RADIO SPECTRUM MANAGEMENT

NOT GOVERNMENT POLICY

Renewal of Rights Options:

Management Rights in

1800 & 2100 MHz

MINISTRY OF BUSINESS, INNOVATION & EMPLOYMENT
HĪKINA WHAKATUTUKI

New Zealand Government

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Invitation for comments

Interested parties are invited to comment on the content of this document, in particular the questions posed, and on any related issues. Comments should be submitted in writing, no later than **23 August 2016** to:

By email:

Radio.Spectrum@mbie.govt.nz

Subject line: "Renewal of rights options 1800 & 2100 MHz"

Or

By post:

Renewal of rights options 1800 & 2100 MHz
Radio Spectrum Management Policy and Planning
Ministry of Business, Innovation and Employment
PO Box 2847
WELLINGTON 6140

Any party wishing to discuss the proposals with Ministry officials should email, in the first instance Radio.Spectrum@mbie.govt.nz

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1 Introduction

1. Management rights for cellular services in the 1800MHz and 2100 MHz bands will expire in 2021. These bands, identified for International Mobile Telecommunications (IMT), are currently used by the three main mobile telecommunications providers to deliver 3G and 4G services. The management rights in the 1800 MHz band are evenly distributed between the three mobile network operators, while the management rights in the 2100 MHz band are not distributed evenly.
2. This document explores options for consideration in developing the assignment mechanisms for the future use of management rights used for cellular mobile services in the 1800 MHz and 2100 MHz bands and seeks comments from interested parties.

2 Policy considerations

Radio spectrum is a basic asset for the development and use of New Zealand's national mobile infrastructure – crucial to the growth of broadband networks, applications and high value services. Thus, in designing the renewal of these spectrum rights, the Crown needs to balance an array of issues impacting long-term economic and social outcomes. Therefore, ensuring spectrum allocation processes serve the Crown's broader policy objectives is a primary consideration in the development of MBIE's advice to the Minister for Communications.

Particularities of the radio spectrum assets may also be addressed in the formulation of advice on policy considerations, for example, some bands are better than others for delivering capacity to users versus coverage, impacting on the availability of substitutes for service delivery and service quality. Similarly, market demands for services requiring specific frequencies with certain characteristics may lead to increased competition for accessing key bands – where a limited pool of spectrum assets would require higher efficiencies in spectrum use.

The Crown may consider the following issues as inputs into the decision making process leading to the future allocation of 1800 & 2100 MHz spectrum rights:

- Efficient use of the radio spectrum
- Competition in the mobile market
- Capacity and coverage of cellular mobile services
- Business certainty for operators, and
- Crown revenue

The options and mechanisms laid out in this document will be assessed against each of these issues. This assessment will form the basis of MBIE's advice on the renewal of the 1800 and 2100 MHz spectrum bands.

You may wish to comment on the issues and their relative importance in your response.

3 Bandwidth Allocation Options

Allocation options are considered on the basis that a fixed portion of the spectrum could be offered for renewal. These allocation options take into account parameters such as minimum block size, amount of spectrum not subject to direct renewal and the possible placement of contestable spectrum within the bands. The Ministry wishes to receive feedback from operators on these options.

