Annex A

Market definition

Approach used to define markets

A.1 Chapter 2 of this explanatory statement sets out the Director's general approach to market definition, in particular his assessment of demand and supply-side substitutes using the 'hypothetical monopolist' test. This annex sets out the market identification and analysis in more detail.

A.2 As set out in Chapter 2, the service considered in this review is wholesale mobile voice call termination. Call termination is the service necessary for a network operator to connect a caller with the intended recipient of the call on a different network. If call termination was not available a network operator could only terminate calls to other customers on its network. This service is referred to as wholesale because it is sold and purchased by network operators rather than retail customers.

A.3 This review only looks at voice call termination on public mobile networks (hence private mobile networks, such private Tetra networks, are excluded) as required by the EU Commission. Fixed voice call termination is dealt with in a separate review, Review of fixed geographic call termination markets Final explanatory statement and notification - 18 November 2003, (available at: http://www.ofcom.org.uk/legacy_regulators/oftel/narrowband/Eureviewfinala1.pdf). Data termination is not considered. The analysis, hence, only covers GSM, 3G and Tetra public networks in the United Kingdom, but does not cover public wireless local access networks (WLANs) which are devoted to data transmission. SMS termination is also excluded (the reason for this is further discussed below).

Calling party pays

A.4 Before considering the market definition, it is important to consider the "calling party pays" ('CPP') arrangement adopted in the UK telephony market because it has a notable impact on the boundaries of this market. Under the CPP arrangement, the calling party (and not the called party) pays the total price of a retail call. This means that the voice call termination charge is included in the originating network provider's (either fixed or mobile) cost base and is reflected in the retail price it sets for calls originating on its network. CPP, thus, leads to a disconnection between the person paying for the calls and so, indirectly, for the termination charge (i.e. the calling party) and the person who makes the choice of the terminating network and could thereby influence the level of the termination charge (i.e. the called party).

A.5 The overall effect of this arrangement in the retail markets (i.e. the market for calls from fixed to mobiles – which is part of the fixed narrowband retail services markets -and the market for calls from mobile to mobile – which is part of the market for mobile access and origination) is that, while MNOs have an incentive to keep the price of those services required and paid for by the subscriber at a level to attract and retain customers, they have less incentive to keep the price of calls to mobiles low. This is because those calling a mobile subscriber cannot take their business elsewhere if dissatisfied, as they have no alternatives to terminating the calls on the network to which the called party subscribes.

A.6 In the wholesale market, the effect of the CPP arrangement is similar. For calls from fixed-to-mobiles, it means that the operators running fixed public electronic communications networks ("fixed PECN providers") pay the MNOs to terminate calls on the MNOs' networks. The MNO has little incentive to keep voice call termination charges low, because the fixed PECN providers will pay a high charge as they have a commercial interest in ensuring that all calls made by their subscribers are terminated. For off-net mobile-to-mobile calls (i.e. from one MNO's network to another), the MNOs pay each other for termination of calls. Again, there is little incentive to keep termination charges low, not least since cutting them would in effect give the MNO's competitors an advantage in the retail market by reducing their costs. Hence, CPP means that an MNO is likely to be able to raise voice call termination charges above the competitive level without suffering sufficient adverse effects to make the rise unprofitable.

A.7 Overall, the Director considers that the CPP arrangement provides the MNOs with the ability and the incentive to set their voice call termination charges above the competitive level.

Product market definition

A.8 As discussed in Chapter 2, the relevant product market is arrived at by starting from the smallest potential definition. In this case, the smallest possible market definition is wholesale voice call termination to a specific mobile subscriber (or number), as a call to another individual is unlikely to be a sufficiently good substitute for a call to a specific recipient.

A.9 The following sections scrutinise that definition using the 'hypothetical monopolist test' to see whether it should be expanded to include other products either because of demand-side substitution, supply-side substitution or the existence of common pricing constraints.

Demand-side substitution

A.10 To assess whether there are any demand-side substitutes that should be included in the relevant market, it is necessary to examine the effect on customers' behaviour of an increase in termination charges by the hypothetical monopolist and whether such behaviour could make the rise unprofitable. To perform this exercise the Director has assessed the effect on both retail consumers and wholesale customers.

Retail demand-side substitution

A.11 The Director considers that an increase in termination charges is likely to lead to a rise in retail call prices. This is because termination charges form the largest part of the marginal cost incurred by a fixed PECN provider when providing fixed-to-mobile calls. BT's retail prices for calls to mobile are the sum of the charge it pays to the terminating MNO and BT's regulated retention rate (discussed in Oftel's Review of the fixed narrowband retail services market Final explanatory statement and notifcation published on 18 November 2003). Therefore, BT transfers any increase in the costs of providing calls to mobiles via its retail prices. Fixed PECN providers other than BT do not have market power in the retail market; it can thus be expected that they would follow BT's behaviour. As for MNOs, Oftel considers that none of them has SMP in the retail market (discussed in Oftel's *Mobile access and call origination services market* – 4 August 2003*)*. Hence, when faced with an increase in the marginal cost of providing off-net calls, it is likely that MNOs will pass at least some of this cost into their off-net retail prices.

A.12 It is, therefore, relevant to consider how retail customers (the calling and the called parties) would respond to a price increase in calls to mobiles engendered by a rise in voice call termination charges and whether their reaction could be a source of competitive pressure on termination charges.

Behaviour of the calling party in response to an increase in the price of calls to mobiles

A.13 If callers reacted to an increase in the retail price for calling mobiles by employing other means of communication to reach mobile subscribers, this form of substitution could act as a competitive constraint on voice call termination charges, although whether it would act as constraint depends on the amount of substitution that takes place. It would affect the MNOs' behaviour only if it was enough to make the increase in the wholesale charges unprofitable. However, for callers to react to an increase in the price of calls to mobiles, it is the Director's view that three conditions need to be satisfied:

- callers must be sufficiently aware that they are calling a mobile and that they are calling a specific network;
- callers must be sufficiently aware of the price of calling that particular network; and
- callers must be sensitive to changes in the prices of calling the network they want to reach, i.e. an increase in the termination charge above the competitive level must cause consumers to adapt their behaviour to find an alternative satisfactory way of contacting the person they want to call.

Awareness of calling a mobile and awareness of calling a specific mobile network

A.14 The lack of consumer awareness over the identification of mobile numbers appears to be fairly high. An Oftel residential consumer survey from August 2002 (*Consumers' use of fixed telecoms services* – published 24 October 2002) shows that only 46% of all residential fixed consumers are "usually" aware of calling a mobile phone (there has been little change in this figure over the previous 18 months). This figure is higher (52%) among consumers who own a mobile phone, but is only 32% among consumers from households who do not have mobiles (*Consumers' use of mobile telephony* - published 27 January 2003). These figures have not changed much in the previous two years, even though mobile penetration has increased.

A.15 In compiling its December 2002 report, the CC collected evidence on consumer awareness of the identity of the particular mobile network they are calling. The CC's own market research (paragraph 2.136 in the December 2002 report) indicated that on average only 28% mobile users knew whether they were calling a mobile phone on the same network as themselves. The results of a survey carried out by NOP for O2, which are quoted in the CC report (paragraph 2.136), found that 57% of fixed phone users who also owned a mobile claimed to know the mobile network they were calling when using their fixed line, whereas only about 30% of fixed users without a mobile were aware of it. When NOP put the same question to mobile-only customers, a similar level of awareness was claimed as that of the owners of both fixed and mobile phones.

