Proposed variation of Everything Everywhere's 1800MHz spectrum licence to allow use of LTE and WiMAX technologies – Vodafone response

Section 1: Introduction and Executive Summary

Vodafone strongly believes that a competitive market in 4G services will bring long-lasting benefits to UK consumers. Having launched these services in a number of other countries we would urge Ofcom to hold a full and fair spectrum auction as soon as possible so that all operators can access the necessary spectrum for 4G. Instead, Ofcom's current consultation proposes to give an unjustifiable head start to the largest player which could seriously undermine competition in the UK market for many years to come.

Ofcom's conclusion that there is no material risk of distortion to competition as a result of liberalising EE's 1800 spectrum now rests on three fundamental errors.

- First, that the EC considered and accepted a first mover advantage when setting the spectrum divestment commitment on Orange and T-Mobile, thereby preventing Ofcom from re-opening that issue now.

- Second, that the period of EE's first mover advantage would be limited to a maximum of 15 months and will not endure beyond that period as EE continues to deepen and widen its LTE network.

- Third, that consumer demand for LTE services is uncertain and the technical advantages of LTE over technologies such as HSPA are unclear.

Ofcom is wrong on the first point because materials from the merger process recently released by Ofcom[1] make it clear that the EC's decision was based upon very clear statements by the parties that they would not be able to launch LTE services before 2013/14. Therefore, when the EC set a long-stop divestment date of September 2013, it was clearly seeking to create broadly equal access to LTE-capable spectrum for multiple operators.

[1]See Attachment 5 at http://www.ofcom.org.uk/foi-responses/april-2012-foi-responses/

In any event, Ofcom has its own duties and responsibilities to consider in light of the evidence before it now whether liberalisation raises the risk of distortion to competition. Ofcom itself acknowledged this at the time of the EC decision.

Ofcom's second point is wrong because it assumes that in any race you stop benefiting from a headstart as soon as your competitors start running. Ofcom assumes that as soon as other operators are able to launch a 4G service, EE's competitive advantage will be immediately neutralised. This is incorrect: even if one assumes that EE's competitors can deploy their networks faster than EE to catch up the lost ground, given EE's LTE headstart their advantage will clearly extend far longer than 15 months.

Finally, Ofcom has misdirected itself on the third point by not considering the question of a distortion to competition taking full account of all EE's other advantages in this market. The question Ofcom has to address is not a hypothetical one about first mover advantage; rather it is a specific question about whether a first mover advantage of this duration in this particular technology, at this particular time and for this particular operator risks distorting competition.

Given that task, it is striking that Ofcom advances no primary evidence in this consultation to address the specific question in front of it. In addition to the EC's merger decision it relies only upon a cross-reference to its January 2012 spectrum consultation which addressed the wrong question. In that consultation the question was: "How does HSPA+ compare with LTE assuming competing operators each use one of those technologies?" But EE already has HSPA+. The question in this consultation must be: "How does the early and exclusive liberalisation of 1800 MHz spectrum impact an operator with both HSPA+ and LTE as well as the most sites, the largest customer base and the most retail stores?" What evidence Ofcom has gathered in its previous consultation on this question argues against its current conclusions.

Ofcom puts forward only a very tentative conclusion that operators with LTE spectrum may be at an advantage when competing for 'certain segments of services or customers.' It needs to be tentative because it has not sought out the evidence necessary to establish the case. In fact, evidence from other markets demonstrates that there is considerable customer demand for the higher speeds of LTE. However, if it is introduced in an uncompetitive manner, consumers are likely to pay high prices in the short term and suffer reduced competition in the longer term. Thus, the risk of a distortion to competition arising from early and exclusive liberalisation of EE's 1800 spectrum is self-evident.

Liberalising spectrum for EE alone, without any preconditions would make it immune to any further slippage in the spectrum auction timetable. Instead, Ofcom should take any remaining measures now to ensure that licences in the 1800MHz band are capable of being used for 4G and other services. However, to promote the interests of effective competition, Ofcom must not vary existing 1800MHz licences until it is satisfied that there are 4 operators holding sufficient cleared spectrum to deploy credible national 4G networks. This is consistent with Ofcom's stated policy objective in both of its most recent spectrum consultations and would, in practice, require the release of new spectrum via the Combined Auction before any 1800MHz licences are varied.

Such an approach would not eliminate the advantage EE has enjoyed from its longer period of spectrum certainty which will have allowed EE greater network planning and deployment time for

LTE than any other player. However, it would broadly equalise the timetable for the launch of LTE services, which was the clear intention of the EC when EE was first created.

For the reasons we articulate in this response, Ofcom cannot proceed along the lines it proposes without clearly contravening its spectrum management duties and obligations.

The remainder of Vodafone's response is set out as follows:

In **Section 2**, we examine the legal responsibilities and obligations upon Ofcom when carrying out this review including its ability to rely upon the Orange / T-Mobile EC merger decision when discharging those responsibilities.

In **Section 3**, we examine Ofcom's assumption that any first mover advantage would be limited to 15 months, demonstrating that it would, in fact, be much longer.

In **Section 4** we examine the evidence from other markets on the likely long-term impact on competition of the early and exclusive introduction of LTE by EE.

Finally, in **Section 5**, we set out our view of the next steps Ofcom should take and propose remedies to address the risk of competitive distortion.

Section 2: Legal analysis

Ofcom's legal case for an immediate variation of EE's licence is based on a number of premises that are plainly wrong. We examine each of these below in further detail. Even absent these glaring errors, the competition assessment that Ofcom has undertaken – upon which it currently relies in support of its proposed course of action – in this case is characterised by a dearth of evidence and a failure to take into account of all relevant facts. Were Ofcom to proceed along the lines it proposes, there is a very real risk that considerable damage would be inflicted to the competitive landscape in the UK mobile market that may not be capable of being remedied in the medium or even the longer term.

Erroneous reliance on the EC merger decision

The European Commission's decision to approve the creation of Everything Everywhere in March 2010 is fundamental to Ofcom's current proposal to vary EE's 1800MHz licence without delay. Specifically, Ofcom claims that:

(i) The European Commission appreciated in March 2010 that EE could be in a position to deploy an LTE network theoretically at any point post-clearance, subject to an authorisation decision from Ofcom;

(ii) The Commission accepted a divestment commitment from the merging parties to address its competition concerns about the merger. The divestment commitment provided by the merging parties would not lead to the creation of a credible rival until potentially as late as 2013/2014, some three years after EE's LTE network could have been deployed;

(iii) The Commission has therefore already satisfied itself that the potential lead or advantage that EE would enjoy over its rivals in respect of the timing of LTE deployment did not raise competition concerns;

(iv) For Ofcom to refuse to vary EE's 1800MHz licence now to enable it to deploy an LTE network would therefore constitute impermissible interference in the exclusive jurisdiction of the Commission in respect of mergers with a Community dimension (as provided for by Article 21 of the EC Merger Regulation).

The reasoning articulated above is wrong on the facts as well as in law. We consider each of these in turn below.

Ofcom rightly notes that a key factor that influenced the Commission's approach in this case was the ability for the merged entity to acquire a timing and marketing advantage in relation to the deployment of LTE services given that no other infrastructure competitor had access to the spectrum necessary to deploy an LTE network. This advantage was further enhanced by the uncertainty surrounding the timing of the auction for the 800MHz/2.6GHz spectrum that would enable the rivals of the merged entity to deploy competing LTE networks. In these circumstances, there would be a clear risk of market bi-furcation that would plainly not be in the interests of mobile consumers. Accordingly, the merging parties offered commitments to remedy this concern, in the form of an undertaking to divest a block of 2x15MHz spectrum in the 1800MHz band. This divestment would ensure that the merged entity would face a competitive constraint in the provision of LTE services post-clearance.

However, Ofcom is plainly wrong to assume blindly that the long-stop date of 30 September 2013 by which EE should clear and hand back its spectrum implies an acceptance on the part of the Commission that EE might have an advantage of up to 3 years post-clearance. What Ofcom has singularly failed to consider before forming its conclusions are: (i) the regulatory framework governing divestment commitments; and (ii) the reasons for the timeframe provided under the specific set of commitments in the Commission's merger decision.

It is therefore necessary to ascertain: (i) why the Commission accepted a divestment commitment that did not require the merging parties to release the divested spectrum until potentially as late as September 2013 (and 2015 in respect of the second tranche of 1800MHz spectrum); and (ii) whether it indeed was of the view that the timing of the divestment provided EE with an advantage that was unlikely to raise competition concerns.

Structural commitments of the type offered by EE are, pursuant to the Commission's own guidelines on merger remedies, recognised as being capable of addressing concerns about the consequences of a merger or acquisition. However, given that a merger or acquisition may pose a risk to competition, it is important that any commitments should take effect as swiftly as possible. This is recognised in the Commission's own guidelines governing merger remedies:

> *"Furthermore, commitments must be capable of being implemented effectively within a short period of time as the conditions of competition on the market will not be maintained until the commitments have been fulfilled."*[2]

A close examination of the Commission's guidelines reveals divestments should take place as speedily as possible and in general within 9-12 months unless there are specific reasons for an alternative divestiture period. Thus, the issue that Ofcom must first address is why EE has been afforded considerably longer than the timeframe envisaged by the merger remedies guidelines to sell or hand back the spectrum that would create a rival provider of LTE services.

From the merger decision itself, it is possible to discern that the Commission was required by a number of third party respondents to address the issue of the timing of the divestiture of the spectrum. The text of the merger decision indicates that the Commission considered the timeframe for clearing and divesting the spectrum was reasonable because it accepted that the merging parties were unable to migrate traffic and customers and clear the spectrum any earlier:

> *"…given the technical characteristics of the parties' integration plans, and the migration and customer base characteristics that the parties have provided to the Commission, to OFCOM and to the OFT, the Commission considers that the timing for clearance of the divestment spectrum proposed by the parties is reasonable and can be accepted."*[3]

Equally, the Commission appears to have relied upon Ofcom's view as to how long it would take for the divestment spectrum to be cleared and transferred to a purchaser:

> *"The Commission's investigation concluded that the timing [for clearance] suggested by the parties seems reasonable and consistent with OFCOM's technical estimation."*[4]

Thus, the Commission was satisfied that spectrum was being made available to a purchaser as soon as it was practicable to do so. But that does not axiomatically mean that the Commission had accepted that the merging parties would have a timing advantage over their rivals and that such an advantage did not raise competition concerns. Indeed, it would have been particularly surprising had the Commission agreed to a remedy that recreated the very advantage for EE that it was seeking to address as part of its merger review. In fact, examination of the evidence from the time reveals quite the opposite.

In this regard, what is clear is that both the Commission and Ofcom were aware that the merged entity's inability to clear 1800MHz spectrum applied equally to the divestment spectrum and the spectrum that would be retained by it. Recent disclosures from Ofcom, pursuant to a request under the Freedom of Information Act 2000[5], confirm that the Commission and Ofcom were actually in possession of information demonstrating that EE would not any enjoy timing advantage over its competitors in the deployment of LTE services.

---

[2] Commission notice on remedies acceptable under Council Regulation (EC) No 139/2004 and under Commission Regulation (EC) No 802/2004, paragraph 9 and 98

[3] Case No. COMP/M.5650, *T-Mobile/Orange*, paragraph 231

[4] Case No. COMP/M.5650, *T-Mobile/Orange*, paragraph 229

[5] All of these materials are available at: http://www.ofcom.org.uk/foi-responses/april-2012-foi-responses/

The parties put in specific responses to the EC on their ability and intentions to launch LTE post-merger stating:

> *Even if available resources were focussed on this activity, the Parties estimate that it would not be possible to clear 20 MHz of 1800 MHz- allowing a 10 MHz LTE deployment* [for EE]- *before 2013.*[6]

The position of the parties was further amplified in a report prepared by RBB Economics as part of the merger review process which stated:

> *"The Parties estimate that it would take at least two years to clear 2*10 MHz of 1800MHz spectrum, without the resource constraints of realizing JV network improvement synergies and completing the initial consolidation of the T-Mobile and 3UK RANs. With these resource constraints, they consider that the earliest date for clearing sufficient spectrum is 2013. As such, the earliest date for the JV to start providing LTE services using 2*10 MHz is 2013, with the possibility for further delays. It would take significantly longer for the JV parties to clear sufficient spectrum to launch LTE services using 2*20 MHz."*[7] [emphasis added by Vodafone]

Elsewhere it appears that the parties claimed they would require 3.5 years (i.e. to September 2013) to clear spectrum for the divestment, relying upon the same network and staff constraints which would prevent their own early LTE deployment. [8] The parties stated:

> *the JV will have higher priorities to modernise and optimise the 2G network for voice, possibly involving a change of vendor, and to consolidate the 2G and 3G networks, both resource intensive processes… Today the planning for these tasks has not been undertaken and it is not possible to give a firm date when spectrum could be cleared. However, we estimate the pressure of other JV tasks would extend the time needed to clear the spectrum by a year, taking the full elapsed time to three years i.e. 2013/2014*.[9]

Thus, it is clear that the Commission operated on the basis that the remedy that the parties offered in relation to spectrum would not result in the merged entity enjoying any significant timing (and marketing) advantage over its rivals in relation to the deployment of a national LTE network. This was quite simply because the merged entity itself, based on its own submissions, could only have deployed an LTE network using 2x10MHz of 1800MHz spectrum in 2013 at the earliest. The Commission could therefore be satisfied that the timing of the divestment remedy would enable the creation of a credible constraint at the time when the merged entity would be in a position to deploy an LTE network.

What is also revealed by Ofcom's recent disclosures is that both Ofcom and the Commission expected that in 2013, all existing mobile operators were likely to be on more or less an equal

[6] Summary of response to Vodafone and O2 submissions (undated)

[7] Report by RBB Economics, 26 January 2010

[8] Ofcom email 19 February 2010. The parties appear to have set out for the Commission detailed justifications for this time-frame including the amount of spectrum available, their 2G traffic loading, the speed of migration to new technologies and spare capacity on the 3G or LTE spectrum. The memo states *"there are additional constrains in the form of staff resources, equipment upgrades and site contract negotiations."*

[9] Additional information requested by the case team in its meeting with the parties on 19 January 2010 dated 26 January 2010

footing in terms of their access to the necessary spectrum and their corresponding ability to deploy an LTE network. Ofcom itself advised the Commission:

> *"Once additional spectrum becomes available through future auctions at 800MHz and 2600MHz in 2010/11, other operators will have the ability to counter or at least react to the merged entity's first mover advantage. 2.6GHz spectrum will be available for use after the auction (but see below) and 800MHz will be available for use in 2013. Of the two, 800MHz spectrum has far more attractive properties for use in terms of providing the best and most cost effective coverage. 2.6GHz spectrum is more suited to allow higher bit-rates in urban areas given its less favourable propagation characteristics."*[10] [emphasis added by Vodafone]

Thus, the claim by Ofcom in this consultation document that EE would have been the only operator able to deploy an LTE network for a period of time following the approval of the merger and the Commission was unconcerned by this prospect is simply not credible. If anything, what these documents demonstrate is that the Commission approved the timing of the divestment on the basis that there would be effective competition to the merged entity not only from the buyer of the divestment spectrum, but also from other mobile operators at the earliest time when the merged entity might have deployed an LTE network. The Commission could not have gone any further than this by, for example, linking the divestment to liberalisation of the spectrum. This is because, as we discuss below, the Commission has no jurisdiction over the management of radio spectrum. This is a matter that has been devolved by the Community legislature to national regulatory authorities such as Ofcom.

Misapplication by Ofcom of Article 21 of the ECMR

Ofcom then seeks to reinforce its claims about the assumptions of the Commission with reference to an argument that any decision not to accede to EE's request would in some way constitute impermissible interference in the exclusive jurisdiction of the Commission in the realm of merger control. Even the most cursory examination of Article 21 of the EC Merger Regulation reveals the deeply flawed nature of Ofcom's legal analysis.

Ofcom's statement at paragraph 4.17 of the consultation document thus reveals Ofcom's error in law and its fundamental misunderstanding of the relationship between the EC Merger Regulation and Ofcom's Community law duties governing the allocation and management of radio spectrum. If Ofcom's reasoning in this case were followed to its logical conclusion, Ofcom would to all intents and purposes be operating in a regulatory vacuum when allocating and managing a scarce resource that is critical to the operation of mobile networks. The reason why such an outcome is simply not plausible is because the Commission's jurisdiction extends solely to concentrations between undertakings that have a Community dimension.

The purpose of Article 21 of the ECMR is to prevent EU Member States from applying national competition law or imposing conditions in a way that impede mergers that are subject to review by the European Commission. Article 21 provides:

> *2. Subject to review by the Court of Justice, the Commission shall have sole jurisdiction to take the decisions provided for in this Regulation.*

[10] Ofcom memo to DG COMP, 21 December 2009

3. No Member State shall apply its national legislation on competition to any concentration that has a Community dimension.

Notwithstanding paragraphs 2 and 3, Member States may take appropriate measures to protect legitimate interests other than those taken into consideration by this Regulation and compatible with the general principles and other provisions of Community law.

Public security, plurality of the media and prudential rules shall be regarded as legitimate interests within the meaning of the first subparagraph.

Any other public interest must be communicated to the Commission by the Member State concerned and shall be recognised by the Commission after an assessment of its compatibility with the general principles and other provisions of Community law before the measures referred to above may be taken. The Commission shall inform the Member State concerned of its decision within 25 working days of that communication

There is no evidence that Ofcom has applied its concurrent competition law powers in any way that might impede the transaction that resulted in the creation of EE. In any event, Ofcom has no formal jurisdiction in respect of mergers or acquisitions involving undertakings in the telecommunications industry, so there is no possibility of it applying UK merger control rules on an ex post basis to the creation of EE. Nor is there any suggestion that Ofcom is proposing to take measures in this case to protect legitimate national interests such as national security or media plurality. Thus the referral to Article 21 of the ECMR is, with respect, little more than a regulatory red herring.

More significantly, the EC Merger Regulation cannot as a matter of law require Ofcom to liberalise (or refrain from liberalising) spectrum. This is because the management of radio spectrum is within the sole competence of Ofcom as the sector-specific regulator in the UK acting in accordance with a set of harmonised principles established by the pan-European regulatory framework (the Common Regulatory Framework or "CRF"). The obligations imposed by Community law upon Ofcom and how they should be applied in relation to the proposed variation of EE's 1800MHz licence are considered in further detail below.

