A submission to the Australian Competition and Consumer Commission

Mobile Services Review 2003[1]

Introduction

This submission to the ACCC is in response to the Discussion Paper published in April 2003 and addresses, in particular, the appropriate definition of services provided by Third Generation (3G) cellular communications systems.

There are compelling technical and commercial reasons to consider 3G systems as new technologies for delivering conventional telephony and telecommunications services, that is, the same but better. We argue that regulation should focus primarily on the nature of services rather than on shifts in technology. This implies that whatever regulatory regime is applied to contemporary (so-called 2G) systems be also applied to the new (3G). Those 3G services which are unique and novel are still emerging and, at this stage, regulatory forbearance should be practised in relation to them.

This paper argues for a consistent approach to regulation of mobile communications. It does not address the form of such regulation. We do not consider whether it is appropriate for mobile services to be declared, nor do we consider regulation of prices, interconnect, access, roaming or market structures including Non-Affiliated Service Providers. Instead we focus on the critical point: the appropriate regulatory response is to forbear on any regulatory changes until the uptake and significance of such services is clear and until the need for specific regulatory intervention can be anticipated.

The argument is progressed firstly by describing 3G technologies, services and applications in relation to existing 2G. Secondly, we note a number of examples from fixed line and mobile telephony which parallel the major drivers behind 3G and we show how these analogies support our regulatory advice. Finally we answer all of the questions raised by the Commission's Discussion Paper.

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Third Generation Services

This section provides a brief description of the technical capabilities of third generation technologies. We argue that a clear understanding of the technology, network architecture, bearer services and applications leads to a logical and consistent approach in regulating such new systems.

We focus on the European standard GSM (Global System for Mobiles) and the corresponding third generation standard UMTS (Univeral Mobile Telephony Services) which supports the application of W-CDMA (Wideband Code Division Multiple Access). Some of these technologies are described within the Discussion Paper (p 24). However, that discussion links 3G with broadband in a way we think too prescriptive. While it is true that new technologies such as W-CDMA can deliver some limited broadband applications, that is not their prime purpose, which is rather to improve network efficiency. Moreover, the broadband wireless applications are commercially unproven and we suspect will be unviable in most settings. If W-CDMA has new, broadband applications, they are likely to be limited and are 3-5 years into the future. Over the medium term W-CDMA will be used to deliver services currently available.

To see this critical point, we firstly describe the 3G architecture, showing that it is a further extension of the development of 2G via the application of the GPRS upgrade and that it has a common core network. We then describe the drivers for 3G, determining that the generational upgrade is primarily intended to enhance efficiency not to provide radical new services. Finally, we explain the likely evolution of 3G, from conventional through emerging to future applications, and from the perspective of the end user.

Third Generation Architecture

Telstra, Optus and Vodafone each operate GSM networks which already have been upgraded to support the General Packet Radio Service (GPRS), providing a so-called 2.5G capability. The network consists of a radio access network, switched core network, packet data core network and service/support platforms. The relevant standard was originally designed and optimised to carry voice telephony and circuit-switched data at rates up to 9600 bit/s.

The GPRS upgrade overlays a packet data delivery mechanism on the GSM system. This allows data services to be delivered without needing to reserve a circuit and the greater flexibility then leads to increased network efficiency (and to the possibility of billing by data volume rather than hold time). Data rates up to 36 kbit/s are readily achieved but higher data rates using the 2.5G solution are more difficult for various

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technical reasons.[2] It is important to realize that the GPRS solution is not only an interim solution to delivering packet data services over the GSM network, it also provides the core solution for the third generation upgrade. This means that 2.5G and 3G both share the same core network characteristics.

The architecture of an initial UMTS deployment on an existing GSM network is shown in Figure 1.