3.1 Options for 1800 MHz

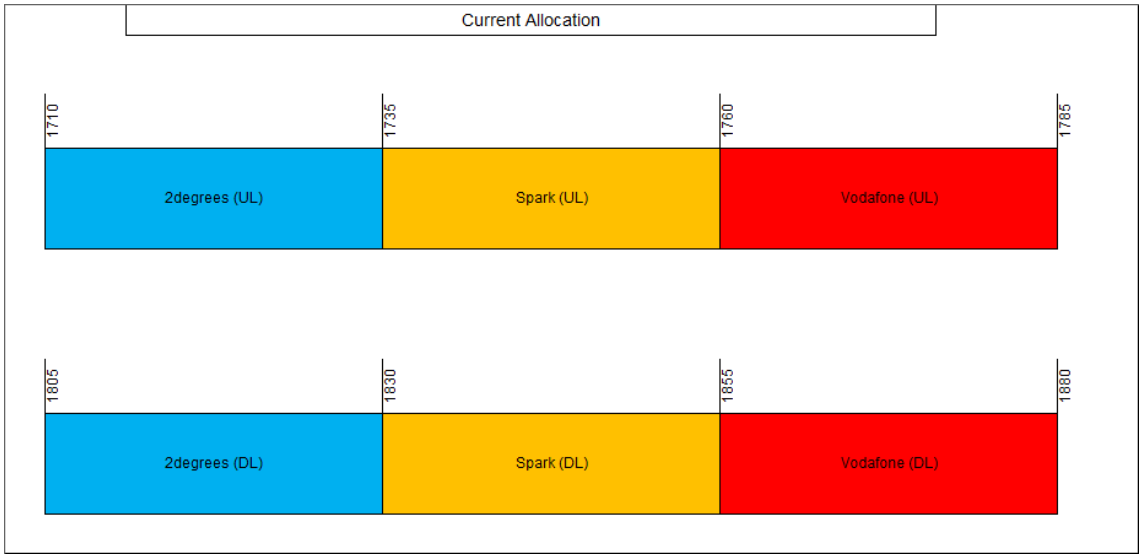


Figure 1. Current allocation in 1800 MHz: Vodafone (2 x 25 MHz), Spark (2 x 25 MHz), 2Degrees (2 x 25 MHz) 3GPP Band 3: 2 x 75 MHz of total available spectrum

The 1800 MHz band (1710-1785 MHz / 1805-1880 MHz) was largely used for GSM when this band was first released. Operators have deployed 4G/LTE services in this band since early 2013, while Vodafone and 2 degrees still retain a small portion of their spectrum in this band for GSM. 4G/LTE networks have the capability of working in pairs of 5, 10, 15 or 20 MHz. While in theory it is possible for 4G/LTE to operate with a smaller 2 x 5 or 2 x 10 MHz spectrum block, it is likely that these configurations would constrain the capability of 4G/LTE networks for a single operator (given that this band is typically used for capacity purposes). The 1800 MHz spectrum band is commonly awarded internationally using either 2 x 15 MHz or 2 x 20 MHz block sizes[1].

[1] Example of 1800 MHz holdings in France

Options 1800 MHz	Commentary
Option one: direct renewal of incumbent holdings	Status quo.
Option two: direct renewal of 20 MHz blocks	This option allows incumbents to secure sufficient spectrum for the latest versions of IMT/IMT-A The vacated 2 x 15 MHz blocks could be made available to interested parties via contestable mechanism or direct assignment (e.g. for commercial or public safety uses)
Option three: direct renewal of 15 MHz blocks	Renewing incumbents will be able to secure access to bandwidth capable of supporting versions of IMT/IMT-A up to 15 MHz bandwidths Freed-up spectrum of 2 x 30 MHz becomes available with this option which would be made available for allocation to interested parties

MBIE notes that in options two and three, the freed-up spectrum could be reassigned via a contestable mechanism.

Question 1: In allocating bandwidth for future 1800 MHz rights, what block size option is the most appropriate?

Question 2: If the allocation configuration for the 1800 MHz band results in vacant spectrum, would a contestable mechanism be appropriate for assigning this spectrum?

Question 3: If the allocation configuration for the 1800 MHz band results in vacant spectrum, where in the band should the vacated spectrum be accommodated? Should this be made available in a contiguous block or fragmented?

