

## Enabling UK growth – Releasing public spectrum

Making 500 MHz of spectrum available by 2020

### Joint response from the Radio Society of Great Britain, UK Microwave Group, Amsat-UK and BATC

June 2011



#### Introduction

This response is a joint one to the above DCMS consultation document from the Radio Society of Great Britain (RSGB, [www.rsgb.org.uk](http://www.rsgb.org.uk)) on behalf of its members and the wider Amateur Radio community. The latter includes both individual operators as well as a variety of special interest groups including those with significant microwave spectrum interests - Amsat-UK ([www.uk.amsat.org](http://www.uk.amsat.org)), UK Microwave Group (UKuG, [www.microwavers.org](http://www.microwavers.org)), and the British Amateur Television Club (BATC, [www.batc.org.uk](http://www.batc.org.uk)).

RSGB is recognised as one of the leading organisations in the world in the field of amateur radio. It collaborates with its fellow national societies via the International Amateur Radio Union (IARU) through IARU Region-1 ([www.iaru-r1.org](http://www.iaru-r1.org)).

Amateur radio is a science-based technical hobby enjoyed by over three million people worldwide. From a statutory point of view it is fully 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.

Given the new spectrum role that DCMS now has, it is worth noting that spectrum used by Amateur activities embraces Culture, Media and Sports as well as skills development, innovation and emergency communications. RF skills are a very rare commodity and can underpin UK Growth.

#### Shared Spectrum

The Amateur Services successfully share spectrum with Public Bodies including MoD, CAA and MCA; and are also supporting public initiatives including UK Space and the 2012 Olympics. We are keen that this relationship continues and that the investments and innovations by thousands of licensed amateurs are safeguarded. In this regard we have particular concerns regarding:-

DCMS doc Public Sector band, MHz	UK Amateur Allocation, MHz
406.1-470	430-440
1215-1350	1240-1325
2300-2400	2310-2400
3400-3600	3400-3475

This is not the first occasion that public sector spectrum has been reviewed. RSGB has previously participated in the HM Treasury sponsored Independent Spectrum Audit process (aka the 'Cave Audit'), the Ofcom Public Sector Framework Review and the MoD Defence Spectrum Demand Study, amongst other key milestones. We are keen that a long term internationally harmonised solution is arrived at that provides certainty, protects amateurs and permits the hobby and the UK to prosper.

Overleaf we have provided additional information and would be pleased to participate in any future discussions, both with DCMS, Ofcom, MoD and any other stakeholder who has an interest.

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*RSGB, Amsat-UK, UKuG & BATC, June 2011*

## General Background

Activity by individual amateurs and interest groups includes long range equipment built for self-training, propagation research, emergency communications, radio sports, amateur satellite links and international earth-moon-earth (EME) communication (aka moonbounce).

Transmissions have evolved over the years from basic CW(Morse code) FM and Single sideband(SSB); to encompass a variety of advanced data and machine generated modes – including adaptations of DVB-S for terrestrial digital amateur television, ultra-weak signal modes, GPS-locked direct digitally synthesised systems, internet linked transmitter networks etc.

The training and examination system that supports amateur licensing is supported by volunteer tutors at many local clubs working with Ofcom, RSGB and the Radio Communications Foundation (RCF). Examinations, licensing and privileges are based on a three tier structure, the top tier of which is internationally harmonised in line with ITU and CEPT requirements.

Having successfully shared spectrum with public sector users for many years, we are most concerned that the DCMS document contemplates unprecedented releases compared to what has gone before. For example whilst the release of the upper part of the 3400MHz band has been coordinated with the amateur community, this is the first time that there is a real prospect of release in the precious 2300-2400MHz band which is home to a wide variety of activity.

We would caution that any precipitous decision and uncoordinated release would impair a raft of innovative activity that is aligned with many DCMS and other national goals. We therefore look forward to further discussions with DCMS. In the meantime we offer below nominal answers to the document questions.

## Questions & Answers

The answers below are based on the DCMS consultation document. In addition we have provided some illustrative examples of amateur operations in some of the release candidate bands in the Appendices.

### Section 4: Demand for spectrum

*Q1: What services do you think are most likely to demand spectrum from the public sector holdings between now and 2020 and when? Please provide evidence to support your answer.*

Firstly we would challenge the view that there will be inexorable commercial demand that cannot be met. We contend there is already ample supply of new spectrum already being made available to the commercial wireless sector via liberalisation and planned auctions (including the UHF Digital Dividend, 2.6 and 3.5GHz). In addition some spectrum already allocated such as 3G-TDD at 2GHz and Qualcomm's 1.45GHz block remains under-utilised. We thus believe there needs to be a more thorough and balanced assessment.

