OFFICE OF COMMUNICATIONS

Business Radio Trading & Liberalisation

A consultation on proposals to liberalise and simplify business radio licensing (including measures to extend spectrum trading)

Consultation

Publication date: 6 July 2006

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Contents

Section 1

Executive Summary

Ofcom's approach to spectrum management

1.1 Ofcom has set out its approach to spectrum management in the Spectrum Framework Review (SFR).The central theme of the SFR is that the management of the radio spectrum can be carried out most effectively if market forces are harnessed to a significantly greater degree than in the past.

1.2 Key policies designed to further the development of this new approach include:

- spectrum trading - allowing holders of wireless telegraphy licences to transfer all or part of their rights and obligations under their licence(s) to another party;
- spectrum liberalisation - the reduction or removal of restrictions on the use that can be made of spectrum while continuing to avoid unacceptable increases in interference, and;
- spectrum awards – releasing un-used spectrum into the market.

1.3 This document details plans to take forward the implementation of spectrum trading and liberalisation in relation to the Business Radio sector. Ofcom is consulting separately on proposals to review wireless telegraphy licence fees for a range of sectors, including Business Radio. Details of this exercise can be found at http://www.ofcom.org.uk/consult/condocs/pricing06/, although an overview of proposals, as they relate to Business Radio, is provided in this document.

A phased approach to change

1.4 Ofcom believes that a phased approach to liberalising spectrum management is appropriate. Phasing allows the appropriate balance to be struck between establishing a flexible market based approach to spectrum management as quickly as possible, and ensuring appropriate preparation is completed prior to changes being introduced.

1.5 Phase one is currently in place. In this phase, users are able to ask Ofcom to change their licence, for example to remove the restriction to a particular technology. Ofcom will consider each request on its merit but has indicated the various categories of change to which Ofcom would normally expect to agree while making clear that it also encouraged applications outside these categories.

1.6 Phase 2 of liberalisation involves further extending the scope of trading and making licences more intrinsically flexible (i.e. users can make certain changes to the characteristics of their operations without seeking Ofcom approval). This document deals with Phase 2 measures as they apply to the Business Radio sector.

1.7 Going forward Ofcom is consulting on a new approach that could possibly be taken to the next phase of liberalisation – specifying technical restrictions in licences in terms of spectrum usage rights ("SUR") which is available on: http://www.ofcom.org.uk/consult/condocs/sur/

Proposals for the Business Radio Sector

1.8 The Business Radio sector encompasses a wide range of services and users from High Street taxis and couriers to large businesses and the Emergency Services. As previously highlighted significant progress has already been made in this sector with certain classes of licence already tradable and a range of liberalisation measures already implemented. Ofcom proposes to continue with a progressive extension of its liberalisation approach and specifically the proposals set out in this document detail how Ofcom plans to:

- introduce significant additional liberalisation to the sector through the adoption of more flexible licences and spectrum management techniques;
- extend the ability to trade spectrum to a considerably increased range of licence classes and licensees;
- simplify and rationalise our licensing arrangements to make them simpler and more flexible, adopting more deregulatory approaches to authorisation where appropriate;
- update our approach to setting fees to reflect a liberalised Business Radio environment.

Extending Spectrum Trading

1.9 In 2004 Ofcom introduced trading to the Business Radio sector. This initial implementation focussed on licence types that were for large geographical areas and assigned exclusively to a single user. The licence classes in question were analogue PAMR, National Paging, Data Network, CBS and National & Regional PBR.

1.10 Ofcom now proposes to extend trading to a far greater range of licence classes in the Business Radio sector, and in so doing provide the facility to trade to over thirty five thousand licences. Exhibit 1.1 details the current licence classes that we now propose to make tradable in 2007.

1.11 Ofcom proposes to support a wide range of different types of transfer for these licences including the ability to partially trade parts of their spectrum and, for certain licence classes, by allowing the partial trading of geographical areas. Such changes allow licensees the flexibility to trade unused elements of their spectrum to those who might wish to make use of it.

Introducing more flexible licences

1.12 Ofcom's general policy is to set technical restrictions that are the minimum necessary to provide adequate protection against harmful interference. This is because optimal use of the radio spectrum is more likely to be secured if users decide, rather than Ofcom dictates, what technology to use or service to provide in a particular frequency band. Imposing the minimum necessary constraints will increase users' flexibility and freedom to respond to changing conditions, and to make best use of the valuable spectrum resource.

1.13 In January 2005, Ofcom liberalised elements of its approach to the management of licences in the Business Radio sector. These changes included more flexibility and equipment choice enabled by the introduction of a single set of equipment

requirements and, for certain licence classes, the removal of distinctions based upon the type of use spectrum may be put to. For the most part, licensees wishing to take advantages of these new flexibilities are required to apply to Ofcom for a variation to their licence.

1.14 Ofcom now wishes to extend liberalisation further in the Business Radio sector by:

- making licences intrinsically flexible – removing the need for licensees to seek individual approval from Ofcom for some specific changes to the way they wish to use spectrum;

- removing much of the current usage based segmentation of Business Radio spectrum – allowing users far greater choice as to what purpose spectrum is put to.

1.15 To do this we plan to use the technical capabilities of a new assignment and spectrum management tool, MASTS (Mobile ASsignment Technical System), to achieve this increased flexibility whilst ensuring the risk of interference is properly managed. The tool, combined with a range of other measures, will enable us to greatly reduce the number of different licence types (from the current 21) replacing them with fewer, more flexible and better licence classes.

1.16 We also plan to greatly improve the level of information available about the expected quality of spectrum. We will do this through the use of improved Spectrum Quality Benchmarks (SQBs) and by providing greater clarity as to the rights and obligations of licences and the flexibilities they can offer. Exhibit 1.1 also summarises our proposals for liberalising licensing in the Business Radio sector.

Simplification and rationalisation

1.17 Currently in the Business Radio sector there are 21 licence classes. Ofcom proposes to greatly simplify current arrangements by delivering fewer, more flexible licence classes. We have also examined ways in which the current licensing approach could be improved to remove unnecessary restrictions and reduce the regulatory burden on licensees and this document sets out proposals for ways in which we intend to streamline and simplify our licence administration.

Extension of licence term

1.18 Ofcom intends to vary those licence classes which are made newly tradable to have an indefinite a rolling licence term, with a 5 years minimum notice period for revocation for spectrum management reasons except for certain cases such as a breach of licence terms, non payment of the annual fee, the grounds set out in paragraph 4(5) of the Wireless Telegraphy Act 1998 (national security or compliance with an EU or International obligation), breach of spectrum regulations or a direction by Ofcom or the Secretary of State.

1.19 This approach is designed to give licensees greater certainty. The changes would bring the newly tradable licences into line with those classes made tradable in 2004.

Publication of Information

1.20 Ofcom recognises that access to a range of accurate and up-to-date information is a prerequisite for a successful market. Ofcom currently publishes a range of

information about licences and transfers through its Spectrum Licensing Portal (and specifically the Wireless Telegraphy (WT) Register). This information is restricted to licence classes that are currently tradable. With the extension of trading we also propose to extend publication of this information to the newly tradable licence classes.

Scope and Responses

1.21 This document discusses specific proposals for the extension of our liberalisation policies to the Business Radio Sector. Proposals to extend trading to licences within a range of new classes, to liberalise licensing arrangements, and to rationalise and simplify our approach in this sector are detailed. In addition related proposals to move licences to a minimum notice period and extend the WT Register to include all newly tradable licences are also set out.

1.22 Your comments are invited by 15 September 2006.

Exhibit 1.1: Summary of the trading and liberalisation proposals for Business Radio

Current Products	Proposals
• Business Radio (Public Wide Area Paging) • Business Radio (Public Mobile Data, Non-Voice) • Business Radio (National and Regional) • Business Radio (Tetra Digital PAMR) • Business Radio (CDMA Asset Tracker) • Business Radio (Remote Meter Reading Operator) - Exclusive channel	**Trading measures** • Outright transfers of all rights and obligations under a licence. • Extension of trading to UHF1 (420-450 MHz). Partial transfers • Spectrum segmentation to a minimum channel width of 6.25 kHz. • Geographical segmentation to a minimum trading unit (50 km square grid). **Liberalisation measures** • Merge existing classes into single Area Defined licence class giving users wider flexibility to change use and application without reference to Ofcom. • Single set of flexible technical requirements. **Administration** • Move to on-line application.
• Business Radio (Analogue PAMR) • Business Radio (Common Base Stations) • Business Radio (Remote Meter Reading Operator) - Shared channels • Business Radio (Wide Area Speech and Data Systems) • Business Radio (Wide Area One-Way Paging and Speech Systems) • Business Radio (Wide Area Distress Alarms) • Business Radio (Band 1 and Band III CBS) • Business Radio (IR2008 Data) • Business Radio (On-Site Speech and Data Systems) • Business Radio (On Site Hospital Paging and Emergencies Speech Systems)	**Trading measures** • Outright transfers of all rights and obligations. • Extension of trading to UHF1 (420-450 MHz). Partial transfers • Spectrum segmentation to a minimum channel width of 6.25 kHz. **Liberalisation measures** • Merge existing classes into single Technically assigned licence class. • Introduction of MASTS tool allowing greater change of use, application and mobile number without Ofcom consent. • Single set of flexible technical requirements. **Administration** • Move to on-line application.
• Business Radio (Standard)	Product withdrawn from July 2007
• Business Radio (UK General) • Business Radio (On-Site Local Communications) • Business Radio (On-Site One-Way Paging and Speech) • Business Radio (Self-Select) • Business Radio (Suppliers)	**Liberalisation measures** • Single set of equipment requirements. **Administration** • Rationalisation of product structure. • Adoption of a single application process. • Move to five years payment period. • Move to on-line application.

Section 2

Background

Ofcom's approach to management of the radio spectrum

2.1 This document forms one of a series setting out Ofcom's new approach to management of the radio spectrum, which is designed to promote innovation and competition in the provision of wireless services across the UK. Radio spectrum is a key raw material for the communications sector. Consumers, equipment manufacturers and network operators all stand to benefit from spectrum being managed in a way that can respond more quickly to technological and market change.

2.2 One of Ofcom's principal statutory duties is to secure optimum use of spectrum and Ofcom's overall approach to fulfilling this duty is set out in the Spectrum Framework Review (SFR), which was published in June 2005. Its central theme is that the management of the radio spectrum can be carried out most effectively if market forces are harnessed to a significantly greater degree than in the past. Ofcom considers that this approach will:

- promote efficient use of the radio spectrum by allowing spectrum to be transferred to, and used by, the user who values it most highly;
- promote competition by increasing the availability of spectrum for use by the most valuable service.

2.3 Spectrum trading, liberalisation and the administrative incentive pricing of spectrum are key mechanisms in the implementation of a more market-oriented approach to spectrum management.

The Ofcom Spectrum Vision

Spectrum should be free of technology and usage constraints as far as possible. Policy constraints should only be used where they are justified.

It should be simple and transparent for licence holders to change the ownership and use of spectrum.

Rights of spectrum users should be clearly defined and users should feel comfortable that they will not be changed without good cause.

2.4 The proposals set out in this consultation are designed to contribute to achieving its objectives within the framework of these policies. They also aim to implement Ofcom's general approach to spectrum management, which has been set out in a number of documents published by Ofcom, including:

- the Spectrum Framework Review consultation document published in November 2004 ("SFR") and Statement published in June 2005 ("SFR Statement") and are available on: http://www.ofcom.org.uk/consult/condocs/sfr/;
- the Spectrum trading consultation document published in November 2003 ("Trading Consultation Document") and Statement published in August 2004

("Trading Statement") and are available on: http://www.ofcom.org.uk/consult/condocs/spec_trad/;

- the Spectrum Liberalisation consultation document published in September 2004 ("Liberalisation Consultation Document") and Statement published in January 2005("Liberalisation Statement") and are available on: http://www.ofcom.org.uk/consult/condocs/liberalisation/;

- Spectrum Usage Rights (SURs) - Technology and usage neutral access to the radio spectrum – consultation document published on 12 April 2006 and available on: http://www.ofcom.org.uk/consult/condocs/sur/

What is spectrum trading?

2.5 Spectrum trading is the transfer of rights and obligations arising by virtue of a licence issued pursuant to the Wireless Telegraphy Act 1949 (the "WT Act licence). Grants of Recognised Spectrum Access (RSA) issued pursuant to the Communications Act 2003 may also be made tradable.

2.6 It is Ofcom's statutory duty to secure the optimal use of spectrum for the benefit of UK consumers and citizens. Spectrum trading plays an important part in securing this objective, because it enables spectrum to migrate to users that will use it to generate greatest economic benefit, including for consumers.

What is liberalisation?

2.7 Radio spectrum is a resource of considerable importance and value. A wide range of applications – commercial, public safety, national security, cultural, social and scientific – depend on access to spectrum. It is crucial that the spectrum is managed effectively to meet these demands.

2.8 In the past, this tended to be done by specifying – often in considerable detail – how spectrum should be used. Licences issued under the Wireless Telegraphy Act 1949 have tended to impose restrictions on how spectrum is to be used, for example on:

- the application to which the spectrum is to be put, e.g. mobile, point-to- point terrestrial links and type of business;

- use to be made of the spectrum;

- technology to be employed;

- transmitter power, location and antenna height;

- frequency and bandwidth.

2.9 This is often referred to as 'command and control'. Given the pace of change and growing demand for spectrum, this way of managing spectrum is no longer sustainable. Liberalisation involves the removal and reduction of restrictions on spectrum use and represents a move away from a command and control approach.

The Benefits of Trading and Liberalisation

2.10 Ofcom expects that trading and spectrum liberalisation will make it easier for entrepreneurs and innovators to enter the market, deploy new technologies and applications, and compete with existing players. Trading and liberalisation will make it easier for spectrum to migrate to higher value uses.

2.11 This is a key part of Ofcom's Spectrum Vision for moving away from 'command & control' in spectrum management towards market mechanisms. Although spectrum trading and liberalisation are distinct developments, they are complementary.

2.12 A recent report for the European Commission[1] estimated the benefits of spectrum trading with liberalisation to be some €9bn per year across the EU, predominantly arising from the earlier adoption of new technologies and applications that trading and liberalisation would allow. The benefits of spectrum trading alone, without liberalisation, were estimated to be about one tenth of this.

2.13 Some restrictions on the use of spectrum are essential in order to prevent unacceptable interference between neighbouring spectrum users. Certain restrictions may also be necessary in order to comply with international obligations and to promote certain other public policy goals. The challenge is to maintain sufficient control over the use of spectrum to ensure that interference is kept under control (and other obligations and objectives are met), while allowing as much flexibility of use within those constraints as possible, thereby maximising the potential value that can be derived from the use of spectrum for the benefit of UK citizen-consumers.

2.14 In conjunction with measures to liberalise spectrum use, Ofcom propose to extend the number of licences that are tradable; these proposals are set out in Section 5.

Two ways of liberalising spectrum

2.15 Ofcom has identified two ways of liberalising spectrum. The first involves requests from licensees to Ofcom to vary wireless telegraphy licences individually to reduce or remove restrictions. The second involves Ofcom changing licences generically to make them less usage and technology specific.

2.16 Of these two mechanisms, the first allows Ofcom to exercise control over interference (and other issues) on a case-by-case basis and to minimise the risk of unacceptable interference. However, licensees (and the industry more generally) will not have certainty about what will be permitted until Ofcom has given its consent to a specific change. This mechanism is also administratively burdensome.

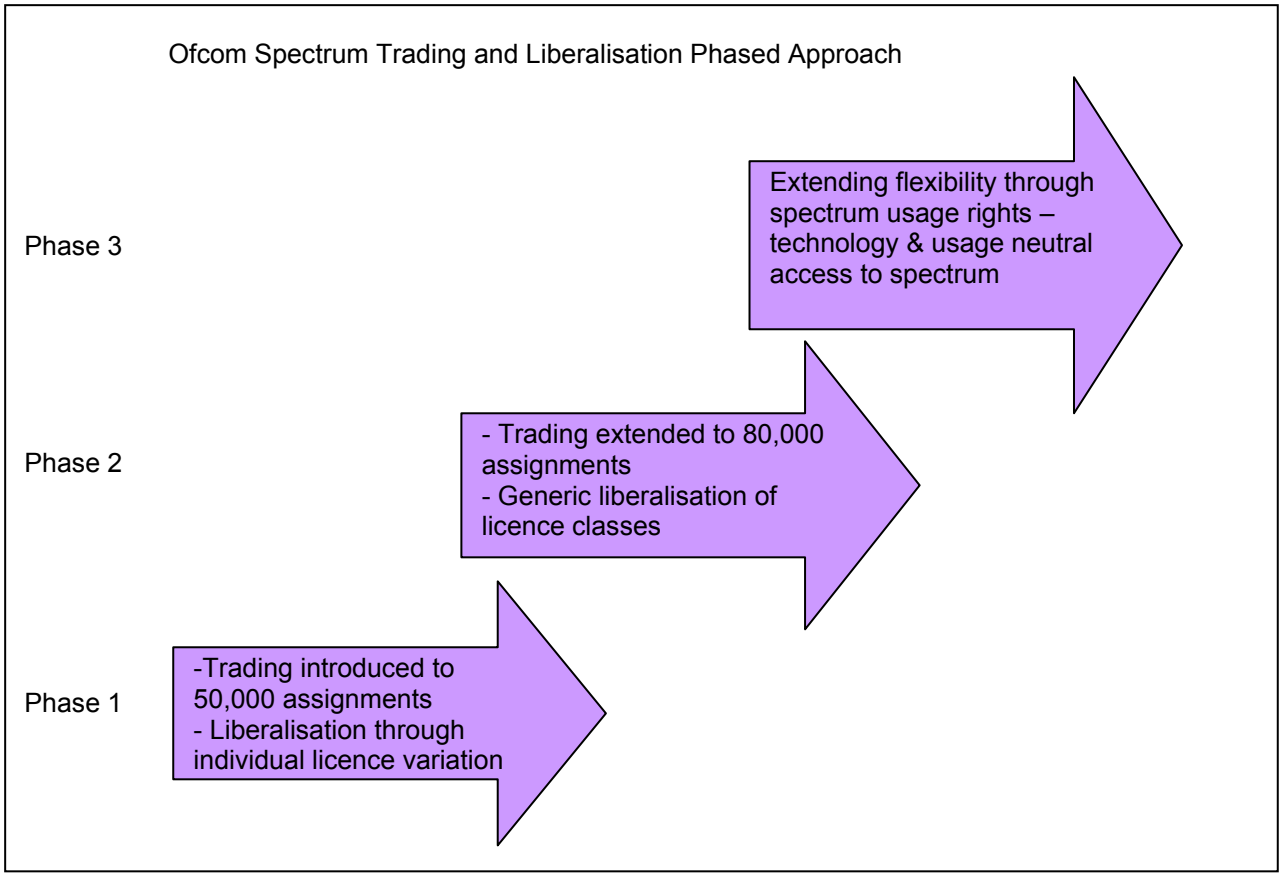
2.17 The second mechanism is superior to the first in that it provides more certainty and is less burdensome administratively. However, implementation is more challenging as a licensee's rights and obligations need to be defined in a way that is more technology and usage neutral while maintaining the necessary degree of control over interference.

[1] http://europa.eu.int/information_society/policy/radio_spectrum/docs/ref_docs/secontrad_study/secontrad_final.pdf

A phased approach to change

2.18 Ofcom believes that a phased approach to liberalising spectrum management is appropriate. Phasing allows the appropriate balance to the struck between establishing a flexible market based approach to spectrum management as quickly as possible, and ensuring appropriate preparation is completed prior to changes being introduced. Ofcom believes this approach is the best way to realise the benefits of liberalisation while allowing the circumstances of different licences and licence classes to be fully taken into account. Figure 2.1 sets out our current plans for phased progress towards a liberalised spectrum management regime in line with the SFR.

