OFFICE OF COMMUNICATIONS

Modifications to Spectrum Pricing

A consultation on proposals for setting wireless telegraphy act licence fees

Consultation

Publication date: 6 July 2006

Closing Date for Responses: 15 September 2006

Contents

Section 1

Summary

Summary of Proposals

1.1 This consultation concerns a set of proposals to add or modify some licence charges under the Wireless Telegraphy Act (the "WT Act"). These proposals further implement Ofcom's general approach to Wireless Telegraphy Act charges as set out in Ofcom's Spectrum Pricing consultation in September 2004[1] and subsequent statement published in February 2005[2]. Current proposals relate both to Administered Incentive Pricing (AIP) and charging to ensure spectrum management costs are covered for each type of services.

1.2 The purpose of this consultation is largely two fold:

- it further implements Ofcom's general approach to spectrum pricing as set out in the September 2004 consultation; and
- it makes proposals for updating the level of fees applied to different licence classes;

1.3 This consultation largely concentrates on the following licence classes:

- Business Radio licences (linked to a separate consultation concerning trading and liberalisation);
- Satellite Earth Station licences;
- Programme Making and Special Event licences;
- Community Radio spectrum licences;
- Channel Islands and Isle of Man Public Network licences;
- Some minor changes to the way fees are collected for fixed link licences, an additional fee for uncoordinated links opened in new bands, and an adjustment to the calculation for fixed links in the Channel Isles and Isle of Man;
- Some other minor changes (to science and technology and to coastal station licences).

This consultation looks in detail at the proposed changes to the licence charges applied to these classes.

1.4 There will be a separate consultation in relation to the fees for WT Act licences for broadcast use of spectrum.

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[1] *Spectrum Pricing*, consultation, Ofcom, September 2004
http://www.ofcom.org.uk/consult/condocs/spec_pricing/

[2] *Spectrum pricing A statement on proposals for setting Wireless Telegraphy Act licence fees, statement,* Ofcom 23 February 2006
http://www.ofcom.org.uk/consult/condocs/spec_pricing/statement/statement.pdf

Continued use of Administered Incentive Pricing

1.5 Ofcom's current operation of spectrum pricing is based on its legal powers in the Wireless Telegraphy Act 1998 and the Communications Act 2003. Section 2 of this document details the rationale and economic arguments for Ofcom's continued use of AIP. It also outlines the independent reviews of AIP commissioned by the Radiocommunications Agency and subsequently by Ofcom, since 1996.

1.6 Ofcom is not proposing any major changes to the licence charges applied to the majority of licence classes. However, significant changes are proposed to certain licence classes. The proposed changes to these licence classes are outlined in the table below.

1.7 Views on these proposals are requested by 15 September 2006.

Licence Sector	Summary of changes proposed	Comments
Business Radio (BR)	New pricing structures to reflect proposed new simplified licence class structure (see "Business Radio Trading and liberalisation" consultation document on Ofcom website). New classes proposed are: • Business Radio (Area Defined) licence class to cover all national or regional uses. • Business Radio (Technically Assigned) licence class to cover local uses ranging from on-site to wide area uses from an assigned base. • Business Radio (Light) licence class to cover all unco-ordinated uses.	New licence classes and fees structure proposed: • Reduces 21 licence types and over 50 types of user classification to 3 licence classes. • A new single structure for 6 types of national and regional area licences. • A new single structure for 10 types of assigned licences. • A single low cost fee proposed for a new type of uncoordinated 5- year licence class. The new structures for pricing the assigned and area licences will be derived from the current AIP value applied to BR licences - reflecting the opportunity cost of these bands. The new simpler pricing structures will result in a significant proportion of existing licensees paying less and some paying more. These changes reflect the removal of a number of historical disparities and anomalies in fee levels.
Satellite Earth Stations	Pricing mechanisms updated resulting in higher fees. Introduction of new fee for new licence class - Earth Stations on Trains.	Update to ensure current fees reflect opportunity costs of spectrum used. Proposals for new AIP fees based on values derived from fixed links largely using same frequency bands.
Programme Making and Special Events	Increase of fees for certain licences to bring fees more in line with costs (20% overall increase).	Change intended to help recover the costs of managing PMSE spectrum.

Public Wireless and Fixed Wireless networks in Channel Isles and Isle of Man	Extended to cover new network licences for the Channel Islands and Isle of Man.	Charged on same basis as other existing network licences (in the Islands and pro rata to the UK).
Fixed Links	Minor adjustment to the billing arrangement to reflect the surrender of links, New bands for un-coordinated links added, A minor change for the Channel Isles and Isle of Man.	Surrender of links (which allows reutilisation of spectrum) is rewarded if pre notified – as opposed to charging until next renewal period. New bands added at same rate as existing un-coordinated bands, Proposal to remove link length factor in calculating fees in the islands to simplify.
Radio Broadcasting	Introduction of new simplified fee for Community Radio licence class.	To provide greater simplicity and avoid community radio services in urban areas (especially those broadcasting on the AM (medium wave) band) being charged disproportionately more for their WT Act licences than services in non-urban areas.
Science and Technology	New fee for ground probing radar and for some scientific uses.	New low fee rates added
Maritime	Reduction of the Coastal Station Radio fee for training schools (uses Ship radio on land).	To bring into line with new Ship radio fee being simplified.

Section 2

Background

Rationale for WT Act licence charges

2.1 Radio spectrum is a vital resource for electronic communication services and networks and a major asset to the UK economy. One of Ofcom's primary statutory duties is to ensure the optimal use of the radio spectrum in the interests of citizens and consumers. It is essential that the regulatory regime for spectrum is able to respond to changes in the demand for and use of spectrum in the UK. This duty is set out in the Spectrum Framework Review (SFR)[3], which was published in November 2004. The SFR's 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.

2.2 Ofcom's vision for spectrum management, as set out in the Spectrum Framework Review, is for market forces to play an increasingly important role in determining how spectrum is used. Ofcom believes that this will encourage efficiency in spectrum use, by increasing the likelihood that spectrum will be held by those who can make best use of it, and by creating more freedom for spectrum to be used for more valuable applications.

2.3 The Wireless Telegraphy Act 1998 was a landmark in spectrum management. It facilitated the use of market mechanisms in spectrum management, such as auctions, for the first time in the UK. Ofcom now uses auctions as the preferred method of awarding blocks of spectrum. However much spectrum has been assigned in the past on other bases of award (such as first-come, first-served) and is still in use. To encourage licensees of non-auctioned spectrum to use spectrum more efficiently, the WT Act 1998 also enabled prices for annual licences fees to be set above administrative cost to reflect a range of spectrum management objectives (efficient management and use, economic, innovation and competition) having regard in particular to the expected future demand for spectrum. This system has been termed Administered Incentive Pricing (AIP).

Administered Incentive Pricing

2.4 In 1996, the RA commissioned a study by NERA and Smith Systems Engineering Limited looking into the use of spectrum pricing[4]. The NERA Smith approach recommended setting prices according to the opportunity cost of spectrum. The opportunity cost of spectrum represents the benefits that would be derived from the next best alternative use and can be calculated on the basis of the least cost

[3] http://www.ofcom.org.uk/consult/condocs/sfr/sfr2/#content

[4] *Study into the use of Spectrum Pricing*, Study for the Radiocommunications Agency, NERA and Smith System Engineering Limited, April 1996 http://www.ofcom.org.uk/research/radiocomms/reports/independent_review/spectrum_pricing.pdf

alternative use of spectrum that would enable the same output to be produced. Given the uncertainties that surround the calculation of AIP, these prices were set conservatively at first.

2.5 In 2002, the Cave Review[5] was commissioned by the Government as an independent review of spectrum management. It recommended greater use of auctions and AIP, and specifically that AIP should be applied at more realistic levels across different spectrum bands. The report strongly suggested that prices should be set at full opportunity cost where spectrum shortages occur in a particular band. In its response to the Cave Review, the Government recommended that the existing model and methodology for setting fees should be reviewed.

2.6 Subsequently, in 2003 Indepen[6] was commissioned to update the original analysis and rationale for pricing by NERA Smith and to assess how the methodology could be applied more widely to other areas of spectrum use. The report widened the scope of the marginal value to include the value of alternative uses of a spectrum band in addition to the existing use. This broader methodology for determining AIP resulted in changes to licence fees for a number of licence classes which have resulted in the new fees introduced in 2005, and in further changes now being proposed in this consultation.

2.7 The economic approach to using AIP is set out in more detail in Annex 6.

Legal background

2.8 Ofcom legal powers to prescribe regulations come from Section 2 of the Wireless Telegraphy Act 1998 ("the 1998 Act") as amended by the Communications Act 2003 ("the 2003 Act"). Under section 2(2) of the 1998 Act, Ofcom may, if it thinks fit in the light of duties under section 154 of the 2003 Act, prescribe fees which would be greater than those necessary for the purposes of recovering costs incurred by Ofcom in connection with its functions under the enactments relating to the management of the radio spectrum. In particular, pursuant to section 154, it is Ofcom's duty in relation to the management of radio spectrum to have regard to:

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

[5] *Review of Radio Spectrum Management*, Study for Department of Trade and Industry and Her Majesty's Treasury, Martin Cave, March 2002
http://www.ofcom.org.uk/static/archive/ra/spectrum-review/2002review/1_whole_job.pdf
[6] 2004 report on an economic study to review spectrum pricing by Indepen, Aegis Systems and Warwick Business School.
http://www.ofcom.org.uk/research/radiocomms/reports/independent_review/spectrum_pricing.pdf

2.9 In particular, Ofcom is empowered under the 1998 Act to prescribe by regulations fees payable for wireless telegraphy licences on their issue, or subsequently at such times during the terms of the licences as may be prescribed therein. Those powers also enable Ofcom to prescribe in regulations that licensees shall pay to Ofcom such fees (whether on the issue of the licence or subsequently) as Ofcom may in the particular case determine. The existing regulations therefore contain provisions both as to the specific fees for certain wireless telegraphy classes and as to other licence charges that may be decided in the particular case.

2.10 It is proposed to make amending regulations to enact the changes set out in this consultation. In accordance with 1998 Act, Ofcom will publish and further consult on these amendment regulations before they are made and brought into effect.

Section 3

Business Radio

Introduction

3.1 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). 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.

3.2 In conjunction with this document, Ofcom has published a set of proposals aimed at changing the way spectrum in this sector is managed and which introduce significant liberalisation and simplify and rationalise our licensing arrangements. The proposals are set out in the "Business Radio Trading & Liberalisation" consultation document which is available on the Ofcom website[7].

3.3 The proposed changes involve a restructuring of existing licensing arrangements in order to replace the existing range of licence classes with fewer and much more flexible licence classes. In order to support this approach it is also necessary for Ofcom to develop a fees approach which supports the new structure and is consistent with our liberalisation and simplification policies. As set out in its statement on Spectrum Pricing of 13 February 2005, Ofcom does not intend to change the valuation by reference to which most Business Radio services annual fees are calculated (£9,900 per a 2 x 12.5 kHz channel). It does, however, intend to take this opportunity to change its approach to fee setting.

3.4 This section sets out our fee proposals for Business Radio to support the proposed new licensing structure. In order to enable readers to identify which of the new licence types reader's existing licence class will be replaced by, and consequently which fee we propose to charge, we have provided an overview of the reform measures below. If you require more information on these changes, they are set out in detail in the consultation document at http://www.ofcom.org.uk/consult/condocs/brtrading/.

Proposals for Liberalisation and Simplification of Business Radio

3.5 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.

3.6 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;

[7] http://www.ofcom.org.uk/consult/condocs/brtrading/

- administered incentive pricing of spectrum – setting wireless telegraphy licence fees to encourage the optimal use of spectrum.

3.7 In its Business Radio Trading and Liberalisation consultation document,(published in conjunction with this document), Ofcom sets out measures to continue with a progressive extension of its liberalisation approach by applying it to the Business Radio sector. Specifically, the proposals set out 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 the simpler and more flexible Business Radio environment.

3.8 Ofcom expects that further introduction of spectrum liberalisation in conjunction with trading will encourage more entrepreneurs and innovators to enter the market, deploy new technologies and applications, and make it easier for spectrum to migrate from relatively low value uses to higher value ones.

3.9 Ofcom proposes to implement the changes by replacing the current 21 different licence classes in the sector with fewer, more flexible licence classes. Exhibit 3.1 shows which of the existing licence classes would be replaced by which of the new licence classes. If Ofcom decides to go ahead with the proposed measures, existing licensees will automatically be issued with a new licence in the appropriate new licence class.

Exhibit 3.1 sets out in a little more detail Ofcom's proposals for the Business Radio sector

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.

