



Office of the Director of
**Telecommunications
Regulation**

CONSULTATION PAPER

Expanding Opportunities in the Radiocommunications Market: Fixed Wireless Access (FWA)

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Foreword

This consultation document seeks views on a number of new proposals in relation to fixed wireless access (FWA), which is one of several technology platforms that can provide access to broadband public telecommunications networks. The proposals are intended to provide a further stimulus for the development of broadband services in Ireland, and are based on an extensive review of the European FWA market undertaken recently by this Office. The proposals include rationalisation of existing broadband FWA spectrum assignments to provide greater scope for service development and diversification, a new licensing regime for local area FWA systems and further provision for licence exempt wireless access systems.

In the three years since liberalisation, competition has transformed the nature of the Irish telecommunications market. There are now 43 operational licensed public telecommunications operators¹. New market entrants have a 20% share of the fixed telecommunications market and a full range of carrier pre-select services provide users with unprecedented choice in the provision of voice and narrow band services. The major challenge in the telecommunications market now is to develop similar levels of choice and competition in broadband service provision. FWA can provide fast and cost-effective service rollout and is particularly suitable where alternative wire-line platforms such as digital subscriber line (DSL) are not feasible.

I would welcome the views of all interested parties on these new proposals, which I believe will help to further the development of a competitive broadband market. Please submit your responses to the address in section 7, by no later than 28th March, 2002.

Etain Doyle,
Director of Telecommunications Regulation.

¹ Source: ODTR Quarterly Review, December 2001

1 Introduction

The fixed telecommunications market has become increasingly competitive, with availability of new services and the entry of new players, leading to increasing customer choice. It is important that this trend is maintained if the growing demand for broadband network access is to be met. Fixed Wireless Access (FWA) is one of several delivery mechanisms that can provide broadband connectivity or high-speed access to the Internet and other interactive services. As FWA is a radio based technology, the work and time associated with laying cable is dramatically reduced, thus assisting in faster roll-out time. When FWA services were licensed in the late 1990's it was anticipated that this type of technology would bring about significant further competition in telecommunications markets.

Since then, development of FWA services internationally has been limited, partly reflecting wider difficulties in the global telecommunications market and partly due to the availability of alternative platforms such as digital subscriber line (DSL) and fibre. However, the unique characteristics of FWA together with reductions in equipment costs mean this technology is still likely to have a key role to play in developing the Irish broadband market.

In Document ODTR 01/43 "New Opportunities in the Radiocommunications Market: Fixed Wireless Access (FWA)", the ODTR undertook to review the future of FWA licensing in Ireland. This document presents the conclusions of that review. The review addressed a number of issues, including the extent to which FWA services are available in Europe, the availability of FWA equipment, the services delivered over FWA networks and the growing interest in provision of public services using licence-exempt spectrum. The document invites comments on a number of specific proposals that have been developed in the light of the review and are intended to stimulate the provision of FWA and related services in Ireland. These proposals relate to:

- rationalisation of spectrum assignments in the 26 GHz band to reflect the potential range of services that might be offered over FWA networks;
- licensing of local area FWA networks in the 10.5 GHz band; and
- use of licence exempt spectrum in the 5.725 – 5.875 GHz band to provide public access to data networks.

The Director of Telecommunications Regulation ("the Director") is responsible for the regulation of the Irish Telecommunications sector in accordance with national and EU legislation. The mission of the Director and her Office (the ODTR) is to open up the market to benefit the user through the development of competition.

This consultation paper is does not constitute legal, commercial or technical advice. The Director is not bound by it. The consultation is without prejudice to the legal position of the Director or her rights and duties under relevant legislation and does not form part of any formal tender process.

2 Background

Fixed Wireless Access (FWA), is a means of delivering access to the public switched telephone network by means of radio rather than conventional wire line connections. FWA is sometimes referred to as Fixed Wireless Point to Multipoint Access (FWPMA), but services may be delivered using other network architectures such as “mesh” configurations or point to point links. FWA can be used to replicate the existing wire line local loop or to provide direct access to broadband data networks such as the Internet, or both. FWA thus has the potential to enhance competition in the market by providing alternative access networks to the existing local loop and to provide broadband access in areas where alternative platforms such as digital subscriber line (DSL), cable or fibre might not be feasible. The availability of multiple platforms - DSL, cable, satellite and FWA - provides some assurance that the technological and commercial challenges faced by each platform can be overcome by the use of substitutes in different parts of the country, and increases the prospects of infrastructure competition, with the attendant benefits for users of better services and competitive prices.

