



Broadcasting Services (Technical Planning) Guidelines 2017

The Australian Communications and Media Authority makes the following guidelines under section 33 of the *Broadcasting Services Act 1992*.

Dated: 26 September 2017

Richard Bean
[signed]
Member

James Cameron
[signed]
Member/General Manager

Australian Communications and Media Authority

Part 1—Preliminary

1 Name

These are the *Broadcasting Services (Technical Planning) Guidelines 2017*.

2 Commencement

These guidelines commence on 30 September 2017.

3 Authority

These guidelines are made under section 33 of the Broadcasting Services Act.

4 Repeal of the *Broadcasting Services (Technical Planning Guidelines) 2007*

The *Broadcasting Services (Technical Planning) Guidelines 2007* [F2007L02469] are repealed.

5 Application

Unless otherwise specified, these guidelines apply to licensees.

Note: See paragraphs 108A(1)(d), 109(1)(e), 109A(1)(f) and 109B(1)(n) of the Radiocommunications Act.

6 Interpretation

(1) In these guidelines:

AM radio band means the frequency range 526.5 kHz to 1606.5 kHz.

AM radio service means:

- (a) a commercial radio broadcasting service;
- (b) a community radio broadcasting service;
- (c) a national radio broadcasting service; or
- (d) an open narrowcasting radio service;

transmitted in the AM radio band.

authorised person, in relation to a transmitter licence, means a person authorised to operate a radiocommunications device under the licence, under Division 4 of Part 3.3 of the Radiocommunications Act.

broadcasting licensee means the holder of a broadcasting service transmitter licence.

broadcasting service transmitter licence means a transmitter licence issued under section 101A or section 102 of the Radiocommunications Act.

Broadcasting Services Act means the *Broadcasting Services Act 1992*.

channel means a part of the radiofrequency spectrum intended to be used, or set aside for use, for radio emission.

Note: A channel may be described as a part of the spectrum bounded by two frequencies, by the centre frequency of the channel and the channel's bandwidth, or by another method.

cymomotive force or ***CMF***, for a transmitter, means the product, expressed in volts, of:

- (a) the electric field strength at a given point in space, due to the operation of the transmitter; and
- (b) the distance of that point from the transmitter's antenna.

Note 1: See subguideline 6(2).

Note 2: At a distance of 1 kilometre from the transmitter's antenna, the CMF for a transmitter corresponds numerically to the electric field strength in millivolts per metre (mV/m).

datacasting licensee means the holder of a datacasting transmitter licence.

datacasting service means a service that is, or a number of services together that are, transmitted by a transmitter the operation of which is authorised by a datacasting transmitter licence.

Note: The definition of ***datacasting service*** in these guidelines is different to the definition of ***datacasting service*** in the Broadcasting Services Act.

datacasting service area, in relation to a datacasting service, means the geographic area in which the ACMA has made available a channel for use by the datacasting service, in a determination made under section 34 of the Broadcasting Services Act.

designated BSA radio area has the meaning given by section 5 of the Radiocommunications Act.

device has the meaning given by subsection 9(1) of the Radiocommunications Act.

digital radio broadcasting service means:

- (a) a commercial radio broadcasting service;
- (b) a community radio broadcasting service; or
- (c) a national radio broadcasting service;

transmitted by a transmitter authorised by a digital radio multiplex transmitter licence.

digital radio channel plan has the meaning given by section 5 of the Radiocommunications Act.

DRCP means a digital radio channel plan.

DRMT licence means a digital radio multiplex transmitter licence within the meaning given by section 5 of the Radiocommunications Act.

DRMT licensee means the holder of a digital radio multiplex transmitter licence.

effective radiated power or ***ERP***, for a transmitter, in a direction, is the product, expressed in watts, of:

- (a) the power supplied to the transmitter's antenna; and
- (b) the antenna's gain, relative to a half-wave dipole antenna, in the direction.

EMC calculations, in relation to a transmitter, means calculations of the potential for interference (if any) caused by the operation of the transmitter to radiocommunications made by radiocommunications licensees.

Note 1: See guideline 19.

Note 2: Radiocommunications made by radiocommunications licensees include broadcasting services, national broadcasting services, datacasting services and digital radio broadcasting services.