Current Fee Approach and Need For Change

3.10 Administered Incentive Pricing has been applied to the Business Radio sector since 1998. The approach is designed to encourage the most efficient use of the available spectrum. In Ofcom's current implementation of the approach a number of slightly different ways of setting fees are applied to the 21 licence classes[8] in the sector. The approaches do, however, share the same basic valuation of Business Radio spectrum (£9,900 per a 2 x 12.5 kHz channel) and take into account similar factors, such as geographical area of coverage, frequency band, channel width and congestion.

3.11 However, there have been significant historical differences in the way that fees have been been applied in practice to the many existing types of business radio licence. For example, some classes categorise a particular area as congested and apply a higher fee, while other classes do not. Some classes, such as the Common Base

[8] The Wireless Telegraphy (Licence Charges) Regulations 2005, SI 2005/1378

Station class, have special fee arrangements for new licences [9], and other classes do not. In most part these differences were designed to encourage specific types of use or behaviours (such as the use of data). Across the 21 licence classes in the sector, there are a range of differences and complexities in the way in which individual licence fees are calculated. We believe that these differences are no longer consistent with our proposed approach to spectrum management in the sector.

3.12 As part of Ofcom's move towards a more liberalised spectrum management regime, Ofcom introduced spectrum trading and a number of liberalisation measures to certain Business Radio licence classes in late 2004/early 2005. The removal of restrictions that these changes entailed has already started to erode some of the distinctions between licence classes. For example, we now permit licensees to move between certain classes through the licence variation process. In conjunction with the proposals for further reform of the Business Radio sector, it is clearly important to develop a fees approach that is consistent across the sector as a whole and that supports the new flexibilities and simpler licensing structure proposed for Business Radio.

3.13 Ofcom first consulted on its intention to restructure its approach to calculating fees in the context of a more liberalised approach to spectrum management in the 2004 Spectrum Pricing Consultation[10]. The document outlined plans to reform fees in a way that:

- was consistent with our liberalisation policies;
- removed special fee considerations such as choice and diversity and escalator factors;
- removed inconsistencies between classes in the new liberalised environment.

3.14 Our statement of 13 February 2005 set out our intention to consult on the specifics of these changes once detailed proposals for Business Radio reform were available – these have now been published. The statement also set out Ofcom's decision to retain the AIP valuation by which most Business Radio services annual fees are calculated at £9,900 per 2 x 12.5 kHz channel, although Ofcom signalled its intent to review this valuation in the future.

General Approach for Business Radio Fees

3.15 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 for licences in classes that will form part of the 'Business Radio Light Licence Category' (see table 3.4), where Ofcom only performs limited tasks;
- the adoptions 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

[9] A "fees escalator" - which is a gradually discounting rate for the first few years of a licence's issue.
[10] http://www.ofcom.org.uk/consult/condocs/spec_pricing/spec_pricing/

approach and also by the findings of the Indepen review of spectrum pricing commissioned by the Radiocommunications Agency in 1996[11].

3.16 In setting fees for licences in the Business Radio sector (excluding the 'Light' category – see paragraph 3.44) 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.

3.17 How we propose to apply these factors is set out in the following paragraphs.

Congested locations

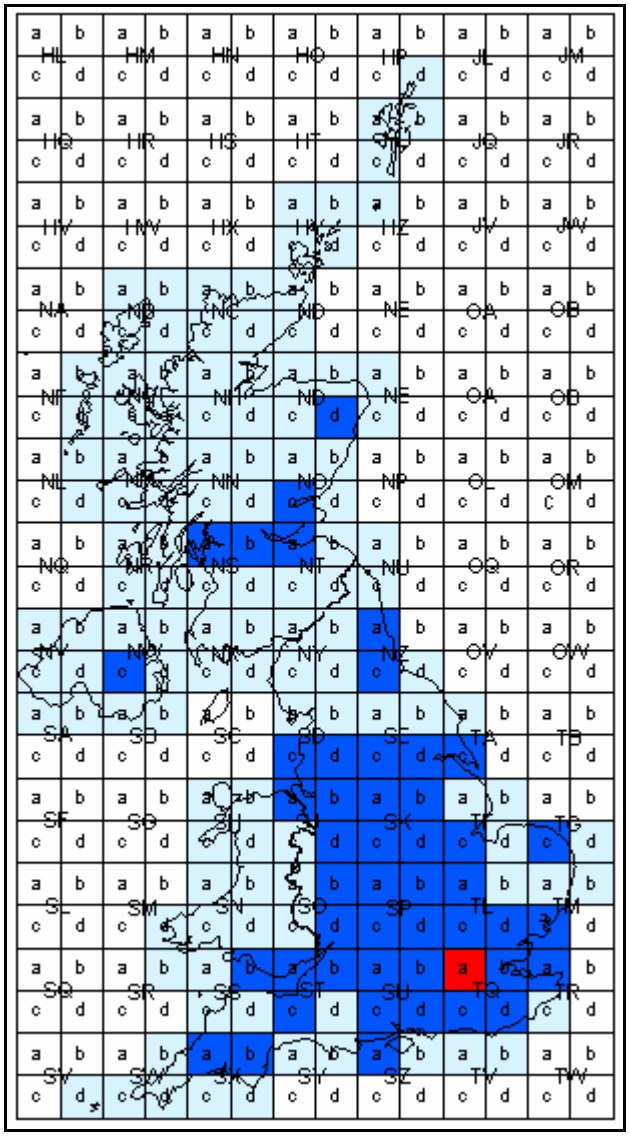
3.18 The current fees approach for some existing licence class incorporates a geographical congestion factor. This factor was introduced in 1998 and was calculated by measuring the channel loading during busy hours.

3.19 The Indepen review recommended the use of population as a way of identifying congested or higher value geographical locations. The assumption that the value of Business Radio use broadly correlates with population is based on the premise that most licences are held by organisations serving the general population (taxis, utilities, public transport operators etc). As indicated in the February 2005 statement on pricing, Ofcom believes that this is a sensible proposal as population is an easily observed and transparent published measure. It also has advantages, when combined with the concept of coverage, in providing a fair and flexible means of distributing the national fee rate across individual licences using the same spectrum.

3.20 Consequently, Ofcom proposes to adopt population as the way of identifying specific areas as congested and apply this single categorisation to all relevant licence classes. In order to provide a simple and transparent categorisation of congested areas we have divided the UK into a grid (50 km squares) and categorised the population in each square into one of three categories. Figure 3.1 shows our proposed population-based categorisation of the UK.

[11] Study into the use of Spectrum Pricing, Study for the Radiocommunications Agency, NERA and Smith System Engineering Limited, April 1996 - http://www.ofcom.org.uk/research/radiocomms/reports/independent_review/spectrum_pricing.pdf

Figure 3.1: UK map showing the trading units (based on GB Ordnance Survey National Grid System) and division of population between these units



Notes:

- Category A (Red)- High population category - This represents a population greater than 3 million (Actually 7.8 million – London);
- Category B (Dark blue) - Medium population category - This represents a population between 300,000 and 3 million (maximum population is around 2.33 million - Leeds);
- Category C (Light blue)[12] - Low population category – This represents a population less than 300,000.

Coverage

3.21 If a spectrum user covers a greater area with a particular transmission, for example, by using a higher transmitter power, we consider they should pay a higher rate than a

[12] The Channel Islands and the Isle of Man fall under category C.

licensee operating with a smaller range as they deny a greater number of other potential users the opportunity to use the spectrum.

3.22 The Indepen review recommended an approach for taking coverage into account which distributed the national rate for a particular channel by the proportion of the national population covered by a particular transmission. Indepen identified a field strength contour as being an appropriate criterion for defining this area. Field strength is the level of signal received at a particular point in space and is fundamental to the way we assign new spectrum in the Business Radio sector. It is the criterion by which we decide whether spectrum can be used by others or not.

3.23 This approach combined the concept of congested locations previously outlined with a flexible way of distributing fees. For example, a transmission in a rural area (which would be in the low population category) would reach fewer people, and attract a lower fee, than a similar range transmission in an urban area. We believe this approach has much to commend and have incorporated this concept into our proposals for fees in the Business Radio sector, albeit with some simplification to make fees easier to understand and more transparent.

3.24 This principle has been applied to the two categories (Area defined and Technically Assigned) which in future will attract spectrum pricing in ways that reflect their characteristics.

Business Radio Technically Assigned Licence Class

3.25 Although it is possible using complex computer tools to predict the coverage of each individual transmitter we licence, we believe that such an approach would be complex and opaque, as licensees would require access to the sophisticated computer modelling tools used by Ofcom in order to estimate their licence fees.

3.26 Instead we propose a simpler implementation of the concept whereby typical coverage is categorised into classes by two important determinants of a transmitter's coverage area; its power and its height. The advantage of these parameters is that they are readily available to all licensees as part of their existing licence schedule.

3.27 Table 3.1 shows the way we have categorised coverage using these parameters, the values for typical coverage radius reflect our current planning assumptions for services with these characteristics.

Table 3.1: Coverage categorisations for Technically Assigned licence class

Coverage categorisations	Coverage radius in Km	Proxies for coverage: Power (P), in Watts, and antenna height (A_h), in meters, combinations
Category 1	6	$P \leq 5$ W and $A_h \leq 10$m
Category 2	30	$P \leq 5$ W and $10m < A_h \leq 30m$
		$P > 5$W and $A_h \leq 10$m
Category 3	60	$P > 5$W and $10m < A_h \leq 30m$
		$P \leq 5$ W and $A_h > 30$m
Category 4	90	$P > 5$ W and $A_h > 30$m

3.28 In deriving fees for this licence category we have calculated the average population within each population category identified at figure 3.1, and applied this as a

proportion of the UK population to the national fee rate, also taking into account our costs in managing the radio spectrum. These values are shown in table 3.2 (please note that this value is our calculation of spectrum value and not a proposed fee which is set out in detail at 3.7).

Table 3.2: Technically Assigned spectrum value

Population category	6 Km radius (£)	30 Km radius (£)	60 Km radius (£)	90 Km radius (£)
A	200	740	1480	2030
B	100	200	300	920
C	75	95	110	130

3.29 Ofcom is aware that the value calculated in the 90 km category represents a substantial increase on current fee levels. Consequently we do not propose to introduce this coverage category at this time (instead fees will be set based upon an assumption of a 60 km coverage). Nonetheless, users in this category do deny large areas of spectrum to other users and Ofcom may consider introducing this category at some point in the future.

Business Radio Area Defined Licence Class

3.30 Business Radio Area Defined licences will typically be for users who operate over large geographical areas with exclusive access to spectrum. In this type of authorisation, a licence simply defines an area and a boundary field strength that must not be exceeded. The user has exclusive use of the spectrum within the defined area and the freedom to deploy their transmitters anywhere in the area as long as they comply with the licence conditions.

3.31 Licences within classes which we propose to move to this category are currently for the UK, or for Nations within the UK. When calculating fees for the nations we propose to simply apportion the national channel rate by the population which reside in that Nation. For example approximately 83.6 % of the UK population reside in England, therefore the fee will be 83.6 % of the national rate (0.836*9900= £8275).

3.32 As part of the reforms for this sector we also propose to include in the flexibility of licensees in this class to partition their licences, through trading, into smaller geographical areas. For example, a licensee with a UK licence may not need spectrum in the Glasgow area and could choose to trade that spectrum to an operator who would value it.

3.33 In order to enable this partitioning we have proposed that such a licence can be divided into ‘trading units’. Trading units will be defined as 50 km grid squares in accordance with the map set out at figure 3.1. The fee payable for each square will be determined by its population category. Ofcom proposes to calculate this fee by apportioning the UK channel rate by the average population in a square of that category. These values are set out in table 3.3.

Table 3.3: Trading units licence fees

Population categories	Trading unit fee rate (£)
Category A - High population	1185
Category B – Medium population	150
Category C – Low population	14*

* a minimum licence fee of £75

Less popular band factor

3.34 Indepen identified certain bands as being more popular than others. This reflects the technical characteristics of the spectrum. For example, certain bands, such as Band I, require the use of larger antennas and are therefore less popular for mobile applications.

3.35 Ofcom does not propose to remove modifiers which are frequency band specific. These are designed to address technical limitations on specific spectrum bands. These modifiers ensure that licence fees encourage the use of less popular bands if possible and that fees reflect some of the technical limitations on the use of a particular band. Ofcom intends to continue to apply these band specific modifiers at the level currently defined for the Business Radio (National and Regional) licence class. Ofcom therefore proposes to modify fees by a factor of 0.83333 for Area Defined and Technically assigned licence classes in the following bands:

- Paging Band: 26.225 – 49.49375 MHz;
- Band I: 55.75 – 68.0 MHz;
- Low Band: 68.08125 – 87.49375 MHz;
- Mid Band: 137.9625 – 166.04375 MHz and
- Band III: 177.20625 – 207.49375 MHz.

