450 – 470 MHz Band Alignment

Response to the Radiocommunications Agency Consultation Document – December 2002

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Introduction

JFMG Limited is an Agent of the Radiocommunications Agency, contracted by the RA to manage the radio spectrum used in the UK for Programme Making and Special Events (PMSE), and to issue licences to users of this spectrum.

In responding to the current Consultation, we are giving our opinion on the technical and operational aspects of the proposed spectrum realignment. As far as financial and resource implications are concerned, we will comment on general aspects only and not attempt to quantify these factors. We believe that individual PMSE licensees are best placed to give details of the likely impact on their own businesses, and we have actively encouraged them to respond to the Consultation.

JFMG is a member of the Industry Working Group set up by RA to advise on the realignment plan. At this forum we have commented on the general aspects of the plan as it has been developed, and have made various suggestions for improvement. We do not therefore intend to comment again on every aspect of the published plan, but are concentrating on those points which have particular relevance to the PMSE service.

1. Specific Comments on the Consultation Document

In this section we respond to certain sections of the Consultation Document that are particularly relevant to Programme Making and Special Events. Quotations from the Consultation are shown in *italics*.

1.1 Introduction
1.3 Background
JFMG agrees with the underlying principle and stated intentions of the band realignment. The discontinuity in band planning of mobile radio services at national borders within Europe is no longer supportable, and needs to be corrected. However in any such change it is essential that the impact of the change on existing users be properly assessed, and that where necessary measures are taken to ensure that individual users are not penalised for the move – particularly where they will gain nothing directly from it.

1.4.1 Major benefits to the UK
1.4.2 Better use of spectrum
The benefits of facilitating the introduction of digital services such as TETRA are recognised. However it must be noted that many users are entirely satisfied with their existing analogue systems and have no need for the additional facilities offered by new (and more expensive) digital voice technologies. Among these are a significant number of PMSE licensees whose operations require the use of single constant-carrier channels without processing delays, economically provided by the systems they already have. This legitimate requirement should not be stifled by any regulatory change.

1.4.6 Interference from neighbouring countries
PMSE licensees rarely complain of problems that are attributable to continental interference. Whilst accepting the possibility that future changes of use on the continent may affect existing UK users, it seems unlikely that they will consider this in itself a convincing reason for spending money on modifying or replacing their radio systems.

Band reversal in the UK will permit co-ordination of services with the Continent, as the document states. However co-ordination is a two-way process. It will also result in geographical restrictions on the establishment of some services. Some existing users may have to modify or move their base sites and network links to obtain co-ordination, at considerable cost. Geographical and power restrictions due to co-ordination will in effect reduce the net gain of spectrum from the re-alignment.

1.5.6 Why is Band alignment happening now?
RA is already in close dialogue with its Irish counterpart.
We consider it essential to a successful alignment process that the Irish Administration agrees to synchronise their own changes with the UK. There

is a potential for considerable interference in both directions if the Irish do not change at the same time as the UK – not just within Ireland but between the Republic and Wales and the north-west of England.

2.2 Proposed band plan and migration

There is no single ideal way to reorganise 20 MHz of UHF spectrum and all of the customers using it. Any proposed final plan, and any way of staging its implementation, will entail some degree of disruption and costs to users. However we believe that the plan and transition process, as published in the Consultation, are not likely to be substantially improved upon. In a later section we have some observations with particular regard to the proposed PMSE bands.

2.3 IT Solution

users will be notified of new assignments from summer 2003.

JFMG will be taking the opportunity presented by the alignment, to reorganise the PMSE allocations and more fully meet the current needs of users. We intend to draw up a policy document and consult fully with the many types of users that we license. Individual assignments will be calculated by JFMG using our own planning tools, rather than by the RA's new tool. Consequently PMSE users will not receive their precise frequencies during 2003. It is important however to confirm to licensees (and their equipment suppliers) the frequency bands they will be moved to, and the dates of the move, so that they can plan resources accordingly. This will be our first priority.

4.2 Implications

SRD's are licence-exempt, so it is not considered feasible to move this block over the timescale.

Leaving the SRD's where they are will not prevent or delay the alignment process, and will reduce the overall national impact of the changes. It need not therefore be considered at this time. If RA considers such a change to be necessary, it should be addressed as a discrete issue and made the subject of a separate consultation.

4.4 What will band alignment mean for the licensee?

As noted earlier, there may be cases when current base sites (particularly in south-east England) become untenable due to co-ordination issues. The user will then be faced with substantial costs to re-engineer his service so that he can cover the same territory at a lower co-ordination profile. This may affect a number of PMSE users who currently have base stations installed on dominant broadcast sites.

