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RADIO SPECTRUM POLICY

17.7 – 20.1 GHz Band Plan

1 Purpose

The re-allocation of the spectrum 18.7-19.3 GHz to the FIXED SATELLITE service (FSS) as a co-primary service to the FIXED service (FS) at WRC 97 required a re-consideration of New Zealand utilisation of this part of the spectrum. This policy describes the manner in which both services can be accommodated by band segmentation. ITU-R Resolution 130¹ and ITU-R Resolution 538² apply.

2 Policy

From the date of publication of this POLDOC the use of the spectrum 17.7-19.7 GHz shall be in accordance with the following criteria, the allocation table at [Annex 1](#), the band and channel plan at [Annex 2](#), and the detailed channeling plans at [Annex 3](#).

3 Specific Criteria

To make provision for non-GSO FSS, no further assignments will be made to the FS in the 18.8 - 19.3 GHz spectrum, **unless they cannot be accommodated in the 19.3 - 19.7 GHz spectrum**. Any new assignments to the FS will be made in the 19.3 - 19.7 GHz spectrum, and the paired spectrum shown in Annex 2. If new assignments to the FS cannot be accommodated in the 19.3 - 19.7 GHz spectrum, they will be placed in the 19.05-19.3 GHz spectrum which is already partially occupied by fixed services.

If any satellite service provider requires access to more than the currently unoccupied 250 MHz of spectrum in the 18.8 - 19.05 GHz frequency range (that is, access to any part of the 250 MHz of spectrum in the 19.05 – 19.3 GHz frequency range), co-ordination with any FS licensees operating in the specified spectrum will be necessary.

As grantor of radio licences in these bands, the Ministry will facilitate the initiation of such co-ordination discussions. The Ministry will not, however –

- a) grant the satellite operator a radio licence affording protection from harmful interference from co-channel emissions in the specified spectrum [regulation 8(3)(b)(ii)]; and
- b) revoke any FS licence relating to the specified spectrum [regulation 15(2)] –

except at the request in writing of any affected FS licensee.

¹ Use of non-geostationary systems in the fixed-satellite service in certain frequency bands

² Use of the frequency bands covered by appendices S30/30 and S30A/30A by non-geostationary-satellite systems in the fixed-satellite service

In parallel with the generation of policy to allow the introduction of the FSS, it is appropriate to define the parameters which apply to the FS use of the band. These are:

- Spectral efficiency This is required to be better than 1 bit per Hz. In heavily congested areas, it is highly desirable to use equipment which can achieve better efficiencies in order to conserve spectrum and maximise channel reuse.
- Notional antenna 300 mm high-performance parabolic dish with half-power beamwidth of 3.6° and on-axis gain =>33.5 dBi. Note: High sites such as Skytower require high performance antennas of at least 600 mm diameter to provide maximum frequency reuse and improved immunity to interference.
- Use of passive repeaters Passive repeaters are not permitted in areas of high usage or demand because of the negative impact on frequency reuse.
- Minimum path length 2 km.

4 General Technical Considerations

Calculations have shown that non-GSO FSS earth station receivers cannot be coordinated with terrestrial FS transmitters using the same frequency range, as the earth stations can be located anywhere in the country. In spite of the significant discrimination provided by the earth station antenna and the high minimum elevation angle of 40° for the earth station antenna, the potentially close proximity of the FS transmitters would still adversely affect the earth station receivers in significant parts of the major metropolitan areas.

To allow the introduction of this new FSS technology that will provide ubiquitous broadband communications, it is necessary to segment the 18 GHz band.

Considering that by 1 September 2001, the 19.3 – 19.7 GHz spectrum had been utilized to capacity in Auckland, licences may have to be issued in the 19.05 – 19.3 GHz spectrum to meet demand, as provided for above.

5 General - Primary User Status

Primary User status is a concept that was developed to assist major FS users of the spectrum to minimise the provisioning of spares for their equipment. Rather than select the next available channel, each major user was allotted a block of channels, and all assignments to that client were made from its Primary User block. This meant that only one model of spare equipment had to be held, rather than the four to six sets that would be required if random channels were assigned. As the number of channels available to the FS has been substantially reduced by the reservation of spectrum for the FSS in this band, the concept of Primary User status for blocks of channels cannot be continued for this band.