3.36 Currently a geographical congestion factor is not applied to less popular bands. Also some licence classes do not apply a geographical congestion factor while others do. Going forward all licences under the Technically Assigned category will be subject to a geographical congestion factor but this will be set at 0.5 for the high population category to minimise the impact on existing fee rates in this licence class.

3.37 The long term future of Business Radio use of Band III spectrum was the subject of a review at the International Telecommunications Union Regional Radio Conference which took place in May/June 2006. Ofcom will therefore need to reconsider the management of the band informed by the outcome of the conference and will consider introducing a Band III modifier to accommodate any constraints that may be imposed on the use of the band. Until this is decided, Band III will continue to be treated as a less popular band for pricing purposes.

Occupied bandwidth factor

3.38 Ofcom believes that users who occupy more bandwidth should pay higher prices in order to reflect the opportunity to exploit that spectrum denied to other users. By taking this basic factor into account when setting fees Ofcom aims to encourage more efficient spectrum use and more spectrally efficient technologies.

3.39 Currently Ofcom defines its fees in terms of a standard charge rate based on 2 x 12.5 kHz of spectrum. In order to support the use of a wider range of technologies and more flexible spectrum segmentation, Ofcom proposes to extend the current range of available bandwidth modifier factors to support a much greater range of possible bandwidths. This will enable Ofcom to charge a lower fee for narrow bandwidth technology. For example, a licensee deploying a simplex system using 6.25 kHz technology would attract a fee of 0.25 of the standard fee rate.

Shared assignment discount factor

3.40 Shared channels are where a number of users share the same spectrum in a particular geographical area. As spectrum is a scarce resource Ofcom tries to encourage and facilitate the sharing of spectrum wherever possible and has generally set fees to encourage such arrangements. Ofcom's current spectrum management approach for facilitating such sharing uses broad correlations between particular kinds of business and the pattern of spectrum use they generally show. To some extent our charging approach has mirrored these broad correlations.

3.41 The liberalisation measures proposed for the Business Radio sector involve the adoption of a new approach to facilitating sharing supported by a new computer tool (MASTS – the Mobile ASsignment Technical System). This new approach adopts a much simpler categorisation of spectrum sharing, identifying it as either shared or exclusive. Accordingly we propose to adopt a much simpler approach to setting fees for users who share spectrum.

3.42 In order to encourage spectrum users to share spectrum a fee modifier of 0.5 will be applied to assignments categorised as shared. Users who require exclusive access to spectrum will be charged at the full rate for their assignment, as this reflects the opportunity denied to others to use that spectrum.

Other factors

3.43 Business Radio licence fees will be further simplified by the removal of the 'step-in' and 'choice and diversity' factors. These factors were introduced to promote the use of certain services in Business Radio in order to provide choice and diversity in telecommunications services. As set out in Ofcom's Spectrum Pricing Statement 2005, we believe that such modifiers are inconsistent with the market based approach to spectrum management adopted by Ofcom and should be withdrawn. However, we made a decision at that time to delay the removal of these modifiers until proposals for a new licence class structure were available. These have now been published in conjunction with this document.

Business Radio Light Licence Class

3.44 Light licences are licence types which are effectively pre-packaged or lightly managed. As part of the rationalisation and simplification measures for the Business Radio sector we propose to rationalise current arrangements. Table 4 shows how current licence classes will map onto the proposed new structure.

Table 3.4: Rationalising arrangements for current licences class that will be managed under the Light licence class

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

3.45 The overall approach to light licensing will be much simplified. These licences are issued on-demand without a complex technical assignment process. The technical and physical characteristics of these licences make them an ideal candidate for licence simplification. Light licences are heavily shared and use relatively low power.

3.46 There are six current Business Radio licence classes that will move to the new Light licence class and these have various licence fees and renewal periods associated with them (some are charged annually and others every three years).

3.47 Ofcom proposes to introduce a five year renewal period for the Light licence class; this will mean that the fee will only need to be paid every five years. This measure will reduce the regulatory burden on stakeholders and support a much more efficient administrative process for these licence categories. The licence fee for the five year period will be £75 per base station or a simple £75 flat fee for mobile use. The fee reflects the reduction in the transaction cost.

Fee Proposals

3.48 The following table shows the fee proposals for licences within the new licence categories. The coverage, population, bands and assignment type categorisations discussed previously are summarised in annex 7.

Business Radio Area Defined Licence Class

3.49 Table 3.5 shows the annual fee proposals for the Business Radio Area Defined licence class, for a 2 x 12.5 kHz channel.

Table 3.5: 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, 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

Business Radio Light Licence Class

3.50 Table 3.6 shows the fee proposals for the Business Radio Light licence class.

Table 3.6: Business Radio Light licence 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

Business Radio Technically Assigned Licence Class

3.51 Table 3.7 shows the annual fee proposals for the Business Radio Technically Assigned licence class for a 2 x 12.5 kHz channel.

Table 3.7: Business Radio Technically Assigned Licence Class fee proposals for a 2 x 12.5 kHz channel

Coverage categories	Category 1 (6 Km radius)				Category 2 (30 Km radius)				Category 3 (60 Km radius)			
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)

Conclusion

3.52 We propose to take forward the Indepen recommendations for the Business Radio sector incorporating a more flexible and rationalised approach to setting fees. There are many spectrum management benefits for Ofcom in adopting this approach to spectrum pricing.

3.53 The new fees structure will facilitate the change to the technical management of certain licence classes to make them as flexible, efficient and usage neutral as possible.

3.54 Ofcom believes that the proposed changes are important to support enhanced flexibility for spectrum users in a transparent and fair fee structure. Although the proposals will not alter the amount of revenue Ofcom collects in licence fees.

3.55 We have developed the fee proposals for this sector in a way that attempts to ensure that the impact of fee changes on individual licensees are, whenever possible, minimised. For the majority of licences (over 90%) fees will remain at or around current levels or reduce. Where fees do increase, this is in line with our pricing principals as articulated in this document.

Question 1) Do you agree with Ofcom proposals to simplify the fees charged for Business Radio Light Licence Class?

Question 2) Do you agree with Ofcom's fee proposals for the Business Radio Area Defined Licence Class?

Question 3) Do you agree with Ofcom's fee proposals for the Business Radio Technically Assigned Licence Class?

Section 4

Satellite earth stations

Current position and charging

4.1 In the majority of bands available to satellite earth stations, fixed links have access either to the same bands or to bands immediately adjacent. Therefore fixed links are already, or could potentially be, an alternative user of the same spectrum that is used by satellite earth stations. Consequently AIP (or the opportunity cost) of this spectrum can be estimated with reference to the value of this spectrum to a fixed link user.

4.2 This principle is already embodied in the current algorithm for satellite earth station fees, since the reference fee is based on that for the fixed links. The application of administered incentive pricing to satellite earth stations fees based on fixed links was initially applied following the Radiocommunications Agency's consultation on Spectrum Pricing in March 2003[13] .

4.3 AIP is currently directly applied to licence products for permanent, transportable, network and aircraft earth stations and earth stations on board vessels. The fees are based on an algorithm that reflects the opportunity cost based on an alternative fixed link user (see paragraph 4.10 for current algorithm).

4.4 The structure of the existing algorithm is such that it promotes the efficient use of the spectrum by ensuring satellite earth station operators pay the opportunity cost of the spectrum they use. This aims to encourage operators to use frequencies with a lower opportunity cost i.e. those frequencies that experience relatively less demand from spectrum users.

New products, trends and developments

4.5 Ofcom has recently implemented changes to the fixed link fee charging algorithm following the conclusion of the Ofcom Spectrum Pricing consultation in March 2005 and subsequent implementation of pricing regulations. Ofcom's intention to consult further on possible changes to satellite earth station fees was also detailed in that consultation.

4.6 Ofcom proposes to introduce a new licence product for 'Transportable very small aperture terminals'. It is expected to be available for applications in early 2007. This is a normal 'very small aperture terminal' (VSAT) terminal in most respects, but is transportable in nature between each use. As with VSAT, it is intended to include this use within the Earth Station Network class of licences and fee calculation- see below.

4.7 Ofcom also proposes to introduce a new licence product for Satellite (Earth Stations on board Train). This is a new licence product expected to be available for new applications in early 2007. Licensees in this licence product will be subject to the same algorithm as the earth station network algorithm.

[13] *Spectrum Pricing: Year Six,* consultation, October 2003 http://www.ofcom.org.uk/static/archive/ra/topics/spectrum-price/spec-pric/oct2003/formalnoticeofregulationsfinal.doc

Specific proposals for charging

4.8 Ofcom proposes to continue the application of administered incentive pricing to earth station fees in all bands to reflect Ofcom's objective of imposing incentives to ensure that spectrum is used as efficiently as possible. A review of the charging algorithm has been carried out to ensure that spectrum pricing remains comparable to that applied to fixed links and to ensure it continues to reflect policy objectives.

4.9 It should be noted that Ofcom initially consulted industry during the formulation of these fee proposals. Fee proposals are given for the following satellite service licence products.

- Permanent Earth Stations (PES)
- Transportable Earth Stations (TES)
- Earth Station Network
- Earth Station non-geostationary
- Earth Station Non-fixed Satellite Service
- Transportable very small aperture terminal (new- to be included in the Earth Station Network class)
- Aircraft Earth Station
- Earth Station on board a vessel (ESV)
- Earth Station On board a Train (EST)

4.10 The existing Permanent Earth Station (PES) algorithm determines fees as a function of a standard reference fee rate (derived from the value of spectrum to a fixed link user), the bandwidth and band of the spectrum being used and the power fed to the earth station antennas.

$$Fee = \sqrt{433.4 \times \sum (P_{ijk} \times BW_{ijk} \times MOD_{ijk})}$$

where:

P_{ijk} = peak power delivered into the antenna (W)

BW_{ijk} = transmit authorised bandwidth for the assignment (MHz)

i = number of earth station terminals on a site

j = number of satellites to which earth station i can work

k = number of transmissions over which earth station i works with satellite j, where a transmission can be made up of one or more emissions

MOD_{ijk} = Modifier Value, according to the following table

Band (GHz)	Modifier value
5.85 - 7.075	1
12.5 - 12.75	0.5
12.75 – 13.25	1
13.75 – 14.25	0.5
14.25 – 14.50	1
17.3 – 17.7	0.5
17.7-29.5	1
29.5 – 30.0	0.5

4.11 The review has concluded that no significant changes are needed to the basic structure of the algorithm and the basic factors that apply. However some modifications are needed to the value of the constants (i.e. the reference and Modifier Value) in order to ensure consistency with the fees applicable to the updated AIP for fixed links. Some example calculations using the proposed fee algorithm for earth stations are given in Annex 8.

Satellite (Permanent Earth Station)

4.12 Ofcom proposes to adjust the beta value (β) (i.e. the constant parameter: 433.4) in the existing fee algorithm in order to better reflect recent changes to the fixed link licence fee algorithm.

4.13 In the existing algorithm, β is derived from the equivalent fee for a unidirectional fixed link. In the revised algorithm, β is derived from the fee applicable to a uni-directional fixed link in the lowest FSS uplink band, i.e. 6 GHz. This frequency band was chosen as this is the lowest FSS uplink frequency band that shares with the fixed service and has the most denial considerations made due to propagation effects.

4.14 The review started by considering the characteristics of a typical fixed link in the 6 GHz band and used these to derive an associated fixed link reference licence fee. Taking the resultant fee value into the current fee algorithm and assuming the reference bandwidth and power for a typical 6 GHz earth station, a new beta value of 52 for earth station was obtained.

4.15 A detailed explanation of the derivation of the revised β value for earth stations is provided in Annex 9.

4.16 The fixed link algorithm contains a band factor which grants a discount to use of high frequency spectrum. We propose to incorporate this factor into the earth station licence fee algorithm to reflect the varying opportunity cost associated with each band. This factor replaces the existing modifier value (MOD). A detailed explanation of the derivation of the band modifier factors is given in Annex 9.

4.17 The peak power value, P, is to be retained in the algorithm because it best reflects the geographical area of denial of an earth stations transmission. The bandwidth value, BW, is also to be retained because it reflects the amount of spectrum occupied by an earth station transmission.

4.18 Ofcom considers that a revision of the discount given for co-located earth stations is necessary. A discount for co-location of earth stations (the square root function) is appropriate because it reflects the fact that spectrum denial does not increase

linearly with each additional earth station where usage of spectrum overlaps. The current approach provides discounts for co-located earth stations irrespective of which frequency bands are in use. Ofcom proposes that, to better encourage spectrum efficiency, the fee algorithm should only provide discounts for co-located earth stations operating within the same band. Therefore, for a single licensee, earth station transmissions operating within the same band, originating within 500 metres of a nominated 'site centre' will receive a discount, provided by the square root in the proposed fee algorithm.

