



# Statement on Regulations for Recognised Spectrum Access as applied to Radio Astronomy 2007

Statement

Publication date: 28 February 2007



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## Section 1

# Summary

- 1.1 This Statement confirms that following a formal consultation process, Regulations in connection with recognised spectrum access (“RSA”) for radio astronomy have been made by Ofcom and will come into force on 8 March 2007.
- 1.2 Notice of Ofcom’s proposal to make Regulations in connection with Recognised Spectrum Access for radio astronomy (the “Statutory Notice”) was published on 10 November 2006 and is available electronically on Ofcom’s website <http://www.ofcom.org.uk/consult/condocs/rsa/>. The Statutory Notice arose from Ofcom’s original consultation and statement on RSA for radio astronomy, both published in 2005<sup>1</sup>. The Statutory Notice proposed four statutory instruments to give effect to RSA in connection with radio astronomy, namely:
- RSA Regulations;
  - a Limitations Order applying to the number of grants of RSA;
  - Wireless Telegraphy Register Amendment Regulations. These amending Regulations include two non-RSA changes that were the subject of separate statutory consultations. More details is provided in section 3; and
  - RSA Charges Regulations.
- 1.3 The Statutory Notice closed on 18 December 2006. On 24 November 2006 Ofcom published a short document intended to provide clarification on a specific point raised in the Statutory Notice about the process for setting parameters about interference levels, spectrum quality benchmarks and whether other spectrum users will be involved<sup>2</sup>.

## Responses to the consultation

- 1.4 Ofcom received three responses to its Statutory Notice, one of which comprised a confidential and non-confidential version. The comments raised in the responses are discussed in Section 3. The respondents are listed in Annex 1 and the non-confidential content of the responses has been placed on Ofcom’s website.
- 1.5 One respondent agreed with the proposed regulations, one generally supported them but made two detailed comments and one opposed the introduction of RSA. Ofcom has carefully considered the responses but does not consider that they would justify reconsidering the introduction of RSA for radio astronomy and has therefore decided to proceed with making the regulations in the form proposed by the Notification with no material changes as a result of the responses. Changes have however been made to the statutory powers referenced in the Regulations to reflect the coming into force of the Wireless Telegraphy Act 2006 (the “Act”) on 8 February 2007. Ofcom has now made the Regulations which will come into force on 8 March 2007.

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<sup>1</sup> <http://www.ofcom.org.uk/consult/condocs/astronomy/statement/statement.pdf> and [http://www.ofcom.org.uk/consult/condocs/astronomy/main/radio\\_astronomy.pdf](http://www.ofcom.org.uk/consult/condocs/astronomy/main/radio_astronomy.pdf)

<sup>2</sup> <http://www.ofcom.org.uk/consult/condocs/rsa/clarification/clarification.pdf>

- 1.6 As previously stated in the Statutory Notice, these Regulations relate to the introduction of RSA for spectrum used for radio astronomy. Work is being undertaken separately in relation to the introduction of RSA in relation to Crown bodies, which will be the subject of a separate consultation later this year.
- 1.7 The remainder of this Statement is structured as follows:
- Section 2 provides a brief outline of radio astronomy and RSA;
  - Section 3 summarises the general effect of the Regulations, responses to the Statutory Notice on the draft regulations and Ofcom's conclusions;
  - Annex 1 lists respondents to the Statutory Notice; and
  - Annex 2 contains the Regulatory Impact Assessment for the various Regulations that have been made.

## Section 2

# Background

- 2.1 This section provides a summary of the background to the making of the Regulations.

### What is radio astronomy?

- 2.2 Radio astronomy consists of the observation of radio signals and the background radio 'noise' for research into the properties of stars, the nature of galaxies and the age of the universe. These observations provide an insight into the structure of matter and origins of the universe. Radio astronomy is financed in the UK by Government grants to the Particle Physics and Astronomy Research Council ("PPARC") and there are a number of operational radio astronomy sites in the UK.

### Which radio frequencies do astronomers use?

- 2.3 Frequencies of observation are largely, if not completely, governed by the physical characteristics of the extra-terrestrial transmissions and fundamental physical constants. So radio astronomers, unlike many other radio users, have little choice about the frequencies they use, although they have some choice over where to locate radio telescopes and some scope to shield them from unwanted signals.
- 2.4 A significant range of frequencies are currently allocated to radio astronomy as detailed in Annex D of UK Frequency Allocation Table (the "UK FAT"). Some of the allocations are pursuant to international agreements. These frequencies are in the range 13 kHz to 275 GHz.
- 2.5 The International Telecommunication Union ("ITU") has, through the table of allocations in the Radio Regulations, allocated some 2% of the spectrum below 50 GHz to radio astronomy. About one-third of the frequencies are harmonised globally for passive use and these bands are shared with other passive applications, such as remote sensing and earth observation. The remaining two-thirds of frequency bands are shared with active services including terrestrial fixed and mobile services. These other services can interfere with radio astronomy if positioned too closely to radio astronomy sites; and protecting specific radio astronomy sites can significantly constrain deployment of other services.

