

Submission to the Ministry of Economic Development

DIGITAL FUTURES

Planning for Digital Television and New Uses

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Mobility Matters

1. Introduction

This submission to the Ministry of Economic Development has been commissioned by Two Degrees the recent third challenger mobile operator in New Zealand. However, the views expressed in this submission are my own based on observation of the development of the New Zealand mobile telecommunications sector over twenty years and public domain information. My views do not necessarily align the views of Two Degrees who are in a position to have their own discussion with the Ministry.

My observations of the New Zealand mobile telecommunications sector include:

- As national manager of the Telstra¹ mobiles business in Australia between 1988 and 2003 I followed the series of spectrum auctions conducted in New Zealand in the late 80's and early 90's. A particular turning point for the industry at that time was the decision by TCNZ to relinquish GSM spectrum for further 'analogue' spectrum. I expand on the impact of this decision in this submission.
- After the introduction of the three GSM networks in 1993 in accordance with the Australian Government's acceptance of the recommendation of the 1989 Austel report, growing 'roaming traffic' between Australia and New Zealand increasingly converged on GSM roaming with the New Zealand GSM operator Vodafone² at the expense of TCNZ.
- In the late 90's as Director of CTIN at the University we supported clients in spectrum auctions both in Australia and overseas. In my view the policy framework and the 'PCS' spectrum auction process in New Zealand failed

¹ Telstra was at that time called Telecom Australia

² Bell South the original GSM operator was acquired by Vodafone in 1998

to increase competition and further entrenched the incumbents. I will expand on this observation in this submission.

- In 2008 I was commissioned by Two Degrees (then New Zealand Communications) to provide an expert view to the Commerce Commission at a Co-location Public Hearing on co-location issues. Again this reinforced my view that the policy and regulatory framework that impacts the telecommunications sector needs to be reviewed.
- During my review of the NZ mobile sector in 2008 I was struck by the high price of handsets and calls compared to Australia and other developed markets in the OECD. I further became aware of the 'unique' duopoly market structure in NZ that had developed where customers carried both a TCNZ D-AMPS handset AND a Vodafone handsets.

Over this twenty time frame I have developed a view that the New Zealand Telecommunications policy needs to be urgently reviewed to ensure that the opportunity [Ref 3] of the reallocation of potentially 100MHz of prime spectrum real estate to New Zealand's broadband future, rural broadband in particular is not lost. A key consideration for example is the development of a framework for the Commerce Commission and the Ministry of Economic Development to work together on any such reallocation to ensure both spectrum efficiency and competitive industry outcomes.

This view has been reinforced by my consideration of the 806-960 MHz Band Plan proposal [Ref 2] in June 2009 and my consideration of the Digital Dividend [Ref 1] that the New Zealand Government needs to urgently review the effectiveness of Government regulation with respect to the mobile communications sector of the telecommunications industry. In my view Spectrum management and competition policy with respect to the mobile communications sector need to be considered together and not in separate silos. I will make reference to how this is done in Australia between the ACMA and the ACCC.

The lessons that can be learnt from the 1990's light handed regulation in New Zealand is that:

- Government through the competition regulator has now clear evidence of the huge risk of making market dominance decisions *after* the auction process without such common measures as spectrum caps for incumbents or blocks for potential new entrants
- The need for close institutional collaboration between the spectrum regulator (eg the Ministry) and the competition regulator (eg the Commerce Commission) in the design of spectrum allocation in key industries such as telecommunications as in most developed economies
- The huge down side risks of allowing monopoly players stalling the entry of competition and stalling the evolution of the industry to worlds best practice. As an example, if one considers the pace of mobile substitution of the fixed service Australia is behind Europe but NZ is even further behind.

This submission is a brief coverage of my review of the intended directions indicated in the report as it impacts the mobile telecommunications sector. While the focus of my previous submission [Ref 2] on the 806-960 MHz band was to provide immediate certainty to the sector, for the consideration of the allocation of the 700MHz for LTE

mobile technology there is time to review the policy framework before making such allocation decisions.

2. Focus of Submission

The focus for my submission with respect to the draft report and the questions are those relevant to the future broadband telecommunications sector and do not address questions to do with spectrum bands under 700MHz.

Before addressing the questions asked in the report, the submission discusses the application context of interest to the mobile communications sector in this new potential allocation.

