

Spectrum Management in the Radio Licensing Regime

Discussion Document

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Executive Summary

Radio spectrum allocated under the Radio Licensing Regime is an important resource for New Zealand's ICT infrastructure. It is important to ensure that spectrum management continues to meet the changing needs of private and public users in order to maximise the value of spectrum to New Zealand society.

This Discussion Document summarises the Ministry's view of the effectiveness of the current Radio Licensing Regime in achieving its objectives. In general, the evidence suggests that the regime as a whole is working well. Nonetheless the discussion document identifies some specific concerns, such as potential congestion in K band fixed services (915 – 921 and 929 – 935 MHz) in Auckland, which may warrant further consideration on a case-by-case basis. While concerns have also been raised around potential issues in F band land mobile (470.5 – 494 MHz), the demand pressure on this band is likely to decrease as major users migrate to digital platform in other bands.

The report also considers a range of potential options which may help address potential problems, if any, with a discussion of their costs and benefits. These options include status quo (with potential modifications), conversion to management rights and administrative incentive pricing. No preferred option is proposed at this stage and whether further intervention is necessary will depend on responses to this discussion document.

Your comments are invited on the analysis in this document and any other issues you think warrant further consideration. There will be further opportunities for consultation, if any changes are proposed as a result of this discussion document.

1. Introduction

The Ministry of Economic Development (MED) is currently reviewing the way spectrum is managed under the Radio Licensing Regime. This discussion paper is a first step in the review process.

One reason for the review is that there have been considerable technological and economic developments in the ICT area since the Management Rights Regime was first introduced in 1989 to complement the longstanding administrative Radio Licensing Regime. Demand has increased in some parts of the spectrum to support growing services, such as cellular mobile, and there has consequently been greater competition among users for access to the spectrum. It is important to ensure that the overall spectrum management regime is dealing with these changes adequately and in a sufficiently future-proofed way.

While there has been considerable work carried out in relation to competition issues associated with the Management Rights Regime, less attention has been paid to the bands under the Radio Licensing Regime. It is timely to examine the ongoing effectiveness of the Radio Licensing Regime from an economic perspective and this discussion document is a part of this quality assurance process.

The discussion document looks at whether there are potential problems with the current Radio Licensing Regime and the extent of such problems. It also considers a number of potential options which may help improve the overall efficiency and effectiveness of spectrum management in the regime. The main purpose of this discussion document is to invite public comments in order to test our thinking and gather better information around the effectiveness of the Radio Licensing Regime.

The Ministry commissioned Hugh Railton Limited to conduct an initial technical study of the utilisation of spectrum under the Radio Licensing Regime. The report is attached to this discussion document. The study focused on the land mobile and fixed service bands and has provided a high level overview of the situations in other bands. The objective of the study was to inform the Ministry's thinking and provide a starting point for discussion. Further research and policy development might be necessary, depending on the responses to this discussion document.

The discussion in this paper is at a relatively high level, as it is at an early stage of policy development. This discussion document reflects the Ministry's thinking at this stage. It is by no means the Ministry's final view of the potential issues around the Radio Licensing Regime or the merits of intervention options. And nor does the Ministry have any specific plans to make immediate changes to current practices.

The Ministry is seeking feedback on the analysis of potential problems, if any, and options in this discussion document. We are particularly interested in additional information which may help us to establish the magnitude of potential problems as well as the extent of the benefits and costs associated with various options which might address these potential problems.

There will be further opportunities for discussion, if any changes are identified by the Ministry following this discussion document, and before the Ministry makes any recommendations to the Government. Further consultation, if necessary, is likely to occur in 2009/10.

2. Scope

This discussion document does not consider issues around Management Rights and the associated Spectrum Licences. Competition issues associated with such rights and licences have been given considerable attention in recent spectrum allocations and some specific competition safeguards, including spectrum caps and use conditions are currently being implemented to address these issues.

General User Radio Licences (GURLs) are excluded from this study. These licences are issued where individual licences are impractical or inappropriate, for example, for consumer applications such as wireless local area networks at 2.4 GHz (WLAN). These licences clearly provide significant utility to firms and consumers. There may be some capacity issues associated with these types of bands, although there is no indication that there are serious problems as users tend to adopt alternative technologies if they cannot get an adequate quality of service under a General Licence. GURLs represent a different framework which caters for different uses of spectrum under the Radio Licensing Regime than ordinary licences. Thus it warrants separate consideration from this discussion document.

Frequency bands below 50 MHz are also excluded from consideration because there is very low demand for this spectrum. Spectrum allocation in this range is also constrained by international agreements because of its potential to cause long range interference. Frequency bands above 30 GHz are excluded due to the low level of demand.

No preferred options are proposed at this stage.

3. Background

Spectrum management in New Zealand is governed by the Radiocommunications Act 1989 and associated regulations. The radiocommunications market also falls under the competition provisions of the Commerce Act 1986.

Prior to 1989, all radio frequencies were allocated by the Government by administrative means. The 1989 Act introduced a new market-based, tradable property rights regime for certain parts of the spectrum (the Management Rights Regime). Administrative licensing (the Radio Licensing Regime) is retained for the rest of the spectrum, and is the focus of this discussion document.

Although the Management Rights Regime occupies a relatively small part of spectrum, it includes the bands considered to have the highest commercial value. These include the 800-900 MHz, 1800 MHz and 2100 MHz bands for mobile phones, AM/FM bands for commercial sound broadcasting, VHF/UHF bands for commercial television broadcasting, and other bands at 2.3/2.5 GHz, 3.5 GHz and 24 GHz for broadband and telecommunications services. The rationale to include these bands in the Management Rights Regime was that they are mainly used for commercial purposes and likely to be subjected to competitive pressure. In many cases access to the downstream market is inherently limited by available spectrum resources. The Management Rights Regime also has the potential to provide greater flexibility for different technological solutions, if rights are appropriately packaged.

The Management Rights Regime has a number of key features:

- Management rights are defined by technical parameters such as upper and lower bounds, emission limits and power floor;
- Wherever possible, management rights are defined in a technologically neutral manner, enabling it to provide different services;
- Tenures of management rights are up to 20 years duration;
- Right-holders are entitled to license users of radio spectrum for uses by their own organisations or by external organisations;
- Management rights are normally allocated through auction initially;
- Management rights are tradable assets and can be mortgaged; and
- the Crown can achieve its policy objectives by retaining management rights or placing conditions on allocation or ongoing use of rights as seen appropriate.

This regime is based on the assumption that a market-based mechanism of competitive allocation and subsequent trading will ensure the most efficient outcome for this spectrum over time. New Zealand was one of the first countries to enact a property rights-based regime for radio spectrum allocation and this regime is still regarded internationally as a efficient and cost-effective approach to spectrum management.

The system has evolved over time and there remain a number of issues, such as utilisation and competition safeguards, which may have room for improvement. These issues are outside the scope of this discussion document. Nonetheless over the last 20 years there have been several reviews of issues associated with the Management Rights Regime (including the Review of Radio Spectrum Policy in New Zealand in 2005¹ and reviews associated with specific allocations of Management Rights) and the Ministry is committed to continuous improvement of the regime.

Originally it was envisaged that all frequencies will be transferred to a Management Rights Regime. However, the administrative licensing regime ended up being retained for a variety of reasons, which include:

- Spectrum is used for non-commercial objectives, such as public safety, emergency or defence purposes, which do not fit easily with a purely market-based approach;
- Costs of conversion to management rights and re-engineering could outweigh potential benefits from market discipline; and
- Supply of certain frequency bands exceeds demand and is likely to be adequate for future growth.

