

# University of Maryland

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3 March 2006

Leslie Marx, Chief Economist  
Federal Communications Commission  
445 12th St SW  
Washington DC 20554

Dear Leslie:

I wish to address two matters related to the comments filed in response to the Public Notice DA 06-238, “Auction of Advanced Wireless Services Licenses Scheduled for June 29, 2006:” the Reitsma et al. paper on self-enforcing strategic demand reduction and the reply comments of Milgrom and Rosston and the FTC economists.

## **Demand Reduction**

The CAPCP comment<sup>1</sup> cited Reitsma et al. (2002), hereafter “RSCL,” which describes an algorithm for demand reduction—a bidding strategy of reducing demands before the bidder reaches its marginal valuation for spectrum (see Ausubel and Cramton 2002). In discussions with FCC staff, I have been told that the RSCL paper was one of the motivations for moving from full transparency, since it provides “an algorithm for collusion.” Such a characterization of the paper is wrong. Here I will explain what the paper does, and what it does not do.

RSCL consider two types of bidding, straightforward bidding and a particular demand reduction strategy. Straightforward bidding is a bidding strategy in dynamic auctions in which, in each round, the bidder bids the minimum bid on the package of items that maximizes its profits given the bidder’s values, budget constraint, and the current prices.<sup>2</sup> Demand reduction is a strategy in which the bidder stops bidding on a license before the license price reaches the bidder’s incremental value for the license. A third strategy, equilibrium bidding, is the strategy in which each bidder bids unilaterally to maximize profits given the anticipated bidding behavior of the other bidders for the remainder of the auction.

RSCL show that in terms of bidder profits a particular demand reduction strategy does better than straightforward bidding. This is not surprising, and indeed *it has to be the case, regardless of whether the auction is transparent or anonymous*. In either case, straightforward bidding is not consistent with equilibrium bidding—equilibrium bidding always entails some demand reduction. I prove this quite generally in my paper with Larry Ausubel on demand reduction (Ausubel and Cramton 2002). The prices that result from straightforward bidding are therefore

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<sup>1</sup> “Comments on the Auctions of Advanced Wireless Services by the FCC,” Center on the Study of Auctions, Procurements, and Competition Policy at Penn State University, FCC Docket AU 06-30, 14 February 2006.

<sup>2</sup> RSCL call this the knapsack strategy, because the optimization is a knapsack problem (see Cramton et al. 2006).

not a relevant benchmark. Straightforward bidding results in higher prices than would occur in any outcome in which each bidder seeks unilaterally to maximize profits.

RSCL do not show to what extent demand reduction is mitigated by withholding bidder identities. This is an open question, although my paper with Larry Ausubel proves that demand reduction occurs in any bidding equilibrium with or without full transparency.

In my work advising bidders, I frequently explain the strategy of demand reduction and the phenomena of the winner's curse. This is and will be the case regardless of whether the FCC's auction is fully transparent or anonymous. Demand reduction is required of any profit maximizing bidder, regardless of the information policy. The incentives for demand reduction stem from uniform-pricing (similar licenses selling for similar prices as a result of arbitrage), and not from the information policy.

The specific demand reduction strategy presented by RSCL, although perhaps of interest to the computer science research community, cannot be implemented in practice. First, real bidders do not arrive at the auction knowing values for particular licenses. Valuation information is continually refined and developed throughout the auction process. This fact is a major reason why a dynamic auction format is required. In addition, there are important value interdependencies. Licenses cannot be valued individually but only in combination with other licenses. Similarly, there are externalities that arise from market structure, interference, and other issues, which imply that values depend on who wins which licenses. Finally, real bidders do not have a single and fixed budget constraint. Rather budget constraints evolve during the auction and are much more complicated than a single number.<sup>3</sup> Simply put, the RSCL demand reduction strategy is not relevant in practice.