A.16 Hence, callers appear to the Director to have limited knowledge of specific networks they are connecting to when making a call to a mobile.

Awareness of relative and actual prices

A.17 Despite the high penetration of mobiles, there is still evidence of low consumer awareness of the costs of calling mobile numbers (in general and on each specific networks). An Oftel qualitative study of telephone users' behaviour (*Oftel Price of Calls to Mobiles Qualitative Research Findings* - published March 2001) shows that most fixed line users do not generally check their phone bills; and, thus, that most were unable to quantify the costs of calling either a fixed or a mobile number. Specific differences in the prices of calling different mobile networks from a fixed line were also unknown and respondents assumed that they would be essentially similar. A more recent Oftel residential consumer survey (*Consumers' use of fixed telecoms services* – published 24 October 2002) shows that just 17% know approximately how much it costs to call a mobile from their fixed phone.

A.18 As part of their 2002 investigation on calls to mobile, the CC also assessed how knowledgeable mobile owners and fixed-line users are about the actual costs of calling mobiles and the relative costs of different call types. The CC's survey only covered awareness of the price of a fixed-to-mobile call because the large number of different tariffs available would have made it difficult to elicit reliable responses about mobile-to-mobile prices. The main result was that only 21% of customers had an approximate idea of the true cost of such a call. Evidence collected by the CC (paragraphs 2.136 to 2.141 in the December 2002 CC report) also suggests that a large number of callers to mobiles have little knowledge either of the actual or relative levels of prices for calling each mobile network.

A.19 An NOP survey, conducted on behalf of O2 and referred to in CC report (paragraphs 2.137 to 2.141), tested consumers' knowledge of relative prices. This revealed that about 48% of respondents thought that fixed-to-mobile calls were a lot more expensive than fixed-to-fixed calls (findings which correspond to actual price relationships) and 36% said that off-net calls were a lot more expensive than fixed-to-fixed calls (which also corresponds to the actual position). The difference between fixed-to-fixed and fixed-to-mobile prices is actually smaller than the difference between fixed-to-fixed and off-net prices. Therefore, the finding that there were fewer respondents who thought that off-net calls were a lot more expensive than there were respondents who thought that fixed-to-mobile were a lot more expensive, indicates a lack of widespread awareness of the relative prices of different types of call. This survey also found that 50% of the consumers appear to be aware that on-net prices are lower than off-net prices and that the price of fixed-to-mobile calls varied by time of day. In addition, 44% knew that the price of calling mobiles from fixed lines varied by the network being called.

A.20 The Director believes that, even though there is some consumer awareness of relative prices for different types of calls, knowledge of actual prices is low, in particular of the price of calling a specific network. The Director also notes that mobile number portability makes it more difficult for called parties to know or identify which network they are calling (and thus what is the relevant price), unless they are calling a person with whom they are in a repeated calling relationship.

Consumers' sensitivity to changes in the prices of calling a specific network - adapting behaviour

A.21 Even if awareness of prices was high, competitive pressure will only be exerted if consumers are willing to adapt their behaviour through substitution, so that MNOs lose profits on mobile termination if they attempt to raise termination charges.

A.22 The Director has considered a range of different possible types of substitution:

- mobile-to-fixed calls as a substitute for off-net calls;
- mobile-to-mobile calls as a substitute for fixed-to-mobile calls;
- on-net mobile-to-mobile calls as a substitute for off-net calls;
- SMS as a substitute for mobile-to-mobile calls;
- unified messaging and message clips';
- voice over Internet Protocol calls; and
- call-back arrangement.

A.23 However, as explained below, the Director considers that none of the above is likely to have a constraining effect on voice call termination charges.

Mobile to fixed calls as a substitute for off-net calls

A.24 Following an increase in termination charges and, thus, in the cost of calling another mobile, the calling party may switch to calling the intended party on a fixed number. However, it is unlikely that a call to a fixed line can represent a satisfactory substitute for calling someone on a mobile network in a sufficient number of instances to act as a constraint on the charges for mobile voice call termination. In particular, a call to a fixed line is not a viable alternative if the called party is, or is thought to be, away from their fixed line phone, since immediacy of contact is an important feature of calls to mobiles.

Mobile to mobile calls as a substitute for fixed-to-mobile calls

A.25 After an increase in termination charges and, thus, in the cost of calling another mobile, the calling party may keep calling the desired party's mobile number, but from a mobile phone rather than from a fixed one. The ability of this form of substitution to constrain voice call termination charges depends on its effect on the profits from termination services for the network operator. The price of on-net calls does not include the termination charge and the service is designed to attract subscribers who care about inbound call prices (so that if they can be on same network as their callers). Hence, on-net call retail prices are generally set at low levels and generate lower revenues for the MNOs. In contrast, off-net calls are subject to the same termination charge as calls from fixed lines. Hence, substitution may act as a constraint only if callers were to switch from fixed-to-mobile calls to on-net calls.

A.26 In the Director's view, for on-net calls to be a viable alternative to fixed-to-mobile calls:
- the caller must know the mobile network (s)he is calling; and
- the caller must be on the same network as the call recipient.

A.27 It is not clear if this happens sufficiently in practice for it to act as a constraint (the only evidence available suggests that 13% of consumers with both fixed and mobile phones use their mobile to make 'on-net' calls because it is cheaper). As discussed above, awareness of the specific network called is limited (around 60% among mobile users). In addition, mobile subscribers are split between four main operators, hence, the probability of the caller being able to reach the desired call recipient with an on-net call is substantially less than 100%. The probability that a call remains on-net will reflect the market share of the mobile operator in the outgoing retail market, currently between 24% and 26% on the basis of total subscribers. However, this probability is likely to be higher, because there is evidence that some customers with repeated calling patterns tend to congregate on the same network (see paragraphs A.60 – A.67). On that basis, the availability of on-net calls as a substitute for calls from fixed phones to mobiles is limited.

A.28 However, if a caller knows that (s)he makes calls to one network more often than to the others, this could influence the choice of network so as to benefit from the lower prices charged for on-net calls. In that case, calling mobile-to-mobile on-net might be an effective substitute for a call from a fixed phone. However, this substitution is unlikely to constrain termination charges because MNOs design tariffs so as to separate the more price sensitive subscribers from the others (e.g. by attracting them with low on-net prices). They can, thus, put up termination charges for the less price sensitive subscribers. This issue is examined more in detail under the heading 'Closed user groups'.

On-net mobile to mobile calls as a substitute for off-net calls

A.29 Termination charges for off-net calls could be constrained by substitution to on-net calls. This would require the calling party to be on the same network as the called party or to use more than one network to originate their calls (e.g. by having multiple SIM cards).

A.30 The use of multiple SIM cards appears unlikely because the process of switching cards (to make different calls) is laborious and time-consuming. In addition, MNOs often lock handsets to the SIM that is originally sold with the handset so that it can only be used on their network. Those factors, and limited consumer awareness of the higher cost of off-net, (an Oftel survey, *Consumers' use of mobile telephony* – February 2001, found that 37% of users thought that off-net calls were 'a lot more' expensive, 29% thinking that they were 'a little more' expensive and 30%

considering they were ‘roughly’ the same), means that it may be some considerable time before multiple SIM devices generate any significant competitive pressure on voice call termination charges. Oftel has found (*Consumers' use of mobile telephony* – November 2001) that, at present, while 63% of mobile users were aware that it was possible to use different SIM cards to log onto another network, only 6% of these (4% of total mobile users) used multiple SIM cards. Further details on multiple SIM cards can be found in Annex D (Alternative solutions).

