Supplementary document to the Radio Licence Certification Rules (PIB 38)

Rules for Fixed Satellite Service Earth station licensing in the 17.7 – 20.2 GHz (space to Earth) and 27.5 – 30.0 GHz (Earth to space) frequency bands

Contents

Version number	Date issued	Description
1.1 (in force)	19 May 2026	Updates on: • Added a table of contents. • Clarifying that User Terminal / VSAT specific point and all New Zealand blanket licensing are available in 29.5 -30 GHz. • Correcting the power spectral density towards the horizontal plane. • Clarifying and providing further information on the calculation of power flux density for different cases in section 3.3.2.2. Note, further clarifications may be made in the next update. • Clarified some of the parameters to be recorded in the RRF in section 4.1. • Corrected some of the licence conditions in section 4.3. • Made other editorial corrections and amendments.
1.0	7 April 2026	First publication

1. Background

Between 2021 -2026 the radio spectrum replanning and consultation process was undertaken on the 24 -30 GHz frequency range. Initial high level allocation decisions were made by Cabinet in August 2023 for the following allocations:

- The 26 GHz frequency band is to be allocated primarily to mobile service use. This will include its applications such as International Mobile Telecommunications (IMT) and Fixed Wireless Access (FWA). There is an option to include some satellite services in specific areas of New Zealand under technical conditions (e.g., Earth Exploration Satellite Service (EESS) and Space Research Service (SRS) (space-to-Earth)).

- The 28 GHz band is to be split into two portions:
    - 27.5 – 28.35 GHz frequency range, which is to be shared between mobile and fixed-satellite services (Earth-to-space) (including its applications, e.g., Earth Station in Motion (ESIM)) with the appropriate sharing model.
    - 28.35 – 29.5 GHz frequency range will be allocated primarily for satellite services, with the option to include some mobile use under technical conditions (to be defined).

Following technical discussions with stakeholders through three technical working groups, a consultation was published for comment on 17 October 2025. Final decisions were published on RSM's website on 7 April 2026. See https://www.rsm.govt.nz/projects-and-auctions/current-projects/future-use-of-the-24-30-ghz-spectrum for details.

There are a number of outcomes from this consultation that are outlined on the website that will need to be implemented in due course, a general outline is given in Figure 1. Decisions were also made for the 17.7 -20.2 GHz frequency band. This document implements the outcomes for Fixed Satellite Service (FSS) Earth stations providing the licensing rules that apply for the bands in scope.

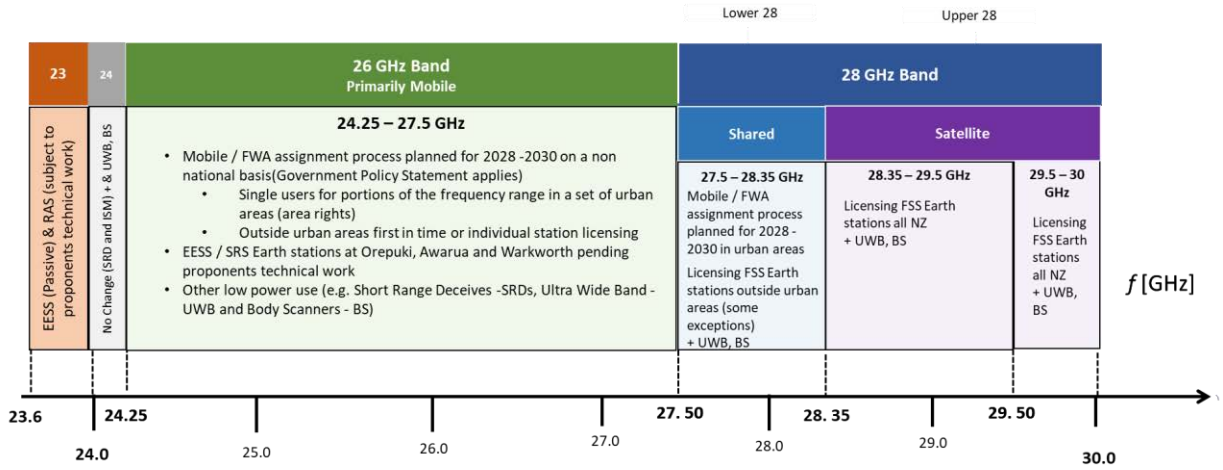

Figure 1: General outline of the outcomes for the 24 -30 GHz frequency range[1]

2. Scope and intention

This document provides set of rules to engineer and apply for licenses for Fixed Satellite Service Earth stations in the following frequency bands:

- 17.7 – 20.2 GHz (space to Earth)
- 27.5 -28.35 GHz (Earth to space) - lower 28 GHz
- 28.35 -29.5 GHz (Earth to space) and 29.5 -30 GHz (Earth to space) - upper 28 GHz.

These rules cover the following types of Earth stations and related licence types:

- Gateway / feeder link Earth stations
- User terminals / Very Small Aperture Terminals (VSATs) Earth stations

In future the rules will be updated to cover the following types of Earth stations and related licence types[2]:

- Land Earth Stations in Motion (L-ESIM)

[1] See https://www.rsm.govt.nz/projects-and-auctions/current-projects/future-use-of-the-24-30-ghz-spectrum for specific details

[2] Note some ESIMs may currently be under General User Licences in the 29.5 -30 GHz frequency range https://www.rsm.govt.nz/about/our-work/general-user-licences.

- Aeronautical Earth Stations in Motion (A-ESIM)
- Maritime Earth Stations in Motion (M-ESIM)

These rules include restrictions that apply to Earth station licensing to ensure that licences accurately reflect the use and ensure that the 27.5 -28.35 GHz frequency range (shared frequencies on a geographic basis – see section 3.3) remain largely available for future Mobile / Fixed Wireless Access stations in urban areas around area of the country. Assignment processes for Mobile / Fixed Wireless Access are anticipated to be around the 2028 -2030 period alongside the 26 GHz assignment process.

To date, Fixed Satellite Service Earth stations have been licensed on a case-by-case basis under fixed term licences with no expectation of being able to continue beyond the expiry date. Current licences are set to expire on 31 May 2026. One outcome of the 24 -30 GHz process is to provide ongoing access to spectrum for Fixed Satellite Service Earth stations, which are within these licensing rules, subject to Radio Spectrum Management's (RSM) normal spectrum replanning processes.

These rules need to be read in conjunction with the Radio Licence Certification Rules (PIB 38), in particular section 5 'Space Services'. It should be noted that in reading Section 5, the 27.5 -30.0 GHz frequency band is open to licensing as per Table 10 of PIB 38 in accordance with the rules in this Annex. Paragraph 1 of section 5.1.1 of PIB 38 is also superseded by these rules.

These also need to be read in conjunction with Radio Licence Policy Rules (PIB 58) and the Operational Satellite Policy (PIB 60) as well as RSM's other documentation on it's website.

In due course the rules in this supplementary document are intended to be included in RSMs standard PIB documentation, including Radio Licence Certification Rules (PIB 38), upon the next updates. This may include clarifications and corrections. Any suggestions should be emailed to RSMLicensing@mbie.govt.nz in line with the process set out in PIB 38.

3. Specific rules for licensing FSS Earth stations in the 17.7 -20.2 GHz and 27.5 -30 GHz frequency bands

This provides the specific rules for licensing according to the different frequency ranges and types of Earth stations.

Table 1: Overview FSS Earth station types in the 17-7 -20.2 GHz and 27.5 -30 GHz and licensing rules

Type of FSS Earth station	Licensing rules overview
17.7 -20.2 GHz FSS (space to Earth) Earth stations	
Gateway / Feeder Link Earth station	**Open for licensing** - For existing Earth stations, from the date of publication of these rules until 17:00 22 May 2026. - For all other (e.g. new) stations, applications can be submitted from 09:00 8 June 2026

Type of FSS Earth station	Licensing rules overview
	- Available for receive protection licences for specific point locations anywhere in NZ (i.e. no geographic restrictions) - Shared with existing fixed service stations, treated on a first-in-time basis
User Terminal / Very Smal Aperture Terminal (VSAT)	**Open for licensing** - For existing Earth stations, from the date of publication of these rules until 17:00 22 May 2026 - For all other (e.g. new) stations: applications can be submitted from 09:00 8 June 2026 - Available for receive protection licences but only for specific point locations anywhere in NZ (i.e. no geographic restrictions) - Shared with existing fixed service stations, treated on a first-in-time basis - Not available for non-point location / area location licences which are not protected (opportunistic)
Aeronautical Earth Station In Motion (A-ESIM) Maritime Earth Station In Motion (M-ESIM) Land Earth Station in Motion (L-ESIM)	**Licensing arrangements to be developed** - Planned to be made available for receive protection licences but only for specific point locations in NZ (e.g. a point location where the ESIM is stationary) - Shared with existing fixed service stations, treated on a first-in-time basis - Not available for non-point location / area location licences are not protected (opportunistic)
27.5 -28.35 GHz FSS (Earth to space) Earth stations (Shared band)	
Gateway / Feeder Link Earth station	**Open for licensing** - For existing Earth stations, from the date of publication of these rules until 17:00 22 May 2026 - For all other (e.g. new) stations: applications can be submitted from 09:00 8 June 2026 - Available for transmit licences for specific locations anywhere in NZ outside of specific geographic areas along with technical rules - Existing Earth stations that were licensed before 2026 can continue and they may add additional licences to that location / site - Shared with future mobile / fixed wireless access by geographic area – see section 3.3 - There is an application window for Earth stations in urban areas - see section 3.3.4
User Terminal / Very Small Aperture Terminal (VSAT)	- **Open for licensing**

