

**RADIO SPECTRUM  
MANAGEMENT**



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# Radiocommunications History in New Zealand

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**MINISTRY OF BUSINESS,  
INNOVATION & EMPLOYMENT**  
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## Introduction

This document has been compiled from many sources, both public and private, including the Internet. It makes no claim to originality, accuracy or completeness of the subject matter concerned.

It aims to expand on the more concise history of radiocommunications detailed on this webpage.

## The early history of radio

In 1865 a Scottish physicist, Maxwell, demonstrated mathematically the theory of electromagnetic energy. This was confirmed in 1888 when Heinrich Hertz (pictured, right), a German, caused an electrical discharge between two metal balls spaced very close together. Hertz's achievement was to project the charge from the space between the balls across a distance of some feet to detection apparatus consisting of a wire loop with a similar gap. Hertz had demonstrated the ability to convert electricity into another form, electromagnetic energy, which could be conducted over distance without wires. This energy came to be known as radio waves, Hertzian waves or simply wireless<sup>1</sup>.



Many others contributed to the improvement of transmission and reception devices<sup>2</sup>, including New Zealander Ernest Rutherford who, in **1894**, developed a more sensitive receiver known as a magnetic detector for radio waves.



It was left to a 21 year old Italian - Irishman Guglielmo Marconi (pictured, left) to realise the communication possibilities of artificially generated radio wave energy<sup>3</sup>. In **1895** he experimented on the family farm near Bologna with a home - made transmitter and receiver and, most importantly, added a telegraph Morse key. With this primitive equipment he managed to send the letter 'S' in Morse over a distance of three kilometres. The Italian Minister for Post and Telegraph declared that the new technology had no potential for communication purposes so Marconi took his ideas and equipment to England where the British Government backed his work. In **1899** he sent a message across the English Channel, and by **1901** he had spanned the Atlantic. The technology was primitive and the concept of frequency management as a means of enabling simultaneous radiocommunications was still largely unrealised.

## Government monopoly

The first official mention of radio in New Zealand is a 17 October **1902** notification to mariners of a list of stations established by the *Marconi Wireless Telegraph Company*, albeit there were none in the southern hemisphere, let alone New Zealand. Nevertheless the New Zealand Government was reputedly first in the world to take control of the use of the new technology by way of the New Zealand Wireless Telegraphy Act **1903**<sup>4</sup>. In essence only the Government was permitted to receive and transmit wireless communications and anyone else who did so without permission was liable to a £500 fine and confiscation of equipment. As Albert Pitt, the Attorney-General, stated to Parliament at the time

"The whole principle of the Bill is that the Government intend to acquire a monopoly of this system in the colony".

One of the main concerns, as outlined by the Postmaster-General of the day, was that the new wireless telegraphy technology might render the wired telegraphy network obsolete and thereby deprive the Government of revenue.

The first public demonstration of radio in New Zealand was given by the Marconi Company at the **1906** Christchurch International Exhibition. The military and maritime potential of radio was spurred by the Radio-telegraph Convention signed at Berlin on 3 November **1906**, which the New Zealand Government ratified the following year. The first message by wireless from New Zealand to another country was sent on 3 February **1908** from Sir Joseph Ward on board the HMS Pioneer berthed at Wellington. The message was relayed by the HMS Powerful in the Tasman Sea to the HMS Psyche berthed at Sydney.

In **1909** an Australasian Telegraph Conference was held in Melbourne and this led to a New Zealand Government decision to establish a number of marine radio coast stations at Auckland (ZLD), Wellington (ZLW) and the Chatham Islands (ZLC)<sup>5</sup>.

The first station, a 2.5 kilowatt 'spark' transmitter, opened on 26 July **1911** and operated from a tower at the General Post Office in Wellington<sup>6</sup>. In October of that year<sup>7</sup> the station was transferred to Mount Etako (also known as Mt Wakefield and latterly as Tinakori Hill) where it provided a wireless telegraph service to ships within a 600 mile radius. Two high-power stations with a range of 1250 miles were also planned, one at Awanui (ZLA) in the north and the other at Awarua (ZLB) near Bluff<sup>8</sup>.

The frequency of early radio transmitters and receivers was not able to be controlled to any significant degree, thus only one wireless communication at a time could take place in any given geographical area. With the tragic circumstances surrounding the loss of the Titanic in **1912**<sup>9</sup>, it was realised that a management framework for radio transmission and reception was necessary to ensure the potential of the technology could be realised. Although the upper range of frequencies suitable for wireless communication was unknown, the concept gradually emerged of the radio spectrum<sup>10</sup> as a public and economic resource, and licensing (the generation of radio waves) as a management tool for the prevention of radio interference.

Government regulation of the transmission of radio waves thus had a two-fold purpose - to protect Government revenue (by ensuring there was a Government monopoly on telecommunications), and to organise and allocate frequencies to prevent interference. While the first objective disappeared with the progressive deregulation of New Zealand telecommunications in the 1980's, spectrum management, albeit within a market allocation framework since 1990, has become increasingly important in maximising the societal benefits and commercial opportunities of radiocommunication technologies.

## Development of broadcasting

By **1907** the work of two men, John Fleming and Lee De Forest (pictured), had resulted in the development of a device to amplify and detect weak electrical signals - the vacuum tube (or valve as it was also known). This laid the foundation for radio-telephony and De Forest was quick to see the opportunities. His diary records the following comments



"My present task is to distribute sweet melody broadcast over the city and sea ..... someday the news and even advertising will be sent out over the wireless telephone"<sup>11</sup>.

