Response on behalf of UK Radio Astronomy to the Ofcom consultation on:
"Licence Exemption of Wireless Telegraphy Devices: Proposed changes"

Introduction

UK Radio Astronomy is a stakeholder within the scope of this consultation as any changes to the regulation and use of both bands concerned would directly affect its operations. Radio astronomy research is concerned with naturally occurring phenomena, so the operational frequencies it uses cannot be moved within the spectrum. Additionally, radio astronomy cannot operate effectively with levels of interference that would be tolerable in commercial systems. Consequently, its coexistence with other services in adjacent and shared bands needs careful management. We appreciate the opportunity to provide our views on the Ofcom licence exemption proposals and make responses to the specific questions in the consultation.

Responses

Question 1): Do you agree with Ofcom's proposal to give an 18-month notice period for the closure of the 10.68 to 10.7 GHz band to new SRD deployments?

The closure of the 10.68 - 10.7 GHz band to new SRD deployments is welcomed in the shortest practical timescale.

Question 2): Do you agree with Ofcom's proposal to licence exempt MSS user terminals operating in the 1518 to 1525 MHz and 1670 to 1675 MHz bands?

We consider that there can only be agreement under the condition that adequate protection is afforded to observatories of the UK-RAS from the inevitable increase in the general background interference levels that licence exemption would fuel. Our main concern is the uncontrolled proliferation and use of MSS handsets transmitting in the 1670 – 1675 MHz band in the vicinity of UK radio observatories resulting in unwanted emissions falling into the RAS band at 1610.6-1613.8 MHz and particularly into the immediately adjacent 1660.0-1660.5 MHz, 1660.5-1668.0 MHz and 1668-1670 MHz bands, all of which are of considerable importance to the UK-RAS.

The importance of the 1.6-GHz bands to the UK-RAS

Many different types of observations, both continuum and spectral line, are made in the RAS bands at ~1.6 GHz, and, in addition to those made at individual observatories, for many years now there has not been a MERLIN, EVN or Global VLBI observing session that has not included observations at these frequencies. The spectral line observations mostly involve the study of the OH radical, but there are also some of somewhat more complex molecules (e.g. HCOOH). Such radio astronomy observations are especially important as they are very difficult to carry out in a laboratory. The OH radical is highly reactive and is therefore very short-lived under such conditions. Thus, this astrochemistry is of vital interest for an understanding of the formation of stars, planets and therefore life. The continuum

observations are often made over the entire contiguous bandwidth using the largest telescopes to achieve maximum sensitivity. As indicated above both these and the spectral line observations are frequently conducted using the VLBI technique (linking RAS sites to achieve greater resolution and sensitivity). Developments over the last 20 years mean that such radio astronomical observations are now often made on a coordinated basis worldwide with the UK playing a significant part. When UK and European telescopes (including those in The Russian Federation) are combined with those in the USA and Asia, almost the present maximum possible collecting area can be obtained as well the maximum angular resolution currently achievable.

The importance to the UK-RAS of these bands has been recognized within a "Grant of Recognized Spectrum Access to Radio Astronomy".

Comments on proposals

The clear commitment from Ofcom to protect Radio Astronomy in the UK by not authorizing the band 1668 to 1670 MHz for MSS use is noted and appreciated. This band and the other lower adjacent bands are all allocated to the UK-RAS on a (co-) primary basis. They are covered by RR footnote 5.149 and in the UK by an Ofcom grant of RSA for the various sites listed in Annex D of the UK-FAT (as shown in Table 1 below). The RSA is associated with agreed Spectrum Quality Benchmarks (SQBs) based on levels in ITU-R Recommendation RA.769 and notional 50 km restricted zones.

Table 1 - The following frequency bands are where RSA is available for sites at Jodrell Bank (JB), Cambridge (CA), Defford (DE), Darnhall (DA), Pickmere (PI) and Knockin (KN) and the list of Radio Astronomy sites covered under grant of RSA:

Frequency Band (MHz)	Typical Applications	Radio Astronomy Sites Covered Under Grant of RSA
1610·6-1613·8	MERLIN and hydroxyl line studies.	CA DA DE JB KN PI
1660·0-1660·5	MERLIN and hydroxyl line studies.	CA DA DE JB KN PI
1660·5-1668·0	MERLIN and hydroxyl line studies.	CA DA DE JB KN PI
1668-1670	MERLIN and hydroxyl line studies.	JB CA DA DE KN PI

Grants of RSA were envisioned for users such as the UK-RAS whose spectrum use is not licensable and so cannot be subjected to market mechanisms, but which has to be taken into account by Ofcom in planning the spectrum so that other licensed users do not cause it excessive interference. At the grant of the RSA it was stipulated that Ofcom would have a duty to take account of the existence of a grant of RSA in the same way as it would in respect of a licence, with levels of emissions from other users into the spectrum and in geographical areas covered by RSA being regulated.

Under the proposals, the mobile equipment to be licence exempted will naturally have unwanted emissions falling into the above bands; ETSI EN docs 301 444 & 301 681 give various maximum allowable levels that may be produced by such equipment under various circumstances. Although these unwanted emissions may be tolerably low from a commercial perspective, they would be expected to exceed the RAS threshold of interference levels where mobiles are operating near a radio telescope site. EN 301 444 & 301 681 also state a requirement for implementation of functionality for disabling handsets "in the vicinity of RA stations recorded in the ITU MIFR".

Consequently, to protect the RAS within any new licence exemption regulations for the equipment concerned, we believe that Ofcom should include appropriate usage restrictions for specific geographic

locations (and/or frequencies) in the vicinity of RA stations, recognizing the potential for interference to RAS operations as a result of the permitted levels of unwanted emissions given in the ETSI harmonized standards EN 301 444 & 301 681. Inclusion of these restrictions should have no financial implications for the UK-RAS.

Concluding comments

Licence exemption of MSS handsets in the 1670 – 1675 MHz band has the potential to result in reductions to the operational effectiveness of the U.K.'s radio observatories, perhaps irrevocably or for many years to come. UK-RAS representatives consider that agreement to licence exemption of MSS handsets in this band can only be under the condition that adequate protection is afforded to UK-RAS stations. We would welcome the chance to engage in a dialogue with Ofcom to define the specifics of this.

We believe that radio astronomy has a considerable societal value which is not easy to measure in hard cash terms (See ITU-R REPORT RS.2178). We urge Ofcom to put in place all the necessary technical and regulatory requirements to adequately protect UK radio astronomy operations from any changes to the use and licensing of the band under consideration and ensure that any changes eventually implemented impose no financial or operational constraints to the UK-RAS.

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