A.31 A constraint may, nevertheless, be posed by groups of mobile owners who are willing to switch networks to be on the same network and thus pay on-net prices to call each other (for more details on these groups see the section on closed user groups below). If enough subscribers switch to be on the same network - the one with the lowest on-net charges - MNOs may not just lose revenues from off-net calls, but may even lose subscribers.

A.32 However, the Director considers that substitution of off-net calls by on-net calls could reduce, rather than increase, the constraint on the general level of voice call termination charges. That is because MNOs, by offering lower on-net call prices, can segment the market by type of customer and separate the more price-sensitive customers from the others who are less price-sensitive. They can then set high termination charges for others (i.e. off-net termination charges). Thus, the Director is of the view that the nature and extent of this type of call substitution is not sufficient to act as a competitive constraint on termination charges.

SMS as a substitute for mobile-to-mobile calls

A.33 Short message services (“SMS”) enable parties to exchange text messages between mobile phones. SMS cannot act as a constraint on voice call termination charges, because SMS termination is offered by the same MNO providing voice termination. Thus, the MNO could set charges for SMS termination in such a way as to avoid any competitive pressure on its charges for voice termination.

A.34 In addition, there are other reasons for believing that SMS would be a substitute for a voice call only in very limited circumstances. SMS can only be relatively short, because the number of characters allowed in a text message is limited to 160 characters. Furthermore, SMS are not real time because, unlike mobile voice calls, SMS are transferred between networks on a store and forward basis, rather than on a ‘real time’ basis. Therefore, SMS do not afford the opportunity for immediate conversation and interaction offered by voice calls.

A.35 Evidence collected by Oftel on mobile users’ behaviour is mixed. Qualitative evidence (*Oftel Price of Calls to Mobiles Qualitative Research Findings* - March 2001) shows that text messaging is regarded, especially by the young (who send the highest proportion of messages), as an activity separate from voice calls. It also reveals that SMS are largely additional to voice calls to mobile phones, rather than a substitute. It is difficult to establish a quantitative threshold beyond which substitution could be said to be significant. A more recent Oftel survey (*Consumers' use of mobile telephony* - 27 January 2003) found that 30% of mobile users never use an SMS instead of a mobile voice call, 20% rarely do so, 14% do so sometimes and 36% do so frequently. There was also some indication that certain consumers used SMS rather than fixed to mobile calls (17% of mobile users claimed to do so frequently). The research did not, however, examine the call volumes of the various groups of SMS users. While the Director tends to the view that the two retail services are not currently demand-side substitutes, as MNOs can set wholesale SMS charges in such a way as to minimise the impact on termination revenues, it is not critical to the wholesale market definition whether or not this is the case.

Unified messaging services and 'message clips' as a substitute for mobile to mobile calls

A.36 Unified messaging services and 'message clips' (short voice or video message sent over the IP network) could also develop as a potential substitute for voice calls. However, these technologies are not developed enough to be deployed and it is difficult to assess when they will become commercially available. Moreover, the Director is of the view that, as with SMS, these services, once available, are more unlikely to put any competitive pressure on voice call termination charges, as the same MNO sets the termination charge for all these services.

Voice over Internet Protocol (VOIP) calls as a substitute for calls to mobiles

A.37 Voice calls to mobile phones could also potentially be delivered as VOIP calls using general packet radio system ("GPRS"). GPRS is the enhancement to GSM that allows a mobile subscriber to transmit and receive data in a packet mode. Packet mode data has the advantage that the resources of the network are only used when data is transmitted or received. This important enhancement allows MNOs to charge users for the amount of data they send or receive, as opposed to the length of time they are connected; hence, it is ideal for services such as web browsing and connecting to the Internet. When a mobile subscriber is connected to the Internet (is "on-line"), such a subscriber could be contacted by another person, who is also on-line, through a VOIP call. An example is the service provided by Microsoft Messenger, which allows two parties who are on-line to set up a VOIP call by logging on to a dedicated website (for example, an individual can go to the website that offers the VOIP service and check if the person they want to call is on-line. If they are on-line, the server sends an alert saying that an incoming call is being made, they can then decide whether to take the incoming call).

A.38 VOIP calls could, in theory, represent an effective substitute if the price for standard voice calls to mobile were to rise (due to an increase in termination charges). This is due to the fact that the payment arrangement is different because both on-line mobile users pay for the data they send or receive (at a per bit rate). Therefore, in the example given above, the individual making the on-line call only pays to be on-line (which does not include a mobile termination charge) and the target of the call (if they answer the call) similarly only pays to be connected to the website/server. Thus, in a VOIP call both the called and the calling parties pay for receiving/making it. Such a partial Receiving Party Pays ('RPP') arrangement changes the incentives on the called party and is likely to affect their behaviour, although it is still unclear in what specific manner. For example, it is possible that the called party does not accept VOIP calls because they would have to in part pay for them, thus forcing the calling party to reach them via a standard voice call to their mobile. In this case, VOIP calls would not impose competitive pressure on the level of the termination charges.

A.39 The constraining effect of VOIP calls may also be undermined by the MNOs' behaviour. The reason is that it is the MNO to which the called party subscribes that sets both the voice termination charges and the price for the Internet connection. That MNO also determines the quality of service (i.e. data delay and bit errors). Hence, it could adjust the GPRS quality parameters such that it was still acceptable for web browsing and e-mail, but not for voice calls.

A.40 A further reason why VOIP is, at present, unlikely to be an effective substitute for standard voice calls to mobiles is that the called party must be on-line to be contactable. Furthermore, the mobile handset must be GPRS-enabled and have the hardware and software necessary to convert speech into data.

A.41 In conclusion, the Director considers that, at present, it unlikely that the availability of VOIP calls could put competitive pressure on the level of mobile voice call termination.

Call-back

A.42 Call-back refers to a situation where the direction of a call is ‘reversed’ and the calling party is called back by the called party, either in an ad hoc manner or through a commercial scheme. Call-back could render an increase in termination charges unprofitable only if the profitability of outgoing calls is lower than that of incoming calls, and call-back is carried out in sufficient volume.

A.43 The Director has no evidence of any commercial operators currently offering call-back on calls to mobiles within the UK and found no evidence that the practice of ad-hoc call-back is having a constraining effect on voice call termination charges.

A.44 It is possible that MNOs could introduce a call-back service to offer an alternative to callers to their subscribers. The Director believes that this form of call-back could not be relied upon in the immediate future to act as a viable constraint on mobile voice termination charges. This is partly because MNOs have no incentive to introduce a service of a price and a quality such that it could act as an effective substitute for their own monopoly service. More details on the Director’s view on this form of call-back are contained in Annex D on alternative solutions.

A.45 Consequently, the Director is of the view that currently no competitive pressure on termination charges is exerted by or is likely to come from this source.

