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# **Spectrum allocation processes**

## A review of global experience

Prepared for Bell Canada

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## 1 Executive Summary

Gilbert + Tobin has conducted a review of international experience in allocating spectrum. This report highlights the findings from this review. Our key findings are that:

- (a) regardless of whether a country employs auctions or “beauty contests” involving competitive bidding, more sustainable market outcomes result when few restrictions are set within the allocation process or on the future operations of firms in the industry;
- (b) in the countries studied, we have found no example where setting aside spectrum for new entrants as part of a spectrum allocation process has achieved the original expectations of the intervening regulator in the longer term;
- (c) in most jurisdictions it has been recognised that there is no need to mandate roaming because market forces will encourage commercial roaming arrangements among market participants. In the countries studied, where the power to impose mandatory roaming has been held by the regulator, that power has not been exercised;
- (d) the use of mandatory tower sharing as a regulatory tool in spectrum allocation is rare. It has been used as a factor in the assessment of potential spectrum acquirers as part of beauty contest spectrum allocations. Otherwise, mandatory tower sharing has not been imposed on licensees of spectrum in the countries studied and is losing favour as a remedy under general competition law;
- (e) the mechanisms commonly employed by governments to encourage or facilitate a new market entrant usually fail to achieve the intended goal of enhancing competition in the longer term. International experience shows that favouring a new entrant does not usually result in sustainable, pro-consumer outcomes;
- (f) we would caution against regulatory intervention to encourage or facilitate a new entrant where there is no market failure to justify such intervention. Particularly in the case of the mobile market, there is a danger that imposing such mechanisms for a new entrant can unbalance the commercial drivers that will ultimately lead to positive market outcomes and an increase in consumer welfare;
- (g) before intervening in a market, a regulator must be certain that there is evidence of a market failure in the Canadian market. The failure of the last fourth facilities-based mobile operator was a market outcome and intervening to encourage or facilitate new entry will not lead to improvement of the welfare of consumers. To the contrary, international experience demonstrates that intervention is more likely to support or encourage inefficient or marginally viable new entrants; and
- (h) inappropriate protection mechanisms and heavy handed regulation in the long term are likely to result in further market consolidation rather than increased competition. International experience shows that regulatory measures targeted at increasing the number of market players are misguided, as, in the medium to long term, market equilibrium often sees a return to status quo, either through the new player acquiring an existing player, as occurred in Korea and Japan, or through other forms of market consolidation such as in France, Germany and Ireland, where processes designed to attract new entrants either failed to do so, or attracted new entrants that eventually failed to meet other licence requirements.

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## 2 Methodology

- (a) We have been asked to consider the extent to which entry-assisting spectrum policies like set-asides, mandated roaming and mandated tower-sharing result in new entry in the market and enhanced competition in the longer term. To do this we reviewed the spectrum allocation processes used in a number of jurisdictions.
- (b) In conducting our review we selected a number of jurisdictions which represented a cross section of international markets and reviewed the respective approaches to spectrum allocation in those countries. The following countries were the subject of our review:
- USA
  - Canada
  - Australia
  - New Zealand
  - France
  - Ireland
  - UK
  - Finland
  - Germany
  - Belgium
  - Malaysia
  - South Korea
  - Japan
  - Hong Kong
  - Singapore
- (c) For each jurisdiction we specifically considered:
- the policy objectives that informed approaches to the allocation process;
  - the nature of the process for allocation, that is, whether by auction or by an alternative selection process;
  - eligibility criteria for bidding for spectrum and/or licence conditions imposed;
  - prices paid for spectrum; and
  - resulting outcomes based on number of operators, history of compliance or failure to comply with licence conditions and market developments since the allocation process.
- (d) The report is set out as follows:
- In Section 3 we provide an overview of the spectrum allocation outcomes;
  - In Section 4 we look at a number of specific mechanisms used to encourage or protect a new market entrant and set out our observations on the resulting outcomes in those jurisdictions which employed such mechanisms; and
  - In Section 5 we provide examples of market led outcomes in the absence of intervention to show that market led outcomes are the most sustainable and that commercial imperatives are more likely to lead to long term benefits for consumers.

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## 3 Overview of spectrum allocation outcomes

- (a) In this section we provide an overview of the market outcomes observed in the course of our review.

