



European Radiocommunications Committee (ERC) within the
European Conference of Postal and Telecommunications Administrations (CEPT)



**ERC REPORT ON INSPECTION PROCEDURES
INCLUDING TRAINING OF INSPECTORS**

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ERC REPORT ON INSPECTION PROCEDURES INCLUDING TRAINING OF INSPECTORS

1 INTRODUCTION

Enforcement is the range of actions and sanctions that can be used to enhance the respect of national law and regulations for the purpose of achieving the best possible quality of (radio) communications for the legitimate users of the radio frequency spectrum. It includes taking action against occurred and potential sources of interference and unauthorised use and may include appropriate enforcement measures. Enforcement can include all types of activities such as inspection of radio equipment, investigation, monitoring and/or market surveillance.

Inspection of Radio Equipment is defined as carrying out on-site measurements on radio stations and checking whether or not radio equipment complies with the general/ individual licence and/or permitted conditions.

2 AIM OF THIS ERC REPORT

The aim of this ERC report is to provide CEPT administrations with information on the inspection of radio equipment and on training of inspectors. All information should be considered as advisory and is not intended to be obligatory. Enforcement and inspection of radio equipment remains an integral part of National Administrations' responsibility

3 ENFORCEMENT AUTHORITIES ACTIVITIES

It is the responsibility of each national CEPT administration to control the use of the radio spectrum. The fundamental aim is to promote the most efficient use of the spectrum. Licensing is one method of controlling radio spectrum use

4 LICENSING

As detailed in paragraph 3 of the ERC Report 61 on harmonisation of licensing, the use of radio frequencies has to be carefully planned and authorised to ensure the provision of a sufficiently high standard of radio service otherwise it can cause interference to other users. Paragraph 8 of the this report defines the parameters within which equipment is to be used.

Also paragraph 12 of the same document states the importance of carrying out inspections and this report elaborates further on the need for inspections and staff training.

5 NATIONAL POLICY OF INSPECTIONS OF RADIO EQUIPMENT

As mentioned in paragraph 2 inspection of radio equipment is the responsibility of the national authorities. **Annex 1** gives additional information on the approach of fifteen CEPT administrations towards inspection. Based on the collected information the majority of the responded CEPT administrations will only carry out inspection in cases of reported interference. Administrations from Cyprus, Germany, The Netherlands and Poland carry out routine inspections and also respond to interference complaints.

6 INSPECTION PROCEDURES

6.1 Purpose of Inspection

The use of radio equipment continues to expand rapidly. This applies to business, telecommunication, broadcasting, amateur and leisure activities. Unauthorised use of radio equipment may cause interference to legitimate users. Safety of life may be put at risk if, for example, radio equipment, used by emergency services, suffers interference.

The successful running of a business can be affected by radio interference. Domestic viewers and listeners can be prevented from enjoying services such as television and radio services.

The Enforcement Authority of an administration has a responsibility to ensure that harmful interference is avoided and an inspection may draw attention to a licence discrepancy (either accidental or deliberate) before any serious interference problems arise.

A radio station inspection will also be necessary when the radio station in question is identified as being responsible for a specific complaint of interference. In summary, the inspection, whether carried out as part of an administration's work programme or in response to a specific interference complaint, is designed to ensure that the installation conforms to conditions for its use and that the radio equipment operates in a manner that is not likely to cause undue interference.

Radio equipment generally must be installed and used in accordance with licence or exempt conditions. These may specify, for example, frequency assigned, transmitter power, type of antenna, height of the external antenna, frequency deviation, occupied bandwidth, etc. Inspections and measurements of radio stations are carried out by national Authorities in accordance with their own guidelines and procedures.

