Implementation report on the Council Recommendation limiting the public exposure to electromagnetic fields (0 Hz to 300 GHz).[*]

[*]In accordance with the terms of Recommendation (1995/519/CE) inviting the Commission: "to draw up a report, giving due consideration to the Member states' reports as well as the most recent opinions and scientific data", please find enclosed for publication in the Official Journal the implementation report on the Council Recommendation limiting the public exposure to electromagnetic fields (0 Hz to 300 GHz).

LEGAL NOTICE

The Council Recommendation of 12 July 1999 on the limitation of exposure of the general public to electromagnetic fields invites the Commission "*to keep the matters covered by this recommendation under review, with a view to its revision and updating, taking into account also possible effects, which are currently the object of research, including relevant aspects of precaution and to prepare a report, within five years, taking into account reports from Member States and the latest scientific data and advice"*.

In accordance with this invitation, the Commission is publishing hereafter, on the basis of the information transmitted by the Member States' Authorities, the first report on implemented legislative measures taken at national level to protect the public against effects on health of non-ionising radiation.

Due to the rapid evolution existing in this domain, we draw your attention on the fact that some elements might have changed since the publication and might be subject to confirmation.

INDEX

1. Introduction

Given the developments in the industrial sector, it is more than likely that there will be an increase in exposure of the population to electromagnetic fields. With this in mind, the Health and Consumer Protection Directorate General or the European Commission feels it might be useful to work towards the establishment of a commonly agreed framework for the limits of exposure. Previously, requirements that existed in some Member States resulted in varying regimes as regards the public's protection against electromagnetic fields. Such variations and gaps in provisions and guidelines contributed to a sense of insecurity and confusion among Community citizens and undermined confidence in health authorities.

To remedy this, in its resolution of 5 May 1994[1] the European Parliament called on the Commission to propose legislative measures seeking to limit the exposure of workers and the public to non-ionising radiation. With the adoption of the Commission's proposal and the *Council Recommendation of 12 July 1999*[2] *on the limitation of exposure of the general public to electromagnetic fields (0 Hz to 300 GHz)*, the framework was in place for a more uniform and equal protection of the public from the exposure to electromagnetic fields (EMFs). The Council Recommendation (1999/519/EC) outlines a set of basic restrictions and reference levels for the Member States to follow and sets out possible options for further action at the Community Level.

This report was prepared on the basis of the results of written consultation exercises with various experts and information sent by Member and Accession States following a questionnaire which was sent out by the Commission services in January 2001. The information was compiled in a separate text for each Member and Accession State following which each participating country was asked via the Permanent Representations, Missions and Delegations present in Brussels to confirm the information included in the texts by the 4th February 2002.

2. Purpose

The Commission was invited in the Council Recommendation (1999/519/EC)[3] to "*keep the matters covered by this recommendation under review, with a view to its revision and updating, taking into account also possible effects, which are currently the object of research, including relevant aspects of precaution and to prepare a report, within five years, taking into account the reports of the Member States and the latest scientific data and advice*". The aim of this report serves to update the European Parliament, the Council and the Committee on Environment, Public Health and Consumer Policy on the work undertaken at a Community level by the Commission and Member States since the Council Recommendation of 12 July 1999 above-mentioned.

[1] Resolution on combating the harmful effects of non-ionizing radiation. Official Journal C205, 25/07/1994, p. 0439

[2] 1999/519/EC: Council Recommendation of 12 July 1999 on the limitation of exposure of the general public to electromagnetic fields (O Hz to 300 GHz). Official Journal L199, 30/07/1999, p.0059-0070

[3] OJ L199, 30/07/1999, p.0059-0070

This report also aims to provide policy makers across the Union with a synopsis of the various measures being employed by the Member and Accession States, leading to a better understanding of the scope of the current measures. And indeed, the review process which is required after a period of five years following the adoption of the Recommendation has been initiated earlier to take into account mounting public concern, the development of new technologies and the necessity to respond more rapidly to new scientific evidence.

The Commission hopes this report can as well serve as an important tool and basis for the implementation of possible future measures in the field of electromagnetic fields.

3. The need for action

The Commission found it necessary to work towards the establishment of a commonly agreed framework as the ever-growing involvement of the Community in promoting activities in various industrial sectors is likely to increase exposure of the population to electromagnetic fields. This, in combination with the mounting concern over their effects on the part of decision-makers, health professionals, interest groups and members of the public, make it imperative to undertake efforts to establish commonly-agreed principles in this field at Community level.

In addition, requirements that exist in some Member States result in varying regimes as regards the public's protection against electromagnetic fields. Such variations and gaps in provisions and guidelines contribute to a sense of insecurity and confusion among some Community citizens and undermine confidence in health authorities. In keeping with the Treaty obligation to contribute to ensuring a high level of public health protection, the Commission proposed and the Council adopted the Recommendation in 1999 for a commonly agreed framework of basic restriction and reference levels.

4. The public concern and scientific evidence before the 12th July 1999 Recommendation

During the past 20 years there has been a huge research effort under banner of the World Health Organisation's EMF-Project and the International Commission on Non-Ionising Radiation Protection (ICNIRP) to look for evidence of adverse health effects from the exposure to electromagnetic fields. Laboratory researchers have looked at the cellular level (in vitro) and at the whole body (in vivo), other researchers have looked for statistical evidence of disease in populations (epidemiology).

The results from this research has led to a wide consensus regarding the short-term effects of EMF exposure; these are mainly effects on electrically excitable cells at lower frequencies and heating at higher frequencies, and the effect stops when the exposure stops.

Regarding the long-term effects there is much more debate. Possible effects that are considered include carcinogenic effects (e.g. leukemia and other cancers) and biological effects. The results of the research in this field have been contradictory, and the balance of scientific evidence did not demonstrate at the time any risk associated with EMF exposure at the low levels to which the public is confronted in its everyday

life. Before the implementation of the 1999 Recommendation, all the available evidence the world's largest health authorities[4] have concluded that the weight of scientific evidence indicated that electromagnetic fields did not cause cancer[5].

An opinion by the Scientific Steering Committee[6] (1998) and a scientific review by WHO[7], published within the framework of the International EMF Project, concluded that, from scientific literature currently available, there was no convincing evidence that exposure to EMFs shortens the life span of humans, or induces or promotes cancer. However, the same documents also stressed that further studies were needed to draw a more complete picture of health risks, especially about the possible cancer risks from long-term exposure to low-levels of EMFs. These data gaps were specified following a WHO/ICNIRP meeting in 1996 and a European Commission Expert Group Report[8], and several studies are now in progress. The results of these studies could be of importance for risk assessment and risk reduction policies following concerns raised by episodic reports on the long-term effects of exposure to EMF. A major epidemiological study is due to be published by IARC in 2004. This study will enable the Commission to review the matter based on better scientific evidence.

5. The Council Recommendation

5.1 Principal Actors

The International Commission on Non-Ionizing Radiation Protection (ICNIRP)
ICNIRP was founded in 1992 and is the scientific base of the European Communities' actions in the field of EMF. It is an independent scientific organisation responsible for providing guidance and advice on the health hazards of non-ionising radiation exposure and has earned respect for the scientific quality of its work. ICNIRP consists of internationally acknowledged scientific experts on the EMFs issue.

The Scientific Steering Committee (SCC)
The eight scientists of the SCC were nominated by the Commission on 29 July 1997[9] with the purpose of assisting the Commission and providing it with the latest available scientific knowledge about science matters.

The Health Questions Working Party
This expert group (also known as the Health Group) under the Council gives its comments on and examines the proposals of the Commission regarding health matters. The Working Party presents its conclusions to the permanent representatives of COREPER, before the Health Council votes on the matter.

The European Commission

[4] WHO, NIEHS, NRC
[5] See the Fourth Progress Report for the WHO's EMF-Project (http://www.who.int/peh-emf)
[6] Adopted at its meeting of 26-27 October 2000
[7] See http://www.who.int/inf-fs/en/fact183.html.1999
[8] "Non-ionising radiation: Sources, exposure and health effects", European Commission (published 1996)
[9] Commission Decision No 97/404/EC of 10 June 1997 setting up a Scientific Steering Committee. Official Journal 169, 27/06/1997, p.0085-0087

The legal basis of the Commission on health matters is established in article 152 §1 (ex-article 129) which states that "a high level of human health protection shall be ensured in the definition and implementation of all Community activities and policies". And further that "Community action, which shall complement national policies, shall be directed towards improving public health, preventing human illness and diseases, and obviating sources of danger to human health".

The role of the Commission on EMF matters can be seen as the mediator between science, business and the public. Over-stringent requirements for evidence of safety will stifle development of vital technologies and innovations. In spite of severe constraints, there is a need to find a balance between the requirement for time for further analyses before using a new technology (pre-market) and taking advantage of its opportunities and dealing with safety problems in parallel or subsequently (post-market). Ideally a balance should be established between encouraging innovations with high potential societal benefits on the one hand and not exposing the public to significant involuntary risks on the other.

5.2 Background

The work towards the Council Recommendation began, when the **Parliament in its resolution of 5 May 1994** called on the Commission to propose legislative measures seeking to limit the exposure of workers and the public to non-ionising radiation.

In 1996 the **World Health Organisation's International EMF-project** was established with the purpose of coordinating the scientific work on the subject. The program has a wide range of participants: 8 international organisations, 8 collaborating organisations with the WHO and more than 45 national authorities.

On 4 June 1997 the Commission adopted a proposal for a **programme of Community action 1999-2003 on pollution-related diseases**[10], which considers health hazards, including those due to exposure to electro-magnetic fields.

On 29 July 1997 the Commission nominated eight scientists as members of **the Scientific Steering Committee** (see earlier explanation).

In April 1998 the **International Committee on Non-Ionising Radiation Protection (ICNIRP) published its** *Guidelines for Limiting Exposure to Time-varying Electric, Magnetic, and Electro-magnetic fields (up to 300 GHz)*[11]. The report lined out a set of basic restrictions and reference levels based on the best available scientific data[12] in order to ensure a high level of protection against exposure of the general public to electromagnetic fields. The advice given in this publication was endorsed by the Commission's Scientific Steering Committee.

[10] Proposal for a European Parliament and Council Decision adopting a program on Community action 1999 –2003 on pollution-related diseases in the context of the framework for action in the field of public health /* COM/97/0266 final _ COD 97/0153*/ Official Journal C214, 16/07/1997, p. 0007-0010

[11] Published in Health Physics Vol. 74, No 4, pp. 494-522, 1998. See also http://www.icnirp.de/use.htm

[12] WHO Health Criteria documents and more recent studies

On the 22 January 1998 the **Scientific Steering Committee was requested by the Commission to give its opinion** on the health effects of electro-magnetic fields. The conclusions of the Committee at the meeting 25-26 June 1998[13] were that "regarding non-thermal exposure to EMFs, the available literature does not provide sufficient evidence to conclude that long-term effects occur as a consequence of EMF exposure. Therefore any recommendation for exposure limits regarding non-thermal long-term effects cannot be made at this stage on a scientific basis". The conclusions regarding the short-term effects were that "as regards the assessment of acute thermal effects from 0 Hz – 300 GHz electro-magnetic fields the advice of the ICNIRP guidelines provides the appropriate basis to develop exposure limits against the risk".

Using the ICNIRP guidelines before mentioned as the scientific basis, the **Commission presented the Council on 11 June 1998 with a proposal for a recommendation**[14] based on Article 129(4) second intent of the Treaty.

The Council decided on 3 July 1998 to **consult, on a facultative basis, the European Parliament on this proposal**, taking account of the general interest the Parliament has shown for this subject matter in the past. The President of the Parliament referred the proposal to the Committee on the Environment, Public Health and Consumer Policy, which nominated Mr Tamino as rapporteur, responsible for drafting a report on the subject with comments on the Commission's proposal.

At its meeting on 14 July 1998, the **Health Questions Working Party** had a preliminary exchange of views on the proposal for a Recommendation, and at its meeting on 11 September 1998 the Working Party examined the technical annexes. Some delegations expressed the view that the fact that the scope of the Recommendation is limited to acute thermal effects should be clearly expressed in the text, and other delegations suggested introducing a reference to the principle of precaution concerning the long-term effects.

On 21 January 1999 the **Committee on Research, Technological Development and Energy** adopted the draft report prepared by Mr Scapagnini[15]. The committee called on the Committee on the Environment, Public Health and Consumer Protection, as the committee responsible, to incorporate 5 amendments in its report, drafted by Mr Tamino. The report by Mr Scapagnini proposed, among other things, to apply the "As Low As Reasonably Achievable" (ALARA) principle and the precautionary principle.

The **Tamino draft report**[16]**,** tabled on 25 February 1999, from the Committee on the Environment, Public Health and Consumer Policy, raised several questions about the approach taken in the Commission's proposal, in favour of a much more restrictive text imposing considerable reductions in exposure levels.
Firstly, the report objected to the choice of a Recommendation rather than a more binding instrument.

[13] Document R013VDAT
[14] Proposal for a Council Recommendation on the limitation of exposure of the general public to electromagnetic fields (O Hz to 300 GHz) (COM(98)268 final)
[15] (PE228.970/fin)
[16] Committee on the Environment, Public Health and Consumer Protection, Report of the proposal for a Council Recommendation on the limitation of exposure of the general public to electromagnetic fields 0 Hz to 300 GHz, A4-0101/99, PE 228.570/DEF

Secondly, it considered that the "precautionary principle" mentioned in Article 130, and more precisely Article 174, of the Amsterdam Treaty and the "As Low As Possible" (ALARA) principle" should be the basis for a much more restrictive and cautious approach to exposure levels than that proposed by the Commission.
Finally, the report alleged that a mass of available scientific evidence had not been considered by the Commission in making its proposal. A total of 16 amendments were proposed in the report.

On 10 March 1999 the **European Parliament delivered its opinion**[17], based on the Tamino report, with a total of 17 amendments to the Commission's proposal. Taking into account the advice of the Parliament, the Commission prepared an amended proposal accepting, completely or partially, 9 of the Parliament's amendments. The application of the precautionary principle and the ALARA principle was not accepted by the Commission (see explanation in the following chapter). Amongst the changes accepted either partially or totally and taken into account by the Commission was the mentioning in the amended proposal that only established effects have been used as the basis for the recommended limitation of exposure and that Member States may, in accordance with the proportionality principle established in theTreaty, provide for a higher level of protection than that set out in the Recommendation. It was also included that the European bodies of standardisation should be encouraged to develop standards within the framework of Community legislation for the purposes of the design and testing of equipment.

On 27 May 1999 the Commission presented the amended proposal to the Council[18].

At its meeeting on 8 June 1999 the Council recorded its agreement on the text of the Recommendation by a qualified majority. Fourteen delegations were in position to accept the text, the British delegation maintaining a parliamentary scrutiny reservation, while Italy maintained its general reservation with the argument that the Italian legislation is unjustifiably restrictive (and also non-applicable and non-enforceable) and takes into account non-established effects (such as cancer) in a comprehensible and inconsistent manner. Italy feared that industry would be given ammunition with the Council Recommendation to challenge Italian law in the courts.