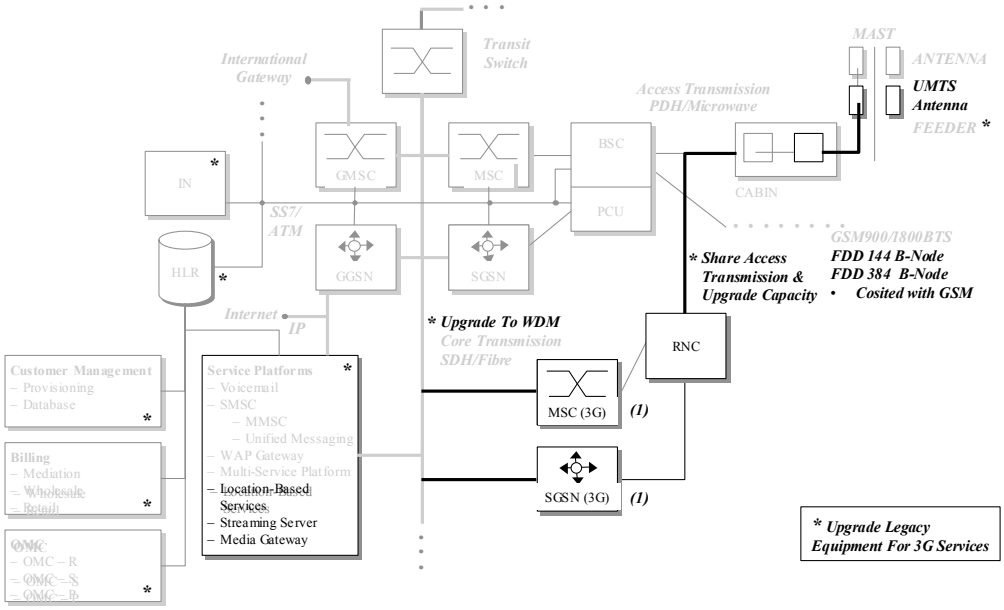

Figure 1: Example initial deployment of a UMTS network on existing GSM infrastructure

The key point is that the GSM core switching and packet network infrastructure is re-used in UMTS. The major upgrade required is that of the radio network. In practice, this is non-trivial as the new 3G radio standard, based on W-CDMA, requires greater technical complexity, new consumer handsets and new spectrum allocation for initial deployment.[3] It should be noted that, consistent with this point, Hutchison is deploying a greenfields 3G network in Australia with a core infrastructure based on equipment initially developed for GSM/GPRS and updated to the 3G standard.

From the users' perspective, 3G handsets are initially dual-mode 2G and 3G so that they provide seamless handover between the two. This highlights the point that, for 2G-like services such as voice telephony and short messaging, *there is no useful*

[2] Higher data rates require the use of more timeslots, higher rate coding schemes (with an increase in error rate) or higher order modulation (known as EDGE). Each of these solutions are limited by handset support and network upgrades including distribution link capacity and base station equipment.
[3] The high cost, internationally, of such spectrum is well known and will not be addressed here, suffice it to say that delays in network equipment development, high spectrum costs and questionable market demand have significantly delayed the launch of 3G networks.

distinction between 2G and 3G. This means that, from a regulatory point of view, there are compelling technical reasons to deal with 2G-like services consistently, whether they are delivered over a 2G or 3G radio network.

That analysis suggests that there is little difference between 2G and 3G. While that is true in the medium term, it leads to two related questions: why roll out 3G at all and how might new 3G-only services emerge over the longer term.

Why does 3G use Wideband CDMA?

W-CDMA offers a number of technical advantages compared with the radio interface used in GSM but the fundamental feature of importance is that network operators are better able to make efficient use of network resources, particularly of spectrum. GSM uses Time- and Frequency- Division Multiple Access (TDMA/FDMA), in which each user is allocated a particular timeslot in a particular radio channel for transmission. By contrast, W-CDMA allocates to each user's transmission a digital code which means that the same spectrum can be used for all users and on all neighbouring base stations. It means that more can be carried on a given amount of spectrum.[4]

These improvements can offer broadband data rates to users. However, in the initial phase, the greater efficiency will provide more familiar services which compete directly with 2.5G. One reason for this is that, in many broadband applications, 3G must compete against fixed line, and 3G is at a significant cost disadvantage in that comparison. The high fixed and operating costs associated with deploying and operating a mobile network mean that 3G prices are likely to remain around 2 orders of magnitude higher than the prices of corresponding services delivered over fixed line.[5] This means that, while it is technically possible for a 3G network to deliver data at 384 kbit/s, in practice the price of such a service would be too great for it to be a service with significant demand and therefore with significant regulatory implications.