Type of FSS Earth station	Licensing rules overview
	- For existing Earth stations, from the date of publication of these rules until 17:00 22 May 2026 - For all other (e.g. new) stations: applications can be submitted from 09:00 8 June 2026 - Available for Earth to space licences but only for specific point locations outside of specific geographic areas along with technical rules - Shared with future mobile / fixed wireless access by geographic area – see section 3.3 **Licensing arrangements to be developed** - Planned to be available for blanket licensing, likely based on Territorial Local Authorities (TLAs) outside of specific geographic areas along with technical rules pending satisfactory evidence of operational measures to protect those geographic areas (e.g. geofencing)
Aeronautical Earth Station In Motion (A-ESIM)	**Licensing arrangements to be developed** - Planned to be made available for specific point locations in NZ (e.g. a point location where the ESIM is stationary) - Planned to be made available under a blanket licence with technical conditions based on ITU Radio Regulations, Resolutions 169 and 123 (e.g. altitude above 3000 m and a Power Flux Density (PFD) limit)
Maritime Earth Station In Motion (M-ESIM)	**Licensing arrangements to be developed** - Planned to be made available for specific point locations in NZ (e.g. a point location where the ESIM is stationary) - Planned to be made available for transmit blanket licences with technical conditions based on ITU Radio Regulations, Resolutions 169 and 123 (e.g. 70 km from the coast and Effective Isotropic Radiated Power (EIRP) spectral density limit)
Land Earth Station in Motion (L-ESIM)	**Not available for licensing**
28.35 -29.5 GHz FSS (Earth to space) Earth stations	
Gateway / Feeder Link Earth station	**Open for licensing** - Existing Earth stations from the date of publication of these rules until 17:00 22 May 2026 - New Earth station applications from 09:00 8 June 2026

Type of FSS Earth station	Licensing rules overview
	- Available for transmit licences for specific point locations anywhere in NZ under technical rules
User Terminal / Very Smal Aperture Terminal (VSAT)	**Open for licensing** - Existing Earth stations from the date of publication of these rules until 22 May 2026 - New Earth station applications from 09:00 8 June 2026 - Available for Earth to space licences for specific point locations anywhere in NZ - Available for blanket licences (e.g. covering consumer user terminals) likely based on All New Zealand basis
Aeronautical Earth Station In Motion (A-ESIM)	**Licensing arrangements to be developed** - Planned to be made available for specific point locations in NZ (e.g. a point location where the ESIM is stationary) - Planned to be made available for transmit blanket licences, likely based on an 'All New Zealand' basis, with technical conditions based on ITU Radio Regulations, Resolutions 169 and 123 (e.g. 70 km from the coast and EIRP spectral density limit) - Alternative limits may be considered
Maritime Earth Station In Motion (M-ESIM)	**Licensing arrangements to be developed** - Planned to be made available for specific point locations in NZ (e.g. a point location where the ESIM is stationary) - Planned to be made available for transmit blanket licences with technical conditions based on ITU Radio Regulations Resolutions 169 and 123 (e.g. altitude above 3000 m and a PFD limit) - Alternative limits may be considered
Land Earth Station in Motion (L-ESIM)	**Licensing arrangements to be developed** - Planned to be made available for specific point locations in NZ (e.g. a point location where the ESIM is stationary) - Planned to be made available for transmit blanket licences, likely based on an 'All New Zealand' basis, with technical conditions outlined in the consultation (see sections 2.4.1 and 3.4)
29.5 -30.0 GHz FSS (Earth to space) Earth stations	
Gateway / Feeder Link Earth station	**Open for licensing** - Existing Earth stations from the date of publication of these rules until 17:00 22 May 2026

Type of FSS Earth station	Licensing rules overview
	- New Earth station applications from 09:00 8 June 2026 - Available for transmit licences for specific locations anywhere in NZ
User Terminal / Very Small Aperture Terminal (VSAT)	**Open for licensing,** - Can continue under the General User Radio Licence (GURL) for the time being, this is planned for replacement with a a blanket licences (e.g. covering consumer user terminals), likely based on an 'All New Zealand' basis, to replace the provisions in the GURL. Comparable technical conditions to the GURL will apply - Available for Earth to space licences for specific point locations anywhere in NZ - Available for blanket licences (e.g. covering consumer user terminals) likely based on All New Zealand basis
Aeronautical Earth Station In Motion (A-ESIM) Maritime Earth Station In Motion (M-ESIM) Land Earth Station in Motion (L-ESIM)	**Licensing arrangements to be developed** - Can continue under the GURL for the time being - Planned development of a blanket licences (e.g. covering consumer user terminals). likely based on an 'All New Zealand' basis, to replace the provisions in the GURL - Comparable technical conditions to the GURL likely to apply

For clarity, the 17.3-17.7 GHz (space to Earth), 24.65 -25.25 (Earth to space) and 27.0 -27.5 GHz (Earth to space) frequency bands are not available for Fixed Satellite Service Earth station use or licensing. The 20.2 -21.2 GHz (space to Earth) and 30 -31 GHz (Earth to space) frequency bands are already covered in PIB 38 and are for government satellite communications only.

Upon the publications of these rules there are an existing set of licences (see Search Licences) for Gateway / Feeder link Earth Stations and User terminals for 14 locations involving three licensees, these sites are listed in 3.3.3. These are deemed to be 'existing Earth stations' and in-line with decisions are allowed to continue with further expansion on those sites permitted under these rules. These licensees have been contacted directly and invited to apply for subsequent licences to follow the existing licence commencing on 1 June 2026. These licensees have been given until 17:00 22 May 2026 (New Zealand Time) to lodge their applications, after this date these will no longer be deemed to be 'existing Earth stations' and it is assumed that that those Earth station licences are longer required. It is noted that licences who held maritime ESIMs are not 'existing' and will need to reapply under the new rules. From the publication of these rules until 09:00 8 June 2026, RSM is only processing the existing licences for the 17.7 -20.2 GHz (space to Earth) and 27.5 -30 GHz (Earth to space) and not accepting new applications. New applications may be lodged in accordance with these rules from 09:00 8 June 2026 (New Zealand Time).

Noting that this is a new set of rules with new procedures, **it is recommended that Approved Persons first lodge a single application and see this through the licensing process before lodging bulk applications**. This will allow any errors to be rectified early in the process and avoid having a large number of applications all declined at once due to errors on all of the applications.

3.1. Specific rules for 17.7 -20.2 GHz FSS (space to Earth) Earth stations

The following types of Earth stations and receive protection licence types are permitted in the 17.7 – 20.2 GHz (space to Earth) frequency range:

- Gateway / Feeder Link Earth station, for specific point locations anywhere in NZ (i.e. no geographic restrictions).
- User Terminal / Very Small Aperture Terminal (VSAT) Earth stations for specific point locations anywhere in NZ (i.e. no geographic restrictions).

This is subject to the rules in this document and the rules in PIB 38, PIB 58 and PIB 60 along with other RSM documentation.

In-line with section 5 of PIB 38, Earth stations that are operating space to Earth (downlink) receive only (i.e. there is no transmitter in New Zealand) are not considered to need individual licences in New Zealand, unless receive protection is required (also see PIB 60). FSS operators using this approach are doing so on an opportunistic basis and need to accept the risk that RSM provides no status to such receive licences and such use will not be protected from interference or considered ongoing development of Fixed service stations and future spectrum re-planning or licensing reform RSM may undertake.

Receive protection licences are not available for non- point location / area licences which are not protected and are on an opportunistic basis.

Licences must not be created for point locations where there is no intention of operating an Earth station from that location (e.g. reserving spectrum). Note that 'use or lose' applies in accordance with the Radio Licence Policy Rules (PIB 58) and Regulation 15C, *Radiocommunications Regulations 2001*.

It is envisaged that the rules will be updated at a future point to allow A-ESIM, M-ESIM and L-ESIM receive protection licences for specific point location when the ESIM is not in motion (e.g. stationary at a Port, Airport or logistics hub) and these will likely be licenced on a comparable basis to a user terminal.

The 17.7 – 20.2 GHz frequency is shared between FSS (space-to-Earth) Earth stations and Fixed Service stations on a first-in-time station by station basis. Meaning that the any new or planned licences for stations must protect and / or accept interference from planned or current licences for stations recorded in the Register of Radio Frequencies (RRF) prior to the new or planned licence.

Fixed service stations operating within 17.7 – 20.2 GHz are in accordance with the channel plans set out in PIB 22 and the technical as well as policy rules set out in PIB 38 and PIB 58, respectively. This also includes various restrictions on licensing for some of the fixed link channels in the

frequency range 18.8 - 19.05 GHz and 19.05 - 19.3 GHz portions of the band, as highlighted in Section 5.7 of PIB 58.

Approved Persons need to consider interference between the Earth station and terrestrial stations (i.e. Fixed Service stations) in-line with sections 5.5 and 5.6 of PIB 38.

In cases where an Approved person finds that a specific existing fixed service station does not meet the protection criteria for the Earth station but the applicant still wishes to have receive protection licence (e.g. receive protection licences need to be considered when licensing future fixed service stations) then they still may proceed to license under conditions in 4.3.

Table 2: Minimum technical conditions for gateway / feeder link and User terminal Very Small Aperture Terminal Earth stations

Parameter	Minimum requirement for gateway / feeder link	Minimum requirement for user terminal / VSAT	Notes
Licensee	Satellite network operator or Earth station operator or provider		See section 3.3.5
Term / duration	None		Expiry date is optional, licences no longer need to have an expiry date
Geographic / sharing restrictions	None – Anywhere in New Zealand subject to technical compatibility		
Location type	Specific point locations only		Area licences not available for receive protection (opportunistic basis only).
Antenna Arrays	See section 5.2.2 'Antenna Arrays' of PIB 38 except the array's boundary does not exceed 30 m from that boundary's centroid instead of 15 m currently in PIB 38		In due course PIB 38 will be updated to change 15m to 30m
Antenna make and model	Must be provided		
Antenna pattern	ITU Radio Regulations Appendix 8, Recommendations ITU-R S.465, ITU-R S.524, ITU-R S.580 (GSO) ITU-R S.672 (GSO) or ITU-R S.1428 (NGSO), measured / actual as applicable		Measured antenna pattern should be provided in the antenna reference data

Parameter	Minimum requirement for gateway / feeder link	Minimum requirement for user terminal / VSAT	Notes
Polarisation	Must be provided		
Minimum elevation with respect to the local horizontal plane	10 degrees		Must be accurately recorded Must be reciprocal with the Earth to space licence (e.g. 30° elevation should appear on both licences)
Antenna height above ground level	No limit – must be accurately recorded		This height is to the centre of the antenna
Feeder loss	Must be provided		Recoded in conditions see section 4.3
Protection criteria	-10 dB I/N		
Shielding	Shielding is not required but if it is used detailed information should be provided on the azimuth that shielding exists and the attenuation it provided		See section 3.3.7

3.2. Specific rules for 27.5 -30.0 GHz FSS (Earth to space) Earth stations

The 27.5 -30 GHz (Earth to space) frequency range has separate sub bands and the following types of Earth stations and transmit licence types:

- 27.5 -28.35 GHz (Earth to space) -Lower 28 GHz (Shared):
  - Gateway / Feeder Link Earth station, for specific point locations in Fixed Satellite Service Geographic areas (Outside Urban areas) as outlined in section 3.3 (note there are some exceptions - see section 3.3.3).
  - User Terminal / Very Small Aperture Terminal (VSAT) for specific point locations in Fixed Satellite Service Geographic areas (Outside Urban areas) as outlined in section 3.3 (note there are some exceptions).
- 28.35 -29.5 GHz (Earth to space) -Upper 28 GHz:
  - Gateway / Feeder Link Earth station, for specific point locations anywhere in NZ (i.e. no geographic restrictions).