Due to the densely packed environment of multi-user base sites within major cities, and at hilltop sites in rural areas, we believe there will be many cases of blocking and intermodulation when the various services reverse their

frequencies at different times. This will result in a changing pattern of interference throughout the changeover period. In some cases it may be possible to ameliorate the effects (at a cost) with suitable additional filtering. This point needs to be explained to the users who may suffer the interference and will presumably have to pay the costs of any special engineering.

TV Channel 21

As mentioned in *Annex B* of the Consultation, users with base transmit frequencies near to the 470 MHz end of the band may cause interference to domestic TV reception. This may entail restrictions on the location of base transmitters, and/or the installation of special filtering to TV receivers. This point is particularly relevant to PMSE and so we re-visit it later; but it also applies to other services.

The use of spectrum above 467 MHz by PMSE currently takes place on a non-interference basis to TV broadcasting in channel 21 (470 – 478 MHz). For analogue television, this is based on protection criteria published in 1986. For digital television, the Chester Agreement of 1997 is used. Together, these requirements place substantial restrictions on where the 467 – 470 MHz bands can be used, particularly for base stations at a power of 5 watts or more. Experience with the former national paging service at 466.075 MHz shows that the problem extends well below 467 MHz. Under the new plan, the band from 466 – 467 MHz will contain PMSE, CAA and Home Office services.

We therefore consider it essential that a new study be carried out by RA of the potential interference to the current production of both analogue and digital television receivers, from interfering transmissions across the new base transmit band 460 – 470 MHz. The study should define what degree of interference is acceptable, and what restrictions should be applied to the new allocations in this range to achieve this level of protection. This must be done immediately so that potential users of the spectrum can be informed how they will be affected, and so that changes can be made to the band plan if unacceptable operating restrictions are indicated.

2. Requirements of PMSE Spectrum and effects of UHF alignment

2.1 Current PMSE allocations

The spectrum blocks allocated to PMSE within the frequency range covered by the Consultation, are as follows:

454.9875 – 455.4750 MHz
457.2500 – 457.4750 MHz
461.23125 – 461.25625 MHz
462.7500 – 463.0000 MHz
467.2625 – 469.8750 MHz

These five bands are all available throughout the United Kingdom, except that the last band has substantial geographical restrictions in order to protect the reception of television broadcasting. All of the bands are also available for airborne use, which is a significant requirement for many PMSE operations.

In addition, two other bands just outside this range are allocated for PMSE:

442.2625 – 442.5125 MHz
446.4250 – 447.5125 MHz

These two bands are available on a geographically restricted basis, and are partly pre-emptible at two weeks' notice by the primary user.

Assignments within these bands are in many cases used by JFMG licensees in conjunction with frequencies in the 450 – 470 MHz bands, for instance as one half of a duplex pair. Therefore any change above 450 MHz will affect operations below 450 MHz. Also, it is understood that the RA intends to concentrate simplex operations within the band 440 – 450 MHz as recommended by CEPT. For both of these reasons, we believe it necessary to include the two bands within the re-alignment process for the PMSE service.

The above bands were inherited by JFMG from historic assignments to the BBC, IBA, and independent programme makers. As such, they are not necessarily ideal to meet current PMSE requirements which have evolved rapidly in recent years.

2.2 Use of affected bands

The frequency bands listed above accommodate the following types of operations:

- simplex and duplex radio talkback, and cue to presenters
- audio programme links
- data (e.g. to control camera functions)

Each of these operations may be located:

- at a fixed permanent location, such as a theatre or studio
- mobile within a defined geographical area for news-gathering
- at a short-term location-specific activity such as a sporting event
- for linking between event locations (but not for fixed links)

Bandwidths vary from 12.5 kHz for radio talkback, up to 50kHz for broadcast-quality links

JFMG licenses these services either on an annual basis (for fixed sites and news-gathering) or for short, defined periods of use (all other operations).

The PMSE service has a number of unusual characteristics:

- the pattern of operations, and therefore of frequency assignments, varies from hour to hour and from day to day
- frequency assignments are routinely requested and issued at a few hours' or days' notice
- frequency use can be very intensive. At a major sporting or public event, 50 or more UHF channels may be assigned by JFMG, in addition to those in use for normal PBR.
- In order to meet this intensive requirement without unacceptable intermodulation problems it is necessary to have a number of smaller frequency bands rather that a single large one.
- for the same reason, PMSE duplex assignments use non-constant tx/rx offsets.
- many radio talkback transmissions require continuous transmission, often with an open talkthrough facility.
- quality of service is of paramount importance. Live, or as-live programme links require total freedom from interference. Talkback or cue circuits must be reliable and uninterrupted because they are crucial to the timing of a programme or event.
- airborne assignments are in daily use for traffic-reporting and for news-gathering, and also for many major public and sporting events.

