

IBS Response to Digital Television: The Principles for Spectrum Planning.

The Institute of Broadcast Sound has over 800 members, of whom approximately 400 use radio microphones regularly in their daily work. About 200 of these are freelance sound recordists, most of whom own substantial quantities of radio equipment, using mainly Channel 69, the other 200 being sound supervisors, outside broadcast engineers etc. employed by the BBC, ITV, BskyB and other U.K. broadcasters who work with any or all UHF and some VHF bands.

In addition to these personal members, the Institute has over 30 sponsor company members, and these include most of the major importers and indigenous manufacturers of radio microphone equipment in the U.K.

The Institute's concerns about the proposals in the discussion document thus cover three distinct areas – the damage already being done to our manufacturer members by the uncertainty over a cut-off date for the existing UHF analogue spectrum, the probability that the large investment in existing equipment owned by our members will be written off, and the inability of our members to carry out their day-to-day tasks in providing sound to the U.K.'s broadcasters. Furthermore, the Institute believes that the spectrum pricing proposals in Professor Martin Cave's report are seriously flawed, and show little understanding of the way in which the spectrum is currently used by the PMSE (Programme Making and Special Events) sector.

Manufacturing

The U.K. has five indigenous manufacturers of radio microphones and personal (in-ear) monitoring (IEM) equipment. Though wielding considerable international prestige, all are small in business terms, with a total annual turnover estimated to be in the order of £5 million, and all are already suffering because customers are holding off from placing orders due to the uncertainty about the future availability of the UHF spectrum. Both our sponsor manufacturer members have stated that unless some future availability of UHF spectrum for their products can be guaranteed, they will be driven out of business.

Existing Investment

A minimum figure for capital invested in analogue UHF radio microphones by an individual sound recordist is estimated at £10,000, with many IBS members owning equipment worth considerably more than that. A minimum figure for the total existing investment in radio microphone equipment by individual members is thus £2 million. In addition, several of our sponsor company members run rental services, and have large investments in radio equipment, all of which is likely to become unusable unless spectrum remains available. IBS members represent a minority proportion of users and owners of radio microphone equipment in U.K. Broadcasting. Most broadcasters and outside broadcast fleets have large investments in radio microphone equipment, and estimates of the total sum invested in radio microphone equipment range up to £50 million.

Other users of the UHF spectrum with large capital investments under threat include theatres, rental companies, corporate users and thousands of smaller users such as churches and dramatic societies, many of which are serviced by IBS members.

From figures supplied to the Institute by importers and U.K. manufacturers, we estimate that over 14,000 UHF systems intended for use in Channel 69 and other licensed UHF channels were supplied during the 2000/2001 financial year. One U.K. manufacturer estimates his company's installed base at over 5,000 units, on the basis of systems lasting 10 years in service and selling at a rate of 500 units a year. Calculations based on these figures indicate that the total number of radio microphone systems currently in use in the U.K. in the licensed UHF bands is between 70,000 and 130,000. Applying an average cost of £2,500 per system to a median total of 100,000 gives an installed base value of £250 million.

Licenses and Numbers

That many of the above figures may appear to be considerably at odds with the number of actual licences held is unfortunate but it has to be accepted that illegal operation, though reprehensible, does not make a system any less necessary from a programme-making point of view. Despite the best efforts of the JFMG, assisted by the IBS, the percentage of licensed users in the PMSE sector has been estimated at as low as 20%, with many users taking the view that the inability of the JFMG to guarantee interference-free operation means that payment of a license fee is a useless expense. The very low power output of radio microphone transmitters virtually ensures that any interference is suffered by, as opposed to being caused by, a PMSE sector user. It also makes detection by the very small number of enforcement officers a highly unlikely occurrence. This low level of license registrations is thus understandable, though obviously not condoned by the Institute, which is greatly concerned that any decisions on spectrum reallocation may be based on usage figures which are very far from reflecting the true situation.

