

Commonwealth of Australia

Radiocommunications Act 1992

**Radiocommunications Advisory Guidelines (Managing Interference
from Apparatus-licensed and Class-licensed Transmitters —
2 GHz Band) 2000**

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

Dated 4 December 2000.

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BACKGROUND

A spectrum licence consists of a frequency band and a geographic area. Interference occurring between adjacent spectrum licences consists of:

- in-band interference, across the geographic boundaries; and
- out-of-band interference, across the frequency boundaries.

This interference is managed by creating emission buffer zones along the geographic and frequency boundaries of the licence, using a number of tools provided by the *Radiocommunications Act 1992*. These tools are:

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

The following advisory guidelines under section 262 of the Act have been made for the management and settlement of interference to receivers operating under spectrum licences in the 2 GHz band and caused by transmitters operating under apparatus licences or class licences. In all cases, the receivers and transmitters are radiocommunications devices located at a fixed point on land or sea and not established for use while in motion.

PART 1 - INTRODUCTION

Title

1.1. These guidelines are called the *Radiocommunications Advisory Guidelines (Managing Interference from Apparatus-licensed and Class-licensed Transmitters—2 GHz Band) 2000*.

Commencement

1.2. These guidelines commence on 4 December 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 operating under spectrum licences issued for the 2 GHz band from interference caused by fixed transmitters operating under apparatus licences or under class licences.

Interpretation

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

2 GHz band means the following frequency bands:

- (a) 1900 MHz – 1920 MHz (the 2 GHz Lower Band)
- (b) 1920 MHz – 1980 MHz (the 2 GHz Upper Band A)
- (c) 2110 MHz – 2170 MHz (the 2 GHz Upper Band B).

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Act means the *Radiocommunications Act 1992*.

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

section 145 determination means the *Radiocommunications (Unacceptable Levels of Interference—2 GHz Band) Determination 2000*.

1.4 (2) A term used in these guidelines that is defined in the s.145 determination has the same meaning as in that determination.

[NOTE: The following terms, used in this determination, are defined in the *Radiocommunications Act 1992* and have the meanings given to them by that Act:

ACA	apparatus licence
class licence	frequency band
interference	spectrum licence
transmitter.]	

PART 2 - MANAGING INTERFERENCE FROM NON-SPECTRUM LICENSED SERVICES

In-band interference

2.1 (1) In-band interference caused in a receiver operating under a spectrum licence by a transmitter operating under an adjacent spectrum licence is managed by:

- (a) the core conditions of the licence under section 66 of the Act; and
- (b) the device boundary criteria under the section 145 determination.

2.1 (2) In-band interference caused in a receiver operating under a spectrum licence by a transmitter operating under an apparatus licence that is issued after the issue date of the Marketing Plan is managed as if the transmitter is operated under a spectrum licence. The same device boundary criteria that apply to spectrum licensed transmitters also apply to new apparatus licensed transmitters. Therefore, spectrum licences are afforded the same level of in-band protection from new apparatus licensed transmitters as they are afforded from transmitters operated under adjacent spectrum licences.

2.1 (3) The ACA would not regard in-band interference to a receiver operating under a spectrum licence caused by a transmitter operating under a class licence as unacceptable if the operation of the transmitter complies with all relevant conditions of the class licence.

[NOTE: Spectrum licensees must accept any interference caused by apparatus licensed transmitters whose licences were issued before the issue date of the *Radiocommunications Spectrum Marketing Plan (2 GHz Bands) 2000*]

Out-of-band interference

2.2 (1) Out-of-band interference is difficult to predict because the levels and frequencies of unwanted emissions depend on both the proximity, and the operating frequencies of transmitters and receivers. In addition, out-of-band interference:

- (a) can extend for many MHz either side of the frequency boundary of a spectrum licence;
- (b) is dependent on the quality of the receiver as well as the levels of transmitter emission; and
- (c) is difficult to accurately model.

2.2 (2) If emission limits were used to manage out-of-band interference for devices in close proximity, the interference modelling inaccuracy would require large probability margins to be added to those limits. These margins would place severe constraints on use of the spectrum because the frequency boundaries of a spectrum licence extend throughout the entire geographic area of the licence. Therefore, emission limits that manage out-of-band interference for the entire geographic area of a spectrum licence (including communal sites) cannot be used because they would lead to a severe loss of use of the spectrum on both sides of the frequency boundary.