- (b) International approaches to spectrum allocation models generally fall into the following categories:
- “beauty contests” whereby the regulator makes a comparative assessment of various bidders for spectrum. These are sometimes coupled with tender rules or eligibility criteria which are intended to narrow down the number and characteristics of bidders to target bidders with sustainable business models; and
  - competitive auctions, whereby spectrum is allocated to the highest bidder. Again, these are sometimes coupled with bidding restrictions or rules of participation that narrow down the number and characteristics of bidders, but ultimately, among those who are eligible to bid, the highest bidder is awarded the spectrum.
- (c) Both beauty contests and auctions are competitive in nature, because, although the assessment in a beauty contest process is opaque, such contests are still inherently competitive. Price as well as costs of service delivery usually form part of the assessment criteria in a beauty contest process. For example, bidders making rollout commitments factor this cost into the licence they are bidding for and are assessed by the regulator based on relative commitments made by other bidders.
- (d) Auctions are favoured in common law countries, in jurisdictions which foster a free market approach to deriving the best value for the state from the allocation of a public resource, and jurisdictions which place importance on the transparent, objective selection process that an auction, with publicly known rules, can provide. For example, the UK, US and Australia use auctions to allocate spectrum.
- (e) Beauty contests are more likely to occur in civil law countries or in jurisdictions in which government policy has a strong social welfare focus, as, in those jurisdictions, it is considered appropriate that the state retain control to decide how social welfare is best served, for example, Scandinavian countries. Beauty contests are also more likely to occur in less mature telecommunications markets, or developing countries where there is a higher level of government involvement in management of the telecommunications sector, and where the government wants to ensure that spectrum rights are only licensed to operators who they believe have viable and sustainable business models that will benefit the sector and the broader economy. Some Asian markets would be examples of this approach.
- (f) Our observations show, however, that regardless of the allocation model chosen, any allocation model which includes significant regulatory intervention is less favourable than a model which imposes fewer restrictions on bidders for spectrum. This is partly because restrictions which form auction rules and those imposed on the potential use of the spectrum increase the complexity of bidding decisions. Restrictions will curb the value that a potential bidder ascribes to the relevant spectrum, because of the cost of complying with the restrictions imposed. Therefore regulatory restrictions are likely to distort the private values that bidders will bring to an auction or other bidding process and affect the ability of the state to recover the optimum price for the spectrum being allocated.
- (g) In assessing particular regulatory measures, it has been difficult to isolate the impact of any one regulatory measure, given that market outcomes tend to be the product of the combination of regulatory measures in place. However, the following summarises the key market outcomes we observed in jurisdictions where restrictive regulatory measures were employed:
- **Spectrum set aside** – this measure sees spectrum reserved for a new entrant, and is implemented either through measures which explicitly restrict

incumbent operators from bidding for certain spectrum lots or through the design of the allocation process, for example beauty contests which allocate higher assessment points to new entrants over incumbents, or auctions which are designed to allocate more licences than there are incumbent operators. Generally we observed that spectrum set aside did not achieve the sustainable introduction of a competitive new entrant. In the UK, setting aside the largest 3G licence for a new entrant generated significant interest among new entrants in the relevant spectrum, however, this level of interest led to irrational bidding and the new entrant (BT) exited the market by divesting the spectrum to O2. In Australia, rules which restricted incumbents from obtaining certain allocated spectrum resulted in the spectrum being sold off to private interests, rather than being deployed in a way which increased consumer welfare. In Belgium, more licences were made available than there were incumbents, however, this failed to generate interest among potential new entrants. Of the countries studied, the only jurisdiction in which explicit reservation of 3G spectrum for a new entrant had marginal success in attracting a sustainable new entrant was Finland. There were a number of additional factors that contributed to this outcome. No licence conditions were imposed, the allocation was made in an environment of light-handed regulation and the spectrum was allocated for free under a beauty contest approach. However, since then, the government's goal of increasing the number of firms has been thwarted. Due to subsequent market consolidation (through the merger of Telia and Sonera), there are now only three 3G operators in Finland.

- **Mandatory Roaming** – this measure has been implemented as an explicit licence condition, which would require incumbent operators to provide roaming services to new entrants, as was the case in Hong Kong and Finland. In Hong Kong the measure proved to be unnecessary as no new entrants bid for the spectrum on offer. This measure has also been implemented in combination with eligibility criteria that apply to the new entrant, before that new entrant is entitled to acquire roaming. This was the case in Finland where the 3G operator requesting roaming was required to have its own 3G network covering at least 20% of the population before it could require an incumbent with significant market power to provide roaming. In practice, the national regulatory agency in Finland (FICORA) had not determined that any operator had significant market power at the time of the 3G allocation. Subsequently, FICORA found that no mobile operator had SMP in the relevant market. That is, there were separate policy considerations that justified requiring a new entrant to meet the minimum rollout condition independent of any mandatory roaming obligations. In most jurisdictions, however, it is recognised that there is no need to mandate roaming because market forces will encourage roaming arrangements among market participants. This is the approach taken in Malaysia, the US, Ireland and Australia.
- **Mandatory Tower Sharing** – This measure has been held as a reserve power by regulators (that is, available to the regulator as an ex post remedy) in a few countries. However, incumbents in several countries would have obligations to share facilities under general competition law regimes. Such an obligation would not always require a finding that the controller of the tower holds significant market power in a relevant market. We observed that it is not common to impose infrastructure sharing. In the limited cases where commitments to share infrastructure formed part of the selection criteria for allocating spectrum, such sharing did not have the intended effect of ensuring that new entrants met rollout obligations. Mandatory tower sharing is also losing favour as a remedy under general competition law. In the US, in the context of wholesale requirements on fixed line facilities, mandated facilities sharing has been rejected as a

policy. Following the failure of the “Unbundled Network Elements - Platform” experiment in the fixed context, the view of the US regulator is that forced infrastructure sharing provides too much of a disincentive to innovation and investment.

- (h) As our analysis of the various regulatory interventions shows, spectrum allocation processes which employ significant restrictions in an attempt to create a tailored outcome are more likely to inhibit market development and competition in the long run. Moreover, jurisdictions with market-driven outcomes and ex-post competition regulation as a fall back, have achieved better results than jurisdictions that impose significant restrictions on spectrum allocation processes.
- (i) This is supported by well accepted auction theory that observes that intervention which has the effect of excluding potential bidders has the result of reducing private and public values and leads to an inefficient outcome.

