



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



## **HARMONISATION OF FREQUENCY BANDS TO BE DESIGNATED FOR RADIO LOCAL AREA NETWORKS (RLANs)**

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Reports are being issued from time to time by the European Radiocommunications Committee (ERC) of CEPT to inform industry, operators, users and other interested parties of the work in hand, provisional conclusions and future activities in specific areas of radio frequency management. Such Reports give more details than is normally possible in a Recommendation and allow an opportunity for comment to be made on the work carried out so far. In most cases, it would be hoped that a formal CEPT Recommendation could be issued on the subject of the Report in due course, taking into consideration any comments received on the Report.

Reports are formally approved by, and issued in the name of, the Committee itself. In general the detailed preparation of Reports, and further work on the subject, will be done by Working Groups or Project Teams. Thus, any reference in the Reports to the ERC should be taken to include the whole framework of the ERC, including its Working Groups, Project Teams, etc.

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## HARMONISATION OF FREQUENCY BANDS TO BE DESIGNATED FOR RADIO LOCAL AREA NETWORKS (RLANs)

### 1. INTRODUCTION

There is an increasing need for the introduction of computer terminals and peripheral equipment into the business and industrial environments. Currently, information is exchanged between such equipment by cable, resulting in a rigid hardware structure.

Radio Local Area Networks were conceived in order to replace physical cables for the connection of data networks within a building, thus providing a more flexible and, possibly, a more economic approach to the installation and use of such networks within a building or factory.

There are many potential application for RLANs and, after an initial consideration, the ERC has come to the preliminary view that more than one technology and frequency band would be necessary to meet the requirements of the various applications.

This report attempts to categorise the various types of RLANs and examine the frequency management issues involved in selection of harmonised frequency bands.

It deals with the frequencies for RLANs themselves and does not address the question of the interconnection of individual networks.

### 2. BACKGROUND

Some countries outside Europe have designated spectrum for RLANs in their ISM bands at 900 MHz, 2.5 GHz and 5.8 GHz. Also, there has been significant development work in the USA on RLANs in the 18 GHz band. Within CEPT, Recommendation T/R 22-03 E provisionally designates the frequency range 59 GHz - 62 GHz for RLANs.

Within Europe the DECT system has been developed in the 1880 MHz - 1900 MHz band offering speech and data facilities which may meet some of the RLAN requirements mentioned above.

Compatibility and technical parameters of RLANs will be studied in CCIR Study Group 9 and, in Europe, the development of equipment standards will be undertaken by ETSI.

In CEPT, the newly formed telecommunications regulatory committee, ECTRA, has set up a Project Team to report on the scope for harmonised regulatory policies in the mobile communications field. RLANs will be one of the systems to be considered.

### 3. CATEGORIES OF RLANs

Three categories of RLANs can be identified:

- (a) Systems using currently available technology in the low microwave bands. These systems take advantage of spread spectrum modulation techniques, which enable them to operate satisfactorily in a noisy radio environment. In the low microwave bands, good in-building penetration may be achieved but systems are limited to low data rates (up to 1 Mbit/s) because of spectrum availability.
- (b) Systems requiring higher data rates and consequently greater bandwidths but smaller range. Such systems are ideally suited to the millimetric bands. However, the technology has yet to be developed.
- (c) Systems requiring reasonable in-building penetration and medium data rates (at least 10 - 15 Mbit/s).

#### 4. CONSIDERATION OF FREQUENCY BANDS

##### 4.1. For category (a) systems

900 MHz

This band is unavailable for RLANs in CEPT countries because of the high density of use by cellular radio.

2.4 GHz - 2.5 GHz

This band is designated for ISM applications in all ITU regions. Accordingly it would seem to offer a good alternative to the 900 MHz band without requiring a significant change to equipment design. However, some CEPT Administrations have expressed the view that they would be unable to designate any of this band for RLANs without a detailed compatibility study with existing radiocommunications systems.

5.725 GHz - 5.875 GHz

This band is also designated for ISM applications in all ITU regions. However, in order to use the band, a design change would be required, delaying the introduction of RLANs, and there would be less in-building penetration at this frequency. Again, some CEPT Administrations have expressed the view that they would be unable to designate any of this band for RLANs without a detailed compatibility study with their existing radiocommunications systems.

##### 4.2. Category (b) systems

As mentioned above, CEPT Recommendation T/R 22-03 E designates the frequency band 59 GHz - 62 GHz for radio links and RLANs.

However, it is considered that initial RLANs could be accommodated in a smaller sub-band in order to encourage the development of spectrum efficient equipment and similar to the concept of category (a) equipment, the ISM band 61 GHz - 61.5 GHz is recommended. At a later stage, compatibility studies with the fixed service may enable frequency sharing in all or part of the 59 GHz - 62 GHz band.

##### 4.3. Category (c) systems

An operational system meeting the requirements of this category has been developed in the United States to work in the frequency band 18.8 GHz - 19.2 GHz. In CEPT countries this band is used in accordance with the Radio Regulations and CCIR Recommendations for the fixed service. Compatibility studies between the fixed service and the RLAN system mentioned above are in progress in some CEPT countries. Preliminary results are not encouraging. Further studies are necessary to confirm these results and to investigate the possibility of using adjacent bands within the tuning range of equipment.

If these studies finally prove negative, it will be necessary to identify a suitable alternative band to meet the perceived requirement of category (c) systems.

#### 5. PROPOSED ACTION AND TIMESCALES

Steps have been taken within the framework of the ERC to provide Administrations with the technical information on category (a) RLANs and to prepare example methodologies for compatibility studies between RLANs and existing systems operating in the frequency band 2400 MHz - 2500 MHz and 5725 MHz - 5875 MHz.

This work will include consideration of national compatibility studies between RLANs and the fixed service in the 18 GHz band and provide a joint conclusion on the possibility of frequency sharing.

Work on category (a) systems is in hand and it is hoped that decisions can be reached in June 1991.

If the studies at 18 GHz prove negative, the work will continue to provide a longer term solution to the requirement for category (c) RLANs.