FM radio band means the frequency range 87.5 MHz to 108 MHz.

FM radio service means:

- (a) a commercial radio broadcasting service;
- (b) a community radio broadcasting service;
- (c) a national radio broadcasting service; or
- (d) an open narrowcasting radio service;

transmitted in the FM radio band.

frequency block means a channel that has a bandwidth of 1.536 MHz.

Note: For digital radio, the frequency blocks are identified by the European channel number allocated to the corresponding television channel, and lettered in the sequence A, B, C and D. Australian television channels 6, 7, 8, 9 and 9A correspond to European television channels 5, 6, 7, 8 and 9, respectively. Australian and European television channels have identical numbering for television channels 10, 11 and 12. Consequently, some frequency block identifiers do not correspond with Australian television channel identifiers. For example, frequency block identifiers 5A, 5B, 5C and 5D correspond with Australian television channel 6.

interference has the meaning given by section 5 of the Radiocommunications Act.

LAP means a licence area plan.

licensee means each of:

- (a) a broadcasting licensee;
- (b) a datacasting licensee;
- (c) a DRMT licensee.

narrowcasting service means:

- (a) an open narrowcasting service;
- (b) a subscription narrowcasting service.

narrowcasting service area, in relation to a narrowcasting service, means the area for the service specified in:

- (a) if the service is planned in a LAP – the LAP; or
- (b) in any other case – a transmitter licence that authorises the operation of a transmitter for transmitting the service.

Note: The area for a narrowcasting service may be referred to in a special condition in a LAP or a relevant transmitter licence as the “coverage area”, “coverage radius” or “licence area”.

national signal reception area, in relation to a transmitter that is operated to transmit a national broadcasting service, means the area in which the median field strength is equal to, or greater than, the planned minimum field strength.

nominal location, for a transmitter, means the location of the transmitter specified in a LAP or DRCP.

nominal transmission parameters, for a transmitter, means the technical specifications for the transmitter determined in a LAP or DRCP.

Note: Where a LAP or DRCP sets out a maximum level for a technical specification, the nominal transmission parameter that relates to that technical specification is the maximum level.

planned minimum field strength, in relation to a service to which these guidelines apply, means:

- (a) for a transmitter authorised to be operated in the AM radio band — 54 dB μ V/m (0.5 mV/m); and
- (b) for a transmitter authorised to be operated in the FM radio band — 54 dB μ V/m; and
- (c) for a VHF television transmitter — 44 dB μ V/m; and
- (d) for a UHF television transmitter:
 - (i) if the transmitter operates on a frequency less than 610 MHz — 50 dB μ V/m;
 - (ii) if the transmitter operates on a frequency equal to or greater than 610 MHz — 54 dB μ V/m; and
- (e) for a transmitter operated under a DRMT licence — 60 dB μ V/m;

unless otherwise specified in:

- (f) the LAP that relates to the transmitter; or
- (g) the DRCP that relates to the transmitter; or
- (h) the transmitter licence that authorises the operation of the transmitter.

Note 1: The planned minimum field strength is the minimum median field strength planned for a service for which protection against interference may be afforded.

Note 2: A higher median field strength may be specified for some broadcasting services. For example, an interference-limited service, or a service intended to serve an area for which protection to the planned minimum field strength is not required, might have a higher median field strength specified in the relevant LAP.

Example for note 2: A repeater that services several suburbs with deficient coverage, but whose coverage area is enclosed within that of a much higher powered transmitter that covers most of a much larger metropolitan area.

Note 3: In the case of the AM radio band, the field strength to be considered is that of the day-time ground wave signal (not the sky wave signal).

Note 4: The planned minimum field strength for all services except AM radio is calculated at a height of 10 metres above ground.

radio emission has the meaning given by section 5 of the Radiocommunications Act.

radiocommunication has the meaning given by section 5 of the Radiocommunications Act.

