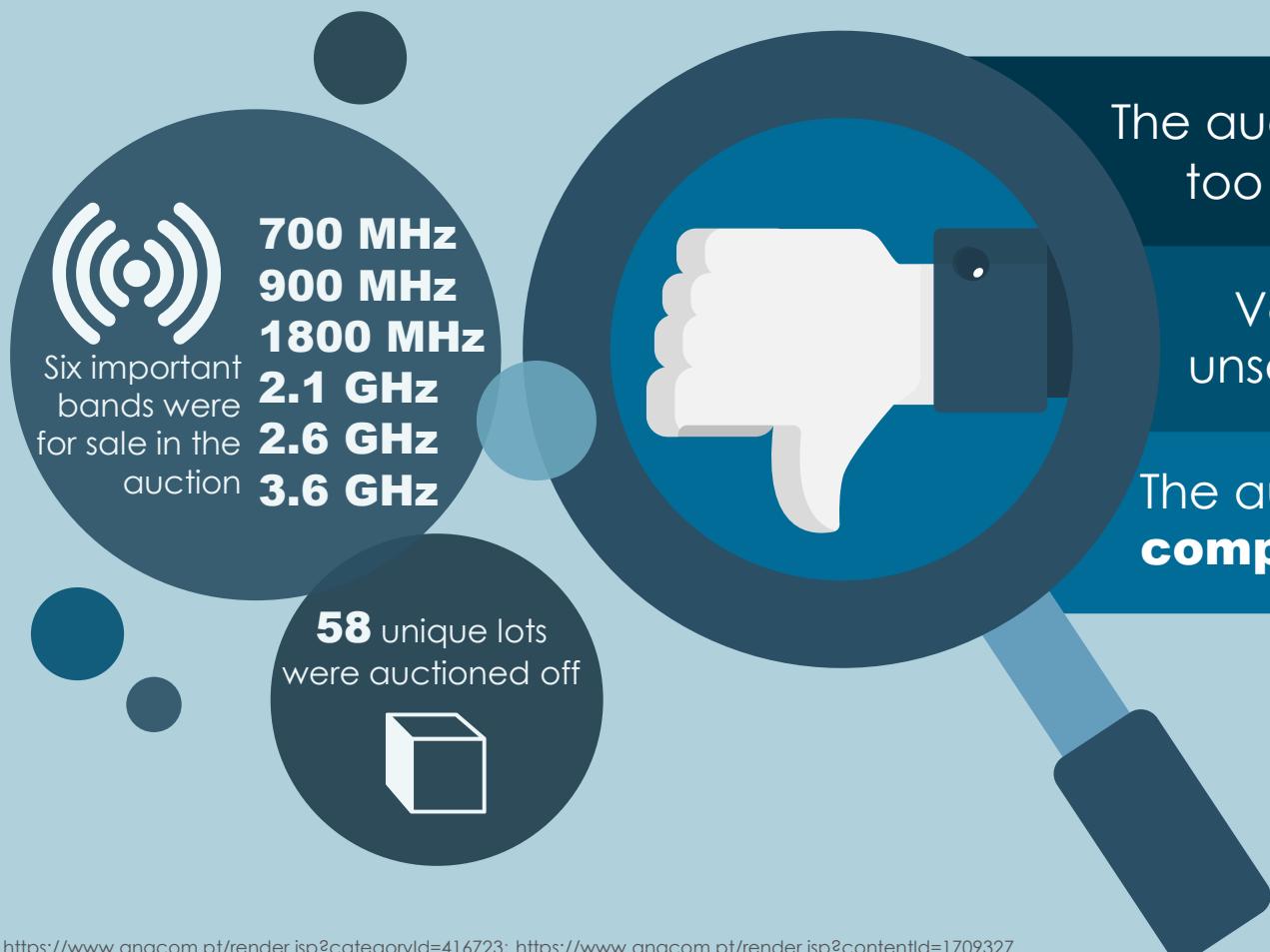


Auction design in the recent Portuguese 5G auction – what went wrong?