6.2 Procedure

To carry out inspections, suitable calibrated test equipment will be used in line with national administrations' policy. Ideally, communication service equipment is recommended because they combine the functions of a number of test instruments in a single transportable unit. The test instruments should also be calibrated, regularly

All types of radio systems can be checked, but the inspection of radio equipment in many CEPT countries is focused on PMR networks and only carried out in cases of reported interference. For any radio system inspection a check should be made of the number of mobiles and hand-portables in a radio network available for use. Prior "off air" monitoring should also give an idea of the size of the operation and the number of mobiles or hand-portables involved.

The technical part of inspection of radio equipment should include at least:

- (a) location of the radio base station;
- (b) conformity assessment control;
- (c) frequency and toleration ;
- (d) harmonics and spurious;
- (e) transmitter power;
- (f) occupied bandwidth or frequency deviation;
- (g) type of antenna, height of the antenna, etc. depending on the type of installation.

6.3 Location of the radio base station

The radio base station should be confirmed as being located at the address as shown on the licence. Such matters need to be resolved before proceeding with the station inspection. If a radio base station has moved a short distance so that the coverage area is little changed, the licensee should be informed, subject to national administration policy, to regularise the licensing position, rather than closing the station down.

6.4 Conformity Assessment control (for EU Administrations)

Radio Equipment should be checked to ensure that it complies with the current relevant manufacturing specification i.e. type approval regime pre R&TTE Directive implementation. The entire installation should be checked to confirm that it is within the operating characteristics as specified in the current licence schedule.

After the implementation of the R&TTE Directive (expected May 2000) all radio equipment shall be in conformity with the essential requirements. The radio equipment should bear a "CE" mark, including an alert symbol if the radio equipment is not harmonised in the Community.

6.5 Frequency

The RF frequency measuring function of communications service test equipment takes the form of a frequency-offset meter. This means that if the nominal frequency is not known or is not as expected, it has to be located and centralised on the spectrum analyser display before it can be measured. Care has to be taken that the signal being measured is not a spurious or harmonic from the transmitter under test, or possibly one generated in the test equipment. When a separate frequency counter is being used this measurement is somewhat more straightforward. Modulation on the carrier can sometimes cause errors, as can an incorrect signal level into the counter, or neglecting to allow sufficient time for warm-up.

6.6 Harmonics and Spurious

The spectrum analyser function of a communications service monitor gives a very useful and immediate indication of the quality of the transmitter output. Problems such as spurious frequencies, wide-band noise, instability and splatter on modulation can easily be seen. Harmonics and noise side-bands can also be estimated but as with other tests that make use of the spectrum analyser function, the dynamic range and noise content of the communications service monitor itself must be kept in mind.

6.7 Transmitter power

Transmitter power levels are normally quoted in terms of Effective Radiated Power (ERP), which is defined in ITU Regulations as the product of the power supplied to the antenna and its gain in a given direction. When calculating ERP, measurements need to be taken of the carrier power at the transmitter socket and all subsequent losses in the system, such as attenuation in filters, isolators, combiners, and in the feeder cable need to be taken into account. This calculation can be simplified by making the power measurement at a point close to the antenna so that any devices affecting the power level on the transmitter side of this point do not need to be included in the calculation. The antenna will need to be identified and its gain, if any, found from manufacturers data or by estimation.

6.8 External antenna

An inspection of a radio base station should include a check of the antenna in use, and include the following four main characteristics of interest:

- a) Type antenna;
- b) Height of the antenna;
- c) Direction of main lobe;
- d) Gain relative to a dipole.

6.8.1 Type antenna

Type Omni-directional antenna are by far the most common, and simple dipoles and ground-planes can easily be identified. Antenna possessing gain such as stacked dipoles and yagis (the latter having directional properties) can also be identified, and assumed to have standard properties of gain and directivity, even if it is not possible to determine the exact model and manufacturer. Antennas with an unconventional construction, or those contained within a featureless fibreglass tube, can present a problem of identification. Antennas may require further investigation if they are suspiciously long (compared to a halfwave at the frequency of operation) and a gain of unity is being claimed by the user.