    - User Terminal / VSAT Earth stations for specific point locations anywhere in NZ (i.e. no geographic restrictions).
    - Available for blanket licences (e.g. covering consumer user terminals) on an 'All New Zealand' basis.
- 29.5 -30 GHz (Earth to space) -Upper 28 GHz:
    - Gateway / Feeder Link Earth station, for specific point locations anywhere in NZ (i.e. no geographic restrictions).
    - User Terminal / VSAT Earth stations for specific point locations anywhere in NZ (i.e. no geographic restrictions).
    - User Terminal / VSAT wide area use, may be covered by the General User Radio Licence for Satellite Services. Note this will be migrated to a blanket licence to individual licensees in due course.
    - Earth stations in Motion (L-ESIM, A-ESIM, M-ESIM) may be covered by the General User Radio Licence for Satellite Services, General User Radio Licence for Aeronautical Purposes or the General User Radio Licence for Maritime Purposes. Note this will be migrated to a blanket licence for individual licensees in due course.

In-line with section 5 of PIB 38, all transmitting Earth Stations (Earth to space / uplink) within New Zealand must be licensed.

Licences must not be created for point locations where there is no intention of operating an Earth station from that location (e.g. to reserve spectrum for potential future plans). Note that 'use or lose' applies in accordance with the Radio Licence Policy Rules (PIB 58) and *Radiocommunications Regulations 2001*, Regulation 15C.

Approved Persons need to consider interference between the Earth station and terrestrial stations (i.e. Fixed Service stations) in-line with sections 5.5 and 5.6 of PIB 38.

At this stage there is no area / blanket licensing available to for FSS User Terminal / VSAT Earth station in 27.5 – 28.35 GHz (e.g. supporting widespread deployment of user terminals in an area) as a framework needs to be developed. It is anticipated this will be licensed based on how the Territorial Local Authority[3] categorises urban and rural areas. There will need to be clear technical evidence from FSS operators on how they will ensure that no user terminals are active in urban areas and meet PFD limits (as defined in section 3.3), operational measures may include geofencing.

An overview of the technical conditions that apply gateway / feeder link Earth stations and VSAT Earth stations in the 27.5 -30 GHz frequency band are in Table 3 below.

[3] Territorial Local Authorities as defined under schedule 2, part 1 of the Local Government Act 2002 and administered by Statistics New Zealand See https://www.stats.govt.nz/information-releases/geographic-boundaries-annual-release-as-at-1-january-2025/

Table 3: Minimum technical and operational conditions for gateway / feeder link Earth stations and User Terminal / Very Small Aperture Terminal (VSAT) Earth stations in the 27.5 -30 GHz frequency band

Parameter	27.5 -28.35 GHz (shared) minimum requirements		28.35 -29.5 GHz and 29.5 - 30 GHz minimum requirements		Notes
	Gateway / feeder link Earth stations	User Terminal / Very Small Aperture Terminal (VSAT) Earth stations	Gateway / feeder link Earth stations	User Terminal / Very Small Aperture Terminal (VSAT) Earth stations	
Licensee	Satellite network operator or Earth station operator or provider	Satellite network operator with some exceptions	Satellite network operator or Earth station operator or provider	Satellite network operator with some exceptions	See section 3.3.5
Term / duration	No limit / expiry required – subject to RSM normal replanning rules				Expiry date is optional, licences no longer need to have an expiry date
Geographic / sharing restrictions	In FSS Geographic areas (Outside Urban areas) - see section 3.3 Note there are some exceptions - see 3.3.3	Non-urban areas only see section 3.3	None – Anywhere in New Zealand subject to technical compatibility		
Location type	Specific point locations only		Specific point locations only	Specific point locations OR All New Zealand	

Parameter	27.5 -28.35 GHz (shared) minimum requirements		28.35 -29.5 GHz and 29.5 - 30 GHz minimum requirements		Notes
	Gateway / feeder link Earth stations	User Terminal / Very Small Aperture Terminal (VSAT) Earth stations	Gateway / feeder link Earth stations	User Terminal / Very Small Aperture Terminal (VSAT) Earth stations	
Earth station Antenna array size	See section 5.2.2 'Antenna Arrays' of PIB 38 except the array's boundary does not exceed 30 m from that boundary's centroid instead of 15 m currently in PIB 38				In due course PIB 38 will be updated to change 15m to 30m
Antenna make and model	Must be provided and reflect the actual make and model used under the licence				
Antenna pattern	ITU Radio Regulations Appendix 8, Recommendations ITU-R S.465, ITU-R S.524, ITU-R S.580 (GSO) ITU-R S.672 (GSO) or ITU-R S.1428 (NGSO), measured / actual as applicable				Measured antenna pattern should be provided in the antenna reference data
Polarisation	Must be provided and accurately recorded				
Minimum elevation with respect to the local horizontal plane (baseline)	20 degrees		20 degrees 28.35 -29.5 GHz 10 degrees 29.5 -30 GHz		Must be accurately recorded (e.g. not the minimum on all licences) The highest elevation limit will apply for licences spanning multiple bands
Minimum elevation with respect to the local horizontal plane	15 degrees outside urban areas only, where a measured antenna pattern must be provided	None – no exceptions	15 degrees for 28.35 - 29.5 GHz where an antenna pattern is provided	None – no exceptions	Measured antenna pattern must be provided and must be better than the ITU masks

Parameter	27.5 -28.35 GHz (shared) minimum requirements		28.35 -29.5 GHz and 29.5 - 30 GHz minimum requirements		Notes
	Gateway / feeder link Earth stations	User Terminal / Very Small Aperture Terminal (VSAT) Earth stations	Gateway / feeder link Earth stations	User Terminal / Very Small Aperture Terminal (VSAT) Earth stations	
(exception)					
Antenna height above ground level	20 meters Heights above this are permitted but shielding must be applied for all azimuths (see 3.3.7)		No limit	No limit for Specific point locations Assumed to be 3 metres for blanket licences (All New Zealand)	Must be accurately recorded This height is to the centre of the antenna
Feeder loss	Must be provided				
EIRP (main beam)	No limit	45 dBW. Justification needs to be given for higher limits (e.g. link budget)	No limit	45 dBW. Justification needs to be given for higher limits (e.g. link budget)	Transmit peak EIRP for user terminals is typically in the order of 35 to 45 dBW
EIRP / MHz (power spectral density (PSD) of the main beam)	No limit – must be provided				
EIRP / MHz (PSD with	−15 dBW/MHz				

Parameter	27.5 -28.35 GHz (shared) minimum requirements		28.35 -29.5 GHz and 29.5 - 30 GHz minimum requirements		Notes
	Gateway / feeder link Earth stations	User Terminal / Very Small Aperture Terminal (VSAT) Earth stations	Gateway / feeder link Earth stations	User Terminal / Very Small Aperture Terminal (VSAT) Earth stations	
respect to the local horizontal plane)					
EIRP / MHz in unwanted emissions (PSD at the local horizontal plane)	-35 dBW/MHz				Limit is based on EN 303 699 and ECC Decision (05)01
Shielding	Shielding is not required but if it is used detailed information should be provided see section 3.3.7	Not applicable	Shielding is not required but if it is used detailed information should be provided - see section 3.3.7	Not applicable	

3.3. Rules for sharing in 27.5 – 28.35 GHz FSS (Earth to space) Earth stations – Lower 28 GHz

The 27.5 – 28.35 GHz frequency band is shared between Fixed Satellite Service (Earth to-space) and Mobile Services / Fixed Wireless Access. Sharing is geography-based by area type with a geographical split where stations of the different services can operate broadly based on Fixed Satellite Service Stations being permitted for licensing and operation outside urban areas and in the future Mobile Services / Fixed Wireless Access being permitted inside urban areas. There are specific definitions from Statistics New Zealand for these areas that apply and technical conditions that are required. The onus is on the applicant and approved person to provide evidence they meet these rules. It is a requirement to upload evidence to the file note and attach on the licence so that it is viewable to other Approved Persons. Licence conditions (see section 4) are also required which ensure that use under the licence is in accordance with these rules.

3.3.1. Definition of geographic areas

The definitions of the geographic areas are derived from Statistics NZ definitions[4] with two main criteria relevant to the licensing and certification rules are below:

- Major, large and medium, and small urban areas and
- High, medium or low urban accessibility areas.

These two main criteria are used for determining which geographic are a given location falls within. The criteria are given Table 4 below provides the different geographic areas for the purposes of sharing which are:

- Mobile / FWA geographic area: Urban areas
- Fixed Satellite Service Geographic area: Outside Urban areas

Table 4: Mobile / FWA geographic area: Urban areas and Fixed Satellite Service Geographic area: Outside Urban area (based on Statistics NZ definitions 2025)

Urban and accessibility category (includes all)	Criteria
Mobile / FWA geographic area: Urban areas (with some exceptions for FSS) – all conditions below apply	
Major	100,000 or more residents
Large	30,000 – 99,999 residents

[4] Further information can be found from Statistics New Zealand, 2020 on https://www.stats.govt.nz/assets/Uploads/Methods/Urban-accessibility-methodology-and-classification/Download-document/Urban-accessibility-methodology-and-classification.pdf.