Figure 2.1: Ofcom Proposed Phased Approach to Introducing Trading and Liberalisation



2.19 The first phase of change took place in 2004 with the introduction of trading to certain fixed wireless access, business radio and fixed link licence classes. Services covered by these licences include broadband access services to businesses and consumers, a wide range of business radio services, for example transport organisations (e.g. Network Rail, AA) and the utilities (e.g. British Gas), and point-to-point communication links. This was soon followed by measures to liberalise our approach to the management of certain licence classes by indicating categories of changes of use that Ofcom considered it would be likely to approve (while welcoming applications outside those categories). To take advantage of this flexibility, licensees were required to apply to Ofcom on a case-by-case basis for approval.

2.20 The next phase of liberalisation, which is the subject of this document, is planned to commence in the Business Radio sector and involves a move towards making

certain licence classes in the sector intrinsically more flexible so that individual users have greater scope to change the characteristics of their operations without seeking Ofcom's approval. This document consults on Phase 2 measures as applied to the Business Radio sector.

2.21 Ofcom continues to investigate ways in which its liberalisation policies can be best applied to other sectors of radio use, taking into account the particular conditions and technical constraints that apply in each circumstance. Once proposals are developed for other sectors Ofcom would intend to consult on such measures prior to their introduction.

2.22 Ofcom has also recently launched a consultation on the concept of Spectrum Usage Rights (SURs), as an option that could form a basis for the longer term for Phase 3 liberalisation.

Constraints on liberalisation

2.23 Ofcom has a statutory duty to ensure that licence conditions are objectively justified in relation to networks and services to which they relate, non-discriminatory, proportionate and transparent. These obligations are ongoing and must be assessed against market circumstances and the state of technology development at the time.

2.24 Ofcom has broad discretion under section 1(4) of the Wireless Telegraphy Act 1949 to agree to vary licences but legal rules operate to limit that discretion. These legal rules include the following, in summary:

- UK obligations under European law or international agreements where use of spectrum has been harmonised: Ofcom will not agree to remove restrictions from licences or other changes that would conflict with the UK's obligations under international law. This includes changes in use or technology that would contravene binding Community measures, such as directives or harmonisation measures adopted under the Radio Spectrum Decision (676/2002/EC) and ITU Radio Regulations.

- Ofcom must comply with any direction from the Secretary of State under sections 5 or 156 of the Communications Act 2003.

- Ofcom must act in accordance with its statutory duties, including the duty to secure optimal use of the spectrum, and obligations under the European Authorisation Directive (2002/20/EC)[2].

- General legal principles, which include the duties to act reasonably and rationally when making decisions and to take account of legitimate expectations.

2.25 The management of interference is discussed in Section 4 of this document. Ofcom would not normally expect to vary a licence if the change would reduce the

[2] Section 1D(9) of the Wireless Telegraphy Act 1949 and the EC Authorisation Directive 2002/20/EC

estimated spectrum quality of neighbouring[3] assignments below the benchmark level.

2.26 Ofcom will also consider carefully whether there are domestic policy objectives that justify delayed introduction of trading or liberalisation in some types of spectrum use or that justify restricting the extent of liberalisation permitted in some areas. In general, Ofcom considers that constraints due to policy considerations should be the exception rather than the norm. Such constraints are also in general likely to be transitional.

2.27 Ofcom would not, for example, allow a change of use or configuration of the spectrum used by the emergency services if this would undermine their ability to operate effectively.

2.28 Ofcom considers that in general spectrum liberalisation should be highly beneficial to competition, by removing unnecessary constraints on the competitive process. However, there may also be circumstances in which liberalisation could lead to a distortion of competition. This could arise, for example, as a result of the circumstances under which the spectrum used in a particular economic market was originally acquired, or the specific licence conditions imposed. Ofcom would consider such matters before making or agreeing to vary a licence.

Ofcom's proposals for the Business Radio sector

2.29 This document sets out detailed proposals for changing the way Ofcom manages spectrum in the Business Radio sector including significant extension of trading and liberalisation opportunities.

2.30 The Business Radio sector encompasses a wide range of services and users from High Street taxis and couriers to large businesses (such as oil companies, utilities, transport companies and supermarket chains) and the emergency services. Operators in this sector include local and central government, spectrum management organisations, radio suppliers and dealers, emergency services, fleet operators, public transport systems, construction projects, utilities companies, medical facilities and numerous niche services.

2.31 Significant progress has already been made in introducing market mechanisms into this area with the introduction of spectrum trading to some Business Radio licence classes in 2004 followed, soon after, by Phase 1 liberalisation in January 2005. Ofcom now proposes to continue with a progressive extension of its liberalisation approach in line with previous statements on the matter. Specifically, the proposals set out in the document detail how Ofcom's proposes to:

- introduce significant additional liberalisation to the sector through the adoption of generically more flexible licences and spectrum management techniques;
- extend the ability to trade spectrum to a significantly increased range of licence classes and licensees;

[3] SQB (Spectrum Quality Benchmark) used to define the standard of quality that licensees can expect to experience.

- simplify and rationalise our licensing arrangements to make them simpler and more flexible, adopting more deregulatory approaches to authorisation where appropriate.

2.32 Ofcom is consulting separately on proposals to review wireless telegraphy licence fees for a range of sectors, including Business Radio. Details of this exercise can be found at http://www.ofcom.org.uk/consult/condocs/pricing06/, although an overview of proposals, as they relate to Business Radio, is provided in this document.

2.33 Subject to this consultation, Ofcom intends to implement the proposed reforms from April 2007.

The Emergency Services and other Public Sector users

2.34 As stated above, users in the sector include public sector bodies such as the emergency services. The Government's response[4] to the independent audit of major spectrum holdings by Professor Martin Cave[5] reaffirms the principle that public sector users, including the Emergency Services, should pay for spectrum on a comparable basis as the private sector and agrees that they should, as a general rule, obtain their spectrum through the market. The response also commits to various measures to extend market mechanisms to public sector spectrum and to provide public sector users with extended incentives and opportunities to share spectrum with commercial users. Although this document focuses on commercial users, the proposals in it are consistent with the approach being adopted for the public sector in response to the independent audit.

2.35 Ofcom will work with the relevant agencies and Government departments through the UK Spectrum Strategy Committee and the Public Safety Spectrum Policy Group (PSSPG) to apply its spectrum management policies to public sector users. The response to the audit gives details of the implementation programme and timetable for promoting more effective use of public sector spectrum.

Structure of Document

2.36 The structure of this document is as follows.

- Section 2 provides background on Ofcom approach to management of the radio spectrum.
- Section 3 provides an overview of our proposals.
- Section 4 sets out our proposals to make licences more flexible and improve elements of our spectrum management approach.
- Section 5 sets out our proposals to extend spectrum trading to new licence classes and extend the type of trades currently supported.
- Section 6 provides an overview of our proposals for a new approach to business radio pricing approach. We are formally consulting on these proposals

[4] http://www.spectrumaudit.org.uk/220306.htm
[5] http://www.spectrumaudit.org.uk/final.htm

as part of a wider review of our approach to WT licence fees which can be found at http://www.ofcom.org.uk/consult/condocs/pricing06/.

- Section 7 sets out a number of related proposals and issues relating to our trading and liberalisation proposals.

Section 3

Overview of proposals for a new approach to managing Business Radio Spectrum

Current Approach to Business Radio Sector

A complex sector

3.1 The Business Radio sector covers a wide range of services and users from High Street taxis and couriers to large businesses (such as oil companies, utilities, transport companies and supermarket chains) and the emergency services. There are over 35,000 live Business Radio licences on issue (to approximately 26,000 customers) which use a range of frequency bands between 30 MHz and 1 GHz although most use is in the VHF (130-200 MHz) and UHF (425-465 MHz) ranges.

3.2 Currently there are 21 licence types in the Business Radio sector, allied to 50+ types of user classification, a range of different approaches to the application of Administrative Incentive Pricing (AIP), and a range of different technical restrictions. This complex set of technical and administrative rules can be difficult to understand, use and administer. Further, this complexity creates a barrier to liberalisation as spectrum is often reserved for specific types of use and spectrum users must apply to Ofcom if they wish to change the characteristic of their operations. The proposals set out in this document aim to improve and simplify current arrangements by providing users with additional flexibility to change use within a smaller number of broader licence classes.

Some spectrum is already tradable

3.3 Ofcom introduced trading into the Business Radio sector in 2004. This initial implementation focused on licences for large areas and assigned exclusively to single users. In its August 2004 Spectrum Trading Statement, Ofcom indicated its intention to extend the scope of tradability to a much wider range of licence types once new technical tools were developed to support these measures. These tools are now approaching the end of their development and we plan to put them into operation early next year. Consequently this document sets out proposals to extend both the scope of trading and the types of trade Ofcom will permit in the Business Radio sector.

Effective control of interference

3.4 Spectrum in the Business Radio sector is carefully managed to enable sharing between the many different users of this spectrum, often operating in the same geographical location. To control interference, highly specific restrictions are imposed on the particular type of communication service that may be provided and the equipment that may be used. These conditions are required in order to facilitate coordination between the many different users within a complex electromagnetic environment. While our current approach has proven successful in meeting the needs of radio users, Ofcom believes that it does not exploit the efficiency gains and flexibilities that can be supported by advanced computer based propagation tools.

Spectrum Fees

3.5 Administered Incentive Pricing has been applied to the Business Radio sector since 1999. The approach is designed to encourage the most efficient use of the available spectrum as possible. In its spectrum pricing statement published in 23 February 2005, Ofcom indicated its desire to make certain changes to its fees approach in this sector taking forward the recommendations of the Indepen review[6].

3.6 In addition, significant liberalisation measures introduced in early 2005 to the Business Radio sector have started to erode the current use-based segmentation of spectrum. However, use-based pricing differentials remain in our fee structures. Consequently, licensees exercising the new flexibilities (currently enabled through varying a licence from one class to another) might find themselves paying a different fee and we believe this is not consistent with our overall objectives in this area.

Our Proposals for Business Radio

Spectrum liberalisation – fewer, broader and more flexible licence classes

3.7 In January 2005, Ofcom liberalised elements of its approach to the management of licences in the Business Radio sector. These changes included more flexibility and equipment choice enabled by the introduction of a single set of technical requirements on equipment (IR 2044) and the removal, for certain licence classes, of use based spectrum segmentation. For the most part, licensees wishing to take advantages of these new flexibilities would be required to apply to Ofcom for a variation to their licence. This process was required as our current licensing systems were not designed to cope with increased flexibility while at the same time ensuring interference was effectively managed. Details of the changes introduced can be found at: http://www.ofcom.org.uk/radiocomms/ifi/trading/libguide/

3.8 Ofcom now wishes to extend liberalisation further in the Business Radio sector by:

- making more licences intrinsically flexible – reducing the need for licensees to seek individual approval from Ofcom for changes to the way they wish to use spectrum;
- removing much of the current use-based segmentation of Business Radio spectrum – allowing users greater scope to decide what purpose spectrum is put to.

3.9 We plan to use the technical capabilities of the new assignment and spectrum management tool, MASTS, to achieve this increased flexibility whilst ensuring the risk of interference is properly managed. The tool, combined with a range of other measures, will enable us to replace 21 different licence types with three intrinsically flexible licence classes.

3.10 We also plan to greatly improve the level of information available about the expected quality of spectrum, through the use of improved Spectrum Quality Benchmarks (SQBs) and by providing greater clarity as to the rights and obligations of licences and the flexibilities they can offer.

[6] http://www.ofcom.org.uk/research/radiocomms/reports/independent_review/spectrum_pricing.pdf

3.11 Section 4 sets out our proposals for liberalising Business Radio licensing.

Spectrum Trading – 2007 proposals for Business Radio

3.12 In 2004 Ofcom began phasing in spectrum trading in the Business Radio sector. This initial implementation focused on licence types that were for large geographical areas and assigned exclusively to a single user. The licence classes in question were Analogue PAMR, Public Wide Area Paging, Public Mobile Data, Common Base Stations and National & Regional.

3.13 Ofcom now proposes to extend trading to a greater range of licence classes in the Business Radio sector. The licence classes that we propose to make tradable in 2007 are set out below.

- Business Radio (Wide Area Speech and Data Systems)
- Business Radio (Wide Area One-Way Paging and Speech Systems)
- Business Radio (Wide Area Distress Alarms)
- Business Radio (IR2008 Data)
- Business Radio (On-Site Speech and Data Systems)
- Business Radio (On Site Hospital Paging and Emergencies Speech Systems)
- Business Radio (Remote Meter Reading Operator)
- Business Radio (Tetra Digital PAMR)
- Business Radio (CDMA Asset Tracker)

3.14 Ofcom proposes to support a wide range of different types of transfer for these licences including partial trading of parts of their spectrum assignment or geographical coverage areas for licence classes that are for large area (national) and on an exclusive basis. Such changes allow licensees the flexibility to trade some, or all, of their spectrum to those who can make better use of it.

3.15 Section 5 details our proposals for extending trading.

Simplification and rationalisation

3.16 Ofcom proposes to simplify current arrangements by delivering fewer, more flexible licence types as the introduction of MASTS makes it possible to remove the current use-based segmentation that was previously necessary to help us manage the spectrum effectively.

3.17 We have also examined ways in which the current licensing approach could be improved to remove unnecessary restrictions and reduce the regulatory burden on licensees. The key way in which we propose to do this is to move to a simple, streamlined approach to the licensing of many on-site radio applications.

Extending choice

3.18 Our proposals are designed to provide licensees greater flexibility over how they use their spectrum and opportunities to innovate or trade, improve the precision of our interference planning approaches, and provide greater clarity as to the characteristics of the available spectrum. Licensees are free to take advantage of any, all or none of the proposed flexibilities.

Extension of licence term

3.19 Ofcom intends to vary those licence classes which are made newly tradable to have an indefinite duration, with a 5 years minimum notice period for revocation for spectrum management reasons except for certain cases such as a breach of licence terms, non payment of the annual fee, the grounds set out in paragraph 4(5) of the Wireless Telegraphy Act 1998 (national security or compliance with an EU or International obligation), breach of spectrum regulations or a direction by Ofcom or the Secretary of State.

3.20 This approach is designed to give licensees greater certainty. The changes would bring the newly tradable licences into line with those classes made tradable in 2004. Section 7 provides more information on our proposals.

Section 4

Liberalisation - Detailed proposals to liberalise Business Radio spectrum

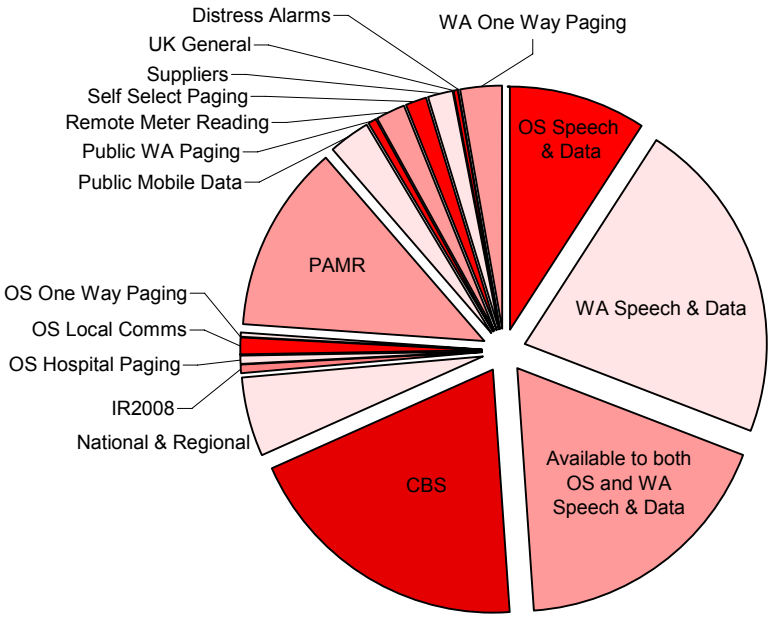
Liberalising Business Radio

Current approach

4.1 Business Radio spectrum has traditionally been carefully 'micro-managed'. Spectrum has been identified and set aside for particular types of use, for example, spectrum available to providers of public services was different to that available for private users. Where spectrum was shared by many different users, the techniques we employed to manage sharing have exploited correlations between particular kinds of use or application and the way they tend to use spectrum. Although many elements of this approach have a sound spectrum management basis, it has led to a segmentation of spectrum by use or application.

4.2 This segmentation is reflected in our current licensing arrangements for the Business Radio sector where there are 21 different licence types available and over 50 different types of user classification. Different classes have been subject to different approaches to fee setting, and have also had different technical restrictions applied to them. Figure 4.1 illustrates the heavily segmented nature of Business Radio spectrum displaying the proportion of spectrum used by each licence class.

Figure 4.1: Current Spectrum Segmentation within the Business Radio Sector



4.3 This complex set of technical and administrative restrictions presents a barrier to flexible use of the available spectrum and its exploitation by users who value it most.

Business Radio liberalisation 2005

4.4 In early 2005, Ofcom took the first steps to liberalise Business Radio licensing and enable spectrum users to make choices about the way they use spectrum and the technology they employ. These included:

- measures to make it easier to switch between different types of use of spectrum (such as between public and private use);
- introduction of a single, liberalised, set of equipment requirements;
- introduction of a process to consider any licence variation request;
- clearer definition of the licence restrictions and spectrum characteristics and quality.

4.5 Exhibit 4.1 details the liberalisation measures introduced to Business Radio in 2005 by licence class along with illustrations of the sorts of flexibilities now available. Ofcom has produced a set of guidelines which set out these flexibilities in more detail and explain the process licensees should follow to take advantage of them[7].

Exhibit 4.1: Liberalisation measures introduced to the Business Radio sector in 2005

Licence class	Current Liberalisation Measures (introduced in January 2005)
• Business Radio (Analogue PAMR) • Business Radio (National Paging) • Business Radio (Public mobile data, Non voice) • Business Radio (Common Base Station) • Business Radio (National and Regional)	• Liberalised technology through new single Interface Requirement. • Change of use enabled by licence variation between these licence classes (excluding CBS). • Minimum subscriber requirement for CBS licence class removed. • Consideration of any licence variation request.

4.6 As the January 2005 statement on Spectrum Liberalisation acknowledged, the reduction or removal of restrictions can increase the risk of interference. To address this risk, a framework of effective and proportionate technical regulations and processes has been established to support the new flexibilities. Central to this framework is a requirement in many cases that licensees seeking to exploit the flexibilities should obtain prior approval from Ofcom to vary their licences.

Next Steps in Liberalisation

4.7 Ofcom has established a streamlined assessment process for dealing with many types of request for licence variation. Nonetheless processing them does take time (our performance target is the same for variation as for a new application to the relevant licence class) and licensees face a degree of uncertainty as to whether their request will be granted. Ofcom's proposed next step in liberalising licensing in the Business Radio sector is to redesign licences and the technical systems that support them in such a way as to make licences intrinsically more flexible while still ensuring interference is effectively managed.

[7] http://www.ofcom.org.uk/radiocomms/ifi/trading/libguide/

4.8 Our proposals, supported by the introduction of an advanced computer based radio planning tool, involve redesigning licences so that they are specified in a way that supports increased flexibility while ensuring effective interference management. By doing this Ofcom will be able to:

- rationalise the Business Radio licensing regime, replacing the current 21 different licence products with 3 broader and more flexible licence types;
- remove distinctions between licence classes that are not for sound spectrum management reasons;
- change our approach to the technical management of certain licence classes to make them more flexible, efficient and as usage neutral as possible while ensuring the risk of interference is properly managed;
- provide improved clarity as to the characteristics, constraints and quality of available spectrum.

Proposals for a Liberalised Business Radio Licensing Regime

MASTS as Enabler for Change

4.9 In its January 2005 statement on liberalisation Ofcom indicated that its ability to make licences in this sector more intrinsically flexible, whilst ensuring that the risk of interference was responsibly managed, was constrained by the current technical tools and processes used to assign and manage Business Radio licences. Consequently Ofcom planned to delay the introduction of more flexible licences until an advanced spectrum planning and assignment tool, known as MASTS, was available to plan and manage assignments more effectively.