6.8.2 Height of the external antenna

Height A possible source of confusion in relation to the height shown on the licence is the difference between height above sea level, height of mast, and height of antennas above ground. Therefore the height of the mast or pole and the height of the building or structure to which it is attached must both be taken into account. Advantageous antenna locations are more often the cause of complaints of excessive coverage, made by co-channel sharers, than the use of excessive ERP. Power limitations should be imposed in an attempt to combat such problems.

6.8.3 Direction of the main lobe

Direction of main lobe The use of a directional antenna is a technique which allows a degree of control over the service area. This might be used where a base station is located at one end of the required service area. It can also relieve problems of interference in directions where coverage is not required and perhaps allow reuse of the frequency at a closer distance than would otherwise have been the case. Antenna chosen to provide such directivity are often Yagi types, but the close proximity of mast structures can give this effect to an omni-directional antenna. The direction of the main lobe can be checked by the use of a compass or by reference to known geographical features.

6.8.4 Gain of the antenna

In order to calculate the ERP it is necessary to know the gain of the antenna relative to a half-wave dipole.

6.9 Modulation (frequency deviation)

The frequency deviation is the maximum difference between the instantaneous frequency of the modulated radio frequency signal and the carrier frequency in the absence of the modulation. The level of used bandwidth against the allowed bandwidth can be measured with either communications service monitors or a separate deviation meter if available.

6.10 Additional Facilities

During a radio equipment inspection a check should be made of any additional facilities in use which may not be allowed under the licence

7 MONITORING AS PART OF INSPECTION

7.1 Off-Air Monitoring

Radio stations can be monitored off-air as part of the inspection. Enforcement matters such as the use made of air time, the use of callings, and the size of the operation, can be examined and at the same time it is possible to measure the technical parameters of the signals received.

7.2 Occupancy of Frequency

Spectrum monitoring serves as the eyes and ears of the spectrum management process. It is necessary because, in practice, the actual use may be at variance with the planned use

The monitoring process provides a method of verification and closes the loop on the spectrum management process. For many services, such as Land Mobile and Fixed Links, the frequencies are re-used in a cell-like structure.

Occupancy measurements are necessary to enable the most efficient use of the channels where a number of separate users share a frequency. The occupancy measurements will enable an Administration to determine how many other users may be able to use the same radio channel. Techniques for measuring occupancy are constantly being improved with advances in technology but detailed discussion of the techniques can be found in the ITU Spectrum Monitoring Handbook.

8 Training Strategy to Accomplish Effective Inspection

In order to fulfil the needs outlined above in the Inspection requirements, suitable training of radio inspectors is essential. The following identifies such needs and offers methods to provide the necessary training to achieve the skills to be able to perform the enforcement tasks.

8.1 Objective of Administrations

To ensure that technical staff has the opportunity to be fully trained in:

- Technical aspects of radio;
- Enforcement of relevant legislation, including the EMC and R&TTE Directives;
- Health & Safety requirements of their work;
- Administrative skills that the staff member and line manager consider as beneficial.

8.2 Technical training

National Administrations should ensure that all local technical staff have a working knowledge of the subjects contained in the types of training subjects detailed below, in order to obtain and refresh their knowledge and skills. Administrations should also ensure that training is kept under review, in order to provide the necessary skills in new radio technology and to meet changes in legislation, technology and working practices.

The following specific subject areas for courses are recommended, with a view to fulfilling training commitments, mainly arising from the need to keep pace with new technology to fulfil the needs of field staff:

- Basic Radio & Interference Mechanisms;
- Digital Broadcasting;
- Private Mobile Radio Systems and Paging;
- GSM and Tetra techniques;
- Direction Finding Techniques;
- Spectrum Management.
- General Training in Enforcement & Regulation;
- Enforcement Interview skills.

8.3 Basic Radio and Interference Mechanisms for new technical staff

The following specific objectives are identified:

- Radio Systems;
- Modulation;
- Propagation;
- Aerials;
- Electronic circuits;
- EMC/Determination of interference mechanisms;
- Measurements;
- Filters;
- Specifications;
- Inspection of radio system.

