

**DISCUSSION DOCUMENT**

**PROPOSED AUCTION OF  
SPECTRUM RIGHTS FOR WLL,  
LMDS & CELLULAR SERVICES**

Radio Spectrum and Broadcasting Policy Group  
Resources and Networks Branch  
Ministry of Economic Development  
WELLINGTON

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## Introduction

1 Since 1989 the Ministry has created management rights with 20 year terms in a number of radio frequency bands. Where there is no specific policy reason for management rights to be held by the Crown they have been allocated by tender or auction. Rightholders are then able to create licences as they see fit.

2 The most recent auction was for spectrum in the 2 GHz frequency band. The Ministry has also had requests for access to other frequency bands for telecommunications purposes. The frequency bands in question are:

- 3.4-3.6 GHz, suitable for Wireless Local Loop (WLL) applications;
- 24.5-26.4 GHz, suitable for Local Multipoint Distribution Services (LMDS);
- 890-900 MHz suitable for cellular purposes (this band could be paired with spectrum at 845 MHz for DAMPS/CDMA services or with spectrum at 935 MHz for GSM services).

3 It is proposed to allocate these frequency bands by auction. The auction would be held in the first half of 2002.

### Summary of Issues

4 The proposed auction raises seven main issues:

- i *Should management rights in the WLL, LMDS, and 800-900 MHz frequency bands be auctioned?*
- ii *Should these management rights be included in a single auction that is expected to be held in the first half of 2002?*
- iii *Should all of the available bands be allocated at this time, and if spectrum is retained for geographic licensing of particular uses, how should any retained spectrum be managed?*
- iv *Would the spectrum be useful for promoting Maori language and culture and, if so, how, and to what extent, should the Crown retain spectrum for this purpose?*
- v *Should acquisition limits be imposed on one or more of the frequency bands proposed for auction?*
- vi *What are the best ways of arranging management rights or auction rules to maximise potential use of the 890-900 MHz band, while guarding against any potential interference susceptibility of equipment?*
- vii *What expiry dates are appropriate for any management rights auctioned in the 800-900 MHz bands?*

5 The Ministry is seeking comments on these issues and on specific proposals, which are explained in the following pages.

## **Frequency Bands**

### **3.4-3.6 GHz (WLL)**

6 In late 2000, the Ministry published an Engineering Considerations Document (ECD) for the band 3.4-3.6 GHz. This ECD ascertained the preferred technical subdivision of the band for WLL purposes and determined any necessary sharing with other services. Up to 11 paired blocks, each of 7 MHz bandwidth, are potentially available (see Appendix 1).

### **24.5-26.4 GHz (LMDS)**

7 The 24.5-26.4 GHz band has also been the subject of a Ministry ECD. This band is adjacent to other bands suitable for LMDS use allocated by auction in February 1998. The ECD proposed a technical plan for creating further management rights based on a European plan. Up to five paired blocks, each of 168 MHz bandwidth, are potentially available (see Appendix 2).

### **890–900 MHz (and Associated Paired Spectrum)**

8 Management rights already exist for the band 890-900 MHz band (and the associated GSM pair at 935–945 MHz). Parts of these bands were used for GSM cellular services in the early 1990's but, following some interference, the usage was relocated to higher bands. Similar interference effects were experienced in Australia. The 890-900 MHz band was left as a "guardband" and is held by the Crown. Management rights can also be readily created for the band 845-849 MHz (the associated pair if AMPS/CDMA use is envisaged). Possible uses for the 890-900 MHz frequency band therefore include both GSM and AMPS/CDMA technologies. Some new cellular technologies have been introduced to New Zealand since 1994 and the Ministry has recently investigated the technical compatibility of the various cellular systems operated in the 890–900 MHz band. Some cellular use of the 800-900 MHz frequency band is now considered to be possible. Recent investigations are available from the Ministry web site <http://www.med.govt.nz/rsm/publications/dps/gsm-a-finalreport.pdf>

