Mobile phone health concerns and the telecom industry

1. Introduction

This series of SEE risk briefings seeks to identify areas of potential social, environmental and ethical (SEE) risk, analyse the ways in which these risks may materialise and highlight how companies can manage these issues.

The mobile phone industry has grown dramatically since it took off around 15 years ago. The number of users worldwide has increased from 11 million in 1990 to 1.5 billion today - in many countries more than half of the population use mobile phones. New developments such as photo messaging and the launch of third generation (3G) phones are expected to result in further growth. In the UK alone, there are already 55 million mobile phones subscribers and about 45,000 radio base stations, which could rise to 50,000 by 2007, according to the Mobile Operators Association (MOA).

The growth in mobile phone use has been accompanied by an increasing community concern about the numbers of masts and exposure to radio waves. The introduction of mobile phones was followed by allegations that the microwave radiation used to transmit communications between base stations and handsets could cause brain damage - leading to memory loss and malignant tumours. After hundreds of studies around the world, the evidence remains inconclusive. Concerns about potential adverse health effects of radio frequency (RF) emissions from mobile
handsets and base stations have been the subject of a very public debate involving the press, governments, international organisations and local communities.

Both operators and manufacturers have come under increased pressure to demonstrate that they are taking these concerns into account and addressing related risks. As time passes, manufacturers are progressively reducing the power output of their phones, so radiation risks to individual users are diminishing. However, as the number of subscribers surges past 1.5 billion, even a tiny individual health risk could have a large impact. The safety of mobile phones is likely to remain a contentious issue for many years to come.

2. Background

2.1. The science

Mobile phones and their base stations transmit and receive signals using electromagnetic waves - also referred to as electromagnetic fields, or radio waves. Frequencies between about 30 kHz (kilohertz) and 300 GHz (gigahertz) are widely used for telecommunication, including radio and television, and comprise the radio frequency (RF) band. Both mobile phones and base stations emit RF radiation. Exposure levels depend on the source and generally reduce with increasing distance from the source. For mobile phones exposures are principally to the side of the head for hand-held use, or those parts of the body closest to the handset for hands-free use. RF exposure from base stations will be to the whole body, generally at a lower level of intensity than handsets, but continual. Base stations vary in size and the power output of the antennae - macrocells, microcells and picocells.

Radio waves are electromagnetic energy. It has been established that such energy can lead to the heating of the body but radio waves do not have enough energy to damage cell structures and are known as 'non-ionizing'. Scientific research has led to the conclusion that a temperature rise of no more than one degree Celsius is a safe level for the body to cope with. International health and safety guidelines are in place to limit public exposure to radio waves from base stations and mobile phones, and are set by the International Commission on Non-Ionizing Radiation Protection (ICNIRP).

Some countries have introduced national limits for RF exposure largely based on ICNIRP standards, which are endorsed by the World Health Organisation (WHO). Specific Absorption Rates (SAR) measure the energy absorbed from mobile handsets. Guidelines for the general public have been set at 2.0W/kg (watts per kilogram of tissue). Handsets sold in the EU have SAR values between 0.2W/kg and 1.7W/kg, with most around the 1.0W/kg level. All are below the guidelines for the EU of 2.0W/kg.

The WHO concluded, based on an in-depth review of the scientific literature, that current evidence does not confirm the existence of any health consequences from exposure to low level RF emissions. However, the WHO considered that some gaps in knowledge regarding biological effects exist and that these areas require further research. The WHO has established an International Electromagnetic Fields (EMF) Project to assess the scientific evidence of possible health effects of RF emissions.
In May 2000, the UK Independent Expert Group on Mobile Phones, chaired by Sir William Stewart, concluded that the balance of evidence to date did not suggest mobile phone technologies cause adverse health effects. However, it called for more research to fill gaps in scientific knowledge and for a precautionary approach to be adopted, including limiting the use of mobile phones by young children. This was reaffirmed by the National Radiological Protection Board (NRPB), also chaired by Sir William Stewart, in January 2005. Similar conclusions were drawn in reports commissioned in other European countries such as the Zmirou Report in France.

Findings from a team of scientists from the Karolinska Institute in Stockholm told a different story. They published a report in October 2004 showing that people who used mobile phones for more than 10 years had a doubled risk of developing acoustic neuroma, a slow-growing tumour of the nerve between the ear and brain. Confirmation - or otherwise - may occur soon. The Swedish study is part of a large collaboration, involving researchers from 13 countries, called Interphone, which is co-ordinated by the International Agency for Research on Cancer (IARC). The focus is on investigating three types of tumour including brain tumours, acoustic neuromas and tumours of the salivary gland, whose location makes them the most likely candidates for a link with mobile phone radiation. Interphone expects more national studies to be published during 2005 and early results from the international programme should also be available this year.