3.2 Options for 2100 MHz

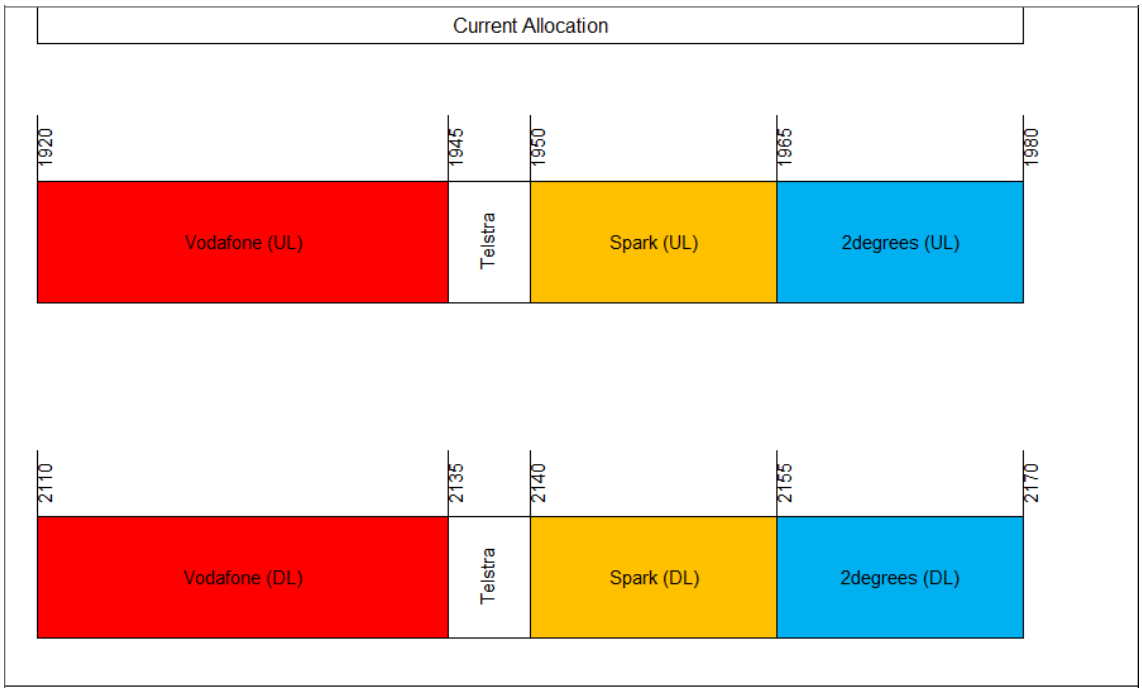


Figure 2. Current allocation in 2100 MHz: Vodafone (2 x 25 MHz), Spark (2 x 15 MHz), 2Degrees (2 x 15 MHz). One unused block of (2 x 5MHz Telstra)
3GPP Band 1: 2 x 60 MHz of total available spectrum

The 2100 MHz band (1920-1980 MHz / 2110-2170 MHz) was largely used for 3G technology based on W-CDMA system (also known as UMTS) when this band was first released. The 3G/UMTS technology has a minimum spectrum requirement of 5 MHz pairs (2 x 5 MHz).

While in theory it may be possible to use only a single 2 x 5 MHz spectrum block, the evolution in 3G/UMTS technology towards HSPA+ system typically requires a minimum of two spectrum blocks to support dual-carrier transmission mode.

The block allocated to Telstra is currently not in use. Considering the inactive status of the Telstra block, it is unlikely this block will be offered for renewal to the incumbent.

Options 2100 MHz	Commentary
Option one: direct renewal of incumbent holdings	Status quo. The question will remain on how to best utilise the spectrum currently assigned to Telstra.
Option two: direct renewal of 20 MHz blocks	This option may affect the operations of Vodafone (currently using 2x 25 MHz) Suitable for future upgrade to 4G
Option three: direct renewal of 15 MHz blocks	Renewing incumbents are able to secure access to bandwidth capable of supporting versions of IMT/ IMT-A up to 15 MHz bandwidths Freed-up spectrum of 2 x 15MHz would be made available for allocation to interested parties

Question 4: In allocating bandwidth for future 2100 MHz rights, what block size option is the most appropriate?

Question 5: If the preferred option is status quo (option one) for allocating future rights in the 2100 MHz band, what would be the most appropriate way to utilize the spectrum portion currently allocated to Telstra?

4 Renewal Term Options

MBIE has devised three Management Rights term options for the renewal of the 1800/2100 MHz management rights. The Ministry wishes to receive feedback from operators on these options.

Options for 1800 and 2100 MHz bands

Options	Commentary
Option one: new 20-year term	Provides operators with high security of tenure
Option two: custom term	Permits a targeted ongoing review of capacity bands in isolation with respect to other bands
Option three: aligning the expiry date of 1800/2100 MHz rights with the expiry dates of sub-GHz bands (expiring in 2031)	Ease of management for government and high degree of certainty for operators in terms of securing access to both coverage and capacity bands

Question 6: Which option is the most suitable for setting the Management Right term of the future rights in the 1800 & 2100 MHz bands? Should these bands be given different renewal terms? If yes, why?

5 Financial aspects

5.1 Payment mechanisms

MBIE has devised two options for scheduling payment of the licence awards. The Ministry wishes to receive feedback from operators on these options.

Options	Commentary
Option one: lump-sum payment	Ease of management and processing
Option two: payment schedule via equal instalments	Easier fund raising for operators and enables spreading costs over a longer period

Question 7: Which payment option is the most suitable for handling payment of the future rights in the 1800 & 2100 MHz bands? If option two is preferred, what should be the payment schedule period?

