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# RADIO SPECTRUM POLICY

## 10 GHz –17.70 GHz Band Plan

### 1 Policy. 22/02/2000

On application, licences for radio transmission (and reception protection) in the range 10 GHz to 17.70 GHz, will only be granted according to the allocations and associated frequency ranges indicated in section 2 of this document.

### 2 Specific Criteria.

The following table shows the frequencies and associated service allocations adopted, from the International Radio Regulations table of allocations, by Radio Spectrum Management for use in New Zealand. The first column gives the frequency range that an allocation in the second column applies to. The second column shows the complete allocations for ITU region 3, within which lies New Zealand. The third column shows which region 3 allocations are adopted for use by New Zealand. Entries in upper case indicate primary allocation status, entries in lower case indicate secondary allocation status, entries in parenthesis qualify the associated allocation.

Applicable ITU Footnotes are reproduced following the table, and all references contained therein refer to the ITU Radio Regulations Edition of 1998. In the interests of brevity, footnotes **not** pertaining to New Zealand have been omitted.

Frequency (GHz)		Allocation to Services	
Lower	Upper	ITU Region 3	New Zealand
10.00	- 10.45	FIXED MOBILE RADIOLOCATION Amateur S5.479	RADIOLOCATION Amateur S5.479
10.45	- 10.50	RADIOLOCATION Amateur Amateur-satellite	
10.50	- 10.55	FIXED MOBILE RADIOLOCATION	FIXED ('H' band)
10.55	- 10.60	FIXED MOBILE except aeronautical mobile Radiolocation	

Frequency (GHz)		Allocation to Services	
Lower	Upper	ITU Region 3	New Zealand
10.60	- 10.68	EARTH EXPLORATION-SATELLITE (passive) FIXED MOBILE except aeronautical mobile RADIO ASTRONOMY SPACE RESEARCH (passive) Radiolocation S5.149, S482	
10.68	- 10.70	EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) S5.340	SPACE RESEARCH (passive)
10.70	- 11.70	FIXED FIXED-SATELLITE (s – e) MOBILE except aeronautical mobile S5.484A, S5.441	FIXED ('Z' band)
11.70	- 12.20	FIXED MOBILE except aeronautical mobile BROADCASTING BROADCASTING-SATELLITE S5.487, S5.487A, S5.492	BROADCASTING (including DATACASTING) BROADCASTING SATELLITE S5.487
12.20	- 12.375	FIXED MOBILE except aeronautical mobile BROADCASTING FIXED SATELLITE (s – e) S5.484A, S5.491	BROADCASTING (including DATACASTING) FIXED SATELLITE (s – e) S5.484A, S5.491
12.375	- 12.50		FIXED SATELLITE (s – e) S5.484A, S5.491
12.50	- 12.75	FIXED FIXED-SATELLITE(s – e) MOBILE except aeronautical mobile BROADCASTING-SATELLITE S5.484A, S5.493	BROADCASTING SATELLITE FIXED SATELLITE (s – e) S5.484A, S5.493
12.75	- 13.25	FIXED FIXED-SATELLITE(e – s) MOBILE Space research (deep space) (s – e) S5.441	FIXED ('X' band)
13.25	- 13.40	EARTH EXPLORATION-SATELLITE (active) AERONAUTICAL RADIONAVIGATION SPACE RESEARCH (active) S5.497, S5.498A	
13.40	- 13.75	EARTH EXPLORATION-SATELLITE (active) RADIOLOCATION SPACE RESEARCH Standard frequency and time signal-satellite (e – s) S5.501A, S5.501B	
13.75	- 14.00	FIXED SATELLITE (e – s) RADIOLOCATION Standard frequency and time signal-satellite (Earth-to-space) Space research S5.491, S5.502, S5.503, S5.503A	FIXED SATELLITE (e – s) S5.491, S5.506