2.2. Public concerns

Incomplete scientific evidence and ineffective communication of available evidence has lead to widespread public confusion and mistrust. Understanding public perceptions of risk and health concerns is a key issue for telecom companies.

**Handsets** Members of the public have attributed a range of symptoms to the use of mobile handsets including impairment to short-term memory, headaches, brain tumours, other cancers, sleep disturbance, depression and tiredness. However, the majority of mobile phone users perceive the health risk as low, as the handsets are voluntarily chosen and convey an advantage to the user.

**Mobile base stations** Symptoms attributed to RF exposure from base stations include headaches, sleep disturbance, depression, stress and tiredness. In some cases a correlation with an increased incidence of cancer has been suggested. There is particular concern regarding the siting of base stations on or near schools, hospitals and residential areas. Other concerns include the negative visual impact and potential reductions to property values.

The involuntary nature of RF exposure from base stations increases the magnitude of perceived risk. People, especially those who do not use mobile phones, often perceive the health risks as high.

A proposal to site a new base station frequently meets with strong community disapproval and opposition. In many countries local community protest groups are formed. In some cases these may be co-ordinated at a national level, for example in the UK Powerwatch and Mast Sanity campaign for acknowledgement of the adverse health effects of RF emissions and protest against insensitive siting of base stations.
3. Scope of EIRIS research

EIRIS analysis focuses on European mobile operators. While both mobile phone manufacturers and operators may be adversely affected by risks related to RF emissions, this analysis focuses on operators as their risks relate to both masts and handsets and their level of exposure to the risks identified is, therefore, relatively higher.

Although excluded from the analysis, mobile handset manufacturers may need to address concerns related to the use of handsets and some of them are already involved in initiatives to develop guidelines and best practice approach. Mobile handset manufacturers have adopted a broadly common approach to the potential health effects from handsets. For example, the Mobile Manufacturers Forum (MMF), an international association representing Alcatel, Ericsson, Mitsubishi Electric, Motorola, Nokia, Panasonic, Philips, Sagem and Sony Ericsson, jointly funds key research projects and co-operates on standards, regulatory issues and public communication.

This analysis also excludes mobile virtual network operators (MVNOs) because they do not have direct control over mast siting. MVNOs do not operate a physical mobile network but can access the mobile network of one or more mobile operators to provide mobile communications services to their customers. Although they may have a responsibility to inform the public on health issues related to mobile phones and masts, they have no power to decide where the masts are located or their level of RF.

4. Potential social, ethical & environmental risks and opportunities

This briefing seeks to identify areas of potential risks and ways in which these may materialise in the short to medium term (three to five years).

The balance of evidence to date from both national and international sources supports the view that low level RF emissions do not cause adverse health effects. However, there remains a possibility that current guidelines are insufficient to guard against any adverse health effects which may be found to exist in the future. Health risks, whether actual or merely perceived, could result in fewer new network subscribers, lower network usage per subscriber, higher churn rates, difficulty obtaining planning permission for masts, product liability lawsuits or a reduction in the outside financing available to the mobile industry.

Key ways in which mobile phone companies may be affected in practice if these concerns are not addressed are outlined below:

License to operate Erosion of community confidence and consequent opposition to proposed mast sitings increases direct costs to operators through site acquisition delays. Operators may face a loss of earnings because of delays in erecting new masts and therefore difficulties in attracting new customers due to potential reduction in service quality. The degree of public disapproval is largely dependent on the country in question. The number of community action groups, public complaints and level of press coverage varies from country to country.
Litigation Claims relating to potential adverse health effects may be brought by customers, communities or employees. A limited number of claims have been brought against mobile operators and manufacturers alleging personal injury, including brain cancer. The losses that may arise from these claims have not been quantified and claims are being vigorously defended. Irrespective of outcome, the cost of defending such actions is considerable and may not be fully recoverable even if the claim does not succeed.

Regulation ICNIRP guidelines for maximum exposure levels have been adopted in an EC Recommendation agreed in principle by all EU countries. Many national authorities have set lower limits. Planning regulations relating to mast siting vary by country and in many cases power is devolved to local authorities. Some have taken strong positions refusing permission for masts to be sited on their land, especially near schools. Ignoring local concerns can lead to rejection of planning applications and the potential for more restrictive planning regulations at a national level. Indeed, a report from the All-party Parliamentary Group on Mobile Communications recommended new legislation on the siting of masts in the UK. Self-regulation may remove the need for this.