Thus the EC Merger Regulation cannot displace or override Ofcom's free-standing obligations and duties in relation to the management of radio spectrum since the ECMR must co-exist with the ex-ante regulatory framework. The Commission can no more interfere in the way that Ofcom manages radio spectrum than Ofcom can seek to apply national competition law to a merger with a Community dimension. If Ofcom's interpretation of the operation of Article 21 were correct, it would mean that Article 21 would provide the Commission with carte blanche to impose any number of positive obligations upon Member States to put in place measures to give effect to the assumptions of the Commission when reviewing a merger. Taking Ofcom's theory to its logical extreme, it would be possible to argue that the imposition of caps in the forthcoming spectrum auction or the reservation of spectrum in that auction for H3G or a new entrant would be required because of the Commission's merger decision. This is plainly nonsensical and Ofcom at no point in its spectrum auction consultation suggests that its latest proposals in relation to the 800MHz/2.6GHz auction are necessary to give effect to the Commission's merger decision. Nor does it suggest that any alternative proposals that were considered previously (including the effective reservation of 5MHz of 800MHz spectrum for EE) would constitute a breach of Article 21 of the ECMR.

This is why there can be nothing in the Commission's merger decision that connotes an obligation upon Ofcom to vary EE's 1800MHz licence within a certain timeframe. Nor does it appear that Ofcom provided any such commitment to the Commission.[11] Nor could it have done so, given that the Community legislature had not in March 2010 (at the time of the merger) authorised refarming the 1800MHz band for LTE services. Indeed, given the facts described earlier, the most that the Commission might have possibly inferred (if any inference could be drawn) would be that Ofcom might vary licences at some point in 2013 or 2014 to enable EE and all of its rivals to deploy LTE networks broadly simultaneously. Accordingly, a decision not to vary EE's licence at this time cannot be deemed in any way to obstruct or otherwise prevent the implementation of the merger.

If, contrary to Vodafone's primary case, Ofcom's interpretation of Article 21 is correct, a decision to liberalise unconditionally EE's 1800MHz spectrum at this juncture would, in fact, constitute a breach of Article 21. As can be seen from the documents disclosed by Ofcom, the Commission's decision to accept the proposed remedy (and its timing) in March 2010 was based on an assumption that was the very opposite of the one claimed by Ofcom. For Ofcom to liberalise now EE's 1800MHz spectrum and allow EE to deploy an LTE network at least 15 months in advance of its competitors would be to render ineffective the Commission's merger decision (which plainly was predicated on the assumption that the timing of the divestment would prevent a significant first mover advantage and any subsequent distortion to competition arising from the merger). Accordingly, on any analysis, the provisions of the EC Merger Regulation cannot be used to bolster Ofcom's case for the unconditional liberalisation of EE's 1800MHz spectrum.

What must be of much greater concern to Ofcom is that any decision to proceed on the basis of the argument articulated in the consultation document would involve a wanton disregard for its Community law duties and obligations in relation to the management of radio spectrum. We consider this matter further below.

Failure to discharge duties in the management of radio spectrum

The critical issue to which Ofcom must turn its mind is whether the immediate and unconditional liberalisation of EE's 1800MHz spectrum would attain its Community law duties and objectives. Ofcom's consultation document is conspicuous for the absence of any consideration of these matters. Vodafone's more forensic examination below of the claims put forward by Ofcom in sections 3 and 4 of the consultation document to justify its proposed course of action reveal that it would be in breach of these duties were it to proceed as planned.

The promotion of effective competition is critical to any impact assessment

Radio spectrum, as Ofcom itself recognises in its recent spectrum auction consultations, is a scarce resource that is a critical raw input to the deployment and operation of mobile networks. The way in which it is allocated and managed will therefore shape the way in which competition develops

[11] The only circumstance in which an Article 21 infringement might arise could be if a Member State had committed to adopting a particular course of action. See Case no. COMP/M.157 *Air France/Sabena*

and, in so doing, promote (or not) the interests of mobile consumers. This is why the CRF, which provides for a set of harmonised principles to be applied by national regulators when regulating communications markets, has explicitly established a link between the promotion of competition and the management of radio spectrum. Article 9 of the Framework Directive, which provides for the general principles and obligations that shall govern the approach of national regulatory authorities across the EU to the issue of radio spectrum, states:

> *1. Taking due account of the fact that radio frequencies are a public good that has an important social, cultural and economic value, Member States shall ensure the effective management of radio frequencies for electronic communication services in their territory in accordance with Articles 8 and 8a.*

Article 8, and in particular Article 8(2) to which Article 9 refers stipulates:

> *The national regulatory authorities shall promote competition in the provision of electronic communications networks, electronic communications services and associated facilities and services by inter alia:*
>
> *(a) ensuring that users, including disabled users, elderly users, and users with special social needs derive maximum benefit in terms of choice, price, and quality;*
>
> *(b) ensuring that there is no distortion or restriction of competition in the electronic communications sector, including the transmission of content;*
>
> *(c) [deleted by Directive 2009/140/EC]*
>
> *(d) encouraging efficient use and ensuring the effective management of radio frequencies and numbering resources.*

The provisions of the Framework Directive are reinforced by a series of decisions of the European Commission, the Parliament and Council under the aegis of a broad radio spectrum policy framework. The most recent of these is a Decision of the Parliament and Council of 14 March 2012 establishing a multiannual radio spectrum policy programme, upon which Ofcom seeks to rely to justify a decision to vary EE's licence.[12] The recognition of the Community legislature of the need to ensure that the management of radio spectrum should not lead to competitive distortions is clear:

> *"…spectrum management may affect competition by changing the role and power of market players, for example if existing users receive undue competitive advantages… Member States should therefore take appropriate ex ante or ex post regulatory measures (such as action to amend existing rights, to prohibit certain acquisitions of rights of use of spectrum, to impose conditions on spectrum hoarding and efficient use such as those referred to in Directive 2002/21/EC, to limit the amount of spectrum available for each undertaking, or to avoid*

[12] This Decision provides, pursuant to Article 6(2) that Member States shall carry out the authorisation process by 31 December 2012 enabling spectrum in the 1800MHz band to be used to provide services with alternative technologies.

excessive accumulation of rights of use of spectrum) to avoid distortions of competition…" [emphasis added][13]

Previous Commission decisions providing for liberalisation of other frequency bands have also highlighted the need for national regulators to be satisfied that permitting an existing holder of spectrum to refarm would not lead to competitive distortions. Indeed, the Directive providing for liberalisation of the 900MHz band, enabling mobile operators to operate 3G services in that band, required the national regulator to:

"examine whether the existing assignment…is likely to distort competition…and address such distortions in accordance with Article 14 of [the Authorisation Directive]."[14]

Accordingly, as Ofcom has previously noted in its spectrum auction consultation[15], the mere fact that a spectrum band can be 'authorised for use' with another technology does not axiomatically mean that the regulator must accede to a request from an existing holder for its licence to be varied. Liberalisation is not an end in itself. Rather, it may facilitate benefits for mobile consumers. But that is precisely the matter to be determined by Ofcom in its capacity as the regulator and will be dependent upon the market context. Accordingly, Ofcom must evaluate the ramifications of such a decision upon competition and the welfare of mobile consumers before acting. This much has been made clear by the jurisprudence of the Competition Appeal Tribunal (the "CAT") when seeking to interpret and apply the provisions of the pan-European regulatory framework governing spectrum liberalisation in the context of 3G refarming:

"If the purpose were liberalisation alone, it would, as we have said, cut across the regime that has been created by the directives and decisions to which we have referred in detail. If the purpose were to achieve liberalisation in one stage, an absurd result could occur in numerous situations across the EU. If O2 and Vodafone were indeed entitled to have their licence restrictions lifted without consideration of competition issues, they would have been able to start operating UMTS technology in the 900/1800 MHz band at once. If a subsequent competition evaluation had decided that such a result distorted competition, one or both

[13] DECISION No 243/2012/EU OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 14 March 2012 establishing a multiannual radio spectrum policy programme, Recital 15

[14] DIRECTIVE 2009/114/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 16 September 2009 amending Council Directive 87/372/EEC on the frequency bands to be reserved for the coordinated introduction of public pan-European cellular digital land-based mobile communications in the Community, Article 1

[15] See Ofcom, *Second Consultation on assessment of future mobile competition and proposals for the award of 800MHz and 2.6GHz spectrum and related issues*, 12 January 2012, paragraph 1.59: "*It is clear from Telefónica O2 UK Limited v Office of Communications (900 MHz Band) [2010] CAT 25 that the obligation in the amended Commission Decision only extends to putting in place any measures necessary to ensure that, by 31 December 2011, the 900 MHz and 1800 MHz bands are available throughout EU Member States to be authorised for use with LTE and WiMAX technology, and are thereby capable of being made use of. "* In this regard, Decision 2011/251/EU, amending Decision 2009/766/EC, which requires national regulatory authorities to remove all impediments and put in place measures for 1800MHz spectrum to be used to deploy LTE services provides no further assistance to Ofcom.

could then have lost that right very soon thereafter, creating chaos for service providers and consumers alike." [16]

Thus, the recent Decision of the Parliament and Council of 14 March 2012 requiring the authorisation of existing spectrum bands to be used to provide 'high speed communications services' by 31 December 2012 cannot provide Ofcom with succour for its proposed course of action. Ofcom has simply misdirected itself as to the effect of this Decision. The Decision must be construed in the context of the wider overarching framework governing spectrum, at the heart of which is the need to prevent competitive distortions from arising when managing spectrum. A thorough and robust ex ante competition assessment is therefore critical for Ofcom to be satisfied that its proposed course of action is compatible with its duties and obligations. As we discuss below, the competition assessment that Ofcom has carried out to date is simply not fit for purpose. Neither Ofcom, nor the stakeholders that it regulates can currently conclude that the proposed variation to EE's licence will be beneficial to competition and consumers (in whose interest Ofcom must seek as a matter of law to act).

Ofcom's existing competition assessment is deficient

Whilst Ofcom appears to have sought to undertake a prospective analysis of the potential consequences of varying EE's licence, this assessment is notable for blithe assertions with little in the way of credible supporting evidence. Before turning to the deficiencies in this competition assessment, it is important to consider the standard that would apply in such an ex ante analysis and why it is important for Ofcom to discharge this burden.

Any decision of whether or not accede to EE's request to vary its 1800MHz licence and allow it to deploy an LTE network necessitates an assessment of how competition will develop on a prospective basis. Given the inherent uncertainty and risk entailed in such a forward-looking analysis, the need for Ofcom to be proportionately more rigorous and careful is clearly compelling. Such a proposition has been endorsed by the Community courts and appellate bodies in the context of appeals brought under the sector-specific telecommunications regulatory framework.[17] This obligation means that any analysis undertaken by Ofcom in this case must, before adopting any precipitate measures, investigate thoroughly and take into account all relevant facts and developments from the UK market as well as experience from other markets where LTE services have already been deployed.

The need for rigour on the part of Ofcom when conducting an impact assessment under section 7 of the Communications Act 2003 has also previously been endorsed by the CAT, which noted that:

"..it is still incumbent on OFCOM, in light of their obligations under section 3 of the CA 2003, to conduct their [impact] assessment with appropriate care, attention and accuracy so that their results are soundly based and can withstand the profound and rigorous scrutiny that the Tribunal will apply on an appeal on the merits under section 192 of the CA 2003… It is the

[16] *O2 v Ofcom* [2010] CAT 25, paragraph 95
[17] Case C-12/03P *Tetra Laval v Commission*, paragraphs 42-43, endorsed by the Irish Electronic Communications Panel in *Hutchison 3G Ireland Limited v Commission for Communications Regulation* Decision No: 02/05, paragraph 4.23

duty of a responsible regulator to ensure that the important decisions it takes, with potentially wide ranging impact on industry, should be sufficiently convincing to withstand industry, public and judicial scrutiny."[18]

Given that Ofcom's proposed course of action will shape the development of the UK mobile market and the competitive landscape in that market for the foreseeable future, the principles articulated by the CAT would appear to be especially germane to the impact assessment that Ofcom is undertaking now. The central issue is whether Ofcom's impact assessment in this case takes into account these principles and satisfies the standard that is expected of it. For the reasons articulated below, the answer is plainly not.

The inchoate and hurried nature of Ofcom's analysis is revealed by its current reasoning for a decision to vary EE's licence. Ofcom considers that the case for immediate and unconditional liberalisation of EE's 1800MHz spectrum can be made out because:

- LTE is a superior product to 3G and thus should be launched as soon as possible to benefit consumers; and
- There is no evidence, or it is uncertain, that customers will actually recognise any superiority of LTE and hence EE will not obtain a material competitive advantage from an early launch.

It is difficult to perceive how these claims are reconcilable. In any event, they certainly cannot, on their face, form the basis of a decision to accede to EE's request for its licence to be varied at this time.

But, even if Ofcom were able to adduce a considerably more robust benefits case for the unconditional liberalisation of EE's 1800MHz spectrum, what is of considerably greater concern is Ofcom's failure to consider whether granting EE the right to deploy an LTE network may not operate in the interests of mobile consumers because of the potential adverse impact on competition. Specifically, Ofcom cannot seek refuge in the Commission's merger decision or its early view of the deployment of LTE services in 2009-2010. Given the effluxion of time and the fact that LTE services have now been deployed in a number of other markets, Ofcom must consider carefully, with reference to all the facts including technological developments in the UK and further afield, how competition may develop in terms of the intensity of competition in the UK mobile market over the medium to long term and the consequences for consumers in terms of choice and pricing. In particular, it must examine more closely the nature of the advantage accruing to EE (in terms of timing and spectrum certainty) and the scope for its competitive advantage to become entrenched over a much longer period of time than is envisaged in the current consultation document. The potential adverse consequences for mobile consumers resulting from such an advantage becoming entrenched is a critical element of any competition assessment and is regrettably absent from the current consultation document.

The reason why such a concern about the development of future competition arises in the first instance is because any decision to accede to EE's request would confer upon EE a de facto monopoly in the provision of LTE services.

[18] *Vodafone v Ofcom* [2008] CAT 22, paragraphs 46-47

Such an outcome arises because, as Ofcom itself recognises in its recent spectrum auction consultation, none of EE's competitors has a path to LTE deployment based on their existing spectrum holdings. All of these competitors will require additional spectrum to be in a position to deploy an LTE network. Additional spectrum will only become available via EE's divestment or in the forthcoming spectrum auction and the timing of both remain uncertain. Thus, Ofcom proposes to hand to EE the very marketing and timing advantage that the European Commission's merger decision was seeking to address. Such a course of action is particularly surprising given the weight that Ofcom attached to infrastructure-based competition between four mobile operators in its recent spectrum auction consultations.

Ofcom's own claims that alternative technologies could enable EE's rivals to constrain EE is simply not supported by any technical evidence, as we explain in further detail below. Ofcom therefore proposes to insulate EE from competitive pressures for a minimum period of fifteen months (which we explain below will actually be much longer) with no consideration of the adverse consequences stemming from such a decision. Moreover, Ofcom seems to have ruled out, with the most cursory of assessments, the possibility of the imposition of any wholesale access obligations upon EE in its consultation document. EE would therefore in effect be granted a 'regulatory holiday' by Ofcom simply on the basis that the deployment of a new service is in the consumer interest. This clearly contravenes the principles of the CRF.[19]

Vodafone's own evidence from other markets where LTE has been deployed indicates that mobile operators will seek to extract additional value from consumers, potentially in the form of a pricing premium. In a scenario where an entity faces no challenge from its rivals, there must be a clear risk that mobile consumers face the risk of exploitative pricing for the supply of LTE services. Yet, Ofcom's consultation contains no assessment of the possible harm to consumers in this regard.

Moreover, Ofcom has misconstrued the fifteen month period that it considers to be the timeframe over which any competitive advantage would arise. First there is the risk that the spectrum auction – which is the only realistic means though which EE's rivals may get access to additional spectrum – may be subject to litigation. Any litigation, which could take as long as a year to conclude, would delay the release of the asset needed by EE's rivals and in so doing extend EE's competitive advantage, its monopoly position and the competitive distortion to over two years. Ofcom itself was fully cognisant of this risk at the time of the creation of EE:

> *"…experience in the UK and in other countries suggests that any auction could well be subject to litigation, which would further delay the allocation [of spectrum]."*[20]

Even absent delay to the auction, Ofcom has assumed that EE's advantage will be immediately neutralised as soon as any competitor can launch an LTE service. This is clearly wrong. Finally, Ofcom has failed to give any meaningful consideration to how enduring the competitive advantage or the distortion may be. In this regard, the contrast between Ofcom's current approach and that

[19] Case C-424/07, *Commission v Germany*. The Commission brought Article 226 infringement proceedings against Germany for the implementation of measures confirming that the incumbent, Deutsche Telekom, would not be required to open its new VDSL broadband network up to third party wholesale access seekers. The European Court of Justice confirmed that Germany had infringed the CRF.

[20] Ofcom submission to DG COMP, 21 December 2009. Ofcom's previous plans to auction spectrum in the 2.6GHz band were delayed by litigation.

which it adopted in regard to the liberalisation of the 900MHz band for use with 3G technology (where it conducted three consultations and undertook a detailed technical analysis) could not be more stark.

Available evidence suggests that a decision to enable EE to deploy an LTE commercial service now could enable it to establish an entrenched competitive advantage. The prospect of just such a long-term market bi-furcation, was a serious concern for both the European Commission and the Office of Fair Trading (the "OFT") at the time of the EE merger[21] concluding that a two-tier market would not operate in the interests of consumers. It is difficult to understand why Ofcom appears untroubled by the risks arising from its current course of action. In the circumstances, Ofcom cannot safely conclude that the obligations mandated by the CRF would be attained through its proposed course of action.

Section 3: Ofcom's "Interim Period"

Ofcom suggests that if the 1800MHz spectrum band is liberalised and authorisation given to EE to deploy LTE during Q2/2012, EE might be able launch services by the end of Q3/12. Ofcom proposes that a competitor could launch LTE services by the end of 2013 based on spectrum acquired either through the divestment by EE or the Combined Auction and, on this basis, defines an Interim Period of 15 months between the earliest date it assumes EE might be able to launch LTE services and the earliest opportunity for a competitor to launch its own LTE service following the availability of cleared spectrum. Ofcom additionally assumes that during this period EE would be the only operator providing LTE services; that the gradual availability of 800MHz and 2600MHz spectrum during 2013 might shorten the Interim Period and that an operator could be in a position to launch an LTE network to compete with EE within 1-2 months after the first tranche of 2x10MHz of divestment spectrum is available on 30th September 2013.

