

3. SPECTRUM PLANNING, MANAGEMENT AND SUPERVISION

The management of radio spectrum, involving planning and the associated compatibility studies, the allocation of spectrum resources by means of radio licences and their supervision, is among ICP-ANACOM's responsibilities. Activities were carried out in various aspects of this area in 2003.

3.1 Planning and compatibility studies

At planning level and deriving from the new community framework new spectrum management concepts were introduced that in 2003 merited particular attention and which concern "spectrum usage rights" and "secondary spectrum trading".

Although these notions have been considered in the new legislation – Law no. 5/2004 of 10 February – they still warrant thorough study to consolidate them and determine the impact of their implementation in both the communications market and on spectrum management.

These studies were launched in 2003 at both national and community level, with a first outline of possible scenarios. This work continues to be developed and should be consolidated in 2004.

The following is also noteworthy at the level of planning and compatibility studies:

Frequency Publication

With the main goal of ensuring transparency in the conditions for effective market competition with regard to radio spectrum access, ICP-ANACOM approved and published the "Publication of Frequencies for the 2002-2003 period". This document identifies the frequencies allocated until 30 September 2002 and the frequency bands reserved for 2003, for use by the operators of public telecommunications networks, public telecommunications service providers and holders of private telecommunications networks, besides defining the frequency allocation modes for the different entities.

This publication also includes the spectrum uses that are exempt from radio licence, of which low power short range stations stand out, among others.

Wireless local area networks (WLANs)

The recent proliferation of SRD applications in the 2.4 GHz band and the demand for public usages of WLAN technology will tend to increase saturation of the 2.4 GHz band, with impact on the quality of service.

Under these conditions it was held to be vital to provide more spectrum for such applications, as among other factors it is a necessary condition for satisfactory performance in the presence of other non-co-ordinated users, and is one of the key conditions for market acceptance of such applications.

The expected upsurge of the WLAN market led regulatory bodies to seek new frequency bands for the implementation of WLAN, such as 5 GHz, for example.

The studies resulted in identification of the 5150-5350 MHz and 5470-5725 MHz frequency bands for WLAN use. (This matter was also subject to a WRC03 decision). Nevertheless, the DFS specification work that includes a mechanism to detect radio systems in the same channel, thus preventing interference, was under development, and industry was unable to produce equipment that complied with the relevant CEPT Decision.

SAP/SAB applications

New frequency bands were identified and the current ones re-planned to accommodate SAP/SAB video connections in Portugal, particularly wireless cameras, portable and mobile SAP/SAB video connections and temporary point-point SAP/SAB digital video connections, used for direct transmissions of reports or events.

SRR applications

Under the eSafety programme to improve road safety in Europe, the European Commission has considered that the utilisation of automotive short range radars (SRRS) using broadband technologies, to be installed in new vehicles in the future, is of major importance for the reduction of road accidents.

To pursue this goal the European Commission mandated CEPT to harmonise spectrum use for these short range radar systems.

To fulfil this mandate a solution was developed with identification of a permanent band (77 GHz) to be used in the long term for SRR in Europe, and an interim 24 GHz solution to allow the advance introduction of SRR equipment. This solution envisages a transfer mechanism that guarantees that all systems should function in 77 GHz in the medium/long term.

CDMA2000 systems

With the aim of facilitating this technology's implementation for Trunking Mobile Services (TMS), studies were undertaken of compatibility between CDMA2000 systems and other systems in the 450 MHz band (TETRA, NMT450).

The first phase of the study on the relationship between traffic flow capacity and the number of RF channels needed for CDMA systems and other systems meant for TMS was also begun.

Fixed Service

Software applications were developed to implement models for propagation and the determination of fading margins in the context of fixed service.

DVB-T

At the level of digital television network planning, beyond the necessary negotiations with the Spanish administration, various studies and efforts were undertaken as part of national preparations for the first session of the Regional Conference (RRC04). Note that this Conference will revise the 1961 Stockholm Plan currently in force and draft new plans for the introduction of digital television in Europe, Africa and other Arab countries. This plan will form the framework for television development in upcoming decades.