Reputation Local community campaigns against mast siting or a wider public health scare leading to adverse national press coverage may negatively impact corporate reputation in the long term. The extent of this activity is largely dependent on the country as public perceptions of the health risks related to mobile phones vary greatly across the world. The level of brand awareness globally, whether the mobile operations and parent company have the same name and the brand valuation will influence the damage to the company. The quality and availability of information on mobile phones and health provided by operators and their engagement with concerned communities on the issue can, to some extent, limit such negative impact. Subsequent evidence establishing negative health effects associated with mobile phone use, while considered unlikely at this stage, presents a significant longer term risk for the sector.

On the basis of this analysis the most significant short to medium term risks would appear to result from difficulties siting new masts.

5. Exposure factors

5.1. Size of mobile operations

In identifying the companies most at risk EIRIS considers the largest companies to be most significantly affected by these issues and has set the threshold for turnover at GBP100m derived from mobile operations. EIRIS has identified 18 companies for which the turnover is above this threshold. These comprise Bouygues (France), Cosmote (Greece), Deutsche Telekom (T-Mobile, Germany), France Telecom (Orange), KPN (Netherlands), Mobistar (Belgium), O2 (UK), Portugal Telecom, Swisscom, Tele2 (Sweden) Telekom Austria, Telenor (Norway), Telecom Italia (TIM), TeliaSonera (Sweden), Telefonica (Spain), TDC (Denmark) Vivendi Universal (SFR, France) and Vodafone (UK).

Exposure to the risks outlined above may also vary according to factors identified below. These have not been independently assessed by EIRIS in reaching its assessment of each company, but analysts may wish to take them into account.
5.2. Country of operation

The country of operation plays a key role both as a result of national regulations and the degree of localised concern.

In September 2003, Vodafone commissioned market research company MORI to carry out a global survey of perceptions about health issues connected with mobile phones and masts. The survey, which comprised more than 17,000 interviews in 14 different countries, provides useful insights into how public concern about electronic magnetic fields (EMF) is stronger in some countries than others. In Greece, Portugal and Sweden, for example, the majority of the population do not believe that mobile phones are safe to use, while in the UK the majority think mobiles are safe. In Germany, Ireland, Italy, Malta and Spain, opinion is divided.

Relative perceived benefits of mobile phones also vary, but users in most European countries, except Greece, believe the benefits of using mobile phone outweigh the claimed health effects. This is the case for 73% of the population in Ireland and 71% in Germany but only 28% in Greece. EMF exposure from masts is generally perceived to be a more serious issue than exposure from handsets. Background information outlining key regulatory requirements and industry initiatives in European operators’ main countries of operation is provided in Annex 9.2.

5.3. Network expansion plan including 3G technology

A company’s license to operate with respect to mast siting is identified as a key short-term risk. Few would welcome a mast in their local area and objection to such plans is common. Without community approval, mast siting may incur additional costs and threaten a company’s ability to expand. The degree to which this affects a company will depend on a company’s network expansion strategy with regard to 2G and 3G networks. The cell sizes for 3G networks are smaller than for 2G and therefore, require more base stations to cover the same area. Some operators are already seeking to upgrade their existing base stations or share sites used by other operators but more masts will be needed to meet licence requirements.

Questions for analysts

What are public perceptions and relevant regulations in the countries of the company’s main geographical focus?

To what extent does the company’s growth strategy depend on extending its mobile mast networks?

6. Managing the risk

In analysing the ways in which companies can manage the risks identified by this study we have assessed the policies and systems adopted, the extent of public provision of information and ways in which the company engages with affected communities.

Although there is no incontrovertible evidence that mobile phones represent a health threat, each new study has the potential to generate damaging media coverage. Mobile operators need to take appropriate steps to address issues related to mobile phone health...
concerns to ensure they will not suffer the same fate as other industries that have ignored or mismanaged similar health scares such as GMO technology.

According to Chris Genasi, the president of the UK’s Institute of Public Relations and a specialist in managing corporate reputations, adherence to what he calls "the three golden rules" could significantly benefit all companies facing a health scare crisis. "The first is acknowledgment of it. Do not make the mistake of poo-poohing a concern. Whether it's real or perceived, you acknowledge that it's there. Second, you put it into perspective... And then, finally, you make it clear that you are doing something about it," he told the Financial Times in January 2005.

Network operators have not denied that there is a problem. Many of them insist that they take the issue seriously and refer to independent scientific studies or to the work they have done either in distributing information to stakeholders or in supporting the research. According to the World Health Organisation, some EUR154m (USD200m) has been spent on researching the potential health hazards.

