

# RADIO SOCIETY OF GREAT BRITAIN

Independent Audit of Spectrum Holdings (IASH):



## A review of access to and demand for Public Sector Spectrum

Formal response from the Radio Society of Great Britain.

### Summary

**UK Radio Amateurs share a number of public sector bands. This paper introduces the Amateur Radio Services to the auditors, highlights a number of issues and provides a basis for further more detailed discussions.**

#### 1. About the Radio Society of Great Britain

The Radio Society of Great Britain (RSGB) is the recognised national organisation that represents the interests of the UK's 60,000 licensed radio amateurs. The Society was formed in 1913. The Society is recognised as one of the leading organisations in the world in the field of amateur radio.

#### 2. What is Amateur Radio?

Amateur radio is a science based technical hobby enjoyed by over three million people worldwide. Amateur radio is recognised by the International Telecommunication Union (ITU) as a service and is listed in the ITU Radio Regulations as the Amateur Service and the Amateur-Satellite Service.

Amateur radio is a regulated hobby. World wide, to become a licensed radio amateur individuals have to undertake training, either in a formal surrounding or by self training and then take an examination. In the UK, the Amateur Radio Examination, known as the Radio Communications Examination, is sponsored by Ofcom and administered on its behalf by the RSGB.

Amateur radio has a tradition of scientific investigation and experimentation which continues to the present day and radio amateurs have been at the forefront of almost all technical innovations in the field of radio communications.

Amateur radio play a key role for emergency communication, as recently demonstrated in the immediate wake of the Asian Tsunami disaster. In the UK the Radio Amateur Emergency Network (RAYNET) provides cover at public events across the country every week of the year. It is working with the CSIA unit of the Cabinet Office in response to the 2004 Civil Contingencies Act.

The amateur voice, packet and television repeater network, and leading edge modulation methods such as PSK31, are some of the many examples of spectrum efficiency and leading edge design and implementation. Amateur systems inherently employ narrow bandwidths due to the modest allocations and crowded nature many of the available bands, and utilise receivers that often need operate very close to the noise floor..

Amateur innovation is exemplified by having over 50 Satellites successfully launched into earth orbit starting with Oscar-1 (an acronym for Orbital Satellite Carrying Amateur Radio) in 1961, to Oscar-51 most recently. An Amsat-UK transponder is due for launch on the ESA satellite SSETI-Express in mid-2005, whilst Amsat mission P5A to Mars is due for launch in 2007/9.

### **3. Amateur Radio – A major Spectrum Stakeholder**

In the UK licensed radio amateurs have been granted access to the radio spectrum in bands from 136kHz to 250GHz. These allocations are on both a Primary and Secondary basis. For use of this spectrum allocation radio amateurs pay an annual licence fee to the UK government. Several of the frequency allocations available to UK Amateurs are shared with Public Sector Primary users, such as the MoD and CAA. We ourselves would of course appreciate increased flexibility in bands such as at 430MHz. However it is also important that our use of such shared bands is not compromised by pressures for deregulation or the reallocation of spectrum on a primary basis to more aggressive commercial interests – particularly given the free reins they might have as envisaged by the Ofcom Spectrum Framework review.

Past arrangements for shared bands have been long established (since 1947, Atlantic City) and carefully managed (by the relevant authorities with the active cooperation of the Amateur Services). We do not recognise Ofcom's view of 'Command & Control' as being an inherently bad thing. The spectrum is a finite resource and can be likened to a carefully balanced ecosystem. Amateurs and others have relied on the public sector bodies such as the former Radio Communications Agency to manage the spectrum, EMC/interference and enforcement, abide by the international radio regulations and engage with international organisations such as CEPT and the ITU. The RSGB is gravely concerned at Ofcom's irresponsible headlong rush to cast aside an established, proven, international, philosophy for managing this precious (spectrum) resource. Ofcom's actions threaten to disenfranchise the Amateur Services and, with it, a precious resource of innovation, training, and emergency support. Ofcom itself is a public sector organisation and should not be immune to audit and accountability for its actions as part of the IASH exercise.

### **4. IASH Response**

The RSGB welcomes the opportunity to make this submission to the Spectrum Audit Team, and looks forward to further engagement and discussion. We have structured the response on the themes of Current Sharing, and Future Demand.

#### **4.1 Current Sharing**

##### **4.1.1 Shared Bands**

Radio Amateurs in the UK have quite a number of frequency allocations in which sharing occurs with the public sector. These are listed in Table-1. Many of the allocations shown in the table are on a secondary basis, but we would highlight that a couple of entries are Amateur Primary allocations, which also have issues.

