Supplementary Planning Guidance Note 28: Telecommunications, 2003
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Introduction

28.1 This Note sets out guidance for operators or information for people who may be concerned about proposals for telecommunications development. It details the role of the Local Planning Authority (in terms of what it can and cannot do) in determining planning related applications for such proposals within the city. It takes on board the advice from Government on telecommunications matters contained within Planning Policy Guidance Note 8, Local Plan policy and the City Council’s draft Telecommunication Mast Protocol (which refers to masts and equipment on land and property in the Council’s ownership) approved by the Cabinet Committee in December 2001.

28.2 This SPG is divided into 3 separate parts concerning;

- background to the telecommunications industry and technical details associated with the operating systems;

- Government policy and the planning framework; and

- the Council’s requirements in determining related applications for telecommunication mast proposals and offers specific guidance on siting and design.

Background

28.3 The telecommunications industry is now a major component of the U.K. economy. It represents 3% of Gross Domestic Product, employs over 213,000 people and serves more than 62 million telephone users, including over 40 million mobile phone subscribers (source: DETR – Telecommunications Mast Development Consultation paper, July, 2000). The Government has therefore attached considerable importance to the development of the telecommunications industry which it considers provides a number of economic and environmental benefits. Planning Policy Guidance Note 8 - Telecommunications identifies that “fast, reliable and cost effective communications can attract business to an area and help firms to remain competitive”. An efficient communications network also is considered to help reduce the need to travel and therefore the volume of pollutants and carbon dioxide emissions.

28.4 The current mobile communications network in place in the U.K. is the Digital Cellular system which was introduced in the early 1990’s. This network is served by five operators, Vodafone, O2, T-Mobile, Orange and Hutchison. Under the conditions of their licence these operators are required to provide coverage for 90% of the U.K. population. Current U.K. coverage is for over 98% of the population.

28.5 Although this population coverage now exceeds the licence requirements it does not mean that the need for operators to provide additional antenna will cease. As more users enter the market the capacity of networks can become restricted and as a result more infrastructure may be necessary to address this problem. In addition the introduction of the new third generation mobile phone system (known as 3G) requires a new nation-wide network of antenna. It is envisaged that this new digital network will provide an enhanced service for mobile users through higher data rates than the present system. The five existing mobile phone operators have been
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granted a 3G licence. Under the terms of this licence each operator is required to provide a network that will cover 80% of the population by 2007.

28.6 Operators of radio telecommunication systems require a licence under the Telecommunication Act 1984 and the Wireless Telegraphy Act 1949 and 1998 to run their systems. The licences are issued by the Secretary of State for Trade and Industry. Licensees are known as ‘code system operators’ ie. Vodafone, O2, T-Mobile, Orange and Hutchison. In May 2000, the Government awarded five operators licences valid until 2021. The licence gives code operators special rights and obligations, known as ‘Code Powers’ to facilitate the installation of their systems. The code powers are quite extensive.

28.7 The mobile phone operators have come together to form the Mobile Telecoms Advisory Group (MTAG), which publishes up to date information and facts on mobile equipment, health and technology issues associated with the telecommunication industry (www.mobilemastinfo.com). As part of its brief, the FEI has published a list of ‘Ten Commitments’ to which all the code operators agree to abide by in terms of providing better consultation with the public and local planning authorities about future network rollout plans.

What are telecommunication systems and how do they operate?

28.8 In basic terms, mobile telecommunication systems operate by sending radio signals between ‘base stations’ (using masts and antennae) to mobile phones. The system works by using and re-using the same radio frequencies and allocating them to geographical ‘cells’. The Code Operators divide the country into thousands of individual cells and at the centre of each is a ‘base station’. The whole system is known collectively as the ‘network’.

29.9 Within the network, each of the base stations connect to each other via a small microwave dish antenna and their purpose is to track mobile phones so that when one caller moves from one cell to the next, the call can be transferred without a break in service. The area covered by the cell is governed by the anticipated capacity (i.e. the volume of calls made), the height of the antenna above the ground, the local terrain, the power output and radio frequency used.

29.10 The largest cells tend to be within the rural areas where population levels are relatively small, whilst the smallest cells are located within urban areas where the systems are more heavily used. There is a great variety in the way cells are configured and split, but splitting cells can help to increase the amount of capacity of calls (known as ‘traffic’) which can be handled at any one time.