### **Reply Comments Recommending Secrecy**

Now let me turn to the reply comments of the FTC economists<sup>4</sup> and Milgrom and Rosston<sup>5</sup>. Both of these comments rightly recognize that there are both costs and benefits to full transparency. Both comments tend to downplay the benefits and focus primarily on the costs of full transparency. They thus conclude—wrongfully I believe—that the FCC should abandon full transparency in the AWS auction. These commentators and a few brief academic commentators, are alone in this position, aside from Verizon's inconsistent view on information policy.<sup>6</sup>

I will not repeat the arguments already presented in my declarations. Rather, let me emphasize four important points, which neither the FTC nor Milgrom-Rosston recognize.

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<sup>3</sup> In advising more than twenty-five companies in high-stake simultaneous ascending auctions, I have never once encountered a bidder with a fixed budget constraint, nor have budget constraints ever been represented by a single number.

<sup>4</sup> "Reply Comment of the Staff of the Bureau of Economics of the Federal Trade Commission," FCC Docket AU 06-30, 28 February 2006.

<sup>5</sup> "Reply Comments of Paul Milgrom and Gregory Rosston," FCC Docket AU 06-30, 28 February 2006.

<sup>6</sup> "Comments of Verizon Wireless," FCC Docket AU 06-30, 14 February 2006. Verizon supports full transparency in the package auction (where presumably it hopes to acquire its licenses at a steep discount), and supports an anonymous auction for the licenses sold using the SMR format.

First, neither the FTC nor Milgrom-Rosston, provide any empirical support for their assertions that full transparency has reduced auction revenues or harmed efficiency. In contrast, through a series of published research papers, I have studied many of the FCC's major auctions using full transparency. In this work over more than ten years, informed not just by data but by extensive participation on over twenty-five bidding teams, I have yet to find *any* evidence that the bidding strategies enabled by full transparency have undermined efficiency; rather I conclude that the FCC's SMR auction format is highly efficient and full transparency is at least part of the explanation. Moreover, although there are a few exceptional instances where retaliatory strategies have appeared to reduce revenues, such as in the DEF auction, there is *no* evidence that the overall impact of full transparency has been to reduce revenues. Indeed, there is substantial evidence that revenues in the FCC's auctions have been high, representing a very large share of value (arguably more than 100%), and the UK UMTS auction and the Nextwave auction (Auction No. 35) provide examples where transparency increased revenues (see footnote 8).

Second, the problem of leaks is real and important in this type of auction if the "secrecy" approach is used. The commenters are right that many other high-stake auctions are done under secrecy; however—and this is critical—none of these high-stake auctions conducted under secrecy require secrecy for a period of many weeks.<sup>7</sup> Indeed, the vast majority of these auctions are conducted in a single day. The New Jersey auction for basic generation service is one of the few auctions conducted under secrecy that lasted for multiple days. If the FCC were to conduct the AWS auction under secrecy it largely would be breaking new ground.

The FCC's own experience with secrecy has been less than auspicious. In the very first SMR auction, the Nationwide Narrowband PCS auction conducted in July 1994, the FCC conducted an "anonymous auction," largely in response to bidder concerns about predatory bidding by competitors.<sup>8</sup> The secrecy in this auction was a complete failure (Cramton 1995). The large bidders quickly figured out who was who. Only the smaller bidders and the press were in the dark. During the auction the FCC *inadvertently* released a round report with bidder time-stamps, which made it easy for even the small bidders to figure out bidder identities. Although I am confident that the FCC has learned important lessons from the experience that would prevent this mistake going forward, I am quite concerned about the ability of the FCC, the bidders, and the investment community to maintain secrecy in an extremely high-stake auction over a period of many weeks, if not months. Indeed, I would be shocked if secrecy were sustained. A much more likely outcome is that there are many leaks, especially through the investment community, which enable at least large bidders to have a sufficiently clear picture so that retaliatory strategies in major markets will still be adopted with about the same frequency as we see in the FCC's fully transparent auctions, that is to say, extremely rarely.