Both radio telegraphy and radio telephony were used during World War I, but the military were slow to relinquish their hold on it for civilian applications. Even home construction of radio receivers was made difficult because valves were not freely available. It wasn't until the Post and Telegraph Amendment Act of **1920** that provision was made to licence receivers independent of transmitters, and this set the scene for broadcasting as we know it.

In **1921** a Wellington businessman, Charles Forrest, began transmitting gramophone recordings from a room in the Hope Gibbons building. Although he had no formal permit or licence he had a verbal understanding with the Chief Telegraph Engineer such that whenever his transmissions were causing reception problems at the nearby marine radio station, he would cease until the ship-to-shore communication was concluded. Professor Robert Jack of Otago University became the first licensed broadcaster when, on 17 November **1921**, he transmitted the first of a series of concerts that included live music and gramophone recordings. His transmissions were heard as far afield as Auckland.

In July **1922** a radio station commenced, in Wellington, which was licensed to operate on a wavelength of 275 metres (~1000 kHz). The operators were even invited by the P & T to broadcast the 1922 election results. In **1923** the Government decided to promote private



broadcasting and regulations were introduced which divided the country into regions, specified frequencies and transmitters powers, but banned advertising. The first station licensed under the new regulations was 1YA in Auckland (pictured). A licence, costing 5 shillings, was required to receive broadcast transmissions, and applicants had to supply a character reference and proof of British nationality.

Space does not permit a history of broadcasting in New Zealand, suffice to say that private broadcast stations (known as the 'B stations') flourished during the 1920's and 1930's. However the Broadcasting Act 1936 established state broadcasting under a new Government department, the National Broadcasting Service (NBS) and by the beginning of World War II all but two of the private stations had been purchased by the Government. Radio, and eventually television, broadcasting was largely to be the preserve of the Government for many years to come.

## Telecommunications

The early development of the use of radio grew out of the experimentation of radio amateurs (known as 'radio hams'). They pushed the boundaries of both the technology and its applications, especially in the use of the higher 'short wave' frequencies (3 - 30 MHz). In **1927** this lead was taken over by the Government when a short-wave radio-telegraph link was established with Apia by the Department of External Affairs. The service was extended to Rarotonga in May **1930**.

Also in **1930** voice telephony equipment was added to the short-wave transmitter installed at Wellington Radio. A public radio-telephone service was opened between New Zealand and Australia on 25 November **1930**; and in July **1931** this service was linked with the Australia to UK service. A high - speed radiotelegraph service to San Francisco commenced in **1942**.

World War II saw the development of new technologies such as radar which now have wide application in navigation and weather prediction. Interest in the short-range communication possibilities of Very High Frequencies (30 - 300 MHz) intensified. Traffic Officers had two-way VHF radios installed in their vehicles and the Police established a one-way broadcast system in Auckland and Wellington in **1946**. This was expanded in **1949** to a 2-way VHF system operating at 40 MHz. Around the same time the Post and Telegraph Department<sup>12</sup> was establishing VHF radio toll circuits across Cook Strait.

Commercial mobile radiotelephone services, aimed at taxis and delivery firms and the like, were also installed providing wide area coverage through VHF 'repeater' stations located on prominent hilltops. During the **1950's** the first microwave bearer links were established in the North Island. In **1965** the first commercial HF radio circuits to Antarctica (Scott Base) were established at Wellington Radio<sup>13</sup>.

While the NZPO had a monopoly<sup>14</sup> on the provision of commercial mobile services, some private services were licensed. These were often in rural areas where it was not considered viable for the NZPO to establish a service. One of the few significant departures to the NZPO monopoly was the establishment, in October **1969**, of a microwave network operating in the 2GHz band for the purpose of reticulating state-owned television services.

## International communication links

Until the first telegraph cable was laid between Australia (Botany Bay) and New Zealand (Cable Bay near Nelson) in **1876**, shipping provided the only means of international communication. The cable also provided an onward link to the UK - at a cost of 15 shillings a word!

In **1965** the first global telecommunication satellite network, INTELSAT, came into being. It was essentially a geopolitical initiative of the USA that has since grown into a system of 14 satellites and over 100 member states, including New Zealand. Access to international communication services was managed by the NZPO through its INTELSAT earth station at Warkworth for more than 20 years. This largely consisted of NZPO telephone traffic, and news and event feeds for public broadcasters. In the words of an INTELSAT official it:

"was built around a fundamental concern of sovereign[nations] to control foreign communications in the interest of their national security".

The policy of protecting INTELSAT is often defended by an appeal to global egalitarianism. Small, developing nations are supposed to gain from a single-system approach to international

satellite communications. With the global telecommunication reforms of the last decade however the role of the organisation is being reviewed<sup>15</sup>.

## Spectrum management framework

Up to **1987** spectrum management in New Zealand evolved, as in many other economies, as a centralised, administered system. Under NZPO administration, frequency bands were allocated to services mainly in accordance with ITU recommendations<sup>16</sup> and considering the frequency range of available transmitting and receiving equipment. Channelling plans and technical standards<sup>17</sup> were determined, albeit with limited private sector input, and made publicly available. These spectrum planning decisions were largely based on technical efficiency and ITU provisions, rather than economic criteria.

