

## 600 MHz auction leaves FCC red-faced

*A regular column on the information industries*

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Spectrum auctions in the USA are not normally held for nationwide licences. Rather, the country is divided up into a variety of areas, often including economic areas and cellular market areas. Furthermore, for a country of its size, the USA does not have many nationwide incumbents (four), and it does not normally have comparable spectrum reserves, as these are acquired on a regional basis either in auctions or via spectrum swaps or from regional operators. This makes it impossible to draw direct comparisons with most other countries, especially those in Europe, where licences are almost always nationwide.

The Federal Communications Commission (FCC) keeps a record of all spectrum auctions at <http://wireless.fcc.gov/auctions>. The first recorded was in 1994 and the most recently completed, No. 98, took place in July 2015. Most of these auctions have nothing to do directly with the spectrum used by mobile operators, and most of the auctions have raised rather modest amounts of money. Table I below accordingly summarises only those auctions which raised more than \$1bn.

With spectrum in bands readily useable for the provision of LTE services largely allocated, an innovative idea to emerge from the

regulator, the FCC, was in respect of so-called “incentive auctions”. In effect, the objective is to provide an incentive for the holders of under-utilised spectrum to hand it over for re-farming in return for receiving part of the proceeds of any subsequent auction of the spectrum. The initial plan was to finalise formal rules for the 600 MHz band by mid-2013 and to hold auctions during 2014, but this was later set back to early 2016, initially on the grounds that arrangements were proving too complex to proceed at an earlier date and subsequently because the National Association of Broadcasters filed a petition in August 2014 to force a review.

Harking back to the 2009 National Broadband Plan which concluded that 126 MHz could be freed up using 6 MHz channels in the UHF TV spectrum band, the plan in this case involved a two-stage auction. The first part would involve acquiring the spectrum from the broadcasters via a “reverse auction” in which at least two competing licensees would have to offer a minimum acceptable sale price, and after a repackaging exercise designed to create contiguous blocks of cleared spectrum, the second part was the “forward auction” would involve the sale of

**Table I** Selected auctions involving spectrum of potential use for the provision of LTE

<i>Auction no.</i>	<i>Name</i>	<i>Date</i>	<i>No. of licences on offer</i>	<i>Net proceeds (million dollars)<sup>a</sup></i>
04	Broadband PCS A and B Block	March 1995	99	7,019.404
05	Broadband PCS C Block	May 1996	493	10,071.709
11	Broadband PCS D, E and F Block	January 1997	1,479	2,517,440
66	Advanced Wireless Services (AWS-1)	September 2006	1,122	13,700.267
73	700 MHz band <sup>b</sup>	March 2008	1,099	18,957.582
96	H Block	February 2014	176	1,564.000
97	Advanced Wireless Services (AWS-3)	January 2015	1,614	41,329.000
1002	600 MHz	2016/17	416	c20,000,000

**Notes:** <sup>a</sup>Net of bidding credits; <sup>b</sup>The D block failed to reach its reserve price

**Source:** Adapted from <http://wireless.fcc.gov/auctions>

the repackaged spectrum to mobile operators. Broadcasters would be entitled to retain their spectrum and would be provided with guard bands to prevent interference, and this led commentators to speculate that the owners of the most valuable licences might refuse to sell.

According to the rules for the auction, mobile devices would have to be interoperable across the entire 600 MHz band. New licensees would be required to cover 40 per cent of the population in their service areas within six years and 75 per cent by the end of the initial 12-year licence period. Up to 30 MHz would be reserved for operators that at the time of the auction held less than one-third of the available spectrum below 1 GHz in any single market – as one-third is equivalent to 45 MHz, this would in practice affect only Verizon Wireless and AT&T, albeit not in every so-called partial economic area (PEA) for which an individual licence would be assigned.

In June 2015, the FCC stated that it would make it easier for small companies to acquire spectrum as part of the “Broadcast Television Spectrum Incentive Auction” now pencilled in for March 2016. Also, 30 MHz of the available spectrum would be reserved for smaller operators, and these operators would also be permitted to bid for unreserved spectrum. Furthermore,

they would not be required to roll out their own networks.

In March 2016, the FCC stated that 104 companies had applied to participate in the auction, although only 69 had completed their applications in full. In April, the FCC added that the maximum 126 MHz of spectrum had been cleared and repackaged into 100 MHz of clean spectrum during the reverse auction and that residual issues relating to interference were almost completely resolved. As a result, it was intended that there would be ten licences made available – the so-called “forward auction” – across most of the USA, each comprising a 10 MHz block. Each block would be split into 428 PEAs, including 4,030 licences with less than 15 per cent impairment. The auction was pencilled in for 31 May.