Digital audio broadcasting – DRM System

Regulatory conditions were established to allow regular transmission of digital audio broadcasting – DRM (Digital Radio Mondiale) system – to begin in Portugal.

Satellite radio-determination – Galileo system

In the wake of the decisions made at WRC-2000 and WRC-03 on the allocation of frequency bands and the respective regulatory framework applicable to such systems, a group (GLS) was formed comprising the ITU-R notifying administrations vis-à-vis this future system, in which Portugal has participated.

This group accompanies the regulatory developments stemming from European Galileo notifications and co-ordinates European intervention in technical co-ordination meetings (in a global context) between the notifying administrations for all satellite radio-determination systems.

There is in this phase a proposal to create an MoU to formalise the group.

The following stand out with regard to established agreements on national and international frequency co-ordination:

Co-ordination with the Spanish administration

In order to plan and resolve interference a co-ordination meeting is held annually with Spain, to define the rules governing the two countries' spectrum usage with the aim of preventing interference in the various radiocommunications services.

A meeting to co-ordinate spectrum frequencies between Spain and Portugal was thus held in Madrid in January 2003, during which various cases of interference were studied; rules of procedure were also approved and agreements made on co-ordination of frequency use by stations and networks involving the following radiocommunications services:

- Digital audio broadcasting service (T-DAB)
- Digital television broadcasting service (DVB-T)
- Audio broadcasting service in modulated frequency

- Analogue television broadcasting service
- Land Mobile Service
 - o private networks
 - o GSM system
 - o UMTS system
- Fixed Service
 - o point-multipoint connections (FWA)
 - o point-point connections
- Satellite radiocommunications services

Agreement on the JTIDS/MIDS system

Co-ordination work continued with the aim of drafting an agreement between the Armed Forces General Staff/Communications and Information Systems Division (EMGFA/DICSI), the National Civil Aviation Institute (INAC) and the ICP-Autoridade Nacional de Comunicações (ICP-ANACOM) in order to allow the Portuguese Armed Forces and allies to use JTIDS/MIDS (Joint Tactical Information Distribution System/Multifunctional Information Distribution System) systems in Portugal installed in aerial, naval or land platforms, operating in the 960-1215 MHz frequency band.

That Agreement means to create necessary and sufficient conditions for rational use of JTIDS/MIDS system networks in airspace assigned to Portugal's responsibility. Thus, by delegation from the EMGFA/DICSI, the Portuguese Air Force (FAP) will have the flexibility and freedom of action needed to programme the means, strictly obeying the applicable conditions and terms, particularly regarding the need to safeguard the security of air traffic services; it will also gain possession of an instrument that will speed the whole process of obtaining the authorisations needed to use the JTIDS/MIDS system in Portugal, improve the co-ordination procedures and facilitate contact between interested parties.

3.2 Management and Supervision

3.2.1 Radio licensing

In wake of the publication of Decree-Law no. 151-A/2000 the update and corresponding publication of the Notice in the *Diário da República*, 3rd series, no. 168, of 23 July 2003 took place, with indication of the radiocommunications stations and/or networks that required a radio licence as well as those exempt from licence and radio fees.

In this area, ICP-ANACOM assured in 2003 analysis of the licensing processes, including the assignment of frequencies, with the aim of issuing network and station licences for the various radiocommunications services, particularly for the areas of land mobile service (private networks and public networks), fixed service (especially fixed service by radio relay system) and broadcasting service (audio and television).