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## 4 Regulatory intervention to facilitate new entrants

### 4.1 Spectrum set aside

- (a) Some countries have attempted to facilitate new entry by setting aside spectrum for which only new entrants can bid.
- (b) It is intended to ensure that a new entrant enters the market and it is argued that it encourages facilities based competition. However, our findings are that setting aside spectrum does not guarantee that the spectrum will be used by the new entrant or that it will encourage effective facilities based competition.
- (c) Excluding incumbents from the sale of particular bands of spectrum which are reserved for new entrants does not ensure that the state retains the economic rent associated with the spectrum for the welfare of all. It can instead result in the new entrant retaining the economic rent without passing on the benefit to consumers. This loss of consumer benefits may take the form of the new entrant selling its effectively subsidised spectrum for a speculative profit (in jurisdictions where spectrum trading is permitted). Or alternatively, the new entrant will not have the resources to build optimally to fully exploit the spectrum asset. In essence, the new entrant retains the public asset, but cannot efficiently use it to provide maximum consumer benefits.
- (d) Where spectrum is set aside for a new entrant, there is also a risk that the spectrum will lose value and lie fallow, or cease to be available for public telecommunications services. This can occur if the new entrant fails to launch a service using that spectrum and the new entrant is prevented from later from re-selling the spectrum to firms that will make better use of it.
- (e) An example of this is the Australian experience of auctioning 850 MHz: even though a set-aside enabled a new entrant to obtain spectrum in the 850 MHz band, that firm did not deploy services. The spectrum was later resold to another new entrant, which has now closed the deployed network. A further Australian example is found in the results of the auction of 1800 MHz spectrum. In that auction spectrum was acquired by 5 operators. The existing GSM licensees which were Telstra, Optus and Vodafone built networks in the capital cities as an expansion of their existing GSM 900 networks. Hutchison and One.Tel were the other successful bidders. In the 7 years since acquiring the spectrum, Hutchison has not deployed network using this spectrum. One.Tel built network but the business failed due to billing problems. The One.Tel spectrum was eventually acquired by NSW State Rail to build a private network using GSM technology.

- (f) In Europe, where spectrum set asides were employed for 3G auctions, generally the number of operators increased by at least one operator except in Denmark and the Netherlands where the number of 3G licences offered equalled the number of existing 2G operators.<sup>1</sup> While some of these jurisdictions experienced a temporary increase in the number of market participants, the number of participants was eventually determined by market outcomes. Some of the new entrants ended up returning their licence (for example, Sweden), while others were swallowed in industry consolidation (for example, Finland). In cases where there was only a temporary increase in the number of players, the associated inefficiency and industry costs would reasonably be considered a policy and regulatory failure.
- (g) In France the four 3G spectrum lots were designed to elicit four bidders including one new entrant (there were 3 GSM licensees). Despite the four licences on offer, only two operators went through the whole selection procedure (beauty contest) the first time around. Orange France and SFR were granted UMTS authorisations in 2001. A third operator was licensed in September 2002 and on 28 February 2007, the regulator recommended that the process for allocation to a fourth operator be commenced. The French set-aside process did not succeed because there was an absence of operators that qualified for the selection procedure. It took more than 6 years to resolve and the government's goal of increasing the number of operators was thwarted.
- (h) In Hong Kong, measures that were intended to encourage new entrants to the market made the licences so onerous that they were unattractive both to incumbents and new entrants. No new entrants entered the market and the licences were issued to incumbents at reserve price only.
- (i) In Ireland, no spectrum was specifically set aside for a new entrant, instead, under the beauty contest process, additional points were awarded to new entrants. The outcome of the 3G spectrum allocation was that one new mobile entrant was awarded a 3G licence, but one of the 3G licences was not awarded at all due to lack of interest. The fourth remaining 3G licence was offered to a new entrant in 2005, but the licence was withdrawn, when the new entrant failed to meet original licence conditions. In Ireland, measures to favour a new entrant in the allocation process did not result in the anticipated number of players in the market.
- (j) In general, we have observed that attempts to use spectrum set asides to encourage new entrants and encourage facilities based competition, fail to achieve the sustainable introduction of a competitive new entrant. This failure means that there is no increase or only a limited increase in facilities based competition. The cause of the failure varies from country to country and is related to a number of factors. However, there is a consistent outcome that attempts by regulators simply to increase the number of operators does not achieve that outcome.

## 4.2 Mandatory roaming

- (a) Mandatory roaming is intended to encourage more immediate services based competition. It is a condition usually imposed on other operators to give the new market entrant the ability to provide full service coverage to its customers before having established its own network infrastructure to support such coverage. In particular, it has been used in the course of 3G spectrum allocation, as a mandated

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<sup>1</sup> See "Comparative Assessment of the Licensing Regimes for 3G Mobile Communications in the European Union and their Impact on the Mobile Communications Sector", European Commission, Directorate-General Information Society, Final Report, 25 June 2002, Exhibit 12.

requirement that 3G operators be entitled to roam onto existing 2G networks, with the aim of facilitating earlier launch of 3G services.

