

28<sup>th</sup> September 2007

Brice Le Cannu  
Ofcom  
3<sup>rd</sup> Floor  
Riverside House  
2A Southwark Bridge Road  
London SE1 9HA

Dear Brice,

### **Ofcom's discussion document on the award of 2600MHz**

O2 (UK) Limited ["O2"] welcomes this opportunity to comment on Ofcom's recent discussion document. It is helpful to understand and have the opportunity to contribute to Ofcom's emerging spectrum management policy, including *inter alia*, complex transitional issues such as the maintenance of equitable competitive conditions between new entrants and existing operators. We note that this document is neither a formal consultation nor a regulatory Statement (Decision). O2 notes that Ofcom has not addressed in detail many of the issues raised by O2 in its consultation response.

Ofcom has limited O2's ability to respond more fully the discussion document and associated reports, which run to nearly 400 pages, by timing the consultation to coincide with the summer holidays, various appeals in the Competition Appeals Tribunal (involving all of the MNOs) and two large information requests from the consumer policy arm of Ofcom. As a consequence of Ofcom's timetable, O2 is only able to comment on certain elements of policy at this time. We hope to be able to contribute further on the policy, auction design and technical issues raised in this document in due course.

### **Spectrum Packaging**

Question 1 : Do stakeholders agree with Ofcom's assessment of the blocking effect and its implications for spectrum packaging?

O2 appreciates the additional analysis that Ofcom has undertaken on the technical aspects of the proposed award, but we believe that there are still a number of elements that may lead to an inefficient award and/or reduced benefits to the UK. As noted in our consultation response, O2 still believes that Ofcom needs to allow a clearer European regulatory picture to emerge, in relation to harmonisation. If the auction is conducted with uncertainties in this area, with respect to potential interference from radar usage, and/or with respect to international coordination agreements, smaller bidders in particular will be disadvantaged as they will be less able to gauge the impact of future decisions.

We support Ofcom's proposal not to pursue a UK specific SUR approach for this award, but we remain concerned that the assessment of blocking and the consequential proposed spectrum packaging, auction design and detailed specification of spectrum masks may not be the most appropriate to ensure that the full benefits of harmonisation can be realised in the UK. For example:

- The suggestion in §3.51 that the inclusion of tuneable filters into terminals might be a cost-effective solution to this problem begs the question, cost effective for whom? It would appear that Ofcom is keen to place costs on the MNOs and/or their customers (for such devices would have to be widely populated within the subscriber bases of the MNOs) in order to allow for market entry by more TDD operators than the CEPT band plan would otherwise allow. O2 notes that Ofcom has not analysed the welfare benefits and losses of such an outcome, nor where these gains and losses might lie. However, Ofcom is, in our view, correct in surmising (§3.54) that operators are unlikely to respond to the prospect of blocking by specifying handsets tailored only for the UK market. Blocking **will** occur and we note that Ofcom acknowledges this as being a legitimate concern (§3.56).
- The comparison that Ofcom makes between the blocking effect on FDD (UMTS) mobile terminals and the blocking effect on TDD (WiMAX) devices (for example in §3.55) is spurious – WiMAX devices developed to cover the whole band are clearly not intended to meet the CEPT harmonised band plan. The fact that potential WiMAX operators have not complained about blocking is irrelevant.
- The fact that there will be some blocking even if the CEPT band plan were used from TDD devices at the top end of the centre block is also spurious – the problem potential FDD bidders face with Ofcom's proposal is the incremental interference from TDD terminals in-band, which in any case will be more significant, as Ofcom itself acknowledges (§§3.39-3.41).
- O2 does not consider that a 0.5% increase in blocking (which actually doubles the self-interference blocking probability of 0.5% simulated by Ofcom) should be described as "modest" (§3.42).
- In our view, the ongoing discussions regarding WAPECS **must** be taken into account when Ofcom finalises its views on spectrum packaging and the technical licence conditions that will be applied (see also our response to Question 3 below). Even if other European regulators are currently planning to allow TDD operation within 2620-2690MHz, all Member States will need to comply with any harmonisation measure introduced by the Commission following completion of the WAPECS work. O2 anticipates that the current technical work on WAPECS being undertaken by the CEPT/ECC will result in a thorough assessment of the issues associated with the 2600MHz band, and this may lead to a different approach being adopted by the Commission with regard to homogeneous (FDD/FDD or synchronised TDD) and/or mixed (FDD/TDD or unsynchronised TDD) usage when compared to Ofcom's current proposals. However, since this is very much work in progress at the time of writing

(CEPT/ECC project team SE42 are meeting in the week that Ofcom chose to close the comment period for the present document), we are unable to compare the latest results of these European discussions with Ofcom's proposals. We will offer our views on this subject to Ofcom at a later date.