In 1999, the ODTR held a competitive tender for eight fixed wireless access licences (the FWPMA Licences), four in the 26 GHz band, two comprising spectrum in the 2 GHz and 3.5 GHz bands, one in the 2.4 GHz band and one in the 10.5 GHz band. All except the 10.5 GHz licence were awarded on completion of the competition. The successful applicants were:

- eircom: 2 GHz / 3.5 GHz and 26 GHz
- Chorus (formerly Princes Holdings): 2 GHz / 3.5 GHz and 26 GHz
- Esat Telecom: 2.4 GHz and 26 GHz
- Formus: 26 GHz

Subsequently, Esat Telecom declined the offer of a 2.4 GHz licence, but retained its 26 GHz licence. Formus launched an FWA service in late 2000, but owing to financial difficulties the company went into voluntary liquidation in March 2001 and the licence was subsequently revoked. A second competition for additional licences in the 28 GHz band and a re-tendering of the 10.5 GHz licence was held in November 2000, but there were no applicants.

The revocation of the Formus licence, the apparent lack of interest in further national licences in the 26/28 GHz and 10.5 GHz bands, and the emergence internationally of public fixed access services based on licence-exempt technology prompted a further ODTR consultation in June 2001. This addressed the following issues in relation to FWA:

- i. A proposal to offer a new national broadband FWA licence comprising 2 x 56 MHz of 26 GHz and, where justified, 2 x 30 MHz of 10.5 GHz radio frequency spectrum;
- ii. A proposal to offer 2 x 30 MHz of 10.5 GHz radio frequency spectrum to existing FWA licensees;
- iii. An exploration of the possibility of future local area FWA licences in areas not covered by the existing FWA licences;
- iv. An exploration of the possibility of licensing the limited provision of FWA and FWA type services (based on Radio LAN technology) to third parties in the 2.45 GHz, 5 GHz and 40 GHz radio frequency spectrum bands.

The responses to the consultation indicated that there was some interest in further FWA licences, but that a different approach to licensing may be appropriate to reflect the limited development to date of the FWA market.

3 Structure of the paper

This paper is structured in a number of main sections as follows:

Section 4 summarises the outcome of the FWA market review.

Section 5 addresses specific licensing proposals arising from the review, namely:

- Services deliverable over FWA networks and implications for spectrum requirements;
- Licensing of spectrum in the 10.5 GHz band on a local area , first-come first-served basis;
- The delivery of public access fixed wireless services in the 5.725 – 5.875 GHz band on a licence-exempt basis

Section 6 addresses existing FWA licences

Section 7 explains the procedure for submitting responses.

4 Outcome of FWA Market Review

In her response to last year's consultation on "New Opportunities in the Radiocommunications Market: Fixed Wireless Access", the Director committed to carry out a full review to identify the best basis for future licensing of FWA in Ireland. That review has now been completed and the principal conclusions are summarised below.

- i. The take-up of broadband technologies including FWA has been muted throughout Europe to date, with several countries having no subscribers and an estimated penetration level across the EU of around 0.1% of total fixed line connections. It is estimated that there are currently no more than 50,000 broadband FWA subscribers in the EU, compared with over 1.5 million DSL and cable modem subscribers.
- ii. FWA equipment costs appear high relative to alternative broadband access platforms but prices are falling, and there are indications that lower cost, consumer oriented customer premises equipment is now becoming available in a number of frequency bands.
- iii. There are indications from other European countries that the economic case for broadband FWA networks, particularly those in higher frequency bands where more bandwidth is available, can be strengthened where they provide wholesale or infrastructure services to service providers or other network operators.
- iv. Whilst FWA networks operating in frequency bands below 20 GHz typically position their services as an alternative to platforms such as DSL, offering bit rates up to 2 Mbit/s, networks operating in higher frequency bands tend to offer higher bandwidth services, reflecting the generally higher costs and greater bandwidths associated with those frequencies.
- v. In some countries (e.g. France) regional and national FWA licences have been licensed and there are indications that this can enhance choice and competition in the provision of broadband services.
- vi. There is growing interest in the use of licence-exempt spectrum to deliver wireless public access services, principally Internet access to suitably equipped laptop computers at locations such as airports, hotels and coffee shops. Licence exempt

bands have also been used in some instances to provide wireless access on a wider geographic basis, in the form of Metropolitan Area Networks (MANs). Licence exempt spectrum is not protected from interference however and cannot therefore be considered an alternative to licensed spectrum where quality of service is a consideration. In the light of these conclusions, a number of proposals have been developed and these are addressed in the next section.