Amateur Radio itself is also witnessing innovation and growth in licensees and demand. Our Vetting web pages testify to an increasing backlog of unfulfilled amateur requests for frequency clearances for new-generation repeaters and beacons to support voice, data, propagation research and local Digital Amateur TV services in the 430MHz, 1.3, 2.3 and 3.4GHz bands. Two further examples are:

In 2.3GHz we have previously been excluded from 2300-2310MHz - denying harmonised EME operation with our colleagues in Europe and the USA. Requests to Ofcom now provisionally indicate this can be made available to UK amateurs in time for the '15<sup>th</sup> International EME Conference' at Churchill College Cambridge in August 2012 - the first time the UK has ever hosted this prestigious event.

The Amateur Satellite Service is currently limited to 2400-2450MHz (along with some ATV repeaters) and now suffers from intense interference from Wi-Fi etc. We seek substitute spectrum with lower interference.

## Section 5: Release issues

**Q2:** *We have described the issues that we see in releasing public sector spectrum holdings in section 5. Are there any other issues that we should consider?*

In certain bands such as 1.3 and 2.3GHz, amateurs have substantial infrastructure operating in accordance with Ofcom and ITU allocations. This includes the largest example of Local TV in the UK in the form of the UK ATV Repeater network (50 duplexed repeaters). (See the maps in Appendix-1)

Our UHF allocation (430-440MHz) which is shared with MoD is home to activity by thousands of amateurs and a national network of 230 voice/data repeaters (plus simplex internet gateways). We are currently engaged in careful collaboration with Ofcom in support of the 2012 London Olympics in this band.

The 435-438MHz sub-section is the largest active band for international amateur satellites as well as highly innovative long range spectrally-efficient digital ATV developments (typically QPSK DVB-S based).

As we are a fully licensed ITU service and long-time existing user, we respectfully request that any significant changes should be discussed, including the time and cost of mitigation or migration measures.

## Section 7: Preliminary views on the 500 MHz

**Q3:** *Are there spectrum bands that we have not mentioned in section 7 that you think we should consider for release?*

The tables omit two potentially highly suitable bands for mobile use:-

- The 700MHz band, which would be released by 'DSO2'. This would arise naturally around the year 2020 if trends to spectrally efficient DVB-T2 domestic television are encouraged (such as using the UK 600MHz dividend for DVB-T2). Ofcom and Europe are considering this topic. It would also more closely align with USA allocations/equipment.
- Prime harmonised mobile spectrum lies fallow in the UK and much of Europe at 1452-1492MHz (originally intended for L-band DAB and mobile-TV).

**Q4:** *Of the bands we have mentioned in section 7 which should we investigate first?*

### With respect to Table-3:

We have extensively engaged in preparation regarding the 3400MHz band. At present our allocation is 3400-3475MHz. In return for some additional privileges such as Amateur Satellite operation, we are on record as being prepared to focus operations into the European harmonised 3400-3410MHz range aligned with European Common Allocation Footnote EU17 and ITU Regions-2 & 3 Amateur Satellite Service allocations.

We are however opposed to any precipitous release of the 2300-2400 band, which is allocated to Amateurs on a global basis, and where upheaval would potentially be both damaging and costly.

### With Respect to Table-4:

We would be concerned if release occurs just below the 3400MHz band edge as this is adjacent to the sensitive international long-range amateur narrowband section at 3400-3401MHz.

### With Respect to Table-5:

We would be gravely concerned if further losses occur to our shared allocation within the sub-band 1240-1325MHz – much of which we cannot use as it is safety-of-life aviation band.

### With Respect to Table-6:

As noted, there is considerable Amateur and Amateur Satellite Service use in 430-440MHz.

**Q5: What would be an appropriate timing for releasing parts of those bands?**

The timing of any release should be reconsidered based on:-

- A reassessment of demand vs supply and actual usage, accounting for existing/planned spectrum releases (eg 790-862, 2500-2690 and 3440-3600MHz and 2G to 3/4G liberalisation/upgrades)
- Existing allocations and users of the bands
- Measures to ensure that any changes are internationally harmonised

With respect to the last point the Society is open to discussions regarding a solution that would offer long term certainty and better aligned Amateur and Amateur Satellite Service allocations in the microwave bands - where between 440MHz and 24GHz we have no Primary allocations.

## **Section 8: Conclusions and next steps**

**Q6: What actions do you think that we should be taking at this stage beyond those described in section 8?**

We would strongly encourage DCMS to engage with all affected stakeholders, particularly existing users/sharers of Public Sector Spectrum such as the Amateur Services, PMSE sector etc

We would also highlight there is little need to rush to release those bands that are not fully harmonised. Such an approach risks negligible support by equipment manufacturers and spectrum becoming fallow, despite the upheaval of removing existing users.