In contrast to the Management Rights Regime, the Radio Licensing Regime has not been subject to major reviews since 1989, although various reviews have touched on potential issues related to the Radio Licensing Regime. The Ministry has, for example, carried out work to improve the security of tenure for radio licences. It is timely therefore to examine the efficacy of the Radio Licensing Regime, as some of these reasons referred to above for retaining the administrative regime may no longer apply to all frequency bands under the regime. Where there are potential problems, consideration needs to be given as to whether these problems can be addressed by conversion to the Management Rights Regime or by other mechanisms.

¹ <http://www.rsm.govt.nz/cms/pdf-library/licensing/review-of-radio-spectrum-policy-in-new-zealand-report-735-kb-pdf>

4. Objectives of Spectrum Management

The overall purpose of spectrum management is to minimise harmful interference between uses. This can require exclusive allocation and an objective of any allocation is to ensure that spectrum is allocated to the uses that New Zealand society values most. This objective can be further defined in terms of efficiency, effectiveness and equity.

4.1 Efficiency

Efficiency can be interpreted in different ways. It may refer to technical efficiency, which is a measure of the output/input ratio. The less spectrum required to deliver a given level of output (e.g. radio broadcasting over a defined area), the more technically efficient it is.

Alternatively, it can refer to productive efficiency. Productive efficiency takes into account the economic cost of inputs other than radio spectrum, such as optical fibre. The lower the cost of the mix of different inputs to produce a given level of output, the more productively efficient it is.

These two concepts of efficiency are important. However, New Zealand's spectrum management policy has focused on a broader concept of economic efficiency, which encompasses both allocative efficiency and dynamic efficiency. Allocative efficiency means that spectrum should be allocated in such a way that it maximises the values of the outputs/services, rather than merely lowering the costs. Dynamic efficiency captures productivity gains and innovations over time as a result of market discipline and competitive pressure.

Where there may be natural constraints on the competitiveness of end service markets, achieving allocative and dynamic efficiency requires spectrum policy to facilitate as much as possible the competition of final services providers who use spectrum and to prevent the abuse of market power by dominant firms. Consideration must also be given to ensure there are appropriate incentives for investment.

The concept of efficiency may not be the most important objective in some circumstances, such as provision of public safety services. Nonetheless, in such circumstances, it is still important that public users maximise the efficiency of spectrum use while ensuring other objectives are achieved effectively.

4.2 Effectiveness

Effectiveness means that the allocation of spectrum must be fit for purpose. This requires spectrum policy to ensure adequate interference protection for legitimate users of spectrum in order to maximise its value.

Spectrum management must provide for reliable means to minimise the likelihood of harmful interference and resolve interference problems that minimise transaction costs both within and outside New Zealand's legal jurisdiction.

Additionally, the measure of effectiveness entails that technological neutrality in the design of the system, whenever possible, is a desirable goal to provide for maximum flexibility and scope for innovation.

4.3 Equity

The Government has a range of important social, cultural or political objectives that it wishes to pursue. These objectives do not in themselves predetermine any particular policy option. It is important that they are taken into account in the design of any spectrum management policy. These objectives may commonly include, among other things:

- Services provided in the public interest
- Services or spectrum which are subject to international treaty obligation
- Services to meet the Government's social or cultural policy objectives.

Equity may also encompass concepts such as fairness and transparency. It means that policy should take into account the differences among various spectrum-based services. For example, spectrum used to provide non-for-profit public services should be treated differently from spectrum provided mainly for commercial gains. Policy-making should also be transparent in terms of criteria and process to the public.

Clearly there may be potential conflicts among these objectives. For instance, market-based measures aimed at maximising economic efficiency may not be appropriate for achieving the equity objective. Spectrum management policy is tasked with achieving a balance between these objectives.

Q1: Do you agree with these objectives? If not, how would you interpret the objectives of spectrum management policy?

5. Problem and Status Quo

5.1 Radio Spectrum as an Economic Good

Radio spectrum can be regarded as an economic resource, which can be bought and sold on an open market. However, there are certain characteristics of spectrum which distinguish it from other market commodities, which must be taken into account in economic analysis.

- Spectrum is an excludable but not exhaustible resource. While spectrum may become congested, the congestion does not deplete the stock of spectrum.
- Spectrum is an infrastructure asset. Access to spectrum is essential to facilitate the actual production of goods and services but may have different patterns of demand from these goods and services (e.g. wireless broadband services, TV programmes or mobile services).
- There is little independent demand for spectrum as such. Use of spectrum is often highly integrated with the business model for end services. These services themselves, such as telecommunication, may often have high set-up costs elsewhere (and limited competition). The utility of spectrum per se in a highly integrated value chain is often uncertain.
- The small size of the New Zealand economy plays a role in determining the competitiveness of the end services markets and therefore the demand for spectrum.
- Demand for spectrum is often geographically specific. Metropolitan centres usually have a higher demand for spectrum than rural areas. There is a particularly high concentration of spectrum use in Auckland.
- The demand for particular parts of the spectrum is often determined by available technology and equipment. Substitutability between different parts of spectrum and re-use of spare spectrum can therefore be very limited, as technology is generally sourced from overseas.
- Spectrum use in New Zealand is highly dependent on the international environment. Flexibility and scope for innovation may be limited by production of equipment overseas, as well as international regulation.

5.2 Problem and Status Quo

The Radio Licensing Regime operates on traditional frequency assignment lines, through the issue of radio (device or station) licences. These licences are normally assigned on a first-come first-served basis, and are managed by the Chief Executive of MED. Licences are not tradable and have no commercial value as assets. Licence fees are calculated on an average cost-recovery basis, and there is no additional charge for using the resource. These licences have limited security of tenure (five years, or a shorter period in conjunction with a transition plan), although in practice licences are usually renewed until relinquished by the licensees.

Currently there are approximately 29,819 licences allocated under the Radio Licensing Regime (at 1 December 2008).² These licences support a wide range services, including, amongst others:

- Non-communications radio uses (e.g. radio beacons, radar)
- Public services (e.g. defence, police, public safety and emergency)
- Bands subjected to international agreements (e.g. maritime, aeronautical)
- Scientific research (e.g. meteorology, space communications)
- Fixed Links for commercial and government uses
- Non-cellular land mobile systems for commercial and government uses
- Other non-commercial activities (Citizens' Band; Amateur Radio)

Problems can arise when demand for certain frequency bands exceeds the supply of these bands. Excess demand can come from competing users within the same band, or from users in other bands already congested. When there is excess demand, the Radio Licensing Regime effectively provides incumbent users with monopoly control over scarce spectrum resources and discriminates against new competitors. As competitive pressures are absent, there is also no economic incentive for licensees to use their resources efficiently or to innovate to meet changing customer needs.

Neither does the Radio Licensing Regime provide an explicit means of ensuring that incumbents continue to meet the social, cultural or other objectives for which spectrum is allocated. In these circumstances, administrative allocation will fail to achieve the objective of allocating spectrum to its highest value use both in economic and social terms.

Quantifying actual costs of potential congestion is difficult at this stage. Quantification will require, among other things, measuring the magnitude of potential excess demand for radio spectrum, and economic valuation of services foregone because excess demands are not met. Obtaining such data will require considerable time, expertise and financial resources. Given that we are at a relatively early stage of policy development, the focus is on three qualitative benchmarks: excess demand, barrier to entry, and technical innovation/efficiency.

