

Switching it up: a closer look at bidding patterns in the US 3.45 GHz auction

We have analysed bidding data from the recent US 3.45 GHz auction.

In this presentation, we briefly explore an interesting bidding pattern from Round 37 – where there was a sudden and substantial shift of demand into smaller markets.

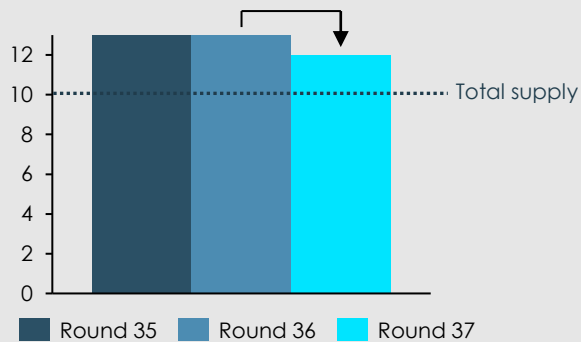


Source: <https://www.fcc.gov/document/procedures-established-auction-110-345-355-ghz-band>

1. The big switch: A substantial shift of demand in Round 37

In round 37, demand decreased in a few larger markets like LA...

Number of blocks

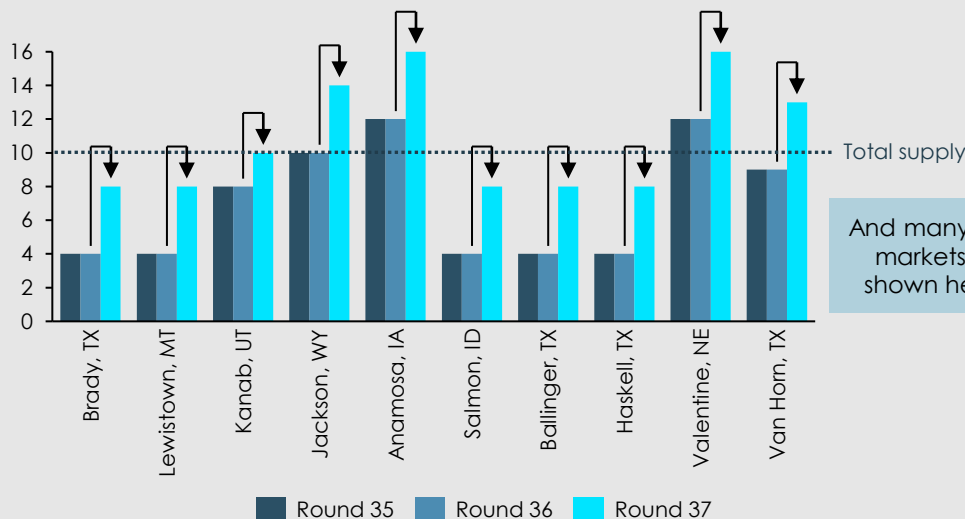


In Round 37 of the auction, demand for spectrum decreased in several larger markets.

The graph to the left shows the development of demand in Los Angeles where demand decreased by one block. A reduction of one block in LA corresponds to 19,410 bidding units (the 'currency' used to determine the relative size/importance of different geographical markets).

... but simultaneously increased in a huge number of smaller markets

Number of blocks



And many more markets not shown here...

Demand simultaneously increased in all of the 90 smallest markets in the auction (only 10 shown in the graph) – in most cases by 4 blocks (the maximum demand per bidder per market). This suggests that a single bidder suddenly decided to switch demand into smaller markets.

Demand had otherwise been constant in all 90 smaller markets from round 35 to 36 – so this increase was sudden, dramatic, and correlated with the drop-off in larger markets.




The total increase in demand across the 90 smallest markets corresponds to 18,961 bidding units. That is, the reduction in LA of one block was sufficient to 'free up' enough bidding units to increase demand in all 90 smaller markets by several blocks.*

*Note: Demand in other large markets than LA decreased at the same time – and it was thus not necessarily the LA bidding units that were used to increase demand in smaller markets.

Source: Copenhagen Economics based on [FCC data](#)

2. Honest bidding or strategic bidding?

Different explanations for what was going on

Explanation 1: Honest bidding	Explanation 2: Strategic bidding	
Switching	Signalling	Parking
<p>During an auction, bidders can switch between different items if they see them as substitutes.</p>  <p>In principle, bidders could view large and small markets as substitutes. As relative prices change (e.g., as large markets become more expensive) bidders might want to substitute their demand towards something else that they want instead (e.g., the relatively cheap small markets).</p> <p>This would be a sign of bidders expressing their true preferences – which is desirable from an auction design perspective.</p> <p>In this case, given that so many small markets saw such a sudden increase in demand, the bidding pattern is, however, arguably unlikely to reflect honest bidding.</p>	<p>Bidders can use switching to offer compromise and avoid a bidding war.</p>  <p>Example: a bidder currently demands 4 blocks in a market with excess demand of 2 blocks. If this bidder could accept an outcome where it wins 3 blocks, the bidder could reduce demand to 3 blocks (leaving excess demand of just 1 block) to signal a willingness to compromise.</p> <p>Other bidders would then be able to potentially close the market by reducing their demand also by 1 block in the following round.</p> <p>The first bidder can, however – by switching – keep the bidding units in other markets whilst waiting to see whether the compromise is accepted – potentially switching back to return to fight for 4 blocks if the offer of compromise is not reciprocated.</p>	<p>Bidders can park eligibility to ‘wait it out’ and pounce into their target markets later.</p>  <p>Blocks in large markets are worth more bidding units. Thus, it is easy for bidders to maintain high aggregate demand by placing bids in large markets. A bidder can do this with the intention of switching into other markets later in the auction. Bidders might want to ‘wait it out’ and bid for what they actually want later in the auction in the hope that their competitors spend their budget on something else in the meantime.</p> <p>As long as there is excess demand in the larger markets and/or if the reserve price of the auction has not yet been reached, this is a relatively low risk strategy.</p> <p>This type of parking delays the spread of bidding activity to smaller markets, leading to a longer duration of the auction.</p>

3. What does this mean for auction design?



Auction design should – to the extent possible – enable bidders to express their **honest preferences**. If bidders could indeed view different areas as substitutes (or complements) then it makes sense to sell them simultaneously and allow bidders to switch between them as relative prices change.



However, it is very tricky to design an auction mechanism which both facilitates **honest bidding** and also disallows any form of **strategic bidding**.

In this auction, there were at least two important auction design choices to balance this trade-off:



1. Getting the bidding units right

The regulator must devise a points system that allows bidders to ‘convert’ demand in one market to demand in another area. This is what bidding units are for.

However, this conversion should not allow any de facto increase in total demand by single bidders (e.g. if blocks in Van Horn, TX were worth the same as New York, NY) – so bidding units should be set to approximately correspond to the relative value of different types of spectrum.



2. Disincentivising strategic switching

Bidders should not be able to switch back and forth between items as they see fit – but only in a way that is broadly consistent with honest preferences.

For instance, it should not be possible to reduce demand if there has not been a price increase (there is no reason why an honest bidder would want to do this). Such a rule was implemented in this auction. A switch into a market without excess demand (such as Haskell, TX in Round 37) was thus essentially a binding commitment to buy that spectrum and such demand would be ‘stuck’ unless/until there was a further influx of demand creating excess demand later on.

Source: <https://www.fcc.gov/document/procedures-established-auction-110-345-355-ghz-band>