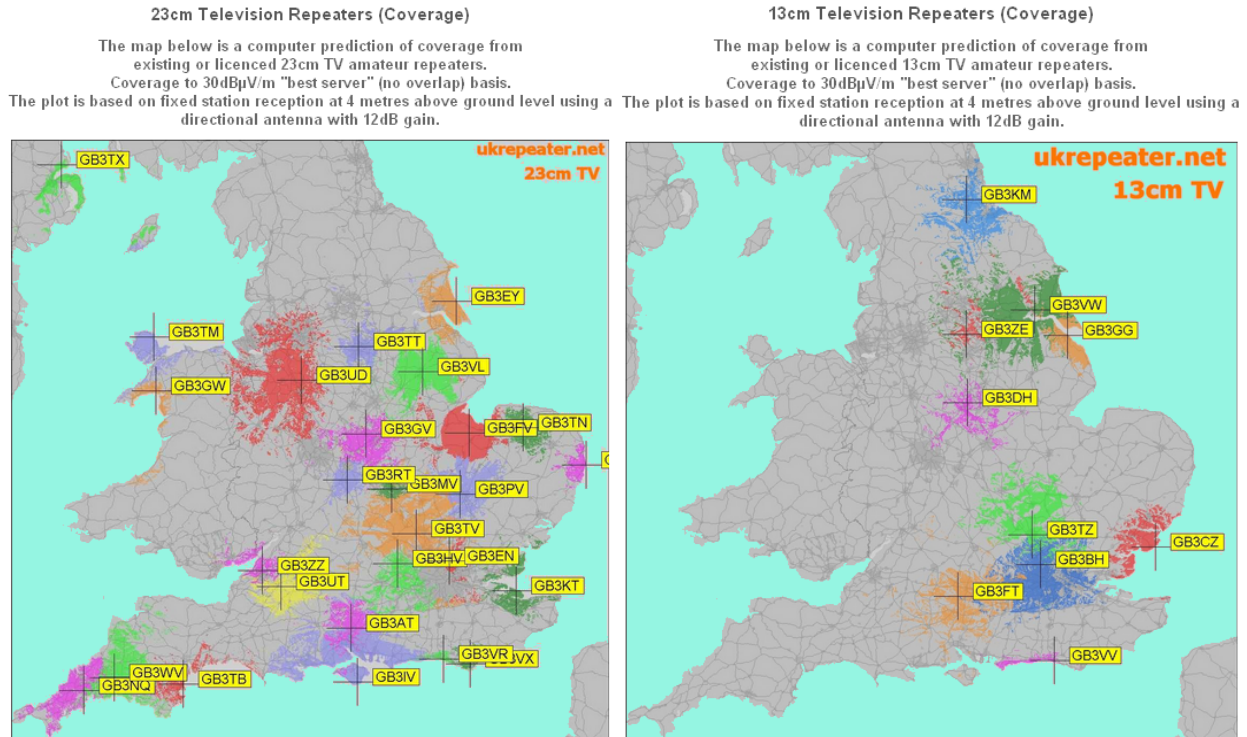
## **References**

- [1] RCF - Radio Communications Foundation Exams: <http://www.commsfoundation.org/rce>
- [2] UK Repeater Network: <http://www.ukrepeater.net/> (Pending Applications on Vetting Page)
- [3] UK Propagation Beacons: <http://www.beacons.org.uk/> (Pending Applications on Vetting Page)
- [4] UK and European Propagation Beacon lists/reports: <http://www.beaconspot.eu/>
- [5] Radio Society of Great Britain (RSGB) <http://www.rsgb.org/>
- [6] RSGB Band Plans <http://www.rsgb.org/operating/bandplans>
- [7] Amsat-UK: <http://www.uk.amsat.org>
- [8] UK Microwave Group: <http://www.microwavers.org/>
- [9] British Amateur Television Club, BATC: <http://www.batc.org.uk/> and TV streamer service <http://www.batc.tv/>
- [10] 15th International EME Conference <http://www.eme2012.com/>
- [11] CEPT European Common Allocations Table Footnote EU17:-  
***"In the sub-bands 3400-3410MHz, 5660-5670MHz, 10.36-10.37GHz and 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."***

## Appendix-1 – UK Amateur TV

Whilst the common perception of amateur radio is HF (Short Wave) orientated, the VHF/microwave bands are host to a series of communities and special interest groups who exhibit considerable skills in either narrowband long-range DX operation, or local ATV activity. From their analogue roots, both these sectors are rapidly evolving leading edge digital techniques with consequential improvements in range and spectral efficiency.