Initial conclusions on the behaviour of callers in response to an increase in the price for calls to mobiles

A.46 On the basis of the evidence and the arguments discussed above, the Director considers that the behaviour of callers in response to a rise in termination charges and, thus, in the price of calls to mobiles, is unlikely to render this increase unprofitable. Factors such as consumers’ low awareness of the prices of calls to mobile networks, the limited availability of effective substitutes and the use by the

MNOs of on-net prices to separate the most price sensitive consumers suggests that callers are unlikely to react to a price increase. The Director has therefore reached the initial conclusion that minimal constraints on the level of mobile voice call termination charges are currently likely to arise from the behaviour of callers to mobiles.

Behaviour of the called party in response to an increase in the price of calls to mobiles

Choice of network

A.47 There would be constraints on termination charges if mobile subscribers chose their network on the basis of the prices of incoming calls and, thus, switched network as a result of an increase in these prices. However, as mentioned above, the CPP arrangement implies that the calling party, and not the called party, pays the total price of a retail call. Therefore, the called party, who makes the choice of the terminating network, is not affected by the level of the prices of calls to her/him (and thus by the level of mobile termination charge of her/his network).

A.48 However, it is still possible that mobile subscribers could react to a rise in the termination charges of the MNO they subscribe to by switching to a network with lower termination charges, if they expected that the higher price of calling them would have an impact on their callers. For this to be true, it is the Director's view that four conditions would have to be met:

- mobile subscribers would have to value incoming calls to such an extent that a change in the price of these calls could make them change network;
- callers to mobiles should be sensitive to the price of outgoing calls;
- callers to mobile should be aware of the mobile network they are calling and of the price of calling it; and
- mobile subscribers should be aware that callers to mobile are sensitive to and have knowledge of the prices of outgoing calls.

A.49 The Director considers that only if all four of the above conditions have been met would mobile subscribers consider that the level of the termination charges of their network affects the cost for others to call them, thereby influencing the number of calls they would receive. This could then act as a competitive constraint on mobile termination charges, since an MNO that increased its charges would suffer a loss of users on its network.

A.50 However, the evidence collected by the Director leads to two main conclusions:

- that consumer awareness of the price of calls to mobile phones is low especially in respect of the price of calls to each specific network; and
- that the price of incoming calls is not considered by consumers to be an important factor in their choice of a mobile network and other factors are more influential.

A.51 In Oftel's consumer survey from August 2002 (*Consumers' use of mobile telephony* - published 24 October 2002), just 46% of consumers said they "usually knew" they were calling a mobile phone from their fixed phone at home. Qualitative research carried out in March 2001 showed that few people had any real idea of the cost of calling mobiles, but it was perceived as ‘expensive’.

A.52 Evidence collected by the CC (paragraphs 2.136 to 2.141 in the CC December 2002 report) suggests that the majority of callers did not know the identity of the particular mobile network they were calling and that a large number of callers had little knowledge either of actual prices or the relative levels of charges for calling each network. The CC concluded that these findings overall “reveal a degree of awareness on the part of consumers which is insufficient to enable them to make an appreciable impact on prices or to drive termination charges down to competitive levels” (paragraph 2.141 in the CC report).

A.53 The introduction of mobile number portability has further complicated matters by rendering it extremely difficult for callers to find out which network they are calling (and thus what is the relevant cost), unless they have a repeated calling relationship with the person they are calling.

A.54 Oftel survey data on residential mobile owners suggests that the choice of which mobile network to subscribe to is mostly driven by the cost to subscribers (and not to those who call them) of being part of a network. A consumer survey from August 2002 (*Consumers' use of mobile telephony* - published 24 October 2002) revealed that:

- 18% of mobile customers found out how much it would cost others to call their mobile before choosing their network (up from 15% in February 2002); and
- 8% of customers considered the cost of other people calling them as a major factor in their choice of the mobile network (it was 9% in February 2002).

A.55 For the majority of residential customers (59%), outgoing call costs were the most significant reasons for choosing a network, compared with coverage and reception (21%) (*Consumers' use of mobile telephony* - February 2002).

A.56 Business users – in particular small and medium sized enterprises (‘SMEs’) - appear to be more concerned than residential users about the cost of calling their mobiles. This might be because their business depends on calls from clients, or because a significant part of their own phone bill is from their employees calling mobile phones. Oftel’s research (*Business use of mobile telephony* - 24 October 2002) shows that 27% of SMEs consider the cheapest network to call when choosing a mobile network (up from 19% a year before). Similar to residential consumers, SMEs revealed that other factors, such as coverage and customer service, were however of greater importance to them than the cost of incoming calls when choosing the mobile network. SMEs are a small proportion of total business mobile ownership.

A.57 The British Market Research Bureau (‘BMRB’) survey commissioned by the CC also found that the cost of incoming calls was not an important factor for consumers when choosing their mobile network. It ranked 10th out of the 14 factors suggested, the most important being ‘the price you pay to call others’. In addition, 61% of mobile users expressed more concern about the cost to them of calling others than the cost to others of reaching them. Only 9% were more concerned about the cost to others (paragraphs 2.133 to 2.135 in the CC report).

A.58 These findings are consistent with surveys of residential customers commissioned by two of the MNOs and presented at the CC inquiry. O2's NOP survey found that for nearly 75% of respondents the cost to other people of calling them on their mobile phone was an unimportant factor when they decided which mobile network to join. Fewer than 20% said that it was important. High proportions (85%) of both categories were unable to say why they took the view they did (paragraphs 2.133 to 2.135 in the CC report). The NOP survey commissioned by Vodafone showed that the price of outgoing calls was much more important to mobile users than the costs that others incurred to reach them (paragraphs 2.133 to 2.135 in the CC report).

A.59 The Director considers that the available evidence supports the conclusion that an insufficient number of consumers consider the prices of incoming calls when choosing their network for it to provide a competitive constraint on the price of calls to mobiles (see also section on closed user groups below).

Closed user groups

A.60 The existence of 'closed user groups' (i.e. groups of people whose members care about the cost to the other members of calling their mobile number) could mitigate the effect of the CPP arrangement and act as a constraint on voice call termination charges. However, for this constraint to be effective, these groups should be numerous and not isolated through targeted tariffs that bypass the usual termination charges.

A.61 As discussed above, the evidence available shows that few groups of people are sensitive to the cost of incoming calls, and even those that are sensitive consider the cost of outgoing calls to be far more relevant. The NOP survey, conducted for Vodafone and whose results are in contained in the CC report (paragraph 2.116), reveals that 19% of mobile users are on the same network as members of their family because it reduced calling costs. Another NOP survey commissioned by O2, and reported in the CC report (paragraph 2.116), also found that for around one-third of respondents the network used by people with whom they are likely to be communicating is an important factor when deciding which network to join. However, it also found that for over half of respondents it was unimportant and a high percentage of these groups could not say why this factor was, or was not, important to them.

A.62 The BMRB survey commissioned by the CC (paragraph 2.116 in the CC report) confirms these findings. It found that 81% of consumers had never chosen, or even changed, mobile network in order to be on the same network as the people to whom they often spoke, while 15% had chosen their network on this basis and 4% had changed it for this purpose.

A.63 The Director considers that this evidence further reinforces his initial conclusion that most residential consumers are not affected in their choice of mobile network by the cost to others of calling their mobile number. Only a small minority of residential mobile users are interested in keeping the cost of call charges among their circle of family and friends low.

A.64 Business users seem to be more concerned about the cost of calling their mobiles both for their employees and their customers. Oftel's August 2002 survey of SMEs (*Business use of mobile telephony* - published 24 October 2002) shows that a fifth of the SMEs with mobile phones had taken steps to reduce the cost to call their own mobile phones (ranging from 19% of small businesses up to 38% of medium businesses), such as using mobile-to-mobile adaptations or private wire services (see below).