With regard to Ofcom's further analysis:

- The simulation undertaken by Ofcom's consultants has a "hot spot" setting that clusters interfering WiMAX mobiles around the central UMTS Base Station (§3.25 footnote 20, §A6.7), and an "interference mode" parameter that is supposed to simulate differences in location of the hotspot within the UMTS cell, but the results that Ofcom has chosen to highlight in §3 are all for uniform distributions of WiMAX devices, which are not therefore the worst case effects. The interference effect being tested is supposed to be "mobile-mobile", which is always going to be worse at the cell edge (where the wanted received UMTS signals are at their weakest, as acknowledged by Ofcom in §3.46), so the "interference mode" parameter is most important. We acknowledge that many hot spots may be covered by local UMTS cells, but we believe that Ofcom's consultants should also have examined the worst case scenario (that of a hot spot in a fixed location at the cell edge), perhaps as "interference mode 2", and that Ofcom should have presented representative results for all cases when summarising the studies in §3.
- The "mean additional rejections" appear to be significant (~2-12%) even at high separation distances (>30m) and even appear to be increasing with increasing distance in both the least and the most dense WiMAX device cases (Figure 4, p.24). Ofcom's own conclusions have focussed on the rapid increase at separation distances <8m, but have ignored the significant rejection rates at the higher distances. The reason for this appears to be that Ofcom have focussed solely on the measure of mean marginal rejections rather than mean additional rejections, but for prospective UMTS operators it is more important to consider the total number of potential rejections (background WiMAX interference plus close proximity effects).

At §3.48 Ofcom asserts that blocking is mainly viewed as an issue by the MNOs and, in any event Ofcom says, their customers would have access to other spectrum so their devices would fall back onto those other networks. This may not always be the case.

- Firstly, Ofcom is pre-supposing the future network designs of the MNOs.

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Question 2 : Do stakeholders agree with Ofcom's analysis of interference conditions that are to the use of generic lots?

Again, O2 appreciates the additional analysis Ofcom has undertaken regarding in-band FDD/TDD interference and we support the results and conclusions drawn. In particular, we support the additional restrictions proposed on the "restricted" TDD channel blocks to improve the outdoor interference case. (See also our response to Question 3 below.)

With regard to the further assessment of the technical characteristics of PMSE equipment and practicality of using filters to improve coexistence, we repeat the concern stated in our consultation response about the implications of imposing a requirement on incumbent PMSE users to adopt mitigation techniques to protect themselves from new licensees. Some of the mitigation techniques considered by Ofcom have no cost implications (e.g. locating receivers to avoid direct line of sight), others have direct cost implications (additional filtering), and others have indirect cost implications (lowering the modulation, using other channels). If PMSE users are required to provide their own mitigation then this appears to run counter to the widely held belief, shared by O2, that incumbent services compliant with their licences have rights over incoming adjacent services to the extent that the cost of any mitigation required is imposed on the incoming licensee. Once more, we request that Ofcom clarify their intentions in this regard.

For the adjacent users at the top of the 2600MHz band, O2 thanks Ofcom for providing additional information on the use of military radars in the 2700-2900MHz band. We look forward to seeing the final results of the study from ERA relating to the effect of radar OOB emissions on UMTS and WiMAX systems, which at the time of writing are still not available. Depending on the final results of this study, and noting that when the military usage now documented is added to the civil usage previously reported the potential for interference is increased, O2 considers that Ofcom should reassess its earlier conclusion, stated in the original Consultation, that the potential for interference "seems unlikely to be significant". We also note that the ongoing consultation on the introduction of spectrum trading and spectrum usage rights for public sector spectrum holdings, and the forthcoming consultation on the application of AIP to aeronautical radar, both introduce significant uncertainties over the future use of this adjacent band. However, we also note that any changes made in the 2700-2900MHz band subsequent to the award at 2500-2690MHz will need to consider the 2500-2690MHz licensees as the incumbents (with preferential rights as far as the imposition of mitigation is concerned), assuming that our belief stated above regarding the rights of incumbent licensees is verified by Ofcom.

O2 is once more grateful to Ofcom for providing more up to date information regarding the use of the 2600MHz band in Ireland and its potential for interference, and the additional information relating to usage of the spectrum bands in France. Once more though, we urge Ofcom to endeavour to establish an MoU with both ComReg and ANFR respectively prior to the award, to decrease the uncertainties for bidders.

Question 3 : Do stakeholders agree with Ofcom's updated proposals for technical conditions?

As stated above, we support Ofcom's proposal not to pursue a UK specific SUR approach for this award. Also as stated above, O2 believe that the ongoing discussions regarding WAPECS **must** be taken into account when Ofcom finalises its views on the technical licence conditions that will be applied. O2 anticipates that the current technical work on WAPECS being undertaken by the CEPT/ECC will result in a thorough assessment of the issues associated with the 2600MHz band, and this may lead to a different approach being adopted by the European Commission with regard to homogeneous (FDD/FDD or synchronised TDD) and/or mixed (FDD/TDD or unsynchronised TDD) usage when compared to Ofcom's current proposals. It is not surprising that Annex III of the Interim Report from the CEPT/ECC in response to the WAPECS mandate from the Commission contains an approach that is based on Ofcom's proposals (§4.12), as this Annex simply contains "proposals from two CEPT countries"<sup>1</sup>, one being the UK. However, since this is very much work in progress at the time of writing (CEPT/ECC project team SE42 are meeting in the week that Ofcom chose to close the comment period for the present document), we are unable to compare the latest results of these European discussions with Ofcom's proposals. We will offer our views on this subject to Ofcom at a later date. Whilst we are unable to comment further on how Ofcom's revised proposals for technical licence conditions compares with the consensual European view that is developing within the CEPT/ECC. We support the additional restrictions proposed on the "restricted" TDD channel blocks, reducing the in-band power to 18dBm/MHz EIRP, to improve the outdoor interference case.

