Commonwealth of Australia

Radiocommunications Act 1992

Radiocommunications Advisory Guidelines (Managing Interference from Non-Spectrum-Licensed Transmitters—27 GHz Band) 2000

THE AUSTRALIAN COMMUNICATIONS AUTHORITY makes the following guidelines under section 262 of the *Radiocommunications Act 1992*

Dated 21 September 2000

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Chair

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BACKGROUND

Interference to a spectrum licensee's registered receiver is managed using a number of tools provided by the *Radiocommunications Act 1992*. These tools are:

- the core conditions in all spectrum licences (see s.66 of the Act), about:
  - emission limits outside the area; and
  - emission limits outside the band;
- other conditions of the spectrum licences (see s.71 of the Act);
- the determination under s.145 of the Act about what constitutes unacceptable interference;
- advisory guidelines made under s.262 of the Act, about managing interference in specific circumstances.

The following advisory guidelines under s.262 of the Act have been made for the management and settlement of interference to registered fixed receivers operated under 27 GHz spectrum licences and caused by non-spectrum-licensed transmitters.

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PART 1—INTRODUCTION

Title

1.1. These guidelines are the *Radiocommunications Advisory Guidelines (Managing Interference from Non-Spectrum-Licensed Transmitters—27 GHz Band) 2000.*

Commencement

1.2. These guidelines commence on 21 September 2000.

Purpose of these guidelines

1.3. The purpose of these advisory guidelines is to manage interference by providing for the protection of registered fixed receivers under spectrum licences issued for the 27 GHz band from interference caused by non-spectrum-licensed transmitters.

Interpretation

1.4. In these guidelines, unless the contrary intention appears:

Act means the *Radiocommunications Act 1992.*

adjacent channel selectivity means a measure of the ability of the receiver to receive a wanted signal without exceeding a specified degradation in output quality caused by the presence of an unwanted adjacent channel signal.

blocking means a measure of the ability of the receiver to receive a wanted signal without exceeding a specified degradation in output quality caused by the presence of a high level off-tune signal overloading the receiver's front-end.

fixed receiver means a radiocommunications receiver located at a fixed point on land or sea and not established for use while in motion.

in-band, in relation to a transmitter operated under a spectrum licence, means the frequencies within the frequency band of the spectrum to which the licence relates.

intermodulation immunity means a measure of the ability of a receiver to receive a wanted signal without exceeding a specified degradation in output quality caused by the presence of two or more unwanted signals with a specific amplitude and frequency relationship to the wanted signal frequency.

non-spectrum-licensed, for a transmitter or a service, means a transmitter or service operated in spectrum space by a person:

(a) who does not hold a spectrum licence for that space; and

(b) who is not authorised under section 68 of the Act to operate Radiocommunications in that space.

Register means the Register established under s.143 of the Act.

RF selectivity means a measure of the ability of a receiver to attenuate an unwanted out-of-band signal.
RF and IF selectivity means a measure of the ability of a receiver to attenuate an unwanted out-of-band signal including the attenuation of that signal after conversion to another frequency within the receiver.

s.145 determination means the *Radiocommunications (Unacceptable Levels of Interference—27 GHz Band) Determination 2000.*

spectrum space means a 3 dimensional space consisting of a frequency band and a geographic area.

spurious response immunity means a measure of the ability of the receiver to discriminate between the wanted signal at its nominal frequency and an unwanted signal at any frequency at which the receiver responds.

27 GHz band means the frequency band 26.5 GHz - 27.5 GHz.

(2) In these guidelines, the range of numbers that identifies a frequency band includes the higher, but not the lower, number.

(3) A term used in these guidelines that is defined in the s.145 determination has the same meaning as in that determination.
[NOTES: 1. The following terms, used in this determination, are defined in the *Radiocommunications Act 1992* and have the meanings given to them by that Act: frequency band, interference, ACA, spectrum licence, transmitter.]

PART 2—MANAGING INTERFERENCE FROM NON-SPECTRUM-LICENSED SERVICES

Recording Device Details in the Register

2.1 A receiver will not be afforded protection unless details of the receiver are in the Register.

Space Services

2.2 Spectrum licensees must accept any in-band interference from the Inter-Satellite Service and Earth-Exploration-Satellite Service presenting power flux densities on the surface of the Earth not exceeding the levels set down by the ITU-R Radio Regulations S21.16 and presented in the following table.

