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Reception & interference (/Citizen/Consumer-info/My-connected-home/Reception-and-interference)

A good TV antenna Installation

An effective TV antenna installation system is critical for good (consistent images and sound) TV reception.

Generally, a simple antenna system consists of an outdoor antenna, coaxial cable, and a fly-lead between the wall plate and TV. In other situations, it may include other ancillary devices such as masthead amplifiers for weak signal areas and splitters or distribution amplifiers for the purpose of signal distribution for multiple TV equipment.

Antenna

Antenna performance is a measure of how efficiently an antenna can receive the broadcast signal. The design, size and type of antenna, and the method of installation used, can affect its performance. The size and shape of an antenna depend on three characteristics:

- > The specific frequencies which the antenna is designed to receive
- > The polarisation of the broadcast transmission signal

Broadcast transmitted signals are either horizontally or vertically polarised. The most efficient signal reception is achieved when the receiving antenna is polarised in the same direction as the broadcast signals. That is, they are on the same orientation plane.

- > The gain of the antenna

In areas of poor reception, it may be necessary to increase the received power of the broadcast signal with a more directional, higher gain and frequency band specific antenna.

Antenna for digital TV reception should be capable of receiving only:

- > VHF Band 3 (VHF channels 6 - 12) and UHF Band 4 (UHF channels 28 – 35) for metropolitan areas
- > UHF Band 4 (UHF channels 28 – 35) and UHF lower Band 5 (UHF channels 36-50) for regional areas

Some regional areas also have digital services using VHF Band 3 (VHF channels 6 - 12) and UHF upper Band 5 (UHF channels 36-68). If digital TV services are currently using UHF upper Band 5 channels, these services will be relocated to lower Band V, and possibly Band 4, channels following switchover. In these areas it is recommended to use a wideband UHF antenna for both Band 4 and Band 5 reception.

An antenna should meet the following key criteria:

- a. Show suitable and flat gain in the specified reception bands so it will operate in areas with good field strength without requiring additional amplification;
- b. Show good directivity and front to back ratio so it minimises reception of unwanted signals,
- c. Be robust enough to withstand the continual attention of large Australian birds. Its components should be made of heavy duty, UV-stabilised plastic or fibreglass reinforced element clips and balun housing, riveted element attachment and stainless steel screw connections.

A number of antennas either manufactured and/or designed in Australia meet these criteria, but antennas designed for other markets or for global distribution may not.

Antennas not recommended for good TV reception:

> Indoor antennas (sometimes called “rabbit ears”).

In areas of high signal strength, an indoor antenna may just be sufficient to receive some or all TV channels, however, it lacks the directivity that is achievable with outdoor type antennas to shield TV reception from interference

> Antennas designed to receive either FM radio or TV channels in the VHF band 1 and 2 (channel 0-5)

Cabling, Connectors and Fly Lead

Quad-shield coaxial cable (type RG6) with “F” type connectors are recommended for good TV reception. Quad-shield cable provides superior shielding against noise and external interference than single or dual shield cables in the market.

Fly leads are generally used to connect wall outlet plates to either the set top box or TV. Fly leads are generally the weakest link in the antenna installation. Quad shield fly leads provide superior performance compared to other types. Care should also be taken to maintain adequate clearance (at least 50mm) from AC mains power cabling and leads to minimise induction of impulse noise. Excessive bending and long fly leads can cause problems for TV reception. It is recommended to use custom made fly leads rather than connecting two or more leads together.

Ancillary Devices

Masthead amplifiers (MHA), splitters and distribution amplifiers are common ancillary devices used in antenna installation systems.

A MHA or booster is generally used in areas where only very weak television signals are available. The television signal may be weak due to intervening terrain, vegetation and buildings, or due to the distance between the broadcast transmitter and television antenna.

A television distribution amplifier is used to distribute the signal to several television receivers. Unlike the masthead amplifier, a distribution amplifier is installed within the building in which it operates, normally within the roof area. Distribution amplifiers are used in hotels, motels, blocks of units and similar high occupancy buildings.

As the name suggests, amplifiers, amplify both wanted TV signals and other unwanted signals indiscriminately due to its wide operating bandwidth. Therefore, masthead and distribution amplifiers should only be used when it is essential and care should be taken to set the gain of the amplifier appropriately. The best practice for TV reception is to install a higher gain antenna and only add a lower gain amplifier as required to provide the most robust signal. If the amplifier’s gain is excessive it may overload the TV receiver and cause disturbance to the picture or loss of signal. For good TV reception, the desired signal level at wall plates is around 54 dBµV. Signal levels below 45 dBµV and above 80 dBµV is not suitable for TV reception.

Read more about [interference from masthead amplifiers \(/Citizen/Consumer-info/My-connected-home/Reception-and-interference/masthead-and-distribution-amplifiers\)](http://www.acma.gov.au/Citizen/Consumer-info/My-connected-home/Reception-and-interference/masthead-and-distribution-amplifiers).

A splitter is a passive device that divides the signal from the antenna system to enable two or more outputs to operate effectively from the one antenna system. Some signal strength losses can be expected if a splitter is used.

Limiting interference at the antenna

Minimising interference at the antenna

Impulse noise is one of the main forms of interference to television reception. Impulse noise is more likely to be prevalent at lower frequencies (VHF bands) than in higher frequencies (UHF bands). This noise may transfer to the antenna terminals along with the wanted digital signals. By having a good antenna you can improve the quality of signal.

Antenna defects leading to poor TV reception



Antenna installed too close to roof



Missing elements



Missing UHF reflector



Mast head amplifier too close to the antenna



In and out cables attached together



Poorly constructed antenna with inadequate antenna spacing

Choosing the best antenna installation system

This should be done with the assistance of an experienced local antenna installer, who will know the specific antenna requirements for your area.

The installer will consider the following factors when selecting an antenna:

- > What channels are required?
- > What signal strength is available?
- > What, if any, reception problems exist in the area?
- > What polarisation is required?
- > Will a masthead amplifier be necessary?
- > Will separate VHF and UHF antennas be necessary?

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