4.10 Final testing of the MASTS tool is now underway within Ofcom and we plan to start to deploy the tool operationally from April 2007. The tool will enable us to better model and predict the characteristics of radio systems and so manage spectrum more efficiently and more flexibly. The proposals set out below explain how we intend to use the new tool to enable us to introduce a licensing regime with far fewer, far more intrinsically flexible licence classes. We believe that it is sensible to introduce the MASTS tool in conjunction with these measures to ‘re-design’ our current licensing regime as the new licensing arrangement are specifically designed to maximise the benefits available from the new technical tool. Annex 7 provides more detail on the MASTS tool.

4.11 The MASTS tool, allied to some other changes to the way we assign and manage licences, will also enable Ofcom to greatly improve the quality of information we provide about the characteristic and quality of the spectrum associated with a licence (its ‘spectrum quality benchmark’). This improved ‘benchmark’ will provide guidance for licensees about the levels of interference that Ofcom expects are likely to be encountered from other licensed services. In this way licensees will have greater certainty over the quality of spectrum they should expect going forward and this will enable them to make informed choices about how to make best use of their spectrum.

Removing Unnecessary Distinctions, Maintaining Useful Distinctions

4.12 Ofcom proposes to redesign its current licensing regime, moving from the 21 current licence classes, to a new regime based around 3 basic approaches to

licensing. This proposal reflects the fact that some of the distinctions we currently make between licence classes are, and will continue to be, essential for ensuring efficient spectrum management, reducing the risk of interference, and providing spectrum of the right kind for particular applications or users. Perhaps the most fundamental distinction relates to Ofcom's basic approach to authorising and managing the spectrum available to a licence class. In the Business Radio sector there are three different types of approach or 'licensing paradigm':

- For some licence classes we carefully plan and micro-manage at the level of individual transmitters – we refer to this licensing paradigm as **technically assigned**;
- For some licence classes, usually for larger geographical areas, we allow licensees to deploy transmitters anywhere in a defined area – we refer to this licensing paradigm as **area defined**;
- Finally, for some licence classes spectrum is effectively 'pre-packaged' or subject to less exacting interference checks – we refer to this paradigm as **light licensing**.

4.13 Exhibit 4.2 provides further detail on each of these basic licensing paradigms and identifies the current Business Radio licence classes under each.

Exhibit 4.2: Business Radio Licensing Paradigms and Current Licence Classes

Authorisation Type	Description	Licence classes that currently adopt this approach.
Technically Assigned	For some licence classes Ofcom carefully plans the assignments. Ofcom uses mathematical tools to model electro-magnetic propagation, often combined with local engineering knowledge, to work out how an application can be accommodated whilst minimising the risk of interference to other users. At the end of this process the applicant is issued with a licence which defines in considerable detail the technical parameters (such as frequency, antenna height and type, power etc) they must operate in accordance with. We tend to use this approach for licences that require coverage of a relatively small geographical area and where the spectrum is shared between many different users. We refer to this licence type as technically assigned.	• Business Radio (Analogue PAMR) • Business Radio (Common Base Stations) • Business Radio (Remote Meter Reading Operator) - Shared channels • Business Radio (Wide Area Speech and Data Systems) • Business Radio (Wide Area One-Way Paging and Speech Systems) • Business Radio (Wide Area Distress Alarms) • Business Radio (Band 1 and Band III CBS) • Business Radio (IR2008 Data) • Business Radio (On-Site Speech and Data Systems • Business Radio (On Site Hospital Paging and Emergencies Speech Systems)
Area Defined	Where users need to operate over larger geographical areas and require exclusive access to spectrum, what is known as an area licence has often been used. These licence classes allow	• Business Radio (Public Wide Area Paging) • Business Radio (Public Mobile Data, Non-Voice) • Business Radio (National and

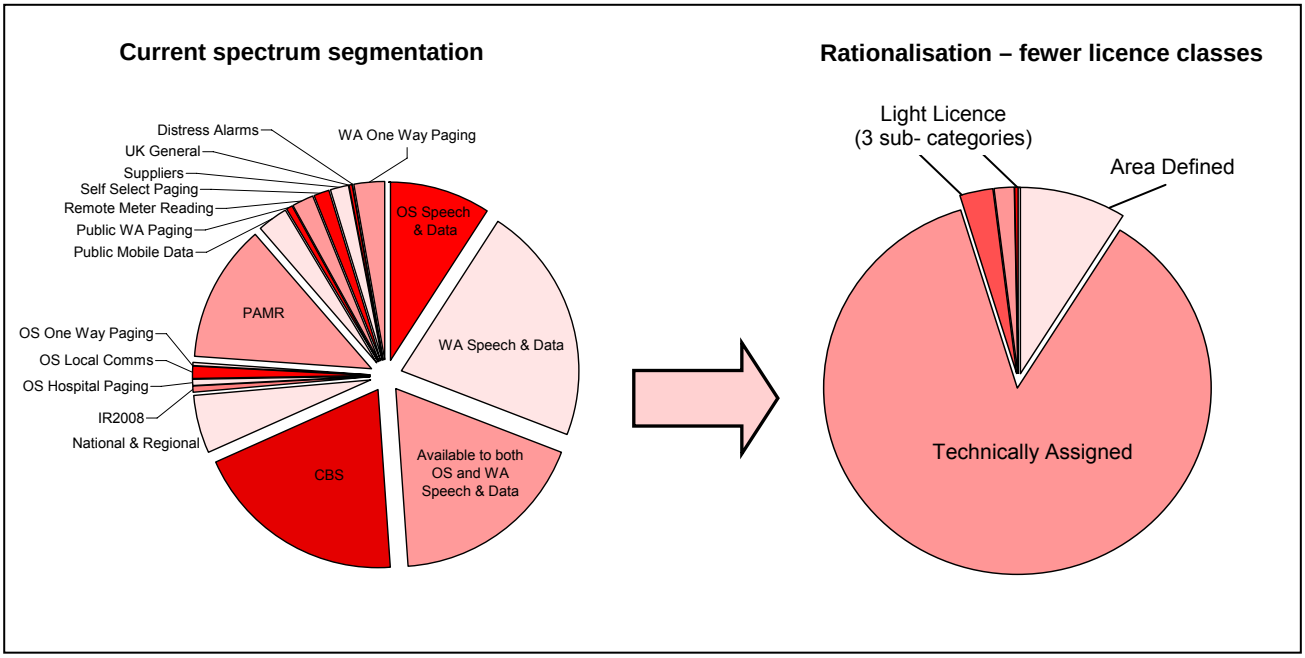
Authorisation Type	Description	Licence classes that currently adopt this approach.
	a licensee to deploy transmitters anywhere in a defined area, although each deployment may require clearance through Ofcom. This type of authorisation is particularly well suited to national networks.	Regional) • Business Radio (Tetra Digital PAMR) • Business Radio (CDMA Asset Tracker) • Business Radio (Remote Meter Reading Operator) - Exclusive channel
Light	Finally, some licence types might be viewed as effectively 'pre-packaged' or 'lightly' managed. In this type of licence Ofcom set aside channels which users have ready access to but must share and self co-ordinate with other users (for example by selecting unused channels). Ofcom carefully constrain the technical characteristic of equipment operating in this spectrum and may also carry out limited interference checks to minimise the risk of interference. This approach has proved particularly suited to many lower power On-Site requirements. For the purpose of this document we have referred to this type of approach as light licensing.	• Business Radio (UK General) • Business Radio (On-Site Local Communications) • Business Radio (On-Site One-Way Paging and Speech) • Business Radio (Self-Select). • Business Radio (Suppliers).

4.14 We believe that these distinctions are useful as each approach meets different types of demand for spectrum access. For example, where users seek greater assurance of quality of service, then the technically assigned paradigm is probably most appropriate as the spectrum benefits from careful micro-management. Alternatively, where flexibility of deployment is paramount to a user then the area defined licensing approach might be better suited.

4.15 It is, however, difficult to share the same spectrum between these fundamentally different approaches to spectrum authorisation. Consequently our proposals aim to remove unnecessary restrictions within these basic paradigms whilst maintaining the existing plurality in our basic approach to authorising spectrum access. We propose to "rationalise" our current licensing regime around these three basic models for authorisation, replacing the current 21 different licence classes with three basic licence types. Figure 4.2 provides a diagrammatic overview of our proposals – displaying the current highly segmented nature of Business Radio spectrum and the impact of our proposals in removing much of these divisions.

4.16 Ofcom believes this approach strikes the right balance between real and substantive progress towards a fully liberalised spectrum management environment, ensuring interference is properly managed, and the current and future needs of users of this spectrum.

Figure 4.2: Rationalisation of Business Radio products



4.17 As these basic paradigms for authorisation are fundamentally different we have taken different approaches to liberalisation for each as described in more detail below.

Technically Assigned Licences

4.18 Our current approach to technically assigned licences aims to enable sharing between the many different users of this spectrum, who often operate in the same geographical location. To control interference, licences mandate highly specific restrictions as to the particular kind of use (e.g., the provision of a public telecommunication service), equipment (e.g., paging) or type of business (e.g. taxi businesses) that may be employed. These restrictions provide the necessary coordination of the many different users and the interference environment, however they do make licences somewhat inflexible.

4.19 This approach has proven largely successful up until now in meeting the needs of radio users. However, with increasing demand on the spectrum and the need to accommodate new technologies and applications we wish to exploit the efficiency gains and new flexibilities that could be supported by employing advanced computer based propagation tools in the Business Radio sector.

4.20 Our new tool, MASTS, will provide the capabilities to enable us to specify licences much more flexibly. Nonetheless, interference management still remains a priority in the complex shared radio environment generally managed under the technically assigned paradigm and our proposals place appropriate restrictions on licences to ensure the risk of interference is managed effectively.

4.21 A detailed breakdown of our proposals for the new licence design for area and technically assigned licences is provided at Annex 6. The following paragraphs provide an overview and relevant context for our proposals.

Technically Assigned - We Propose to Reduce Distinctions Between Licence Classes

4.22 Currently, there are ten different licence classes in the Business Radio sector which we manage by employing the technically assigned licensing paradigm. The different licence classes reflect differences in the way we currently assign and manage spectrum between different types of use or applications. Examples of the distinctions we currently make include:

- we use licence classes to effectively dedicate certain spectrum to particular types of use (for example the Analogue PAMR class operates in dedicated channels);
- we use licence classes to enable us to employ different assignment techniques for spectrum with different coverage requirements. For example a different assignment process is used for smaller coverage requirements such as On-Site applications than that for wide area services;
- we use licence classes to reflect the different quality of service requirements of particular kinds of use. For example, our current assignment processes provides greater assurance against interference (through the use of a greater protection distance[8]) to certain applications;
- we use licence classes to reflect different assumptions about how radio systems co-exist with other users. For example, we assume that two systems using speech can operate closer together than two paging systems.

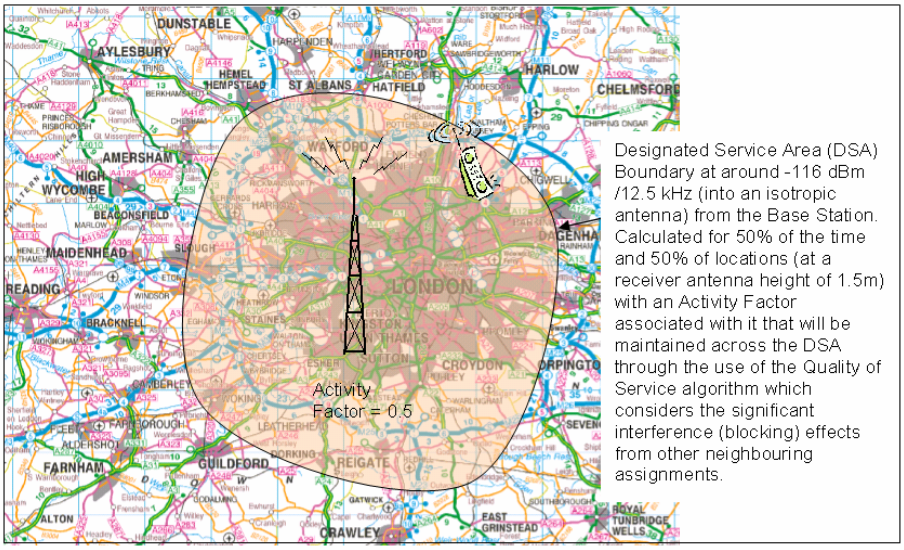
4.23 This approach has proved effective in managing the risk of interference but restricts the choices licensees can make about how they use the spectrum. The capabilities of the MASTS tool will allow us to remove the need to make such distinctions at licence class level whilst maintaining and improving on those elements of effective interference management provided by the current approach.

4.24 The advanced mathematical modelling capabilities of the MASTS tool will enable all assignments to be expressed in terms of an area in which a certain quality of service[9] is required to be maintained. We refer to this as an assignment's Designated Service Area (DSA). DSA is one of the key aspects of our new assignment and spectrum management approach using MASTS. DSA removes the need to distinguish between different types of use or technology (i.e. digital or analogue). Figure 4.3 shows the DSA for a typical assignment.

[8] Protection distance is the distance from any particular transmitter which we assume in our current processes must not overlap with the protection distance of another transmitter operating on the same channel if adequate quality of service is to be provided to both systems. Protection distances vary with the type of use and the type of technology.

[9] Defined in terms of the likelihood of blocking from neighbouring assignments on the same frequency.

Figure 4.3: Designated Service Area (DSA)



4.25 With an assignment specified in terms of DSA a licensee can now make a much wider set of choices about the way they use spectrum. Provided the change that a licensee wishes to make is within the general technical constraints of the licence, which will no longer identify use and application and provide a much broader set of equipment requirements, there will be no need to inform Ofcom. For example, a taxi firm could change its business to include courier, security activities or public access radio. Alternatively, in areas where an assignment is not shared with other users (exclusive) licensees have a great deal of discretion as to the technology they use (for example, they could change from analogue to digital technology) provided they remain within their licensed transmission characteristics.

4.26 The DSA for any assignment will normally be specified during the application process. In the case of existing assignments we plan to calculate the DSA using the technical information we currently hold about licensees in our licensing systems. This will be equal to the calculated sterilised area resultant from applying the MASTS propagation algorithm. In this way we can ensure that the advantages of the new approach are available to both new and existing licensees.

4.27 In sum, we propose to remove current distinctions between licence classes within the technically assigned licensing paradigm. Our assignment process will define a DSA and related quality of service. Users will be free to make changes to the use they make of their licence within the general technical constraints.

4.28 Exhibit 4.3 shows the current licence classes that we propose to merge into a single, flexible, ‘Business Radio Technically Assigned Licence Class’.

Exhibit 4.3: Current licence categories to be rationalised to the Business Radio Technically Assigned licence class

Current Licence Category	New Licence Category
• Business Radio (Analogue PAMR) • Business Radio (Common Base Stations) • Business Radio (Remote Meter Reading Operator) - Shared channels • Business Radio (Wide Area Speech and Data Systems) • Business Radio (Wide Area One-Way Paging and Speech systems) • Business Radio (Wide Area Distress Alarms) • Business Radio (Band 1 and Band III CBS) • Business Radio (IR2008 Data) • Business Radio (On-Site Speech and Data Systems) • Business Radio (On Site Hospital Paging and Emergencies Speech Systems)	Business Radio Technically Assigned

Technically Assigned - We Propose to Remove Unnecessary Restrictions Within Classes

4.29 Currently, within each licence class we make further distinctions as to the type and nature of use that is permitted under an individual's licence. These restrictions are generally designed to enable sharing of the same frequency channel by a number of users in the same geographical location. A frequency channel has only a finite capacity. However, many communication applications only use a channel for a proportion of the time (and therefore a proportion of a channel's available capacity). This means that it is possible to share the same channel between a number of users in the same location. However, different users and different applications make different demands on a channel's capacity. Consequently it is important that users of the same channel generally make demands on the channel's capacity that are compatible and can be accommodated within the available capacity of the channel.

4.30 We currently manage this task by taking into account two factors:

- type of 'business' use – we draw on general correlations between particular kinds of use of the spectrum and how much channel capacity they require. This is reflected in the distance we allow between users of the spectrum when making assignments;

- number of mobiles – users with a higher numbers of mobiles will tend to use a channel more.

4.31 In developing the MASTS tool, we have examined how best to manage sharing between co-channel users in the same location. In conjunction with the DSA discussed previously it is possible to specify a figure which indicates how much of a channel's available capacity in any area an individual assignment, on average, will use. This parameter is called the Activity Factor (AF). An AF of 0.5, for example, would mean that an assignment could share spectrum with another system of the same AF covering the same geographical area.

4.32 Ofcom has carried out measurements of the actual level of channel activity (AF) associated with our current classification of business use. The measurement found that differences, in terms of activity factor, between many of our current categorisations was actually quite small (two distinct categories) and this has enabled us to develop a much simpler a way of categorising sharing for business radio. In the future we propose to classify assignments as either shared with other users in the same area or available on an exclusive basis in that area.

4.33 When making assignments, our current system also takes into account the number of mobiles used by an application when specifying the minimum distance required between users. In operating this system we have found a number of practical difficulties in maintaining information on mobile activity of an adequate quality to provide benefits to the assignment process. We also believe there are advantages in allowing licensees greater flexibility as to the way they deploy their mobile terminals. Consequently, our judgment is that any potential technical efficiency benefit that might be gained by taking into account details of mobile use is more than offset by i) the benefits of greater flexibility and; ii) the difficulties in maintaining in practice an assignment approach that takes into account the number of mobile terminals. Assignments will continue to be protected, but this will be through the use of a single system Activity Factor for the assignment as a whole (comprising of an AF which encompasses an allowance for both base and mobile terminals).

4.34 This simpler categorisation, which will relate to the nature of the available spectrum rather than the characteristics of an individual licensee's use means that licensees will no longer be required to seek Ofcom approval if they add extra mobiles to their system or change the type of business in which they are engaged.

Technically Assigned - Spectrum Usage Rights and Spectrum Quality

4.35 Licences under the new approach will be specified in much the same way as they are currently. The licence document will still define the characteristics of each transmitter (e.g. its frequency, power and location etc) permitted under the licence. However, the tool also has the advantage of enhancing the approach we take to assignment (our Technical Frequency Assignment Criteria) and improving the level of information about the quality and characteristics of available spectrum. This will enable us to provide spectrum users with greater clarity as to the rights and obligations of licences and the flexibilities they can offer.

4.36 The current spectrum assignment and interference management for these licence classes relies heavily on technical judgement and local knowledge rather than repeatable scientific modelling. A set of rudimentary technical rules defines, for different services and technologies, the distances necessary between transmitters to avoid interference (e.g. 100 km for ambulance transmitters, 20 km for hospital paging). Local engineers may adapt these rules to local circumstances. Information on the quality of the assignment is not readily available.

4.37 The MASTS tool enables us to improve the quality of information available about an individual assignment by:

1. Adopting a computer based modelling approach. This reduces the level of human intervention in the assignment process and the uncertainties this can introduce. Consequently we will publish the TFAC to provide more accurate information on the nature of available spectrum;

2. The Designated Service Area concept enables us to define any assignment in terms of:

    a. A geographical boundary defined in terms of a minimum specified field strength for 50% location and 50 % of the time;

    b. A % exclusivity or activity factor (a measure of how much they occupy the channel on average – 100% for an exclusive channel, 50 % for a channel shared equally between two users).

4.38 Ofcom plans to continue to define the transmission characteristics on a licence in fundamentally the same way as we do at the moment (i.e. a transmitter power from a location). However, we are able to supplement this basic description of the transmitter right with additional information on what this means in terms of their spectrum quality benchmarks; this information may prove extremely helpful to the spectrum market.

4.39 Exhibit 4.4 below compares the licence and SQB parameters defined under our current approach and those for the proposed new approach.