### Auction Design

Question 4 : Do stakeholders agree with the proposed changes to the auction design set out in the December 2006 consultation?

O2 notes that Ofcom has not addressed the issue of pairing external spectrum licensed under one set of restrictive non-technical licence conditions (specifically rollout and fixed tenure), with spectrum auctioned through this process.

O2 is interested to further understand two issues in relation to association between applicants for this spectrum:

- Exchange of confidential information : it is possible that potential applicants would wish to enter the auction only if they could enter into a national roaming agreement with an existing player. As O2 highlights in its consultation response, there is a high likelihood that such an agreement would be forthcoming. However, in order to enter into meaningful commercial negotiations, roaming providers need to understand a number of technical, volume and commercial parameters that might be regarded as "confidential" in the context of an auction. O2 believes it would be helpful for the market

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<sup>1</sup> SE42(07)048 "Interim Response to the EC Mandate on WAPECS approved ECC Constanta", July 2007.

to understand how Ofcom expects such discussions to take place within the context of the auction rules.

- Exercising effective control : Ofcom's definition of control in this and other auctions rests on effective shareholding (as measured by voting rights). There are many contractual methods of exercising effective control on bidders. For example, a small company (A) may enter into a supply contract with another larger bidder (B), such that the potential future business (perhaps underwritten in some way) from B is sufficient for A to raise funds for its bid in the auction. It may be that B's future business is 100% of A's future value. However, if B is also a bidder it knows it has an outside option to acquire A in due course. For should B terminate its contract with A, A has no other business than with B and therefore could not service the debt incurred in entering into its bid. B could then easily acquire A at little or no premium above the price paid by A for the spectrum. O2 would like to understand how Ofcom would deal with such an eventuality.

### **Linkages to other pending regulatory decisions**

O2 welcomes the further indications from Ofcom that it will endeavour to reduce the private value uncertainty of the MNOs before any auction of the 2600MHz auction. ✕

### Discrimination

We welcome Ofcom's acceptance of its public law duties [§8.10]. Ofcom asserts that three factors are important in its treatment of like cases:

- i. The parties involved must be in similar circumstances; and
- ii. There must be identical treatment within a regulatory decision; unless
- iii. Such discrimination is objectively justified.

Ofcom attempts to address these three issues thus:

- i. At [§8.15] Ofcom accepts equivalence of the spectrum to be awarded and the 3G spectrum licensed to O2 in most material respects<sup>2</sup>. However, Ofcom tries to draw a distinction between new entrants from this auction and the existing operators in the

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<sup>2</sup> At §8.33 Ofcom suggests that because the unit cost of coverage may be higher at higher frequencies, then the 3G MNOs have significant cost advantages in any eventuality. In fact, this is just one factor to consider in relation to an operator's costs and cost equivalence. A robust analysis would need to take into consideration the relative whole life costs of different networks, which will be a function of, *inter alia*, the cost of the spectrum; the number of cells required to cover a given area in light of the propagation characteristics of that spectrum; the ongoing operating cost of these cells. The overall NPV of this calculation can be equivalent for two different frequencies of spectrum by simply varying the upfront cost of the spectrum. Furthermore, if new entrants acquired spectrum up to the cap proposed (2x45MHz) and subsequently become successful in the market, the cost of the entrants network may be more influenced by the cost of creating additional capacity (cell splitting) than the cost of providing coverage. This has been identified by Ofcom in its recent Statement on mobile voice call termination (see Mobile Call Termination Statement – 27 March 2007 §9.97) Again, it is easy to envisage traffic scenarios that would, from a cost perspective, lead to unit cost equivalence between O2 and a new entrant, albeit some years hence.

downstream mobile communications market, ie it believes that the parties are not in similar circumstances [§§8.31-8.32]. This might be sufficient for a regulatory decision based on the merits of a particular case at a particular time, but this is a forward looking analysis. Efficient entrants can expect to grow and mature into established operators; inefficient operators will fail and exit the market. Ofcom must assume that any new entry is efficient and contribute to sustainable competition.<sup>3</sup> Furthermore, if Ofcom believes that (a) the spectrum on offer will lead to higher cost operators in perpetuity and (b) that those operators will lack scale in perpetuity, O2 trusts that Ofcom will be transparent in this regard to potential bidders and their investors when the time comes to write the Information Memorandum.

- ii. Ofcom correctly states that it must set the terms of the new licences on offer in this award on the basis of the prevailing law and spectrum management policy, a point O2 made in its response to the consultation. O2 agrees with Ofcom that *“the changes in circumstances...are central to the nature of the award. To be precluded from taking them into account would effectively prevent Ofcom from developing and enhancing its spectrum policy in an environment where technology and demand for spectrum to deploy new technologies is increasing, and it would run the risk that Ofcom was unable to fulfil its statutory duties, including to promote competition and to ensure optimal use of spectrum.”* However, O2’s point is that these changes in law, spectrum management policy, market and technical circumstances (since the 3G award in 2000) also apply to the 3G licences of the MNOs. Ofcom has recently recognised<sup>4</sup> that its duty under s9(7) of the Wireless Telegraphy Act 2006<sup>5</sup> is *“ongoing and must be assessed against the market circumstances and state of technology development at the time.”* In light of Ofcom’s improved understanding of its duties, we hope Ofcom will undertake these duties towards all parties in the downstream mobile communications market, not just UK Broadband (subject to the outcome of this consultation).
- iii. Ofcom does not appear to put forward any relevant objective justification for differing treatment. In light of s9(7) of the 2006 Act, any justification presented by Ofcom that relates to the circumstances of the award in 2000 are erroneous. Any objective justification can only arise following an assessment of the 3G licences within the context of prevailing law, spectrum management policy, market circumstances and technological advances. ✕In summary, in a forward looking analysis the circumstances of the parties (see (i) above) are not a factor on which Ofcom can place considerable weight. Circumstances change and ownership of spectrum can now change. In relation to similar treatment (see (ii) above) Ofcom has yet to undertake its statutory duties, specifically s9(7) of the 2006 Act, in relation to the 3G licences and consequently it is not in any position to assess whether the 3G licences need to be modified to match the