5.2 Valuation methodology

MBIE is considering exploring the following three options for the valuation of spectrum rights. The Ministry wishes to receive feedback from operators on these options or comments on other relevant models.

Options	Commentary
Option one: full enterprise	Represents the maximum value an operator is willing to pay for spectrum
Option two: cost reduction (or Optimised Deprival Value)	Actual network capacity requirements are considered as part of the total radio network costs
Option three: international benchmarking	Easier to implement as it requires a simple average of the data points used (international awards)

Question 8: What valuation methodologies do you consider appropriate for valuing the future rights in the 1800 & 2100 MHz bands?

Note on valuation models

Full enterprise

The full enterprise value of the spectrum is the Net Present Value (NPV) of the total profit from operating a mobile network, assuming that spectrum is a free input into the business. It is assumed that all profits are derived from the use of spectrum, although in practice part of the value will be derived from other intangible factors (e.g. brand, reputation to customers) that cannot be readily quantified. From the total spectrum holdings, the value of the band in question can be derived from modelling based on Average Revenue per User (ARPU). Thus, the full enterprise value represents the maximum that an operator would be willing to pay for the spectrum being valued.

Cost reduction

The cost-reduction value (also known as Optimized Deprival Value, ODV) is the cost savings from having an additional small or marginal block of spectrum. Cost savings arise principally because the marginal spectrum increases capacity per site and therefore reduces the overall infrastructure requirement and total radio network costs. The calculated cost reduction value is of cost savings over the term of the management right.

Benchmarking

The benchmarking model utilises historical international award data to derive an estimated value per MHz of the spectrum specific to population data. Three benchmarking approaches are generally used:

1. Absolute value approach – most common method based on simple average for a selected set of data points.
2. Relative value approach – using ratios of benchmark prices for different mobile bands to derive values.
3. Econometrics – using econometric models to explain and estimate spectrum values.

6 Mechanisms for assigning rights

MBIE has devised three assignment options for the renewal of the 1800/2100 MHz management rights. The Ministry wishes to receive feedback from operators on these options.

Options	Commentary
Option one: assignment via direct renewal offer	Administratively simple mechanism for awarding licences
Option two: assignment via auction	Allows for market price discovery and ensures transparency
Option three: hybrid – direct renewal offer plus auction of vacant spectrum	Given the possibility of reorganising current holdings for further efficiency, some spectrum could become vacant. Assigning vacant spectrum via contestable mechanisms could encourage new uses (e.g. for commercial or public services)

Question 9: Which option is the most suitable mechanism for assigning the future rights in the 1800 & 2100 MHz bands? Would different assignment mechanisms be more appropriate for each band? If yes, why?

7 Summary of options

OPTIONS FOR ALLOCATING 1800 MHz BANDWIDTH	OPTIONS FOR ALLOCATING 2100 MHz BANDWIDTH	OPTIONS FOR RENEWAL TERM IN 1800 & 2100 MHz BANDS
Option one: direct renewal of incumbents holdings (status quo)	Option one: direct renewal of incumbent holdings (status quo), except Telstra.	Option one: new 20-year term
Option two: direct renewal of 20 MHz blocks	Option two: direct renewal of 20 MHz blocks	Option two: custom licence term
Option three: direct renewal of 15 MHz blocks	Option three: direct renewal of 15 MHz blocks	Option three: aligning rights with sub-GHz bands
OPTIONS FOR PAYMENT MECHANISM	**OPTIONS FOR VALUATION METHOD**	**OPTIONS FOR ASSIGNING RIGHTS**
Option one: lump-sum payment	Option one: full enterprise	Option one: assignment via direct renewal offer
Option two: payment schedule via instalments	Option two: cost reduction (or Optimised Deprival Value)	Option two: assignment via auction
	Option three: international benchmarking	Option three: hybrid – direct renewal offer plus auction of vacant spectrum