9 The Ministry recognises that existing services in the adjacent frequency bands will limit a new management rightholder's ability to create and certify licences. The extent of actual usage will depend upon the nature of the technology adopted and whether special filters are used to protect receivers from out-of-band transmissions. At this stage it is considered that a manager could use at least 50% of the 890-900 MHz band with very few constraints. The constraint on usage is effectively applied through the process of creating licences under the Radiocommunications Act 1989. Licences are required to be certified as being technically compatible with other existing services by an approved radio engineer. The Chief Executive of the Ministry also has the statutory power to develop a Reference Standard to apply when certifying any licences in these bands.

## **Other Spectrum Rights**

10 A single unpaired management right for the frequency range 1785-1805 MHz (recorded on the Register of Radio Frequencies as Management Right No 78) was not sold in the recent 2 GHz auction. It is proposed to include this spectrum in the auction with the other management rights.

## **Background**

11 A Ministry discussion paper published in May 1998, *DP 11: A Spectrum Allocation Strategy*, identified a draft auction schedule in which auctioning spectrum for digital television services and VHF-FM sound broadcasting would follow the 2 GHz auction. The 2 GHz auction has now been completed and is now being reviewed so as to improve the implementation of future auctions.

12 Before any spectrum for digital television or VHF-FM sound broadcasting can be allocated, it is necessary to finalise policies on the expiry of spectrum rights, including existing rights used for these two services. The Government has also not yet confirmed reservations of spectrum for non-commercial VHF-FM sound broadcasting. The policies and technical details of licences for digital television services and VHF-FM sound broadcasting are expected to be finalised by early 2002. The auction of spectrum for WLL, LMDS and cellular services could therefore take place before the allocation of the broadcasting spectrum is ready to commence.

13 The Ministry considers that management rights can be created (where necessary) in the WLL, LMDS and 800-900 MHz frequency bands, and then allocated by auction. Allocating management rights for these bands is considered to be better than allocating either apparatus or spectrum licences because it enables services to be developed without the need for ongoing Ministry intervention. Allocating management rights also provides maximum certainty for potential users of the bands. It is also consistent with previous allocations of spectrum for these types of uses.

## **Key Issues**

### **Auction Content**

*Should management rights in the WLL, LMDS, and 800-900 MHz frequency bands be auctioned?*

14 The Ministry wants to ensure that spectrum it manages or administers can be used as soon as it is needed. In addition, it wishes to ensure maximise certainty for users. The use of management rights is seen as providing appropriate legal certainty for a future manager. An auction would allocate the spectrum to those who value it the most, and so achieve an economically efficient outcome. The management rights regime allows an efficient allocation to be maintained through the ability to trade in the rights.

15 Any allocation by auction should minimise future transaction costs. For this reason, comments are sought on pairing frequency bands and specifying initial band edge conditions.

*Comment is invited on:*

- 1.1 *Whether the WLL bands at 3.4 GHz should be auctioned as paired bands;*
- 1.2 *Whether the LMDS bands at 24.5 GHz should be auctioned as paired bands;*
- 1.3 *What band edge conditions (protection limits, adjacent frequency emission limits) are necessary to accommodate likely uses of the 3.4 GHz and 24.5 GHz frequency bands;*
- 1.4 *Whether there are other frequency bands that should also be considered for inclusion in an auction; and*
- 1.5 *Whether there are specific reasons for not allocating particular parts of the proposed frequency bands (note that the issues concerning spectrum at 800-900 MHz are also discussed later).*

### **Auction Process and Timing**

*Should these management rights be included in a single auction that is expected to be held in the early part of 2002?*

16 In general, it is considered better to auction spectrum suitable for broadly comparable uses at the same time. This allows bidders the flexibility to adopt strategies based on market values as they emerge through the auction. The Ministry recognises, however, that this may place added demands upon bidders if the auction is prolonged, with interest being confined to a small group of auction lots. Alternative procedures might involve two or more distinct auctions at the same time, or one after the other. The frequency bands proposed for auction comprise a relatively small number of unencumbered management rights. A single auction for these particular frequency bands is therefore favoured.