6. The approach of the Commission

6.1 The legal basis of the recommendation

The response of the Commission to the questions raised regarding the choice of a recommendation instead of a directive was that Article 152 (ex 129) specifically provides for adoption of recommendations in the public health field, stating that the Council "…shall adopt incentive measures, excluding any harmonization of the laws and regulations of the Member States"; and "acting by a qualified majority on a proposal from the Commission, shall adopt recommendations".

[17] Document 6444/99 PE RE-21
[18] Document 8550/99 SAN79 ECO 228

6.2 The ALARA Principle (As Low As Reasonably Achievable)

The World Health Organization's ALARA principle, under which exposure to radiation must be as low as reasonably possible, excludes avoidable exposure to radiation. The principle refers to exposure to agents which might cause or promote health effects for which there is no threshold, i.e. there is a probability that the effects occurs, following even the tiniest exposure to this agent. In the case of **ionising radiation** this principle is enshrined in Community law[19], and the effects concerned are cancer and hereditary effects (changes in the chromosomes passed to the offspring of the exposed individuals). However, regarding the possible application of this principle in the Recommendation, the Commission's response was that these effects, and the principle, are not of relevance to **non-ionising radiation from electromagnetic fields** which is the objective of the Council Recommendation. Indeed there is no robust evidence for cancer and hereditary effects from such sources, and, therefore, no basis for considering the ALARA principle. As the Commission stated in the comments on the report from the Research Committee[20]: "The ALARA principle is not defined in the Treaty, and such a mention in the recitals is inappropriate".

6.3 The Precautionary Principle

Regarding the legal aspects of applying the precautionary principle, the Commission's response (in the earlier mentioned comments on the report from the Mr Scapagnini of Research Committee) was that: "This amendment, as with amendment 2 of the Environment Committee (the Tamino report, ed.), covers principles falling outside the scope of Article 129 (now 152) of the Treaty, in so far as the precautionary principle refers to Community policy on the environment, which is not the subject matter of this Recommendation.

Regarding the application of the precautionary principle due to possible long-term effects of EMFs the response of the Commission was, in line with the response to the above mentioned ALARA principle, that the present state of the art (according to the advice of the SCC) does not provide sufficient evidence for health concerns due to non-thermal effects of electromagnetic fields. Therefore the Commission did not consider it comprehensive to invoke the precautionary principle either. This is fully in line with the Communication from the Commission on the Precautionary Principle[21] which states that the precautionary principle should be invoked "where there are indications that the possible effects on the environment, or human, animal or plant health may be potentially dangerous" (p.8). This is not the case regarding EMFs as there are no clear scientific indications that the possible effects on human health may be potentially dangerous.

Therefore the Commission decided to base its proposal on established health effects only, for which there are thresholds of exposure before the effects occur. However, since there are safety factors of about 50 between the threshold values for acute effects and the basic restrictions this recommendation would cover implicitely possible long-term effects in the whole frequency range. As a result, ICNIRP

[19] Basic standards directives based on Art. 30 of the Euratom Treaty
[20] Document JFR/Sectox/4337
[21] Communication from the Commission on the precautionary principle /*COM/2000/0001 final */

guidelines provide safe protection thresholds with respect to adverse health effects which may be caused by EMF exposure[22].

Furthermore, the Commission stated that the Recommendation specifically acknowledges that Member States can go further than the limits set in the Recommendation if they may so desire.

Finally, regarding the supposed mass of available scientific evidence not considered by the Commission's proposal, the Commission stated that the standards proposed are fully in line with international and Community scientific advice.

7. Implementation of the Council Recommendation

7.1 The role of the Member States

The Council Recommendation asks the Member States of the European Union to adopt a protection framework based on the Recommendation into their national legislation and to implement measures according to this framework. Such national measures should take into account the protection limits set in the Recommendation.

This implies that:

Member States should take into account the reference levels given in Annex III for exposure assessment purposes or, when they exist, as far as they are recognised by the Member State, European or national standards based on agreed scientifically proven measurement and calculation procedures designed to evaluate compliance with the basic restrictions.

Member States should provide appropriate information to the public on the health impact of EMFs and the measures taken to address them.

Member States should promote and review research on the health effects of EMFs.

Member States should prepare reports on the experience obtained in the field and should inform the Commission thereof after a period of three years following the adoption of the Recommendation.

7.2 The role of the European Commission

The Commission is invited by the Recommendation to work towards the establishment of European standards, including methods of calculation and measure.

The Commission is called upon by the Recommendation to encourage research activities and to provide incentive and co-ordination as well as to continue its

[22] Indeed, ICNIRP stated in their guidelines: "It is the view of ICNIRP that the results from the epidemiological research on EMF field exposure and cancer, including childhood leukemia, are not strong enough in the absence of support from experimental research to form a scientific basis for setting exposure guidelines"

participation in the work of international organizations in this field and to promote an international consensus and advice on protective and preventive measures.

Within 5 years from adoption of the Recommendation the Commission will review its effectiveness, taking into account the latest scientific data and advice as well as the reports of the Member States about experiences with the implementation of the Council Recommendation.

8. Present action at Community level

8.1 Update of scientific evidence

In January 2001, following mounting public and political concerns and anticipating the reviewing process, the Health and Consumer Protection Directorate General (DG SANCO) asked the Scientific Committee on Toxicity-Ecotoxicity and Environment (CSTEE) to deliver an update of the opinion previously adopted by the Scientific Steering Committee.

In the light of new knowledge and technological developments in electromagnetic fields, the Committee was asked whether:

(a) Any new recommendations for exposure limits can be made to prevent non-thermal and long-term effects, specifically using epidemiological evidence on genetic, biological and carcinogenic effects.

(b) The technical annex for the Council Recommendation based on the ICNIRP guidelines is still the appropriate scientific basis for a system of health protection against both thermal and non-thermal effects from non-ionising radiation.

The conclusions of the Scientific Committee on Toxicity, Ecotoxicity and the Environment[23] have established that for radiofrequencies, the additional information which has become available on carcinogenic and other non-thermal effects of radiofrequencies and microwave radiation frequencies in the last years does not justify a revision of exposure limits set by the Commission on the basis of the conclusions of the 1998 opinion of the Steering Scientific Committee. In particular, in humans, no evidence of carcinogenicity in either children or adults has resulted from epidemiological studies (the size of some of which was remarkable, although the period of observation was not long enough for a definitive statement). A relatively large series of observations has not provided evidence of genotoxicity. Subjective symptoms affecting some individuals possibly exists, but not enough information is available either on the level of exposure producing such effects, on the features underlying individual susceptibility, on the possible biological mechanisms and on the prevalence of susceptible individuals in different populations. Thus, current knowledge is insufficient for the implementation of measures aimed at their identification and protection.

[23] Available on the internet http://europa.eu.int/comm/food/fs/sc/sct/out128_en.pdf

Thus, current scientific knowledge on this range of frequencies does not suggest the need for a revision of exposure limits.

With regard to extremely low frequency electromagnetic fields, the CSTEE reached the following conclusions:

- Combined analysis of the epidemiological studies on the association between exposure to extremely low frequencies (ELF) and childhood leukaemia have strengthened the evidence of an association. However, given some inconsistencies in exposure measurements and the absence of other criteria commonly used in assessing causality (particularly a plausible explanation of underlying biological mechanisms), the association does not meet adequate criteria for being considered causal and the overall evidence for 50/60 HZ magnetic fields to produce childhood leukaemia is limited.

- The effect, if any, seems to be limited to exposures above 0.4 uT. In European countries, the proportion of children exposed to such levels is less than 1%. Assuming that the risk is doubled among the exposed, in the general population this would roughly correspond to an excess incidence of less than 1% childhood leukaemia. In European countries, the incidence of leukaemia is around 45 per million children (age 0-14) per year.

- There is no convincing suggestion of any other carcinogenic effect of ELF on either children or adults. Current information on this respect does not provide clues for reconsidering exposure limits.

- Also in the case of ELF, reports on possibly hypersensitive individuals require information and do not provide a basis for changes in exposure limits.

As a general conclusion, on the basis of the information available to the CSTEE at the time of its work on this opinion request, the committee cannot currently propose, for thermal and non-thermal effects, alternatives to the technical annex for the Council Recommendation setting up basic restrictions and reference levels limiting the exposure to non-ionising radiation, based on the guidelines published by the International Commission on Non-Ionising Radiation Protection (ICNIRP).

The opinion of the Commission Scientific Committee reflects the consensus of the international and national scientific committees and major organisations such as the WHO. Although there are gaps and inconsistencies in the scientific knowledge, it is agreed that radiofrequencies have not established carcinogenic health effects from electromagnetic fields exposures below the ICNRP guidelines. On the other hand for extremely low frequencies (ELFs), while the classification of these fields as possibly carcinogenic to humans has been made, it remains possible that there are other explanations for the observed association between exposure to ELF and childhood leukaemia.

8.2 Standardisation

As stated directly in the Recommendation, the European Commission is invited to "work towards the establishment of European standards…..". As a consequence of this the Commission has mandated the Standardisation bodies (CENELEC and ETSI[24]) to work on establishing European standards, including harmonised methods of calculation and measurements. This will enable verification that the safe exposure limits set in the Recommendation are met. These standards will be applicable throughout the European Union, replacing existing national standards, thus offering a uniform level of protection.

Products will be marked with the CE symbol to demonstrate that they comply with all the applicable European legislation requirements imposed on the manufacturer.

A first standard for mobile telephones has been published in 2001, and other standards will follow.

8.3 EMF Conference November 30th, 2001 "Electromagnetic Fields and Health Conference –Which Regulatory Framework for the European Community?"

The conference was aimed at discussing technical, scientific and legal aspects of electromagnetic fields and health especially in the light of the recent scientific opinion from the SCTEE.

Member and Accession States representatives and the industry were invited to participate.

During the first part of the conference, the latest state of the scientific knowledge was tentatively established while the second part focused on the existing regulatory framework and its possible developments according to the competence given to the Community by the Treaty. Abstracts of the presentations made during the conference can be found on the Commission's webite (address). These are followed by transcriptions of the questions and comments made to and by the speakers. For more detailed information, one can refer to the annexes where one can find the complete presentations.

In conclusion, it was agreed that the scientific knowledge available to date was well reflected by the opinion of the Commission's Scientific Committee on Toxicity-Ecotoxicity and the Environment. There was no proposal to change the current limits set up by the 12th July Council Recommendation, which limits the exposure of the general public to Electro-Magnetic Fields. It was stated that any recourse to stricter limits without a stronger scientific basis would neglect the work made and the high quality studies funded since many years to explore health risks associated with the exposure to non-ionising radiation. This does not mean that recent findings in the extremely low frequency area do not have to be taken into account, but that they have to be further evaluated and that further measures, if needed, have to be proportionate to the established risks.

[24] CENELEC is the European Committee for Electrotechnical Standardisation; ETSI is the European Telecommunication Standardisation Institute.

Regarding the developments of the electromagnetic fields legislative framework, most of the Member States have transposed the limits of the Council Recommendation in their law. More detailed information about this can be found in part 10 "Action undertaken at Member State level" and part 11 "Action undertaken at Accession country level" of this report. It has also been reported that all apparatus put on the market should respect the limits set up by the Council Recommendation in a near future. This is due to the on-going development of binding European standards for devices emitting non-ionising radiation under the banner of the Low Voltage Directive and of the Radio Telecommunications and Terminal Equipment.

Some gaps may remain in the control of the total body exposure of human beings in very specific situations when multiplying the sources of emission. These particular cases could be legally addressed through the development of specific actions, which could be based either on Articles 152 or Article 174 of the Amsterdam Treaty (cf. presentation of Mr Partsch).

But, first, such situations should be clearly demonstrated and identified. In this regard, the future development of a common European measurement standard for the emissions of mobile telecommunications base stations and a pilot monitoring campaign by the Commission Joint Research Centre will give a strong database to any new initiative in the field.

The Commission services are following actively the Electromagnetic Fields Area. Far from relying on existing protection framework for the public, they react to any new scientific evidence, which has not already been taken into consideration within the limits of competence given to the Community by the Treaty.

9. Actions undertaken at Member State level

9.1 Austria

a- The protection framework in Member States

Austria has implemented two standards to protect the public from exposure to electromagnetic fields, one for the low frequency range and one for the high frequency range. Austria has more or less implemented the limits set down by the Council Recommendation (1999/519/EC). The levels in the two standards follow in principle the ICNIRP guidelines, but differ slightly in some frequency ranges. In the frequency range for GSM-Networks, the Austrian limits are slightly higher than the limits set down in the ICNIRP guidelines.
Concerning the operation of radio equipment, the competent Austrian federal authorities have to use these standards (or the Council Recommendation when it is more stringent) when an individual or a general licence is required. In these cases the standards (or the Council Recommendation) are legally binding. Specific additional legislation (i.e. a "radiation limits ordinance") is not necessary.
Austria is awaiting the outcome of the WHO EMF Project before applying any additional safety parameters to the levels of EMF-exposure allowed.
There are only a few regional variations in Austria regarding the protection of the public from EMFs. These are not due to federal law but are sometimes demanded by

local authorities or institutions for licences based on provincial law for regional planning, general environmental protection and building construction. In these cases stricter limits are set down. According to some legal experts, however, the compliance of these regulations with the Austrian Constitution is not without doubt but has not been challenged yet. It is also to be mentioned that some action groups suggest to take into account the precautionary principle.

b- The scope of the implemented measures

Standard ÖNORM 1119 covers 0 Hz-30 kHz and standard ÖNORM 1120 covers 30 kHZ-3000 GHz.
These measures address exposure levels from environmental exposure, also called "electro-smog", as in principle all sources in the high frequencies should be taken into account.
Austria controls that the actual levels of exposure to electromagnetic fields comply with the implemented measures by spot measurements performed occasionally, especially in case of uncertain compliance with the binding limits of radiation.

c-Additional measures

Austria promotes research relevant on electromagnetic fields on human health. For example, it finances national surveys of scientific publications and publishes surveys in German. Research on a-thermal effects is supported by national institutions and authorities in Austria.
Austria implements measures to inform the public on the health impact of electromagnetic fields and the measures taken to address them. For example, it has translated and published WHO publications.
Austria has promoted the development of new technology in the field of electromagnetic fields. GPRS is part of the service covered by 2G°-licences and it has been broadly introduced in the meantime. Concerning UMTS, licences (3G°-licences) have already been placed and UMTS will start in Austria by the end of 2003.