Exhibit 4.4: Licence Parameters and SQBs Under Current and Proposed Approach

	Current Licences	**New Licence**
Licence parameters	Use restriction (either by licence classes and business use) Operating frequency/ bandwidth/Timeslot Location of base station or area Antenna characteristics Technical IR 2044 and 2008 restrictions Numbers of mobiles	Use restriction largely removed Operating frequency and bandwidth/Timeslot Location of base station or area Antenna characteristics One technical IR (revised IR 2044 and include IR2008/TDMA)
Spectrum quality benchmarks (SQBs)	TFAC (ofw164)[10]	Detailed TFAC (MASTS assignment process) Map indicating coverage area (DSA). Quality of service / Activity factor

Question 1) Ofcom would welcome comment on its proposals for the Business Radio Technically Assigned licence class.

Area Defined Licences

4.40 Licences currently employing the area defined paradigm are specified in much the same way as licences under the technically assigned paradigm and place very

[10] http://www.ofcom.org.uk/radiocomms/ifi/tech/tfacs/ofw164.pdf

specific restrictions as to the type of application that is permitted. The licence may also identify, in detail, the characteristics of each individual transmitter permitted to operate under the licence. However, licences under this paradigm give licensees the right to deploy anywhere in a defined area (for example the UK or England) and make choices as to the level of interference they will tolerate between base stations in their own network. So, whilst our procedures currently do allow a certain amount of freedom to licensees about how they deploy their network, licences are currently specified in a way that restricts flexibility and requires Ofcom intervention to permit changes.

4.41 We believe it is possible to change the licence conditions such that usage of the radio spectrum is not as tightly specified. The focus of the licence conditions would be on regulating interference with neighbouring users. This would allow greater flexibility in the usage licensees make of the radio spectrum within certain restrictions that safeguard the spectrum quality of neighbours.

4.42 A detailed breakdown of our proposals for the new licence 'design' with which we would intend to replace all existing licence classes identified as currently managed under the area assigned paradigm is provided at Annex 6. The following provides an overview and relevant context for our proposals.

Area Defined - Removing Unnecessary Distinctions Between Licence Classes

4.43 Currently licence classes managed under this paradigm are distinguished by the type of use a licensee is permitted to make of their spectrum. For example some licences only permit use by someone operating a public telecommunications network, while others must be used by those providing private communication systems.

4.44 Segmenting spectrum in this way limits the spectrum user's freedom to make choices about the best use of spectrum, a choice Ofcom believe they are best placed to make. Consequently, Ofcom proposes to remove current usage distinctions by merging the existing the national licences classes into a single new licence category: 'Business Radio Area Defined Licence'. This licence class will be defined in a way that is much more usage and technology neutral, giving users greater flexibility about the way they use spectrum without the need to gain Ofcom's consent to the same extent.

4.45 Exhibit 4.5 shows the current licence classes that we would propose to merge into a single, flexible, 'Business Radio Area Defined Licence'.

Exhibit 4.5: Current licence categories to be rationalised to the Business Radio Area Defined licence

Current Licence Category	New Licence Category
• Business Radio (Public Wide Area Paging) • Business Radio (Public Mobile Data, Non-Voice) • Business Radio (National and Regional) • Business Radio (Tetra Digital PAMR) • Business Radio (CDMA Asset Tracker) • Business Radio (Remote Meter Reading Operator) - Exclusive channel	Business Radio Area Defined

Area Defined - More Technical Flexibility and Better Spectrum Quality Benchmarks

4.46 We propose to specify licences using this paradigm in a way that focuses on the impact of changes on neighbouring users rather than on the nature of the service provided as we believe this to be more closely aligned with our duty to secure optimal use of the radio spectrum. To do this we propose to specify a set of conditions that must be met at the boundary between licences. This boundary will have both geographic and spectrum elements that are defined in terms of i) the level of power density permitted at, and beyond, a licence's geographical boundary; and ii) a spectrum mask that limits the power levels allowed at different frequencies.

4.47 Ofcom believe that the proposals will provide the licensee with:

- increased flexibility – provided that a licensee operates within their boundary conditions and complies with other defined requirements of the licence, such as site clearance and international co-ordination, they will be free to use the spectrum, and deploy transmitters, as they wish;

- greater clarity – defining the boundary condition will provide licensees with a much clearer statement of what they are permitted to do under the licence and so aid them when planning and deploying systems;

- better indicators of spectrum quality – the boundary condition defines the level of interference they should expect from other users of the spectrum and provides a clearer SQB than is currently available;

- support segmentation of licences – by defining a licence by its boundary condition, licensees can readily segment their spectrum or geographical area with a clear understanding of what the boundary of any new licence created will be. Our proposals for allowing geographical segmentation of licences through spectrum trading in this category are set out in section 5 of this document.

4.48 An example of how such an approach might work is illustrated at Figure 4.4. A licensee in Area A is free to deploy a transmitter for any purpose provided:

- the apparatus they use complies with the specified equipment transmission mask and technical requirements as defined in IR2044;

- that the predicted[11] field strength level specified in terms of power density at and beyond the boundary with Area B from any transmitter in Area A is below the defined boundary level of -116 dBm/12.5 kHz[12] (into an isotropic antenna at

[11] It is important that Ofcom and stakeholders can quickly and unambiguously determine their compliance with the power density condition of the licence. As the propagation of radio waves can be affected by a range of factors, such as local topography and atmospheric conditions, the actual power density at the boundary will constantly vary. Mathematical models of propagation use statistical techniques to take account of these variations and also have the advantage of avoiding time consuming and expensive measurements. Ofcom propose to determine compliance with this licence condition by using the ITU standard propagation model for mobile radio (ITU-R P: 1546) and specify exactly how this will be used – Annex 6 gives details of our proposed approach. This will ensure a shared understanding of the boundary conditions of a licence.

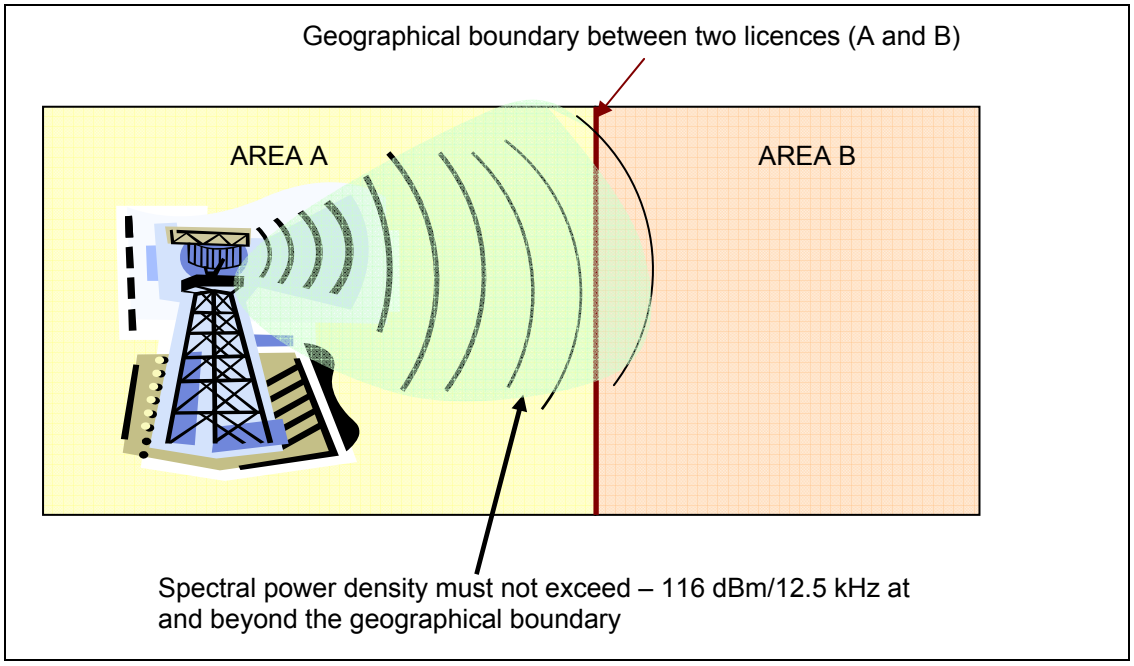
[12] This level is analogous to the level we use when planning assignments under the technically assigned paradigm to determine when spectrum can be re-used – this is often referred to as the interference field strength.

a receiver height of 1.5m). Using predicted field strength allows Ofcom and licensees to quickly and easily plan transmitter deployment and assess compliance with this licence term without the need for expensive and time consuming measurements;

- that where transmitters require site clearance or additional national or international coordination this is completed through Ofcom prior to the transmitter being brought into service.

4.49 Ofcom is also keen to ensure that licensees are able to use the spectrum as effectively as possible near geographical boundaries. To do this, neighbouring licensees might agree to receive more interference from their neighbour than permitted by the defined boundary condition. Ofcom is currently considering the role it should play in approving and facilitating such an arrangement and we welcome your views on how this might be achieved.

Figure 4.4: Boundary Conditions Between Two Area Licences



Question 2) Ofcom would welcome comment on its proposals for the Business Radio Area Defined Licence Class.

Light Licences

4.50 Licence classes under this paradigm might be viewed as effectively 'pre-packaged' or 'lightly' managed. Ofcom set aside channels which users have ready access to but must share and self co-ordinate with other users (for example by selecting unused channels). In order to minimise the risk of interference it is necessary to carefully constrain the technical characteristics of equipment operating in this spectrum, for example by limiting the maximum permissible power to just a few Watts. This approach has proved particularly suited to many lower power On-Site requirements.

4.51 The benefit of this approach is that it allows licensees quick and flexible access to spectrum with the minimum of Ofcom intervention. Set against this, the technical flexibilities available to the licensee are limited and, as the quality of service is not managed by Ofcom, it may not be as high as that provided by the other identified licensing paradigms. Nonetheless this type of authorisation is of particular value to certain users and we propose to maintain and improve on our current arrangements.

4.52 Currently there are five Business Radio licence classes that use this paradigm. For historical reasons, each is obtained through a slightly different procedure, each has a different renewal period (some must be renewed annually, some every three years), and each attracts a different fee. Ofcom proposes to rationalise current arrangements so that all licence classes follow:

- a common application process – we propose to move quickly to a new electronic application process;

- a common set of technical restrictions – we propose to only keep restrictions that will minimise the risk of interference;

- a common payment interval – we propose that all licences have a payment interval of five years. We believe a five year period allows us to strike the right balance between minimising regulatory intervention and enabling Ofcom to maintain a clear picture of the level of activity in the available channels;

- a common fee – licences will be charged using a common fee approach. Fees will be charged at a rate that reflects Ofcom's direct costs in managing these licences; in the most part fees for this type of licence will remain near to the current level or reduce. Fees are subject to a separate consultation but an overview of our proposed approach is set out in section 6.

4.53 Accordingly we propose to:

- merge the Business Radio (On-site Local communications Systems), Business Radio (On-Site One Way Paging and Speech Systems) and Business Radio (Self-Select) licence classes into a single licence class. To aid stakeholder understanding this licence will be named the "Business Radio Simple Site Licence" to reflect the need to register each site used under the licence;

- retain the Business Radio (UK General) licence class where mobile and hand portables can be used anywhere in the UK, but re-name it as the 'Business Radio Simple UK Licence';

- the Business Radio (Standard) licence class was not included in our spectrum management proposals as this licence class will be discontinued; licensees were given a five year notice period which ends in July 2007.

4.54 The Business Radio Simple Site licence class will have a set of technical restrictions designed to minimise interference. These reflect and make explicit current restrictions applied to licences in these classes through our assignment processes. Transmitters under this licence will be permitted a maximum power output of 2 Watts ERP for base station use and 5 Watts ERP for mobile use. The maximum permitted height above ground level for a base station will be 10 metres. In special circumstances Ofcom has authorised, on an individual basis, transmitters to be used outside these limits. Due to the requirements of national and

international coordination Ofcom does not believe that this facility is consistent with the new arrangements for these channels and will not offer this facility going forward. Licensees currently operating under such individual arrangements may, however, continue to do so.

4.55 The Business Radio (Suppliers) licence class is a specialist licence available to Radio Suppliers for the purpose of hiring out terminals to their customers for a limited period of time (12 months maximum). The radios are typically used on construction sites or for temporary use at events. This category has proved popular with those in the radio industry and we propose to maintain the licence in its current form subject to the changes proposed at paragraph 4.52.

4.56 Figure 4.5 below summarises our proposals for rationalising arrangements for licences currently managed under the light licensing paradigm.

Figure 4.5: Summary of proposals for rationalising arrangements for licences currently managed under the light licensing paradigm

Current Licence Category	New Licence Classes
• Business Radio (Standard)	To be removed from July 2007
• Business Radio (UK General)	Business Radio Simple UK licence
• Business Radio (On-Site Local Communications) • Business Radio (On-Site One-Way Paging and Speech Systems) • Business Radio (Self-Select)	Business Radio Simple Site licence
• Business Radio (Suppliers)	Business Radio Suppliers licence

Question 3) Ofcom would welcome comment on its proposals for the Business Radio Light Licence Class

Licence class names

4.57 Ofcom's proposed names for the new licence classes are designed to reflect the greater flexibilities and liberalisation measures proposed in this document. We would welcome your views on alternative names that you think may enable better stakeholder understanding of the new licensing regime

Section 5

Spectrum Trading - Ofcom's detailed proposals to extend the scope of trading in Business Radio

The legislative framework

5.1 The Framework Directive enables Member States to introduce spectrum trading. It permits a range of approaches, subject to the need to ensure that:

- competition is not distorted as a result of any trade; and
- the use of spectrum harmonised under Community measures does not change.

5.2 The Framework Directive is implemented in UK law by the Communications Act 2003. Section 168 of this Act contains provisions allowing Ofcom to establish a spectrum trading regime in the UK by making regulations ('the Trading Regulations'). Under that section, transfers that fail to comply with the Trading Regulations will be void.

5.3 The Wireless Telegraphy (Spectrum Trading) Regulations 2004 (hereafter referred to as 'the Trading Regulations'), which entered into force on 23rd December 2004, implement this possibility with regulations detailing possible transfers, tradable licence classes, trading procedures etc.

Introduction of Trading in the UK

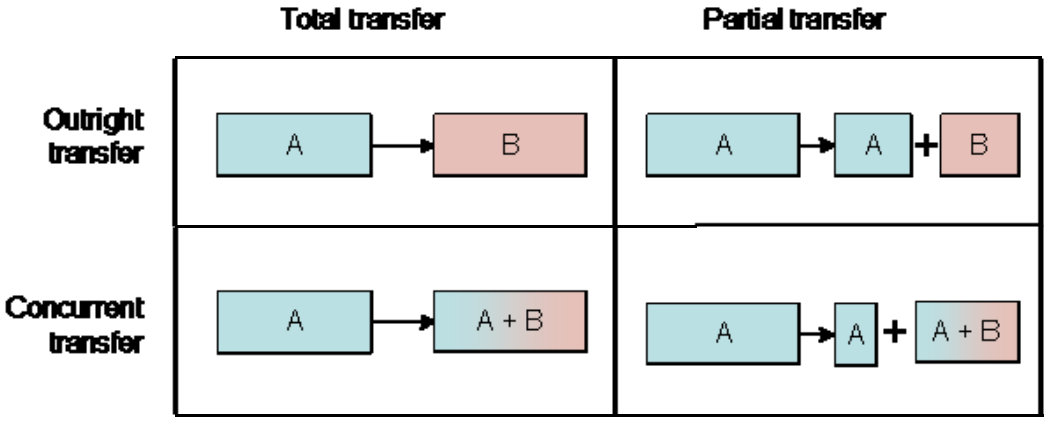
5.4 The Trading Regulations enable trading in certain fixed wireless access, business radio and fixed link licence classes. Services covered by these licences include broadband access services to businesses and consumers, a wide range of business radio services, for example transport organisations and the utilities, and point-to-point communication links.

5.5 The framework was designed to cater for a range of different types of transactions that involve the transfer of rights to use radio spectrum from one organisation to another. These could involve the outright sale, leasing or swapping of rights. They could be for the entirety of the rights granted under a licence, or just a part; for example, the rights in only one part of the country, or for a subset of the licensed frequencies. A transaction could be concerned almost entirely with the transfer of spectrum usage rights, or be part of a much larger deal, for example, the transfer of an entire wireless network. Further details and guidance on the current regime for Spectrum Trading can be found in the Trading Guidance Notes published on Ofcom's website[13].

[13] http://www.ofcom.org.uk/radiocomms/ifi/trading/tradingguide/tradindguidencenotes.pdf

5.6 The exhibit below, exhibit 5.1, gives some illustrative example of the types of transfers that are currently possible.

Exhibit 5.1: Example of current types of transfers



5.7 As set out in its August 2004 Statement on Spectrum Trading Ofcom intends to expand the range of licences that can be traded, with the majority of licences becoming tradable before the end of the decade.

Spectrum Trading in Business Radio

5.8 Ofcom's initial introduction of spectrum trading to the Business Radio sector focused on licences for large areas which are assigned exclusively to single users. This initial implementation comprised of the following, currently tradable, licence classes:

- analogue PAMR for both national and regional channels;
- national Mobile Operator for Public Wide Area Paging for both national and regional channels in the 153 MHz and 450-470 MHz bands;
- public Mobile Data, Non-Voice only operation licences for both national and regional channels in all licensed UHF and VHF bands;
- Common Base Station licences.

5.9 The UHF1 band (420 – 450 MHz) was not made tradable for any classes due to the sharing requirements of other Government users of this band.

5.10 Within these classes a range of different types of transfer are permitted, including the transfer of all rights and obligations under a licence, partial transfers of part of a licensee's frequencies (resulting in the licence being partitioned into two distinct licences), and the ability to trade to a third party which results in a concurrent holding of all or parts of the rights and obligations.

Extending Range of Tradable Licences

5.11 In its statement on spectrum trading, Ofcom indicated its intention to extend the ability to trade to a wider range of licences in the Business Radio sector once the MASTS tool was available so that interference could be properly managed under the new regime. As previously indicated we now plan to deploy MASTS and in

conjunction with the liberalisation measures set out in this document we propose to extend the ability to trade to licences currently in the following classes.

- Business Radio (Wide Area Speech and Data Systems)
- Business Radio (Wide Area One-Way Paging and Speech Systems)
- Business Radio (Wide Area Distress Alarms)
- Business Radio (IR2008 Data)
- Business Radio (On-Site Speech and Data Systems)
- Business Radio (On Site Hospital Paging and Emergencies Speech Systems)
- Business Radio (Remote Meter Reading Operator)
- Business Radio (Tetra Digital PAMR)
- Business Radio (CDMA Asset Tracker)

5.12 Section 4 sets out proposals to liberalise the Business Radio sector by re-designing current licensing arrangement so that existing classes are subsumed within a set of fewer, but more flexible licences. Most of the licence classes identified above will come within the new Business Radio Technically Assigned licence category. Licensees within these classes will be 'migrated' to the new Business Radio Technically Assigned licence class by Ofcom (details of this process are set out at Section 8). It is our intention to extend the current trading framework to this new licence category.

5.13 In addition to the outright transfer of the rights and obligations of a licence, Ofcom proposes to provide a range of trading options, which will include:

- the ability to transfer part of the frequencies under a licence to a minimum of 6.25 kHz within existing channel plans;
- the ability to transfer the rights and obligations under a licence such that the transferred rights and obligations become rights and obligations of the transferee while continuing to be rights and obligations of the person making the transfer (known as 'concurrent transfers').

Question 4) Do you agree with Ofcom proposals to extend trading in the Business Radio sector?

5.14 Going forward, Ofcom proposes to explore if more flexible options for frequency and geographical partitioning could be supported once MASTS is in full operation and would hope to introduce such facilities progressively over the next few years.