8 Summary of questions

Question 1:	In allocating bandwidth for future 1800 MHz rights, what block size option is the most appropriate?
Question 2:	If the allocation configuration for 1800 MHz results in vacant spectrum, would a contestable mechanism be appropriate for assigning this spectrum?
Question 3:	If the allocation configuration for 1800 MHz results in vacant spectrum, where in the band should the vacated spectrum be accommodated? Should this be made available in a contiguous block or fragmented?
Question 4:	In allocating bandwidth for future 2100 MHz rights, what block size option is the most appropriate?
Question 5:	If the preferred option is status quo (option one) for allocating future rights 2100 MHz, what would be the most appropriate way to utilize the spectrum portion currently allocated to Telstra?
Question 6:	Which option is the most suitable for setting the Management Right term of the future rights in the 1800 & 2100 MHz bands? Should these bands be given different renewal terms? if yes, why?
Question 7:	Which payment option is the most suitable for handling payment of the future rights in the 1800 & 2100 MHz bands? If option two is preferred, what should be the payment schedule period?
Question 8:	What valuation methodologies do you consider appropriate for valuing the future rights in the 1800 & 2100 MHz bands?
Question 9:	Which option is the most suitable mechanism for reassigning the future rights in the 1800 & 2100 MHz bands? Would different assignment mechanisms be more appropriate for each band? If yes, why?

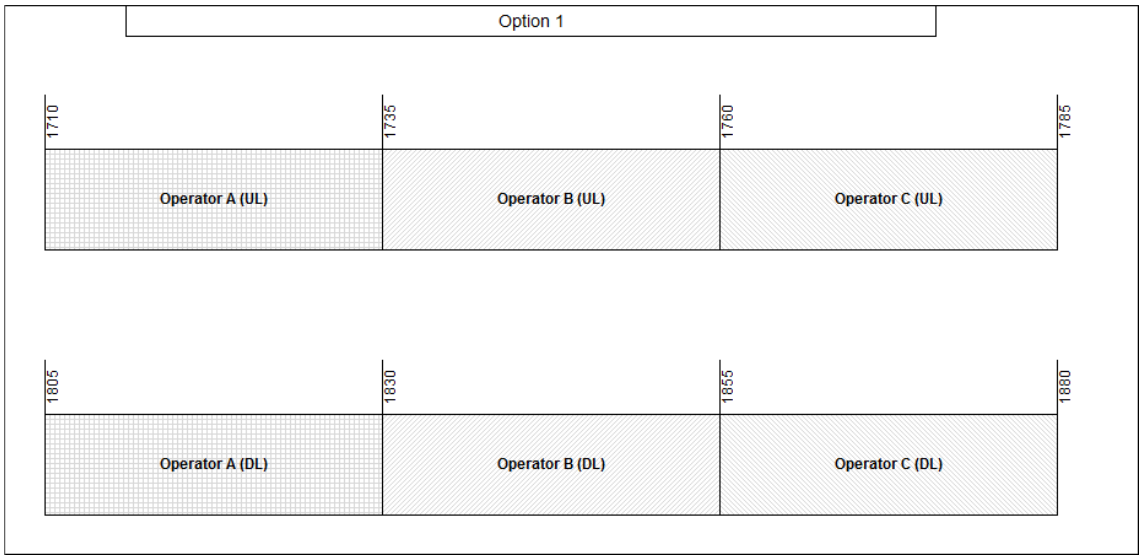
Appendix 1

Pictorial detail of allocation options:

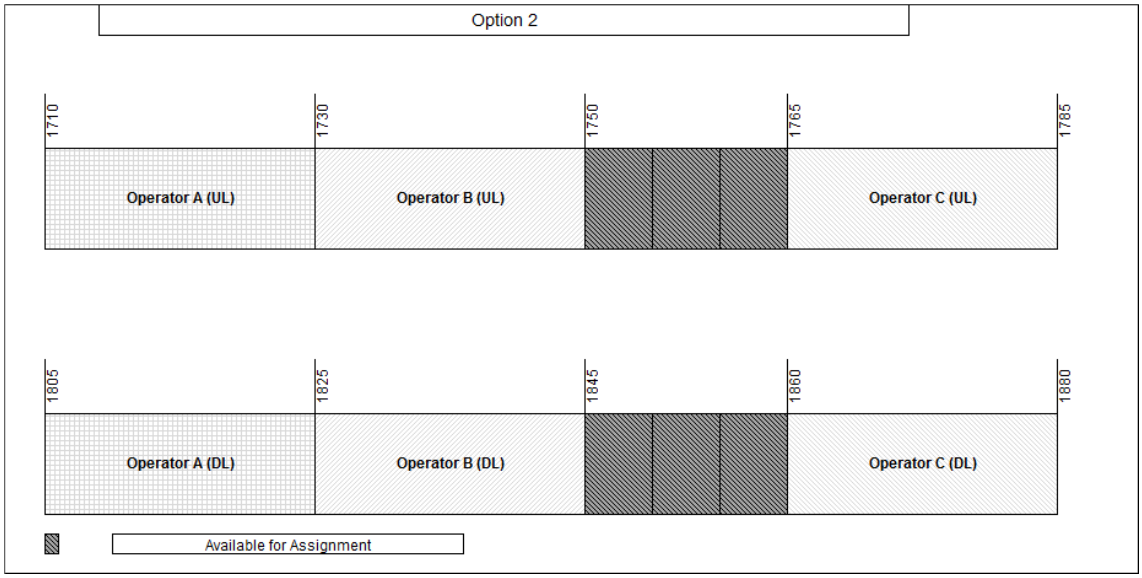
Note: In the below diagrams, the location of direct offer and contestable blocks are indicative only and do not represent any position held by the Ministry.