Urban and accessibility category (includes all)	Criteria
Medium	10,000 – 29,999 residents
Small	1,000 – 9,999 residents
High urban accessibility	0 – 15 minutes drive time (In average traffic conditions at 50 km/h) from major urban areas
Fixed Satellite Service Geographic area: Outside Urban areas (specific rules for FSS apply)	
These locations that are outside the Mobile / FWA geographic area, urban areas as defined above. These include rural settlements and Medium, low remote and very remote urban accessibility categories.	

The urban areas are available at Urban Rural 2025 | Stats NZ Geographic Data Service. The urban area definition used for the purpose of these rules are set on the 2025 dataset and if this dataset is to be updated in the future the 2025 definitions will still apply.

3.3.2. Determining if a FSS Earth station is outside a FSS Geographic area (outside an urban area)

Earth stations can only be licensed outside of urban areas in the 27.5 -28.35 GHz frequency band with some exceptions outlined in section 3.3.3.

3.3.2.1. Determining if a proposed Earth station is outside a Mobile / FWA geographic area.

To assess if a new FSS Earth station is outside a Mobile / FWA geographic area, the Approved Person must:

- Assess that the location does not fall within a Major, Large, Medium or Small urban area (see Urban Rural 2025 | Stats NZ Geographic Data Service) utilising mapping tools or GIS tools to show this.
- Assess the location is outside the 'High urban accessibility' and is greater than 15 minutes drive time (in average traffic conditions at 50 km/h) from major urban areas. Mapping / satellite navigation tools may be used to determine the road distance and a calculation will then need to be done to determine the time it takes.

The Approved Person must clearly document this assessment showing the placement of the Earth station relative to the nearest urban areas and show that there is greater than greater than 15 minutes drive time from the nearest major urban area. This will need to be shown in map or Geographic Information System (GIS) form that visually shows that the placement of the Earth station meets the criteria. This assessment must be uploaded to the application with the file

note and attachment on the licence so that it is viewable to RSM and other Approved Persons / licensees. Applications that are unclear and / or do not contain this information in a satisfactory form will be rejected.

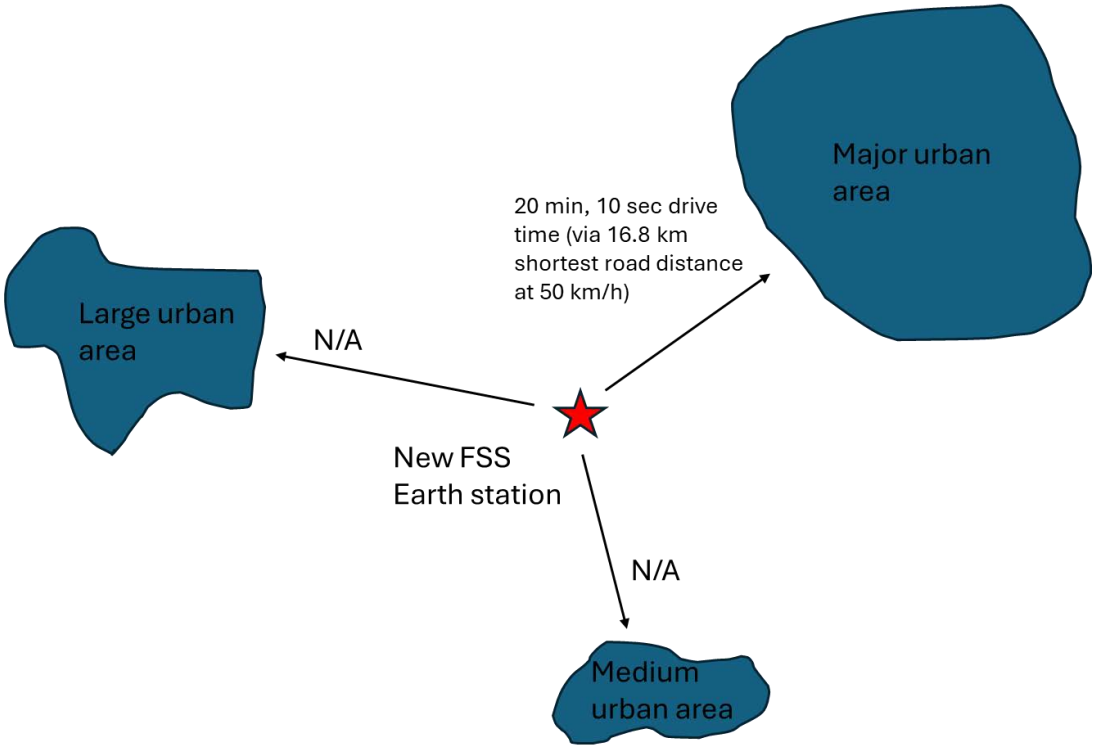

Figure 2: Provides simplified example of the assessment that is undertaken to determine if the proposed new FSS Earth station is outside a Major, Large, Medium or Small urban area and that it is outside a high urban accessibility area.

3.3.2.2. Determining if Earth station meets technical limits to protect Mobile / FWA geographic areas

A PFD limit of -91 dBW/m^2/MHz at 5 metres above the ground level, not to be exceeded for more than 5% of time within a 24-hour window[5] anywhere in the urban area applies at any location within Major, Large, Medium and Small urban areas. A new FSS Earth station must not exceed this PFD limit anywhere in one of these urban areas. This limit is to provide a reasonable level of protection for future Mobile / FWA use and is the same limit that has been implemented in

[5] The exceedance criteria is only applied in the case of a stochastic analysis. See below for details on how the limit is applied in a stochastic or deterministic analysis.

Australia[6]. When calculating if this limit is met or not, only the Earth station that the licence that is being engineered for needs to be considered. Other existing Earth station do not need to be considered meaning that aggregate interference from all Earth stations (other than the one that is being licenced) is not considered in the calculation. There are two cases to consider in calculating the PFD limit as outlined below. Case 1 is for a single FSS Earth station with a single antenna and Case 2 is for a single Earth station with multiple antenna.

Earth stations may use different types of antennas which include passive antennas with (parabolic antennas) and electronically steered antennas (phased arrays), these antenna will have different characteristics. For gateways Earth stations / feeder links, passive antennas are common but there will likely be continued adoption electronically steered antennas in the coming years. For user terminal Earth stations, passive antennas are also used, and electronically steered antennas are now common. Many satellite systems are moving from passive antennas electronically steered antennas.

Case 1: Single FSS Earth station with a single antenna

This case is used when licensing is being considered for single FSS Earth station which us at a specific location (site) and that Earth station is operating a single antenna for the link(s) that is being licenced. This case is typical for GSO systems and some NGSO systems. If the location (site) has multiple Earth stations on it (e.g. under existing licences) aggregate interference from all of these stations do not need to be considered. The following applies for Case 1:

$$PFD(\phi_{horiz}, \theta_{horiz}) = EIRP(\phi_{horiz}, \theta_{horiz}) - Loss_{path} - Loss_{pol} - 10log_{10}\left(\frac{\lambda^2}{4\pi}\right) \quad (1)$$

Where:

$PFD(\phi_{horiz}, \theta_{horiz})$ = Power Flux Density where the calculated value is compared with the limit.

$\mathrm{EIRP}(\phi_{\mathrm{horiz}}, \theta_{\mathrm{horiz}})$ = Effective Isotropic Radiated Power at the local horizontal plane from the Earth station towards the receiver (i.e. urban area). Note that θ is elevation on the vertical plane (z axis) and ϕ is azimuth on the horizontal plane (x-y axis). The combination is used to calculate the off angle EIRP towards the horizontal, this is done considering a local coordinate system shown in figure 5. In a simplified case calculating the 'compound angle' (see section 5.6.2 of PIB 38) could be used.

$\mathrm{Loss}_{\mathrm{path}}$ = Path loss which includes all propagation losses between the FSS Earth station and urban area receivers (see below for calculation of path loss).

[6] -91 dBW/m^2/MHz aligns with the limit set in ACMA RALI MS46 based on proposals received in the 24 -30 GHz consultation process

Note that shielding may also be considered in the losses (see section 3.3.7)

Loss_{pol} = Polarisation losses can be considered as the mismatch between the FSS Earth station and Mobile / FWA station. The figures of 0 dB or 3 dB can be applied depending on if there is a mismatch or not. Approved persons may wish to consider the worst case.

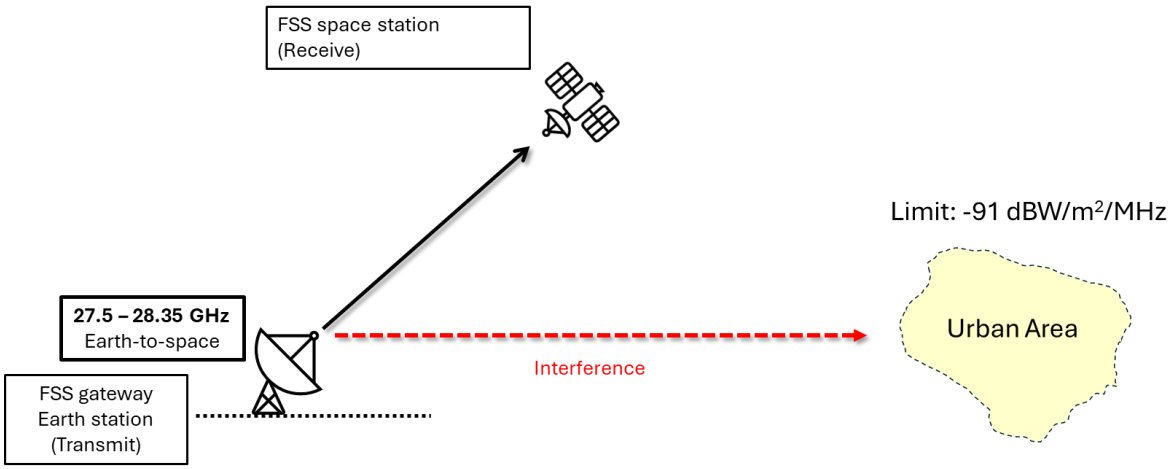

Figure 3: Example of case 1 with a single FSS Earth station with a single antenna

<u>Case 2:</u> Single FSS Earth station with multiple antenna (Array)