9.2 Belgium

a- The protection framework in Member States

Belgium took steps to protect the public against exposure to electromagnetic fields by issuing the Royal Decree of 29 April 2001, which lays down requirements for aerials emitting electromagnetic waves of between 10 MHz and 10 GHz. The Belgian government did not take account of the limits specified in the Council Recommendation (1999/519/EC) but applied the precautionary principle whereby the power limit is set to one quarter of the one recommended by the WHO and ICNIRP and the limit of the electromagnetic field is set at one half of that recommended in the ICNIRP guidelines. For example, at 900 MHz, E = 20.6 V/m, instead of 41.25 V/m. However, the Belgian government did not impose additional safety requirements/levels to complement the authorised levels of EMF exposure.
There are no regional variations in Belgium concerning protection of the public against electromagnetic fields.

b- The scope of the implemented measures

The measures taken concern the levels of exposure associated with a frequency range of between 10 MHz and 10 GHz.
They do not address authorised levels of environmental exposure.
The IBPT/BIPT (Belgian Institute for Postal Services and Telecommunications) carries out checks to ensure that levels of exposure to electromagnetic fields comply with the implemented measures. The Belgian norms specify that the Minister responsible for Telecommunications sets the protocol followed by IBPT/BIPT.

c- Additional measures

Belgium does not promote research into the effects of electromagnetic fields on human health as this is not included within the scope of the Health Council (CSH – *Conseil Supérieur d'Hygiène*).
In order to inform the public on matters concerning electromagnetic fields, the Belgian government has published an information brochure (available to the public on demand) and is also preparing a website (http://www.health.fgov.be/CSH_HGR) about the health impact of electromagnetic fields and the measures taken to deal with this problem.
Licences have been issued to operators to promote the development of new technologies relating to electromagnetic fields.

9.3 Denmark

a- The protection framework in Member States and scope of the measures

Denmark follows the ICNIRP recommendations and has not implemented any legally binding measures to protect the public against exposure to electromagnetic fields. Its Labour Inspectorate follows the ICNIRP recommendations when evaluating exposure.

b- Additional measures

Denmark promotes research into the impact of electromagnetic fields on human health as researchers in this field can apply for public funding for their work. In addition, the Danish Health Minister has asked the mobile telephone sector to support research in this field.
The Danish Government has implemented measures to inform the public about the health impact of electromagnetic fields and the measures taken to address this issue. In collaboration with the mobile telephone sector and consumer associations, the Danish Government has produced information material concerning mobile telephones and health for Danish consumers.
Denmark promotes the development of new technologies in the sphere of electromagnetic fields by supporting European and global standardisation work and by permitting, as far as possible, new technologies to be marketed and used in Denmark. In particular, Denmark supports the harmonisation of technical specifications and standards in this field. It also ensures that the necessary frequencies can be made available and that the necessary authorisations are granted. This applies also to Bluetooth technology and UMTS or GPRS licences.

9.4 Finland

a- The protection framework in Member States

Exposure to electromagnetic fields has been studied in Finland since the mid-Seventies. In 1986, electromagnetic fields and other forms of non-ionising radiation were included in the legislation on radiation protection. The regulations in Finland currently governing electromagnetic fields are:

- Council of Ministers Decision No 473 on high-frequency equipment and control thereof (1985);
- Radiation Protection Act (592/91);
- Social Affairs and Health Ministry Decision on limiting exposure to non-ionising radiation (1474/91, currently undergoing amendment);
- Regulation on non-ionising radiation control (1306/93).

What is more, the Radiation Protection Centre has issued instructions on pulse radar and transmitting stations:

- Instruction 9.2: pulse radar safety (1991);
- Instruction 9.3: safe practices when working on frequency modulation and television masts.

The above-mentioned regulations are legally binding, whereas the Radiation Protection Centre instructions are not, but their application helps consolidate adherence to the regulations.

The regulation covers fields over 100 kHz and has followed the international recommendations of the IRPA/INIRC (forerunner to the ICNIRP) since 1988. These are the main differences by comparison with the Council Recommendation on the frequencies in question. However, the Ministry of Social Affairs and Health is currently drawing up a decree amending the maximum exposure limits (up to 100 kHz recommendations, >100 kHz legally binding limits) to bring them into line with the Council Recommendation. This should be finalised by March 2002.

Finland does not have any safety criteria or levels that are in addition to the authorised electromagnetic field exposure levels.

There are no regional variations included in the protection framework of the general public from electromagnetic fields in Finland.

b- The scope of the implemented measures

The applicable regulations mentioned above govern radiation at frequencies over 100 kHz. These cover, for example, mobile phone base stations and radio and television transmitters. They do not apply to mobile phones because these are not subject to the local specific absorption rate (SAR) limit of 2 W/kg. Nor do they cover high voltage lines whose electromagnetic field frequency is under 100 kHz. The new decree will remedy these shortcomings.

Both the old and new exposure limits are high, which means they do not apply to "electro-smog". Nor does the Finnish government deem it necessary – from the biological angle – to tackle this question.

Finland monitors compliance of electromagnetic field exposure levels with the implemented measures. The Radiation Protection Centre is the authority responsible for monitoring application of the decisions. The measurements and calculations

required for this are based in part on tried-and-tested methods and commercially available equipment, and partly on methods/procedures and equipment developed by the Centre itself.

c- Additional measures

Since the mid-Seventies, Finnish universities and research institutes have been studying exposure to non-ionising radiation, the biological consequences of radiation and also dosimetry and other measurement procedures. A vast national research programme was launched in 1994 to study the impact mobile phones have on health (COST, COSTbis, LaVita). Studies also cover methods for testing mobile telephone radiation and the health impact of fields emitted by electricity supply lines.
Experts of the Radiation Protection Centre, the Occupational Health Institute and other specialists continuously inform the public and media about safety issues relating to electromagnetic fields. Such information is distributed in hard copy form or electronically (internet) and public information conferences are arranged, for example as part of the *Tieteen Päivät* scientific symposium. The universities of Kuopio and Jyväskylä are looking into ways of drawing the general public's attention to the risks posed by radiation from base stations and mobile phones.
Finland encourages the development of new technologies in the EMF field. It is renowned for its leading role in radio-communication technologies. Considerable R&D has been undertaken, especially by the mobile telephone industry (Nokia in particular), but the State has also made a major contribution, chiefly via the National Technology Agency (TEKES) and the universities. The emphasis is currently on developing third-generation (UMTS) and fourth-generation mobile telephone networks.

9.5 France

a- The protection framework in Member States

France has taken a number of steps to protect the public against exposure to electromagnetic fields.

- Regulation (*Ordonnance*) No 2001-670 of 25 July 2001, transposing Directive 1999/5/EC[25] and published in the *Journal Officiel* (French law gazette) of 28 July 2001, established health protection as one of the essential requirements regarding telecommunications equipment.
- The specifications to be met by operators wishing to set up and operate mobile telephone networks were changed by an Order (*Arrêté*) issued on 14 November 2001 to take account of the provisions on public health protection. This Order contains a reference to the exposure limits set out in the Recommendation of 12 July 1999 (1999/519/EC).
- The Regulation also provides for the publication of a decree laying down limits that must not be exceeded by the electromagnetic fields emitted by any kind of telecommunications equipment to which the public is exposed.

[25] Directive 1999/5/EC of the European Parliament and of the Council of 9 March 1999 on radio equipment and telecommunications terminal equipment and the mutual recognition of their conformity. Official Journal L 091 , 07/04/1999, p. 0010 - 0028

This decree, which is to cover all radio-frequency transmitters including radio and television stations, is currently in preparation. It will lay down exposure limits for fixed equipment which existing installations must comply with and is expected to be published at the beginning of 2002.

- Another decree transposing Directive 1999/5/EC will stipulate methods for assessing the conformity of terminals, based on compliance with the exposure limits for users.
- An interministerial circular laying down technical requirements for the installation of mobile telephony base stations was issued on 16 October 2001. On the basis of the exposure limits set out in the European Recommendation (1999/519/EC), the circular contains practical rules for determining safety perimeters and markings around base stations. It also refers to the rules governing environmental protection. Finally, it extends the powers of the local consultation bodies, set up in 1998 to study questions of environmental integration, to the field of health protection, with a view to providing information for local authorities and the general public.
- For extremely low frequencies: the Order of 17 May 2001 (*Journal Officiel* of 12 June 2001) lays down technical requirements for power supply systems and states that new or modified installations must comply with exposure limits. This Order does not concern domestic or industrial installations situated outside areas covered by power supply agreements. The exposure limits chosen are those specified for 50 Hz alternating current by the Council Recommendation of 12 July 1999, i.e. 5 000 V/m and 100 µT (Article 12a).

All orders or decrees are legally binding, whereas the Circular of 16 October 2001 is mainly intended to provide information. It is aimed at the local consultation bodies which it is recommended should be set up to deal with public health and environmental questions connected with the installation of mobile telephone aerials.
In all the regulatory or information-related texts that have already been published or are being drafted, the limits chosen correspond to the basic restrictions and reference levels specified in the Recommendation of 12 July 1999.
There are, however, other requirements apart from authorised exposure levels:

- the Circular of 16 October 2001 recommends that safety perimeters be set up around mobile telephony base stations. The distances specified were proposed by the *Centre scientifique et technique du bâtiment* (scientific and technical centre for the building industry) to take account of the only effects of electromagnetic fields so far established (thermal effects).
- In a report entitled "*Les téléphones mobiles, leurs stations de base et la santé*" ("Mobile Phones, their Base Station and Health", report of group led by Dr Zmirou, January 2001 — can be consulted on the Ministry of Employment and Solidarity's website: http://www.sante.gouv.fr), the experts involved did not support the idea that the health of people living near base stations is at risk but nevertheless recommended that certain "sensitive" buildings less than 100 m away from a macrocellular base station should not be directly exposed to the aerial beam. This recommendation is mainly intended to allay certain fears among the public, so far unfounded, about effects on their health (see Circular of 16 October 2001).

b- Scope of implemented measures

Concerning whether the measures implemented deal with a specific frequency range, only the Order of 17 May 2001 contains provisions specifically for extremely high frequencies used for the transmission of electric current. The other texts on telecommunications cover all radio frequencies.
The forthcoming decree laying down limits for public exposure to radio-frequency electromagnetic fields incorporates the provisions in Annex IV, on exposure to sources with multiple frequencies, of the Recommendation of 12 July 1999, and thus addresses the question of environmental exposure.
In France, there is a system for regularly checking that levels of exposure to electromagnetic fields comply with requirements. Pending the publication of a harmonised European standard for *in situ* measurements of radiation from radio-frequency transmitters, the national radio-frequency agency (ANFR) has prepared a measurement protocol based on the Council Recommendation (1999/519/EC). This protocol[26] has become the reference method used in France and was made official by the Circular of 16 October 2001. A national campaign for measuring radioelectric fields at sites representative of public exposure was carried out in 2001, the results have been published on 19 December 2001.

c- Additional measures

The French authorities encourage research into the effects of electromagnetic fields on human health. At an international level, France is taking part in the EMF programme co-ordinated by the WHO and in the Interphone epidemiological study now being conducted by the International Agency for Research on Cancer (IARC). At the European level, French laboratories are taking part in research programmes under the 5th FRDP.
In France, the COMOBIO (Mobile Communications and Biology) research programme was launched in 1998 and is now coming to an end. The main results were presented on 21 December 2001. An invitation to tender for a second COMOBIO programme is now being drawn up.
The French government has taken various steps to inform the public about the health effects of electromagnetic fields and about the measures taken in this area. In 1994, the Directorate-General for Health produced an information document on the health aspects of electromagnetic fields and power lines which was intended for the general public. This document is still available, and is currently being updated. Other public information documents on mobile phones and their base stations are being drafted. For its part, the national radio-frequency agency has produced and distributed a booklet which contains information on mobile telephony base stations and addresses health concerns. Copies of this document have been sent to all local councillors and to public authorities. In addition, the above-mentioned report entitled "*Les téléphones mobiles, leurs stations de bases et la santé*" can be consulted on the internet and can be bought in bookshops. It was presented at a press conference on 7 February 2001. It constitutes a digest of current scientific knowledge for the general public and contains a number of recommendations both for the public and for the public authorities.

[26] Which can be found at http://www.anfr.fr

France is also promoting the development of new technologies in the EMF field by means of the orders (*arrêtés*) authorising the operation of third-generation radiotelephone networks which were signed on 18 July 2001.

9.6 Germany

a- The protection framework in Member States

Germany has implemented several legally binding measures to protect the public from exposure to electromagnetic fields, including the 26th BImSchV (Pollution Control Order) of 16 December 1996[27] and BMPT Order 306/97 (the updated version of Order 94/92 published in 1992). The German Government implements the limits laid down by the Council Recommendation via reference levels, as the emission limits are based on the values set by ICNIRP. It does not apply additional safety parameters to the levels of EMF exposure allowed, as it considers that there is no scientific justification. However, special protection by means of even lower limits is ensured against electromagnetic fields in the frequency range of 50 kHz to 50 MHz, which could interfere with or switch off cardiac pacemakers.
There are no regional variations within Germany regarding the protection of the public from EMFs.

b- The scope of the implemented measures

The measures implemented in Germany address exposure levels from specific frequency ranges:

- Under BMPT Order 306/97: 3 kHz – 300 GHz
- Under the 26th BImSchV: 16 2/3 Hz; 50 Hz; 10 MHz – 300 GHz.

The environmental exposure levels are addressed under the 26th BImSchV. In the low-frequency range, the limit values have to be complied with taking other low-frequency emitters into account. In the high-frequency range, compliance with the limit values must take into account other fixed radio transmission installations. In BMPT Order 306/97, incidental exposures are taken into account by means of a supplementary factor.
Germany ensures that the levels of exposure to EMFs comply with the implemented measures via DIN VDE 0848, BMPT Order 306/97 at Federal level and the 26th BImSchV at *Land* and municipal level. The level of exposure has been measured nation-wide several times, i.e. in 1992, 1996/97 and 1999/2000. It is planned to repeat this action every two to three years. More than 3 600 points located throughout the 16 *Bundesländer* and accessible to the public have been evaluated. All the exposure levels measured were below the limits set by ICNIRP and by the Council Recommendation respectively. The mean level was at least 100 times lower. Further details can be found at URL http://www.regtp.de/tech_reg_tele/start/fs_06.html.

c- Additional measures

The German Government has refrained from introducing special precautionary levels; instead, it has initiated the following measures:

[27] Federal Law Gazette (BGB1.) I, p. 1966

- The German Government will step up its research activities in the field of mobile telephony:
  - The Federal Ministry of the Environment, Nature Protection and Reactor Safety will increase the budget appropriations for research into the effects of mobile phones. In the period 2002 to 2005, a total of € 8.5 million will be allocated. In their voluntary undertaking of 6 December 2001, the mobile phone companies promised to support this research programme with a further € 8.5 million.
  - In the period 2002 to 2005, the Federal Ministry of Economic Affairs and Technology will provide € 5 million for research in connection with technical regulation questions during the development of UMTS networks.
  - The Federal Ministry of Education and Research is preparing an initiative for the promotion of emission-reducing technologies in mobile phone systems, with total funding of € 7 million in the period 2002 to 2005.
- Like the mobile phone operators, the German Government will provide additional funds for new initiatives to inform the public about the current state-of-the-art and about specific projects.