2.2 (3) Instead of making large tracts of spectrum space unusable through the imposition of emission limits, the interference is managed through procedures based on a compatibility requirement for existing receivers. A minimum level of receiver performance has to be specified in conjunction with the compatibility requirement because the performance level of receivers:

- (a) affects the level of interference; and
- (b) varies widely for receivers operating under spectrum licences.

PART 3 - MINIMUM LEVEL OF RECEIVER PERFORMANCE

Recording receiver details in the Register

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

Mobile devices

3.2 The compatibility requirement does not apply to mobile devices because the transient nature of mobile devices prevents the use of a practical interference management procedure.

[NOTE: The ACA does not intend to require the registration of mobile transmitters - see section 69(2) of the Act and the registration conditions of spectrum licences.]

Receiver performance level

3.3 The level of interference caused by out-of-band emissions depends on the interference susceptibility of a receiver. Emission levels from transmitters should not have to be reduced below a point where the performance of the receiver is really the problem. Therefore, it is necessary to establish a benchmark minimum receiver

performance level when setting a compatibility requirement for receivers. The receiver performance level is set out in Schedule 1. A receiver must meet this level of performance to gain protection.

[NOTE: Schedule 1 specifies the anticipated receiver performance based on the most current information provided by industry at the time of issue of this guideline. These performance requirements are able to be amended in the future, if it can be demonstrated that the parameters of typical equipment intended to be deployed in the band readily meet any proposed changes. Such changes would be introduced in consultation with 2 GHz band licensees.]

PART 4 - COMPATIBILITY REQUIREMENT

Apparatus licensed transmitters

4.1 A fixed transmitter operating under an apparatus licence must meet the compatibility requirements in Schedule 2 in relation to a fixed receiver:

- (a) with a minimum level of performance; and
- (b) registered before the issue of the apparatus licence under which the transmitter operates.

Class licensed transmitters

4.2 A fixed transmitter operating under a class licence must comply with the conditions of the class licence.

SCHEDULE 1

Receiver minimum level of performance

The minimum performance level for a receiver relates to:

- selectivity;
- intermodulation immunity; and
- blocking.

Frequency offsets are specified with respect to the carrier centre frequency of the transmitter communicating with the receiver. All levels are referenced to the antenna connector of the equipment. The Notional antenna for a fixed receiver has a total gain of 19 dBi in all directions, including feeder losses.

[NOTE: For testing purposes (if required), a minimum wanted signal of -120 dBm per 1 MHz (or equivalent) should be used where possible, otherwise Receiver Sensitivity Level + 3dB]

Receiver Adjacent Channel Selectivity

Adjacent Channel Selectivity means a measure of the ability of a receiver to receive a wanted signal in the presence of an unwanted adjacent channel signal at a given frequency offset.

The minimum adjacent channel selectivity is 45 dB, measured at an offset of 5 MHz.

Receiver Intermodulation Response Rejection

Intermodulation Response Rejection means a measure of the capability of a receiver to receive a wanted signal in the presence of two or more unwanted interfering signals which have a specific frequency relationship to the wanted signal.

The minimum intermodulation rejection level is -54 dBm per 1 MHz, at an offset of 20 MHz or more.

Receiver Blocking

Receiver blocking means a measure of the ability of a receiver to receive a wanted signal in the presence of a high level unwanted interferer on frequencies other than those of the adjacent channels.

The minimum unwanted signal level to cause receiver blocking is:

- a signal level of -46 dBm per 1 MHz with a frequency offset of 10 MHz or more; and
- a signal level of -21 dBm per 1 MHz for frequencies outside the band 1880 to 2190 MHz.

[NOTE: The accuracy of measuring equipment, measurement procedure and any corrections to measurements necessary to take account of practical filter shape factors would normally be in accordance with good engineering practice.]_____

SCHEDULE 2

Compatibility requirement

The compatibility requirement is an unwanted signal level that is never more than -126 dBm for more than 1% of the time in any 1 hour period; when measured as mean power within a 30 kHz rectangular bandwidth that is within the frequency band of the spectrum licence.

[NOTE: The maximum unwanted signal level is the target interference level at the fixed receiver, and the 30 kHz rectangular bandwidth provides a method of normalising the requirement for different transmitter power spectral densities.]