The questions can be considered in two groups of questions:

- Questions 4, 7 and 9 which are related to the broad band segmentation to ‘new uses’ of the band which is relevant to the broad band telecommunications segmentation
- Questions 17, 18 and 19 which consider the alignment of a ‘preferred’ band with other regions and the timing for detailed subdivision

In addition to providing answers to the six of the thirty-nine questions directly relevant to the future of the telecommunications sector, my submission will argue why the 700MHz is so important to the sector and the New Zealand economy. A study in Australia of the impact of the sector the ‘preferred’ band in Europe and Australia for LTE is still under discussion and this timing period should be used to review the current spectrum allocation process. This submission will expand on my observations of the current process over ten years to support the argument for a review.

Further, the 700MHz spectrum for potential mobile broadband use cannot be viewed in isolation from the other cellular bands that make up the spectrum asset for each operator. For example an operator will likely need to have access to the other higher frequency bands such as that at 1.8GHz to be able to offer broadband mobile service covering the more dense city usage as well as rural coverage where frequencies below 1GHz such as 700MHz are valuable. As discussed in Section 4, while 2 Degrees can now deliver a GSM based service, it is severely constrained to be able to transition its customers from 2G to 3G with its limited spectrum holdings.

3. Digital Dividend and LTE

Following on from the development of 3G technology that initially was designed for voice plus some data operating at the 3G spectrum at 2.1GHz. Since then the industry developed HSPA technology which while maintaining the priority for voice services, has dramatically increased the data throughput to achieve several tens of Mbit/s to support a growth in mobile broadband. In addition, since 2006 when Telstra launched its NextG™ 3G/HSPA network at 850 MHz (the AMPS band) all operators around the world are progressively offering 3G/HSPA at 900MHz (the GSM band).

In Australia, over 65% of all new services are now 3G and this trend will continue so that operators need to ‘transition’ their customer base from the 2G base (ie either GSM or D-AMPS) to 3G and to do that they need sufficient spectrum. In addition to

meet demand in the city they need more spectrum above 1 GHz (eg 1.8GHz and above) and more below 1GHz for rural coverage. It is that context with an ever-growing demand for mobile broadband with greater speeds coupled with greater effective coverage the availability of new spectrum at 700/800 MHz is very attractive.

Reference to the Ericsson White paper on LTE [Ref 5] shows the original LTE bands 5, 6 and 8 for LTE below 1GHz using FDD with 45MHz duplex spacing that allow deployment in either the GSM spectrum or AMPS spectrum. In addition to bands 1,2,3, 4, 7,10 and 11 above 1GHz. In addition LTE offers a TDD option well suited to even higher speed data and several bands were identified. The United States was the first to open up the Digital Dividend spectrum for auction in 2007 and since that time four more bands 12, 13, 14 and 17 have been identified for LTE application in the United States again using FDD but with a reduced 30MHz duplex spacing.

The European Digital Dividend spectrum for potential LTE application is still being finalised but at this stage is from 790MHz to 862MHz that overlaps the AMPSA band. Similarly Australia is still finalising the rechannelisation but has a similar objective to New Zealand to be able to access the best of both.

The discussion illustrates the need to consider the re-allocation of some 100MHz of the Digital Dividend Spectrum to the mobile broadband demand in a way that recognises:

- The total spectrum for the sector and the holdings of operators
- The competition impacts of spectrum bottle necks
- International development and supply of equipment
- The integration of the considerations of competition policy in auction design

And given the importance of this spectrum to the industry, I am concerned that from my observations of the market in past discussed in the next section that the dominant players will constrain any new entrant without appropriate intervention.

4. Observations over Ten Years - New Zealand Mobiles Sector and Spectrum

This section expands on my early summary observations over ten years of the impact of the New Zealand policy/regulatory regime that has in my view not been as successful for NZ customers and for the overall economy as it could have been.

Back in the early 90's New Zealand was the first country to employ spectrum auctions to assign spectrum management rights. In the auction of the spectrum of major use for mobile communications, the AMPSB spectrum and three blocks of GSM spectrum were auctioned and TCNZ won the AMPSB spectrum and one of the GSM bands. Bell South won one of the other GSM bands. The Commerce Commission *after the auction* ruled TCNZ could only retain one of the two blocks and TCNZ chose to retain the AMPSB spectrum and relinquish the GSM block. As a result TCNZ could expand its AMPS network more cost effectively and then transition to the D-AMPS digital technology whereas Bell South rolled out a GSM

network just as Australia was rolling out GSM by Telstra³ along with the two new competitors⁴ Optus and Vodafone.