4.19 The proposed Permanent Earth Station algorithm is:

$$Fee = \sum_{band=1}^{b} \left[\beta \times BF \times \sqrt{\sum_{ijk} \left(P_{ijk} \times BW_{ijk} \right)} \right]$$

where:

b = number of satellite uplink frequency bands [see Band Frequency Table below]

β = 52 (a constant)

P_{ijk} = peak power delivered into the antenna (W)

BW_{ijk}= transmit authorised bandwidth for the assignment (MHz)

i = number of earth station terminals on a site in band b

j = number of satellites to which earth station i can work

k = number of transmissions over which earth station i works with satellite j, where a transmission can be made up of one or more emissions

BF = band factor, according to the following table

Band (GHz)	Band factor Bf
< 3.00	1.35
5.725 - 7.075	1.00
12.5 – 14.5	0.58
17.30 - 18.4	0.41
27.5 – 30.0	0.35

4.20 Ofcom proposes to retain the current minimum fee of £ 500 for this class of licences.

4.21 In summary the key changes to the original algorithm are:

i) The MOD factor has been replaced by the Band Factor which relates directly to the band factor in the fixed link algorithm so that consistent relative increases or decreases in fees are applied for use of spectrum in different bands according to a common view on relative congestion;

ii) The beta value (β) has been increased from 20 (√433.4) to 52 to reflect the revisions made to the fixed link algorithm;

iii) The calculation of fees is separated for earth stations transmitting in different bands so that the discount for co-location only applies to earth stations transmitting in the same band.

Satellite (Transportable Earth Station)

4.22 It is proposed to use the new PES fee charging algorithm given above as the basis for setting fees for the three categories of TES licences. Use of the same algorithm for TES and PES is considered appropriate since they both share the same bands and have similar assignment characteristics.

4.23 Ofcom considers it appropriate to increase transportable earth station fees to reflect the recent changes to the fixed service algorithm. This ensures that AIP for both services is consistent.

4.24 The inherently unpredictable nature of transportable earth station operations justifies the retention of the multi-use approach. Transportable earth stations by nature are only used for very short periods of time, on an infrequent basis at locations which are unknown until immediately prior to transmission. Ofcom therefore considers it appropriate to retain that terminals are charged annually for unlimited use.

4.25 The proposed categories and fees are:

	P x BW	Existing fee per terminal	Proposed fee per terminal
Cat 1	F ≤ 100	£200	£300
Cat 2	100 < F ≤ 2500	£1,000	£1,500
Cat 3	F > 2500	£3,000	£4,500

Where:

P= Input power into the antenna

BW = Accessible bandwidth of the emission

F= P x BW

4.26 An explanation of the derivation of the figures in the above table is provided in Annex 9

Satellite (Earth Station Network)

4.27 It is proposed to use the new PES algorithm given above as the basis for setting fees for earth station network licences and to continue to charge Earth Station licence fees on the basis of the stations licensed using the on-line clearance and notification system (currently called SATCLEAR), month by month, within a given annual period. In addition Ofcom proposes that the minimum fee for an earth station network licence is changed from £20 to £200 but the current charge for minimum of 50 terminals under this licence class is to be removed.

Satellite (Earth Station Non-geostationary) and Satellite (Earth Station Non-fixed Satellite Service)

4.28 Current charging for these licence products is based upon a fixed fee of £500 for cost recovery reasons. This is due to the small demand and spectrum utilisation of these terminals. Ofcom proposes no changes to the applicable fees for these licence products, the equipment for which currently does not operate in conventional FSS bands. It is our anticipation that demand and spectrum utilisation for these licence products will remain low. In view of this, we see no justification for going through the process of changing fees. However, if demand or spectrum utilisation levels for these products were to substantially increase, we will review this decision in the light of the possibility of bringing the fees into line with the changes being made for the PES class at the next opportunity.

Satellite (Transportable Very Small Aperture Terminal)

4.29 This is a new licence product anticipated to be available for application in early 2007. Since the terminals subject to this licence product will operate within a network in a similar manner to terminals covered by the earth station network licence, Ofcom proposes that the same earth station network algorithm is applied to this new licence product.

Satellite (Aircraft Earth Station) network operator licence and Satellite (Earth Station on board Vessel) network operator licence

4.30 Ofcom proposes to review the applicable algorithm for these licence products in future but does not propose any changes at this time. In view of this, we see no justification for going through the process of changing fees with all the associated issues which arise for what is only expected to be a short term measure.

Satellite (Earth Station on board Train) Network operator licence

4.31 This is a new licence product anticipated to be available for application in late 2006. Since the terminals subject to this licence product will operate within a network in a similar manner to terminals covered by the earth station network licence, Ofcom proposes that the same earth station network algorithm (given above) is applied to this new licence product.

Subsequent additions to a licence after renewal and fee charging principles

4.32 Currently when any Satellite Services licence product is amended to increase spectrum or power usage within that licence, the increase in licence fee is not payable by the licensee until the next renewal period. Ofcom considers that the continuation of this approach is justified in order to minimise the administrative burden on Ofcom in the processing of licence fees, especially as some licensees amend their licences numerous times throughout a given annual period. Ofcom notes that this practice also applies to fixed link licensees.

Other matters

Geographical location of earth station

4.33 Ofcom has considered the justification for charging a relative fee based on the geographical location of the earth station. During pre-consultation discussions with

industry it was suggested that opportunity cost could be linked to geographical areas, assuming that fixed link demand differed between geographical areas. After examination of fixed link deployments in the various spectrum bands, no clear relationship between fixed link deployment density and geographical area could be identified. Thus Ofcom concludes that the inclusion of a factor for geographical area within the earth station fee algorithm is unjustified.

Back-up earth station services

4.34 During pre-consultation discussions with industry it was suggested that Ofcom should not charge for back-up earth station services at the same site. Ofcom has considered this and proposes not to charge for earth stations which are deemed to be acting solely as a back-up facility for another earth station on the same site.

4.35 A back-up facility would be regarded as one which only becomes operational in the event of a failure of another licensed earth station providing service at the same site operated by the same licensee. The back-up earth station service operational and technical characteristics from a spectral efficiency viewpoint must be as good as or better than those of a fully licensed service. (This would normally require either the same size or a larger antenna).

Question 4) Do you agree with proposed modifications to the algorithms for each satellite earth station licence class?

Section 5

Programme Making and Special Events

Current position and charging

5.1 Programme-Making & Special Events (PMSE) licenses are not currently charged on an AIP basis, but on the basis of meeting the costs of providing the service across this sector. Licence fees are calculated with the aim of recovering the direct costs associated with managing the spectrum whilst taking licensee's use of spectrum into account.

5.2 In 2005 Ofcom increased PMSE fees for the first time in several years in order to address the gap between licence revenue and PMSE spectrum management costs. Ofcom stated that they would continue to review the financial situation to propose further charging decisions in 2006. The current PMSE licence fees can be found at the following link: http://www.opsi.gov.uk/si/si2005/20051378.htm

5.3 Currently, PMSE spectrum is managed through JFMG, who issue licences on behalf of Ofcom to all PMSE users. However, JFMG's contract is due to expire within the next two years, after which it is not yet decided how PMSE spectrum will be managed in the longer term.

Future plans and specific proposals for charging

5.4 Given possible changes to the management of PMSE spectrum, Ofcom is not proposing substantial modifications to the ways that fees are calculated and in particular it is not proposing to introduce AIP. Nevertheless, a number of changes are necessary in order to recover the current costs of managing PMSE spectrum and to ensure efficient use and management of the spectrum. In particular Ofcom is proposing to:

- increase PMSE spectrum fees by 20% on average. The increase proposed is higher for some exclusive-spectrum use licences, particularly in the 65 - 470 MHz frequency range;
- simplify the fee structure by consolidating some frequency ranges;
- freeze the fees for online Radio Microphone licences;
- introduce an online 12 hour booking system at a discounted fee for digital wireless cameras.

5.5 It should be noted that Ofcom has worked closely with JFMG to devise the proposals outlined in this consultation. As such, these proposals have JFMG's full support for future implementation.

Overall fee increase

5.6 The 2004 Indepen report suggested that AIP be considered for PMSE where channels are assigned on an exclusive basis over a local, regional or national area. The implementation of these proposals would have resulted in substantial fee increases for congested spectrum also available for Private Business Radio use.

5.7 Ofcom announced in the 2005 spectrum pricing document that it did not believe that the implementation of AIP to PMSE spectrum was practical at the time because of the planned possible changes to the management of PMSE spectrum.

5.8 Ofcom still believes that the implementation of AIP is impractical at this time because these possible changes have still to be determined. However, Ofcom has monitored PMSE revenue since the 2005 fees increases and has established that further increases remain necessary to bridge the gap between PMSE income and direct expenditure. Full details of the proposed changes can be found in Annex 10.

5.9 The proposed increase will apply to all PMSE licence categories but a higher increase will be applied to licensees in the 65 - 470 MHz frequency range. Increases in fees for temporary users have been kept below the average increase level. This provides an option for many users to mitigate the increases.

5.10 Despite the higher increase proposed for 65 - 470 MHz exclusive use spectrum for cost recovery purposes, fees would still remain substantially lower than comparable AIP fees: a UK wide PMR licence in UHF spectrum currently costs in the region of £9,900 but an equivalent PMSE licence would cost around £ 2,700 per year. Despite full AIP rates, demand from business radio users in these adjacent channels continues to be high.

Removal of Frequency Ranges

5.11 Programme Making & Special Events use is authorised in a wide range of radio frequencies and as a result, a complex fees structure has evolved. JFMG's response to last year's pricing consultation highlighted the need to simplify the fees structure to make it easier for customers to calculate their fees. In the subsequent pricing statement Ofcom agreed that this issue should be looked at in future pricing consultations.

5.12 Although a complete re-structure will not be possible this year, a simplification with regard the number of frequency ranges used to calculate the fee can be achieved. Therefore Ofcom intends to consolidate the 8 - 20 GHz, 20 - 40 GHz and > 40 GHz frequency ranges into one range, namely > 8 GHz. There would be a minimal impact on fees due to the very limited current use of spectrum above 20 GHz.

UK Wireless Microphones (on-line)

5.13 In 2005 Ofcom introduced the provision of an online licensing system for UK Wireless Microphones. Customers who applied on-line for their radio microphone licences were not subject to the fee increase as other applicants. The aim of the scheme was to improve the efficiency of the application process, enabling JFMG staff to dedicate more time to complex frequency management work. As a result of the success of this scheme, Ofcom proposes to freeze the on-line licence fee for a second year running, whilst increasing the licence fee for all other application methods. Ofcom hopes that this will further encourage customers to apply online.

PMSE Digital Wireless Camera – 12 hour on-line booking facility

5.14 Ofcom's contractor JFMG is in the process of implementing an on-line booking facility to enable customers to book channels in the 2-5 GHz range for Digital Wireless Camera use on a 12 hour basis. The system is only currently ready for 2.025 – 2.110 GHz and 2.200 – 2.290 GHz. JFMG hope to have other bands such as 3.5 GHz online by end 2006. Currently, a 48 hour charge is applied to all occasional use but

often the amount of time for which spectrum is actually used is considerably less. Recent analysis shows that future spectrum demand for Digital Wireless Camera's may outstrip supply and as a result it is necessary for Ofcom to reconsider the way this spectrum is managed.

5.15 The introduction of the online 12 hour booking system at a discounted fee, coupled with a fee increase of around 20% for all assignments in the 2-5GHz band, aim to alter current demand for assignments and to encourage a more efficient use of spectrum.

Question 5) Do you agree with Ofcom's PMSE fee proposals?

Section 6

Other changes

Community Radio

6.1 Community Radio is licensed under both the Broadcasting Act and under the Wireless Telegraphy Act. These proposals only relate to the latter. The current charge for WT Act licence fees for community radio, based on population coverage and waveband, is set by regulation to be the same basis as national and regional radio broadcasting licences. That is as follows:

FM

- £339 for a minimum coverage area (MCA) of fewer than 100k adults.
- For MCAs of more than 100k adults, £509 for every 100k adults.

AM

- £226 for an MCA of fewer than 100k adults.
- For MCAs of more than 100k adults, £339 for every 100k adults.