This case is used when licensing is being considered for single FSS Earth station which us at a specific location (site) and that Earth station is operating an antenna array, comprised of an array of individual, mutually-dependent, identical antenna elements (radiators) (see section 5.2.2 of PIB 38), for the link(s) that is being licenced. This case is typical for NGSO systems with antenna arrays where there are two or more antennas in that array (e.g. modern arrays may be up to 10- 30 antennas). If the location (site) has multiple independent existing Earth stations on it (e.g. under existing licences) aggregate interference from all of these stations do not need to be considered. The following applies for Case 2:

$$PFD(\phi_{horiz}, \theta_{horiz}) = \sum_i^N EIRP_{ES,i}^{horiz}\left(\phi_{horiz}^{(i)}, \theta_{horiz}^{(i)}\right) - Loss_{path} - Loss_{pol} - 10log_{10}\left(\frac{\lambda^2}{4\pi}\right) \quad (2)$$

Where:

$PFD(\phi_{horiz}, \theta_{horiz})$	= Power Flux Density where the calculated value is compared with the limit(s) below.
$\mathrm{EIRP}(\phi_{\mathrm{horiz}}, \theta_{\mathrm{horiz}})$	= Effective Isotropic Radiated Power at the local horizontal plane from the Earth station towards the receiver (i.e. urban area). Note that θ is elevation on the vertical plane (z axis) and ϕ is azimuth on the horizontal plane (x-y axis). The combination is used to calculate the off angle EIRP towards the horizontal, this is done considering a local coordinate system shown in figure 5. In a simplified case, calculating the 'compound angle' (see section 5.6.2 of PIB 38) could be used.
$\mathrm{Loss}_{\mathrm{path}}$	= Path loss which includes all propagation losses between the FSS Earth station and Urban area receivers. Note that shielding may be considered in the losses (see section 3.3.7)
$\mathrm{Loss}_{\mathrm{pol}}$	= Polarisation losses can be considered as the mismatch between the FSS Earth station and Mobile / FWA station. The figures of 0 dB or 3 dB can be applied depending on if there is a mismatch or not. Approved persons may wish to consider the worst case.
i	= Antenna index which i transmitting at the point in time
N	= Total number of antennas active at the point in time. This will typically be obtained from the satellite operator and relates to the number of co frequency beams illuminating the array at a point in time

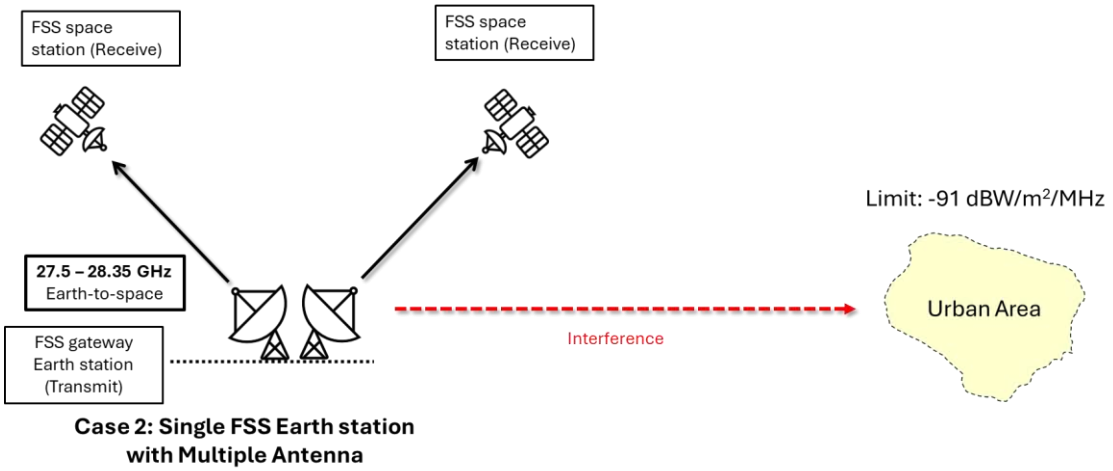

Figure 4: Example of case 2 with a single FSS Earth station with a multiple antenna, known as an array

For the calculation 'θ' elevation on the vertical plane (z axis) and ϕ is azimuth on the horizontal lane (x-y axis) a local coordinate system is used relative to the position of the Earth station as shown in the example in Figure 5. In a simplified case, calculating the 'compound angle' (see section 5.6.2 of PIB 38) could be used which approved persons should be familiar with.

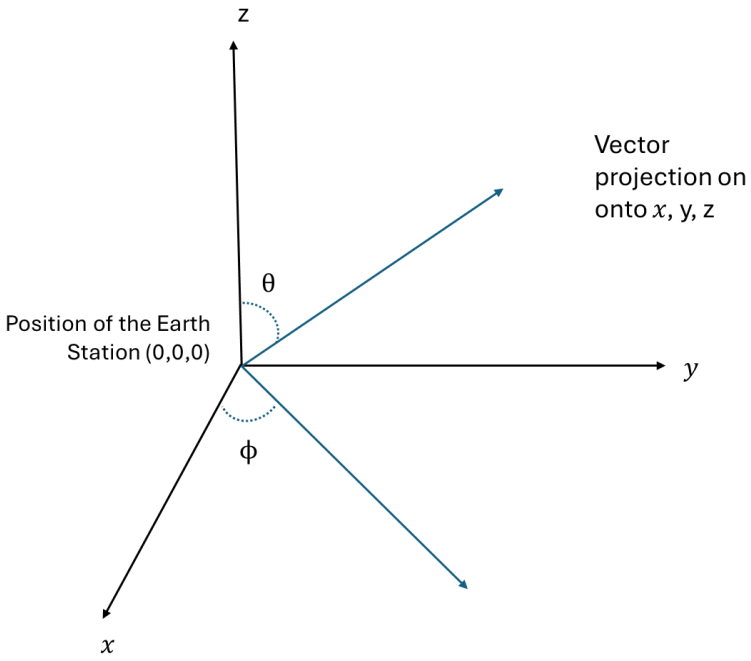

Figure 5: Example of a local coordinate system for the calculation of ϕ_{horiz} and θ_{horiz}

Analysis required and application of the PFD limit

Approved persons need to determine the case that is appropriate to for the Earth station licence they are engineering. It is recommended that approved persons undertake a stochastic analysis, using accurate characteristics to produce calculated results as a cumulative distribution function. This will provide the most accurate results. Alternatively approved persons can use a deterministic analysis using conservative assumptions (for a simplified analysis) which may be adequate where the proposed FSS Earth station has high isolation / pathloss from urban areas (e.g. far from urban areas and / or terrain obstructions). This analysis must show that the proposed FSS Earth station meets the following limits:

- Stochastic analysis: FSS Earth station will not exceed -91 dBW/m2/MHz at 5 metres above the ground level, not to be exceeded for more than 5% of time within a 24-hour window anywhere in the urban area
- Deterministic analysis: FSS Earth station will not exceed -91 dBW/m^2/MHz at 5 metres above the ground level

Ideally the analysis will be shown as an area (e.g. spectrum denial zone / coordination zone) but this could be looking at a set of 'test' points in the urban area, particularly along the boundary of the urban area. Evidence that clearly show the calculated PFD for each relevant urban area and outline the method used to calculate must be uploaded to the application as a file note and attachment on the licence so that it is viewable to RSM and other approved persons / licensees.

Applications that are unclear and / or do not contain this information in a satisfactory form will be rejected. An example of the minimum acceptable evidence for a deterministic approach is shown in figure 6.

A stochastic analysis may take into account the dynamics of the constellation including the satellite tracking for NGSO.

The aggregate limit of -15 dBW/MHz EIRP towards the local horizontal plane may be used for a simplified calculation under a deterministic approach for a simplified case. However, this is not recommended

Regarding high urban accessibility areas, the PFD limit of -91 dBW/m^2/MHz is not required to be met in these areas nor does an approved person need to undertake this assessment to the high urban accessibility area. In future there may be licences for Mobile / FWA stations in these areas but they will need to take existing FSS Earth stations into account.

Calculating the propagation losses / path loss

Outlined below are the two approaches, simplified and standard approach, for calculating the propagation losses over the path propagation models:

Simplified approach (Deterministic only)

For a simplified approach AREs may use a simplified approach with the standard propagation models in PIB 38 which are:

- Recommendation ITU-R P.525 *"Calculation of free-space attenuation"*
- Recommendation ITU-R P.526 *"Propagation by diffraction" or Degout 94*

In this approach a Digital Elevation Model (DEM) of a resolution better than 25 x 25 m should be used for calculating diffraction over isolated obstacles or general terrestrial paths. Clutter loss should not be included / considered under this approach therefore a Digital Surface Model (DSM) is not applied.

It is likely that this approach may over predict the PFD but it is simpler to implement and may be adequate depending on the location of the FSS Earth station.

Improved accuracy

It is recommended that the following models are used:

- Recommendation ITU-R P.452 *'Prediction procedure for the evaluation of interference between stations on the surface of the Earth at frequencies above about 100 MHz'*

This is a path specific model and the calculation requires a specific terrain profile. This should be used with an accurate DEM of a resolution better than 25 x 25 m resolution. If clutter is considered then a DSM that includes land cover information (vegetation, building height) should be used for the modelling of clutter data, preferably based on Lidar measurements / data. It is important that where clutter is considered that it is accurate and present on the specific path (e.g. if the Earth

station is above roof top and / or there is no clutter on the path then clutter losses should not be included).

This model is a more accurate prediction of propagation / path losses and should be used for a stochastic analysis.