A.65 In addition, Oftel's survey reports that 70% of SMEs with mobile phones use some method to reduce the cost of customers to call their mobile phones. To achieve that, 27% claimed to have chosen the cheapest network to call when selecting a mobile network (up from 19% a year ago). However, the survey shows that the most popular measure to keep cost down is keeping the call to the mobile short (47%).

A.66 Overall, SMEs seem to be more concerned than residential consumers about the costs of calling their mobiles and a significant proportion appeared to be adapting their behaviour to try to minimise this cost. However, SMEs are a small proportion of total business mobile ownership and do not provide a complete picture of business users' behaviour. In addition, those firms also stated that the cost of outgoing calls and the coverage were their most important concerns when choosing the network to which their employees subscribe. So even for these customers, features other than the price of incoming calls have more influence on their choice of the network.

A.67 In addition, the effect of closed user groups in constraining voice call termination charges is lessened by the ability of the MNOs to separate these customers from others through special self-selecting arrangements that by-pass high termination charges (e.g. on-net calls or private wire services). In this way, those customers who are most concerned about the price of calling mobiles and who are most able to bring pressure to bear on the MNOs are prevented from placing any pressure on termination charges. The MNOs are then able to impose high termination charges on the less price-sensitive users.

Private wire services and mobile-to-mobile adaptations

A.68 As mentioned above, in the Director's view, closed user groups do not generate sufficient competitive pressure to constrain the level of termination charges because the MNOs can separate them from less sensitive customers by offering special arrangements that bypass termination. By separating out the more price-sensitive customers, the MNOs face less competitive pressure in setting charges for the other customers. Private wire services and mobile-to-mobile adaptations are examples of such arrangements that segment the market in this way.

A.69 Private wire services are provided as leased lines that connect a corporate private exchange to a mobile network. They allow corporate customers to make and receive calls to and from mobile phones without paying the retail price for fixed-to-mobile calls. Under private wire arrangements, the price for calls from fixed-to-mobiles is lower than the price paid by the generality of fixed line customers. For SMEs that try to reduce the costs of calls to their own mobiles, private wire services are a relatively popular solution (Oftel's *Business use of mobile telephony -* published 24 October 2002 noted that 7% of small businesses and 21% of medium businesses used private wire services in this way).

A.70 Mobile-to-mobile adaptations consist of devices which give callers a radio link from their private exchanges to allow fixed-to-mobile calls to be converted to on-net mobile-to-mobile calls. Using this facility, calls can be made from the fixed phones in the office to the company's mobiles but are carried and charged in the same way as calls from mobiles. This allows the subscriber to take advantage of lower prices for on-net calls rather than paying the standard price for calls from fixed-to-mobiles.

A.71 Private wire services and mobile-to-mobile adaptations are likely to be introduced only where the savings from lower prices for call to mobiles outweigh the costs of installing them. This, in turn, is likely to occur only where a sufficient proportion of the fixed line phone calls of the customer is directed to a single mobile network. Thus, they are unlikely to be an effective substitute to standard fixed-to-mobile calls for residential consumers. However, as mentioned above, the main reason why their presence is unlikely to constrain termination charges for fixed-to-mobile calls generally is that they constitute a targeted tariff aimed at separating out the most price-sensitive customers. They do not impose a competitive constraint on the prices which operators can charge for calls to less price sensitive customers.

Multiple SIM cards

A.72 If mobile users could receive their incoming calls on mobile networks other than the one to which they subscribe for making outbound calls, this could put some pressure on mobile voice termination charges. For that form of substitution to take place, the called party must be able to switch their handset between different networks. This is possible through the use of multiple SIM cards.

A.73 A subscriber can have a mobile phone with an internal dual SIM cardholder that allows him to switch from one network to another by turning the phone on and off. There are already devices available in the UK market which allow customers to use different SIM cards in the same handset and, thus, switch between networks (Oftel is aware of the existence of SIM holders that can hold up to four SIMs). However, to place some pressure on the MNO with high termination charges the subscriber should be, by default, on the network with cheap voice call termination charges and only switch to the other network to make cheap outbound calls. This is laborious and time-consuming (because to switch networks is an operation that requires time). In addition, it relies on the called party having the incentive to change network every time (s)he needs to make a call and to switch back again at the end of the call, so that the next inbound call will use the network with lower termination charges. It is doubtful that such an incentive currently exists given the CPP arrangement and customer behaviour under that arrangement. Hence, it is more likely that subscribers currently exploit the dual SIM card opportunity purely to take advantage of differences in the prices of outgoing calls.

A.74 An automatic mechanism to re-route calls can also be considered. This mechanism would instruct the called party's mobile phone to switch network automatically when a call is arriving. No such mechanism currently exists and, in the

Director’s view, it is unlikely to develop in the foreseeable future, due to significant technological difficulties and to the lack of incentives on the part of the called party to make use of a facility that reduces the cost of incoming calls. In addition, a further hurdle is posed by the need for MNOs to allow access to their handsets/SIM cards to install the necessary software (as well as allowing any necessary signalling to pass across the mobile network to control network selection) since the MNOs have little incentive to give this co-operation.

A.75 The main limitation of these two scenarios is that they rely on the called party having an interest in reducing the cost to other persons of calling his/her mobile (as for example (s)he needs to acquire a multiple SIM handset). At present, this incentive is absent (see above paragraph 3.7); though this could change over time, as discussed in Annex D.

Call- divert

A.76 To have calls automatically forwarded, mobile users could subscribe to a personal numbering service (PNS) which allows them to give out a single number and have all their calls directed to any number they specify (e.g. their fixed line). Calls to PNS are more expensive than calls to mobile numbers because:

- to divert calls an additional leg is added to their route (Calls to a personal number go to the PNS provider first, which then forwards it to the appropriate terminating network). PNS providers have to ensure that they can cover the cost of terminating calls to any number specified by the subscriber (i.e. also to mobile numbers); and
- PNS providers need to keep a database of the numbers to which it must forward the calls.

A.77 Calls to PNS can be either CPP or RPP, but in either case their higher price implies that it seems unlikely that they could represent effective substitutes to calls to mobile phones for called and calling parties. This service may, thus, be attractive only for those subscribers who are sensitive to the price for others to call them on their mobile. However, the MNOs will typically have already separated these subscribers from the generality of subscribers by offering them specially targeted tariffs.

A.78 An alternative to PNS is for the called party to use a single terminal that is both a cordless phone and a GSM phone. This allows subscribers to make and receive calls using their "fixed line" (via the cordless element of the phone), when within the range of the cordless base station and the GSM element, when outside of it. Thus, while the called party is within the range of the cordless base station, there is a substitute for the termination service.

A.79 However, the cost of such dual phones is currently high and, since the range of the cordless base station is limited, the savings that accrue to the called party (from lower outgoing charges) are small. It is the calling party who derives most of the benefits from the use of these phones, but, as discussed above, due to CPP, most mobile subscribers would not factor into their decision any saving apart from their own (see section on closed user groups for consideration of the minority of mobile subscribers that do consider the cost to others). Hence, these phones are not widely used. The situation may, however, become different if over time there is a change in the incentives on the called party change.