Radiocommunications Act means the *Radiocommunications Act 1992*.

radiocommunications device has the meaning given by section 5 of the Radiocommunications Act.

radiocommunications licensee means a “licensee” within the meaning given to that term by section 5 of the Radiocommunications Act.

technical operating specifications, in relation to a transmitter, means all the characteristics of the transmitter in operation, including the site of the transmitter, the height of the transmitting antenna, the frequency on which the transmitter transmits, and the radiation pattern of the transmission.

television broadcasting service means:

- (a) a commercial television broadcasting service;
- (b) a community television broadcasting service;
- (c) a national television broadcasting service;
- (d) an open narrowcasting television service.

transmitter has the meaning given by subsection 8(2) of the Radiocommunications Act.

transmitter licence means any of the following licences:

- (a) a licence issued under section 101A of the Radiocommunications Act;
- (b) a licence issued under section 102 of the Radiocommunications Act;
- (c) a datacasting transmitter licence;
- (d) a digital radio multiplex transmitter licence;
- (e) a licence issued under section 100 of the Radiocommunications Act that authorises the transmission of a narrowcasting service.

UHF has the meaning given by Schedule 1 to the *Radiocommunications (Interpretation) Determination 2015*.

UHF television transmitter means a transmitter authorised to operate in UHF.

urban centre means an area designated by the Australian Bureau of Statistics as an urban centre in the 2011 Census.

VHF has the meaning given by Schedule 1 to the *Radiocommunications (Interpretation) Determination 2015*.

VHF television transmitter means a transmitter authorised to operate in VHF.

Note: A number of other expressions used in these guidelines are defined in the Broadcasting Services Act, including the following:

- (a) ACMA;
- (b) broadcasting service;
- (c) broadcasting services bands;
- (d) commercial broadcasting service;
- (e) commercial radio broadcasting service;
- (f) community broadcasting service;
- (g) community radio broadcasting service;
- (h) datacasting transmitter licence;
- (i) digital radio multiplex transmitter licence;
- (j) licence area;
- (k) licence area plan;
- (l) national broadcasting service;
- (m) national radio broadcasting service;
- (n) open narrowcasting service;
- (o) subscription narrowcasting service;

(p) television licence area plan.

- (2) For the purposes of calculating CMF for a transmitter:
- (a) the field strength must be measured at a distance from the transmitter's antenna where the reactive effects are negligible; and
 - (b) assume that the finite conductivity of the ground has no effect on propagation.

7 References to other instruments

In this instrument, unless the contrary intention appears:

- (a) a reference to any other legislative instrument is a reference to that other legislative instrument as in force from time to time; and
- (b) a reference to any other kind of instrument or writing is a reference to that other kind of instrument or writing as in force or in existence at the commencement of this instrument.

Note 1: For references to Commonwealth Acts, see section 10 of the *Acts Interpretation Act 1901*; and see also subsection 13(1) of the *Legislation Act 2003* for the application of the *Acts Interpretation Act 1901* to legislative instruments.

Note 2: All Commonwealth Acts and legislative instruments are registered on the Federal Register of Legislation, which may be accessed at www.legislation.gov.au.

8 Site tolerance

- (1) If a licence area plan refers to these guidelines in relation to site tolerance, subguideline (2) applies.
- (2) For the purposes of that licence area plan, a person will be taken to operate a transmitter in accordance with a technical specification determined in the licence area plan if, in relation to that technical specification, the transmitter is operated in accordance with these guidelines, as they apply to or modify that technical specification, or as they allow the person to act otherwise than in accordance with that specification, subject to any conditions set out in these guidelines.

Part 2—Start up procedures

9 Application of Part 2

This Part applies to a licensee of, or an authorised person in relation to, a transmitter licence in circumstances where:

- (a) the licensee or authorised person is planning to establish a transmitter to transmit:
 - (i) a broadcasting service; or
 - (ii) a datacasting service; or
 - (iii) a digital radio broadcasting service; or
- (b) the licensee or authorised person is planning to change the technical operating specifications of a transmitter which is authorised for transmitting:
 - (i) a broadcasting service; or
 - (ii) a datacasting service; or
 - (iii) a digital radio broadcasting service.

10 Start up procedures

A licensee or authorised person to which this Part applies must:

- (a) conduct test transmissions for a period of at least 168 continuous hours;
- (b) take reasonable steps to notify each potentially affected person prior to the commencement of test transmissions;

Note: The ACMA may request the licensee or authorised person to submit evidence of steps taken to provide notice of the test transmissions.