Frequency (GHz)		Allocation to Services	
Lower	Upper	ITU Region 3	New Zealand
14.00	- 14.25	FIXED SATELLITE(e – s) RADIONAVIGATION Mobile-satellite (e – s) except aeronautical Space research S5.491, S5.506, S5.504	
14.25	- 14.30	FIXED SATELLITE (e – s) RADIONAVIGATION Mobile-satellite (e – s) except aeronautical Space research S5.491, S5.506, S5.504	
14.30	- 14.40	FIXED FIXED SATELLITE (e – s) MOBILE except aeronautical mobile Mobile-satellite (e – s) except aeronautical Radionavigation satellite S5.491, S5.506	
14.40	- 14.47	FIXED FIXED-SATELLITE (e – s) MOBILE except aeronautical mobile Mobile-satellite (e – s) except aeronautical Space research (s – e) S5.491, S5.506	
14.47	- 14.50	FIXED FIXED-SATELLITE(e – s) MOBILE except aeronautical mobile Mobile-satellite (e – s) except aeronautical Radio astronomy S5.149, S5.491, S5.506	
14.50	- 14.80	FIXED FIXED-SATELLITE (e – s) MOBILE Space research S5.510	FIXED ('G' band)
14.80	- 15.35	FIXED MOBILE Space research S5.339	
15.35	- 15.40	EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) S5.340	
15.40	- 15.43	AERONAUTICAL RADIONAVIGATION S5.511D	
15.43	- 15.63	FIXED-SATELLITE (s – e)(e – s) AERONAUTICAL RADIONAVIGATION S.5.511A, S5.511C	
15.63	- 15.70	AERONAUTICAL RADIONAVIGATION S5.511D	
15.70	- 16.60	RADIOLOCATION	
16.60	- 17.10	RADIOLOCATION Space research (deep space)(e – s)	
17.10	- 17.30	EARTH EXPLORATION-SATELLITE (active) RADIO ASTRONOMY SPACE RESEARCH (active) S5.513A	

Frequency (GHz)		Allocation to Services	
Lower	Upper	ITU Region 3	New Zealand
17.30	- 17.70	FIXED-SATELLITE (e – s) Radiolocation S5.516	

- S5.149** In making assignments to stations of other services to which the bands: 10.6-10.68 GHz, 14.47-14.5 GHz are allocated, administrations are urged to take all practicable steps to protect the radio astronomy service from harmful interference.
- S5.339** The band 15.20-15.35 GHz is also allocated to the space research (passive) and earth exploration-satellite (passive) services on a secondary basis.
- S5.340** All emissions are prohibited in the bands: 10.68-10.7 GHz, except those provided for by No. **S5.483**, 15.35-15.4 GHz, except those provided for by No. **S5.511**.
- S5.441** The use of the bands 10.7- 10.95 GHz (space-to-Earth), 11.2-11.45 GHz (space-to-Earth) and 12.75-13.25 GHz (Earth-to-space) by geostationary-satellite systems in the fixed-satellite service shall be in accordance with the provisions of Appendix **S30B**. The use of the bands 10.7-10.95 GHz (space-to-Earth), 11.2-11.45 GHz (space-to-Earth) and 12.75-13.25 GHz (Earth-to-space) by non-geostationary-satellite systems in the fixed-satellite service shall be in accordance with the provisions of Resolution **130**.
- S5.479** The band 9 975-10 025 MHz is also allocated to the meteorological-satellite service on a secondary basis for use by weather radars.
- S5.482** In the band 10.6-10.68 GHz, stations of the fixed and mobile, except aeronautical mobile, services shall be limited to a maximum equivalent isotropically radiated power of 40 dBW and the power delivered to the antenna shall not exceed –3 dBW. These limits may be exceeded subject to agreement obtained under No. **S9.21**.
- 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**.
- S5.487** Shall not cause harmful interference to broadcasting-satellite stations operating in accordance with the provisions of Appendix **S30**.
- S5.487A** The band 11.7-12.2 GHz, is also allocated to the fixed-satellite service (space-to-Earth) on a primary basis, limited to non-geostationary systems and subject to the provisions of Resolution **538**.
- S5.491** Limited to national and sub-regional systems. The power flux-density limits in Article **S21**, Table **S21-4** shall apply to this frequency band.
- S5.492** Assignments to stations of the broadcasting-satellite service in conformity with the appropriate regional Plan in Appendix **S30** may also be used for transmissions in the fixed-satellite service (space-to-Earth), provided that such transmissions do not cause more interference or require more protection from interference than the broadcasting-satellite service transmissions operating in conformity with this Plan. With respect to the space services, this band shall be used principally for the broadcasting-satellite service.
- S5.493** Limited to a power flux-density not exceeding  $-111 \text{ dB(W/m}^2\text{)}/27 \text{ MHz}$  for all conditions and for all methods of modulation at the edge of the service area.
- S5.497** Limited to Doppler navigation aids.
- S5.498A** The Earth exploration-satellite (active) and space research (active) services shall not cause harmful interference to, or constrain the use and development of, the aeronautical radionavigation service.
- S5.501A** Limited to active spaceborne sensors. Other uses of the band by the space research service are on a secondary basis.
- S5.501B** The Earth exploration-satellite (active) and space research (active) services shall not cause harmful interference to, or constrain the use and development of, the radiolocation service.
- S5.502** In the band 13.75-14 GHz, the e.i.r.p. of any emission from an earth station in the fixed-satellite service shall be at least 68 dBW, and should not exceed 85 dBW, with a minimum antenna diameter