Daily programming

An examination of the numbers of radio microphones used for a typical evening's viewing on the three main U.K. (terrestrial) television channels shows the following:-

BBC 1

1900 - Vets in Practice - 4 radio mics
1930 - Eastenders - 2 radio mics
2000 - DIY SOS - 6 radio mics
2030 - This is Your Life - 20 radio mics
2100 - Clocking off (drama) - 6 radio mics
2200 - BBC News - 4 radio mics
2225 - Local News - 5 radio mics

BBC 2

1930 - Crufts 2002 - 8 radio mics
2000 - Lifting the Bonnet - 3 radio mics

2030 - Wrong Car, Right Car - 4 radio mics
2150 - Trouble at the Top - 3 radio mics
2230 - Newsnight - 5 radio mics

ITV

1900 - Emmerdale - 6 radio mics
1930 - Tonight with Trevor McD - 4 radio mics
2000 - The Bill - 3 radio mics
2100 - Bad Girls (drama) - 6 radio mics
2200 - ITV News at Ten - 5 radio mics

On other evenings, the much publicised Pop Idol finals on ITV used 24 radio mics, Open House with Gloria Hunniford on Ch 5 used 6, Night Fever on the same channel used no fewer than 21 radio microphones, and Ready Steady Cook and Good Food Live each used 7 radio mics.

City Hospital uses 18 radio mic transmitters, 4 IEM frequencies, and 8 duplex pairs for up to 40 handportables for production staff.

The BBC's Saturday morning children's programme, "The Saturday Show" uses 19 bodypack personal radio mics, 7 handheld radio mics, 6 channels of IEM and the normal studio TB system (3 channels). Other programmes such as Children in Need and Comic Relief exceed these numbers. As the Sound Supervisor for the show points out, "a whole genre of programming has grown up that could not possibly be made without these multi RF setups."

Retuning

Radio microphone systems that are no more than about 3 years old will generally have some degree of frequency agility, though the user may not have access to the full range. Older systems normally require factory retuning and perhaps replacement of parts. This is not a trivial matter, both in cost to the user, and in the restricted technical and human resources of manufacturers. Costs of >£100 per system and throughputs of no better than 10s of units per day per manufacturer should be anticipated. Therefore even significant reallocation of frequencies, let alone removal of them, should not be considered lightly.

Spectrum Pricing

The proposals in the Cave report (sections 8.43 and 8.44), which include auctioning spectrum to ensure "efficient use" appear to the IBS to be irreconcilable with reality. Most of the radio systems used on the PMSE sector are of very small power, typically 10mW, which means that many users can be operating on the same frequency provided that an adequate geographical spread is maintained, but such users are at the mercy of any other spectrum user operating on the same frequency at a higher power. It is difficult to imagine a mechanism whereby a large enough number of PMSE users could be organised so that their joint licensing fees for a single channel would offer a greater return for the use of that segment of the spectrum than would, for example, a broadcaster or mobile phone company, especially as the JFMG's current regulations do not provide PMSE users with any immunity from interference.

Programme-making within both the public broadcast and the corporate environments is massively dependent upon the affordable availability of radio spectrum for radio microphones, IEM links and the like. The Institute's members are greatly concerned that if this UHF spectrum is auctioned to the highest bidders, programme making as it is currently undertaken will no longer be possible, and their many millions of pounds worth of personally owned equipment will be rendered useless. Furthermore, such spectrum reallocation will, in the considered view of industry experts, make it impossible for any major prestige events such as a future Olympic Games to be staged in the U.K.

The UHF Spectrum

The internationally allocated UHF spectrum for TV broadcasting, from 470MHz to 862MHz, is split into 49 channels, numbered 21 to 69. Each channel is 8MHz wide, and can comfortably accommodate 8 radio microphone or IEM systems, or possibly up to 12 in certain circumstances, used simultaneously in one location. The only UK channel effectively dedicated for radio microphones is Ch 69, so when more than 8 systems are to be used, the JFMG allocates other channels as required. It can be seen that for many of the examples above, an additional 4 or 5 channels of 8MHz are needed. The JFMG's contribution to the consultation gives a very clear picture of the requirements of the PMSE sector, and the Institute of Broadcast Sound supports most strongly the points made in that contribution, namely:

It is unlikely that PMSE sharing with new private or public mobile services in cleared spectrum will be technically feasible or economically desirable.

If interleaving on the current basis is precluded by the density of use by future spectrum users, 6 x 8MHz channels would be required for [short-term] future PMSE use. The Institute believes that this should be in addition to the existing use of Channel 69, which should remain available for analogue PSME users indefinitely regardless of any future developments in digital technology.

It is essential that PMSE requirements are properly taken into account when planning for other services on interleaved channels.

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