- (c) without limiting paragraph (b), prior to the commencement of test transmissions, place a notice on the licensee's website or an industry website that states:
 - (i) the date and time of commencement of the test transmissions;
 - (ii) the proposed duration of the test transmissions;
 - (iii) the frequency to be used for the test transmissions; and
 - (iv) the email address and telephone number of a person to contact in relation to the test transmissions;
- (d) prior to the commencement of any test transmissions, provide the ACMA with a copy of the notice referred to in paragraph (c);
- (e) include, in any test transmissions required to be conducted by this Part, regular voice announcements, or, in the case of a television broadcasting service, voice or visual information, identifying the licensee or authorised person and providing sufficient details for members of the public to contact the licensee or authorised person if the test transmissions cause interference to radiocommunications transmitted by another radiocommunications licensee;
- (f) conduct test transmissions in accordance with the technical operating specifications specified or set out in a relevant DRCP, LAP or transmitter licence, as modified by these guidelines, or as these guidelines apply to the specifications, for a period of at least 168 continuous hours;

Note: If any part of the period mentioned in paragraph (a) is not conducted in accordance with the technical operating specifications, it is not included for the purposes of paragraph (f). For example, if, for the purposes of the test transmissions required by paragraph (a), a transmitter is operated at less than the maximum power specified in the relevant LAP

Part 2 – Start up procedures

Section 10

for a period of 24 hours, that period does not count towards the minimum duration for the test transmissions required by paragraph (f).

- (g) if, during the test transmissions, the operation of the transmitter caused interference to a broadcasting service or datacasting service – before the conclusion of the test transmissions adjust, or fit devices to, one or more of:
- (i) the transmitter;
 - (ii) a receiver of the service to which interference was caused; or
- undertake other measures in order to eliminate or minimise the interference at the licensee's own expense;

Note: It may be an offence under section 197 of the Radiocommunications Act to engage in conduct and be reckless as to whether the conduct will result in substantial interference with radiocommunications.

- (h) if, during the test transmissions, the operation of the transmitter caused interference to radiocommunications transmitted by another radiocommunications licensee – before the conclusion of those test transmissions, undertake measures to minimise such interference to a level acceptable to that other licensee; and

Note: It may be an offence under section 197 of the Radiocommunications Act to engage in conduct and be reckless as to whether the conduct will result in substantial interference with radiocommunications.

- (i) prepare interference assessment reports and documentation of any relevant calculations and provide such reports and documentation to the ACMA on request.

Part 3—Coverage and interference

11 Minimum coverage criterion – transmitter located at the nominal location

- (1) Subject to subguideline (2), this guideline applies in relation to a transmitter licence, other than a datacasting transmitter licence.
- (2) This guideline applies unless otherwise specified in a LAP or DRCP that relates to the transmitter licence, or in the transmitter licence.
- (3) If:
 - (a) a transmitter authorised by a transmitter licence is located at the nominal location specified in the LAP or DRCP that relates to the licence; and
 - (b) the LAP or DRCP specifies an omnidirectional output radiation pattern for the transmitter;a transmission made by the transmitter must be at or between:
 - (c) 5 dB below the maximum CMF or ERP specified in the LAP or DRCP; and
 - (d) the maximum CMF or ERP specified in the LAP or DRCP.
- (4) If:
 - (a) a transmitter authorised by a transmitter licence is located at the nominal location specified in the LAP or DRCP that relates to the licence; and
 - (b) the LAP or DRCP specifies a directional output radiation pattern for the transmitter;a transmission made by the transmitter must be at or between:
 - (c) 5 dB below the maximum CMF or ERP specified in the LAP or DRCP over at least 60 per cent of each arc specified in the LAP or DRCP for the pattern; and
 - (d) the maximum CMF or ERP specified in the LAP or DRCP over at least 60 per cent of each arc specified in the LAP or DRCP for the pattern.

12 Minimum coverage criterion – transmitter not located at the nominal location

If a transmitter, other than a transmitter operated to provide a datacasting service is not located at the nominal location specified in the LAP or DRCP that relates to the transmitter licence that authorises operation of the transmitter, the licensee must provide a service to those urban centres in the licence area or designated BSA radio area that relates to the service and that would have received the service from a transmitter operating from the nominal location at the minimum CMF or ERP permitted by guideline 11.