5.2.1 Excess Demand

Findings from the technical study do not show widespread problems of excess demand across the whole of the spectrum. This is consistent with the Ministry's observation and historical data, which suggests that, with the exception of fixed services in certain geographic areas, there has been moderate growth or little growth in most licence categories. In some cases, sudden growth is often due to migration of services or transition to new services in a different band.

² Total number of spectrum and radio licences is 39,939.

However it also needs to be recognised that once a particular frequency band is near capacity with then existing parameters, it is common practice to plan for a further band to accommodate any further growth in demand. For example the UHF land mobile bands, C, D, F and public safety bands have been added progressively over time.

In the land mobile bands, public safety and emergency services account for some of the largest growth areas in spectrum use. A government cross-agency project led by Police, the Public Protection and Disaster Relief radiocommunications network (PPDR), is now underway. This project aims to consolidate the spectrum used for public safety and emergency purposes across the whole of Government within dedicated bands (ESB, 138 – 144 MHz and ESC bands, 494 – 502 MHz) and upgrade the services to use digital equipment. This project is likely to reduce demand pressure in other bands over time.

In addition, the study finds that there are a considerable number of cancelled licences in the majority of bands. These unused cancellations provide an indirect indicator of the potential additional capacity of the bands (although not the maximum capacity).³

In some bands, demand appears to be decreasing. For example, the demand for A band (81 – 88 MHz) land mobile licences has decreased significantly over the last twenty years. The band currently has 143 simplex licences and 248 two-frequency licences, with 484 and 405 cancellations respectively. This may be due to the shortage of supply of equipment based on older technology, as equipment manufacturers are moving towards new technologies at higher frequencies. Availability of cellular mobile services might also be a factor.

Furthermore, the study does not find any instance of ‘spill-over’ uses of spectrum under the Radio Licensing Regime. That is, where users access low cost administratively allocated spectrum to provide for certain services which are normally provided under the Management Rights Regime with higher costs of competitively allocated spectrum under the current regime. The study suggests that there is limited substitutability between frequency bands under these two regimes. There appears to be little or very low risk of abuse and potentially unfair competitive advantage to users under the Radio Licensing Regime vis-à-vis those under the Management Rights Regime.

Given the low growth rate in spectrum usage and the availability of more efficient digital technology, the supply of spectrum used for radio licensing appears to be sufficient to meet current and future demand. In addition, the technical study argues that there is no acute supply shortage in similar bands in much larger population centres such as New York or Tokyo with higher demand than New Zealand. It is therefore less likely that congestion problem will occur here.

However, the study finds that demand for spectrum varies with a number of factors, such as availability of alternatives, demand for end services and locations. Some spectrum uses, in particular fixed services, have experienced higher growth over the last few years, which is likely to continue into the future. There would appear to be a relatively higher

³ Information about demand is extrapolated from the number of licences issued and cancelled. In some cases, cancellation may be a result of rationalisation rather than spectrum falling into disuse. For example, the large number of cancellations in the TD bands in 2001 is due to TCNZ selling its interests to Team Talk. In other cases, a large number of cancelled and reissued licences are results of changes in technical parameters. The raw data of the technical study does not separate these two types of cancellations, and therefore is interpreted based on practical experience.

likelihood of congestion in these bands in the future. Nonetheless there appears to be sufficient supply of spectrum to meet such demand. The study suggests that:

- These services are mostly used where there may be little alternative, for instance, in linking cell sites to provide cellular mobile networks, where there is no commercially viable fibre optic network.
- Pressures on spectrum allocation are probably associated with high commercial demand for end services such as cellular mobile or broadband internet.
- Such growth is strongest in main population centres, especially Auckland.

The technical study identifies the K band (915 – 921 and 929 – 935 MHz) studio-to-transmitter links (STLs) in Auckland as most likely to suffer from congestion problems. Spectrum for this service appears to be almost exhausted. The study suggests that given the low price of spectrum, there is a lack of incentives to adopt better, spectrum-efficient technologies. In particular, the study looks at the allocation of STLs at Sky Tower in Auckland, and suggests that there may be potential inefficiencies in the high use of spectrum over very short distances where there may be other alternatives⁴.

The study also indicates that it may be difficult to find available frequencies in the land mobile F band (470.5 – 490 MHz). There is a high demand from the New Zealand Police in this band. And as mentioned previously, demand pressure is expected to reduce as the Police migrate to digital platforms.

5.2.2 Barrier to Entry

There is little indication of barrier-to-entry issues in the technical study, which may signal that there is still excess capacity in the bands and therefore few competition concerns.

However, the study does suggest that some bands only have a limited number of users. In some cases, this may well be a sign of limited demand for particular end services delivered through radio spectrum. Given sufficient demand, users have the flexibility to choose particular bands to employ services, which results in a limited number of users in some bands with large number of licences compared to others. For instance, the small land mobile MS band (160.970 - 161.490MHz) was useful to resolve a technical issue for railway communications, and it is therefore primarily used by the railway user with a large number of licences issued in 2004. Nonetheless, this may increase the likelihood of competition issues later on, if spectrum becomes congested in the future as new technologies are applied to more valuable commercial uses.

Some parts of spectrum such as fixed services are used in support of end services such as telecommunications or broadcasting. The predominance of telecommunications and broadcasting firms as licensees in these bands may be a reflection of the characteristics of these end-service markets and therefore not necessarily a problem in itself. Similarly the New Zealand Police plays a lead agency role in ensuring public safety and also holds a large number of licences, compared to other public agencies, in the public safety and

⁴ The Ministry has undertaken technical reviews of spectrum allocation for studio-to transmitter links previously, with a view to address some of the demand pressure. For details about the reviews please see <http://www.rsm.govt.nz/cms/policy-and-planning/current-projects/broadcasting/review-of-spectrum-allocations-for-studio-to-transmitter-linksreview-of-spectrum-allocations-for-studio-to-transmitter-links>

emergency services bands to meet its need for communications. This appears consistent with the Ministry's experience. There does not appear to be any indication that spectrum policy has created further competition problems in these areas on its own.

5.2.3 Technical Innovation/Efficiency

Estimating efficiency in each of the bands is difficult. The technical study does not consider economic efficiency in band use. To do so would require complex modelling of economic value of spectrum in relation to the end services provided, which has not been carried out at this stage. In general, however, the absence of excess demand means that the economic value for spectrum should be near zero or very low, with few incentives for users to trade.

The technical study also suggests that there are practical difficulties in measuring technical efficiency of the bands. Such measurement would require a comprehensive examination of each licence and equipment used. Moreover, the study argues that the maximum capacity in each band is not fixed and often depends on the particular deployment strategy of certain technology, and will change over time as new technologies become available. It points out that there may be room for rationalisation in some bands which will increase total capacity. Thus no percentage or saturation rate is provided.

However, the pattern of technological adoption reveals there may be scope for improvement. MED's experience in spectrum management suggests that spectrum users tend to use particular equipment up to or even beyond its expected life, rather than investing in more efficient, newer technology. A possible explanation is the high initial set-up cost, and the fact that the equipment might still be perfectly adequate for services currently provided. There is no real incentive in the radio licence framework to seek more efficient licences along with the newer technology. Such practices also mean that barrier to entry for new entrants will be potentially higher, as spectrum becomes more congested with less efficient uses.