8.4 Technical training course objectives

The following are suggested training courses that have been identified, mainly arising from the need to keep pace with new technology to fulfil the needs of field staff:

a) Digital Broadcasting

This course is specifically for technical staff and is intended to provide the basic principles on which digital Radio/TV receivers operate. The course objective is to allow field staff to have some knowledge of the internal working of digital Radio/TV receivers, from the tuner to the CRT.

b) Private Mobile Radio Systems (PMR) and Paging (ERMES)

This course is for technical staff, who might feel they have the need to refresh themselves on the basic functions of both private Mobile Radio systems, together with Paging technology.

c) GSM and Tetra

With the main emphasis being on TETRA based systems, it is recommended that this course will be offered to all field staff. It will involve some revision of the theory already provided in a previous course, but will be mainly orientated towards the practical side of TETRA systems. It will be advantageous if the course includes a visit to a working TETRA site.

d) Direction Finding Techniques

This course should be open to all field staff, who may have a requirement to refresh themselves on basic DF techniques and theory. It is recommended that will involve the use of both loop aerials and automatic DF systems and will be biased towards the practicalities of DF systems and their use.

e) Spectrum Management

This course will provide the fundamental issues behind good spectrum management and should be open to all field staff. It will deal with both the international and national regulatory functions and provide a good theoretical grounding for staff who deal with licensing issues.

8.5 Technical training for new Technical staff

The most vital training for new staff is that done on the job in the company of experienced local officers. In the earlier stages of a new recruits' career, suitable courses, should be identified to provide a firm grounding in both the technical and general development for the new officer. With attendance at these courses, a new recruit will have a firm grounding in the enforcement, technical and general development requirements of the job.

8.6 On the job training

Many skills have to be learned on the job itself. Mistakes are made and lessons are learnt. This build up of experience by doing the job is an invaluable part of the overall training strategy. National Administrations should have a commitment to ensure that local training is an integral part of the job plan. Feedback is an important part of the training process for the staff.

8.7 Health and safety

CEPT administrations should offer training on any equipment, which may have health and safety implications. Additionally Administrations should be aware of matters relating to personal safety e.g. Use of IT equipment; Exposure to Radio Frequency energy, etc. Regular refresher courses are important to maintain safe working practices. Administrations should encourage attendance of staff on any general health and safety courses. First Aid training is also to be encouraged.

8.8 Quality Standard

It is recommended to have a Quality Standard in place to provide a framework for effective investment in the training and development of each member of staff.

Quality Standard Philosophy:

The following four key points define the framework to achieve objectives to assist the individual to develop improved skills and clearly defined personal objectives:

- Commitment;
- Planning;
- Action;
- Evaluation.

This will result in being:

- part of a more successful team;
- encouraged to have good ideas and see them implemented;
- given help to develop their skills and abilities for the future.

8.9 Evaluation of training

An important element of training is to include an adequate assessment of the actual training provided. At the end of each training course attended, it is recommended that trainees will be asked to complete an evaluation of the training received. This type of evaluation by the trainee is an important feedback path for Administrations in deciding whether training was effective.

References

CEPT/ERC Report 61 on harmonisation of licensing (Annex 8);
R&TTE Directive;
ITU Handbook for Monitoring.

ANNEX

THE FOLLOWING GIVES ADDITIONAL INFORMATION ON THE APPROACH OF DIFFERENT ADMINISTRATIONS TOWARDS INSPECTIONS

1. AUSTRIA

No random or regular inspections are carried out. Installations are inspected once in the year after issuing the licence. Inspections are then only carried out in response to an interference complaint.

2. BELGIUM

Inspections are carried out in all cases of reported interference. Preventative controls are also carried out. Most new PMR licences are subject to inspections. This procedure has had good results and represents a large part of the work of the department.

