

The UK's Auction of the 3G Spectrum (B)

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The UK Setup

The British government realized that fostering competition had to be a primary objective for the auction to run efficiently. Therefore, it developed a plan that ensured entrants that they would win at least one auction and, consequently, should participate in the auctions. The government implemented a plan where it split the spectrum into five parcels with parcel "A" specifically reserved for new entrants. (See Exhibit 1). No incumbent could bid on this parcel, and thus new entrants understood that the auction setup guaranteed them at least one parcel. This did in fact encourage entrants, and in total 13 companies applied to be a part of the auction. The companies were as follows: 3G (UK) Limited, BT(3G) Limited, Crescent Wireless Limited, Epsilon Tele.com PLC, NTL Mobile Limited, One.Tel Global Wireless Limited, One2One Personal Communications Limited, Orange 3G Limited, SpectrumCo Limited, TIW UMTS (UK) Limited, Telefonica UK Limited, Vodafone Limited, and WorldCom Wireless (UK) Limited. The incumbents, with their market share in parentheses, were BT(3G) Limited (30.1%), One2One Personal Communications Limited (15.4%), Orange 3G Limited (17.2%), and Vodafone Limited

(37.3%). To ensure that all bidders were indeed serious, the government required a £50 million deposit. Additionally, if a firm wished to bid more than £400 million in the auction, the government required another deposit of £50 million.

Note that paired and unpaired spectrum are used for different applications. The paired spectrum notation 2x10 MHz, for example, means that an operator would get two 10 MHz bands of spectrum in two different ranges of frequencies. As shown in Exhibit 1, the winner of block A would get 2x15MHz of paired spectrum which is 15 MHz in one range of frequency paired with another 15 MHz in another range of frequency. The winner of block A would also get 5 MHz of unpaired frequency. Paired and unpaired are used for different applications, but in general paired spectrum is more valuable. [1]

Auction Setup

The Radiocommunications Agency conducted the auction of the 3G licenses. The agency set up the licenses so that they would be effective for 20 years until 2021. The agency also setup the licenses with minimum buildout requirements and no trading of the spectrum

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to stop any company from trying to speculate on the value of the spectrum. [2] This ensured that the agency would only sell licenses to those companies that were going into the business of offering mobile service. The auction was an ascending price auction where the winning bidders would be obligated to pay their winning bid to the English treasury.

The organization of the auction was fairly simple. In the first round, each bidder must make a bid at least as great as the reserve price on one of the parcels, use a waiver for that round, or withdraw from the auction completely. After that round, the highest bid for a parcel became that parcel's "current price" and the firm that made that bid was the "current price bidder." In the case of a tie, the agency selected the "current price bidder" randomly from those who made the high bid.

In the following round, the agency only allowed the bidders who were not "current price bidders" to participate. The agency

locked in the current price bidders with their bid from the previous round. The firms had three choices in each round: (1) they could place a bid on one of the parcels that was at least X% higher than the current bid, where X was initially 5% and later chosen by the Radiocommunications Agency; (2) the firms could use one of their three waivers and not have to perform an action; however, once a firm exhausted its three waivers, it could no longer use this option; or (3) they could withdraw from the auction completely which was a final decision.

The agency certified the auction as complete when there were no more bids in a round. At that point, the parcels were then allotted to the "current price bidders" at the "current price." The winner could either pay immediately or choose to defer some of the payment at a set interest rate.

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Endnotes

[1] Specifically, with paired spectrum, one set of the paired frequencies can be used for uplink to a tower or satellite, and the other set for downlink to a device. With unpaired spectrum, this option is not possible, so the spectrum cannot be utilized as efficiently.

[2] Specifically, the network had to cover 80% of the UK population by 2007.

References

3G: Country Information - UK. 2001. 3GNewsroom.com.
<http://www.3gnewsroom.com/country/uk.shtml>. (accessed July 19, 2007).

Börger, Tilman, and Christian Dustmann. 2003. "Rationalizing the UMTS Spectrum Bids: The Case of the U.K. Auction." In *Spectrum Auctions and Competition in Telecommunications*, ed. Gerhard Illing and Ulrich Klüh, 119-158. Cambridge: The MIT Press.

Exhibit 1.