Extending trading flexibilities

5.15 Chapter 4 details proposals to effectively merge a range of current Business Radio licence classes, which are designed for users operating exclusively in larger geographical areas, into a single Business Radio Area Defined licence class. The licence classes affected by these proposals are:

- Business Radio (Public Wide Area Paging)
- Business Radio (Public Mobile Data, Non-voice)
- Business Radio (National and Regional)
- Business Radio (Tetra Digital PAMR)
- Business Radio (CDMA Asset Tracker)
- Business Radio (Remote Meter Reading Operator) - Exclusive spectrum

5.16 The majority of licences on issue in these classes are currently tradable and support concurrent trading and the partial transfer of frequencies under a licence (with certain limitations). It is our intention to maintain current trading options for licensees within these classes, but also to use the flexibilities offered by the new Area Defined licence approach to:

- extend the ability to trade to all licensees in these classes under the new Area Defined licence approach;
- extend the range of transfer options to allow the transfer of geographical elements of a licence;
- extend options for spectrum segmentation and amalgamation through the trading regime.

5.17 The greater range of options for geographical trading and spectrum segmentation and amalgamation are explored in a more detail below.

Geographical segmentation

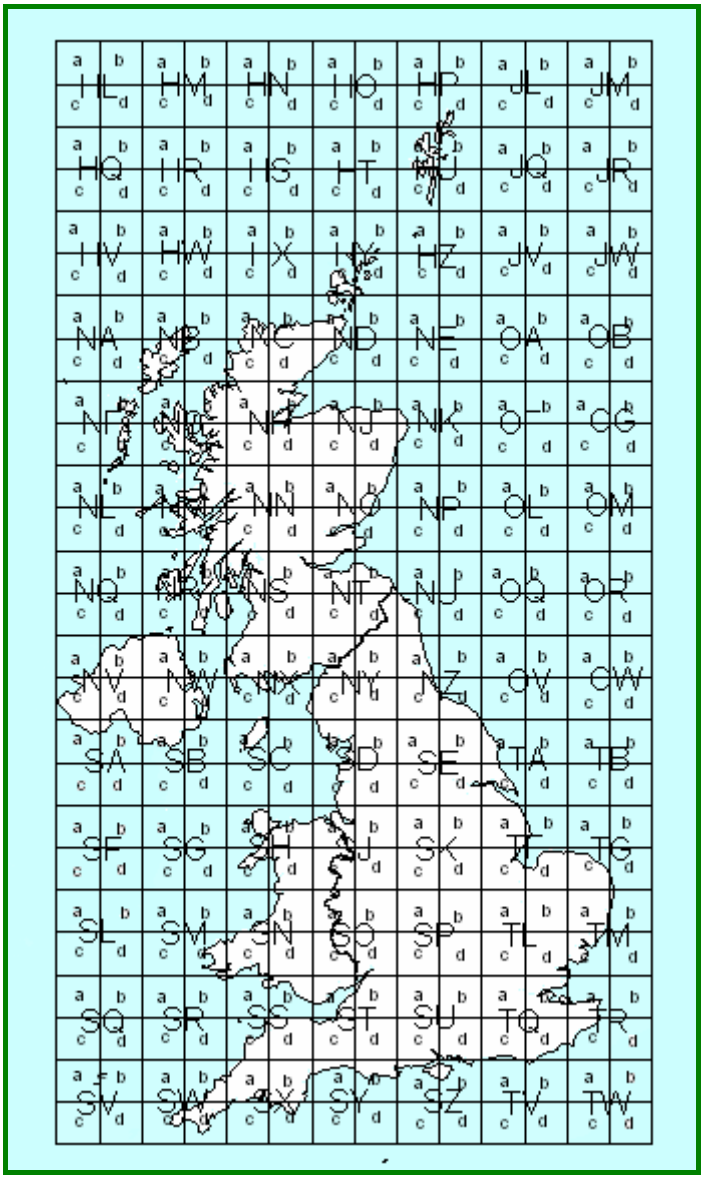
5.18 Ofcom proposes to allow geographical partitioning of the new Business Radio Area Defined licence category. This will mean that licensees can trade part of the geographical area in which they are currently entitled to operate to a third party. For example, a licensee with a licence for the whole of the UK could partially trade that part of their licence that permitted operation in Scotland. This would create two new licences, one covering England, Wales and Northern Ireland, held by the original licensee, and one for Scotland held by the buyer in the transaction.

5.19 Ofcom is keen to introduce a mechanism for partial geographical trading that provides both a streamlined process and clarity as to the terms and conditions of the licence which would arise from any trade. To do this we propose:

- to provide unambiguous and easily specified geographical boundaries defining the UK in terms of set 50 km grid squares (as shown in figure 5.1) based on the GB Ordnance Survey national grid reference system. Licensees will be able to trade any combination of these trading units, the minimum area tradable being a single trading unit;
- that at boundaries between different licences the level of power density, from a single transmitter, at and beyond the geographical boundary of the area defined licence is below the defined boundary level of -116 dBm/12.5 kHz. This is the standard specified boundary level for the Area Defined class and effectively

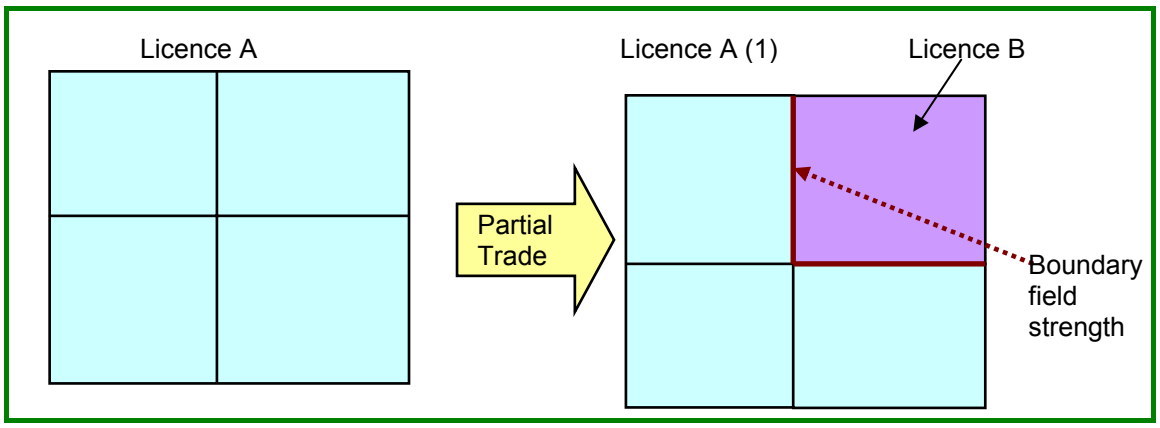
means that licences that arise from a partial geographical trade are more localised versions of the original licence.

Figure 5.1: Ofcom proposals for dividing the UK into trading units (50 km grid squares)



5.20 Figure 5.2 demonstrates this concept. In this example a licence, A, made up four trading units is partially traded to form two new licences A(1) and B. At, and beyond, the boundary between A(1) and B the boundary field strength must be adhered to, but licensees A(1) and B could negotiate different boundary conditions along the boundaries between A(1) and B and Ofcom is considering options on how to facilitate this arrangement.

Figure 5.2: A Geographical Partial Trade Using Trading Units

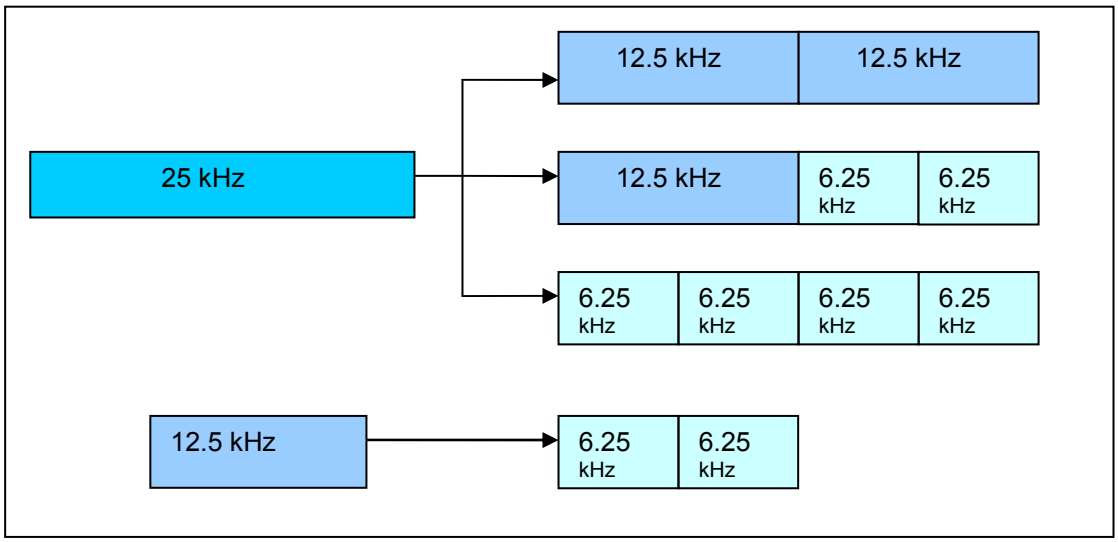


Spectrum segmentation

5.21 Under our proposals for the Business Radio Area Defined licence we intend to specify the spectrum boundary of a licence by a spectrum mask that limits the power levels allowed at different frequencies. These limits are based on the transmission characteristics of individual transmitters using the equipment requirements detailed in the liberalised interface requirement IR 2044. This is the current set of technical restrictions used for licences in the Business Radio sector.

5.22 For those licence classes which are tradable, and which we intend to merge into the Area Defined class, the current minimum level of spectrum segmentation allowed is to a minimum channel width of 12.5 kHz. We propose to reduce this to 6.25 kHz. This will be achieved by making slight amendments to IR 2044 to support this smaller channel width. This would mean, for example, that a 12.5 kHz channel could be segmented into two 6.25 kHz channels or a 25 kHz channel could be segmented into one 12.5 kHz and two 6.25 kHz channels as illustrated in figure 5.3.

Figure 5.3: Level of Spectrum segmentation that will be supported



5.23 Ofcom will revise the current IR 2044 to facilitate the introduction of 6.25 kHz spectrum partitioning and explore if more flexible options for frequency partitioning could be supported and we would hope to introduce such facilities over the next few years which will be subject to further consultation.

Question 5) Do you agree with Ofcom proposals to extend trading flexibilities?

Extending Trading to UHF 1 (420 – 450 MHz)

5.24 Licences in the UHF 1 band (420-450 MHz) were not made tradable in the first phase of trading due to the sharing concerns of other Government users of the band (coordination with RAF Fylingdales). We have discussed the possibility of extending trading to licences in this band with the relevant Government users, who now have had the chance to fully assess the impact of trading on their services and are comfortable with our proposals. Consequently, we propose to extend trading for all tradable Business Radio licence classes to incorporate the UHF1 band.

National coordination

5.25 All assignments in the UHF1 band must be coordinated with RAF Fylingdales. This coordination does not permit an increase in the total RF power and essentially means an existing assignment has to be removed to make space for any new assignment. Any deployment and change to the characteristics of a radio system will need to be cleared through the coordination process. Ofcom has developed tools to undertake basic coordination and all potential changes can be made by request and will be part of the Ofcom validation process for any change within UHF 1.

Question 6) Do you agree with Ofcom proposals to extend trading to the UHF 1 band?

Summary of Trading Proposals

5.26 In sum, Ofcom plans to greatly extend the number of licences that are tradable in the Business Radio sector to cover in excess of 50,000 assignments and 35,000 licensees. We also plan to provide a range of transfer options that allow a greater range of flexibility as to the type and nature of trades. Our proposals will involve:

- extending trading to 9 current licence classes in the Business Radio sector;
- providing the ability to trade spectrum to a minimum channel width of 6.25 kHz for all tradable licences;
- extend trading to licences with frequencies in the UHF1 band;
- allow geographical segmentation with certain constraints for licences in the new Business Radio Area Defined Licence Class.

5.27 Summary of current tradability in the Business Radio sector, along with our proposals are set out in exhibit 5.2.

Exhibit 5.2: Summary of the current and proposed trading measures for each business radio class

<table>
<tr><th>Licence classes</th><th>Current trading measures</th><th>Proposed trading and measures.</th></tr>
<tr><td>Business Radio (Public Wide Area Paging)</td><td rowspan="3">• Transfers of all rights and obligations of all band except UHF1 (420 – 450 MHz).
• Spectrum partitioning to a minimum channel of 12.5 kHz all bands except 420 – 450 MHz.</td><td rowspan="4">• Outright transfers of all rights and obligations under a licence.
• Extending trading to UHF1 (420 – 450 MHz).
• Partial transfers
o Spectrum segmentation to a minimum channel width of 6.25 kHz.
o Geographical segmentation to a minimum of trading unit (50 km grid squares).</td></tr>
<tr><td>Business Radio (Public Mobile Data, Non voice)</td></tr>
<tr><td>Business Radio (National and Regional)</td></tr>
<tr><td>Business Radio (Remote Meter Reading Operator) - Exclusive spectrum</td><td>Not tradable</td></tr>
<tr><td>Business Radio (Tetra Digital PAMR)</td><td>Not tradable</td><td rowspan="3">• Outright transfers of all rights and obligations under a licence.
• Extending trading to UHF1 (420 – 450 MHz).
• Partial transfers
o Spectrum segmentation to a minimum channel width of 6.25 kHz.</td></tr>
<tr><td>Business Radio (CDMA Asset Tracker)</td><td>Not tradable</td></tr>
<tr><td>Business Radio (Analogue PAMR)</td><td rowspan="2">• Transfers of all rights and obligations of all band except UHF1 (420 – 450 MHz).
• Spectrum partitioning to a minimum channel of 12.5 kHz all bands except 420 – 450 MHz.</td></tr>
<tr><td>Business Radio (Common Base Stations)</td></tr>
<tr><td>Business Radio (Remote Meter Reading Operator) - Shared spectrum)</td><td rowspan="9">Not tradable</td><td rowspan="9"></td></tr>
<tr><td>Business Radio (Wide Area Speech and Data Systems)</td></tr>
<tr><td>Business Radio (Wide Area One-Way Paging and Speech Systems)</td></tr>
<tr><td>Business Radio (Wide Area Distress Alarms)</td></tr>
<tr><td>Business Radio (Band 1 and Band III CBS)</td></tr>
<tr><td>Business Radio (IR2008 Data)</td></tr>
<tr><td>Business Radio (On-Site Speech and Data Systems)</td></tr>
<tr><td>Business Radio (On Site Hospital Paging and Emergencies Speech Systems)</td></tr>
</table>

Section 6

Overview of Setting Business Radio Fees

Current Fees Approach and Need For Change

6.1 Ofcom has published in conjunction with this document a set of proposals to revise fee arrangements in this sector in a way that complements the liberalisation and simplification measures set out in this document. These proposals are set out in detail in "Spectrum Pricing 2006" which is available on the Ofcom website.

6.2 Administered Incentive Pricing (AIP) has been applied to the Business Radio sector since 1999. The approach is designed to encourage the most efficient use of the available spectrum. Ofcom remains committed to AIP and proposes in its Spectrum Pricing document to maintain its application to the Business Radio sector.

6.3 As set out in its statement on Spectrum Pricing on 13 February 2005, Ofcom does not intend to change the valuation by which most Business Radio services annual fees are calculated (£9,900 per 2 x 12.5 kHz channel). It does, however, intend to take this opportunity to change its approach to fee setting in order to make it consistent with the new licence structures set out in this document, and with the general thrust of its liberalisation and simplification proposals. If you require more detailed information on these changes to fees in the Business Radio sector these are set out in detail in the consultation document available at http://www.ofcom.org.uk/consult/condocs/pricing06/.

6.4 In Ofcom's current implementation of the approach, a number of slightly different ways of setting fees are applied to the 21 licence classes[14] in the sector. Whilst the approaches do share the same basic valuation of Business Radio spectrum and take into account similar factors, such as geographical area of coverage, frequency band, channel width and congestion, there remains a range of differences and complexities in the way in which individual licence fees are calculated. We believe that this is no longer consistent with our proposed approach to spectrum management in the sector.

6.5 In order to provide a fees structure that is consistent with our proposals for liberalisation and simplification in the Business Radio sector we propose that:

- the adoption of a simple flat rate fee for licence classes that will form part of the 'Business Radio Light Licence Category', where Ofcom only lightly manages use;
- the adoption of a single set of fee setting principles for all other licence classes (forming part of the new Area Defined and Technically Assigned categories). The principles we have developed are informed by our experience of our existing fee approach and also by the findings of the Indepen review[15] of spectrum pricing commissioned by the Radiocommunications Agency in 1996[16].

[14] The Wireless Telegraphy (Licence Charges) Regulations 2005, SI 2005/1378
[15] http://www.ofcom.org.uk/research/radiocomms/reports/independent_review/spectrum_pricing.pdf
[16] Study into the use of Spectrum Pricing, Study for the Radiocommunications Agency, NERA and Smith System Engineering Limited, April 1996

6.6 In setting fees for licences in the Business Radio sector (excluding the 'light' category) we propose to take into account the following factors:

- whether a location is highly populated;
- the extent of coverage of a radio system;
- whether the frequency band is congested;
- the amount of spectrum bandwidth used;
- whether spectrum is shared with other users.

6.7 The following tables provide proposed fee rates for licences within the new licence categories. The coverage, population, bands and assignment type categorisations are provided in annex 8. Detail of how these fees were derived can be found in the fees consultation document.

Fee Proposals

6.8 Table 6.1 shows the annual fee proposal for the Business Radio Area Defined licence class, for a 2 x 12.5 kHz channel.

Table 6.1: Business Radio Area Defined Licence class fee proposals for a 2 x 12.5 kHz channel

Area	Fee (£) for most popular bands	Fee (£) for less popular bands
UK	9900	8250
England	8275	6895
Wales	490	410
Scotland	855	710
Northern Ireland	280	235
GB (England, Wales and Scotland)	9620	8015
Trading unit within high population category (A)	1185	990
Trading unit within medium population category (B)	150	125
Trading unit within low population category (C)	14*	12*

* a minimum licence fee of £ 75

6.9 Table 6.2 shows the fee proposal for the Business Radio Light licence class.

Table 6.2: Business Radio Light licence class fee proposal

Licence class	Licence fee
Business Radio Simple UK licence	£ 75 per 5 years
Business Radio Simple Site licence and Business Radio Suppliers licence	£ 75 per site per 5 years

6.10 Table 6.3 shows the annual fee proposal for the Business Radio Technically Assigned licence class, for a 2 x 12.5 kHz channel.

Table 6.3: Business Radio Technically Assigned Licence Class fee proposals for 2 x 12.5 kHz channel

Coverage categories	**Category 1**				**Category 2**				**Category 3**			
Assignment Type	Exclusive		Shared		Exclusive		Shared		Exclusive		Shared	
Bands**	MPB	LPB	MPB	LPB	MPB	LPB	MPB	LPB	MPB	LPB	MPB	LPB
Population category A	£200	£100	£100	£75	£740	£370	£370	£185	£1480	£740	£740	£370
Population category B	£100	£85	£75	£75	£200	£170	£100	£85	£300	£250	£150	£125
Population category C	£75	£75	£75	£75	£95	£80	£75	£75	£110	£90	£75	£75

** MPB (Most popular bands) – LPB (Less popular bands)

Section 7

Related Issues

Publication of information by Ofcom to facilitate trading and more efficient use of spectrum

7.1 In general, markets function most efficiently when the maximum amount of information is available, because they benefit from the transparency and certainty this brings. In the case of spectrum markets, this includes information about individual spectrum assignments, and the notification of trades and completed trades.

7.2 Under the Communications Act 2003, Ofcom has powers to require specific information in connection with spectrum trades be provided by the applicants and to publish it. We also have the ability under the Act to make regulations concerning licensing information being published in a register. In its statement on Spectrum Trading (August 2004) Ofcom indicated that, in order to facilitate trading, it will publish as much relevant information as it can, but in so doing it would address concerns raised by respondents to the consultation on spectrum trading on issues of security and commercial sensitivity.