While this decision was prudent at the time, it has proved to be a costly strategic error by TCNZ at the time given the decision by Australia to go GSM and the increasing dominance of the GSM technology worldwide. Only in 2009 when TCNZ introduced its new 3G/HSPDA network at 850MHz (ie the AMPS band) like Telstra had done in Australia in 2006 with NextGTM could TCNZ recover its strategic position. Meanwhile 2 Degrees which acquired assorted spectrum back in 2001 was only able to launch a third mobile network in 2009 only after intervention by the Commerce Commission to force exchange of spectrum lots with the two mobile incumbents TCNZ and Vodafone!

In 2008 I was asked by 2 Degrees (then New Zealand Communications) to make a submission and appear before the Commission at a workshop to resolve the supposed 'technical difficulties' of TCNZ and Vodafone to co-locating many of its antennae as required under the 2001 Act. In contrast in Australia and the UK, co-location is common practice and has been progressively increased through the 1990's to the point that separate companies (eg Crown Castle) manage the sites for multiple operators.

These observations are consistent with my view that the current 'silos' of spectrum management and competition policy are having a damaging effect on the industry, mobile customers and the NZ economy. A study conducted in Australia [Ref 4] estimated that the mobile sector contributed 0.62% of GDP. The advent of significant spectrum at 700MHz becoming available over the next few years for mobile broadband particularly for rural application mean a review of this flawed policy/regulatory framework is essential. The fact there is now a third player in 2009 can be traced back to 1999 when after a court ruling led to the Ministry offering the Maori people some discounted spectrum lots which has evolved into the third player but only after Government intervention in the spectrum renewal of the incumbents to swap spectrum lots!

In my view the role of Government policy and regulation is to assure the long-term interests of the users and the sequence of decisions made within two distinct silos cannot reasonably be argued to have achieved that objective and are unlikely to do so going forward. I would ask the Ministry to reflect on the failure of the spectrum allocation process over the past ten years to facilitate the entry of competition in the mobile communications sector until 2009 some ten years after there was the opportunity to do so.

5. Overall Spectrum Policy as it impacts the mobile communications sector?

In my view the current dominant duopoly mobile communications sector is a result of a succession of policy failures from the early 1990s that failed to recognise the crucial role spectrum management policy plays in assuring a sustainable competitive

³ Telstra was then called Telecom Australia

⁴ Australia used an administrative spectrum allocation process to divide the the GSM spectrum amongst the three competitors.

dynamic in the sector. The policy in New Zealand of spectrum management by the Economic Development Ministry independent of Competition Policy by the Commerce Commission has failed the mobile communications sector and New Zealand mobile consumers. The Ministry policy review paper of 2005 [Ref 2] in my view is very sparse on understanding of the mobile communications sector and how the mobile market in NZ has been severely damaged by this lack of consideration in the past. I summary these mobile industry characteristics which are very different from other markets in the OECD are:

- Some of the highest prices of calls and handsets in the OECD
- High differential between on-net and off-net tariffs that attempt ‘customer lock in’
- A structural duopoly that has fractured the user community by geography as well as other segments
- Effective gaming of the regulator till recently to block the entry of the third competitor

While New Zealand led the world in 1990 with the implementation of a spectrum management rights regime and the use of spectrum auctions where demand exceeded supply there was inadequate spectrum planning involving the consideration of competition issues or sustainable economies of scale considerations. What evolved in New Zealand was a duopoly on two different mobile technology evolution standards, AMPS by TCNZ and GSM by Vodafone⁵ The important observation is that the Spectrum Management policy showed little understand of the connection between spectrum and global technology standards and little regard to the potential market implications for further possible competition over time. The spectrum holdings of Telecom New Zealand and Vodafone are huge by international standards particularly for a small national dispersed market.

In an earlier submission [Ref 2] I drew on the example of the long drawn out spectrum allocation process in the mobile sector. Two Degrees entered the New Zealand Market as Econet in 2001 and only now in 2009 is in a position to offer a third network. The relative mobile spectrum holdings of the three players are shown Table 1.