Ofcom is right to recognise that if it proceeds with its current proposal to liberalise for EE alone, unconditionally, EE will be the only network able to offer LTE services for a considerable period of time. However, Ofcom's assertion that the Interim Period it has chosen to define represents the maximum duration of competitive advantage for EE is fundamentally flawed for two reasons.

In the first place, the earliest date that a competitor can launch an LTE service in competition to EE is clearly dependent on the timing of future landmark events, namely availability of spectrum and accompanying authorisation, whose timing is not presently guaranteed. Any slippage from the outline timetable Ofcom has assumed will thus elongate the effective length of the Interim Period on Ofcom's own analysis.

Secondly, Ofcom's framework of analysis effectively assumes that EE's competitive advantage is neutralised immediately a competitor is able to launch any LTE service. There are compelling

[21] See the OFT Article 9(2) referral request, 2 February 2010, Paragraph 120 and the OFT's reliance on the evidence from the Australian market at footnote about how such a two-tier market could harm the interests of mobile consumers.

reasons, however, to doubt that this will be the case in circumstances where EE has a substantial head start already due to its unique privilege of having enjoyed spectrum certainty since May 2010.

Ofcom's analysis effectively assumes that the existence of LTE service is a binary matter – you either offer such a service or you don't. In reality, there is every reason to suppose that EE will continue to extend and refine its LTE network post launch such that by the time a competitor launches, EE's LTE network will have further entrenched the performance and coverage advantages afforded by its substantial head start. If EE and its competitors are equally able to deploy and extend their LTE network and services post launch, the technical advantage enjoyed by EE will last for a considerable period – EE's network deployment will only be matched by the other operators some period after EE attains its full LTE deployment. Even if one assumes that competitors are somehow able to build their own networks at a faster rate than EE such that they might eventually close the gap at an earlier date, the point of convergence is likely to lie well beyond the end of Ofcom's Interim Period.

The key spectrum factors that affect an operator's ability to launch an LTE network are the following;

- **Spectrum certainty;** i.e. certainty over frequency bands and available bandwidth which enables the operator to commit the large sums of capital and the resources necessary to deploy the key components of an LTE network. The particular spectrum band in which LTE is deployed has a significant impact on the specific hardware that needs to be deployed.

- **Authorisation;** which allows the operator to use LTE technology in the relevant frequency band.

- **Spectrum availability;** which enables the operator to activate, test and optimise a network in preparation for a commercial launch.

We believe that Ofcom has only considered the issues of authorisation and spectrum availability without adequately addressing what is arguably the most important spectrum factor affecting potential LTE competitors to EE; namely *spectrum certainty*. EE has benefited from spectrum certainty since its creation in 2010. It is not a case of "if" EE deploys LTE in the 1800MHz band but only "when" EE deploys LTE in the 1800MHz band. In marked contrast to the position of all other operators, EE already has the spectrum certainty necessary to be able to commit to the deployment of LTE hardware without the risk of stranding such LTE investment. Competitors by contrast are dependent on the outcome of either the sale of the Divestment Spectrum or the Combined Auction for spectrum in which their LTE services could be launched.

The equipment that needs to be deployed to support LTE is, to a large extent dependent on the frequency of the spectrum to be used. Therefore, spectrum certainty assumes key importance in network planning and associated lead times to roll out (see further explanation of this point in Annex 1 below).

A simple diagram can illustrate the path of LTE deployment and launch for a typical operator, designated MCPx:

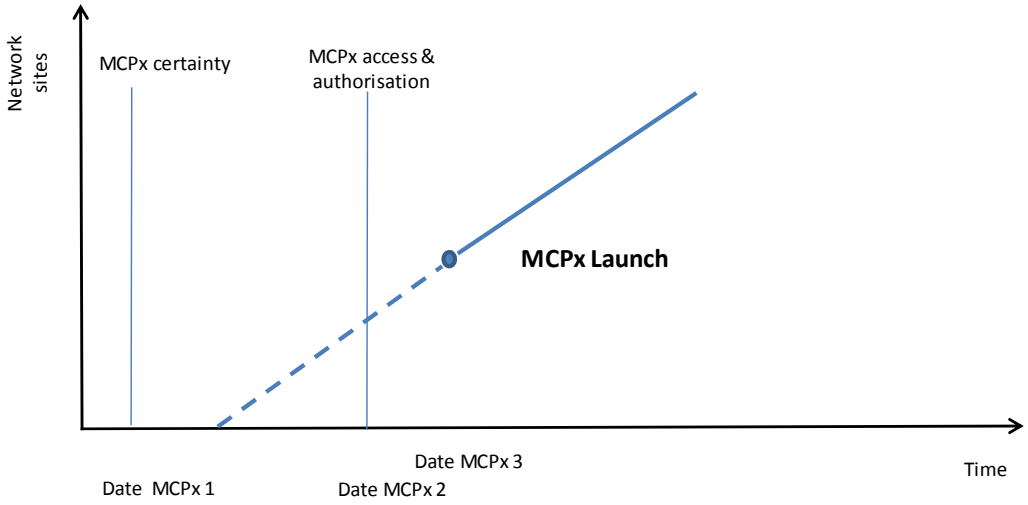


Figure 1 – Typical Deployment Path

The diagram shows the extent of network deployment over time pre- (dotted line) and post- (solid line) launch. It assumes that on date 1 the MCP achieves spectrum certainty i.e. certainty over frequencies and available bandwidth as described in section 2 above. As described in above and in Annex 1, once the subsequent planning phase is complete, network investment/deployment can commence. For simplicity and ease of exposition the diagram assumes a linear deployment over time. At date 2, the operator is given access to the spectrum to commence testing and optimisation (as described in more detail in Annex 1), and also obtains authorisation to launch commercial services. Actual launch, at date 3, occurs when the operator is satisfied that the service can be launched to an acceptable QoS, with sufficient area coverage. The operator continues network deployment thereafter to increase the depth of its service coverage.

The interval between date 2 and date 3, Ofcom's 3 - 6 months in the case of EE, is necessary to ensure that the network can launch to a reasonable QoS: the length of the interval between date 1 and date 3 determines the depth of network coverage that is possible at service launch.

EE's situation

EE already has a significant spectrum holding in the 1800MHz frequency band as a result of the merger between Orange and T-Mobile. After EE has divested 2x15MHz of this spectrum, (a condition of the merger), it will still hold 2x45MHz of 1800MHz spectrum, which is more than adequate to support a 2G network and operate a credible LTE network with a carrier bandwidth of at least 10MHz (but more likely to be expanded to 15MHz or even 20MHz relatively quickly). In the short term, until the two tranches of 1800MHz divestment spectrum are released, EE has the full 2x60MHz to utilise, thereby easing its ability to launch LTE early while it gradually clears 2G traffic from the first tranche of divestment spectrum between now and 30 September 2013.

EE already has 1800MHz capable antennas rigged as a result of its existing 2G networks, which can be reused for LTE deployment at 1800MHz. This will save EE many of the antenna re-engineering activities faced by its competitors, ✂. But it is not simply the cost of new equipment that may handicap operators who have to engage in such physical re-engineering, it is the logistical challenge of carrying out the work at large numbers of sites that introduces a time penalty.

EE already has a contract with a leading infrastructure supplier (announced in May 2011[22]) to modernise its 2G infrastructure at 1800MHz with Single RAN hardware. This equipment is readily upgradable to LTE; the baseband and RF components will be largely LTE capable already; both 2G and LTE networks operate in the 1800MHz frequency band and EE can commit to any additional components required for LTE, safe in the knowledge that their LTE1800 investment will not be wasted. EE can upgrade its transmission network early, upgrading base station transmission equipment, e.g. microwave equipment, at the same time as it modernises its legacy hardware to provide the access and backhaul transmission necessary to support high bandwidth LTE services.

EE is in control of its own destiny regarding the clearance of 1800MHz spectrum for LTE and, the fact that EE has now applied for a variation to its licence indicates that the spectrum has already been, or soon will be, cleared of 2G traffic. EE's illustrative network deployment diagram, assuming Ofcom gives EE permission to use its 1800MHz spectrum for LTE in June 2012, is as follows:

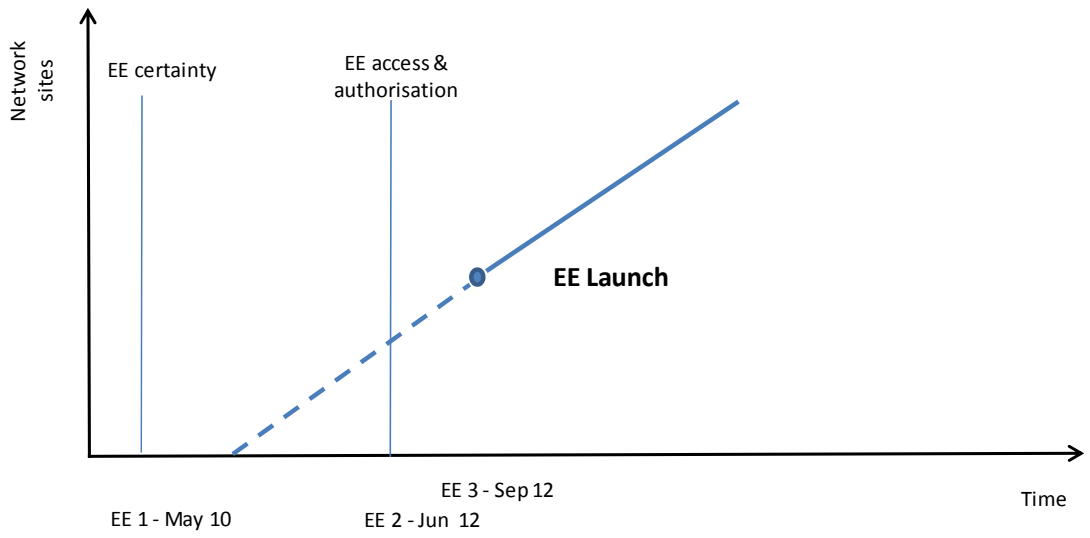


Figure 2: EE deployment path

Although EE achieved spectrum certainty with the clearance of its merger in May 2010 we have conservatively shown LTE deployment commencing a year later. We also somewhat conservatively assume that EE require refarming authorisation in say June 2012 before network optimisation and tuning can commence, prior to the launch assumed, as Ofcom, at September 2012.

[22] http://www.globaltimes.cn/business/industries/2011-05/653534.html
http://www.theregister.co.uk/2011/05/09/huawei_ee/

EE competitor situation

Irrespective of the spectrum landscape post the EE divestment of 1800MHz spectrum and the Combined Auction, every competitor will be deploying LTE hardware in either new frequency bands ✂. This is potentially much more complex and time-consuming than launching an 1800MHz LTE service for an operator that already has an existing national 1800MHz 2G service.

This will impact the hardware they have to deploy. Without the spectrum certainty enjoyed by EE, competitors cannot, at this stage, fully commit the capital and resources to ✂. In any event, they can only deploy the key radio hardware components to base station sites after they have spectrum certainty.

For a national LTE coverage network, competing operators will have to deploy LTE hardware to a network consisting of many thousands of sites, which will necessitate the activities outlined in the previous sections. Depending on the mechanism and timing of the process by which spectrum for LTE becomes available, the period of time between spectrum certainty and spectrum availability may well be relatively short compared to the situation enjoyed by EE.

Combined auction spectrum

The Combined Auction is currently scheduled to complete in early 2013 and successful operators will only have a number of months to deploy hardware before the spectrum becomes available.

The deployment diagram for an operator obtaining its first LTE capable spectrum from the combined auction thus looks approximately as follows:

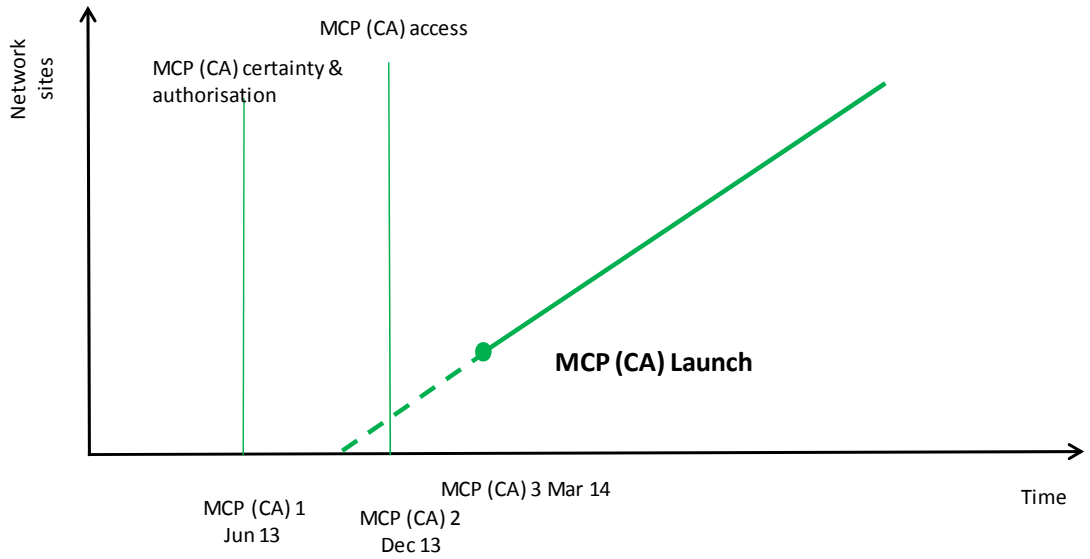


Figure 3: Deployment path for an operator receiving LTE spectrum from the combined auction

Following Ofcom's assumption of the conclusion of the auction by June 2013[23], the operator will have a period of six months before the acquired spectrum becomes available (if 800MHz), and a further three months before launch is possible following on from optimisation and tuning. There is

[23] See Ofcom's Figure 1: illustration of timelines

thus a considerably shorter period between spectrum certainty and earliest launch date for MCPs in these circumstances than is available to EE. Therefore, the degree of network coverage at launch date for these operators will be less than EE's, as well as occurring at a date approximately 18 months after (from September 2012 to March 2014).

It should be pointed out that the illustrative diagram above shows the same slope of network deployment as for EE, despite the suggestion made elsewhere in this document that in practice the speed of deployment in 800MHz will be slower than for EE in 1800MHz, since ✂. It is therefore conservative in this respect.

Divestment spectrum

After (and if) the Divestment Spectrum were to be sold by EE, the first tranche of 2x10MHz must be released by EE by 30th September 2013. Assuming spectrum surrendered to Ofcom becomes available to the purchaser with all necessary authorisation without further delay, that operator may, in principle, be able to launch in advance of those operators relying on the Combined Auction spectrum. The true lead time the eventual purchaser has to deploy LTE radio hardware (i.e. from the date of spectrum certainty) will only be known when the spectrum has actually been sold. This date is unknown as of the submission of this response, but clearly has an impact on the extent of network deployment that will be achieved by the earliest possible launch date by a successful purchaser, assumed, as Ofcom, to be December 2013. The limited period between spectrum certainty and spectrum availability will restrict the geographic extent to which a competitor can deploy its LTE network.

The deployment diagram for the successful purchaser of the divestment spectrum might look like this:

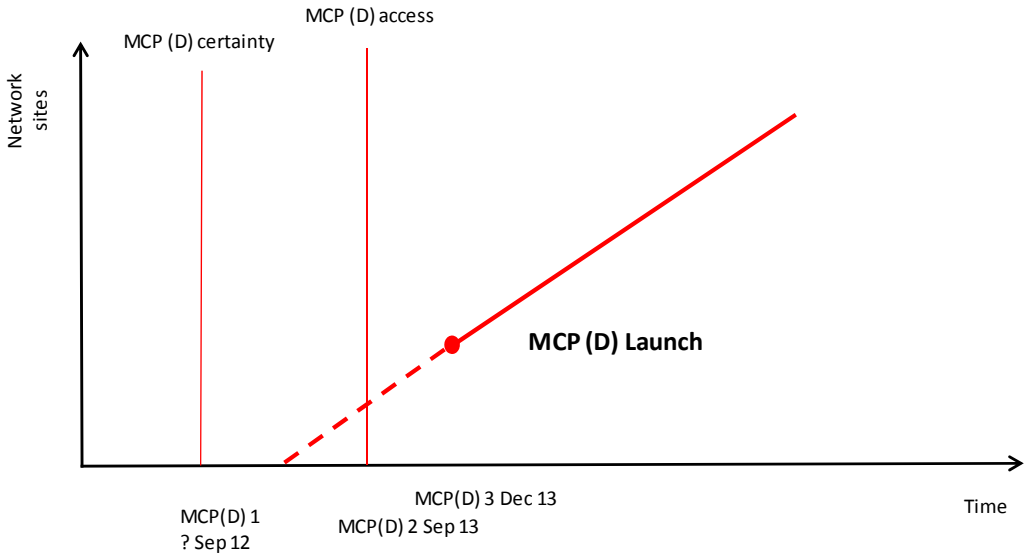


Figure 3: Deployment path for an operator receiving LTE spectrum from EE divestment

For the purposes of this illustration it has been assumed that the sale of divestment spectrum is concluded by September 2012 (though there currently is no certainty that this will be achieved). The interval between EE's prospective date no 3, i.e. first LTE commercial launch, September 2012, and that of the divestment recipient, December 2013, marks the "Interim Period" as designated by Ofcom in the present consultation, of the 15 month period of EE's competitive advantage.

Comparison with EE's LTE position

EE already has spectrum certainty and has had this certainty ever since the EE decision to allow the merger of Orange and T-Mobile in Mar 2010, providing them with as much as a two year run up to the start of Ofcom's "Interim Period". No other competitor is in this position, or will be, even after the Divestment Spectrum has been sold or the Combined Auction has completed. Should the sale of the Divestment Spectrum or the Combined Auction be delayed, EE's advantage will be even greater. EE is able to commit to LTE deployment, while its competitors must wait for spectrum certainty. This will enable EE to achieve extensive geographic coverage ahead of its rivals. If EE is authorised to use its 1800MHz spectrum for LTE now, these advantages will be even greater since EE will be able to optimise and develop its LTE network while competitors wait for spectrum certainty, authorisation and availability.