ICP-ANACOM's activities in this area consisted of licensing networks and stations split among the various radiocommunications services, as shown below:

New licences (2003)

Radiocommunications Service		Registration of New Stations	New Licences	
			Station	Network
Amateur	Amateur	255	255	-
Mobile	Land – Private Networks	251	-	203
	Land – Public Networks (GSM)	437	-	0
	Land – Public Networks (UMTS)	0	-	0
	Land – Trunking	10	-	1
	Maritime	30	30	-
	Aeronautic	11	11	-
Fixed	Point-Point Connections	1266	-	59
	Point-Multipoint Connections	58	-	4
	Studio Connections – Transmitter	200	-	60
	Transportable Beams	0	-	0
Broadcasting	Audio (Analogue)	41	41	-
	Audio (Digital)	10	-	1
	Television (Analogue)	33	33	-
Satellite	Fixed by Satellite	15	15	-
	Very Small Aperture Terminal	7	-	3
	Satellite News Gathering	9	9	-

	Earth Exploration by Satellite	0	0	-
	Mobile by Satellite	1	1	-
Radiodetermination	Land Radiodetermination	0	0	-
Radionavigation	Maritime	0	0	-
	Aeronautic	0	0	-
Radiolocalisation	Weather Application	0	0	-

Sources: ANACOM

Modification and renewal of radio licences (2003)

Radiocommunications Services		Modified Licences	
		Station	Network
Amateur	Amateur	753	-
Mobile	Land – Private Networks	-	798
	Land – Public Networks (GSM)	-	18
	Land – Public Networks (UMTS)	-	0
	Land - Trunking	-	1
	Maritime	809	-
	Aeronautic	253	-
Fixed	Point-Point Connections	-	193
	Point-Multipoint Connections	-	14
	Studio Connections – Transmitter	-	162
	Transportable Beams	-	0
Broadcasting	Audio (Analogue)	356	-
	Audio (Digital)	-	1
	Television (Analogue)	24	-
Satellite			

	Fixed by Satellite	30	-
	Very Small Aperture Terminal	-	24
	Satellite News Gathering	11	-
	Earth Exploration by Satellite	1	-
	Mobile by Satellite	3	-
Radiodetermination	Land Radiodetermination	31	-
Radionavigation	Maritime	0	-
	Aeronautic	12	-
Radiolocalisation	Weather Application	0	-

Source: ANACOM

Modification of stations' technical parameters (2003)

Radiocommunications Services		Modified Stations
Amateur	Amateur	753
Mobile	Land – Private Networks	781
	Land – Public Networks (GSM)	293
	Land – Public Networks (UMTS)	0
	Land – Trunking	1
	Maritime	395
	Aeronautic	215
Fixed	Point-Point Connections	2707
	Point-Multipoint Connections	51
	Studio Connections – Transmitter	48
	Transportable Beams	0
Broadcasting	Audio (Analogue)	197
	Audio (Digital)	94
	Television (Analogue)	98
Satellite		

	Fixed by Satellite	12
	Very Small Aperture Terminal	18
	Satellite News Gathering	2
	Earth Exploration by Satellite	0
	Mobile by Satellite	1
Radiodetermination	Land Radiodetermination	87
Radionavigation	Maritime	0
	Aeronautic	0
Radiolocalisation	Weather Application	0

Source: ANACOM

Computer System (PLAGE) – Diverse modifications

Radiocommunications Services		Diverse Modifications No. of Requests
Amateur	Amateur	1922
Mobile	Land – Private Networks	538
	Land – Public Networks (GSM)	51
	Land – Public Networks (UMTS)	0
	Land – Trunking	2
	Maritime	112
	Aeronautic	31
Fixed	Point- Point Connections	377
	Point-Multipoint Connections	10
	Studio Connections – Transmitter	37
	Transportable Beams	3
Broadcasting	Audio (Analogue)	243
	Audio (Digital)	8
	Television (Analogue)	39

Satellite	Fixed by Satellite	1
	Very Small Aperture Terminal	1
	Satellite News Gathering	14
	Earth Exploration by Satellite	1
	Mobile by Satellite	0
Radiodetermination	Land Radiodetermination	1
Radionavigation	Maritime	0
	Aeronautic	4
Radiolocalisation	Weather Application	0

Source: ANACOM

Also noteworthy in the licensing scope are the following:

Euro 2004

Procedures were established and specific computer tools developed for the temporary licensing of radiocommunications stations and networks to be used during the 2004 European Football Championship. These tools will allow users to directly request licences for their stations and networks by electronic means.