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<sup>7</sup> A conservative estimate sets the duration of the AWS auction at six weeks, and the collusion restrictions begin on the deadline for filing short forms (typically 6 to 8 weeks before auction start) and end on the deadline for down-payments (another 3 to 6 weeks after auction end), for a total "quiet" period of at least four months.

<sup>8</sup> Experience has shown that these concerns about predatory behavior in the spectrum auctions are misplaced. I am aware of predatory bidding occurring in only a few instances (Cramton 2006). These are the exceptions that prove the rule that bidders are extremely hesitant to spend any shareholder money to raise rival's costs in spectrum auctions.

Preventing leaks through the investment community is problematic at best. Large investors have a need to know, since they are typically involved in the decision making while the auction is taking place. Confidentiality rules could limit leaks somewhat, but it is naïve to think that leaks could be prevented over such a long period of time when both the stakes and the number of people with knowledge is so large.

Third, the benefits of transparency are especially strong when auctioning encumbered spectrum, as in the AWS auction. The commercial clearing of microwave links is done through negotiation as in the PCS auctions. These links often cross spectrum blocks, which introduces an externality in the clearing process. A bidder on one block cares about how eager the bidder on the adjacent block is to clear the link. The clearing problem is exacerbated when the microwave license is held by a carrier bidding in the auction, as is often the case in the AWS bands. In this case, transparency may reduce the use of anticompetitive strategies in which a carrier attempts to take advantage of its microwave license holdings.

Fourth, none of the commentators have made the important point that, although there are costs and benefits to full transparency, *the costs quickly decline with the extent of competition*. Retaliation strategies that may support low-price equilibria simply do not work when there is sufficient competition. Any examination of the FCC's many competitive auctions will bare this out. For example, in the famous C-block auction, I was advising Pocket Communications, the second-largest bidder in the auction. In that auction, the auction team used sophisticated retaliatory strategies, as well as other demand reduction strategies, in an attempt to reduce the prices paid for spectrum. As the outcome confirms, these strategies were completely ineffective despite their common use by the large sophisticated bidders, such as Pocket and Nextwave. Given that the costs of full transparency quickly fall with the level of competition, but the benefits do not, it seems clear that if secrecy is considered, it should only be considered in auctions where competition is weak.

Fortunately, the FCC has an excellent measure of competition: the initial eligibility ratio<sup>9</sup> (Cramton 1997). The FCC's own experience is that auctions with eligibility ratios of two or more have robust competition (for example, the DEF auction had an eligibility ratio of 1.68, much lower than the other PCS auctions; the C auction and the Narrowband PCS auctions were all above 2; the AB auction was on the margin of competitive at 1.93). By way of comparison with other high-stake auctions, the eligibility ratio (called the coverage ratio in finance) for US Treasury auctions typically has averaged about 2. Thus, I recommend that if the FCC does adopt an information policy with an anonymous auction, that the auction be fully transparent if the initial eligibility ratio exceeds 2. This would prevent the FCC from losing the substantial benefits of full transparency in situations where I suspect there is consensus that the costs of full transparency are small.

While I agree that the FCC should continue to study information policy in its auctions, it would be unwise to experiment with secrecy in the most significant spectrum auction in a

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<sup>9</sup> The initial eligibility ratio is calculated from the sum of the upfront payments. Thus, it is known by the FCC at the upfront payment deadline, typically three weeks before the auction is to start. Each upfront payment provides gives the bidder its initial eligibility in MHz-pop. The eligibility ratio is total eligibility, summing over all bidders, divided by the total MHz-pop being sold in the auction. An eligibility ratio of 2 means that there is twice as much demand as the supply available.

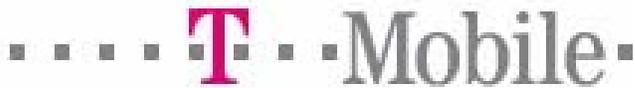
decade. In the past, the FCC has limited experimentation to less critical auctions. Conducting the narrowband PCS auctions in 1994 before the major broadband auctions in 1995 and 1996 is a good example of effective implementation strategy. The FCC should continue to follow this sound approach. Experiment on more minor auctions; stick with the highly successful and well-tested fully-transparent SMR auction format for the AWS auction.