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<sup>3</sup> S4(8)(a) of the Communications Act 2003 – “the 2003 Act”.

<sup>4</sup> Consultation on WTA licence variation for UK Broadband §4.8, 18<sup>th</sup> June 2007

<sup>5</sup> “the 2006 Act”.

terms of the new licences, or whether there is objective justification for different treatment (iii).

Ofcom has helpfully provided some limited insight into its future plans to resolve a number of regulatory issues within its ambit before the auction of 2600MHz. If Ofcom is not able to resolve such issues it believes that it will have provided sufficient clarity on future supply conditions for mobile spectrum in order for MNOs to accurately estimate their demand and private valuations for the spectrum bands identified within this award. O2 believes this is insufficient. Coterminal decisions on this award and 2G/3G liberalisation, at least, are vitally important to ensure identical treatment in equivalent regulatory decisions ie. the application of Ofcom's duties under law (particularly s9(7)) and Ofcom's spectrum management policy.

#### Security of tenure of 3G licences and overlay auctions

At §8.82 Ofcom accepts that insufficient certainty over the future tenure of the 3G licences beyond their fixed term could have a negative impact on investment. Ofcom goes on to suggest that besides altering the terms of the 3G licences, which we must infer is an option, Ofcom could undertake an overlay auction.

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#### Tradability and Change of Use

Ofcom has recently proposed that the 3G licences should be made tradable and become liberalised. We trust that Ofcom will also address how it intends to ensure compliance with the rollout obligation if operators were to trade spectrum.

O2 notes that the obligation is an ongoing one and if, for example, H3G were to exit the market and trade its spectrum, would the new owner be required to instantly comply on acquisition of the spectrum asset? Wouldn't that mean that 3G spectrum could only be sold with the associated physical assets to comply? Doesn't that render Ofcom's spectrum management policy redundant, in that 3G spectrum could not be valued in isolation from the assets required to deliver a service to 80% of the population? Alternatively, wouldn't that restrict the class of purchasers to those operators with networks that could, instantly, broadcast CPICH within the assignment currently held by H3G?

#### Inefficient entry in the absence of a roll-out obligation – errors of analysis

Ofcom has come to the conclusion that the absence of a roll-out obligation would not result in inefficient entry. In particular:

*Ofcom does not find the case compelling that new entrants are likely to be able to gain roaming at low or incremental costs and therefore considers that incumbents are likely to have ample flexibility to respond to entrants with 2.6GHz licences as currently proposed<sup>6</sup>.*

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<sup>6</sup> Ofcom (2007), 'Award of available spectrum: 2500-2690MHz, 2010-2025MHz', August 1st, para 8.45

The first part of this conclusion indicates that Ofcom believes that the likely market dynamics that will exist after the new licences have been acquired will be such that the price of national roaming for that new entrant will not approximate the long run incremental costs incurred by another operator to provide such a roaming service, but will be higher than this. Ofcom's prediction is that:

*Instead, it is quite possible that roaming charges could be set on an "opportunity cost" basis that would compensate the incumbent for the loss in its margin on sales in the downstream market due to increased competition, i.e. prices could be significantly above incremental costs.<sup>7</sup>*

Although Ofcom has made this conclusion probabilistic (ie, 'quite possible', 'prices could be', among others), it appears to rely on this kind of outcome in reaching the final conclusion set out earlier.

There appear to be a number of logical steps that Ofcom went through to arrive at this conclusion. In particular, Ofcom claim that there are a number of assumptions that underpin the O2 analysis, and that these assumptions do not hold. These primary assumptions are<sup>8</sup>:

- (a) *'...entrants will have incentives to compete on a more geographically limited basis than the incumbents ..'*
- (b) *'...new entrants require and are able to implement roaming technically ..'*
- (c) *'...network costs are not the only operating cost faced by a new entrant and it assumes that new entrants are able to roll out networks in urban areas and operate with a total per unit cost base which is approximately equivalent to that for the incumbent MNO's network in such areas.'*

Ofcom has erred in its conclusion that the arguments necessary for inefficient entry require these underlying assumptions and we explore the reasons for this later.

Ofcom then appeals to a number of conditions which would result in roaming not being offered and, if offered, roaming prices to be higher than the total long run incremental cost (TLRIC) to the incumbent of supplying the roaming service. These include:

- overall competitive intensity may increase as a result of providing roaming, putting downward pressure on the prices charged to final users. If this effect is greater than the potential profits earned from supplying roaming, the service may not be provided<sup>9</sup>; and
- the presence of sunk costs for providing roaming will ensure that prices are above incremental costs<sup>10</sup>.