Publicity actions were also undertaken to this end; potential users were informed of the national requirements for licensing this type of networks and stations.

SIRESP System

Procedures were adopted for the licensing of radiocommunications networks for emergency and security communications and the process of licensing emergency and security networks was begun, with the aim of future inclusion in the Integrated System of Portuguese Emergency and Security Networks (SIRESP).

Radio interfaces

The technical specifications of radio interfaces regarding radiocommunications equipment were updated.

3.2.2 Price Table

Decree-Law no. 151-A/2000 of 20 July established the applicable regime for the licensing of radiocommunications networks and stations, and oversight of the installation of said stations and the use of radio spectrum, including the principles applicable to radio fees, protection against exposure to electromagnetic radiation and radiocommunications infrastructure sharing.

With Administrative Rule no. 667-A/2001 of 2 July, and following on the publication of Decree-Law no. 151-A/2000, the radio fees were modified so as to gradually reflect an increasingly greater adjustment between the burden they represent for radio licence holders and the benefit the latter gain from the use of radiocommunications stations and networks, likewise promoting more efficient use of the radio spectrum.

In this regard, continuing the said transition process which according to a new methodology will be extended in stages to all categories of radiocommunications services, some modifications to the price table were proposed in 2003 and reflected in Administrative Rule no. 149-B/2004, published on 12 February, and which are worthy of note.

The values of the public radiocommunications fees in the scope of land mobile service were thus modified.

The radio fees applicable to stations for digital audio broadcasting service by terrestrial means functioning in the LF (long wave), MF (medium wave) and HF (short wave) bands were incorporated.

Also, the radio fees applicable to multi-user mobile service stations and networks were suppressed, along with paging service, as these services were no longer available.

The usage fees applicable to auxiliary broadcasting services (audio and video connections) for cases of temporary licences to be granted for the 2004 European Football Championship were also included.

Finally, regarding FWA, the pricing regime included in Administrative Rule no. 465-A/99 of 25 June was kept in force and expanded to the frequency bands to which same is applicable. Note that the applicable regime for FWA systems is currently being revised.

3.2.3 Spectrum management information systems

Integrated Spectrum Management System - SIGE

The Integrated Spectrum Management System known as SIGE comprises a set of software tools for the various existing radiocommunications services and a digital on-the-ground information database.

This system plays a vital role in such important areas as spectrum planning and management, licensing, monitoring, co-ordination between administrations and ITU notification.

SIGE was in the final implementation phase in December 2002. The year 2003 saw the start of testing of interfaces for the licensing database (PLAGE) with the calculation tools for the various radiocommunications services (GSM, radio-relay system, DVB-T, for example), as well as adjustment of PLAGE and the calculation tools to enable their effective integration.

After the final acceptance in July 2003 of the calculation tools for the various radiocommunications services, the first phase of the SIGE project was completed in November 2003, with provision of the respective interfaces with the licensing database (PLAGE) and its adaptation, and the calculation tools to enable its effective integration.

Licensing database - PLAGE

In order to implement the current legal framework ICP-ANACOM developed a new spectrum planning and management tool – PLAGE – which ensures the necessary flexibility, specifically by supporting the calculation of spectrum usage fees according to new methods. The registration of all the administrative information of users of radiocommunications systems and the technical parameters that characterise radio stations and networks is also carried out by this database.

In this context, and after procedures and parameters had been established to enable it to support the price table applicable to land mobile service – private networks, PLAGE was further adapted in 2003 for the radio licensing of services previously not included, namely radiodetermination service.

