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BTconsultancy LLC and Wrege Associates reply comments on a framework to auction spectrum in the 2 GHz Range including Advanced Wireless Services

Wrege Associates and BTconsultancy LLC are pleased to offer reply comments to Industry Canada's consultation on a framework to auction spectrum in the 2 GHz Range including Advanced Wireless Services. The comments filed so far show a division between parties on the issue of spectrum set-asides for new entrants, but while there is a difference of opinion on the matter, it is clear that there are a number of potential new entrants who wish to compete with the three incumbent nationwide carriers. A properly designed auction can facilitate the entry of new players in the market while mitigating the risk of exposure that bidders can face when attempting to aggregate spectrum in an auction. We offer a new auction design that will meet these goals.

Qualifications

Karen Wrege, founder of Wrege Associates, and Brett Tarnutzer, founder of BTconsultancy LLC, were responsible for developing and managing the auction software programs that have supported more than 70 spectrum auctions for the United States Federal Communications Commission (FCC).

Ms. Wrege served as Deputy Chief of the Wireless Telecommunications Bureau, Spectrum Management Resources and Technologies Division at the Federal Communications Commission until January 2005 when she formed Wrege Associates. In addition to serving as Chief of the Operations Branch of the FCC's spectrum auction program, Mr. Tarnutzer most recently served as Project Manager for the FCC's auctions research and spectrum auction software development teams. BTconsultancy was formed in 2007. Both firms are consultancies specializing in the practical implementation of auction policy and

strategic bid consulting to international spectrum authorities and spectrum auction bidders.

While at the FCC, Ms. Wrege and Mr. Tarnutzer managed the design, programming and implementation of numerous spectrum auction software systems. These include auction systems for simultaneous multiple round ascending (SMR) and SMR package bidding (SMRPB) auctions and a research simulation tool that implemented a combinatorial clock auction with a final proxy round.

Auction Design Option: Simple Package Bidding

The comments already filed express a variety of opinions on the issue of offering spectrum set-asides for new entrants, but it appears clear that there are new entrants who want spectrum, and at least some that want sufficient spectrum to make them competitive with the incumbent providers on a large scale. A well designed auction can allow new entrants to aggregate the spectrum they need while limiting the risk of them only winning a portion of what they need to become a viable wireless telecommunications competitor, the so-called “exposure risk.”¹ The exposure risk can be a significant problem for bidders that have “all or nothing” strategies, and can result in serious inefficiencies, including bidding more than they can afford, or dropping out early to avoid the risk.

Auction theory has generally supported combinatorial bidding (also known as package bidding) as a mechanism for limiting the exposure risk in situations where there are strong complementarities among licenses, as in the case of a new entrant wishing to aggregate sufficient spectrum to becoming a nationwide

¹ For a complete discussion of exposure risk in spectrum auctions, see. Spectrum Auctions, Peter Cramton, University of Maryland, February 2001, Handbook of Telecommunications Economics, Martin Cave, Sumit Majumdar, and Ingo Vogelsang, eds., Amsterdam: Elsevier Science B.V., Chapter 14, 605-639, 2002.

competitor. In package bidding, bidders can place a single bid on a group of licenses instead of bidding on each license individually, thereby limiting the risk of exposure because the bid becomes an “all or nothing” proposal.

While package bidding can facilitate aggregation and limit exposure risk, it often comes at the cost of increased complexity. In combinatorial auctions where bidders create their own packages of licenses, determining winners can become very difficult, as can determining the prices of individual items that are part of a package. Trickier still is the complex fitting problem that occurs as bidders try to craft packages that will fit with other bids so as to be part of a winning coalition. In order to study these issues, the has held several conferences on package bidding designs and released information on the findings.²

Recently, in conjunction with the AWS and 700 MHz proceedings in the United States, a number of parties have proposed simplified versions of package bidding that are designed to give some of the benefits of package bidding without introducing the complexity.³ The United States Federal Communications Commission (“FCC”) recently commissioned an economic study of two of these techniques and released the results of the experiments.⁴

In general, the simplified package bidding scenarios limit the number of allowable packages and force them to follow certain guidelines so that they will fit together in logical ways, making it simple to compute winners and identify coalitions. To simplify the approach further, the FCC tested an auction methodology where the auctioneer predetermined the packages and allowed bidders to bid on either the

² http://wireless.fcc.gov/auctions/default.htm?job=past_conferences

³ See the comments of Paul Milgrom and Karen Wrege and the Declaration of Dr. Gregory L. Rosston and Dr. Scott Wallsten attached to comments filed by Access Spectrum, Columbia Capital, Paguasus Communications and Telecom Ventures.

⁴ Report on Results of Economic Experiments Comparing Performance Properties of Certain Simultaneous Multiple Round Spectrum License Auctions With Package Bidding , PUBLIC NOTICE (DA 07-2222), 5/25/2007.

packages or the individual licenses. The pre-created packages nested together in a hierarchical manner with no partial overlaps, e.g. combining individual licenses into regional packages and also into a nationwide package, giving bidders the opportunity to bid on a variety of different aggregations. While it is unlikely that an auctioneer can prepackage the licenses in a way that precisely meets the interests and needs of every bidder, if there is strong evidence of bidder preferences, packages can be created to meet the needs of most bidders, and the others can continue to bid on licenses individually or supplement the pre-created packages with some individual bids. While the exposure risk may not be eliminated for every bidder, it can be substantially mitigated.

The simplified combinatorial auction solves many of the issues relating to complexity found in combinatorial auctions with full flexibility for package creation. Determining winners is a simple matter involving the comparison of the package bids with the bids on the component parts. Similarly, bidders can see with relative ease how their bids can fit with other bids to overcome bids on larger packages.

The simplified combinatorial auction is a relatively straightforward expansion of the traditional SMR auction format that Industry Canada has used to allocate spectrum in the past. The existing SMR activity and eligibility rules can be used and because the packages are hierarchical with no partial overlaps, activity can be determined by simply summing the bidding units of all individual licenses on which a bid is placed. Prices for individual items that are part of a package can be determined in a number of ways, as have been discussed at the FCC's auction conference, but can be as simple as letting each license share in the difference between the sum of the bids on the individual items and the package bid based on the size of the license.

Conclusion

Given the importance of this auction for the Canadian consumers and the telecommunications industry, we feel that Industry Canada should consider implementing such a methodology for the upcoming auction. The proposed package bidding feature adds an option for bidders, not a requirement, and allows bidders to participate effectively even in the face of severe exposure problems. It promotes the objectives of efficiency, fairness, scalability, computational feasibility and individual license pricing, and, with a proper implementation, can also achieve reasonable speed in achieving its outcome. Such an auction can substantially improve upon the current simultaneous multiple round design when the exposure problem is a serious one. We commend it for your consideration.