Mobile Band	TCNZ	Vodafone	Two Degrees
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⁵ Vodafone acquired the Bell South mobile business in 1998

AMPS – 3G at 850 band	15MHz	0	6 MHz ⁶
GSM 900 band	0	15MHz	10MHz
GSM 1800 band	25MHz	15MHz	10MHz
3G 1.8GHz band	15MHz	15MHz	0
Total Useful Spectrum	55MHz	45MHz	20MHz⁷

Table 1 – Mobile Spectrum Holdings

<http://www.rsm.govt.nz/cms/licensing/register-of-radio-frequencies>

Two Degrees while now having sufficient spectrum for its GSM network, with 50% less spectrum⁸ compared to TCNZ and Vodafone this could mean higher capital costs and a constraint on potential market share. Further 2 Degrees will need to invest in 3G/HSPDA at 900MHz given the transition of the market to 3G by the end of 2008 and unlike TCNZ and Vodafone have limited spectrum to manage this transition as mentioned earlier.

It could be argued that New Zealand through the lack of consideration of future possible competition put too much spectrum⁹ on the market that unnecessarily limited the potential for a third competitor other than through the highly interventionist policy between 2006 and 2009 during the licence renewal process [Ref 3] which has finally enabled 2 Degrees sufficient spectrum to start a network. This might have been possible eight years earlier!

<http://www.beehive.govt.nz/release/government+improves+mobile+infrastructure>

In Australia, the spectrum regulator is the ACMA¹⁰ and in the cases where demand exceeds supply, a spectrum licence is declared and a spectrum-marketing plan is developed in consultation with industry and the ACCC that considers competition issues. The ACMA and the ACCC have cross Board representation to ensure the balance of spectrum management and competition impacts are considered. No such formal systemic collaboration is apparent in the NZ regime.

5 Answers to the selected Questions raised in the Report

In this section of my submission, I will cover the identified nine questions that relate to the spectrum for potential application for wireless broadband.

While not envisaging any specific requirements by Maori interests for Question 21, it is instructive to remember that the belated inclusion of Maori interests in 1999 provided the narrow ray of light for what has evolved into the third mobile competitor 2 Degrees.

Broadly, questions 4,7 and 9 are questions as to the broad segmentation of the band for new uses that is the area of focus for my submission.

⁶ This 6MHz held by Two Degrees is not useful to them because it is in the AMPS band and is not paired!

⁷ This total of useful spectrum does not include the 6MHz in the AMPS band

⁸ This depends on how one weights the utility of the 3 bands

⁹ The amount of spectrum put up for auction was high by international comparisons taking into account population density in NZ.

¹⁰ The ACMA was formed from the ACA that had earlier in 1997 combined the SMA with the technical regulation component of Austel.

In relation to Question 4 asking whether approximately a third should be allocated nationally, this seems about right given:

- The United States has allocated some 102 MHz to this application
- The organization AMTA in Australia is calling for an allocation of 100MHz for mobile telecommunications
- Europe has suggested only 72MHz for mobile broadband and it has been noted that Europe is at a significant spectrum disadvantage in not being able access some 100MHz

Question 4

I agree the Ministry should consider approximately 100MHz of the band for allocation for new uses on a nationwide basis.

The mobile broadband market using 3G HSPDA technology around the world in developed markets has accelerated over the last 18 months and is increasing the demand for more spectrum. While the allocation of 2.6GHz spectrum in the cities will help, the availability of spectrum below 1 GHz will be essential to allow mobile broadband access in rural areas such as in New Zealand and Australia.

Telstra in Australia has been very successful with its deployment of 3G (including HSPDA) at 850MHz from 2006 and TCNZ has started its 3G-HSPDA network in 2009 at 850MHz transiting its D-AMPS customers within the band. Vodafone and other GSM operators are following suite with the roll out of 3G/HSPDA at 900MHz transiting their customer base within the 900MHz band.

Question 7

A significant part of the band above 700MHz should be identified for the allocation for the telecommunications sector and recommend the allocation of management rights by market mechanisms but in consultation with the Commerce Commission to develop a competition framework.

It is recognised by world wide that the availability of new spectrum is the only time in practice to potentially allow new competition as well as meet demand for new services. New Zealand to date has not benefited to the degree possible in the past.

Question 9

I agree the spectrum above 700MHz should be identified for the application of new uses such as LTE for the telecommunications sector.

Given the likely band of interest for LTE by the Telecommunications sector is above 700MHz (eg >704MHz in the USA) establishing a lower limit is sensible.

Question 17

I agree that preferred band limit be established at 694MHz which will allow protection for the upper band and not defer allocations below 694MHz.