- (b) In the countries reviewed, most spectrum allocations were national rather than regional. That is, licences include both the more profitable, densely populated areas as well as the more sparsely populated and less profitable areas. It is the more profitable areas which are suitable for "cream skimming" in which infrastructure capital expenditure is readily justified. An operator with access to mandatory roaming can either delay or avoid the deployment of infrastructure in less profitable areas, depending on the associated terms and conditions.
- (c) However, in any environment where roaming is mandated, there is the risk that it will in fact act as a disincentive for the new entrant to build its own network infrastructure. There is the risk that a new entrant will simply resell services, especially in areas with low population density, where the cost of building its own infrastructure is high. In effect, this leads to a situation where the new entrant is in a position to target the higher value customers in areas with established services while offering no incentive to expand services to less lucrative, underserved areas. In this way, mandatory roaming can work counter to broader investment incentives, and can lead to a form of spectrum squatting, which sees the new entrant having won spectrum rights, but having little incentive to exploit those rights to the full extent.
- (d) In Hong Kong, despite a history of leaving roaming arrangements to commercial negotiations, 2G licensees were obliged to provide mandatory roaming to any new entrant 3G licensee. However, at the end of the 3G spectrum allocation process, there were no new entrant 3G licensees. Therefore the requirement itself, even in combination with other mechanisms to facilitate new entrants, was not enough to attract new market entrants. The policy combination influenced the design of 3G networks. Incumbents were required to deploy more cell sites to cover the additional traffic that would have had to be carried on their networks because of the roaming requirement. This therefore made the 3G rollout exercise overall more costly for incumbents, and in turn reduced the price that incumbents were prepared to pay up front for the 3G licences.<sup>2</sup> Effectively, the combination of mandated roaming and spectrum set aside to encourage new 3G market entrants, reduced the overall price that the Hong Kong government could recover for the relevant spectrum. This example also highlights that where the spectrum allocation policy is misguided, the state stands to lose an opportunity to maximise revenue from the sale of the asset, and the market itself cannot correct the results of a policy failure of this kind.
- (e) In Malaysia, although not mandated, as part of the beauty contest process there, applicants for 3G spectrum were required to prepare a roaming plan as part of their tender for assignment of 3G spectrum. 3G to 2G roaming was made subject to access obligations under the Communications and Multimedia Act 1998 when it was included on the Access List Determination No 1 of 2005. However, actual 3G rollout in Malaysia has been marked by significant delays in roll out by the operators. Although rollout obligations were imposed when 3G spectrum was assigned in 2002, neither Malaysia Telecom nor UMTS commenced rollout until 2005. Therefore, the ability for new entrants to roam onto existing 2G networks did not achieve the desired effect of encouraging new entrants to launch 3G services quicker than they would have without the roaming requirements.

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<sup>2</sup> See [http://www.3gnewsroom.com/3g\\_licenses\\_db/company.php](http://www.3gnewsroom.com/3g_licenses_db/company.php), which refers to the licences in Hong Kong being sold at the minimum reserve price after the plans to auction were scrapped because of lack of interest.

- (f) The Malaysian experience further shows that roaming arrangements are likely to occur commercially. That is, operators preferred to negotiate a commercial roaming agreement rather than relying on the mechanisms provided by the regulatory “backstop” or the commitments made during the selection process. In April this year Maxis, Celcom and DiGi announced a commercial agreement in principle to permit roaming between their respective networks.<sup>3</sup> In welcoming the commercial arrangement reached between the operators, the regulator commented:

*"We have discussed this with the telcos who agree that rather than all of them going into the same area, it is better and more cost-effective for one to enter the place and for the rest to share the network."*<sup>4</sup>

This highlights the Malaysian regulator’s understanding of the importance of commercial outcomes rather than the inappropriate use of regulatory remedies.

- (g) In Australia, the ACCC decided regulating roaming would not promote the long-term interests of users in the mobile market. It also determined that there was no market failure which required that roaming be mandated. The Commission decided that there was no need to mandate roaming because no operators had complained that they had been refused GSM inter-carrier roaming. It also determined that there was effective competition between actual and potential roaming providers. The report on the decision observed that there would be effective competition for GSM roaming services if demand arose.<sup>5</sup> The ACCC concluded that Telstra was the only supplier of CDMA roaming but there was insufficient information to form a view on whether declaring CDMA roaming would promote competition. The practical outcome was that Hutchison, the new entrant, negotiated roaming on a commercial basis to avoid investment costs.
- (h) In Ireland, ComReg included a mandatory roaming condition in 3G licence conditions of existing GSM networks. In effect, it required Vodafone and O2 to provide “3” with national roaming once the “3” network had reached 20% population coverage. If negotiations failed, ComReg had power to intervene and impose a national roaming agreement if necessary. If it had to impose a charge, ComReg indicated that the price would be set based on the price charged to provide the service to end users, minus the costs of any charges not incurred in providing the same service to the new entrant, plus any cost elements reasonably incurred solely to provide the roaming service.<sup>6</sup> In Ireland, although some regulatory pressure was applied, government intervention was not required in the end to bring about the national roaming agreement between O2 and Meteor.<sup>7</sup>
- (i) In the UK, Oftel (now Ofcom) has the power to require the provision of national roaming. It had retained this power as a backstop on the basis that it provides regulatory certainty. Oftel considered that:

<sup>3</sup> See <http://star-techcentral.com/tech/story.asp?file=/2007/4/4/technology/20070404130621&sec=technology>.

<sup>4</sup> See <http://star-techcentral.com/tech/story.asp?file=/2007/4/4/technology/20070404130621&sec=technology>.

<sup>5</sup> ACCC, *Mobile Services Review: Mobile Domestic Inter-carrier Roaming Service, Final report on whether or not the Commission should declare a mobile domestic inter-carrier service*, December 2004. Referred to in Commerce Commission, *A Review of Cellular Mobile Market Entry Issues*, 10 October 2006, p28.

<sup>6</sup> Office of the Director of Telecommunications Regulation, *Extending Choice, Opening the Market for third generation Mobile Services (3G Mobile), Response to the Consultation ODTR 00/92*, December 2000. Referred to in Commerce Commission, *A Review of Cellular Mobile Market Entry Issues*, 10 October 2006, p28.

