

# WEATHER RELATED PROBLEMS

Radio & Television  
Investigation Service

Fact Sheet 6

This Fact Sheet, produced by the Radio & Television Investigation Service (RTIS) describes the different problems which can be caused by the weather and atmospheric conditions.

## INTRODUCTION

---

Weather can temporarily affect reception of both TV and radio in a variety of ways. It can also, rarely, affect transmission. However, *it is important not to blame the weather for reception problems* unless you have eliminated other causes. Genuine weather-related problems are actually fairly uncommon and are normally short-lived, so if your reception problem is long-standing, or continues despite changes in the weather, you should seek elsewhere for a cause. Speaking to neighbours will often show if the problem is temporary and widespread. If it affects those some distance from you it could well be related to the weather conditions but, again, if it persists you should consider other possible causes. Visit the RTIS Website and check our other RTIS Fact Sheets for further assistance.

## WHAT THIS SHEET COVERS

---

Analogue Television

Freeview Digital Television

Satellite Television

Cable Television

FM radio

AM (LW & MW) radio

Short Wave radio

DAB digital radio

## ANALOGUE TELEVISION

---

Typical weather-related effects are ‘venetian blinds’ which may be static or move slowly up or down the picture. These normally occur during stable, fine weather caused by high pressure. Certain parts of the country – particularly coastal areas – can be more susceptible than others. In severe cases another channel may be seen underneath, and the picture may tear or roll, with buzzing on the sound. These effects are due to co-channel interference from another analogue TV signal. This may not happen on all the channels, only on one or two.



The reason for the problem is that high pressure weather systems can cause signals to travel long distances with ease. This means that as well as your local transmission, your aerial can pick up those from distant transmitters as well. If they are on the same frequency, the result is co-channel interference.

Co-channel interference from a digital broadcast onto an analogue one is more subtle. It usually appears as an even, structured ‘grainy’ appearance rather like the noise seen on a weak analogue signal.

### What to do

Unfortunately, there is no way to stop this kind of interference, and broadcasters can't prevent it. Adjusting your aerial won't usually make any difference. You may find Freeview is less liable to weather-related interference after Digital Switchover than analogue is now, but if problems persist, satellite or cable TV may be the ultimate solution. *If your problem does not go away when the weather becomes more changeable, a different cause is more likely.*

## FREEVIEW DIGITAL TELEVISION

---

Freeview TV is rarely affected by weather but sometimes pictures and sound can break up during stable, fine weather caused by high pressure. Certain parts of the country can be more susceptible than others, notably coastal regions facing the near continent.

The reason for the problem is that high pressure weather systems can cause signals to travel long distances with ease. This means that as well as your local transmission, your aerial can pick up those from distant transmitters as well. If they are on the same frequency, the result is co-channel interference which can ‘scramble’ the digital signal.

### What to do

Unfortunately, there is no way to stop this kind of interference. European broadcasters have already minimised it as much as possible. Adjusting your aerial won't make any difference. If the problem is severe and persistent, satellite or cable TV may be the answer.

*N.B. We're aware that some viewers have installed Freeview even though they are not predicted to be in full coverage. In such circumstances they may be much more prone to weather effects than others. You can check this by going to the Digital UK Postcode Checker, and on the results page further clicking "Check other transmitters at your address". If reception from the transmitter you use is shown as yellow (variable) or red (poor), you will not be receiving the maximum protection from co-channel interference. If Digital Switchover has yet to reach your area, coverage—and hence protection—should improve greatly when it does.*

## SATELLITE TELEVISION

---

Satellite television is normally unaffected by weather. Occasionally, very heavy rain in the vicinity, high altitude clouds of ice crystals or snow accumulating in the dish can cause poor reception.

### What to do

There is nothing you can do. Fortunately such effects are normally very short-lived and when the weather changes, the problem should cease. If there is snow in your dish, and you can reach it, you may find that clearing it can help, but be careful not to damage the equipment. Breaking or melting ice from the dish is not recommended.

## CABLE TELEVISION

---

Cable television is normally unaffected by weather. However, highly unusual weather conditions have been known to affect the cable company's receiving equipment so if you have a problem which persists for more than a couple of hours, and you are sure your equipment and connections are not at fault, contact your cable TV provider.

## FM RADIO

---

The weather can affect FM radio reception in two basic ways:

- Whistles / warbles / twittering
- Blotting out by a foreign station

Both of these can occur at the same time but there are several mechanisms which can cause them.

### High pressure weather effects (tropospheric propagation)

Normally, FM signals are limited in coverage to places where there is line-of-sight plus a little bit more. This is why FM reception can be difficult in deep valleys, or in hilly areas a long way from the nearest transmitter. Signals angled upwards from the ground fly off into space and are lost. Transmitters therefore aim most of the signal along the surface of the ground, or angled downwards a little, as this provides the best coverage where it's needed. All the same, some signal escapes upwards into space.

During stable high pressure weather conditions, upward-going signals can be bent back down towards the ground tens or hundreds of km away. The layers which cause this are in the part of the lower atmosphere called the troposphere. Because there are so many stations on FM throughout the UK and the near continent, these conditions can cause two stations to be received in your home on the same frequency. The result can be whistling and warbling if the effect is mild, or a complete swamping of one station by another if it's more severe. Because these conditions are often stable, the problem can last for many hours, perhaps even a day or two, though it can vary in intensity during that time.

These problems will disappear when the weather changes, particularly when a front associated with low pressure passes through.