In relation to the preferred band, the divergence of the spectrum allocations for Europe and the United States **again** impacts the decision in smaller economies like Australia and New Zealand who where possible allow both technology alignments to be possible.

Question 18

No I don't agree **at this time** to align the New Zealand technical planning on spectrum allocations of the United States. It is too early to make such a decision given the need to consider the other spectrum allocations internationally and Australia in particular.

Discussion in Section 3 on how LTE as a potential pre-4G technology has evolved since the first phase using current band plans (eg 45MHz duplex spacing) to the second phase developments as a result of the United States Digital Dividend band plans (eg 30MHz duplex spacing) are a reason for caution in doing detailed technical subdivision too early ahead of clear international trends.

Question 19

I agree that detailed technical subdivision of the released nationwide spectrum be deferred until international trends (eg Australia, Europe, China) are likely to be resolved by 2011.

Note the brief discussion at the introduction to Section 5.

Question 21

No specific requirements by Maori interests for potential uses but I recommend learning from history.

A critical success factor for the mobile communications industry has been and will continue to be the 'handset ecosystem' that fuels the cycle of demand and the achievement of economies of scale. This issue is critical for smaller markets like Australia and New Zealand that need to take advantage of the global technology standards development and avoid as far as possible technology stranding.

5 Summary

This submission has provided my view on six of the questions in the Ministry report relevant to the reallocation of spectrum for mobile broadband noting in particular the Ministry needs to be careful not to define detailed subdivision of the 700MHz band in line with the United States before the plans of countries of Australia and Europe are clearer.

However, even more importantly, the available time before these decisions have to be made presents an urgent opportunity to review the policy/regulatory framework of the roles of the Ministry and the Commerce Commission to ensure a competitive mobile communications sector as well as efficient spectrum allocation.

My key recommendations to the Ministry in relation to the reallocation of the Digital Dividend Spectrum is to:

- Thoroughly review the Digital TV transition strategies in the key markets of Europe and the USA as well as Australia and the implication for potential spectrum channelisation for the mobile communications sector
- Work with the Commerce Commission to review the structural aspects of the mobile communications sector to inform strategies for future spectrum channelisation for the mobile communications sector
- Jointly with the Commerce Commission recommend to the Government an effective institutional process for more integrated consideration of spectrum allocation

6 References

- [1] DIGITAL FUTURES Planning for Digital Television and New Uses, A Discussion Paper, Ministry of Economic Development, August 2009
- [2] Submission to the Ministry of Economic Development on the 806-960 MHz Band Replanning Options – Plan, Professor Reg Coutts, 30th June 2009
- [3] Getting the most out of the digital dividend in Australia, a report by Venture Consulting commissioned by the Australian Mobile Telecommunications Association (AMTA), April 2009
www.gsmworld.com/documents/SVP_Australia_report.pdf
- [4] Australian Mobile Telecommunications Industry: Economic significance and contribution, a report by Access Economics for the Australian Mobile Telecommunications Association, June 2008
- [5] LTE – an introduction, White Paper published by Ericsson, June 2009
- [6] Five-year Spectrum Outlook 2009-2014, AMTA response to the Australian Communications and Media Authority (ACMA) Consultation, 31st July 2008

Attachment 1 – Expertise of Professor Reg Coutts BSc, BE(Hons), PhD, SMIEEE, FIEAust, FACS, MAICD

Career History

- After 17 years in Telstra from 1976 till 1993, including executive roles, Dr Coutts was appointed to the Chair in Telecommunications at the University of Adelaide in 1993. Professor Coutts left the University at the end of 2003 as Emeritus Professor to establish his own company Coutts Communications Pty Ltd www.couttscommunications.com, which provides strategic advice to government and industry both in Australia and overseas. Over the last five years Reg has written papers on 4G and articles on WiMAX and Telstra's 3G strategy (see www.couttscommunications.com) and served on the Government's NBN Expert Panel which recommended the broad policy for the future Broadband Network announced on April 7th 2009.