of 4.5 m. In addition the e.i.r.p., averaged over one second, radiated by a station in the radiolocation or radionavigation services towards the geostationary-satellite orbit shall not exceed 59 dBW.

- S5.503** In the band 13.75-14 GHz, geostationary space stations in the space research service for which information for advance publication has been received by the Bureau prior to 31 January 1992 shall operate on an equal basis with stations in the fixed-satellite service; after that date, new geostationary space stations in the space research service will operate on a secondary basis. The e.i.r.p. density of emissions from any earth station in the fixed-satellite service shall not exceed 71 dBW in any 6 MHz band in the frequency range 13.772-13.778 GHz until those geostationary space stations in the space research service for which information for advance publication has been received by the Bureau prior to 31 January 1992 cease to operate in this band. Automatic power control may be used to increase the e.i.r.p. density above 71 dBW in any 6 MHz band in this frequency range to compensate for rain attenuation, to the extent that the power-flux density at the fixed-satellite service space station does not exceed the value resulting from use of an e.i.r.p. of 71 dBW in any 6 MHz band in clear sky conditions.
- S5.503A** Until 1 January 2000, stations in the fixed-satellite service shall not cause harmful interference to non-geostationary space stations in the space research and Earth exploration-satellite services. After that date, these non-geostationary space stations will operate on a secondary basis in relation to the fixed-satellite service. Additionally, when planning earth stations in the fixed-satellite service to be brought into service between 1 January 2000 and 1 January 2001, in order to accommodate the needs of spaceborne precipitation radars operating in the band 13.793-13.805 GHz, advantage should be taken of the consultation process and the information given in Recommendation ITU-R SA.1071.
- S5.504** The use of the band 14-14.3 GHz by the radionavigation service shall be such as to provide sufficient protection to space stations of the fixed-satellite service.
- S5.506** The band 14-14.5 GHz may be used, within the fixed-satellite service (Earth-to-space), for feeder links for the broadcasting-satellite service, subject to coordination with other networks in the fixed-satellite service.
- S5.510** The use of the band 14.5-14.8 GHz by the fixed-satellite service (Earth-to-space) is limited to feeder links for the broadcasting-satellite service.
- S5.511D** Fixed-satellite service systems for which complete information for advance publication has been received by the Bureau by 21 November 1997 may operate in the bands 15.4-15.43 GHz and 15.63-15.7 GHz in the space-to-Earth direction and 15.63-15.65 GHz in the Earth-to-space direction. In the bands 15.4-15.43 GHz and 15.65-15.7 GHz, emissions from a non-geostationary space station shall not exceed the power flux-density limits at the Earth's surface of  $-146 \text{ dB(W/m}^2 \text{ /MHz)}$  for any angle of arrival. In the band 15.63-15.65 GHz, where an administration plans emissions from a non-geostationary space station that exceed  $-146 \text{ dB(W/m}^2 \text{ /MHz)}$  for any angle of arrival, it shall coordinate under No. **S9.11A** with the affected administrations. Stations in the fixed-satellite service operating in the band 15.63-15.65 GHz in the Earth-to-space direction shall not cause harmful interference to stations in the aeronautical radionavigation service (No. **S4.10** applies).