### Current authorisation of radio astronomy under the Act

- 2.6 Radio astronomy in the UK involves reception by radio telescopes located in the UK of faint signals from space. Radio astronomy use therefore does not require a wireless telegraphy licence as radio telescopes used for observations are not designed to transmit and so are inherently incapable of causing harmful interference to other radio users. By virtue of the Wireless Telegraphy Apparatus (Receivers) (Exemption) Regulations 1989 (S.I. 1989/123), they are therefore exempt from the requirement to be licensed.

## What is RSA?

- 2.7 RSA is a new spectrum management instrument that fills a significant gap in the management of the radio spectrum. The gap arises because there are current and potential users 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. In the absence of a grant of RSA, this use could continue. However, grants of RSA will give holders greater certainty by formally recognising their spectrum use while enabling market mechanisms to be applied thereby contributing to securing optimal use of spectrum resources in line with Ofcom's spectrum management duties under the Act.
- 2.8 The main features of RSA are:
- Grants of RSA can only be made after Ofcom has made the necessary regulations;
  - Ofcom has 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. For example, Ofcom would plan to limit the levels of licensed emissions into spectrum and geographical areas covered by RSA;
  - RSA is not mandatory even in bands in which it has been introduced. It will remain lawful to operate without RSA, although users without RSA forego the benefits that RSA confers;
  - Ofcom is able to charge fees for RSA that reflect the economic value of the spectrum to which it relates. As for wireless telegraphy licences, there are statutory safeguards to ensure that fees are no higher than required for spectrum management purposes;
  - RSA can be made tradable and convertible into licences although these regulations do not make provision for this to happen in the current case. We will consult on this issue if the RSA for radio astronomy is to be made tradable in the future;
  - Similar provisions apply to the issue, variation and revocation of RSA as apply to licences; and
  - RSA does not provide an absolute guarantee of protection from interference but offers a higher degree of certainty than would otherwise be the case.

## Ofcom's role and RSA

- 2.9 Ofcom's primary duties as a regulatory body are set out in sections 3 – 6 of the Communications Act 2003 (the "2003 Act"), which includes a duty to secure optimal use of the electro-magnetic spectrum for wireless telegraphy. In addition, Ofcom's additional specific duties in relation to carrying out its radio spectrum functions are set out in section 3 of the Act<sup>3</sup>. Under section 3 Ofcom is required to consider the

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<sup>3</sup> The Wireless Telegraphy Act 2006 is a consolidation measure that replaced the Wireless Telegraphy Act 1949 and certain other legislation relating to spectrum management, including provisions of the Communications Act 2003 that relate to RSA. The new Act entered into force on 8 February 2007.

extent to which spectrum is available for use or further use, the current and future demand for radio spectrum, the economic and other benefits that may arise from the use of wireless telegraphy and the efficient management and use of spectrum. Section 18 of the Act empowers Ofcom to introduce RSA for the purpose of carrying out certain of its functions in relation to the radio spectrum.

- 2.10 Under section 20(2) of the Act, a grant of RSA would have the effect of requiring Ofcom in planning and managing the radio spectrum to take account of the use of the spectrum that is the subject of the grant on a comparable basis to a licensed use. RSA is therefore a means for Ofcom to take into account, within national spectrum planning, the use of frequencies used for reception of services that do not require to be licensed under the Act, for example because transmissions are made from outside the UK. As noted in paragraph 2.6, radio astronomy is exempted from the requirement to be licensed and is therefore eligible for a grant of RSA.

### **Ofcom's earlier consultation on RSA**

- 2.11 Ofcom consulted on the introduction of RSA to the radio astronomy sector on 6 April 2005 and, having considered the responses, published a statement with its conclusions on 17 October 2005. The consultation document and statement are available at <http://www.ofcom.org.uk/consult/condocs/astronomy>.
- 2.12 Ofcom concluded that its objective of securing optimal use of the radio spectrum used for radio astronomy will be best secured in relation to radio astronomy by:
- making transparent the economic cost of making spectrum available for radio astronomy so as to assist rational and informed decision-making;
  - providing appropriate incentives for radio astronomers to use spectrum efficiently.
- 2.13 This conclusion was in line with recommendations of the Independent Audit of Spectrum Holdings (the "Audit") and endorsed by the Government in the response to the Audit. The Audit and response may be found at [www.spectrumbaudit.org.uk](http://www.spectrumbaudit.org.uk).
- 2.14 Accordingly, Ofcom decided to proceed with its proposals and on 10 November 2006 published the Statutory Notice<sup>4</sup> requesting views on four separate Regulations that Ofcom proposed to make in order to introduce RSA for radio astronomy:
- the main Regulations establishing the circumstances in which Ofcom will grant RSA and the restrictions and conditions that may be applied to RSA grants;
  - a Limitations Order restricting the number of RSA grants to existing uses of radio astronomy;
  - an amendment to the Wireless Telegraphy (Register) Regulations 2004<sup>5</sup> to enable Ofcom to publish details of RSA grants Ofcom may make; and
  - Regulations setting out the charges for RSA grants based on the opportunity cost of services<sup>6</sup> denied access to spectrum in order to avoid causing excessive interference to radio astronomy observations.

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<sup>4</sup> See <http://www.ofcom.org.uk/consult/condocs/astronomy>.