TABLE

Limit (dB(W/m^2)) in 1 MHz bandwidth for angles of arrival above the horizontal plane

Angles	$0^o – 5^o$	$5^o – 25^o$	$25^o – 90^o$
Limit	-115	-115 + 0.5(angle-5)	-105

Other Non-Spectrum-Licensed Services

2.3 There are no incumbent devices licensed in Australia using in-band frequencies of the 27 GHz band. Interference can however be caused by frequency-adjacent services through mechanisms that act directly (for example, out of band emissions) or indirectly (for example, receiver intermodulation) and usually occur between devices located close to each other at communal sites. The spectrum licensee is required under the licence to take reasonable steps to manage interference in the case of co-sited devices (that is, devices within 200m).

The following will be considered in managing interference:

- the characteristics of the registered receiver; and
- the minimum receiver performance characteristics in Part 3 and Schedule1; and
- the compatibility requirement in Part 4.

PART 3—MINIMUM RECEIVER PERFORMANCE LEVEL

Minimum Receiver Performance Level

3.1 The level of interference caused by out-of-band emissions from a transmitter depends on the interference susceptibility of the receiver as well as the frequency offset and level of the emissions. A receiver's minimum level of performance should be such that its susceptibility to interference does not reduce the use of adjacent licensees' spectrum beyond what is reasonable.

An estimate of the interference susceptibility of a receiver would be based on its performance in relation to adjacent channel selectivity, blocking, intermodulation immunity and spurious response immunity. These characteristics of a receiver are influenced by the RF and IF selectivity of a receiver. A receiver operated under a 27 GHz spectrum licence should have a minimum level of combined RF and IF selectivity and minimum level of RF selectivity as set out in Schedule 1.

PART 4—COMPATIBILITY REQUIREMENT

Compatibility Requirement

4.1 A fixed transmitter must meet the compatibility requirement set out in Schedule 2 for a registered fixed receiver:

(a) with a reasonable minimum level of performance; and

(b) registered before the issue of the licence under which the transmitter operates; and

(c) operated under a spectrum licence issued for the 27 GHz band.

SCHEDULE 1 Clause 3.1

MINIMUM RECEIVER PERFORMANCE LEVEL

1. RF and IF selectivity

Table 1 sets out the minimum selectivity caused by the sum of the RF and IF selectivities of a receiver operating under a spectrum licence issued for the 27 GHz band for interfering signals from a transmitter operated under a non-spectrum licence.

- Column 1 sets out the frequency offset by reference to the upper and lower limits of the frequency band of the spectrum space in which the receiver operates. A negative offset means that the frequency is inside the frequency band of the licence by the amount of that offset.
- Column 2 sets out the frequency offset by reference to the upper and lower absolute frequency limits of the effective occupied bandwidth of the transmitter that communicates with the receiver.

Column 1 Frequency Offset (MHz) — frequency band of licence	**Column 2 Frequency Offset (MHz) — effective occupied bandwidth**	**Loss (dB)**
-8	0	3
-3	5	10
2	10	20
7	15	40
32	40	60

Table 1 — Receiver RF+ IF filter characteristics.

2. RF selectivity

Table 2 sets out the minimum RF selectivity of a receiver between the antenna and the antenna connector of the equipment. The frequency offsets are specified with reference to the upper and lower limits of the frequency band of the spectrum licence under which the receiver operates. A negative offset means that the frequency is inside the frequency band of the licence by the amount of that offset.

Frequency Offset (MHz)	**Loss (dB)**
-8	0
-3	1.5
7	4.5
42	15
92	30

Table 2 — Receiver RF filter characteristics.

SCHEDULE 2 Clause 4.1

COMPATIBILITY REQUIREMENT

The compatibility requirement for a fixed receiver operating under a 27 GHz spectrum licence to be provided by a fixed non-spectrum-licensed transmitter is:

- an output quality equivalent to a wanted to unwanted signal level ratio that is not less than 14 dB for more than 1% of the time in any 1 hour period; and
- with the wanted signal never less than -92 dBm; and
- when measured within a 1 MHz rectangular bandwidth that is within the frequency band of the spectrum licence.