17 If Cabinet agrees, it is proposed to conduct the auction as early as practicable, probably in the second quarter of 2002. The details of the auction rules and content would be published in late 2001.

*Comment is invited on:*

- 2.1 *Whether the proposed frequency bands should be included in a single auction; and*
- 2.2 *The proposed timing in 2002.*

## **Extent of Allocation**

*Should all of the available bands be allocated at this time, and if spectrum is retained for geographic licensing of particular uses, how should any retained spectrum be managed?*

18 The Ministry wishes to allocate spectrum to ensure that needs for use of the spectrum can be met, but without precluding future options which may be based on alternative technologies. Some spectrum may also need to be retained to ensure that government objectives that may not otherwise be achieved, particularly high speed internet provision in rural areas, can be met in the future. Retaining some spectrum would enable the Government to provide licences on appropriate terms in specific geographic areas of New Zealand. If it becomes clear that spectrum retained by the Ministry is not required for that purpose the spectrum can be included in a future auction.

19 It is recognised that any unwarranted retention of spectrum from the auction process may have the effect of increasing prices paid in an auction and it is therefore necessary to judge the extent of demand that exists for the relevant spectrum. Retention of two of the eleven paired blocks of WLL spectrum is being considered by the Ministry to facilitate geographic licensing of uses such as rural internet provision. Similarly, retention of one of the five paired blocks of LMDS spectrum is being considered.

20 If spectrum is retained, criteria for allocation of geographically-specific licences will need to be determined, as will the value of any such licences. This will need to recognise that the Ministry will effectively be competing with other parties who have obtained spectrum at auction. The allocation criteria could be:

- first come-first served; or
- by a call for interest in a given area and allocation according to pre-determined criteria; or
- by a transparent contestable allocation process for each licence sought.

21 Recognising that there will be other parties who hold spectrum, the administratively simple first come-first served approach is favoured, possibly with some conditions as to the timely implementation of service. The average value of a nationwide block of spectrum can readily be assessed from auction prices. A block can typically be re-used many times over for licences in different geographic areas. The average value of a licence could therefore be determined by dividing the value of a block by a re-use factor. A re-use of around 100 could be achieved for WLL spectrum, and around 200 (or even more) for LMDS spectrum. Alternative methods of assessing value could include calculations of population covered by the licence, or area covered. The simpler re-use factor approach outlined above is favoured, but comments are sought on both allocation criteria and the assessment of value.

*Comment is invited on:*

- 3.1 Whether spectrum suitable for WLL (two paired blocks) and LMDS (one paired block) should be withheld from auction to facilitate geographic licensing of potential individual users in rural areas;*
- 3.2 Whether the proposed retention would unreasonably restrict supply and therefore artificially inflate prices; and*
- 3.3 If spectrum is retained, what criteria should the Ministry use to allocate geographically specific licences and how should the value of these licences be assessed?*

### **Promotion of Maori Language and Culture**

*Would the spectrum be useful for promoting Maori language and culture and, if so, how, and to what extent, should the Crown retain spectrum for this purpose?*

22 The Crown has obligations to promote Maori language and culture and one mechanism to undertake this has been through broadcasting for direct reception by the general public. The Crown has accordingly reserved spectrum for both radio and television broadcasting purposes.

23 The International Radio Regulations do not provide for broadcasting services in either the WLL or LMDS bands and therefore there is no equipment suitable for broadcasting purposes in these bands. There are internationally agreed allocations for fixed, mobile, and broadcasting services in the 800-900 MHz bands, but little use is made internationally of the band for broadcasting and few existing television receivers are able to operate in this frequency range. In New Zealand, broadcasting usage is constrained to below 806 MHz, and spectrum has already been reserved in these slightly lower bands for the promotion of Maori language and culture through broadcasting.