Provided the NZPO monopoly on provision of telecommunication services was not compromised, radio licences<sup>18</sup> were granted, essentially on a 'first-come-first-served basis'<sup>19</sup>. Annual licence fees were adjusted to recover licensing administration costs, including interference management and ITU membership. While a licence could, in theory, be revoked at any time or not offered for renewal by the NZPO, this was a rare occurrence. There was a general public acceptance however, although not explicitly documented, that services might need to be relocated from time to time to alternative frequencies to make way for new services or technology developments. While no direct compensation was provided, long transition periods and other technical arrangements were usually employed to maximise the economic life of existing equipment investment. The clearance of 94 - 100 MHz of land mobile services, beginning in the **1970**'s to provide for the introduction of FM broadcasting, was a notable example of this policy.

On 1 April **1987** the NZPO was split into three state-owned businesses (SOE's) and the regulatory functions, including radio spectrum management, were transferred to the Department of Trade and Industry (DTI)<sup>20</sup>, and administered under the Telecommunications Act **1987**. New regulations were passed in late **1987**<sup>21</sup> that, while continuing the Telecom monopoly<sup>22</sup>, for the first time prescribed criteria that the Secretary of Trade and Industry was required to have regard to when considering whether or not to grant radio licences<sup>23</sup>. These were:

- a. International agreements (eg the ITU)
- b. The "public interest in achieving the maximum benefit from the radio spectrum"
- c. Technical compatibility of equipment
- d. Government policies for broadcasting and telecommunications.

## Deregulation

Late in **1987** a report<sup>24</sup> by the Business Roundtable recommended substantial reform of telecommunications. In essence it proposed that the monopoly of the new SOE, Telecom Corporation of New Zealand (TCNZ), should be removed with competition regulation by a body such as the Commerce Commission. The report also recommended the introduction of "a system for allocating and pricing the radio frequency system on a competitive tendering basis"<sup>25</sup>.

On 17 December **1987** the Hon R. W. Prebble, Minister of State-Owned Enterprises, released a Government Economic Statement which, in a section entitled Deregulation of the Telecommunications Industry, stated "the Government has decided to remove the statutory prohibition on competition with Telecom's network with effect from late 1988 or the start of **1989**". The paper went on to say "The Government recognises that the radio frequency spectrum can play a major role in developing an efficient telecommunications market. The Government has instructed officials to report in **1988** on policy options available to make the best use of the spectrum".

Early in **1988** the DTI commissioned a report<sup>26</sup> that surveyed economic literature on radio spectrum management. In particular, material on the economic theory of spectrum property rights (Coase) and a specification for such rights (de Vany et al) were explored. While promoting the concept of TAS<sup>27</sup> units, de Vany et al acknowledged that rights could be defined with an emphasis on either flexibility or certainty. They suggested that economic efficiency implied that one chooses between alternative property right specifications so as to maximise the aggregate value of resources to users, net of aggregate transaction costs (negotiation on externalities, monitoring and enforcement). It was their view that narrowly restricted rights are easier to enforce but usually have a lower value. On the other hand highly flexible rights, while adaptive to changing markets and technology and thus more valuable, are likely to have higher transaction costs - especially given the range of externalities applying to interference management in radiocommunications.

In specific response to the Government Policy Statement, the DTI next commissioned a substantive study. The underlying objectives of the study, as specified in the terms of reference, were:

- i. To maximise economic efficiency in usage of the spectrum within New Zealand
- ii. To examine the scope for achieving a financial return to the Crown
- iii. To evaluate and recommend practical and equitable options for implementation of an allocation and management regime

Speaking at a TUANZ conference in August **1988** on the forthcoming deregulation of telecommunications and broadcasting, a senior DTI official commented on competition and spectrum issues:

'New Zealand's approach will be to rely primarily on our competition law to discourage our dominant operator, Telecom, from anti-competitive behaviour, particularly in setting the terms and conditions for interconnection to its bearer networks. The Government's view is that, on one hand, industry-specific rules, and regulatory authorities, have inherent disadvantages, and on the other that our competition law is robust and effective'.



'Until the consultants' study is completed at the end of October, and the Government has had time to reflect on it and make decisions, we are not going to be able to inform you exactly how frequencies will be allocated in the deregulated environment. The issues involved are particularly complex involving difficult economic, engineering and legal issues. We are pioneering in this area, and have few overseas precedents to guide us. Almost certainly however you can expect that the Government will want to move away from the present system of first-come first-served administrative allocation, which cannot cope with the deregulated environment, to some sort of market based system.'

## The NERA report

The contract was won by NERA who noted that the imminent "deregulation of the telecommunications and broadcasting industries on 1 April 1989, and future growth in demand for spectrum will mean that [the DTI] will increasingly have to make choices between competing uses and users of spectrum"<sup>28</sup>. The NERA report went on to analyse the costs and benefits of spectrum regulation versus spectrum markets.

NERA noted that:

"a markets most conspicuous advantage is that decentralisation allows those parties who have the most information, the individual users, to make the decisions."