Another reason to think that 3G technologies are likely to be primarily directed to network efficiency gains with few new services in the medium term is that many potential network operators, in Australia and overseas, have legacy systems which they will take off line only progressively. In short, just because 3G can support new applications is no reason to think that it will immediately or that imminent regulatory change is required. Instead of radical, immediate change, we expect a slower emergence of 3G services. We suggest that regulators consider the evolution of 3G services over the following categories:

- **Conventional cellular applications** – "2G-like" services including voice telephony and short messaging. In this case the market for such services is

[4] Our calculations suggest that UMTS is approximately three times more efficient than GSM in terms of voice telephone lines per MHz of spectrum, with potential for significantly greater improvement.
[5] Currently, data volume charges on fixed line is around 10c per Megabyte and around $10 per Megabyte on 2.5G GPRS.

mature and well understood and the fact that a UMTS network is the delivery mechanism is largely irrelevant. The key improvement offered by UMTS is that a high-quality voice service is available (known as Wideband Adaptive Multi Rate or W-AMR).[6]

- **Emerging cellular applications** – including multimedia messaging, higher-speed data access and video telephony. In these cases there is concurrent deployment on 2.5G networks. The market for such services is developing and the potential for such services is unclear. Third generation networks are needed to widely deploy these emerging services and the primary goals of 2.5G deployment are to build market demand and, as 3G networks are rolled out, to provide interim service availability.
- **Future cellular applications**. This category refers to services which are unavailable or unviable using current 2.5G technology and which will only become apparent in a more mature 3G environment. Examples are now beginning to emerge in Japan and South Korea such as daily 10-second mini-soap video episodes.

This categorisation suggests that regulatory forbearance is required at present and we support that conclusion by responding below to the specific questions raised by the Discussion Paper. There are some additional reasons, drawn from the recent experiences of the industry in Australia and overseas, to think that will be the best approach.

Some relevant examples

Network Efficiency and New Services

We have argued that the key, initial driver for the move to UMTS is increased spectrum efficiency. In particular, mature incumbent operators in Europe see UMTS as a more cost-effective means of deploying cellular voice telephony than GSM. In this regard, the move to the new technology is similar to the upgrade of fixed-line networks from Channel Associated Signalling to Common Channel Signalling or, to use the Australian terminology, Telstra's move from the "Analogue Mode of Operation (AMO)" to the "Future Mode of Operation (FMO)". In both cases the technology upgrade could provide greater efficiency and new services and the regulatory experience of FMO suggests forbearance is appropriate in these cases.

To explain: the FMO involved the upgrade of transmission and equipment to a digital form while at the same time moving signalling from the traffic channels to a separate, common, signalling channel. The result for Telstra was substantially increased network reliability and quality and in particular improved network efficiency and security. Users perceived improved voice quality and network availability but the

[6] W-AMR is defined in the UMTS specifications: 3GPP TS 26.171, available from www.3gpp.org

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fundamental telephony service was basically unchanged. This parallels the efficiency gains available with 3G.

The FMO also enabled new services not previously available, especially through the ability of the new system to divert telephone calls. However, these new services, such as *Call Forward*, *Call Waiting* and *Voicemail*, were a by-product, not the focus, of the network upgrade. The point is that the regulatory focus was appropriately applied to the new services, ignoring the underlying raison d'etre of the new technology. In the same way, 3G technology improves network efficiency and performance. The regulatory attention should remain on the emergence and significant uptake of innovative services. While 3G remains focused on 2G-like services, no regulatory response is required other than to ensure consistent regulation of 2G-like services on 2G and 3G networks.

Incentives to Inter-connect

The history of the development of Short Messaging Service (SMS) is instructive in considering the regulatory implications of 3G and, particularly, in indicating the need for early intervention to promote 3G interconnect.