Sample data sources for DEM and DSM

- Data sources are available on the LINZ website https://www.linz.govt.nz/products-services/data/types-linz-data/elevation-data
- Data can be downloaded from the LINZ data service https://www.linz.govt.nz/products-services/data/types-linz-data/elevation-data/access-elevation-data

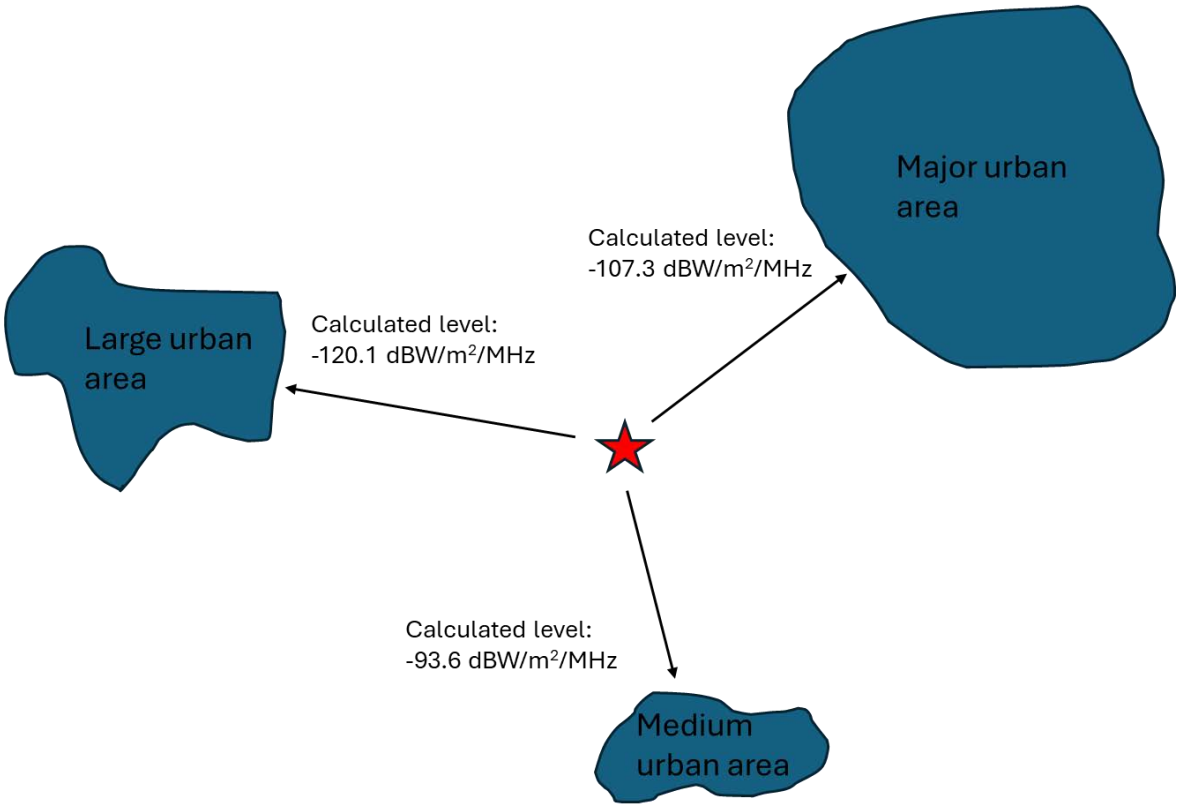

Figure 6: Example of simplified deterministic approach for the calculation determine if the aggregated EIRP towards the local horizontal plane is below -91 dBW/m²/MHz for 5m above ground level. Note that this needs to be met anywhere in the urban area

3.3.3. Existing FSS Gateway / Feeder Link Earth stations

There are some existing FSS Gateway / Feeder Link Earth stations and user terminals that operate within the 27.5 -28.35 GHz frequency band recorded in the RRF with an expiry date of 31 May 2026 (see Search Licences) at the specific sites listed in Table 5. The licensees have been invited to

reapply for all of their existing links and transmitters using comparable parameters but updating the licence to some of the new requirements. It is noted that licences who held maritime ESIMs are not 'existing' and will need to reapply under the new rules. The existing Gateway / Feeder Link Earth stations are listed in Table 5 below. Some of these existing Gateway / Feeder Link Earth stations are in urban areas.

Table 5: Existing FSS Gateway / Feeder Link Earth stations

Name of Earth station	RRF Location IDs	Latitude	Longitude	Licensee	Within an urban area (see section 3.3.1)
Albany Earth station	46583 73556 74451	-36.74805 -36.747963 -36.747988	174.695919 174.696586 174.696286	Inmarsat / Viasat	Yes
Nelson Amazon	73454 73455 73456 73457 73458	-41.2989903 -41.2990086 -41.2989364 -41.2989548 -41.2991617	173.2308934 173.2307263 173.2307977 173.2306306 173.230703	Amazon LEO	Yes
Awarua Starlink	56383	-46.530528	168.383068	Starlink	No
Clevedon Starlink	57189 73041 73042 73043 73044	-36.9897321 -36.989697 -36.990016 -36.989949 -36.990016	175.0554795 175.055459 175.055568 175.055707 175.055802	Starlink	No
Cromwell Starlink	56839	-45.061065	169.192763	Starlink	Yes
Hinds Starlink	57282	-44.0074152	171.5717356	Starlink	No
Hororata Starlink	74261 74262	-43.5558027 -43.5559194	171.8133222 171.8133277	Starlink	No
Pahiatua Amazon	72591	-40.4463384	175.8150699	Amazon LEO	No

Name of Earth station	RRF Location IDs	Latitude	Longitude	Licensee	Within an urban area (see section 3.3.1)
Puwera Starlink	57321	-35.793465	174.300736	Starlink	No
Te Hana Starlink	56530 73037 73038 73039 73040	-36.23674 -36.236744 -36.236937 -36.236748 -36.23693	174.512169 174.512775 174.512768 174.512628 174.512627	Starlink	No
Te Kuiti Starlink	73820 73821	-38.3026166 -38.3026194	175.1443361 175.1449167	Starlink	No
Waipara Starlink	73818 73819	-43.0637583 -43.063775	172.7473583 172.7475278	Starlink	No
Warkworth Earth station	62329 62417 72260 74102	-36.4327216 -36.4331999 -36.432611 -36.4326147	174.6686293 174.6692308 174.666714 174.6682413	Inmarsat / Viasat Amazon LEO	No
Woodville	73816 73817	-40.3520194 -40.352125	175.866775 175.8668555	Starlink	No

These existing Earth station sites / locations are permitted to continue to expand the number of links and transmitters on site provided that they are in accordance with the technical conditions in table 3 with sections 3.3.1 and 3.3.2 not applying. As these Earth stations are preexisting it is not anticipated that the continued licensing and expansion on sites will have a material impact on areas where Mobile and FWA can be used in the future.

3.3.4. Application window for Gateway / Feeder Link Earth station inside urban areas

In general Gateway / Feeder Link Earth stations do not need to be within Mobile / FWA geographic areas and there are plenty of non-urban locations available around the country. However, there will be an application window process that will allow consideration Gateway / Feeder Link Earth stations where there are advanced / preexisting plans for important infrastructure (see section 3.3.1). The application window for these is anticipated be open from 10:00 1 July 2026 to 17:00 31 August 2026 New Zealand Time. Details of the application window and process are still to be determined and this will be provided ahead of time. An initial outline of the application process is as follows:

- Applicants should be the satellite operator or an Earth station operator with a clear contractual relationship to the satellite operator.
- Evidence needs to be provided that there was an advanced / preexisting plan to build a Gateway / Feeder Link Earth station in an urban area prior to 7 April 2026 (further guidance to come).
- Justification and details on why this Earth station needs to be in an urban area and cannot be located outside an urban area.
- The calculated accurate coordination zone (see section 3.3.2) along with the mitigations used to minimise the coordination zone. Proposals without mitigations may not be accepted.
- Outline of future mitigations that can be used where coordination is requested by mobile / Fixed Wireless Access. Note that licensees will have an ongoing obligation to coordinate with mobile / FWA users within the coordination zone.
- The applicant will be informed of the outcomes of this assessment and if satisfactory will be invited to lodge an application in the RRF.
- Upon approval of an application, for the application window, the applicant must apply for a licence that commences within 2 months.
- Licencees will be given 6 months to implement from the granting of a licence. This will be as described on the application, parameters including the location cannot be changed.
- After commencing transmission the licensee will need to sign a statutory declaration showing that they are adhering to the plan as in the application. If this does not hold true into the future then RSM will need to be informed and the declaration may need to be updated.
- Where no statutory declaration provided or the applicant is not adhering to the plan at a future stage then RSM may revoke the licence.

For clarity, this application window is not available for user terminals / VSATs or ESIM.

RSM will look to update these rules after the application window process. RSM anticipate that in the 2028 -2030 period when the assignment process for FWA / mobile is considered, there may be another opportunity for future Earth stations to be considered in urban areas.

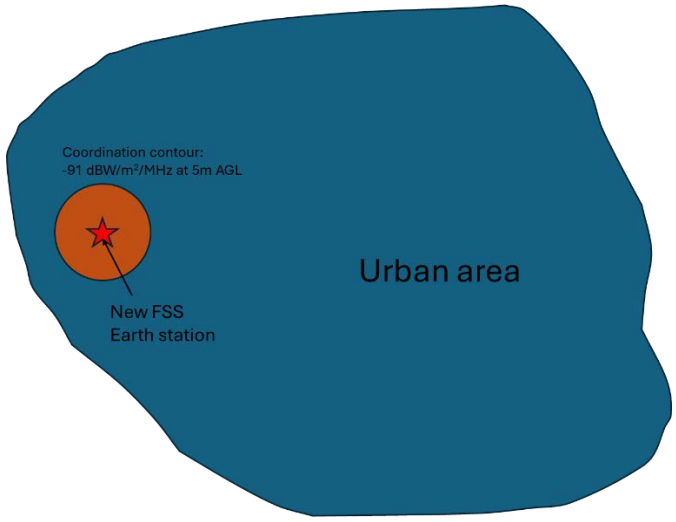

Figure 7 Example of a coordination contour within an urban area

3.3.5. Licensee

It is important that the licence is held by the relevant and responsible entity. The licensee for the Earth station is the responsible and culpable for the transmissions under that licence. Should there be issues such as interference or breaches of licence conditions the licence holder may be held responsible (e.g. in the case of investigation and enforcement activities). The licensee must have the ability to mitigate issues including changing frequency, reducing power, or ceasing operation. The licensee can authorise other parties to operate pursuant to its licence in accordance with Section 2.5 of PIB 58. For Earth station licences RSM require the following:

- Earth station gateways / feeder links: Licences held by the Satellite network operator or Earth station operator / provider.
- User terminal / Very Small Aperture terminal Earth stations: Licences should be held by the Satellite network operator. If the licences are held by a third party that is not the satellite operator then the agreement between the satellite operator and the third party must be provided. This may be a letter from the satellite operator to the third party outlining the agreement / arrangement to provide satellite services.

