

## Successful Wireless Auctions for competitive markets - the UK Experience

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## Introduction

In recent years the UK has adopted a liberalised approach to allocating spectrum - favouring auctions and, so far as possible, allowing licensees to trade.

This paper looks at UK policy in relation to spectrum awards for mobile wireless services. In particular, it examines the treatment of new entrants and the elimination of entry barriers.

We take as our starting point that market entry is in principle a good thing and that these markets are characterised by high, non transitory barriers to entry. The obvious barrier is the requirement for rights to use wireless spectrum. However, this is not the only barrier: the capital expenditure requirements to enter these markets as a network provider are formidable. In addition, the time to market from licence grant is likely to be significant particularly if the new entrant is required to build the network before it can introduce services.

The UK government has pursued a remarkably consistent and determined policy of encouraging network-based entry into mobile telephony markets. Indeed, it is broadly a given of UK policy in this area that market entry is to be welcomed and fostered where possible. For example, commenting on the result of the UK's 3G auction in April 2000, Stephen Byers, the UK's Secretary of State for Trade and Industry said this:

*"I welcome the introduction of a new entrant to the UK mobile telecoms market. This has been a direct result of the decision to auction five licences. Greater competition will spur faster roll-out of more innovative services, as well as delivering greater choice and lower prices to the consumer..."*

Policies on spectrum allocation can ensure that new entrants gain access to the right kind of spectrum but can also mitigate other barriers to entry and increase speed to market.

This paper examines the kind of measures which regulators may wish to take and does so with reference to two UK spectrum allocation processes:

- The 3G auction which took place in March and April 2000<sup>1</sup>; and
- The GSM/DECT guardband auction which took place in April 2006<sup>2</sup>.

The first example has been chosen because it was specifically designed to encourage market entry in relation to 3G mobile communications services, delivering both voice and data. At the time of the auction, there were four established national mobile operators. The auction added a fifth. It was a massive undertaking and generated total auction receipts of around £22.5 billion.

The second example has been chosen because, although it was neutral to the kind of services which might be provided, the spectrum abuts the GSM bands and is

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<sup>1</sup> This auction was described in detail in an Information Memorandum published by the UK's Department of Trade and Industry and their advisers, N. M. Rothschild, dated 1 November 1999

<sup>2</sup> This auction was described in detail in an Information Memorandum published by Ofcom on 24 November 2005.

therefore reasonably suitable for mobile applications. To quote Ofcom, “*The Spectrum Bands fall within the operating range of the majority of existing GSM mobile phones.*” It is important to note that spectrum rights in the guardband auction were non-exclusive (they are shared between all successful bidders); that only a relatively small amount of spectrum was on offer (1781.7-1785 MHz paired with 1876.7-1889MHz); and that the licences were low power licences<sup>3</sup> However, incumbent mobile operators had argued strongly for the possibility of exclusive occupation and high-power use<sup>4</sup> and Ofcom’s decision to pursue a structure which virtually guaranteed market entry is therefore significant. .

In addition, we examine briefly the UK’s PCS 1800 award process which commenced in 1989 - not an auction process, but nevertheless important in relation to the award of spectrum rights.

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<sup>3</sup> Presumably for these reasons the guardband auction generated much less money: a total of around £3.7 million - much smaller than the 3G auction

<sup>4</sup> See, for example, the consultation responses of Vodafone and T-Mobile dated September 2005 and 16<sup>th</sup> September 2005 respectively

## 2. Lessening entry barriers part I - auction design

We deal here with, first, ensuring there are enough packages to allow a new entrant (i.e. that the number of packages is at least one more than the number of incumbents) and, second, the possibility of designating one package (probably the largest) for new entrants.

### **3G Auction**

In the UK 3G auction, five packages of spectrum were available and bidders were allowed to bid only on one package. This ensured that, on completion of the auction, there would be five separate licensees - guaranteeing a new entrant. In addition, the largest package of spectrum -- so-called "Licence A" -- was designated for new entrants. Existing entrants were not allowed to bid for this Licence. The government said as follows:

*"Five WT Act Licences are available, based on the following blocks of frequencies:*

*1 Licence (A) 2 x 15 MHz paired spectrum, plus 5 MHz unpaired spectrum*

*1 Licence (B) 2 x 15 MHz paired spectrum*

*3 Licences (C to E) 2 x 10 MHz paired spectrum, plus 5 MHz unpaired spectrum*

*Licence A will be reserved in the Auction for a New Entrant. The remaining four WT Act Licences will be available to both New Entrants and 2G operators who bid."*

And again:

*"A five licence auction is intended to deliver the Government's objective for the efficient use of the spectrum and, in particular, will encourage market entry and sustainable competition by ensuring that at least one New Entrant can enter the UK market."*

It is important to note that licence A, designated for new entrants, was quite significantly larger than all of the other licences except licence B (which was still smaller, but only slightly). However, it also had a proportionately higher reserve price - in other words, there was no suggestion of a built-in subsidy.