More cautiously though NERA also observed that:

"A market in itself does not solve the potential problem of dominant suppliers of downstream services hoarding spectrum in order to prevent the development of competition.....ultimately, the success of the market will depend on the strength of competition law and other appropriate measures to prevent abuse of a dominant position in spectrum ownership."<sup>29</sup>

In addition to advocating market allocation of spectrum, the NERA report went on to propose a:

"system of spectrum management and allocation based on tradable spectrum rights, that is, designed to take advantage of market mechanisms wherever there is good reason to consider that the resultant efficiency gains will be significantly greater than any potential increase in administration, transaction, and enforcement costs."<sup>30</sup>

NERA proposed a new regime comprising nationwide spectrum bands (for flexibility), and spectrum products<sup>31</sup> (for certainty). The owners of nationwide frequency bands should be able to create spectrum products for specific frequencies within their bands and allocate them to whomsoever the owner wished. NERA envisaged that commercially used spectrum would eventually transition, by way of auctions, from public sector to private sector management over a period of time. Public sector management, either under administrative licensing or spectrum rights, should continue wherever deemed necessary to meet public policy objectives or international treaty requirements.

Within this broad framework NERA made 20 specific proposals, the key ones summarised as follows:

- i. Auction bands - Spectrum bands for auction should be chosen to reflect existing New Zealand allocations and future demand. Where bands are characterised by local use (eg FM broadcasting and mobile radio) spectrum products<sup>32</sup> should be planned to reflect known local demand.
- ii. Duration of rights - On economic grounds alone, spectrum rights should be granted in perpetuity although the efficiency loss associated with fixed period rights is likely to be small if rights for future periods are issued well in advance of the termination of existing rights. If the Government chooses to issue fixed period rights these should take the form of 20 year rights with new rights issued, via an auction, no fewer than 5 years in advance of the time they take effect.
- iii. Legal definition - There should be a registration system similar to a land registry.
- iv. Internationally determined distribution - Where spectrum is allocated by international agreement<sup>33</sup>, the Ministry of Commerce (or other Government administered agencies) should continue to plan and administer the bands concerned.
- v. Lawful interference - Where two (or more) right holders exercise their rights in accordance with their respective licences and create unexpected interference, the parties should negotiate a solution to the problem with the costs being borne equally by the parties involved. If there is no technical solution, 'first-in-time' rules should apply.
- vi. Unlawful interference - In cases where a party is acting unlawfully, that is transmitting other than in accordance with a licence, adjudication should be by the courts alone.
- vii. Enforcement role for Ministry - The Ministry should continue to have a role, either directly or by agency authorisation, in the protection of small spectrum users - for example the detection and resolution of broadcast interference. The enforcement of electromagnetic compatibility (EMC) requirements and international spectrum agreements are other appropriate roles.
- viii. Anti-competitive behaviour - There is a potential for some organisations to 'dominate the spectrum market and hence stifle competition in the main downstream markets of telecommunications and broadcasting'. Three proposals were made to mitigate this possibility:
  - a. apply an 'essential facilities' doctrine to spectrum property rights
  - b. limit the amount and nature of rights that may be acquired by any one organisation at auction
  - c. the sale of spectrum product licences to facilitate access to spectrum by small users, or to avoid monopoly power (such as might occur with the auction of the VHFTV spectrum bands used by TV1, TV2 and TV3).

## Spectrum rights legislation

Cabinet considered the NERA report at its meeting on 12 December **1988**<sup>34</sup> and agreed to adopt in principle a spectrum management regime providing for 'a mixture of administered licences<sup>35</sup> and the creation of property rights in the form of both spectrum products<sup>36</sup> and spectrum bands<sup>37</sup> enforceable by statute'. Drafting priority was given for a Radiocommunications Bill, reflecting the NERA recommendations, to come into effect on 1 April **1989**. Cabinet also decided, as a matter of policy, that the Crown should retain spectrum bands and products "to enable social defence and security obligations to be met, with an administered licence and pre-determined resource cost being charged".

In introducing the Radiocommunications Bill in August **1989**, the Rt. Hon. Jonathan Hunt Minister of Broadcasting stated<sup>38</sup>:

'The Government's decision to permit competition in telecommunication network services was implemented on 1 April this year by the Telecommunications Amendment Act **1988**. Major changes to the structure of broadcasting were implemented under the BCNZ restructuring legislation enacted late last year, and the Broadcasting Act 1989, which came into force on 1 July. These reforms, as foreshadowed in the Government's announcements last year, and during the passage of the amendments to the telecommunications and broadcasting legislation, also require the reform of the present legislative management regime for radio spectrum.'

The Bill closely followed the NERA recommendations however a 20 year maximum term, rather than rights in perpetuity, was implemented, and no industry-specific competition measures were adopted<sup>39</sup>.

The Bill made no specific spectrum provisions to meet the requirements of public safety and security services, public broadcasting, Maori broadcasting or other social policy objectives. Rather, Government decided that these were matters best taken into account at the time when decisions are made to create spectrum rights over particular bands. This flexible approach was considered more appropriate to avoid such services being restricted to particular frequencies or constrained by 'sunset' technologies.

While the Bill did not specify any particular allocation process an owner of a management right must use, the Government had already signalled that, as the initial owner of all management rights, it intended to adopt the 2nd price, sealed bid tender method. This was with some opposition and subsequent auctions based on this method were subject to criticism<sup>40</sup>.

With the earlier abolition of the Broadcasting Tribunal there was no mechanism for allocating radio and television broadcasting licences. Following the Bill's enactment by Parliament on 19 December **1989**, a media statement was released the next day which stated:

"Mr Hunt said that it would take time to bring radio frequencies for all telecommunication and broadcasting services under the new legal rights regime, but that priority would be given to new broadcasting spectrum. Tenders for UHF [television] frequencies are to be called shortly by the Secretary of Commerce. Expressions of interest for FM and AM sound radio broadcasting frequencies will be evaluated by the Ministry of Commerce in the new year."