It is important to note, however, that adoption of new and more efficient technology is not, and should not be, driven solely by the scarcity of spectrum. The Ministry is aware that many spectrum users are transitioning to newer technology, such as digital platforms, or are migrating to other technologies such as optical fibre, as a result of consumer demand for better services and changing market environment for technological alternatives. It is critical, therefore, that spectrum policy does not distort these existing incentives, which may be more efficient than regulatory intervention.

Technological innovation may also be potentially constrained by the inflexibility of centralised administrative licensing arrangements. Re-planning and migration of spectrum uses under the Radio Licensing Regime might be time consuming, with potentially weaker incentives to respond to changes than market mechanisms. Specific parameters on licences would need to be changed before new technologies can be employed in any frequency band.

5.2.4 Summary of the Problem

In summary, there is no strong evidence suggesting that there are widespread problems with spectrum management under the Radio Licensing Regime. Generally there appears to be sufficient supply of spectrum under the Radio Licensing Regime to meet current and future demands. However, certain bands in metropolitan areas such as Auckland, particularly those used in support of highly valuable commercial services, are likely to

suffer from congestion problems. In particular, the current allocation of spectrum for K band STLs in central Auckland may be insufficient to meet future demand.

Any intervention proposals will be based on a case-by-case basis with detailed evidence-based analysis. The initial priority of such studies is to examine STL fixed services bands in Auckland areas. The Ministry has already undertaken some work to address issues around studio-to-transmitter links in the 900 MHz band and this issue is being considered further in a wider review of the 800/900 MHz spectrum in 2009.

Q2: Do you agree with the Ministry's analysis of the problem above?

Q3: Do you think the Radio Licensing Regime is meeting the objectives discussed previously? If not, what are the problems in your view?

Q4: Are you aware of current or potential congestion problems in individual bands under the Radio Licensing Regime (including bands which are not covered by the technical study)?

Q5: Do you agree that further study is needed before any change is recommended? Which bands should be prioritised for review?

Q6: Do you have any quantitative data around the cost of potential congestion (e.g. lost economic value as a result of inability to obtain licences in congested bands)?

6. Remedial Options

This section provides a general discussion of potential remedial options and their costs and benefits. The Ministry is not proposing any changes at the moment and there is no preferred option. This discussion provides an early opportunity to test the Ministry's understanding of relevant issues of each option at a relatively high level. This will contribute to the quality of policy advice in the future. The submissions in response to this document will help us achieve this objective.

6.1 Common Considerations

There are a number of considerations common to all these options, which are discussed below in points 6.1.1 to 6.1.3.

6.1.1 Local Issues

The issue of area-based Management Rights within legislation was considered but rejected in the 1988 NERA report⁵ on the basis of relatively high transaction costs between users in and outside the area boundary. The Ministry has subsequently assigned 3.5 GHz licences using the geographic areas of territorial local authorities and this work has confirmed that there are boundary issues that need to be addressed when creating such licences.

The findings from the technical study show that geographic/demographic factors play an important role in the utilisation of spectrum. It also argues that the 'all New Zealand' licences can potentially reduce the capacity of spectrum. The Ministry no longer issues All New Zealand exclusive licences except for governmental purposes⁶. The Ministry considers that remaining licences do not appear to pose a significant problem.

While there is clearly a need for further analysis, the findings nonetheless provides a strong argument for considering local solutions to localised problems in population centres, especially in the Auckland region. Given the fast growth of Auckland and its importance to New Zealand's economic growth today, the potential benefits of localised policy changes may outweigh the costs of boundary issues. Moreover, focusing on these areas may reduce the cost of policy and impacts on other parts of New Zealand.

It should be noted that legislative changes would be required if regional management rights were considered to be an appropriate option in certain cases.

6.1.2 Competition Safeguards for Downstream Services

Given spectrum use is highly integrated with downstream services, there is a question whether it would be more effective to apply competition safeguards to downstream

⁵ The report was commissioned by the Ministry of Commerce in 1988 and carried out by the National Economic Research Associates (NERA), a consultancy company based in the UK. The NERA report provides important inputs into the reforms of spectrum management in 1989 and the introduction of the Management Rights Regime under the Radiocommunications Act 1989.

⁶ The Ministry does provide All NZ licences for simplex land mobile on a shared basis, as well as land mobile Repeater and Paging radio licences that can be used on multiple sites through New Zealand.

services themselves rather than spectrum per se. This is more relevant when the downstream markets, such as telecommunications, are already subjected to a high level of regulatory oversight.

From an economic perspective, it is often more efficient to target downstream services, especially when there is excess supply of spectrum. In general, this means spectrum allocation policy should be to facilitate, rather than displace, competition safeguards, if any, for downstream services, and that regulators should not rely on spectrum policy alone to engineer efficient outcomes in downstream markets.

In the past, the Ministry has implemented acquisition limits (caps) and eligibility requirements to ensure competitive allocation of management rights and spectrum licences where competition safeguards in the downstream markets were perceived to be in need of strengthening. A number of these measures were of a transitional nature with an eventual expiry date. Application of such measures within the radio licence regime would require strong evidence of the impact of spectrum allocation on downstream services, clearly distinguished from other factors which might contributed to competition issues downstream. Applying new competition safeguards to radio licences may require appropriate policies of Government to be made in accordance with s.112 of the Radiocommunications Act.

6.1.3 Transitional Issues and Existing Uses

It is an important objective of spectrum allocation policy to ensure that the users have as much certainty as possible over the allocated spectrum. This means two issues must be taken into account in the design of any options.

First, when a policy change is necessary, there must be adequate measures to ensure that the costs of change for existing users are kept to the minimum. Such costs will need to be taken into account in evaluating policy options. It also means that policy development will need to involve stakeholders at the earliest opportunity and sufficient time should be allowed for existing users to adjust their business models.

Second, as spectrum use usually requires considerable investment, there may be a trade-off between ensuring investment certainty and achieving maximum efficiency in the short run. In practice, this means that policy regulators should be realistic about keeping pace with technological development or policy changes overseas. Frequent changes could reduce the confidence of spectrum users to make long term investments and therefore undermine efficiency in the long run.

Q7: Do you think a localised approach would work to address issues concerning the Radio Licensing Regime? What do you think are its main costs and benefits?

Q8: What do you think the relationship should be between competition policies in the downstream service markets and spectrum use?

Q9: What do you think are the best ways to ensure smooth transition when policy changes are made?

6.2 Option 1: Status Quo

Because congestion is unlikely to be a major problem in near future, the status quo may be a viable light-handed regulatory option. In addition, it may be prudent to avoid major policy changes at this stage, given the move to digital equipment and current spectrum policy reforms in the EU and elsewhere towards greater liberalisation. These changes may in turn alter the demand patterns for spectrum in New Zealand as overseas equipment suppliers shift to newer, more efficient technology and respond to their new domestic policy settings. The transition to digital platforms in particular may also provide a solution to increasing demand pressure without the need for further intervention.

Under the status quo, licences will continue to be issued on a first-come first-served basis, subjected to a fee covering administrative costs. General practices to issue licences until they are cancelled will remain unchanged, with security of tenure limited to that currently prescribed under Regulation. Licences will not be tradable and will have no commercial value as assets recorded.

It is worth noting, however, that because of the lack of overall excessive demand, in practice, the Ministry takes an accommodating approach to the needs of users themselves in issuing licences. In other words, there is a considerable degree of *de facto* devolution to users themselves.