The post and telecommunications regulatory authority will make data about emitters available in a central database. In their voluntary undertaking the mobile phone operators promised, in the interests of better consumer information, to press the manufacturers of mobile phones to provide consumer-friendly and transparent data on the radiation levels involved.

The German Government is also currently engaged in talks with mobile phone manufacturers aimed at developing a voluntary quality seal for mobile phones with a particularly low SAR (specific absorption rate).

Germany has promoted research relating to the effects of electromagnetic fields on human health by participating in and funding research projects. Most projects are promoted by the Federal Ministry of the Environment, Nature Protection and Reactor Safety. The programme will include:

- Dosimetry: improvement of dosimetry in experimental work and in recording of exposure of the population, especially from base stations. Development of standardised test rigs for simulating exposure caused by, inter alia, UMTS installations, development of reliable and practicable personal dosimetry procedures for epidemiological studies.
- In vitro and in vivo investigations: investigation of effect mechanisms by means of biological systems in which biological effects have already been demonstrated experimentally (blood-brain barrier model, isolated pineal body) and at molecular level; investigations on plants, investigations on animals, with the emphasis on long-term studies; experimental investigations to determine psychophysiological effects (in vivo tests and tests on healthy volunteers).
- Epidemiological studies: cohort study on risks of sickness among highly exposed (occupational) groups; cross-sectional study on possible impairment from electromagnetic fields among the population ("electrosensitivity"); epidemiological study on "electrosensitive" patients plus recording of clinical parameters; epidemiological study on cattle.
- Risk communication: representative determination of the population's perception of possible hazards caused by the electromagnetic fields of

mobile phones; development and application of communication strategies relating to these hazards.

The German Government has published brochures and put information on the Internet to inform the public about the health effects of electromagnetic fields and the measures taken to address them. For example:

- *Bundesministerium für Umwelt, Naturschutz und Reaktorsicherheit* (BMU) at http://www.bmu.de/fset1024.htm
- *Bundesamt für Strahlenschutz* at http://www.bfs.de/
- *Bundesministerium für Wirtschaft und Technologie* (BMWi) at http://www.bmwi.de/Homepage/Startseite.jsp
- *Bundesamt für Telekommunikation und Post* (Reg TP) at http://www.regtp.de/

Germany is promoting the development of new technologies, such as PLC and UMTS. In this area there are problems with EMC and protection against hazards caused by EMF. Germany is establishing and adapting a regulatory framework in this area.

9.7 Greece

a- The protection framework in Member States

Greece has implemented legally binding measures for the protection of the public from exposure to electromagnetic fields by putting into force a new national legislation entitled “Protection measures for the exposure of the general public to all land based antenna stations” (Act 1105/Vol. II/6.9.2000). In this new legislative action, which is common ministerial order, the basic restrictions and reference levels values set in the Council Recommendation concerning the frequency range of 0-300 GHz have been implemented. However, Greece applied additional safety parameters where the safety limits for exposure of the general public to all land based antenna installations are set at 80% of the reference level values. It must also be noted that there are no regional variations within Greece regarding the protection of the public from electromagnetic fields.

b- The scope of the implemented measures.

The implemented measures cover the 0-300 GHz frequency range for both single and multiple frequency emissions. The Greek legislation adopted precisely the contents of the Council Recommendation concerning these matters.

The levels of the emitted electromagnetic fields from all kind of antennas stations are regularly monitored, in order to ensure compliance with the safety limits for the public or, if this is not the case, to ensure that all necessary protection measures around an antenna base station are being taken in every case. The Greek Atomic Energy Commission (EEAE) is the national competent body for protection of the general public from all types of non-ionising radiation. Therefore, for every antenna station, a complete technical study for its electromagnetic emissions should be submitted to EEAE, which gives its experts opinion to the authority in charge for issuing the license for the antenna installations. The EEAE also carries out measurements in all kinds of non-ionising radiation facilities in order to monitor whether the general public exposure limits are being adhered to. Measurements in

antenna stations may also be performed by the Ministry for the Environment, Regional Planning and Public Works, the Ministry of Health and the Ministry of Transport and Communications or others accredited by the EEAE laboratories. The EEAE is responsible for the co-ordination of measurements.

c- Addition measures

According to the Greek legislation, the Greek Atomic Energy Commission and the Ministry for the Environment, Regional Planning and Public Works, the Ministry of Health and the Ministry of Transport and Communications undertake co-ordinated actions in order to stay informed of all the latest developments in this field, to organise research programmes and to diffuse information about health matters related to the electromagnetic radiation.
Research actions are mainly being performed in universities and research centres and are funded by the Greek government and the European Community.
The EEAE is responsible for providing information to all interested public groups for matters concerning the health effects of electromagnetic fields. To this end, the EEAE publishes information brochures on biological effects of electromagnetic fields and organises or participates in lectures, courses and workshops in order to inform the public.
The Greek government also promotes the development of new technologies in the field by issuing licences for new services, such as UMTS, LMDS.

9.8 Ireland

a- The protection framework in Member states

Ireland has implemented several measures to protect the public from exposure to electromagnetic fields. For example:

- The Department of the Environment and Local Government issued formal Guidelines for the siting of telecommunications masts in July 1996.
- The Office of the Director of Telecommunications Regulation (ODTR), the independent licensing body for the telecommunications publishes, annually since 1998, a Compliance Report where a representative sample of transmitters (covering the whole radio frequency spectrum) is surveyed to verify that public exposures to non-ionising radiation are within ICNIRP guidelines.
- Licences issued by the ODTR require operators to comply with ICNIRP guidelines. ODTR licence conditions are legally binding.
- The state electricity company, ESB, ensures that its facilities comply with ICNIRP guidelines. This requirement is not a legal obligation, but a measure adopted by ESB at the request of the Minister for Public Enterprise on behalf of the State (its owner).
- Planning conditions attached to all major electricity transmission and distribution projects require adherence to ICNIRP guidelines. The Planning and Development Act empowers planning authorities to attach such conditions to electrical developments. Planning conditions are legally binding.

Other measures are in the process of being implemented.

- The Department of Environment and Local Government has in November 2001 submitted an updated and revised Planning and Development Act to Dail Eireann. This introduces, inter alia, new measures concerning the siting of mobile phone masts. Planning and Development Acts are legally binding.
- The Department of Public Enterprise, co-operation with the Department of Health and Children has begun to assemble web-sites and prepare material for brochures dealing with "Telecommunications" and "Electricity" respectively.

Another measure is under consideration. The Department of Health and Children has expressed its possible intention to bring the relevant parts of the Council Recommendation of July 1999 into Irish Law. These could include the adoption of the exposure guidelines set out in the Council Recommendation and the application of these guidelines in line with the approach proposed in the Recommendation. At this time this action is not expected to take place prior to the 2002 General Election.
Ireland does not apply additional safety parameters/levels to the levels of EMF-exposure allowed, as the ICNIRP guidelines are considered adequate.
No regional variation within Ireland regarding the protection of the public from EMFs exists.

b- The scope of the implemented measures

The measures implemented address exposure levels from a specific frequency range. Telecommnunications licenses from ODTR refer to specific frequencies. In addition, planning consents for power lines refer to ELF 50 Hz fields.
The measures do not specifically address exposure levels from environmental exposure. Cumulative exposures at survey sites are measures by ODTR along with specific frequency contributions from individual transmitters. Where the cumulative exposure approached or exceeded ICNIRP guidelines, then remedial action would be taken.
Ireland regularly monitors that the levels of exposure to EMFs comply with the implemented measures. For example:

- In co-operation with ESB, the Department of Public Enterprise provides a free electromagnetic field monitoring service to the public with respect to extremely low frequency fields from electrical power installations.
- The Department of Health and Children is in the process of engaging consultants to undertake environmental surveys of EMF exposure, in response to specific recommendations in this regard contained in the Council Recommendation of 12 July 1999.

In the context of new regulations for siting mobile phone masts, it has been decided to institute a monitoring programme whereby the public exposure to 10% (around 400-500) of all base stations in Ireland will be measured annually. It is intended to complete its first annual survey by September 2002.

c- Additional measures

Ireland contributes to internationally co-ordinated research activities. It has, through the ESB, contributed financially to the UK Childhood Cancer (epidemiological) study. It was a founding member and financial supporter of the WHO International EMF Project that was launched in 1996. It is intended to make a further significant

financial contribution to the project in January 2002. Ireland is also participating in the recently established COST 281 action and through the Chief Technical Advisor to the Department of Public Enterprise also participates in the COST 281 Steering Committee. Ireland will be hosting a COST 281 workshop in the autumn of 2002. In addition, and again through the Chief Technical Advisor to the Department of Public Enterprise, Ireland is represented on the Executive Committee of the International Committee on Electromagnetic Safety (ICES) which has been developing internationally accepted standards on non-ionising radiation exposure for nearly 40 years. Ireland also contributes manpower, expertise and scientific papers to WHO seminars and publications on the subject of EMF risk Communication.
In addition to the measures already reported concerning measures implemented by the Irish government to inform the public on the health impact of electromagnetic fields and the measures taken to address them, the Department of Public Enterprise provides an advisory service to the public on non-ionising radiation issues. For example, the Department of Public Enterprise will respond to any answer from the public on any aspect of non-ionising radiation. Enquiries are mostly received by telephone although some arrive via post or e-mail. In nearly all the cases the response to the enquiry will be followed up by sending a letter to the caller or writer summarising the advice given over the telephone and including a package of recent articles and position papers selected from the publication of health advisory authorities and other expert bodies around the world.
Ireland is also promoting the development of new technology in the field. ODTR is in the process of appraising and awarding operating licences for third generation wireless telecommunications.

9.9 Italy

a- The protection framework in Member States

Italy has implemented several measures to protect the public against exposure to electromagnetic fields. Law No. 36 of 22-2-01 “Framework Act 36 on protection against exposure to electric, magnetic and electromagnetic fields” (Official Gazette 55 of 7-3-2001) was promulgated on 22 February 2001. It is to be implemented by specific decrees, in particular the prime ministerial decrees mentioned in Article 4(a) and (b) on setting of exposure limits, alert levels and quality objectives to safeguard the health of the general public and occupationally exposed workers. These implementing decrees have not yet been issued, since it has proved necessary to give further consideration to various health and regulatory aspects. Article 16 of the Act, in any case, expressly provides for the existing legislation in this area to remain applicable on a transitional basis. This consists of the following instruments:

- Ministerial Decree 381 of 10-9-98 issued by the Ministry of the Environment, in agreement with the Ministries of Health and Communications, on the “Regulations establishing rules for the determination of maximum radiofrequency levels compatible with human health” (Official Gazette 257 of 3-11-1998) pursuant of Article 1(6) of Act 249 of 31 July 1997 (establishment of the telecommunications authority). Article 4 of this decree also lays down further precautionary measures to minimise exposure to the public.
- Prime Ministerial Decree of 23-4-92 on “Maximum limits for exposure to electric fields and magnetic fields generated at the nominal power

frequency (50 Hz) in residential environments and external environments" (Official Gazette 104 of 6-5-1992), pursuant to Article 2 (14) of Act 349 of 8 July 1986 (establishing the Ministry of the Environment). As a further precautionary measure, this decree lays down clearances between power lines and residential buildings.

- Prime Ministerial Decree of 28-9-1995 on "Procedural technical rules pursuant to the Prime Ministerial Decree of 28 April 1992 on power lines" (Official Gazette 232 of 4-10-1995), concerning the improvement works mentioned in Article 7 of the previous decree.

As regard to radiofrequency and microwave sources, a technical annex to the above-mentioned Ministerial Decree 381/1998 provides for existing plants to be brought into conformity in the course of improvement work.
As regards to the EU Council Recommendation of 12 July 1999, Act 36 of 22 February 2001 provides for action to establish not only exposure limits but also alert levels to prevent possible long-term health effects and quality objectives for new installations so that exposure to electromagnetic fields can be progressively minimised. These alert levels have been laid down with a view to precautionary measures "*in pursuance of the European principle referred to in Article 174(2) of the Treaty establishing the European Union*" (Article 1(2) of the Framework Act mentioned in point 1 above).

b- Scope of the implemented measures

Concerning which monitoring protocol will be used and which frequency levels will be addressed, Article 2 of Law No. 36/2001 states that "*exposure limits, attention levels, and quality goals…are established, within 60 days form the enforcement of the present law*", with appropriate Ministerial decrees.

c- Additional measures

The government promotes research into the impact of electromagnetic fields on human health in accordance with Articles 1 and 4(b) of Law 36/01.
The Minister for the Environment, in agreement with the Minister for Health and the Minister for Education, the Universities and Research, has launched an environmental information and education campaign in accordance with the provisions of Law No. 349 of 8 July 1986, with a budget of 2.000 million Lira per year from 2001 onwards.
Pursuant to Article 4(b) of Law No. 36 of 22-2-01, the Italian State is involved in promoting research activities and technical and scientific experimentation. The conclusion of programme agreements with companies manufacturing domestic appliances, personal appliances or work appliances which produce electric, magnetic and electromagnetic fields will be encouraged, with a view to developing technologies allowing emissions to be reduced.

9.10 Luxembourg

a- The protection framework in Member States

Luxembourg has implemented a number of measures to protect the public against exposure to electromagnetic fields. For example:

- « *Normes au sujet des radiations non-ionisantes dues à la téléphonie mobile cellulaire* » ["Standards regarding non-ionising radiation due to cellular mobile telephony"] issued by the Environment Ministry and the Labour and Employment Ministry (http://www.aev.etat.lu/sec/Formulaires/F-302.doc). This instrument was made legally binding by the decree authorising the base station. It applies to frequencies in the range 10 kHz to 3000 GHz.
- « ITM-CL 179.2 » (http://www.itm.etat.lu/condtype/pdf/Cl179-2.pdf) which is not legally binding. This applies to frequencies in the range 10 kHz to 300 GHz.
- Circular no. 1644 (ref. 26/94) of 11 March 1994 to local authorities concerning the recommendation that land in the immediate proximity of high voltage power lines should no longer be approved as building land. This is merely a recommendation and not therefore legally binding. It applies to electric and magnetic fields with a frequency of 50 Hz.