1800 MHz options

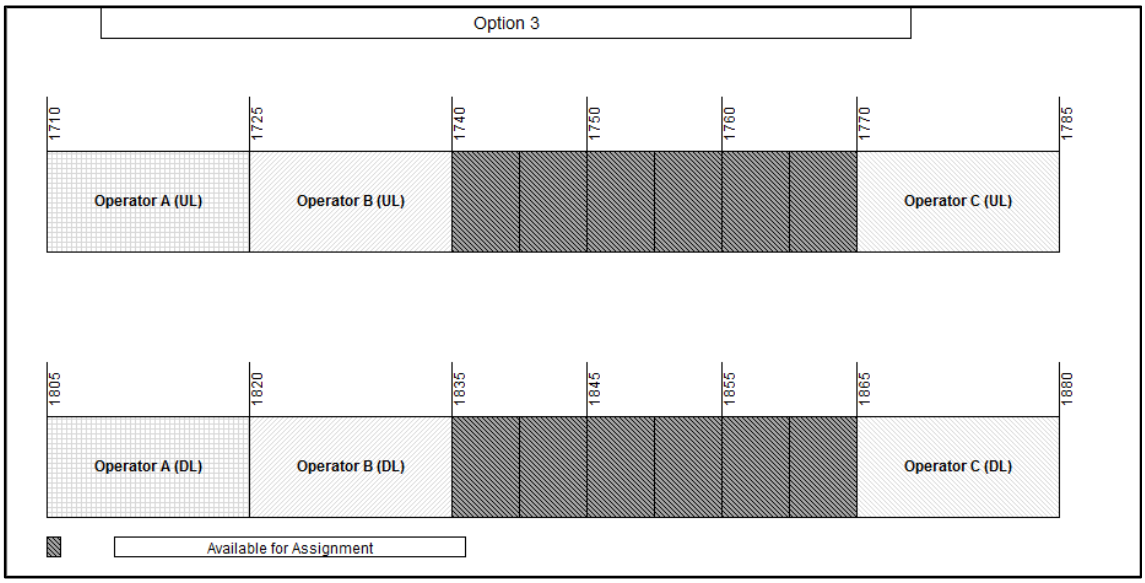
Option one: direct renewal of current holdings (status quo)



Option two: 20 MHz blocks (via direct renewal offer)

