



## Mobile Services Review 2003

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Australian Competition and Consumer Commission

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## Scope of our submission

- Application of mobile services regulation to 3G services
  - Recognition of 3G as an evolution of existing systems
  - Consistency with regulation of 2G
  - Identification of 2G-like versus new services
  - Reasons justifying our position

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The purpose of our submission, and my comments today, is to put third generation mobile, or 3G, into an appropriate commercial and technical context. In reading the discussion paper I was concerned that the ACCC was putting too much emphasis on 3G being some radical new revolution, rather than an evolution of the systems currently in place. In reviewing the other written submissions, I noted with some alarm that many dismissed 3G as some immature new technology, not requiring regulation, or ignored the new services altogether.

3G is not radical, it is just an evolution of the current systems. For this reason alone, it is important that 3G be regulated as consistently as possible with the 2G systems it will eventually replace. My comments today will justify that position and highlight the regulatory implications for the ACCC and its administration of the Trade Practices Act (Part Eleven C).

I also want to emphasise that I am advocating consistency in regulation. I am not going to be drawn into the debate about whether these services should be declared, or the form of regulatory intervention.

## About CCRG

- Formed in 2002
- Based in the School of Electrical and Electronic Engineering, University of Adelaide
- Members include academics and industry professionals in
  - Engineering
  - Economics
  - Law
  - Telecommunications regulation
  - Media production

I would like to begin by briefly outlining our research group. We formed in 2002 and have our roots in the Centre for Telecommunications Information Networking (CTIN). However our focus is on the convergence of telecommunications and media and our diverse group of academics and experts reflects the need to work across specialisations. For this reason we are uniquely placed to make well-informed comments to a forum such as this.

## Our International Experience in 3G

Country	Client	Role
Australia	ACA	Manager, Standards & USO
Australia	Various spectrum holders	Consultant, 2G business case
Italy	Incumbent GSM operator	Consultant, 3G auction strategy
Hong Kong	Incumbent GSM operator	Consultant, 3G business case and licence strategy
Taiwan ROC	Incumbent GSM operator	Consultant, 3G auction strategy
Malaysia	Incumbent GSM operator	Consultant, 3G bid preparation
United States	FCC	Advisor, spectrum allocation

It is also worth making brief mention of the fact that amongst our members we have considerable experience in 3G technology, regulation, licensing, business case development and evaluation and in a number of significant markets.

## 3G - the Same, but Better

Carriage Service	2G	2.5G	3G
Voice telephony	✓	✓	✓ and Wideband
Short Messaging	✓	✓	✓
Circuit Data	9.6 kbit/s	28.8 kbit/s	64 kbit/s
Multimedia Messaging	✗	✓	✓
Packet Data	✗	62.4 kbit/s	384 kbit/s
Video Messaging	✗	✓	✓
Video telephony	✗	✗	✓

Note: Data rates quoted are currently achievable. Higher theoretical rates are often quoted but are currently unrealistic 5

The moniker “Second Generation” is an appropriate recognition of a generational change introduced by such technologies as GSM, the Global System for Mobiles. Technically, this was a transition from analogue to digital circuit-switched cellular telephony, but there was more to it than this. In Europe, GSM replaced a multitude of disparate, incompatible national standards with a unified, higher capacity system. This standard is now used in nearly 200 countries.

The term “Third Generation” is intended to signify another radical generational change. In this case, the intention was to introduce a system capable of delivering a multitude of multimedia services over a variety of carriage rates, including broadband speeds up to 2 Mbit/s. Europe adopted the term UMTS, or Universal Mobile Telephony System. The first phase of the third generation is more modest, delivering higher data rates supporting, for example, video telephony. And in the meantime, the second generation standards have been updated to increase data rates, capacity and in particular to provide packet data services. Hence, services envisioned for 3G such as the multimedia messaging service are now being delivered through interim upgrades often referred to as “2 and a half” G

## Why 3G?

- Spectrum efficiency means more capacity
    - At least 3x capacity per MHz of spectrum vs GSM
  - Data rates
    - Easy to integrate data rates up to 384kbit/s
  - Simplified network management
    - Resource management for high data rates is simpler than TDMA/FDMA systems
    - Capacity upgrade requires less planning
- ⇒ New services
- More viable because of higher data rates and improved capacity

So what does 3G offer? In fact, many of its advantages are hidden from the user. The standards and choice of technologies have resulted in three key areas. Firstly, the radio multiplexing system, Wideband CDMA, makes more efficient use of spectrum. Secondly, a family of modulation schemes have been developed which allow single user channels of different data rates up to 384kbit/s. And thirdly the difficulties of managing a multitude of disparate services at different data rates are very much simplified in a Wideband CDMA system.