Industry sponsored research is often mistrusted and if this is to be avoided mobile companies need to be at arm's length from the research and remain committed to a transparent approach by keeping employees, customers and the public informed of any significant developments.

To avoid losing public confidence network operators will need to engage with the public over perhaps the most controversial aspect of mobile telephony - masts and base stations. Engagement and consultation with concerned communities may not put an end to the controversy but can reassure the public that their interests are being addressed. Mike Dolan, executive director of the Mobile Operators Association admits that "people like their phones but don't like the network" and says that any expansion of the network infrastructure must be sensitively handled. "In terms of network development, we have taken a proactive approach, with a commitment to best practice on siting. The operators also publish roll-out plans before they go to the more difficult sites" he says.

Despite national differences, telecom companies often have a global presence and there is an increasing trend towards group-wide policies and management practices regardless of the country of operation. EIRIS has identified 16 key indicators for assessing companies' management of mobile phone health concerns. These fall into three categories and are as follows:

**Strategy & responsibility**

- Senior manager or committee responsible for RF related issues
- RF emissions identified as SEE risk at board level
- Funding of independent scientific research into health effects
- Commitment to best practice siting guidelines
- Commitment to site sharing with other operators
- KPIs or targets to assess management of risk related to RF emissions
- R&D strategy to minimise RF emissions

**Public information - availability and quality of information provided by the company regarding RF emissions**

- Clear section in public reports and/or website or FAQs on RF issues
- Details of independent information source
Public database of mast sites
Monitoring of compliance with ICNIRP levels
Stand-alone document for customers providing information on RF health risks etc
Disclosure of SAR levels for handsets

Community engagement & measures

- Stakeholder engagement
- Clear communication channels
- Free RF measurement or independent audit for local residents living near a mast

EIRIS will also record a commitment to minimising visual impact of masts, although this will not count in the assessment of the company’s management of mobile health concerns. Detailed definitions of indicators are provided in Annex 9.1.1.

7. Good practice examples

In countries with significant public opposition to mast siting mobile operators have formed associations and drawn up best practice guidelines for mast siting. One such example is the UK Mobile Operators Association (MOA) which has established the 'Ten Commitments to best siting practice’. These are externally audited and include improved consultation with communities, detailed consultation with planners and prompt response to enquiries. Mobile operators in Switzerland have committed to financing an independent ombudsman to resolve disputes over mast siting.

Best practice with regards to providing public information includes Frequently Asked Questions (FAQs) in company reports or website, publishing stand-alone documents distributed in sales outlets and the provision of a dedicated channel of communication. Orange, for example, provides a free phone number to address queries. Active community engagement has been demonstrated by Telefonica Moviles who proactively sent out a separate report 'Electromagnetic Fields, Mobile Telephony and Health’ to professional organisations and municipal governments addressing specific stakeholder concerns. Swisscom goes further offering to provide specialists to give a lecture at community meetings and answer questions in person.

Sources
Mobile Phones and Health – the Stewart Report; the World Health Organisation; the International Commission on Non-Ionizing Radiation Protection; The European Telecommunications Network Operators Association (ETNO)’s Sustainability Charter; GSM Association website; MMF website; the UK Mobile Operators Association, the French Association of Mobile Operators (AFOM), Forum Mobil (Switzerland), various national and international press reports; mobile handset manufactures’ and mobile operators’ websites, annual and CSR reports; communication with Powerwatch, the deputy chairman of the UK Advisory Group on Non-Ionising Radiation and mobile operators. EIRIS research partners Imug and Ethifinance.
8. Company assessments