Sincerely yours,



### References

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- Cramton, Peter (1995), "Money Out of Thin Air: The Nationwide Narrowband PCS Auction," *Journal of Economics and Management Strategy*, 4, 267-343.
- Cramton, Peter (1997), "The FCC Spectrum Auctions: An Early Assessment," *Journal of Economics and Management Strategy*, 6:3, 431-495.
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- Cramton, Peter, Yoav Shoham, and Richard Steinberg (2006), *Combinatorial Auctions*, Cambridge, MA: MIT Press.
- Reitsma, Paul S. A., Peter Stone, Janos A. Csirik, and Michael L. Littman (2002), "Self-Enforcing Strategic Demand Reduction," in *Agent Mediated Electronic Commerce*, J. Padget, O. Shehory, D. Parkes, N. Sadeh and W. Walsh (eds.), Springer, 289-306.



March 9, 2006

**EX PARTE SUBMISSION**

*Electronic Filing*

Ms. Marlene H. Dortch  
Secretary  
Federal Communications Commission  
445 12<sup>th</sup> Street, SW, Room TW-A325  
Washington, D.C. 20554

Re: AU Docket No. 06-30

Dear Ms. Dortch:

Tom Sugrue, Vice President-Government Affairs of T-Mobile USA, Inc. (“T-Mobile”), and Peter Cramton, Professor of Economics at the University of Maryland, on behalf of T-Mobile, submit this letter in response to the Ex Parte Submission of the Department of Justice (the “Department”) made on March 3, 2006 in the above referenced proceeding.

In its ex parte filing, the Department expresses support for the proposal in the Wireless Bureau’s Public Notice<sup>1</sup> to use secret bidding in Auction No. 66. Surprisingly, it bases this position largely on its analysis of Auction No. 11, which closed more than nine years ago. For the reasons set out below, the Department’s analysis is flawed, and its reliance on the results of Auction No. 11 to support non-transparent bidding in Auction No. 66 is completely misplaced. Moreover, the Department misstates the results of investigations by the FCC and the Department itself of certain Auction No. 11 bidding conduct. If the Department has harbored concerns about the Commission’s transparent bidding practices, it has had ample opportunity to voice them before, during or after any of the fifty wireless auctions that have been conducted since Auction No. 11.<sup>2</sup> Equally puzzling is its failure to examine the data from the auctions conducted after the FCC implemented the Department’s own recommended reforms following Auction No. 11.<sup>3</sup>

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<sup>1</sup> FCC Public Notice, *Auction of Advanced Wireless Services Licenses Scheduled for June 29, 2006, Comment Sought on Reserve Prices or Minimum Opening Bids and Other Procedures*, AU Docket No. 06-30, DA 06-238 (rel. Jan. 31, 2006).

<sup>2</sup> For example, in the case of Auction No. 35, the Department was heavily involved in reclaiming many of the subject licenses from bankruptcy and, presumably, should have had every incentive to raise the bidder-information policy issue to which the Department now attaches such high importance.

<sup>3</sup> One would expect that the DOJ, having thoroughly examined the bidding behavior in Auction No. 11 and recommended auction reforms, would have examined the market data at some point during the past nine years to determine the effectiveness of the reforms. The fact that the Department makes no mention of any post-Auction No. 11 auctions, other than one isolated example from Auction No. 58, suggests that the Department has not

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In fact, the Department acknowledges that, since Auction No. 11, the FCC has “adopted other mechanisms to reduce opportunities for collusion.”<sup>4</sup> These reforms have been successful in mitigating tacit collusion in fully transparent auctions and include: 1) limiting the number of bid withdrawals; 2) eliminating trailing digits in bids by requiring bidding in a number of formula-based bid increments, from 1 to 9, for each license; 3) using a reserve price representing a significant fraction of the projected license value; and 4) managing the auction pace through larger bid increments. We are aware of no empirical evidence from more recent auctions that would support a conclusion that full transparency has facilitated collusion, harmed efficiency or reduced auction revenues.