6.2.1 Efficiency

Such a regime is clearly inefficient in bands which are, or are likely to be, congested. Users will not face any particular pressure to economise on their spectrum use. There is no recognition of value of scarcity, and therefore no assurance that spectrum will be allocated to its highest value use. Furthermore, because of the lack of price signals, there is little incentive on users to make economically rational decisions on the actual utilisation of spectrum, once it is allocated to them. This creates a risk of “hoarding” of spectrum, which may lead to inefficient outcomes particularly if it has anti-competitive implications (discussed in s.6.3). In addition, the current regime does not provide ready solutions to the localised congestion problem.

When congestion is not a concern, the current arrangements are efficient in a sense that, subject to technical limits, most demand is satisfied. “Hoarding” is not an issue as no users would be precluded as a result. Avoiding the potentially high cost of changes and impacts on existing investment in certain frequency bands also adds to reasons for maintaining status quo.

However, the trade off is that as the number of existing users grows, there may be higher transitional costs, if changes are required. In addition, the current regime might not have enough flexibility to deal with more localised problems, although there is already a degree of devolution of technical assurance to external engineers with the Approved Radio Engineers/Approved Radio Certifiers system. These problems increase administrative costs and reduce the efficiency of the system.

6.2.2 Effectiveness

Lack of flexibility also reduces the effectiveness of the system, as spectrum allocation may not meet the varied needs of individual users in a timely fashion. It relies heavily on regulators, who may have limited information or resources, to respond to market demands.

This needs to be balanced, however, against a high level of certainty that the current system provides for existing users and may allow more scope to respond to significant global changes in the future.

6.2.3 Equity

The administrative regime provides a cost-effective means for the Government to meet its non-economic objectives, when there is no acute shortage of spectrum. There is still potential for higher levels of collaboration among spectrum users in the public sector through a variety of channels to ensure that such non-economic values are maximised.

Conclusion

In brief, the main cost of the status quo appears to be associated with the lack of flexibility in the system. This concern can be addressed through a number of measures, which include the devolution of licensing function, continuous improvement in technical planning, implementing an access seeker regime and introducing flexible licensing conditions. Some of these measures are already occurring in practice, particularly amongst large users. Nonetheless there may still be scope for wider application. Some options for improving the status quo are discussed below in point 6.4.4.

6.2.4 Potential improvements to the Status Quo

Devolution of licensing function: it has been suggested to the Ministry that the administrative licensing function could be delegated from the Chief Executive of MED to a third party, such as an industry organisation of users within a certain band, outside the Ministry. The third party would coordinate and reallocate licences among subscribed users to achieve efficiency gains.

Devolution can also be considered for frequency bands which in practice are used mostly by other public agencies, for example, when frequency bands are reserved for particular uses or users under international agreements. Such arrangements are already in place, for example, for the Civil Aviation Authority.

A devolved regime, in a similar way to management rights, may be able to provide more flexibility and technological neutrality in licensing, as there is more opportunity to configure a wider frequency band for different uses.

This change could give users more collective control over spectrum allocation and allow them greater flexibility to design and alter licences to suit their changing needs. It might improve the efficiency of spectrum management by utilising the knowledge and expertise of users themselves. It could also reduce the costs to the Government.

The disadvantages of a devolved regime include, among other things, difficulty of coordination and quality assurance, as well as the lack of a broader public interest perspective. Any external management entity would, unless otherwise constrained, manage the spectrum in the best interests of their members, and not necessarily new entrants. There would be little incentive to redeploy spectrum to different, higher value, uses. These disadvantages may create additional costs for the Government and spectrum users. There are a few concerns which must be taken into account:

- There will be potential competition concerns when spectrum is controlled by a limited number of licensing agencies, rather than actual users of spectrum themselves. There will need to be appropriate arms-length arrangements to ensure that the licensing agency does not exploit the devolved regulatory power.
- There may be little interest from spectrum users whose core business and expertise is not spectrum management, but rather the provision of final goods and services through spectrum use.
- If membership in the devolved regime is on a voluntary basis, a third party will need to have sufficient support and trust of industry members for devolution to be meaningful. There would also need to be safeguards to ensure that non-members are not unduly disadvantaged.
- Good governance and accountability requirements must be in place to ensure that the licensing agency will serve the interest of all users.
- There may still need to be a degree of regulatory oversight to ensure the quality and effectiveness of a devolved licensing regime, especially if the membership in the devolved regime is compulsory.
- A coordination mechanism will need to be put in place to ensure that individual licensing agencies work together to ensure the overall efficiency of spectrum management.

Currently, there is no legislative provision for delegation by the Chief Executive of MED to outside persons and entities designated under the Radiocommunications Act. Legislative changes may be required to implement this change.

Continuous improvement through technical planning: the Ministry is committed to quality improvement in spectrum planning to ensure that spectrum continues to be available for users. Recent review of spectrum management by PriceWaterhouseCooper also recommends that the Ministry's medium to long term planning capability be strengthened.

Improved planning may help to address cases where apparent excess demand in some areas might be a result of poor coordination among users or outdated equipment standards, rather than genuine scarcity of spectrum supply. In other words, the congestion problem is primarily a transaction cost and an economically neutral outcome could be achieved by additional planning and subsequent changes. The costs and benefits of such an approach may well be positive overall, but they do not fall equally on the parties concerned.

The technical study has identified several bands as candidates for further rationalisation. The Ministry will consider these suggestions on a case-by-case basis. Consideration will also be given to regional problems, in particular Auckland.

The benefit of this option is that it can potentially expand the capacity of spectrum at a relatively low cost, especially with the assistance of modern computer-based spectrum planning tools. It will also reduce high transaction costs involved in negotiations among a large number of users, for example, in the case of fixed link services. In addition, a centralised regime can enable a broader perspective in planning and thus potentially higher efficiency gains.

Nonetheless, as with any centralised planning regime, a potential disadvantage is that it may not fully meet the individual needs of users in a timely fashion. In some cases, tighter technical specification may be necessary to enable re-planning of spectrum use. In addition, there may be considerable costs to some users as a result of new planning, especially given that New Zealand users often plan spectrum investment on a long term basis and do not have strong incentives to upgrade equipment which is still functioning.

“Access seeker” regime: under this framework when there is competition between users for specific use of spectrum, such as a specific fixed link, the parties can negotiate among themselves to reach a private resolution. The responsibility will fall on the parties involved to ensure allocation is fit for their uses. The Ministry would implement the resolution, provided such resolutions do not adversely affect third parties. When a resolution could not be reached by private agreement, the Ministry or an independent arbitrator would make a binding decision over the allocation of spectrum.

Such negotiations can take the form of a commercial transaction and therefore may, in effect, allow the “trading” of licences in circumstances where there is no clearly defined market.

Managed spectrum parks (MSPs) recently introduced by the Ministry in the 2.3 GHz and 2.5 GHz bands under the Management Rights Regime can be seen as a practical example of this regime. MSPs are intended to allow access to a number of users in a common band of spectrum on a shared and, as far as possible, self-managed basis.

This regime would add more flexibility to the spectrum system and avoid potential costs and delays of a centralised command-and-control system. Such flexibility can potentially enable users broader scope in terms of technological innovation. It might also ease the demand for spectrum by allowing different users to share spectrum in collaborative and innovative ways. In addition, it may be able to capture specific ‘markets’ of spectrum use in certain areas for particular users facing perhaps a temporary supply constraint, by utilising efficient market mechanisms. Overtime, a well designed regime may lower the costs of compliance and administration.