3.3.6. Actual antenna patterns

Antenna performance and off axis gain / discrimination is important for compatibility with other in band and adjacent band radio systems including terrestrial radio systems. Where possible the actual antenna pattern should be provided that is specific to make and model of the antenna, ideally this should be the measurement but it could be an envelope of the measured result. The specific antenna patterns generally show better off angle discrimination / sidelobe performance than the generic ITU Radio Regulations or ITU-R Recommendation envelope patterns. See also 5.6.2 'Antenna angle and discrimination' in PIB 38. It should be noted that in some cases in these rules the actual antenna pattern is required. When providing this antenna pattern it must clearly show the off axis gain / discrimination for any given angle. There are two generally acceptable formats:

- A table that provides the antenna gain / discrimination for any angle from 0° to + 90° (when symmetrical) or -180° to 0° to +180° (when not symmetrical) in increments of 1° or less.
- A clearly readable diagram showing the antenna gain / discrimination from 0° to + 90° (when symmetrical) or -180° to 0° to + 180° (when not symmetrical) in increments of 1° or less.

This antenna pattern must be uploaded to the antenna record in the RRF when the antenna pattern option 'Other (please state)' is selected from the dropdown list under the Transmit Details section of the Earth station and the text 'Measured pattern, see antenna identifier' is entered.

3.3.7. Site shielding

Site shielding can provide attenuation in specific azimuth (or all azimuths if around the outer perimeter of the site, i.e. Earth station is contained within the shielding) which is beneficial for compatibility with terrestrial services. Where there is site shielding, this should be provided as part of the licence and application. Where site shielding is used for the calculation for compliance with the PFD limit in section 3.3.2 or for any other engineering and compatibility reason, detailed information must be provided. The following information on site shielding must be provided:

- The azimuth relative to the point location of the Earth station which the site shielding is applicable. For example, this may be on one side of the Earth station say between 10° and 80° azimuth or it may be on all sides of the Earth station (shielding is around the perimeter of the Earth station) between 0 -360°.
- Evidence of the attenuation this shielding provides towards the local horizontal plane
- Detailed information on the shielding showing that it is metallised or equivalent (capable of attenuating radio signals) and its ability to obstruct the Earth station at the local horizontal plane. This may be in a combination of photos and drawings along with relevant evidence

This information must be uploaded to the licence application and the licence in the RRF as a file note attachment and the appropriate specific condition must be added.

4. Licensing and recording of information in the Register of Radio Frequencies

This outlines licensing considerations and how parameters are recorded in the RRF

4.1. Parameter recording in the RRF

It is important that information is accurately recorded on the licence in the Register of Radio Frequencies. For some of this information there is currently no specific selectable field in the RRF and this needs to be recoded in another free text field to be captured. If information has not been correctly recorded the application will be sent back to the Approved person or rejected.

Table 6 below outlines the parameters for a licence in the order and the fields they appear on a licence. It should be noted that these fields may be in a different order on the application form. Note that fields in '[...]' are for the approved person to complete this with correct parameter and delete the square brackets when engineering licences.

Table 6: Parameters for licences (as they appear on the licence)

Parameter	Options / details	Notes
Application details		

Parameter	Options / details	Notes
Purpose of service	Free text field. The following details need to be provided: **Purpose:** [....] **Link:** [....] **Antenna:** [....] **EIRP:** [....] **REF Frequency:** [....] **BW:** [....] **POL:** [....]	Approved persons need to complete the fields in '[...]' and delete the square brackets
Additional information	Free text field.	Optional to add information as necessary.
Basic details		
Licence type	Satellite/Satellite (G1)	Only option currently available for FSS in the Ka band (17.2 -20.2 GHz s-E and 27.5 - 30 GHz E-s)
Licence classification	Earth to space only	Must be used for transmit only where there is no associated space to Earth link At this stage this also needs to be used for Earth to space and space to Earth links
	Space to Earth only	Can be used for space to Earth only (receive protection) where there is no associated space to Earth link At this stage this also needs to be used for Earth to space and space to Earth links
	Earth to space and Space to Earth	Should be used where there is both an Earth to space and space to Earth

Parameter	Options / details	Notes
		link. However, there are some current issues with the RRF and updates are being investigated
ITU name of Satellite	Select appropriate satellite network from the location reference data The satellite name must match the name of the satellite on the ITU filing	A point location for the satellite needs to be added / available under the location reference data. See section 5.3, PIB 38
Geostationary Satellite Orbit (GSO) / NGSO	GSO NGSO	Select the appropriate orbit. NGSO includes all orbits that are not GSO
Minimum elevation	Must be accurately recorded	See tables 2 and 3 which have specific limits
ITU SNS Notice ID	Add ITU SNS notice ID of the relevant ITU filing	If there is not a valid ITU SNS notice ID then it is not filed with the ITU and cannot be licensed. See section 5.3 of PIB 38
Beam name	Add applicable beam names from the relevant ITU filing	
Commercial name of satellite	Add the commercial name of the satellite	
Satellite owner and operator	Add the satellite owner and operator	
Fixed Term / non fixed term	Yes / No selectable. Set the commencement and expiry date. Commencement date may be in the future.	It is optional if this is fixed term or has no expiry See tables 2 and 3
Additional information	Free text field. Add and complete the following:	Approved persons need to complete the fields in '[...]'

Parameter	Options / details	Notes
	Class of Service: [State the satellite Class of Service e.g. Fixed Satellite Service (FSS)] **Earth Station Class of Station:** [For E-s licence state the ITU description and symbol e.g. Earth station in the fixed-satellite service (TC)] **Space Station Class of Station:** [For s-E licence state the ITU description and symbol e.g. Space station in the fixed-satellite service (EC)] **Earth station name:** [Common name for the specific Earth station being licensed that may not match the RRF Location name (e.g. the specific name of system / antenna / array on the site)] **Earth station provider:** [The provider of the Earth infrastructure (e.g. antenna, transmit building and transmitters)] **Earth station operator:** [The day-to-day operator of the Earth station which may be different from the provider]	and delete the square brackets For the Class of Station description and symbols refer to Table 3 in the https://www.itu.int/en/ITU-R/space/Preface/preface_e.pdf State **Earth station class of station** or **Space station class of station** applicable to the licence classification.
Spectrum details		
Channel	Leave blank	No channels plans are available for Ka band (17.2 -20.2 GHz s-E and 27.5 - 30 GHz E-s)
Frequency details	**Frequency low and Frequency high** to be added in MHz **Reference frequency** in MHz is generally the centre frequency of the emission/s	The frequency range should not be wider than the widest emission on the ITU filing
Power dBW (EIRP)	EIRP should the highest figure the Earth station is capable of but also should be accurately recorded	See limits in Table 3
Emission	Add 7 digit codes matching the emission designators for the beam/s	The emission/s must be listed under the ITU Filing

Parameter	Options / details	Notes
		allocated frequency band with its associated beam/s and class of station
Polarisation	Select correct polarisation	Large range of options. Correct polarisation must be selected Note: Circular (clockwise) or Circular (anticlockwise), if you select Circular you must be operating both polarisations
Location Earth station (may appear on transmit location or receive location details depending on if it is Earth to space or space to Earth licence classification)		
Location Earth station	Specific Point location for each gateway / feeder link and User terminal / VSAT Earth stations Defined area locations of 'All New Zealand' may be used for Terminal / user terminal / VSAT in 28.35 -29.5 GHz	See tables 2 and 3 for rules Note that point locations must be accurate and exactly where the Earth station is located. See section 2.7 and 2.8
Station type	Selectable: Gateway / feeder link	
	Terminal / user terminal / VSAT	
	Antenna	
Make	Must be specific	Where a make is not given it will be rejected
Model	Must be specific	Generalised details will be rejected
Type	Parabolic Phased array	Note aperture must be appropriate for the type of station
Remarks	For a phased array include details on the antenna such as:	

Parameter	Options / details	Notes
	Phased array dimensions: [X] metres length by [Y] metres width Number of elements: [X] d/λ element spacing: [Y] meters Where a measured antenna pattern is provided include "Measured Antenna Pattern as file note and attachment'"	
Antenna Pattern	S.580 S.465 Other (please state) • Provide detail of antenna type or ITU Recommendation OR • "Measured pattern, see antenna identifier"	
Upload file	Upload the antenna measured antenna pattern where applicable	See Tables 2 and 3 and section 3.3.6
Antenna height above ground level	No field available	Recorded in condition as there is no current field under location currently
Other		
Feeder loss	No field available	Recorded in conditions, see section 4.3
System noise temperature (K)	Add appropriate systems noise temperature accurate to the system	Values are expected to be in the 250 -500 K range, or greater (as per parameters in ITU TG 5-1)
Location space station (may appear on transmit location or receive location details depending on if it is Earth to space or space to Earth licence classification)		
Location	Select appropriate satellite network from the location reference data	A point location for the satellite needs to be added / available under the location reference data. See section 5.3, PIB 38 The space station location name

Parameter	Options / details	Notes
		must match the ITU Satellite name on the ITU Filing.
Specific conditions		
Specific conditions	Add the correct conditions including filling out the appropriate parameter	Different specific conditions apply for different Earth station types and frequency bands See section 4.3 for the conditions
General conditions and schedule conditions	Set conditions (non-modifiable)	General conditions are set and apply to all licences Schedule conditions are set and apply to all licences under this licence type
File note and attachment		
File note and attachment	Upload appropriate file notes and attachments. Ensure that this has an accurate title and notes to describe what it is	There are specific requirements to upload file notes and attachments in these rules and in PIB 38 and PIB 58.

4.2. Relationship between ITU filings, RSM and RRF parameters

This outlines the relationship between the parameters in ITU filings (See ITU Space Services Department and Radiocommunication Bureau - Preface) and RSM and RRF parameters. This provides the combinations on what is permitted for licensing. Approved Persons need a TIES access account to view some of the ITU information, the application process is on the ITU website and RSM will need to approve it.