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<sup>7</sup> Ibid, para 8.42

<sup>8</sup> Ibid, para 8.35

<sup>9</sup> Ibid, para 8.38

<sup>10</sup> Ibid, para 8.37

Ofcom also notes that the Bertrand model itself is not applicable to the market for roaming as it assumes that suppliers determine the price they wish to supply, not the quantity. In addition, Ofcom states that roaming services are unlikely to be homogenous and the decision to supply roaming is unlikely to be a once and for all decision. Instead, Ofcom believes that more realistic assumptions are that:

- roaming services are likely to be differentiated, the supply of roaming services will be on relatively short term contracts, and incumbents will face capacity constraints in supplying roaming. Under these conditions, economic theory predicts that the price of roaming is likely to be above marginal costs; and
- roaming may not be supplied at all if the service the new entrant wishes to buy is differentiated.

Ofcom's assumptions do not appear to be particularly realistic, and although there may be conditions under which Ofcom's assumptions do hold, these conditions need to be traced through to the final product market in order to assess the impact on competition. In particular, the dynamics in the market for roaming services needs to be clearly distinguished from the retail market for services delivered over either 3G networks and over networks using the new frequencies, which may or may not use 3G technology. These Ofcom assumptions are analysed in more detail below.

#### *Geographic scope of new entrant's services*

Ofcom have made an assumption that:

*... entrants will have incentives to compete on a more geographically limited basis than the incumbents ....*<sup>11</sup>

This assumption is not correct. It may be that for services where geographic coverage is not an issue (eg, fixed wireless access) the new entrant would not need to have complete geographic coverage in order to compete effectively in those areas where it did roll out its network. However, where coverage is an issue for customers, the main point being made in the O2/Oxera analysis is that it is the provision of the roaming service that allows the new entrant to compete. And it is the provision of these roaming services at a price that is less than the costs that the new entrant would incur if it rolled out its own network that is the key to the inefficient entry and competitive harm. With roaming the new entrant will have a geographic base that is at least as wide as its roaming supplier, and could even be wider, but it will not have incurred the full costs of creating its own network to meet this demand.

#### *Technical implementation of roaming*

Ofcom argues that:

*new entrants require and are able to implement roaming technically ..., but this may not necessarily be true as entrants would not be restricted to using 3G technologies. ...*<sup>12</sup>

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<sup>11</sup> Ofcom, *ibid*, paragraph 8.35

<sup>12</sup> Ofcom, *ibid*, paragraph 8.35

Clearly if the services that the new entrant chooses to offer are implemented in such a way that the incumbents do not have the technical capability to offer a roaming service then no roaming service will be supplied. Under these circumstances the new entrant would be restricted to supplying its services only in those places where it had rolled out its network. The issue of roaming prices would not arise.

However, given the nature of the technology market and the services that consumers seem to want, it would appear to be extremely risky to conclude that a new entrant would adopt a strategy that results in it being unable to obtain roaming because of technical incompatibility. There are no restrictions on the new entrant using compatible technology, which implies that if it were to enter the final product market with services that competed with the incumbents services it would be free to adopt compatible technology and, therefore, be able to benefit from roaming in areas where it faces high unit costs of self supply.

In addition, although not elaborated in the submission, there are conditions when, even without roaming because of technical incompatibility, inefficient entry could occur as a result of the lack of a roll-out obligation where incumbents have adopted geographically uniform pricing structures (see below).

#### *New entrant's costs*

Ofcom criticises the O2/Oxera analysis regarding cost assumptions for the potential new entrant as follows:

*'...network costs are not the only operating cost faced by a new entrant and it assumes that new entrants are able to roll out networks in urban areas and operate with a total per unit cost base which is approximately equivalent to that for the incumbent MNO's network in such areas. ...'*<sup>13</sup>

Again, clearly if the new entrant's unit costs of its own network are very much higher than the incumbents then even with access to roaming at the incumbent's TLRIC the new entrant may not be competitive. Under these circumstances new entry would be uneconomic, and the harm from the issue of the new licences without a roll-out obligation would be minimal, because no (competing) services would be offered.

However, it seems rash to assume that the new entrant's cost base will be sufficiently higher than the incumbents' to ensure that there is no inefficient entry because entry does not occur. Indeed, if entry does occur, and the new entrants costs are higher than the incumbents, this entry is, at least in a static sense, inefficient. Ofcom appear to be relying on the fact that no new entry will occur in order to justify not applying a roll-out obligation. If Ofcom are relying on no new entry to occur to ensure that there are no negative consequences of their actions, they should only allow the incumbents to enter the auction.

In addition, in setting mobile termination rates Ofcom have made a number of assumptions about the likely market share for H3G, which implies that a new entrant could reach a size similar to that of the incumbents, when differences in economies of scale would largely

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<sup>13</sup> Ofcom, *ibid*, paragraph 8.35

disappear<sup>14</sup>. Furthermore, although the new entrant would have a low level of activity in the services currently provided by the incumbents, it would not necessarily have a low activity in the elements needed to put together such a service. For example, if the new entrant was BT it would already have large scale billing systems, very large activities with respect to back haul services, large back office operations, marketing departments etc. The underlying assumption that a new entrant would necessarily face higher costs across its operations does not appear to be realistic.