However, the feasibility of such a regime will also depend largely on the stability of demand and supply, and the characteristics of users. Such a system will incur certain transaction costs and may not be practical when there are many third parties or when parties involved are unable to absorb the costs of technical planning on their own. There may also be potential risks of anticompetitive behaviour or non-compliance with licence conditions particularly if negotiating parties do not have comparable bargaining power in terms of information or resources. This may necessitate some type of arbitration or redress, as well as monitoring/enforcement mechanisms, adding to the costs of the regime.

Q10: Do you think the status quo is working satisfactorily?

Q11: Do you agree with the Ministry’s analysis of the costs and benefits of the status quo above? If not, then please explain why.

Q12: What other benefits and costs associated with the status quo should be considered?

Q13: Do you think the following measures will improve the Radio Licensing Regime, and why?

- Devolution of licensing function
- Improved technical planning
- “Access” seeker regime
- Flexible licence conditions

Q14: In which bands do you think these measures should apply?

Q15: What do you think the impacts of status quo or any additional measures would be on your organisation and other users?

6.3 Option 2: Management Rights

Moving bands under the Radio Licensing Regime to the Management Rights Regime might be a way to address potential congestion issues. Conversion to a management rights regime will require a number of steps, including:

- Defining property rights, i.e. how bands can be “packaged” prior to allocation to ensure maximum commercial value to potential buyers
- Determining the method of allocation. The preferred option is to allocate licences by competitive options. Other non-competitive methods may be considered for transition and to meet the Government’s social or cultural policy objects.
- Providing for non-commercial uses
- Safeguarding competition
- Ensuring adequate transition planning for incumbent users.

The benefits of this option lie primarily in potential efficiency gains. This is based on the conventional economic assumption that, if a well-defined property rights regime is in place (with appropriate competition safeguards), market forces will ensure the most economically efficient outcome in the allocation of scarce resources.

Transfer of spectrum to management rights might still be efficient even when supply exceeds demand for the time being. A market structure may be more responsive to changes in supply/demand and emergence of new markets. The benefits are better certainty and incentives for users to proactively plan bands which are likely to become a scarce economic resource.

There is, however, a significant risk of spectrum hoarding, which may lead to anti-competitive outcomes. Therefore, the timing of transfer is critical. If transfer to a market regime occurs too early, given imperfect knowledge of future congestion problems, there may be a strong incentive to purchase a large number of licences at a very low price. It may be difficult to justify competition safeguards at this early stage when there is still excess supply. Such behaviour can increase the risk of anti-competitive problems once spectrum is exhausted and this in turn reduces the efficiency gains of the market specially if the cost of spectrum is low.

6.3.1 Efficiency

The efficiency gains of market mechanisms are limited in other aspects. In the first place, there are practical difficulties in defining a viable market. When there is excess supply or low demand, there will effectively be no competitive pressures, and licences or management rights will have near zero values as in the case of the recent allocation of local commercial sound broadcasting licences. While it is possible that regulators might choose to restrict supply of spectrum to particular uses to create a market, this approach is illogical, particularly when engineering possibilities to expand the capacity of the bands have not yet been exhausted.

In the case of fixed services which are likely to face higher demand than the rest of the band, definition of a market and allocation of property rights may pose a further problem. The nature of fixed services means that the requirements of users are highly specific (for example a link from a specific building is likely to be of interest only to the existing building user). It will be difficult to predict conflicting demands for a particular fixed link, let alone take into consideration potential congestion in the future. This in turn may lead to inefficient outcomes if property rights are defined too broadly or too narrowly initially.

Moreover, the ideal assumption of a perfectly competitive market rarely applies in the spectrum markets. As indicated above, in some bands under the Radio Licensing Regime, there are likely to be a relatively small number of operators, and therefore ongoing needs for interventions to encourage competition, or prevent anti-competitive behaviours. Such measures can improve the efficiency of the spectrum market, but they often add to the costs of market mechanisms.

A further problem associated with the above is that in some cases there may be a trade-off between competitiveness and incentives for investment. New entrants or smaller operators may lack the economies of scale to make the necessary investment in spectrum-related technology or to make long term plans for their spectrum use, which might add to the transaction costs of spectrum re-planning.

Finally, as it is unlikely that regulators will be able to achieve optimal outcomes through the initial round of market allocation, the implicit assumption is that any inefficiency will be corrected eventually by secondary trading on a competitive market. The Ministry's experience suggests that the volume of secondary trading activities in New Zealand under the Management Rights Regime is low, and spectrum trading often occurs as part of restructuring or sale of businesses. Experiences in the UK, Australia and the US also suggest that secondary trading is limited. There is reason to believe that any secondary trading of spectrum, if introduced under the Radio Licensing Regime, will be even more limited, as the commercial value and demand for this part of spectrum are significantly lower than that for spectrum under the Management Rights Regime.

There are considerable disagreements over the optimal level of secondary trading. It has been argued that the low volume of trading may reflect the long-term high-cost nature of spectrum investment and is therefore not a cause for concern. Moreover, the integrated business model of services and limited number of competing users also reduce the incentive to trade, as the loss of downstream services and market shares can easily outweigh the profit in spectrum sales.

The absence of an active secondary market might reduce the efficiency of market mechanisms. There is a risk that inefficient allocation in the initial round may well persist into the future. However, there is not yet conclusive evidence of its cause or impact. Such

uncertainty should be taken into account as the understanding of secondary trading in spectrum develops over time.

6.3.2 Effectiveness

Transfer to the Management Rights Regime could also increase the effectiveness of current allocation, even when congestion is not an issue. In such circumstances, the Management Rights Regime is similar to a devolved administrative regime and provides more flexibility to spectrum users to plan their own licence allocations. It can also enable a more technologically neutral approach than the current regime. A key consideration is whether the Crown should retain or devolve any such Management Right as a Management Right holder will be able to exercise their property rights over spectrum with or without the consent of licence holders. There may not be enough commercial incentives (with the right retained or devolved) to allow access by competing users or to consider broader efficiency issues. As a result, there may be efficiency costs associated with competition concerns as discussed above.

A Management Rights Regime might complicate the problem of interference protection at frequency boundary, as the market on its own might fail to coordinate the private interests of users. Government interventions may still be required to address such problems, particularly in defining property rights. Such interventions could potentially restrict the flexibility of right-holders and thus reduces the effectiveness of this option to some extent.

6.3.3 Equity

In terms of equity, there are a number of benefits associated with a Management Rights Regime. It can be argued that a market based regime is more 'transparent' because it recognises the opportunity costs of spectrum use, i.e. the 'lost' economic values in denying the use of spectrum, as a scarce resource, to other users. This often includes an explicit recognition of the economic costs of providing public protection and emergency services. Such an argument is not particularly strong when there is no scarcity problem.

It can also be argued that bands which are primarily used for commercial purposes should be allocated under a Management Rights Regime. This would allow a clearer distinction between commercial and non-commercial services, and potentially more consistency with other commercial uses.

However, a purely market-based regime might not be the best way to achieve the Government's equity objectives. Such a regime does not take into account costs and benefits which are difficult to quantify, or are simply non-economic. For some users of radio spectrum, there is no market for the end services, in particular public safety and emergency services, and hence no commercial value attached to these services. They are inherently in a weaker position vis-à-vis commercial competitors in terms of flexibility, access to capital and so on. It is also questionable whether it is appropriate or efficient to manage competing demand within the public sector itself using price competition. It may distort decision-making by favouring measurable economic costs and discounting less tangible benefits.