A preliminary draft law concerning exposure of the public and of workers to non-ionising radiation (electromagnetic radiation with a wavelength not exceeding 100 nm and acoustic radiation) is also under consideration.
Luxembourg has applied stricter limits than those laid down in the Council Recommendation. For example, a value of 3V/m is applied to "premises in which humans may stay" for base stations for mobile phones. The values laid down in the Council Recommendation 1999/519/EC have been adopted for persons exposed at work. For power lines, in Circular No. 1644 the Luxembourg Government opted for distances as the unit of measurement rather than electric or magnetic fields, since distances are more easily measurable and are in direct relation with the fields.
No regional variations have been reported regarding protection of the public against electromagnetic fields. However, the *administration communales* (local administrations) have the authority to ignore the national standards or apply stricter limits for public exposure to electromagnetic fields.

b- Scope of the implemented measures

As reported in the previous part, the measures taken by Luxembourg to limit exposure of the public to electromagnetic fields apply to several specific frequency ranges.
The measures do not deal with the levels authorised for environmental exposure but deal in part with the issue of "prudent avoidance" (http://www.who.int/peh-emf/publications/facts_press/EMF-Precaution.htm).
Luxembourg monitors levels of exposure to electromagnetic fields by means of:

- calculations (via power and antenna diagrams)
- checks on reception – direct measurements (e.g. sampling at locations where calculations indicate high electromagnetic fields or critical locations such as hospitals, schools and crèches)
- measurement of electromagnetic fields on request from the public, industry, etc.

The Luxembourg Government does not promote research into the effects of electromagnetic fields on human health because there is no budget for this and because the subject is not a health priority
Luxembourg has implemented measures to inform the public about the health impact of electromagnetic fields and the measures taken in this context, by setting up a telephone helpline: + 352 478-5673.

Luxembourg has also promoted the development of new technologies in the sphere of electromagnetic fields by making frequencies available.

9.11 The Netherlands

a- The protection framework in Member States

The Netherlands has implemented measures to protect the public from exposure to electromagnetic fields. Directive 1999/5/EC of the European Parliament and of the Council of 9 March 1999 on radio equipment and telecommunications terminal equipment and the mutual recognition of their conformity cites various essential requirements applicable to all equipment. One of these essential requirements is health protection. In addition, where specific product requirements are lacking, Article 18(c) of the *Warenwet* (Food and Commodities Act, so-called general product safety requirements) specifies that products intended for the private sector must not pose any risk to human safety or health. Reference to the EU Council Recommendation is to be introduced into the Netherlands' environmental legislation. An appropriate option for this will be the *Besluit Voorzieningen en Installaties Milieubeheer* (Environmental Management Equipment and Installations Decree). This will probably be in 2003.
There are no regional variations within the Netherlands regarding the protection of the public from EMFs.

b- The scope of the implemented measures

The measures implemented address exposure levels from a specific frequency range. These future measures are for both radio- and television-antennas and GSM-base-stations.
The cited future measure will probably address exposure levels from environmental exposure, also called “electro-smog”.
The Netherlands monitors that the levels of exposure to EMFs comply with the implemented measures. Local authorities monitor exposure from environmental factors such as transmission masts and GSM base stations. The *Rijksdienst voor Radiocommunicatie* (Radiocommunications Agency) offers the local authorities technical backing. Monitoring at the general policy level in the Netherlands is seen as a responsibility accruing to the Ministries involved, among them the Ministry of Transport, Public Works and Water Management. As far as the technicalities regarding day-to-day application are concerned, the recently-created *Nationaal Antennebureau* (National Antenna Bureau, NAB) established in 2001, has a supervisory responsibility. Headquartered in the city of Groningen, the NAB can conveniently be accessed through its website, located at http://www.antennebureau.nl and includes a full English-language service. The *Keuringsdienst van Waren* (Inspectorate for Health Protection and Veterinary Public Health) monitors product safety and exposure of consumers.

c- Additional measures

The Netherlands promotes research relevant to the effects of electromagnetic fields on human health. The competent authorities have recently commissioned a research

institute to carry out further research into non-specific health complaints of people claiming to be hypersensitive to electromagnetic fields. The Netherlands Government is also considering the possibility of launching research programmes on the subject of electromagnetic fields.
The Netherlands implements measures to inform the public on the health impact of electromagnetic fields and the measures taken to address them. This is done by various authorities and the National Antenna Bureau. Public information can be found on the internet and in brochures.
The Netherlands is also promoting the development of new technology in the field of electromagnetic fields such as Bluetooth, UMTS pr GPRS licenses, etc. For example, the government sold UMTS licences in 2001

9.12 Portugal

Following the request to the Portuguese government by the Health and Consumer Protection Directorate of the European Commission to fill in a questionnaire on the legislative acts protecting the public against the health effects of exposure to non ionising radiation, adopted by the Member States in application of *Council Recommendation of 12 July 1999 on the limitation of exposure of the general public to electromagnetic fields (0 Hz to 300 GHz)*[28], the ministry of Health reported that Portugal had not implemented measures to protect the public from exposure to electromagnetic fields. The reason for the negative response is because the interdisciplinary nature of the subject makes it advisable that the measures to be implemented should be prepared by a group of technical experts designated for the purpose, which has so far not been done. As a draft joint order has already been drawn up by the Ministry of Social Infrastructure and the Ministry of Health to this end, it is anticipated that a start will be made shortly on implementation in the area in question.

9.13 Spain

a- The protection framework in Member States

The Ministry of Health and Consumer Affairs and the Ministry of Science and Technology have produced a Royal Decree 1066/2001 of 28 September 2001 (Official State Gazette No 324 on Saturday, 29 September 2001) approving the Regulation setting out rules for the protection of installations emitting non-ionising radiation, restrictions on emissions on non-ionising radiation, and health protection measures against emissions of non-ionising radiation. This Royal Decree is designed to guarantee the safety of the public domain from the radioelectricity and ensure health protection against emissions from electromagnetic waves in the spectrum of radiofrequencies. This latter decree supplements the General Law on Telecommunications 11/1998 of 24 April, the Royal Decree 1451/2000 of 28 July, the Royal Decree 1450/2000 of 28 July, the General Law of the Ministry of Health 14/1986 of 25 April, and the Technical Regulation on High Voltage Power Lines, approved by decree 3151/1968 of 28 November. The publication of this Royal Decree answers an enormous public demand for the health authorities to lay down health protection criteria, in particular concerning mobile telephony (antennae and mobile phones).

[28] OJ L199, 30/07/1999, p.0059-0070

The Royal Decree 1066/2001 faithfully transposes the contents of the Recommendation 1999/519/EC into Spanish law. However, it also provides:

- special protection for "*espacios sensibles*" (sensitive areas) by requiring that "levels of emissions into sensitive areas such as schools, health care centres, hospitals or public parks shall be kept as low as possible" (Article 8.7 d). In addition, wherever possible, there should be no emission footprints impinging on buildings, terraces or attics.
- compulsory sign-posting and fencing for installations emitting non-ionising radiation (Article 8.2.).

This decree, including its preventive measures, is based on a report[29] by a working group set up and co-ordinated by the Ministry of Health and Consumer Affairs. This group is composed of experts in various disciplines relating to the evaluation and monitoring of risks caused by electromagnetic fields. Its aim is to prevent problems of sensitisation of people who could be affected by electromagnetic fields from such installations as a result of conditions relating to growth, development, pregnancy, chronic illness or use of implants or prostheses.

There are regional variations in Spain regarding the protection of the public from electromagnetic fields. Indeed, there are Autonomous Communities which have promulgated legislation on this subject, imposing more stringent limits than those established in the Royal Decree. Measures which have been introduced for operators and holders of licences to submit plans for putting up signs and, if need be, fencing to restrict access to unauthorised people to zones in which the limits laid down in Annex II of the Royal Decree could be exceeded.

b- Scope of implemented measures

The Royal Decree makes reference exclusively to radiofrequencies and not the whole spectrum of non-ionising radiation.

Exposure to sources with multiple frequencies is dealt with in the Royal Decree.

Spain has decreed that an inspection and evaluation of radioelectrical installations be undertaken. Spanish legislation provides for three types of checks:

- prior authorisation is required before a new installation emitting non-ionising radiation is set up, so ensuring that emission limits are complied with
- existing installations have been given a deadline (28 June 2002) for sending the authorities certificates, signed by specialists, attesting that the limits set are not exceeded
- inspection measures: there is an annual inspection of the installations commissioned during the previous year. In addition, inspections are made of installations approaching the emission limits and of those near sensitive areas. This is separate from the general programme of scheduled inspections.

Information on emissions supplied by the Ministry of Science and Technology and the Ministry of Health and Consumer Affairs in co-ordination with the Autonomous Communities will be used to carry out a health assessment of the risks in any cases where it is necessary.

c-Additional measures

[29] "Electromagnetic fields and health" (http//:www.msc.es/salud/ambienta/home.htm)

The Spanish Government promotes research into the effects of electromagnetic fields on human health. In the Royal Decree, Article 10 states that, based on the information available, the Ministry of Health and Consumer Affairs shall evaluate the potential health risks of exposure of the public in general to radioelectrical emissions, taking account of the number of persons exposed, their epidemiological characteristics, their age, the parts of the body exposed, the exposure times and the health conditions of the subjects.
The Ministry of Health and Consumer Affairs is putting a great deal of effort into informing the public about the impact on human health of electromagnetic fields. It receives many requests for information from syndicates of property owners, associations, courts and a wide range of public and private authorities, who would like to see the Ministry of Health and Consumer Affairs adopting legislation on the technical and health criteria concerning exposure to electromagnetic fields. The Ministry of Health and Consumer Affairs is currently in the process of drafting an information brochure on the risks to human health of electromagnetic fields.

9.14 Sweden

a. The protection framework in Member States

Sweden has issued a number of binding laws and regulations to protect the public from exposure to electromagnetic fields:

- the Radiation Protection Act (1988:220)
- the Radiation Protection Ordinance (1988:293)
- the Regulations of the Swedish Radiation Protection Authority (SSI) concerning drying with the use of microwaves (SSI FS 1995:3)
- the Environmental Code (1998 :808) which contains among other things a general precautionary principle including both ionising and non-ionising radiation
- the Regulation on Monitoring in accordance with the Environmental Code (1998 :900)
- the Regulation on Activities Dangerous for the Environment and on Health Protection (1998 :899)

Already before the Environmental Code was adopted, Sweden had issued a recommendation involving application of a precautionary principle for low frequency (in the main power frequency) electromagnetic fields (text published by the National Occupational Safety and Health Administration, the National Housing, Building and Planning Board, the National Electrical Safety Board, the National Board of Health and Welfare and the Swedish Radiation Protection Authority). The frequency range is not specified.
The laws and regulations and the Recommendation mentioned are applicable throughout the whole of Sweden.
The Swedish Radiation Protection Authority is about to publish general guidelines based on the limits laid down in the Council Recommendation and in the guidelines of the International Commission on Non-Ionising Radiation Protection (ICNIRP). General guidelines are not legally binding.
Sweden considers that, based on the current state of knowledge, there is no need for other safety criteria or safety levels for the moment.

b- Scope of implemented measures

The Regulations of the Swedish Radiation Protection Authority concerning drying with the use of microwaves (SSI FS 1995:3) apply to electromagnetic radiation in the frequency range 10 to 150 000 MHz.
Sweden considers that the provisions are worded in such a way that, in practice, they apply to a source's immediate environment and thus address the question of environmental exposure.
Sweden has implemented measures to monitor/ensure that the levels of exposure to electromagnetic fields comply with the implemented measures. Thus, in accordance with Article 15 of the Radiation Protection Ordinance (1998 :293), compliance with the Swedish Radiation Protection Authority's Regulations concerning drying with the use of microwaves (SSI FS 1995 :3) forms part of that authority's ordinary monitoring activity.

Monitoring of the exposure of the public to electromagnetic fields in general, including mobile telephony, takes place within the context of environmental monitoring. If the limit values applicable pursuant to the Council Recommendation are exceeded, the Swedish Radiation Protection Authority may, pursuant to the Radiation Protection Act, issue orders obliging the transgressor to comply with the limits. This eventuality has, however, not yet arisen.
Sweden has promoted research into the impact on human health of electromagnetic fields on several occasions. In December 2000 the National Research Council on Working Life presented a report on hypersensitivity to electricity and the health risks of electromagnetic fields (National Research Council on Working Life, December 2000, ISBN 91-88531-13-9). In addition, in April 2001 the Swedish Radiation Protection Authority published a report on exposure to the radiation produced by radio frequencies and mobile telephony.
Research into electromagnetic fields and human health is financed directly by the research authorities concerned in Sweden and, in certain cases, from various authorities' budgets.
Sweden has implemented measures to inform the public about the health impact of electromagnetic fields and the measures taken to address this issue. The consultation group set up by the competent authorities produced a report for the general public in 2000 covering the latest findings in this field, entitled "Magnetic fields and possible risks to health". In addition, the Swedish Radiation Protection Authority has published the following information sheets:

- Radiation produced by mobile telephony base stations
- Recommendations concerning base station antennae
- Specific energy absorption rates of mobile telephones

Other information sheets are published regularly. This documentation can also be found on the homepage of the Swedish Radiation Protection Authority (http://www.ssi.se).
Sweden promotes general research and technological development (e.g. through the Swedish National Board for Industrial and Technical Development -NUTEK) and the universities, but also through the Sixth Community Framework Research Programme).
In the telecommunications field, technological development is essentially a matter for industry. However, Sweden can be said to promote the development of better telecommunications services insofar as it participates in standardisation and

harmonisation activities and, as regards radio communications, facilitates the development of new services by granting, wherever possible, exemptions from the obligatory licensing scheme (e.g. wireless LANs and Bluetooth) or by issuing licences where necessary (e.g. UMTS). As regards GPRS, no new licence is necessary beyond the GSM.

9.15 United Kingdom

a- The protection Framework in Member States

The UK has implemented several legally binding measures within the Health and Safety at Work Act etc 1974 in order to protect the public from exposure to electromagnetic fields. Section 3 of the Health and Safety at Work Act etc 1974 places general duties on employers to ensure so far as is reasonably practical that members of the public who are affected by the conduct of employer's undertaking are not thereby exposed to risk to their health and safety. In complying with this section of the Act, employers are expected to take account of the National Radiological Protection Board (NRPB)[30] guidelines. The NRPB has the statutory responsibility for advising on matters of radiological and EMF safety[31].
UK implementation of the limits set down in Council Recommendation in the aforementioned measures is still under consideration. There is still a debate on the practical differences between the UK's NRPB investigation level or the EU Recommendation for extremely low frequency fields (ELFs). The ICNIRP levels have been implemented by the Government for mobile phone frequencies. The mobile phone operators have voluntarily agreed to comply following the Parliamentary Select Committee Report November 1999 and the IEGMP (Stewart) report May 2000[32].
Concerning additional safety parameters/levels to the levels of EMF exposure allowed, the UK has, for example, forbidden the use of mobile phones in hospital and air-crafts as their signals could interfere with the present equipment (question of electromagnetic compatibility).
There are no regional variations within the UK regarding protection of the public from EMFs.

b- The Scope of the Implemented Measures

[30] The National Radiological Protection Board are non-departmental public body of about 300 staff funded by the Department of Health. They were set up by statute in 1971 to advise government and others on radiation protection matters. EMFs have been part their remit since the mid 70s. they have research function to support their advisory capacity and are world renowned for their expertise.
[31] NRPB. Board Statement on Restrictions on Human Exposures to Static and Time Varying Electromagnetic Fields and Radiation. *Docs NRPB*, **4**(5), 1993.
NRPB. Board Statement: Advice on the 1998 ICNIRP Guidelines for Limiting Exposure to Time-Varying Electric, Magnetic and Electromagnetic Fields (up to 300 GHz). *Docs NRPB*, **10**(2), 5-59, 1999.
NRPB. Consultation Document on Guidelines for Restricting Exposure of the UK Public to Electromagnetic Fields. Working Party Report (2001).
[32] Sir William Stewart (Chairman) *Mobile Phones and Health*. A report from the Independent Expert Group on Mobile Phones, Chilton, IEGMP Secretariat (May 2000).