Electronic licensing

ICP-ANACOM is likewise working on a project that aims to provide in web environment automatic means for users vis-à-vis radio licensing, frequency allocation and the simulation of spectrum usage fees. This action was begun in 2002 with a target of 2004, and particularly depends on the technical possibilities (integration of calculation systems, geographic database, PLAGE, development of interactivity models and verification of security aspects) and the study of legal issues.

3.2.4 Protection of radiocommunications stations and networks

Context

Due to the responsibilities assigned it by Decree-Law no. 151-A/2000 of 20 July, and consequent to the licences and authorisations it grants for the functioning and use of radiocommunications stations and networks, ICP-ANACOM is obliged, in order to safeguard their workability and operation, to ensure that the said stations and networks have the necessary and possible protection allowing them to pursue their objectives.

Complementary to this, and as per associated legislation, ICP-ANACOM has the following obligations:

- Under terms of Decree-Law no. 597/73 of 7 November, it must follow up on requests to constitute radio rights of way to protect radiocommunications centres and fixed radio connections assured by radio relay system, preparing the corresponding administrative processes and respective draft instruments, for approval or revocation by the Tutelary entity and consequent publication in the *Diário da República*;
- Also in the scope of the same instrument or measures deriving therefrom it must study requests for opinion requested by local governments or developers of urbanisation projects, concerning municipal master plans, buildings or similar constructions whenever the former are in approval, revision or detailing phase and the latter in review phase for issuance of the corresponding building permit, exercising influence on the areas of clearance and removal as defined in the applicable instruments;
- In process of definition in the scope of the study or environmental impact assessment, under terms of Decree-Law no. 69/2000 of 3 May, joined with

the provisions of Decree-Law no. 597/73, it must study projects concerning the establishment of aerial high tension lines and the implementation of wind power complexes, in order to issue the opinions requested by the entities involved, namely the Institute of the Environment;

- In Municipal Licensing processes concerning the installation of support infrastructures for radiocommunications stations and respective accessories, under the provisions of Decree-Law no. 11/2003 of 18 January, it must study the opinion requests solicited by local governments vis-à-vis municipal authorisations for the installation of radiocommunications stations;
- In process of licensing by the Directorate General of Geology and Energy, as per section 5 of part 2 of Annex 2 of Decree-Law no. 312/2001 of 10 December, joined with the provisions of Decree-Law no. 597/73 of 5 November, it must study projects involving the establishment of wind power complexes and respective electric power transport lines, so as to issue the opinions requested by the entities developing the said wind power complexes;
- In the analysis of projects to implement wind power complexes, given their potential ability to disturb radiated electromagnetic fields, especially in signals involving analogue television broadcasting, which specific studies carried out under the auspices of the International Telecommunications Union (ITU) have shown to be due basically to the movement of the power generators' rotors, a number of measures of a preventive nature have been adopted. Prior technical inspections have been carried out at selected sites, so as to indicate to their developers the existence of radiocommunications stations installed in the locations under analysis, explicitly television broadcasting service stations, so as to prevent or minimise the appearance of such disturbances.

In this context, the following cases were studied within ICP-ANACOM during the year 2003:

- a) 6 cases concerning the revocation of rights of way;
- b) 51 opinions concerning the revision of Municipal Master Plans;
- c) 69 opinions concerning buildings and urbanisation projects;
- d) 10 opinions concerning the study and/or evaluation of environmental impact, vis-à-vis the establishment of High Tension Aerial Lines;
- e) 30 opinions concerning the study and/or evaluation of environmental impact, vis-à-vis the establishment of Wind Power Complexes;

- f) 76 opinions concerning the implementation of Wind Power Complexes;
- g) 55 opinions concerning the installation of radiocommunications stations;
- h) 144 ongoing cases involving rights of way;
- i) 8 other cases.

