

Copyright Notice

Crown copyright material is reproduced with the permission of the Controller of HMSO and the Queen's Printer for Scotland

All material contained in this document was scanned from an original printed copy of Exhibition 1971 Leicester produced by the Directorate of Telecommunications in September 1971.

The licence granted by HMSO to re-publish this document does not extend to using the material for the principal purpose of advertising or promoting a particular product or service, or in a way, which could imply endorsement by a Department, or generally in a manner, which is likely to mislead others.

No rights are conferred under the terms of the HMSO Licence to anyone else wishing to publish this material, without first having sought a licence to use such material from HMSO in the first instance.

Signed

Steven R. Cole
22nd October 2004

RADIO AREA COVERAGE - PART I

By: G J Mewett C Eng MIEE

In this talk I feel that we should first of all stress a few of the difficulties associated with providing radio schemes to conform to your requirements of area coverage. I will, therefore, in the first part of this talk concentrate on the general aspects related to the provision of radio area coverage whereas the second part of this talk will deal with particular systems.

In the ideal mobile system we would have 100% radio coverage of a given area for 100% of the time. This ideal is certainly very difficult to achieve from an engineering point of view and I would say, in most cases, not possible to achieve in practice. This means that in real terms a compromise has to be reached. This compromise is, in the main, determined by the following factors :

- a. Cost of the radio scheme necessary to meet the area cover requirements.
- b. Location and acquisition of suitable radio sites.
- c. Availability of suitable radio equipment to provide the scheme.
- d. Assignment of suitable frequencies for the scheme.

I will now spend a few moments on each of these aspects. First of all, but not necessarily the most important, we have 'cost' which places a limit on what can be provided as it is a function of what you, the customer, are prepared to pay. Hence it may not be possible to provide adequate radio cover purely on financial grounds.

We now come to my second point which relates to radio sites. Before any radio scheme can be planned suitable radio sites have to be found in order to meet the radio cover requirements. When a possible site is located a radio survey is performed and, if satisfactory, negotiations to use it would then commence. I should perhaps mention at this point that by using the present system of "AM Spaced Carrier" techniques to provide area coverage one is limited to an ideal maximum of three main station sites. No doubt you can appreciate how difficult it is to find three sites that are in the right locations, especially if the area is large. Even if these sites can be found, permission to use them has still to be obtained and is now often refused on the grounds of "spoiling the local amenities".

I will now move on to my third point—the availability of suitable radio equipment. This is associated with the time scale in which your requirements have to be met. Provided sufficient 'long' and 'medium' term planning is done in relation to the proposed schemes then no major problems should be encountered. However, if your requirement is immediate, then one can only use that equipment which is available 'ex stock' at that time.

My last point deals with the aspect of frequency assignments. This factor is, I am sorry to say, all too often taken for granted. Before any radio scheme can become viable a frequency or set of frequencies has to be assigned to it.

The Home Office has been allotted blocks of frequencies, within the various bands, from which we are free to make our own assignments. However, the blocks of frequencies are not inexhaustible and now, in some areas, saturation of available channels in certain bands has been reached.

In the past, frequencies in the UHF band, which we use mainly for 'Personal Radio Schemes', have been assigned on the basis of 50 kHz channel spacing. We are now moving towards equipment requiring 25 kHz channel spacing and all new equipment will be based on this. This means that twice as many channels can now be made available in this band. This will undoubtedly relieve the saturation problem that exists at present, particularly in the Midland area, and will therefore reduce the number of complaints regarding interference between nearby schemes at present sharing the same channel.

At present the lower VHF band of frequencies, that is those used for your main schemes, are assigned channels on the basis of 25 kHz spacing, whereas other private users within this band are required to use $12\frac{1}{2}$ kHz channels. With the increased demand for extra channels we will have to move in this direction ourselves. Unfortunately the 'Spaced Carrier' system, now used, requires a channel of 25 kHz spacing and, in fact, pollutes adjacent 25 kHz channels so preventing their use in the nearby area.

Assignments of 'Link' circuits are made from the Upper VHF band and with these we have already reached the saturation point in certain areas of the country, unless we are prepared to accept an increase in interference between non-related schemes sharing the same channel. No doubt you already appreciate that sharing of channels between non-related forces is unavoidable. However, we try to do this on the basis of causing minimal interference between schemes and, in practice, find that we are able to use a channel approximately five times throughout the country. To increase sharing means an increase in interference and to avoid this we must now seriously consider a move towards $12\frac{1}{2}$ kHz channel spacing on 'Link' circuits and possibly re-think the basis upon which the present schemes are provided.

It is now time to deal with Part II of the talk but first of all I would like to end Part I with the following comment:-

As the customer you can help us to meet your operational requirements for radio area cover by making sure that your requests are based upon 'what you really need' as opposed to 'what you would like to have'. You can help further by appreciating that with ever increasing demands for radio schemes a certain amount of interference is inevitable, and if this can be tolerated we will obtain a slight relief of pressure on frequency allocation.

Mr Mewett recently joined the Home Office as a Senior Wireless Engineer in charge of the Frequency Planning and Common Services Section. He began his career with the Post Office in the Telecommunications Branch subsequently leaving to join the General Electric Company as an Applications Engineer on radio transmitting valves. He then took up an appointment in the Telecommunications Branch of the Central Electricity Generating Board and finally moved to his present post in the Home Office.