29.11 Networks consist of three sizes of base stations;

- **Macrocelp base stations** - These provide the main radio coverage infrastructure for the network. Antenna for macrocell base stations are usually mounted on ground based masts, on top of tall buildings, or other existing structures such as electricity pylons.

- **Microcell base stations** - These are used to ‘infill’ and improve the main network of macrocells. They are most commonly used in urban areas where the call traffic is high. The antenna are relatively small in size and are usually mounted at street level either onto the facade of buildings or disguised as lamp posts or other forms of street furniture.
• Picocell base stations - These have even smaller antenna (the size of a burglar alarm) and are generally sited inside of large buildings such as shopping centres to help improve the quality of the calls being made and received.

29.12 Third generation (3G) mobile services will however require more base stations because 3G radio signals do not travel as far and the resultant smaller cells leave gaps in the radio coverage between existing sites currently being used by the second generation.

29.13 There are also number of other telecommunication system operators which have slightly different networks. These are as follows:

• Terrestrial Trunked Radio (TETRA) - This is a digital communication system which operates specifically on low frequencies and therefore the range from each of the base stations will be much greater than required by mobile phone operators. This system is used by Airwave which provides a communication service for emergency services such as the police.

• Fixed Radio Access (FRA) - This system uses base stations and antennas to provide a fixed telephone link between users such as offices which also utilises fast access to the internet as an alternative to conventional telephone lines.

• Private Business Radio (PBR) - This system provides voice only communication for businesses such as taxi firms. This system uses slim line aerials rather than larger antennas.

• Broadcasting Systems - These are the systems used by national broadcasters and are based on tall masts which carry a variety of antennae and microwave dishes to provide quality broadcasting for television and radio. The masts are often located in prominent locations as they require a direct line of site to cover transmission of their signals.

Central Government Legislation and Planning Guidance

29.14 The majority of telecommunications development proposed by mobile phone operators does not need a planning application as it is deemed ‘permitted development’, by virtue of the amended Town and Country Planning (General Permitted Development) Order 1995 (GPDO). In this instance ‘prior approval’ of the proposal from the Local Planning Authority (LPA) is necessary. Where prior approval is required and subject to the development meeting the limitations set out in the GPDO (attached as appendix 1) the operator is required to apply to the LPA for determination as to whether the siting and appearance of the development is acceptable. The LPA then has 56 days to consider only the siting and appearance of the proposed development.

29.15 Where the development proposed does not fall within the limitations of the GPDO or ‘permitted development’ rights have been removed, the operator is required to submit a full planning application for the development. In considering such a proposal the LPA is required to take into account relevant policies of the Development Plan (comprising the Structure Plan and Local Plan) in addition to any other material considerations. Certain minor telecommunications proposals may not
constitute development in which instance applications for prior approval or full planning permission will not be necessary.

29.16 Planning Policy Guidance Note 8 "Telecommunications" sets out the Government’s guidance on planning for telecommunications development including masts, towers and antennas. LPAs are required to consider the guidance contained within PPG8 when preparing Development Plans. The guidance is also material to the consideration of both ‘prior approval’ and full planning applications, including the consideration of appeals.

Consultation and Publicity

29.17 Public consultation requirements under the 56 day Prior Approval procedures are now exactly the same as for development requiring planning permission. In addition to any statutory consultation, the Government advises local planning authorities to undertake any additional publicity that they consider to be necessary, in order to give people likely to be affected by the proposed development an opportunity to make their views known. In particular, where a mast is to be installed on or near a school or college, the local planning authority should consult the relevant body of the school or college concerned and should take into account any relevant views expressed.

29.18 The following has been adopted by Planning Services as the consultation procedure for both prior approval and full telecommunication applications:

- Details of the application are recorded on the planning register held at Kingston House, Bond Street, Hull.

- Details of the application appear on the ‘weekly list’ of applications received. This list is sent directly to all Members of the Council and is made available for inspection at the local information offices and the Council’s web site.

- The Council will notify by letter, the owner/occupier of all properties (both residential and commercial) which immediately adjoin the site, or are located within close proximity and may be directly affected by the development proposed.

- With regard to telecommunication development proposals that are located within 100 metres of a school (buildings or associated grounds), the Council will consult with both the Head Teacher and School Governors of the nearby school.