3.2.5 Spectrum monitoring and control (SMC)

Spectrum monitoring and control (SMC) is a part of the frequency management process whose main goals are to oversee the conditions governing the operation of radiocommunications stations and networks, according to current legislation, specifically Decree-Law no. 151-A/2000 of 20 July, and to gather information in the field to aid the activities of spectrum planning and licensing of radiocommunications stations and networks.

Although the core SMC activities are centred on operational activities, the importance of support activities must be stressed, as they ensure that field actions are carried out according to the established rules and that the equipment used is appropriate and in perfect condition.

The activities to equip and technologically modernise technical infrastructures in 2003 is noteworthy.

In this context, acquisition of the following tools was undertaken:

- Update of the SINCRER system, anticipating its technological modernisation and its integration with the SIGE system;
- RF watt-meters for the new radiocommunications services in frequencies above 1 GHz;
- Communications receiver with measurement capacity for the Azores Office.

The bases for future acquisition of the following infrastructures were also launched:

- 2 V and UHF radiogoniometers;
- 2 mobile SMC stations;
- Fixed HF radiogoniometer;

- Test system for DVB-T.

Development continued under the Integrated Monitoring Project, with completion of the report on the Azores Spectrum Monitoring and Control Centre (CMCEA). This report is undergoing internal review to define the hardware platform upon which the software to develop in collaboration with the Telecommunications Institute will run.

Also in this project, and parallel to the aforesaid activities, the following tools were developed:

- Diverse equipment control software modules, among them the remote ESMB receiver command;
- Controller for the rotor and the polarisation selector of the HL007 directive antenna;
- 6 antenna selectors.

Also with regard to the technical management of ICP-ANACOM's SMC systems and equipment, the following activities are worthy of note:

- Equipment calibration:
 - Definition of calibration profiles for new equipment;
 - Calibration of 118 equipment items, of a total of 129 envisaged in the Calibration Plan. Note an increase of 287.8 percent over 2002, when 41 equipment items were calibrated;
- At the level of corrective maintenance of equipment from all the SMC centres, a total of 182 interventions were carried out (243 in 2002), of which only 12 with recourse to human resources outside ICP-ANACOM;
- At the level of preventive maintenance actions were carried out, using specialised companies, on the SINCRER towers and antennas, at the Barcarena Centre and at the North Office Centre.

From the operational aspect of SMC, and although the active structure has a significant reactive component, i.e., based on claims/requests, periodic monitoring campaigns have been undertaken in order to verify whether the operation of stations and networks complies with the legislation in force and specifically with the conditions imposed in the licences for radiocommunications stations and networks.

About 900 actions were carried out in the field in 2003, with almost all of them involving trips to the operating sites of the radiocommunications stations and networks. Nearly 50 percent of the situations were originated by claims over interference (of these about a third correspond to claims from the general public on interference affecting their television reception systems). The remaining 50 percent were basically inspections of radiocommunications stations and networks, with the aim of verifying compliance with the licensing conditions (in these are included verification of compliance with the reference levels for protection of the general public).

The following actions were additionally accomplished:

- Monitoring of the RDS (Radio Data System) and MPX (composed signal) parameters for all audio broadcasting stations operating in band 2 of VHF (commonly known as FM stations);
- Gauging the quality of service of GSM900/1800 networks in the field;
- Detailed investigation of the 406.1-430 MHz band.

Worthy of special attention in SMC activities is harmful interference that affects the following frequencies, channels and stations:

- Aeronautic mobile service (R) frequencies for runway approach, search and rescue, and airport control towers;
- Maritime mobile service call, danger and rescue channels;
- Maritime and aeronautic radionavigation services stations.

Action is based on the principle that it is crucial to eliminate harmful interference as soon as possible, if necessary by using exceptional measures that can include closing down the station originating the disturbance.

About 40 situations of this type were identified in 2003 as originating in national stations; they were quickly resolved after identification of the interfering station.

Nevertheless, when the interfering station is a foreign one, resolution of the interference can take much longer; to that end the Radio Regulation notification procedures are especially significant.