##### **4.1.2 Barriers to Progress**

Depending on the band, sharing has either proven relatively easy or in other cases difficult to nigh impossible. The generic reasons for these barriers and their consequences are:-

- 1) The lack of clearly defined contacts, lines of responsibility and change mechanisms amongst some of the public sector users.
- 2) The need for an enhanced understanding of typical amateur operation. Public sector bodies often fear the worst conceivable case. However amateur use is generally on a Listen-before-Transmit basis, with low transmit duty cycles, and using powers often well below the legally maximum permitted powers (especially in the microwave bands).

- 3) A hidden consequence of excessive restrictions is to encourage congestion and use of less suitable amateur bands. Ironically this may inhibit new developments that may ultimately be more innovative and spectrally efficient, or be of benefit to the UK for education, training and emergency communications.
- 4) At the moment the relevant Public Sector bodies are relatively well known, and many are coordinated by Ofcom. The Spectrum Framework Review, however, envisages that ownership rights could become more dynamic and delegated in shared bands. Unless a transparent framework for coordination is put in place and enforced, this new regime could make progress more difficult. A detailed and easily accessible online register of frequency allocations and rights holders/contacts is also desirable.
- 5) Ofcom has mooted deregulation for Amateur and other users. However a consequence of this for Amateurs is that where we share bands such as 430MHz, primary users could increase their objections & restrictions further, risking complete loss of Amateur access in the worst case.
- 6) The European Union Frequency Allocation Table has notes EU17 and EU23 which request that administrations consider Amateur weak signal flux users in the microwave bands. However we often find this is ignored in practice, and may be further undermined by liberalisation and trading in these bands. We would request that both public and private sector users respect such notes.
- 7) EMC compliance, interference enforcement and respect for the noise floor are all seeing lower priority, to the detriment of Amateurs and other users across public sector and other bands.

### **4.1.3 Restrictions**

A detailed discussion of every restriction is beyond the scope of this paper and the RSGB would welcome further contacts on such matters. However we would highlight that the most prominent issue has been the recent restrictions and freeze on development in the 430-440MHz (70cms) amateur band. Whilst dialogue has recently started concerning this, there are other cases where this still proving difficult. Not all restrictions relate to frequency or power. Restrictions on unattended operation also inhibit operations particularly in shared bands.

The Society would welcome discussions with the Auditors, Public Sector Users and Ofcom on such matters.

## **4.2 Future Demand**

### **4.2.1 Availability of spectrum**

The modest overall bandwidth available in most amateur allocations (which it must be remembered are, for the most part, common to worldwide amateur radio) encourages amateurs to develop techniques which are relatively narrow bandwidth and thus more spectrally efficient. However, as highlighted above, restrictions do distort the overall picture. There is pent-up demand amongst other things on LF-HF bands, and for repeaters, beacons, data and new Amateur-TV systems.

A number of bands have been fragmented or even broken up by past restrictions. The Amateur Services would appreciate more contiguity in its allocated spectrum, so it can operate in a harmonised manner with its international counterparts.

#### **4.2.2 Estimating Demand for New Technologies and Future Spectrum Needs**

A number of bodies within the RSGB, including its Spectrum Forum, Data, and Repeater Committees deal with spectrum and technology developments on a regular basis and coordinate new systems and applications. Additionally, affiliated to the RSGB, are groups such as Amsat UK (Satellites), UK Microwave Group, and the BATC (for TV). The Amateur community also has regular meetings where papers are presented on technology, propagation and operating topics. Whilst the amateur allocations are largely technology-neutral, newer systems which include sophisticated digital modes, DSP, remote control etc increasingly present challenges for the current rules and restrictions.

#### **4.2.3 Future demand for spectrum - For what services? In what bands?**

Again a full list is beyond the scope of this paper, but some examples would be:-

- a) Enhancements to certain HF (1-30MHz) allocations.
- b) Conversion of either whole allocations or at least sub-bands to Primary Status to enhance Amateur and Amateur Satellite Service profile and protection.
- c) There is an undoubted demand for further unattended data-nodes, beacons and repeaters.
- d) Renewed flexibility at 430MHz has been already mentioned.
- e) The 1.3GHz band (23cms) is the principal one for the development of Amateur TV (ATV) and new work on spectrally efficient Digital ATV is ongoing, but is also a band where CAA restrictions have been severe.
- f) Support for European-wide Amateur allocations at 70MHz – already available in the UK but so far rare elsewhere.
- g) Access to new narrow bands in the 26-40GHz range on an experimental non-interference basis to support innovation and propagation research.
- h) Coordination with UK Amateurs would also be welcome in the run-up to WRC-07

#### **4.2.4 Future demand and current Ofcom plans**

Ofcom do not appear to have any specific plans to increase Amateur frequency allocations, and are generally committed to reduce resources devoted to Amateur Radio. There are certainly crowded sections on the amateur bands, and expansion or increased flexibility would be welcome to relieve this. Ofcom has delegated training and other aspects to the RSGB, and the Society would welcome additional discussion in this regard.

