally Winning Bids). In addition to these bids, the FCC Auction System considers a set of “FCC bids.” There is an FCC bid on each license, and the amount of each FCC bid is slightly below the minimum opening bid amount.

<sup>69</sup> The hierarchical structure of HPB was suggested by Rothkopf, Pekeč, and Harstad, “Computationally Manageable Combinatorial Auctions,” *Management Science*, 44(8), August 1998, 1131-1147. The pricing mechanism for HPB was proposed by Goeree, J. K. and C. A. Holt, “Hierarchical Package Bidding: A Paper & Pencil Combinatorial Auction,” *Games and Economic Behavior* 70(1), September 2010, 146-169.

### **Determining Current Price Estimates for Licenses**

CPEs for licenses are determined in such a way as to indicate to bidders how high they must bid to compete with the provisionally winning bid on the package containing those licenses in the event the package bid is the provisionally winning bid. If the bids on the individual EA licenses are all provisionally winning, then the CPEs are simply equal to those bids, as is the case in an FCC simultaneous multiple round (SMR) auction without package bidding. But if the bid amount for a package is greater than the sum of the bid amounts for the individual licenses it contains, then the highest bids received so far for the licenses are scaled up to the package bid amount by adding “shares.”<sup>70</sup> These shares are proportional to the bidding units associated with each license relative to the total number of bidding units in the package.

Suppose that all EA licenses have equal bidding units, and that the bid amounts are as shown as in the example above. The high bid on the MEA2 package is 32, which exceeds the sum of the bids for the EA licenses in the package. Therefore, to calculate the CPE the individual bids for licenses EA4 and EA5 are raised from 10, to  $10 + (1/2)(32-20) = 16$ . In other words, the “shortfall” of 12 is divided among the 2 licenses in the package in proportion to their bidding units (which are equal in this case). In this example, a “package share” of 6 is added to the high bids on the EA licenses in the MEA2 package, but there is no package share for the licenses in the MEA1 package.

Minimum acceptable bids for licenses in the next round of the auction are calculated by adding a percentage to the license CPE.<sup>71</sup> For packages, minimum acceptable bids are the sums of the minimum acceptable bids for the licenses in the package. As a result of constructing CPEs in this way, the minimum acceptable bids for the next round will indicate to bidders what they must bid to be able to unseat the provisionally winning bids from the last round.

### **Technical Description**

The discussion below is specific to a two-tier package structure. For a more general description, which can be applied to variations on HPB, see Goeree and Holt, “Hierarchical Package Bidding: A Paper & Pencil Combinatorial Auction,” *Games and Economic Behavior* 70(1), September 2010, 146-169.

*To Determine Provisionally Winning Bids:* Suppose a package  $r$  is divided into individual licenses,  $i = 1, \dots, I_r$ , where  $I_r$  is the number of individual licenses in package  $r$ , each with  $a_{ir}$  bidding units. Bidders can submit bids on individual licenses and package bids for the entire package. Let  $b_{ir}^{\max}$  denote the highest bid for license  $i$  in package  $r$  and  $b_r^{\max}$  the highest package bid for package  $r$ . In this case, the revenue-maximizing allocation can be found recursively (Rothkopf, Pekeč, and Harstad, 1998):

1. Pick the larger of  $b_r^{\max}$  and  $\sum_{i=1}^{I_r} b_{ir}^{\max}$ , which determines  $Rev_r$ , the revenue for package  $r$ .
2. If  $Rev_r = b_r^{\max}$ , the highest package bid for package  $r$  is provisionally winning and the bids on individual licenses in that package are losing, otherwise the highest bids on individual licenses in package  $r$  are provisionally winning and the package bid for package  $r$  is losing.

<sup>70</sup> If no bids have been placed on an individual license, the share will be added to the minimum opening bid amount.

<sup>71</sup> In a standard FCC SMR auction (without package bidding), the FCC Auction System adds a percentage to the current provisionally winning bid amount for each license to determine minimum acceptable bids for the next round. This percentage may be determined by an activity-based formula, described in Attachment C and in Section IV.C.5. (Bid Amounts).

*To Determine CPEs for Licenses:* A second procedure is used to calculate CPEs for licenses (Goeree and Holt, 2010).<sup>72</sup> The CPE  $p_{ir}$  of license  $i$  in package  $r$  is the maximum bid for the license plus a “package share” (if the sum of the high bids for individual licenses in the package falls short of  $Rev_r$ ). The shares are determined by the relative sizes of the licenses in terms of bidding units. Let  $\alpha_r = \sum_{i=1}^{I_r} \alpha_{ir}$  denote the total number of bidding units in package  $r$ . With this notation, the pricing formula is:

$$p_{ir} = b_{ir}^{\max} + \frac{\alpha_{ir}}{\alpha_r} \left( Rev_r - \sum_{i'=1}^{I_r} b_{i'r}^{\max} \right)$$

where the difference in parentheses is non-negative by construction. Thus,

- $p_{ir} = b_{ir}^{\max}$  if an individual license bid wins.
- $p_{ir} = b_{ir}^{\max} + \text{package share}$  if a package bid wins.