It is possible to overlay the different roll-out programmes of the three operator groups into a single diagram, but for clarity it may be easier to present the illustrative significant dates in a tabular format:

Status	**EE**	**Operator (divestment)**	**Operators (auction)**
Spectrum certainty	Mar 10	[Sep 12?]	[Jun 13?]
Spectrum access	Jun 12	Sep 13	Dec 13
Service launch	Sep 12	Dec 13	Mar 14
Interval between certainty and launch	16+ months	[15 months?]	9 months
Launch delay from EE launch	-	[15 months?]	[18 months?]

Table 1: Potential LTE timetable, by operator group

Other things being equal therefore, the third and fourth operators are likely to be able to launch LTE 18 months after EE with a significantly lower level of network deployment, and the divestment operator is likely to launch at least 15 months after EE, again with a significantly lower level of network deployment.

Network deployment after service launch

Ofcom has assumed that the interim period during which EE has clear competitive advantage finishes immediately a second operator launches a LTE service. This is clearly incorrect, unless one can assume that all LTE services of whatever depth are identical from a competitive point of view.

Most significantly however EE will obviously continue extending its LTE network after its launch date. There will thus be two distinct periods of EE's advantage under the current liberalisation proposals: the period where EE is the only LTE operator (Ofcom's interim period) and the period where EE is the largest LTE network operator.

Assuming a constant rate of expenditure, EE will by the launch of the divestment operator be a minimum of 16 plus 15 months from its own date of spectrum certainty, whereas the divestment operator will be only 15 months from its own date of spectrum certainty. It follows that EE is likely to have a LTE network twice as extensive as any divestment operator at the point the latter can launch. For the operators that are dependent on the spectrum auction for LTE spectrum, at the point of their launch, EE will be 16 plus 18 months from its point of spectrum certainty, whilst the auction dependant operators will be only 9 months from their date of spectrum certainty – arguably therefore EE will have a network approximately three times as extensive as these operators at the point of their launch.

Diagrammatically the relative deployments of EE, the divestment MCP and the combined auction MCPs could be presented as follows, assuming a constant rate of deployment for all operators:

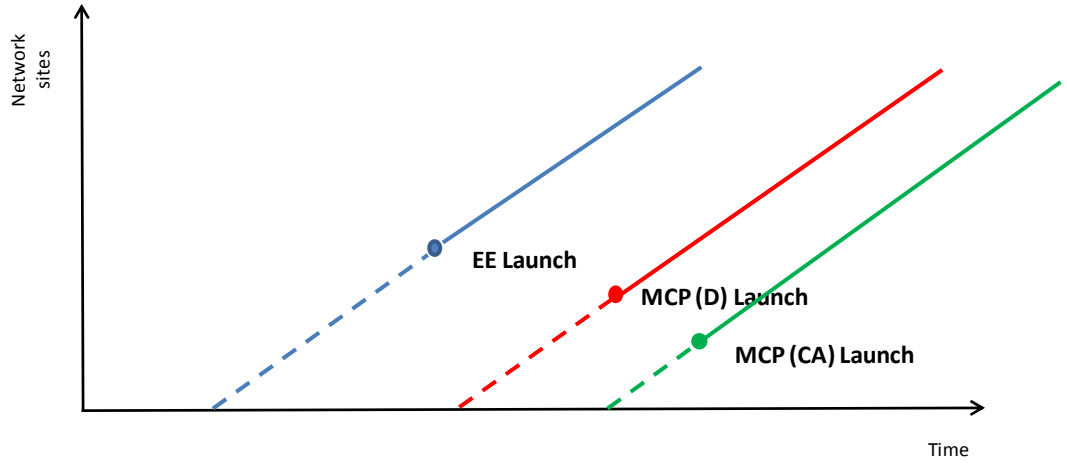


Figure 4: Network deployment by operator type, before and after first launch

It is readily obvious therefore that EE's competitive advantage persists for an extensive period after the initial LTE launch of its competitors. The other operators can only catch up to the level of EE's deployment if they are able to roll out network equipment at a very significantly faster rate than EE despite the difficulty they face as described above (and in Annex 1), and EE makes no attempt to match this rate, and/or after the point where EE largely finishes its programme of network deployment. ✂. Even assuming heroic attempts by the others to catch up, it is hard to see that EE's competitive advantage could be eroded therefore before the end of 2015. This suggests that the two periods of EE's competitive advantage could be 15 months where they are the only LTE operator, and a further at least 24 months where they are the largest LTE operator. In total, therefore, the advantage to EE could persist for more than three years.

In summary, we believe that EE already has a significant advantage in its ability to deploy an LTE network at 1800MHz and has held this advantage ever since the formation of EE in March 2010. This advantage will only increase if Ofcom authorises 1800MHz spectrum for immediate LTE use and the distortion to competition it causes will endure far beyond Ofcom's assumed Interim Period while competitors attempt to close the coverage gap with EE's LTE network, to be able to offer credible alternatives to consumers. There is simply no reason to suppose, as Ofcom appears to do, that benefits to early adopters during a protracted period when EE has an unmatchable advantage is sufficient to offset the clear danger of market bifurcation discussed elsewhere in this document.

Response options for competitors during the Interim Period

Having erroneously concluded that EE's first mover advantage is limited to "approximately up to 15 months"[24] Ofcom goes on to argue that any (temporary) competitive advantage for EE could be largely negated by responses from competitors. Ofcom offers five potential responses, all of which can be shown to be insufficient, incoherent or improbable.

The acquirer of the 1800 MHz divestment spectrum deploying LTE rapidly

The fundamental point is that no-one else can deploy LTE without available spectrum in which to do so. While there is, of course, a possibility that another operator could acquire divested 1800MHz spectrum outside of the auction, under the terms of EE's undertaking to the European Commission the first 10 MHz tranche of 1800MHz spectrum does not have to be cleared and surrendered until September 2013 while the second 5MHz tranche does not have to be cleared until September 2015. ✂.

Furthermore, the undertakings require the surrender of cleared spectrum to Ofcom for reallocation but do not require EE to ensure that the spectrum in question is actually in the hands of competitors and available for use with appropriate authorisation in place. To the extent that these further steps require time to complete, there may be a further delay before any competitor to EE actually has authorisation and practical ability to use divested spectrum.

Ofcom estimates that that *"it would take EE a number of months from the time of authorisation to be ready to launch LTE services commercially, with a minimum level of coverage (though potentially it could take rather more time)."* [25] Yet as noted previously, Ofcom's assertion that an acquirer of divestment spectrum could deploy it so as to foreshorten the Interim Period by 1-2 months implies that anyone newly acquiring spectrum could deploy it *more rapidly than EE*, which already has 1800MHz spectrum available to it and the network advantages described previously, which is implausible.

It follows that even if Ofcom is correct that the Interim Period ends in December 2013 (which, for the reasons outlined previously is open to question) it is extremely unlikely that commercial deployment of LTE on divested spectrum could mitigate EE's competitive advantage to any appreciable extent during the Interim Period as defined.

[24] See 6.3. Ofcom's assumption that the Interim Period is a maximum of 15 months it itself open to question as noted above

[25] See 4.24 of the consultation

Other competitors deploying more advanced HSPA technology so that it delivers some of the advantages associated with LTE technology

If advanced HSPA were a good substitute for LTE, the option of pursuing HSPA instead of LTE is already available to EE (and competitors) without liberalisation. It is open to all operators to deploy advanced HSPA as a complement to 2G, 3G and – in due course - LTE. EE is in fact already doing so, as a press release in February 2012 acknowledges[26]. However, Ofcom has recognised that HSPA does not deliver sufficient performance to be an effective substitute for LTE.

As Ofcom notes at 5.6:

> *"LTE and WiMAX technologies are designed to provide high speed mobile data services. LTE technology specifically, has a number of advantages over3G/UMTS/HSPA technology because underlying differences in these technologies enable LTE to operate more efficiently with respect to the use of spectrum. Specific aspects of network performance where LTE delivers advantages over 3G/UMTS/HSPA, include greater cell spectral efficiency, improved latency, scope to prioritise traffic and the potential for higher peak data rates."*

Ofcom suggests that any temporary or enduring competitive distortion might be offset by competitors which do not hold spectrum suitable for LTE, being incentivised to deploy more advanced versions of HSPA to deliver some of the advantages of LTE technology. We believe that there are a number of factors that limit the effectiveness of such a strategy.

- The highest HSPA data rate supported by current devices is 43.2 Mbps, e.g. the Apple iPad 3, with a limited number of further devices likely to become available during the remainder of 2012 and 2013.

- The support of higher HSPA rates requires devices that support 57.6 Mbps and MIMO technology[27]. Our understanding is that chipsets supporting this technology are being developed but are not yet available in commercial devices. ✂. In effect, competitor operators will be limited to 43.2 Mbps devices.

- Figure 5 below illustrates the performance differences between LTE operating in a 10MHz bandwidth and HSPA Dual Carrier 43.2 Mbps. The data shows that LTE exhibits a 40% improvement in practical peak data rate over HSPA 43.2 Mbps, which suggests that even 43.2 Mbps HSPA is unlikely to be competitive against an LTE network operating in a bandwidth of 10MHz. Should the LTE network operate in a wider bandwidth as EE is likely to be able to do in the near future, by clearing a further block of at least 5MHz for its own use beyond the 10MHz that it says it will have cleared in 2012, the theoretical and practical performance differences will be even more marked.

---

[26] *"The nationwide roll-out of 3G upgrade technology HSPA+ 21 has already reached 60% of the network and will be completed in Q3 2012. In addition trials of HSPA+ 42 are due to begin in Q2 with a goal to roll out the technology to customers in Q4 2012."* Everything Everywhere announces major steps towards a 4G future, 23rd February 2012

[27] MIMO: Multiple In/Multiple Out technology whereby parallel data streams are transmitted using multiple antennas.

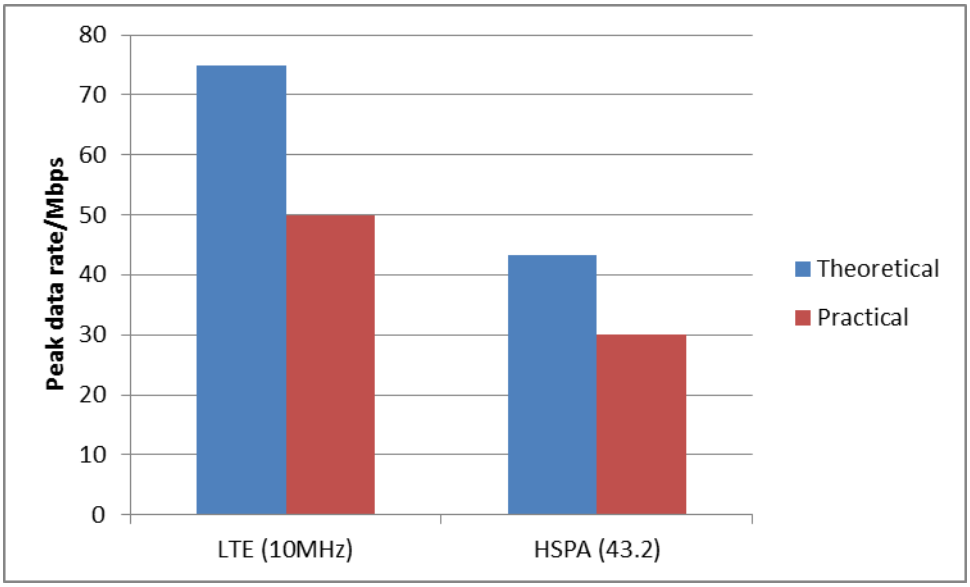


Figure 5: Comparison between LTE (10 MHz) and HSPA (43.2 Mbps) performance

- In the real world, the difference experienced by consumers may be even more pronounced since early LTE networks are unlikely to be heavily loaded and thus may be able to provide their maximum customer data throughputs, whereas 3G networks will be more heavily loaded and contention will reduce the achievable customer data throughputs. Furthermore, given that the data usage of 3G is skewed by the small proportion of intensive users, and assuming fairly reasonably that these will be early adopters given the advantage of LTE for high volume users, then the ability of EE to offer LTE technology will take off the congestion pressure in busy areas on 3G (and to a lesser extent 2G) for EE. ✂.

Therefore there is a risk that early adopters will experience the LTE performance improvements and that EE could establish a reputation as the network for data for some period. EE will have the opportunity to ✂.

Any capital invested in more advanced HSPA will be investment that cannot be re-invested in LTE, after competitors have acquired spectrum suitable for LTE. This may reduce the investment competing operators make in their early LTE deployments, increasing the advantages enjoyed by EE, allowing the distortion to competition to endure for even longer.

Competitors taking measures to help accelerate the ecosystem for LTE in other spectrum bands

Ofcom suggests that competitors who lack EE's clear advantage in already possessing spectrum in a band where LTE is already an established commercial proposition might nevertheless somehow be able to compete by "accelerating the ecosystem" for LTE in other bands. However, it is unclear what measures Ofcom thinks competitors can take to accelerate the ecosystem for LTE in other spectrum bands. Manufacturers looking for scale economies naturally focus innovation on spectrum bands offering the widest addressable market. They have focused on bands other than 900MHz because, as in the UK, 900MHz spectrum is currently in use and would have to be cleared before it could be deployed for LTE, even if compatible equipment were available. Thus the market opportunity for

LTE 900MHz is more distant, and even if UK competitors had an incentive to attempt to accelerate the ecosystem for LTE in bands where it is not currently developed, their practical ability to do so is clearly limited given their size relative to the wider addressable market.

Ofcom itself acknowledges that no LTE equipment is currently available in the 900MHz band[28] and that any commercial opportunity to deploy LTE in 900MHz, 1800MHz and 2.1GHz bands depends also on the current extent of use of 2G and 3G in those bands as well as the ability of user equipment currently in the hands of consumers to use those bands with LTE technology.[29]

These considerations led Ofcom to conclude, correctly, that:

> *" . . . it is unlikely that the 900 MHz band will be used for LTE until after the 800 MHz and 2.6 GHz bands become available for use. Our understanding is also that the 2.1 GHz band is likely to be used for 3G services for some time yet, and that LTE equipment is unlikely to become available of that band for at least a few years."*[30]

In the light of this conclusion, the suggestion that EE's competitors can accelerate the ecosystem for LTE in other bands sufficiently to negate EE's competitive advantage during the Interim Period is simply incoherent.

Competitors deploying LTE with 800MHz and 2.6 GHz sooner than they would otherwise have done

At first sight, this is a very curious argument i.e. the way to spur competition is to increase the advantage already held by the largest operator with the largest spectrum holding by authorising EE alone to deploy LTE ahead of any competitor. It is also very difficult to substantiate, given the difficulty establishing the counterfactual i.e. what would have happened otherwise, so is hardly a factor Ofcom can place any substantial weight on.

Unlike EE which has enjoyed spectrum certainty since its merger clearance in May 2010, competitors need spectrum certainty i.e. to know what spectrum bands and how much bandwidth they have available to them before they can plan and execute network deployment for LTE. Thus in the case of auction spectrum (✂) there is no prospect whatever of deployment before the auction has run its course. Ofcom says that it expects LTE to be deployed in the 800MHz and 2.6GHz bands "soon after they become available"[31], but implicitly recognises that it will take some time to deploy (otherwise the Interim Period would halt immediately once licences are granted post-auction).

Ofcom has defined the Interim Period as ending immediately after 800MHz and 2.6GHz auction spectrum has actually become available. There is thus no realistic prospect of competitors deploying LTE commercially at 800MHz or 2.6GHz during the Ofcom Interim Period. The only question is how soon after the end of the Interim Period Ofcom has defined competitors can launch in practice, and how the depth and extent of their launch network will compare with what EE has, by then, been able to achieve.

[28] See 4.26
[29] See 4.27
[30] See 4.28
[31] See 4.29 of the consultation

EE presently enjoys the unique advantage over any competitor wishing to deploy its own rival LTE network in that it has long had certainty over the spectrum available to it in relation to LTE, enabling it to 'jump the gun' on authorisation by deploying equipment in advance of a decision to liberalise. EE also has the added advantage that the 1800MHz spectrum it intends to use for LTE is in the same frequency band as its existing network, minimising the need for frequency specific investment ✂. There is thus no strong reason to suppose that competitors can in practice deploy LTE more rapidly than EE itself, however motivated they may be to do so.

On the default assumption that from the point where a competitor enjoys sufficient certainty to be able to commit to invest in LTE deployment in a known frequency band EE can extend its own investment at the same rate, competitors may never be able to achieve convergence with EE. Vodafone recognises that once it faces competition, EE will be spurred to maintain investment to preserve, and if possible extend its lead as figure 6 below illustrates, and that the impetus provided by competition could in principle spur a general acceleration in investment compared to the prior period in which EE enjoys an effective monopoly. However, this cannot provide a justification for allowing EE such a substantial head start during which, by definition, it faces no competition.[32]

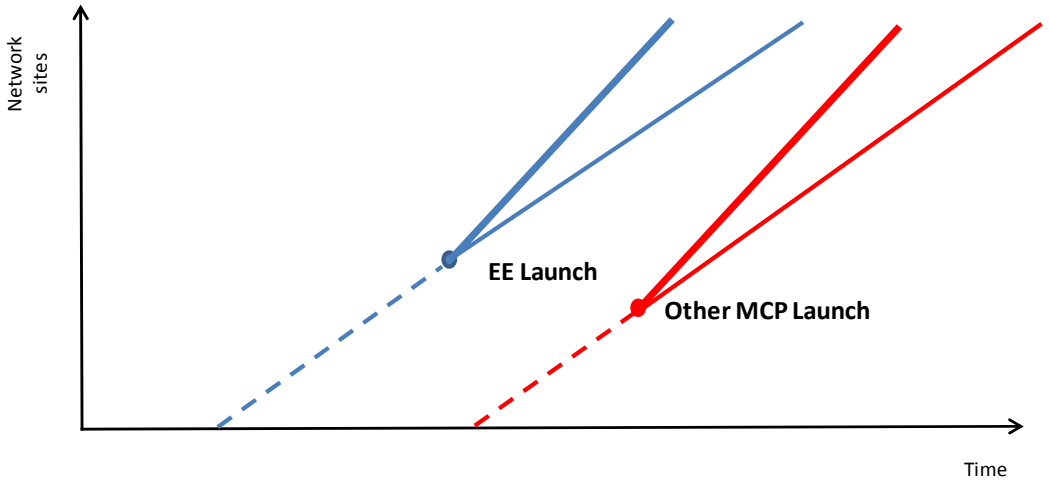


Figure 6: Comparative network deployment rates post launch

Even in the alternative scenario where it is assumed that competitors can somehow roll out their LTE networks at a faster rate than EE (presumably at substantially increased cost compared to EE) and that EE cannot or does not respond, the earliest point at which technical comparability might be achieved in terms of performance and depth of coverage is clearly some way beyond the point of initial commercial launch. This still points to enduring distortion for a substantially longer period than Ofcom currently assumes. Any slippage in the auction timetable and/or subsequent authorisation and spectrum clearance clearly pushes launch and eventual convergence (if any) further to the right.