There is a spin-off for the user. New services exploiting higher data rates become viable. Though it is not clear what exactly those services will be, keeping in mind that mobile data today is 100 times more expensive than fixed-line, and that ratio is likely to remain for the foreseeable future.

## Evolutionary Paths - GSM and cdma

Generation	New feature	European-centric Standard	US-centric Standard	
"2+G"	2G	Base family	GSM	IS-95A CDMA
	2G Phase 2	Higher speed circuit data	GSM - HSCSD	IS-95B (in part)
	"2.5G"	Packet Data	GSM - GPRS	IS-95B (in part)
	"2.99G"	Higher speed data modulation	GSM - EDGE*	cdma2000 1xRTT*, EV-DO*
	3G	Universal and high speed data	UMTS**	cdma2000 3xRTT*
Standards group		3GPP/ETSI	3GPP2 et al	

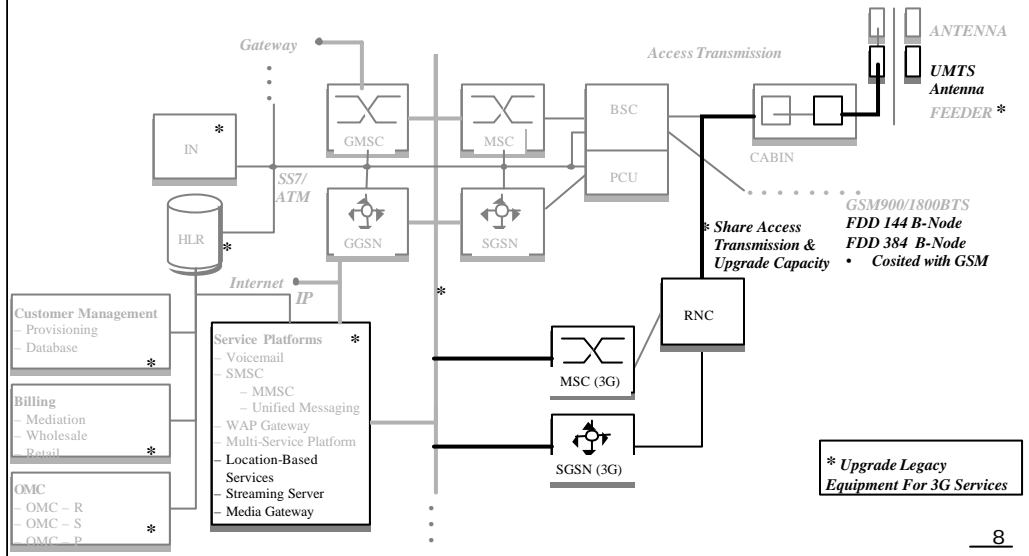
\* New radio modulation scheme interoperable with existing spectrum/modulation

\*\* Requires new radio access network. Not compatible with older handsets

In the meantime, the second generation has evolved so that 3G is not so much a revolution as a small step. This table does not do justice to the wide range of upgrades but does at least capture a snapshot of the evolution. In simplistic terms, 2.5G introduced packet-data services piggybacked onto circuit switched systems, and 2.99G is, as the name implies, almost 3G. I have included both the European and the US standards as both are in use in Australia. There are, of course, a handful of other standards around, especially in Japan and China. For the rest of this paper, I shall use the term "2+G" to describe all levels of second generation systems.

The key reasons for the incremental upgrades were to bring current systems, and the market, up to speed with the promises of 3G. So multimedia messaging is widely deployed on 2.5G, and operators are finding that there is more life in the old networks than the 3G pundits might have suggested five years ago.