<sup>5</sup> S.I. 2004/3155 as amended by S.I. 2006/340 and S.I. 2006/1808



- 2.15 In the Statutory Notice Ofcom explained that, whilst it believes it will be desirable to make RSA tradable, it does not intend to proceed with this at the present time pending clarification by the Government of the treatment of the proceeds of public sector spectrum trading and leasing. This is in line with the Government's response to recommendation 2.4 of the Audit.
- 2.16 On 24 November 2006, Ofcom subsequently published a clarification on a specific point about the process for setting spectrum quality benchmarks and whether other spectrum users will be involved. In response, Ofcom confirmed that initial grants of RSA would reflect Ofcom's current planning assumptions and criteria that it applies in making assignments for fixed and mobile use in bands shared with radio astronomy within specified distances of radio astronomy sites and that these would apply only to in-band emissions. Accordingly, Ofcom saw no need to consult other spectrum users as initial grants of RSA for radio astronomy would impose no additional restrictions on other existing services in the frequency bands and at the locations in question.
- 2.17 The next section discusses the responses to the Statutory Notice, Ofcom's comments in response and a brief outline of the general effect of the Regulations that have been made.

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<sup>6</sup> This charging mechanism is known as Administrative incentive pricing (AIP). AIP is set at a rate in excess of Ofcom's administration costs and is designed to encourage users of the spectrum to make economically efficient use of their spectrum

### Section 3

## Comments on the regulations on RSA for radio astronomy, Ofcom's conclusions and next steps

- 3.1 A total of three responses were received in response to the Statutory Notice. These were from the PPARC; Inmarsat; and T-Mobile. The non-confidential content of the responses has been placed on Ofcom's website together with the consultation, statement and Statutory Notice at <http://www.ofcom.org.uk/consult/condocs/rsa/>.

### General comments

- 3.2 Two respondents, including PPARC, agreed that RSA was potentially beneficial and could help manage the spectrum used for radio astronomy more effectively.
- 3.3 PPARC stated that, while a number of issues remain to be clarified relating to implementation of RSA, it is content that the consultation has addressed all of its principal concerns. PPARC went on to express cautious optimism that the introduction of RSA will help ensure that the interests of radio astronomers will be protected without placing radio astronomy at a disadvantage relative to commercial users of spectrum. PPARC noted that it looked forward to working with Ofcom to ensure that the final terms and conditions of the RSA are fully acceptable. Ofcom agrees that it will be important to work closely with PPARC to ensure that a smooth transition is made from current arrangements for managing the spectrum used for radio astronomy to the implementation of RSA.
- 3.4 Inmarsat argued that RSA was unnecessary, disproportionate and not objectively justified, although that respondent also conceded that, by ensuring that the conditions attached to RSA for radio astronomy would mirror the current frequency sharing arrangement, the terms of Ofcom's proposed regulations went some way to eliminating its concerns.
- 3.5 Ofcom has considered the arguments put forward against introducing RSA for radio astronomy but believes that it should proceed. The policy arguments in favour of the introduction of RSA for radio astronomy have already been set out at length in Ofcom's previous consultation and statement and are not repeated in full in this document. They may be summarised as follows:
- RSA will provide an additional degree of certainty and security that radio astronomers do not currently enjoy as Ofcom will be under a statutory obligation to take account of the use of spectrum for radio astronomy;
  - further, as recommended by the Audit, RSA will enable market-based incentives for spectrum efficiency to apply to radio astronomy, which uses around 2% of the spectrum below 50 GHz; and
  - finally, Ofcom has seen no evidence that RSA for radio astronomy will be disproportionate or impose a significant additional regulatory burden on Ofcom

and the radio astronomy sector. The impact of the Regulations is analysed in the RIA (see Annex 2), which concludes that the costs associated with RSA appear small and likely to be outweighed by the benefits.

- 3.6 Accordingly, Ofcom made the Regulations to enable the introduction of RSA for radio astronomy. Comments specific to the Regulations are discussed below.

### **Wireless Telegraphy (Recognised Spectrum Access) Regulations 2007**

- 3.7 The Wireless Telegraphy (Recognised Spectrum Access) Regulations 2007 (the “RSA Regulations”) establish the circumstances in which Ofcom will grant RSA for radio astronomy and the restrictions and conditions that may be applied to grants of RSA. They are made under section 18 of, and Schedule 2, paragraph 1, of the Act and define:

- the circumstances of use;
- frequencies and locations of where RSA for radio astronomy is available;
- particulars of the restrictions and conditions to which a grant may be made subject;
- information and requirements which must be met by the applicant before a grant will be made; and
- time limits on Ofcom for dealing with applications for a grant of RSA.

### **Comments on the RSA Regulations**

- 3.8 One respondent commented on the inclusion of the frequency band 606–614 MHz in the RSA Regulations and suggested that Ofcom should consider what other uses could be made of the band.
- 3.9 The ultra-high frequency (UHF) frequency range 606-614 MHz that is currently used for radio astronomy occupies channel 38 of the spectrum allocation that is predominately devoted to television broadcasting. It is an important band for radio astronomy in the UK and in the Netherlands and has long received protection from the primary and secondary services that occupy the band. This is recognised not just in UK spectrum planning but also in international agreements. Existing broadcast use of the channels adjacent to channel 38 is already heavily constrained by the need to minimise any interference to this use of the channel. Further, at the 2006 ITU Regional Radio Conference that agreed a European plan for the UHF television broadcasting allocation following digital switch-over, neighbouring administrations accepted the need to protect channel 38 for radio astronomy in the UK and the Netherlands and reduced the number of assignments accordingly.
- 3.10 For there to be significant use of channel 38 for alternative services, this use would have to cease in both the UK and the Netherlands. In its consultation on the Digital Dividend Review<sup>7</sup>, published in December 2006, Ofcom explained that channel 38 is to be retained for radio astronomy. Ofcom considers that it is appropriate to introduce RSA for radio astronomy in the band and therefore the reference to this band has been retained in the RSA Regulations.