| Strategy and responsibility | O2 | Orange (Deutsche Telekom) | T-Mobile (Deutsche Telekom) | Bouygues Telecom | Vodafone | KPN | Portugal Telecom | SPR (Vivendi Universal) | Swisscom | TDC | Telefonica | Moviles | Telefonica | Telenor | TeliaSonera | TIM (Telecom Italia) | Mобistar | Telekom Austria | Cosmote (OTE) | Tele2 |
|-----------------------------|----|---------------------------|-----------------------------|------------------|----------|-----|----------------|-------------------------|----------|-----|-------------|---------|-------------|--------|-------------|-------------|------|---------------|-------------|
| Responsibility for RF issues | ●  | ●                         | ●                           | ●                | ●        | ●   | ●                          | ●                      | ●       | ●   | ●                      | ●       | ●           | ●      | ●            | ●            | ●    | ●             | ●            |
| Identification as SEE risk  | ●  | ●                         | ●                           | ●                | ●        | ●   | ●                          | ●                      | ●       | ●   | ●                      | ●       | ●           | ●      | ●            | ●            | ●    | ●             | ●            |
| Independent research        | ●  | ●                         | ●                           | ●                | ●        | ●   | ●                          | ●                      | ●       | ●   | ●                      | ●       | ●           | ●      | ●            | ●            | ●    | ●             | ●            |
| Best practice siting guidelines | ●  | ●                         | ●                           | ●                | ●        | ●   | ●                          | ●                      | ●       | ●   | ●                      | ●       | ●           | ●      | ●            | ●            | ●    | ●             | ●            |
| Commitment to site-sharing  | ●  | ●                         | ●                           | ●                | ●        | ●   | ●                          | ●                      | ●       | ●   | ●                      | ●       | ●           | ●      | ●            | ●            | ●    | ●             | ●            |
| Management KPIs or targets  | ●  | ●                         | ●                           | ●                | ●        | ●   | ●                          | ●                      | ●       | ●   | ●                      | ●       | ●           | ●      | ●            | ●            | ●    | ●             | ●            |
| R&D strategy to minimise RF | ●  | ●                         | ●                           | ●                | ●        | ●   | ●                          | ●                      | ●       | ●   | ●                      | ●       | ●           | ●      | ●            | ●            | ●    | ●             | ●            |
| Public information          | ●  | ●                         | ●                           | ●                | ●        | ●   | ●                          | ●                      | ●       | ●   | ●                      | ●       | ●           | ●      | ●            | ●            | ●    | ●             | ●            |
| Clear info for RF issues    | ●  | ●                         | ●                           | ●                | ●        | ●   | ●                          | ●                      | ●       | ●   | ●                      | ●       | ●           | ●      | ●            | ●            | ●    | ●             | ●            |
| Independent info source     | ●  | ●                         | ●                           | ●                | ●        | ●   | ●                          | ●                      | ●       | ●   | ●                      | ●       | ●           | ●      | ●            | ●            | ●    | ●             | ●            |
| Public database of mast sites | ●  | ●                         | ●                           | ●                | ●        | ●   | ●                          | ●                      | ●       | ●   | ●                      | ●       | ●           | ●      | ●            | ●            | ●    | ●             | ●            |
| Monitoring ICNIRP levels     | ●  | ●                         | ●                           | ●                | ●        | ●   | ●                          | ●                      | ●       | ●   | ●                      | ●       | ●           | ●      | ●            | ●            | ●    | ●             | ●            |
| Disclosure of SAR levels    | ●  | ●                         | ●                           | ●                | ●        | ●   | ●                          | ●                      | ●       | ●   | ●                      | ●       | ●           | ●      | ●            | ●            | ●    | ●             | ●            |
| Stand-alone document        | ●  | ●                         | ●                           | ●                | ●        | ●   | ●                          | ●                      | ●       | ●   | ●                      | ●       | ●           | ●      | ●            | ●            | ●    | ●             | ●            |
| Community engagement        | ●  | ●                         | ●                           | ●                | ●        | ●   | ●                          | ●                      | ●       | ●   | ●                      | ●       | ●           | ●      | ●            | ●            | ●    | ●             | ●            |
| Stakeholder engagement      | ●  | ●                         | ●                           | ●                | ●        | ●   | ●                          | ●                      | ●       | ●   | ●                      | ●       | ●           | ●      | ●            | ●            | ●    | ●             | ●            |
| Communication channel       | ●  | ●                         | ●                           | ●                | ●        | ●   | ●                          | ●                      | ●       | ●   | ●                      | ●       | ●           | ●      | ●            | ●            | ●    | ●             | ●            |
| Free RF audit/measurement   | ●  | ●                         | ●                           | ●                | ●        | ●   | ●                          | ●                      | ●       | ●   | ●                      | ●       | ●           | ●      | ●            | ●            | ●    | ●             | ●            |
| Minimising visual impact    | ●  | ●                         | ●                           | ●                | ●        | ●   | ●                          | ●                      | ●       | ●   | ●                      | ●       | ●           | ●      | ●            | ●            | ●    | ●             | ●            |

**Assessment**

| Assessment | G | G | G | G | I | I | I | I | I | I | I | I | I | I | L | L | NE | NE |

*NE – no evidence; L – limited; I – intermediate; G – good; A – advanced*

Detailed grading methodology is provided in Annex 9.1.

* Publicly quoted operator △ Publicly quoted operator with publicly quoted parent company (name in parenthesis) □ Unquoted operator with publicly quoted parent company (name in parenthesis) NB Parent company must own at least 20% of subsidiary
9. Annex

9.1. Grading methodology

The assessment is based on evidence of the elements listed below in one or more of the companies’ main countries of operation.

