Crown Recognised Spectrum Access in 3400 to 3600 MHz

Statement on terms of new grants and licences and Statutory notice of Ofcom's intention to make regulations

Statement and statutory notice

Publication date: 17 December 2010

Closing Date for Responses: 28 January 2011

Contents

Section 1

Summary

1.1 This document explains our decisions on Crown Recognised Spectrum Access (RSA) in the 3400 – 3600 MHz band and on the associated conditions of the grants and licences. It also gives statutory notice of our intention to make the necessary regulations to enable Crown RSA in the band.

1.2 The Ministry of Defence (MOD) has stated its plans to release parts of the 3400 to 3600 MHz band, of which it is the manager and part user. RSA, granted by Ofcom, is required before the MOD can release spectrum to the market. However, RSA is not yet available for this band and various regulations and an order need to be made to allow Ofcom to grant RSA in this band. In light of this, Ofcom published the consultation on *Crown Recognised Spectrum Access in the 3400 MHz to 3600 MHz band* in September 2009, seeking views on whether RSA should be available in this band and on the conditions of the grants and licences.

Our decisions on the consultation proposals

1.3 Our consultation proposed that we make RSA available in the 3400 – 3480 MHz and 3500 – 3580 MHz frequency ranges. A majority of the 15 stakeholders that responded to the consultation supported our proposal and there are no subsequent developments that would make us reconsider our position, therefore we have decided to make the necessary regulations and order to implement this proposal.

1.4 We also consulted on a number of licence conditions, notably technical conditions. The table below summarises our decisions with regard to this:

Issue	Decision
Minimum Spectrum Trading Unit	No minimum
Terminal station in block limits	Fixed and nomadic outdoor +50 dBm/MHz EIRP Fixed and nomadic indoor+ 42 dBm/MHz EIRP Mobile + 25 dBm/MHz EIRP
Mobile terminal station out of block limits at 3480 MHz, 3500 MHz and 3580 MHz	No regulatory mask, compliance with R&TTE Directive and Harmonised Standards would be sufficient
Fixed and nomadic terminal station out of block limits at 3480 MHz, 3500 MHz and 3580 MHz	No regulatory mask, compliance with R&TTE Directive and Harmonised Standards would be sufficient
Base station in block limits	53 dBm/MHz EIRP
Base station out of block limits at 3480 MHz, 3500 MHz and 3580 MHz	Mask based on the annex of the Commission Decision 2008/411/EC, a 20 MHz block size and 16 dBi antenna
Technical limits for air to ground videolinks when the block boundary is at 3475 MHz	In block limit: 20 dBW EIRP; Out of block mask : the requirements of existing licences are maintained although expressed as a block edge mask
Technical limits for air to ground videolinks when the block boundary is at 3480 MHz	Unlikely to materialise, but if it does In block limit: 20 dBW EIRP; Out of block limit: the requirements of existing licences are maintained although expressed as a block edge mask
Should we align UK Broadband licence conditions with those in the RSA grants if and when UK Broadband requests us to do so?	Yes
Should less stringent technical parameters be permitted if agreed between neighbouring operators?	Yes

1.5 In most cases the decisions confirm the proposals set out in the consultation. These proposals were broadly supported by respondents. However, we have changed our position on the issue of out of block mask for fixed and nomadic terminal stations for the reasons explained in section 4.

Statutory notice of Ofcom's intention to make regulations

1.6 In order to be able to grant RSA to the Crown in the 3400 – 3480 MHz and 3500 – 3580 MHz blocks, and to allow the Crown to trade such RSA, we need to make the following regulations and order:

1) *The Wireless Telegraphy (Recognised Spectrum Access) (Amendment) Regulations 2011*, to allow Ofcom to grant RSA in the 3400-3480 MHz and 3500-3580 MHz frequency blocks.
2) *The Wireless Telegraphy (Recognised Spectrum Access and Licence) (Spectrum Trading) (Amendment) Regulations 2011*, to allow the trading of RSA grants and of licences arising from such trade.
3) *The Wireless Telegraphy (Limitation of Number of Grants of Crown Recognised Spectrum Access) Order 2011*, to limit the number of RSA grants that we may issue in the band.
4) *The Wireless Telegraphy (Register) (Amendment) Regulations 2011*, to allow for information from the grants of RSA, and the licences arising from trade of the grants, to be published in the Wireless Telegraphy Register.

1.7 In accordance with the requirements set out in the Wireless Telegraphy Act, we now give formal notice of our proposal to make these regulations and order and invite representations until the 28th January 2011.

Next steps

1.8 If, after completion of this statutory consultation and review of the representations, we decide to make the regulations and order, we will publish a short statement with our decision to do so.

1.9 Following this, the government – specifically the MOD – will be in a position to apply to us for a RSA grant and then to release spectrum in this band. We expect the MOD to proceed with its application for RSA during the course of 2011.

Section 2

Introduction and notice of proposals

2.1 This document follows our consultation on Crown Recognised Spectrum Access (RSA) in the 3400 MHz to 3600 MHz band published in September 2009 (the Consultation)[1]. It explains our decisions on

- introduction of Crown RSA in the band, and
- conditions of the grants and licences

2.2 This document also gives notice of our intention to make the necessary regulations and order to introduce Crown RSA in the band. These regulations and order will

- allow Ofcom to grant RSA at 3400 – 3480 MHz and 3500 – 3580 MHz to the Crown;
- limit the number of grants of RSA;
- allow trading of RSA granted in the 3400 – 3480 MHz and 3500 – 3580 MHz bands
- provide for certain information about the grants of RSA and licences issued on transfer of RSA to be published in the Wireless Telegraphy Register (WTR).

2.3 These regulations and order represent a first step in the process required to make this band available for private sector use, potentially for broadband wireless services. Once the regulations and order are made, Ofcom will be in a position to grant RSA to the Secretary of State for the frequency blocks above or part thereof. The government department holding the grant will then be able to trade with interested organisations so that broadband wireless, or other service compatible with the licence terms, can be provided in this band.

2.4 The rest of this document is organised as follows:

- section 3 provides the background,
- section 4 contains our decisions on the issues raised in the Consultation,
- section 5 presents the general effect of the proposed regulations. Annex 6 to 9 contains the drafts of the proposed regulations and order,
- section 6 sets out the next steps,
- annex 4 summarises the responses from stakeholders, and our position on these responses

2.5 Representations with respect to the proposed regulations and order are invited by the 28th January 2011.

[1] http://stakeholders.ofcom.org.uk/consultations/3_4ghz/

Section 3

Background to this statement and notice

3.1 The Ministry of Defence (MOD) has stated its plans[2] to release parts of the 3400 to 3600 MHz band, of which it is the manager and part user. RSA, granted by Ofcom, is required before the MOD can engage with the market. However, RSA is not yet available for this band and regulations (and an order) need to be made to allow Ofcom to grant RSA in this band. In light of this, Ofcom consulted on whether RSA should be available in this band and on the conditions of the grants and licences in 2009.

3.2 In this section we briefly describe the statutory framework within which we manage spectrum, we provide some general information in relation to the RSA mechanism and we outline the international and UK status of the 3400 MHz to 3600 MHz band. Further information in relation to those matters is set out in the Consultation. We also summarise our Consultation and we provide an update on recent developments affecting the band.

The statutory framework

3.3 Ofcom manages the radio spectrum within a statutory framework[3] created by the Communications Act 2003 (the 'Communications Act') and the Wireless Telegraphy Act 2006 (the 'WT Act'). These Acts set out our duties, functions and powers. In particular, with regards to spectrum we are required to secure

- the optimal use for wireless telegraphy of the electro-magnetic spectrum;
- the availability throughout the UK of a wide range of electronic communications services;

3.4 We carry out our duties and functions in spectrum management through a variety of tools and mechanisms. We have a preference for market-based mechanisms, as we detailed in our Spectrum Framework Review[4], which sets out Ofcom's overall strategy for the management of spectrum.

Public sector spectrum and Recognised Spectrum Access

3.5 The government, supported by Ofcom, committed to a programme for improving the efficiency with which public bodies manage and use their spectrum holdings. The government agreed in particular that market mechanisms should be extended more widely to the public sector, in line with Ofcom policy in the commercial sector. A key element of this is to enable public bodies to trade their spectrum holdings. Crown bodies currently use spectrum without individual authorisation from Ofcom[5]; as a result, there is no formal recognition akin to that conferred by a Wireless Telegraphy (WT) licence and Crown spectrum holdings cannot be traded.

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2 Ministry of Defence, UK Defence Spectrum Management Statement http://www.mod.uk/NR/rdonlyres/40622FC9-DC7B-40FC-B48A-90408F6F7676/0/spectrumstatement_051208.pdf

3 http://www.ofcom.org.uk/about/what-is-ofcom/statutory-duties-and-regulatory-principles/

4 http://www.ofcom.org.uk/consult/condocs/sfr/

5 The WT Act does not bind the Crown, so Crown bodies do not need authorisation from Ofcom in order to install or use radio equipment

3.6 A grant of Recognised Spectrum Access[6] (RSA) defines the rights and obligations that may be traded and that will have to be complied with by any person acquiring a licence created by transferring the RSA. Grants of RSA are therefore suitable for bodies that cannot be licensed by Ofcom but still want to engage in trading their spectrum holdings.

International regulatory status of the band

3.7 International Telecommunications Union (ITU) Radio Regulations allocate 3400 to 3600 MHz to fixed services and fixed-satellite services (space-to-Earth) on a primary basis, and to mobile services in a number of countries including the UK also on a primary basis but subject to certain conditions[7].

3.8 The key regulatory piece in Europe is the European Commission Decision on the Harmonisation of the 3400 – 3800 MHz band (the Commission Decision)[8]. This Commission Decision aims at harmonising, without prejudice to the protection and continued operation of other existing use in this band, the conditions for the availability and efficient use of the 3400 to 3800 MHz band for terrestrial systems capable of providing electronic communications services. The Commission Decision came into force in October 2008 for the 3400 – 3600 MHz block.

3.9 The UK implemented the Commission Decision through regulations in 2008[9]. These regulations impose a duty on Ofcom to carry out their functions so as to give effect to the requirements in the Decision.

Status of the band in the UK

3.10 The 3400 – 3600 MHz band is managed and used by the Ministry of Defence, but it has also extensive shared civil use which is licensed by Ofcom following various arrangements with the MOD, which remains ultimately responsible for the band. In contrast with other arrangements in other jurisdictions, the band is not allocated to satellite services in the UK.

3.11 The frequency allocations of these uses are described below:

- **Ministry of Defence**. Essential military use[10] of this band extends from 3400 MHz to 3410 MHz. There is some residual MOD requirement for spectrum across the rest of the band.

- **Broadband Wireless Access**. The 3480 – 3500 MHz and 3580 – 3600 MHz blocks were released by the MOD in 2003 for fixed wireless access. UK Broadband holds the licence, which is national and lasts until 2013 (extendable until 2018). The conditions were liberalised in 2007 to remove the limitation to fixed applications.

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6 Sections 18 to 26 of, and schedule 2 to, the WT Act contain the principal statutory provisions relating to RSA

7 ITU Radio Regulations 2008, footnote 5.430A, http://www.itu.int/publ/R-REG-RR-2008/en

8 Commission Decision of 21 May 2008 on the harmonisation of the 3400-3800 MHz frequency band for terrestrial systems capable of providing electronic communications services http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2008:144:0077:0081:EN:PDF

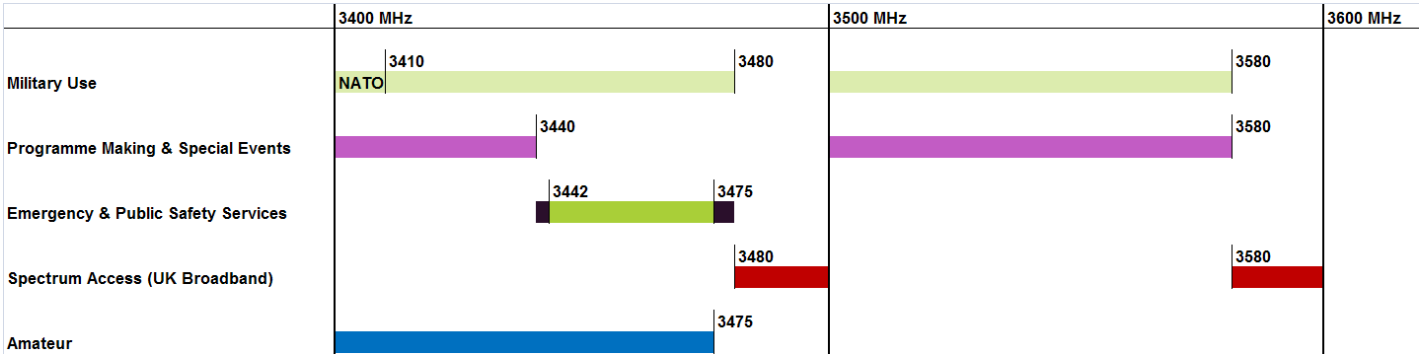
9 The 3400 – 3800 MHz Frequency Band (Management) Regulations 2008, SI 2008/2794 http://www.opsi.gov.uk

10 See European Common Allocation, http://apps.ero.dk/ECA/

- **Programme Making and Special Events (PMSE).** The MOD permits the use of wireless video links in the 3400 – 3440 MHz and 3500 – 3580 MHz blocks, at events that are localised and of limited duration.

- **Emergency and Public Safety Services (EPSS or Emergency Services).** EPSS currently have access to 33 MHz at 3442 – 3475 MHz pursuant to an arrangement between the MOD and the EPSS sponsor departments. The 33 MHz block is used for air to ground videolinks.

- **Amateur use.** Amateur radio users have access to the 3400 – 3475 MHz band on a secondary basis, with use predominantly concentrated in the lower 10 MHz.