[32] Whether or not there is any acceleration in EE's own deployment once competitors emerge depends, of course, on the commercial strategy EE decides to pursue post authorisation. ✂.

Spectrum sharing

Ofcom also notes that Vodafone and O2 each hold 2x5.8 MHz of 1800MHz spectrum and that it may be possible for them to offer more competitive LTE services through spectrum sharing, subject to the relevant licences being varied to permit LTE and compliance with the requirements of competition law.[33]

We agree that technically this might be possible ✂. However, ✂.

Section 4: The extent of EE's competitive advantage from early and exclusive liberalisation

We conclude in the section above that Ofcom has erroneously concluded that if it were to rapidly authorise the use of LTE in the 1800MHz band, there would be at most only a 15 month period before EE's competitive advantage was erased. In fact, as pointed out above, this timing is dependent upon there being no further delay in the auction timetable, something which at this stage cannot be taken as a known fact. It also assumes that EE's competitive advantage ceases immediately once any other operator launches a commercial LTE service, neglecting the fact that EE will have continued to expand and develop its own LTE network in the period after its launch, extending its first mover advantage for a further substantial period.

Ofcom then goes on to consider whether as a result of this delay there is a material risk of a distortion of competition, concluding "*there is no material risk of a distortion of competition if EE is permitted to use the 1800 MHz band to deploy LTE and/or WiMax technologies at the earliest opportunity.*"[34] It reaches this conclusion not by seeking out and weighing the available evidence as it applies to the particular question before Ofcom, but by relying on its general comparative review from January 2012. Effectively there need to be two components to this evaluation:

- Is there a material technical advantage available to EE from being the sole LTE operator by reason of LTE being superior to 3G/HSPA?
- To the extent that there is a superior technical advantage, how will this be regarded by UK customers and thus how will it translate into a competitive advantage to EE?

Ofcom has failed to consider either of these issues in the specific context of immediate liberalisation of 1800MHz spectrum for EE alone. Instead, it has simply adopted generic conclusions that it made in its competition analysis of its January 2012 consultation[35], where Ofcom concluded, as recorded in 5.11 of this consultation:

[33] It is noteworthy that Ofcom does not commit to authorising LTE at 1800 MHz for Vodafone or O2. This contrasts with the present approach to authorising LTE at 1800 MHz for EE, which is portrayed as largely automatic, subject only to necessary formalities being observed.
[34] Paragraph 5.19 of Ofcom's consultation
[35] Second consultation on assessment of future mobile competition and proposals for the award of 800 MHz and 2.6 GHz spectrum and related issues, January 2012

"In view of the technical advantages of LTE, there are likely to be some competitor advantages associated with holding spectrum suitable for delivering LTE services ahead of competitors; although the extent of these is unclear"

Ofcom has expanded this general conclusion into a series of unsubstantiated assertions in the current consultation (described further below). Of these seven assertions it is notable that they include two "it is unclear that", one "it may be" one "it could be" and one "it is plausible that". Where is the evidence-based regulation of which Ofcom is usually so proud?

In addition to their tentative nature, the problem with relying on the January 2012 consultation in drawing out these assertions is that that consultation did not consider the present circumstances. What Ofcom was considering in January was whether an operator that failed to receive in the spectrum auction (or otherwise) sufficient spectrum to be able to launch LTE services but was forced to rely on HSPA or HSPA+ could continue to be a credible national operator in circumstances where all other operators were launching LTE. Its conclusion was that whilst it was clear that an operator unable to launch LTE at the same time as its competitors would be disadvantaged, the extent of such disadvantage was not clear. However, Ofcom attached sufficient importance to the advantage of LTE that it did conclude that it was important that four national operators be able to bid for and acquire the auctioned spectrum.

What Ofcom did not consider in the January consultation was whether an operator in EE's particular circumstances i.e. the exclusive and early liberalisation would be likely to obtain a competitive advantage over all others. The comparison here that actually needs to be made is whether an operator with both LTE *and* HSPA (with more spectrum for the latter alone than any other competitor) would be able to obtain a competitive advantage in circumstances where all other operators only operated HSPA.

The closest Ofcom came to examining this point in the January consultation was in 4.122:

"Everything Everywhere's existing spectrum portfolio has important strengths. It is currently the largest of the existing national wholesalers' holdings. After the auction, this still represents a significant share of spectrum, with 24% of the total paired spectrum and 33% of the spectrum at 2.1GHz spectrum and below. <u>It also has an early route to LTE with its large amount of 1800 MHz spectrum and the ability to deploy a 2x20 MHz LTE carrier, though it is unclear how important these potential advantages will be. Compared to spectrum used for HSPA, this will give Everything Everywhere's capacity a further boost, because LTE is more spectrally efficient than HSPA.</u> Everything Everywhere also has a current advantage in terms of its large site base, with more than 18,000 sites. But over time other national wholesalers could vary their site numbers to match or exceed this.[36]*"*

This view, rather than the more generic conclusion that the relative advantage of LTE over HSPA was uncertain, should have formed the starting point for the present examination. Ofcom should have re-examined the evidence that it used in the January consultation (together with other available evidence such as that described below) and applied it to the current context. It is clear to Vodafone that the evidence points to the conclusion that EE would be able to obtain significant competitive

[36] Vodafone emphasis

advantage by being the sole LTE operator. Ofcom fundamentally misdirected itself by failing to establish the proper framework within which it needed to re-assess the data it already possessed, and failing to seek further evidence.

We note that Ofcom was not unaware of this risk to competition. In a note to the DG Comp on 21st December 2009 in relation to the proposed merger of Orange and T-Mobile, Ofcom noted that:

> *"Overall therefore, although there are sizeable uncertainties, there are also genuine reasons for concern that the merged entity will be able to build an early position in LTE as a result of its spectrum holdings and a risk that this could become entrenched leaving other operators in a difficult position to catch up"*[37]

Given this view, and the fact that spectrum certainty has been delayed for all operators other than EE since this note was written as discussed above any judgement on this issue in this consultation should, prima facie, have been supported by Ofcom by rigorous examination of available evidence, and not merely by generic supposition in a different context, in order to properly form a view of the extent of the potential risk of EE "entrenching" its first mover advantage.

But the data used in January 2012 is not the only evidence Ofcom should have looked at. Given that it noted then that uncertainties exist as to both the real world relative speed advantage of LTE, and the real level of customer interest in LTE, it is highly relevant to examine the evidence from those operators who have already launched LTE in order to attempt to address this uncertainty.

Vodafone has sought its own evidence in relation to the UK mobile market, analogous technology developments, and overseas experience of LTE. In particular we have examined evidence (described below) from other markets where LTE has already been launched, particularly in circumstances where the leading firm has had some form of 'head start' on other operators. Whilst we recognise the challenges of extrapolating from evidence in other markets, it is incumbent upon Ofcom when fulfilling its duties set out above, to actively seek out and consider such evidence to determine whether or not it supports the premises upon which Ofcom bases its conclusions.

Technical Advantages for EE from exclusive and early liberalisation

It is clear that in the current consultation Ofcom significantly underplays the benefits to EE of LTE. The fundamental problem is that Ofcom's analysis does not consider the specific context of early liberalisation for EE alone. The correct inter-operator comparison is not LTE vs. HSPA in the abstract, but the advantages for EE derived from being able to simultaneously run LTE and HSPA networks, weighted against the fact that all other operators will only have HSPA. In other words the issue is LTE *plus* HSPA vs. HSPA alone.

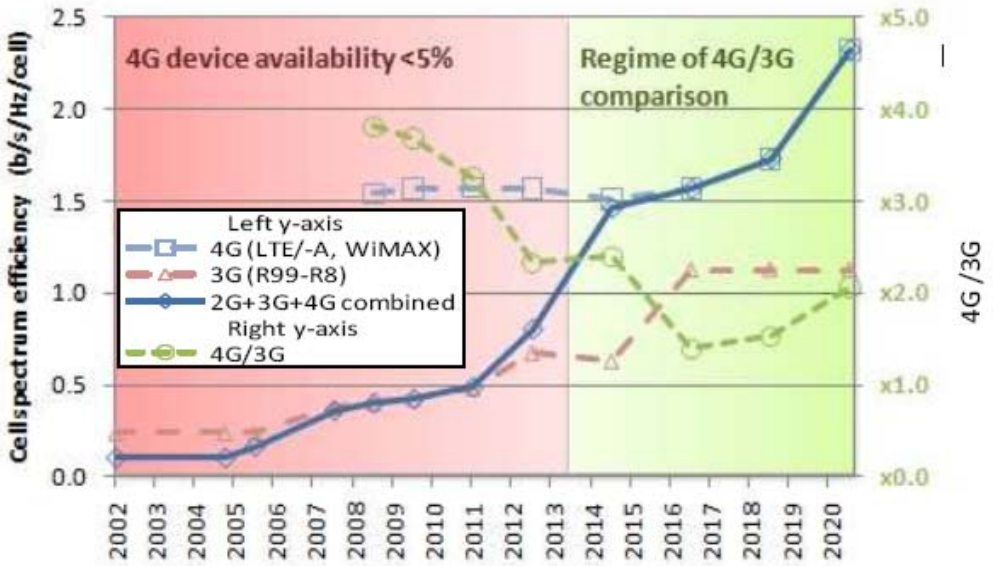
In relation to the general advantage of LTE over HSPA in terms of, for example, headline and average data rates available from LTE in comparison with those from 3G, Ofcom does in fact provide reasonable evidence in the January 2012 consultation. It notes in 5.6 of the consultation that:

> *"LTE and WiMAX technologies are designed to provide high speed mobile data services. LTE technology specifically, has a number of advantages of over 3G/UMTS/HSPA technology*

[37] Paragraph 53 on page 76 of attachment 2 of case 1-203896858 in Ofcom's April 2012 FoI responses

because underlying differences in these technologies enable LTE to operate more efficiently with respect to the use of spectrum. Specific aspects of network performance where LTE delivers advantages over 3G/UMTS/HSPA, include greater cell spectral efficiency, improved latency, scope to prioritise traffic and the potential for higher peak data rates."

All of this is well established. A Real Wireless report for Ofcom in 2011 produced the following table on the relative advantage of LTE:



"Figure 1-5: Real Wireless assessment of changes in "blended" spectrum efficiency and spectrum efficiency gain of 3G and 4G networks over a 10 year timeline allowing for changing network and terminal device features over time[38]"

One can see that from 2011 the path of an operator offering LTE as a complement to 2G and 3G moves substantially ahead of that of an operator that can only provide 3G. Much of this is discussed in Ofcom's January 2012 consultation. In paragraph 3.7 of Annex 6 Ofcom states:

"In line with the main issues raised in responses, we consider four distinct dimensions to high quality data services that are affected by spectrum in the auction and that could put national wholesale competition at risk. They are:

- *Available capacity and average data rates*
- *Ability to deliver good quality coverage*
- *Ability to deliver highest peak data rates*

[38] Report for Ofcom, 4G capacity gains, Real Wireless, January 2011, at http://stakeholders.ofcom.org.uk/market-data-research/technology-research/2011/4G-Capacity-Gains/?utm_source=updates&utm_medium=email&utm_campaign=4Gcap, page 12

• *Ability to deliver LTE services"*

From paragraph 3.49 Ofcom considers the ability of different technologies to supply capacity.

> "*3.49 Different technologies can deliver different levels of capacity and data rates, for a given amount and type of spectrum. Therefore the frequency of spectrum held will also have an indirect impact on capacity given that the timing of the technologies that can be deployed will depend on the frequency of spectrum held (e.g. see Figure 3.14 below).*
>
> *3.50 In particular, capacity and ability to deliver high average data rates will be affected by the cell spectral efficiency of the technology. The cell spectral efficiency refers to the total throughput which a cell can provide in a unit spectrum bandwidth, taking account of interference from other cells at a given loading level and the distribution of users around the cell. As a result it provides a measure of the overall capacity which is available to be shared amongst users, normalised to the quantity of spectrum available to deliver it. The capacity may be shared amongst the users equally or otherwise, depending on their needs and the operator policies."*

In subsequent paragraphs it makes the following observations:

- Early deployments of LTE will provide around 20% more capacity for the same spectrum compared to high end HSPA networks available at a similar time;
- The wider the bandwidths that are supported by LTE, the greater the efficiency benefits.
- High peak data rates can also improve the overall capacity of the network.
- As a result more resources are available for serving users with poor signal conditions meaning those users can potentially experience a higher data rate or more of those users can be served.
- Having large contiguous blocks of spectrum suitable for LTE may allow national wholesalers to deliver high peak speeds with associated capacity benefits.
- Peak speeds delivered using HSPA are increasing. Nevertheless, these are significantly less than the peak speeds that can be delivered for the same standards release using LTE[39].

Although each of these points identify the superiority of LTE over HSPA, they do not make clear the *extent* of the superiority of say 5MHz of LTE over 5MHz of HSPA: this remains somewhat of an open question.

But what Ofcom has failed to do in the present consultation is to consider the implications of the superiority of LTE over HSPA in relation to the specific facts at issue. EE already has 20MHz of 2100MHz spectrum in use for 3G/HSPA. It is proposing to overlay this with a minimum of 10MHz of 1800MHz spectrum in use for LTE. The nearest available competitor is Vodafone, which has 15MHz of 2100MHz spectrum for 3G/HSPA. EE already has 33% more than this, and is proposing to overlay this advantage with 10MHz more at LTE.

It is possible from this to make a very primitive calculation to attempt to identify the minimum scale of the advantage to EE. Simply for illustrative purposes, using a scale uplift of 20% for this spectrum based on the first bullet point above would lead to EE having 20 MHz plus 10 MHz * 1.2 or 32 3G

[39] At paragraph 3.165

equivalent MHz , i.e. 113% more spectrum capacity than Vodafone. If this additional capacity were to be translated directly into average data rates (assuming an even distribution between the two networks), then ✂.

We accept that this is deliberately a very basic and simplistic illustrative analysis and one that understates EE's advantage – however the point we are seeking to make is that whilst it may be fair to consider the overall uncertainty of performance differential as an abstract issue and to conclude that it is impossible to measure, the same cannot be said in relation to 10MHz of LTE plus 20MHz of HSPA in comparison with 15MHz of HSPA – it is **absolutely** clear that the former offers a significant practical performance advantage – ✂.

To put this into some form of context, the superiority of LTE over HSPA is confirmed by real-world experience from Telstra's live 1800MHz LTE network in Australia, which demonstrates that LTE not only provides far higher peak data rates, but also delivers consistently higher actual speeds as the figure below demonstrates, as well as lower latency. This means that the user experience for <u>all</u> services is significantly enhanced; not simply those that rely on high peak data rates.

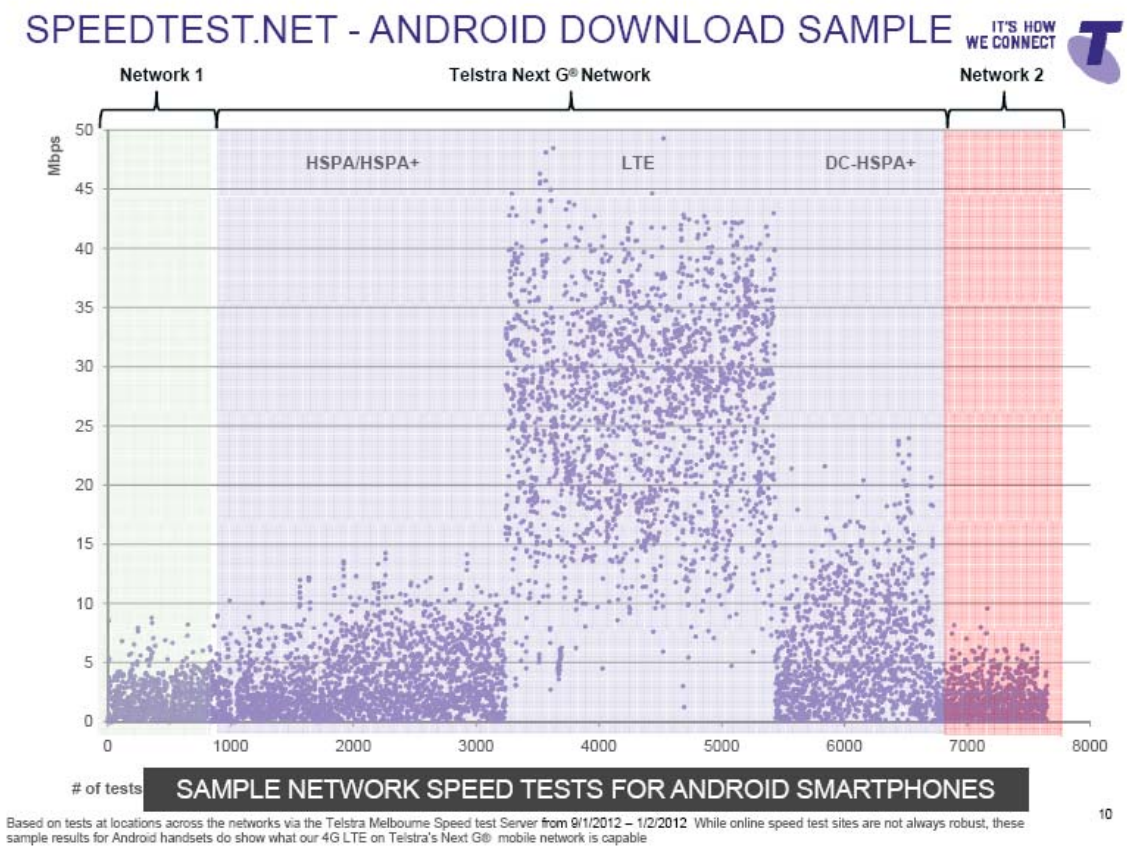


Figure 7: Telstra – sample network effective data rates[40]

[40] Spectrum: Using what we've got; Mike Wright (Executive Director, Telstra), slide 10 Presentation by Mike Wright, Executive Director Networks and Access Technologies, Telstra, given on October 26, 2011 at GSA 4G World 2011, Chicago (Global mobile Suppliers Association)
http://www.gsacom.com/gsm_3g/info_papers.php4

This chart does not quite relate to the UK position, since it is showing comparative performance of an operator with both HSPA and LTE networks ✂[41].