5 Future FWA Licensing Proposals

In the light of the FWA market review, the Director has developed a series of proposals intended to encourage the roll out of FWA services in Ireland. These relate to the range of services that can be delivered over FWA networks and the implications for spectrum requirements to deliver these services, licensing of regional FWA networks and the use of licence exempt spectrum to deliver public access to data networks. These are addressed in more detail in the following sections.

5.1 Services deliverable over FWA networks and implications for spectrum requirements

FWA is primarily intended to deliver access services to end-users, and FWA licences include conditions requiring operators to meet roll out and coverage obligations relating to the delivery of such services. However, the market review has identified a growing interest among FWA operators in using FWA networks to deliver wholesale or infrastructure services in addition to access services. There is a growing consensus that such services can enhance the economic basis for FWA rollout.

The review also revealed that operators using 26 GHz spectrum are in general concentrating on higher bandwidth services than those offered by platforms such as DSL, enabling higher revenues to be generated to reflect the higher costs associated with operating in higher frequency bands. Support of high bandwidth access services and wholesale / infrastructure provision requires access to sufficient radio spectrum that is not unduly encumbered by the need to co-ordinate with other operators, and this has prompted the Director to review the current configuration of FWA spectrum in the 26 GHz band.

The currently licensed spectrum comprises paired blocks of 2 x 56 MHz per operator (see figure 1a) and does not provide any separation (or "guard bands") between adjacent

operators' frequencies. Consequently up to half the assigned spectrum is subject to co-ordination requirements which may in the future limit an operator's ability to develop additional services such as wholesale provision, whilst meeting their existing service and coverage obligations for access services. Additional spectrum in the 26 GHz band is currently designated for review and in the future may be made available to existing operators, for additional FWA licences or for other radicomunication services, depending on market developments. Should additional spectrum be made available to existing licensees, the total spectrum licensed will be subject to a maximum of 2 x 112 MHz per operator and will be made available on a demonstrable need basis.

In response to a previous consultation², some respondents suggested that there would be efficiency benefits if any additional spectrum which might be made available in the future to existing operators were to be located adjacent to the operators' existing spectrum assignments. The withdrawal from the market by Formus Communications provides an opportunity to review the current spectrum assignments in the 26 GHz band and to rationalise these in a manner which would facilitate this and provide greater opportunities for operators to expand their service portfolios.

On this basis, the Director is seeking views on the possibility of modifying the spectrum assignments as indicated in figure 1b. Following the proposed rationalisation, a total of 2 x 280 MHz of spectrum remains under review. This spectrum may be made available in the future to existing licensees to cater for service expansion, on a demonstrable need basis and subject to compliance with the conditions of the licences. Spectrum may also be made available in the future depending upon market developments, for further national or regional broadband FWA licences, or for point to multipoint backhaul purposes or may be made available for use by other fixed services.

² "Extending Choice...Expanding the market for FWA, Response to the Consultation, document ODTR 00/81