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<sup>7</sup> <http://www.ofcom.org.uk/consult/condocs/ddr/>

### **Ofcom's conclusion on the RSA Regulations**

- 3.11 Ofcom confirms that it has made the RSA Regulations in the form proposed in the Notification without substantial modifications (other than to clarify drafting and update the references to statutory powers to reflect the entry into force of the new Act).

### **Wireless Telegraphy (Limitations of Number of Grants of Recognised Spectrum Access) Order 2007**

- 3.12 In accordance with section 29(1) to (3) of the Act, Ofcom has made the Wireless Telegraphy (Limitations of Number of Grants of Recognised Spectrum Access) Order 2007 (the "Limitations Order"). This limitations order provides that there will be a limited number of grants based on the stated frequency bands and locations where radio astronomy is currently carried out.

### **Comments on the Limitations Order**

- 3.13 A respondent sought clarification of whether all frequency bands listed in the Limitations Order would be available to all six radio astronomy sites.

### **Ofcom's response and conclusion on the Limitations Order**

- 3.14 Ofcom has confirmed that initial grants of RSA for radio astronomy will reflect current planning procedures and sharing assumptions and will impose no additional restrictions on existing users that share spectrum with radio astronomy and consultation with existing users of spectrum is unnecessary.
- 3.15 Ofcom has considered whether to modify the Limitations Order so that RSA may be granted only in those frequency bands that are currently considered within Ofcom's spectrum planning assumptions at the specific sites in question. This would introduce an additional constraint that would make it more difficult for radio astronomers to acquire additional spectrum through spectrum trading or applications for variations to RSA grants in the future.
- 3.16 Although provision is not being made at this stage for conversion between RSA and licenses or applications for additional spectrum to that which the radio astronomy community is utilising at present, it is Ofcom's intention to allow such consideration to be made in due course. In the future when applications of this nature can be made, Ofcom would fully assess the possible impact of the request on any existing users sharing the same spectrum. In the event of any possible impact to existing licence users Ofcom would reject the application or upon request Ofcom may consult affected licensee to seek to gain mutual acceptance of the proposal. This mirrors Ofcom's current processes for dealing with Wireless Telegraphy licences.
- 3.17 Ofcom has therefore decided not to modify the Limitations Order although it remains its intention that initial grants of RSA will reflect current use of spectrum for radio astronomy around each site.
- 3.18 Ofcom has made the Limitations Order in the form proposed in the Statutory Notice without modification (other than to update the references to statutory powers to reflect the entry into force of the new Act).

## Wireless Telegraphy (Register) (Amendment) Regulations 2007

- 3.19 The Register was established by the Wireless Telegraphy (Register) Regulations 2004 and came into force in December 2004<sup>8</sup>. Since then, there have been several amendments to the Register to incorporate more classes of licences<sup>9</sup>.
- 3.20 The Wireless Telegraphy (Register) (Amendment) Regulations 2007 (the “Register Regulations”) provide for Ofcom to include information about grants of RSA for radio astronomy as part of the Register. RSA grants will be listed in Part 8 of the Schedule, which lists the various licences classes included on the Register. The Register Regulations also include two other non-RSA amendments that were the subject of separate Statutory Notifications at the end of 2006. The reason for combining two additional unrelated amendments in the one statutory instrument was to avoid the need to publish three separate statutory instruments, each making minor amendments to the Wireless Telegraphy Register at around the same time.
- 3.21 The first of the non-RSA amendments included in the Register Regulations is the insertion of a new row in Part 4 of the Schedule to allow for the inclusion on the Register of a licence in the 1785 – 1805 MHz frequency band due to be awarded at auction later this year. The general effect of this amendment and other accompanying Regulations relevant to the forthcoming award by auction of that licence were set out in a statement “**Award of Available Spectrum: 1785 – 1805 MHz**” published by Ofcom in conjunction with ComReg, the Republic of Ireland regulatory body, on 14 December 2006<sup>10</sup>. The Statutory Notice of Ofcom’s intention to make regulations in connection with this award of available spectrum was also published on 14 December and closed on 19 January 2007<sup>11</sup>. No responses were received in relation to Ofcom’s proposal to amend the Wireless Telegraphy Register Regulations of 2004 to include this licence in Part 4 of the Schedule of the Regulations. The information to be published on the Register relating to this licence will be the same categories of information already provided in relation to other licences on the existing Register.
- 3.22 The second of the non-RSA amendments is the insertion of a new Part 9 in the Schedule to include information on point to point broadband fixed wireless systems under the new licence class ‘Self coordinated links’ in the 64-66 GHz, 71.125-75.875 GHz, and 81.125-85.875 GHz bands. The notification was published on 20 December 2006 and closed on 21 January 2007. A copy of that document can be found at <http://www.ofcom.org.uk/consult/condocs/licensing7176/licensing/>
- 3.23 The intention of including information on the Register about this new licence class is so that licencees can facilitate self coordination within these bands. With respect to the 71.125-75.875 GHz and 81.125-85.875 GHz bands, Ofcom published a statement on dated 8 November 2006 which sets out a light licensed approach for broadband fixed wireless systems. These amendments set out the name and frequency bands of the new class of licence and extra relevant information which will be entered on the Register in respect of the new class to allow for self-coordination.