6.2 In the interests of greater simplicity and to avoid community radio services in urban areas (especially those broadcasting on the AM (medium wave) band) being charged disproportionately more for their WT Act licences than services in non-urban areas, Ofcom proposes to revise the charge such that there will be a flat fee of £250 per annum charged for each WT Act licence issued to community radio broadcasters. The same fee will apply to all licensees (i.e. the tariff will be waveband neutral). This rate will be sufficient to make a reasonable contribution towards the cost of licensing these services and to the relatively small coverage and bandwidths involved when compared with other spectrum usage.

Question 6) Do you agree with these proposals for simplifying the fee for community radio?

Fixed Links

6.3 Ofcom is considering making some adjustment in the regulations to the billing arrangements for Fixed Links. It is intended that if a licensee pre-notifies Ofcom that they are surrendering a link then Ofcom will abate the fee paid as a discount at the next renewal for remaining links to reflect the complete number of calendar months of use since licence issue or variation for that specific link or from the last renewal date of the licence. Ofcom will not make repayments for surrendered links if there is no continued licensing from which such abatement can be made because the transactional cost of the refund is likely to be higher than the refund itself. Furthermore Ofcom can not give any abatement for links notified as having been surrendered after the event as Ofcom will have had no opportunity to re-assign them.

6.4 Otherwise fees are payable on issue of the licence, or on the variation of the licence to add or upgrade links and the billing is checked and validated a few weeks prior to the anniversary renewal date. It is hoped that this new concession will encourage

licensees to surrender their licences when they are no longer required. This will enable the spectrum to be quickly re-assigned and thus help to improve the efficiency of spectrum use in the band.

6.5 Ofcom also proposes to make a small change in the pricing formula for application in the Channel Isles and Isle of Man. Because of constraints in the Islands it is proposed to set the link length factor at unity. This will remove an anomaly in some fees charged in the islands that was causing some fees to be higher than necessary due to abnormal link lengths having to be set.

Question 7) Do you agree that this proposal will encourage efficient surrender and re-assignment of fixed links and with the change for the channel Isles and Isle of Man?

70/80 GHz Self Co-ordinated Links

6.6 The current regulations provide a fee of £ 50 per annum for each 65 GHz fixed link for this form of light licensing. In support of our recent Ofcom consultation, Making Spectrum Available in the 71 - 76 GHz & 81 – 86 GHz Bands[14], it is proposed to extend the current fee arrangement for the 65 GHz band to also cover these newly proposed light licensing bands. This fee is intended to be sufficient to reflect Ofcom's costs and also to deter applications for links that are never built but may prevent other users from sharing these channels. Ofcom considers that extending this fee arrangement to the new bands would be a straightforward approach, and Ofcom is minded to adopt this. However, Ofcom would be interested to know if stakeholders would prefer a different approach (such as a higher flat fee covering multiple years).

Question 8) Do you agree with this proposal to extend a fee of £50 per annum, for self co-ordinated links in the new bands?

Channel Island and Isle of Man public wireless and fixed wireless network licences

6.7 Ofcom proposes to clarify the fee structure in the current regulations for the Channel Islands and Isle of Man public wireless network (PWN) licence class for mobile telephony use. The regulations currently express the fee as £320 per 2 x 200 kHz channel/slot. However for 3G spectrum, which is expressed in 5 MHz carriers, there is a need to have both paired and unpaired spectrum which is charged on the same basis pro-rata.

6.8 It is proposed that the regulation will therefore include the following fees:

- £320 per 2 x 200 kHz channel/slot;
- £8,000 for each 2 x 5MHz carrier;
- £4,000 for each 1 x 5MHz carrier.

6.9 Ofcom also proposes to extend the current fixed wireless access licences for 3.4, 3.6 - 4.2 GHz to include the 10 GHz band. It is proposed to use the same rate as for the existing licences that is: £5,000 for each licence for five years duration.

[14] http://www.ofcom.org.uk/consult/condocs/71-86ghz/71-86.pdf

Question 9) Do you agree with the proposed extension of the licence classes for public wireless and fixed wireless access network licences in the Channel Islands and the Isle of Man?

Other proposed amendments to WT Act licence charges Regulations

6.10 We propose to publish in the WT Act licence charges regulations a number of spectrum licence charges which are currently in force but not included in the current Regulations. For reasons of improved transparency Ofcom proposes to include the national public safety licence (see the business radio section) above, and the national analogue television networks licences, at current rates. In the past, we have relied on Regulation 6 for the provision of these fees and going forward we believe it would be more appropriate to include these fees on the face of the schedule of charges in the WT Act licence charges regulations rather than in a discreet regulation.

6.11 Ofcom also has a requirement to license some miscellaneous uses in the Science and Technology sector which do not generally interfere with commercial networks or services. In particular we propose to issue licences for ground probing radar and for scientific uses such as the transmission of time signals at 50 kHz. Ofcom proposes to have standard approach for all such types of use which is to charge £ 20 per licence for temporary uses up to one year, or £ 50 for any period up to five years for longer term use of over 1 year.

6.12 Ofcom has also been approached by some maritime training establishments about the fees for Maritime Coastal Station (Training School) Licences. These small numbers of licences establish ship stations in a land based training environment. Given the recent proposals for deregulating ship licences, Ofcom is also minded to make similar changes to these training licences as is being made for ships, but would welcome views.

Question 10) Do you agree with the other proposed amendments to the WT Act licence charges regulations?

Clarifying the way in which licence fees may be paid

6.13 Ofcom believes direct debit payment is the most effective way of ensuring licence fees are promptly paid each year after licences are issued. They are convenient for licensees and convenient for Ofcom and save a lot of manpower resource for everyone, especially if forgotten payments lead to licences being revoked. Ofcom will therefore continue to strongly promote this payment method

6.14 In order to promote internet licensing, Ofcom is also prepared to now accept credit and debit cards for sums up to £ 1000. No additional charge is involved. Cheques will also continue to be accepted for both new payments and for renewals, but licensees are reminded that they are liable for any discrepancies that may occur, which could lead to licences being delayed on issue or being revoked if cheques for renewal fail to clear on time.

6.15 Arrangements for larger sums of money being paid by bank transfer (e.g. CHAPS or BACS) may continue at the discretion of Ofcom. These payment methods are not suitable for smaller sums.

6.16 Given the convenience of all these payment methods, Ofcom wants to discourage other methods of payment in the future. Ofcom finds it inconvenient to accept

payment by cash or postal order and proposes to stop accepting payment by these methods in future.

Question 11): Are there any points you want to raise concerning the payment methods proposed?

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

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

Diana Kennedy
Spectrum Markets Team
3rd Floor
Riverside House
2A Southwark Bridge Road
London SE1 9HA

Fax: 020 7981 3333

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

A1.6 It would be helpful if your response could include direct answers to the questions asked in this document, which are listed together at Annex 3. It would also help if you can explain why you hold your views.

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 Diana Kennedy on 020 7783 4201.

Confidentiality

A1.8 We believe it is important for everyone interested in an issue to see the views expressed by consultation respondents. We will therefore usually publish all responses on our website, www.ofcom.org.uk, ideally on receipt (when respondents confirm on their response coversheet 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 facilitate the carrying out of its statutory functions.

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

Next steps

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

Ofcom's consultation processes

A1.14 Ofcom seeks to ensure that responding to a consultation is easy as possible. For more information please see our consultation principles in Annex 2.

A1.15 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, who are less likely to give their opinions through 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
Sutherland House
149 St. Vincent Street
Glasgow G2 5NW

Tel: 0141 229 7401
Fax: 0141 229 7433

Email vicki.nash@ofcom.org.uk

Annex 2

Ofcom's consultation principles

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

Before the consultation

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

During the consultation

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

A2.4 We will make the consultation document as short and simple as possible with a summary of no more than two pages. We will try to make it as easy as possible to give us a written response. If the consultation is complicated, we may provide a shortened 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 organizations 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 coversheet for responses (see below) and would be very grateful if you could send one with your response (this is incorporated into the online web form if you respond in this way). This will speed up our processing of responses, and help to maintain confidentiality by allowing you to state very clearly what you don't want to be published. We will keep your completed coversheets 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 coversheet in a way that allows Ofcom to publish their responses upon receipt, rather than waiting until the consultation period has ended.

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

A3.5 Please put any 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 coversheet 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?	

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

Question1) Do you agree with Ofcom proposals to simplify the fees charged for Business Radio Light Licence Class?

Question 2) Do you agree with Ofcom's fee proposals for the Business Radio Area Defined Licence Class?

Question 3) Do you agree with Ofcom's fee proposals for the Business Radio Technically Assigned Licence Class?

Question 4) Do you agree with proposed modifications to the algorithms for each satellite earth station licence class?

Question 5) Do you agree with Ofcom's PMSE fee proposals?

Question 6) Do you agree with these proposals for simplifying the fee for community radio?

Question 7) Do you agree that this proposal will encourage efficient surrender and re-assignment of fixed links and with the change for the channel Isles and Isle of Man?

Question 8) Do you agree with this proposal for self co-ordinated links in the new bands?

Question 9) Do you agree with the proposed extension of the licence classes for public wireless and fixed wireless access network licences in the Channel Islands and the Isle of Man?

Question 10) Do you agree with the other proposed amendments to the WT Act licence charges regulations?

Question 11) Are there any points you want to raise concerning the payment methods proposed?

Annex 5

Impact Assessment

Introduction

A5.1 This annex when read in conjunction with the rest of this consultation document sets out an Impact Assessment (IA) as defined by section 7 of the Communications Act 2003. RIAs provide a valuable way of assessing different options for regulation and showing why the preferred option was chosen. They form part of best practice policy-making and are commonly used by other regulators.

A5.2 Section 7 of the Communications Act 2003 sets out that Ofcom has to carry out RIAs where our proposals would be likely to have a significant effect on businesses or the general public, or when there is a major change in Ofcom's activities. In accordance with this section, in producing the RIA in this document, Ofcom has had regard to such general guidance as it considers appropriate, including Cabinet Office guidance, Comments on this RIA should be sent to Ofcom by the closing date for this consultation. We will consider all comments before deciding whether to implement our proposals as set out in this consultation document.

A5.3 Radio spectrum is an important asset to the UK economy. Under the Communications Act 2003 Ofcom has a general duty to promote the "efficient use and management of the electro-magnetic spectrum for wireless telegraphy; and for connected purposes". In exercising its functions in relation to spectrum management (including its power to set licence fees), Ofcom is also required (under section 154) to have regard, inter alia, to:

a) the extent to which the electro-magnetic spectrum is available for use;

b) present and future demand for use of that spectrum for wireless telegraphy;

c) the desirability of promoting;

i) efficient use and management of the electro magnetic spectrum;

ii) economic and other benefits arising from the use of wireless telegraphy;

iii) the development of innovative services; and

iv) competition in the provision of electronic communications services.

A5.4 In order to encourage the efficient use of spectrum, Ofcom is increasingly relying on market forces and market mechanisms such as auctions and trading. In addition, Ofcom believes that efficiency can be promoted by setting spectrum fees with desirable incentive properties. This approach to setting fees is termed Administrative Incentive Pricing and is discussed at length in Annex 6.

A5.5 Within this general background, Ofcom is making a series of proposals to

a) rationalise the structure of some licence classes;

b) ensure that spectrum management costs are met; and

c) encourage the efficient use of spectrum by charging fees that reflect the opportunity cost of the spectrum.

Identification and assessment of options and the impacts on stakeholders

Satellite

A5.6 The impact assessment of the revision of earth station fees has considered three options:

- Revising the current fee structures for earth station licensing in order to align them with the recent revisions to fixed link fees, thus reflecting the opportunity cost of the spectrum;
- Fee exemption for all earth stations; and
- Retaining the status quo with no regulatory intervention.

A5.7 The following table analyses the options, the benefits, costs and risks and mitigating measures associated with these three proposals.

Option	Benefits	Costs/risks
To revise the licence fees in line with fixed link fee revisions	Ofcom recovers spectrum management costs Consistency of AIP for users sharing the same spectrum Creation of efficient incentives for the use of spectrum and for spectrum trading when available (the Spectrum trading consultation indicated that trading for satellite services is to become available in 2007, although it is not yet decided when or how trading might be introduced for satellite service licences).	Financial impact to industry: analysis of the impact to earth station licence fees shows on average a ratio increase of 2.5 across the whole sector
To retain the status quo	Industry see no change in fee appropriation	Fees do not reflect opportunity cost - conflicts with AIP principles and does not promote efficient use of the spectrum Does not promote efficient incentives for spectrum trading
To licence exempt earth stations	No financial costs to industry	Fees do not reflect opportunity cost of the spectrum. Does not promote efficient

Option	Benefits	Costs/risks
		use of the spectrum conflicting with AIP principles Ofcom needs to co-ordinate satellite earth stations to ensure against interference between licensees. National coordination and site clearance still required for many earth stations.