In considering any proposed new bandplan, it is essential to ensure that all the above industry user requirements can continue to be met.

2.3 Current state of PMSE UHF spectrum

In 1998 we took advantage of the amalgamation of different pools of UHF spectrum inherited from Broadcasters' JFMG and ASP, to re-allocate many of the channels for short-term duplex talkback. This increased the useable number, and particularly the quality of service, of these channels.

The wide-area channels used for news-gathering by local and regional radio and television stations require a complete re-planning exercise to accommodate new and different demands. In some areas we are not now able to find new news-gathering assignments, because the allocated bands for this purpose are full. We have invested heavily in the best available planning tools and are prepared to commence a full re-planning exercise. However, we are in the same position that the RA finds itself on a larger scale in approaching the band re-alignment – it is not possible to move a service that fully occupies a band, without the facility of clean spectrum to provide a working space.

For this reason, JFMG welcomes the band alignment project as an opportunity to bring PMSE wide-area assignments up to date.

2.4 The RA's proposed realignment plan

JFMG has taken part in the Industry Working Group, and through that medium has requested changes to the original draft plans. In general, the bands now to be allocated to the PMSE service seem satisfactory. We do however have some specific concerns, which need to be addressed. These are as follows:

2.4.1 As mentioned earlier, a study is required to establish the criteria for use of the spectrum adjacent to the TV broadcasting bands, to establish what degree of protection is required. Since PMSE will be the nearest service to 470 MHz, this service is particularly affected.

2.4.2 Under the new plan, PMSE assignments have been split into three separate duplex paired blocks, at JFMG's request in order to provide scope for better intermodulation protection when many channels are required at major events. The lowest base receive block is immediately adjacent to the 450 MHz band edge. It now appears that high power paging services will be moved into the block immediately below 450 MHz, and consequently there is a danger of blocking to co-sited PMSE base receivers in the 450 MHz band. We therefore propose a change to step 11, so that the "450 MHz" block, together with its paired base transmit, is moved slightly up in frequency to be adjacent to the scanning telemetry block. This move would appear to have no implications for any other existing service.

2.4.3 All the current PMSE bands from 450 – 470 MHz are available for airborne operation at heights of up to 2,000 feet above ground, and are used in this manner - in some cases on a daily basis. We require confirmation that the new bands are available for similar airborne activities. Since not all of the PMSE spectrum requires airborne operation, it may be possible to agree parts of each band that can be used in this way.

2.4.4 Because PMSE assignments are requested and issued at very short notice on a 24 hour / 365 day basis, individual co-ordination for these

assignments is not possible. It will therefore be necessary to pre-coordinate the PMSE bands for mobile operations, if necessary with agreed height / power / bearing limits in areas adjacent to other countries.

2.4.5 JFMG assignments form a constantly changing pattern of duplex, base transmit simplex, and portable transmit simplex, assignments within the appropriate bands in order to meet changing user requirements. Also, bandwidths of up to 50 kHz are required for high-quality audio links. Consequently, it is important that co-ordination and other arrangements do not specify fixed 10 MHz tx-rx spacing, or limit channel bandwidths to 12.5 kHz.

2.5 PMSE licensees

2.5.1 PMSE licensees vary widely in their size and type of business, from sole traders up to the national and international broadcasters. We have encouraged all those affected by the proposed changes to respond to the Agency's Consultation, so that their financial and other costs can be properly assessed.

2.5.2 It should be particularly noted that many PMSE assignments are used continuously for live news-gathering purposes, and there are public service requirements on some broadcasters to provide an uninterrupted service. Very careful arrangements will be necessary to ensure that these services can be maintained during the changeover process.

Summary

JFMG supports the principle of the UHF Band alignment, and that it should be carried out over the minimum possible timescale in order to reduce the period of transient site engineering problems.

There will be significant implications for many users in terms of equipment modification and/or replacement, and staff resources. RA should consider what can be done to assist users in overcoming these difficulties.

We believe that a study of the likely interference from base transmitters between 460 – 470 MHz to TV broadcasting reception is required, on an urgent basis, to establish what operational restrictions may apply.

As far as the PMSE service is concerned, RA must ensure the suitability of the replacement spectrum to meet all the particular needs of this sector of the industry.