Current price estimates based on this procedure address the “threshold problem” in the sense that they provide benchmarks for bids on individual licenses that will, when scaled up, or incremented, allow the individual license bids to displace a provisionally winning bid on the package containing those licenses.

The procedures for determining provisionally winning bids and CPEs for licenses, set forth here for two tiers, can be generalized for any number of levels. With a single level these procedures reduce to the SMR pricing and allocation rules in which the provisionally winning bid for a license is the highest bid received for that license. With multiple levels, the algorithm for determining provisionally winning bids follows a “bottom-up” approach and checks at every level,  $h$ , whether it is better to provisionally assign a level- $h$  package to the high bidder for that package or to provisionally assign the smaller sub-packages that it contains. The rule for determining CPEs follows from this recursive comparison of level- $h$  and level- $(h+1)$  packages: if the larger packages provide higher revenue, then the prices of the individual licenses contained in the larger packages are incremented in proportion to bidding units to reflect this shortfall. Once the algorithm finishes, the CPEs of the individual licenses add up to the sum of the associated provisionally winning bids.

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<sup>72</sup> The computed prices determine minimum acceptable bids for licenses by adding a percentage. The minimum acceptable bid for a package is equal to the sum of the minimum acceptable bids for the licenses it contains.

## ATTACHMENT C

## Minimum Acceptable Bid Formula

The following formula used to calculate minimum acceptable bids is based on activity. After current price estimate (CPE) for a license is calculated, the minimum acceptable bid amount for that license will be equal to the amount of the CPE plus a percentage of that CPE, calculated using the formula below. In general, the percentage will be higher for a license receiving many bids than for a license receiving few bids.

$$A_i = (C * B_i) + ((1-C) * A_{i-1})$$

$$I_{i+1} = \text{smaller of } ((1 + A_i) * N) \text{ and } M$$

$$X_{i+1} = I_{i+1} * Y_i$$

where

$A_i$  = activity index for the current round (round i)

$C$  = activity weight factor

$B_i$  = number of bidders submitting bids on the license in the current round (round i)

$A_{i-1}$  = activity index from previous round (round i-1),  $A_0$  is 0

$I_{i+1}$  = additional percentage for the next round (round i+1)

$N$  = minimum additional percentage or floor

$M$  = maximum additional percentage or ceiling

$X_{i+1}$  = dollar amount corresponding to the additional percentage

$Y_i$  = current price estimate (CPE) for the license from the current round

(The CPE for a license is the provisionally winning bid, unless there is a provisionally winning package bid covering the license. See Attachment B for more information on CPEs.)

## Examples

$$C = 0.5, N = 0.1, M = 0.2$$

Please note that these values are for illustrative purposes only and might not be the same as those used in the auction.

Round 1 (2 bidders submitting bids, CPE = \$1,000,000)

1. Calculation of additional percentage for round 2:

$$A_1 = (0.5 * 2) + (0.5 * 0) = 1$$

$$I_2 = \text{The smaller of } [(1 + 1) * 0.1] = 0.2 \text{ and } 0.2 \text{ (the maximum additional percentage)}$$

$$= 0.2$$

2. Calculation of dollar amount associated with the additional percentage for round 2 (using  $I_2$  from above):

$$X_2 = 0.2 * \$1,000,000 = \$200,000$$

3. Minimum acceptable bid amount for round 2 = \$1,200,000

Round 2 (3 bidders submitting bids, CPE = \$2,000,000)

1. Calculation of additional percentage for round 3:

$$A_2 = (0.5 * 3) + (0.5 * 1) = 2$$

$$I_3 = \text{The smaller of } [(1 + 2) * 0.1] = 0.3 \text{ and } 0.2 \text{ (the maximum additional percentage)}$$
$$= 0.2$$

2. Calculation of dollar amount associated with the additional percentage for round 3 (using  $I_3$  from above):

$$X_3 = 0.2 * \$2,000,000 = \$400,000$$

3. Minimum acceptable bid amount for round 3 = \$2,400,000

Round 3 (1 bidder submitting bids, CPE = \$2,400,000)

1. Calculation of additional percentage for round 4:

$$A_3 = (0.5 * 1) + (0.5 * 2) = 1.5$$

$$I_4 = \text{The smaller of } [(1 + 1.5) * 0.1] = 0.25 \text{ and } 0.2 \text{ (the maximum additional percentage)}$$
$$= 0.2$$

2. Calculation of dollar amount associated with the additional percentage for round 4 (using  $I_4$  from above):

$$X_4 = 0.2 * \$2,400,000 = \$480,000$$

3. Minimum acceptable bid amount for round 4 = \$2,880,000

For packages, the minimum acceptable bid amount is the sum of the minimum acceptable bid amounts for the licenses in the package.