3. CYPRUS

The administration of Cyprus carries out periodic inspections as well as inspections in response to reported interference cases.

4. DENMARK

Inspections are carried out only in response to an interference complaint. Routine inspections are not considered necessary

ENFORCEMENT OF THE LEGISLATION ON RADIO EQUIPMENT IN DKIntroduction

The following illustrates briefly how enforcement of the rules on radio equipment is carried out in Denmark. It aims at contributing to the clarification on how different CEPT countries administer these areas.

The concept of enforcement on radio equipment regulations

The National Telecom Agency understand enforcement as both checking the *marketing* and the *use* of radio equipment. The purpose of market surveillance is to ensure that only equipment which is approved (when approval is a requirement) and CE-marked is put on the market. The purpose of inspecting the use of radio equipment is to eliminate disturbances. This should be done through monitoring of frequencies which makes it possible to see whether the radio equipment is using the correct frequency. Furthermore, it enables the monitor to see if radio equipment is used in a correct manner, by way of example, whether the user is blocking the frequency. Finally, the use of radio equipment should be checked through spot test on location and when dealing with actual interference cases. Where incorrect use is observed action must be taken.

Enforcement put into practice

The enforcement of the regulation on radio equipment is carried out in two different ways. Firstly, through market surveillance at the distributors' premises and, secondly, through inspection of the equipment at the end-users' premises.

The market surveillance concentrates on the dealers and basically consists of checking the marking of the radio equipment on the dealers' shelves. If the equipment is not type approved or not supplied with correct marking (including the CE-mark) a ban on marketing is issued and the manufacturer is fined. So far no equipment has been taken to laboratories for tests. However, during 1998 tests will be carried out as resources have now been earmarked for this purpose.

Aiming at preventing actual disturbances equipment at the end-users place is checked through spot test and through monitoring of frequencies. This inspection includes checking whether measurements connected to the licence are observed. However, it should be noted that the spot tests rarely take place as most resources are spent on actual disturbance instances. When visiting the end-user to solve an actual instance of disturbances the compliance of relevant measurements is also inspected. Where non-compliance occurs the user is told to bring the equipment in accordance with the rules. If the request is not observed a ban on the use and fines are issued.

Instruction of staffs

The Inspection Division has guidelines for the market surveillance and the inspection work. This guide sets out the legislation and describes how to carry out the enforcement in practice, including standards when visiting outlets and end-users, and how to react to infringements etc.

Education of staffs

The Inspection Division holds internal seminars where the employees exchange experiences and co-ordinate the enforcement. The seminars tend to be based on case studies. Furthermore the employees attend relevant technical courses. By way of example some employees have attended a course on digital radio.

5. FINLAND

The Finnish administration performs radio station inspections in general only on the basis of complaints. However all private sound and TV broadcast stations (not operated by Finnish Broadcasting Company) are inspected for typically those parameters in WGRR/PT11(98) 11 rev 1 Annex 10 and, in addition, the system for controlling deviation. In some cases, special or unconventional installations may be inspected which are considered more demanding than normal but this is done on a case by case basis. In general, licensees are expected to use professional help with their installations. There is no authorisation or certification system for installation companies of radio stations. For ship radio stations there is of course the same type of survey system as in other countries, but this is based on IMO and national maritime regulations and is also performed by the administration. The Board of Aviation is responsible for corresponding activities as regards aeronautical radio.

6. FRANCE

The monitoring of radio-electrical equipment use in France relies on articles of the Post and Telecommunication Code which punishes:

- frequency, radio-electrical network or radio-electrical equipment used without authorisation or out of the authorisation conditions;
- jamming of a service legally authorised by another with a lower status.