## FM RADIO

---

### Fog banks (low level temperature inversions)

A more localised effect can occur during fog, especially early in the morning. Fogs can form where warm air traps a layer of cooler air beneath it, known as a temperature inversion. When this is close to the ground, FM signals can travel under this layer as if in a duct. Because both transmitter and receiver need to be within the same fog bank, this effect rarely extends over a few tens of km. However, sea-fogs can cause longer ducting resulting in intense interference at times, especially across the North Sea or English Channel.

These problems often occur in tandem with the more widespread high pressure weather effects, since they require the same stable atmospheric conditions.

### Upper atmosphere effects (sporadic E)

During the high summer, certain atmospheric conditions can cause stations hundreds of kilometres distant to suddenly appear on your radio dial. They usually emerge very suddenly and can last from a few seconds up to an hour or more. Sometimes one station can be replaced by another one without you re-tuning your radio, and can be so strong they completely blot out your normal reception. The effect is known as Sporadic-E and, although not well understood, is thought to take place in the upper atmosphere where, for short periods, layers can emerge which are highly reflective to radio signals. These radio 'mirrors' can bounce signals back to earth which would normally disappear into space and be lost; transmissions hundreds of kilometres distant can be heard by this means. Sporadic-E is most prevalent from June to August but can occasionally occur either side of those months, and usually peaks around the middle of the day.

#### What to do

There is nothing you can do. Fortunately such effects do eventually cease. If you live in an area where this is a frequent nuisance, try using an alternative means to listen to your station, such as DAB digital radio or digital satellite. You may also be able to listen online.

## AM RADIO (LW & MW)

---

AM radio is not actually affected by the *weather*, but by changes in the *atmosphere*, many of which are very predictable. The biggest difference is between day and night.

During the daytime, LW & MW signals follow the contours of the ground (known as ground wave propagation). LW signals can be heard a couple of hundred km distant—MW ones a few tens of km distant. Because of careful frequency planning, interference is quite rare although there are some areas where transmitter coverage areas overlap (called *mush zones*). These are deliberately placed in regions with few people. Signals moving skywards are absorbed by lower atmospheric layers and do not return to earth.

During the night, the absorbing layer dissipates allowing more reflective layers in the upper atmosphere to bend the signals back to earth, often over distances of hundreds of km. This results in a significant interference problem despite the best efforts of international frequency planners.

Because night-times are longer, interference on AM is more prevalent during winter than summer.

## What to do

Because the interfering stations often come from differing directions, portable radios can be turned to reduce interference rather than simply to maximise the signal. If an alternative frequency is available for your station, you may find it better. You could also try using an alternative means to listen to your station, such as FM, DAB digital radio or digital satellite. You may also be able to listen online.

## SHORT WAVE RADIO

---

Short wave signals 'bounce' off layers in the upper atmosphere allowing large distances to be covered. However, reception is highly dependent upon the state of the upper atmosphere which itself is influenced by conditions on the sun. This has drawbacks, such as:

- Pronounced fading and distortion
- Sudden loss of reception
- Interference from other stations
- Whistles

Fading is caused by fluctuations in the way signals are bounced off the atmospheric layers. In general, the more distant your station, the higher the frequency you will need to listen on, and the greater the potential for fading. However, even lower frequencies can fade badly at times. In extreme cases the signal can flutter very rapidly. The problem is often compounded by distortion during the fade.

Because the state of the upper atmosphere changes over time, especially between day and night, signals can drop out completely in a matter of minutes. For this reason, short wave broadcasters often transmit on a range of frequencies simultaneously on the basis that if the listener loses them on one frequency, there is a good chance that a different one is now more effective.

Short wave bands are so crowded that there is often interference and whistles from stations using frequencies either side, or on the same frequency as you are listening on. As the atmosphere changes this interference can vary considerably, both between day and night and from one day to the next.

## What to do

Try a different frequency for the station you are listening to. If reception on the new frequency later deteriorates, try retuning again. More sophisticated types of radio use *synchronous detection* which reduces the distortion caused by fading and may also make the fade itself less apparent.

Better radios reduce splatter and whistles by enabling you to select different filtering options, sometimes in tandem with synchronous detection. Careful use of such filtering can reduce these types of interference and can render quite weak signals much clearer.

Serious short wave listeners often use directional aerials to help reduce interference. This is especially useful when two stations are both heard on the same frequency.

Broadcasters are now using other means to reach their listeners, such as satellite, online and digital short wave (DRM). If these options are available you may find reception better.

## DAB DIGITAL RADIO

---

Weather effects on DAB digital radio are less common than for FM. Although high pressure weather conditions and fog banks can affect DAB frequencies, the resilience of the DAB system (in particular the Single Frequency Network) normally prevents these conditions from causing significant disruption. However, with certain weather conditions problems can occur when strong signals from more distant DAB transmitters are received on top of your local one, temporarily overwhelming the DAB system's digital safeguards.

It is very difficult to distinguish weather-related problems on DAB from other causes by symptoms alone. Such symptoms include break-up or burbling, and intermittent loss of reception on one or more station, or one or more multiplex. On rare occasions reception could be unavailable for minutes or even hours at a time.

### What to do

The only sure way of determining if weather is the cause is to see whether the problems persist once the weather has changed. Another means of checking would be to see if normally good FM reception is affected by whistles or interfering stations.

If weather does seem to be affecting DAB reception, there is nothing you can do other than wait until the problem goes away.