NRPB guidelines apply across the whole spectrum from 0 Hz to 300 Hz and apply to all sources of exposure[33].
The guidelines do not address exposure levels from environmental exposure, also called "electro-smog". Exposure levels from these sources are well below those at which effects are known to occur. Employers have a duty to co-operate with each other to ensure that risks to employees other than their own and the public are controlled (Management of Health & Safety at Work Regulations 1999) and that any additivity is taken into account.
The UK monitors and controls that the levels of exposure to EMFs comply with the implemented measures.

- During sample inspections HSE Inspectors would consider employers' risk assessments, and refer them for specialist consideration if necessary. Employers or duty holders should routinely measure EMFs arising form work activities as part of their risk assessments. Failure to consider EMF exposures in risk assessments could lead to enforcement action under Health & Safety legislation.
- NRPB has carried out many measurements of exposures to electromagnetic fields and provides hazard measurements. Advice is given in relation to exposure guidelines. For example, NRPB-R321 on "Exposure to Radio Waves near Mobile Phone base Stations" (S M Mann *et al.*) had provided a summary of measurements made near mobile phone base stations.
- The Radiocommunications Agency has begun an audit of mobile phone base stations (masts) to assess emissions. Masts near school buildings will be the first to be audited. The results are being published on the internet.
- For ELF, *ad hoc* measurements of power supply equipment have shown that these are all below the present national guidelines.

c- Additional Measures

The UK is promoting research relevant to electromagnetic fields on human health via several programmes. NRPB has an extensive programme of research related to concerns about exposures to electromagnetic fields. The programme covers dosimetry, experimental biology and support for epidemiological studies. The work covers exposures to both power frequencies and radiofrequencies. A new research programme into possible health effects of mobile phone technologies has been initiated with funding from Government and industry. The first project under this programme will start early this year. Government sponsored EMF health research includes that funded by the Department of Health under its public health radiation protection programme, the Health and Safety Executive for the health and safety of workers. The Department of Trade and Industry funds specific research both in radiofrequency region and in the power frequencies. The UK Government is also contributing to the funding to the WHO EMF project. The UK Electricity Industry also sponsors research separately.
The UK has implemented measures to inform the public on the health impact of the electromagnetic fields and the measures taken to address them. NRPB has an active policy of providing information and advice to the public. Much of the advice is gives

[33] NRPB-R301 *Occupational Exposure to Electromagnetic Fields : Practical Application of NRPB Guidance* provides advice on interpretation of the guidelines.

is related to concerns about EMFs. It has issues At-a-Glance information leaflets; it answers about 10 000 telephone requests for advice annually on this issue; it has appointed a Public Health Physician with a remit which includes developing approaches to giving advice to the public; it has set up a web site with extensive information on EMF issues (http://www.nrpb.org.uk), this is being further developed at present to give an improved interface with the public; it is in the process of setting up an Advisory Group on Radiation Risk and Society that will also examine ways to deliver information to the public. The Department of Health has published leaflets for the public on "Mobile phones and Health" and on "Mobile phone Base Stations and Health".
The UK is also promoting the development of new technology in the field by auctioning licences for third generation (3G) services in 2000. UK had supported research into 3G mobiles and continues to do so. The UK has initiated SAR measurements of 3G terminals and will be supporting biological research into emerging technology as for example with UMTS.

10. Actions undertaken at Accession Country level

10.1 Estonia

a- The protection framework in candidate countries

Estonia has taken the following legally binding measures to protect public against exposure to electromagnetic fields:

- Regulation of the Government of Estonia on occupational health and safety limits on physical hazards and procedures for measuring them (86/188/EEC) was adopted on 22 January 2002 and will enter into force on 1st June 2002. The paragraphs 10-15 of the Regulation enact limits of the electromagnetic fields in the working environment. The National Labour Inspectorate is responsible for the implementation of this Regulation.
- The Telecommunications Act was adopted on 9 February 2000 and entered into force on 1st August 2000. The Act provides health protection requirements and limits of electromagnetic fields for the telecommunication installations and nets. The health protection requirements for a radio installation are specified in the Regulation of the Ministry of Social Affairs No 48 of 8 August 2000.
- The Ministry of Social Affairs of Estonia has drafted a regulation for levels of electromagnetic levels in the environment and procedures for measuring them. The Regulation will harmonise the Council Recommendation 1999/51/EC of 12 July 1999. According to the draft the Regulation will enter into force on 1st May 2002 and will annul old regulations and standards (Decree No 2971-84 of 28 February 1984 and Decree No 2963-84 of 19 January 1984) regarding electromagnetic radiation. The Health Protection Inspectorate will implement the new Regulation.

All requirements enacted in above-mentioned legal acts are compulsory.
In Estonia there are no regional variations regarding to the protection of public against electromagnetic fields.
No additional safety parameters have been implemented.

b- Scope of the implemented measures

The implemented measures cover exposure levels from 0 to 300 GHz.
The new regulation of the Minister of Social Affairs on electromagnetic levels in the environment and procedures for measuring them will also enact environmental exposure levels.
State supervision bodies for electromagnetic fields are Health Protection Inspectorate and National Labour Inspectorate.

c- Additional measures

Estonian Biomedical Techniques Centre research mobile phones' impact on human health.
According to the Public Health Act informing the public about the deterioration of living conditions and the dangers that this entails, one of the main priorities of the Health Protection Inspectorate is to raise public awareness on the effects of electromagnetic fields. Relevant information and materials are published through various media channels.
Estonia does not promote the development of new technologies in the above-mentioned field.

10.2 Latvia

a- Protection framework in candidate countries

Latvia has implemented a number of measures to protect the public against exposure to electromagnetic fields. The national standards are recommendations.

- LVS ("*Latvijas Valsts Standarts*" –Latvian Standards) ENV 50166 – 1: 1995 "Human exposure to electromagnetic fields. Low frequencies (0 Hz–10 kHz)"
- LVS ENV 50166 – 2: 1995 "Human exposure to electromagnetic fields. High frequencies (10 kHz–300 GHz)", registration no. 3309
- Law on Protected Belts adopted on 05.02.1997, which determines protection zones.

Latvia is implementing the limits set down in the Council Recommendation 1999/519/EC for exposure to electromagnetic fields.
The Latvian government does not have any safety criteria or levels in addition to the authorised levels of exposure to electromagnetic fields.

b- Scope of the implemented measures

The measures implemented to protect the public against exposure to electromagnetic fields in Latvia cover exposure levels ranging from 0 to 300 GHz.
The above-mentioned measures do not address the limits for background exposure, also known as "electro-smog".
Latvia measures the levels of exposure to electromagnetic fields of mobile phone base stations when commissioning them, to ensure confidence in public health. Measurements are arranged to respond to complaints received from the population as well.

c- Additional measures

Latvia promotes research into the impact of electromagnetic fields on human health. This research is carried out by experts from the Institute for Working Conditions and Environmental Quality at the Medical Academy (Riga Stradins University) and the centre for biomedical and ecological research at the Latvian Institute of Physics [34].
Latvia has implemented measures to raise public awareness of the health impact of electromagnetic fields and of the measures taken to address them. These include the following publication:

Matisāne: *Vai mobilie telefoni var nodarìt launu músu veselìbai?* (Can mobile phones damage our health?) Doctus, 2000, No 1, pp. 35–37.

Latvia is considering the possibility of promoting the development of new technologies such as Bluetooth and UMTS/GPRS licences.

10.3 Malta

a – The protection framework in candidate counties

Malta has implemented a number of measures to protect the public against exposure to electromagnetic fields. These are included in a report entitled "Report on the Recommendations on limiting the exposure of the general public to electric, magnetic and electromagnetic fields for frequencies between 0 Hz and 300 GHz" issued by the Ministries of Health, Transport and Communications and Social Policy.
There is no law dealing specifically with these measures. They are usually administrative in nature and are currently being administered by the Wireless Telegraphy Department in consultation with the Public Health Department.
The recommendations made in the above-mentioned report are based on those of the International Commission on Non-Ionising Radiation Protection (ICNIRP), applying to the general public and to workers exposed to such radiation in the workplace. To date, the Government believes that the ICNIRP recommendations are satisfactory. Malta has not, therefore, applied any further safety requirements regarding exposure to electromagnetic fields.
There are no regional variations in Malta regarding the protection of the public from electromagnetic fields.

[34] K. Krūmiņš, D. Sprūdža. M. Baķe and I. Lūse – Les champs électromagnétiques et leur influence sur la santé de l`homme, Académie médicale. Conférence scientifique en médecine, 25.02.2000, p.98.
L. Matisāne, M. Avota, I. Lūse and B. Aulika – Le champ électromagnétique comme un facteur nuisible professionnel des gens travaillant en médecine, Académie médicale. Conférence scientifique en médecine, 25.02.2000, p.101.
N. Gromiko, J. Vandans, Dz. Tinte and A. Romancuks – Forschung bei einfachen und komplizierten Benehmensreaktionen bei der Einwirkung des Elektrostatischen Felds (ESF) verschiedener Stärke-Fachverbund für Strahlenschutz e V. Nichtionisierende Strachlung, Köln , 27.09.-01.10.1999, Band I, S.181-184.
A. Romancuks and N. Gromiko – Forschung von einfachen und komplizierten Bechmensreaktionen bei der Einwirkung des Einwirkung des elektostatischen Feldes (ESF) verschiedenet Stärke.- 28.09.1999.
N. Gromiko, A. Romancuks and K.Pudovskis – L'Exposition de l' organisme au champ électrique technogène, IIème congrès des savants lettons, 14.08. –15.08.2001, Riga.

b- Scope of the implemented measures

The measures taken address levels of exposure covering a wide range of frequencies, namely 0Hz to 300 GHz.
The mandate mentioned in the "Report on the recommendations on limiting the exposure of the general public to electric, magnetic and electromagnetic fields for frequencies between 0 Hz and 300 GHz" included background levels from environmental exposure, also known as "electro-smog".
Malta uses the implemented measures to monitor compliance with the maximum levels of exposure to electomagnetic fields. The measurement and calculation methods are based on recommendations from international organisations such as Health Canada (1999), IEEE (1991), Industry Canada (1994), OET (1997) a,b,c, DIN VDE (1995), and NCRP (1993). The Wireless Telegraphy Department monitors the above-mentioned levels.

c- Additional measures

Malta may consider the requirement for local research into the impact of electromagnetic fields on human health. The resources (human and otherwise) available to Malta will determine the extent of local research, if any, in this field.
The Maltese government is considering implementing measures to inform the public about the health impact of electromagnetic fields and the measures taking in this context. The above-mentioned report is itself in the public domain. The issue of the impact electromagnetic radiation has on public health has been of great media interest in Malta. With the exception of this report, however, no other awareness raising measures have been taken.
Malta also intends to actively encourage and stimulate the local introduction and development of various wireless technologies such as Bluetooth GPRS and UMTS, amongst others. The Malta Communications Authority is assessing ways of promoting investment in services based on these technologies. It is also building the requisite capacity to ensure that the amounts of non-ionising electromagnetic radiation generated through the use of such technologies comply with internationally recognised standards that serve to limit public exposure to radio frequencies.

10.4 Poland

a- The protection framework in Accession countries

Poland has implemented legally binding measures to protect the public from exposure to electromagnetic fields. At present, protection of the public against electromagnetic fields is governed by the Law of 27.07.2001 implementing the Protection of the Environment Law, the Act on waste and the Law amending some laws (DZ.U. - Official Polish Journal- of 18 September 2001) and by the Protection of the Environment Law of 27.04.2001 (DZ.U. of 20 June 2001).
The Polish Orders apply basic restrictions similar to those in the Council Recommendation 1999/519/EC. Allowable field values in Poland are generally lower than in the EU; this is especially true for microwave fields (300 – 300 000 MHz) and for the electric component, with the exception of 50 Hz frequency in non-residential areas, for which the EU's allowable values are lower. In the case of the magnetic components for 1 – 100 kHz and 0.365 – 10 MHz fields, allowable intensity is higher

in Poland than in EU, for 50 Hz frequency it is identical, while for 0.1 – 0.365 MHz frequencies and static fields the values of Polish standards are lower than EU's ones.
Poland has implemented safety criteria over and above the authorised levels of exposure to electromagnetic fields. In residential areas and areas containing, in particular, hospitals, crèches, kindergartens and boarding schools, the electrical component of a 50 Hz field may not exceed 1 kV/m (elsewhere, the limit is 10 kV/m).
There are no regional variations within Poland regarding the protection framework of the public from electromagnetic fields.

b- Scope of the implemented measures

The measures implemented apply to exposure levels from a range of specific frequencies which includes continuous fields; fields of 50 Hz; from 0.001 to 0.1 MHz; from more than 0.1 to 10 MHz; and from more than 10 to 300 MHz.
The measures implemented by the Polish Government do not address exposure levels from environmental exposure, also called "electro-smog", as the Government considers there is not sufficient evidence of the possibility of a biological impact from these fields.
Poland checks that the levels of exposure to electromagnetic fields comply with the implemented measures. Monitoring is carried out when the source of the electromagnetic field is first switched on for use and then whenever changes occur during use that are likely to alter the intensity of the fields emitted.

c- Additional measures

Poland promotes research relevant to the impact of electromagnetic fields on human health. However, research programmes in this field are treated like any other research project and do not enjoy any priority.
The Polish Government has implemented measures to inform the public about the health impact of electromagnetic fields and the measures taken to address this issue. The Law of 9.11.2000 (which entered into force on 1 December 2001), relating to access to information concerning the environment, protection of the environment and evaluation of impacts on the environment (DZ.U. 2000/109, point 1157) requires that the public be informed about all projects likely to have an impact on the environment (these also include projects involving the emission of electromagnetic fields). Poland also organises conferences, to which journalists are invited, and finances the publication of brochures concerning protection against electromagnetic fields.
Poland is promoting the development of new technologies in the sphere of electromagnetic fields. For example, it has been decided to launch a call for tenders for the acquisition of UMTS licences.