24 The Ministry therefore considers that it would be impracticable and a poor use of resources to attempt to establish what would effectively be a non-standard broadcasting type of service in the WLL, LMDS, or cellular.

25 The WLL, LMDS, and cellular spectrum is expected to be used for telecommunications purposes. This use is typically as a part of an internal or private network and used to serve one or more customers. There is generally no ability for parties other than those authorised as customers to access or use these networks. In many cases the customer may be unaware of the actual technical method of service provision. Some LMDS services could be construed as a closed distribution service, akin to a private broadcasting service, but operating over very short distances (1-2 km). Nonetheless it would be accessible only to those with technically suitable, and authorised equipment.

26 The Ministry does not see that this spectrum would be useful or effective for the promotion of Maori language and culture through either telecommunications or other means, and have therefore it is not proposed that any spectrum be reserved for this purpose.

*Comment is invited on:*

4.1 *Is this spectrum considered to be useful in promoting Maori language and culture through either broadcasting or telecommunications services; and*

4.2 *If so, how would such spectrum be used and to what extent should spectrum be reserved and eventually allocated for promotion of Maori language and culture.*

### **Acquisition Limits**

*Should acquisition limits be imposed on one or more of the frequency bands proposed for auction?*

27 Acquiring spectrum is subject to the Commerce Act 1986. In designing the 2 GHz auction, additional acquisition limits (and association rules) were included for the 3G spectrum. Other bands in the auction had no such limits.

28 The Ministerial Inquiry into Telecommunications considered the use of spectrum acquisition limits. As a result, the Government decided that competition issues relating to spectrum rights should continue to be dealt with by applying the Commerce Act 1986 and by Government policy considerations at the time spectrum rights are allocated. The Commerce Act 1986 has recently been amended to provide for stronger acquisition tests which would be applicable to the proposed auction. The Commerce Commission would still need to determine the relevant markets in applying the new tests.

29 If an acquisition limit is necessary, it could be applied solely for the initial allocation, with the Commerce Act governing later trading. Alternatively, an acquisition limit could be applied for a defined, longer period of time.

30 The Ministry considers that there may be merit in some limits being placed on initial acquisition as this would give a high degree of certainty in the auction process, and therefore help ensure earliest use of the spectrum. The cost of such certainty may be some potential inefficiency in the allocation process. Subsequent secondary trading could redress any inefficiency over time. On balance the Ministry considers that limits are desirable in these bands, and a maximum initial acquisition of three paired WLL blocks and two paired LMDS blocks is proposed. It is likely that this limit would still allow acquisition of spectrum sufficient for a new service to be developed.

31 The 800-900 MHz frequency band has the ability to provide a further cellular service, or to expand the capacity of those presently in operation. The Ministry considers that it is desirable for an early entry of a further operator in the New Zealand market and this would not occur in these bands if Telecom or Vodafone were permitted to acquire the bands. Conversely, there is no assurance that a new manager of these bands would make an early entry, and there are already opportunities for parties who

acquired spectrum at 2 GHz to enter the market. The use of these cellular frequency bands by either Telecom or Vodafone may be an efficient way to expand their services. The Ministry is therefore seeking comments on whether or not Telecom and Vodafone should be prevented from acquiring these bands.

*Comment is invited on:*

- 5.1 *Whether acquisition limits should be applied in one or more of the frequency bands proposed for allocation;*
- 5.2 *If limits should be applied, the best specific form of acquisition limits;*
- 5.3 *Whether the proposed WLL and LMDS acquisition limits are appropriate;*
- 5.4 *Whether, and if so why, Telecom and Vodafone should be prohibited from acquiring further cellular spectrum at 800-900 MHz; and*
- 5.5 *Whether any of the above acquisition limits should relate to the initial acquisition only, or also to any later trading of the spectrum rights.*

### **800-900 MHz Band**

*What are the best ways of arranging management rights or auction rules to maximise potential use of the 890-900 MHz band, while guarding against any potential interference susceptibility of equipment?*

32 Equipment typically used for cellular services, and in particular mobile equipment, is susceptible to overloading when subject to high unwanted field strengths on frequencies close to the wanted frequencies. This will limit the extent to which a manager of the 890-900 MHz band will be able to fully exploit the band with particular technologies. The nature of management rights provided and the auction rules may also give some initial control over determining the technologies that are used in the band. In order to limit potential interference, it is also possible to use a Reference Standard when certifying licences created under the Radiocommunications Act.