### **Guardband Auction**

The guardband auction took a slightly different approach to a similar issue. In this case, a flexible number of licensed packages was auctioned, with a minimum number of seven and a maximum of 12.

The process effectively ran six consecutive auction options, each auctioning a different number of licences. Participants could take part in any or all of the options. For example, a participant might submit a bid in the option for seven licences which was higher than their bid in the auction 12 licences. In the event, the bids were as follows:

Bidder	Option (number of licences on offer)					
	7	8	9	10	11	12
British Telecommunications PLC	£305,112	£295,112	£275,112	£275,112	£275,112	£275,112
Cable and Wireless UK (England)	£281,002	£281,002	£101,002	£51,002	£51,002	£51,002
COLT Mobile Telecommunications Ltd	£1,513,218	£1,513,218	£1,513,218	£1,513,218	£1,513,218	£1,513,218
Cyberpress Ltd	£151,999	£151,999	£151,999	£151,999	£151,999	£151,999
FMS Solutions Ltd	£113,000	£113,000	£113,000	£113,000	£113,000	£113,000
Mapesbury Communications Ltd	£76,660	£76,660	£76,660	£76,660	£76,660	£76,660
O2 (UK) Ltd	£209,888	£209,888	£209,888	£209,888	£209,888	£209,888
Opal Telecom Ltd	£155,555	£155,555	£155,555	£155,555	£155,555	£155,555
Orange Personal Communications Services Ltd	£50,000	£50,000	£50,000	£50,000	£50,000	£50,000
PLDT (UK) Ltd	£88,889	£88,889	£88,889	£88,889	£88,889	£88,889
Shyam Telecom UK Ltd	£101,011	£101,011	£101,011	£101,011	£101,011	£101,011
Spring Mobil AB	£50,110	£50,110	£50,110	£50,110	£50,110	£50,110
Teleware PLC	£1,001,880	£1,001,880	£1,001,880	£1,001,880	£1,001,880	£1,001,880
Zynetix Ltd	£50,000	£50,000	£50,000	£50,000	£50,000	£50,000
<b>Option total</b>	<b>£3,618,654</b>	<b>£3,721,654</b>	<b>£3,622,665</b>	<b>£3,687,212</b>	<b>£3,738,214</b>	<b>£3,788,324</b>

The option selected, under the auction rules, was to be the option with the highest total amount of all effective bids under that option (e.g. in the seven licence option, the seven highest bids and so on).

There are two significant points to note about this. First, the guardband auction inherently generated market entry because the minimum number of licences on offer was seven (in a market with five established players). Secondly, subject to the minimum of two new entrants, the auction was specifically designed to allow the market to decide the optimal number of licences. However, it did this without allowing the option that the whole award might be reserved for a single high-power player (i.e. almost certainly an incumbent network operator).

### ***PCS 1800 award***

This award process followed the UK government's innovative consultation document entitled "Phones on the Move". Issued in 1989, this proposed the adoption of a GSM-like standard in the 1800MHz ranges. Three new licences were to be awarded. Significantly, neither of the then-incumbents (Vodafone and Cellnet) was to be allowed licences. At the time (although no longer) Cellnet was a majority-owned subsidiary of British Telecom (BT); and BT was also prevented from participating in the process in its own right. The reason for this approach was to encourage competition in a market which, at the time, had only two players. It seems clear that this licensing structure has indeed been a significant factor in the development of the UK market which shows remarkably even distribution of market shares between the four major players<sup>5</sup>.

In conclusion in this section, in both of the major award processes (the 3G auction and the PCS 1800 process) and also in the less significant (but more recent)

<sup>5</sup> At the end of calendar Q3 2006, Vodafone had 14.1m customers; Orange had 15.1m; T-Mobile 16.6m; and the largest of the four was O2 with 17.3m. Vodafone, interestingly, generated more revenue than the others, despite having fewest customers. (Source: Ofcom - [http://www.ofcom.org.uk/research/cm/tables/q3\\_2006/q3\\_2006.pdf](http://www.ofcom.org.uk/research/cm/tables/q3_2006/q3_2006.pdf) )

guardband auction, the UK thought it advisable to design the auctions in a manner which would ensure a new entrant. In the 3G auction, substantially the largest spectrum package was designated for such an entrant<sup>6</sup>.