10.5 Romania

a- The protection framework in candidate countries

Romania has implemented a number of measures to protect the public against exposure to electromagnetic fields. The Order of the Ministry of Health and Family no. 1957/1995 –"Standards on Occupational Medicine" regulates the occupational exposure to electromagnetic fields. The Regulation establishes maximum allowed values of intensity (RMS) for static electric and magnetic fields (low frequency and

50-60 Hz). It also contains maximum allowed values of intensity and power density for high frequency electromagnetic fields, ranges from 0.1 MHz to 300 GHz (radio and microwave radiation). The national authority dealing with energy fields, (National Regulatory Authority for Energy -ANRE), has laid down a set of General Occupational Health and Safety Regulations (NGPM), which were enacted by the Ministry of Labour and Social Solidarity (MMSS) in 1996. These regulations set out the maximum authorised limit values for exposure to electromagnetic fields and a number of measures aimed at reducing them. The General Occupational Health and Safety Regulations are legally binding and were based on specific standards applying to various fields of activity:

- "specific occupational health and safety standards for the transportation and distribution of electrical energy" – drawn up by the National Network for Electric Energy (RENEL) and the Institute for Scientific Research on Labour Security (ICSPM), approved by the order of the Ministry of Labour and Social Solidarity (MMSS), No 655/10.09.97;
- complex measures established according to technical requirements for setting protection and safety zones around power plants, approved by ANRE Decision No 61/1999, including, for example:
    - PE 101A/1985 (reissued in 1993) – Instructions for setting regulated safety distances around electrical installations with voltages in excess of 1 kV, in relation to other structures;
    - PE 104/1993 – Set of standards for the construction of overhead powerlines with voltages in excess of 1000V;
    - PE 107/1995 – Set of standards for the planning and implementation of electric cable networks;
    - PE 123/1978 – Set of standards for the systematic development, location, construction and maintenance of electrical networks passing through forests and agricultural land;
    - STAS 932/1979 – Effects of high-voltage electrical installations on telecommunications networks.

For the above-mentioned measures, only the network and electrical base station protection standards proposed in the Council Recommendation 1999/519/EC address the protection of the general public. The Ministry of Health and Family (MSF) deals with Recommendation 99/519/EC, which is currently being implemented.

There is also a regulation on occupational safety and hygiene, approved by Ministry of Public Works, Transport and Housing (MLPTL) Order 9/N/1993. MLPTL has implemented a number of limits as required by the Council Recommendation 1999/519/EC, applying only to the frequency range 0-30MHz.

The Ministry of Industry and Resources (MIR) has not taken any measures yet for the following reasons:

- no national provisions regarding this matter have been adopted. The MIR believes that the following institutions must be involved in the preparation of these: MSF, the Ministry of Waters and Environment Protection (MAPM), ANPC, the Ministry of Industry and Resources (MIR) and the Romanian Association for Electromagnetic Compatibility (ACER);
- the ENV 50166 standard has been translated into Romanian, but will not be adopted until it has been adopted at European level;
- technical resources for measurement and monitoring are insufficient. ICMET Craiova is currently involved in a joint venture with Germany, setting up a calibration laboratory for electromagnetic field measurement equipment up to

1 GHz and power frequency magnetic field within 100 –1000 μT. This equipment must be extended in the range of the electromagnetic field for frequencies within 0.9 – 1.8 GHz with a view to covering the second band for mobile telephony as well as in the range of low frequency electric field, namely 50 Hz. The field calibration laboratory of ICMET will assure traceability of the German standard, European standards respectively.

ANRE and MLPTL do not believe sufficient data to be available in Romania for laying down any limits or coefficients in addition to the authorised levels of exposure to electromagnetic fields.

There are no regional variations in Romania regarding the protection of the public against the effects of electromagnetic fields.

b- Scope of the implemented measures

The measures implemented by ANRE apply to 50Hz electricity networks and generating stations.

The above-mentioned ANRE standards partially deal with the effects that energy installations have on other types of installation emitting non-ionising radiation. Background exposure levels are also addressed: multiple-frequency emissions from TV and computer screens are subject to specific monitoring by the MLPTL.

ANRE periodically measures electric and magnetic field strength to check that the value limits for electricity networks and electricity generating stations are complied with. This measurement is carried out using the method outlined in international standard CII/833/1985. The Ministry of Health and Family (MSF) is working towards obtaining the necessary authorisation to be able to monitor:

- Telecommunications (transmitters for radio, TV, mobile phone and radar, etc.);
- High-voltage power networks;
- Base stations.

The Ministry will use departmental calculation methods, in line with ISO methods. On demand, the Inspectorate-General for Communications will also measure electromagnetic fields to check that they comply with the Occupational Health and Safety standards.

c- Additional measures

Romania supports research into the effects of electromagnetic fields on human health. For example, in its plan for 2001, CN Transelectrica SA included research into the environmental impact of electromagnetic fields, addressing the Council Recommendation 1999/519/EC. A research project is in progress under the European UNION's COST programme “Potential Health Implications from Mobile Communication Systems” in which relevant Romanian research institutes and universities are involved. For the above programme, a consortium was set up consisting of INSCC Bucharest, ICMET Craiova, Medicine Univeristy Bucharest, Medicine University Craiova, “Politechnica” University Bucharest and others. This consortium will take the necessary steps for the Memorandum of Understanding to be signed by Romania within the first semester of 2002. In order to continue the research programmes in this complex field, Romania will spend 40, 000 € for the COST 281 programme.

Romania has implemented a number of measures to raise public awareness of the health effects of electromagnetic fields and of the measures taken to prevent them. Relevant information is available to the public via the ACER Bulletin and ACER website (http://www.acero.ro), GSM Magazine, mobile telephony company websites and the press (which features related international press reports). ANRE believes that more precise information will be available following the publication of the conclusions of in-depth studies into the health impact of electromagnetic fields.
Romania supports the development of new technologies relating to electromagnetic fields. The Ministry of Communication and Information Technology (MCTI) reports that Bluetooth technology has been implemented. In addition:

- the UMTS licence is currently being implemented;
- the GPRS licence is being prepared.

10.6 Slovak Republic

a- The protection framework in candidate countries

The Slovak Republic has implemented measures to protect the public from exposure to electromagnetic fields. These include legally binding acts:

- Act of the National Council of the Slovak Republic No 272/1994 (Coll.) on the protection of public health;
- Decree of the Ministry of Health of the Slovak Republic No 123/1993 (Coll.) on the protection of health from the harmful effects of electromagnetic fields.

An amendment to the aforementioned decree is being drawn up. The reference levels laid down in the EU Council Recommendation 1999/519/EC will be applied — the highest possible authorised levels.
There are no regional variations in the Slovak Republic regarding the protection of the public from electromagnetic fields and there are no plans to introduce them.

b- Scope of measures implemented

The measures implemented relate to levels of exposure to electromagnetic fields within the frequency ranges from 60 kHz to 3 MHz, from 3 MHz to 30 MHz, from 30 MHz to 300 MHz and above 300 MHz. Other measures are being implemented for the low frequencies from 0 Hz to 10 kHz and the high frequencies from 10 kHz to 300 GHz, for which a more detailed classification will be drawn up. Hence, the entire range of frequencies from 0 Hz to 300 GHz will be covered.
The Slovak Republic monitors whether the levels of exposure to magnetic fields comply with the measures implemented. Measures are being implemented as regards the strength or power density of the electromagnetic field, while exposure levels of specialist workers and the public are determined in the vicinity of almost all the sources of radiation in the frequency ranges from 50 to 1000 Hz, from 2 to 300 kHz, from 0,5 MHz to 6 GHz, and from 80 MHz to 40 GHz.

c- Additional measures

The Slovak Republic has promoted research into the effects of electromagnetic fields on human health by taking part in the COST 244 programme from 1992 to 1997.

The Slovak Republic has implemented measures to inform the public about the health impact of electromagnetic fields and the measures adopted in this area. Information is provided to the general public via the press, radio and television.
The Slovak Republic is investigating the possibility of promoting the development of new technologies in the area of electromagnetic fields.

10.7 Slovenia

a- The protection framework in candidate countries

Slovenia has implemented measures to protect the public from exposure to electromagnetic fields. At the end of 1996, two legislative instruments came into force: the decree on electromagnetic radiation in the natural environment and in areas of habitation (Official Journal of the Republic of Slovenia No 70/96) (hereinafter referred to as "decree") and the regulation on the methods of measuring and monitoring sources of electromagnetic radiation and the conditions in which they are applied (Official Journal of the Republic of Slovenia No 70/96) (hereinafter referred to as "regulation"), based on recognised international directives (International Commission on Non-Ionising Radiation Protection — ICNIRP) and on European pre-standards ENV 50166. Slovenia has taken account of the limits established by the Council recommendation 1999/519/EC. However, the decree sets threshold values for the size of electromagnetic fields in the environment which are lower than those set by this Council recommendation; an exception is the frequency range >0,01-1 MHz for which the threshold value for the effective strength of the electrical field is higher (according to the Council recommendation 1999/519/EC 3-150 kHz and 0,15-1 MHz is 87V/m; according to the regulation >0,01=<0,68 MHz is 126 V/m, >0,68-<10 MHz is 86/f (MHz) V/m).
In view of the longstanding opposition of local organisations in Slovenia to new sources of electromagnetic radiation, Slovenia also applies safety criteria or levels which supplement the authorised levels of exposure to electromagnetic fields. The decree also includes reasonable preventive measures. Two zones have been created, which reflect the levels of protection required against radiation (requirements set out in Article 3 of the regulation). Zone I calls for a higher level of protection and covers, for example, hospitals, buildings in the tourist sector, specific places of habitation and recreation, sports fields and public parks, etc. Zone II includes all the zones which do not come within Zone I, such as areas without private dwellings, used either for industrial, professional or other purposes, or relating to transport, storage or services; and agricultural or forested areas, etc. It is for the competent local authorities to assess the purpose of certain territorial areas. Slovenia is one of the first countries in the world to have introduced more stringent preventive measures and supplementary criteria, which are included in this legislation. Particularly vulnerable areas are subject to laws which are ten times more stringent.

b- Scope of measures implemented

In Slovenia, the law includes measures to reduce environmental exposure also called “electro-smog”.
Levels of exposure to electromagnetic fields are subject to checks. Initial measures were introduced after new and reconstituted sources of radiation were used for the

first time. When sources of radiation are functioning or being used, periodic calculations are made

- once every three years for high-frequency radiation and
- once every five years for low-frequency radiation.

Checks on the pollution from sources are carried out by the inspectorate responsible for environmental protection.

c- Additional measures

Slovenia encourages research into the effects of electromagnetic fields on human health through the following scientific research projects:

- Monitoring of the effects on people who come into contact with sources of non-ionising radiation;
- Measures and mechanisms relating to the biological effects of electromagnetic radiation;
- NF influence of magnetic fields on healing benign hypertrophied prostate;
- Numerical methods in bioelectromagnetics;
- Non-ionising radiation and organisms.

Slovenia has implemented measures to inform the public about the health impact of electromagnetic fields and the measures adopted in this field. The public has access to publications such as:

- Electromagnetic radiation and radar: how can they coexist?
- Electromagnetic radiation and health — mobile phones and base stations.
- The effect of electromagnetic radiation on the biological system.

Various specialist articles have also been published on electromagnetic radiation and its effects on human health, while international seminars have also been organised on the same subject.
Slovenia encourages the development of new technologies based on Bluetooth technology, and of UMTS and GPRS licences, while observing the provisions of the decree.

10.8 Czech Republic

a- The protection framework in Accession countries

The Czech Republic has implemented measures to protect the public from the effects of electromagnetic fields. It has adopted the Governmental Decree No 480/2000 (one of the governmental decrees relating to protection against non-ionising radiation), which came into force on 1 January 2001 and which lays down the health limits for public exposure to electric and magnetic fields. The decree is legally binding. It follows exactly the basis of the limit and reference values set out in the ICNIRP directive of 1998. The decree is enforced by the health offices set up by the Ministry of Public Health.
The Czech Republic has not applied additional safety parameters or levels to the authorised levels of exposure to electromagnetic fields.
There are no regional variations in the Czech Republic concerning the protection of the public from the effects of electromagnetic fields.

b- Scope of measures implemented

The Governmental Decree No 480/2000 clearly defines the levels of exposure for all frequency ranges from 0 Hz to 300 GHz on the basis of the density of movements produced in the body, the specific absorbed power and the density of flux from electromagnetic waves. These measures relate to levels of protection from the effects of environmental exposure. However, the term "electro-smog" or rather "electromagnetic smog" is not used in connection with Opinion No 480/2000. In this case, the following terms are used: "electromagnetic base levels", "strength of electromagnetic field", "magnetic induction", "density of radiant flux", "specific absorbed power", etc. Analysis is based on the opinion mentioned above. In view of the large number of sources, the opinion does not deal with the aforementioned cases individually.
The Czech Republic monitors whether the levels of exposure to magnetic fields comply with the measures implemented. The methodological directive concerning checks on the implementation of Governmental Decree No 480/2000 was drawn up by the chief medical officer on 16 January 2001. Where necessary, the levels of electromagnetic fields are monitored by the hygiene service within the Ministry of Public Health.

c- Additional measures

The Czech Republic plays an active part in international research into the effects of electromagnetic fields on human health. Currently, research into the modelling of absorbed power is under way at ČVUT FEL (Electronics Faculty of the Czech Technical University), in collaboration with university medical faculties.
The Czech Republic has introduced measures to inform the public about the health impact of electromagnetic fields and the measures taken to address them. The hygiene office for the city of Prague, in collaboration with the National Reference Laboratory (NRL) for non-ionising electromagnetic fields and for radiation, publish key information on the internet concerning the impact of electromagnetic fields on human health. The NRL has also organised several information seminars on the problems of electromagnetic fields for hygiene offices. The NRL provides information for the media, draws up reports and supplementary information for the Ministry of Public Health, and follows the specialist press (in the medical field) and the international press in particular. The Czech Republic regularly takes part in conferences on the impact of electromagnetic fields on human health. These conferences relate to research, scientific work and the conclusions reached by European and other international organisations which have been approved by the World Health Organisation (WHO). The development of new technologies in the field of telecommunications is taking place with the co-operation of both European and international specialists from organisations such as the ETSI and the IEEE. The Czech Republic has an obligation to ensure, among other things, that the equipment for which this technology is used meets the health requirements laid down. (A distinction should be made between *technical standards* — the technologies indicated above, such as Bluetooth, UMTS and GSM, which are subject to Governmental Decree No 480/2000 — and *user standards,* which are the responsibility of the server — GPRS networks, HSCSD transmission, etc.) The NRL supplies information on systems such as GSM, UMTS and Bluetooth, and places particular emphasis on the health limits mentioned above.