- Where it is apparent that the proposed development is likely to be of greater significance to more than just immediate neighbours, a public site notice may also be displayed in close proximity to the site, for a period of not less than 21 days, outlining the details of the application and the date by which any representations must be made to the Council.
Existing Local Policy

29.19 Policies relevant to determining proposals for telecommunications development are contained within the Hull Local Plan. These are currently approved planning policies for development control purposes.

- Hull Local Plan Policy BE14 states:

BE14 'Telecommunications development will be allowed if the apparatus is sited and designed taking into account of operational needs, to minimise its impact on amenity.'

Determining telecommunication proposals

29.20 Considerations that will be taken into account by the LPA in determining ‘prior approval’ or full applications for planning permission include the following;

- Preferred and unsuitable locations

29.21 Areas dominated by tall buildings and structures such as those within the City Centre or in employment and commercial areas are considered to be the most appropriate locations for new base stations and mast/site sharing. The existence of large scale development and high buildings or structures in such areas will often permit the integration of new telecommunication development with the least environmental impact.

29.22 Areas containing predominantly commercial properties may be appropriate locations for new base stations and mast sharing, subject to careful consideration of the siting and design of both masts and equipment particularly if residential properties are located close by.

29.23 Predominantly residential areas are considered generally to be unsuitable for new macrocell base station developments. However, microcell base stations maybe considered to be appropriate, providing that the proposed mast/equipment is of a suitable design and can be accommodated without adversely affecting the character of the area. Macrocell developments should only be sited in residential areas where it can clearly be demonstrated that there is an overriding need for the base station to meet the network demands and that the siting and design of both mast and equipment does not cause undue harm to the visual amenity of the area.

29.24 Listed buildings and environmentally sensitive areas such as conservation areas are inappropriate locations for telecommunication developments, unless it can be demonstrated by the code operator that there are no suitable alternative sites available to meet their operational demands and that the design and siting of the mast and equipment would have minimal environmental impact. In conservation areas and on listed buildings, operators will be required to demonstrate how the proposed development would preserve or enhance the special character of the building or area in which it is to be located.

- Need for the proposed development

29.25 An important principle identified within PPG8 is that authorities should not "seek to prevent competition between different operators and should not question the need for the
telecommunications system which the proposed development is to support”. However, PPG8 considers it appropriate for the LPA to request evidence regarding the need for the proposed development. Therefore, it will be expected that prior approval and full planning applications include details of how the proposed development will relate to the operators existing network in terms of current coverage and capacity. Where proposals are required to improve capacity of existing coverage the operator will be expected to provide details of the shortfall of capacity in relation to network demand.

- **Pre rollout/application discussions and consultations**

29.26 In line with advice received within PPG8, the City Council is committed to undertaking pre-rollout and pre-application discussions with operators. It will therefore be expected that an operator will inform the City Council, on at least an annual basis, of their forthcoming rollout plans. The Council will expect all operators to co-ordinate their rollout programmes in helping to reduce the number of new sites that will be required.

29.27 Operators will also be expected to consult with the City Council prior to the submission of either a prior approval or full planning application. At this time it will also be necessary for the operator to have demonstrated that other relevant stakeholders and appropriate members of the public, i.e. immediate neighbours to a proposed development, have received appropriate consultation. Details of such consultations should be included with the relevant application. Where a proposal will be sited within 100m of a children’s nursery, school or college, the operator shall, in line with the requirement of PPG8, discuss the proposal with the relevant body of the nursery, school or college concerned and advise the Council of their consultations and its outcome including any responses received.

- **Mast and site sharing**

29.28 The City Council considers that, when appropriate, the sharing of masts or other appropriate structures can in some cases limit the environmental impact of the proposal and prevent the need for additional structures. Care must be taken when choosing the mast sharing option, as the ultimate structure may result in a larger and more visually intrusive installation than before. An alternative to mast sharing should be considered on sites where additional antennas would lead to undue clutter of antennae or increase the height of the structure to an unacceptable level of prominence. Operators who choose not to mast share where there is an opportunity to do so should fully justify the reasons for not sharing.

29.29 However, the Council accepts that due to technical constraints, including the suitability of existing masts and structures to hold additional equipment, sharing will not always be feasible. In certain instances the upgrading of an existing mast may have a more prominent environmental impact than the installation of a new structure. It will therefore be necessary for operators to have clearly demonstrated that existing masts and structures or alternative locations within the area of search have been considered when submitting proposals for new masts. Full justification will be
necessary to explain why it is not appropriate to have sited the proposal on an existing mast or structure or alternative sites and the reasons why the preferred location has been chosen.