Under the current Management Rights Regime, the Crown has retained management rights of certain frequency bands and thus effectively reserved these frequencies for its equity objectives. When there is no shortage of spectrum supply, or when competing demand from other users is absent, such arrangements do not differ substantially from the status quo. Conversely, the current administrative regime may provide more flexibility to

respond to changes in non-economic objectives. It may also allow more scope for technical planning to expand the capacity of frequency bands, and thus forestall potential congestion issues.

Q16: Do you think conversion to a Management Rights Regime will improve spectrum currently allocated under the Radio Licensing Regime?

Q17: If so then which bands should be considered for conversion to a Management Rights Regime?

Q18: Do you agree with the Ministry's analysis of the costs and benefits associated with conversion of certain bands to the Management Rights Regime? If not, then please explain why.

Q19: What other costs and benefits associated with conversion of certain bands to the Management Rights Regime should be considered?

Q20: What do you think the impacts would be on your organisation and other users if administrative licences are converted to management rights?

6.4 Option 3: Administrative Incentive Pricing

In the absence of a market, an Administrative Incentive Pricing (AIP) scheme can be used with the intention of encouraging the efficient use of spectrum under an administrative regime in both public and private sectors. This scheme has been used in the UK and Australia. Some parts of spectrum covered by AIP overseas fall under the Management Rights Regime in New Zealand. However, AIP has also been applied to spectrum under the Radio Licensing Regime, such as fixed links as well as spectrum used for defence and other public agencies. Recently, the UK regulator *Ofcom* made an attempt to introduce AIP for aeronautical and maritime services.

Under an AIP regime, licences are issued through an administrative process, usually on a first-come first-served basis, and carry with them an obligation to make regular payments to the regulator or government agency.

The fee is usually based on the opportunity costs of the use of spectrum. Opportunity costs can be based on three different principles:

- The value of the spectrum for a user supplying another service
- The additional costs if the service had to make use of other means
- The additional costs if the licensee had to make use of less spectrum.

In the UK, AIP is calculated on the "least cost alternative" basis. Therefore the opportunity cost faced by a competing user of a specific fixed-link service is the cost of employing the least cost alternative, such as optical fibre, to deliver same level of end services. This is then compared with the opportunity cost faced by the existing user of that specific fixed link to determine the administrative price, which is usually set slightly above the lower of the two.

Licences allocated under the AIP regimes can be made tradable. However, a tradable regime, as it presumes there is a viable market for such licences, begs the question of why initial price should be set administratively.

6.4.1 Efficiency

The primary benefit of AIP is said to be the encouragement of efficiency. The idea is that AIP will give the owner of the license an incentive to return unused spectrum, rather than pay the fee, which can then be used for other purposes. It may also motivate a licensee to use the spectrum more efficiently by employing new technology. In addition, production efficiency is improved as the users are forced to take into account the cost of spectrum in relation to other inputs such as optical fibre. Proponents of the AIP also argue that this approach may be more efficient than a market-based regime because it can potentially reduce transactional costs and impose a stronger incentive on government agencies.

This rationale may not sit easily within the New Zealand policy environment, which targets the economic efficiency of end services – in allocative and dynamic terms as discussed previously – rather than productive or technical efficiency of spectrum use alone. The least cost alternative methodology does not take into account the value of spectrum to users or society as part of its end services. This value would be extremely difficult to calculate accurately. At best, this is an inaccurate approximation of the real market value of spectrum and may therefore need to change over time as congestion increases. It can be problematic too if increased spectrum price reduces incentives to invest in other areas that support end services. Therefore, while this approach may reduce the complexity and costs faced by regulators to some extent, it should only be used with caution.

This may not necessarily be a problem when spectrum allocation is the only barrier to competition in the end service markets. This does not appear to be the case in New Zealand. There is a risk that an over-emphasis on production or technological efficiency might create its own persistent distortion in the end-service markets. This in turn will reduce the allocative and dynamic efficiencies of the New Zealand economy.

In addition, the least cost alternative methodology assumes that alternatives are readily available and there are no imperfections in the alternative input markets. This assumption is not particularly strong in a New Zealand context, given that markets for alternatives to spectrum, such as optical fibre, are still emerging. In some cases, there are simply no realistic alternatives to spectrum uses. It is not clear whether these factors are taken into account sufficiently in the current design of AIP. Conversely, the use of spectrum may in fact provide a cost-effective way to address the current limits of markets for alternative inputs, such as optical fibre, especially when there is still spare capacity. In such circumstances, aligning price with the least cost alternatives may in fact reinforce market imperfections and reduce overall efficiency.

Overseas experience also suggests that calculating administrative pricing with a least cost alternative approach can still be difficult. Complex economic modelling will be required to ensure that the price is set at a fair and efficient level. In practice, the method must be simplified, which reduces its potential efficiency gains. For instance, the availability of data means that AIP often lends itself to calculating the average value of spectrum use, across a variety of different users, rather than the marginal value as required in theory. Costs to implement such policy may well exceed the efficiency gains.

Moreover, the significant variability across New Zealand in terms of population, terrain and so on is likely to add to the complexity and costs of administrative pricing when estimating

the value of spectrum and the cost of alternatives. Potential efficiency gains will be reduced further if such variables are not taken into account.

Finally it is not clear how the AIP should apply in situations where there is still excess supply of radio frequency overall across competing uses. Under such circumstances, the problem of congestion in one band can be resolved either through market trading or simply rationalising spectrum allocation, when there is already sufficient spare capacity to satisfy excess demand from other users. In other words, opportunity costs for spectrum use can still be equalised to zero. While AIP can potentially achieve the same outcome, it would appear to be a blunt instrument, given its complexity and cost. Regulators would have to quickly remove administrative pricing once these isolated congestion problems are resolved to avoid the penalising users.

The concerns discussed above mean that there is a risk that administrative price would be set at an inefficient level, as a result of regulatory failure.

If the price is set too low, there are no strong incentives to improve efficiency. An administrative charge will simply increase the costs to businesses which will eventually be passed on to consumers. If the price is set too high, the spectrum may be underused. A high price also inevitably raises the barrier of entry for new entrants. Both reduce the economic efficiency of spectrum use. Given the New Zealand market of alternative inputs such as optical fibre, which is still developing, and the relatively high prices for these alternatives, it seems likely administrative pricing will tend to over-price spectrum.

In such circumstances, regulators may choose to lower the price from the standard least cost alternative estimate, so that spectrum is used. However this approach begs the question of the rationale of the AIP regime itself. In essence, it requires the regulator to “discover” the market clearing price for spectrum use, based on very limited information. This will inevitably introduce an element of arbitrariness and uncertainty, and therefore increase the risk of regulatory failure. Open auction with subsequent trading would appear to be a more efficient way to obtain such prices.

While an iterative process to recalibrate administrative prices may improve the accuracy of administrative pricing to some extent, it remains questionable whether such an arrangement is enough to correct inefficiencies resulting from sub-optimal pricing, let alone taking into account changes in market places.

6.4.2 Effectiveness

In terms of effectiveness, the AIP regime does not differ significantly from the status quo. Although spectrum users will have stronger incentives to economise on spectrum, reallocation remains an administrative process. Where there is excessive supply, a potential concern is that AIP may place a heavy emphasis on technical efficiency, which may conflict with other needs of businesses.