## First auction

During the months preceding the coming into force of the Radiocommunications Act **1989**, the Ministry of Commerce had been evaluating public submissions in regard to UHF television, and engineering auction lots accordingly. This enabled the first call for bids to tender for spectrum licences to be released just three days following the passage of the legislation<sup>41</sup>. Sky Network Television, a pay-TV company, had constructed a transmission network and was anxious for the tender to commence as soon as possible. In keeping with the recommendations of NERA, seven lots were configured as nationwide networks<sup>42</sup> while the balance of the lots were individual licences. Sky won four of the nationwide network lots. Not all UHF television spectrum was offered for auction however. A block of frequencies was retained to meet future requirements for non-commercial broadcasting and the promotion of Māori language and culture.

By the time the results of the first auction were announced<sup>43</sup>, planning was already well advanced for two further auctions. The first of these was, primarily, the auction of management rights for cellular services. Telecom already had incumbency rights to one of the two AMPS cellular bands and, after various legal actions following the auction, was allowed to uplift the management rights to the other. BellSouth and Telstra each acquired the management rights over a GSM44 cellular band in the same auction. Full details of the various auctions conducted by the Ministry over the decade **1989 - 1999** are available from this website.

## Māori claims

The second auction called in **1990** was for AM and FM radio broadcasting licences. This led to a request for an urgent hearing by the Waitangi Tribunal of two claims before it<sup>45</sup>. The claimants maintained that the number of frequencies, especially FM, the Government proposed to reserve for promotion of Māori language and culture through broadcasting were inadequate. The Tribunal recommended postponement of the auction however this was refused by the Government. The claimants commenced action in the High Court and on 21 September **1990** and Justice Heron declared that the Crown should postpone the auction for six weeks. This was appealed to the Court of Appeal in October. The majority of the Court found that the Minister could not reasonably have decided to proceed with the auction without first awaiting the report of the Waitangi Tribunal<sup>46</sup>.

A general election was held in 1990 and the new Minister of Communications, the Hon. Maurice Williamson, issued this media release on 18 December **1990**:

"The tender had been delayed since September as a result of a declaration in the High Court that the Government should consider the Waitangi Tribunal's recommendations before proceeding further. A key recommendation of the Tribunal had been that the Government provide FM frequencies for Māori broadcasters in Auckland and Wellington. 'The Government has now considered the Tribunal's report. Its decision is that the AM/FM tender should proceed,' Mr Williamson said. 'Notwithstanding this decision, I am satisfied that an FM frequency or frequencies giving reasonable coverage to Māoridom could be engineered for Wellington, and possibly for Auckland as well'."

Although the auction proceeded, further FM frequencies were reserved nationwide for promotion of Māori language and culture.

## Review of the Radiocommunications Act

In **1991** the new Government emphasised its policy for telecommunications with the following statement<sup>47</sup>:

"The objective of the New Zealand Government is efficient markets in telecommunications goods and services. To this end, the Government has adopted policies and promoted statutory measures to facilitate competitive entry into those markets and to maintain the conditions for effective competition."

In April **1994** the Ministry of Commerce released a public discussion paper<sup>48</sup> on the Radiocommunications Act and the Government policies relating to its use. The principal purpose was to examine

'the effectiveness of the provisions and mechanisms of the Act in enabling the economic and social benefits from the use of the radio spectrum to be maximised'<sup>49</sup>.

The paper posed a number of key questions:

- a. Does the Act define property rights in a way which facilitates the most efficient use of the radio spectrum?
- b. Is interference managed in a way which produces the most efficient outcomes?
- c. Should the Act expressly address the issue of Crown allocation decisions?
- d. What is the best option for promoting competition in markets for radiocommunication services?
- e. What is the most effective and efficient approach to the registration of rights under the Act?
- f. What is the best approach to the regulation of privacy in radiocommunications?

Over the next 18 months the Ministry received and evaluated public submissions and held two workshops<sup>50</sup>. Aside from the substantive issue of the administrative framework for spectrum rights, submissions and discussions covered a range of other issues. These were summarised in a further public document published by the Ministry of Commerce in December 1995<sup>51</sup>. Key issues addressed were:

### **Term of Rights<sup>52</sup>**

The report concluded that there is no compelling reason for rights to be limited to a maximum of 20 years<sup>53</sup>. Further, it was stated that 'rights of indefinite length are more likely to enhance the value of the spectrum over time, and would obviate the need to resolve difficult succession questions in future.'

### **Competition Safeguards<sup>54</sup>**

The report concluded that no amendments to the Radiocommunications Act were necessary to restrict the amount of spectrum any one firm could acquire at auction.

Such provisions could easily be included in auction rules. The report also concluded that:

"Any consideration of the threshold for assessing dominance under the Commerce Act is best undertaken in the context of the Commerce Act, and not separately for radiocommunications. The Ministry is not convinced that the characteristics of radiocommunications are such as to warrant individual treatment. In any case, such

matters concern the Commerce Act directly and they are therefore outside the scope of this review".

The issue of 'use-or-lose' was reconsidered<sup>55</sup>. While seemingly attractive in principle to prevent the hoarding of spectrum for anti-competitive purposes, the practical problems of defining, monitoring and enforcing such provisions were considered to be significant. The report also concluded that use-or-lose 'would impose barriers to new market entrants and thus be counter-productive to their purpose.'

