**Ofcom Consultation**
**Public Sector Spectrum Release: Amateur use of 2310 to 2450 and 3400 to 3475 MHz**

# Questions & Answers

## The Release Bands (2350-2390, 3410-3475 MHz)

*Q1. Do you agree that it is likely that the benefits to UK consumers and citizens will be greater from the MoD's release of spectrum in the 2.3 GHz and 3.4 GHz release bands than from retaining the current amateur use?*

By definition the amateur and amateur satellites services are non-commercial. It is therefore inherently difficult to compete on the same terms as an ITU designation comparison to commercial Mobile services. In that respect the question is somewhat unfair.

Whilst it is recognised that the UK benefits significantly from modern rf/microwave (wireless) technologies – it is not necessarily the case that releases in these particular bands will have significant consumer benefits:-

a) The release of the 2.3/3.4 bands will not make any significant contribution to consumer/citizen priorities which focus on reliable connectivity, not-spots, rural coverage etc – which is better solved by lower frequency alternatives such as 700/800/900MHz (and hopefully 1.4GHz) that have far better reach and building penetration Nor will they have much impact on tablet use etc which is predominantly Wi-Fi based in 2.4GHz (with 5GHz Wi-Fi due to play an increasing role in future). The 2.3 and 3.4 bands will also not be as uniformly harmonised across Europe as other bands , again reducing the potential benefit to consumers.

b) Spectrum releases require careful technically planning to avoid greater damage than net benefit – as for example identified by both amateur and commercial responses to the recent separate consultation on LTE vs 2.4GHz exempt use. That quite clearly showed there is genuine concern regarding net damage to valuable consumer use of 2.4GHz Wi-Fi and other exempt devices, from the adjacent 2.3GHz release. Likewise it is disappointing to see there is no consensus on a single standard for the 3.4GHz band, which would be essential for a successful market in terminals and free roaming for citizens across Europe. For the avoidance of doubt we prefer the FDD option as that fully respects incumbent government and amateur use of 3.40-3.41 GHz.

c) Apart from exempt Wi-Fi, to date no Time-Duplexed (TDD) wireless broadband spectrum/technologies have succeeded in the market. GSM(2G), UMTS(3G) and LTE(4G) are predominately or exclusively Frequency Duplexed (FDD). No FDD option exists for the 2.3GHz band. Previous examples of TDD have been the 'unpaired 2GHz' bands for 3G. These had no interest and have lain idle for many years (as has the 1.4GHz band). Thus it can be argued that such past TDD examples proved detrimental to their original users who were cleared, with no benefit whatsoever to any UK/European citizen. In addition, given the recent auction of the 4G bands (800MHz and 2.6GHz), it can be argued that the industry already has far more spectrum than it can effectively use - or can design into a multi-band handset for consumers. Thus we would argue that more suitable spectrum (which is more harmonised that 2.3/3.4) is already available

d) It should also be of considerable concern that the number of experienced senior rf engineers in the UK is rapidly declining (and many are licensed amateurs). At these frequencies the self-training aspect of amateur radio is considerable as there is little off-the-shelf equipment. Amateur Radio plays key development, educational and practical training role at these frequencies that other institutions struggle to. In the past, amateurs have given considerable service to the nation, inspired leading companies such as SSTL etc, underpinned the work force of a raft of UK rf companies and volunteered for the 2012 Olympics. UK Government strategy now has a renewed emphasis re-balancing the economy and engineering skills[1] etc. These bands require particular mix of designs skills and technologies, which are quite different to other frequencies. It is important that a key resource for inspiring and training the next generation of rf/wireless engineers is not extinguished and thus inadvertently undermines the UK's ability to develop, maintain and exploit wireless technologies for its citizens.

[1] The latest initiative is: http://engineeringforgrowth.org.uk/

*Q2. Are there current uses in the release bands other than those detailed in RSGB's band plan and discussed in Section 3 of this consultation?*

In general the Ofcom document (the summary in Section-3 and additional data in Annex-6) appear to have covered existing use quite well. We take this opportunity to thank Ofcom for their engagement prior to this consultation in assessing a wide variety of amateur radio material, and undertaking ATV equipment/repeater tests.

*Q3. Are there further consequences of removing the release bands from amateur licences that have not been considered in our analysis?*

If not mitigated, a combination of the size/nature of the release bands (particularly in 2.3GHz) and the consequential changes in the adjacent bands, will pre-emptively obsolete significant proportions of analogue ATV. An initial preference would of course be to discuss the options for a retune for the analogue repeater inputs as this could be quickly implemented. Migrating to more spectrally efficient/filtered digital systems is possible, but that has a higher practical cost and time factor, particularly for the user equipment (which we note in other clearances has been more fully catered for).

There are also some consequential changes to licensing guides/specifications for NoVs (repeaters, beacons etc) and the RCF Examinations that we would wish to discuss with Ofcom.

## The Adjacent Bands (2310-2350, 2390-2400, 3400-3410 MHz)

*Q4. There is an option (although not preferred) to remove access to the adjacent bands, as well as to the release bands. What are the consequences of removing access to the adjacent bands from amateur licences?*

We would consider such a step a serious and disproportionate step with a far wider impact than the release bands. ITU and CEPT decisions full accept ongoing use by existing services specifically including the amateur service. In 2.3 GHz the CEPT -FM52 process formally recognises amateurs as a valid incumbent (on a secondary basis)

Numerically it more than doubles the impact on UK users and also has an extended impact on European amateurs who have narrowband and ATV contacts with their UK colleagues, and rely on reception reports of the UK propagation beacons.