33 There are at least three allocation options that determine the eventual technology used in the bands. Under the following options, the holder or holders of spectrum in the 890-900 MHz range become effectively responsible for interference management. The three options are:

- a ***five management rights*** option (845-849, 890-894, 894-900, 935-939, and 939-945 MHz) that provides maximum flexibility for both GSM and/or DAMPS/CDMA technology. Some management rights may remain unsold;
- a ***three management rights*** option (845-849, 890-900, and 935-945 MHz) that allows bidding to determine which technology would eventually be used. Only one of the competing technologies would be able to be used unless a single holder acquired all rights. One management right may remain unsold;

- a *single management right* option (890-900 MHz) with the auction rules allowing/requiring the successful bidder to purchase either the 845-849 MHz or the 935-945 MHz band (or, as a variant, just the 939-945 MHz band) at the same cost per MHz as paid for the 890-900 MHz band. Again, only one of the competing technologies would eventually be able to be used and one or more management rights would remain unsold.

34 The Ministry considers that the single management right option is preferable as it allows flexibility for either, but not both, of the potential cellular technologies, and minimises the potential for interference between existing and new licences.

*Comment is invited on:*

6.1 *Which of the three options is best, and why;*

6.2 *Whether a Reference Standard should be developed to manage the creation and certification of licences under the Radiocommunications Act; and*

6.3 *Whether there is any other better specific arrangement for facilitating use and mitigating potential interference risks.*

### **Tenure of Rights in 800-900 MHz Bands**

*What expiry date is appropriate for any management rights auctioned in the 890-900 MHz band?*

35 The expected tenure for new management rights, such as those proposed for WLL and LMDS, would be 20 years. The existing management rights at 890 MHz and 935 MHz (suitable for GSM use) were created in 1992 and expire in 2012. It is recognised that there would be a much shorter period of potential use than with other rights. However, if a management right were created at 845 MHz for paired AMPS/CDMA use, that right could last for the normal 20 year period if so desired.

36 The policy options that could be applied for the expiry of those rights held by external parties have recently been considered by the Government. In the 890-900 MHz and 935-945 MHz bands, the rights already exist and are held by the Crown. It is still necessary to consider the appropriate length of tenure necessary for new investment purposes, and whether bands that are used in paired forms should have similar expiry dates for each half of the pairing. It is noted that when the amendments to the Radiocommunications Act 1989 come into force shortly, it will be possible to create a succeeding management right before an existing right expires.

*Comment is invited on:*

- 7.1 *Whether, in view of ongoing technological changes, management rights suitable for WLL and LMDS should be limited to a term of, say, 10 years, as opposed to the normal 20 year term?*
- 7.2 *Whether succeeding management rights at 890 MHz and 935 MHz should be created and allocated for the period beyond 2012, for auction in conjunction with the present rights;*
- 7.3 *What term any such rights should have, if creating succeeding rights is favoured;*
- 7.4 *Whether the expiry of any rights created at 845 MHz should be aligned to that of the rights existing at 890 MHz and 935 MHz; and*
- 7.5 *Whether succeeding management rights should be created at 845 MHz if they are created at 890 MHz and/or 935MHz.*

## **Responses to Discussion Paper**

37 Comment on the above issues should be sent to:

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PO Box 1473  
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Attention: Ian Hutchings

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Fax: (04) 499 0969  
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38 Comments should be received by **20 October 2001**.