6.4.3 Equity

It may be argued that AIP increases the transparency of spectrum allocation, by explicitly recognising its economic cost, for both private and public sector users. However, it raises other questions around equity, especially when there is excess supply. A selective application may therefore be necessary.

As discussed previously, AIP necessarily involves considerable simplification. This means that there is an unavoidable trade-off between administrative expediency and certainty, and consideration of individual needs and circumstances.

In addition, there does not appear to be good reasons to apply administrative incentives to existing users if spectrum cannot be allocated to other users. This may be because the bands are subject to international regulation, or because necessary equipment is not available to other users in New Zealand. While the Ministry acknowledges the argument that these restrictions could be changed in the long term, such changes are often not within the control of individual users or the Government. It is not appropriate to impose costs on New Zealand users for what is essentially the responsibility of international regulators.

There are a number of difficulties when AIP is applied to the public sector. In the first place, since AIP reflects market valuation of spectrum, regulators are required to make an economic decision. However, there is no recognition of the benefit of public services under the AIP regime. There is a risk that decision makers can be responsive to easily measured costs but overlook benefits which are often impossible to quantify accurately. Furthermore, because public sector users are constrained in their ability to trade in a market place under an AIP regime, they face punitive incentives for existing and additional requirement for spectrum, but no reward for provision of additional services, or saving in spectrum use.

This is particularly problematic when there is no effective competing demand from the private sector, for example, in the aeronautical and maritime sector. Under such circumstances, AIP provides one way to measure the merits of competing demand among public sector users themselves. However, price signals may not be the most appropriate or effective means to resolve conflicts between the Government's policy objectives. In addition, if the Government's policy is simply to incentivise public sector users to use less spectrum, a more direct approach, such as Cabinet directives, may be more cost-effectively than a complex AIP regime. Ultimately it is the Government's decision whether to allocate less spectrum to the public sector, whether or not a price signal is attached to current use.

Q21: Do you think Administrative Incentive Pricing will improve spectrum allocation under the Radio Licensing Regime?

Q22: If so then which bands should be subjected to Administrative Pricing?

Q23: Do you agree with the Ministry's analysis of the costs and benefits associated with AIP? If not, then please explain why.

Q24: What other costs and benefits associated with AIP should be considered?

Q25: What do you think the impacts of AIP would be on your organisation and other users?

7. Conclusion

The current Radio Licensing Regime appears to be adequate in meeting current and potential demands. There does not appear to be excess demand or signs of competition issues resulting in congestion problems across the whole of spectrum. The Ministry does not consider that there is sufficient evidence supporting radical departure from the current administrative licensing regime at this point. Nonetheless, there are rooms for improvements in terms of administrative flexibility/efficiency and incentives for innovation.

However, the Ministry is aware that there are specific instances, such as K Band STL services in Auckland, where there are potential congestion problems. Further consideration will be given to address these specific problems on a case-by-case basis in conjunction with the Ministry's other work such as the review of the 800/900 MHz spectrum in 2009.

This discussion paper has also considered several potential options, including the status quo with a number of variations, conversion to management rights regime and administrative pricing. These options all have their advantages and disadvantages in terms of efficiency, effectiveness and equity, as discussed above. The relative merits of these options depend on a number of factors, including the magnitude of excess demand amongst other things. A judgement will need to be made whether the benefits of a certain option will outweigh the costs on a case-by-case basis, when more information becomes available.

Q26: Do you agree with the Ministry's assessment of the Radio Licensing Regime?

Q27: Are there any other issues that you think the Ministry should consider?

Q28: Is there any other option that might improve spectrum allocation under the Radio Licensing Regime?

Submissions

Submissions should be provided to the Ministry as soon as practicable, but in any case **before 5.00 pm on Tuesday, 19 May 2009**. This will enable the Ministry to analyse the views provided, undertake any specific discussions deemed necessary, and report to Ministers by end of June 2009.

The Ministry would prefer that submissions be provided electronically to radiospectrum@med.govt.nz in either word or PDF format, with 'Radio Licensing Regime' in the 'Subject' line. Any questions about this paper or the process should be directed to the same email address.

The Ministry's preferred format is:

Respondent's name

Organisation (or, for example, 'private individual')

Nature of organisation's interest (eg, 'TV content producer')

Email address or other address for written communications

Response to Question 1

Response to Question 2

....etc

Any other matters that you believe the Ministry should consider in reviewing this document.

The Ministry notes that submissions are subject to the Official Information Act 1982. If a respondent considers that there are grounds for the Ministry to withhold key information in a submission, this information should be clearly marked and the relevant reason stated so that the Ministry can determine whether withholding may be justified under the Act.

A list of questions is in Appendix A.

Appendix A: List of Questions

Objectives

Q1: Do you agree with these objectives? If not, how would you interpret the objective of spectrum management policy?

Problem and Status Quo

Q2: Do you agree with the Ministry's analysis of the problem above?

Q3: Do you think the Radio Licensing Regime is meeting the objectives discussed previously? If not, what are the problems in your view?

Q4: Are you aware of current or potential congestion problems in individual bands under the Radio Licensing Regime (including bands which are not covered by the technical study)?

Q5: Do you think that further study is needed before any change is recommended? Which bands should be prioritised for review?

Q6: Do you have any quantitative data around the cost of potential congestion (e.g. lost economic value as a result of inability to obtain licences in congested bands)?

Options

Q7: Do you think a localised approach would work to address issues concerning the Radio Licensing Regime? What do you think are its main costs and benefits?

Q8: What do you think should be the relation between competition policies in the downstream service markets and spectrum use?

Q9: What do you think are the best ways to ensure smooth transition when policy changes are made?

Status Quo

Q10: Do you think the status quo is working satisfactorily?

Q11: Do you agree with the Ministry's analysis of the costs and benefits of the status quo above? If not, then please explain why.

Q12: What other benefits and costs associated with the status quo should be considered?

Q13: Do you think the following measures will improve the Radio Licensing Regime, and why?

- Devolution of licensing function
- Improved technical planning
- "Access" seeker regime
- Flexible licence conditions.

Q14: In which bands do you think these measures should apply?

Q15: What do you think the impacts of status quo or any additional measures would be on your organisation and other users?

Management Rights

Q16: Do you think conversion to a Management Rights Regime will improve spectrum allocation under the Radio Licensing Regime?

Q17: Which bands should be considered for conversion to a Management Rights Regime?

Q18: Do you agree with the Ministry's analysis of the costs and benefits associated with conversion of certain bands to the Management Rights Regime? If not, then please explain why.

Q19: What other costs and benefits associated with conversion of certain bands to the Management Rights Regime should be considered?

Q20: What do you think the impacts would be on your organisation and other users if administrative licences are converted to management rights?

Administrative Incentive Pricing

Q21: Do you think Administrative Incentive Pricing will improve spectrum allocation under the Radio Licensing Regime?

Q22: Which bands should be subjected to Administrative Pricing?

Q23: Do you agree with the Ministry's analysis of the costs and benefits associated with AIP? If not, then please explain why.

Q24: What other costs and benefits associated with AIP should be considered?

Q25: What do you think the impacts of AIP would be on your organisation and other users?

Conclusions

Q26: Do you agree with the Ministry's assessment of the Radio Licensing Regime?

Q27: Are there any other issues that you think the Ministry should consider?

Q28: Is there any other option that might improve spectrum allocation under the Radio Licensing Regime?