Although the Department acknowledges that important refinements have been made to the auction rules, it nonetheless attempts to find instances of collusive bidding in auctions since Auction No. 11. This exercise bears virtually no fruit. Indeed, the Department comes up with a single purported example of bidding in one BTA in a recent auction -- Roanoke, VA in Auction No. 58 -- to support its contention that non-transparent bidding should be instituted for Auction No. 66. The Department argues that “anomalous”<sup>5</sup> or collusive bidding behavior caused the winning bid on one of the three licenses in this BTA to exceed the bids on the other two licenses. Contrary to these conclusory claims, it was virtually a statistical certainty that the bid on *one* of the licenses would exceed the other two. Moreover, there may have been any number of reasons why the bidders behaved the way they did in the rounds in question, which came at the last stages of the auction. In short, the Department’s assertions of collusion are highly conjectural, ultimately prove nothing and, in particular, provide no basis for the dramatic change in auction procedures they advance.

More significantly, the Department mischaracterizes the *Mercury PCS* case which arose after Auction No. 11 in an effort to support its assertion that tacit collusion can adversely affect competitive forces during an auction. The Department suggests that the FCC issued a fine in this case, when, in fact,<sup>6</sup> the FCC ultimately rescinded in its entirety the Notice of Apparent Liability claim against Mercury.<sup>7</sup> Furthermore, despite the Department’s statement that Mercury’s conduct was also the basis for a Department enforcement action,<sup>8</sup> that civil action ended in what

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conducted any such study. Curiously, the FCC and the Department considered bidder-information policy at the time they implemented the other reforms but chose not to restrict bidder information until the current proposal.

<sup>4</sup> Department Letter at 10. The FCC’s design and implementation of the auction reforms can be credited, in part, to the recommendations of Professor Cramton.

<sup>5</sup> *Id.* at 8.

<sup>6</sup> *Id.* at 4 (“The FCC fined Mercury PCs for engaging in this type of ‘reflexive’ or code bidding . . .”).

<sup>7</sup> The FCC reasoned that its interpretation of Section 1.2105(c) and “the Wireless Telecommunications Bureau’s neutral pronouncement immediately following the initial allegation of reflexive bid signaling” had not afforded Mercury and the other bidders notice that reflexive bidding was prohibited. *Mercury PCS, LLC*, 13 FCC Rcd 23755 ¶ 10 (1998).

<sup>8</sup> See Department Letter at 4.

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amounted to a “slap on the wrist” -- a Final Judgment that prohibited Mercury from entering into anticompetitive agreements when participating in future FCC auctions and required Mercury to establish and maintain an anti-trust compliance program.<sup>9</sup> The Department, however, did not pursue any criminal action to impose any fine or other penalty. This case simply does not support the application of sweeping non-transparency rules in FCC auctions over nine years after-the-fact. The reality is that, after extensive investigations, both the FCC and the Department took no serious action against Mercury or other Auction No. 11 participants. Using this case as the basis for a change today is more than a stretch, it is just plain wrong.<sup>10</sup>

The Department's assertion that Professor Cramton's conclusions about Auction No. 66 are inconsistent with his statements about Auction No. 11 is also wrong. Professor Cramton's recommendation to the Department and his subsequent writings consistently presented a balanced view on the issue of transparency, just like his comments in this proceeding. His recommendation in 1997 to the Department and the FCC, after extensive analysis of the 23,157 bids in Auction No. 11, was to continue with full transparency, but take steps to mitigate the possibility of tacit collusion by a number of rule changes. This recommendation was endorsed by the Department and subsequently implemented by the FCC.