SMS was originally specified for mobile termination only. That is to say, it could only be received, not originated, by a mobile handset. Following updates to the GSM standard in 1997 (so-called "Phase 2"), mobile-originated SMS was defined and implemented. Originate SMS was not widely used until operators interconnected their networks, allowing SMS to be sent from and to any mobile network in April 2000. Following that agreement, SMS has become extremely popular and is now a major revenue source, as noted in the ACCC's discussion paper.

The success of SMS has been a lesson to the telecommunications industry. Using the Australian Communications Industry Forum (ACIF) as the negotiating mechanism, the industry came to agreement on commercial terms and this made the service attractive to users. Without inter-connect agreements, SMS would not be the profitable offering it has come to be. While there are legitimate technical and commercial issues to resolve in the interconnection of any new service, this experience shows that the industry is capable of reaching agreement and that it can be in the interest of the industry participants to do so.

The emerging Multimedia Messaging Service (MMS) allows pictures and audio to be sent and received in standard formats between mobile phones.[7] It has been deployed on 2.5G networks and is gaining popularity with users as MMS-capable handsets begin to gain market share, especially higher-end phones with cameras. The major

[7] MMS is specified in 3GPP 23.140. The standard includes support for well known multimedia formats such as JPEG and GIF image formats, MIDI and MP3 audio formats, and H.263 and MPEG-4 VLBV video formats.

network operators are promoting the service widely and supporting MMS interconnect, suggesting that participants have learned the lesson from SMS and are working together to build the market for MMS without the need for regulatory intervention at this stage.

Finally, we consider mobile video-telephony as an example of a future cellular application which has no 2G analogue. At this stage, the viability of mobile video telephony is questionable and the demand for the service is limited with consumers regarding it as experimental rather than as a "killer application".Technically, it is reasonably straight forward to interconnect the mobile video telephony service to conventional ISDN-based video conferencing systems but the demand for such interconnection is unknown at this stage. It will also be straight forward to interconnect between 3G mobile networks as new 3G networks emerge. To be clear, none of this is to suggest that industry will quickly develop interconnect agreements, nor that regulatory intervention will be required soon if the agreements are slow to emerge.

Questions raised by the ACCC Discussion Paper

1. What is the appropriate service definition for 3G mobile services?
We consider 3G to be, first and foremost, an evolution of second generation networks and applications, with the primary focus being on improving the quality and efficiency of telecommunications services. It is therefore most appropriate that 2G-like services delivered on 3G networks should be regulated in the same way as services on conventional networks. This applies particularly to voice telephony and short messaging.

Emerging 3G and 3G-like services such as Multimedia Messaging may also be delivered over 2G or 2.5G networks and these too do not provide a compelling case for 3G-specific regulation. Future services which will only be available on 3G (or at best, in very limited form on 2/2.5G) should be defined as consistently as possible with existing services. In addition, these 3G-like applications are unlikely to be used widely in the short term, so that regulatory forbearance is the most appropriate approach.

2. Are there likely to be any bottlenecks associated with the provision of 3G services?
The primary impediments to the provision of 3G services are

- unknown demand for 3G and 3G-like services
- the cost of provision, including the costs of handsets
- the lead time required for the development of applications

It is unlikely that bottlenecks comparable to Telstra's control of the local loop will emerge in the 3G environment.

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3. If the Commission were to consider declaring 3G mobile services, should the Commission declare a separate 3G service or vary the existing service description for other mobile services to include 3G mobile services?
Consistent with our claim that 3G is the same but better, it is most appropriate that 3G services be defined and regulated consistently with existing mobile services. However this approach is only applicable where there is an analogous existing service, otherwise see our comments in response to (9) below.

The issue of declaring 3G services is one which we decline to address, other than to say that 3G regulation should be an extension of whatever mechanism is used to address 2G regulation.

4. Would declaration of a 3G mobile service… be in the LTIE?
From the user perspective, technology is unimportant, it is services that matter and in this 3G currently provides nothing radically new. Hence, consistent with (3) above, regulation of conventional services delivered over a 3G system should be consistent with the conventional means of delivery.