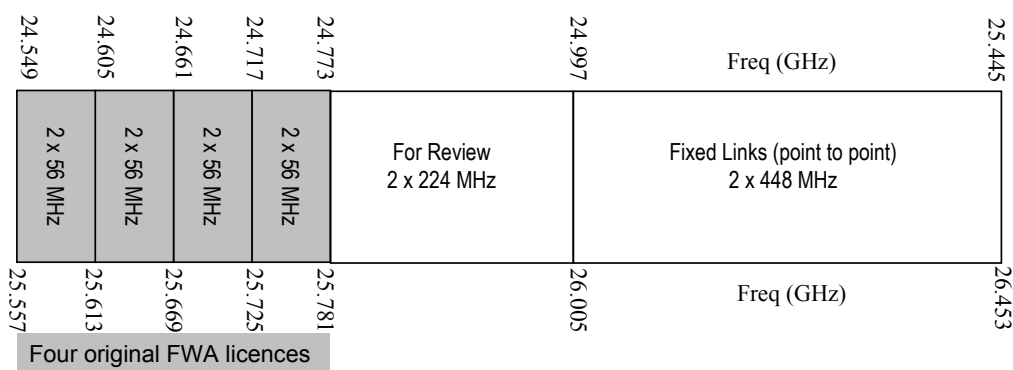


Figure 1a: Original 26 GHz spectrum assignments

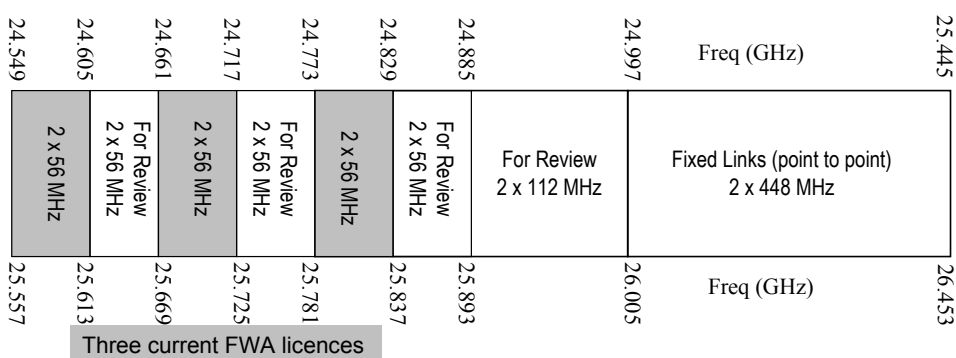


Figure 1b: Proposed revision of 26 GHz spectrum assignments

Q.1 Do you agree with the proposed rationalisation of the 26 GHz band spectrum? (if you do not, please provide supporting arguments)

Q.2 Do you have a view on how the 26 GHz spectrum currently identified for review in the future should be licensed?

5.2 Licensing of spectrum in the 10.5 GHz band on a local area , first-come first-served basis

The possibility of regional FWA licences was raised by the ODTR in previous consultations, and related documentation³. In response to the consultations⁴, the majority of respondents who expressed a view were in favour of regional FWA licences being

³ Opening the market for fixed wireless point to multi-point access services - Consultation Paper, ODTR 98/32, Competition for Award of Licences to Provide Fixed Wireless Point to Multipoint Access - Information Notice, ODTR 99/07, Extending Choice...Expanding the market for Fixed Wireless Access (FWA), document ODTR 00/47, ODTR 01/43 New Opportunities in the Radiocommunications Market: Fixed Wireless Access (FWA),

⁴ See document ODTR 00/81, ODTR 01/70

offered in the future, but there was no consensus on the most appropriate frequency band for regional services.

The Director has considered the options available for introducing regional FWA networks and has concluded that these should in the first instance be accommodated in a different frequency band from existing networks. This is because no further FWA spectrum is currently available in the 2 GHz and 3.5 GHz frequency bands and remaining spectrum in the 26 GHz bands may be required for expansion of existing networks, subject to future demonstrable need, or for other services such as point to point links.

On two previous occasions, national FWA licences in the 10.5 GHz band have been offered. In each case no applications were received that were compliant with the minimum entry requirements. During the previous FWA consultation, some respondents cited limited equipment availability as a factor in the lack of interest in this band. The market review recently conducted by the ODTR suggested that equipment availability in this band is improving and that there is a choice of equipment at prices comparable to, and in some cases lower than, other FWA frequency bands.

In view of this apparent improvement in equipment availability and the existence of 10.5 GHz licences in several other European countries, the Director is minded to introduce a regional i.e. local area FWA licensing regime in the 10.5 GHz frequency band.

The details of the licensing regime will be developed over the coming months, taking account of the responses to this consultation, however it is anticipated that systems will be licensed on a first-come, first served basis and that each licence⁵ will cover a single FWA base station. Fees will be charged on a per-MHz basis and an initial spectrum cap will apply. The licence will be renewed on an annual basis only if the spectrum is in use by the time renewal falls due. Additional spectrum may be made available on a demonstrable need basis and subject to availability, where there is clear evidence that the existing spectrum assignment is being fully utilised. A balance may need to be struck between the permissible coverage areas served by individual licensed base stations and the number of stations that can be licensed in the available spectrum; views are therefore

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- ⁵ Individual base station licences will be issued under the Wireless Telegraphy Acts, 1926-1988. A single, separate licence issued under the Postal and Telecommunications Services Act 1983 will also be required to provide public telecommunications services.
 - It should be noted that the Wireless Telegraphy licence is an annual renewable licence and whilst the ODTR will endeavour to renew the licence, this may not always be possible (due to, for example, non-compliance with the licence requirements, international spectrum agreements, requirements to optimise the use of the spectrum etc).

sought on what constraints on individual local area FWA base stations might be appropriate.