A.80 Therefore, for the reasons set out above the Director believes that automatic call forwarding services do not currently generate significant pressure on the level of mobile voice termination charges.

Initial conclusions on the behaviour of called party in response to an increase in the price for calls to mobiles

A.81 On the basis of the evidence and the arguments discussed above, the Director considers that the behaviour of mobile subscribers in response to a rise in termination charges above the competitive level and, thus, in the price of calls to their mobiles is unlikely to render this increase unprofitable. The majority of subscribers are unlikely to react to a price increase and the presence of some users who choose their mobile network also on the basis of the cost of incoming calls is not sufficient to constrain voice call termination charges (because of the ability of the MNOs to separate these customers from the other through special self-selecting arrangements). Hence, at present, no significant constraints on the MNOs' ability to set termination charges above the competitive level appear to arise from the behaviour of the called party.

Initial conclusions on retail demand-side substitution

A.82 In conclusion, the Director considers that there are no effective retail demand-side substitutes that could constrain mobile termination charges to the competitive level.

Wholesale demand-side substitution

A.83 Substitution of wholesale voice call termination on an MNO's network with wholesale voice call termination on a different MNO's network cannot provide any direct constraint on termination charges, since an operator wishing to offer calls to a customer of a specific MNO must purchase termination from that MNO or it will not be able to terminate the calls (on this issue see also the section on multiple SIM above).

Initial conclusions on demand-side substitution

A.84 For the reasons listed above, the Director considers that, at present, there are no effective demand-side substitutes for voice call termination to specific subscribers of a particular MNO. However, before reaching an initial conclusion on the appropriate market definition, it is necessary to examine if there is any potential for supply-side substitution or if products (or areas) over which there are common pricing constraints should be included within the market definition.

Supply-side substitution

A.85 Supply-side substitution occurs when, in response to a rise in the price of a product, suppliers of other products switch into supplying the product whose price has risen and render the price increase unprofitable for the firm that implemented it. This entry has to be fast enough (i.e. happen within one year) and at sufficiently low cost, otherwise it would be classified as new entry and its impact could be considered as part of the SMP assessment rather than in the market definition.

Retail supply-side substitution

A.86 For retail supply-side substitution to impose a constraint on the level of mobile voice termination charges, there would have to be operators which do not currently provide calls to mobiles that can switch into such provision and thus undermine a price set above the competitive level. In order to have such an effect, the new provider(s) would have to be able to provide a service which did not rely on the provision of termination from the MNO to which the called party subscribes. At present, the Director cannot identify any such provider that would not depend on the MNO to which the called party subscribes to terminate the calls.

Wholesale supply-side substitution

A.87 For supply-side substitution to be an effective constraint on mobile voice termination charges, there have to be other firms who could switch into the provision of wholesale voice call termination to a specific subscriber of an MNO's network with relative ease in response to an increase in termination charges.

MNOs other than the one to which the called party subscribes

A.88 Supply-side substitution in the wholesale market for mobile voice termination could come most easily from other MNOs, which have the necessary network infrastructure and expertise to terminate mobile calls. However, having a mobile network is not sufficient for an MNO to be able to terminate calls to a subscriber of a rival network. For this to happen, the mobile phone should automatically move from its home network, on to that of the alternative MNO on which the call would then be terminated.

A.89 It is possible for GSM handsets to operate on more than one network. This was an original design requirement of GSM, and is relied upon for international roaming. However, it is not currently possible for the originating network of a call to a mobile to select which MNO terminates a mobile call.

A.90 Hence, it is the Director's view that at present the lack of access to handsets/SIM details and the technical difficulties in taking control of the handset constitute an effective barrier to an MNO providing voice termination to subscribers of another MNO.

Local Area Networks over short-range radio technologies or Wireless Local Area Networks

A.91 Operators running WLANs could possibly enter the market for calls to mobiles competing with MNOs and, thus, put pressure on the level of mobile voice termination charges. However, the Director believes that, at present, there are significant technical obstacles that would have to be overcome before such a service could become viable for mobile users. For example WLAN operators cannot currently offer the same coverage of GSM networks because of the limited range of reception allowed by their equipment.

A.92 The main limitation of these two scenarios is that they rely on the called party being responsive to the price of inbound calls, so they would be prepared to incur some cost to reduce the cost to the person calling his/her mobile (for example by acquiring a multiple SIM handset). At present, the evidence presented in this annex suggests that mobile subscribers do not take into consideration to any great extent the price of inbound calls when making their purchasing decisions.

A.93 The Director has therefore reached the preliminary conclusion that all of these obstacles would prevent WLAN operators from being able to supply voice call termination in competition with MNOs.

Mobile Virtual Network Operators

A.94 An MVNO is a firm that provides mobile telephony services to its customers, but does not have an allocation of spectrum and uses part of an MNO's network. Currently, the Director is not aware of there being any MVNO in the UK that provides termination services to its subscribers. To the Director's knowledge, calls to the MVNO's subscribers are directly routed to the host MNO's network and the originating operators pay this MNO for termination (directly). However, if an MVNO were able to offer termination by having incoming calls to its customers routed to itself rather than to the host MNO and if it could select the mobile network on which to terminate each call on the basis of the charges, this may place some pressure on the level of the termination charges.

A.95 For this form of arbitrage to happen, the MVNO should be able to control on which mobile network its subscribers were logged on at any time. Hence, the MVNO should be able to signal to its subscribers' handsets, or SIM cards, to change network, and then receive an acknowledgement back to say this had been done successfully. However, even if this technological hurdle were overcome, MNOs would have little incentive to conclude the necessary agreements to allow MVNOs to operate in this way. The Director is not aware of any MVNO in the UK which has such a multiple roaming agreement.

A.96 Furthermore, even if MVNOs could manage to negotiate lower termination charges, they would have the same weak incentive to reduce prices for calls to mobiles as the MNOs. As discussed above, retail subscribers select their mobile service provider (MNO or MVNO) on the basis of the price of a number of services which do not often include the price of calls to their mobiles (an exception is members of closed user groups, see section above). Therefore, it seems unlikely that the MVNOs, even if they managed to negotiate lower mobile termination charges, would reflect this in lower retail prices for calls to their subscribers; rather they would be much more likely to set lower prices for retail services purchased by their subscribers.

A.97 MVNOs, therefore, are unlikely to increase the competitive pressure on voice call termination charges because a number of significant technological developments would have to take place before they could exploit an arbitrage opportunity in termination charges. It is the Director's view that the necessary changes are unlikely to occur in the foreseeable future (i.e. in the next three years). In addition, they would lack the incentives to pass through any reduction in termination charge they may be able to obtain from MNOs into the prices that callers pay to reach their subscribers. Therefore, the Director considers that MVNOs do not currently provide an effective constraint on mobile voice termination charges.

Initial conclusion on supply-side substitution

A.98 For the reasons mentioned above, the Director considers that there are no effective supply-side substitutes for voice call termination to the subscribers of a specific MNO.