3.12 The MOD has recently stated its plans to reform the way it manages its spectrum[11]. In particular, it has outlined a programme of release of spectrum to the market in which the 3400 – 3600 MHz band appears prominently.

3.13 In order to proceed with its plans, the MOD will need to hold grants of RSA for the spectrum it may want to release directly to the market. However, grants of RSA are not yet available in the 3400 – 3600 MHz range – existing RSA regulations need to be amended to introduce the new band.

3.14 We considered that we should consult on the specifics of RSA in the band – the frequency blocks were it would be available and the licence conditions – before making the decision to modify the regulations.

Ofcom consultation on Crown Recognised Spectrum Access in 3400 to 3600 MHz

3.15 We consulted in September 2009, proposing to make regulations that would allow us to grant RSA in the band and to do so in a way that follows the mandate of the Commission Decision. Specifically, we proposed:

i) To amend the existing RSA Regulations 2009[12] to include the 3400 – 3480 MHz and 3500 – 3580 MHz frequency ranges.

ii) Some of the conditions that would be included in the RSA grants and the prospective WT licences arising from trade, in particular the technical licence conditions and the conditions relevant to trading.

[11] Ministry of Defence, UK Defence Spectrum Management Statement
[12] The Wireless Telegraphy (Crown Recognised Spectrum Access) Regulations 2009, S.I. 2009/16

3.16 Our proposal regarding the frequency range was informed by the following considerations:

- The MOD has informed PMSE users that following grant of an RSA, they will continue to be able to access this spectrum under the same terms and conditions as at present. However, the MOD also informed PMSE users that this arrangement is unlikely to continue if and when the MOD decides to release the spectrum to the market;
- The MOD has agreed that the Emergency Services airborne videolink application will continue in the band, but possibly not at its current frequencies, and that it will be accommodated under RSA;
- UK Broadband may decide to extend its licence until 2018 and hence Ofcom would not be able to grant RSA in the blocks covered by UK Broadband's licence even if it was covered in the RSA Regulations 2009.

3.17 With regard to the grant and licence conditions, the Consultation proposed that

- A minimum spectrum trading unit, either in the geographic or the frequency domain, would introduce an unnecessary constraint in the way the RSA holder can trade.
- The Technical Licence Conditions (TLCs) for Broadband Wireless Applications should align with the proposals in the Commission Decision.
- Since the Commission Decision does not include out of block conditions for terminals, the Consultation presented alternatives based on different usage assumptions.
- The TLCs for the RSA for airborne videolink should reflect the conditions currently included in the licence, but should be expressed in a different way
- The actual location of the EPSS block in the band may change. The MOD and the relevant government departments will have to decide on this but, in the meantime, our Consultation proposed TLCs for the all the options being studied.

Developments since the publication of the Consultation

Interference to radars in the 2700 to 3100 MHz band

3.18 Our Consultation noted that there is a possibility that mobile networks block and interfere with S-band radars operating in bands hundreds of MHz away. We have published an information paper[13] and several technical reports[14] providing further details of the issue, which could affect cellular deployments in the 2.6 GHz and the 3400 – 3600 MHz bands. We are currently engaged in a programme of work aiming at: accurately understanding the blocking and interference effects, identifying whether mitigation solutions on the radars are necessary, and setting out an implementation plan for the mitigation solutions and for transitional restrictions on the cellular deployments where necessary.

[13] Coexistence of S Band radar systems and adjacent future services http://stakeholders.ofcom.org.uk/binaries/spectrum/spectrum-awards/awards-in-preparation/757738/587_Information_Update_Coex1.pdf

[14] http://stakeholders.ofcom.org.uk/spectrum/spectrum-awards/awards-in-preparation/award_2010/

3.19 This work will provide an assessment of what would be required to avoid blocking and interfering from deployments in the 3400 – 3600 MHz band. There is a possibility that coordination between cellular deployments and the radar sites will be necessary until the full set of mitigation measures is in place. We expect to have more accurate information on the radar susceptibility early next year and to reflect transitional coordination requirements, if required, in the RSA grants.

Arrangements for Emergency Services in 3400 – 3500 MHz

3.20 EPSS currently use the 33 MHz in the 3442 – 3475 MHz range. The MOD has agreed that these users remain in the band and, therefore, a block should be reserved for them and not released to the market. We explain in the Consultation that there are however two issues of a practical nature – and out of Ofcom's scope – that government departments need to address to implement this:

i) **Which body will hold the RSA grant for the frequencies used by the Emergency Services?**
We considered in the Consultation that this could be the MOD as the sole RSA holder, a concurrent RSA held by the MOD and other departments, or one of the departments with responsibility for Emergency Services as sole holder. Our understanding is that departments have not yet reached an agreement on this point.

ii) **What will be the location of the EPSS block?**
The current 3442 – 3475 MHz block may be migrated elsewhere within the 3400 – 3480 MHz band, and it may be either enlarged or reduced. Two broad alternatives where envisaged at the time of the Consultation:

- The EPSS block is moved down in frequency to an allocation such as, for example, 3410 – 3443 MHz.
- The EPSS block remains essentially where it is now – although the exact position of its upper boundary may change.

Our understanding of ongoing discussions between the MOD and the organisations representing the Emergency Services community is that there is a preference for the first alternative, although this is subject to funding availability. In any case, the decision is yet to be taken. This does affect our decision to make the regulations, since these will cover all options envisaged.

Spectrum Plan for the London 2012 Olympic Games

3.21 We published a consultation[15] and a statement[16] with our plans for spectrum for the London 2012 Games. The 3400 – 3600 MHz band was not included in the statement. However, in the update[17] to our statement we have included spectrum within 3400 – 3600 MHz as this will be very important to meeting the spectrum demand for wireless cameras.

3.22 Since the publication of our statement in October 2009 and in line with the Government's two binding guarantees to the International Olympic Committee, covering the allocation of the spectrum required for the organisation of the Games

[15] http://stakeholders.ofcom.org.uk/binaries/consultations/london2012/summary/london2012.pdf
[16] http://stakeholders.ofcom.org.uk/binaries/consultations/london2012/statement/statement.pdf
[17] http://stakeholders.ofcom.org.uk/consultations/london2012/london2012-spectrum-plan-update/

and the waiving of fees payable by members of the Olympic Family for the spectrum required for the Games, the MOD has agreed to the inclusion of spectrum from the 3400 – 3600 MHz band in our spectrum plan in recognition that they may not now be able to release this spectrum to the market in the timescale envisaged by their spectrum strategy published in December 2008. This agreement will ensure that spectrum that is already used for wireless cameras is available for the Games. The MOD has agreed that, in the event that spectrum from within the 3400 – 3600 MHz band is released to the market before the Games, the release conditions will exclude the use of this spectrum from 28 June 2012 to 23 September 2012.

Discussions relating to UK Broadband's blocks in the 3.4GHz band

3.23 UK Broadband holds a licence covering the frequency blocks 3480 – 3500 MHz and 3580 – 3600 MHz. The technical conditions in this licence place constraints on the out of band emissions from UK Broadband's blocks into the frequencies below 3480 MHz, above 3500 MHz and below 3580 MHz which are covered by the prospective RSA. When adjacent holders of rights to use spectrum wish to change the nature of the boundary conditions between them, Ofcom considers this as being, primarily, a matter for negotiation between the parties.

3.24 Following the closure of our Consultation UK Broadband and the MOD opened discussions on a number of potential adjustments to their spectrum usage rights in this band. We took the view that we should allow these discussions to take place before finalising our position in relation to the RSA. In the event, these discussions have not led to an agreement to change the nature of the spectrum usage rights at the adjacencies between the UK Broadband spectrum blocks and the MOD's prospective RSA blocks. We consider that it is now appropriate to move ahead with this Statement on the RSA.

Section 4

Our decisions on the issues raised in the Consultation

4.1 In this section we review the questions set out in the Consultation and we present our decisions in relation to these matters. We also deal with some issues raised by stakeholders that are outside the scope of the questions in the Consultation. In reaching our decisions we have carefully considered all responses received. A summary and review of these responses is included in Annex 5.

4.2 This section is structured in four parts:

- Extension of the RSA Regulations 2009 to the 3400 to 3600 MHz band. We asked whether RSA should be available in the band and, if so, for what frequency blocks.
- Minimum trading unit of geographical coverage or frequency bandwidth in a partial trade.
- Technical Licence Conditions– technical limits applicable at the boundaries of the RSA and in block, and other related issues such as the applicability of the limits to UK Broadband's licence.
- Other major issues raised by stakeholders.

4.3 We also asked stakeholders for their views on the technical limits to be used in the case of a partial trade of an RSA block. These limits will be for the RSA holder, rather than Ofcom, to agree with its trading parties, but we nevertheless considered useful to gather the views of the industry. The responses we received on this are included in Annex 5.

4.4 We address next each of the four areas above in turn.

Extension of RSA to the 3400 to 3600 MHz band

4.5 We proposed that we should include the 3400 – 3480 MHz and 3500 – 3580 MHz ranges in the RSA Regulations 2009. Most of the stakeholders supported this proposal without reservation; however two of them expressed some concerns. In addition, one stakeholder was against this proposal on the basis that it considered this to be a satellite band, and another suggested that we should consider excluding the 3400 – 3410 MHz block because it is an internationally recognised defence band.

4.6 With regards to satellite use we note that, although ITU Radio Regulations allocate 3400 to 3600 MHz to fixed and fixed-satellite (space to earth) services on a primary basis, this block is not allocated to satellite services in the UK. Indeed, the UK Frequency Allocation Table and the UK Plan for Frequency Authorisation[18] do not include satellite services.

[18] UKFAT and UKPFA at http://spectruminfo.ofcom.org.uk/spectrumInfo/

4.7 In relation to the suggestion that we should consider excluding the 3400-3410 MHz band because it is an internationally recognised defence band, we note that defence use in the lower 10 MHz in the UK is managed by the MOD. RSA gives the MOD the option, but not the obligation, to release the block if the MOD decides that there is no further military need for the spectrum.

4.8 Accordingly, we have decided to move ahead with our proposal. We will put in place the regulatory mechanisms that will allow us to grant RSA to the Crown in the 3400 – 3480 MHz and 3500 – 3580 MHz blocks, and allow the Crown to trade the RSA grants. The legal instruments that will allow us to do this are introduced in section 5 and reproduced in full draft form in Annexes 6 to 9.

Minimum Spectrum Trading Unit

4.9 When making the grants and WT licences tradable, we need to consider the need for a minimum spectrum trading unit (STU). A minimum STU is the smallest unit of geographical coverage or frequency bandwidth that will be allowed to be transferred in a partial trade. The view that we expressed in the Consultation is that neither a geographical nor a frequency STU was necessary in this band.

4.10 Most stakeholders did either not express a view on a geographical STU or supported our no minimum STU approach. On the other hand, many stakeholders argued that there should be a minimum STU in the frequency domain. Minimum units of 5 MHz, 10 MHz and 20 MHz were suggested, on the basis of, among others, the following arguments:

- The absence of a minimum trading unit may lead to fragmentation. Fragmentation is undesirable because it actively discourages the deployment of high-value services and it hinders the deployment of future technologies requiring high carrier bandwidths.

- Wide blocks are required to provide Broadband Wireless Access (BWA) services. Small blocks would not serve the interests of potential operators.

4.11 We remain unconvinced of the need for a minimum STU in the frequency domain. We still think that it would impose an unnecessary constraint on the parties involved in a trade, and with regard to the issues raised we consider that

- Some stakeholders may have interpreted the minimum STU as the package size at the time of a competitive award. This is not correct. If and when the MOD releases spectrum in this band, it will have to assess the optimum format of the release. This will include, among others, the size of the spectrum blocks. We expect that the MOD will consult with the industry to assess this.

- We do not think that we should put measures in place to avoid fragmentation. If spectrum is more valuable in large block size then it is highly unlikely that parties will choose to fragment their blocks and trade in small blocks. The market will decide on this and a minimum STU is not required to enforce it.

- The licence currently held by UK Broadband at 3480 – 3500 MHz and 3580 – 3600 MHz, spectrum which is likely to be used for very similar services as the RSA blocks once released to the market[19], does not require a minimum STU. We

[19] See also paragraph 4.14 below

think that the same rights should be given to the adjacent spectrum in the RSA block.

- The MOD, as the prospective RSA holder, also rejects a constraint in the shape of a minimum STU.

4.12 In light of the above, we have decided to follow our initial proposal and not include a minimum geographical or frequency STU.

Technical limits for grants and licences

4.13 The RSA grants will include Technical Licence Conditions (TLCs) to protect other users from interference. For this we have considered:

- Boundary conditions at the edges of the proposed RSA blocks: 3400 MHz, 3480 MHz, 3500 MHz, 3580 MHz.

- In band power limits in the 3400 – 3480 MHz and 3500 – 3580 MHz ranges.

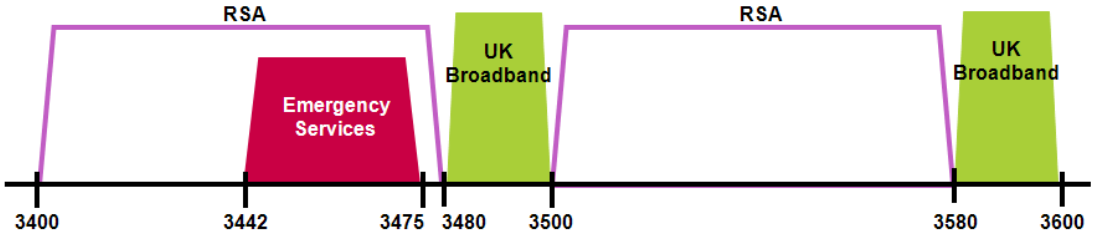
4.14 The Commission Decision requires Member States to make spectrum available in compliance with the technical parameters in its annex. Accordingly, this constrains our ability to set technical conditions in the scenario anticipated in the Commission Decision.