Note: No minimum coverage criterion requirements are applicable to datacasting services. However, protection of a datacasting service against interference from other services will generally only be provided on the basis that the datacasting service provides a median field strength equal to, or greater than, the planned minimum field strength.

13 Overspill criterion – transmitter not located at the nominal location

- (1) This guideline applies in relation to a transmitter, other than a transmitter operated to provide a datacasting service, that is not located at the nominal location specified in the LAP or DRCP that relates to the transmitter licence that authorises operation of the transmitter (*relevant transmitter licence*).
- (2) The licensee of the relevant transmitter licence must ensure that the estimated population able to receive a broadcasting service transmitted by the transmitter

Section 14

outside the licence area or designated BSA radio area of the licence does not exceed the estimated population that would be able to receive the service outside that area if the transmitter were located at the nominal location.

- (3) In this guideline, a person is able to receive a broadcasting service transmitted by a transmitter if a receiver at the person's location would receive a signal level:
- (a) greater than 68 dB μ V/m (2.5 mV/m) where the service is an AM radio service;
 - (b) greater than 64 dB μ V/m where the service is a digital radio service;
 - (c) greater than the planned minimum field strength, for all other broadcasting services.

14 Overspill criterion – transmitter with no nominal location specified

If, for a transmitter, there is no nominal location specified in a LAP or DRCP that relates to the transmitter licence that authorises operation of the transmitter, the median field strength of a transmission made by the transmitter in any urban centre outside the licence area or designated BSA radio area for the licence must not exceed the greater of the:

- (a) planned minimum field strength; or
- (b) field strength that would be achieved by a transmitter operating with the nominal transmission parameters.

15 Overspill criterion – datacasting services

A transmitter authorised to transmit a datacasting service in a particular datacasting service area must be located within the relevant datacasting service area.

16 Interference to other services – broadcasting services and datacasting services

- (1) If the operation of a transmitter causes interference to a broadcasting service or datacasting service, the licensee must (at the licensee's own expense) adjust, or fit devices to, one or more of:
- (a) the transmitter;
 - (b) a receiver of a service to which interference was caused; or
- undertake other measures in order to eliminate or minimise the interference.
- (2) Subguideline (1) only applies in relation to interference caused to a broadcasting service or datacasting service if:
- (a) the transmitter that provides the service operates in accordance with the LAP or DRCP (if any) that applies in relation to the transmitter licence that authorises operation of the transmitter; and
 - (b) the transmitter that provides the service operates in accordance with the transmitter licence that authorises the operation of a transmitter; and
 - (c) the interference is caused to the service within:
 - (i) if the service is a commercial broadcasting service or a community broadcasting service – the licence area for the commercial broadcasting licence or community broadcasting licence for the service;
 - (ii) if the service is a national broadcasting service – for a transmitter that transmits the service, the national signal reception area for the transmitter;

Part 3 – Coverage and interference

Section 17

- (iii) if the service is a datacasting service – the datacasting service area for the service;
 - (iv) if the service is a narrowcasting service – the narrowcasting service area for the service;
 - (v) if the service is authorised by a DRMT licence – the designated BSA radio area; and
- (d) the service is, or but for the interference would be, received with a median field strength equal to, or greater than, the planned minimum field strength; and
- (e) the receiving system does not incorporate any active components external to the receiver (such as mast head amplifiers or distribution amplifiers) that result in the receiving system being more susceptible to interference than would otherwise be the case.

17 Interference to other services – radiocommunications

- (1) If the operation of a transmitter causes interference to other services provided by radiocommunications licensees, the licensee of the transmitter that is causing the interference must, in consultation with affected persons, resolve complaints of interference caused to those other services.
- (2) Subguideline (1) only applies where the radiocommunications devices affected by the interference are operated, installed and maintained in good order and are appropriate for the electromagnetic environment of the site.

Part 4—Change of transmitter site and technical operating specifications procedure

18 Application of Part 4

This Part applies to a licensee or an authorised person in circumstances where:

- (a) the licensee or authorised person intends to change the location of a transmitter; or
- (b) the licensee or authorised person intends to change the technical operating specifications of a transmitter where such changes, if implemented, may cause interference to radiocommunications transmitted by transmitters operated by radiocommunications licensees.