10.9 Republic of Lithuania

a- The protection framework in Accession countries

Lithuania has implemented a number of measures to protect the public against exposure to electromagnetic fields. For example:

- Lithuanian Hygiene Norm (HN) 80: 2000. "Electromagnetic fields in the workplaces and residence environment. Permissible levels and measurement requirements in the frequencies 10 kHz – 300 GHz" approved by Order of the Minister of Health of the Republic of Lithuania of June 27, 2000.
- Lithuanian Hygiene Norm (HN) 81: 1998. "Base transmitters of mobile cellular radio communication systems" approved by Order of the Minister of Health of the Republic of Lithuania of December 8, 2000.
- Lithuanian Hygiene Norm (HN) 104: 2000. "Protecting the public against electromagnetic fields emitted by overhead power lines" approved by the Order of the Minister of Health of the Republic of Lithuania of January 4, 2001.
- Technical Norm (TN) 01: 1998 "Display screens. Maximum authorised levels of electromagnetic field radiation" approved by the Order of the Ministry of Communication of the Republic of Lithuania of June 23, 1998, No. 257.
- Lithuanian Hygiene Norm (HN) 110: 2001 "Electromagnetic field of 50 Hz frequency in the work places. Permissible digital levels and measurement requirements" approved by the joint Order of the Minister of Health and the Minister of Social Security and Labour of the Republic of Lithuania of December 21, 2000, No. 660/174.

These standards are legally binding for any natural or legal person designing, installing, using or monitoring equipment which emits electromagnetic radiation.
The above-mentioned measures take account of the limits set by the Council Recommendation 1999/519/EC.
The hygienic classification of working environment factors approved by the Order of the Minister of Health of the Republic of Lithuania of December 31, 1998, No. 799 provides for normal, hazardous and very hazardous impact levels of electromagnetic fields applied for hygienic evaluation of working places (according to the Decision of the Government of the Republic of Lithuania "On working places hygienic evaluation" of October 27, 1998). The summarised indication of hazardous factors of working environment is ascertained according to the total value of actual harmfulness of all factors evaluated.
Lithuania does not have any safety criteria or levels in addition to the authorised levels for exposure to electromagnetic fields.

b- Scope of the implemented measures

The measures implemented apply to specific frequency ranges:

- HN 80: 2000 (10 kHz-300 GHz)
- HN 81: 1998 (450 MHz, 900 MHz, 1800 MHz)
- HN 104: 2000
- TN 01: 1998 (5 Hz-2 kHz, 2 kHz-400 kHz)
- HN 110: 2001 Draft (50 Hz)

Environmental exposure levels, also known as "electro-smog" are also taken into account. HN 80: 2000 (10 kHz-300 GHz) limits levels of exposure to electromagnetic fields in the home.
Lithuania ensures that electromagnetic fields do not exceed the levels of exposure authorised by the regulations. The measures are implemented by competent institutions via accredited laboratories. Results are compared with the limits set down in legislative acts HN 80: 2000, HN 81: 1998, HN 104: 2000 and TN 01: 1998. In the event of a breach of these limits, measures to establish the cause of the breach and rectify it will be taken immediately.

c- Additional measures

Lithuania promotes research into the impact of electromagnetic fields on human health. The National Environmental Health Action Plan, under development under Public Health and Environment Ministerial Orders No. 480/156 of 21/08/1998 and No. 376/255 of 13/08/1999, provides for the development of research into the impact of electromagnetic fields on health.
Lithuania is considering the possibility of implementing measures to raise public awareness of the health impact of electromagnetic fields and of the measures taken to address them. The National Environmental Health Action Plan aims to inform the public of the levels of electromagnetic radiation in Lithuania by organising public information campaigns through the school system.
Lithuania is promoting the development of new technology in the field. Under its Telecommunications Act (O.J. 1998, No. 56-1548), the Communications Regulation Service is responsible for granting licences to users of new communications technologies; and it is intended that it should co-ordinate its activities with those of the National Centre for Public Health.

11. Actions undertaken at the Swiss level

a- The protection framework in Switzerland

Switzerland has implemented a number of legally binding measures to protect the public against exposure to electromagnetic fields. According to the Law on the Protection of the Environment (LPE; RS 814.01, articles 1, 11 and 13), the non-ionizing radiation must be limited in such a way that it is not damaging for the environment or man, as long as this is technically and economically possible. This law was implemented with an Ordinance relating to the “Protection from Non-Ionizing Radiation” (ONIR) (implemented on 1rst February 2000).
There are no regional variations within Switzerland regarding protection of the public against electromagnetic fields.
Switzerland has not implemented the limits set down in the Council Recommendation although the limits for exposure to electromagnetic fields in the Swiss law are based on the guidelines from ICNIRP. However, Switzerland judges that although the science world is waiting for confirmations on the possible harmful effects of electromagnetic fields, measures taken from now on should include these in order to minimize risks. Article 1 of the LPE law states that “*Early precautionary measures shall be taken in order to limit impacts which could become harmful or a nuisance*”. This article does not require these harmful or unpleasant effects to be proven but only that there could be the possibility that they may become so. The limits set by ICNIRP

cover demonstrated harmful effects of electromagnetic fields and thus do not cover the requirements set by Article 1 of the law of the protection of the environment and man, as these need to cover the potential experimental effects of electromagnetic fields as well. Thus, Switzerland should be setting their own emission limits, which would fulfill the criteria set by the LPE law, but it has giving up trying as the data available was not sufficient enough yet. However, they have chosen the following concepts:

- The ICNIRP limit values will be adopted provisionally as exposure limit values. The limits are minimum requirements and must be adhered without exemption to at all places accessible to people. Experience shows that in today's environment, this is the case at practically all points accessible to the public.
- Should new data become available on the effects of weak non-ionizing radiation, the exposure limit values must be revised accordingly either within the framework of ICNIRP or by the issue of Swiss exposure limit values, as the case may be.
- In the meantime, the limited protection afforded by the current exposure limit values must be supplemented by effective precautionary measures. For this reason, the precautionary principle, that is the precautionary limitation of emissions under Articles 1 and 11 of the LPE, takes on very special significance in the present case.

The limits have been chosen in such a way that it is possible to respect them technically and economically. Switzerland understands though that it is not always possible to follow the law in all circumstances and dispensations are given out for example for old installations, large individual emitting bases such as for radiodiffusion and for linear sources such as power lines and railways.
While considering the emitting sources, the Ordinance only covers stationary installations, for example power lines and railways. Mobile phones, electrical apparatuses and domestic equipment also emit electromagnetic fields and Switzerland would like to limit their emissions. However, the Swiss government considers that it cannot set the limits individually as these apparatuses, contrary to stationary installations, are international commercial products. In 1993, the Federal Council had decided not to set norms specific to Switzerland so as not to hinder commerce. The technical directives should be set via the international technical normalization. These already exist for microwaves and screens and are in preparation for mobile phones.

b- Scope of the implemented measures

As reported in the previous part, the measures taken by Switzerland to limit exposure of the public to electromagnetic fields apply to all ranges covered by ICNIRP.

Switzerland limits exposure to electromagnetic fields address levels from environmental exposure, also called electro-smog, as the LPE law restricts emission from several apparatuses at one time.
The Ordinance makes it compulsory to collaborate in the monitoring of the levels of electromagnetic fields to assess whether the exposure complies with the implemented measures. SAEFL has set up a recommendation on the protocols to be used for controlling public exposure to electromagnetic fields. The monitoring can also be contracted out to licensed private companies.

12. Commission Report Conclusions

After this consultation exercise with the Member and Accession States, one can see that the various initiatives that have been, and will be, taking place at Community level have contributed to ensure a higher level of protection of the public from exposure to electromagnetic fields (EMFs). It must be remembered that although a Recommendation has a strong persuasive effect and is a very useful instrument imposing a certain degree of obligation on the Member States, it is not a source of law in the complete sense of this term. It is up to the Member States to implement the Recommendation guidelines regarding EMFs into national regulations, reporting back to the Commission about the progress in this regard. However, the general picture of the legislation on EMFs in the Member States is that most countries have some kind of protection framework, although these cannot be characterised as uniform.

Firstly, all countries use the ICNIRP guidelines and the Council Recommendation 1999/519/EC as the scientific basis for their recommended levels of exposure for frequencies of 0 Hz to 300 GHz. For France, in all the regulatory or information-related texts that have been already published or are being drafted, the limits chosen correspond to the basic restrictions and reference levels specified in the Recommendation of 12 July 1999. Nevertheless, several Member and Accession States have adopted stricter limits for public exposure to EMFs. For example, the Belgian government applies the precautionary principle whereby the power limit is set to one quarter of the one recommended by the WHO and ICNIRP and the limit of the electromagnetic field is set at one half of that recommended in the ICNIRP guidelines. Austrian limits for the frequency range for GSM-Networks are slightly higher than the limits set down in the ICNIRP guidelines and moreover some action groups suggest taking into account the precautionary principle. Switzerland uses the ICNIRP guidelines under normal conditions, but with stricter levels at “sensitive locations” and for mobile phone masts, only allowing 1% of the levels of emission recommended by ICNIRP. Luxembourg has also applied stricter limits for base stations for mobile phones than those laid down in the Council Recommendation 1999/519/EC. Slovenia has taken account of the limits established by the Council Recommendation. However, the Slovenian decree sets thresholds values for the size of electromagnetic fields in the environment which are lower than almost all those set by the aforementioned Recommendation. Greece applied stricter safety limits for the exposure of the general public to all land based antenna installations as they are set to 80% of the reference level values.

Secondly, most of the above-mentioned countries have legally binding measures to implement their framework for protecting the public against electromagnetic fields. However, not all Member and Accession countries have taken this step. This is the case for Denmark, Portugal, Romania and Malta. The reason for this in Portugal is because the interdisciplinary nature of the subject makes it advisable that the measures to be implemented should be prepared by a group of technical experts designated for the purpose, which so far has not been done.
Moreover, other countries are still in the process of implementing the guidelines set by the EC Recommendation such as Finland and Estonia.

On the other hand, most countries which have responded to the Commission’s questionnaire, such as Ireland and Finland, have not applied additional safety

parameters to the levels of electromagnetic fields exposure to the public as they often consider the Recommendation 1999/519/EC or ICNIRP guidelines adequate. However, France, for example, recommended that safety perimeters be set up around mobile telephony base stations although this is not legally binding. Poland forbid the electrical component of a 50 Hz field to exceed 1 kV/m (elsewhere the limit is 10 kV/m) in residential areas and areas containing, in particular, hospitals, crèches, kindergartens and boarding schools.

The evidence that some Member and Accession countries have adopted stricter regulations while others not, could end up going against the free goods movement law in the EU. This idea has been developed in the "Electromagnetic Fields and Health Conference –Which Regulatory Framework for the European Community?" which was held in Luxembourg in November 2001[35]. This means that the Commission is faced with the problem of harmonising the protection levels adopted throughout the Member States.

There is little regional variation reported for protection regimes within Member and Accession States although, some countries have installed "zones" (e.g. near hospitals, schools, depending on density of population, etc) where allowed EMF frequency limits are more restrictive. For example, Slovenian law has created two zones which reflect two different levels of protection against radiation. In Austria, regional variations are not due to federal law but are sometimes demanded by local authorities or institutions for licenses based on provincial law for regional planning, general environmental protection and building construction. In these cases, stricter limits are set down. France has also put out a Recommendation ("circulaire", i.e. not legally binding) on 16 October 2001 asking for a security area to be set up around mobile phone stations to counteract EMFs thermal effects. Spain has set up security zones for sensitive areas, such as schools, health care centres, hospitals or public parks.

Regarding the scope of the measures in the countries, the majority of States now cover all frequency fields. Indeed, the UK, which used to focus solely on mobile phone communication, now has regulations for EMF up to 300 GHz. Similarly, Switzerland, which used to focus on power lines, substations and mobile phone masts, now covers EMF frequency ranges from 0 Hz to 300 GHz.

Although the Recommendation did not address the problem of environmental exposure or "electro-smog", several Member and Accession States have measures that address directly or indirectly exposure levels from environmental exposure such as Sweden and Germany. Electro-smog is the total emission from several products located together; each product by itself not emitting much, but all of them together exceeding the recommended levels of emission. It is a difficult problem to solve but one which has to be addressed taking into account the foreseen increase in transmitter masts and site sharing. The UK encourages employers to co-operate with each other to ensure that risks to employees other than their own and the public are controlled and that the additivity is taken into account. Ireland, for example, does not address exposure levels from environmental exposure directly. It surveys cumulative exposures by ODTR (Office of the Director of Telecommunications Regulations)

[35] Conclusions of the conference can be found on http://europa.eu.int/comm/health/ph/programmes/pollution/ph_fields_index.html

along with specific frequency contributions from individual transmitters and where the cumulative exposure approaches or exceeds ICNIRP guidelines, remedial action is taken.

All contacted countries promote research relevant to electromagnetic fields effects on human health except Luxembourg, Belgium and Estonia, either for budgetary reasons or priority setting. In Greece, research actions are mainly being performed in universities and research centres and are funded by the Greek government and the European Community. One of the Czech Republic's research programmes is the modelling of absorbed power. In parallel, Commission research activities are developed within various projects. Of interest, there is the establishment by the Commission's Joint Research Centre of a collaborative survey on human exposure to radiation from GSM and GPRS/UMTS base stations across Europe. The proposed study will provide a technical forum and platform for forthcoming standardisation activities at EU level; assess the environmental, socio-economic and health impacts of GSM and the related emerging technologies; provide policy makers with a useful tool for decision at European level; but also the COST actions and the projects developed under the banner of the 5th framework program.

Furthermore, most countries promote the development of new technologies in the sphere of electromagnetic fields. In particular, Denmark supports the harmonisation of technical specifications and standards in this field.

All the countries inform or are considering informing their population about the health impact of electromagnetic fields and the measures taken in this context. This is mostly done via publications and creation of internet sites, several of which are listed in this report. In order to further match the public demand for information, the Commission could play a co-ordinating role in propagating clear and coherent information or in establishing guidelines or recommendations for such information. In this regard, within a pan European information system, a portal erected by JRC with links to WHO and other relevant organisations with EMF information could be set up within several Commission Directorates in the near future.

This report on the implementation of the Council Recommendation 1999/519/EC summarises all the information available to date on the legislation and scientific expertise on public exposure to electromagnetic fields within Member and Accession States. This report is the result of an initiative taken by the Health and Consumer Protection Directorate General in order to encourage the establishment of a commonly agreed framework for the limits of exposure. Moreover it is the aim of the European Commission to continue to monitor, use exposure data and encourage research and develop initiatives to decrease public exposure to EMFs. This is especially so regarding recent findings on the possible epidemiological association between public exposure to extremely low frequencies fields and increase in childhood leukaemia incidence, and regarding the introduction of third generation mobile phones which will lead to the deployment of new networks which could increase total body exposure to radiofrequency fields.