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RADIO SPECTRUM POLICY

STUDIO TO TRANSMITTER LINKS

1. Policy.

The wideband channels in the 400 and 900 MHz frequency bands, commonly known as the STL bands, shall from the date of this policy be reserved exclusively for sound broadcasting studio to transmitter links (STLs).

2. Specific Criteria.

- STLs requiring more than two hops shall **not** be permitted. In areas of particularly high demand, ie Auckland, Hamilton, Wellington, Christchurch and Dunedin metropolitan areas, more than one hop shall not normally be permitted.
- In all cases at least one end of an individual STL shall terminate at a studio or sound broadcasting transmitting site.
- All new STL installations shall meet the requirements of specification RFS 37 for STLs.
- Applications for licences which do not meet the above criteria, but which the applicant believes should be treated as a special case, shall be considered under regulation 15(b) of the Radiocommunications (Radio) Regulations 1993 if fully supported by technical justifications and engineering calculations.

3. General Technical Considerations.

- Wideband (75 kHz, 100 kHz and 150 kHz) channels in the 400 MHz band shall normally be assigned for single monophonic STLs only.

Note: Applications for dual monophonic systems will be considered for obstructed or difficult paths which cannot realistically be serviced at 900 MHz. Such applications must be accompanied by full technical justification and supporting engineering calculations.

- Channels in the 900 MHz bands shall be assigned for single monophonic, dual monophonic or composite stereophonic STLs.
- The use of high performance receive and transmit antennas may be required in congested areas.
- The provisions of regulation 15(b) and (c) of the Radiocommunications (Radio) Regulations 1993 shall apply.

4. General.

Existing linking systems which do not meet these requirements will be allowed to continue to operate for the meantime. However in areas of high demand for STLs the continued licensing of such systems may have to be reviewed on a case by case basis at some future date. The provisions of regulation 15(b) of the Radiocommunications (Radio) Regulations 1993 apply.

5. Background.

Transmission of broadcast quality sound programme material requires the use of wideband links to connect the studio to the broadcasting transmitter site. Many broadcasters have found that the most cost effective method of implementing these links is to use radio links in the bands established for the purpose at 400 MHz and 900 MHz. In the past, adequate radio frequency spectrum resource to meet the demand existed, but with the substantial increase in the number of broadcasters post-deregulation, these bands are being filled rapidly in areas of high demand.

An increasing number of broadcasters have a requirement to network several broadcasting transmitters, and have expressed an interest in using the STL frequency bands to achieve this aim. As the resource is already stretched to the limit, this use cannot be accommodated without denying other broadcasters the opportunity of obtaining an STL channel. Use of the STL bands for networking was not envisaged when the bands were first established, and as a result, there is insufficient spectrum resource available to allow for networking.

The technical requirements of the STL service put quite severe demands on the apparatus, which is required to transmit and receive programme material with an audio bandwidth of at least 15 kHz, while introducing minimal additional distortion and noise. A signal to noise ratio of at least 60 dB, and preferably 70 dB, for the demodulated programme material is required. Such performance demands wide bandwidth channels, so that the deviation can be high enough to optimise the noise/distortion performance. In the 400 MHz band, this requires 75 kHz channels for monophonic programme feeds to AM broadcast stations using 10 kHz audio bandwidth, or 100 kHz to 150 kHz channels for FM broadcast stations using 15 kHz audio bandwidth. In the 900 MHz band, channel bandwidths of 250 kHz and 500 kHz are necessary for monophonic and composite stereo transmissions respectively. Because of the limited initial demand for STL services, only two bands were subdivided into channel bandwidths suitable for STLs; namely the 404-406/410-414/418-420 MHz, and the 915-921/929-935 MHz bands.

AM and monophonic FM broadcasters can have their requirements met in either the 400 MHz band, where 75 kHz, 100 kHz and 150 kHz channels are available, or the 900 MHz band where 250 kHz and 500 kHz channels are available. It is preferable for AM broadcasters to use the 400 MHz band, where the available 75 kHz channels are adequate for their purpose. Dual monophonic or composite stereophonic STL channels are only available in the 900 MHz band, as the number of 100 kHz and 150 kHz channels at 400 MHz is insufficient to allow dual monophonic usage except in the more remote rural areas, and the channels at 400 MHz are too narrow to accommodate a composite emission.

Linking frequencies in the 400 MHz range in particular have the technical advantage of being able to provide an adequate service over a moderately obstructed path. This can allow the use of a single hop link over a path with up to 20 dB of obstruction loss, whereas the use of a 900 MHz frequency would require a two hop link.

Multi-hop links to provide onward linking from a broadcasting transmitter site also cause frequency planning problems. At any STL receive site, the particular frequencies used are determined by the number of STLs receivers at that site. Where usage is light, frequencies in only one half of the band are used. Where demand is high, it may be necessary to use frequencies in both halves of the band. At any site used for onward linking, it is essential to have all the receivers in either the low or the high half of the band, and this precludes the use of one half of the band for reception purposes. Therefore, a site where a large number of broadcasters intend to operate cannot realistically be used for onward linking.

The ability to use a site for onward linking can be negated by the need to use an STL transmitter in the other half of the band to preclude interference to adjacent frequency receivers in the vicinity of the STL transmitter; ie to avoid a high/low conflict.

Where a requirement for networking, or multi-hop linking exists, it should be met by using either wireline connection, microwave backbone bearers, or satellite bearers, rather than seeking assignments in the heavily used STL bands. While these are not ideal solutions from the economic viewpoint, they are the only possible approaches which will leave the STL channels available for their intended purpose.

To assist in maximising the reuse of channels in the 900 MHz band, the Ministry reserves the right to require the use of high performance antennas in congested areas, such as the Auckland, Hamilton, Wellington, Nelson, Christchurch and Dunedin metropolitan areas. It is important that the STL receive antennas are also of the same performance standard as the STL transmit antennas, as their rejection of unwanted co- and adjacent-channel signals is a prime determining factor in allowing channel reuse.

Approved By:

**Manager
Radio Spectrum Policy**