<sup>7</sup> ComReg, *Market Analysis – Wholesale Mobile Access and Call Origination*, December 2004, footnote 76. Referred to in Commerce Commission, *A Review of Cellular Mobile Market Entry Issues*, 10 October 2006, p27.

- (i) the power may have been a factor in encouraging the commercial agreement between Hutchison and O2; and
- (ii) there was a risk in giving up that power.<sup>8</sup>

Oftel has now officially recognised that there is no need for ex ante mandatory roaming.

- (j) In Belgium part of the 3G spectrum allocation process involved a right for new entrants to have access to national roaming for 8 years, after they had reached a network rollout target of 20% coverage. The terms and conditions of roaming are required to be reasonable, non-discriminatory and proportional. In assessing the proportionality and non-discriminatory aspects the regulator could have particular regard to the type, quality and tariffs of services offered by a 2G operator to its own customers.
- (k) There is increasing recognition that in the absence of regulatory intervention, market-based roaming arrangements develop through normal commercial negotiations. Regulatory intervention, if clearly needed, is best used as a regulatory back stop rather than a pre-emptive measure. If mandatory roaming is imposed at all, there is an increasing tendency to ensure that a new entrant will only be entitled to roam after it has reached its network rollout targets. Mandating roaming on its own does not provide any incentive to encourage a new entrant to progressively invest in infrastructure.

#### 4.3 Mandatory tower sharing

- (a) Mandatory tower sharing is intended to reduce environmental impact and encourage services based competition, by reducing the costs associated with setting up cell sites. The aim is to assist a new entrant by reducing the cost of supplying service.
- (b) However, mandatory tower sharing can allow new entrants to “free ride” on the planning and construction efforts of a more vigorous mobile operator who is investing in towers. There is also insufficient recognition of the risk taken by the first mover in an environment where site acquisition and approval is a lengthy process. Mandatory tower sharing runs contrary to the idea of competition between network providers and is subject to technical feasibility. There is also no need to mandate tower sharing in areas of high penetration.
- (c) In Malaysia, applicants for 3G spectrum assignments were required to demonstrate in their applications a capacity, capability and commitment to sharing infrastructure. Applicants were required to indicate a sharing commitment in terms of a percentage of total sites or level of sharing in relation to towers or floor space and antennae at each site. Applicants were also required to indicate any charges they would impose for sharing facilities. As noted above, however, these tower sharing requirements did not achieve the result for which they were intended, as they did not result in the faster rollout of 3G infrastructure in Malaysia because of the delays mentioned above.
- (d) The US has rejected mandatory collocation of tower facilities for the wireless sector. The Federal Communications Commission ruling which required ILECs to

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<sup>8</sup> Oftel, National roaming condition: A consultation on proposals to set a national roaming condition after 25 July 2003, 15 May 2003. Referred to in Commerce Commission, A Review of Cellular Mobile Market Entry Issues, 10 October 2006, p29.

make their network facilities available to CLECs at rates determined by state public utility commissions, which is referred to as the “Unbundled Network Elements - Platform” experiment, has also failed in the fixed-line context. The US experience is that forced infrastructure sharing provides a disincentive to innovation and investment.

- (e) Where tower sharing is not mandated, it is generally common for tower sharing arrangements to be negotiated on a commercial basis and this has also led to the emergence of non-carrier tower operators (for example, in Australia and UK), also referred to as tower site aggregators. The entry of non-carrier tower site aggregators is a practical market led outcome. These players take on the regulatory, planning and capital risks in order to be able to sell services to all of the operators on a non-discriminatory basis. The aggregator can leverage the capital investment significantly more effectively than any one operator. The aggregator does not need to self supply and can sell capacity to the highest bidder rather than seeking to reserve capacity to itself.
- (f) Rather than national regulation, local planning requirements, which place rules on the levels of tolerable duplication of infrastructure also tend to lead to appropriate commercial outcomes.
- (g) In Australia, a “facilities access regime” applies to towers, poles and masts and is administered by the ACCC. This means that there is a competition regime under which operators can make complaints to the ACCC if they are refused access to facilities, which they are entitled to access under the regime. There is no requirement to find significant market power before an operator is required to provide access to facilities under the regime. In addition, there is a code of practice for all carriers which imposes an obligation to minimise environmental impact and local councils normally encourage collocation by declining to permit multiple towers in adjacent sites. Despite this, most companies are able to reach commercial arrangements in relation to facilities sharing. Aggregators have also emerged who own sites and negotiate access by a range of operators. The aggregators range from national operators (for example, Crown Castle, Broadcast Australia) to private property owners (for example, Accor hotels group).
- (h) An alternative to tower sharing is a cost sharing approach. Cost sharing involves operators jointly constructing and owning network components. A common argument against this type of approach is that it reduces incentives for competitors to compete vigorously against each other. International opinion is mixed regarding this kind of approach. The practice is prohibited in the Netherlands, but encouraged in Sweden. The German regulator was initially pro cost sharing but subsequently clarified that 3G operators would only be permitted to share costs of parts of their infrastructure and, in particular, only in relation to towers and antennae. It required that each operator would still be required to build their own network.
- (i) Mandatory tower sharing is not commonly used as a mechanism for encouraging new entrants as part of a spectrum allocation process. In Malaysia the fact that a commitment to share facilities was required of incumbent applicants as part of the selection process, did not assist new entrants in launching services any sooner. In France, facilities sharing is permitted for passive network elements, however operators are only permitted to share base stations and radio network controllers if each operator retains control of its own frequency and base station elements that manage emission and reception along the radio path. In the Netherlands, sharing the cost of facilities is prohibited. The approaches in France and the Netherlands highlight that there are genuine competition concerns (mainly related to collusion) associated with the way in which firms may share facilities. Approaches in the US, UK and Australia evidence a growing international acceptance that the market will

arrive at appropriate, commercially negotiated, facilities sharing arrangements in the absence of regulatory intervention.