In this context the following were subject to notification in 2003:

- 34 stations potentially interfering with national stations, which were operating in the maritime mobile service and aeronautic mobile service (R), derogated to the RR, complying with the stipulations of Resolution 207 of the RR;
- 4 technical and operational infringements of the RR, which caused harmful interference in national stations, resolved in the meanwhile.

As for international co-operation, besides the nearly 176 situations of exchanging specific information with other international monitoring centres, Portugal in 2003 participated in the international spectrum monitoring system, a regular annual activity overseen by the International Telecommunications Union (ITU); some 444 stations were monitored and 10 RR infringements identified.

Lastly, worthy of note are the technical co-operation actions with Hungary and with the CPLP countries, and the realisation of about 60 actions (recordings and operational verification) involving audio broadcasting stations under the ICS (Media Institute) co-operation protocol.

3.3 Non-ionising radiation

Context

In April 2001 the then ICP decided to adopt reference levels for the population's exposure to electromagnetic fields set in Council Recommendation 1999/519/EC of 12 July, which establishes a table of reference levels and basic limits, and recommends their adoption by the European Union member States. These levels were soon applied as a technical parameter to all radiocommunications stations to be installed under a network or station licence.

This measure was taken under article 22 of Decree-Law no. 151-A/2000 of 20 July on a transitory basis, until said provision should be endowed with the still lacking legislative or regulatory endorsement, i.e., approval of those reference levels by the responsible entities, namely from the health area.

Decree-Law no. 11/2003 of 18 January was published in 2003; modifying Decree-Law no. 151-A/2000, it envisages that those reference levels will be set by joint administrative rule from various ministers.

In derivation from that publication, ICP-ANACOM developed two Draft Regulations:

- Draft Regulation on the procedures to monitor and measure the intensity levels of electromagnetic fields originating in radiocommunications stations, which has already been subject to the public consultation process;
- Draft Regulation that establishes the methodology for monitoring and measuring the intensity levels of electromagnetic fields due to emissions from radiocommunications stations, which will be subject to public consultation in 2004.

Also, with regard to this problem, the Draft Regulation that establishes rules for the identification and signalisation of radiocommunications stations was subject to the public consultation process.

The publication of these regulations depends on publication of the aforementioned joint administrative rule.

Analysis of the effects of non-ionising radiation

The Inter-Ministry Group established by Joint Order no. 8 of 2002 of 7 January from the ministers of Social Infrastructure, Economy, Health, and Science and Technology, on the population's exposure to electromagnetic fields, and which counted the participation of the Autoridade Nacional de Comunicações (ANACOM), completed its work on 7 April 2003.

This working group's Report, which has yet to be approved by the ministers involved, recommends, based on current scientific knowledge, adoption of the reference levels and basic limits contained in the Recommendation of the Council of the European Union no. 1999/5199/EC of 12 July 1999.

It also presents a set of recommendations that aim to enhance protection of the population in general, namely protecting workers and consumers, as well as the operation of medical equipment.

Information to the public in general on non-ionising radiation

The increasing installation of base station antennas for mobile telephones, in self-supported towers or masts atop buildings, has given rise to a high number of clarification requests addressed to ICP-ANACOM about consequences of the population's exposure to the electromagnetic fields generated by those radiating systems.

Analysis of the clarification requests involving radiocommunications stations has shown that in most cases the electromagnetic field values were substantially less than the reference levels in the said Recommendation 1999/519/EC of 12 July.

Given the need to clarify the population in general on how the respective structures work and regarding the fear that such installations are not duly controlled, ICP-ANACOM developed a set of measures meant to promote public awareness about electromagnetic fields caused by mobile telephone base station antennas.

On the one hand, following a previous determination of the then ICP in November 2001, a pamphlet on this issue was produced in 2002. It aimed to explain the technical and legal questions associated to the localisation of antennas and the authorised emission levels for electromagnetic radiation, which are among the most evident concerns of the general public, whether individuals or institutions of various kinds, and sought to answer questions related to ICP-ANACOM's area of intervention.