Note: Increasing the power level of a transmitter, changing antenna radiation patterns and changing location of an antenna on a structure are changes that are likely to increase the potential for interference.

19 Change of transmitter site and technical operating specifications procedure

- (1) A licensee or authorised person to which this Part applies must cause EMC calculations to be performed by a person competent to carry out such calculations.
- (2) For services planned in a LAP or DRCP, the EMC calculations referred to in subguideline (1) must be performed assuming the maximum ERP specified in the relevant LAP or DRCP for the transmitter.
- (3) Interference assessment reports and documentation of any relevant EMC calculations must be made available by a licensee or an authorised person to the ACMA upon request.

Note: Information and documents provided to the ACMA under these guidelines may be accessed by or given to third parties.

Part 5—Requirements for broadcasting and datacasting services

20 Application of Part 5

This Part applies to a licensee or an authorised person who operates:

- (a) a transmitter for the transmission of an AM radio service;
- (b) a transmitter for the transmission of an FM radio service;
- (c) a transmitter for the transmission of a television broadcasting service or datacasting service using a channel in the 174 to 230 MHz band, or the 520 to 694 MHz band, of the radiofrequency spectrum; or
- (d) a transmitter under a digital radio multiplex transmitter licence that is occupying a frequency block in the 174 to 230 MHz band of the radiofrequency spectrum.

21 Maximum field strength within the licence area

AM radio band

- (1) A transmitter operated to transmit an AM radio service must not be located at a site if operation from that site would result in more than 1 per cent of the total population of the transmitter's coverage area within the licence area receiving that AM radio service at field strengths greater than 120 dB μ V/m (1 V/m).

Note: Subguideline (1) deals with potential interference and/or degradation in receiver performance due to excessive signal levels at the input terminals of the AM radio receiver.

FM radio band, digital radio, television and datacasting services

- (2) A transmitter operated to transmit a service other than an AM radio service must not be located at a site if operation from that site would result in more than 1 per cent of the total population of the transmitter's coverage area within the licence area receiving that service at field strengths greater than 110 dB μ V/m (316 mV/m).
- (3) A transmitter operated to transmit a service other than an AM radio service must not be located at a site if operation from that site would result in the lesser of:
 - (a) 0.1 per cent of the population of; or
 - (b) 100 persons within;

the transmitter's coverage area within the licence area receiving that service at field strengths greater than 120 dB μ V/m (1 V/m).

Note: Subguidelines (2) and (3) deal with potential interference and/or degradation in receiver performance due to excessive signal levels at the input terminals of the broadcasting or datacasting receiver.

- (4) In this guideline:

Census means a census taken under the *Census and Statistics Act 1905*.

coverage area, for a transmitter, means the area in which the median field strength is equal to, or greater than, the planned minimum field strength.

population, for an area, means:

- (a) in relation to a transmitter authorised to operate under a transmitter licence issued before the commencement of these guidelines, other than a

Section 22

transmitter mentioned in paragraph (b) – the population specified for the area at the most recent Census taken before the transmitter was first authorised to operate;

- (b) in relation to a transmitter authorised to operate under a transmitter licence issued before the commencement of these guidelines, if a nominal transmission parameter specified in the LAP or DRCP that relates to the transmitter licence was varied before the commencement of these guidelines – the population specified for the area at the most recent Census taken before the most recent variation of a nominal transmission parameter before the commencement of these guidelines;
- (c) in any other case – the population specified for the area at the 2011 Census.