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<sup>6</sup> It was in fact common practice in many EU member states to design processes for 3G licence allocation using the “N+1” approach (i.e. where the number of licences available either ensured a new entrant or at the least allowed the possibility that there would be more licences than incumbents)

### 3. Lessening entry barriers part II - other measures

This section deals with other ways of reducing entry barriers and encouraging market entry. Part of the thinking here is that once the new entrant has been awarded rights to use spectrum, it must devote time and money to rolling out a network and establishing a brand. Established players do not only have traditional incumbency advantages; they are also likely to be able to roll-out *new* networks more quickly because they have established infrastructure. This would serve only to entrench the advantages they already enjoy.

There are various ways of mitigating these factors, some of which are described in this section.

#### (i) *National roaming / pure resale*

The obvious way to allow a new entrant to offer services quickly is by mandated access to existing networks during its roll-out phase. This issue generated considerable controversy in the UK's 3G auction. In the original draft auction rules, it was proposed that it be a condition of participation in the auction that all the existing players accept a licence condition which would entitle any new entrant to national roaming on the 2G network<sup>7</sup>.

Two of the four 2G operators (Orange and One2One (now T-Mobile)) chose to challenge this requirement in court. They lost their challenge; however, faced with the prospect of an appeal which could have disrupted the auction process, the UK government decided not to press ahead with its attempts to force all 2G operators to accept a national roaming condition. Instead, it agreed voluntary licence amendments with the two longest-established operators, Vodafone and Cellnet<sup>8</sup>.

The UK government was able to make the following statement in the information memorandum:

*“The 2G operators are currently licensed to use spectrum in the 900 and 1800 MHz bands to offer mobile telecommunications services in the UK. All four 2G operators have built networks which serve an area where more than 90% of the UK population live. If the land mass of Great Britain alone is considered, then coverage extends to 97% of the population. The Government considers that this would represent a significant advantage in the mobile telecommunications market over any New Entrant, since a 2G operator with a*

<sup>7</sup> At this time, mobile network providers had to be licensed under two completely separate regimes: they required a wireless telegraphy licence for spectrum use; and they were also required to be licensed under the Telecommunications Act 1984 to run telecommunications networks and provide services. The legal mechanism proposed by the government was that the grant of a new wireless telegraphy licence for 3G spectrum be conditional on agreements to amendments to the Telecommunications Act licence so as to mandate national roaming. This convoluted approach was necessary because amendments to Telecommunications Act licences could only be given effect either by agreement or following an extremely lengthy inquiry by the UK's Monopolies and Mergers Commission.

<sup>8</sup> The Government said as follows: “As long as either BTCellnet or Vodafone (or a member of either of their groups) wins a 3G licence, the availability of roaming to new entrants on fair terms will be guaranteed. Against that background, and the need to minimise uncertainty while the possibility of an appeal by One2One to the House of Lords remains, the Government does not now expect to use its power to impose the roaming condition through the auction rules.” (Statement by UMTS Auction Consultative Group, 14 October 1999)

*3G WT Act Licence would be able to offer voice and some data mobile telecommunications services across the UK through its existing 2G network whilst a 3G New Entrant was still rolling out a network.*

*Roaming by customers of a 3G New Entrant onto the network of a 2G operator would alleviate the initial inability to provide mobile telecommunications services across the UK. The Government has therefore sought to ensure that New Entrants should have a high degree of certainty as to the availability of roaming and the conditions upon which they would be able to conclude an agreement...*

*Vodafone and BTCellnet have consented to the insertion of the new condition into their Mobile PTO T Act Licences and these modifications have been made. In the event that agreement cannot be reached during commercial negotiation, a dispute may be referred to the Director General. If the 2G mobile operator does not win a Licence then the condition will not be triggered.”*

In short, while the Court action concluded that the government had the power to require national roaming as a precondition for auction participation, it did not need to use that power because Vodafone and Cellnet had already consented to amendments to their licence in any event. This was important because it enabled the government to proceed with the auction quickly.

In our view, while the factual matrix is a little complex, the UK government came as close as possible to requiring national roaming<sup>9</sup> and was prevented from actually doing so merely by force of circumstance. In practice, we regard the distinction as so nice as to be effectively a semantic one<sup>10</sup>.

In the event, it is understood that Hutchison 3G, the successful entrant, negotiated a national roaming deal with Cellnet. The intervention of the UK's then regulator (the Director General of Telecommunications, usually known as Oftel) was allowed for in the national roaming licence condition but was not in the event required<sup>11</sup>.