## Evolution to 3G - GSM to UMTS



Just to highlight this point, this system diagram shows that the European 3G standard, UMTS, reuses the same core network as its predecessor, GSM. So the inter-network gateway is the same device. The circuit switches are the same. The packet routers are the same. The service platforms are the same. Of course, the legacy equipment must be upgraded but in doing so it will support both the new wideband CDMA radio network and the older radio network, allowing the old and the new to coexist as coverage, and users, migrate slowly to the new system.

And this brings up a second point - UMTS handsets are dual mode and operate also as GSM handsets. So Hutchison's 3 customers roam onto Vodafone's GSM network. As far as the network system, and the users are concerned, the delineation between 2G and 3G is very fuzzy indeed.



## So what is a 3G service anyway?

- Carriage services
  - Same as 2+G, with higher data rates
    - Circuit switched voice/data
    - Packet switched data
    - Short messaging and multimedia messaging
  - Exception: video telephony not available on 2+G
- Content services
  - Same as 2+G with higher data rates
    - Games, information, ring-tones etc
  - Exception: video clips (possible but less viable on 2+G)

Which brings us to the question, what is a 3G service? In terms of carriage, it is more of the same, but better. Data rates and capacity are higher. The only clear difference is videotelephony, which is simply unviable on a 2+G radio network.

Of course, a system which delivers bandwidth capable of multimedia-rich services can provide a wide range of content. But that content is already being delivered on 2+G. 3G can deliver that content in a richer form, but the service itself is just better, not distinctly different.

## Terminating and Originating Access Service, and International and Domestic Intercarrier Roaming

- 3G carriage is more of the same, but better
  - Networks will evolve and support both 2+G and 3G radio access networks, so core network does not distinguish between 2+G and 3G carriage
  - 3G handsets are dual mode, so user equipment does not distinguish between 2+G and 3G carriage

### Recommendation

- That regulation of carriage access consider 2+G and 3G networks as the same technology family

Keeping this in mind, we can only reach one conclusion - that 3G carriage regulation needs to be consistent with 2G carriage regulation. It is not my intention to discuss the merits of declaration, only to note that the same rules must apply to both 2+G and 3G.

This does not mean that Telstra and Hutchison, for example, should be treated as the same, only that there should be no significant regulatory differentiation on the basis of technology standards

## Packet versus Circuit

- Circuit and packet carriage access might have different regulatory outcomes
  - Enable different types of services
  - Have different accounting methods
  - Are negotiated separately by carriers

### Recommendations

- That regulation of packet data access consider 2+G and 3G networks as the same technology family
- However apply regulatory principles to circuit and packet carriage access separately

Let's consider the 3G case in the more general context of packet data carriage. It is important to understand that traditional, fixed line telephony has evolved in a circuit-switched environment and this approach underpinned the first generation of analogue mobile phones and indeed the beginnings of the second generation. But this has all changed because of the introduction of packet data carriage on mobile networks, so-called 2.5G. It is this development that makes Multimedia Messaging, mobile web browsing and similar services viable, not 3G itself.

So a modern mobile phone is a converged communications device, but it connects into two different backbones which are still coming to terms with convergence, namely the telecommunications and the information technology domains. These domains have very different legacies, services, standards, cost structures, accounting methods and even philosophies. So until and indeed unless there is significant convergence in these two paradigms, a one-size-fits-all regulatory outcome is unlikely to be suitable for both, even in the converged mobile environment.

Without wishing to advocate a position on whether packet data access should be declared, I would simply make the points that, firstly, consistency between 2+G and 3G is required and secondly that the very different nature of circuit and packet carriage merit separate consideration.

## Content services

- Consistency between 2+G and 3G is key
  - 2+G and 3G deliver the same types of content services
- Can only regulate carriage service, not content
  - So cannot direct content provider to provide content to specific carriers

### Recommendation

- That regulation of carriage of content services consider 2+G and 3G services as the same technology family
- Can only regulate carriage of content, not provision of content to carriers

I would also make the point that Part Eleven C of the Trade Practices Act is concerned with access to carriage services. Access means that content providers and other carriage service providers can seek access to a network. But a content provider is neither a carriage service provider nor a facilitator of carriage services. So while it may be appropriate to intervene should a content provider wish to make its content available on a particular network, the converse is outside of the jurisdiction of part XIC. That is, XIC does *not* apply should a carriage service provider seek access to particular content.