As the Department can surely appreciate, competition best protects against tacit collusion, and any costs of full transparency quickly fall with the level of competition. As T-Mobile has stated, if the FCC does choose to conceal bidder identities, it should do so only if the initial eligibility ratio at the time of the upfront payment deadline is less than two (2). Experience from the FCC spectrum auctions suggests that an auction with an eligibility ratio of two or more will be competitive, and therefore the benefits of transparency will outweigh the risks of any potential collusive behavior in this case.

In the absence of any compelling evidence of harm from continued use of transparency, the FCC should not experiment with untested, unproven methodologies in Auction No. 66. Auctions of CMRS spectrum over the past several years have been very successful by any measure, achieving or even exceeding market value for the licenses auctioned. These undeniable results strongly support continued use of full transparency in the upcoming AWS auction.

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<sup>9</sup> See *United States v. Mercury PCS II LLC*, Civ. No. 98-2751 (PLF), 1999 WL 1425379 (D.D.C. entered April 29, 1999).

<sup>10</sup> The appropriate response to Mercury's conduct (code bidding) in Auction No. 11 was to introduce a rule change that prevents such behavior in future auctions. This is exactly what the FCC did following Auction No. 11.

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Pursuant to section 1.1206(b) of the Commission's rules, an electronic copy of this letter is being filed.

Sincerely,

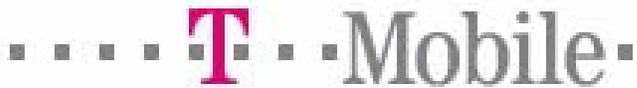
/s/ Thomas J. Sugrue  
Vice President - Government Affairs, T-Mobile

T-Mobile USA, Inc.

/s/Peter Cramton  
Professor of Economics, University of Maryland

cc: Leslie Marx  
Walter D. Strack  
Evan R. Kwerel  
Fred Campbell  
Barry Ohlson  
John Giusti  
Aaron Goldberger  
Jim Schlichting

dc-443559



March 20, 2006

**EX PARTE SUBMISSION**

*Electronic Filing*

Ms. Marlene H. Dortch  
Secretary  
Federal Communications Commission  
445 12<sup>th</sup> Street, SW, Room TW-A325  
Washington, D.C. 20554

Re: AU Docket No. 06-30

Dear Ms. Dortch:

On March 17, 2006, Tom Sugrue and Kathleen Ham of T-Mobile USA, Inc. (“T-Mobile”), accompanied by Peter Cramton, Professor of Economics of the University of Maryland, met with Leslie Marx, Chief Economist of the Federal Communications Commission (“FCC”) and Evan Kwerel of the Office of Strategic Planning & Policy Analysis. The purpose of the meeting was to discuss the appropriate information policy for the upcoming AWS auction. This ex parte letter summarizes the concepts and suggestions discussed during that session.

In particular, the attendees discussed the proposal put forth previously by T-Mobile and Professor Cramton,<sup>1</sup> which suggested that the FCC’s decision to apply a non-transparent bidding regime should depend on whether the auction was competitive as measured by the “eligibility ratio” established once applications are filed and upfront payments are made.<sup>2</sup> It was suggested that this information be revealed at least three to four weeks prior to the auction. According to the T-Mobile/Peter Cramton proposal, if the eligibility ratio was 2 or above the auction would be fully transparent, whereas the auction would be non-transparent if the eligibility ratio was below 2.

The attendees discussed whether an eligibility ratio of 2 is the best threshold for a presumption of a competitive auction. Professor Cramton indicated that looking at past FCC auctions, an eligibility ratio of 2 is an excellent indicator of robust competition. Such a threshold indicates that most of the FCC’s major auctions were indeed competitive. For example, under this measure, for the major broadband auctions, Auction No. 4 (PCS A and B blocks, eligibility ratio = 1.93) was nearly competitive; Auction No. 5 (PCS C block, eligibility ratio = 6.72) was

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<sup>1</sup> See Letter from Tom Sugrue et al., T-Mobile, to Marlene Dortch, Secretary, FCC, AU Docket No. 06-30 (Mar. 3, 2006).