A5.8 Ofcom believes that revising the current approach to earth station fees is necessary for several reasons:

- to enable Ofcom to recover its costs relating to satellite services spectrum management functions;
- to encourage allocative efficiency by providing the incentive for ensuring spectrum users face the opportunity cost of spectrum they seek to use, in particular with respect to fixed link, upon which the opportunity fees for earth stations are based;
- to encourage productive efficiency by reflecting the cost of using the spectrum to other users and creating efficiency in spectrum user to minimise costs for a given level of productive output;
- to encourage dynamic efficiency by adjusting the prices of the market to re-align with the recent amendments to the fees applied to fixed links; and
- to promote incentives for spectrum trading.

Business Radio

A5.9 Ofcom is proposing to make changes to the pricing structures for Business Radio to support the replacement of 21 current licence classes with three new licence classes:

- Business Radio Technically Assigned Licence Class. The proposed fee will take into account where a transmitter is sited, the typical coverage from transmitter operating at certain powers and will reference the population tables covered by such factors;
- Business Radio Area Defined Licence Class – the proposed fee will use pre-defined boundary areas derived by dividing the UK into trading units to apportion the national channel rate by population, and will also reflect harmonisation of the fee rate used;
- Business Radio Light licence class – the proposed simple 5 year fee will be based on the cost to Ofcom of managing the spectrum

The IA for these pricing proposals is summarised in the following tables.

Business Radio Technically Assigned Licence Class

Option	Benefits	Costs/risks
Licensee will be charged differential rates depending on location of transmitter and its power and antenna height (affecting radio coverage) ▪ population density is used as a proxy for value of spectrum ▪ transmitter power and antenna height used as a proxy for coverage	Improves efficiency in use by ensuring that users pay a fee based on their valuation of the spectrum. This is also a technology neutral approach. Demand for business radio applications is highly correlated with population density and is likely to provide the closest approximation to a true valuation and provides incentives for efficient use. Simpler and transparent – allows fees to be generated from data held in the licence schedule (power, antenna height, frequency , location and assignment type) Supports trading by having consistent conditions applied at a local level.	By removing the technology restriction and the impact of the corresponding pricing, some technologies currently in use may have to give way to those that can generate higher value. It may underestimate the true value of spectrum use in some low population areas (for eg, motorways etc).

Business Radio Area Defined Licence Class

Option	Benefits	Costs/risks
UK to be divided into trading units of 50 × 50 km • population in each trading unit based on three categories • fee for each trading unit based on apportionment of national harmonised rate for % of recorded population within each trading unit in a	Allows geographical categorisation within which licences can be assigned on an exclusive basis and for business user base. Simplifies the calculation of the licence fees on the broad basis of the types of uses that might serve such population segments. Also allows such units to be traded in future. Is in keeping with Indepen's recommendation and Ofcom's own spectrum pricing proposals and signals transparency in setting of	Population categories may be considered too broad to meaningfully capture the value to the user – for example, new technologies with limited initial coverage may pay a lower fee than may be justifiable from an efficiency perspective based on the value of the business and the willingness to pay. This may result in inefficient use of spectrum. But these effects may be minimised by the

Option	Benefits	Costs/risks
category	fees. Simple and provides licensees with information of value of spectrum to be traded.	impact of introducing opportunities for trading.

Business Radio Light Licence Class

Option	Benefits	Costs/risks
Charge a 5 years flat fee to reflect Ofcom's costs of managing spectrum	Easier compliance and cheaper licences. Simpler for Ofcom to administers.	Risk that less contact with licensees may result in database containing less accurate data. 5 years renewal period is a judgement aimed at getting the right balance.

Impact on users

A5.10 The impact on different users of business radio spectrum is as follows:

Business Radio Technically Assigned licence class

A5.11 The impact on the current licensees in this category is as follow:

- for 72 % of licences fees will not change, or will decrease;
- for 21.5 % of licences, the annual licence fee will increase, but not more than by £150 per annum;
- for 6.5 % of licences, fees will increase by more than this, in some cases by more than 100 %.

A5.12 Although some current licence users are likely to face an increase in licence fees, and some substantially so, Ofcom is of the view that a significant proportion of licensees would face no increases in fees or benefit from a decrease. The overall impact is the same amount of total fees accruing to Ofcom. Given that the increase in fees for some licensees reflects the congestion factor or the coverage, Ofcom believes that the fee changes will better reflect the opportunity cost of the spectrum and therefore enhance efficiency of use of the spectrum. Those licensees facing bigger increases may want to re-examine their coverage requirements.

A5.13 On balance therefore, Ofcom is of the view that the fee changes carry more benefits to users than the costs.

Business Radio Area Defined licence class

A5.14 The impact on the current channels associated with this category is as follow:

- for 60 % of channels, fees will not change, or will decrease;

- for 23 % of channels, fees will increase by up to 8 %;
- for 17 % of channels fees will increase by up to 25 %.

Business Radio Light licence class

All current licensees within the existing classes that will transfer into the proposed light licence class category will benefit from a reduction in fees and from fees being collected less often.

Summary

A5.15 Ofcom believes that revising the current approach to business radio fees is necessary for several reasons:

- to enable Ofcom to restructure Business Radio spectrum fees in order to reflect the proposed licensing changes;
- to help to rationalise fess across the business radio sector and make them more intrinsically flexible, efficient and service neutral;
- to encourage efficiency by providing the incentive for ensuring spectrum users face the opportunity cost of spectrum they seek to use, in particular with respect to using congested bands;
- to promote incentives for spectrum trading.

PMSE

A5.16 Ofcom is proposing to increase PMSE spectrum fees as specified in Annex 10. The increase is necessary in order to allow Ofcom to recover the costs of managing PMSE spectrum. Ofcom is proposing the increase should be higher for annual licences in high-demand frequency ranges. This is expected to improve the efficiency of spectrum use and provides an option for many users to mitigate the increases.

A5.17 The impact assessment of the revision of PMSE fees has considered three options:

- revising the current fees;
- increasing all current fees by the same percentage;
- retaining the current fees.

Option	Benefits	Costs/risks
To increase the fees as detailed in Annex 10.	Fees would reflect the cost of managing PMSE spectrum. The increase would allow Ofcom to recover PMSE spectrum management costs. The differential increase will	The increase for exclusive annual licences in the 65 – 470 MHz frequency range is higher than the average fee increase.

Option	Benefits	Costs/risks
	allow keeping fees for temporary use below the average level. In the congested 65 – 470 MHz band, the differential increase would provide users with a stronger incentive to consider the requirement of an exclusive annual licence.	PMSE users will incur additional costs. However, the increase for small users, and especially for users of low-power applications is minimal. Risk that the level of costs recovered may be excessive. However, costs can be precisely identified since Ofcom uses a contractor as band manager. Risk that users of spectrum in congested areas do not face the opportunity cost of the spectrum they use and therefore may use spectrum inefficiently.
To increase all PMSE fees by the same proportion.	Fees would reflect the cost of managing PMSE spectrum. The increase would allow Ofcom to recover its full administrative spectrum management costs. Exclusive annual licences would be subject to a lower fee increase.	Occasional users would have to pay higher fees. Risk that the level of costs recovered may be excessive. However, costs can be precisely identified since Ofcom uses a contractor as band manager. Risk that users of spectrum in congested areas do not face the opportunity cost of the spectrum they use and therefore may use spectrum inefficiently.
To apply AIP to PMSE spectrum in demand from other services.	PMSE users would face the opportunity cost of the spectrum they intend to use, which would promote	Ofcom is considering how PMSE bands should be managed in the longer term. In

Option	Benefits	Costs/risks
	economic efficiency.	this perspective, the introduction of AIP may be disruptive to the industry. Introducing AIP would increase the costs of the industry. If there is no viable alternative to spectrum for PMSE users, broadcasting output may be impaired. If there is no viable alternative demand for PMSE spectrum, given the constraints placed on its usage, the efficiency foregone will be small.
To retain current fees.	Licensees would not incur additional costs.	PMSE licence fees would not be sufficient to cover PMSE spectrum management costs.

Other changes

Fixed links

Option	Benefits	Costs/risks
To financially reward surrender of links if pre-notified.	Licensees will be encouraged to surrender their licences when they are no longer required. This will enable the spectrum to be quickly re-assigned and thus will improve the efficiency of spectrum use in the band.	Since licensees anticipate that they will be able to surrender links, demand for annual licences may increase.
To retain the status quo.		Licensees do not have incentives to surrender spectrum that they no longer require.

Community radio

Option	Benefits	Costs/risks
To charge a flat fee of £ 250 per annum.	Most community radio broadcasters will pay less than they are currently paying. The fee structure for community radio licences would be greatly simplified. Community radio services in urban areas would not be charged disproportionately more for their WT Act licences than services in non-urban areas.	Risk that the level of fees will not be sufficient to recover relevant spectrum management cost. If fees do not reflect costs, inefficient demand for community radio licences could be encouraged.
To retain current fees.	Ofcom may recover a larger proportion of spectrum management costs.	Community radio services in urban areas may be charged disproportionately more for their WT Act licences than services in non-urban areas.

Fee payment mechanisms and other changes

Proposal	Benefits	Costs/risks
Encourage payment by direct debit	Licensees will pay by credit card or direct debit thereby reducing the costs of processing the application and speeding up the process. Ofcom would not have to incur the cost of not having to handle payments by cash or postal orders.	There is the risk that some users may not be able to pay by cheque, credit or debit card.
Discourage payments by cash or postal orders in the future.	Ofcom would not have to bear the costs of handling these forms of payment.	Risk that some users may not easily pay licence fees by other means.
Extension of fees for network licences for the Channel Isles and Isle of Man	Licensees for additional public communication services in the islands to benefit from services similar to those on the mainland, including 5 year fee for Fixed Wireless use.	Have consulted Island providers to ensue this aims to meet needs on a consistent basis as far as practicable.

Addition of new fee scale for scientific uses and ground probing radar	New simple licensing fee to reflect costs of light licensing	Fees may encourage unlicensed use, but designed to minimise this by providing 5 year fee.

Conclusions

A5.18 This Impact Assessment has developed the analysis of the impact of the proposals put forward in this consultation only in qualitative terms since in general the quantification of the benefits and costs of each proposal has not been possible.

A5.19 Nevertheless, Ofcom is satisfied that the qualitative analysis undertaken shows that the benefits of its proposals outweigh the costs and that the net benefits of its proposals appear greater than those of the alternative options considered.

A5.20 In particular, the proposals put forward in this consultation are expected to;

- enable Ofcom to recover its costs;
- encourage efficiency by ensuring that spectrum users face the opportunity cost of the spectrum they intend to use;
- promote incentives for spectrum trading; and
- simplify the structure of licence fees where possible.

Annex 6

Economic Approach to using AIP

Rationale and objectives of AIP

A6.1 As we explained in the 2005 fees consultation, under the Communications Act 2003, Ofcom has a general duty to promote the "efficient use and management of the electro-magnetic spectrum for wireless telegraphy; and for connected purposes". In exercising its functions in relation to spectrum management (including its power to set licence fees), Ofcom is also required (under section 154) to have regard, inter alia, to:

a) the extent to which the electro-magnetic spectrum is available for use;

b) present and future demand for use of that spectrum for wireless telegraphy;

c) the desirability of promoting:

i) efficient use and management of the electro magnetic spectrum;

ii) economic and other benefits arising from the use of wireless telegraphy;

iii) the development of innovative services; and

iv) competition in the provision of electronic communications services.

A6.2 Ofcom considers that AIP is an important mechanism for promoting efficient spectrum management. This is because AIP signals to the spectrum user the opportunity cost of using the resource. The rationale for AIP is to promote the efficient use of spectrum (where it is congested) by allocating it to those who value it most. Those users to whom spectrum is worth more than the AIP fee will keep the spectrum they hold (or buy any that becomes available), and those to whom spectrum is worth less will sell any spectrum they hold.

A6.3 In determining appropriate spectrum prices under AIP, the starting premise is that spectrum is a finite and scarce resource, and therefore prices should maximise economic welfare. In principle therefore, prices should be equal to the marginal benefit from using the good. This is the economic principle underpinning administrative pricing. It seeks to value the marginal benefit of the spectrum. To do this the marginal use and user of the spectrum must be identified and then the cost to the marginal user of being denied access to the spectrum estimated. This gives the marginal benefit of the spectrum.