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<sup>8</sup> SI 2004/3155.

<sup>9</sup> As amended by SI 2006/339 and SI 2006/1808.

<sup>10</sup> The Statement is at <http://www.ofcom.org.uk/consult/condocs/availspec/statement/statement.pdf> and the original consultation can be found at

[http://www.ofcom.org.uk/consult/condocs/availspec/1785\\_1805.pdf](http://www.ofcom.org.uk/consult/condocs/availspec/1785_1805.pdf)

<sup>11</sup> <http://www.ofcom.org.uk/consult/condocs/award1785/award1785.pdf>.

### **Comments on the Register Regulations and Ofcom's decision**

- 3.24 No specific comments were received in response to Ofcom's proposal to add grants of RSA to the Register and other non-RSA amendments as discussed above. Ofcom has therefore made the Register Regulations in the form proposed in the Statutory Notice without modification (other than to update the references to statutory powers to reflect the entry into force of the new Act).

### **Wireless Telegraphy (Recognised Spectrum Access Charges) Regulations 2007**

- 3.25 The Wireless Telegraphy (Recognised Spectrum Access Charges) Regulations 2007 (the "Charges Regulations") provide for the fees to be charged by Ofcom for grants of RSA for radio astronomy and fall under sections 21 and 22(2) and (3) of the Act and having regard to section 3 of the Act. In accordance with sections 3 and 22 of the Act. The Charges Regulations provide for fees in some bands to be set above the level necessary to recover Ofcom's costs. This is in order to provide incentives to share spectrum with other applications having regard to:

- the availability of electro-magnetic spectrum for use for wireless telegraphy;
- the present and future demand for its use;
- the desirability of promoting its efficient management and use;
- the economic and other benefits that may arise from its use; and
- innovation and competition in electronic communications services.

- 3.26 Fees in frequency bands in which international constraints prevent sharing with other applications will be set by reference to Ofcom's costs.

### **Comments on the Charges Regulations and Ofcom's decision**

- 3.27 No specific comments were received on the Charges Regulations. Ofcom has therefore made them in the form proposed in the Statutory Notice without substantial modification (other than to clarify drafting and update the references to statutory powers to reflect the entry into force of the new Act).

### **Regulatory impact assessment (RIA)**

- 3.28 Inmarsat commented in general terms that the impact of introducing RSA for radio astronomy would be excessive and disproportionate but provided no detailed evidence to dispute Ofcom's conclusion that the regulatory burden would be small and outweighed by the benefits.
- 3.29 Each of the Regulations that Ofcom has made include a separate RIA. As the Regulations are to be made in the form proposed within the Statutory Notice, the RIAs reproduced in Annex 2, confirm Ofcom's previous statements.

### **Next steps**

- 3.30 Ofcom made the Regulations on 14 February 2007 and they will come into force on 8 March 2007. The Regulations will be officially published on the Office of Public Sector Information's website in due course at [www.opsi.gov.uk](http://www.opsi.gov.uk).

## Annex 1

# List of Respondents

The following non-confidential submissions were received in response to the Ofcom's Notification which ran from 10 November to 18 December 2006.

The responses may be viewed on the Ofcom website at <http://www.ofcom.org.uk/consult/condocs/rsa/responses/>

INMARSAT

PPARC

T-Mobile

## Annex 2

# Regulatory Impact Assessments

- A2.1 Ofcom published a consultation on Recognised Spectrum Access (RSA) as applied to radio astronomy in April 2005<sup>12</sup>. This included an Impact Assessment (IA). Ofcom's conclusions following consideration of responses to the consultation were given in its statement of October 2005 <http://www.ofcom.org.uk/consult/condocs/astronomy>. Ofcom further published a notice of proposals which can be found at <http://www.ofcom.org.uk/consult/condocs/rsa/rsa.pdf>.
- A2.2 The analysis set out below lists the Regulatory Impact Assessment ("RIA") arising from the Regulations Ofcom has made in connection with Recognised Spectrum Access (RSA) for radio astronomy<sup>13</sup>, published on 10 November 2006.
- A2.3 RIAs provide a valuable way of assessing different options for regulation and showing why the preferred option was chosen. They form part of best practice policy-making and are commonly used by other regulators. In producing the RIA in this document, Ofcom has had regard to such general guidance as it considers appropriate, including related Cabinet Office guidance.