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9.1.1. Indicator definitions

- **Identification as SEE risk** - health concerns related to mobiles and masts identified as risk at board level
- **Independent research** refers to research project carried by health organisations and universities. This includes for example research by the World Health Organisation or the Interphone project co-ordinated by the International Agency for Research on Cancer (IARC). It does not cover research conducted or commissioned by the Company or the industry
- **Best practice siting guidelines** include national best practice such as the Mobile Operators Association guidelines in the UK or the GSM Europe siting guidelines
- **Management KPIs or targets** – clear key performance indicators or targets to assess the management of risk related to RF emissions
- **R&D strategy to minimise RF emission levels and incorporate findings in development or design of products and services**
- **Independent information sources** include reports or other research published by the World Health Organisation, the International Commission on Non Ionizing Radiation Protection, and governmental bodies such as the National Radiological Protection Board in the UK and universities. This does not cover research conducted or commissioned by the company or the industry
- **Stand-alone document** for customers providing information on RF health risks, ongoing research and preventive measures to limit exposures to emissions and protect populations at risk such as children
- **Monitoring ICNIRP levels** - some countries have introduced national requirements to limit RF emissions based on the ICNIRP
- **Stakeholder engagement** - proactive public communication and consultation with stakeholders
- **Communication channel** includes clear and dedicated contact for queries, complaints or dispute resolution

See also section 6 – Managing the risk

9.2. Country profiles

Public perceptions regarding EMF and related risks vary according to country. The country of operation therefore plays a key role in mobile operators’ exposure to risk as a result of both national regulations and the degree of localised concern. The information below provides background on regulatory requirements and industry initiatives in place in European operators’ main countries of operation.

**Austria**

In Austria the Telekommunikationsgesetz defines the maximum level for RF radiation, which follows the ICNIRP recommendations. Austrian safety requirements for high-frequency electromagnetic fields are laid down by ONORM S1120 (Österreichisches Normungsinstitute – Austrian Standards Institute) and installations are regularly tested. There are over 450 small protest groups of residents campaigning to prevent the building of masts. A key complaint is that there is no right of veto against mast siting in their neighbourhood. There are calls from protest groups, politicians and scientists for the government to implement uniform regulations across Austria.

The Forum Mobilkommunikation (FMK, [www.fmk.at](http://www.fmk.at)) is an industry-wide initiative including all Austrian mobile operators, the mobile communications industry and the Association of Austrian
Electrical and Electronics Industry (FEEI) established in 1996. Its mission is to promote a socially, environmentally and financially responsible and successful mobile industry. Mobile communication and health is a key focus. In response to growing public demand for information a voluntary industry initiative was launched in October 2003 to publish site data for existing mobile communications facilities on the Internet. The information published includes all mast and rooftop locations for transmission facilities including both GSM and UMTS antennae.

In 2001 Austrian mobile service providers concluded an agreement with the Österreichische Gemeindebund (the association representing smaller local authorities) defining the procedures for disseminating information about new network expansions and the scope of such information.

Belgium
In December 2001, the Belgian federal government published a Royal Decree (amending the April 2001 Royal Decree) introducing a new procedure to check whether or not an antenna site complies with the ICNIRP levels. Mobile operators are required to send a technical file to the Belgian regulator, Institut Belge des Postes et Telecommunication (BIPT) containing information on the theoretical radiation emitted by the antenna. A law introduced in January 2001 imposes obligatory site sharing between mobile operators, prohibits restrictive clauses on existing sites and imposes the establishment of a database of all antenna sites in Belgium.

Denmark
The Danish Ministry of Science, Technology and Innovation released a report in 2003 looking into the safety of mobile phones base stations. The report concluded that the strength of radio waves from mobile networks in Denmark is well below ICNIRP limits. However, there are many local groups protesting against the erection of masts or for the removal of those already built. In response, some local authorities are refusing permission for new masts.

France
In 2001 the Zmirou Report, commissioned by the French government to investigate the potential health risks associated with RF radiation, was published. As a result of its recommendations, the government outlined guidelines for mast siting and maximum RF radiation levels within existing ICNIRP guidelines. In 2003, the French Agency for Environment Health and Security (AFSEE) recommended mobile operators and local administrations negotiate and sign charters in each city outlining rules for mast siting. Some consumer associations believe potential risks have not been adequately communicated.