29.30 When considering either mast or site sharing options the code operators should take into account the following guidelines:

- Assessing the character of the area where the site is located, taking into account both short and long distance views.

- Assessing the overall change to the visual appearance of an existing site if additional equipment is to be installed. The preparation of a ‘before and after’ photo montage would be helpful in this form of appraisal.

- Designing new masts to cater for future mast sharing possibilities on appropriate sites.

- **Detailed design and appearance**

29.32 By its nature, telecommunication development and associated equipment may often appear to be an incongruous feature within the environment. The fundamental principle is to minimise the contrast between the equipment and its surroundings. The visual impact of a mast or antenna depends on how it is seen, both in terms of the image it conveys and its composition within its immediate environment. Operators will therefore need to demonstrate that they have taken all reasonable measures to minimise environmental impact of the telecommunication development when seeking approval from the Council. Issues taken into consideration when assessing the visual impact of such proposals will include the height of the mast, the structure proposed and the prominence of the development in relation to existing buildings.

29.33 In order to minimise visual impact, operators should:

- Select a site that has the least environmental impact rather than one which is merely convenient to the operator in terms of the land owners agreement or acquisition.

- Select a site that would not be unduly conspicuous when viewed from a sensitive location i.e. residential property.

- Select a shape, height and design appropriate to the character of the area where the mast/antennae equipment it is to be sited, bearing in mind that it may also be seen from another area which has different characteristics.

- Use the simplest form of mast/antennae possible unless the site is considered suitable for mast sharing.

29.34 There is a wide range of techniques that can be used to either disguise or conceal telecommunication equipment and there is enormous scope for code operators to provide creative and imaginative solutions. Masts and other equipment can be designed to resemble street furniture such as lamp posts or incorporated into shop fascia signs and even flagpoles. The use of ‘glass reinforced plastic’ (GRP) to screen antennae is now becoming popular, as it can be
designed and painted to match the colour and texture of a building or specific architectural feature, such as brickwork or even chimneys.

29.35 Measures that can be used to help conceal and disguise masts include:

- Where possible use existing buildings, structures and masts.
- Choosing a design suitable to the character of the location where the mast is to be sited.
- Incorporating the mast into the overall design of the building on which it is to be sited.
- Using existing landscaping and topographical features to help screen the main elements of the mast from view.
- Incorporating new landscaping to help screen the base of the mast and equipment cabins.
- Creating an innovative design as part of a public art structure.

29.36 Measures that can help to conceal and disguise antennae include:

- Painting them in a sympathetic colour to their setting.
- Placing them in areas of shadow on building elevations i.e under eaves or behind coping stones and plinths.
- Avoiding locations that contrast with architectural details.

29.37 One of the elements that will reflect the siting and design of telecommunications infrastructure is the technological constraints faced by the operators. Operators will be required to justify the design chosen. This requirement will be particularly important where proposals relate to the siting of either a new mast or an antenna in a Conservation Area or on a listed building.

29.38 A wide range of tall buildings and other structures can often be used for siting telecommunication equipment, as their height offers advantage in operational terms. Where appropriate, new tall buildings should include facilities for the accommodation of telecommunication equipment as part of their overall design. Appropriate buildings and structures can include:

- Office blocks
- Churches
- Chimneys
- Floodlighting towers
- Warehouses

29.39 The architectural style of the building/structure will help influence the siting and design of the equipment to be installed, but the main aim is to minimise the visual impact of the development on what would be a prominent location. Positioning equipment in a group with
symmetrical order, or placing equipment against existing roof top structures such as a plant room will help to minimise the overall visual impact and protect the building’s silhouette.

29.40 Installation on buildings and structures that are Listed as being of architectural and historical character, will only be acceptable where it can be demonstrated that the proposed development is appropriate to the character and appearance of the building. Operators will therefore need to show that their telecommunication equipment can be accommodated without affecting these special characteristics.

29.41 Sites where new telecommunication masts would not normally be acceptable are those areas which are considered to be environmentally sensitive such as Conservation Areas. If a code system operator proposes a new mast in such areas, then it will be necessary to show that there are no suitable alternative site locations available outside these areas and that the design and siting of the mast and associated equipment has taken into account the environmental characteristics of the area where it is to be located. The main test of the suitability and appropriateness of the proposed development will be weighed against the need to ‘preserve or enhance’ the character of the Conservation Area.