4.15 For the purpose of our analysis, we have assumed that, in line with the position anticipated in the Commission Decision, spectrum released to the market in the RSA block is likely to be used for BWA. We have therefore looked at a scenario where BWA is introduced in the RSA block. In addition, as the MOD has agreed to the continued operation of Emergency Services airborne videolinks in the band, we have looked at TLCs for that usage too.

4.16 We explained in the Consultation that we would not set boundary conditions at 3400 MHz. The characteristics of the military applications in the 3300 – 3400 MHz band are confidential to the MOD for national security reasons. As a result, it is not possible for us to determine technical limits that ensure interference remains below the threshold acceptable for such applications. It will be for the MOD, if it decides to release spectrum immediately above the 3400 MHz boundary, to specify the appropriate technical requirements for the protection of the military applications below the 3400 MHz boundary.

4.17 As explained in paragraph 3.20, the layout of the 3400 – 3500 MHz block is still uncertain. The MOD and other relevant government departments will decide whether the Emergency Services block stays in its current location i.e. 3440 – 3475 MHz, or is moved elsewhere in the band. Our Consultation introduced different proposals for the out of block (OOB) limits at 3480 MHz to cover these possibilities.

4.18 The figure below shows the lay-out of the band with the Emergency Services block at its current location:



4.19 Our Consultation made proposals reflecting:

1) In block power limits for terminal stations in the 3400 – 3480 MHz and 3500 – 3580 MHz blocks, based on the annex of the Commission Decision.

2) In block power limits for base stations (BS) in the 3400 – 3480 MHz and 3500 – 3580 MHz blocks, based on the annex of the Commission Decision.

3) Out of block limits for terminal stations at 3480 MHz, 3500 MHz and 3580 MHz, based on simulation work we carried out. The Commission Decision does not contain proposals for this.

4) Out of block limits for BSs at 3480 MHz, 3500 MHz and 3580 MHz, based on the annex of the Commission Decision.

5) In block limits for airborne videolink services in 3400 – 3480 MHz, and out of block limits at 3480 MHz boundary, based on the technical conditions of the current licences. The Commission Decision does not address this use in its annex.

4.20 Elaborating on the last two points, we note that the choice of out of block TLC at the 3480 MHz boundary will depend on the nature of the future use of the RSA spectrum below the adjacency at 3480 MHz. If airborne videolinks are moved from their current frequency location to further down the 3.4 GHz band then the out of block TLC at the RSA's 3480 MHz boundary will be set by reference to BWA use.

4.21 We also made proposals on two other aspects related to the TLCs:

6) whether we should be permit a relaxation on the technical conditions if agreed between neighbouring operators, and

7) whether we should align UK Broadband's TLCs with those of the RSA if and when UK Broadband asked us to do so.

4.22 The following paragraphs set out our decisions in these areas.

1) In block power limits for terminal stations in 3400 – 3480 MHz and 3500 – 3580 MHz

4.23 Our proposed limits followed the power limits set out in the annex to the Commission Decision. Specifically, we proposed:

- Fixed and nomadic terminal station outdoor: + 50 dBm/MHz EIRP
- Fixed and nomadic terminal station indoor: + 42 dBm/MHz EIRP
- Mobile terminal station: + 25 dBm/MHz EIRP

4.24 Stakeholders generally agreed or did not have a strong view on these limits. The only proposed change was from UK Broadband and suggested that fixed/nomadic outdoor terminals with non directive antennas should be subject to a power reduction requirement of 15 dB.

4.25 The rationale behind UK Broadband's proposal is that high power devices with non directive antennas are likely to cause high out of block interference levels. Specifically, high EIRP outdoor terminals would interfere with BSs in the adjacent channel, unless such terminals use directive antennas.

4.26 We think that this scenario will not arise as terminals are required to be compliant with the requirements of the R&TTE Directive[20], as implemented in UK law[21]. Manufacturers and operators generally follow Harmonised Standards to ensure compliance with those requirements. The current Harmonised Standard relevant to fixed/nomadic terminals in this band is EN 302 326[22], which indicates that fixed/nomadic terminals with omni directional antennas must be restricted to indoor deployment to be considered compliant. We think that this restriction provides enough protection and therefore there is no need to introduce a technical requirement in our licences to avoid this particular interference scenario.

2) In block power limits for base stations in 3400 – 3480 MHz and 3500 – 3580 MHz

4.27 Our Consultation proposed alignment with the Commission Decision limit of 53 dBm/MHz EIRP. The majority of stakeholders agreed with this proposal and there are no developments that would make us reconsider our position. Therefore our decision on this is a limit of 53 dBm/MHz EIRP.

3) Out of block limits for terminal stations at 3480 MHz, 3500 MHz and 3580 MHz

4.28 The Commission Decision does not address limits for terminal stations. Our Consultation proposed that we adopt the same OOB limits at 3480 MHz as at 3500 MHz or 3580 MHz. This addresses the scenario where the EPSS block is moved away from its current location and a BWA user is licensed next to UK Broadband block. We consider that the adjacency situation at 3480 MHz in this case would be similar to that appearing at the 3500 MHz and 3580 MHz boundaries – BWA on both sides – and therefore we proposed to apply at 3480 MHz the same technical requirements as in 3580 MHz and 3500 MHz. Stakeholders did not present objections to this approach.

4.29 We address separately the cases of mobile stations and fixed/nomadic stations:

Out of block limits for mobile stations

4.30 Our Consultation set out four alternative limits for mobile terminal stations. The first three consisted of a block edge mask (BEM) built on the ETSI Harmonised Standard

[20] Directive 1999/5/EC of the European Parliament and of the Council of 9 March 1999 on radio equipment and telecommunications terminal equipment and the mutual recognition of their conformity http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:31999L0005:en:NOT

[21] By virtue of the Radio Equipment and Telecommunication Terminal Equipment Regulations 2000, Statutory Instrument 2000/730.

[22] ETSI EN 302 326 Fixed Radio Systems; Multipoint Equipment and Antennas – Multipart EN

for mobile terminals EN 302 623[23], but differed from each other in terms of the required separation between adjacent channels. The fourth option proposed that no BEM is required, and that compliance with the relevant Harmonised Standards would be the only requirement.

4.31 The stakeholders that expressed a view on this question had a preference for either Option 3 – the most relaxed of the BEM based options – or Option 4 – no BEM, only compliance with Harmonised Standards.

4.32 Most responses argued that there is no need to separate channels in frequency in order to avoid terminal to terminal interference. It was noted that an implicit guardband to avoid mobile terminal to terminal interference (Options 1 and 2) results in inefficiency in terms of total throughput. This was shown in the study submitted by UK Broadband as part of their response.

4.33 Option 3 was based on no separation between channels – i.e. no implicit guardband – and on terminals with 10 MHz channels, and would therefore be a solution that allows the efficient deployment of 10 MHz terminals.

4.34 However, some stakeholders indicated that terminals with channel bandwidths larger than 10 MHz are likely in the future. Option 3 would be inefficient in that case, and the stakeholders would prefer an approach where they have to comply with Harmonised Standards only (Option 4) which are normally updated as new equipment is developed.

4.35 We agree with the stakeholders' views on this. It is plausible that the 3.4 GHz band will become the home for the large bandwidths required for IMT-Advanced technologies. We do not think the TLCs should impose constraints on this and therefore we have decided to select Option 4 from our Consultation proposals. We will therefore rely on standards and not on a block edge mask to achieve interference mitigation.

4.36 We note that under the R&TTE Directive we cannot mandate a specific technology standard in our licences. However, equipment put into the market must be compliant with the requirements of the R&TTE Directive. In practice this compliance is normally achieved by meeting the requirements of a Harmonised Standard, when such standard exists. This is the case for mobile terminals in this band since they are covered by EN 302 623.

4.37 Therefore, although we cannot mandate conformity with specific standards, compliance with the requirements of the R&TTE Directive will mean in practice that it is highly likely that mobile terminals will comply with EN 302 623, or any other Harmonised Standard produced in the future (for instance for devices with bandwidth larger than 10 MHz).

Out of block limits for fixed/nomadic stations

4.38 Our Consultation proposed that the out of block requirement should be the same for all types of terminals i.e. fixed, nomadic & mobile. This would provide certainty for the adjacent users about the interference they might expect.

[23] ETSI EN 302 623 Broadband Wireless Access Systems (BWA) in the 3 400 MHz to 3 800 MHz frequency band; Mobile Terminal Stations; Harmonized EN covering the essential requirements of article 3.2 of the R&TTE Directive

4.39 Most stakeholders that expressed a view on this question argued that compliance with the relevant Harmonised Standard should be the only requirement for fixed and nomadic terminals. ECC (Electronic Communications Committee) also indicates in its ECC Recommendation (04)05[24] that, provided that omni directional terminals are used indoors only, the Harmonised Standard should be enough to ensure low probability of interference to adjacent users.

4.40 In light of the stakeholders' comments and the review of ECC work, we have decided to align the approach to out of block requirements for fixed/nomadic terminals with the proposal for mobile terminals (i.e. we will only require compliance with the requirements from the R&TTE Directive, normally achieved by showing conformity with the relevant Harmonised Standard).

4) Out of block limits for base stations at 3480 MHz, 3500 MHz and 3580 MHz

Base station out of block limits at 3500 MHz and 3580 MHz

4.41 Our Consultation proposal for this TLC was based on the limits in the annex to the Commission Decision. Specifically, we proposed a BEM based on the mask in the annex and on two additional technical assumptions: 20 MHz block size and a 16 dBi BS antenna. The responses expressed a wide range of views on this subject and are addressed in detail in Annex 5.

4.42 There was general support for a set of conditions in the form of a block edge mask, but a major concern from stakeholders was that the conditions should not result in limitations to adjacent use. In particular, stakeholders expressed concerns about increased interference into UK Broadband's blocks and how this interference could affect this licensee's ability to exploit its spectrum. One response suggested that 5 MHz guardbands should be put in place and, therefore, that the BEM set out in the Commission Decision should be applied at 3505 MHz and 3575 MHz rather than being applied at 3500 MHz and 3580 MHz. UK Broadband suggested a different shape for the mask, put together from parts from the BEM set out in the Commission Decision and parts of EN 302 326.

4.43 We recognise that the Commission Decision seeks to balance different interests. On one hand, the Decision requires Member States to implement the conditions in its annex, which is based on technical work by CEPT and presents a compromise between spectrum efficiency and protection of adjacent blocks under the assumptions of the work at CEPT.

4.44 On the other hand, the Commission Decision is without prejudice to the protection of existing users. We understand that stakeholders' concerns are related to the fact that the proposed mask would allow high power transmitters to be placed in the channels immediately adjacent to the edge between blocks, and this would have an effect on UK Broadband's receivers located close to the adjacency.

4.45 We have consideed the two alternatives raised by stakeholders to mitigate this effect:

i) a guardband, and

ii) a power-restricted block.

[24] ECC Rec. (04)05, "Guidelines for accommodation and assignment of multipoint fixed wireless systems in frequency bands 3.4-3.6 GHz and 3.6-3.8 GHz"

4.46 These are alternatives to a BEM that is positioned right up to the boundary of the adjacent blocks without a guardband or a power restricted block.

4.47 With regard to guardbands, we consider the following points to be relevant:

- **Block edge masks up against the boundary present an advantage over guardbands in terms of flexibility**, which we consider key in this band. The guardband method requires good knowledge of the technologies and the deployment scenarios used in the adjacent blocks, and gives the best results when the same technology is used on both sides. However, this is not the scenario of the 3400 – 3600 MHz band, where different applications, channel bandwidths and deployments are likely. On the other hand, a block edge mask up to the edge at both sides of the adjacency gives the licensee freedom to meet the requirements in a number of different ways[25] and encourages the upgrade to more efficient technology[26].

- **The band is managed by the MOD**. When establishing the conditions of the RSA grants, Ofcom's purpose is to mitigate the interference into adjacent blocks without imposing unnecessarily restrictive conditions on the RSA grant itself that would result in an avoidable loss of value. Therefore, provided that we set RSA conditions that grant protection to adjacent users, we do no think that we should impose additional restrictions on spectrum that is not managed by us.

- **The work in the ECC on this band supports the block edge mask approach.** The technical background to the mask in the Commission Decision was developed by the ECC and can be found in ECC Rec. (04)05 and ECC Report 33[27]. Both documents argue that the block edge mask approach suits the scenario of this band better than guardbands.

4.48 We have also carefully considered the merits of a restricted block against a the Commission Decision BEM up against the boundary:

- **The BEM set out in the Commission Decision was designed on the basis of a low level of interference.** In order to comply with it, network operators will most likely introduce an internal guardband or reduce the EIRP level. However, as technology improves on both receivers and transmitters it would be possible to get closer to the block edge at higher EIRP while maintaining low interference. A restricted block will preclude this and so could lead to spectrum inefficiencies.

- **UK Broadband's licence does not include a power-restricted block**, and therefore it allows them to deploy high power stations right to the block edge. We do not think it is proportionate that a power-restricted block is imposed on the RSA side for what may well be a radio service with characteristics very similar to the one that UK Broadband might deploy.

[25] The licence holder has three ways to meet the requirements of the BEM: 1) it may fit filters to the transmitters to enable the equipment to operate adjacent to the block boundary and keep unwanted emissions low in the adjacent block, 2) it may operate equipment without filters, or with less stringent filters, but place its channel away from the boundary and well within its own block, and 3) it may operate equipment at lower transmitter power. This would in turn lower the out of block emissions as well.

[26] A licensee that upgrades to equipment with better out of block emissions would be able to place its transmissions closer to its block edge. This would allow for a larger usable bandwidth.