22 Radiated signal characteristics

AM radio band

- (1) An AM radio service carrier:
 - (a) must be amplitude modulated to a maximum of 125 per cent positive and 100 per cent negative modulation by the sum signal ($L+R$); and
 - (b) if the transmission of the signal is a stereo transmission – the carrier must be phase modulated to a maximum of ± 1.26 radians by the combination of the difference signal ($L-R$) and a 25 Hz pilot signal.
- (2) An emission caused by the transmission of an AM radio service on a frequency more than 9 kHz, but not more than 18 kHz, from the carrier, must be attenuated at least 25 dB below the level of the carrier.
- (3) An emission caused by the transmission of an AM radio service on a frequency more than 18 kHz, but not more than 27 kHz, from the carrier, must be attenuated at least 35 dB below the level of the carrier.
- (4) An emission caused by the transmission of an AM radio service on a frequency more than 27 kHz from the carrier either:
 - (a) must be further attenuated at a rate of 1 dB per kHz; or
 - (b) must not exceed a level of 200 $\mu\text{V/m}$ at a distance of 1 km from the transmit antenna.
- (5) For the purposes of subguidelines (1) to (4) and this subguideline (5):

baseband signal means the modulating signal applied to produce amplitude modulation of the main carrier or amplitude and phase modulation in the case of a stereo transmission.

Note: In mono transmissions, the baseband signal is the sum of the left (L) and right (R) audio signals.

carrier means the MF signal modulated by the baseband signal.

L means the left audio channel of a stereo audio signal.

MF has the meaning given by Schedule 1 to the *Radiocommunications (Interpretation) Determination 2015*.

R means the right audio channel of a stereo audio signal.

Section 22

FM radio band

- (6) In relation to an FM radio service:
- (a) the main carrier must be frequency modulated by the baseband signal;
 - (b) the maximum frequency deviation of the main carrier must not exceed ± 75 kHz; and
 - (c) a positive value of the baseband signal must correspond to a positive frequency deviation of the main carrier.

Note: There is a positive value of the baseband signal when the signal crosses the time axis with a positive slope.

- (7) An emission caused by the transmission of an FM radio service on a frequency removed from the main carrier by more than 120 kHz, but not more than 240 kHz, must be attenuated at least 25 dB below the level of the unmodulated main carrier.
- (8) An emission caused by the transmission of an FM radio service on a frequency removed from the main carrier by more than 240 kHz, but not more than 600 kHz, must be attenuated at least 35 dB below the level of the unmodulated main carrier.
- (9) An emission caused by the transmission of an FM radio service on a frequency removed from the main carrier by more than 600 kHz must be attenuated either:
- (a) at least $43 + 10 \log P$ dB (where P is transmitter power in watts) below the level of the unmodulated main carrier; or
 - (b) at least 80 dB below the level of the unmodulated main carrier;
- whichever is the lesser attenuation.
- (10) For the purposes of subguidelines (6) to (9) and this subguideline (10):

baseband signal means the composite modulating signal applied to produce frequency modulation of the main carrier.

Note: In mono transmissions without an ancillary communication service, the baseband signal is the audio signal. An ancillary communications service is a separate supplementary information service on a modulated sub-carrier.

main carrier means the VHF signal modulated by the baseband signal.

Television and datacasting

- (11) The radiated signal characteristics of television and datacasting transmitters must comply with clause 6.2.10 and clauses C5, C6 and C7 in Appendix C of Australian Standard *AS 4599.1-2015 Digital television – Terrestrial broadcasting – Part 1: Characteristics of digital terrestrial television transmissions*.

Digital radio

- (12) Subject to subguideline (13), the radiated signal characteristics of a transmitter used to provide a digital radio broadcasting service must comply with the spectrum mask for VHF transmitters represented by the dotted line in clause 15.4 of standard ETSI EN 300 401 V2.1.1 Radio Broadcasting Systems; Digital Audio Broadcasting (DAB) to mobile, portable and fixed receivers, issued by the European Telecommunications Standards Institute (***ETSI***).

Section 22

(13) If:

- (a) the DRCP that relates to a transmitter used to provide a digital radio broadcasting service; or
- (b) the DRMT licence that authorises the operation of that transmitter;

specifies a spectrum mask (*the relevant spectrum mask*) other than the spectrum mask mentioned in subguideline (12), the radiated signal characteristics of that transmitter must comply with the relevant spectrum mask.

Note: Clause 15.4 of EN 300 401 V2.1.1 provides for a spectrum mask for VHF transmitters in ‘critical areas for adjacent channel interference’ (solid line), and a spectrum mask for transmitters in ‘certain other circumstances’ (dotted line). The ACMA may specify in a DRCP or DRMT licence where a requirement exists to apply the spectrum mask for critical areas for adjacent channel interference.