Verified by:

Approved By:

Manager – Spectrum Planning

Manager – Operational Policy

ANNEX 1 – Table of Allocations

Frequency (GHz)		Allocation to Services	
Lower	Upper	ITU Region 3	New Zealand
17.70	– 18.10	FIXED FIXED-SATELLITE (space-to-Earth) S5.484A (Earth – space) S5.516 MOBILE	FIXED
18.10	- 18.40	FIXED FIXED-SATELLITE (space-to-Earth) S5.484A (Earth – space) S5.520 MOBILE S5.519 S5.521	
18.40	- 18.60	FIXED FIXED-SATELLITE (space-Earth) S5.484A MOBILE	
18.60	- 18.80	FIXED FIXED-SATELLITE (space-Earth) MOBILE except Aero mobile Earth exploration satellite (passive) Space research (passive) S5.484A, S5.522, S5.523A	
18.80	- 19.05	FIXED FIXED-SATELLITE (space-Earth) S5.523A MOBILE	
19.05	- 19.30		FIXED-SATELLITE (space-Earth) S5.523A MOBILE Fixed
19.30	-19.70		FIXED FIXED-SATELLITE (space-Earth)
19.30	-19.70	FIXED FIXED-SATELLITE (space-Earth) (Earth-space) MOBILE S5.523B, S5.523C, S5.523D, S5.523E	FIXED
19.70	- 20.10	FIXED-SATELLITE (space-Earth) Mobile-satellite (space-Earth)	

S5.484A Use by non-geostationary and geostationary-satellite systems in the fixed-satellite service is subject to the provisions of Resolution **130**. The use of the band 17.8-18.1 GHz (space-to-Earth) by non-geostationary fixed-satellite service systems is also subject to the provisions of Resolution **538**.

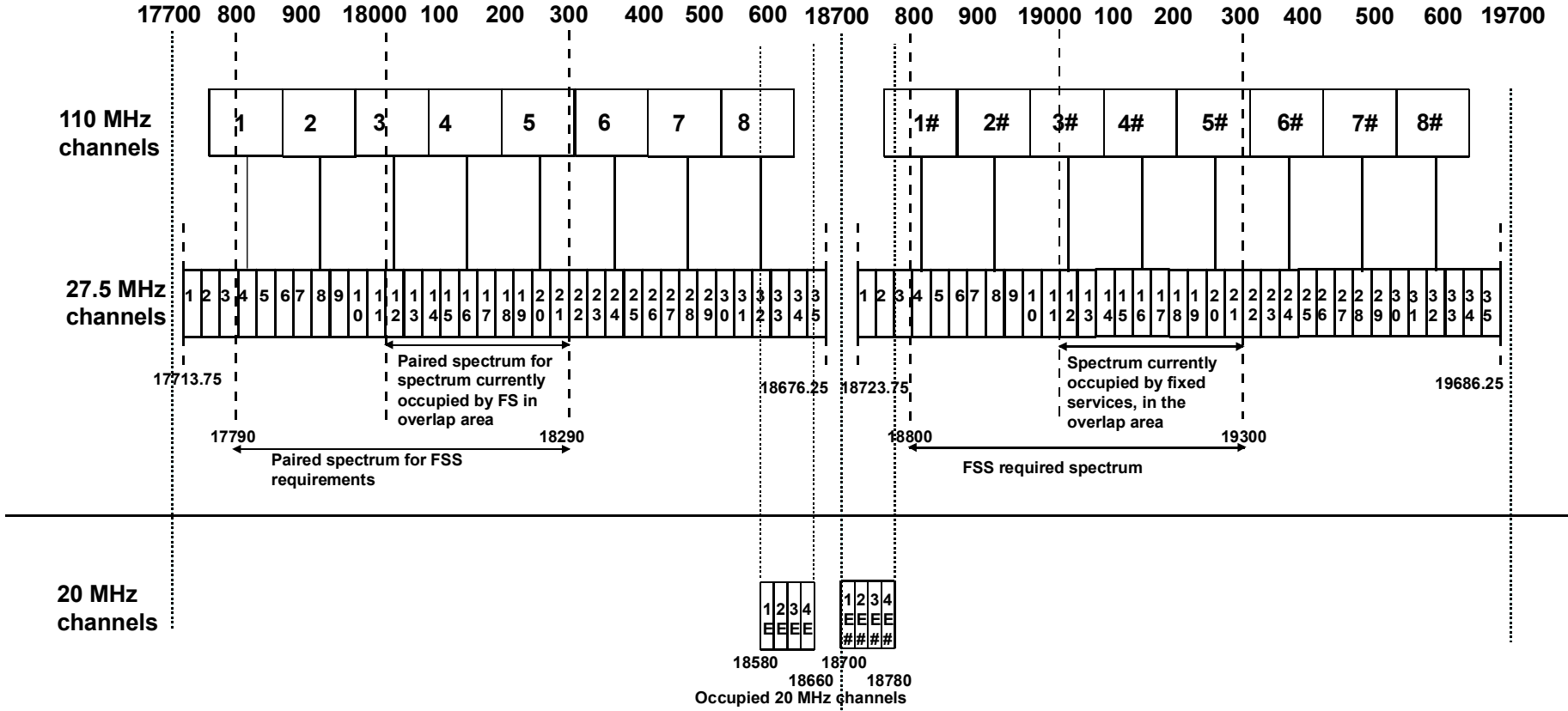
S5.516 The use of the band 17.3-18.1 GHz by geostationary-satellite systems in the fixed-satellite service (Earth-to-space) is limited to feeder links for the broadcasting-satellite service. The use of the bands 17.3-18.1 GHz (Earth-to-space) by non-

geostationary-satellite systems in the fixed-satellite service is subject to the provisions of Resolution **538**.