The auction **dragged out** for far too long (lasting 200 days)

Valuable spectrum went unsold and will **go to waste**

The auction format made life **complicated** for the bidders

<https://www.anacom.pt/render.jsp?categoryId=416723>; <https://www.anacom.pt/render.jsp?contentId=1709327>

1. The auction dragged out for three reasons

A. ANACOM had chosen a very slow auction format

The SMRA format that ANACOM had chosen does not increase the price of all spectrum of the same type simultaneously. A smarter auction format (e.g. a clock or eSMRA auction format) would have ended the auction much faster (6-28 days)

It took 1,727 rounds to finish the auction

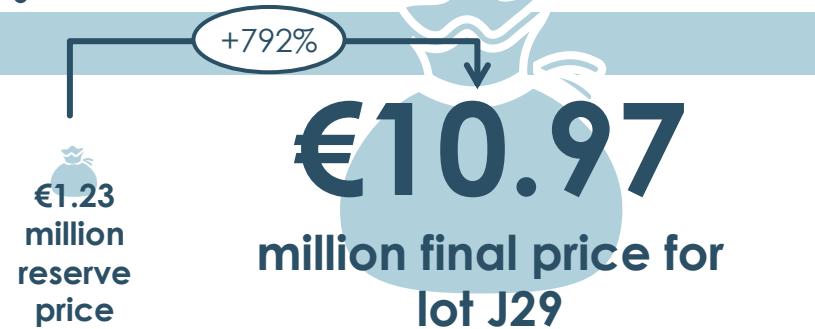


This is more than the number of steps to the top of the Eiffel Tower (1,665)



B. The start price was too low

The start price for the 3.6 GHz lots was far lower than the final price – and the price had to increase almost 8-fold. With a start price closer to the expected market price, the auction would have lasted fewer rounds



C. Prices were increased too slowly

ANACOM's price increase increments were very small, down to just 1% per round (and, as explained above, due to the auction format, not all prices increased in all rounds). With larger price increments, the auction would have lasted fewer rounds



2. The auction rules meant that some valuable spectrum will go to waste

A valuable block of 700 MHz spectrum went unsold



In the 700 MHz band, there were 6 lots of 2x5 MHz for sale (each lot identical to the other)



Each lot had a start price of €19.2 million



In the end, only 5 out of the 6 lots were sold. These were all sold at the start price



Unsold spectrum (in a valuable band) is one of the **worst possible outcomes** of an auction. The spectrum goes to waste and the auctioneer makes no revenue: this is a lose, lose situation. This is equivalent to a motorway being available but no one being allowed to drive

Price per lot € million



There are at least two potential explanations:



Bidders couldn't bid for the unsold spectrum block: there was a cap restricting bidders from bidding for more than 2x10 MHz



The start price was too high – meaning that bidders didn't even want the spectrum at its initial asking price

<https://www.onacom.pt/render.jsp?contentId=1709322>

3. The auction format made life complicated for the bidders



Bidders generally want to win large amounts of spectrum in the 3.6 GHz band – often at least 80-100 MHz



A good auction format allows bidders to condition their demand for individual lots on winning all of the spectrum that they need, e.g. saying "I want this 10 MHz lot but only if I also win at least 50 MHz more, i.e. 60 MHz total. I don't want 10 MHz on its own." However, ANACOM's format did not allow bidders to bid in this way and hence forced bidders into taking risks (by having to bid for individual lots not knowing whether they would also be able to secure the other lots necessary for their overall business case)



This is akin to holding an auction for a pair of shoes where bidders are forced to bid on the left and right shoe individually. Bidders would be nervous bidding for the shoes individually knowing that they might be forced to pay for one even if they lost out on the other



Auction designs in other countries have addressed this risk. For example, in Slovenia, the auction rules allowed bidders to protect themselves from winning less than 60 MHz in this band. Similarly, in the UK, the auction rules allowed bidders to protect themselves from winning less than 40 MHz

<https://www.gsma.com/spectrum/wp-content/uploads/2021/04/5G-Spectrum-Positions.pdf>; https://www.akos-rs.si/fileadmin/user_upload/Tender_documentation_multiband.pdf;
https://www.ofcom.org.uk/_data/assets/pdf_file/0027/109764/guidance-bidders.pdf

Hypothetical impact*



One of the bidders, Nowo, won just 20 MHz of spectrum in the 3.6 GHz band**



This is an unusually small spectrum package in this band



It is possible that Nowo actually wanted to buy at least e.g. 40 MHz in order to have a viable business case



However, when Nowo lost the bidding war for 40 MHz, Nowo was then – due to the auction format – not able to pull out of the band entirely, and was still forced to buy 20 MHz (even if such a small package of spectrum was worthless to them)

*Note: we have not been in discussion with Nowo and do not know anything about their specific business case or auction objectives. The example is for illustrative purposes.

**Nowo won a total of 40 MHz in the band but 20 MHz are associated with geographical restrictions, hence Nowo only won 20 MHz in national licenses.