In the previous consultation, the possibility of making 10.5 GHz spectrum available to existing licensees was mooted, and licensees were invited to submit firm expressions of interest in this spectrum. No such expressions were received and the Director does not therefore propose to make any specific offer of 10.5 GHz spectrum to existing licensees. Licensees would however be entitled to apply for local area licences in the band on a first come first served basis should such a licensing regime be adopted.

In order to maximise the spectrum available for local area licences in the 10.5 GHz band, the Director may investigate the options for increasing the available spectrum for FWA services in the band beyond the current 2 x 30 MHz. A new ITU recommendation⁶ is being developed which identifies the bands 10.15 – 10.3 and 10.5 – 10.65 GHz for fixed services (i.e. 2 x 150 MHz), however the lower band is currently also used in Ireland by radio amateurs and the upper band is used by short range motion sensors. Views are therefore sought on how additional spectrum for FWA services might be made available in these bands whilst accommodating the requirements of these other users.

Q.3 Do you agree with the proposal to introduce a local area licensing regime for FWA systems in the 10.5 GHz band? If you do not, please provide supporting arguments and any alternative proposals.

Q.4 Do you agree with the proposal to use a first-come, first served approach to licensing local area FWA systems?

Q.5 Do you agree with the proposal to licence local area FWA systems on the basis of individual base stations?

Q.6 Do you have a view on whether licensing of local area FWA systems should be restricted geographically, and if so in which areas licences should or should not be awarded?

Q.7 Do you have a view whether constraints should be placed on the coverage of individual local area FWA base stations, and if so what these constraints should be?

Q.8 Do you have a view on the size of the initial spectrum assignment that should apply to local area FWA licences in the 10 GHz band?

Q.9 Do you have a view on whether additional spectrum beyond the current 2 x 30 MHz should be made available in the 10 GHz band for FWA services, and if you support this option what measures are required to accommodate other users of this spectrum?

Comments from existing users in this band, i.e. from the Radio Experimenter Community and from users of short range devices would be welcomed.

5.3 Delivery of public access fixed wireless services in the 5.725 – 5.875 GHz band on a licence-exempt basis

In her response to the previous FWA consultation, the Director confirmed that short range public access services may be provided in licence exempt bands, subject to compliance with relevant European specifications and, where applicable, the holding of a basic or general telecommunications licence. The relevant licence exempt bands are:

- 2.45 GHz (2400 – 2483.5 MHz)
- 5 GHz (5150 – 5350 MHz, 5470 – 5725 MHz and 5.725 – 5.875 MHz)

The 2.45 GHz band is already extensively used in Ireland for Wireless Local Area Networks (WLANs), serving both private and public applications. The band is also used extensively by a variety of other short range devices, including RF identification devices, video links and more recently by Bluetooth devices, which provide simple wireless connections between mobile phones, computers and a wide variety of other equipment. Bluetooth is expected to become a standard feature of the majority of mobile phones, laptop computers and personal digital assistants over the next few years and recent European studies have suggested that the devices may be susceptible to interference from high power emissions within the 2.4 GHz band.

⁶ Draft New Recommendation ITU-R F.[Doc. 9/48]Radio-Frequency Block Arrangements For Fixed Wireless Access (FWA) Systems In The Range 10.15-10.3/10.5-10.65 GHz

Hence the scope to accommodate significant numbers of outdoor wireless access systems, or to operate at higher power levels than those currently permitted without causing undue interference to other users is likely to be very limited. Increasing demand for high bandwidth WLANs is expected to lead to similar pressure on the two lower parts of the 5 GHz band in the future, similarly restricting the scope for extensive deployment of outdoor systems in that band.

Responses to the previous FWA consultation indicated that there was interest in the provision of fixed wireless access services in licence-exempt bands with coverage beyond that attainable with power levels in existing bands. The Director accepts that whilst they would be unable to provide the surety of service quality that licensed spectrum can provide such licence exempt systems could usefully complement licensed FWA networks and help to extend the provision of broadband access within Ireland. Extension of the coverage area would require an increase in the permissible transmitter EIRP⁷, which as already noted is unlikely to be realisable in the 2.4 GHz and lower 5 GHz bands without risking undue interference to other users.