A6.4 It is difficult to identify the marginal use and user directly, without knowing first what the most efficient allocation of spectrum is (if this could easily be derived, Ofcom could just allocate the spectrum accordingly). In practice, we can estimate the marginal benefit of the spectrum to "representative" users in its existing and alternative uses. The level of AIP which promotes the efficient use of spectrum can be arrived at over time as follows: Initially AIP could be set according to the value of spectrum in its existing use. It could then be adjusted at regular review periods towards the value in the alternative use (re-calculated each time), taking into account information on changes in spectrum usage during the review period.

A6.5 To estimate the marginal benefit of spectrum, it is necessary to calculate the cost of alternative means for the representative user of achieving the same output. The core purpose of administered pricing is to influence the choices made by spectrum users so that:

- decisions on spectrum use reflect the value of that use;
- users of the spectrum consider alternative means of communication -not necessarily requiring access to the radio spectrum - and seek to avoid use of the most congested frequencies;
- existing users examine their spectrum needs and shed surplus spectrum; and
- new entrants and new technologies have a greater chance of gaining access to the spectrum if their use has a higher potential value.

Three types of efficiency

A6.6 Economic efficiency can be looked at in three different ways relating to consumption, production, and the use of resources over time. The methodology for setting AIP fees will depend on which of these definitions of efficiency we are aiming for. The three definitions of efficiency are:

- **allocative efficiency** – an allocation of inputs that maximises the value of goods and services produced such that no other allocation can increase the well-being of one economic agent without harming that of another;
- **productive efficiency** – an allocation of inputs in the production of goods and services that produces a given level of output at the lowest possible cost;
- **dynamic efficiency** – inputs are allocated to the production of goods and services over time so that productive and allocative efficiency are maintained in response to changes in technology or consumer preferences.

A6.7 Pricing can promote the attainment of allocative efficiency by reflecting what those who value spectrum most highly are willing to pay to use it. Prices set at the appropriate level will ration demand, so that only those who value an additional unit of spectrum more than the price charged for it will demand more spectrum. When price reaches the level at which the demand for spectrum from alternative uses matches its supply, the marginal benefit of spectrum should be equal across those uses and the allocation of spectrum should be efficient (externalities may affect this and will be discussed later). In other words, it would not be possible to increase the total value generated from the spectrum by re-allocating spectrum from one use to another.

A6.8 Pricing can achieve productive efficiency by reflecting the opportunity cost of using spectrum, for a given level of output. The opportunity cost of spectrum is its value at the margin in terms of the cost of other inputs saved by using the spectrum, while keeping output constant. Setting price equal to the opportunity cost encourages productive efficiency by creating incentives for users to minimise the cost of producing a given level of output. One measure of the marginal benefit of using spectrum (assuming output is held constant) is the cost saved by using a marginal unit of spectrum, e.g. not having to install more base stations. If the marginal benefit to a user is less than the opportunity cost of the spectrum, the user will have an incentive to give up spectrum. When the use of spectrum across the economy is

optimal, the marginal benefit of spectrum across competing uses should be the same, implying that the cost of producing a given set of outputs could not be lowered by re-allocating spectrum[15].

A6.9 Dynamic efficiency can be promoted by adjusting prices regularly - on the basis explained above - to take account of changes in the market. Ofcom proposes to review AIP levels every 3 to 5 years, depending on the specific licence class. Regularly reviewing AIP levels would enable it to reflect such developments and help ensure dynamic efficiency in the use of spectrum. This also fits in with Ofcom's duty to promote innovation.

Taking social benefits into account

A6.10 Ofcom has the power to set AIP fees to take into account objectives other than promoting efficiency. Ofcom can set AIP levels to promote 'economic and other benefits' e.g. social benefits and costs. Ofcom should consider whether it would be more effective and efficient to address social benefits/costs through AIP or through existing policy tools.

A6.11 Some Ofcom stakeholders have argued that AIP should take into account the social benefits (and costs) associated with the use of spectrum by certain services, most notably the public service aspects of broadcasting, but also social benefits associated with emergency services. Since Ofcom intends that AIP fees will reflect the demand for spectrum from competing uses, it could be argued that if AIP ignores social benefits, the benefits of spectrum to the economy and society may not be maximised.

A6.12 Indepen addressed this issue in their review of spectrum pricing. Following the work of Diamond and Mirrlees[16] they concluded that it was better to address externalities such as social benefits by subsidising prices charged to end users rather than by subsidising the price of inputs such as spectrum.

A6.13 Ofcom believes that in general the approach suggested by Indepen is likely to be the better way forward. There may be adverse effects on efficiency if AIP is applied in a way that seeks to promote particular social benefits, and public policy goals may be better pursued through adjusting end-user prices or using other policy tools such as direct intervention. Whatever instrument is used, it is important that a proper consideration of costs, benefits and alternatives is undertaken before the decision is made.

Application of AIP

A6.14 The demand for spectrum, like any good, can potentially vary with its characteristics, location and even the time of day or year. This determines how AIP can be applied to spectrum.

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[15] Productive efficiency is a necessary condition for allocative efficiency. However while productive efficiency concerns how goods and services are produced, allocative efficiency also concerns maximising the value of those goods and services produced to consumers. Therefore productive efficiency is not sufficient by itself to ensure allocative efficiency.

[16] 'Optimal taxation and public production 1: Production efficiency and 2: Tax rules' American Economic Review, vol. 61, Peter Diamond and James Mirrlees, 1971. This work proved that, in competitive markets, if the prices of inputs are set so that a given level of output is produced at the minimum cost (productive efficiency), then retail prices can be adjusted by subsidies so that social benefits are taken into account in markets for end-user goods and services.

A6.15 Characteristics - low frequencies, such as those used for national radio stations, travel much further than high frequencies, such as those used for high speed wireless broadband services. Thus the potential uses of a block spectrum will depend on frequency and this will be reflected in its value and the AIP that attaches to it.

A6.16 Location - the extent to which the demand for a block of spectrum varies by geography depends a lot on its potential use. Private business radio services, such as those used by a large retail store, may only be required for a limited geographic area. Broadcasting in contrast can be both local and national. AIP can therefore be charged on a local, regional or national basis. For local areas, a standard geographic area could be defined, or AIP could be set as proportion of the national value depending on the service area[17].

A6.17 Time - typically licence fees are not set at different rates depending upon when spectrum is used. However, some charges are set pro rata according to how long spectrum is used. Intermittent users of spectrum, such as outside broadcasters at a sports event, are charged (cost recovery fees at the moment) on the basis of to the duration of their use of the spectrum. Under new proposals, classes where AIP is applied will also be able to be time-divided.

A6.18 Following the advent of trading, licences may be partitioned by frequency, geography, or period of use. AIP could then be set for each new licence according to how the licence had been split.

Expanded use of adjusted AIP

A6.19 As explained in Ofcom's Spectrum Pricing consultation in September 2004, Ofcom proposes to amend the methodology for determining AIP in the light of the Indepen review of spectrum pricing. In the past AIP has been set in relation to the value of spectrum for its existing use, we propose, as Indepen recommended, that AIP should be set in relation to the potential use for each band. This proposal was implemented and applied to Business Radio, PMSE and Fixed link licences in the WT Act licence charges regulations 2005. This consultation proposes to further implement this approach to fee charging in other areas of spectrum.

A6.20 Ofcom intends to set fees conservatively, so as not to create disincentives for trading. It will be set towards the bottom range of its value for existing and alternative uses. AIP will then be adjusted towards the equilibrium level at regular review points on the basis of market developments, so that AIP fees will attach to the spectrum itself rather than the existing use of spectrum.

[17] In practice this is determined as the area in which other users would not be able to operate because of interference and is called the area sterilized by the service.

Annex 7

Business Radio Fee Proposals – categorisation

A7.1 The following tables show the bands, coverage, geographical areas (population), and assignment type categorisations used to determine the assignment licence fee.

A7.2 Bands categorisation

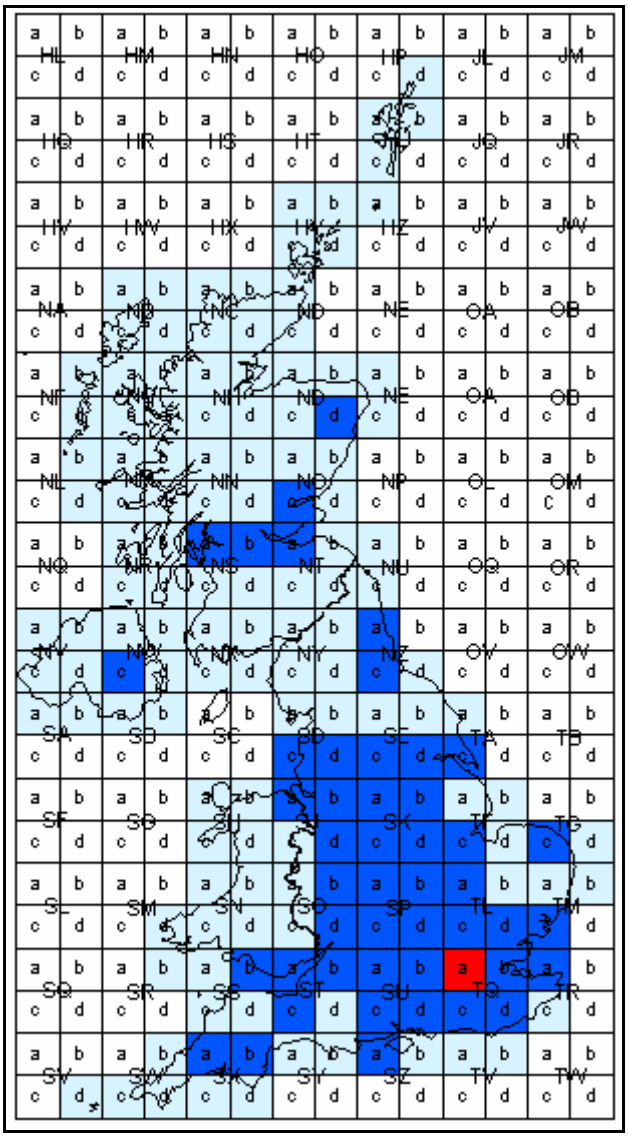
Band categorisations	Bands	Frequency range (MHz)
Most Popular Bands (MPB)	High Band	165.04375 – 173.09375
	UHF 1	425.00625 – 449.49375
	UHF 2	453.00625 – 466.0875
Less Popular Bands (LPB)	Paging	26.225 – 49.49375
	Band 1	55.75 – 68.0
	Low Band	68.08125 – 87.49375
	Mid Band	137.9625 – 165.04375
	Band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

A7.3 Coverage 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 $10m < A_h \leq 30m$
		$P > 5$W and $A_h \leq 10$m
Category 3	60	$P > 5$W and $A_h > 10$m
		$P \leq 5$ W and $A_h > 30$m

A7.4 Population Categorisation

7.4.1 UK map showing the trading units* and division of population between these units (see table 7.4.2)



*based on GB Ordnance Survey National Grid system

7.4.2 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	

A7.5 Shared and exclusive assignment categorisation for the current product 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 8

Example calculations using proposed Satellite fee algorithm

Example 1 - Satellite (Permanent Earth Station)

A8.1 Three permanent earth stations located within 500 metres of a specified site centre have the following characteristics:

A8.2 Earth station 1 has flexibility to operate two emission carriers of bandwidth 36 MHz and 8 MHz on a centre spot frequency of 14.24 GHz working to a single satellite. The maximum power into the antenna is 800 Watts.

A8.3 Earth station 2 has flexibility to operate two emission carriers of bandwidth 192 kHz and 8.5 MHz anywhere over a transponder bandwidth of 72 MHz which is centred on 13.10 GHz to two separate satellites. The maximum power into the antenna is 300 Watts.

A8.4 Earth station 3 has flexibility to operate three emission carriers of bandwidth 64 kHz, 3.5 MHz and 15 MHz anywhere over a frequency range of 500 MHz between 5925 MHz and 6425 MHz. The maximum power into the antenna is 200 Watts.

A8.5 Using the existing fee algorithm, the licence charge would be:

$$Fee = \sqrt{433.4 \times \left[(800 \times 36 \times 0.5) + (300 \times 72 \times 1.0) + (300 \times 72 \times 1.0) + (200 \times 500 \times 1.0)\right]} = £8{,}265$$

A8.6 Using the proposed fee algorithm, the licence charge would be:

$$Fee = \left[52 \times 0.58 \times \sqrt{800 \times 36}\right] + \left[52 \times 0.58 \times \sqrt{(300 \times 72) + (300 \times 72)}\right] + \left[52 \times 1.0 \times \sqrt{200 \times 500}\right] = £27{,}831$$

Example 2 - Satellite (Transportable Earth Station)

A8.7 Two transportable earth stations have the following characteristics:

A8.8 Earth station 1 operates with a maximum power of 60 Watts and maximum bandwidth of 3.5 MHz.