NB. It is important to note that the siting of equipment on rooftops may be influenced by the need to provide an adequate exclusion zone and ensure the installation complies with the ICNIRP guidelines for public exposure.

- **Health considerations**

29.42 Mobile phones and their associated base stations transmit and receive radio signals using electromagnetic waves, (referred to as EMF). EMFs are all around us and often occur naturally, such as within the earth’s own electromagnetic field. There are also a wide range of man-made sources of EMF emissions i.e. from domestic appliances, power lines and electric trains.

29.43 The Government’s statutory advisers on radiological protection matters are the National Radiological Protection Board (NRPB). They provide expert advice and information to local planning authorities and the general public on health matters associated with EMFs. Further information can be obtained from the NRPB’s own web site (www.nrpb.org.uk). Guidelines on exposures to radio frequency (RF) radiation have also been published by the International Commission on Non-Ionising Radiation Protection (ICNIRP) (www.icnirp.de).

29.44 It is the Government’s view, expressed in PPG8, that the planning system should not determine applications on health issue grounds. The issue of health effects from the use of mobile phones, base stations and transmitters was addressed by an independent Expert Group on Mobile Phones (EGMP) who published a report on their findings. This report, known commonly as the Stewart Report, concluded that:

‘the balance of evidence indicates that there is no general risk to the health of people living near to base stations on the basis that exposures are expected to be only small fractions of the guidelines. However, there can be indirect adverse effects on their well-being in some cases.’

29.45 As a result of the Stewart Report the Government has taken the view that if a proposal conforms with the guidelines for exposure to electromagnetic fields (EMFs), as identified by the
International Commission on Non-Ionising Radiation Protection (ICNIRP), it should not be necessary for the issue to be considered further. Therefore, in submitting both prior approval and full planning applications operators will be expected to confirm that the proposal would be compliant with the ICNIRP guidelines.

29.46 However, notwithstanding the findings of the Stewart Report, compliance with the ICNIRP guidelines does not address concerns people may have that there is a perceived health risk from telecommunications development. The City Council considers that such a fear is likely to be exacerbated where the development proposed is sited in close proximity to sensitive land uses such as education facilities and housing. In such instances the City Council will expect the operator to take into account the fact that such concerns may exist. Appropriate pre application consultation will help to highlight sites where such concerns may arise.

Appendix 1 – Summary of permitted development rights from the TCP GPDO, 1995

29.47 All types of apparatus required for the code operator’s telecommunications system may be installed in, on over or under land (including on buildings and on other structures, such as radio masts), or altered or replaced, subject to a number of limits and conditions, of which the principal ones are summarised as follows:

- Apparatus such as a radio mast (or tower), which is being installed on the ground must not exceed a height of 15m above ground level, or the height of any apparatus which it replaces, whichever is the greater (this limit does not apply to antennas installed on a radio mast).

- When apparatus is sited on a building or other structure it must not itself exceed 15 metres in height, if the building (or structure) is 30m or more in height, or exceed 10m if the building (or structure) is less than 30m in height. The height of 15m does not include antenna on top. In addition it must not add to the overall maximum height of the building by more than:
  - 10m for buildings of 30m or more,
  - 8m for buildings between 15m and 30m
  - 6m for buildings of 15m or less

- An antenna may be installed on a building, other than a dwelling house, that is below 15m in height, or on a mast located on such a building subject to a number of limitations including the size of the antenna, the overall number and the positioning.

- Radio equipment housing, including any ancillary works such as fencing may be installed provided that it is ancillary to a telecommunications installation and within certain size limits.

- Before it is possible to make use of the permitted development rights in respect of the installation of a radio mast, radio equipment housing with a volume in excess of 2 cubic metres or a public call box, a code system operator must apply to the local planning...
authority for a determination as to whether the prior approval of the authority will be required to the details and siting and appearance of the apparatus.

- The prior notification application shall be accompanied by a written description of the proposed development and a plan indicating the site, together with the appropriate fee. Development shall not be begun before:

  (1) The authority indicates that prior approval of the details is not required, or the authority indicates prior approval is required and the details of the siting and appearance of the apparatus are agreed and approved by the authority within 56 days, beginning with the date on which the local planning authority received the application.

  (2) Where the local planning authority gives written notice that prior approval is required, the giving of that approval is given within 56 days, beginning with the date on which the local planning authority received the application, without the local planning authority notifying the applicant that approval is given or refused.