[27] ECC Report 33, The analysis of the coexistence of point-to-multipoint FWS cells in the 3.4 – 3.8 GHz band

- **In practice, coordination between operators is very likely** at the locations where interference is detected, and this may lead to adjacent operators introducing internal guardbands in a coordinated manner.

4.49 We have therefore decided to proceed with the Commission Decision BEM up against the boundary as it is offers the best trade-off between spectrum efficiency and protection of UK Broadband receivers.

Base station out of block limits at 3480 MHz

4.50 Our Consultation proposed for this boundary the same TLCs as those proposed for 3500 MHz and 3580 MHz. We note however that the current situation at 3480 MHz is different from the other two boundaries in that there is currently a 5 MHz guardband[28] between 3475 MHz and 3480 MHz. Some stakeholders argued that UK Broadband has a legitimate expectation to see this guardband preserved.

4.51 Our duties are to promote optimal use of spectrum. We see this as being consistent with maintaining the ability of UK Broadband to use their licensed spectrum blocks. However, the consideration of optimal use, which determines our decision on the TLCs for the RSA block at 3480 MHz, depends on the nature of the future use of the RSA block below 3480 MHz. The current airborne videolinks use may remain – we consider this scenario and the relevant TLCs below. But, as we explain in section 3, airborne videolinks could be moved to lower frequencies within the 3400 – 3480 MHz block. In this scenario, we expect the spectrum immediately below 3480 MHz to become available for BWA use. In this case the adjacency scenario at 3480 MHz becomes identical to the 3580 MHz and 3500 MHz cases. As above, we consider that a BEM – with no guardband or restricted block – promotes the most efficient use of spectrum.

4.52 We consider that this provides adequate protection for UK Broadband against undue interference – and whilst UK Broadband can expect to continue to have adequate protection for a use in accordance with its licence conditions, this does not constrain our ability to permit a change in the nature of the adjacent use (i.e. there is no legitimate expectation that conditions relating to adjacent use cannot change – particularly when this is to enable the possibility of more efficient use in line with our duties).

4.53 Therefore, we have decided to apply the same conditions at the 3480 MHz boundary as at 3500MHz/3580 MHz boundaries if the airborne videolink allocation is moved to the lower part of the 3400 – 3480 MHz block.

5) In block limits for airborne videolink services in 3400 – 3480 MHz, and out of block limits near 3480 MHz

In block power limit for airborne videolinks

4.54 Our Consultation proposal was to maintain the current power limit which is 20 dBW. No concern was raised in the responses to our Consultation and we will therefore apply this limit to the RSA.

[28] This guardband appeared as a result of the re-farming of the band before the 2003 auction. Its size is a result of the re-farming of the blocks and not of considerations about protection of fixed wireless above 3480 MHz or airborne videolinks below 3475 MHz.

Out of block limits for airborne videolinks

4.55 If airborne videolinks are not moved down in the 3400 – 3480 MHz range then the out of block TLC for the RSA's boundary at 3480 MHz will need to reflect the requirements of the airborne videolinks use (instead of the requirements of BWA). We address this case here.

4.56 Our Consultation set out a proposal for out of block TLC for airborne videolinks in such a way that would enable this use to be moved slightly closer to the 3480 MHz boundary – into what is currently the 5 MHz guardband. The proposed mask[29] gives UK Broadband a similar level of protection as the current guardband-based arrangement. This approach might be appropriate if it enabled a more efficient use of spectrum (although it would impose higher requirements in term of transmitter filtering on the airborne videolink) and if the MOD and the Emergency Services organisations supported this change.

4.57 In the event the Emergency Services community declared in their response to our Consultation that they do not support the case for moving up to 3480 MHz and that, if they do not move down in the 3400 – 3480 MHz range, they would prefer to stay at their current frequencies.

4.58 Since the choice of location within the band is a decision for the Emergency Services organisations and the MOD to make – and not a decision for Ofcom – we have considered the choice of appropriate out of block TLCs for the scenario where the upper boundary of airborne videolink use stays where it currently is, i.e. at 3475 MHz. Our proposals for these TLCs consisted of a BEM which allows for the same out of block emissions above 3480 MHz as currently permitted by airborne videolink licences[30]. This was broadly supported by stakeholders. We will therefore proceed with these out of block TLCs for airborne videolinks in the case where airborne videolinks remain in their current position within the band.

4.59 If, however, the MOD and the Emergency Services organisations were to decide to move the airborne videolink allocation further up towards the 3480 MHz boundary, then we believe that the out of block TLCs we set out in our Consultation document and which allow for the same out of block emissions as currently permitted by airborne videolink licences, would be appropriate for the reason explained above.

6) Relaxation of the technical conditions

4.60 The Commission Decision states that less stringent technical parameters, if agreed between operators of neighbouring networks, can also be used. The majority of our respondents also supported having this option. It was noted, however, that bilateral agreements might become obstacles for later trades and act as an inhibitor to the creation of a harmonised band.

4.61 Our view is that the ability to reach such agreements will increase efficiency, but the agreements need to be reflected in the licences. This is because a network operator using equipment that does not respect the limits stated in its licence would be in breach of the licence conditions even if it has the agreement of its neighbour. To avoid this, the operators involved will have to inform us of their agreements and,

[29] This out of block mask proposal has a sharp edge at 3480 MHz and then a flat baseline level of -25 dBm/MHz above 3480 MHz.

[30] This out of block mask proposal has an edge at 3475 MHz, followed by a transitional slope and a flat baseline level of – 25 dBm/MHz starting at 3478 MHz.

once that we are sure that no third party is affected, we will implement the changes in the licences. There will be no uncertainty about the legitimacy of an inter-licensee agreement once that the changes are implemented in the licences.

4.62 We recognise that a harmonised set of conditions is valuable in the primary market i.e. when the regulator first issues the licences. But after release, relaxation agreements will let the operators fine tune their licences to better fit their specific business needs, and thus increase the efficiency in spectrum use.

7) Alignment of the TLCs in UK Broadband's licence with the TLCs in the RSA grant

4.63 The Commission Decision does not require us to impose the technical limits in its annex on existing users. However, in anticipation of potential interest from UK Broadband in a variation of its licence to line up with our Consultation proposals, we specifically asked for stakeholders' views on whether we should accept such an alignment if requested by UK Broadband.

4.64 Respondents generally supported this approach but were very clear that it should only be made following UK Broadband's request. We note that the MOD, the stakeholder that would be affected were this alignment to happen, was supportive of the proposal.

4.65 One response commented that different licence conditions in different parts of the band for the same type of equipment would impose an additional burden for manufacturers, and another observed that all licences should align with the requirements of the Commission Decision. However, as explained above the Commission Decision is very clear that it is without prejudice to existing use. Therefore, we don't think we should or can on the basis of the Decision, impose a change on an existing licence without the licensee's consent.

4.66 We intend to proceed as proposed. We note that UK Broadband has already indicated interest in some of the technical conditions presented for the RSA, and that it may submit a formal specific request in the near future. We will proceed with granting the change without further public consultation provided that the request replicates the technical terms in this statement. In this context, UK Broadband can request a change that brings the TLC for either, or both of, its base station or terminal equipment in line with the conditions of the RSA block.

Other major issues raised by stakeholders

Relocation of Emergency Services to the lower part of 3400 – 3600 MHz

4.67 We explain in the Consultation and in section 3 of this document that the current 3442 – 3475 MHz EPSS block may be migrated elsewhere within the 3400 – 3480 MHz band, and that it may be either enlarged or reduced. In particular, the MOD and the Emergency Services organisations are considering relocation to the lower part of the block, for instance to 3410 – 3440 MHz. Several stakeholders have expressed support for such move, on the basis that it will allow a contiguous broadband wireless allocation from 3440 MHz to 3600 MHz. This will have benefits in terms of coordination of use and interference mitigation and would therefore increase the value of the band.

4.68 As we note in section 3 this decision is for the MOD and the government departments sponsoring Emergency Services and not for Ofcom. However, the

regulations that we make are not affected by this decision as they will allow for the relocation if that is the agreement. The actual RSA grants – specifically the technical conditions attached to them – will contain a menu of different conditions to cater for the two different uses envisaged, i.e. broadband wireless and airborne video links.

Clarifications on satellite use

4.69 The satellite community requested clarification on certain statements that we made in our Consultation that affect satellite use, in particular the interpretation that we have made of certain articles of the Commission Decision. Whilst we understand that the satellite community is seeking a steer from us in respect of the whole 3400 to 3800 MHz range, we note that the 3600 to 3800 MHz band – which does have authorised satellite use in the UK – is out of the scope of this Statement and that it continues to be open for Permanent Earth Station licence applications.

4.70 As far as the 3400 to 3600 MHz band is concerned, this is not a satellite band in the UK. There are no satellite stations licensed to operate in the band, Ofcom does not have a licence product for such use, and the UKFAT does not show this band as allocated to satellite. We do not have the intention to introduce satellite use in the future. Therefore, Fixed Satellite Services (FSS) do not currently constitute an "existing use" in the band that, according to the Commission Decision, should be protected.

4.71 Satellite stakeholders also asked Ofcom to explain how it will ensure protection of FSS when it is adjacent to a broadband wireless network. It is also requested that the co-ordination procedure continues to be specified, including with earth stations located outside of the UK.

4.72 Terrestrial and satellite services have successfully shared the 3600 – 3800 MHz block both in the UK and internationally for decades. In the UK, Ofcom requires coordination between these two services on a "first come, first served" basis. This means that we review all requests for new BWA stations or new FSS earth stations, and authorise them only if certain coordination requirements vis-à-vis the other service are met. We think that this coordination procedure ensures protection of FSS from BWA stations across the band.

4.73 Secondly, protection of FSS stations in the 3600 - 3800 MHz range from BWA in the 3400 – 3600 MHz would be ensured by the frequency separation between the services. This particular issue was already raised at the time of UK Broadband's variation request in 2007[31]. We concluded then that there would be no disproportionate reduction in the spectrum quality of FSS users, on the basis of the low number of FSS stations in the lower part of the 3600 – 3700 MHz. The situation with regard to the RSA block is slightly better, in that there is a larger frequency separation between the top of the RSA block at 3580 MHz and most of FSS use – above 3700 MHz. We think this separation should be enough to mitigate the effect of interference.

4.74 With regard protection of FSS stations located outside the UK from BWA emissions in the band 3400 - 3600 MHz, the UK is bound by the limits in ITU Radio Regulations footnote 5.430A.

[31] UK Broadband application for licence variation http://stakeholders.ofcom.org.uk/consultations/bb_application/

Exemption of terminals

4.75 UK Broadband raised the issue of exemption of terminals and specifically asked that:

- Mobile terminals with total radiated power less than 26 dBm be made licence exempt.
- Fixed and nomadic terminals be made licence exempt as long as total radiated power is less than 30 dBm

4.76 Under the section 8(4) of the WT Act, we are required to exempt the establishment, installation and use of a station or apparatus if it is not likely to involve undue interference. We do this through changes to existing licence exemption regulations. We frequently consult to introduce these changes, for example following developments in technology or to harmonise UK regulations with European law.

4.77 We plan to include a question on exemption of terminals in this band in our next licence exemption consultation early next year. In practice, the licence conditions for terminals discussed in paragraph 4.22 and the following paragraphs would allow terminals to be used legally in the UK, regardless of the exemption status of terminals.

Summary of our conclusions

4.78 The table below recaps our decisions on the points addressed in the Consultation:

<table>
<tr><th>Consultation issue</th><th>Decision</th></tr>
<tr><td>Frequencies to be covered by the RSA regulations</td><td>3400 – 3480 MHz & 3500 – 3580 MHz</td></tr>
<tr><td>Minimum Spectrum Trading Unit</td><td>None</td></tr>
<tr><td>Terminal station in block limits</td><td>Fixed and nomadic outdoor + 50 dBm/MHz EIRP
Fixed and nomadic indoor + 42 dBm/MHz EIRP
Mobile + 25 dBm/MHz EIRP</td></tr>
<tr><td>Mobile terminal station out of block limits at 3480 MHz, 3500 MHz and 3580 MHz</td><td>No regulatory mask, compliance with R&TTE Directive and Harmonised Standards would be sufficient</td></tr>
<tr><td>Fixed and nomadic terminal station out of block limits at 3480 MHz, 3500 MHz and 3580 MHz</td><td>No regulatory mask, compliance with R&TTE Directive and Harmonised Standards would be sufficient</td></tr>
<tr><td>Base station in block limits</td><td>53 dBm/MHz EIRP</td></tr>
<tr><td>Base station out of block limits at 3480 MHz, 3500 MHz and 3580 MHz</td><td>Mask based on the Commission Decision annex, 20 MHz block size and 16 dBi BS antenna, i.e.:
<table>
<tr><th>Frequency offset from block edge (MHz)</th><th>Radiated Power Density Limits (dBm/MHz)</th></tr>
<tr><td>ΔF=0</td><td>10</td></tr>
<tr><td>0<ΔF<4</td><td>10 - 41•ΔF/4</td></tr>
<tr><td>4</td><td>-31</td></tr>
<tr><td>4<ΔF<7</td><td>-31 - 4• (ΔF-4)</td></tr>
<tr><td>ΔF≥7</td><td>- 43</td></tr>
</table></td></tr>
</table>

<table>
<tr><th>Consultation issue</th><th>Decision</th></tr>
<tr><td>Technical limits for air to ground videolinks when the block boundary is at 3475 MHz</td><td>In block limit: 20 dBW EIRP
Out of block mask:<table><tr><th>Frequency (MHz)</th><th>Radiated Power Density Limits (dBm/MHz)</th></tr><tr><td>F=3475</td><td>-4</td></tr><tr><td>3475 < F ≤ 3478</td><td>- 4 - 7• (F - 3475)</td></tr><tr><td>F>3478</td><td>-25</td></tr></table></td></tr>
<tr><td>Technical limits for air to ground videolinks when the block boundary is at 3480 MHz</td><td>In block limit: 20 dBW EIRP
Out of block mask:<table><tr><th>Frequency (MHz)</th><th>Radiated Power Density Limits (dBm/MHz)</th></tr><tr><td>F>3480</td><td>-25</td></tr></table></td></tr>
<tr><td>Should we align UK Broadband licence conditions with those in the RSA grants if and when UK Broadband requests us to do so?</td><td>Yes</td></tr>
<tr><td>Should less stringent technical parameters be permitted if agreed between neighbouring operators?</td><td>Yes</td></tr>
</table>

Section 5

General effect of the proposed regulations

5.1 We concluded in the previous section that we should take the necessary steps to allow us to grant RSA to the Crown in the 3400 – 3480 MHz and 3500 – 3580 MHz blocks, and to allow the Crown to trade such RSA. In practice, this requires us to make various regulations and an order.