## Wireless Telegraphy (Recognised Spectrum Access) Regulations 2007

### Introduction

- A2.4 This RIA considers the principle of introducing RSA for radio astronomy and the framework for introducing it. It reflects closely the relevant sections of the IA included in the April 2005 consultation because Ofcom's proposals are unchanged from those put forward in the Consultation, with the exception of the issue of spectrum trading for RSA.
- A2.5 The issue of tradability of public sector spectrum, including spectrum used for radio astronomy and conversion into licences was considered in the Independent Audit of Spectrum Holdings and the Government's response ([www.spectrumbaudit.org.uk](http://www.spectrumbaudit.org.uk)). As stated in the Government's response, although Ofcom believes that the ability to trade spectrum and convert RSA into licences and vice versa will help secure optimal use of the spectrum<sup>14</sup>, it has decided to defer the introduction of spectrum trading for RSA applied to radio astronomy pending clarification by the Government of how income from the trading of public sector spectrum will be treated in order to provide effective and proper incentives to users. This will be discussed between departments and HM Treasury in the context of the 2007 Comprehensive Spending Review, which will commence shortly.

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<sup>12</sup> The consultation is at

[http://www.ofcom.org.uk/consult/condocs/astronomy/main/radio\\_astronomy.pdf](http://www.ofcom.org.uk/consult/condocs/astronomy/main/radio_astronomy.pdf)

<sup>13</sup> Notice of Ofcom's proposal to make regulations in connection Recognised Spectrum Access (RSA) for radio astronomy, available at <http://www.ofcom.org.uk/consult/condocs/rsa/rsa.pdf>

<sup>14</sup> If, in the future, use of a particular frequency or location became redundant, radio astronomy could potentially benefit from trading the spectrum and society would benefit from more efficient spectrum use.



## Policy, purpose and intended effect

- A2.6 Ofcom's objective is to exercise its functions in relation to spectrum used for radio astronomy in a way that complies with its international obligations and secures optimal use of the spectrum in accordance with its statutory duties. It aims to do this by maximising the value created by use of the radio spectrum while recognising the non-commercial benefits of scientific research. The proposals in this document will achieve this by:
- a) making transparent the economic cost of making spectrum available for radio astronomy and so assisting rational and informed decision-making;
  - b) providing appropriate incentives for radio astronomers while empowering them to choose whether or not to relinquish spectrum; and
  - c) ensuring, through funding arrangements that are the responsibility of the government and Particle Physics and Astronomy Research Council ("PPARC") that financial support for radio astronomy will not be reduced as a result of the proposals and could even increase.
- A2.7 Ofcom has considered two scenarios: introduction of RSA for radio astronomy and continuation of the status quo without RSA.

## Benefits of RSA

- A2.8 As discussed in the notice and statement, Ofcom believes that RSA will be beneficial for radio astronomy as well as helping to secure optimal use of the radio spectrum.
- A2.9 RSA will provide radio astronomers enhanced security and incentives to use spectrum more efficiently. Efficiency gains could open up opportunities for alternative uses of spectrum that could promote innovation and competition, benefiting radio-using businesses and consumers.
- A2.10 The main benefits of radio astronomy are not economic. Nonetheless, radio astronomy research contributes to the UK economy by training high quality scientist and engineers and therefore increasing UK industrial competitiveness.
- A2.11 Radio astronomy also contributes to technology development and has collaborated with industry on development of low noise measurement receiver and antenna technologies.

## Costs of RSA

- A2.12 The costs of RSA will be the increase in fees compared with the amount currently paid by PPARC to Ofcom. Fees will be no greater than necessary for spectrum management purposes. Ofcom understands that the increase in fees will be factored into the financial support made available to radio astronomy by the Department of Trade and Industry so that any impact on the funding available for radio astronomy will be offset. An assessment of the impact of the specific charges Ofcom is proposing to set is contained in the RIA that accompanies The Wireless Telegraphy (Recognised Spectrum Access Charges) Regulations 2007.
- A2.13 Ofcom has already assessed the regulatory burden of the introduction of Administrative Incentive Pricing to various radio astronomy frequency bands and as

a result considers that application of RSA to radio astronomy will not place an extra burden on Ofcom.

- A2.14 Ofcom proposes to review fees for radio astronomy RSA approximately every five years or when the PPARC proposes amendments to the RSA grant. The methodology for calculating the fee charged will be based on spectrum management considerations.
- A2.15 Ofcom believes that it is unlikely that applying RSA to radio astronomy will cause an increase in its own administrative costs. Although Ofcom will have to review fees every five years, much of the work in calculating opportunity costs will have been carried out in setting fees for other spectrum users. Moreover, in between review periods, administrative costs may actually be lower because there will be no need to re-calculate the fees until the next review period, unlike the current system.

### Options and assessment

- A2.16 The following table analyses the options, the benefits, costs and risks and mitigating measures associated with the proposals discussed in this document.

<b>Option/issue</b>	<b>Benefits</b>	<b>Costs/risks</b>	<b>Mitigation</b>
Introduce RSA	Enhance security for radio astronomy  Incentives to share spectrum with commercial users	Radio astronomy bears higher fees.  Risks reducing funding for radio astronomy and impacts UK achievements in field	Fees charged will be no higher than necessary and based on spectrum management considerations. Any reductions of fees as a result of more efficient use can be retained for radio astronomy research.  The Office of Science and Technology in the Department of Trade and Industry intends to adjust the budget available to PPARC in connection with any increased charges that will be payable for grants of RSA

<b>Option/issue</b>	<b>Benefits</b>	<b>Costs/risks</b>	<b>Mitigation</b>
Technical parameters of RSA	Recognition will provide enhanced assurance as Ofcom will have a statutory duty to take radio astronomy into account in spectrum planning.	If parameters are too demanding, other services will be unduly constrained. If they are too relaxed, radio astronomy will be affected by harmful interference.	Appropriate choice of technical parameters based on international standards. When introduced, trading and conversion will provide a mechanism to adjust boundaries with commercial services.