Inspection (especially of radio-electrical equipment):

About 90 persons working for the “*Agence Nationale des Fréquences*” in the whole territory, are involved in the inspection of sites and radio-electrical equipment with the following tasks:

inspection of any new radio-electrical private network (e.g. PMR) within the first year after it started to work and periodical inspection afterwards (at least every two years for the 40 000 networks);
accurate inspection of any site involved in an international event (e.g. World Cup) before and during the latter; immediate inspection after receiving a complaint for interference/jamming.

Remark:

The majority of complaints are a consequence of unauthorised frequency use by a service (the “jammer”) to another one, legally authorised.

Also, it is obvious that radio-electrical equipment users must be well informed about possible interdictions or restrictions regarding this equipment. This must be done through marking and explanation (on the equipment itself – for the marking -, the packaging and an informative document).

7. GERMANY

The German Regulierungsbehörde für Telekommunikation und Post (Reg TP) carries out routine inspections of radio equipment, mostly for PMR. The number of inspections is limited by budget restrictions to avoid increasing financial contributions by the users. (The enormous amount of inadequately operated radio equipment would require more inspections). There are also a minor number of random inspections which are normally carried out in coincidence with traffic inspections of the police.

Two problems may be of general interest. The enlarging number of different types of radio equipment that require special adapters to be connected to the test equipment (e.g. in the case of power measurements) results in the question of how to finance all the adapters or how to avoid them. Built in software often allows the user to switch to additional channels and higher power. So the question is whether we are able to prevent frequency misuse effectively.

8. LUXEMBOURG

The Institut Luxembourgeois des Telecommunications does not carry out routine or random inspections. Inspections are carried out only if an interference complaint has been received.

9. THE NETHERLANDS

Inspections

Enforcement (by Inspection of Radio equipment) of general regulations and specific conditions and restrictions attached to licenses issued to users in the Netherlands, is being reorganised. In the future the activities of the Radio Agency of The Netherlands (RDR) will comprise three types of inspections:

1. Inspections that aim to *establish* the level of compliance in a specific group. These inspections are selected in a random process over the entire group. The number of inspections is kept to a minimum but is such that a 90% accuracy can be expected.
2. Inspections that aim to *improve* the level of compliance in a specific group. These inspections are targeted at users within the specific group that we expect to be running the highest "risk" of non-compliance.
3. Inspections as a reaction to *complaints*. These are not discussed here.

Generally, inspections are limited to the most vital elements for organised radio communication and frequency distribution such as:

- power;
- antenna height and diagram;
- frequencies;
- frequency deviations;
- EMC aspects.

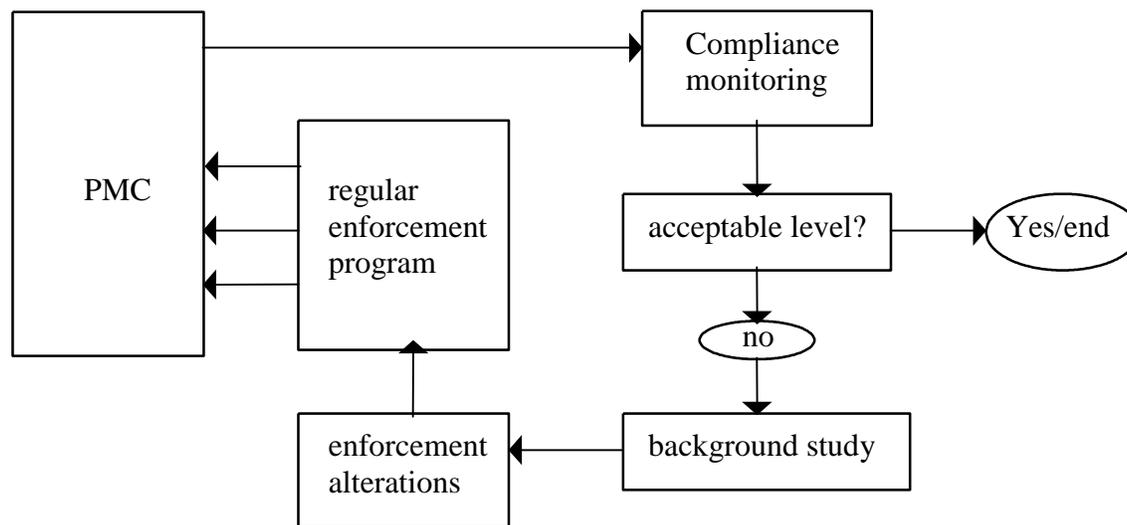
Of course, the use of type-approved radio equipment is mandatory and all illegal apparatus will usually be confiscated.