5.2 In accordance with section 122(4) of the WT Act, before making regulations or an order we must give notice of our proposal to do so, publish notice of the proposal and consider any representations made to us. This document gives notice of our proposal to make the following regulations and order, on which representations are invited until 28th January 2011:

1) The Wireless Telegraphy (Recognised Spectrum Access) (Amendment) Regulations 2011, to allow Ofcom to grant RSA in the 3400-3480 MHz and 3500-3580 MHz frequency blocks.

2) The Wireless Telegraphy (Recognised Spectrum Access and Licence) (Spectrum Trading) (Amendment) Regulations 2011, to allow the trading of RSA grants and of licences arising from such trade.

3) The Wireless Telegraphy (Limitation of Number of Grants of Crown Recognised Spectrum Access) Order 2011, to limit the number of RSA grants that we may issue in the band.

4) The Wireless Telegraphy (Register) (Amendment) Regulations 2011, to allow for information from the grants of RSA, and the licences arising from trade of the grants, to be published in the WT Register.

5.3 The rest of this section discusses the effect and the detail of the proposed regulations. Draft regulations in full text are presented in Annexes 6 to 9.

The Wireless Telegraphy (Recognised Spectrum Access) (Amendment) Regulations 2011

The legislative framework

5.4 The proposed regulations are to be made under section 18 of, and paragraph 1 of schedule 2 to, the WT Act. This section and schedule of the WT Act require us to make regulations to specify the circumstances in which RSA may be granted and to specify the process for granting RSA and its ongoing administration.

5.5 The *Wireless Telegraphy (Crown Recognised Spectrum Access) Regulations 2009*[32] (RSA Regulations 2009) already set this out for certain frequency bands. Specifically, these Regulations set out

- the circumstances of use,
- the time limit for dealing with grant applications,

[32] Statutory Instrument 2009/16, http://www.opsi.gov.uk/

- the requirements that the application must meet, and
- the restrictions and conditions to which a grant may be subject.

The proposed regulations

5.6 The proposed Wireless Telegraphy (Recognised Spectrum Access) (Amendment) Regulations 2011 extend the applicability of the RSA Regulations 2009 to the 3400 – 3480 MHz and 3500 – 3580 MHz blocks.

5.7 The proposed regulations are set out in full in Annex 6. Specifically, regulation 2 adds the 3400 – 3480 MHz and 3500 – 3580 MHz blocks to the Schedule of the RSA Regulations 2009.

The Wireless Telegraphy (Recognised Spectrum Access and Licence) (Spectrum Trading) (Amendment) Regulations 2011

The legislative framework

5.8 The proposed regulations are to be made under section 30 of the WT Act. Under section 30(1), Ofcom may by regulations authorise the transfer to another person by the holder of a WT licence or RSA of rights and obligations arising by virtue of the grant or licence. Under section 30(4), transfers that fail to comply with these regulations will be void.

5.9 We made the *Wireless Telegraphy (Recognised Spectrum Access and Licence) (Spectrum Trading) Regulations 2009*[33] (the 'RSA trading regulations 2009') last year to enable trading of Radio Astronomy RSA and Crown RSA. These regulations set out the following:

- The types of transfer that are authorised. These may be 'total' or 'partial' and 'outright' or 'concurrent'.
- The circumstances in which trades may not be authorised
- The transfer process, which requires that the holder of RSA or licence notify Ofcom of the proposed trade and that Ofcom gives consent to the trade, taking into account a number of factors such as whether the current holders are in breach of the grant or licence terms.
- The publication by Ofcom in the Transfer Notification Register of certain information related to the trade.

The proposed regulations

5.10 The proposed Wireless Telegraphy (Recognised Spectrum Access and Licence) (Spectrum Trading) (Amendment) Regulations 2011 amend and extend the applicability of the RSA trading regulations 2009 to the 3400 – 3480 MHz and 3500 – 3580 MHz blocks. These proposed regulations are set out in full in Annex 7.

5.11 Regulation 2(1) of the proposed regulations amends the RSA trading regulations 2009 to allow for total transfer – outright and concurrent – of RSA in the new blocks.

[33] Statutory Instrument 2009/17, http://www.opsi.gov.uk/

5.12 Regulation 2(2) amends regulation 4 of the RSA trading regulations 2009, related to partial – outright and concurrent – transfer. The new frequency blocks are included under regulation 4(a), which means that there is no minimum trading unit for a trade involving a part of the range of frequencies, or for a trade involving a part of the total geographical area where the grant or licence authorise use.

5.13 Regulations 2(3) and 2(4) reorganise the Schedules to the RSA trading regulations 2009 and add the new frequency bands.

The Wireless Telegraphy (Limitation of Number of Grants of Crown Recognised Spectrum Access) Order 2011

The legislative framework

5.14 Under section 29 of the WT Act, where Ofcom considers it appropriate for the purpose of securing the efficient use of the electro-magnetic spectrum, it must make an order to impose limitations on grants of RSA at particular frequencies.

The proposed order

5.15 The proposed Wireless Telegraphy (Limitation of Number of Grants of Crown Recognised Spectrum Access) Order 2011 sets out these limitations for the grants that Ofcom may grant in the 3400 – 3480 MHz and 3500 – 3580 MHz band. The proposed order is set out in full in Annex 8.

5.16 Grants of RSA in the band will only be made to the Crown. The number of grants is to be limited to the number that would be most likely to secure optimal use of the spectrum and promote competition in electronic communication services having regard to the matters set out in sections 3(1) and (2) of the WT Act, ie availability of and demand for spectrum, efficient management and use of spectrum, innovation and competition.

The Wireless Telegraphy (Register) (Amendment) Regulations 2011

Background and legislative framework

5.17 Under section 31 of the WT Act, Ofcom may make regulations to provide for the establishment and maintenance of a WT Register of "relevant" information. Section 31(3)(b) of the WT Act provides that information is "relevant" for the purposes of the WT Register if it relates to, amongst others, the making, renewal, transfer, modification or revocation of grants of RSA. Under section 31(2), Ofcom may include in the register only that information that is of a description prescribed by regulations.

5.18 Ofcom made the Wireless Telegraphy (Register) Regulations 2004[34] (the 'Register regulations 2004') in December 2004. Since then, the Register Regulations 2004 have been amended on several occasions to incorporate more classes of licences and grants of RSA to be included on the Register.

5.19 Regulation 4(2) of the Register Regulations 2004 specifies what can be "relevant" information for the purposes set out in section 31(3)(b) of the WT Act. This information is the identity and contact details of the holder of the licence or grant, the

[34] Statutory Instrument 2004/3155, http://www.opsi.gov.uk/

licence or grant reference number, the frequencies assigned and the geographical area of transmission or reception.

5.20 We believe that it is necessary to publish this information in order to ensure openness and transparency and to facilitate spectrum release and sharing. However, there might be a need for certain sensitive information to be withheld for security reasons.

The proposed regulations

5.21 The proposed Wireless Telegraphy (Register) (Amendment) Regulations 2011 amend the Register Regulations 2004 to expand the Register to include the information about grants of RSA in the 3400 – 3480 MHz and 3500 – 3580 MHz blocks, and licences arising from the trade of such grants. Specifically, Regulation 2 adds the new frequency blocks to Part 8 of the Schedule of the Register regulations 2004.

5.22 The proposed regulations are set out in full in Annex 9.

Impact Assessment of the proposed regulations

5.23 The proposed regulations, in essence, amend existing instruments to introduce the 3400 – 3600 MHz band into the current regulatory framework for managing public sector spectrum holdings. We consulted on and published the Spectrum Framework Review for the Public Sector[35] (the SRFIP) with our decisions on this framework in 2008. Following that decision, we made regulations in 2009 allowing us to grant RSA to Crown bodies in the 406 – 430 MHz range[36], and we stated at that time that we would extend RSA and trading to other public sector holdings on a phased basis. Our SFRIP statement and regulatory statement contain Impact Assessments that are relevant to the regulations at hand.

The citizen and consumer interest

5.24 The Impact Assessment in the SFRIP looked at the questions of trading and introduction of RSA in detail, and concluded that allowing public bodies to trade their spectrum holdings would benefit citizens and consumers. Citizens would benefit as public services would be provided at lower cost to the taxpayer and to the economy. Consumers would benefit from increased competition, innovation and choice in communications services.

5.25 The introduction of access and trading into the 3400 to 3600 MHz spectrum band will generate similar benefits for citizens and consumers to those set out above. Notably we are supporting the designation of the band for fixed, nomadic and mobile applications in accordance with the Commission Decision. The Commission Decision's objective is that new services provided in this band should mainly target end-user access to broadband communications thus increasing the choice of citizens and consumers.

[35] http://www.ofcom.org.uk/consult/condocs/sfrps/

[36] Spectrum Framework Review for the Public Sector - Notice of Ofcom's proposal to make regulations on Recognised Spectrum Access for public bodies and consultation on technical conditions http://stakeholders.ofcom.org.uk/consultations/sfrps08/

Ofcom's policy objective

5.26 Our overall policy objective in introducing tradable RSA is set out in the Impact Assessment in Annex 5 of our Consultation. It is, in brief, to secure optimal use of the radio spectrum by providing public bodies with incentives and opportunities to use spectrum more efficiently. We will achieve this by enabling them to trade their spectrum holdings.

Stakeholders likely to be affected

5.27 Stakeholders likely to be affected by the proposed regulations include

- public sector users, that will have an alternative to the way they currently manage spectrum;
- citizens, given that RSA can, ultimately, increase spectrum efficiency;
- consumers and providers of spectrum-using communications services, who would also benefit from access to spectrum released or shared by public bodies;
- current users of the spectrum within the scope of these regulations, whose use may be affected.

5.28 Our Consultation sets out in more detail how each of these stakeholders would be affected by the proposed regulations.

Purpose of the proposed regulations

5.29 Under the Wireless Telegraphy Act 2006 Ofcom cannot grant licenses to Crown bodies. This means that, in order to define their rights and obligations in relation to spectrum in a form that they can trade, it is necessary to grant them RSA. Without these regulations, the MOD and other government departments will not have the legal instrument that recognises the rights and obligations that can be traded in the 3400 to 3600 MHz band.

Options

5.30 We have considered two options:

- Option 1: do nothing. Public spectrum release or sharing can take place by returning surplus spectrum to Ofcom to award.
- Option 2: make the regulations that allow Ofcom to grant RSA in 3400 – 3600 MHz, that allow the trading of RSA grants and of licences arising from such trade, that limit the number of RSA grants that we may issue in the band, and that allow for information from the grants of RSA, and the licences arising from trade of the grants, to be published in the WT Register.

Cost, benefit and risks

5.31 The benefits, costs and risk of RSA and trading of RSA were documented in our previous consultations and statements cited above. In summary, RSA will provide public bodies with greater certainty on their rights and obligations, as well as a new option to manage their spectrum. This will benefit citizens and consumers because spectrum may be more easily released for the highest value application.

5.32 Costs and risks of making these regulations and order are related to the impact on existing users and detailed in our Consultation. In summary, the main potential impact is on PMSE users. PMSE access will continue as long as the band is not traded but, after that, access will not be guaranteed. This may lead to PMSE users having to re-fit the equipment or to procure new equipment for use in a different band. There is a risk that not enough spectrum is available for PMSE video links in the future although we consider this unlikely.

Conclusion on the preferred option

5.33 Option 1 represents the *status quo*. Public sector users already have an incentive to return surplus spectrum to Ofcom as they will then pay a reduced fee. However, option 2 gives public sector bodies the opportunity to enter into arrangements with commercial users. These arrangements may present better value for the affected body than simply returning the spectrum.

5.34 We conclude that the costs, in particular to existing users, are outweighed by the value brought by the possibility to trade the spectrum to the optimum use and, therefore, propose to adopt the regulations under the terms included in this notice.

Equality Impact Assessment (EIA)

5.35 Following an initial analysis undertaken in relation to this project we are not aware that the issues being considered here are intended to (or would, in practice,) have a significant differential impact on different racial groups, on disabled citizens or consumers or other minority groups compared with citizens and consumers in general. Similarly, the proposed policies do not make distinctions between consumers or citizens in different parts of the UK or between consumers and citizens on low incomes. We do not believe that the proposed policies will have a particular effect on one group of consumers over another.

Section 6

Next steps

6.1 This document gives notice of our intention to make regulations and an order. We will consider representations on the draft regulations in Annexes 6 to 9 until 28th January 2011. We will make a decision on the regulations and order in the light of the representation received, following which we will make the regulations, publishing a short Statement to this effect at the same time.

6.2 We expect the MOD and the relevant government departments to make a decision on the frequency location of the airborne videolink service in the near future. If we make the proposed regulations and order, we expect the government to apply for an RSA in the band during the course of next year.

6.3 The grants of RSA that we will issue following application will contain licence conditions according to our decisions in this Statement. Depending on the timeline of our next licence exemption consultation, terminal stations may be made licence exempt. The grants will also contain several other conditions that are in line with our WT licences. These conditions may include coordination requirements for the protection of radars, a subject that we are still investigating, and conditions regarding international coordination.