One reason why the real world performance advantage of LTE over HSPA might be the orders of magnitude seen above relates to the relative traffic loading of 3G and 4G networks in the real world. It is clear that one of the factors influencing the actual speed that is available to an individual customer on either 3G or 4G is the number of simultaneous users in the cell. As is widely established, data (and voice) traffic on 3G networks is both high and rising, and an individual's achieved data speeds are being affected by having to share the finite resource available at each cell with others. The contrast between technologies, particularly in the immediate post launch period is therefore between a given resource total shared between multiple users on 3G and a significantly higher resource potentially not shared at all on 4G. (This may be amplified by the shorter activity time implied by a faster throughput speed, decreasing the probability of sharing.)

Therefore EE will be able to obtain effective average data rates for customers of its LTE network that are much faster than competitors' HSPA data rates. But this is not the complete picture. There is potentially a related performance impact on 3G for EE. If one assumes some of the customers attracted to LTE will be existing EE users already making high demands on their 3G network, then any such migration will necessarily ease the pressure on EE's 3G network✂[42].

Furthermore, EE may be able to improve on its performance advantage by increasing its initial 10MHZ of LTE to 15MHz or 20MHz as clearance accelerates, especially given that the divestment spectrum is programmed to be released at staggered intervals. It is absolutely clear that as the spectrum bandwidth of LTE increases, so does its peak speed and its effective throughput[43]. In paragraph 4.121 of the January consultation, Ofcom noted in its assessment of EE's spectrum strengths: "*we also consider that it is likely to be able to deploy a 2x20 MHz LTE carrier relatively quickly*".

There is no doubt therefore that EE will be gifted a significant performance advantage in average data speeds and other performance metrics over its competitors as a result of any exclusive liberalisation.

Will EE's performance advantage translate into a material risk of distortion to competition?

Ofcom's consultation has made no serious attempt to gather or examine evidence from other markets to determine either the benefits to consumers and / or the risk of harm to the process of competition as a result of EE's first mover LTE launch. This failure is particularly important given the conclusions from the previous sections both that the size of the performance advantage to EE will be

[41] The test adopted is that of Speedtest.net, operated by network analytics firm Ookla, which is one of the most widely used and referenced speed tests globally. It used an Android app on the device to sample the actual effective speed at the device - this is analogous to the method used in Ofcom's broadband speed tests in the UK

[42] There is also potentially a feedback loop: as traffic currently fall backs from 3G to 2G when 3G is heavily loaded, any reduction of 3G data traffic might decrease the consequential load on 2G, making 2G clearance easier.

[43] See, for example paragraphs 3.160 to 3.169 of Annex 6 of the Ofcom January 2012 consultation.

substantial and that its duration will be longer than Ofcom has suggested. We examine the likelihood of competitive distortion below.

The benefit for consumers of LTE over 3G

Ofcom's seven assertions leading to the conclusion that there is no material risk to distortion of competition from permitting EE a head start on LTE commercial launch are contained in 5.11 and 6.22 of the current consultation. The first four from 5.11 consider, but fail to measure the extent of the benefit for consumers of LTE over 3G in the present context:

> **Assertion 1: "it is unclear the extent to which consumers are likely to value the features that LTE can deliver over and above HSPA in the short term"**
>
> **Assertion 2: "similarly it is unclear how much consumers value high peak data rates or how much consumers value applications and services that rely on high peak data rates"**
>
> **Assertion 3: "it may be that the features associated with LTE and high peak data rates are only valued by a small group of consumers, particularly in the early stages of LTE deployment"**
>
> **Assertion 4: "indeed for a period, there could be advantages of HSPA over LTE because of a larger range or stock of compatible user devices"**

Ofcom concludes from these lukewarm assessments of LTE in 5.12 that:

> *"we consider that it is <u>possible</u> that those operators with spectrum suitable for LTE <u>may</u> be at an advantage when competing for certain segments of services or customers as compared with operators that do not have spectrum suitable for offering LTE services and high peak rates*[44]*"*

Vodafone's view, supported by the available evidence is that this considerably understates the real competitive advantage that will accrue to EE under Ofcom's current proposals. In relation to assertions 1 and 2 it can be shown that consumers do value LTE's faster data rates. With respect to assertion 3 it can be shown that it is a considerable, rather than a small group of consumers who value LTE. Finally whilst assertion 4 might have been true in the past, it no longer holds. It is convenient to deal with assertion 4 first.

The lack of LTE user devices

It is true that LTE adoption has been limited in the past by the low availability of compatible user devices. However LTE is no longer a "new" technology, either in general or at 1800MHz. The Real Wireless report that accompanied the January 2012 spectrum consultation stated that in October 2011 there was vendor support for 41 LTE devices at 1800MHz[45], up from 17 in June 2011[46]. A GSA news release for January 2012 discloses that there were by then 50 capable devices, noting that the number had "tripled in the last six months"[47]. The subsequent GSA release, in April 2012, shows a

[44] Vodafone emphasis
[45] Table 3.2 at page 45
[46] Table 3.1 at page 45
[47] http://www.gsacom.com/news/gsa_345.php4

further increase to 75 1800MHz LTE devices[48]. Clearly the manufacturer deployment of 1800MHz LTE devices has attained momentum.

This is echoed by Telstra, in the attached charts[49]

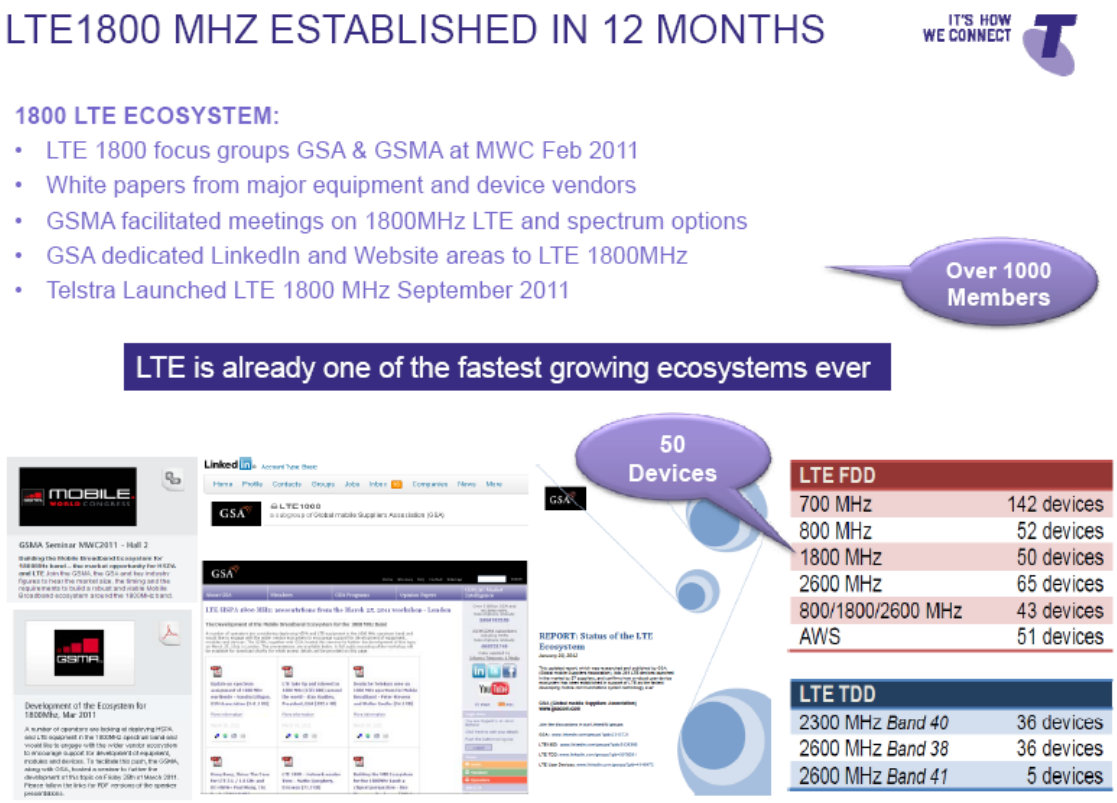


Figure 8: Telstra 1800MHz network background

[48] http://www.gsacom.com/news/gsa_350.php
[49] Mike Wright presentation, referenced above, at slides 7 and 8

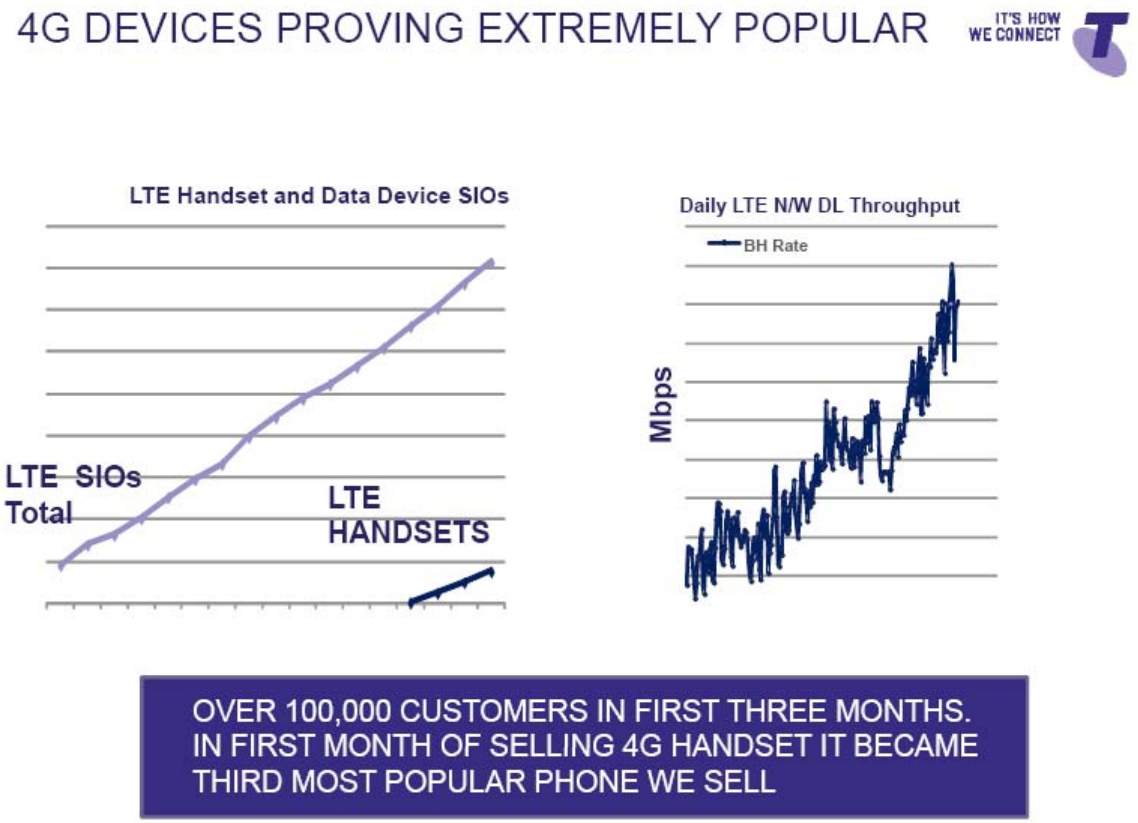


Figure 9: Telstra Handset and traffic data

In the consultation document, Ofcom itself states: *"we believe that a wide range of [LTE] devices capable of using [1800 MHz] bands, including smartphones, will be available across the EU from 2013"*[50] In fact, even this significantly understates the true position.

Vodafone can already see from handset manufacturers' roadmaps that LTE handset availability will increase dramatically in 2012 with the overwhelming majority of these handsets supporting LTE1800. ✂.

Clearly therefore any historic limitation to customer LTE growth provided by the restricted number of LTE 1800MHz devices that were available has been and will continue to be rapidly eroded.

The benefit of LTE plus HSPA over HSPA/3G alone

We have discussed above that Ofcom significantly underplays the benefits of LTE in terms of network performance metrics that will accrue to EE (both in their LTE network and also their 3G network). The consequence of this is that Ofcom has failed to adequately consider in this consultation the benefits to consumers that arise from this in assessing EE's competitive advantage.

Faster average data speeds for customers

[50] At paragraph 4.22

The benefits of faster average data speeds are well established, and need not be reiterated in any detail here. Capital Economics has produced at the behest of EE, a report on 4G technology. It echoes Ofcom's conclusion on the substantial superiority of LTE. It states on page 22:

> *"It is realistic to expect significant improvements in achieved download speeds and even initial deployments of 4G LTE technology will enhance the day-today mobile broadband experience in other ways:*
>
> - *Responsiveness will be as good as or better than the best that 3.5G can offer now or in future:*
> - *4G LTE makes more efficient use of spectrum and hence will have greater capacity than 3G and 3.5G systems and improve the quality of service*
> - *Connection times on 4G LTE will match or better the best that can be offered on 3.5G systems with devices feeling 'always on'"*[51]

This change across all services has been noted by other commentators. Ofcom states in its 2011 Communications report that "*a step change in the performance of mobile networks will come with the launch of LTE networks*".

LTE will allow a proper 'streaming' rather than 'downloading and syncing' experience:

> *"The streaming media experience on mobile handsets today is still patchy, however, especially for video. Network speeds are inconsistent, and quite often simply not fast enough to provide a reliable experience. Many users therefore rely on software such as iTunes to download and sync media libraries onto mobile devices. Better networks, and particularly LTE should make it possible for users to access media libraries using the mobile network, by virtue of its much higher speed. Photos will download immediately at LTE speeds. Song downloads will take a few seconds. A 30 min TV show to watch on the train home will take 1-2 minutes to download (and should stream immediately). Even feature-length movies will take less than 5 minutes. The speeds achieved are a step-change in our current wireless experiences."*[52] (emphasis added)

Importance of peak data rates for competition

Despite the greater importance of the actual data rates that are experienced by customers, peak data rates can still be a significant marketing focus even if they are not used by all customers. For instance, despite the fact that its 4G network is limited to the largest Australian cities, Telstra deliberately emphasises speed and a technological premium (e.g. smart vs. dumb network) in its national advertising as the graphics below[53] show.

[51] Mobile Broadband and the UK Economy, Capital Economics, April 2012, at page 22
[52] Morgan Stanley research November 2011
[53] Compiled by Vodafone from Telstra advertising in Australia

Telstra in-market activity

✂.

The same issue is evident in the US market. By advertising speeds 'up to 10x faster than 3G' as in the case of AT&T advertising LTE is presented to consumers an unmatchable step-change in performance. The fact that HSPA+ cannot compete with LTE on this key marketing metric of peak data rates leads to 3G not being viewed as a substitute by consumers in markets with LTE.

This also allows premium pricing for LTE over 3G. Telia in Sweden for instance offers 5-10 Mb/s and 10-20 Mb/s services at 319 kr but its high end 10-80 Mb/s product is priced at 499 kr. ✂

A similar approach can be presaged in the Capital Economics report for EE, which in section 5 can be clearly seen to be equating LTE with superfast fixed broadband services[54] leaving 3G to be considered as equivalent to or worse than ADSL.

Demand for LTE in other countries

The preceding sections have established that LTE does provide a substantially superior user experience to 3G in the real world, as well as at a theoretical level, and also that whatever barriers

[54] P. 19 of the Capital Economic report for EE

that have existed in the past in terms of limited device availability have fallen away over the last few months. But what about real world demand for LTE?