The Director is therefore proposing to permit the deployment of higher power fixed access systems in the 5.725 – 5.875 GHz frequency band. This band, which is currently subject to a 25 milliwatt EIRP limit in Europe, is already being used for deployment of licence exempt metropolitan area networks (MANs) in the USA and consideration of this possibility on a European basis is underway within ETSI's ⁸ Broadband Radio Access Networks (BRAN) project. The ODTR has also recently proposed to CEPT that consideration be given to raising the EIRP limit in this band to facilitate MAN type operations. ETSI is currently proposing an EIRP limit of 1 watt in the band. Should the Director decide to proceed with the introduction of higher power services in the 5.725 – 5.875 GHz prior to any European decision on the future use of the band, the Director may decide to maintain a register of operations in the band to facilitate any modifications that may be required in the future as a result of European mandates.

Public access systems may also be operated in the HiperLAN⁹ bands (5150 – 5350 MHz, 5470 – 5725 MHz), which are subject to EIRP limits of 200 mW (indoor use only) and 1W (indoor and outdoor use) respectively, but as noted above, these bands are likely to

⁷ Equivalent Isotropically Radiated Power

⁸ European Telecommunications Standards Institute

⁹ HiperLAN refers to an ETSI standard for high performance wireless LANs operating at data rates up to 50 Mbps)

become intensively used by private HiperLAN or similar type systems. It should be noted that licence exempt spectrum is not entitled to any protection from interference and should not therefore be considered as an alternative to licensed FWA spectrum, nor is it likely to be suitable for applications where a specified quality of service is required. The 5725 – 5875 MHz band will continue to be available on a primary basis for radiolocation and fixed satellite (Earth-space) services and on a non-protected basis for a variety of other services, including radio amateurs, low power devices and industrial, scientific and medical (ISM) equipment. The band has also been designated for use by Road Transport and Traffic Telematic systems (e.g., road tolling, traffic information applications etc.).

Q.10 Do you agree with the proposal to increase the EIRP limit in the 5.725 – 5.875 GHz band to facilitate the provision of licence exempt MAN services, and if so do you have a view on what an appropriate EIRP limit would be?

Q.11 What types of service do you think would be suitable for delivery over licence exempt MANs in the 5.725 – 5.875 GHz band?

6 Existing FWPMA Licences

As noted in the introduction to this document, the take-up of FWA services in the market place has been limited, both in Ireland and throughout Europe, but the Director remains of the view that the technology has the potential to make a significant contribution to the promotion of competition in the broadband market.

However, in view of the slow take-up of FWA services to date, informal representations have been made to the ODTR by existing licensees regarding the level of the annual fee associated with the FWPMA spectrum licences.

At present, FWPMA licences are subject to an annual spectrum fee of:

€762 per MHz, payable on issue of the Licence;

€1,333 per MHz, payable on first renewal;

€1,905 per MHz, payable annually thereafter.

In view of these representations, the Director is seeking comments in relation to the annual spectrum fees which apply to FWPMA spectrum.

Q. 12 Do you agree with the representations being put forward that suggest that the level of fees applying to FWPMA spectrum is too high? Please support your arguments.

7 Submitting comments

All comments are welcome, but it would make the task of analysing responses easier if comments were referenced to the relevant question numbers from this document.

The consultation period will run from 20th February, 2002 to 28th March, 2002 during which the Director welcomes written comments on any of the issues raised in this paper. The Director will take due account of the comments received in determining policy for the future licensing of FWA services. In order to promote further openness and transparency the ODTR will publish the names of all respondents and make available for inspection responses to the consultation at her Offices.

The Director appreciates that some of the issues raised in this paper may require respondents to provide confidential information if their comments are to be meaningful. Respondents are requested to clearly identify confidential material and if possible to include it in a separate annex to the response. Such information will be treated as strictly confidential.

All responses to this consultation should be clearly marked "Reference: Submission re ODTR 02/20" and sent by post, facsimile or e-mail to:

Ms. Sinead Devey

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to arrive on or before 5p.m. 28th March, 2002.

8 Glossary

CEPT	Conference of European Post and Telecommunications Administrations
DSL	Digital Subscriber Line
ECC	Electronic Communications Committee (constituent body of CEPT)
EIRP	Equivalent Isotropically Radiated Power
ETSI	European Telecommunications Standards Institute
FWA	Fixed Wireless Access
FWPMA	Fixed Wireless Point to Multipoint Access
MAN	Metropolitan Area Network
WLAN	Wireless Local Area Network

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