Enforcement controlled by compliance

All licenses issued by the Radio Agency of the Netherlands are divided in groups: Product/Market Combinations (PMC), for example, mobile communication for the nautical market or fixed connections for vital government tasks. Most PMCs are subject to programs that permanently monitor the level of compliance within the PMC. These are the first type of inspections (randomly chosen). If compliance drops to an unacceptable level, a study is carried out to establish the most likely reasons for non-compliance. This study is of a very short nature. It is executed with participation of inspection officers who work in the PMC field and is supported by a standardised checklist of items that aim to cover all possibilities.

With the help of this study, and general common sense, a plan of action is constructed to improve the level of compliance. This may result in a tougher inspection program (structural or temporarily) than has been the case for this PMC so far. These inspections are of the second type. Of course the monitoring figures may also show that compliance is rising and regular inspection (type 2) can be cut back. Also, the background study may show certain elements in the regulations that are beyond the control of enforcement instruments: the regulation itself needs attention.

The following figure illustrates this system:



As of July 1998 the RDR started with the implementation of structural monitoring programs. These cover 9 PMCs and the vast majority of permits issued. The programs will deliver a quarterly update of the level of compliance within the PMCs.

A little under 10% of the total number of inspections (9000 per year) is tied up in the structural monitoring programs. The rest can be used in the regular inspection programs (type 2)

Development

Discussions on the acceptability of a certain level of compliance has been boosted by the implementation of the monitoring programs. The trade-off between the importance of regulations and the cost of enforcing them, is all of a sudden far more committing. Generating result will probably prove to be a real challenge, but a set of predetermined “minimal levels of compliance per PMC” will strengthen the system considerably. With the transfer of enforcement capacity from non-risk groups to groups that need attention, flexibility in deployment of personnel is paramount. This issue has already been addressed.

With this system of “compliance controlled inspection” we hope to maximise compliance where it is most wanted, given the limited enforcement capacity.

10. NORWAY

The Norwegian Post and Telecommunications Authority (PT) currently has seven regional offices. These offices are organisationally placed within the Frequency Monitoring Section of the PT. In addition there is one inspector at the central office.

The majority of inspections of radio equipment, mostly PMR, are carried out in response to complaints of interference. In connection with these inspections certain technical and licence conditions are checked. There is no requirement that radio installations, eg PMR, must be checked before they are put into use. It is required however, that only personnel authorised by the PT are allowed to install radio equipment.

Private sound and TV broadcasters are, as part of their licence conditions, required to have their installations checked before their respective transmitters go on air.

Random inspections occur, but to a much lesser extent. An example of the latter may be in connection with the expiration of a licence when it is required that the radio installation is dismantled and the equipment put out of use. Occasionally former

licensees fail to comply with this requirement. Inspection of former licensees are not carried out on a regular basis but may be put on the agenda if the inspectors are in the neighbourhood, eg in connection with other tasks and if time allows a closer look. The monitoring service also assists both the police and customs service on radio related matters in connection with traffic controls and import of radio equipment.

Since inspections of various kinds of radio equipment are within the responsibility of the Frequency Monitoring Section and hence also part of the section's daily work, it may be said to be part of a work programme. There is however, no "ready made form" eg saying that a certain percentage of available time should be used for the inspection of equipment of particular categories.

11. POLAND

Random inspections are carried out as well as inspections if an interference complaint is received.