Despite the historic device limitation, there is strong evidence of customer demand for LTE in other countries. In Japan, NTT Docomo, with first mover advantage, has captured more than 2 million customers, as the chart below shows:

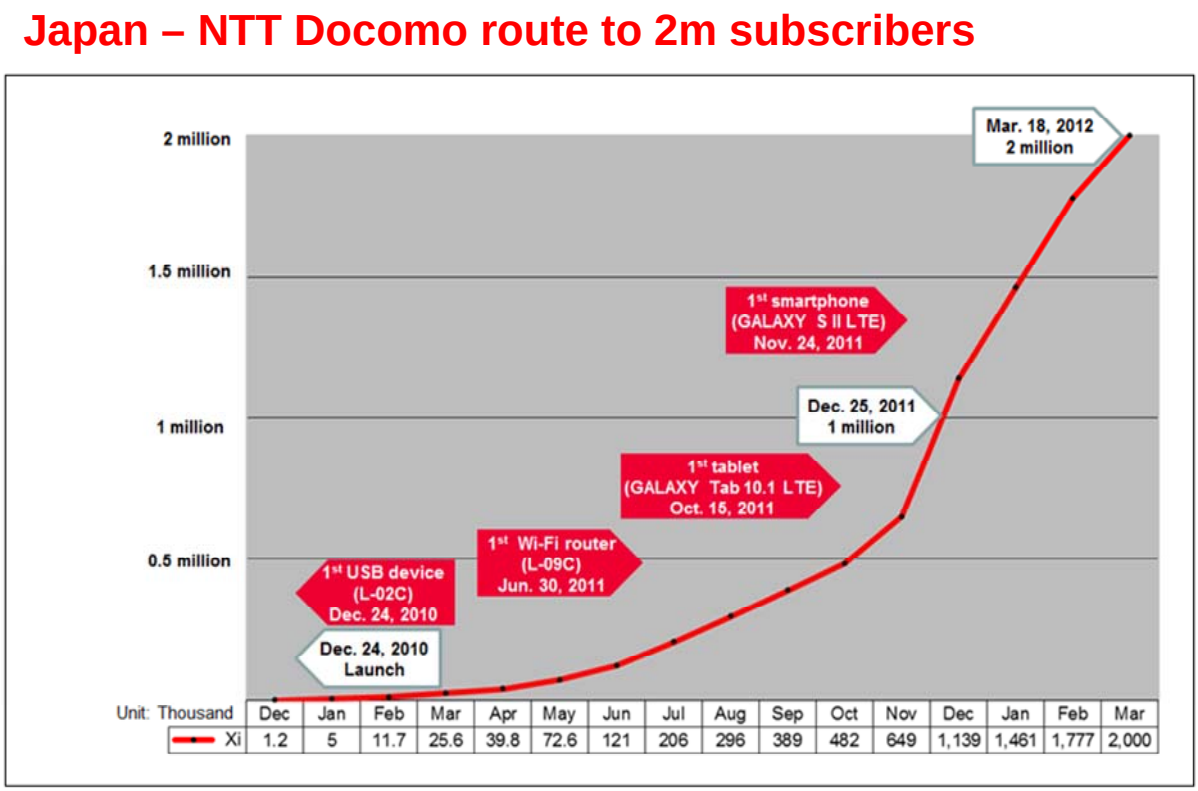


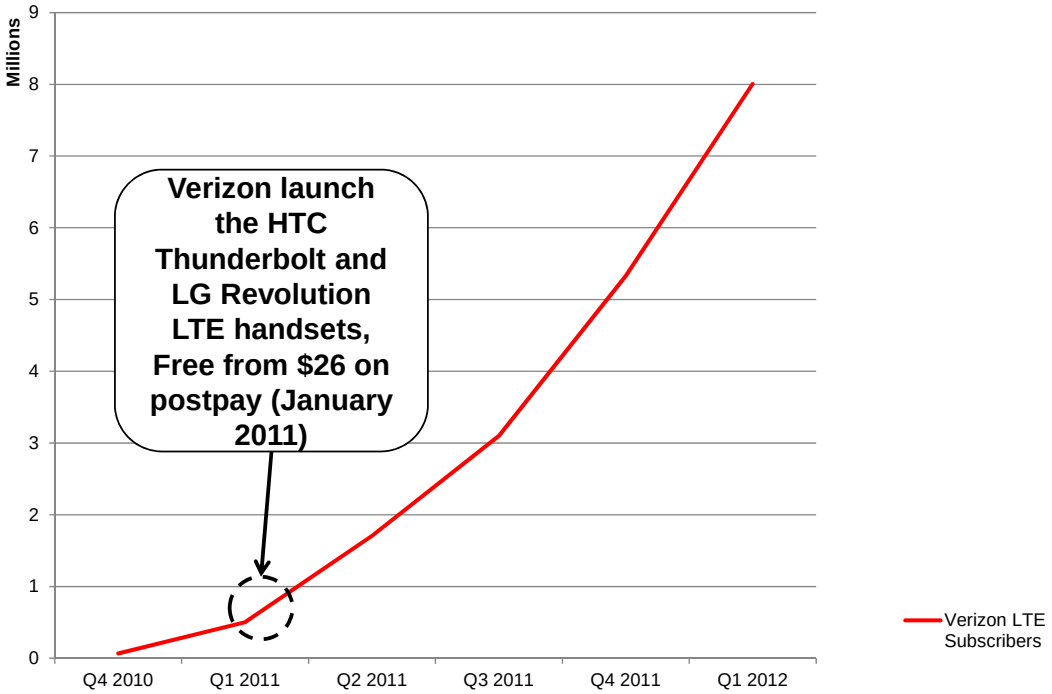
Figure 12: NTT Docomo LTE customer growth[55]

We note that this period of 15 months is the same time frame as Ofcom's "Interim Period", and the growth in the period was achieved despite LTE capable smartphones only being available for the last 4 months (over which the customers grew by 1.3 million of the total).

In the USA, Verizon Wireless has grown even faster:

[55] "NTT Docomo Xi® LTE Service Subscribers Top 2 Million" (March 22, 2012)
http://www.nttdocomo.com/pr/2012/001584.html

Verizon launched handsets early in LTE deployment



Source: Wireless Intelligence Quarterly KPI database, accessed 8/5/12

Figure 13: Verizon Wireless LTE customer growth[56]

Clearly therefore there is evidence of substantial customer demand for LTE.

LTE retail pricing and revenue advantage to LTE operators

LTE retail pricing is still somewhat "experimental" and varies between countries. Verizon and NTT Docomo appear to have priced 4G at broadly the same level as 3G to maximise their market share gain with US operators using the opportunity to phase out 'unlimited' offers (and also raise the floor). An alternative approach, widely adopted in Europe has been to price LTE at a premium, either in general or specifically linked to maximum speeds, and/or monthly volumes. Figure 14 below shows T-Mobile pricing in Germany – one can clearly see the LTE premium rate at the bottom of the figure (€50 compared with €10, €15 and €25 packages).

[56] Wireless Intelligence quarterly data

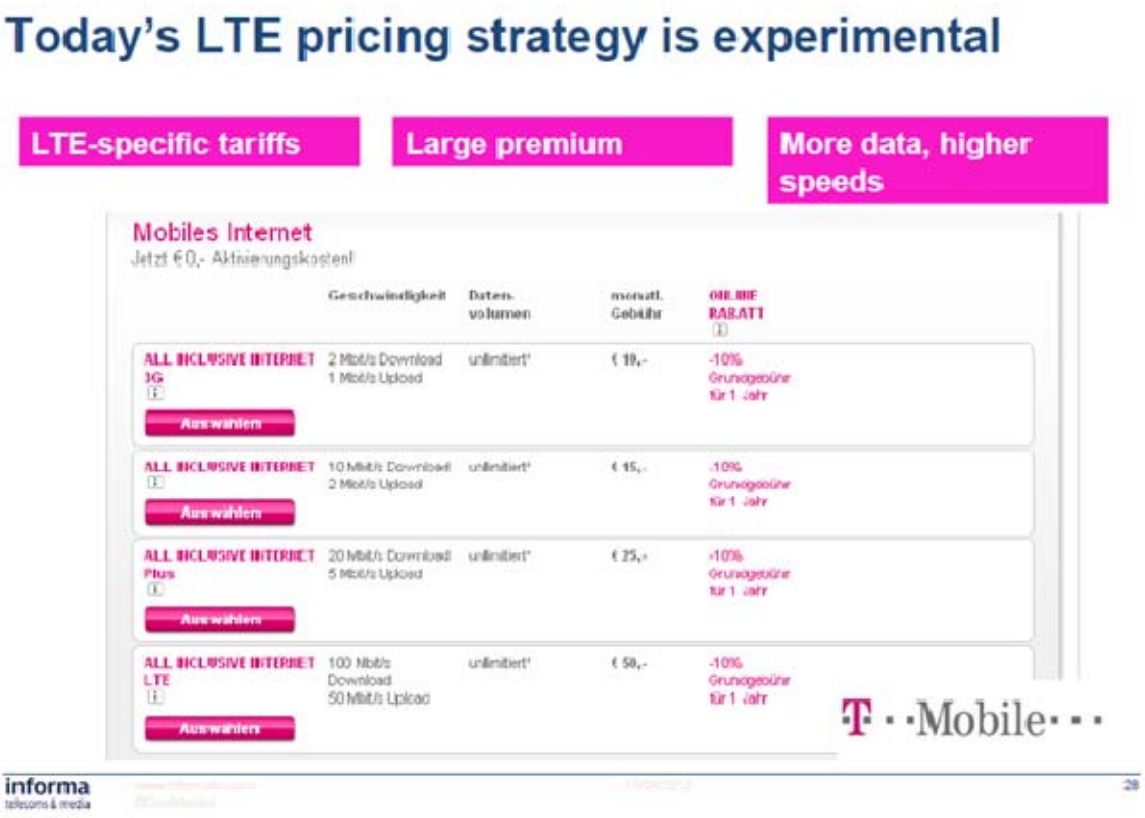


Figure 14: T-Mobile Germany data pricing

In Australia, Telstra (✂) has taken a mixed approach - pricing at levels comparable to 3G at lower speeds but charging a premium for the super-fast speeds that only LTE can deliver.

What is clear from the markets that have launched LTE is that operators have seen extra value, even if the ways in which operators have sought to extract this extra value has differed between markets, varying between no 3G/4G price differentiation to a speed/volume stratified tariff with an LTE premium.

Demand for LTE in the UK

Examining the evidence from other markets clearly demonstrates that it is wide-spread top tier handset and device availability that drives a significant increase in LTE take-up. Given that this global hurdle has already been passed, there is every reason to expect that the UK is likely to show a rapid adoption of LTE. Very early commercial launches when such handsets were not available are less instructive when considering the potential competitive impact of EE's early mover advantage.

The starting point for evaluating the strength of demand for LTE in the UK must be that operators expect consumers to value LTE services more highly than those which can be delivered by HSPA or HSPA+. The first obvious piece of evidence is EE's request for the variation of its licence itself.[57] If consumers do not value these features, why would EE seek an early variation in order to deliver

[57] EE emphatically advocates the case for such benefits on its sponsored website 4GBritain.org.uk

them? Therefore, Ofcom should approach the question from this direction and examine whether there is any evidence that undermines it.

Further clear evidence is provided by Ofcom in the January 2012 consultation:

> *"3.15 Consumer research suggests that consumers value higher data rates. For example, YouGov's Dongle Tracker consumer survey, which tracks the mobile broadband market, finds that download data rates are well correlated to an operator's ratings for quality.*
>
> *3.16 Ofcom's Mobile Broadband Research carried out for the Ofcom Consumer Experience survey 2010 found that slow connection data rate was the most cited problem when accessing the internet via a dongle or mobile phone, both at and away from home (see Figure 3.1 below). For example, over one-third (34%) of laptop/dongle out-of-home users cited slow download data rate as the main cause of dissatisfaction.*
>
> *3.17 In the future, data volumes demanded by mobile customers are expected to continue to grow rapidly. There has been a clear trend of rapid increase in mobile data traffic over the past few years, as is illustrated in Figure 3.2 below. Data volumes are increasing rapidly, growing by approximately 70% between Q4 2009 and Q4 2010, and this is part of a trend over a longer period.*
>
> *3.20 Mobile data services are being accessed by a rapidly increasing portion of UK mobile consumers. In Ofcom's Consumer Experience Report 2011, we found that 38% of mobile phone owners claim to own a smartphone in Q2 2011, compared to 30% in Q1 2011. The trend of rapidly increasing smartphone take-up is likely to not only fuel growth in overall data traffic, but also increase the importance of the ability to provide good quality data services as a larger portion of the customer base uses them.*
>
> *3.21 Overall, we consider that a lack of capacity could have consequences on the ability to compete in the provision of mobile data services. This is because, in order to be credible, national wholesalers are likely to need to be able to exert a competitive threat across a large proportion of the market. National wholesalers with very little capacity will be limited in the number and type of consumers they can serve and are likely to struggle to compete effectively. Going forward, national wholesalers may need to expand capacity in order to be able to meet increasing demands for data volumes, particularly since we expect increasing take-up of smartphones and other devices (e.g. tablets) that make heavy use of data services.*
>
> *3.22 Nevertheless, it is not the case that national wholesalers that face some constraints on capacity or that are more capacity constrained than their competitors will not be credible. They may still be able to act as a competitive constraint across a material proportion of the market. For example, the distribution of heavy users of data services may be such that, by not serving those heavy users, a capacity constrained operator may still be able to deliver services to many consumers. However, competition in those particular customer segments would be weaker than would otherwise be the case. Also, future trends may change the distribution of heavy users such that the commercial cost to an operator of excluding data hungry users from its customer base will become significant."*

This seems very clear – applying these points in the context of the current consultation must lead to the conclusion that the competitive advantage of EE with both LTE and HSPA over an HSPA only operator, even over a 15 month period, will be substantial.

Other evidence supports the view that there are a significant number of consumers who value the higher average data speed services of LTE. Whilst it is hardly objective data, we note that EE has announced the results of its own YouGov survey that it commissioned in April 2012 where 74% of those who expressed an opinion wanted 4G in the UK as soon as possible, and that of these 58% "wanted to access faster internet connections".

In order to enable it to disregard its own arguments from the January 2012 consultation in the current context of EE immediate liberalisation, Ofcom would have to suggest that notwithstanding the evidence above, there are particular circumstances in the UK that lead to strong suggestions that the LTE adoption rate will not be rapid for EE. It has failed to do so. Thus based on the inherent advantages of LTE over 3G, international evidence and the rapid growth in handset availability, Ofcom should have concluded that there is a very real risk that EE will obtain substantial first mover advantage.

Persistence of EE's competitive advantage

When considering the material risk of a distortion to competition, Ofcom accepts that if EE was able to provide LTE services with a high peak data rate and was able to establish and maintain a first mover advantage that persisted this could reduce competitive intensity and the benefits to consumers over the long term.[58] However it dismisses this concern on the basis of a further series of assertions on possible customer behaviour which could undermine that first mover advantage in 6.24:

> **Assertion 5: "The factors that lock in customers during the first mover period are unlikely to be significant" and customer inertia may protect lagging firms**
>
> **Assertion 6: "Even if early LTE customers are completely locked in, the pool of potential customers will be expanding over time as people upgrade"**
>
> **Assertion 7: "it is also plausible that a first mover may find itself at a competitive disadvantage in the longer term compared to other competitors"**

We show below that the available evidence does not support any of these propositions.

The evidence from Japan demonstrates just how enduring LTE market leadership is expected to be, particularly when launched by the leading operator. In Japan, NTT Docomo launched LTE only a limited period before the second competitor, but is forecast to retain more than 50% market share in that segment 4.5 years later. This is a full 9% higher than its share of the overall mobile market. Taken in the context of a mature market like the UK where market shares typically move less than 1% between operators per year this is a significant shift. There is thus a real risk that allowing first

[58] 6.22 of Ofcom's consultation

mover advantage to the largest UK operator could give EE a substantial opportunity to further shift market share its way, particularly in the high user/high value segment.

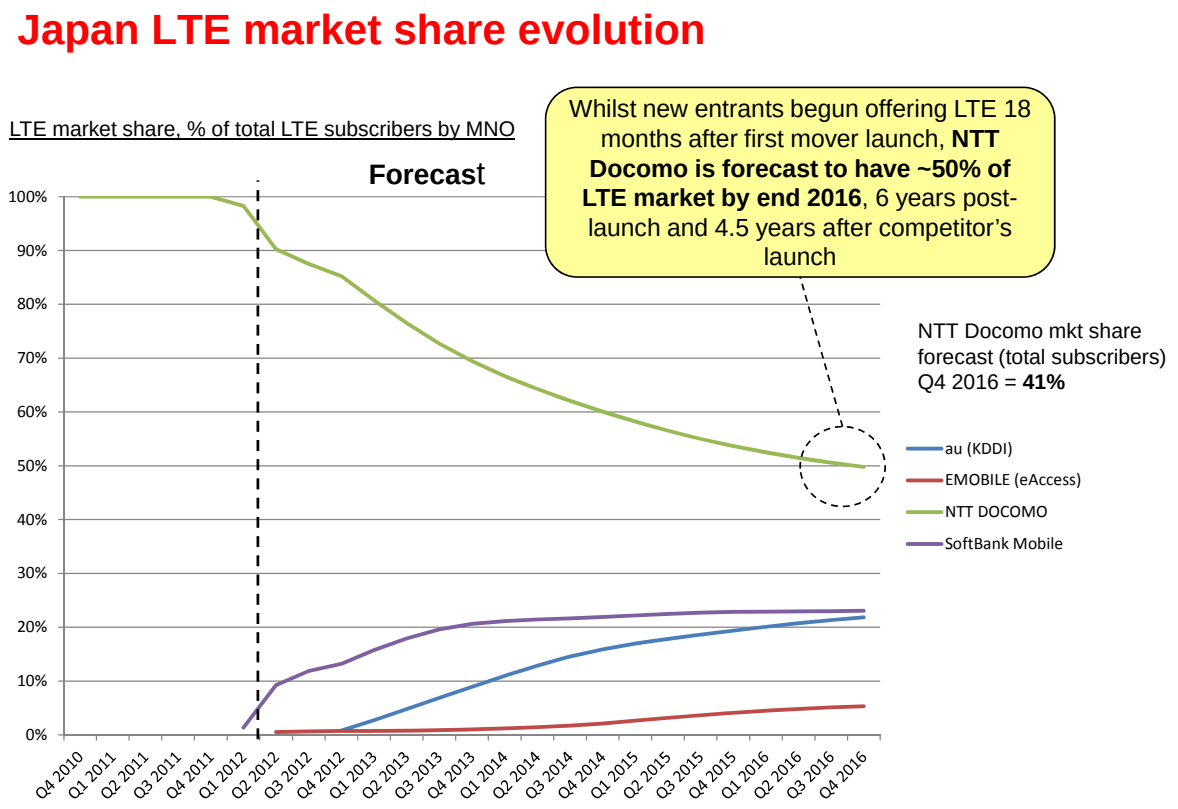


Figure 15: Japan – forecast LTE market share evolution[59]

First mover competitive disadvantage in the longer term compared to other competitors

In the abstract we agree that it is plausible to argue that a first mover competitive disadvantage might exist in some markets for some products or services. It is not difficult to consider that the first launch of a new product or service may be a disaster or at least problematic leading to long term loss of reputation, or if not a disaster, first entry is such that later entrants can "learn the lessons", improve on the product and so forth, leading to an eclipse of the first mover (Friends Reunited vs. Facebook) or a failure to grow in the first mover period or thereafter. Ofcom attempts to support this proposition by claiming that:

> *"a competitor with an early route to LTE may face uncertainty in offering a new set of services. Later LTE providers may benefit from a first mover's investment in developing LTE service and consumer demand and could for example "free ride" on this."*[60]

[59] Wireless Intelligence data
[60] Consultation at paragraph 6.24

But these are not the circumstances of LTE in the UK. LTE is not a new service globally, nor are the services that LTE will supply new – it is merely that LTE will offer a superior experience in a market for which demand is both well established, and rising. EE is not, properly understood, a 'first mover' of LTE in the sense of potential teething problems with the technology or the creation of untried services the demand for which is unknown, or the use of untested devices. On the supply-side it is clear that these markets are global. There are at least 28 LTE networks in full commercial operation around the world today, including EE's German part-owner. Therefore EE will itself benefit from the early investments and maturing of the LTE ecosystem from the true 'first movers.' This can be clearly seen in the case of the recent removal of the limited availability of LTE 1800MHz devices, discussed above. Similarly LTE RAN equipment has been in use globally for some period.

On the demand-side, also as described above, LTE represents a dramatic increase in available speed, but does not fundamentally create a new market or demand for a new set of services. Therefore, the correct question that Ofcom should have considered is whether EE's competitors will be able to compete with it effectively within the existing market for high-speed mobile data both on hand-held devices and PCs.

From the market share dynamics in other markets as shown above there is no evidence that later LTE providers can 'free ride' on first mover's investment in developing service and customer demand. Instead, the first mover is predicted to retain its leading position for many years to come.