Common pricing constraint

A.99 On the basis of the conclusions reached above, there are no demand-side or supply-side substitutes that should be included in the relevant market. Accordingly, the appropriate market definition would appear to be wholesale voice call termination to a specified subscriber or telephone number. However, the Director considers that it would be wrong to narrow the market definition to this extent, because an MNO has limited ability to price discriminate between termination charges to different subscribers on its network. MNOs can separate the more price-sensitive customers by offering them arrangements that bypass the termination charge and so takes such sales outside the scope of the market, e.g. through a private wire service or use of on-net calls (these issues were discussed at length in the section on demand-side substitution). However, the MNOs are not able to price discriminate between customers when termination charges are paid. Thus, a common pricing constraint applies to voice call termination to all subscribers on one network. This implies that, if an MNO wishes to lower termination charges for calls to one subscriber, it must in practice lower termination charges for calls to all its subscribers, effectively equalising the competitive pressures placed on all the networks' termination charges. As a result, the Director is of the view that the relevant market includes voice termination to all subscribers of one MNO.

3G networks

A.100 With the advent of 3G services, the question arises of how termination of voice calls on 3G network fits in the market definition discussed above.

Operators that have both a 2G and a 3G network

A.101 The four MNOs (i.e. Orange, O2, T-Mobile and Vodafone) have acquired the spectrum necessary to offer 3G services and are rolling out the necessary networks. For these operators that run both a 3G and a 2G mobile network, it is necessary to consider whether voice termination on the 2G network and termination on the 3G network of the same operator are in the same economic market. The hypothetical monopolist test needs to be repeated to check whether one service could act as a constraint on the charge levied for the other service.

Demand-side substitution

A.102 The Director has considered whether termination on the 2G network and termination on the 3G network of the same operator are demand-side substitutes. Subscribers to the 3G services of these operators will be given a dual mode handset that works on both 2G and 3G networks and will receive voice calls through both networks. However, the network on which the call is terminated will be chosen by the terminating operator and neither the originating operator nor the calling party will be able to affect this choice or even be aware of whether the 2G or the 3G network has been chosen for termination.

A.103 Since callers are unable to choose the network on which calls terminate, voice call termination on the 2G network does not appear to be an effective demand side substitute if charges for termination of calls to 3G subscribers were raised above the competitive level. Equally, voice call termination on the 3G network does not appear to be an effective demand side substitute if charges for termination of calls to 2G subscribers were raised above the competitive level.

Supply-side substitution

A.104 The fact that the two networks are run by the same operator also implies that termination on the 2G network will never be a supply-side substitute for termination of calls to 3G subscribers. The fact that an MNO can offer termination on its 2G network for calls to its 3G subscribers will not impose any additional constraint on the level of the charges for termination on its 3G network. An MNO will not undercut its own charges. For the same reason, termination on the 3G network cannot be a supply-side substitute for termination of calls to 2G subscribers.

Common pricing to originating operators

A.105 However, the Director believes that the further issue of common pricing also needs to be considered. Although it is not yet clear how prices for 3G voice call termination will be set, the Director has defined the market on the assumption that an MNO with both a 2G and a 3G network will wish, in practice, to present a single price to purchasers of voice call termination to its 2G subscribers and purchasers of voice call termination to its 3G subscribers. MNOs will use both networks to terminate calls to 3G subscribers. It might be feasible for MNOs to set different charges for each of 2G and 3G termination and to levy such charges depending on the network used for termination. There would, however, be some practical problems to be addressed, such as whether upgrades to billing systems would be needed and that originating operators may not know which network had been used for termination. For the purposes of the market definition, the Director has assumed that MNOs will levy a single charge.

A.106 This pricing policy would imply that the same charge would be paid for voice call termination on the 2G network and for voice call termination on the 3G network. Therefore, the Director considers that it would be reasonable to include them in the same economic market.

A.107 However, if originating operators were to pay different charges on the basis of whether (or in what proportions) the call terminated on each of the 2G and 3G networks, there would be a case for defining separate markets for 2G and 3G termination. This would not reflect any substantive change in the constraints on the MNOs' behaviour in setting the terms and conditions for 2G and 3G termination. Therefore, in the view of the Director, even if he were to define separate markets, the services in which the MNOs had SMP and the proportionate remedies would be no different.

The market definition for '3'

A.108 In his first consultation, the Director stated that '3' provides termination services on a 2G network by using the 2G network of another MNO in order to terminate calls to its subscribers. The Director's initial view was therefore that, while '3' provided wholesale voice call termination directly using its 3G network, in the case of 2G, it resold the services of another MNO. Thus, the Director's initial conclusion was that the 2G and 3G voice call termination services provided by '3' to its subscribers were in the same economic market, but the underlying conveyance on the 2G network is part of the market for termination on that 2G MNO's network. The relevant market defined by the Director was thus 'wholesale voice call termination provided to the subscribers of 3'. Representations since made to Oftel have led to a revision of the Director's initial view.

A.109 The Director's intention in defining a different wholesale market for the supply of termination services by '3' was to ensure that the relevant technical characteristics of the supply of the services were taken into account. However, it has become clear to the Director that a different market definition to that used for the supply of services by other MNOs is unnecessary. '3' effectively uses the supply of wholesale termination services by another MNO as an input into its own supply of termination services to originating operators. This is made clear in figure 1 of '3's response to the first consultation, as this shows calls to all subscribers of '3' are transited via BT's network to a gateway MSC of '3'.[31] All voice calls to '3's subscribers pass through the '3' gateway MSC and therefore, as with the other MNOs, '3' singularly controls the termination of voice calls to its network and is providing a PECN. '3' therefore has technical as well as economic (pricing) control over its customers. The relevant market definitions for services supplied by another MNO and '3' should logically, therefore, include the supply by that MNO of wholesale termination services to '3', and by '3' of wholesale termination services to originating operators. The Director believes the definitions proposed in this consultation meet this objective.

A.110 The Director is therefore of the view that the correct market definition is 'wholesale voice call termination provided by '3'. This is consistent with the definition proposed for the supply of voice termination services by other MNOs.

[31] See '3's response at p.10, available at http://www.oftel.gov.uk/publications/responses/2003/ctm0503/h3g.pdf

The market definition for Inquam

A.111 The Director's initial conclusion in the previous consultation document was that wholesale voice call termination services provided by Inquam on its Tetra network were likely to form a separate economic market, following the logic supplied above on demand and supply-side substitutes.

A.112 However, the Director understands that most calls on Inquam's network are within closed-user groups (i.e. on-net) and the majority of its customers (SMEs) are businesses sensitive to the cost of customers calling them. This might therefore suggest that Oftel's market definition and SMP assessment was incorrect.

A.113 While the majority of calls might be on-net, in the Director's view, the wholesale termination services provided by Inquam (i.e. for off-net calls) are likely to form a separate market because there are no effective demand or supply-side substitutes for these services. If this market is small in terms of volumes of calls, it is better addressed in his consideration of proportionate remedies, which the Director has done.

SMS

A.114 Another question related to the product market definition is whether SMS termination and voice termination are in the same market. Voice termination and SMS termination should be regarded as part of the same market if they are demand-side substitutes or supply-side substitutes or if they are subject to a common pricing constraint, for example because they are part of a "cluster market".

Demand side substitution

A.115 As discussed above (see paragraphs A.33 to A.35 above), the Director is of the view that SMS does not provide an adequate alternative for voice calls to mobile phones on the demand side. This is due to the fact that consumers perceive SMS as a limited substitute for a voice call and as an activity largely additional to voice calls to mobile phones. The main reasons for this are that SMS enables parties to exchange only relatively short messages (the number of characters in a message is limited) and that SMS can be delayed, because, unlike a mobile voice call, an SMS is transferred between networks on a "store and forward" basis.