Register of Licences

7.3 In December 2004 Ofcom made the Wireless Telegraphy (Register) Regulations 2004, which enabled Ofcom to establish a register of relevant information. Section 170 of the Communications Act makes a provision for Ofcom to establish such a register. These regulations extend only to those licences which are currently tradable. The register has been realised in the form of an on-line database which is available at http://www.ofcom.org.uk/radiocomms/isu/ukpfa/intro

7.4 As set out in the August 2004 spectrum trading statement, Ofcom would like to extend the scope of the register to a wider range of classes, and in line with this statement Ofcom now proposes to extend the scope of this register to include the licence classes that would be made newly tradable by the proposals set out in section 5 of this document.

7.5 The Register of Licences will provide basic information about licences such as names, contact details, class of licence, the band(s) of frequencies and where relevant the geographical area of operation. It will not provide very precise information about individual transmitters. This limitation reflects some of the concerns raised by respondent to previous consultation about providing more information.

7.6 Table 7.1 provides an indication of the data fields and specific information that Ofcom currently publishes in the Register of Licences. We propose to publish the same set of information for newly tradable licences.

Table 7.1: Register of Licences

Data Field	Description
Name of licensee	Name of individual or enterprise holding the licence
Contact Details	Contact postal address, Email addresses, or Telephone numbers or Agent's contact details
Licence Class	Description of the licence class in use by the licensee
Frequency boundary of right	The radio frequency range of the assignment specified either in terms of a central frequency with a channel width, e.g. 415 MHz, 100 kHz, or a frequency range, e.g. 415.15 to 415.35 MHz
Geographical Information	Specification of the geographical characteristic of the right for example the authorised operational area (e.g. England) or a base station location to the nearest 100 metres.

Publication of trading information

7.7 Ofcom currently publishes information about proposed transfers that have been notified to Ofcom for approval; this information is contained within the Trade Notification Register, which is available on-line at: http://146.101.202.225/public-tnr/wtrSearch.do

7.8 This meets the requirement under the Authorisation Directive to make information about spectrum trades public. If the transfer is approved by Ofcom, and assuming the parties decide to continue with the transfer, then the fact that is has been put into effect will also be noted.

7.9 Ofcom believes that publication of trading information will enable interested parties to find out about the number of transactions that have taken place and the spectrum which is being traded. The information contained on the Trade Notification register includes:

- details of the licence being traded;
- licensee's name and buyer's name;
- date of provision of information required by Ofcom to consider whether or not to consent to the transfer; and
- in the case of a partial transfer a description of which rights under the licence are proposed to be transferred.

7.10 Ofcom proposes to also extend this facility to new licence classes that are made tradable.

Question 7) *Do you agree with Ofcom's proposals to extend information currently available about tradable licence classes to those licences made tradable as a result of the proposals set out in this document?*

Band III (177 – 207 MHz)

7.11 The International Telecommunications Union (ITU) Radio Regulatory Committee held a conference in May and June 2006, during which the long-term future of the use of Band III was reviewed. This conference is known as the RRC06 and one of its tasks was planning the future use of Band III to support digital audio and video broadcasting throughout Europe. The outcome of this meeting is a legally binding international treaty.

7.12 The UK is unusual within Europe as Band III is used for mobile as well as broadcasting and the spectrum is currently apportioned between UK Terrestrial Digital Audio Broadcasting (T-DAB), Programme Making & Special Events (PMSE) and Private Mobile Radio (PMR). Other countries use the spectrum for broadcasting and Band III is largely recognised as a broadcasting band. Negotiations during the conference were successful in maintaining the UK's use of PMR within Band III, albeit with increased restrictions within sub-band 2 in order to achieve equitable access to the spectrum for all countries.

7.13 The conference concluded in mid June 2006 and Ofcom is assessing the outcome in order to achieve compliance. Band III licences will be made as flexible as possible and tradable within the conditions determined by the conference.

Digital PMR 446

7.14 Ofcom is considering the adoption of ECC Decision (05)12 to introduce digital PMR 446 in 446.1 to 446.2 MHz as licence-exempt equipment. Ofcom recognises that there are licensed users within this frequency range and in the unlikely event that any interference issues arise Ofcom will address these on a case by case basis. However if any existing licensees wish to have an alternative assignment out of the 446.1 to 446.2 MHz frequency range an alternative assignment will be offered.

7.15 Ofcom intends to publish a consultation document regarding 'Wireless Telegraphy Licence Exemption' in July 2007 which will include detailed proposals for digital PMR 446.

Extension of notice period

7.16 In line with proposals set out in Ofcom's Spectrum Trading Statement, Ofcom intends to make changes to the terms and conditions of newly tradable licences in relation to the circumstances of licence revocation and licence term. Currently Ofcom could revoke licences at short notice. We propose in future to give 5 years notice of proposed revocation except for certain cases such as a breach of licence terms, non payment of the annual fee, the grounds set out in paragraph 4(5) of the Wireless Telegraphy Act 1998 (national security or compliance with an EU or International obligation), breach of spectrum regulations or a direction by the Secretary of State.

7.17 This approach is designed to give licensees certainty and is not to be a grant of a substantial new right or value.

7.18 As highlighted above, Band III may be subject to changes and additional constraints due to the impact of international treaty. There remains a possibility that parts of this band will not remain available for Business Radio use and current licensees may be given a shorter notice period than the proposed 5 years to vacate the band. Ofcom will communicate the outcome of RRC06 to stakeholders and in particular its impact on current licensing and spectrum arrangements as soon as possible.

Question 8) Do you agree with Ofcom proposals to extend licence term to 5 years notice period

Section 8

Next steps and timetable

8.1 This section explains how the liberalisation process will be taken forward following this consultation.

Analysis of responses

8.2 Ofcom will analyse all responses it receives by the closing date for this consultation of 15 September 2006 and consider them against its statutory duties in finalising its plans. Ofcom will then publish a statement detailing its response to issues raise during the consultation and setting out clearly its plans for taking forward liberalisation and change in the Business Radio sector.

Changes to Regulation.

8.3 If Ofcom decides to proceed with the proposed changes set out in this document a number of changes to existing Statutory Instruments will be required. Ofcom is required to give statutory notice of at least one month prior to making new, or amending existing regulations. It would be our expectation to give such notice at, or shortly after, publication of the statement. The regulations that will require amendment are:

- Statutory Instrument 2004 No. 3154: The Wireless Telegraphy (Spectrum Trading) Regulations 2004[17];
- Statutory Instrument 2004 No. 3155: The Wireless Telegraphy (Register) Regulations 2004[18].

Variation of Licences

8.4 If Ofcom decides to proceed with the proposed changes it will also be necessary to vary licences currently on issue to introduce the new five year notice period and to make the necessary changes to introduce the new licence classes proposed in this document. Pursuant to s1E of the Wireless Telegraphy Act 1949, to do this Ofcom would give a written notice to each licensee setting out the terms and conditions of the proposed wireless telegraphy licence. Licensees will be given a minimum of one month to make any representations about the changes proposed, which Ofcom will consider before issuing replacement licences. Licensees will be asked to advise us if their licence is no longer required.

8.5 It would be our expectation to start this process shortly after the necessary changes to regulations have come into force.

8.6 As the existing licences in most Business Radio classes will be changed in line with the proposals set out in this document, it will be necessary to replace most licences

[17] http://www.opsi.gov.uk/si/si2004/20043154.htm

[18] http://www.opsi.gov.uk/si/si2004/20043155.htm

to include revised terms and conditions (i.e. in line with the simplification of some classes, the removal of certain restrictions, trading, and the change to the notice period).

8.7 Ofcom expects to start this exercise class by class from April 2007. All licensees (ie those holding valid and paid up licences) will be notified of the terms and conditions of the new replacement class of licence. This should not generally affect any existing assignments (e.g base station details) unless licensees raise any specific concerns or issues within one month of the notice, Ofcom will then proceed to generate and automatically issue a replacement licence in the new class. If any specific issues are raised, Ofcom will investigate them and respond as necessary or notify the licensee of their decision as soon as practicable. If licences are no longer required, then Ofcom will ask for this to be notified too.

8.8 There will be a revised fee scale for the new licence classes, as outlined in the separate fees consultation which is available at http://www.ofcom.org.uk/consult/condocs/pricing06/. The new fee will be charged from the first licence renewal date after the issue of the replacement licence.

8.9 New applicants will be able to apply for new licences in these new classes after their availability is announced on the spectrum licensing portal on the Ofcom website (anticipated from April 2007). Until that date applications should continue to be made using existing licence application forms. It is also proposed that any trading of licences in any of the new classes should not start until after the notified date.

Other Documents

8.10 Ofcom will revise the current IR 2044 (to include 6.25 kHz channel width and IR 2008 TDMA) and revised Technical Frequency Assignment Criteria (TFAC) for technically assigned business radio including MASTS algorithm which will be published early next year.

8.11 At an appropriate time Ofcom will also update the current Trading and Liberalisation Guidelines[19] to reflect any change Ofcom introduces to current arrangements.

Events and communications regarding Business Radio liberalisation proposals

8.12 Ofcom intends to give a presentation during the consultation period to stakeholders interested in the liberalisation and trading measures described in this document to publicise and explain their details.

[19] http://www.ofcom.org.uk/radiocomms/ifi/trading/

Annex 1

Responding to this consultation

How to respond

A1.1 Ofcom invites written views and comments on the issues raised in this document, to be made by 5pm on 15 September 2006.

A1.2 Ofcom strongly prefers to receive responses as e-mail attachments, in Microsoft Word format, 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), among other things to indicate whether or not there are confidentiality issues. The cover sheet can be downloaded from the 'Consultations' section of our website.

A1.3 Please can you send your response to businessradio@ofcom.org.uk

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

Reuben Braddock
3rd Floor
Riverside House
2A Southwark Bridge Road
London SE1 9HA

Fax: 020 7783 4303

A1.5 Note that we do not need a hard copy in addition to an electronic version. Also note that Ofcom will not routinely acknowledge receipt of responses.

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 3. 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 Paul Jarvis on 020 7981 3115.

Confidentiality

A1.8 Ofcom thinks 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 (when respondents confirm on their response cover sheer that this is acceptable).

A1.9 All comments will be treated as non-confidential unless respondents specify that part or all of the response is confidential and should not be disclosed. Please place any confidential parts of a response in a separate annex, so that non-confidential parts may be published along with the respondent's identity.

A1.10 Ofcom reserves its power to disclose any information it receives where this is required to carry out its legal requirements. Ofcom will exercise due regard to the confidentiality of information supplied.

A1.11 Please also note that copyright and all other intellectual property in responses will be assumed to be licensed to Ofcom to use, to meet its legal requirements. Ofcom's approach on intellectual property rights is explained further on its website, at www.ofcom.org.uk/about_ofcom/gov_accountability/disclaimer.

Next steps

A1.12 Following the end of the consultation period, Ofcom intends to publish a statement by the end of 2006.

A1.13 Please note that you can register to get automatic notifications of when Ofcom documents are published, at http://www.ofcom.org.uk/static/subscribe/select_list.htm.

Ofcom's consultation processes

A1.14 Ofcom is keen to make responding to consultations easy, and has published some consultation principles (see Annex 2) which it seeks to follow, including on the length of consultations.

A1.15 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, whose views are less likely to be obtained in a formal consultation.

A1.16 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 (Scotland)
Sutherland House
149 St. Vincent Street
Glasgow G2 5NW
Tel: 0141 229 7401
Fax: 0141 229 7433
E-mail: 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 version for smaller organisations or individuals who would otherwise not be able to spare the time to share their views.

A2.5 We will normally allow ten weeks for responses to consultations on issues of general interest.

A2.6 There will be a person within Ofcom who 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. This individual (who we call the 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. This may be because a particular issue is urgent. If we need to reduce the amount of time we have set aside for a consultation, we will let those concerned know beforehand that this is a 'red flag consultation' which needs their urgent attention.

After the consultation

A2.8 We will look at each response carefully and with an open mind. 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, we will publish all consultation responses in full on our website, www.ofcom.org.uk, unless a respondent specifies that all or part of their response is confidential. We will also refer to the contents of a response when explaining our decision, without disclosing the specific information that you wish to remain confidential.

A3.2 We have produced a cover sheet for responses (see below) and would be very grateful if you could send one with your response. This will speed up our processing of responses, and help to maintain confidentiality by allowing you to state very clearly what you don't want to be published. We will keep your completed cover sheets confidential.

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 cover sheet 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 in the form of a Microsoft Word attachment to an email. Our website therefore includes an electronic copy of this cover sheet, which you can download from the 'Consultations' section of our website.

A3.5 Please put any confidential parts of your response in a separate annex to your response, so that they are clearly identified. 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

What do you want Ofcom to keep confidential?

Nothing	Name/contact details/job title
Whole response	Organisation
Part of the response	If there is no separate annex, which parts?

If you want part of your response, your name or your organisation to be confidential, 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. It can be published in full on Ofcom's website, unless otherwise specified on this cover sheet, and I authorise Ofcom to make use of the information in this response to meet its legal requirements. 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 questions

Question 1)	*Ofcom would welcome comment on its proposals for the Business Radio Technically Assigned Licence class*
Question 2)	*Ofcom would welcome comment on its proposals for the Business Radio Area Defined Licence class*
Question 3)	*Ofcom would welcome comment on its proposals for the Business Radio Light Licence class*
Question 4)	*Do you agree with Ofcom proposals to extend trading in the Business Radio sector?*
Question 5)	*Do you agree with Ofcom proposals to extend trading flexibilities?*
Question 6)	*Do you agree with Ofcom proposals to extend trading to the UHF 1 band?*
Question 7)	*Do you agree with Ofcom's proposals to extend information currently available about tradable licence classes to those licences made tradable as a result of the proposals set out in this document?*
Question 8)	*Do you agree with Ofcom proposals to extend licence term to 5 years notice period*

Annex 5

Impact assessment

Policy Objective

A5.1 Impact assessments (IAs) provide a valuable method of assessing different options for regulation and illustrating why the proposed method was chosen. They form part of best practice policy-making and are commonly used by other regulators. Section 7 of the Communications Act also places a responsibility on Ofcom to carry out IAs where the proposals are likely to have a significant impact on businesses or the general public, or where there is a major change in Ofcom's activities.

A5.2 This document discusses Ofcom's approach to Business Radio licensing. This annex constitutes the IA for the proposals on both liberalisation and trading. It assesses the costs and benefits of the proposed introduction of the proposals and how risks might be managed and mitigated.

A5.3 The Business Radio sector encompasses a wide range of land mobile applications used for wireless voice and data communications, including PMR, Paging, Common Base Stations, PAMR, etc. Stakeholders include local and central government, spectrum management organisations, radio suppliers and dealers, emergency services, fleet operators, public transport systems, construction projects, utilities companies, medical facilities etc. The sector uses a range of frequency bands between 30 MHz and 1GHz although most of the use is in the VHF (130-200 MHz) and UHF (425-465 MHz) ranges. Approximately 90 MHz is available. The majority of stakeholders tend to have access to limited amounts of spectrum (a few 2 ×12.5 kHz channels) for small geographical areas (normally from 3 km – 50 km) normally sharing with other users.

A5.4 There are currently 21 licence types in the Business Radio sector, allied to more than 50 types of user classification, a range of different approaches to Administered Incentive Pricing (AIP) and a range of different technical restrictions. This complex set of technical and administrative rules introduces process inefficiency and is a barrier to liberalisation and trading.

Proposal, purpose and intended effect

A5.5 The proposals in this document aim to rationalise the licence classifications to allow more flexible use and extend trading. Ofcom is proposing to:

- extend spectrum trading to identified licence classes within the Business Radio sector;
- liberalise licensing arrangements and technical restrictions in the Business Radio sector to make them more flexible;
- improve spectrum quality benchmarks.

A5.6 Ofcom's objectives are to maximise the value created by the use of radio spectrum by extending opportunities to trade within a more liberalised spectrum environment while at the same time protecting existing users from excessive interference. Value will be maximised by encouraging innovation, by removing barriers to entry for new technologies and by minimising the time that spectrum lies unused.

Benefits of the proposals

A5.7 Ofcom's SFR concluded that spectrum is managed most effectively if the market is allowed greater influence over how spectrum is used. In other words, trading and liberalisation will together ensure greater benefits are generated from the spectrum. Trading will allow licences to be transferred to users who can make better use of them. Liberalisation will allow spectrum to migrate to higher value uses. Together, they will lower barriers to accessing spectrum, promoting competition and innovation. Consumers will benefit through lower prices and increased choice with new services and technologies being introduced more quickly. Businesses will benefit from being able to take advantage of the resulting opportunities to provide radio-based services and from the greater competitiveness that new technologies can enable. There will also be a reduction in regulatory burden as users will have greater scope to change use without applying to Ofcom for a licence variation and less risk of regulatory failure as Ofcom will be less involved in deciding in as much detail how spectrum is used.

A5.8 This is a difficult area to quantify benefits because it is up to licence holders, not Ofcom, to decide how to make the most of the additional flexibility that the proposals will provide. The decisions that they make, which we cannot predict, will have a major impact on the costs and benefits. In the Spectrum Framework Review (SFR) Statement we set out an approach to determining the costs and benefits of our market-based approach based on a study produced for the European Commission.

A5.9 That report, produced by Analysys, DotEcon and Hogan & Hartson on conditions and options in introducing secondary trading of radio spectrum in the European Community, concluded that there are powerful synergies between trading and liberalisation and estimated that benefits from both are over 9 times the benefits from trading alone. The study also estimated that the costs, mainly from additional interference management, amount to less than 1% of the benefits relative to the status quo. Overall benefits for the EU as a whole were estimated at €9bn a year.

A5.10 The responses to the SFR IA were mixed. Some acknowledged that estimating benefits in this area is extraordinarily difficult and that we had done as much as was possible and sensible. Others felt that a more detailed estimate of the benefits was needed but did not provide any views on how this might be achieved. Our assessment is that given the difficulties in estimating the benefits and the fact that the benefits are highly likely to significantly outweigh the costs, it is not appropriate to expend substantial time and effort attempting more detailed quantification. Hence, what follows is based on the material presented in the SFR.

A5.11 As stated above, it is difficult to quantify the benefits of liberalisation or trading because they will depend on the uses to which the spectrum is put and subsequent technical developments. Based on the Analysys et al report and assuming that the benefits to the UK equate to approximately 1/6th of the benefits to all of Europe and that the ratio of costs and benefits in the UK is similar to that in Europe as a whole, it can be estimated that the benefits across all of the economy including licence holders, consumers, etc, from the introduction of liberalisation and trading in all licence classes might be in the region of £0.9bn per year. This estimate is highly speculative, however, and relates to all spectrum users whereas the proposals in this document are confined to Business Radio. Nonetheless, Business Radio contributes around £1bn-£2bn to GDP, which indicates the size of the potential gains.

A5.12 Some of the benefits will result from the existing policies and some will only be realised with the introduction of the proposed extension of trading and liberalisation. Estimating the split is highly problematic. However, insofar as the proposals facilitate

liberalisation, they can be expected to materially enhance the gains. We would welcome evidence from respondents on the extent to which the proposals would make it more likely that they would embark on a process of introducing new services outside the scope of their present licences.

A5.13 The proposals will also reduce the regulatory burden. The potential costs of making a change of use without the proposals include:

- costs to business of going through the Ofcom process;
- costs incurred by Ofcom in considering each request;
- lost opportunities (or much lower probability) of beneficial change of use or ownership of licences since the two parties would have to negotiate a conditional agreement and then both submit change of use requests to Ofcom.

A5.14 Insofar as the proposals enable more changes of use to occur without reference to Ofcom, there will be a reduction in regulatory burden although it is difficult to quantify this.

A5.15 The new proposals would reduce the regulatory and administrative burden on Ofcom as it would no longer have to manage many complex licence classes with different characteristics. This would reduce its administrative costs, which are currently running at about £400,000 a year for PBR, PAMR and national paging licences.

Costs of the proposals

A5.16 With implementation of the proposals in the document, the only costs imposed on licence holders will be voluntary. Any licence holder can choose not to change use and to continue the use of spectrum unchanged or not to trade. If licence holders wish to change their use or to trade, then there may be costs associated with this. However, it is unlikely that they would elect to incur these costs unless they expected the benefits to be greater. Hence it may plausibly be concluded that introduction of the proposals would lead to an overall net benefit.