Particular areas of relevant recent experience as Coutts Communications are:

- 2008 Reg was appointed by the Australian Government to the NBN Expert panel to advise them on the award of \$4.7 billion to roll out a FTN broadband network for Australia. Also in 2008 Reg is an expert witness to the Phuong Ngo enquiry in NSW about the use in evidence of cell phone location data
- Reg was contracted in 2007 by the Australian economic regulator the ACCC to advise on the likely comparative capabilities of WiMAX and 3G HSPA technology platforms to provide fixed wireless broadband in Australia.
- In early 2007 Reg was contracted by the Department of Foreign Affairs and Trade (DFAT) through the Institute for International Economics and Market www.iiebl.adelaide.edu.au to develop and present a workshop on Liberalisation of Telecommunications for Chinese officials negotiating a Free Trade Agreement (FTA) between Australia and with the purpose of including a specific Chapter on Telecommunications. A particular interest by the MII (the regulator in China) was the issue of various 3G developments.
- Reg has provided expert advice both in Australia and overseas on ICT technology innovations. In 2006 has provided expert advice to British Telecom (BT) in the UK on patent issues regarding on early telephone billing technology.
- In 2005 provided strategic advice to the Board of a growing ambitious ISP/carrier reviewing their technology strategy that incorporated deployment of broadband wireless technology in unlicensed spectrum for customer access, the use of Soft Switch technology and VoIP.
- In 2004 conducted a series of pilot interviews for the Cooperative Research Centre's (CRC) Smart Internet 2010 project looking at issues relating to the future of the Internet from the user's perspective including spam, digital rights management, the trade-off between cost and quality, fixed and mobile access to the internet and the impact of other applications using IP including NGNs and VoIP.
- Since 2003 Reg has actively participated in APEC TEL that meets twice per year to advance telecommunications liberalisation in the APEC economies.

The University of Adelaide

In 1993, Reg was appointed to the foundation Chair of Telecommunications. Professor Coutts also was Director of a new centre, the Centre for Telecommunications Information Networking (CTIN) also located at the University of Adelaide. CTIN became a key centre for research, training and business consultancy in telecommunications in Australia and the region. Its scope covered wireless technologies, regulatory issues and the global wireless communications market where the strategy was to link specific technical research with economic/marketing factors as they might impact industry structure and business competitiveness. In addition, Professor Coutts lead a number of broader initiatives to build the university's links to industry and Government. He was also Coordinator for the Smart Internet Technology CRC and Director, Technology Strategy for m.Net Corporation.

Telstra

In July 1988, Reg joined the commercial arm of Telecom Australia at the formation of the Mobile Communications Business Unit, where he was charged with responsibility for steering the technology and regulatory direction of the business. In this capacity, he directed the deregulatory process underway to minimise the erosion of business in the emerging competition environment. To this end, he became actively involved in the development of the new competitive, regulatory framework, especially for the Mobile Communications Industry in Australia. Reg had responsibility for negotiations with the Government on spectrum issues, the industry regulator on competition issues and managing overall business development including research and development investment. During this time, several new businesses including the current GSM network were launched and a number of innovative service features were made available. The Mobiles Business Unit R&D budget alone was in excess of \$11 million.

Prior to this, Reg had joined the Telstra Research Laboratories and led research teams doing pioneering research into high capacity digital microwave systems and later into the emerging mobile communication technologies. In 1982, he became Head of the Radio and Satellite Systems Section in its Research Laboratories and, from this date, he deepened his involvement in the broader telecommunications industry issues. In 1984, he was seconded to the Federal Government's Australian Science and Technology Council (ASTECC) to assist in its review of Research and Development in Telecommunications in Australia.

As head of the Radio and Satellite Systems Section, Dr Coutts transitioned the expertise of the section from digital radio to the study of future digital mobile technology, which lead to Dr Coutts participating in the first meeting in Canada by the ITU in 1986 to consider a third generation mobile technology now referred to as "3G". His involvement in this development by the ITU continued up until 1992, when spectrum was designated for this new technology.

Education

Reg holds a BSc, BE (Hons) and PhD degrees from the University of Adelaide and is a Fellow of the Australian Institute of Engineers (IEAust), a Senior Member of the American Institute of Electrical and Electronic Engineering (SMIEEE) and a Fellow of the Australian Computer Society (FACS). He is also a member of the Australian Institute of Company Directors. (MAICD)

Industry and Professional Leadership

In early 2006 Professor Reg Coutts became Chairman of the Telecommunications Society of Australia (TSA) www.tsa.org.au. During 2006 through to 2008 under Reg's leadership the TSA has been progressively merged within the Australian Computer Society (ACS) www.acs.org.au in recognition of the converging industry. Reg is Director of the ACS Telecommunications Board and is also the Chair of the SA ACS Committee.

In mid 2009 Professor Coutts having served on a number of Boards previously undertook the Australian Institute of Company Directors (AICD) course.