Supply side substitution

A.116 In relation to supply side substitution, as for voice termination, currently each MNO can only supply SMS termination to the subscribers of its own network. Hence, SMS termination to a specific mobile customer is offered by the same MNO that provides voice termination to that customer. Although an MNO can offer SMS termination to its subscribers, it is unlikely to do so in such a way as to impose any additional constraint on the level of the charges for voice termination on its network. It is very unlikely that an MNO will undercut its own charges. This implies that supply side substitution from SMS providers would not constrain voice termination charges.

A.117 Furthermore, MNOs are able to price-discriminate between purchasers of SMS termination and purchasers of voice termination, and currently set different charges for these two services.

Cluster market

A.118 In both the fixed and mobile retail markets, the Director considers a range of call origination services (such as access and outgoing calls) to be in the same market on the basis of a cluster market analysis. This is because consumers purchase these services as a bundle. Operators, thus, compete for retail subscribers, not on the prices of each single outgoing service, but on the overall price of the bundle. This implies that these services, even though no service in the bundle is a demand or supply side substitute for any of the others, are subject to a common pricing constraint and, thus, can be considered to be part of linked markets.

A.119 In the case of mobile voice and SMS termination, the Director considers that this argument does not apply because of the consequences of the CPP arrangement. The CPP arrangement implies that, even though it is the called party that chooses the terminating network on which it can be reached, it is the calling party who ultimately bears the cost of termination. Since the choices of whether to make a call to a particular recipient, and of what type (voice or SMS), are made by a number of different callers at different times, termination services are subject to separate purchasing decisions of different retail customers and are not part of a bundle. The calling parties do not make a single decision to purchase all their voice and SMS call termination services from a particular supplier in the same way that fixed and mobile customers choose their supplier of origination services. Therefore, given the way retail choices are made, the competitive conditions in the wholesale provision of SMS termination and voice termination are not linked by a cluster market analysis in the same way as the provision of origination services. For more details about the issue of linked national markets for mobile services see below (paragraphs A.122 to A.123).

Conclusions on SMS

A.120 In conclusion, the Director takes the initial view that SMS termination and mobile voice termination are not part of the same market. Accordingly, the markets that the Director has identified are for termination of *voice* calls by MNOs on their public mobile networks.

Overall preliminary conclusions

A.121 On the basis of the analysis and of the evidence discussed above, the Director currently considers that no adequate wholesale supply or demand side substitutes for termination of calls to the subscribers of a specific MNO currently appear to exist. Current technology does not allow the termination of a call to a mobile other than on the network of the MNO to which the called party subscribes. This appears unlikely to change in the near future. At the retail level, the Director is of the view that, at present, there are no effective alternatives for callers that could act as a constraint on termination charges. In addition, callers appear to have limited awareness of the cost of calling mobiles. There is a minority of mobile users that would likely show a higher elasticity to the price of incoming calls. The MNOs have, however, to a large degree separated these users by offering them special tariffs, thus preventing this group from putting any effective pressure on termination charges. Technological conditions and the behaviour of called and calling parties may change over time, but the Director believes that this is extremely unlikely to happen in the next three years. Hence, the Director believes that, at present, there are separate markets for voice termination to the subscribers of each MNO.

Alternative product market definitions

National market for wholesale mobile voice call termination on all networks

A.122 A possible alternative definition could be a national market for mobile voice call termination. Such a definition would require that the suppliers of voice call termination (the MNOs) compete with each other on a national scale for the wholesale business of carrying calls to mobiles. Such competition would need to be distinct from retail competition for mobile customers, since otherwise the more appropriate market definition would be linked, or cluster, national markets for mobile services (see below).

A.123 This could happen if one MNO could offer termination of calls to customers of another MNO. However, currently MNOs cannot do so (see section on wholesale supply substitution above) and, therefore, they cannot compete in the provision of voice call termination. Hence, the Director considers this market definition to be inappropriate given the current and expected conditions.

Cluster national market for all mobile services

A.124 Even if the hypothetical monopolist test led to distinct markets for different mobile services, these services might be subject to a common pricing constraint and thus be part of a cluster market.

A.125 If mobile owners purchased a bundle of services from MNOs that included voice call termination together with other retail services, even if each element of the bundle were not a demand-side substitute for any of the others, the fact that they are all consumed and supplied together would link them. This is because under these circumstances, MNOs would be competing for customers not on the price of each single service, but on the overall price of the bundle and, thus, the various services would be subject to a common pricing constraint. This implies that an MNO would not be able to raise voice call termination charges, while keeping prices for the other services in the bundle at the same level, without seeing its customers switch to another network in response to the increase in the overall price of the bundle. The MNO would, therefore, be able to raise termination charges only if, at the same time, it reduced prices for other services, so as to maintain at the same level the overall price of the bundle. If this was true, an MNO could be constrained in its ability to increase charges for voice call termination (though the extent of such constraint would depend upon the level of competition in relation to the provision of the overall bundle).

A.126 However, as discussed above, the evidence does not support the view that mobile owners consider the prices of incoming calls in addition to the prices of outgoing calls, when choosing their mobile network. At present, the evidence suggests that calls to mobiles are not part of the bundle of services on which MNOs compete for subscribers. Therefore, the Director is presently of the view that the appropriate market definition is not that of a cluster national market for all mobile services.

Geographic market definition

A.127 As termination of voice calls to the subscribers of each MNO is a separate market, it is reasonable to conclude that the geographic extent of each market matches the scope of each mobile termination provider's network(s). This is justified by the fact that termination charges are uniform across each network (or groups of networks, i.e. 2G and 3G).

Initial conclusions

A.128 For the reasons outlined in this Annex, together with the Director's views set out in Chapter 2 of this explanatory statement (particularly with respect to responses to the first consultation), the Director believes that, at present, mobile voice termination to each MNO's subscribers constitutes a separate market (with voice call termination to 2G and 3G subscribers in the same market if the MNO has both types of networks).

A.129 Accordingly, the Director considers that, at present, there are six separate markets:

a) wholesale voice call termination provided by '3' (such termination being provided via 3's mobile network);
b) wholesale voice call termination provided by Inquam (such termination being provided via Inquam's mobile network);
c) wholesale voice call termination provided by O2 (such termination being provided via O2's 2G and 3G mobile network);
d) wholesale voice call termination provided by Orange (such termination being provided via Orange's 2G and 3G mobile network);
e) wholesale voice call termination provided by T Mobile (such termination being provided via T Mobile's 2G and 3G mobile network); and
f) wholesale voice call termination provided by Vodafone (such termination being provided via Vodafone's 2G and 3G mobile network).

Forward look

A.130 The Director considers that, at present, there are no adequate supply- or demand-side substitutes for termination of calls to the subscribers of a specific MNO. However, the Director considers that, as technology evolves, effective wholesale supply- and/or demand-side substitutes may arise and market boundaries may thus vary. In addition, changes in the behaviour of callers and of called parties may take place over time, as awareness of the cost of calling mobiles and of methods for keeping down the cost of making and receiving calls on mobiles increases. The Director intends to co-operate with the industry to foster these changes and, thus, generate competition in mobile termination. The Director, nevertheless, believes that it is extremely unlikely that these developments, which could lead to changes to the market definition, will happen in the next three years. However, the Director must, under section 84 of the Act, at such intervals as he considers appropriate, carry out further analysis of identified relevant markets set out therein. He therefore intends to monitor any such developments closely and, if appropriate, carry out a further review.