<sup>2</sup> The eligibility ratio is calculated from the sum of the upfront payments. Thus, it is known by the FCC at the upfront payment deadline, typically about three weeks before the auction is to start. Each upfront payment gives the bidder its initial eligibility in MHz-pops. The eligibility ratio is total eligibility, summing over all bidders, divided by the total MHz-pops being sold in the auction. An eligibility ratio of 2 means that there is twice as much demand as the available supply.

intensely competitive; Auction No. 11 (PCS D, E and F blocks, eligibility ratio = 1.65) was not competitive; and Auction No. 58 (PCS mainly C and F blocks, eligibility ratio = 2.94) was highly competitive. A threshold of 2 is also consistent with eligibility ratios observed in other auctions, which are viewed as competitive. For example, U.S. Treasury auctions typically have an eligibility ratio of about 2.

The attendees also discussed the limitations of such an approach. The FCC might be concerned that a large bidder would strategically increase its upfront payment substantially for the sole purpose of increasing the likelihood that the auction is declared competitive. Professor Cramton suggested that a solution to this problem is to cap the amount of eligibility attributable to any bidder for the purpose of this competition calculation at 50 percent of the total offering.<sup>3</sup> For example, if each of the four largest carriers made upfront payments covering 90 MHz of spectrum nationwide, the adjusted eligibility ratio would be 2, the same as if the largest bidders each put in an upfront payment to win 45 MHz nationwide. No bidder interested in 45 MHz of spectrum or more would have any strategic incentive to manipulate its upfront payment. Professor Cramton also explained that with this rule, a smaller bidder (someone not interested in 45 MHz or more nationwide) might have an incentive to make a larger upfront payment than it otherwise would if it valued full transparency. He added, however, that the incentive for a small bidder to make a larger upfront payment for strategic reasons would be reduced by capital constraints and the limited chance that its action would have any impact.

Another question raised was whether the threshold calculation should also include the number of bidders participating, in addition to the eligibility ratio. For example, if the four largest carriers each deposited upfront payments covering at least 45 MHz nationwide, but no other bidders participated in the auction, then the eligibility ratio still would be 2. Some might view this outcome as less competitive than if there were a number of other bidders competing as well. To account for this, Professor Cramton suggested that the FCC could use a simple table that requires a larger threshold eligibility ratio when there are only a few bidders but falls to 2 as the number of bidders increase. Professor Cramton suggested that under such an approach the FCC only include bidders that have applied for and made upfront payments for more than one percent of the available spectrum in “MHz-pop” terms to ensure significant competitive impact. The following suggested table was discussed:

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<sup>3</sup> The cap of 50 percent is only for the purpose of calculating the threshold ratio to determine competition and is not a cap on the upfront payment or on bidding.

<u>Adjusted Number of Bidders*</u>	<u>Adjusted Eligibility Ratio**</u>
<6	infinity
6	3.0
7	2.9
8	2.8
9	2.7
10	2.6
11	2.5
12	2.4
13	2.3
14	2.2
15	2.1
>15	2.0

\* Adjusted number of bidders only includes bidders with eligibility > 1% of available spectrum.

\*\*Adjusted eligibility ratio is calculated with a cap of 50% eligibility for any bidder.

Professor Cramton indicated his view that in practice, the adjusted number of bidders would be unlikely to affect the threshold eligibility ratio, because it is extremely likely that there will be more than 15 bidders. In these circumstances, the adjusted eligibility ratio and not the number of bidders *should* be the critical factor in determining whether the auction is competitive. Nevertheless, the table above would address the theoretically possible, if practically unlikely, scenario that the auction could achieve an eligibility ratio of 2 even with a small number of bidders.