It also at a stroke across the entire affected community would cause a considerable write-off of valuable assets for which there ought to be some potential compensation, as most of the equipment could not be reused, or retuned to other bands.

*Q5. Are there current uses in the adjacent bands other than those detailed in the RSGB's band plan and discussed in Section 3?*

Not that we are aware.

For information it may be worth noting that narrowband/EME/beacon use is highly optimised for IARU Region-1 international coordinated frequencies around 2320 and 3400MHz. As the band plan notes, there can be additional receiver frequencies outside of the normal UK range at the bottom the 2.3GHz band (most typically for reception of 2304MHz EME from other countries such as the USA). In contrast there is generally more flexibility at national level for shorter range ATV and data systems should they need to be re-planned

*Q6. Are there additional mitigation measures which would provide demonstrable proof that amateurs would not cause interference into LTE in the release bands following the release?*

Our understanding from groups such as UKuG and BATC is that around 90% of their membership is based on very experienced Full Licensees.

We also understand that UKuG, BATC are willing to extend their existing network of technical support, elmers etc to support amateurs regarding best practice, filtering, test facilities etc. This would complement existing services such as the RSGB EMC service and advice. Many microwave events (often called roundtables) already feature sophisticated test equipment facilities, so the community is not adverse to self-help to achieve high technical standards.

Enhancing this 'support network' would supplement the inherent nature of amateur activity at these frequencies which sees considerable attention paid to construction, optimisation, frequency stability, testing etc and eth inherent listen-before-transmit nature of most amateur contacts. Newer repeaters or beacons usually have remote control facilities and some have automated monitoring - again that could be extended for early detection/mitigation of any faults.

*Q7. Do you agree with the proposed process for varying licences following cases of reported interference and our proposal to vary licences should dealing with the number of reported cases become too onerous?*

As Ofcom notes, there are typically very few cases of interference. Indeed at times it can be the relatively larger number of amateurs who monitor the bands and alert current Primary Users to unusual operation or fault conditions from professional services. To our knowledge so far there have been no 'onerous' cases so far at these frequencies.

We also believe there are plenty of existing powers available to Ofcom and that these should initially be more focussed at individuals or particular systems that might be at fault.

Whilst the proposed modification to the main frequency schedule follows established practice, our greatest concern is the additional closedown clause. It has been described by some as a 'Sword of Damocles', and creates far more uncertainty than necessary. We also have concern that it may be open to manipulation, whereby amateurs are unfairly blamed by other organisations or other individuals with a vested interest in order to precipitate a band clearance.

Needless to say we would wish to have further discussions regarding the extra clause and proportionate processes related to it.

*Q8. Do you agree with our preferred option?*

Of the three proposed options, we do indeed prefer to retain as much spectrum as possible to facilitate flexibility and future innovation and thus agree with Ofcom's preferred option.

However thre is one more option. We again take this opportunity to state that should spectrum in 2300-2310 (which is allocated by the ITU and CEPT to the amateur service) become available in the UK, we would be prepared to discuss an appropriate exchange and re-plan that might greater benefits both amateur and Primary Users in the long term.

*Q9. Are there additional changes to the Amateur Radio Licence which would assist amateur in lowering the risk of causing harmful interference to new uses?*

The amateur radio licence is a statutory document so we are not in favour of additional changes at that level. However there is scope for a range of NoV, guidance and educational measures at the next level, some of which is or could be Ofcom endorsed:-

- **RSGB ETCC licensing guide** (currently Repeater, Gateway & Data links etc, but expected to include Beacons in future as part of other planned changes). It is clear the section for TV repeaters in particular will need to be revised to support narrower bandwidth / filtered systems

- **Condoc Section 4.25** - Ofcom support for expediting new ATV repeater licenses.
  To date the delays and difficulties in obtaining NoVs has hindered the introduction of more modern (spectrally cleaner) developments. We obviously would want to have some priority applied to deal with the changes required

- **NoVs issued by Ofcom based on the above.**
  Typically many of these are for transmit powers well below the 400W permitted in the amateur licence – repeaters are typically 25W erp for example. Consequently the practical effect of this is that these applications can be more clearly shown in the band plans. The result is that well defined areas of the bands would not be at a theoretical 400W but be occupied by a pre-determined number of lower power systems with amateurs in receive mode only**.

- **Additional Best practice guides** that Ofcom may wish to endorse regarding the nature of secondary allocations, testing from time to time (esp for out-of-band emissions) resources available from special interest groups etc that might assist further with advice, testing etc

- **Technical recommendations.** Such as for more spectrally efficient data and TV modes

- **RCF Syllabus** updates that include the schedule changes and also increase awareness of Primary and Secondary use

** BATC and RSGB have fairly neutral view on the preferred retained band for the migration of ATV Repeater outputs to narrower/filtered outputs (for example 2-4MHz wide DATV). Either the 2390-2400 or 3400-3410 range in principle is acceptable. However we note that the ETCC application system is currently showing a strong trend towards the 3.4GHz option – which has the benefit of easier duplexer implementation when coupled with user inputs within the 2310-2350 retained band.