6.4 Following the grant of RSA the MOD will be in a position to trade its holdings in this band. The MOD have told us that they plan to engage with the market in 2012.

Annex 1

Responding to this notice

How to respond

A1.1 Ofcom invites written views and comments on the issues raised in this document, to be made **by 5pm on 28 January 2011**.

A1.2 Ofcom strongly prefers to receive responses using the online web form at http://stakeholders.ofcom.org.uk/consultations/crown-rsa/howtorespond/form, as this helps us to process the responses quickly and efficiently. We would also be grateful if you could assist us by completing a response cover sheet (see Annex 3), to indicate whether or not there are confidentiality issues. This response coversheet is incorporated into the online web form questionnaire.

A1.3 For larger consultation responses - particularly those with supporting charts, tables or other data - please email cesar.gutierrez@ofcom.org.uk attaching your response in Microsoft Word format, together with a consultation response coversheet.

A1.4 Responses may alternatively be posted or faxed to the address below, marked with the title of the consultation.

Cesar Gutierrez
Spectrum Policy Group – Market Enhancements Team
Riverside House
2A Southwark Bridge Road
London SE1 9HA

Fax: 020 7981 3770

A1.5 Note that we do not need a hard copy in addition to an electronic version. Ofcom will acknowledge receipt of responses if they are submitted using the online web form but not otherwise.

A1.6 It would be helpful if your response could include direct answers to the questions asked in this document, which are listed together at Annex X. It would also help if you can explain why you hold your views and how Ofcom's proposals would impact on you.

Further information

A1.7 If you want to discuss the issues and questions raised in this consultation, or need advice on the appropriate form of response, please contact Cesar Gutierrez on 020 7981 4686

Confidentiality

A1.8 We believe it is important for everyone interested in an issue to see the views expressed by consultation respondents. We will therefore usually publish all responses on our website, www.ofcom.org.uk, ideally on receipt. If you think your response should be kept confidential, can you please specify what part or whether

all of your response should be kept confidential, and specify why. Please also place such parts in a separate annex.

A1.9 If someone asks us to keep part or all of a response confidential, we will treat this request seriously and will try to respect this. But sometimes we will need to publish all responses, including those that are marked as confidential, in order to meet legal obligations.

A1.10 Please also note that copyright and all other intellectual property in responses will be assumed to be licensed to Ofcom to use. Ofcom's approach on intellectual property rights is explained further on its website at http://www.ofcom.org.uk/about/accoun/disclaimer/

Next steps

A1.11 Following the end of the consultation period, Ofcom intends to publish a statement in February 2011.

A1.12 Please note that you can register to receive free mail Updates alerting you to the publications of relevant Ofcom documents. For more details please see: http://www.ofcom.org.uk/static/subscribe/select_list.htm

Ofcom's consultation processes

A1.13 Ofcom seeks to ensure that responding to a consultation is easy as possible. For more information please see our consultation principles in Annex 2.

A1.14 If you have any comments or suggestions on how Ofcom conducts its consultations, please call our consultation helpdesk on 020 7981 3003 or e-mail us at consult@ofcom.org.uk . We would particularly welcome thoughts on how Ofcom could more effectively seek the views of those groups or individuals, such as small businesses or particular types of residential consumers, who are less likely to give their opinions through a formal consultation.

A1.15 If you would like to discuss these issues or Ofcom's consultation processes more generally you can alternatively contact Vicki Nash, Director Scotland, who is Ofcom's consultation champion:

Vicki Nash
Ofcom
Sutherland House
149 St. Vincent Street
Glasgow G2 5NW

Tel: 0141 229 7401
Fax: 0141 229 7433

Email vicki.nash@ofcom.org.uk

Annex 2

Ofcom's consultation principles

A2.1 Ofcom has published the following seven principles that it will follow for each public written consultation:

Before the consultation

A2.2 Where possible, we will hold informal talks with people and organisations before announcing a big consultation to find out whether we are thinking in the right direction. If we do not have enough time to do this, we will hold an open meeting to explain our proposals shortly after announcing the consultation.

During the consultation

A2.3 We will be clear about who we are consulting, why, on what questions and for how long.

A2.4 We will make the consultation document as short and simple as possible with a summary of no more than two pages. We will try to make it as easy as possible to give us a written response. If the consultation is complicated, we may provide a shortened Plain English Guide for smaller organisations or individuals who would otherwise not be able to spare the time to share their views.

A2.5 We will consult for up to 10 weeks depending on the potential impact of our proposals.

A2.6 A person within Ofcom will be in charge of making sure we follow our own guidelines and reach out to the largest number of people and organisations interested in the outcome of our decisions. Ofcom's 'Consultation Champion' will also be the main person to contact with views on the way we run our consultations.

A2.7 If we are not able to follow one of these principles, we will explain why.

After the consultation

A2.8 We think it is important for everyone interested in an issue to see the views of others during a consultation. We would usually publish all the responses we have received on our website. In our statement, we will give reasons for our decisions and will give an account of how the views of those concerned helped shape those decisions.

Annex 3

Consultation response cover sheet

A3.1 In the interests of transparency and good regulatory practice, we will publish all consultation responses in full on our website, www.ofcom.org.uk.

A3.2 We have produced a coversheet for responses (see below) and would be very grateful if you could send one with your response (this is incorporated into the online web form if you respond in this way). This will speed up our processing of responses, and help to maintain confidentiality where appropriate.

A3.3 The quality of consultation can be enhanced by publishing responses before the consultation period closes. In particular, this can help those individuals and organisations with limited resources or familiarity with the issues to respond in a more informed way. Therefore Ofcom would encourage respondents to complete their coversheet in a way that allows Ofcom to publish their responses upon receipt, rather than waiting until the consultation period has ended.

A3.4 We strongly prefer to receive responses via the online web form which incorporates the coversheet. If you are responding via email, post or fax you can download an electronic copy of this coversheet in Word or RTF format from the 'Consultations' section of our website at www.ofcom.org.uk/consult/.

A3.5 Please put any parts of your response you consider should be kept confidential in a separate annex to your response and include your reasons why this part of your response should not be published. This can include information such as your personal background and experience. If you want your name, address, other contact details, or job title to remain confidential, please provide them in your cover sheet only, so that we don't have to edit your response.

Cover sheet for response to an Ofcom consultation

BASIC DETAILS

Consultation title:

To (Ofcom contact):

Name of respondent:

Representing (self or organisation/s):

Address (if not received by email):

CONFIDENTIALITY

Please tick below what part of your response you consider is confidential, giving your reasons why

Nothing ☐

Whole response ☐

Part of the response ☐

Name/contact details/job title ☐

Organisation ☐

If there is no separate annex, which parts?

If you want part of your response, your name or your organisation not to be published, can Ofcom still publish a reference to the contents of your response (including, for any confidential parts, a general summary that does not disclose the specific information or enable you to be identified)?

DECLARATION

I confirm that the correspondence supplied with this cover sheet is a formal consultation response that Ofcom can publish. However, in supplying this response, I understand that Ofcom may need to publish all responses, including those which are marked as confidential, in order to meet legal obligations. If I have sent my response by email, Ofcom can disregard any standard e-mail text about not disclosing email contents and attachments.

Ofcom seeks to publish responses on receipt. If your response is non-confidential (in whole or in part), and you would prefer us to publish your response only once the consultation has ended, please tick here. ☐

Name

Signed (if hard copy)

Annex 4

Consultation question

Question 1: do you agree that we should make regulations in the form proposed in Annexes 6 to 9?

Annex 5

Stakeholders' responses to the Consultation

A5.1 This annex summarises responses from the stakeholders and our position on them, organised by Consultation question. We received 15 stakeholder submissions, one of which was sent on a confidential basis. The non-confidential submissions can be found on our website[37].

A5.2 Questions 17 to 20 in our Consultation concerned the technical conditions that could apply to licences following a partial trade of the RSA blocks. We summarise stakeholders' responses in this Annex but we do not comment on them. Although we have an interest in these conditions – they will become part of the WT licences after the trade – they are not set by us. Instead, in the event of a partial trade the RSA holder will negotiate and agree the conditions with the transferees and will communicate those conditions to Ofcom, which will implement them in the new licences.

Question 1: do you agree that we should introduce RSA in the 3400 to 3600 MHz?	
Stakeholders' comments	**Ofcom's responses**
• This is an international satellite allocated band.	• ITU Radio Regulations allocate the 3400 – 3500 MHz band to fixed and fixed-satellite (space to earth) services on a primary basis. In addition, footnote 5.430A allocates the band to mobile on a primary basis, subject to agreement with other administrations, in a number of countries including the UK. In the UK, the band is managed and used by the Ministry of Defence. It has also extensive shared civil uses but satellite services are not one of them.
• [With regards to amateur use], our prime interest is in maximum protection and our own development in the 3400-3410MHz subsection of the Amateur 3400-3475MHz allocation. This allocation though on a Secondary basis is based on ITU RR footnote and is also subject to CEPT ECA allocation footnote EU17.	• We expect amateur use to continue under current conditions i.e. secondary use. Specifically, the MOD has indicated that the basis for sharing between the MOD and radio Amateurs is a regular dialogue with the Radio Society of Great Britain, the representative body for radio Amateurs and that it is expected that this relationship will continue.
• We note that there are still several services operating within this band. We believe it would be appropriate for this Spectrum Band to be fully cleared of all uses [so that this spectrum can be made available for mobile use in the future]. All of these services need to be defined and then given a clearance date (which has been aligned to the EU timeline).	• Under current administrative arrangements set out in the UK FAT, the band is used and managed by the MOD. Accordingly, we liaise closely with the MOD before deciding on licences rather than acting unilaterally. Furthermore, the Commission Decision states that harmonisation of the band is without prejudice to the protection and continued operation of existing use so

[37] http://www.ofcom.org.uk/consult/condocs/3_4ghz/

	clearance would go further than the Decision requires.
Question 2: do you agree that we should extend the relevant regulations to allow Crown bodies to be granted and to trade RSA in the 3400 – 3480 MHz and 3500 – 3580 MHz blocks? If not, which frequency ranges do you think the RSA regulations should cover and why?	
Stakeholders' comments	**Ofcom's responses**
• It should be noted that the presence of the Emergency service band will severely restrict FDD deployments and the only reason for the base station Block Edge Mask in the EC decision 2008/411/EC was to permit FDD and TDD systems to coexist. If the band cannot accommodate FDD systems, the benefits from adopting a stringent Block Edge Mask are very limited. Particularly, as the purpose of the EC decision 2008/411/EC was to enable the coexistence of BWA systems.	• We agree that the E.S. block precludes an FDD pairing of the frequencies it uses. We note however that the positioning of the block in the band is still being discussed by the government departments involved. Therefore, at this point we must consider all possible options, which means that paired blocks could be located anywhere in the band
• The 3400 to 3410MHz section is an international defence band that is most unlikely to change, so we are not convinced that much will be gained in extending RSA into that bottom section. Further more throughout Europe (as per a graph in the UK Broadband response) this same section is being excluded, so we request Ofcom to specifically consider this	• We agree that as of today it seems unlikely that the international defence allocation is changed, but we do not want to preclude the possibility if in the future the MOD wants to move that way. We note that the block is explicitly not excluded from the Commission Decision
Question 3: do you agree that there should be no minimum trading unit for the RSA grant and the WT licences arising from trade in the band?	
Stakeholders' comments	**Ofcom's responses**
Stakeholders argue that a minimum STU is necessary for a number of reasons: • No minimum trading unit may lead to fragmentation. Fragmentation is undesirable because it actively discourages the deployment of high-value services and it hinders the deployment of future technologies requiring high carrier bandwidths. • A minimum trading unit would act as counter against uncertainty. • A minimum STU should be in place as means to define a raster for the systems that will use this spectrum. A 5 MHz STU would be appropriate since BWA would accommodate in such raster. • A minimum STU would prevent gaps within	• We remain unconvinced of the need for a minimum trading unit in the frequency domain. See section 4 for detail on our position with regard to stakeholders' comments

the band. • WiMax deployments require at least 2 carriers of 10 MHz, hence the minimum should be 20 MHz blocks. • Wide blocks are required to provide BWA services. Small blocks would not serve the interests of potential operators. A minimum STU of 10 MHz would encourage take up by BWA applications. • There is already a minimum unit in the form of the current 5 MHz guardband. This, or a multiple of it, should be reused.	
Question 4: are there specific conditions that you consider should be included in RSA grants and WT licences arising from trading in the band?	
Stakeholders' comments	**Ofcom's responses**
• Licences should be granted on a national basis, with the option to permit the national licence holder to sub lease the spectrum e.g. in rural areas. The RSA grant should also include coordination obligations and procedures between adjacent operators to maximise and optimise the use of spectrum	• We are proposing to grant RSA on a national basis. Following this, it will be a MOD decision how to release the spectrum (nationally or not). We do not intend to introduce geographical restrictions to the trade therefore it would be possible for licence holders to trade in rural areas if they wish to do so. Spectrum leases are not possible at the moment, although we are currently consulting on how to put them in place. We encourage coordination between adjacent users and we think that it greatly enhances spectrum efficiency, but we are reluctant to include an obligation to do so. Instead, we prefer to include emissions masks so that adjacent users have clearly defined rights over the limits of interference they may suffer in the case coordination is not possible. For the same reason we do not think we should lay out procedures for coordination. We understand coordination to be a negotiation between licensees, any regulation from Ofcom on how these negotiations must be conducted is likely to lead to a less efficient outcome.
• The document does not appear to consider any specific measures to protect Defence and Amateur use of the lower 3410-3480 block edge (as opposed to other block boundaries) In addition there is no significant detail of potential geographic restrictions in the consultation.	• The characteristics of the military applications below 3410 MHz are confidential to the MOD for national security reasons, so it is not possible for us to define measures for their protection. We expect the MOD to specify such measures at the time of the release Amateur use is on a secondary basis and will remain so with the introduction and trade of