A final concern was the possibility that although the auction overall may be competitive, there may be a large regional license that is not competitive, because only two or fewer bidders have enough eligibility to bid on the large license. Professor Cramton suggested that if for each of the Regional Economic Area Grouping (REAG) licenses, the number of eligible bidders (*i.e.*, bidders who have applied for the licenses and deposited sufficient upfront payments) is equal to 3 or more, then the auction should be deemed competitive. For simplicity, it was suggested to limit this calculation to the largest REAG license. This simple rule effectively guarantees that if there are 3 or more bidders for the largest REAG license, then the auction will have 3 or more bidders for each of the smaller licenses, because eligibility is fungible across licenses.<sup>4</sup>

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<sup>4</sup> The only time this would not be the case is when nearly all of the large bidders limited their applications to specific licenses. Such behavior has never been observed in any prior spectrum auction. It is common for some of the small bidders to limit their applications in this way, but not for the large bidders.

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Although T-Mobile and Professor Cramton continue to believe that full transparency is the best policy, in the alternative, the attendees discussed establishing a competitive threshold for transparency that could include one or more of these options. As the auction becomes more competitive, there is a point where full transparency is clearly the best policy, and the above proposals provide an objective, straightforward means of assessing the competitiveness of the upcoming AWS auction so that the FCC can make a reasoned decision on whether to use transparent or blind bidding procedures.

Pursuant to section 1.1206(b) of the Commission's rules, an electronic copy of this letter is being filed.

Sincerely yours,

/s/ Thomas J. Sugrue

Vice President - Government Affairs  
T-Mobile USA, Inc.

/s/ Peter Cramton

Professor of Economics  
University of Maryland

cc: Leslie Marx  
Evan Kwerel  
Walter Strack  
Jim Schlichting

# *University of Maryland*

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Peter Cramton

Professor of Economics

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March 31, 2006

## **EX PARTE NOTICE**

### *Electronic Filing*

Ms. Marlene H. Dortch

Secretary

Federal Communications Commission

445 12<sup>th</sup> Street, SW, Room TW-A325

Washington, D.C. 20554

Re: AU Docket No. 06-30

Dear Ms. Dortch:

On March 30, 2006, I sent the attached email to Leslie Marx, Chief Economist of the Federal Communications Commission, and Evan Kwerel of the Office of Strategic Planning and Policy Analysis relating to the above-referenced proceeding.

Pursuant to section 1.1206(b) of the Commission's rules, an electronic copy of this letter is being filed.

Sincerely yours,



cc: Leslie Marx  
Evan Kwerel

**Peter Cramton**

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**From:** Peter Cramton [pcramton@gmail.com]  
**Sent:** Thursday, March 30, 2006 1:55 PM  
**To:** 'Evan Kwerel'; leslie.marx@fcc.gov  
**Cc:** 'Sugrue, Tom'; 'Ham, Kathleen'  
**Subject:** Random snapshot

Dear Evan and Leslie,

A problem with the snapshot approach is that it creates an incentive to slow the auction and distort the bidding, since bidders will tend to do all their serious bidding in the round before the snapshot. Evan's idea is to avoid this problem by making the snapshot random. For example, rather than taking a snapshot every 5<sup>th</sup> round, instead the FCC takes a snapshot with probability  $.2 = 1/5$  after every round. This is a good idea.

An even better idea is to combine this with the proposal to condition the information policy on the degree of competition. Here is how. Let the probability of a snapshot after a round depend on the degree of competition, as measured by the initial eligibility ratio (adjusted as described below). If the initial adjusted eligibility ratio is 2 or more, then the FCC adopts full transparency (a snapshot is taken with probability 1 after each round), but for lower initial eligibility ratios, the probability of a snapshot falls as follows:

Adj. Elig. Ratio*	Snapshot Probability
2.0	1.0
1.9	.8
1.8	.6
1.7	.4
1.6	.2
1.5	.1

\*Adjusted eligibility ratio is calculated with a cap of 50% eligibility for any bidder.

Note that implementing this rule is no more difficult than implementing any rule involving snapshots.

I think this rule has a lot of merit. It tailors the restriction on information based on the level of competition, and it does so in a way to minimize bidding distortions and still yield most of the benefits of full transparency.

Yours truly,  
Peter

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