- S5.519** The band 18.1-18.3 GHz is also allocated to the meteorological-satellite service (space-to-Earth) on a primary basis. Its use is limited to geostationary satellites and shall be in accordance with the provisions of Article **S21**, Table **S21-4**.
- S5.520** The use of the band 18.1-18.4 GHz by the fixed-satellite service (Earth-to-space) is limited to feeder links for the broadcasting-satellite service.
- S5.521** Alternative allocation: in Germany, Denmark, the United Arab Emirates, Greece, Slovakia and the Czech Republic, the band 18.1-18.4 GHz is allocated to the fixed, fixed-satellite (space-to-Earth) and mobile services on a primary basis (see No. S5.33). The provisions of No. S5.519 also apply. (WRC-97)
- S5.522** In making assignments to stations in the fixed and mobile services, administrations are invited to take account of passive sensors in the Earth-exploration satellite and space research services operating in the band 18.6- 18.8 GHz. In this band, administrations should endeavour to limit as far as possible both the power delivered by the transmitter to the antenna and the e.i.r.p. in order to reduce the risk of interference to passive sensors to the minimum.
- S5.523A** The use of the bands 18.8-19.3 GHz (space-to-Earth) and 28.6-29.1 GHz (Earth-to-space) by geostationary and non-geostationary fixed-satellite service networks is subject to the application of the provisions of No. **S9.11A** and No. **S22.2** does not apply. Administrations having geostationary-satellite networks under coordination prior to 18 November 1995 shall cooperate to the maximum extent possible to coordinate pursuant to No. **S9.11A** with non-geostationary-satellite networks for which notification information has been received by the Bureau prior to that date, with a view to reaching results acceptable to all the parties concerned. Non-geostationary-satellite networks shall not cause unacceptable interference to geostationary fixed-satellite service networks for which complete Appendix **S4** notification information is considered as having been received by the Bureau prior to 18 November 1995.
- S5.523B** The use of the band 19.3-19.6 GHz (Earth-to-space) by the fixed-satellite service is limited to feeder links for non-geostationary-satellite systems in the mobile-satellite service. Such use is subject to the application of the provisions of No. **S9.11A**, and No. **S22.2** does not apply.
- S5.523C** **S22.2** of the Radio Regulations shall continue to apply in the band 19.3-19.6 GHz, between feeder links of non-geostationary mobile-satellite service networks and those fixed-satellite service networks for which complete Appendix **S4** coordination information, or notification information, is considered as having been received by the Bureau prior to 18 November 1995.
- S5.523D** The use of the band 19.3-19.7 GHz (space-to-Earth) by geostationary fixed-satellite service systems and by feeder links for non-geostationary-satellite systems in the mobile-satellite service is subject to the application of the provisions of No. **S9.11A**, but not subject to the provisions of No. **S22.2**. The use of this band for other non-geostationary fixed-satellite service systems, or for the cases indicated in Nos. **S5.523C** and **S5.523E**, is not subject to the provisions of No. **S9.11A** and shall continue to be subject to Articles **S9** (except No. **S9.11A**) and **S11** procedures, and to the provisions of No. **S22.2**.

S5.523E **S22.2** of the Radio Regulations shall continue to apply in the bands 19.6-19.7 GHz, between feeder links of non-geostationary mobile-satellite service networks and those fixed-satellite service networks for which complete Appendix **S4** coordination information, or notification information, is considered as having been received by the Bureau by 21 November 1997.