#### **4.2.5 Acceptable parameters for Shared Bands**

Amateurs are subject to frequency power and sometimes location-based restrictions. Amateur bands feature multiple modes of operation and, in spirit, have been technology-neutral for a long time. Type Approval of equipment would be fiercely resisted, particularly since this concept largely negates the freedom to experiment and to use amateur radio for self-training.

#### **4.2.6 Incentives on public sector holders to share and to improve their spectrum efficiency.**

At the very least, there should be an obligation for public sector holders to have transparent contacts and lines of responsibility for spectrum matters - and a preferably open register of spectrum holdings.

Increased flexibility and sharing with current public sector users would be welcome, although the Society does not believe that modern trends such as Spectrum trading are the best way to achieve spectrum efficiency. Where we do foresee a difficulty is where the more aggressive commercial users are given allocations, and who could then have even less regard for us than the present occupants. Therefore any changes in the bands should be subject to meaningful prior consultation with existing users, including a thorough regulatory impact assessment.

#### **4.2.7 Technology transfer from military to civil sectors (to improve sharing/efficiency)**

The RSGB closely follows the scale and rate of change in academic and commercial wireless developments, and observes that these may actually be outpacing the traditionally slower and longer lifecycles in the defence sector. Therefore there is probably scope for a fuller two-way exchange of technology between the military and civil sectors. Ideally this should be done in an open manner so all spectrum users benefit.

The auditors are also invited to consider and further discuss with the Society examples of Amateur Radio research, innovation and technology, which are higher performance or more spectrally efficient than either Commercial or Military users.

**RSGB. 10 April 2005.**

## **5 References**

- [1] UK Frequency Allocation Table Issue-13, 2004
- [2] UK Amateur Radio Allocations from Ofcom Schedule to Terms, Provisions and Limitations Booklet BR68
- [3] ERC Report 25 - The European Table of Frequency Allocations and Utilisations Covering the Frequency Range 9kHz TO 275GHz, May-2004

**Table-1: Notable Shared Amateur Bands**

Band, MHz	Amateur Allocation Status	Comment
1.81-2.00	Secondary	Shared with Maritime
3.50-3.80	Primary. Shared with other services	Negotiations with MoD were needed for recent Amateur Radio Direction Finding use
7.10-7.20	Secondary	Shared with Broadcasters until 2009
10.10-10.15	Secondary	Shared with fixed services, inc. Defence
144-146	Amateur Primary (Exclusive)	Interference from MoD systems in Northern Ireland
430-440	Secondary with Regional and Power restrictions (Primary elsewhere in Europe)	MoD freeze on Repeaters and Data nodes since Feb-2002
1240-1325	Secondary	Shared with CAA/Radars (and Galileo in future) Amateur Voice and TV Repeaters often incur CAA objections
2310-2450	Secondary Users must accept interference from ISM users	Shared with Home Office, MoD, Commercial, WiFi etc
3400-3475	Secondary	Shared with MoD and Commercial systems
5650-5680 5755-5765 5820-5850	Secondary Users must accept interference from ISM users	Fragmented into 3 sub-bands. EU17* & EU23** Largely ignored Amateur Satellite allocations also fragmented 5.65-5.85GHz continuous available in other European states
10000-10125 10225-10475	Secondary	Restrictions from MoD etc on Beacons, Repeaters etc 10-10.5GHz available in other European states
24050-24150	Secondary May only be used with written consent.	Consent has never been granted!

**Note:** This table is not a complete list of UK Amateur Allocations, but is intended to highlight public sector sharing issues and act as a basis for discussion for the current IASH Spectrum Audit Exercise, which is initially focussed at frequencies below 15GHz.

**\*EU17:** In the sub-bands 3400-3410MHz, 5660-5670MHz, 10.36-10.37GHz, 10.45-10.46GHz the amateur service operates on a secondary basis. In making assignments to other services, CEPT administrations are requested wherever possible to maintain these sub-bands in such a way as to facilitate the reception of amateur emissions with minimal power flux densities.

**\*\*EU23:** In the sub-bands 5660-5670MHz (earth to space), 5830-5850 MHz (space to earth) and 10.45 -10.50GHz the amateur-satellite service additionally operates on a secondary and non interference basis to other services. In making assignments to other services, CEPT administrations are requested wherever possible to maintain these allocations in such a way as to facilitate the reception of amateur emissions with minimal power flux densities.