INTERNATIONAL MEASURES ON RADIO INTERFERENCE

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International Special Committe on Radio Interferance (CISPR) studies interference problems in terrestrial radio, television broadcasting and all kinds of wireless telecommunications systems. CISPR cooperates with the International consultative committee on Radio (CCIR), which advises the International Telecommunication Union (ITU). The European Broadcasting Union (EBU) is member of CISPR. (I)

This committe determines sources of interference which give rise to the largest number of complaints and what can be done about it at reasonable cost and settles the most important parameters to be followed. To cope with interference problems, some of the factors which have to be taken into account are : (2)

a) Standardized methods of evaluation of interference,

b) methods of measurement which correlate well with subjective an noyance,

c) Standardized list of complaints on radio interference,

d) limits of radio interference and their interpretation,

e) fields to be protected against radio interference,

f) immunity of receivers against radio interference,

g) coupling between sources and receivers.

A- Standardized Methods of Evaluation of Interferance

This concept consists of scales of picture quality, impairment, and comparison for the subjective assessment of television images.

B- Methods of Measurement and Measuring Instruments

Wide-band interference (motors, engines) and small-band interference are to be measured, The CISPR first agreed on the measurement of interference to sound (radio) broadcasting. When the television broadcasting developed, some extra principles had to be determined for the most common sources of interference.

C- Standardized Lists of Complaints

Many control authorities produce annual lists of complaints in which all sources of interference are classified. In this way CISPR can see where action is needed most urgently. Such lists are available for long wave, AM, FM and television. Since the lists used different categories, it was not easy to compare them. A working group of CISPR Standardized the complaints and classified in 153 types.

D- Limits of Radio Interference And Their Interpretation

Some limits are recommended on radiation for elements of radio and television broadcast receivers; such as conducted interference, radiated interference, HF terminal voltage measurement.

Although the production of television receivers for one day usually fits the standards, the parameters may be quite different on other days. Atmospheric disturbances may occur and change variable parameters. (3)

E- Fields to be Protected Against Radiointerference

The CCIR has defined that for the reception of monophonic FM signal in the absence of interference a field of 50 μV/m is necessary. In rural areas 250 μV/m, in urban areas 500 μV/m, in large cities 3 mV/m is desirable. For stereo reception the respective figures are 250 μV/m, 500 μV/m, 2 mV/m, 5

mV/m. All field strengths are measured 10m above ground. (4)

The minimum field strengths for planing a television service are : Band I, 40 dB above 1 μV/m ; Band III, 55 dB above 1 μV/m; Band IV, 65 dB 1 μV/m; Band V, 70 dB 1 μV/m. In a practical plan, because of interference from other television transmitters, the field strengths that can be protected will generally be higher than those quoted. The CCIR has also defined the minimum filed strength that will give a satisfactory grade of service taking into account receiver and cosmic noise, antenna gain, and feeder loss. It is clear that CCIR has left much less room for interference in the television service than for FM. (5)

F- Immunity of Receivers Against Interference

Interference may enter the receiver via the aerial (antenna). Interference may also enter a television receiver through pickup of the antenna lead-in cable, through direct pickup of the chassis, and via the main lead. The external immunity of a television receiver installation is the measure of its rejection of signal or interference entering by paths other than the aerial. It depends chiefly upon adequate screening of the input tuned circuits and the continuity of the screen of the unbalanced aerial feeder. For balanced input receivers the immunity for ambient fileds in general very low in Band III and exremely low in Band IV / V. This immunity is of importance when considering limits for interference from domestic appliances, situated at less than 15 meter distance, because multielement aerial discriminates against radiation from below. It is also to be taken into account when in a cable television system the signal enters via the community aerial and also as ambient filed, because it may lead to undesirable echoes. (6)

Because the character of impulsive noise is very different from the character of the desired signal, it is possible to reduce its effect by special electronic circuits. This method is used in some car receivers and in this way the internal immunity of the receiver is improved.

G- Coupling Between Sources and Receivers.

The coupling between sources of interference, situated in an adjacent room or in an adjacent building, and receiver is measured. The difference between the effect direct on the aerial terminals and the distant effect is coupling factor. (7)

Conclusion

The approach taken by CISPR is also usable in other telecommunication services and for problems of electromagnetic compatibility in general. Recommended methods of measurament and limits are also followed in Western Europe. The European Community adopted a standard radio interference legislation based on CISPR recommendations.

NOTES

(1) Herbert Ungerer. **Telecommunications in Europe**. Brussels, The European Perspectives Series. 1990. ss-132-133

(2) International Telecommunications Union. **Radio Regulations**. Geneva. ITU Publication 1990.

(3) Stan Prentiss. **The New mobile Telephone System**. Blue Rigde Summit. Tab Boks Inc. 1984. ss-3-10

(4) Telsiz Genel Müdürlüğü, **Telsiz Dünyası**. Ankara, TGM Dergisi, Sayı. 3-1992. ss-5-8.

(5) ITU, **Radio Regulations**

(6) TGm-**Telsiz Dünyası**-Sayı-4-5-ss-4-5.

(7) ITU **Radio Regulations**