### **Allocation Methodology<sup>56</sup>**

The costs and benefits of sealed bid tenders, open cry auctions and variations thereof were explored. Recent developments in the USA with 'multiple round, ascending bid' (MRAB) auctions led to the conclusion that 'there is no need, in the Ministry's view, to deal with methods of auctioning in the Act. The most appropriate method to auction spectrum can be decided by the government at the time.'

### **Non-Commercial and Māori Broadcasting<sup>57</sup>**

Although the Government policy objectives for non-commercial and Māori broadcasting were outside the scope of the Act and the review, difficulties with administrative processes relating to licensing of such services were addressed, particularly in terms of caveats and contracts restricting sale or transfer. The report concluded that proposed new provisions for amend, cancel and transfer authorities to be included in licences<sup>58</sup>, would also significantly improve the administration of non-commercial and Māori broadcasting licences, without compromising the intent of the established policy.

## **Radiocommunications Amendment Bill**

On 27 May 1996 Cabinet agreed<sup>59</sup> to Ministry of Commerce proposals for a Radiocommunications Amendment Bill. The Bill would:

- a. Remove the 20 year restriction on the duration of management rights.
- b. Adopt changes to improve the technical definition of rights including:
  - i. Flexibility in the spectrum licence format to permit wider technology and service choices
  - ii. Revised requirements for licence engineering and certification
  - iii. Provide for amend, cancel and transfer authorities in a licence
  - iv. Combine into a single publicly accessible register, records of administrative licences and spectrum rights
- c. Allow a succeeding management right to be created prior to the expiry of an existing right in order to facilitate its transfer at expiry.
- d. Provide a new procedure for interference resolution based on compulsory adjudication.
- e. Make the obligation on right holders to comply with the international radio regulations more specific.
- f. Transfer the provisions relating to privacy of radiocommunications from regulations to the Act and make them subject to an offence.

g. Adopt changes dealing with administrative licensing, including the capacity to licence the use of frequencies rather than apparatus.

h. Repeal spent provisions.

The Bill was duly drafted and approved for introduction by Cabinet on 8 December 1997<sup>60</sup>.

## Further Māori claims

One submission to the Select Committee on the Radiocommunication Bill maintained that the Act should be 'consistent with the principles of the Treaty of Waitangi and with the Treaty itself'<sup>61</sup>. In particular the submission claimed that removal of the 20 year cap on management rights would prejudice Māori claims to rangatiratanga over radio frequency spectrum. Partly in response to these views the Committee amended the bill to retain the status quo that is the retention of the 20 year cap. This was the only substantial change made to the bill by the Committee when it tabled its report to Parliament on 27 August 1998.

Following the announcement by Government of a further auction of frequencies in the 2GHz band, a claim in respect of Māori rights to management and development of the radio spectrum was lodged on 8 March 1999<sup>62</sup> and the auction was deferred pending a substantive hearing. The Waitangi Tribunal released its final findings and recommendations on 1 July 1999<sup>63</sup> with a split decision but a majority finding that:

- The claimants would be prejudiced if the 2 GHz auction were to proceed and should be suspended until a fair and equitable portion of spectrum rights (that is the radio to generate radio waves) are reserved for Māori.
- The Radiocommunications Act 1989 is in breach of the Treaty in that it permits alienation of spectrum rights without consultation with Māori, or without allowing Māori a fair and equitable share of those rights.

The minority finding was that:

- The right to generate radio waves was not protected by the Treaty
- The Crown had breached its obligation to protect Maori language and culture and that the measures taken by the Crown to remedy the decline of the Māori language were insufficient.
- It would be an improper use of the Treaty to address the problem of language decline by providing spectrum rights to Māori, however a portion of the proceeds of the 2 GHz auction should be applied to promoting Māori language and culture.

The Government considered the report of the Tribunal but declined to accept that the generation of radio waves for communication purposes was a taonga under Article II of the Treaty, that Treaty principles required spectrum rights to be allocated to Māori, or that the Radiocommunications Act was in breach of the Treaty<sup>64</sup>. The Minister of Communications, the Hon. Maurice Williamson, announced the 2GHz auction would therefore proceed. The Government did agree, however, to make an additional \$15M of funding available for the promotion of Māori language and culture.

## Passage of Amendment Bill and 2GHz auction

A Labour-Alliance coalition Government was elected in November **1999**. While the new Government upheld the previous National Government decision in regard to the WAI 776 claim, it also reserved one '3G' block of 2GHz band spectrum for Māori economic development purposes. The Radiocommunications Amendment Act **2000** received the Royal Assent on 7 April 2000, and the 2GHz auction concluded in February **2001**. New Radiocommunications Regulations, to support the provisions of the amendment act were made by Order-In-Council on 10 September 2001.



## Appendix A

### Extracts from the proceedings of the New Zealand Parliament on the Wireless Telegraphy Act 1903

**The Hon. Mr Pitt** - Sir, the object of this Bill is to provide protection to the Government in case the Marconi system should be introduced into New Zealand. The State has taken to itself protection in the matter of electric lines and telephones, and it is thought proper to be in time in securing for the State similar protection [for wireless telegraphy], and not to wait until some company or individual may have acquired vested interests in respect of it.

We know that the question of electricity is a very important one, and the Government are moving in the direction of conserving rights in reference to the motive power obtainable from the rivers of the colony, and there can be no question that the Government are doing well in asking for the protection which is embodied in the provisions of this Bill.....