Table 7: Relationship between ITU filings, RSM and RRF parameters

Frequency band	ITU Service / Class of Service	ITU Symbol of station (space station)	RSM Type of Earth station	RRF Type of Earth station	RRF Licence classification (s)	RRF Licence type
17.7 -20.2 GHz	Fixed Satellite Service (space to Earth)	EC (Space station in the Fixed-Satellite Service)	Gateway / feeder link	Gateway	Earth to space and space to Earth or Space to Earth only	Satellite/Satellite (G1)
			User terminal (non-ESIM)/ VSAT	User terminal		
			Earth Station in Motion (ESIM) (Aeronautical, Maritime and Land)	User terminal		

Frequency band	ITU Service / Class of Service	ITU Symbol of station (space station)	RSM Type of Earth station	RRF Type of Earth station	RRF Licence classification (s)	RRF Licence type
		EK (space tracking space station) ER (Space telemetering space station)	Telemetry or Teletracking Earth station	Gateway	Earth to space and space to Earth or Space to Earth only	Satellite/Satellite (G1)
27.5 -28.35 GHz & 28.35 -29.5 GHz & 29.5 -30 GHz	Fixed Satellite Service (Earth to space)	EC (Space station in the Fixed-Satellite Service)	Gateway / feeder link	Gateway	Earth to space and space to Earth or Earth to space only	Satellite / Satellite (G1)
			User terminal (non-ESIM) / VSAT	User terminal		
			Earth Station in Motion (ESIM). (Aeronautical, Maritime and Land)	User terminal		
		ED (Space telecommand space station) EK (Space tracking space station)	Teletracking or Telecommand Earth station	Gateway		Satellite / Satellite (G1)

4.3. Licence conditions

The Approved person needs to apply the correct set of conditions for the licence they are applying for. Where in fields are marked as '[...]' the approved person to complete this with the correct parameter and delete the square brackets when engineering licences.

4.3.1. Gateway / Feeder link and User terminals / Very Small Aperture Terminal Earth Stations in the 17.7 -20.2 GHz (space to Earth) frequency band

Conditions for all licences:

"

1. The Earth station operating under this licence shall only communicate with the space stations under the listed ITU SNS Notice ID and the listed beam names.
2. This licence permits a [gateway / feeder link / User terminal / Very Small Aperture Terminal] Earth station at the location specified on this licence only.
3. The Earth station antenna height is [X] metres above ground level.
4. The feeder losses between the Earth station transmitter and Antenna is [XX] dB

Additional conditions for specific cases (see rules above):

"

5. No receive protection is afforded under this licence from transmissions under licence number [XXXXXXX]. The Ministry does not accept liability under any circumstances for any loss or damage of any kind occasioned by the unavailability of frequencies, or any interference to reception.
6. This licence covers an antenna array, comprised of an array of individual, mutually-dependent, identical antenna elements (radiators), which includes all spacings between elements and other applicable space margins, where the array's boundary does not exceed 30 m from the boundary's centroid which is the point location specified on the licence.
7. Site shielding is required that provides a minimum of [XX] dB of attenuation of the Earth station transmissions between the azimuth [X degrees to Y degrees] relative to true north. If the site shielding is removed or degraded where the minimum attenuation cannot be guaranteed, then the Earth station will not be protected and must accept interference.

“

4.3.2. Fixed Satellite service, Gateway / Feeder link Earth Stations in the 27.5 – 28.35 GHz and 28.35 -30 GHz frequency band

Conditions for all licences:

“

1. The Earth station operating under this licence shall only communicate with the space stations under the listed ITU SNS Notice ID and the listed beam names.
2. This licence permits a gateway / feeder link Earth station at the location specified on this licence only.
3. If this licence covers any part of the 27.5 – 28.35 GHz frequency range, the location of this Earth Station shall not be within a Major, Large, Medium and Small Urban Areas as defined by Statistics New Zealand (2025 definitions). If the location of this licence falls within one of these areas then this license may be revoked under the *Radiocommunications Regulations 2001*.
4. No transmission is permitted in 27.5 – 28.35 GHz frequency range if the location of this Earth Station is in a Major, Large, Medium and Small Urban Areas as defined by Statistics New Zealand (2025 definitions).
5. Aggregate co-frequency emissions in the 27.5 – 28.35 GHz frequency range from transmissions pursuant to this licence shall not exceed a power flux density of -91 dBW/ m^2 / MHz at a height of 5 meters above ground level for more than 5% of time within a 24-hour window anywhere in Major, Large, Medium and Small Urban Areas as defined by Statistics New Zealand (2025 definitions).
6. No transmission of the desired signal shall be conducted from the satellite Earth station(s) below the minimum elevation angle of [YY] degrees with respect to the local horizontal plane as specified on this licence.
7. The peak in-band EIRP density of [YY] dBW/MHz of the main beam shall not be exceeded.
8. The peak in-band EIRP density shall not exceed -15 dBW/MHz at the local horizontal plane at the specified minimum elevation angle of [YY] degrees.
9. The adjacent band EIRP density at the local horizontal plane (with respect to the satellite Earth station’s local coordinate system) shall not exceed -35 dBW/MHz
10. The maximum transmit duty cycle of the satellite Earth station is [XX] percent
11. The Earth station antenna height is [X] metres above ground level.
12. The feeder losses between the Earth station transmitter and Antenna is [XX] dB

“

Additional conditions for specific cases (see rules above):

“

13. This licence covers an antenna array, comprised of an array of individual, mutually-dependent, identical antenna elements (radiators), which includes all spacings between elements and other applicable space margins, where the array's boundary does not exceed 30 m from the boundary’s centroid which is the point location specified on the licence.
14. Site shielding is required that provides a minimum of [XX] dB of attenuation of the Earth station transmissions between the azimuth [X degrees to Y degrees] relative to true north. If the site shielding is removed or degraded where the minimum attenuation cannot be guaranteed then the Earth station shall cease transmission.

“

4.3.3. Existing Fixed Satellite service, Gateway / Feeder link Earth Stations in the 27.5 – 28.35 GHz and 28.35 -30 GHz frequency band – see section 3.3.3

Conditions for all licences:

“

1. The Earth station operating under this licence shall only communicate with the space stations under the listed ITU SNS Notice ID and the listed beam names.
2. This licence permits a gateway / feeder link Earth station at the location specified on this licence only.
3. No transmission of the desired signal shall be conducted from the satellite Earth station(s) below the minimum elevation angle of [YY] degrees with respect to the local horizontal plane as specified on this licence.
4. The peak in-band EIRP density of [YY] dBW/MHz of the main beam shall not be exceeded.
5. The peak in-band EIRP density shall not exceed -15 dBW/MHz at the local horizontal plane at the specified minimum elevation angle of [YY] degrees.
6. The adjacent band EIRP density at the local horizontal plane (with respect to the satellite Earth station’s local coordinate system) shall not exceed -35 dBW/MHz
7. The maximum transmit duty cycle of the satellite Earth station is [XX] percent
8. The Earth station antenna height is [X] metres above ground level.

9. The feeder losses between the Earth station transmitter and Antenna is [XX] dB

“

Additional conditions for specific cases (see rules above):

“

10. This licence covers an antenna array, comprised of an array of individual, mutually-dependent, identical antenna elements (radiators), which includes all spacings between elements and other applicable space margins, where the array's boundary does not exceed 30 m from the boundary’s centroid which is the point location specified on the licence.

“

4.3.4. Fixed Satellite service, User terminals / VSAT Earth Stations in the 27.5 – 28.35 GHz and 28.35 -30 GHz frequency band at specific point locations

Conditions for all licences:

“

1. The Earth station operating under this licence shall only communicate with the space stations under the listed ITU SNS Notice ID and the listed beam names.
2. This licence permits a User Terminal / VSAT Earth station at the location specified on this licence only.
3. The location of this Earth Station shall not be within a Major, Large, Medium and Small Urban Areas as defined by Statistics New Zealand (2025 definitions). If the location of this licence falls within one of these areas then this license may be revoked under Regulation 15B of the Radiocommunications Regulations 2001.
4. No transmission is permitted in 27.5 – 28.35 GHz frequency range if the location of this Earth Station is in a Major, Large, Medium and Small Urban Areas as defined by Statistics New Zealand (2025 definitions).
5. Aggregate co-frequency emissions in the 27.5 – 28.35 GHz frequency range from transmissions pursuant to this licence shall not exceed a power flux density of -91 dBW/ m^2 / MHz at a height of 5 meters above ground level for more than 5% of time within a 24-hour window anywhere in Major, Large, Medium and Small Urban Areas as defined by Statistics New Zealand (2025 definitions).
6. No transmission of the desired signal shall be conducted from the satellite Earth station(s) below the minimum elevation angle of [YY] degrees with respect to the local horizontal plane as specified on this licence.
7. The peak in-band EIRP density of [YY] dBW/MHz of the main beam shall not be exceeded.

8. The peak in-band EIRP density shall not exceed -15 dBW/MHz at the local horizontal plane at the specified minimum elevation angle of [YY] degrees.
9. The adjacent band EIRP density at the local horizontal plane (with respect to the satellite Earth station's local coordinate system) shall not exceed -35 dBW/MHz and shall conform to the envelope contained in ETSI EN 303 699 V1.1.1
10. The maximum transmit duty cycle of the satellite Earth station is [XX] percent
11. The Earth station antenna height is [X] metres above ground level.
12. The feeder losses between the Earth station transmitter and Antenna is [XX] dB

"

4.3.5. Fixed Satellite service, User terminals / VSAT Earth Stations in the 28.35 -30 GHz frequency band - All New Zealand blanket licensing

Conditions for all licences:

"

1. The Earth station operating under this licence shall only communicate with the space stations under the listed ITU SNS Notice ID and the listed beam names.
2. This licence permits User Terminals / VSAT at fixed locations only where transmitters shall be stationary and not in moving. Earth Stations in Motion are not permitted. There is no limit to the number of User Terminals / VSAT that may operate under this licence within the defined area of All New Zealand.
3. No transmission of the desired signal shall be conducted from the satellite Earth station(s) below the minimum elevation angle of [YY] degrees with respect to the local horizontal plane as specified on this licence.
4. The peak in-band EIRP density of [YY] dBW/MHz of the main beam shall not be exceeded.
5. The peak in-band EIRP density shall not exceed -15 dBW/MHz at the local horizontal plane at the specified minimum elevation angle of [YY] degrees.
6. The adjacent band EIRP density at the local horizontal plane (with respect to the satellite Earth station's local coordinate system) shall not exceed -35 dBW/MHz and shall conform to the envelope contained in ETSI EN 303 699 V1.1.1
7. The maximum transmit duty cycle of the satellite Earth station is [XX] percent
8. The Earth station antenna height is assumed to be 3 metres above ground level but it is not limited to this antenna height.

"