In 1999, the three mobile operators in France (Bouygues Telecom, Orange France and SFR) signed with the Environment and Culture ministers a National Environmental Recommendations Charter (Charte Environnementale du 12 juillet 1999). According to this charter, followed by an Environmental Recommendations Guide, mobile operators are bound to take into account all environmental considerations pertaining to the quality and fragility of natural environments when planning the installation of a new base station. The three operators created the French Association of Mobile Operators (AFOM, www.afom.fr) in 2002 and, in April 2004, signed with the French mayors (AMF) best practice guidelines for mast siting, consultation with concerned communities and disclosure of information.
Government guidelines published in October 2003 require SAR levels to be disclosed for handsets and a hands-free set to be included with each mobile phone sold.

In January 2005, a governmental decree established a public utility body called the 'Health and radio frequencies foundation' (Fondation santé et radiofréquences). The Foundation was set up to carry out independent research into whether exposures to EMF from mobile phones and their base stations have adverse health effects. The independence of its research is guaranteed by a scientific council under the supervision of the Académie des Sciences.

**Germany**

In Germany, the Bundesimmisions-schutzverordnung has defined maximum radiation levels for masts. This legislation is based on ICNIRP levels. Local planning regulations allow the siting of masts under 10m without local planning permission. However, the erection of masts on the roof of residential buildings represents a change in utilisation and may only be built with prior permission. Each mast requires a site certification by the German Regulatory Authority for Telecommunication and Post (RegTP). Under its site certification procedure the RegTP requires conservative measurements, taking into account all sources of EMF in the surrounding area of the prospective mast. Numerous small residents protest groups exist campaigning to prevent new masts being built in their community. Some are organised into an incorporated society, Bürgerwelle e.V. National critics include the consumer organisation Verbraucherzentrale Bundesverband e.V., the nature conservation association Deutscher Naturschutzzring and the Bundesverband gegen Elektrosmog, campaigning specifically against ‘electro-smog’.

German mobile operators have committed themselves to publishing a database locating all their masts. This is published on the Regulatory Authority for Telecommunications and Post (RegTP, www.regtp.de ) website and provides the public with information on fixed radio transmitters requiring a safety certificate. Locations are listed where tests measuring RF radiation have been carried out to determine the extent of compliance with safety limits. In 2001, all German mobile operators signed a voluntary industry commitment with the government which included the following key elements - consultation with local authorities, information to customers on SAR, research funding and transparency of information. This commitment also includes independent audits as a basis for annual reports to the German government. Such reports have been reviewed annually by independent research groups since 2001.

**Greece**

The Greek Atomic Energy Commission (EEAE) is the national competent authority for the protection of the general public and the environment against non-ionising radiation in Greece. The basic restrictions and reference values set in the Council Recommendation (1999/519/EC) have been implemented but, especially in the case of base stations, Greek legislation has applied additional safety parameters. EEAE conducts and co-ordinates measurements of existing and planned installations and provides information to the public.

**Italy**

The Italian Ministerial Decree DM381/98 fixes exposure limits, cautionary thresholds and quality
objectives for electro-magnetic fields. The restrictions comply with WHO recommendations for ‘maximum caution’. The Financial Law of 2001 established that a share of no less than 10% of the fund set up with the revenues from the UMTS license tender should be allocated to activities for the prevention and reduction of electro-magnetic hazards. The Environmental Ministry, the Ministry of Communications, Ministry of Health and the Ministry of Productive Activities will be assigned part of the fund to finance research on the effects of exposure to electro-magnetic radiation. The state has sole power to fix emission standards for installed base stations; however the Regions have the power to identify zones where base stations may or may not be installed.

Netherlands
In early 2001, the Dutch government published a National Antenna Policy aimed at encouraging and facilitating the siting on an adequate number of antennas within clear public health and environment parameters. The Antenna Covenant (forming part of the National Antenna Policy) was drawn up in 2002, making it possible, subject to certain conditions, to erect antenna masts on buildings up to a height of 5m without a building permit. However, the Antenna Covenant makes the mobile operators fully responsible for the safety of the base station.

Norway
An expert group on mobile telephony and health, under the auspices of the Norwegian Institute of Public Health, published a report in April 2003. The report cautioned that health effects may still occur and for users to limit exposure, especially with regard to children and young people. The Norwegian Radiation Protection Authority has set maximum emission levels for RF radiation within ICNIRP recommendations.

Portugal
The Instituto das Comunicacoes de Portugal (ICP) adopted the maximum radiation levels set out in the Recommendation of the European Council 1999/519/CE and has incorporated this specification in the station license required for the installation of new base stations. Non-compliance with these levels renders the licensee liable to a fine under the terms of the Decree-Law no. 151-A/2000.