- S5.511A** Use of the band 15.43-15.63 GHz by the fixed-satellite service (space-to-Earth (see Resolution **123**) and Earth-to-space) is limited to feeder links of non-geostationary systems in the mobile-satellite service, subject to coordination under No. **S9.11A**. In the space-to-Earth direction, the minimum earth station elevation angle above and gain towards the local horizontal plane and the minimum coordination distances to protect an earth station from harmful interference shall be in accordance with Recommendation ITU-R S.1341. Also in the space-to-Earth direction, harmful interference shall not be caused to stations of the radio astronomy service using the band 15.35-15.4 GHz. The threshold levels of interference and associated power flux-density limits which are detrimental to the radio astronomy service are given in Recommendation ITU-R RA.769-1. Special measures will need to be employed to protect the radio astronomy service in the band 15.35-15.4 GHz.
- S5.511C** Stations operating in the aeronautical radionavigation service shall limit the effective e.i.r.p. in accordance with Recommendation ITU-R S.1340. The minimum coordination distance required to protect the aeronautical radionavigation stations (No. **S4.10** applies) from harmful interference from feeder-link earth stations and the maximum e.i.r.p. transmitted towards the local horizontal plane by a feeder-link earth station shall be in accordance with Recommendation ITU-R S.1340.

- S5.513A** Spaceborne active sensors operating in the band 17.2-17.3 GHz shall not cause harmful interference to, or constrain the development of, the radiolocation and other services allocated on a primary basis.
- 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.
- S5.522** 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.

### **3 General Technical Considerations.**

In accordance with the Radiocommunications (radio) Regulations regulation 15A, when granting a licence under regulation 12 or 13 the Secretary will have regard to the International Radio Regulations as an agreement made between New Zealand and any other country or countries.

#### **4 General.**

Internationally, the radio spectrum is managed and regulated via the International Telecommunications Union (ITU), an international government organisation within the United Nations family of organisations. The ITU-R publishes its articles, recommendations, resolutions and associated appendices as the International Radio Regulations. Article S5 of the International Radio Regulations, 1998 Edition, contains the internationally agreed spectrum allocations.

The New Zealand Government has ratified the International Radio Regulations by virtue of being a signatory to the ITU 1979 Geneva agreement and not indicating otherwise.

#### **5 Background.**

The radio spectrum, comprising emissions of radio energy, is characterised by being electromagnetic in nature and oscillatory with carrier frequencies (or combinations of carrier frequencies) between 9 kHz and 300 GHz. Radio spectrum management can be effected by dividing the spectrum into discrete blocks or bands with possible service uses being allocated to these bands.

Radio licensing, either administrative, or competitive, is a mechanism for managing the use of in-band, wanted emissions of radio energy whilst at the same time mitigating the effect of out of band, unwanted, spurious, harmful and/or harmonic emissions of radio energy.

**Approved By:**

**Manager Spectrum Planning**