



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



## **PRINCIPLES FOR SHARING BETWEEN MILITARY AND CIVIL RADIO SERVICES**

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### 1 INTRODUCTION

The need for sharing between military and Civil use of the radio spectrum is becoming an important issue as the pressure on civil radio spectrum increases to meet the requirements of the new services.

Pressure on the radio spectrum is influenced by the emphasis adopted in provisioning telephony services, which in some countries is concentrated on cable, and also by liberalisation and competing operators. However the need for additional spectrum is important and various sharing principles are identified below.

The need for temporary/short term access to military spectrum at a limited location for applications such as ENG/OB is probably easier to accommodate by a geographical separation/time sharing combination. For longer term access there is a need to guarantee use of the spectrum on a non-interference basis and possible methods are given in section 2 below.

### 2 SHARING PRINCIPLES

Sharing can be achieved between two or more radio services occupying the same portion of the frequency spectrum in one of the following ways:

- a. Use of the same frequency by different services at different times - time sharing.
- b. Simultaneous use of different parts of a shared frequency band by different radio services - frequency separation.
- c. Simultaneous use of the same parts of a shared frequency band but in separated geographical areas - geographical separation.
- d. Simultaneous use of the same parts of a shared frequency band at the same time in the same place but on a non-interference basis - NIB operation.

### 3 PROTECTION OF MILITARY SERVICES

- a. Time-sharing. It seems simple to suggest that civil services should use military spectrum in peacetime and the spectrum should revert to military use only in emergency or war. However, some defence systems are operational in peacetime, e.g. strategic missile detection systems, air traffic control and air defence radars. Also military training and exercises continue in peacetime in order to prepare for war roles. Finally, many civil radio services would be very reluctant to give up their use of radio in exercises or in a period of transition-to-war. Transition-to-war procedures may arrange for civil frequency bands to be taken over by the military but these arrangements constitute overt preparation for war and are unlikely to be agreed except at a late stage of the transition process. The transition-to-war procedures are not appropriate for circumstances of major national or NATO exercises when more spectrum might be needed. Nevertheless, time-sharing is feasible in suitable circumstances, particularly at HF.

- b. Frequency Separation. Civil use of military frequency bands has been agreed in many cases where the military band is not completely occupied in frequency channel terms. This works well in that the civil service operates on dedicated channels independently of the military usage although the military normally insists on a "non-interference no protection" condition to avoid the need for detailed co-ordination and band-edge protection by guard bands. Difficulties can occur if military usage subsequently increases, particularly if the civil user is not aware of the conditions of occupancy and the prior rights of the military. Frequency separation is the most widely practised method of sharing spectrum. Where it is possible to use the same equipment operating in the same frequency band with the same channel plans this will further facilitate sharing.
- c. Geographical Separation. In some cases use of military bands is confined to limited parts of the country, e.g., military training areas, and sharing can be agreed with civil services if those services can be restricted to other locations. Geographical separation may be possible with licensed radio services because they are subject to a radio site clearance procedure which enables military to object to individual sites if interference is likely. Sharing would not be agreed for unlicensed civil services unless there were power limitations applied which would make interference to military systems negligible; this depends upon the sensitivity of the military radio or radar receivers in the band concerned and the type of civil operation. For instance, sharing by low power devices operating in aircraft communication bands has been opposed by NATO on the basis that an aircraft receiver would be subject to a dangerous noise level from the number of devices it could receive from, even if only a small proportion of the devices were in use simultaneously. Geographical separation sharing has been agreed in a limited number of cases.
- d. NIB Operation. Different radio services can share the same frequency channels if the sharing services undertakes not to cause interference to the host service. This is the basis of sharing between primary allocations and secondary allocations in the same band. There is a possibility of severe penalties to the service sharing if the primary service operates in a safety-of-life context because extensive, lengthy and costly testing may be necessary to demonstrate that interference will not occur; this has happened with the military Joint Tactical Information Distribution System which operates in the radio navigation band of 960-1215 MHz. Sharing on a NIB basis has been agreed particularly with radars.

#### **4 CONCLUSIONS**

There are already specific instances where it has proved practicable for shared civil and military use of the frequency spectrum by using one or more of the sharing principles detailed previously. The opportunities for sharing are dependent on the precise civil application such as whether the civil fixed links are for short time periods, permanent use, or for high or low performance availability's and the type of military services.