The rules in relation to spectrum caps meant that Verizon would be able to bid for reserved spectrum in 112 PEAs, AT&T in 242 PEAs and T-Mobile in all of them. However, Sprint ruled out its participation in the auction as it believed that its re-farmed 800 MHz (former iDEN) and 2.6 GHz (former WiMAX) spectrum was sufficient for its purposes in the medium term.

On 1 July, the FCC placed a minimum value of \$86.4bn on the spectrum on offer – equivalent to \$2.15 per MHz per pop (head of population). It was pointed out that

this was more than the market value of T-Mobile US and Sprint combined, which would in principle make it more attractive simply to buy their existing operations. Hence, it was difficult to see how all of the available spectrum could be purchased, in which case some would have to be returned (in accordance with the auction rules) to the would-be sellers.

In mid-July, the FCC declared that 62 companies had paid the deposit required prior to bidding in the auction (identified as Auction 1002). The auction progressed in fits and starts, but bidding ended abruptly on 30 August with 27 rounds completed and \$23.1bn in bids. As a result, the FCC was obliged to reduce the amount of available spectrum to 114 MHz, repackaged into 90 MHz of clean spectrum, at the end of September before resuming the reverse auction in October. The minimum amount that needed to be bid to bring the auction to a conclusion was now reduced to \$54.6bn, but after a single round of bidding, only \$21.5bn had been offered, even less than the first time around.

It accordingly became necessary to reduce what was on offer for a second time and to hold a third reverse auction in December. This time around, 108 MHz of spectrum, repackaged into 80 MHz of clean spectrum, was put on offer for a

minimum \$40.3bn. The auction ended after a single round of bidding, with the amount offered, at \$19.7bn, even less than the second time around.

It was argued that the FCC had misjudged trends in the industry, with operators much less interested in acquiring additional spectrum in the lower spectrum bands. Rather, operators were increasingly looking to use smaller cells and bands above 2 GHz and to determine their needs in much higher bands for the pending introduction of 5G (whatever that might turn out to be) and the expansion of the internet of things.

In June 2016, the FCC had declared that “5G is a national policy”. To this end, it intended to look at the potential of high-band spectrum above 24 GHz – making it the first country in the world to do so – where 200 MHz blocks could be made available. These would then be made available for private-sector-led development without this being hamstrung by unnecessary regulatory restraints. It subsequently announced at the start of the advanced wireless research initiative – a public-private

partnership led by the National Science Federation with the support of the White House to accelerate the development of 5G in the USA.

The new rules were published in mid-July that encompassed nearly 11 GHz of high-band spectrum, comprising 3.85 MHz of licensed spectrum and 7 GHz of unlicensed spectrum. A new upper microwave flexible use service was created in the 28 GHz (27.5-28.35 GHz), 37 GHz (37-38.6 GHz) and 39 GHz (38.6-40 GHz) bands with unlicensed spectrum available in the 64-71 GHz band. The FCC also initiated consultations on a further 18 GHz of spectrum in eight additional bands.

The 28 GHz band has proved to be highly popular with operators, with AT&T, Verizon Wireless, T-Mobile US and some smaller networks setting up trials. However, it is claimed that it will not be possible to earn an acceptable rate of return on investment unless large blocks of spectrum are made available at prices set well below historic levels.

It is sensible not to draw too many general conclusions from the above as outside the USA, it is the 700 MHz band that is mostly being

auctioned and the 600 MHz band has yet to be considered. However, there must be red faces at the FCC, firstly because it staked its reputation on its reverse/forward auction methodology and, secondly, because there is clearly much less demand for low-bandwidth spectrum than it forecast – at least at the high prices set in the auction. The next stage is probably to offer a package of 70 MHz of clean spectrum – of which only 40 MHz is available to all-comers, so AT&T and Verizon are gradually being squeezed. But, the total offer looks to be restricted to roughly \$20bn, so the outcome of stage four is hard to predict.

This demonstrates that there is some confusion as to the desirability of different spectrum bands for 5G, and the FCC is again putting its reputation on the line in promoting the development of certain higher bands that do not form part of the World Radiocommunications blueprint. In this respect, however, it seems to be achieving more success.

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