### **Official Information Act 1982**

39 The content of submissions provided to the Ministry in response to this discussion document may become subject to public release under the Official Information Act 1982. Please advise of any objection held to the release of any information contained in a submission to this discussion document, and in particular, which part(s) you consider should be withheld, together with the reason(s) for withholding the information. The Ministry will take into account all such objections when responding to requests for information on submissions to this document under the Official Information Act 1982.

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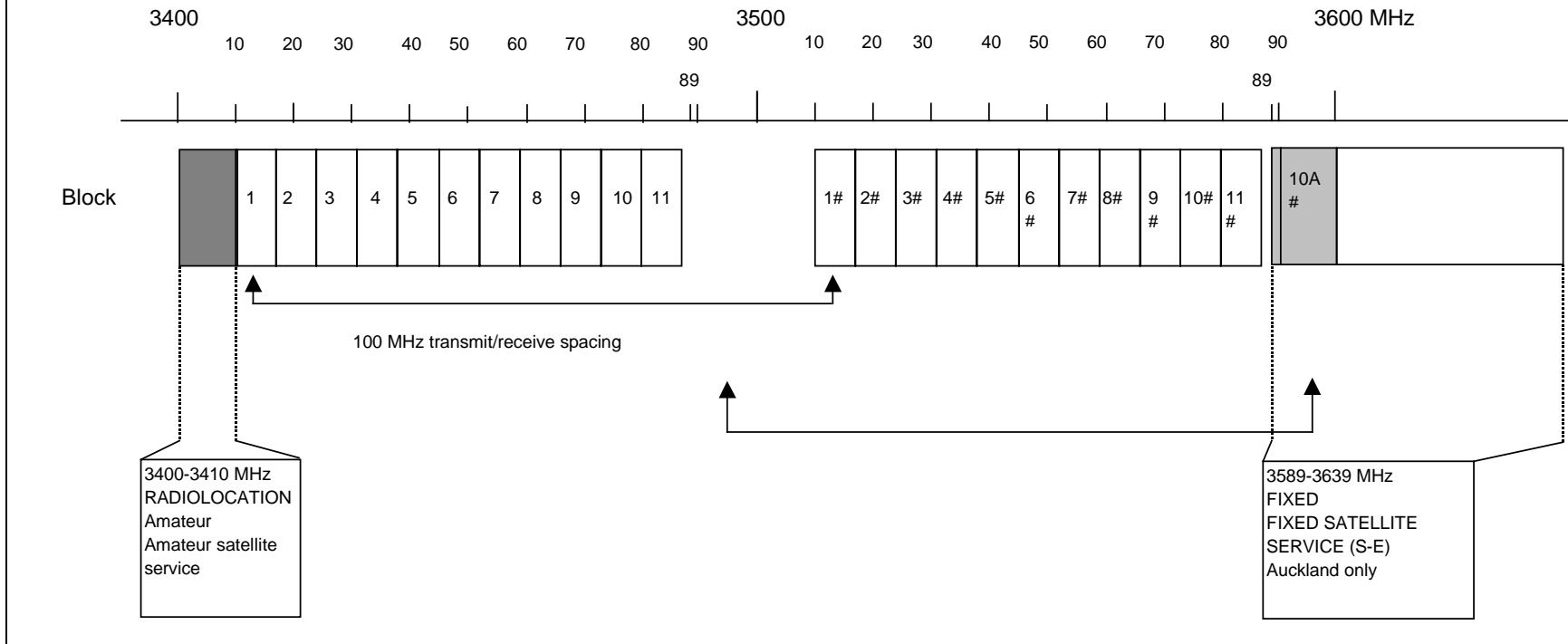
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# Appendix 1: Proposed Management Rights at 3.4 GHz

## Proposed New Zealand disposal plan for 3400-3600 MHz.

Based on CEPT/ERC/REC 14-03



## Appendix 2: Proposed management rights at 24.5 GHz