5. Would declaration of a 3G mobile service be likely to promote competition in the market for 3G mobile and/or related services?
Consistent with (3) above, new 3G operators compete directly with existing 2G operators. At this stage, only Hutchison has launched a 3G network and other carriers with appropriate spectrum access have refrained from building 2G or 3G networks[8], implying they judge that their existing offerings provide some competitive constraint on Hutchison.[9] The existing 2G operators have access to spectrum appropriate for 3G and will launch 3G services if or when it is competitively astute.

6. Would declaration of a 3G mobile service be likely to promote any-to-any connectivity in relation to carriage services that involve communications between end-users of 3G mobile services, either in terms of making or receiving calls?
Consistent with (3) above, the core switching and packet networks of 3G systems are the same as those of 2G networks. Thus there is no technical impediment to connectivity of bearer services where interconnect is appropriate between 3G and appropriate non-3G systems – especially voice connectivity. It is in the interests of a 3G operator to support interconnectivity whenever technically and commercially feasible, as the experience of SMS suggests. Hence, the ACCC should forbear from promoting any-to-any connectivity by declaring 3G services in the medium term.

[8] Specifically AAPT in the 800MHz band and 3G Investments in the 2000MHz band. We also note the failure of One.Tel and Ozphone's decision to sell its spectrum rights to AAPT.
[9] Noting that worldwide and in Australia, the value placed on 3G spectrum by incumbents is as much about protecting market share on existing networks as it is about technological evolution.

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7. Would declaration of a 3G mobile service be likely to promote the economically efficient use of, and the economically efficient investment in, the infrastructure by which 3G mobile services are supplied?
The new 3G network in Australia is competing with existing 2G networks. The 2G operators have purchased rights to appropriate spectrum for 3G and will deploy 3G if and when it is commercially attractive to do so. There is a range of issues affecting the efficiency of use of 3G infrastructure (including the whole competition policy approach) and declaration is unlikely by itself to overcome key impediments.

8. Are there particular risks for the development and uptake of 3G services arising from vertical integration in the provision of network services, 3G applications and content services? How might these risks be reduced?
We note that existing 2G operators in Australia rely increasingly on third party service providers and that the success of 3G will rely on the development and implementation of innovative services. To this end it is in the interest of a 3G carriage service provider to make the most of non-affiliated service providers where it is appropriate.

The experience in Hong Kong, in which 30% of capacity on 3G networks is to be set aside for non-affiliated service providers, is that the only one agreement could be reached and that lasted only 6 months.[10] This suggests that prescribed, regulated access would be premature in Australia. The Hong Kong experience of excessive competition has resulted in re-organisation of the industry due to sustained, below-cost price competition. It is unclear whether this process is efficient in the long term and promotes the interests of end users.

9. Should the Commission engage in regulatory forbearance until such time as the 3G services industry is more mature?
As noted at (3) above, we note that where 3G provides an analogous service to existing technologies, the services should be regulated consistently. No new regulation should be needed initially. Where a 3G system is able to provide new services, the level of demand is currently unclear and it is most appropriate that the Commission should engage in regulatory forbearance.

10. What is the most appropriate commercial interconnection model for governing the exchange of traffic generated by 3G mobile services?
Services delivered on 3G should be regulated consistently with the their mature counterparts such as on GSM. This includes voice telephony, short messaging, multimedia messaging and low volume data traffic. New and emerging services should use the existing services as a base line. It has been shown that the industry can negotiate commercial terms for the interconnect of SMS and it is most appropriate

[10] See "Shell Mobile Hong Kong: Not a Good Location for Location-Based Services", Pyramid Research, September 5, 2002. Available at http://www.pyramidresearch.com.

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that commercial negotiation be the primary mechanism for determining the interconnect arrangements for new services, at least initially.

11. What pricing principles would be appropriate for a declared 3G mobile service, if one were to be declared?
Consistent with our perspective, it is most appropriate that 3G pricing principles should follow the same principles by which 2G services are regulated.

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