License	Paired Spectrum	Unpaired Spectrum	Reserve Price
A (Reserved for a new entrant)	2x15 MHz	5 MHz	£125 million
B	2x15 MHz		£107.1 million
C	2x10 MHz	5 MHz	£89.3 million
D	2x10 MHz	5 MHz	£89.3 million
E	2x10 MHz	5 MHz	£89.3 million

Exhibit 2. Timeline (3G: Country Information, 2001)

<p>July 31, 1997: In a consultation document today, Mrs. Barbara Roche, minister for industry, launched the framework for licensing operators to provide the UK's third generation of mobile communications systems for the next millennium.</p>
<p>October 1, 1997: The Radiocommunications Agency (RA) has published an advertisement in the Official Journal of the European Communities seeking expressions of interest in tendering to provide financial management consulting services. The financial management consultant would assist the RA in preparing for the possible auction of spectrum licenses for Universal Mobile Telecommunications Service (UMTS), the third generation of mobile telecommunications.</p>
<p>November 18, 1997: The DTI has received positive responses from industry to its consultation on the framework for licensing operators to provide the UK's third generation of mobile communications systems. DTI receive a total of 35 responses from the following organizations: AirTouch Communications, AT&T (UK) Ltd, BT Cable & Wireless Communications plc, Cable & Wireless plc, Cellnet (Telecom Securicor Cellular Radio Ltd), Cellcom Ltd, CCSR (Centre for Communication Systems Research), CSS TAC (Telecommunications Advisory Committee), Denbighshire County Council, Ericsson Ltd, FEI (Federation of the Electronics Industry), FCS (Federation of Communication Services Ltd), Fujitsu Europe, Telecom R&D Centre Ltd, General Cable plc, GSM MoU Association, ICO Global Communications Ionica plc, Inmarsat (International Mobile Satellite Organisation), JRC (Joint Radio Company Ltd), Lucent Technologies Network Systems UK Ltd, Motorola Cellular Infrastructure Group, NB3 (National Band Three Ltd), Nokia Mobile Phones (UK) Ltd, NORWEB Communications, NTL, One2One Orange plc, PERA (Political, Editorial & Regulatory Affairs), QNL (UK) Limited, Scientific Generics Ltd, Scottish Telecom, TMA (Telecommunications Managers Association), UKISC (UK Industrial Space Committee), Vodafone Ltd.</p>
<p>January 28, 1998: The Radiocommunications Agency (RA) has appointed N M Rothschild & Sons Limited (Rothschilds) to advise on the possible auction of spectrum licenses for Universal Mobile Telecommunications Service (UMTS), the third generation of mobile telecommunications.</p>

February 9, 1999: A major advance in mobile communications came a step closer today as DTI Telecoms Minister Michael Wills confirmed that substantial progress had been made towards holding an auction of licenses for the next generation of mobile telecommunications networks. In an announcement this afternoon, Mr. Wills highlighted the government's intention to use the auction to promote further competition in the mobile telecommunications industry and to encourage new businesses to enter the mobile market. He confirmed that the government (1) is minded to ensure that new entrants' customers can roam onto existing second generation networks until their own networks are established, and (2) will consult further on the proposal that five licenses be offered, a larger one being reserved for a new entrant.

May 6, 1999: Competition in the UK mobile telecommunications market is set to increase as DTI Telecoms Minister Michael Wills confirmed today a decision to auction five third generation mobile telephone licenses, with a larger license reserved for a new entrant. In paving the way for at least one new network operator, the government also confirmed preparations to provide new entrants with the right to roam onto at least one second generation network.

January 16, 2000: Patricia Hewitt, the small business and e-commerce minister, today named the companies who have applied to bid in Europe's first auction for third generation mobile telecommunication licenses in March. "Thirteen groups have applied to bid in Europe's first ever 3G auction," said Ms Hewitt. "I am delighted that nine potential new entrants to the UK mobile telecoms market see the opportunities and have applied to take part, including interest from outside the traditional telecoms market."

February 15, 2000: Patricia Hewitt, the small business and e-commerce minister, today confirmed that all 13 applicants for the third generation mobile spectrum auction have qualified to participate. "I am delighted that we have been able to qualify all the applicants and that we are on track for the auction beginning in March," said Ms Hewitt. "I expect to announce the exact date for the start of the auction shortly."

February 21, 2000: Patricia Hewitt, the small business and e-commerce minister, today confirmed that the third generation mobile auction will start on Monday March 6. Bids will be submitted by fax with bidding for the licenses taking place in a sequence of rounds. At the end of each round, bidders are advised of all bids made. These details will also be published on the auction Web site. The holder of the highest bid on each license is required to remain inactive in the following round. The auction, which may last several weeks, will end when no further bids are received.

April 27, 2000: The UK 3G spectrum auction ended today after seven weeks - 150 bidding rounds.

September 1, 2000: By this date, the Radiocommunications Agency issued a Wireless Telegraphy Act License for third generation mobile telecommunications spectrum to all the winning bidders. The licenses commence immediately and continue in force until December 31, 2021 unless surrendered or revoked earlier.