### *Differentiation*

Ofcom argues that roaming services are likely to be differentiated to such an extent that models of competition based on homogenous goods are inappropriate. There is some ambiguity as to what competitive effect they have in mind here.

One implication is that the roaming service that could be offered by the incumbents' networks to the new entrant will be different and that if this was the case the price that was offered by the incumbents for the supply of roaming services would not fall to the forward looking costs of the incumbent, but would fall to the opportunity cost of the new entrant or the incumbent. Clearly, if the differentiation of the roaming service that can be offered is such that only one incumbent can satisfy the needs of the new entrant the competitive dynamic is such that one of the high priced outcomes is likely to hold. The market collapses to a monopoly supplier and a monopoly buyer. However, given the similarities of the incumbents' networks (ie they are all combinations of 3G and 2G standards with significant interoperability across the standards) this outcome, at least in its extreme form of a single supplier, is rather unlikely. In addition, even if the roaming services that can be supplied are differentiated to a limited degree, as long as the new entrant is prepared to trade off price against service specification, competition between incumbents will bid the price down to the costs of the second most desirable service when seen from the new entrant's perspective, plus the relative value to the new entrant of the differences in the service levels.

An alternative implication is that the services provided will be differentiated in the final product market, and not (necessarily) in the market for roaming services. If the result of this is that the new entrant would only compete in the downstream market with the services provided by the same incumbent that was providing roaming, then clearly individual incumbents would not have an incentive to provide roaming. As Ordober et al (2007) show, this would be the case even if there is a risk that other incumbent will provide access<sup>15</sup>.

Ofcom notes that 3G operators have different levels of coverage across the UK. This could potentially lead to retail differentiation if there was a restriction in the number of incumbents operating in particular areas and these different coverage areas were a significant driver of choice of incumbent. However, as a result of the coverage obligations of the 2100MHz license holders, 80% of the UK population would need to be covered by the end of 2007. This means

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<sup>14</sup> See, for example, Ofcom (2007), Mobile Call Terminations, Statement, March, paragraph 9.43 and A5.29

<sup>15</sup> Ordober, J. and G. Shaffer (2006), 'Wholesale access in multi-firm markets: when is it profitable to supply a competitor?', The Bradey Policy Research Centre, Financial Research and Policy, Working Paper No. FR 06-08.

that for most final consumers there are going to be five incumbent operators that could potentially offer 3G services. Furthermore, all five incumbents are likely to be able to provide a similar fill-in service for a potential purchaser of roaming services to complete its service coverage. If this were not the case (ie, there are significantly different levels of fill-in effect available to the new entrant) this differentiation may reduce the number of potential suppliers to one, with a high offer price for roaming. Furthermore, it implies that the other incumbents are not in effective competition with the entrant, or the incumbent that provides the roaming service, in the downstream market. This is because the new entrants coverage is at least as wide as its roaming supplier, but this level of coverage does not provide effective substitution for the other incumbent(s)' services.

In addition, Ofcom notes that operators are 'pursuing different strategies in their approach to promoting and supporting the development of new services' and that 'roaming agreements *could* come with complex service agreements' (emphasis added). This may well be true, and it is possible that within any roaming agreement an incumbent would refuse to offer access to those services for which it has a monopoly (or a particularly high market share in the downstream market). If each incumbent has some unique feature the new entrant will not be offered access to any of them. And if a feature of this sort is a requirement for successful operation in the final product market, no incumbent would have an incentive to offer roaming at below its own opportunity costs. But if the new entrant and the incumbents think that there is a market for services without any of the additional features unique to one network, then each will have an incentive to offer this basic roaming if they would be worse off if one of the other incumbents supplied the (plain) service. Clearly this will depend on the degree of substitutability between the "plain" services and a service with an additional unique feature, but the simple fact that services are differentiated will not guarantee that such a trade-off will lead to roaming only being supplied at opportunity cost prices, as Ofcom has concluded.

Input differentiation could also have an impact on the entrant's possibility to differentiate in the retail market, if the entrant benefited from the brand of the roaming provider (eg, the roaming provider has a reputation of providing wide network coverage and of providing excellent call quality). If this were the case, the entrant would be less likely to compete in the retail market with rival incumbents, but more likely to compete with the roaming provider. The entrant would only be able to benefit from the latter's reputation if it can advertise that it uses that incumbent's network to provide retail services. In practice, it is unlikely that the roaming provider would allow this to happen, since it would increase the chances that the entrant steals its customers and cannibalises its revenues. However, as long as the incumbent can stop this happening it is likely to be better off providing roaming than allowing roaming to be provided by another incumbent, notwithstanding its own better reputation.

Unless Ofcom has some other effect of differentiation in mind here it is unclear that the practical level of differentiation that is likely to be present would have the effect of raising roaming prices significantly above the forward looking costs of the provision of that service.

#### *Sunk costs*

Two general types of sunk costs that might be relevant can be distinguished:

- sunk costs that are incurred in the negotiation phase with the entrant; and
- sunk costs that would be incurred only by the successful provider of roaming services to actually provide the contracted services. These are likely to be incurred only after the supplier knows that it has won the contract.