A8.9 Earth station 2 operates with a maximum power of 200 Watts and maximum bandwidth of 36 MHz.

A8.10 The product of power and bandwidth for earth station 1 is 60 x 3.5 = 210. This falls within the range applicable to a category 2 TES licence and therefore the annual fee payable for earth station 1 is:

$$Fee = £1{,}500$$

A8.11 The product of power and bandwidth for earth station 2 is 200 x 36 = 7200. This falls within the range applicable to a category 3 TES licence and therefore the annual fee payable is:

$$Fee = £4{,}500$$

Example 3 - Satellite (Earth station network)

A8.12 It is estimated that the number of terminals in a network is not expected to exceed 600 throughout the course of a year. 350 of these terminals operate with a maximum power of 2 Watt and bandwidth of 300 kHz. The remaining 250 terminals operate with a maximum power of 3 Watts and bandwidth of 3.6 MHz. All transmissions take place in the 14.0-14.25 GHz band.

A8.13 Using the existing fee algorithm, the licence charge would be:

$$Fee = \sqrt{433.4 \times \left[\left(350 \times 2 \times 0.300\right) + \left(250 \times 3 \times 3.6\right)\right]} = £1{,}123$$

A8.14 Using the proposed fee algorithm, the licence charge would be:

$$Fee = 52 \times 0.58 \times \sqrt{\left(350 \times 2 \times 0.300\right) + \left(250 \times 3 \times 3.6\right)} = £1{,}627$$

Annex 9

Derivation of Satellite Earth Station Fee Algorithm

Derivation of Beta

A9.1 The algorithm for deriving fixed link fees : AS = Sp x Bwf x Bf x Plf x Avf which multiplies the spectrum price (£88 per 2 x 1MHz assuming a bidirectional link), the bandwidth (here we take the average bandwidth of the fixed link assignments in the 6 GHz band, which from the Ofcom database is 37.37 MHz), the band factor (0.74 for 6 GHz), the path length factor (the average of all 6 GHz fixed links in the database is 1.0) and the availability factor (the average across the 6GHz fixed links in the database is 1.16). This is then multiplied by 0.75, since a unidirectional fixed link is charged at 75% of the cost of a bidirectional link. This results in a reference fee of £ 2,117.17.

A9.2 This is then used as the basis for deriving β in the earth station fee algorithm by applying bandwidth scaling. The most commonly authorised bandwidth in the 6GHz uplink band is 575MHz, so the appropriate earth station reference fee is £ 2,117.17 x (575/37.37) which is £ 32,576.20.

A9.3 Since the earth station reference fee is based on the most commonly authorised bandwidth in the 6GHz band, the power to be used in deriving β is the average power delivered to the antenna for those 6 GHz band Permanent Earth Station assignments which are authorised for 575 MHz, which is 704 W. The fee of £32,576.20 is that given by the PES algorithm with bandwidth of 575 MHz and power of 704 W. i.e

$$£32{,}576.20 = \beta \times 1.0 \times \sqrt{(704 \times 575)}$$

A9.4 β can thus be derived as 52 (51.2 rounded up to the nearest integer).

Derivation of band factors

A9.5 As described in the last section, the derived beta value of 52 is applicable to the 6 GHz band. The associated earth station fee band factor for the 6 GHz band should therefore be set to 1. In order to reflect the opportunity cost of the other spectrum bands applicable to earth stations, the band factor is varied in conjunction with the band factors applied to the various fixed link spectrum bands. The fixed link band factor for 6 GHz is 0.74, but this has been normalised to 1 for the earth station band factor applicable to 6 GHz. The remaining earth station band factors are therefore calculated by normalising the appropriate fixed link band factor.

A9.6 For example, the fixed link band factor for the range 12.75-15.35 GHz is 0.43. The appropriate earth station band factor for the 12.5-14.5 GHz range is calculated as 0.43 x 1/0.74 = 0.58.

Derivation of TES fees

The proposed PES fee charging algorithm is used as a basis for calculating the appropriate fee for a TES. For simplicity, it is proposed to have three broad categories of TES licence

according to different ranges of the product of the maximum power and bandwidth used by the TES. As shown in the table below, the fee for each category of terminal is calculated by substituting the appropriate values for β (52), Bf (0.58 for the 12.5-14.5 GHz band part of which is available to TES) and the product of maximum power and bandwidth into the PES fee algorithm. For category 1 and 2, the figure for P $\times$ BW used is 100 and 2500 respectively. For a category 3 terminal, the figure for P $\times$ BW used is 23400. This represents a likely maximum power supplied to the input of the antenna of 650 Watts and a maximum modulated bandwidth of 36 MHz.

	P x BW	Derivation of fee per terminal	Proposed fee per terminal
Cat 1	F ≤ 100	$52 \times 0.58 \times \sqrt{100} = £302$	£300
Cat 2	> 100 F ≤ 2500	$52 \times 0.58 \times \sqrt{2500} = £1508$	£1500
Cat 3	F > 2500	$52 \times 0.58 \times \sqrt{23400} = £4614$	£4500

Annex 10

PMSE Fee Change Proposals

A10.1 Table 1: PMSE Digital Wireless Camera – Book On-Line 12 hour

		Current 2005 fee	Proposed 2006 fee
Frequency Range	Per channel	12hr Charge/ Bandwidth Unit	12hr Charge/ Bandwidth Unit
2 - 5 GHz	(10MHz)	Not available	£12.00

No Transaction Charge to apply for on-line bookings

A10.2 Table 2: PMSE Link - Occasional Use 48 hour

		Current 2005 fee	Proposed 2006 fee
Frequency Range	Bandwidth Unit	48hr Charge/ Bandwidth Unit	48hr Charge/ Bandwidth Unit
26 - 65 MHz	12.5kHz	£2.25	£2.75
65 - 470 MHz	12.5kHz	£7.00	£8.50
470 - 1000 MHz	12.5kHz	£2.25	£2.75
1 - 2 GHz	0.5MHz	£14.00	£17.00
2 - 5 GHz	5MHz	£23.00	£28.00
5 - 8 GHz	5MHz	£14.00	£17.00
8 - 20 GHz	5MHz	£7.00	£8.50
20 - 40 GHz	5MHz	£4.50	Not available
> 40 GHz	5MHz	£2.25	Not available

Note: Fee = fee per bandwidth unit x no. of bandwidth units required x no. of 48hr periods

Note: From 2006 20 - 40 GHz and >40 GHz frequency ranges will be removed and the 8 - 20GHz frequency range will become >8 GHz.

A10.3 Table 3: PMSE Low Power - Occasional Use

	Current 2005 fee	Proposed 2006 fee
Type	48hr Charge	48hr Charge
Single Channel	£8.00	£8.50
Multi-Channel or Single wideband channel	£48.00	£51.00

A10.4 Table 4: PMSE Fixed Site

	Current 2005 fee	Proposed 2006 fee
Type	Annual Charge	Annual Charge
Single Channel	£24.00	£28.00
Multi-Channel or Single wideband channel	£96.00	£168.00

A10.5 Table 5: PMSE Low Power – Primary and Secondary Radio microphone

	Current 2005 fee	Proposed 2006 fee
Type	Annual Charge	Annual Charge
Primary UK Channel	£1152	£1382
Secondary UK Channel	£460	£552
Primary Regional Channel	£288	£346
Primary Area or Secondary Regional Channel	£115	£138

A10.6 Table 6: PMSE Link - Primary Regional

		Current 2005 fee	Proposed 2006 fee
Frequency Range	Bandwidth Unit	Annual Charge/ Bandwidth Unit	Annual Charge/ Bandwidth Unit
26 - 65 MHz	12.5kHz	£72	£86
65 - 470 MHz	12.5kHz	£225	£450
470 - 1000 MHz	12.5kHz	£72	£86
1 - 2 GHz	0.5MHz	£432	£518
2 - 5 GHz	5MHz	£750	£900
5 - 8 GHz	5MHz	£432	£518
8 - 20 GHz	5MHz	£216	£259
20 - 40 GHz	5MHz	£144	Not available
> 40 GHz	5MHz	£72	Not available

Note: From 2006, 20 - 40 GHz and >40 GHz frequency ranges will be removed and the 8 - 20GHz frequency range will become >8 GHz.

A10.7 Table 7: PMSE Link - Primary Area and Secondary Regional

		Current 2005 fee	Proposed 2006 fee
Frequency Range	Bandwidth Unit	Annual Charge/ Bandwidth Unit	Annual Charge/ Bandwidth Unit
26 - 65 MHz	12.5kHz	£29	£34
65 - 470 MHz	12.5kHz	£90	£180
470 - 1000 MHz	12.5kHz	£29	£34
1 - 2 GHz	0.5MHz	£172	£206
2 - 5 GHz	5MHz	£300	£360
5 - 8 GHz	5MHz	£172	£206

8 - 20 GHz	5MHz	£86	£103
20 - 40 GHz	5MHz	£58	Not available
> 40 GHz	5MHz	£29	Not available

Note: From 2006, 20 - 40 GHz and >40 GHz frequency ranges will be removed and the 8 - 20GHz frequency range will become >8 GHz.

A10.8 Table 8: PMSE Link - Multi-use type 1 (“Carnet 60 tokens”)

		Current 2005 fee	Proposed 2006 fee
Frequency Range	Bandwidth Unit	Charge for 60 Tokens (type 1)/ Bandwidth Unit	Charge for 60 Tokens (type 1)/ Bandwidth Unit
26 - 65 MHz	12.5kHz	£125	£153
65 - 470 MHz	12.5kHz	£388	£472
470 - 1000 MHz	12.5kHz	£125	£153
1 - 2 GHz	0.5MHz	£777	£944
2 - 5 GHz	5MHz	£1276	£1,554
5 - 8 GHz	5MHz	£777	£944
8 - 20 GHz	5MHz	£388	£472
20 - 40 GHz	5MHz	£249	Not available
> 40 GHz	5MHz	£125	Not available
Low Power	Per Channel		
Radio mic		£444	£472
Multi channel radiomic or single wideband		£2664	£2,831
Wireless Camera (on-line)		Not available	£666

Note: From 2006, 20 - 40 GHz and >40 GHz frequency ranges will be removed and the 8 - 20GHz frequency range will become >8 GHz.

A10.9 Table 9: PMSE Link - Multi-use type 2 (“Carnet 480 tokens”)

		Current 2005 fee	Proposed 2006 fee
Frequency Range	Bandwidth Unit	480 Tokens (type 2)/ Bandwidth Unit	480 Tokens (type 2)/ Bandwidth Unit
26 - 65 MHz	12.5kHz	£810	£990
65 - 470 MHz	12.5kHz	£2520	£3060
470 - 1000 MHz	12.5kHz	£810	£990
1 - 2 GHz	0.5MHz	£5040	£6120
2 - 5 GHz	5MHz	£8280	£10080
5 - 8 GHz	5MHz	£5040	£6120
8 - 20 GHz	5MHz	£2520	£3060
20 - 40 GHz	5MHz	£1620	Not available
> 40 GHz	5MHz	£810	Not available
Low Power	Per channel		
Radio mic		£2880	£3060
Wireless Camera (on-line)		Not available	£4320

Note: From 2006, 20 - 40 GHz and >40 GHz frequency ranges will be removed and the 8 - 20GHz frequency range will become >8 GHz.

A10.10 Table 10: UK Wireless Microphones

	Current 2005 fee	Proposed 2006 fee
Licence	Cost	Cost
UK Wireless Microphone (Annual)	£80 Yearly	£85 Yearly
UK Wireless Microphone (Biennial)	£145 Two yearly	£155 Two yearly

A10.11 Table 11: UK Wireless Microphones (on-line)

	Current 2005 fee	Proposed 2006 fee
Licence	Cost	Cost
UK Wireless Microphone (Annual)	£75 Yearly	£75 Yearly
UK Wireless Microphone (Biennial)	£135 Two yearly	£135 Two yearly

A10.12 Table 12: Programme Sound Links

		Current 2005 fee	Proposed 2006 fee
Frequency Range	Bandwidth Unit	Annual charge/bandwidth unit	Annual charge/bandwidth unit
26 - 65 MHz	12.5kHz	£43	£52
1517 -1525 MHz	0.5MHz	£205	£246

A10.13 Table 13: Restricted Service Programme Sound Links

		Current 2005 fee	Proposed 2006 fee
Frequency Range	Bandwidth Unit	Charge/bandwidth unit for 30days	Charge/bandwidth unit for 30days
26 - 65 MHz	12.5kHz	£12	£14
65 – 470 MHz	12.5kHz	£36	£43
470 – 1000 MHz	12.5kHz	£12	£14
1517- 1525 MHz	0.5MHz	£100	£120