

## Radio Transmitters and Telephones

### Purpose of this leaflet

#### **This leaflet is for the information of householders and other telephone users.**

An ordinary wired telephone is not intended to act as a radio receiver but in some cases, signals from a nearby transmitter may be heard on a telephone. This leaflet explains why this problem occurs and how it can be solved.

#### **Q1. Is my telephone being affected by a nearby radio transmitter?**

Some types of telephone can be affected by nearby radio transmitters. For example, telephone users in certain locations may hear:

- Radio programmes from a nearby BBC or NTL AM broadcast transmitter
- Radio transmissions from a nearby taxi operator
- Radio transmissions from a licensed radio amateur nearby.

If this happens, it is the fault of the telephone as an ordinary wired telephone should not respond to radio signals. If you think that a radio amateur's transmissions are affecting your telephone, you can confirm this by making contact with the radio amateur concerned and asking him or her to do some test transmissions. Alternatively, you could write a list of dates and times when the problem occurs. The list could be compared with the "log" which almost all radio amateurs keep.

Such problems can normally be solved but will require co-operation by all parties involved.

#### **Q2. If a radio amateur's transmissions affect my telephone, is it the radio amateur's fault?**

If signals from a radio transmitter are heard on a telephone, this does not mean that there is anything wrong with the transmitter or with the way it is being operated. In nearly all cases the problem is caused by the design of the telephone. A problem called RF (Radio Frequency) breakthrough can occur because the telephone is not sufficiently good at rejecting radio signals. If this happens, the telephone is said to lack RF immunity.

Most telephones now have reasonable immunity to unwanted radio signals but this may not be the case with older telephones which may still be in use.(see question 8 below).

#### **Q3. How can "immunity" be explained in a non-technical way?**

If a window lets in a draught during windy weather, it could be said that the window has poor "immunity" to wind. As the climate cannot be changed, the window must be made suitable for the climate, by fitting draught excluders. Clearly, it would be better if these had been fitted by the manufacturer.

Radio waves from many sources such as radio and TV broadcast transmitters, emergency services, public utilities and radio amateurs, form a different sort of "climate" (The technical term is "electromagnetic environment"). This varies a great deal from one place to another and even from

one house to another in the same street. It is controlled by licensing. Most users of radio transmitters in the UK, including radio amateurs, operate under the terms of a licence issued by OFCOM. If a telephone has poor immunity, it may only work properly where the radio wave "climate" is "mild", that is, not too near a radio transmitter. Although this "climate" is man-made and can be controlled, the licensed operator of a radio transmitter should not be expected to stop using it because of insufficient immunity of a nearby telephone. For example, if a telephone picks up radio broadcasts near a BBC or NTL AM broadcast transmitter, it would not be reasonable to expect the transmitter to be closed down because of this!

#### **Q4. What if the telephone is rented from BT?**

If the telephone is rented from BT the first step should be to contact BT for advice. Breakthrough to telephones is not a very common fault so be sure that the help-line operator understands the problem and routes you to the appropriate technical advisor.

#### **Q5. What about non-BT telephones?**

In cases of RF breakthrough on a telephone bought from a supplier other than BT, the customer is advised to contact the supplier or retailer.

#### **Q6. What else can be done?**

In the case of RF breakthrough from an amateur radio station, the radio amateur may be prepared to loan ferrite rings (see "Technical Information" below) but is under no obligation to do so. If these are not effective, it will be necessary to obtain a telephone with better RF immunity.

#### **Q7. Is this a new problem?**

Telephones have been used near radio transmitters since the 1920s but until the 1980s, there were very few problems with RF breakthrough on telephones. This is because older dial type telephones did not contain the sensitive electronic circuits which are found in modern telephones. Although modern telephones offer many advantages, some have the disadvantage that they are far more prone to RF breakthrough than older types.

#### **Q8. What is being done to improve immunity of telephones?**

Following a European Directive on Electromagnetic Compatibility (EMC) in 1989, all electronic equipment including telephones manufactured after 1st Jan 1996, must meet European EMC standards and carry a "CE" mark. EMC means that different types of electronic equipment are compatible and do not interfere with each other.

There are various EMC standards which require equipment to have a certain level of immunity to signals from nearby radio transmitters. Until 2001, telephones could be tested to a 1992 standard which requires very little immunity. Standard EN 55024 requires more immunity and newer telephones should meet this standard.

## **Technical Information**

In some cases, RF breakthrough can be reduced by fitting a ferrite ring or a clip-on ferrite core to the telephone cable near the telephone. Answering machines which have a mains power supply unit may also require a ferrite ring on the power cable. Suitable rings are Fair-Rite 2643802702 (available from RSGB). The telephone cable should be wound 12 turns through the ring if possible. Alternatively, 6 turns can be used on a clip-on ferrite core. Further details are given in the EMC section of the RSGB Year Book.

The product-specific RF immunity standard for telephones is EN 55024-1. This tests immunity from 150kHz - 1000MHz with a 3V or 3V/m amplitude modulated signal.

*This leaflet was produced by Radio Society of Great Britain, 3 Abbey Court, Priory Business Park, Fraser Road, Bedford MK44 3WH.*

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