  (3) The expiry of 56 days, beginning with the date on which the local planning authority received the application without the local planning authority notifying the applicant that approval is given or refused.

- There are no permitted development rights for the installation of an antenna, a radio mast, or radio equipment housing with a volume in excess of 2 cubic metres on any Article 1(5) land (Conservation areas, National Parks AONB) unless in an emergency. Where permitted development rights are used to install any other telecommunications apparatus on such land, e.g. a public call box, the determination procedure above applies. Permitted development rights for development on a site of special scientific interest (SSSI) are also restricted.

- When apparatus is no longer required for telecommunications purposes, it should be removed as soon as reasonably practicable from the land or building on which it is located, and the land restored to its condition before the development took place.

- Any antenna which is located on a building must, so far as practicable, be sited so as to minimise its effect upon the external appearance of that building.

Appendix 2 – Glossary

Antenna: Device designed to radiate or receive electromagnetic energy.

Base Station: Facility providing transmission and reception for radio systems. For macrocells, the infrastructure comprises either roof – or mast – mounted antennas and an equipment cabinet or container. For smaller microcells and picocells, the antennas and other equipment may be housed in a single unit.

Cell and Cellular: A cell in the context of mobile phone technology is the area of geographical coverage from a radio base station. “Cellular” describes such systems, but is often used to
distinguish the original analogue systems from the later digital PCN systems, although the latter themselves have cells.

Electric Field: Produces a force on a charged object. Measured in units of volts per metre.

Electromagnetic fields (EMF): The electric and magnetic fields associated with electromagnetic radiation.

Electromagnetic radiation: A wave of electric and magnetic energy that travels or radiates from a source.

Emissions: Generic term used to describe radio waves emitted from a mobile phone transmitter or mobile phone.

Frequency: The number of complete cycles of an electromagnetic wave in a second. Measured in units of hertz (Hz).

Hertz (Hz): Unit of frequency. One cycle per second.

ICNIRP: The International Commission of Non-Ionizing Radiation Protection. Set up by the International Radiation Protection Association and is responsible for co-ordinating knowledge of protection against various non-ionizing radiation. The ICNIRP works closely with both national and world organisations, including the United Nations and World Health Organisation, to monitor and advise on environmental criteria relating to non-ionizing radiation. www.icnirp.de

Ionising radiation: Radiation which is powerful enough to alter the structure of human cells.

Macrocell: The main type of telecommunications transmitter providing the framework for a code system operators coverage. Designed to provide coverage for a radius of up to 35km dependant upon terrain and surroundings.

Microcell: Transmitters designed to boost coverage over small areas already covered by a macrocell transmitter, typically 500 to 800 metres.

Microwaves: Electromagnetic radiation in the wavelength range 0.3m to 0.001m.

National Radiological Protection Board (NRPB): Statutory authority whose responsibilities include the acquisition of knowledge about the protection of people from radiation hazards, and the provision of information and advice to persons and organisations (including Government Departments) with responsibilities in the United Kingdom in relation to the protection from radiation hazards either of the community as a whole or of particular sections of the community. www.nrbp.org.uk

Non-ionising radiation: Radiation which does not contain sufficient energy to alter the structure of human cells.
Personal Communications Network (PCN): A mobile system principally directed towards the hand portable, domestic user market and operating with digital technology at 1.8 GHz. The two main operators are One 2 One and Orange.

Picocell: The smallest of the mobile phone transmitters used mainly to boost coverage within buildings.

Radiation: The emission or transfer of radiant energy as particles, electromagnetic waves, sound etc.

Radiocommunications Agency: Is an Executive Agency of the Department of Trade and Industry. The Agency is responsible for the management of the non-military radio spectrum in the UK, which involves international representation, commissioning research, allocating spectrum and licensing its use. The Agency has been charged with providing a national data base of radio telecommunication base stations and carrying out an audit of their emissions. [www.radio.gov.uk](http://www.radio.gov.uk)

Radiofrequency radiation (RF radiation): Electromagnetic radiation used for telecommunications and found in the electromagnetic spectrum at longer wavelengths than infrared radiation.

Radio Waves: An electromagnetic wave of radio frequency which allows the transmission of signals at set frequencies over distance.

Thermal effects: Effects due to the dissipation of energy into heat by the attenuation of radio waves.

Wavelength: Distance between two successive points of a periodic wave in the direction of propagation, in which the oscillation has the same phase. Measured in units of metres.