Divulcation of this pamphlet began in October 2002 when it was published in the ICP-ANACOM website, provided to the public attendance services and distributed as an insert in the October issue of *Spectru*, the monthly bulletin of ICP-ANACOM. The pamphlet was likewise disseminated via the Portuguese Association for the Development of Communications (APDC) and made

available in all post offices of the CTT – Correios de Portugal (nationwide) and in the Citizen Attendance Centres (*Lojas do Cidadão*) in Lisbon, Oporto, Aveiro, Viseu, Setúbal and Braga. The National Association of Portuguese Municipalities (ANMP) also aided its widespread dissemination. Copies were also sent to the Ministries of Health, of Cities, Territorial Planning and Environment, and of Education. In all, nearly 203,200 pamphlets were distributed.

Meanwhile, in February 2002 a section was set up on the ICP-ANACOM website containing detailed information on the problem of exposure to electromagnetic fields. It provides answers to the main questions associated to the installation of radiocommunications antennas/stations, as well as relevant information on the matter, particularly the main measures adopted by ICP-ANACOM. A number of interesting links are also included, among them studies undertaken by other entities, whether national or from other countries and international organisations.

ICP is also working on a theoretical model that analyses for the various radiocommunications services the distribution of electromagnetic field around the antenna, in order to determine for each of these services the distances that obey the maximum electric field values indicated in the said Recommendation 1999/519/EC.

As a next step, and with the help of other tools (SIGE, for example), plans call for the gauging and evaluation of results. This project's evolution may be dependent on conclusions of the aforementioned inter-ministry group on the population's exposure to electromagnetic fields.

Oversight of compliance with the reference levels

ICP-ANACOM has been overseeing the licence-holders' compliance with the reference levels set in Council Recommendation 1999/519/EC of 12 July, acting either on own initiative or due to complaints or claims; the respective non-compliance is an administrative offence punishable by fine under the terms of Decree-Law no. 151-A/2000.

In this regard and until the end of the first quarter of 2004 ICP-ANACOM received some 617 solicitations involving non-ionising radiation, for the study of tangible situations; 533 cases were closed (77 involving teaching institutions), many of them following on-site measurements.

The results obtained indicate, as mentioned above, values at least 50 times less than the power density reference levels in Recommendation of the European Council 1999/519/EC of 12 July 1999. There were 12 exceptions, seven of them resolved in the meanwhile. The remaining situations, where it was not possible to guarantee the 50 times less platform, though

nevertheless complying with the reference levels, were reported to the people or entities who had requested the evaluations.

Characterisation of the procedures and methods for measuring radiation levels

As mentioned above, the Draft Regulation on the procedures involved in monitoring and measuring the intensity levels of electromagnetic fields originating in radiocommunications stations was developed, which will serve as the basis for evaluations of electromagnetic fields emitted by stations of a fixed nature. In the European Committee for Electrotechnical Standardisation (CENELEC) the work of Committee TC106X (human body's exposure to electromagnetic fields), which deals with various aspects of the population's exposure to electromagnetic fields in the frequency band running from 0 Hz to 300 GHz, is being accompanied.

Standing out among the standards produced by this technical committee, under mandate M/305 of the European Commission and in the scope of Directive 1999/5/EC of the European Parliament and of the Council of 9 March 1999 (concerning radio equipment and telecommunications terminal equipment), are Standard EN50360 – product standard for demonstration of conformity with the basic limits related to human exposure to electromagnetic fields (300 MHz – 3 GHz), and Standard EN50361 – basic standard for measuring the specific absorption rate for human exposure to the electromagnetic fields of mobile telephones (300 MHz – 3 GHz).

The ICP-ANACOM laboratories are studying the possibility of acquiring equipment and enhancing knowledge in this area, to promote implementation of a system to measure the specific absorption rate (SAR) in the head.