Thus there is no evidence of any likely first mover disadvantage in relation to LTE in the UK. The presumption must be therefore that there will be first mover advantage.

Customer lock-in and the pool of potential customers

Ofcom's other arguments relate to the theory that the number of locked in customers which the first mover will obtain is small and that the number of potential LTE customers is also small in the first mover period in the UK. We do not agree.

First movers on LTE will typically seek to lock in any early adopters for contract terms of 24 months, as is normal on mobile contracts. However, Ofcom dismisses this concern on the basis that the same principle of lock-ins may equally protect 'lagging firms'. But this ignores the value of 'spectrum certainty' described above. EE will be in a position to 'pre-market' to likely LTE adopters before its actual launch of services. This would allow such customers to allow contracts to lapse in the interim period. It would also be possible for EE to 'buy out' customers from their existing contracts by offering a discounted introductory period. While other operators could respond with discounting of their own, by definition, they will not have the commercial proposition which is being sought by these customers.

But more importantly Ofcom goes on to assert that even if early LTE customers are completely locked in, the pool of potential customers will be expanding over time as people upgrade, so any first mover advantage is easily competed away.

These two considerations simply do not stand up to analysis. If the level of interest in LTE were to be very low, and customers were tied in to long contracts that lasted considerably longer than the duration of the first mover advantage, then the degree of lock-in by the first mover might be seen to be slight and easily overcome by the later entrants. So for example if all mobile customers were tied

to 10 year contracts whose renewal dates were evenly distributed, then over Ofcom's interim period of 15 months, some 12% of the base would upgrade and enter the pool of potential customers. If the level of interest in LTE was very low such that only 5% of upgrading customers considered LTE adoption then only 0.6% of the total market would become LTE customers of the first mover.

However in the UK mobile market none of these facts are true. The maximum contract length is 24 months, not 10 years. The latest Ofcom quarterly telecoms data tables, published in April 2012 show Ofcom's view of the mobile market, that at the end of 2011 there were 81.6m mobile customers, and 31m connections in the year. Effectively therefore the total base turns over every 2.6 years. On this basis assuming Ofcom's first mover advantage of only 15 months, 50% of all mobile customers or over 40m are in the pool of potential churning customers for the first mover to LTE. Taking Vodafone's view that EE's advantage is rather longer than 15 months, the pool of potential customers available to EE rises towards the totality of the UK mobile market. As to how many of the potential pool might actually become LTE customers, there is EE's YouGov survey suggesting that 58% of 74% or 43% of those surveyed wanted faster mobile internet connections.

Furthermore with respect to data only customers, the pool of such potential customers for LTE is not growing. The current pool is largely the existing mobile broadband customer base on 3G, the growth of which has levelled off since 2010. Ofcom reported at page 322 of the August 2011 Communications Market Report that:

> *"Overall household take-up of mobile broadband increased by just 2% in 2010: this follows three years of initially strong growth since the services launched in 2007. This slowdown in take-up of PC-based mobile broadband may reflect that some users consider internet access on their phone to be sufficient for their mobile internet needs."*

Ofcom analysed this trend in the previous report in August 2010 in a section entitled "Mobile Broadband finds its niche"[61]. It concluded that some of the factors relating to the size of this niche market related to the performance of mobile broadband in relation to fixed broadband, primarily in relation to effective data speeds. It is clear that the launching of LTE services will change the relative performance balance between fixed and mobile, potentially allowing mobile broadband subscriptions to reverse this slowdown – however this will only happen for an operator who possesses a commercial LTE service. The report also highlighted an increasing switch from contract to prepay for new mobile broadband customers.

This leads to two conclusions: for the existing pool of customers the promise of LTE to increase their effective data speed must be attractive, and that new mobile broadband customers (who are currently not using mobile broadband) may be attracted by LTE's speeds. However if this opportunity uniquely exists for EE for at least 15 months (and in practice rather longer) then there is a high probability, given that many customers are on prepay, and the balance on 30 day or 24 month contracts, that a very considerable proportion of mobile broadband customers may switch to LTE, and new mobile broadband customers arrive, during the period when EE is the sole LTE operator. This could very well lead to market dominance in mobile broadband and an effective "lock-in" of such customers by EE.

[61] At page 291 of that document

A similar position can be seen for smartphones. There is very much a flow towards increasingly sophisticated and data hungry applications, that are clearly better served by LTE than HSPA. In reality therefore, this flow is likely to be one way in direction, towards LTE and away from HSPA. In these circumstances therefore, Ofcom's assertions 5, 6 and 7 that minimal first mover advantage will persist appear weak, unfounded, and implausible. If LTE is not going to be popular with customers, what is the point of early liberalisation in the first place?

Conclusion

We conclude therefore that a proper examination of the data that was already in Ofcom's hands, together with additional data that is readily available, is lacking in Ofcom's consultation. Had Ofcom considered the specific circumstances of the proposed exclusive liberalisation for EE, i.e. the possession of both LTE services plus HSPA services in a market where EE was already the largest operator, for an extended period during which all other operators were only able to offer HSPA services, then it should naturally have come to the conclusion that there was a very significant and serious risk to competition.

We turn now to a discussion of the remedies that are appropriate in these circumstances.

Section 5: Remedies

In Section 6 of the consultation Ofcom briefly considers and dismisses three possible measures to address material risk of distortion, namely delaying liberalisation, regulated access and redistributing rights of use.

Delaying liberalisation

Ofcom's consideration of this option is very brief. Ofcom simply states that delaying liberalisation would result in LTE services not being available until after the auction, that this would make at least some consumers worse off without making any consumers better off in the short term i.e. during the Interim Period.

Ofcom states at 6.7:

> *" . . . for delay to liberalisation of EE's 1800 MHz licences to be appropriate and proportionate, any distortion to competition would at least have to exceed any benefits they enjoy from liberalisation during the Interim Period and the associated costs to consumers would have to exceed any benefits they enjoy from liberalisation during the Interim Period. Without any enduring costs, consumers will in our view be better off with early liberalisation (relative to delayed liberalisation)."*

The essential problem with this line of argument is, as demonstrated above, distortion is likely to endure beyond Ofcom's Interim Period. Therefore, on Ofcom's own analysis, delay cannot be ruled

out on the basis of lack of enduring distortion, and may indeed be an appropriate and proportionate response.

Regulated access

Ofcom considers the possibility of regulated access in outline only, while ultimately concluding against it. Whilst Vodafone notes that in principle regulated access may create some complexity, Ofcom must consider in greater depth the viability and potential benefits of wholesale access in the specific market context. Given that EE has developed and is evidently prepared to offer wholesale LTE 1800 services, any regulated product could perhaps simply 'piggy-back' upon the work that EE has already done preparing a commercial offer for H3G. We note the comments of EE's CEO in his letter to Ofcom of 23 November 2011 requesting liberalisation:

> *"As you may recall at the time of the creation of Everything Everywhere last year, we entered into an agreement with H3G to provide them with wholesale LTE 1800 services. I have discussed with David Dyson* [CEO of 3] *in general terms my proposals concerning the launch of LTE 1800 services and work has now started with his team to enable H3G to take advantage of these when we launch them."*[62]

We would welcome further clarification of EE's position in this regard.

Redistributing rights of use

The third option Ofcom considers is redistributing rights of spectrum use. As Ofcom notes, this would be a very significant intervention with many concomitant risks including disruption to existing services resulting in potential adverse consumer impacts. On balance, Vodafone agrees that the risks and lead times associated with such a radical intervention argue against it given the existence of simpler and more proportionate alternatives which we discuss below.

Alternative approach to liberalisation

There are clear risks of enduring competitive distortion were Ofcom to go ahead and liberalise for EE unconditionally. Vodafone considers that the appropriate response in these circumstances is to adopt a different approach to liberalisation.

Instead of liberalising for EE alone, without any preconditions, Vodafone believes Ofcom should take any remaining measures now to ensure that licences in the 1800MHz band are capable of being used for 4G but not vary existing 1800MHz licences until it is satisfied that there are 4 operators holding sufficient cleared spectrum to deploy credible national 4G networks. This is consistent with Ofcom's stated policy objective in both of its most recent spectrum consultations and would, in practice, require the release of new spectrum via the Combined Auction before any 1800MHz licences are varied. There are a number of advantages with such an approach:

- A joined up approach to liberalisation reduces future uncertainty and risk of delay in authorisation;
- The approach is proportionate to the risk it is addressing – it does not eliminate EE's existing advantage but does mitigate the clear risk of market bifurcation arising from EE being able

[62] Letter from Olaf Swantee at EE to Graham Louth at Ofcom dated 23 November 2011

to launch LTE without any competitor being able to respond, and being able to entrench that advantage to the detriment of competition and consumers;

- ✂.

✂.

Vodafone has previously argued that Ofcom's task is not to impose strict egalitarianism between all operators, but that Ofcom must guard against market bifurcation in which EE alone has an entrenched advantage that is damaging to competition and the interests of consumers.[63] The approach described above is entirely consistent with this position.

By contrast, Ofcom's current proposal to liberalise LTE for EE unconditionally is hard to reconcile with the importance Ofcom has attached in its auction consultation on the need to maintain four national wholesalers. Ofcom has insisted that the auction rules must guarantee a minimum of four national wholesalers on the grounds that competition will be diminished and the interests of consumers jeopardised if this is not achieved. Indeed, Ofcom has gone further than this, stating that over and above its main concern that there will be fewer than four credible national wholesalers it also has a (lesser) concern that:

> *" . . . .even if there were at least four credible national wholesalers, one or more national wholesalers will be at a disadvantage in competing across a wide range of services and customers."*[64]

Continuing this theme, Ofcom notes a few paragraphs later:

> *"However, (a) we are concerned that a national wholesaler which had too many disadvantages, and too few or insufficiently important offsetting advantages over its rivals, would not be a credible competitor, and (b) we are concerned that there is a risk of consumer detriment if there is limited competition across the range of services."*

While Vodafone continues to query the basis for Ofcom's attachment to four national wholesalers as being the minimum number necessary to support effective competition, we agree that credible competitors are necessary to support the competitive process and respectfully suggest that this logic must apply to the ability to compete in the provision of LTE services. Clearly, a sole LTE player in the form of an EE monopoly does not constitute competition in LTE services. For reasons discussed earlier we do not find Ofcom's appeal to advanced HSPA as a mitigation against LTE advantage persuasive, given the performance and cost advantages of LTE and in circumstances where EE itself would have both HSPA and LTE capability.

Assuming Ofcom remains wedded to the objective of ensuring the existence of a minimum of four national wholesalers, the logical response would be to design a liberalisation regime that provides

[63] See Vodafone's response to the second auction consultation at http://stakeholders.ofcom.org.uk/binaries/consultations/award-800mhz/responses/Vodafone.pdf

[64] See Ofcom's second auction consultation at paragraph 4.38 under heading "Concerns about future national wholesale competition". http://stakeholders.ofcom.org.uk/binaries/consultations/award-800mhz/summary/combined-award-2.pdf

for at least four operators (including EE) to be in a position to launch LTE at roughly the same time. Indeed, our response demonstrates this is the outcome that would have been envisaged by the Commission when formulating its divestment remedy to address precisely the same competition concerns over market bifurcation that arise now. These concerns are a direct corollary of Ofcom's proposal to licence EE alone to launch LTE services over a year ahead of any competitor.

As noted in above in this response, at the time of EE's merger clearance, the evidence before the Commission was that EE itself would be unable to launch LTE services before 2013/14 –in line with the backstop date for divestment of the first tranche of 2x10 MHz. Moreover, at the time the Commission was reviewing the EE merger, Ofcom anticipated that additional spectrum would become available through auctions of 800 MHz and 2.6 GHz spectrum in 2010/11.[65]

While Ofcom went on to note that precise timing remained uncertain, even now Ofcom expects the combined auction to have been completed by June 2013 at the latest and for 800 MHz spectrum to be available nationally by December 2013, just three months after the earliest assumed LTE launch date for EE at the time the merger was under review.

Thus on the original timelines envisaged while undertakings were being negotiated with EE, the Commission's remedy would have ensured the availability of sufficient spectrum across 800 MHz, 1800 MHz and 2.6 GHz bands to support near simultaneous competitive provision of LTE services by four national wholesalers from late 2013.

All of this is in marked contrast to the present position, where Ofcom envisages EE being able to launch LTE at 1800 MHz around a year earlier than indicated to the Commission (3-6 months from imminent authorisation).

Vodafone's proposal is therefore essentially to restore the position that the Commission must have envisaged at the time it examined the EE merger. Rather than dealing piecemeal with EE's request for licence variation and addressing subsequent liberalisation and authorisation questions at a later date, Ofcom should establish its general policy that liberalisation for LTE use is in principle allowed on all 1800 MHz spectrum from the same effective date in the future when the condition precedent is met. That precondition is that sufficient spectrum has been cleared, transferred to the holder, appropriately authorised (subject to the condition) and is available nationally to enable 4 credible LTE operators. In practice, the critical path is likely to be determined by the release of 800 MHz spectrum which Ofcom currently assumes becomes available nationally by December 2013.

Rather than hard code that date into legislation now, we suggest that Ofcom itself should determine when the condition is satisfied, enabling earlier liberalisation in the event that 800MHz is cleared and becomes available earlier than currently predicted and mitigating the risk of competitive distortion if 800 MHz clearance delays availability relative to 1800 MHz and 2.6 GHz spectrum.

Vodafone's proposal ensures that other operators besides EE would, in principle, be able to offer a competing LTE service from the word go – albeit that EE continues to benefit from early spectrum certainty and a longer planning horizon than any rival operator. Moreover, all operators would

[65] See Ofcom confidential memo to DG comp dated 21 December 2009, paragraph 49, recently published by Ofcom under FoI.

share an interest in the successful conclusion of the auction since without it none would have a clear path to LTE.

Vodafone Limited

8 May 2012

ANNEX 1: THE IMPORTANCE OF SPECTRUM CERTAINTY FOR NETWORK DEPLOYMENT

This annex examines in more detail issues around LTE network deployment and service launch that are dependant on spectrum certainty, spectrum access, and spectrum authorisation that were considered in section 3 above.

✂.

The need for spectrum certainty

In its analysis, Ofcom has missed the importance of the key enabler that allows operators to commit to the deployment of LTE networks; spectrum certainty. The date when suitable spectrum will be available (or authorised) for LTE use is an important consideration, but only when an operator has spectrum certainty can it fully commit the necessary capital expenditure and the resources required to build an LTE network. An overview of some of the steps involved in the deployment of an LTE network is provided below:

- The operator must plan the network coverage and identify the specific sites that will be upgraded to LTE capability. The coverage plan will depend on the frequency band in which the LTE network operates.
- The operator must design the base station solutions and plan the transmission network required to backhaul the predicted LTE traffic. The base station solutions will depend on the LTE frequency and the design of the transmission network will depend on the location of the sites that constitute the LTE network and the capacity required to backhaul the traffic.
- The detailed antenna solutions for base station sites will depend on the frequency band in which the LTE network operates. ✂. The antenna solutions and components will differ depending on the LTE frequency band. Where antennas are shared across a number of frequency bands, the antenna system solution ✂.
- ✂.
- The site activities will involve negotiations with site owners if the required changes are not already covered by the site leases✂.
- If additional antennas are required, planning applications will be necessary to achieve the required permissions.
- The replacement of existing antennas ✂ will require access to the mast head on base station sites to make the necessary alterations. This will, in some cases, require cranes, road closures, etc.

- Antenna changes at base station sites will require outages to comply with health and safety requirements, which may restrict the times at which the changes can be made.
- To deploy a wide area coverage network, an operator has to upgrade potentiality thousands of sites with the appropriate hardware and transmission capabilities.

An operator, which does not have spectrum certainty for LTE, might deploy antenna systems that operate over multiple frequency bands as mitigation against this unknown. However, this complicates the design and increases the cost of the antenna system, reducing the operator's ability to deploy rapidly. Furthermore, the operator may have to revisit the sites ✂ after the operator has spectrum certainty. This ✂will increase the cost and logistical challenges of preparing for a commercial LTE launch.

An operator which deploys LTE on one frequency and then has to re-engineer the network to another frequency would need to redesign certain aspects of the network, replacing any LTE frequency specific components ✂and repeat many of the above activities, incurring significant additional capital costs and delays while the changes are being performed. Furthermore, a significant proportion of the equipment that is replaced would be redundant and have to be written off. Therefore, to a high degree, the geographic extent to which an operator can deploy an LTE network is determined by the lead time the operator has to deploy equipment from the point of spectrum certainty to the point of commercial launch.

Dependencies related to access to spectrum and authorisation for LTE

While there is much that can be done in terms of planning and deployment prior to authorisation/availability once an operator has spectrum certainty, there are some further steps that require actual spectrum availability (and appropriate authorisation) to accomplish.

Ofcom suggests that it would take EE between 3-6 months (or possibly longer) to achieve commercial launch from the date of authorisation. This may well be a reasonable estimate. However, for reasons that are not explained, Ofcom also appears to assume that any competitor only requires 1-2 months from the date of spectrum availability to launch. This is especially surprising considering the advantages that EE already enjoys as outlined above. We believe that it would take longer than the 1-2 months postulated by Ofcom for a competing operator to activate and optimise its LTE network (which is a new technology) after the spectrum is available, so that it would be in a position to launch commercially with performance comparable to EE (albeit with a smaller footprint – as discussed in section 3 above). After spectrum becomes available an operator has to:

- Activate radio transmissions on the base station sites.
- Perform drive trials to optimise the parameter settings (multiple drive trials would be necessary, considering that the optimisation process is iterative and the technology is new).

- Debug any issues identified on the radio interface; it is not possible to test live radio scenarios in a captive test environment. LTE is an immature technology and it is anticipated that issues would be identified post network activation which will require software corrections from the infrastructure manufacturers.

We believe that competitors will require at least a similar period to EE from the point of availability of LTE spectrum to the point of a commercial launch), i.e. 3-6 months, if they are to offer comparable performance (albeit with a smaller footprint – see further below). Post LTE launch, EE will develop their understanding of LTE, acquiring valuable operational and market experience during the "Interim Period", which will enable them to improve their network, providing better performance and services to consumers. This will raise the bar for later entrants, requiring them to perform more extensive parameterisation and optimisation prior to their commercial launches to match the performance (albeit with a smaller footprint) of EE's network at that time.