There are two points: consistency between 2+G and 3G once again, and recognition that regulation in this case is unidirectional.

## 3G-specific services

- Only one 3G specific service has been identified
  - Video telephony
- Others might arise (eventually)
  - Standardisation means proprietary protocols are unlikely

### Recommendation

- That the ACCC should maintain a watching brief on such services
  - Until the viability of 3G-specific services is shown, and competitive issues arise, no 3G-specific regulatory intervention is likely to be in LTIE

Of course, eventually, viable 3G-specific services *might* arise. These will be standards based for reasons of economies of scale.

Videotelephony is the only service offered by 3 that is not viable in some form on 2+G networks, and it is far from clear that this service is sufficiently compelling to require interconnect access at this time.

Until access issues arise that are specifically 3G related, I recommend that the ACCC simply maintain a watching brief on such services.

## Competition in 3G

- 3G spectrum is held by
  - Incumbents Telstra, Optus and Vodafone
  - New entrants Hutchison, 3G Investments, CKW Wireless
- Only Hutchison has rolled out a commercial 3G network
  - 2G Incumbents will roll out 3G networks if/when it is commercially prudent to do so
- 3G is competing with 2+G

### Recommendation

- That regulatory intervention under TPA Part XIB consider 2+G and 3G networks as the same technology family

It is also important to consider the issue of competition in 3G. There is only one commercial 3G network in Australia (Hutchison) - although Telstra is a partner in the experimental mNet 3G network in Adelaide. This does not mean to imply that Hutchison is operating in a competition vacuum. To the contrary, it is competing in the mobile telephony market directly against Telstra, Optus and Vodafone and their 2+G systems, including GSM+GPRS and cdma2000 1xRTT. The three dominant carriers have rights to appropriate spectrum for 3G and will deploy 3G carriage if and when they are ready to do so. I would also observe, based on my international experience, that the value of a 3G licence to incumbents is as much about protecting current investments and market share as deploying a new network - hardly the economically efficient outcome sought by the naive application of auctions for licence allocation. This situation has not arisen in Australia in 3G as there was more than enough spectrum to go around.

So if there are anti-competitive issues to deal with under Part B, then again it is imperative to consider 2+G and 3G in the same context

## Scope of technologies

- The regulatory outcomes for cellular telephony will be different from the appropriate regulation of
  - Satellite mobile services
  - Wireless-LAN and similar wireless data services
  - Wireless Local Loop technologies

### Recommendation

- That mobile services regulation apply only to the specific terrestrial cellular telephony systems in use in Australia, including evolutionary technologies integrated into these standards
- That the ACCC maintain a watching brief on other public wireless carriage services

I have argued that 3G and 2+G are pretty much the same animal. This implies strongly that the regulation of these should be the same. By contrast, other wireless technologies, which can offer similar services, operate in very different environments and require regulatory outcomes tailored to their context. For example, satellite mobile telephony serves a different market with a different cost structure. Wireless LAN provides a different service from telephony. And Wireless Local Loop operates in a different competitive environment from mobile. So it is important that 2+G and 3G be treated uniformly, but to lump in other wireless technologies, as a blanket technology-neutral approach would do, is naive.

## Conclusion

- This is the appropriate time to consider regulation of 3G
- In almost all cases 3G and 2+G should be treated as the same
  - Where there is no equivalent carriage service on 2+G, maintain a watching brief until matters relevant to the TPA Part XI B/C arise
- Limit scope of regulation specifically to terrestrial cellular telephony systems

To conclude, this is the time to incorporate 3G standards into regulation of the cellular telephony market. 3G is just more of the same, but better, so should be regulated in line with 2+G. Only when distinctive 3G services arise will specific 3G regulation be required, until then the ACCC should continue to monitor developments in the 3G market. And finally, I make the point that we are talking about terrestrial cellular telephony systems, and that other wireless telecommunications systems should be considered in other, appropriate, contexts.