	RSA. Geographical restrictions in the band will be needed to protect military use and for national security reasons. We expect the MOD to detail the restrictions at the time of release.
• The most important is keeping the spectrum clean in the junctions between different operators i.e. ECC recommendation REC (04)05, which suggest guard bands on the expense of optional efficiency, especially on the edge of this spectrum.	• We do not support to maintain or introduce guardbands between BWA operators in this band. See section 4.
• FSS earth stations are operated in the bands 3400 – 3480 MHz and 3500 – 3580 MHz in countries neighbouring the UK. The ITU places a requirement for coordination of terrestrial stations which would be located in the coordination area around FSS earth stations.	• UK will comply with ITU requirement as per Radio Regulations footnote 5.430A
Question 5: do you agree with the proposed in block emissions limit for base stations in the 3500 – 3580 MHz block?	
Stakeholders' comments	**Ofcom's responses**
• We think that the limitations shall be with accordance to other EU countries as an example European commission decision for the 2.6 GHz band 2008/477/EC2 and general and ETSI EN 302 326.	• The limits proposed are taken from the Commission Decision relevant to this band, which is binding to Member States. We expect other EU countries to act in accordance with the Decision.
• In principle we agree with this in block emissions limit. Nevertheless we point out that this limit should be applied with some flexibility in order not to give penalty to systems equipped with MIMO and/or beam forming features, i.e. these limits should preferably be applied to each antenna and not globally.	• We think that the in-block limit proposed in the Commission Decision is sufficiently high to allow deployment of narrow beam antennas and still remain below the EIRP limit. We note that the Commission Decision does not include specific provisions for narrow beam antennas, but it allows neighbouring operators to relax conditions if they agree. Hence, we do not think it is necessary to diverge from the Commission Decision requirement and to introduce additional flexibility for narrowbeam systems.
• However these in-block emission limits should apply to base stations operating in the range 3400-3480 MHz too. TDD base stations could be deployed in this spectrum as well. It is not clear if this is the intention in the proposals contained in the consultation document.	• Yes, the in block limits proposed apply to base stations in the 3400-3480 MHz and the 3500-3580 MHz ranges.
• The BEMs in 2008/411/EC is based on non-harmonised band plans, which allow FDD and TDD operations in adjacent channels.	• We agree with these arguments but we do not think we should wait for a band plan in order to decide on the technical conditions of

The means to fulfil those existing BEMs include internal guard bands, additional filters, lower output power and negotiations between the relevant operators. These all lead to inefficient spectrum use and uncertainty of the value of the spectrum, depending on the adjacent channel operations. This is why we support the development of common band plan, which can then be the basis for the review of more practical and spectrum efficient BEMs.	the RSA or to make the necessary regulations. We do not think that band considerations are relevant at this stage. This is because Ofcom remit – with regards to RSA TLCs – is to specify conditions at the RSA boundaries for protection of the rights of adjacent users while remaining as neutral as possible with regards to the use inside the RSA block. These rights need to be protected regardless of any band plan that may arise internationally. Therefore, the development of such bandplan will not change the assumptions used to decide on the RSA conditions at those boundaries.
Question 6: do you agree with the proposed out of block emissions mask at the 3500 MHz and 3580 MHz boundaries for base stations?	
Stakeholders' comments	**Ofcom's responses**
• We would prefer that the out-of-block emissions are defined in terms of transmitted power as defined in the EC Decision and not as proposed by OFCOM in terms of EIRP. Requirements in terms of EIRP are not easy to verify and more complex and cost intensive to measure. Besides, base stations are already being designed according to EC Decision 2008/411/EC block edge mask based on transmit output power for Europe. If UK adopts a mask that is different from the EC decision, that could have some implications on cost since that could imply having to design a product specific to the UK market.	• Our licence conditions are normally expressed as radiated power and not transmitted power. This is because a radiated power limit gives a guarantee to the adjacent user of the likely interference levels that it can expect under a given scenario. A transmitted power limit allows greater flexibility to the operator of the interfering BS on antenna configuration but gives no guarantee to a potential victim that the interference level at its locations is not over a limit, something that could happen if, for instance, a narrow beam is pointed in its direction. In practice in this band, we do not think that the assumption of 16 dBi antennas imposes a great constraint in the deployments. We do not think that there will be an impact on BS manufacturers either since the relative levels of the Commission Decision mask are preserved.
• We think ETSI relevant standards shall be applied.	• ETSI Harmonised Standards are equipment standards, produced to cover the essential requirements under the R&TTE Directive, which is related to placing equipment on the market and putting it into service. A block-edge mask serves a different purpose. It is defined by regulatory authorities and related to spectrum licensing and the avoidance of interference between users of spectrum. Licensees using equipment that complies with the spectrum emissions mask in ETSI standard are still required to comply with the out of block

	emissions limits included in their license. The license does not specify how the BEM should be met, instead operators may achieve this in a variety of ways. Furthermore, we note that the 3.4-3.8 GHz Commission Decision does not rely on compliance with ETSI standards as a means to avoid interference from Base Stations. This Commission Decision is Community law and must be implemented by all member states, including its technical requirements.
• The blocks 3500 – 3505 MHz and 3575 – 3580 MHz should be restricted to synchronised TDD. • We expect the 3500 - 3510MHz blocks to be restricted to TDD because the NATO Blocks at 3400 – 3410 MHz creates corresponding unpaired blocks at 3500 – 3510 MHz. Similarly, we expect the 3575 – 3580 MHz blocks to be restricted to TDD because the current guard block at 3475 - 3480 MHz creates a corresponding unpaired block at 3575 – 3580 MHz.	• Our understanding of synchronised TDD networks is that, at least, the following is required: 1) Shared clock reference 2) Same frame period 3) Same uplink/downlink ratio and switching point We think that an obligation on independent, adjacent TDD operators to coordinate on these network parameters is unworkable as it would impose substantive restrictions on key business choices such as technology and services provided. • We cannot make any assumption regarding the decisions the MOD will take over the 3400 – 3410 MHz and 3575 – 3580 MHz blocks in the future, and therefore we cannot put in place restrictions that will preclude FDD use in the event the MOD releases these two blocks.
• Above and beyond the creation of these unpaired blocks, it is important to note that adjacencies between spectrum blocks need to be accommodated. Commission Decision EC 2008/477/EC (related to the harmonization of the 2500 - 2690 MHz) provides a clear direction regarding adjacencies between licence holders […]	• From a technical perspective the band plan and assumptions behind the 2.6 GHz Decision are different from those that led to the 3.4-3.8 GHz Decision, resulting in a different solution to the problem of adjacent users interference. • Secondly, we do not think that the intention of the Commission is that the technical parameters of the 2.6 GHz decision are applied to other bands, even if their characteristics could be similar. This is even more the case of the 3.4 to 3.6 GHz band where the Commission has issued a different Decision that includes its own set of technical parameters. • Member States cannot circumvent a Decision relevant to a band and implement the provisions of a different Decision. Commission Decisions are part of the Community obligations that have to be implemented by Member States, and failure to do so may lead to formal action from the

	Commission which has the duty to ensure and monitor the uniform application of Community law by the Member States.
• The default base station block edge limits should be based on ECC REC (04)05, with a 20 MHz block allocation and antenna gain of 16 dBi, with the emission limits in the ECC recommendation, starting from the midpoint of adjacent restricted blocks. The use of the restricted band is either through synchronisation or limiting the maximum in band power permitted, similar to the European commission decision for the 2.6 GHz band 2008/477/EC2. The base station Block Edge Mask limits between 0 and 2.5 MHz offset from the block edge, shall comply with ETSI EN 302 326 assuming a 20 MHz channel bandwidth and an in band EiRP of +53 dBm/MHz.	• See Section 4
• Low power Pico base station equipment should be made exempt from a Block Edge Mask in the 3 GHz bands as long as the base station equipment complies with an ETSI harmonized standard.	• We have no evidence of widespread industry interest in pico base stations at this stage. From our perspective there is a risk that such equipment is considered non compliant with the Decision by the Commission.
Question 7: do you agree that less stringent technical parameters should be permitted if agreed between neighbouring operators?	
Stakeholders' comments	**Ofcom's responses**
• See Section 4	• See Section 4
Question 8: should we align UK Broadband licence conditions for base stations at 3500 MHz and 3580 MHz with those in the RSA grants if and when UK Broadband requests us to do so?	
Stakeholders' comments	**Ofcom's responses**
• All operators licences should align with the requirements of the Decision (2008/411/EC)	• The Decision is without prejudice to existing use, therefore it does not require Ofcom to enforce its parameters on existing users
Question 9: do you agree with the proposed in block emissions limits for terminal stations?	
Stakeholders' comments	**Ofcom's responses**
• We do not support EIRP limits greater than 25 dBm for nomadic devices	• We acknowledge there is an issue with fixed/nomadic outdoor devices operating at high power and with non directive antennas. This is discussed in Section 4. Nevertheless, we note that the Commission Decision is very clear in the power levels that should be allowed and we do not think we can restrict it

	to lower levels.
• Mobile terminals with total radiated power less than 26 dBm to be made licence exempt. Fixed and nomadic terminals are licence exempt as long as total radiated power is less than 30 dBm. Fixed and nomadic terminals power limits as set out in 2008/411/EC, with15 dB power reduction for non directive antennas	• See Section 4
Question 10: do you agree that the block edge mask should be based on the spectrum emissions mask from ETSI EN 302 623? *Question 11: do you agree with our derivation of regulatory out of block limits for terminals and, if so, which of the proposed four alternative regulatory conditions do you think most appropriate?*	
Stakeholders' comments	**Ofcom's responses**
• We have to note that equipment does not only have to meet the spectrum mask. To be compliant with the ETSI specifications, equipment has also to fulfil the ACLR requirement. This requirement should be also taken into account in the interference analysis. Further we have another comment regarding Table A8.6 on the UL/DL ratio of TDD equipment. [ ] we see more traffic in the downlink then in the uplink. [ ] Therefore a UL/DL ratio of 1:2 to 1:3 would be more realistic for this band.	• We agree with these comments which we will take onboard if further simulation is required regarding this or other broadband wireless bands. We don't think they invalidate the results though.
Question 12: should out of block limits for fixed, nomadic and mobile terminals be different?	
Stakeholders' comments	**Ofcom's responses**
• See Section 4	• See Section 4
Question 13: should we align UK Broadband licence conditions for terminal stations at 3500 MHz and 3580 MHz with those in the RSA grants if and when UK Broadband requests us to do so?	
Stakeholders' comments	**Ofcom's responses**
• Having different licence conditions in different parts of the band for the same type of equipment would impose additional burden for the manufacturer. Therefore, we would encourage OFCOM to align the licence conditions of UK Broadband with the conditions for the 3500-3580 MHz band.	• See Section 4

Question 14: do you agree that the technical limits at 3480 MHz should copy those at 3580 MHz when the use immediately below 3480 MHz is broadband wireless?	
Stakeholders' comments	**Ofcom's responses**
• Ofcom will appreciate that bidders need to have full information on the in-band and adjacent band use of spectrum in order to determine reliable estimates of spectrum value. The interference environment, regulatory status of the spectrum award, associated co-frequency and adjacent frequency users are all needed for these estimates. We urge Ofcom to clarify this point as soon as possible.	• We agree. However it is for the MOD, rather than Ofcom, to provide information of this nature in its preparation for release of spectrum in this band.
Question 15: do you agree with the proposed technical limits at 3480 MHz for the scenario where the upper edge of the emergency services block does not change from the current allocation at 3475 MHz?	
Stakeholders' comments	**Ofcom's responses**
• The -25dBm/MHz EIRP limit is incompatible with satisfactory QOS for UK Broadband if emergency service deployment is dense.	• Normally, there will be only one aircraft using a frequency channel over a geographic area.
Question 16: do you agree with the proposed technical limits at 3480 MHz for the scenario where the upper edge of the emergency services block is moved to 3480 MHz?	
Stakeholders' comments	**Ofcom's responses**
• See Section 4	• See Section 4
Question 17: do you agree that the technical conditions of the RSA grant at the 3500 MHz and 3580 MHz boundaries are the best option for the boundaries that will appear inside the 3500 – 3580 MHz block if the block is partitioned and traded into several smaller sub-blocks?	
Stakeholders' comments	
• We believe networks in the 3500 - 3580 MHz range will also require restricted blocks between adjacent systems or be synchronised. • We agree with OFCOM that the same technical conditions as at the 3500 and 3580 MHz boundary should be applied. However, also less stringent technical parameters, if agreed between adjacent operators of such networks, should be allowed. • We believe that there shall be restricted bands between operators to avoid interferences. • Yes but in a multi-operator scenario, we reiterate that proper account must be taken of the BEM and internal guard frequency aspect and this should be made clear to those interested in RSA grants when assessing their spectrum requirements. • We support the development of common band plan, which can then be the basis for the review of more practical and spectrum efficient BEMs	

Question 18: do you think that the out of block limits for broadband wireless base stations in Figure 8.2 are sufficient to protect air-to-ground videolink receivers in an adjacent block?

Stakeholders' comments

- We don't see any reason to define a different BS block edge mask at the border to the emergency service block. However, as we pointed out, we would prefer to have a BS mask that is defined in terms of transmit output power instead of EIRP in line with 2008/411/EC.
- Where possible, consistent BEM requirements are desirable to minimise variations.
- Yes provided that a 5MHz external guard band exists between the Emergency Service block and adjacent BWA blocks as is currently the case.

Question 19: what are your views on the requirements for protection of air-to-ground videolink receivers from interference from broadband wireless terminals?