This roaming question was not considered in the UK's guardband auction, presumably because of the small amount of spectrum on offer, and the fact that licences did not convey exclusive access; licences were therefore appropriate only for small, targeted roll-outs e.g. campus-based or in-building services.

## **(ii) Mast and tower sharing**

Infrastructure sharing is an important measure which can have significant benefits for a number of reasons. It can encourage maximum service availability even in areas with existing competition, particularly in dense urban areas where there may be a

<sup>9</sup> At the time of the auction the author of this report was Regulatory Counsel of One2One (now T-Mobile UK), one of the successful bidders and the party which mounted the legal challenge to national roaming.

<sup>10</sup> The UK was by no means the only European Country to mandate national roaming as part of the 3G auction. Others included France, Spain, Italy.

<sup>11</sup> If the UK were to engage in a new licensing process for a “full” mobile licence today, it is possible that an obligation to mandate roaming might not be required - because of competitive conditions in the market, the incumbents might actually welcome the chance to offer the facility on competitive terms. Of course, the UK is fairly unusual in having quite a high number of competitors with approximately equal market shares... However, at the time of the 3G auction it clearly was considered necessary; and, indeed, it might also be considered necessary today - a moot question.

limit on available mast sites; it minimises environmental impacts; and, in the context of new entry, it allows entrants to compete on more equal terms with the established players.

In the information memorandum to the UK 3G spectrum auction, the government made the following statement about infrastructure sharing:

*“1.2.2.4 Infrastructure sharing and planning*

*The Government strongly encourages mobile network operators to share masts and/or sites where possible in order to minimise the environmental impact of networks. This can also reduce the cost of deploying a network.*

*Current site sharing arrangements are a result of commercial agreements between the owner of the site and all sharing operators. The 2G operators enter into such agreements not only with other mobile operators, but also with other types of network operators and site owners (including local authorities and the emergency services as well as a number of other private and public sector organisations).”*

This was accompanied by a statement from Oftel, then the regulator, noting their powers to intervene to resolve disputes about infrastructure sharing pursuant to the Telecommunications (Interconnection) Regulations 1997.

Ofcom made similar statements in relation to the guardband auction:

*“6.14 The Government strongly encourages network operators to share masts and/or sites where possible, subject to any inter-operator radio co-existence issues, in order to minimise the environmental impact of networks. Planning authorities require operators to provide evidence that they have carefully considered the use of existing masts, buildings and other structures before seeking to erect any new telecommunications mast. “*

It is our view that the Ofcom enjoys powers similar to those enjoyed formerly by Oftel to resolve disputes about network sharing (the Telecommunications (Interconnection) Regulations 1997 having been revoked) under Chapter 3 of Part Two of the Communications Act 2003.

In addition, network operators in the UK typically benefit from the provisions of the Electronic Communications Code. This conveys certain rights to gain access to third party real estate including potentially to masts and towers.

#### 4. Conclusions

In conclusion, the UK has persistently pursued a policy of encouraging market entry at every possible opportunity.

The best example of recent UK policy in relation to large-scale spectrum auctions and the proper approach in respect of new entrants is the 3G spectrum auction of March/April 2000.

In this auction, UK government put in place a very extensive regime in order to lessen entry barriers.

Different considerations were at play in the guardband auction. Even here, however, the auction was structured so as to encourage market entry, albeit at low power; and an approach which would have effectively reserved the spectrum for an existing player was ruled out.

In the PCS1800 process, the UK specifically designated the new licences for new entrants.

This report is concerned with the policy behind market entry -- i.e. that it is a good thing -- and not primarily with the success or otherwise of the new entrants. However, recent Ofcom statistics show that the number of customers of 3UK (the new 3G entrant) grew from 0.5m in 2003, to 2.5m in 2004 and 3.5m in 2005. Ofcom also offers the following comment: "3UK had an estimated revenue market share of 7% compared to a subscriber share of 5%, giving it a relatively healthy ARPU." 3UK has also been aggressive in rolling out its new technology, gaining a large proportion of the new 3G market<sup>12</sup>. So, while it is probably too early to judge 3's success, there are promising signs.

The UK has often been held up as a model of success in mobile regulatory policy, enjoying as it does some of the most competitive conditions of any market in the world. It is difficult to avoid the conclusion that this success is a direct result of a consistent pro-competition policy by the UK government.

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<sup>12</sup> See 2 April 2007 Ofcom Digital Progress Report (Fig 44):  
[http://www.ofcom.org.uk/research/cm/broadband\\_rpt/broadband\\_rpt.pdf](http://www.ofcom.org.uk/research/cm/broadband_rpt/broadband_rpt.pdf)