Whilst the UK currently just has one local TV multiplex (Channel-M in Manchester), the Amateur TV network in the lower microwave bands is actually far more extensive, based on well-engineered 24/7 repeater infrastructure. Many of these are now linked to and supplemented by high performance internet streaming, courtesy of <http://www.batc.tv/> for broader coverage. Below are current rf coverage maps:-



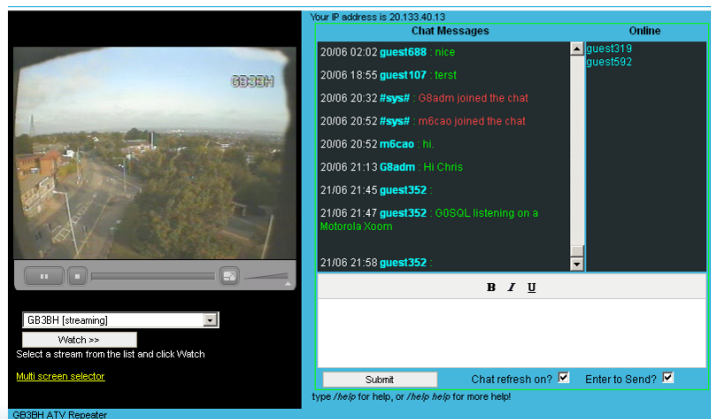
**Coverage and location of UK Amateur TV Repeater Sites: 1.3GHz (left) and 2.3GHz (right)**

*Source RSGB Repeater Data at: <http://www.ukrepeater.net/>*

It should be noted that all these are full broadcast quality dual-band duplexed repeaters. They permit any local amateur television transmission to be received and re-broadcast (typically with 25Watts erp) on a separate output frequency. These repeaters and their user base represent a significant investment in effort and hardware and any loss due to 1.3GHz or 2300-2400MHz release would have a major impact on them.



**Testcard from GB3TN in Norfolk,**



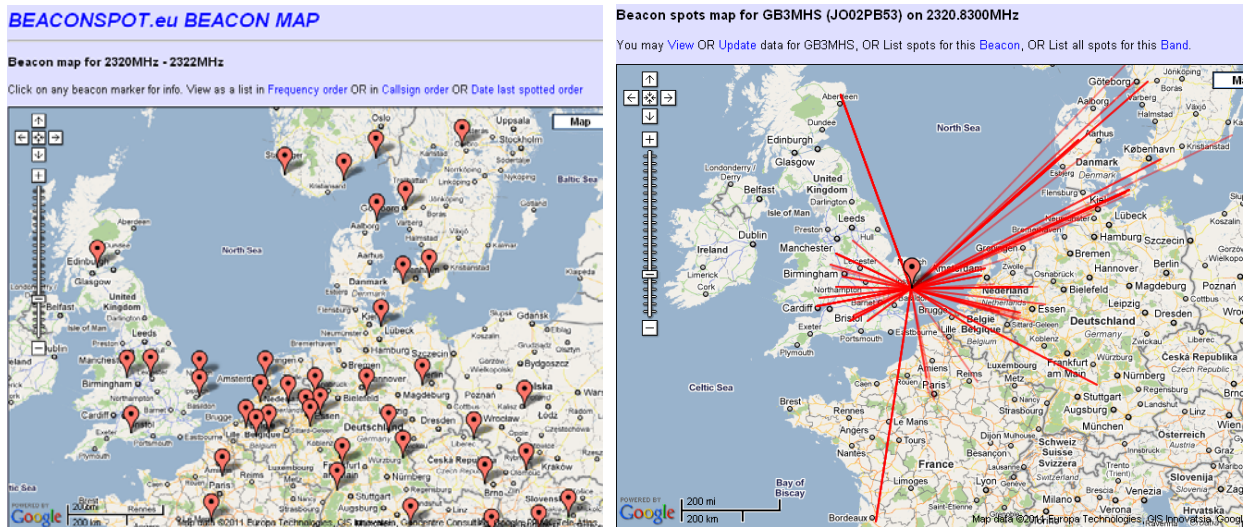
**www.BATC.tv Streaming Transmission from GB3BH, London**



## Appendix-2 – UK DX Operation, Contests & Propagation Research

Narrow bandwidths are commonly employed by morse code, SSB voice and new digital modes for long range contacts, weekend contests etc. The long ranges result in harmonised band planning across Europe with amateur activity of this type centred around 1296, 2320 and 3400MHz, aligned with networks of propagation beacons in each band.

As shown below the propagation can result in considerable distances, beyond line of sight, using fairly ordinary powers and yagi antennas. The UK terrestrial 2-way contact distance record is 1329km to Sweden. Beyond that, the more enthusiastic amateurs devote considerable expertise to low-noise high-power operation for EME (moonbounce) for global coverage, an example of which is in the bottom picture.



2320MHz Beacons – and 2011 Reception Reports for the GB3MHS 25W erp beacon located at BT Martlesham



G4CCH Wire mesh steerable dish for 2.3GHz Global EME (Moonbounce Operation), Lincolnshire