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## 5 Commercial outcomes in the absence of intervention

### 5.1 Introduction

- (a) In this section we provide an overview of the market outcomes that have arisen where market forces and general competition regulation have driven the outcomes, rather than specific regulatory intervention targeting spectrum allocation.
- (b) Our review shows that market outcomes are the most sustainable and that commercial imperatives, rather than pre-emptive regulatory intervention, generally lead to appropriate outcomes.

### 5.2 Roaming

- (a) Australia and Finland are examples of jurisdictions in which roaming agreements have been reached at least in part as a result of the threat of regulatory intervention, but with no regulatory intervention being required.<sup>9</sup>
- (b) In our view, commercially appropriate terms are a necessary condition for roaming to benefit both networks involved, and commercially appropriate terms are more likely to be reached as a result of ordinary market pressures, rather than ex ante regulatory measures. An incumbent operator will only offer roaming to a new entrant after considering whether the benefits flowing to it from the increased network utilisation balance against the loss of retail share that will occur in facilitating the entry of a new market operator.
- (c) There are also technological limitations on effective roaming that would caution against mandating roaming. When Australian new entrant, One.Tel launched, it launched with a minimum of its own infrastructure in key areas such as highly populated central business district areas. Problems arose because of the nature of 2G to 2G roaming, once a customer roams onto another network, the device remains on that other operator's network until the phone is switched off. In effect it was One.Tel's highest value customers who were most likely to roam onto Telstra's network and least likely to switch their phones off. This meant that Telstra's share of revenue from the roaming arrangement was greater than expected and equally, the cost to One.Tel of the roaming service provided by Telstra was much higher than anticipated. While there were other factors that led to One.Tel's business failure, this was one of the main contributing factors. This problem is less likely to occur for 3G networks, as the technical lessons of roaming have been learnt and applied to this technology. However, the example is illustrative of the unforeseen issues that often arise in technology industries, and supports the case for caution before intervention.
- (d) As the Australian regulator's economic advisor stated in recommending against regulation of domestic roaming:

*"... So long as each existing carrier believes that NO OTHER carrier is going to offer roaming, then it will not offer roaming. However, as soon as any carrier believes that another existing carrier is likely to offer roaming, then it will also want*

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<sup>9</sup> OECD, *Competition and Regulation Issues in Telecommunications*, February 2002, p36. Referred to in Commerce Commission, *A Review of Cellular Mobile Market Entry Issues*, 10 October 2006, p27.

*to offer roaming – it is better to offer than not offer if SOMEONE is going to offer roaming.”<sup>10</sup>*

- (e) This is because loss of retail market share is inevitable when a new entrant comes onto the market. Incumbent operators then need to compete for the ability to be able to off-set this with increased network utilisation so that they gain some share of the market lost.
- (f) In Ireland 2G to 3G roaming was mandated on the basis that, in the first few years 3G services were expected to be complementary to 2G services and so 3G operators required access to 2G networks to deliver a full service package. It was considered that 3G operators who did not have a 2G network required roaming onto other operators’ networks. ComReg believed that roaming was a significant factor in enhancing competition between 3G networks and required applicants for 3G spectrum to agree to provide national roaming between 2G and 3G networks as a pre-selection criteria for the licence. The outcome of the beauty contest was challenged by the losing entrants on the basis that selection was opaque. As a result, the process was reversed. The failure of the allocation process in Ireland and the resolution of the subsequent litigation in the first quarter of 2007 means that it is difficult to assess the outcome of ComReg’s decision in relation to roaming specifically.
- (g) In France, domestic roaming was encouraged on a commercial basis with only competition laws acting as a backstop where necessary.
- (h) Roaming is not mandated in the US, but throughout the entire US, the 4 national operators all have domestic roaming arrangements in place as a result of commercial negotiations. There are a myriad of roaming arrangements in place between regional operators, which have also been the result of commercial negotiations.

### 5.3 Facilities sharing

- (a) The greatest positive impact of facilities sharing is in its ability to reduce the cost of infrastructure expenditure for operators. It is estimated by network component manufacturers at Ericsson and Siemens that facilities sharing can reduce the initial roll-out costs for 3G networks by up to 40 percent.<sup>11</sup>
- (b) In jurisdictions such as the European Union, the size of the market and the number of operators has meant that recommendations have been made to remove remaining regulation of facilities sharing, because there is sufficient competition in the market irrespective of regulation. As referred to above, the concern in Europe is to properly address the fact that mandating facilities sharing may be giving operators an incentive and mechanism to collude. Collusion raises potential competition law issues. At present the European Commission (EC) requires operators to retain independent control over frequency resources as a means of preventing integration between competitors, and is reluctant to remove all regulation of facilities sharing for this reason.<sup>12</sup>

<sup>10</sup> ACCC, Previous Domestic Inter-carrier Roaming Report, pp.38-39.

<sup>11</sup> ITU Forum of the Regional Working Group on Private Sector Issues – Asia Pacific Region, “Background Paper on Infrastructure Sharing”, 3 August 2005.