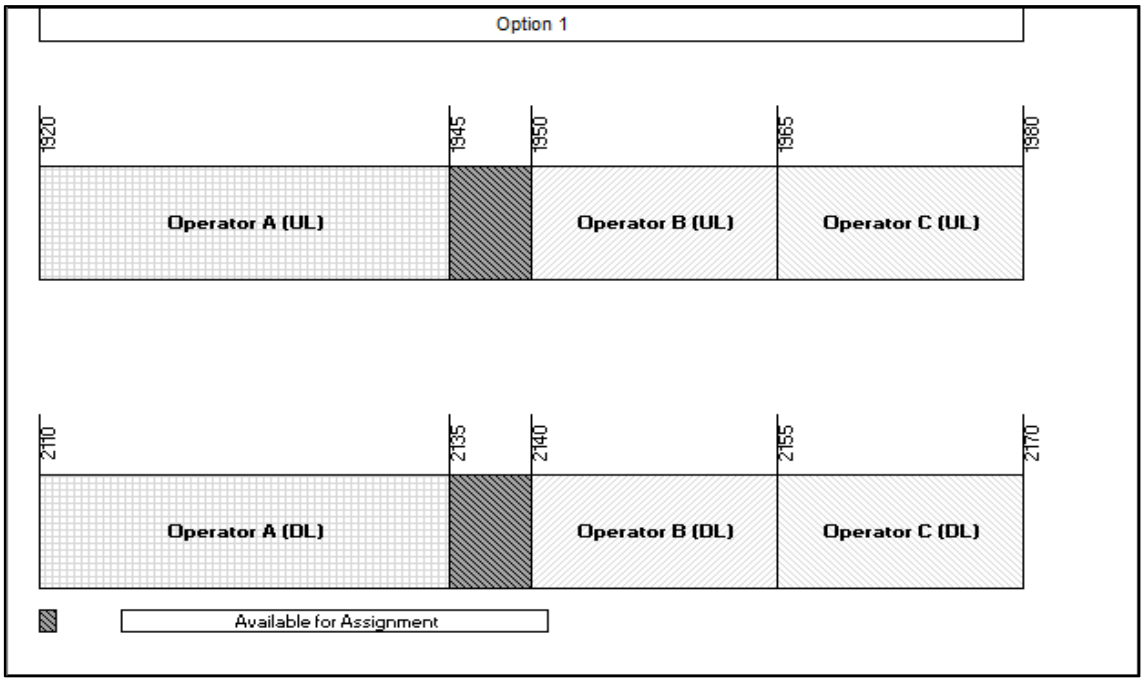


Option three: 15 MHz blocks (via direct renewal offer)

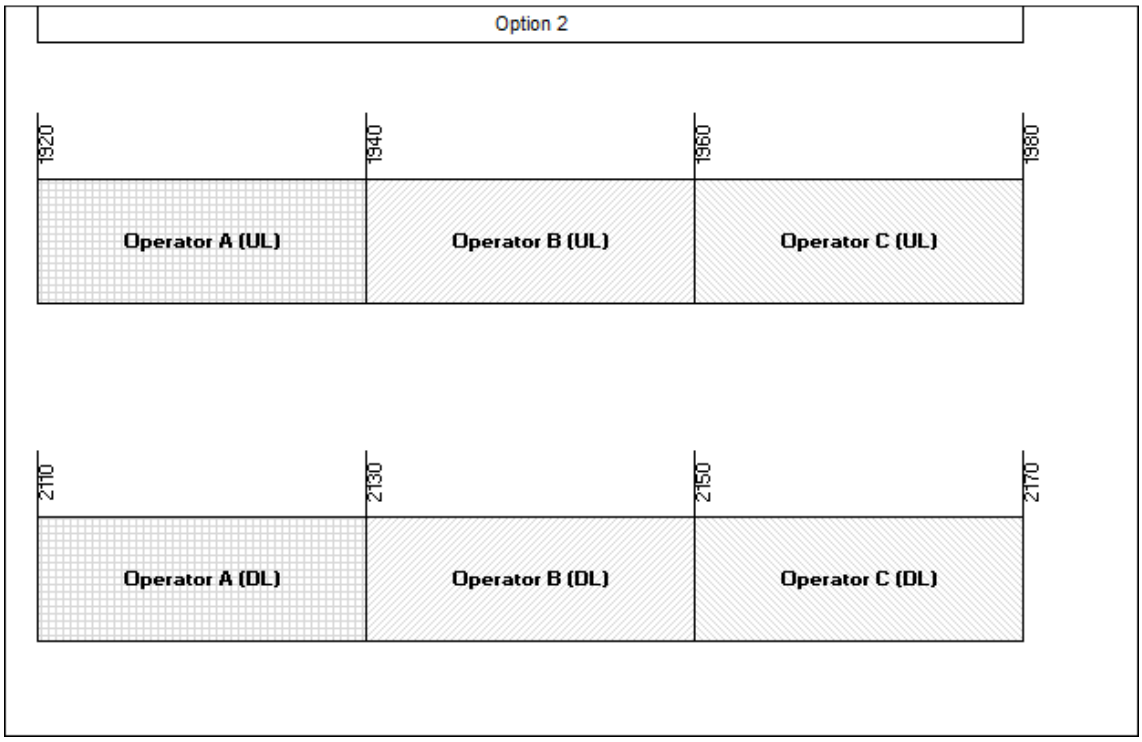


2100 MHz options

Option one: direct renewal of current holdings (status quo), except Telstra.



Option two: equalizing all holdings to 20 MHz blocks (via direct renewal offer)



Option three: equalising all holdings to 15 MHz blocks (via direct renewal offer)