## Conclusion

A2.17 The introduction of RSA for radio astronomy is expected to be beneficial for the economy by promoting efficient use of spectrum. It also offers radio astronomy users additional security. It is not expected to lead to a reduction in radio astronomy activity in the UK as the government has indicated that account will be taken of the long-term nature of radio astronomy research and the need to ensure security of access to spectrum and financial certainty<sup>15</sup>. Moreover, the costs that industry and Ofcom would incur appear small and likely to be outweighed by the benefits.

## Wireless Telegraphy (Limitation of Number of Grants of Recognised Spectrum Access) Order 2007

### Proposal, purpose and intended effect

A2.18 The Limitation Order to which this RIA relates will allow Ofcom to limit the number of grants of RSA for radio astronomy it makes in the frequency bands specified in the Order. The grant of RSA under these circumstances would be limited to users at existing sites specified in the Order.

### Costs and benefits to radio astronomy users

A2.19 Ofcom considers that limiting the grant of RSA for radio astronomy to the frequency bands and sites specified will not impose costs on radio astronomy because these are the only locations where the frequencies radio astronomy requires are available now and for the foreseeable future in the UK. At other feasible locations, users are already very likely to have licenses to transmit in those frequencies.

A2.20 Ofcom's aim of applying incentives for radio astronomers to use spectrum more efficiently can be met without applying RSA more widely. Before trading and conversion are introduced, there is no advantage in making RSA available more widely. There would be no practical point in granting RSA in areas where there are existing licensees as interference levels would in all probability be too high for successful radio astronomy observations.

<sup>15</sup> Government Response to the Review of Radio Spectrum Management – October 2002; section 11.6.

## Costs to Ofcom

A2.21 The costs to Ofcom of limiting the grants of RSA for radio astronomy are likely to be negligible. If anything they may be lower than not having this limitation because Ofcom may make fewer grants of RSA.

## Sectors affected

A2.22 The sector affected by this proposal is radio astronomy.

A2.23 Other business sectors may benefit from opportunities to access more spectrum, as a result of the incentives to promote efficient use of the spectrum allocated to radio astronomy contained in these proposals.

## Conclusion

A2.24 Ofcom has assessed the impact of limiting the grant of RSA for radio astronomy and has concluded that the better option is limitation. This is primarily because radio astronomy users are unlikely to be disadvantaged by this proposition.

## Wireless Telegraphy (Register) (Amendment) Regulations 2007

### Introduction

A2.25 This analysis represents a RIA following Ofcom's:

- a) notice of proposals to make Regulations in connection with the award of 1785-1805 MHz<sup>16</sup>, published on 14 December 2006, and its statement on the Notice consultation<sup>17</sup>;
- b) notice of proposals to make regulations in connection with the creation of a new class of tradable wireless telegraphy licences in the 71-76GHz, 81-86GHz and 64-66 GHz bands<sup>18</sup>, published on 20 December 2006 and its statement on the approach with respect to licences in these bands<sup>19</sup>; and
- c) notice of proposals to make regulations in connection with Recognised Spectrum Access (RSA) for radio astronomy<sup>20</sup>, published on 10 November 2006 and consultation and statement on RSA as applied to radio astronomy<sup>21</sup>.

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<sup>16</sup> Notice of Ofcom's proposal to make regulations in connection with the award of 1785-1805 MHz, available at <http://www.ofcom.org.uk/consult/condocs/award1785/award1785.pdf>

<sup>17</sup> Published on 14 December 2006 and available at

<http://www.ofcom.org.uk/consult/condocs/availspectrum/statement/statement.pdf>

<sup>18</sup> Licensing in the 71-76 GHz, 81-86 GHz and 64-66 GHz bands. Notice of Ofcom's proposal to amend the Wireless Telegraphy (Register) Regulations and the Wireless Telegraphy (Spectrum Trading) Regulations, available at

<http://www.ofcom.org.uk/consult/condocs/licensing7176/consultation.pdf>

<sup>19</sup> The Statement is at

[http://www.ofcom.org.uk/consult/condocs/71-86ghz/statement/71\\_86ghz.pdf](http://www.ofcom.org.uk/consult/condocs/71-86ghz/statement/71_86ghz.pdf). The original consultation can be found at <http://www.ofcom.org.uk/consult/condocs/71-86ghz/71-86.pdf>

<sup>20</sup> Notice of Ofcom's proposal to make regulations in connection Recognised Spectrum Access (RSA) for radio astronomy, available at <http://www.ofcom.org.uk/consult/condocs/rsa/rsa.pdf>

<sup>21</sup> The consultation is at

[http://www.ofcom.org.uk/consult/condocs/astronomy/main/radio\\_astronomy.pdf](http://www.ofcom.org.uk/consult/condocs/astronomy/main/radio_astronomy.pdf) and the statement is at <http://www.ofcom.org.uk/consult/condocs/astronomy>