<sup>12</sup> ITU Forum of the Regional Working Group on Private Sector Issues – Asia Pacific Region, “Background Paper on Infrastructure Sharing”, 3 August 2005.

- (c) A commercially negotiated outcome to share facilities often also promotes environmental interests, because shared facilities means fewer facilities which minimises visual pollution.
- (d) In our view, approaches in the US, UK and Australia evidence a growing international acceptance that the market will arrive at appropriate, commercially negotiated, facilities sharing arrangements in the absence of regulatory intervention.

#### 5.4 Convergence of mobile, fixed-line and fixed wireless

- (a) In our view, increasing convergence of technologies is already a market force which causes increased competition for spectrum resources, and provides new ways for new entrants to enter the market. These developments further reduce the need for up front regulatory intervention. In addition, heavy handed regulation which would target or favour a new entrant using a particular technology or offering a particular service may stifle the development of new technologies as competing technologies in the relevant spectrum bands.
- (b) For these reasons, we would caution against regulatory intervention which imposes differential restrictions between mobile, fixed-line and fixed wireless in developed countries, as the three are increasingly converging. Indeed, even in developing countries, where distinctions were initially made between fixed and mobile (leading to the concept of limited mobility, such as in India), these distinctions have been abandoned in processes such as universal licensing.
- (c) The IMT2000 series of specifications for “mobile” services have been used to deliver fixed, mobile and limited mobility services. For example, CDMA2000 is widely used for wireless local loop applications. GSM standards are used in countries as diverse as Germany and New Zealand to provide a “homezone” where the mobile handset has fixed line applications within the home and has mobile functionality outside of the home.
- (d) There is pressure to ensure that the IMT2000 “advanced” series of technologies also incorporates mobile WiMAX (IEEE802.16e). Most WiMAX equipment vendors currently advocate the use of this standard regardless of whether the application is fixed or mobile broadband.
- (e) As a result of technological development, spectrum which has in the past been used for the provision of fixed wireless services can also be used for the provision of mobile services. Indeed, the rapid evolution of such wireless services has in some circumstances surprised mobile operators who acquired spectrum in the expectation of known competition, and are now faced with competition from fixed wireless providers.
- (f) Wireless broadband is competitive with DSL broadband. Therefore, the scope of services which may be offered by new entrants should also be factored into strategies around spectrum allocation. For example, Singapore prohibited the use of WiMAX for mobile services for a period to allow 3G operators to establish their networks, recognising a level of substitutability between the services.
- (g) While it is too early to provide long term outcomes at this stage, in India, licences were issued to permit mobile providers to provide a fixed-line equivalent service, using wireless technology, in areas where there was very little or no fixed-line infrastructure. The winning bidders implemented a solution which amounted to a limited mobility service – it did not have inter-cell handover but operated as a mobile device within a limited area. Teledensity rose significantly after deployment of this technology, which shows that where there are fewer constraints as to how

allocated spectrum may be used, the resulting market solutions can have significant consumer and economic benefits.

- (h) Ofcom has recognised the convergence between fixed wireless and mobile. Its policy objectives in allocating frequency bands for future wireless telecommunications services, also referred to as IMT (International Mobile Telecommunications), are specifically aimed to provide a technology neutral and flexible approach to allocation of spectrum.<sup>13</sup>

- (i) Ofcom has issued a report which states:

*“The selection of bands to be identified should align with those where it is judged that new applications could bring the greatest benefit to the UK but at the same time, the interests of the present users of the spectrum must be considered and the opportunity cost of displacing those services will represent a reduction in the overall benefit from the new applications. Therefore it is necessary to try to identify those areas where the cost of displacing services is lower and the benefit from introducing new applications is judged to be highest.*

*In the case of a frequency band where there is no primary mobile service allocation in the Radio Regulations, this need not prevent the introduction of mobile systems in the UK but they would be at a disadvantage with respect to protection from interference from other services using the band in neighbouring countries. The addition of a mobile primary service allocation in a frequency band can enable greater regulatory flexibility and remove one of the regulatory barriers that could prevent the market from arriving at an optimal use for that spectrum.”<sup>14</sup>*

- (j) Ultimately, targeted regulatory measures which seek to dictate how spectrum should be used, or dictate the number of competitive players in a market are risky and are likely to cause unintended market distortions. This is particularly so in the current environment of increased convergence of fixed and mobile on the one hand, and voice and data services on the other.

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## 6 Policy implications

### 6.1 Risk of intervention

- (a) Ultimately, none of the various mechanisms intended to either foster the ideal conditions of entry, or to generally promote competition in markets reliant on allocation of spectrum, can be said to have had the intended effect, without causing other market distortions, or without requiring further ongoing monitoring or associated regulatory measures to ensure that market distortions do not result.
- (b) In markets where successful outcomes have been achieved, these are more likely the result of good competition policy, rather than specific restrictions on spectrum allocation or particular spectrum licence conditions. The Swedish market is a good example of this, where the liberalised resale approach was shown to be preferable to any pro MVNO measures.

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<sup>13</sup> WRC-07 Agenda Item 1.4 “Consultation on Candidate Bands under Consideration at WRC-07 for IMT”, Ofcom 27 February 2007.

<sup>14</sup> WRC-07 Agenda Item 1.4 “Consultation on Candidate Bands under Consideration at WRC-07 for IMT”, Ofcom 27 February 2007.

