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# Bid Up! – Spectrum Matters

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# The supply of spectrum

## Think of spectrum supply as 3 markets

	<b>Spectrum</b>	<b>Land analogy</b>
<b>Primary</b>	Auction	New build
<b>Secondary</b>	Spectrum trading	Owned and occupied
<b>Third</b>	Band management	Rentals

But the primary market dominates – and Ofcom is the monopoly supplier

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## But the primary market has undergone considerable change

- Slow but consistent progress from old world (“command & control”) to new world (spectrum liberalisation):

	<b>Principal allocation method</b>	<b>Payment</b>	<b>Licence Tradable?</b>	<b>Technology-Specific?</b>	<b>Rollout Obligations?</b>	<b>Licence term</b>
<b>Old world</b>	Beauty contest	PAYG	No	Yes	Probably	No end date
<b>New world</b>	Auction	Up front	Yes (in whole or part)	No	No	Minimum guaranteed term

The infamous 3G auction of 2000 was in the transition between old and new worlds.



The worst of both worlds!

## What does liberalised spectrum use mean?

- Government/regulator doesn't know best after all. So market-based allocations of spectrum are the optimal approach.
- Spectrum licensees are awarded *rights*, not *obligations*. Licensees decide what to deploy (technology- and service-neutral), with what coverage, subject to:
  - The licence's Technical Licence Conditions (TLCs) – “planning permission for spectrum”.
- No “use it or lose it” obligation.
- A spectrum licence is a tradable asset in whole or part, so a licensee can:
  - Sell the licence if their business model proves flawed (or someone else comes up with a better use for their spectrum)
  - Sell the “white space” around their network
  - Lease the white space to those who only want a bit of it (including geographically or temporally) – or at least that's the theory!

## But there are some points for potential bidders to note

- There's no such things as complete technology- and service-neutrality of use:
  - its pursuit by Ofcom delays offering spectrum to the market and may result in "sub optimal" subsequent use (guard blocks etc)
  - The auction design and timing influence (at least initially) who might purchase some spectrum and what they might do with it.
- No process yet for extending a licence beyond its minimum term.
- **Broadcast service licences will still be required where relevant.**
- Technical Licence Conditions (TLCs) are set UK-wide and Ofcom will be cautious about agreeing to changes:
  - limits mixed uses of same spectrum with geographic separation
  - affects the value of auctioned spectrum in secondary market.
- Ofcom is the dominant supplier of spectrum for certain services (e.g. fixed links, business radio, PMSE), so a commercial spectrum owner may find itself competing against its regulator (like playing against a competing team, where that team has picked the referee).

## Ofcom auctions to date

Date	Spectrum	Minimum Licence term	Geographic licence areas		Number of licensees	Amount raised (£ m)	Anything deployed yet?
			National	Regional			
May 2006	DECT guard band	10	√		12	3.8	Some
Oct 2006	412 MHz	15	√		1	1.5	Yes
May 2007	1785-1805 MHz	15		√	1	0.4	?
Feb 2008	10-40 GHz	15	√	√	10	1.4	A little
May 2008	L-Band	15	√		1	8.3	No
Feb 2009	DDR (interleaved)	16		√	2	0.0	No

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The only spectrum auctions where broadcast service licences might be required by the new licensees.

## Spectrum for auction in the next 2 years

Year expected	Spectrum to be sold	Seller	Potential uses
2009H2-2010H1	2.6 GHz (unpaired)	Ofcom	Mobile/fixed broadband (WiMAX)
2010H1	872/917 MHz (paired)	Ofcom	?
2010	800 MHz & 2.6 GHz (paired)	Ofcom	Mobile broadband (LTE)
2010	406 – 430 MHz	MOD	Private Mobile Radio (PMR) – TETRA
2010	3.4 – 3.6 GHz	MOD	Mobile broadband (WiMAX)
2010	4.4 – 4.5 GHz	MOD	Fixed links?
2011H1	600 MHz	Ofcom	Freeview/mobile TV
2011	10 GHz	MOD	Fixed links?
2011	13 GHz	MOD	Fixed links?

- MOD manages about a third of all spectrum under 15 GHz:
  - Including 2.3 GHz (suitable for mobile WiMAX broadband)

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# Why so much mobile broadband?

- *Commercially-attractive* consumers (driven by iPhone + “all you can eat” data plans) are increasingly demanding access to content and services on demand, wherever they are -
  - Greater consumption on the move (mostly nomadic, some truly mobile)
  - Content not pulled from storage is pulled from an Internet Protocol source (so the future of “mobile TV” may be 3-4G/WiMAX/Wi-Fi rather than broadcast)
  - Still waiting for context- and location-specific services and advertising (very different business model to linear), but they’ll come.
- In addition mobile broadband is finally filling up all of that 3G spectrum.
- Digital Britain proposes:
  - universal broadband - fixed lines may be seen as the answer for most consumers, but wireless will be quicker and cheaper to reach some rural homes
  - broadband on trains & down the Tube.
- Intelligent Transport Systems – coming to a car near you!

And what would taking part in an auction consist of?

## Before the auction starts

- Potential bidders have to register and pay a deposit.
- The size of that deposit determines the maximum spectrum you could bid for.
- Bidders cannot increase the “size” of their bids as the auction progresses – although the total amount you bid may increase.
- Registrants are made public pre-auction, so you can see who you’re up against (but all bids will be anonymous and only total demand will be revealed at the end of each round).

## Bidding

- Bidders log on remotely
- Ofcom sets the Round Price for each type of bundle of spectrum rights (“Lot”)
- Bidders decide how many Lots they would be willing to purchase at the applicable Round Prices
- Ofcom increases prices after each round for each Lot where demand exceeds supply
- Every bid submitted, in any round, is valid and could be accepted
- But any bid accepted has to be accepted in full
- The auction stops when there is no excess demand for any Lot on offer
- Winners don’t pay the price they bid, they pay the 2<sup>nd</sup> price (i.e. prices actually paid are determined by competing bidders).
- So for each licence awarded, there will be no losing bidder who displayed a greater willingness to pay than the final price.

Why does this matter for radio?

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## Would radio transition to the “new world” of spectrum usage?

- Radio is “old world”, ring fenced (for now) from new world spectrum thinking.
- *Quid pro quo* is heavy radio regulation but no spectrum auctions.
- But if spectrum were auctioned for use by radio services:
  - Tradable (in whole or part) spectrum licences.
  - Containing spectrum *rights*, not *obligations* – licensees don’t have to deploy anything at all.
  - Those licences could be used to support any mixture of services which could be accommodated within the spectrum rights awarded.
  - Any tx sites for which spectrum rights were purchased, but which weren’t required by the licensee, could be kept for later expansion or sold for new commercial services (keeping an eye on the minimum licence term).
  - New, plain vanilla service licences (awarded on application) – no prescription on genres, news, local content etc
- Would this be threat or opportunity for radio?
- Does the radio industry make this more likely by demanding reduced regulatory obligations?