Initial Analysis of the FCC Incentive Auction*

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Overview

- Bidding in the first-ever incentive auction concluded on March 30, 2017
- The objective of the auction was to repurpose low-band spectrum from broadcasting to mobile broadband through a voluntary mechanism
- The auction has successfully repurposed 84 MHz of low-band spectrum, including 70 MHz of licensed spectrum and 14 MHz for unlicensed use
- The auction has been successful in achieving efficient clearing
- The gross revenues were $19.77 billion; the net revenues were $19.31 billion
- The clearing cost was $10.05 billion
- The auction outcome should strengthen competition in the wireless market: 95% of spectrum (by value) was won by bidders that were reserve-eligible in all PEAs
The Incentive Auction comprised a reverse auction and a forward auction.

In the reverse auction, television broadcasters bid to voluntarily relinquish their spectrum usage rights in a (descending) clock auction.

The forward auction was an (ascending) clock auction for generic blocks, followed by an assignment phase to assign physical frequencies.

- Only about 0.7% of the revenues came from the assignment phase, suggestive that all seven blocks were viewed by bidders as nearly equivalent and that it was appropriate to treat all blocks as generic spectrum.

Both the reverse and forward auctions were conducted by the FCC using the PowerAuctions™ software platform, the premier software for clock auctions.
Efficient Clearing

- The incentive auction mechanism allowed the quantity of cleared, licensed spectrum to be any number up to ten (paired) blocks.

- Based on all publicly-available information, the auction achieved exactly the efficient amount of clearing:
  - The cost of clearing spectrum for the seven-block band plan was $10.05 billion.
  - The cost of clearing spectrum for the eight-block band plan was revealed to be $40.31 billion (the result of Stage Three of the auction).
  - Thus, the incremental cost of clearing an 8th block would have been $30 billion—more than buyers’ combined bids for the first 7 blocks, or almost $10 per MHz-pop!

- Meanwhile, the resulting seven blocks are: unimpaired, contiguous to one another, and configured well for international alignment (Canada and Mexico).
Proceeds: Forward Auction

The revenues in the Incentive Auction are explained by three factors:

- Verizon did not bid in the auction
- AT&T suddenly changed its bidding to drop out of the auction (variously attributed to Time Warner deal or FirstNet contract)
- Dish and U.S. Cellular did not invest in entities seeking bidding credits in this auction

The revenues of the Incentive Auction have been compared (unfavorably) to the revenues of the AWS-3 Auction (FCC Auction 97, in 2015), which generated net revenues of $41.33 billion

However, if these same three factors had come into play in the AWS-3 Auction, our estimate is that the AWS-3 auction would have generated net revenues of less than $16.5 billion
Comparison with AWS-3 Auction

Net payments by winning bidders in the AWS-3 Auction of 2015:

<table>
<thead>
<tr>
<th>Winning Bidder</th>
<th>Actual Net Payment</th>
</tr>
</thead>
<tbody>
<tr>
<td>AT&amp;T</td>
<td>$18,189,285,000</td>
</tr>
<tr>
<td>Verizon</td>
<td>$10,430,017,000</td>
</tr>
<tr>
<td>Dish / SNR Wireless / Northstar</td>
<td>$ 9,995,567,775</td>
</tr>
<tr>
<td>U.S. Cellular / Advantage Spectrum</td>
<td>$ 338,304,000</td>
</tr>
<tr>
<td>T-Mobile</td>
<td>$ 1,774,023,000</td>
</tr>
<tr>
<td>2014 AWS Spectrum Bidco</td>
<td>$ 291,810,000</td>
</tr>
<tr>
<td>Puerto Rico Telephone Company, Inc.</td>
<td>$ 170,901,300</td>
</tr>
<tr>
<td>All other bidders</td>
<td>$ 139,765,250</td>
</tr>
<tr>
<td>Total</td>
<td>$41,329,673,325</td>
</tr>
</tbody>
</table>
Comparison with AWS-3 Auction

*Simulated net payments if AT&T and Verizon had (not) bid as in Incentive Auction:*

<table>
<thead>
<tr>
<th>Winning Bidder</th>
<th>Actual Net Payment</th>
<th>Simulated Net Payment</th>
</tr>
</thead>
<tbody>
<tr>
<td>AT&amp;T</td>
<td>$18,189,285,000</td>
<td>$896,501,000</td>
</tr>
<tr>
<td>Verizon</td>
<td>$10,430,017,000</td>
<td>$0</td>
</tr>
<tr>
<td>Dish / SNR Wireless / Northstar</td>
<td>$9,995,567,775</td>
<td>$9,989,998,000</td>
</tr>
<tr>
<td>U.S. Cellular / Advantage Spectrum</td>
<td>$338,304,000</td>
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</tr>
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<td>T-Mobile</td>
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<td>$3,499,989,000</td>
</tr>
<tr>
<td>2014 AWS Spectrum Bidco</td>
<td>$291,810,000</td>
<td>$817,271,000</td>
</tr>
<tr>
<td>Puerto Rico Telephone Company, Inc.</td>
<td>$170,901,300</td>
<td>$125,188,000</td>
</tr>
<tr>
<td>All other bidders</td>
<td>$139,765,250</td>
<td>$797,664,000</td>
</tr>
<tr>
<td>Total</td>
<td>$41,329,673,325</td>
<td>$16,464,900,000</td>
</tr>
</tbody>
</table>
Proceeds: Reverse Auction

- While the $10 billion cost of clearing 84 MHz appears credible, the incremental cost of clearing additional spectrum may come across as excessive:

- The incremental cost in going from 84 MHz to 108 MHz (8\textsuperscript{th} block) was $30 billion
- The incremental cost in going from 108 MHz to 114 MHz (9\textsuperscript{th} block) was $14 billion
- The incremental cost in going from 114 MHz to 126 MHz (10\textsuperscript{th} block) was $32 billion
The cost of clearing more than 7 blocks is explained by at least three factors:

- Channel 37
- Increasing marginal costs
- Supply reduction (the mirror image of classic “demand reduction” in auctions) — see Ausubel, Cramton, Pycia, Rostek and Weretka (2014) and Doraszelski, Seim, Sinkinson and Wang (2016). For example, OTA Broadcasting apparently owned 11 television stations in the Pittsburgh DMA; only 5 won in the incentive auction

The reverse auction design, which focused on obtaining an obviously strategy-proof mechanism for single-minded bidders, could have paid greater attention to limiting the gaming by multi-minded bidders.
The Spectrum Reserve

The FCC wrote: “We agree with the Antitrust Division of the DOJ, one of our nation’s expert antitrust agencies: there is a risk of foreclosure in downstream wireless markets. … a provider might be the highest bidder in a spectrum auction, not because it will put the spectrum to its highest use, but because it is motivated to engage in a foreclosure strategy.” (Mobile Spectrum Holdings Report and Order, 2014, ¶62)

Two nationwide operators held 73% of sub-1-GHz spectrum. By contrast, the two smaller nationwide operators held 15% of the low-band spectrum (Report and Order, ¶58)

The Incentive Auction represented the last opportunity in the foreseeable future for operators to acquire sub-1-GHz spectrum at auction (Report and Order, ¶48)

That the spectrum reserve was nonbinding does not prove that it was unnecessary. It is equally likely that the policy was successful in making a foreclosure strategy impossible and in encouraging / emboldening participation by smaller bidders.
These Slides

- These slides contain our initial analysis of the FCC Incentive Auction
- They will be superseded in due course by a full paper, “Market Design and the FCC Incentive Auction”

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