A5.17 The introduction of trading might increase costs to licensees in managing their own spectrum and also to interested parties who may have to depend on the market to obtain information on technical characteristics of the licence. However, to a large extent this cost can be minimised by the use of the MASTS tool and electronic notification to Ofcom.

A5.18 Licensees will be required to notify Ofcom before a transfer is made and on completion of the trade. However, Ofcom is proposing minimising the costs by the use of electronic notification and is not currently proposing to charge an administration fee for whole or partial transfers under spectrum trading.

A5.19 Ofcom would have to incur some costs in developing the MASTS algorithm, but these costs are likely to be outweighed by the potential benefits of the algorithm facilitating trading and the more efficient use of spectrum.

Options

A5.20 Ofcom has identified four main options for future trading and liberalisation in the Business Radio sector.

- Option 1: no change from present liberalisation and trading. All change of use requests beyond the scope of existing licences have to be notified to Ofcom to decide whether they should be allowed (current Phase 1 liberalisation) and trading is limited to certain licence classes and types of trade.

- Option 2: extend spectrum trading to the specified licence classes without liberalising further. Ofcom would continue to require all changes of use to be notified to Ofcom to decide whether they should be allowed (current Phase 1 liberalisation).
- Option 3: the trading and liberalisation proposals set out in this document.

- Option 4: maintain the present position as at option 1 and move direct to technology and application neutral Spectrum Usage Rights in due course.

Comparison of the options

A5.21 The potential cost to businesses and consumers of doing nothing (option 1) is substantial. It will forego the additional benefits of the extension of liberalisation and trading discussed above.

A5.22 The potential cost of extending trading without liberalisation (option 2) is less but still potentially significant. The study for the European Commission mentioned above shows that far greater benefits are realised by trading and liberalisation combined than from trading alone. Trading without liberalisation was estimated to realise only about 10% of the benefits of trading and liberalisation combined (option 3). Hence option 2 would sacrifice about 90% of the potential gains of option 3.

A5.23 Option 4, waiting to introduce SURs directly (option 4), would delay the benefits of the liberalisation and trading. Ofcom is currently consulting on the appropriate form of SURs and there will need to be further consultation about their implementation so it could be some time before Ofcom is in a position to introduce SURs. The proposals in this document represent a step towards SURs and will facilitate their introduction in licence classes in which Ofcom decides to proceed with SURs. Moreover, the SUR consultation suggests that SURs might well not be suitable for the Technically Assigned and Light Licensing types. There is therefore no benefit in delaying their introduction pending SUR developments.

Risk Assessment

A5.24 Based on the foregoing analysis, the proposals in this document (option 3) offer significant advantages over the alternatives. However, option 3 is not risk-free.

A5.25 Both trading and liberalisation involve risks that have been analysed and reviewed in depth in the consultations and statements on trading and liberalisation. It was concluded in those documents that, although some of the risks could potentially be significant, Ofcom could take specific actions to manage or mitigate them. The analysis is not repeated in detail here but the main risks with management and mitigation measures are summarised in the following table.

Area of risk	Possible effects	Management and mitigation
• Licences incorrectly specified to avoid harmful interference	• Increased interference to licence holders. • Flexibility not as great as might be achieved. • Neighbouring licence holders transmit within their rights but suffer interference.	• Careful introduction of liberalisation to allow the interference risk to be assessed. Use of modelling. • Licence redesign and use of new computer based planning tools. • Continued Ofcom involvement in investigating and resolving interference.
• Inefficient use of spectrum	• Fragmentation: trading results in incumbents occupying small assignments scattered throughout bands. High transaction costs prevent acquisition of larger blocks.	• Although effective markets should deliver more effective outcomes, Ofcom could negotiate with licensees and, ultimately, take regulatory action to facilitate re-planning.
• Market failures	• Abuse of market power (eg hold-outs) • Transaction costs	• Use competition powers • Consider making tools available to allow easy assessment of the impact of changes
• Disruption to customers	• As use is changed, some services may be withdrawn with subsequent disruption.	• Limited action from Ofcom – this is part of a standard market and would not normally require intervention.

Summary and recommendations

A5.26 In summary, the proposals in this document can be expected to generate significant benefits for consumers and businesses, including equipment manufacturers and communications service providers, and offer significant advantages over the alternatives. There are risks involved but Ofcom believes that these can be managed and effectively mitigated.

A5.27 Because most of our proposals reduce regulation, there is little cost for users. Benefits are difficult to quantify and necessarily speculative but could be of the order of hundreds of millions of £s per year.

Annex 6

Licence Design for the Area Defined and Technically Assigned paradigms

Area Defined Licence

A6.1 Business Radio licence classes that are used for larger geographical areas on an exclusive basis will be replaced with a single, flexible 'Business Radio Area Defined' licence class. The table below identifies the affected licence classes.

LICENCE CATEGORY	NEW LICENCE CATEGORY
• Business Radio (Public Wide Area Paging) • Business Radio (Public Mobile Data, Non voice) • Business Radio (National and Regional) • Business Radio (Tetra Digital PAMR) • Business Radio (CDMA Asset Tracker) • Business Radio (Remote Meter Reading Operator) - Exclusive channels)	Business Radio Area Defined

A6.2 The spectrum rights of the area defined licence will be defined in much more generically, and in a way that is significantly more usage and technology neutral than our present approach. This will be achieved by defining the level of power density permitted at and beyond a defined geographical boundary combined with a spectrum mask that limits the power levels allowed at different frequencies. Ofcom proposes the following as elements of the area defined licence.

- **Equipment Requirement/Spectral boundary:** This will specify the frequencies on which the licensee can operate, the channel spacing, maximum operating power and the emission limits should meet those specified in the revised Interface Requirement (IR 2044).
- **Geographical boundary:** This will specify the area in which the licensee can operate, using the national grid reference system combined with national borders, and the level of field strength density at their adjacent geographical neighbours. The geographical boundary will be specified either by or a combination of national borders and / or 50 km grid squares.
- **Power Spectral density at the geographical boundary:** This will be a predicted power spectral density value of -116 dBm/12.5 kHz, from a single transmitter, into an isotropic antenna at, and beyond the geographical boundary. The coverage prediction will use the ITU–R P.1546 propagation model for 50% locations for 50% of the time for a receiver antenna height of 1.5m above ground level. When using the model it is expected that a 200 m terrain and clutter map will be used. When a geographical boundary is a coast line then the power density limit should be met at the coastline of the adjacent

licences. This only applies to the national boundaries and excludes the coastlines of the Channel Islands and the Isle of Man.

A6.3 The following table provides an example of the area defined licence spectrum usage rights that will be specified in the licence.

Description of parameter	Limits/Values
Frequency (Single /Dual)	Base frequency in MHz Mobile frequency in MHz
Channel width	12.5 kHz
Max ERP	14 dBW
Out of band emission	Meet the limits within the IR 2044
Geographical boundary	UK national boundaries
Power spectral density at the geographical boundary	- 116 dBm / 12.5 KHz.

Technically Assigned Licence

A6.4 Business Radio licence classes that are used for small geographical areas on a shared basis will be replaced with a single, flexible "Business Radio Technically Assigned" licence class. The table below identifies the affected licence classes.

CURRENT LICENCE CATEGORY	NEW LICENCE CATEGORY
• Business Radio (Analogue PAMR) • Business Radio (Remote Meter Reading Operator) - Shared spectrum • Business Radio (Wide Area Speech and Data Systems) • Business Radio (Wide Area One-Way Paging and Speech Systems) • Business Radio (Wide Area Distress Alarms) • Business Radio (Common Base Stations) • Business Radio (Band I and Band III CBS) • Business Radio (IR2008 Data) • Business Radio (On-Site Speech and Data Systems) • Business Radio (On Site Hospital Paging and Emergencies Speech Systems)	Business Radio Technically Assigned

A6.5 Currently emission rights for the licence categories that will be replaced by the new licence paradigm (Technically Assigned) are defined in terms of the right to send signals, with a defined characteristic (both technology and use) from a particular transmitter. Ofcom proposes to continue to define the transmission characteristics in fundamentally the same way (i.e. a transmitter power from a location) with additional information on what this means in terms of their 'Spectrum Quality' which will be supported by the new assignment tool (MASTS).

A6.6 The basic constituents of the licences specification of the transmission right are:

6.6.1 **Transmission characteristics:** This will specify the transmitter location, antenna characteristics, antenna height, maximum power and channel bandwidth for both base and mobile frequencies and the equipment will also be required to comply with the Interface Requirement (IR 2044).

6.6.2 **Assignment Quality:** We propose to support two basic categories of assignment type, Exclusive or Shared. Our frequency assignment process takes into consideration the requirement for either exclusive or shared use across the Designated Service Area (DSA) for each assignment. This will result in the Activity Factor being respected when considering technical reconfiguration of existing, or the introduction of new, assignments. This cumulative effect of interfering Activity Factors will degrade the Quality of Service with the MASTS algorithm ensuring that a predefined maximum interference (blocking) level is not breached. The resultant effect is that the Activity Factors are maintained throughout the DSA for 50% locations, and for 50% of the time. There may be times when neighbouring assignments produce much higher levels of traffic during peak times with an overall effect of degrading another assignment's grade of service further.

- Exclusive assignment: The licensee will have Exclusive use of the channel within the DSA with clearly defined protection criteria for 50 % of locations and 50% of the time determined by the propagation model (ITU – R P.1546). The MASTS algorithm will work in the same way by allocating the assignment with an Activity Factor of 1. Analysis of the degradation of grade of service will be considered to both existing assignments and from the new assignment to ensure its AF of 1 can be maintained.
- Shared assignment: The channel will be shared with other user(s). The amount of traffic loading contributing to a channel from an individual assignment will be known as the "Activity Factor". Information on the level of sharing that a user should expect will be available in the form of a "grade of service" – although sharing categorisation will not be finely differentiated. This information is indicative and we will not offer any guarantee that this level of sharing will be that which is experienced in practice. Going forward we plan to supplement this information with monitoring data on channel activity from Ofcom's Unattended Monitoring Systems (UMS).

6.6.3 Ofcom plans to supplement information on the technical characteristics permitted under a licence with improved information on the quality of spectrum associated with a licence. We refer to this type of information as the Spectrum Quality Benchmark (SQB)**.** For the Business Radio Technically Assigned class the key SQB is:

- Designated Service Area**:** The designated service area is based on a set of defined locations for which the predicted field strength from the serving station has a power spectral density of at least -104 dBm/12.5 kHz into an isotropic antenna. At the geographical boundary, the predicted power spectral density level is at least – 116 dBm/12.5 kHz for the sterilised area. This is based on receiver sensitivity level of -104dBm/12.5 kHz and a Carrier to Interference Protection ratio of 12dB, into an isotropic antenna at a receiver height of 1.5m.

6.6.4 Full details of the process by which the designated service area is determined can be found in the forthcoming publication of the MASTS algorithm and technical frequency assignment criteria (TFAC). Further, the MASTS algorithm will give details of the way in which Ofcom will indicate the amount of sharing that should be expected. Licensees will be able to use the TFAC to reproduce their DSA. Ofcom proposes to make copies available on request until the necessary tools are e-enabled. Once this is in place then the Customer will have the ability to view the predicted coverage area of their assignment on-line.

A6.7 The following table provides example of the Technically Assigned licence parameters.

Description of parameter	**Limits/Values**
Transmission characteristics	
Frequency (Single /Dual Frequency)	Base Tx frequency in MHz Mobile Tx frequency in MHz Timeslots: x,y,z for IR 2008
Channel width	12.5 kHz
ERP	14 dBW
Out of band emission	Meet the limits within the IR 2044
Base station location (NGR)	TQ xxx xxx
Antenna	Type: Omni/Directional Azimuth (from 0N0): xx degrees Height (AMGL): xx m Indoor/Outdoor
Assignment type	Exclusive/Shared

Annex 7

MASTS - Mobile ASsignment Technical System

Objectives

A7.1 **M**obile **AS**signment **T**echnical **S**ystem (MASTS) provides support to the licensing process for the Business Radio sector. Its principal business objectives are to:

- provide a better, faster and more flexible service to customers;
- improve spectrum utilisation;
- support spectrum trading and liberalisation in the Business Radio sector.

A7.2 MASTS aims to improve the current assignment process by using objective criteria based on a Quality of Service (QoS) algorithm which will be published with the TFACs.

Background

A7.3 The tool has been under development for several years with a primary objective to improve the assignment of Business Radio licence classes. The project has evolved to encompass the requirements to provide the facility for automating the assignment process where possible and to then support trading and liberalisation by providing a better definition of transmission characteristics and consistency in approach.

A7.4 The MASTS algorithm has been subject to:

- presentation and review at IEE at the 'Getting the Most out of the Radio Spectrum' conference in October 2002;
- involvement and continued updates were presented throughout to an RA/Ofcom technical group – which was represented by key Stakeholders from Industry;
- technical review of the algorithm and its suitability of the use of assignment of Business Radio services.

A7.5 Ofcom has commenced implementation of a system for updating the licensing of Business Radio through the use of the MASTS algorithm. In March 2003 the RA contracted an Independent Review using a Consultancy specialising in radio communications modelling to undertake a review of the MASTS algorithm. The objectives of this review were to:

- understand the requirements for a MASTS technical tool;
- review the method proposed in MASTS to ensure suitability and completeness;
- develop the algorithm further to cover PAMR, CBS and Maritime systems;
- investigate which modes of spectrum trading (including Liberalisation) would require the use of MASTS;

A7.6 The requirements were confirmed by the Users and then compared with the intended development and implementation. From this a prototype was developed for an implementation with which to exercise the algorithm and check for suitability and completeness. From this it was concluded that the MASTS algorithm works well and with little exception meets the users' needs.

A7.7 MASTS was then applied to the technologies of other sectors (including PAMR, CBS and Maritime) and some minor modifications were made to take into account the nature of licensing of PMR to cope with these characteristics.

A7.8 From the results of several scenarios that were carried out it was clearly shown that there could be significant spectrum efficiency benefits using MASTS (subject to current spectrum occupancy and ongoing demand).

A7.9 Finally the study investigated the application of MASTS to spectrum trading (including liberalisation) and found that the algorithm contributes significant value and can be viewed as essential to freeing trade and removing uncertainty for many licence classes.

A7.10 A further piece of work then followed to identify suitable Activity Factors for the existing assignments that are currently licensed. This work involved Customer/Dealer Surveys, use of Ofcom's Unattended Monitoring Systems to investigate current spectrum occupancy and traffic levels, and relating this to the assignments held on the Ofcom Licensing Database.

Benefits

A7.11 MASTS introduces many new concepts realising several benefits based on the algorithm and new processes. These include:

- customer requirements: Capturing the area for which the Customer wished to operate their radio system (now known as the Customer Requested Service Area);
- better predictions/accuracy improvement: Assignment algorithm which takes into account radio propagation (through use of a recognised propagation model, terrain and clutter data) and the quality of service algorithm to model the use of shared channels in the same geographical locations;
- efficiency gains: Spectrum efficiency gains have been identified when the independent reviews of the algorithm were initially carried out;
- indicators: Clear and objective definition of an assignment and an indication of the typical quality associated with it including details of the level of acceptable interference and sharing that should be expected;
- flexibility: There will no longer be the need to delineate spectrum on the basis of service type (as assignments will be specified in terms of Designated Service Areas and a level of acceptable sharing);
- surety and fairness: Managing and planning spectrum to maintain spectrum quality and avoid excessive interference;
- consistency: A consistent and transparent frequency assignment model that is applied across the licence class.

Future Plans

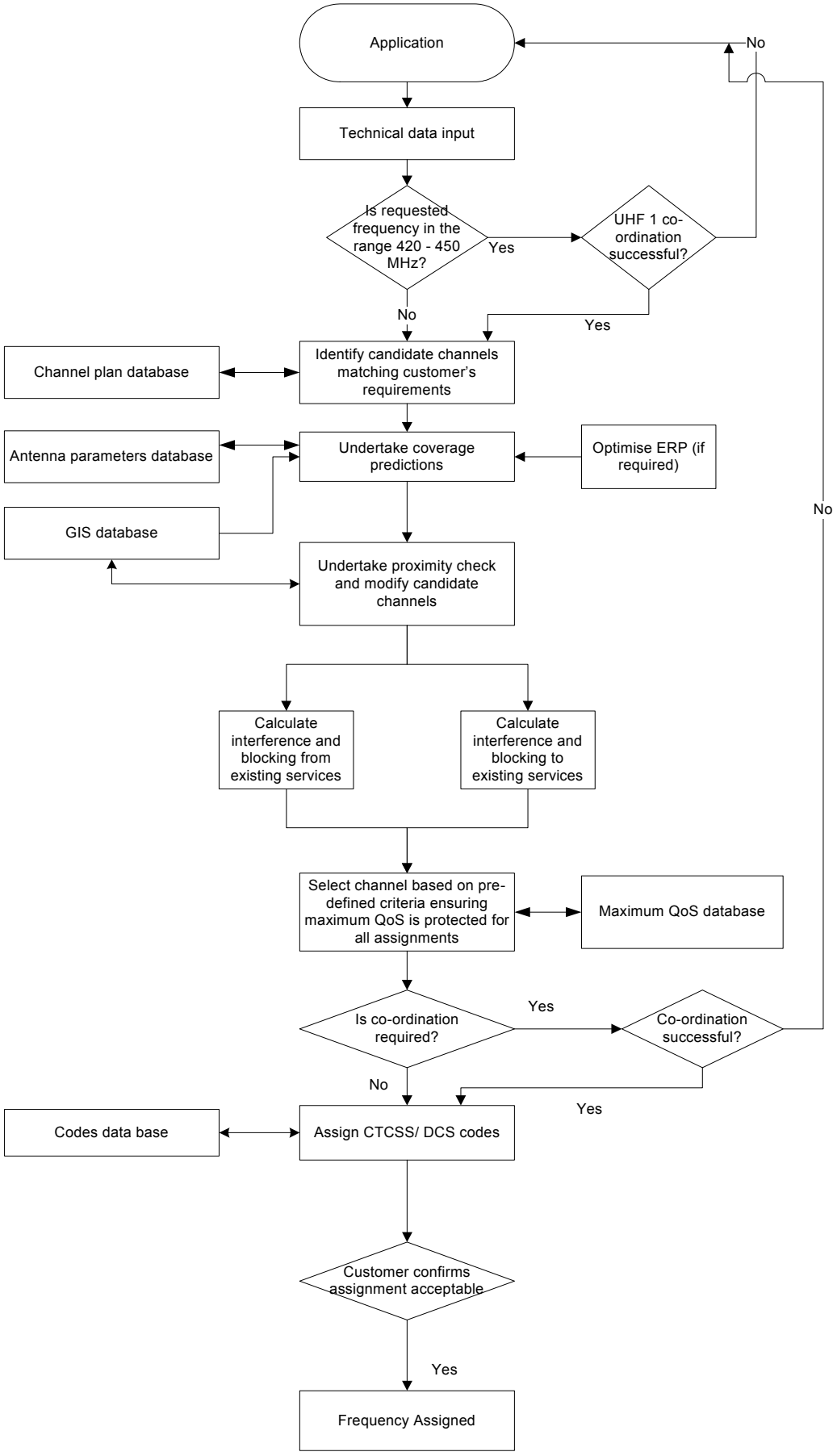
A7.12 MASTS is intended to provide the necessary tools in order to facilitate a semi-/fully automated assignment process for the majority of cases. This will enable an end-to-end licensing process which will offer many advantages to the Customer regarding self-assignment and the resultant time efficiency gains in acquiring a licence.

A7.13 The MASTS process will be continually reviewed in order to identify enhancements and improvements that can be made resulting in further flexibility for the Customer.

Summary of the overall MASTS process

A7.14 Figure A7 – 1 provides an overview of the Technically Assigned licence assignment process using MASTS.