12. SPAIN

The Telecommunication Administration (SECRETARIA GENERAL DE COMUNICACIONES (SGC)) currently has fifty two provincial offices and there is at least one inspector in each office. In addition there are a group of inspectors at the central office.

The enforcement of the regulation on radio equipment include both checking the marketing to ensure that only equipment which is approved and CE-marked is put on the market and the use of radio equipment to avoid and eliminate disturbances.

In general, licensees have to use professional help with their installations and the telecom administration requires the installations to be certified by a qualified professional before they are put into use. In particular broadcast stations and GSM base stations are inspected before they are put into use.

The SGC carries out radio station inspection as part of the work programme of the telecom administration as well as in response to complaints of interference. The inspections check the most vital elements:

- Power;
- Antenna location;
- Antenna height;
- Direction of main lobe;
- Gain;
- Modulation;
- Harmonics and spurious.

13. SWITZERLAND

There are two main tasks: inspection of the frequency spectrum and market surveillance of radio equipment. The purpose of inspecting the use of radio equipment is to eliminate interference on the frequency spectrum.

Inspection of frequency spectrum

The Radio Monitoring section (RM) of the Federal Office for Communications (OFCOM) is in charge of frequency spectrum inspection. RM proceeds to frequency spectrum monitoring with intent to discover interference.

The major part of their inspections are carried out in response to a specific interference complaint. The other part is carried out at random. RM reports the interference cases to the Market and Right section (MR) in charge of market surveillance.

Market surveillance of radio equipment

The main tasks of MR are the following:

Inspections carried out in response to a complaint of RM;

Random inspections;

Inspection carried out after the non-renewal of a concession;

Random inspections carried out coinciding with traffic inspections of the police.

Market surveillance at the distributors' premises to inspect radio communication equipment (VHF / UHF equipment). MR tries to carry out a minor part of the inspections at private equipment holders premises only.

Inspections

The inspection purpose is to verify the facts. When verified, the inspectors commence administrative criminal proceedings and proceed to inquiry, equipment sequestration, holder's examination, etc. Finally non licensed equipment will be confiscated and destroyed in the major part of the cases and the holder will be subject to a penalty.

14. TURKEY

No routine or random inspections. Inspections are carried out in response to an interference complaint. The interference source is determined by a mobile monitoring team and given 2-3 weeks to take necessary measures to mitigate the interference problem. The administration is now establishing a National Monitoring System to cover the whole of Turkey which will be operational in three years time.

15. UNITED KINGDOM

The UK Radiocommunications Agency (RA) endeavours to resolve interference problems by means of a continuing programme of inspections of radio installations, by educating customers in correct radio use and, where required, by enforcement action. All radio usage is covered in RA's activities, including mobile, aeronautical, maritime, broadcasting, fixed services, paging and leisure radio use. Business radio use remains the major element of planned programme work. Inspections of radio installations are a necessary ingredient because failure by one user to meet the terms of the licence may well cause interference to another. The local staff who cover the UK are organised into five regions.

The RA's priorities in dealing with interference are to deal first with interference affecting the emergency services; second to assist businesses affected by interference; and, finally, to deal with other interference complaints. The Agency aims to respond to all complaints from the emergency services within 24 hours, 98% of both commercial and domestic interference complaints within one month.

Regions process PMR applications for local assignments and despatch licences. They then inspect new installations at the earliest convenient time after despatch of the licence, consistent with the need for economy in travelling. The inspection work for existing installations is currently being scaled down to provide room for work of greater priority and is expected to be demand led as a result of interference complaints

Marine inspection campaigns, as an example, concentrate on misuse particularly on safety channels, less on simple licence checking. Emphasis is on the misuse of ship radio and the use of non type approved equipment. Fishing vessels are a particular target because experience indicates this is an area of abuse of licence conditions.

Each region inspects about 10 amateur stations at random. There are about 50 reactive inspections as well, arising from TV interference complaints.