The second type of sunk costs could be transferred by contract to the new entrant. This is because it would be in entrant's interests to incur the quantum of sunk costs that would be faced by the roaming supplier rather than incur its own direct sunk costs to build the equivalent capacity.

As the second type of sunk costs are not sunk at the time the incumbents would decide whether or not to negotiate with the new entrant, these costs will not figure in the decision to enter negotiations. The only sunk costs that are relevant at this stage are, therefore, the sunk costs that would be incurred in the actual negotiation process. These are unlikely to be that significant compared to the costs (and benefits) of actually providing the roaming service.

For the presence of these sunk costs to result in an outcome that sets roaming prices at the opportunity cost of the new entrant (ie, the full exploitation of the monopoly power of the provider of roaming services) one, and only one, incumbent must be prepared to enter the negotiation process. The market dynamic that this implies is that as soon as one operator enters the negotiation all other operators refuse to enter into such negotiations. In the absence of collusion, for that to occur, they must believe that, were they to enter, the price they could get from roaming would be bid down to their (post negotiation) forward looking marginal cost and, therefore, were they to enter they would never recover the (relatively small) sunk costs of the negotiation process.

However, unless the incumbents have perfect knowledge of the costs of their competitors, any operator that thought that its costs were lower than those of its rivals, would enter the negotiations, even if it was not the first to do so. This would be the case provided that the operator believes that the impact of its lower costs meant that it would recover its own fixed costs of negotiation at the price set by the forward looking cost (post negotiation) of the less efficient operator. With some uncertainty as to rivals costs, and at least two suppliers believing that they have costs lower than each other, more than one supplier will enter the negotiations and roaming prices are likely to be bid down to the forward looking cost of the second most efficient.

The conditions under which the presence of the negotiation sunk costs will restrict negotiations to one firm will arise only if there is a universally recognised cost leader (eg, one operator has a larger market share and, hence, can achieve higher efficiencies in the provision of roaming). In this case, the lowest cost incumbent would be the only one to enter the negotiations, or if all incumbents have the same costs and know it, the first mover would be the only one to enter the negotiations.

In addition, if the new entrant believed that the above conditions held, and that only one bidder was likely, it could itself take action to reduce, if not eliminate, sunk costs of negotiation that

would be incurred by the potential bidders by agreeing to compensate potential suppliers for (some of) their negotiating costs.

Furthermore, unless all the incumbents insist on exclusivity before they even enter negotiations, the new entrant can always enter into exclusive negotiations with a second supplier after it has progressed some way with the first. As the first negotiator will have now incurred some sunk costs, this threat by the entrant will change the negotiating incentives and increase the probability of the first firm offering a price that is based on its own forward looking costs, rather than the opportunity cost of the new entrant's costs of self supply, or its own opportunity costs.

More importantly, the existing market in national roaming supplied to H3G is likely to contain the same sunk costs of negotiation (and, in its re-negotiation, sunk costs of capacity for the incumbent supplier of roaming). This market was characterised by multiple suppliers entering into negotiations with H3G delivering national roaming at below TLRIC. Therefore, in a directly analogous market the conditional conclusions held by Ofcom do not appear to hold. Ofcom provides no reasons for concluding that a request for the supply of national roaming outside the areas where the new entrant was active would only elicit serious interest from at most one potential supplier, which is the condition needed for prices to end up at the opportunity costs.

#### *Competitive intensity*

Ofcom appears to be arguing that in offering to supply roaming an incumbent would factor a possible increase in overall competitive intensity in the (presumably downstream) market and, as a result, would set its price for roaming above the TLRIC for the supply of this roaming service. However, if more than one incumbent is bidding (ie, is prepared to incur the sunk costs, if any, of the negotiating process) the incentives it faces in bidding do not primarily depend on the resulting competitive intensity in the downstream market, unless it can collude with the other potential suppliers to halt the bidding process at a price that takes into account the resulting change in the downstream market as a result of the supply of roaming. (And if it can do this, it, and all the other potential suppliers, would collude at a price equal to the monopoly level). The primary choice facing the incumbents is between being the supplier of roaming or not being the supplier of roaming, not between a less intense or more intense competitive market as a result of an additional supplier.

Any attempt by one incumbent to stop the negotiations at a price above TLRIC (say  $P+1$ ) would leave the non-supplier(s) of roaming facing a reduction in demand for its services, the increase in competitive intensity as a result of the additional supplier in the downstream market, and no roaming income. Under these conditions it will still generally pay that incumbent to offer  $P$  and secure the roaming traffic. The point at which the incumbent will not bid lower prices is that point where it is indifferent between supplying roaming and not supplying roaming while in both cases facing increased competitive intensity in the downstream product market. This point is a price equal to the incremental costs of supplying the roaming services once the increased competitive intensity from the additional supplier has been factored in.

There may also be an effect on the competitive intensity of the downstream market that flows from the actual price being struck for that roaming service (ie an additional effect over and above the addition of another supplier in the downstream market). The supplier of roaming may also try to factor this effect into the price he is prepared to supply roaming. For this price to stick, the incumbent who is not about to supply roaming must be indifferent to not supplying roaming and supplying roaming at a price above its TLRIC, but below the current offer, as a result of the reduction in price in the final product market which itself is a result of the roaming price falling.