Stakeholders' comments

- We believe that air to ground video links will be more prone to UWB interference, than interference from mobile BWA terminals. In practice mobile BWA terminals are unlikely to be transmitting at full power when in close proximity to video link receiver, because of power control. Metropolitan BWA networks will usually be designed to give indoor coverage and hence overcome building penetration losses. As a consequence mobile terminals operating outdoors are likely to be transmitting below the 25 dBm/MHz limit because they are in a good coverage area.
- The interference from terminals to emergency receivers is not more critical than the BWA TS to TS interference case. [..] emergency receivers are only in use in the case of an emergency and also the receiver density is not that high as in the case of BWA TS. Therefore, we do not see the need for more stringent requirements then the proposals discussed for the 3500 and 3580 MHz boundary. [..] for terminals.
- We believe this is not an issue and that mobile wireless terminals will not interfere to air-to-ground videolink receiver as they transmit relatively low power.
- Provided that a 5MHz external guard band is maintained between the Emergency Service Block and adjacent BWA blocks at present we do not foresee an issue. However, our preference would be that adjacent BWA usage is for base stations to allow the potential for geographical coordination between the Emergency Service receiver sites and BWA Base stations.
- Where possible, consistent BEM requirements are desirable to minimise variations.

Question 20: do you think that an out of block requirement for airborne videolink transmitters of -25 dBm/MHz EIRP is sufficient to protect broadband wireless receivers?

Stakeholders' comments

- the defined technical requirement should not be more relaxed than the current defined level of -25 dBm/MHz EIRP. However, it might be useful to study this issue in more details to see if more stringent requirements are necessary to protect BWA base stations.
- Typical base station antennas for sectorial coverage can exhibit considerable rejection (perhaps more than 25dB) at elevation angles above around 20degrees which may offer helpful isolation.
- Provided that a 5 MHz external guard band is maintained between the Emergency Service Block and adjacent BWA blocks at present we do not foresee an issue.

Annex 6

Draft
Wireless Telegraphy (Crown Recognised Spectrum Access) (Amendment) Regulations 2011

STATUTORY INSTRUMENTS

2011 No. ***

ELECTRONIC COMMUNICATIONS

Wireless Telegraphy (Crown Recognised Spectrum Access) (Amendment) Regulations 2011

Made - - - -	***
Coming into force - -	***

The Office of Communications ("OFCOM"), in exercise of the powers conferred by section 18(1)(b) and Schedule 2, paragraph 1 of the Wireless Telegraphy Act 2006([38]) ("the Act"), make the following Regulations.

Before making the Regulations OFCOM have given notice of their proposal to do so in accordance with section 122(4)(a) of the Act, published notice of their proposal in accordance with section 122(4)(b) of the Act and have considered the representations made to them before the time specified in the notice in accordance with section 122(4)(c) of the Act.

Citation, commencement and extent

1. These regulations may be cited as the Wireless Telegraphy (Crown Recognised Spectrum Access) (Amendment) Regulations 2011 and shall come into force on ***

Amendment of the Wireless Telegraphy (Crown Recognised Spectrum Access) Regulations 2009

2. The Schedule to the Wireless Telegraphy (Crown Recognised Spectrum Access) Regulations 2009([39]) is amended by inserting, after "429–430 Megahertz"—

"3400–3480 Megahertz
3500–3580 Megahertz"

([38]) 2006 c.36
([39]) S.I. 2009/16

Chief Executive of the Office of Communications
*** 2011 for and by the authority of the Office of Communications

Annex 7

Draft Wireless Telegraphy (Recognised Spectrum Access and Licence) (Spectrum Trading) (Amendment) Regulations 2011

STATUTORY INSTRUMENTS

2011 No. ***

ELECTRONIC COMMUNICATIONS

The Wireless Telegraphy (Recognised Spectrum Access and Licence) (Spectrum Trading) (Amendment) Regulations 2011

Made - - - -	***
Coming into force - -	***

The Office of Communications ("OFCOM"), in exercise of the powers conferred by section 30(1) to (3) and section 122(7) of the Wireless Telegraphy Act 2006([40]) ("the Act"), make the following Regulations.

Before making the Regulations, OFCOM have given notice of their proposal to do so in accordance with section 122(4)(a) of the Act, published notice of their proposal in accordance with section 122(4)(b) of the Act and have considered the representations made to them before the time specified in the notice in accordance with section 122(4)(c) of the Act

Citation, commencement and extent

1. These Regulations may be cited as the Wireless Telegraphy (Recognised Spectrum Access and Licence) (Spectrum Trading) (Amendment) Regulations 2011 and shall come into force on ***

Amendment of the Wireless Telegraphy (Recognised Spectrum Access and Licence) (Spectrum Trading) Regulations 2009

2.—(1) In Regulation 3(3) of the Wireless Telegraphy (Recognised Spectrum Access and Licence) (Spectrum Trading) Regulations 2009([41]) ("the Principal Regulations"), substitute the Regulation for the following Regulation—

([40]) 2006 c.36
([41]) S.I. 2009/17

"Paragraph (1) shall apply to grants of RSA and licences of a class specified in Column 1 of each of the Parts of Schedules 1 and 2, which apply to stations or apparatus operating within any of the frequency bands specified in Column 2 of the same Part of the same Schedule."

(2) Regulation 4 of the Principal Regulations is amended by substituting—

(a) in paragraph (a)(i)(aa) and paragraph (a)(i)(bb), for "Column 1 of Part 1 of the Schedule", "Column 1 of each Part of Schedule 1" and for "Column 2 of the same Part", "Column 2 of the same Part of Schedule 1";

(b) in paragraph (a)(iv)(aa), paragraph (a)(iv)(bb), paragraph (a)(v)(aa) and paragraph (a)(v)(bb), for "Column 1 of Part 2 of the Schedule", "Column 1 of each Part of Schedule 2" and for "Column 2 of the same Part", "Column 2 of the same Part of Schedule 2"

(3) The Principal Regulations are amended by substituting the Schedule for the following Schedule 1—

"SCHEDULE 1 Regulations 3 and 4

PART 1

Column 1	*Column 2*
Class of Licence or RSA	*Frequency Bands*
Radio Astronomy	42.5–43.5 Gigahertz
Converted Spectrum Access	150.05–152 Megahertz
	1660.5–1668 Megahertz
	1668–1670 Megahertz

PART 2

Column 1	*Column 2*
Class of Licence or RSA	*Frequency Bands*
Crown Recognised Spectrum Access	3400–3480 Megahertz
Converted Spectrum Access	3500–3580 Megahertz"

(4) The Principal Regulations are amended by adding the following Schedule 2:

"SCHEDULE 2 Regulations 3 and 4

PART 1

Column 1	*Column 2*
Class of Licence or RSA	*Frequency Bands*
Crown Recognised Spectrum Access	406.1–410 Megahertz
Converted Spectrum Access	410–412 Megahertz
	414–420 Megahertz
	420–422 Megahertz
	424–425 Megahertz
	429–430 Megahertz"

Chief Executive of the Office of Communications
*** 2011 for and by the authority of the Office of Communications

Annex 8

Draft Wireless Telegraphy (Limitation of Number of Grants of Crown Recognised Spectrum Access) Order 2011

STATUTORY INSTRUMENTS

2011 No. ***

ELECTRONIC COMMUNICATIONS

The Wireless Telegraphy (Limitation of Number of Grants of Crown Recognised Spectrum Access) Order 2011

Made - - - -	***
Coming into force - -	***

The Office of Communications ("OFCOM"), in exercise of the powers conferred by sections 29(1) to (3) of the Wireless Telegraphy Act 2006([42]), make the following Order.

Before making the Order OFCOM have given notice of their proposal to do so in accordance with section 122(4)(a) of the Act, published notice of their proposal in accordance with section 122(4)(b) of the Act and have considered the representations made to them before the time specified in the notice in accordance with section 122(4)(c) of the Act.

Citation, commencement and extent

1.—(1) This Order may be cited as the Wireless Telegraphy (Limitation of Number of Grants of Crown Recognised Spectrum Access) Order 2011 and shall come into force on *** 2011.

(2) This Order shall not extend to the Channel Islands or to the Isle of Man.

Limitation of grants

2.—(1) The Office of Communications will make a limited number of grants of recognised spectrum access for use of the frequency bands listed in the Schedule.

(2) The grants shall only be made to the Crown.

(3) Grants shall only be made where a wireless telegraphy station or wireless telegraphy apparatus is operated within any of the frequency bands listed in the Schedule by or on behalf of the Crown.

([42]) 2006 c.36

(4) The number of grants will be the number which is most likely to secure the optimal use of the electromagnetic spectrum and promote competition in electronic communication services having regard to the mattes set out in section 3(1) and (2) of the Wireless Telegraphy Act 2006.

Chief Executive of the Office of Communications
*** 2011 for and by the authority of the Office of Communications

SCHEDULE

Article 2

Frequency bands
3400–3480 Megahertz
3500–3580 Megahertz

Annex 9

Draft Wireless Telegraphy (Register) (Amendment) Regulations 2011

STATUTORY INSTRUMENTS

2011 No. ***

ELECTRONIC COMMUNICATIONS

The Wireless Telegraphy (Register) (Amendment) Regulations 2011

Made - - - -	***
Coming into force - -	***

The Office of Communications ("OFCOM"), in exercise of the powers conferred by section 31(1) and (2) and section 122(7) of the Wireless Telegraphy Act 2006([43]) ("the Act"), make the following Regulations.

Before making the Regulations, OFCOM have given notice of their proposal to do so in accordance with section 122(4)(a) of the Act, published notice of their proposal in accordance with section 122(4)(b) of the Act and have considered the representations made to them before the time specified in the notice in accordance with section 122(4)(c) of the Act.

Citation and commencement

1. These Regulations may be cited as the Wireless Telegraphy (Register) (Amendment) Regulations 2011 and shall come into force on ***

Amendment of the Wireless Telegraphy (Register) Regulations 2004

2. In Column 2 of Part 8 of the Schedule to the Wireless Telegraphy (Register) Regulations 2004([44]), insert, at the end of the column, after "42.5–43.5 GHz"—

"3400–3480 MHz
3500-3580 MHz"

Chief Executive of the Office of Communications

([43]) 2006 c.36
([44]) S.I. 2004/3155 as amended by S.I. 2006/340, S.I. 2006/1808, S.I. 2007/381, S.I. 2007/3389, S.I. 2008/689, S.I. 2008/2104, 2008/3193 and S.I. 2009/14.

*** 2011 for and by the authority of the Office of Communications

Annex 10

Glossary

AIP	Administered incentive pricing – setting charges for spectrum holdings to reflect the value of the spectrum in order to promote efficient use of the spectrum
BWA	Broadband Wireless Access – Radiocommunications systems providing wireless delivery (mainly to an end user but not exclusively) of broadband traffic that can encompass fixed (FWA), nomadic (NWA) and mobile (MWA) applications. It is also considered that BWA systems might include backhauling services for the same or a second operator.
BS	Base Station
CEPT	European Conference of Postal and Telecommunications Administrations
Communications Act	The Communications Act 2003, which sets out Ofcom's powers, functions and duties
Concurrent	(Of *spectrum trading*) a transaction in which rights and obligations are transferred while continuing to be rights and obligations of the transferor, cf *outright*
ECC	Electronic Communications Committee. The CEPT committee dealing with radiocommunications and telecommunications
EIRP	Effective isotropic radiated power
FDD	Frequency Division Duplex – a technology that uses different frequencies to transmit and receive
FWA	Fixed Wireless Access – Wireless access application in which the location of the end-user termination and the network access point to be connected to the end-user are fixed. For example, a stationary roof-top user equipment
Interference	Unwanted disturbance caused in a radio receiver or other electrical circuit by electromagnetic radiation emitted from an external source
ITU	International Telecommunication Union - the United Nations agency for information and communication technology responsible for developing and publishing the *International Radio Regulations*
MOD	Ministry of Defence
MWA	Mobile Wireless Access – Wireless access application in which the location of the end-user termination is mobile. For example, handheld user terminal
NWA	Nomadic Wireless Access – Wireless access application in which the location of the end-user termination may be in different places but it

	must be stationary while in use. For example, a desk-top portable user equipment or laptop PC equipped with the internal access card
OOB	Out of block (emissions)
Outright	(Of *spectrum trading*) a transaction in which the transferred rights and obligations pass to the transferee and are no longer rights and obligations of the transferor, cf *concurrent*
Partial	(Of *spectrum trading*) a transaction in which some rights and obligations are transferred while others are kept by the transferor, cf *total*
PMSE	Programme Making and Special Events – a class of radio application that supports a wide range of activities in entertainment, broadcasting, news gathering and community events
Radio Regulations	International Radio Regulations made by the *ITU*, which have the status and force of a treaty, allocate frequencies globally to various applications and deal with cross-border *interference*
RSA	Recognised Spectrum Access - a spectrum management instrument created by the *Communications Act* to complement *WT licences*
Spectrum trading	Ability of spectrum users to transfer rights and obligations under *WT licences* to another person in accordance with regulations made by Ofcom. Trades may be *total*, *partial*, *outright* or *concurrent*
STU	Spectrum trading unit – the smallest quantum of spectrum that may be transferred in a *partial* trade
TDD	Time Division Duplex – a technology that uses the same frequency to transmit and receive, but at different times
TLC	Technical Licence Conditions – terms of a WT licence that set out the technical parameters for use of the spectrum
UK FAT	The UK Frequency Allocation Table identifies responsibilities for the management of frequency bands or services and is published by Ofcom
WT Act	The Wireless Telegraphy Act 2006, which sets out the statutory framework for management of the radio spectrum consolidating a number of older Acts dating back to 1949.
WT licence	Licence granted by Ofcom to authorise installation or use of radio equipment as required by section 8(1) of the *WT Act*
WT Register	Register maintained by Ofcom containing information about grant, renewal, transfer, revocation or variation of *WT licences* and *RSA*