ANNEX 2 – Band & Channel Plan
18 GHz band F.595-5



ANNEX 3 – 18 GHz Band 17700 - 19700 MHz (Plan A) Channelling

110 MHz Channelling

<u>Channel ITU-R</u> <u>Rec F.595-5</u>	<u>Channel</u> <u>PIB22</u>	<u>Frequency</u>	<u>Assoc. Freq</u>
1	18G1A	17810.000	18820.000
2	18G2A	17920.000	18930.000
3	18G3A	18030.000	19040.000
4	18G4A	18140.000	19150.000
5	18G5A	18250.000	19260.000
6	18G6A	18360.000	19370.000
7	18G7A	18470.000	19480.000
8	18G8A	18580.000	19590.000

55 MHz Channelling

<u>Channel ITU-R</u> <u>Rec F.595-5</u>	<u>Channel</u> <u>PIB22</u>	<u>Frequency</u>	<u>Assoc. Freq</u>
1	18G1B1	17755.000	18765.000
2	18G1B2	17810.000	18820.000
3	18G2B1	17865.000	18875.000
4	18G2B2	17920.000	18930.000
5	18G3B1	17975.000	18985.000
6	18G3B2	18030.000	19040.000
7	18G4B1	18085.000	19095.000
8	18G4B2	18140.000	19150.000
9	18G5B1	18195.000	19205.000
10	18G5B2	18250.000	19260.000
11	18G6B1	18305.000	19315.000
12	18G6B2	18360.000	19370.000
13	18G7B1	18415.000	19425.000
14	18G7B2	18470.000	19480.000
15	18G8B1	18525.000	19535.000
16	18G8B2	18580.000	19590.000

27.5 MHz Channelling

<u>Channel ITU- R Rec F.595-5</u>	<u>Channel PIB22</u>	<u>Frequency</u>	<u>Assoc. Freq</u>
1	18G1C1	17727.500	18737.500
2	18G1C2	17755.000	18765.000
3	18G1C3	17782.500	18792.500
4	18G1C4	17810.000	18820.000
5	18G2C1	17837.500	18847.500
6	18G2C2	17865.000	18875.000
7	18G2C3	17892.500	18902.500
8	18G2C4	17920.000	18930.000
9	18G3C1	17947.500	18957.500
10	18G3C2	17975.000	18985.000
11	18G3C3	18002.500	19012.500
12	18G3C4	18030.000	19040.000
13	18G4C1	18057.500	19067.500
14	18G4C2	18085.000	19095.000
15	18G4C3	18112.500	19122.500
16	18G 4C4	18140.000	19150.000
17	18G 5C1	18167.500	19177.500
18	18G 5C2	18195.000	19205.000
19	18G 5C3	18222.500	19232.500
20	18G 5C4	18250.000	19260.000
21	18G 6C1	18277.500	19287.500
22	18G 6C2	18305.000	19315.000
23	18G 6C3	18332.500	19342.500
24	18G 6C4	18360.000	19370.000
25	18G 7C1	18387.500	19397.500
26	18G 7C2	18415.000	19425.000
27	18G 7C3	18442.500	19452.500
28	18G 7C4	18470.000	19480.000
29	18G 8C1	18497.500	19507.500
30	18G 8C2	18525.000	19535.000
31	18G 8C3	18552.500	19562.500
32	18G 8C4	18580.000	19590.000

Note: Channel 6C3 is subdivided for 3.5 and 7 MHz channels

7 MHz Channelling

<u>Channel PIB22</u>	<u>Frequency</u>	<u>Assoc. Freq</u>
18G6ND7	18325.5	19335.5
18G6ND8	18332.5	19342.5
18G6ND9	18339.5	19349.5

3.5 MHz Channelling

<u>Channel PIB22</u>	<u>Frequency</u>	<u>Assoc. Freq</u>
18G6E1	18322.0	19332.0
18G6E2	18325.5	19335.5
18G6E3	18329.0	19339.0
18G6E4	18332.5	19342.5
18G6E5	18336.0	19346.0
18G6E6	18339.5	19349.5
18G6E7	18343.0	19353.0

ANNEX 4 – 17700 - 19700 MHz 18 GHz Band (Plan B) Channelling

20 MHz Channelling

<u>Channel PIB22</u>	<u>Frequency</u>	<u>Assoc. Freq</u>
1D	18480.000	18710.000
2D	18500.000	18730.000
3D	18520.000	18750.000
4D	18540.000	18770.000
5D	18560.000	18790.000
6D	18580.000	18810.000
7D	18600.000	18830.000
8D	18620.000	18850.000
9D	18640.000	18870.000
10D	18660.000	18890.000
11D	18680.000	18910.000

20 MHz Channelling

<u>Channel PIB22</u>	<u>Frequency</u>	<u>Assoc. Freq</u>
1E	18590.000	18710.000
2E	18610.000	18730.000
3E	18630.000	18750.000
4E	18650.000	18770.000
5E	18670.000	18790.000
6E	18690.000	18810.000
7E	18470.000	18830.000
8E	18490.000	18850.000
9E	18510.000	18870.000
10E	18530.000	18890.000
11E	18550.000	18910.000
12E	18570.000	18930.000

Note These 20 MHz channels are not available for new assignments, but are included for reference purposes in relation to existing licences.