By construction, at this point in time the incumbent that is just about to supply the roaming is going to make a surplus on the supply of roaming as the price is above TLRIC. Whatever price ends up in the final product market the supplier of roaming will be better off than the incumbents that do not supply roaming, by the excess of the roaming price above TLRIC. The incumbent(s) not about to supply roaming would now be better off by offering to supply roaming with a mark-up above TLRIC of marginally less than the original mark-up, even if the reduction in roaming prices feeds through into the price in the final product market. In the extreme, the reduction in mark up is infinitesimally smaller than that which is being offered, so the impact on final prices is also infinitesimally small, ensuring that the new roaming supplier is better off than the position it would otherwise have been in.

Offering a price at just above TLRIC (ie eliminating all the surplus on roaming) would appear to make the supplier worse off than it would otherwise have been, because the advantage of supplying roaming would be less than the disadvantage of facing lower prices in the final product market, and it may be this effect that Ofcom is alluding to. However, even under these conditions the incumbent offering roaming is better off than the other incumbents who do not get they roaming contract (they get the lower prices and no offsetting benefit from supplying roaming).

In addition, although it may not appear to be rational to offer these large drops in roaming prices because of a potential effect on prices in the final product market there is a path of small reductions in roaming prices where each step is rational for the incumbent making the offer. This occurs because as the price of roaming falls the position of the non-supplier(s) of roaming is getting worse. Compared to this new position, a further reduction in the roaming price offer is now rational.

Therefore, although the offer of a large reduction in roaming prices does not appear to be rational for the non-supplying incumbent, there is a path of small reductions in the offer price that will result in the offer of prices that are significantly lower than the current, high, offer price. The series of small steps will result in an offer price that is at, or close to, TLRIC, notwithstanding the impact of this price on the downstream prices that the supplier of the roaming service can charge.

#### *Frequency of interaction*

Ofcom does not believe that roaming negotiations should be treated as a one-off interaction. Instead, Ofcom argues that it is likely that contracts are not long-term and that they can be

renegotiated. Under these circumstances Ofcom asserts that incumbents may behave differently as they would not lose everything if one of their rivals undercut them for one contract. Under these circumstances Ofcom also asserts that game theory shows that prices above incremental costs can be sustained<sup>16</sup>. Ofcom is correct in suggesting that if there are frequent interactions between buyers and a limited number of sellers game theory suggests that there is an increased scope for tacit collusion. Should this tacit collusion be successful, prices above costs can be sustained. Indeed, under these circumstances the suppliers of roaming services would have the incentive to raise the price to the opportunity cost of self-supply by the new entrant.

✂ Furthermore, were the outcome of successful tacit collusion to occur it would imply that those offering to supply roaming contracts were refusing to enter into agreements at prices that would clearly be in their commercial interests, because they could take as given a similar behaviour by their competitors. However, if this tacit understanding was formalised it would clearly be a breach of UK Competition Law. Even without formalisation it is clearly a distortion of competition in the supply of roaming services, and it could be expected that under normal circumstances Ofcom would have a responsibility to take action to remove that distortion.

It seems somewhat unusual for a regulatory authority to rely on the existence of tacit agreements to create distortions of competition to underpin its conclusions that regulatory action is not required.

### *Conclusion*

Close analysis of the likely market dynamics that would occur were a new entrant to enter the market with a service that was in direct competition with the incumbents' services, but where there are no roll-obligations still suggests that inefficient entry could occur and the value of the incumbents' licences are reduced by the asymmetric provisions of the licences. Ofcom's assumptions as to how the market would behave do not seem to be well-founded, and its dismissal of the O2/Oxera arguments inappropriate. Ofcom has therefore not justified its apparent disregard of the analysis presented to it by O2/Oxera showing the potential for inefficient entry and harm resulting from license asymmetry. For the benign outcome that Ofcom claim is likely to occur it would appear that either no new entry in the provision of competitive services occurs or the market for the supply of roaming services is sufficiently uncompetitive that the incumbents can successfully tacitly collude to keep the price roaming services significantly above the price that would emerge if the market for these services was effectively competitive.

Finally, Ofcom make the point that in any case the incumbents would have:

... ample flexibility to respond ...<sup>17</sup>

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<sup>16</sup> Ofcom (2007), 'Award of available spectrum: 2500-2690MHz, 2010-2025MHz', August 1st, paragraph 8.41

<sup>17</sup> Ofcom, *ibid*, paragraph 8.45

to anything untoward that might arise if new entry did occur and roaming was supplied at TLRIC.

The nature of this flexibility that Ofcom has in mind is unclear, but one possible response by the incumbents would be to introduce geographically de-average prices, where the price of a call varied by the current location of the mobile termination point and/or originating point, reflecting the differences in unit costs across the geographic plain. Such a response could have major implications for consumers and it is not obvious that this response would be better for consumers than applying symmetric licence conditions to both the incumbents and the new entrants where they are competing in the same downstream market.

*Reliance on assertion rather than evidence*

Ofcom does not have to rely on economic theory to understand the bargaining around the provision of national roaming services. There must be plenty of empirical evidence available, in that at least three such contracts (O2-H3G, Orange-H3G and BT-Vodafone) have been negotiated to date.

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We look forward to further consultation by Ofcom on the matters we have raised.

Yours sincerely

**Nicholas Blades**  
**Head of Regulatory Affairs**