Figure A7 – 1: An over view of the Technically Assigned licence assignment process



7.14.2 The application is received at Ofcom through the paper forms or via E-Licensing (when available).

7.14.3 After the administrative details have been entered the technical details will follow. This will include the main characteristics of the transmitting station such as Location, ERP, Antenna Characteristics, Shared/Exclusive, etc. Also the Customer Requested Service Area (CRSA) will be described – this is the area over which radio operation is desired.

7.14.4 UHF-1 co-ordination checks will be carried out next (if use of the UHF-1 band is desired).

7.14.5 The available channels will then be identified from the channel plan that matches the type of application.

7.14.6 A coverage prediction will then be carried out based on the technical transmitter characteristics and using the ITU-R P.1546 propagation model based on 50% locations and for 50% of the time (at a receiver height of 1.5m) using a 200m terrain and clutter map. The Designated Service Area can then be derived from the union of the CRSA and the coverage area.

7.14.7 Various other checks including a proximity check (to ensure that, where possible, no more than one single assignment can be located within 500m on the co- and adjacent channels) and zone clearance (to check that the assignment is not in a restricted area).

7.14.8 The next step is to use the MASTS Quality of Service Algorithm. This will identify all the existing assignments that have an effect on or are affected by the proposed assignment. It will also check that the proposed assignment in that specific location will be able to maintain the required Activity Factor across its Designated Service Area. MASTS will assess all the various scenarios and check that any degradation of service is not detrimental in such a way that the Activity Factors cannot be maintained.

7.14.9 This will result in a modified set of available channels that can be utilised for the proposed assignment.

7.14.10 The next step is to identify if International Co-ordination is required. This will be based on either a set of business rules or applying the appropriate MoU for the Frequency Band for the application.

7.14.11 Depending on the outcome of the Co-ordination checks there may be a requirement to formally undertake the International Co-ordination process. It will always be possible to revise the application requirements if and where possible to identify an alternative band or to negate the requirement for Co-ordination through some form of reconfiguration of technical characteristics.

7.14.12 Finally the resultant channel will be identified and offered to the Applicant along with a set of signalling tones.

Annex 8

Business Radio Fee Categorisations

A8.1 The following tables provide Ofcom's bands, coverage, geographical areas (population), and sharing categorisations used to determine the assignment licence fee.

A8.2 Bands categorisation

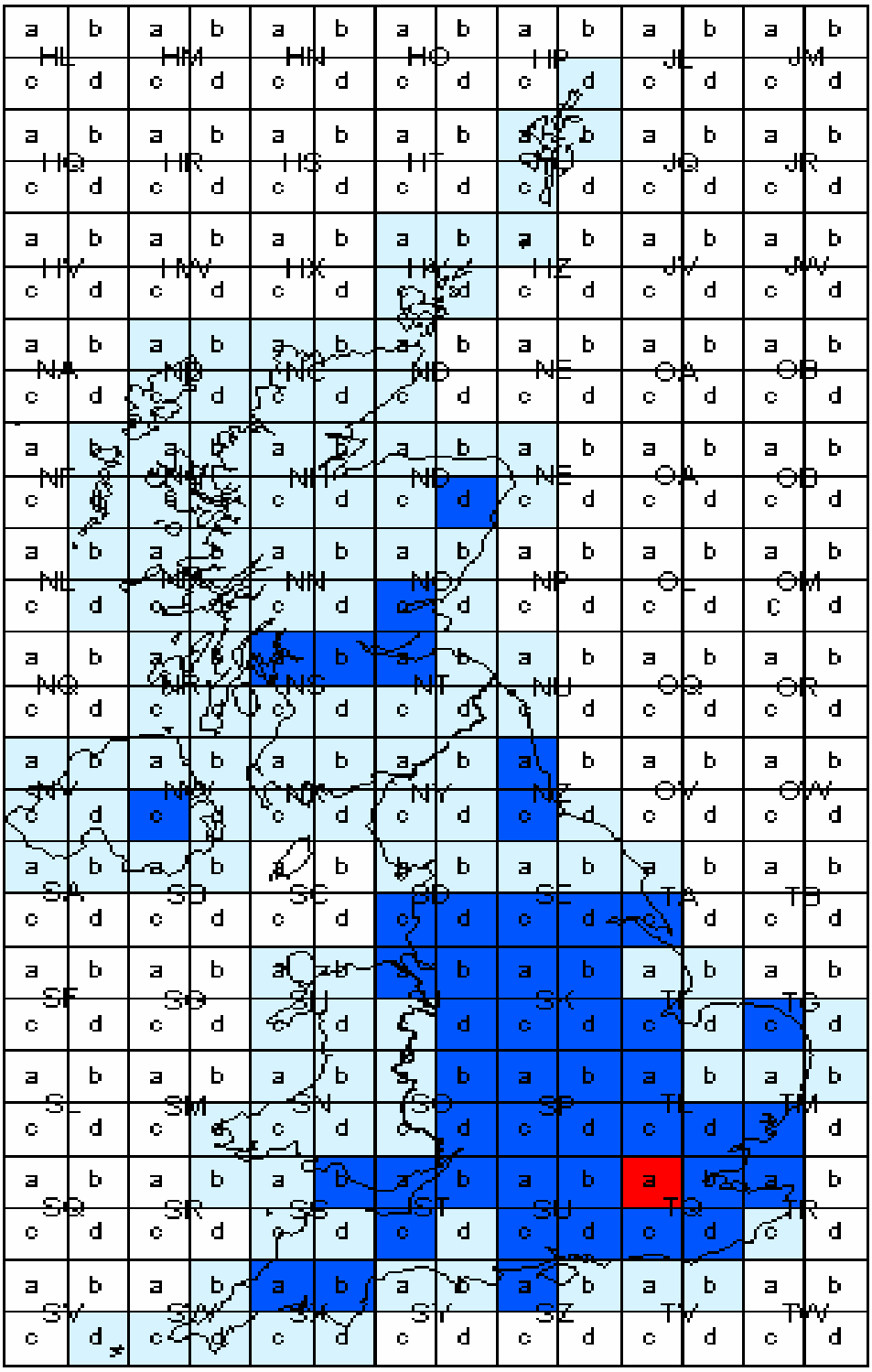
Band categorisations	Bands	Frequency range (MHz)
Most Popular Bands (MPB)	High Band	165.04375 – 173.09375
	UHF 1	425.00625 – 449.49375
	UHF 2	453.00625 – 466.0875
Less Popular Bands (LPB)	Paging	26.225 – 49.49375
	Band 1	55.75 – 68.0
	Low Band	68.08125 – 87.49375
	Mid Band	137.9625 – 165.04375
	Band III	177.20625 – 207.49375

A8.3 Coverage area categorisation

Coverage categorisations	Radius in km	Combinations of Power (P) in Watts, and Antenna height (A_h) in meters
Category 1	6	$P \leq 5$ W and $A_h \leq 10$m
Category 2	30	$P \leq 5$ W and 10m < $A_h \leq 30$m
		P> 5W and $A_h \leq 10$m
Category 3	60	P> 5W and $A_h > 10$m
		$P \leq 5$ W and $A_h > 30$m

A8.4 Population categorisation

8.4.1 UK map showing the trading units* and division of population between these units (see table 8.4.2)



*based on Ordnance Survey National Grid system

8.4.2 Table showing the trading units population categorisation

Designation of area	**Trading Units – 50km^2 areas**									
High population (Red colour on the map)	TQ-a									
Medium population (Blue colour on the map)	NJ-d	NO-c	NS-a	NS-b	NT-a	NW-c	NZ-a	NZ-c	SD-c	SD-d
	SE-c	SE-d	SJ-a	SJ-b	SJ-d	SK-a	SK-b	SK-c	SK-d	SO-b
	SO-d	SP-a	SP-b	SP-c	SP-d	SS-b	ST-a	ST-b	ST-c	SU-a
	SU-b	SU-c	SU-d	SX-a	SX-b	SZ-a	TA-c	TF-c	TG-c	TL-b
	TL-c	TL-d	TM-c	TQ-b	TQ-c	TQ-d	TR-a			
Low population (Light blue colour on the map)	HP-d	HU-a	HU-b	HU-c	HY-a	HY-b	HY-c	HY-d	HZ-a	NB-a
	NB-b	NB-c	NB-d	NC-a	NC-b	NC-c	NC-d	ND-a	ND-c	NF-b
	NF-d	NG-a	NG-b	NG-c	NG-d	NH-a	NH-b	NH-c	NH-d	NJ-a
	NJ-b	NJ-c	NK-a	NK-c	NL-b	NL-d	NM-a	NM-b	NM-c	NM-d
	NN-a	NN-b	NN-c	NN-d	NO-a	NO-b	NO-d	NR-a	NR-b	NR-c
	NR-d	NS-c	NS-d	NT-b	NT-c	NT-d	NU-a	NU-c	NV-a	NV-b
	NV-c	NV-d	NW-a	NW-b	NW-d	NX-a	NX-b	NX-c	NX-d	NY-a
	NY-b	NY-c	NY-d	NZ-d	SA-a	SA-b	SB-a	SB-b	SD-a	SD-b
	SE-a	SE-b	SH-a	SH-b	SH-c	SH-d	SJ-c	SM-d	SN-a	SN-b
	SN-c	SN-d	SO-a	SO-c	SR-b	SS-a	SS-c	SS-d	ST-d	SV-d
	SW-b	SW-c	SW-d	SX-c	SX-d	SY-a	SY-b	SZ-b	TA-a	TF-a
	TF-b	TF-d	TG-d	TL-a	TM-a	TM-b	TR-c	TV-a	TV-b	

A8.5 Shared and exclusive assignment categorisation for the current products that will be rationalised to the Business Radio Technically Assigned licence class.

Current Products	**Exclusive or shared assignment category**
• Business Radio (Analogue PAMR)	Exclusive
• Business Radio (Common Base Stations)	
• Business Radio (Band 1 and Band III CBS)	
• Business Radio (IR2008 Data)	

• Business Radio (Wide Area One-Way Paging and Speech Systems)	Shared
• Business Radio (Remote Meter Reading Operator) - Shared channels	
• Business Radio (Wide Area Distress Alarms)	
• Business Radio (On Site Hospital Paging and Emergency Speech Systems)	
• Business Radio (Wide Area Speech and Data Systems)	Shared*
• Business Radio (On-Site Speech and Data Systems)	

* A detailed analysis has been carried out in order to map the current levels of protection (where possible) to the new assignment process to maintain the current levels of exclusivity.
The majority of assignments within these two classes will be considered as shared, except:

1) licensees which have users with safety critical activities - in which case Ofcom will contact them to discuss their future spectrum and exclusivity requirements with the option to move to shared use;

2) Those assignments with special technical requirements that have an overall impact on how the radio system is used (these include heavy data usage, trunked radio systems, remote control points (using reverse frequency working), talkthrough and TETRA systems.

Annex 9

Glossary

AIP
Administrative Incentive Pricing or spectrum pricing: fees charged for access to spectrum to reflect its value. AIP applies in bands for which significant demand exists for that spectrum either in its current use, or for an alternative radio service, and acts as an incentive to users to use their spectrum as efficiently as possible. AIP is currently set at a level which reflects the value of the spectrum to the user using a methodology reviewed by NERA and Smith System in July 1998, available at: http://www.radio.gov.uk/topics/spectrumprice/documents/spec_rev/review.htm.

A further study to review spectrum pricing, undertaken by Indepen, Aegis, and Warwick Business School, was published in February 2004. It can be found at: http://www.ofcom.org.uk/research/radiocomms/reports/independent_review/spectrum_pricing.pdf

Allocation
a) The process of identifying specific frequency ranges for specific applications; or b) a frequency band entered in a table of frequency allocations, for use by a particular category of services

Antenna
A passive device designed to radiate and receive electromagnetic energy.

Apparatus
Any equipment designed to radiate and receive electromagnetic energy.

Assignment
Authorisation given by a licensing authority for a radio station to use a specific radio frequency or channel under specified conditions.

Authorisation Directive
Directive 2000/20/EC of the European Parliament and of the Council of 7 March 2002 on the authorisation of electronic communications networks and services

Band
A defined range of frequencies that may be allocated for a particular radio service, or shared between radio services.

Base station
A radio transmitter and receiver installed by an operator, usually at a specific location, to provide a communications service, typically used in mobile telecommunications.

CDMA
Code Division Multiple Access.

CEPT
Conference of European Postal and Telecommunications administrations, comprising over 40 European administrations.

Common Base Stations
A single channel base station for BR shared by users (also known as a community repeater); or a PBR installation giving wide area coverage under the control of one or more operators offering mobile communications on a commercial basis to a number of independent (usually business) users.

Communications Act
Communications Act 2003, which confers powers, duties and functions on Ofcom and came into force in December 2003.

Coordination Agreements
Arrangements between the UK and neighbouring countries designed to avoid harmful interference between users in different countries. Also, arrangements within the UK to limit interference between domestic spectrum users.

CRSA
Customer Requested Service Area: The

geographical area over which radio operation is desired.

CTCSS
Continuous Tone Coded Squelch System: A type of sub-audible tone that is transmitted with a voice signal.

Data Networks
A network established and operated for the specific purpose of providing data transmission services for the public.

DCS
Digitally Coded Squelch: This defines a system in which the radio equipment is fitted with devices which at the transmitter generate a specified digital coded signal during transmission and the receiver respond to a specific digital coded signal.

DSA
Designated Service Area:
This is the geographical area resultant from applying the CRSA and the associated technical characteristics required (from the transmitter) to the MASTS algorithm. It is formed by the union of the CRSA and the predicted coverage area, and is the area over which the activity factor is to be maintained.

dBm
dBm is a measure of absolute power values. Zero dBm equals one milliwatt.

eirp
Equivalent Isotropically Radiated Power. The product of power supplied to an antenna and the antenna gain in a given direction relative to an isotropic antenna, ie one that radiates equally in all directions.

EMC
Electro-Magnetic Compatibility: the ability of equipment or systems to be used within designated environments without causing or receiving electromagnetic interference.

Emissions
Electromagnetic energy propagated from a source, which may occur anywhere in the spectrum.

ERP
Effective Radiated Power.

ETSI
European Telecommunications Standards Institute.

Framework Directive
Directive 2002/21/EC of the European Parliament and of the Council of 7 March 2002 on a common regulatory framework for electronic communications networks and services

Frequency Boundaries
The extremities of the radio frequency range of an assignment, specified either in terms of a central frequency with channel width, or a frequency range.

Frequency Re-use
Re-using the same frequencies at different spatial locations, in such a manner that they do not cause undue interference.

GHz
Gigahertz, a frequency of one thousand million Hertz (cycles per second).

Harmonisation
Allocation of frequencies on an international basis, eg within Europe or globally, for particular radio services. Such frequency ranges are known as harmonised bands, or harmonised spectrum.

IR: Interface requirements
In accordance with Articles 4.1 and 7.2 of the R&TTE Directive, UK Radio Interface Requirements (RIRs or IRs) set out the relevant high-level assignment, frequency occupation rules and planning assumptions for licensed equipment. They are referenced in Exemption Regulations and licences.

Interference
The effect of unwanted signals upon the reception of the wanted signal in a radio system, resulting in degradation of performance, misinterpretation or loss of information compared with that which would have been received in the absence of the unwanted signal.

ITU
International Telecommunication Union. The United Nations agency that co-ordinates and manages radio use worldwide through the international Radio Regulations that it promulgates. These have the status of an international treaty and are binding on member states.

kHz
KeloHertz, a frequency of one thousand Hertz (cycles per second).

Land Mobile
A mobile service between base stations and land mobile stations, or between land mobile stations.

Liberalisation
Removal of restriction on use of spectrum (eg technology employed or service provided) including change of geographical coverage, power or frequency bandwidth occupied.

Licence class
Type of licence, for example PAMR or Wide area. Volume classes refer to those licence classes for which there are significant numbers of licensees, for example On Site BR with 26,000 licensees.

Licence exempt
Under regulations made previously by the Secretary of State and now by Ofcom, some types of radio equipment are exempted from the requirement for a licence. The current regulations, the Wireless Telegraphy (Exemption) Regulations 2003 (SI 2003 No. 74), are available at: http://www.legislation.hmso.gov.uk/si/si2003/20030074.htm

MASTS
Mobile Assignment Technical System, an electronic assignment system currently under development for Ofcom and planned to enter service in 2007.

MHz
MegaHertz, a frequency of one million Hertz (cycles per second).

Ofcom
Office of Communications, responsible for spectrum management in the UK and international representation since 29 December 2003.

PAMR
Public Access Mobile Radio

PBR
Private Business Radio (previously known as Private Mobile Radio (PMR). A private radio service installed and operated by businesses and public sector organisations to provide mobile communications for their own workforces. A base station is installed by each organisation on a suitable site providing local coverage, and used to send or receive short messages concerning the business of the organisation to, from or between mobile units.

PMR
Private Mobile Radio (PMR), see PBR.

Propagation
Transmission of radio waves. Propagation characteristics depend on frequency and are affected by the environmental conditions, such as terrain and atmospheric conditions.

PSD
Power Spectral Density. A measure of the intensity of a radio signal, averaged over a specified frequency range.

Radiocommunication Agency (RA)
An executive agency of the Department of Trade Industry responsible of the management of most non-military spectrum in the UK and for representing the UK internationally. RA ceased to exist when its functions transferred to Ofcom on 29 December 2003.

Reconfiguration
The redefinition of a right to use spectrum, for example, by separating one licence into two or amalgamating two licences which are adjacent in terms of geography or frequency.

Remote meter reading
The reading of meters from a distance using radio.

Roll-out requirements
Specific requirements relating to build or operation of radio networks.

Safety of life services
Services provided by organisations who use radio spectrum to protect the lives of individuals, such as the emergency services.

Site Clearance
Permission to install or operate a radio transmitter at a particular site.

SFR
Ofcom's Spectrum Framework Review, published 23 November 2004, that sets out Ofcom's vision for spectrum management.

SFR: IP
The Spectrum Framework Review: Implementation Plan that sets out Ofcom's plans for releasing spectrum in 2005-08 and extending liberalisation and trading to mobile services.

Spectrum
A continuous range of frequencies of electromagnetic radiation (eg radio waves).

Spectrum Licensing Portal
This System provides a range of information about spectrum licences and authorisations that is useful to spectrum users and in particular those interested in Spectrum Trading and Ofcom's other initiatives for liberalising the use of the radio spectrum, available at: http://www.ofcom.org.uk/radiocomms/isu/ukpfa/intro

Spectrum mask
The spectrum space within which a device transmits.

SQB
Spectrum Quality Benchmark – used to define the standard of spectrum quality that licensees can expect to experience. Based on TFAC.

SUR
Spectrum Usage Rights

Telemetry
Transmission of data by radio for remotely indicating or recording measurements.

TFAC
Technical Frequency Assignment Criteria used by Ofcom in planning and granting assignments.

Trading Regulations
Regulations made under section 168 of the Communications Act to introduce and regulate spectrum trading.

Trunked radio
A system in which users share or pool a number of radio channels. Frequencies are distributed by the system according to demand and traffic levels. Trunking can enhance spectrum efficiency in some circumstances.

Undue interference
Interference that is harmful, defined by section 183 Communications Act 2003 to include interference that creates dangers or risks to the functioning of any radiocommunications service used for navigation or safety, or that degrades, obstructs or repeatedly interrupts broadcasting or other radiocommunications.

VHF
Very High Frequency; the portion of the electromagnetic spectrum between 30 and 300 MHz.

WT Acts
Wireless Telegraphy Acts 1949, 1967 and 1998 as amended by the Communications Act. They regulate use of UK radio spectrum.

WT Act licences
Licences issued under the Wireless Telegraphy Act 1949 (as amended).

WT Register
Part of the licensing system prtal system which provide basic information about individual licences such as contact names and address details, class of licence, band(s) of frequencies and where relevant geographic area of operation. At present information is limited to the classes that became tradable in December 2004, available at: http://www.ofcom.org.uk/radiocomms/isu/ukpfa/intro