## Proposal, purpose and intended effect

- A2.26 In order to enhance the general development of a secondary market for the right to use spectrum, Ofcom has established and maintains a register about spectrum licences - the Wireless Telegraphy Register (the "Register").
- A2.27 These Regulations enable information about:
- a) the Northern Ireland licence in the available spectrum 1785-1805 MHz (the "Spectrum Band");
  - b) tradable wireless telegraphy licences in the 71-76GHz, 81-86GHz and 64-66 GHz bands ("Self Coordinated Links") licences; and
  - c) grants of RSA for radio astronomy,  
to be published in the Register.
- A2.28 The amendment to the Register results from Ofcom's planned auction<sup>22</sup> of the Northern Ireland Licence to use the Spectrum Band; the creation of a new class of tradable licences in the 71-76GHz, 81-86GHz and 64-66 GHz bands known as Self Coordinated Links licences; and the introduction of RSA in connection with radio astronomy.
- A2.29 These amendments to include additional information on the Register should facilitate further spectrum trading, by providing information which will enable other licensees and potential buyers to find out who holds what frequencies and the constraints on the use of the specific frequencies or bands.
- A2.30 It will also facilitate coordination and sharing of bands used for radio astronomy. If the trading of grants of RSA is allowed in the future, it should also be facilitated by publishing this information on the Register.

## Costs and benefits

- A2.31 Ofcom carried out a regulatory impact assessment for the Wireless Telegraphy (Register) Regulations 2004, (published December 2004), which established the Register. This proposed amendment to those regulations only has the effect of including the Northern Ireland licence, Self Coordinated Links licences and grants of RSA in the Register. Ofcom considers that the original RIA is also relevant to the impact assessment for these current regulations.
- A2.32 The RIA for the Wireless Telegraphy (Register) Regulations 2004 concluded that the benefits of a having a register exceeded the costs that would be incurred by Ofcom and business in establishing and maintaining the register, and in publishing information.
- A2.33 The costs to Ofcom of updating the Register to add the Northern Ireland licence, Self-Coordinated Links Licences and grants of RSA will be minimal since the Register has already been established and would be maintained regardless of the

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<sup>22</sup> Ofcom's plans are the result of detailed award proposals in December 2005 and a statement in December 2006 ([http://www.ofcom.org.uk/radiocomms/spectrumawards/awardspending/award\\_1785](http://www.ofcom.org.uk/radiocomms/spectrumawards/awardspending/award_1785)) and the consultation and statement on the Notice.

current regulations. Moreover, if grants of RSA are not added to the Register, other spectrum users may incur greater costs in coordinating with radio astronomy.

### Business sectors affected

- A2.34 The main sectors affected by this proposal are radio astronomy, and fixed and mobile communications service provision.
- A2.35 Other business sectors may benefit from opportunities to access more spectrum as a result of the incentives to promote efficient use of the spectrum allocated to radio astronomy contained in these proposals.

### Conclusion

- A2.36 Ofcom's assessment is that the benefits of including the Northern Ireland licence and Self Coordinated Links licence classes and grants of RSA for radio astronomy within the Wireless Telegraphy Register are likely to outweigh the costs. The benefits include reduced coordination costs and more trading possibilities to promote efficient use of spectrum.

## Wireless Telegraphy (Recognised Spectrum Access Charges) Regulations 2007

### Proposal, purpose and intended effect

- A2.37 This RIA examines the impact of introducing charges for grants of RSA.
- A2.38 These Regulations set out the way in which the charges for RSA as applied to radio astronomy will be calculated for the frequency bands in which RSA will be available.
- A2.39 The charges are based on the opportunity cost of the spectrum in the relevant frequency bands. By setting charges on this basis, Ofcom intends to promote efficient decisions about the use of spectrum for radio astronomy that take into account the cost to the economy of spectrum use, in terms of the value that alternative users could make of the spectrum.

### Options and assessment

- A2.40 The benefits, costs and mitigating factors relating to Ofcom's proposed charges for RSA applied to radio astronomy are summarised in the table below.

Option/issue	Benefits	Costs/risks	Mitigation
Level of fees	Incentives for Spectrum efficiency.  Transparency aids decision-making.	Financial impact on radio astronomy sector and reduction in funds for research	Fees charged will be no higher than necessary and based on spectrum management considerations.  Any reductions of fees as a result of more efficient use can be retained for radio astronomy research.

Option/issue	Benefits	Costs/risks	Mitigation
			The Office of Science and Technology in the Department of Trade and Industry intends to adjust the budget available to PPARC in connection with any increased charges that will be payable for grants of RSA.

### Costs to Ofcom

A2.41 The charges for RSA applied to radio astronomy are based on existing calculations of Administrative Incentive Pricing charged to other spectrum users in the relevant bands, and therefore Ofcom will incur little additional cost in setting these charges.

### Sectors affected

A2.42 The sector affected by this proposal is radio astronomy.

A2.43 Other business sectors may benefit from opportunities to access more spectrum, as a result of the incentives to promote efficient use of the spectrum allocated to radio astronomy contained in these proposals.

### Conclusion

A2.44 Ofcom considers that the benefits of more efficient spectrum that applying these charges will create are much greater than the costs of the additional fees that will be paid by radio astronomers for RSA compared to the present cost-based amounts they pay to Ofcom. There should be no adverse impact on the level or standard of radio astronomy in the UK as the Government has undertaken to offset the prospective increase in the fees paid.