The whole principle of the Bill is that the Government intend to acquire a monopoly of the system, just in the same way as has been done in regard to telegraph-lines and telephones.

The opposition, however, made a case for allowing private use of the technology that did not threaten Government revenue:

**The Hon. Mr A Lee Smith** ... I would like to ask ... whether consideration has not been given also to development of scientific enterprise here ... I know of a young man of a scientific turn of mind who is making experiments in the direction of developing the Marconi system, and also another system, the technical name of which I forget, and he has so far succeeded that he can communicate with his family to a distance of about two miles.... Take a large station in the country, for instance, where there are two houses say 20 miles from each other. What a great advantage it would be to the owner if he could by means of wireless telegraphy communicate from one place to another... This is just one of those things which shows the progressive spirit on the part of the British people with regard to new enterprises.

The debate then went on to focus on why the Government should have a monopoly on any telephone or telegraph system, whether or not it was wireless:

**Sir W.R. Russell** ... could not conceive any Department [Post and Telegraph] .... should be so guilty of the enormities which had been perpetrated in the matter of telephones. To run a private telephone the Government demanded the payment of two pounds....In [my] neighbourhood in Hawkes Bay you could see a trimmed totara tree with a single wire running upon it, and alongside there was a private telephone with a post not half the size of the post of the Government telephone, and the private telephone-post carried six wires... The Bill would prevent private persons from being able to take advantage of modern inventions and compel them to depend upon a Government Department....

**The Right Hon. Mr Seddon** ... If the British Government thought it necessary to send a communication ... to this colony... then our Government should do its duty to the Colony and to the Empire as well. [You] have been treating this question of wireless telegraphy just as though it were telephone lines... and if honourable members cannot

discern the difference between a telephone line... and wireless telegraphy, with all its potentialities, then I am sorry for you!

The issue of interception of messages intended for someone else also came under scrutiny:

**Hon Sir J G Ward** ... If the honourable member would read up the records of the Marconi system he would find that Marconi himself admits that he has not yet solved the difficulty of preventing wireless messages from being intercepted by any other station before reaching their destination. If, therefore, private people in this colony were allowed to establish Marconi receivers, the contents of messages sent by this system could be intercepted, and the contents of them could be known to those for whom they were not intended, and that would destroy the value of the system.

There was also a less than perfect understanding of radio wave propagation but we must remember the embryonic nature of wireless technology which was almost beyond concept to most persons of the day:

**The Right Hon. Mr Seddon** ... Under the Marconi system one of the difficulties is that the messages cannot be transmitted in a direct line from station to station. They went in circles, and the circumference of the circles was not under special control, because it was subject to atmospheric conditions – winds and other things - so that if a Marconi message was going to any point in the Colony, or from the Colony, it would not go in a direct line but in a series of circles. It would therefore surely be seen that if private people were allowed to establish stations ... many of these Marconigrams would be intercepted and never reach their proper destination...

The colony of New Zealand owned the telegraph system and had installed it at a very heavy cost indeed. They were also interested in the Pacific cable, and in the event of the Marconi system becoming perfected so as to be brought into general use in the colony, the State, and the State alone, ought to control it for public purposes.

# Wireless Telegraphy Act 1903



ANNO TERTIO

EDWARDI VII. REGIS.

No. 11.

ANALYSIS.

- |  |  |
|--|--|
| <p>Title.<br/>1. Short Title.<br/>2. Wireless telegraph stations may be established.</p> | <p>3. Application of "The Electric Lines Act, 1894."<br/>4. Penalty for unlawfully establishing station.</p> |
|--|--|

An Act to provide for the Establishment and Control of Stations for the Purpose of Wireless Telegraphy.

BE IT ENACTED by the General Assembly of New Zealand in Parliament assembled, and by the authority of the same, as follows:—

1. The Short Title of this Act is "The Wireless Telegraphy Act, 1903"; and it shall form part of and be read together with "The Electric Lines Act, 1894."

2. The Governor may from time to time establish stations for the purpose of receiving and transmitting telegraph messages within New Zealand or between New Zealand and parts beyond New Zealand by what is commonly known as "wireless telegraphy," including in that expression every method of transmitting messages by electricity otherwise than by wires, whether such method is in use at the time of the passing of this Act or is hereafter discovered or applied.

3. The provisions of Part I. of "The Electric Lines Act, 1894," shall, so far as applicable, mutatis mutandis, apply to stations established under this Act, and to communications by wireless telegraphy.

4. Every person who erects, constructs, or establishes any station of wire for the purpose of receiving or transmitting communications by wireless telegraphy without having first obtained the consent of the Governor in Council is liable to a penalty not exceeding five hundred pounds, and any plant, machinery, instruments, and material used by him for such purpose may be forfeited and dealt with as the Commissioner directs.

Examined and certified:

*L. Stowe*  
Clerk of Parliaments.

In the name and on behalf of His Majesty I hereby assent to this Act this twenty-sixth day of September, 1903.

*George*  
Governor.

# Appendix B

## Footnotes

1 Radio waves were also known as airwaves because it was originally thought that air molecules conducted radio energy, or in other words radio waves could not propagate in a vacuum. Although this was proved incorrect, and satellite and spacecraft radiocommunication today confirms it, the term remains in common use.

2 Righi (Italian), Lodge (English), Branly (French) and Popov (Russian)

3 Naturally occurring radio wave energy, such as that emitted by stars and other objects in the universe, has no known utility for communication purposes.