- (c) At best, none of the various mechanisms used to promote a new market entrant, or to encourage competition generally, have achieved any better market outcomes than have ordinary commercial pressures combined with the standard oversight of competition or antitrust laws.
- (d) As a result, we would caution against regulatory intervention where there is no market failure to justify such intervention. Particularly in the case of the mobile market, there is a danger that imposing protection mechanisms for a new entrant can unbalance the commercial drivers that will ultimately lead to positive market outcomes and an increase in consumer welfare.
- (e) Before intervening, a regulator must be certain that there is evidence of a market failure in the Canadian market. The failure of the last fourth facilities-based mobile operator was a market outcome and intervening to encourage or facilitate new entry will not lead to improvement of the welfare of consumers. To the contrary, international experience demonstrates that intervention is more likely to support or encourage inefficient or marginally viable new entrants.
- (f) Inappropriate protection mechanisms and heavy handed regulation in the long term is likely to result in further market consolidation rather than increased competition. International experience shows that regulatory measures which seek to achieve a specific number of market players are misguided since, in the medium to long term, market equilibrium often sees a return to the original number of players, either through the new player acquiring an existing player, as occurred in Korea and Japan, or through other forms of market consolidation such as in France, Germany and Ireland, where processes designed to attract new entrants either failed to do so, or attracted new entrants who ultimately failed to establish sustainable competitive businesses.

## 6.2 Risk of stifling new market

- (a) From all of the observations that we have set out in this document, we would caution against any form of intervention at the spectrum allocation stage. In addition to these observations we have found that:
  - (i) Regulatory measures which aim to achieve specific market characteristics, such as a particular number of competitive operators, are risky. There is a risk that inappropriate regulatory intervention will stifle market developments. These developments could lead to greater consumer welfare gains than can be achieved through pre-emptive regulatory measures.
  - (ii) Despite increasing saturation of the mobile market, the mobile market continues to offer more innovation than fixed line telephony in terms of both market structure and a layered market as well as service offerings. Voice is just one of the mobile services that can be offered and is the most developed of the services on offer. However, the delivery of multimedia data services and the use of handsets for portable music and mobile audiovisual services has not yet developed to its full potential.
  - (iii) There is a risk that intervention in this environment can stifle emerging markets and innovation in a sector which is still evolving. For this reason, over regulation of the industry at the point at which spectrum allocation occurs, should be avoided.
- (b) For example, the allocation of sub-optimal tranches of spectrum such as 5 MHz paired when 10 MHz paired is optimal leads to:
  - (i) inefficiency as the number of base stations required to provide basic services is significantly higher than the optimal case; and

- (ii) reduced scope of services as the available bandwidth is used for basic, rather than higher value, services.

These effects have started to become apparent in European jurisdictions where 10 MHz paired has been allocated for 3G even though 15 MHz paired is optimal. The smaller allocation was a misguided attempt to increase the number of competing operators.

### 6.3 “Technology picking” risks

- (a) In addition to the risks that arise from ex ante regulatory intervention that we have set out above, we also caution that there are risks which arise from “technology picking”. Absence of technology neutrality can be the result of a policy objective or may be incidental. In either case, there is a significant risk that there will be unintended consequences. As we have set out in section 5.4 above, the market has a better medium and long term perspective on appropriate technologies and the market is best placed to determine which technologies will succeed and which will not. Examples of the effects of technology picking include the experience in South Korea and Hong Kong:
  - (i) In allocating 3G spectrum, the South Korean regulator stipulated that the third licensee had to adopt CDMA 2000 technology. The process for selecting a licensee was delayed twice because of a lack of interest from potential operators. The regulator was forced to reduce the price of the licence to attract a bidder and the successful licensee, LG Telecom had not deployed 3G services by 2006 and ultimately had its licence revoked.
  - (ii) In Hong Kong, even established incumbents experienced in operating under restrictions in a particular jurisdiction were deterred from bidding for spectrum. The regulatory restrictions attached to that spectrum imposed further compliance costs on the incumbents. For new market entrants who sought to introduce new technologies, it was even harder to predict the impact that high compliance costs would have on their business models. Heavy-handed regulation of spectrum usage may well have deterred new entrants seeking to launch new technologies. This illustrates the risk that, even if the regulatory measures are essentially technology neutral, the effect is a form of technology picking.

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## 7 Gilbert + Tobin

### 7.1 About Gilbert + Tobin

Gilbert + Tobin, based in Sydney, provides international advisory services which focus on market sectors that are dynamic and evolving. Our advice is aimed at informing and driving the success of large scale commercial, social and government transactions.

We are a 200-strong legal team, acknowledged as leaders in many of our core service areas which include communications, competition regulation and technology. Gilbert + Tobin's Corporate, Communications and Technology team offers integrated services for clients in the convergent fields of telecommunications, media, information technology and e-commerce.

Our seminal work in regional telecommunications markets has made Gilbert + Tobin a vital resource for carriers (wireline and wireless, incumbent and new entrant), regulators and governments. The firm's practice now enjoys global reach, with major projects completed in Europe, North America, China, Japan, Singapore and more than a dozen other Asia Pacific countries from Bahrain to Vietnam. Emerging market development

projects for the Asian Development Bank and the World Bank are an important aspect of our work, reflecting the intellectual rigour Gilbert + Tobin brings to every assignment.

***"Regarded as the premier telecoms boutique in Australia, the firm ... elicits universal market acclaim. One rival conceded 'I wouldn't quibble with its top ranking and nor should anyone else. They deserve it'." -- Chambers Global***

## 7.2 The authors of this report

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