Spain
In 2001 the Ministry of Science and Technology and the Ministry of Health and Consumption jointly drafted a Royal Decree 1066/2001 which approved regulations establishing the conditions of protection from RF emissions, maximum levels and health protection measures. This included a plan for measuring emissions from all base stations near or within populated areas. A further Ministerial Order CTE/23/2002 in 2002 established the conditions, contents and formats of studies and certifications that operators must submit to the Ministry of Science and Technology.

Sweden
In 2002 the Swedish Radiation Protection Authority (SSI) issued general advice on limitation of exposure of the general public to electromagnetic fields. The advice is in agreement with the European Council Recommendation from 1999. There is much public concern regarding potential adverse health effects, especially in connection with building 3G masts. Action groups against 3G exist in different parts of Sweden and there are some local authorities that want to abstain from allowing the building of 3G masts.
In October 2004, a team of scientists from the Karolinska Institute in Stockholm published a report showing a statistically significant correlation between the long-term use of mobile phones and acoustic neuroma, a slow-growing tumour of the nerve between the ear and brain. According to the study, people who used mobile phones for more than 10 years had a doubled risk of developing acoustic neuroma. The Karolinska Institute scientists and the SSI have recommended the use of hands-free kits.

Switzerland
Limits for RF emissions from mobile base stations came into effect in Switzerland in 2000 under the Ordinance relating to Protection from Non-Ionising Radiation (ONIR) set within ICNIRP levels. Urban and regional planning covers landscape and environmental protection and takes into account RF radiation in sensitive areas such as playgrounds and residential areas. Some protest groups exist, mostly campaigning for clearer legislation and a lower maximum level of RF emissions.

The three main mobile operators in Switzerland including Orange, Sunrise and Swisscom have undertaken to finance an Ombudsman for Mobile Communications and the Environment (OMK). This agency operates independently under the auspices of the Federal Department of the Interior and mediates in disputes over antenna sites or questions about RF radiation from mobile phones and base stations. The mobile operators have also established Forum Mobil (www.forummobil.ch) with the purpose of promoting dialogue about all aspects of mobile communications with all interested parties on an objective basis.


UK
In 2000 the Independent Expert Group on Mobile Phones, commissioned by the UK government to investigate the potential health risks associated with RF radiation, published the Stewart Report. The report concluded that “the balance of evidence indicates that there is no general risk to the health of people living near to base stations where the exposures are only small fractions of the guidelines” but recommended a ‘precautionary approach’ until further research is carried out. A review of the evidence conducted in 2004 concluded that there was no reason to amend this advice but cautioned that “mobile phones have only been in widespread use for a relatively short time. The possibility remains that there could be health effects” and that “continued research is needed”. The National Radiological Protection Board (NRPB, renamed the Health Protection Agency in April 2005: www.hpa.org.uk) has published guidelines covering maximum exposure levels at ICNIRP levels. A government database publishes radio frequency emissions from base stations (www.sitefinder.radio.gov.uk).

Planning permission in the UK is under the remit of the local authority, except in Northern Ireland where it is centrally managed. Some refuse permission for masts, especially if sited on or near schools and hospitals. There are numerous protest groups including Powerwatch and their campaigning arm Mast Sanity.

The five main operators in the UK (3, O2, Orange, T-Mobile and Vodafone) have formed the Mobile Operators Association (MOA, www.mobilemastinfo.com). The aim of this association is to represent these...
operators on RF health and planning
issues. They have set out best-practice
guidelines in the ‘Ten Commitments to
mast siting’ which includes a
commitment to develop, with other
stakeholders, clear standards and
procedures to deliver significantly
improved consultation with local
communities. Compliance with the Ten
Commitments is annually checked by
an independent auditor. It was last
reviewed by Deloitte and Touch in
January 2005.

Powerwatch has informally ranked the
five UK operators on their approach to
issues related to mobile phones, masts
and health.

**European Telecommunications
Network Operators’ Association
(ETNO) Members**

Deutsche Telecom, France Telecom,
KPN, OTE, Portugal Telecom, Swisscom,
TDC, Tele2, Telecom Italia, Telefonica,
Telekom Austria, Telenor and
Teliasionera are all members of ETNO
(www.etno.be) and signatories to
ETNO’s Environmental Charter. The
charter makes general commitments
including ‘We shall aim to ensure
recognition and acknowledgement of all
relevant environmental impacts,
including the positive and negative
impacts of our products and services.’
In addition, ETNO and its members
participate in studies commissioned by
the Directorate General Information
Society and Directorate General Health
and Consumers to measure the
potential impact of mobile technologies.
Together with the Mobile Manufacturers
Forum and GSMe, ETNO holds regular
dialogue with all interested parties,
organising information sessions with
Members of the European Parliament to
keep up a flow of objective research
results on radio frequency radiation, for
example.

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