4 See Appendix A for an extract of Hansard relating to the passage of this Act.

5 Opened 18 September 1913.

6 The first Australian coast radio station opened in Melbourne on 8 February 1912.

7 The Auckland station at Musick Point opened at this time.

8 Both opened 18 December 1913. Awanui closed on 10 February 1930.

9 A wireless-equipped ship, the Californian, was only 10 miles away but the sole wireless operator had gone to bed and there was no international agreement for radio watch-keeping and frequencies of operation.

10 The range of frequencies of electromagnetic energy capable of sustaining radiocommunications.

11 The Radio Years - A History Of broadcasting In New Zealand, Patrick Day, Auckland University Press 1994, ISBN 1 86940 094 1.

12 The Post and Telegraph Department became the New Zealand Post Office in 1959.

13 Later transferred to Himitangi (transmit) and Makara (receive).

14 Consolidated under the Post Office Act 1989. Regulation 31 of the Radio Regulations 1970 reads 'Except with the authority of the Minister a radio station shall not be used in any way to compete with Government communication services, and shall not transmit or receive any radiocommunications the transmission or reception of which is calculated in the judgement of the Minister to cause a loss of revenue to the Post Office'.

15 An 'Office of Signatory Affairs' within TCNZ now facilitates access to INTELSAT services for a wide range of users and uses.

16 The International Telecommunications Union (ITU) had its foundation in 1865 with the electric telegraph and later encompassed radio. New Zealand became a member of the ITU on 3 June 1878.

17 Based on considerations such as co-channel and adjacent channel interference probability, propagation, receiver characteristics etc.

18 Also known as apparatus licences or radio apparatus licences.

19 Where broadcasting was concerned a warrant from the Broadcasting Tribunal was necessary before the NZPO would grant a licence.

- 20 Later to become the Ministry of Commerce.
- 21 The Radio Regulations 1987; 1987/412, 17 December 1987.
- 22 The prerequisite for a warrant, where broadcasting was concerned, was also retained.
- 23 Regulation 13.
- 24 'Telecommunications in New Zealand - The Case For Reform', New Zealand Business Roundtable, November 1987.
- 25 Page 98.
- 26 'The Economics of Radio Spectrum Management', Dr John Fountain, ISBN 0-477-05961-9.
- 27 Time (term of rights), Area (geographical boundary) and Spectrum (range of frequencies).
- 28 'Management of the Radio Frequency Spectrum in New Zealand', National Economic Research Associates (NERA), November 1988
- 29 page 81 NERA report
- 30 page 3 NERA report
- 31 defined in terms of location, power, frequency, antenna etc
- 32 'If bands are only sold on a nationwide basis, however, the initial purchase of spectrum may be beyond the reach of many local end users, who will be obliged to acquire spectrum from the new nationwide bandowners. To the extent that this causes problems of monopoly exploitation by band owners or results in very thin markets, one might wish to have some spectrum available on a local basis.' (NERA page 8).
- 34 CM 88/47/39 refers.
- 35 More commonly referred to as apparatus licences and now known as radio licences.
- 36 Now known as spectrum licences.
- 37 Now known as management rights.
- 38 1st Reading 17/8/89 (Hansard Vol 500, 12027-12047); referred to Planning and Development Committee 5/12/89 (Vol 503, 14080-14090); 2nd Reading 5/12/89 (Vol 503, 14090-14113); Committee Stage 12/12/89 (Vol 504, 14468-14473); 3<sup>rd</sup> Reading 12/12/89 (Vol 504, 14473-14479).
- 39 Under clause 125 of the Bill, spectrum rights were deemed to be assets employed in connection with a business for the purposes of s47(1)(c) of the Commerce Act 1986.
- 40 Some years later the allocation process was changed to a 1st price sealed bid and, latterly, to a multiple-round ascending-bid auction.
- 41 Friday, 22 December 1989
- 42 Each lot was a package of some 30 licences
- 43 A significant number of licences were won by Sky Network television Ltd who proposed providing a new pay-tv service.
- 44 At the time of the auction an analogue technology, known as TACS, was still the primary application overseas however this technology was never implemented in New Zealand. BellSouth established service with the new digital GSM technology.

45 WAI 150 and WAI 26 respectively.

46 Summarised from section 2.2 of the Waitangi Tribunal WAI 776 'The radio spectrum management and development final report', 28 June 1999.

47 Reference CAB (91) M 51/32.

48 'Radiocommunications Act Review Discussion Paper'; Ministry of Commerce, April 1994, ISBN 0 478 002785.

49 Chapter 1, Page 3.

50 July and October 1995.

51 'Radiocommunications Act Review: Preliminary Conclusions'; December 1995 ISBN 0-478-003110.

52 Chapter 5, Page 42.

53 Radiocommunications Act s34g.

54 Chapter 7, pages 67 - 79.

55 The proposal was first discussed, and rejected, during the Select Committee hearings in 1989 on the Radiocommunications Bill.

56 Chapter 8, pages 85 - 92.

57 Chapter 12, pages 106 - 109.

58 discussed in Chapter 5 .

59 CAB(96) M 19/19A refers.

60 CAB (97) M 46/11H refers.

61 Submission 14, Whatarangi Winiata.

62 WAI 776.

63 'The Radio Spectrum Management and Development Final Report'

64 CAB (99) M26/14 refer