



Commission for
Communications Regulation

Consultation Paper

Release of Spectrum in the 2300 – 2400 MHz band.

Proposed Options & License Conditions

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All responses to this consultation should be clearly marked:-
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Contents

1	Foreword	2
2	Executive Summary	3
3	Introduction	4
3.1	INTERNATIONAL FREQUENCY ALLOCATIONS AND ASSIGNMENTS.....	4
3.2	EUROPEAN DEVELOPMENTS IN THE 2.3 GHZ BAND	5
3.3	CURRENT AND PROPOSED USAGE OF THE 2.3 GHZ BAND WORLDWIDE.....	5
3.4	COORDINATION AGREEMENTS	6
4	Current Status and use of the Band in Ireland	7
4.1	2.3 GHZ BAND	9
4.1.1	<i>Rurtel usage in Ireland</i>	9
4.1.2	<i>Dáil TV</i>	9
4.1.3	<i>SAP/SAB</i>	10
4.2	FREQUENCY BANDS ADJACENT TO THE 2.3 GHZ BAND	10
5	Possible options for the award of spectrum in the 2.3 GHz band	11
5.1	REGULATORY CONSIDERATIONS	11
5.1.1	<i>Licence Type</i>	11
5.1.2	<i>Award Process</i>	15
5.1.3	<i>Licence Fees</i>	15
5.1.4	<i>Licence Duration</i>	16
5.1.5	<i>Spectrum Cap</i>	16
5.1.6	<i>Utility Conditions</i>	18
5.2	TECHNICAL CONSIDERATIONS.....	18
5.2.1	<i>Channel Bandwidth</i>	18
5.2.2	<i>Power Limits</i>	19
5.2.3	<i>Block Edge Mask</i>	19
5.2.4	<i>Unwanted Emission</i>	20
6	Submitting Comments.....	21
	Annex A – Consultation Questions.....	22
	Annex B – Block Edge Mask	24

1 Foreword

The Commission for Communications Regulation (ComReg) has a statutory obligation to ensure the efficient management and use of the radio spectrum. With that obligation in mind, ComReg promotes competition in the provision of electronic communications services across all platforms.

Spectrum below 4 GHz is considered optimal for the provision of mobile wireless services to consumers. As reflected in our Spectrum Strategy¹, ComReg is committed to making spectrum below 4 GHz available for new and innovative wireless technologies and services in a timely manner and subject to market demand.

In making any spectrum available, ComReg is mindful of its obligation to ensure that efficient use is made of radio frequencies and that radio spectrum is made available through processes that are non-discriminatory, objective, proportionate and transparent.

As a result of the interest expressed in responses received to ComReg's spectrum strategy, and taking account of international developments and the need to ensure that Ireland is at the forefront of bringing new technologies and services to consumers, ComReg is now consulting on proposals to make spectrum in the 2300-2400 MHz band available for licensing of electronic communications services in Ireland.

I welcome the views of all interested parties on the important and interesting proposals addressed in this consultation.

**Alex Chisholm,
Commissioner**

¹ ComReg Document 08/50a - Raiteis Straiteise maidir le Bainistíocht Speictrim 2008 – 2010 and ComReg Document 08/50 - Spectrum Management Strategy Statement 2008 – 2010.

2 Executive Summary

In this Consultation document, ComReg sets out its proposals for making the 2300 – 2400 MHz (2.3 GHz band) available for licensing throughout Ireland. This band is not currently harmonised in Europe, however ComReg is of the view that there are significant benefits to be gained by both Irish consumers and service providers in making this spectrum available in a timely manner. There is work being carried out at European Telecommunications Standards Institute (ETSI) level which would see the band harmonised throughout Europe, which would further push the potential of the band for broadband wireless systems.

The proposals look at possible channel bandwidth sizes as well as various options on how best to make the spectrum available, i.e. national, regional or local area licences. In addition, ComReg outlines its proposals to implement a block edge mask as well as making the spectrum available via an auction. Other technical parameters relating to usage of the spectrum (e.g. power limits, out of band emissions limits) are discussed.

To promote competition, ComReg proposes a spectrum cap, which would set out a maximum amount of spectrum which could be held by any one operator in any one geographic area.

This consultation also addresses the need to consider legacy services that are currently licensed in this band. ComReg outlines the various legacy issues and current users of the spectrum and the geographical location of where these services are currently deployed.

3 Introduction

In its strategy statement¹ “Spectrum Management Strategy Statement 2008 – 2010”, ComReg undertook to release spectrum in the 2300 – 2400 MHz (2.3 GHz) band. This proposal had been supported by the large number of positive responses received on this issue in the consultation that preceded the Spectrum Management Strategy Statement².

In Ireland, the 2.6 GHz band (2500 – 2690 MHz) is currently licensed for the provision of MMDS services and will not be available for other electronic communications services in the short to medium term. The 2.3 GHz band has comparable propagation characteristics to the 2.6 GHz band and whilst not harmonised across Europe, ComReg believes that making the 2.3 GHz band available in a timely manner could facilitate any operator wishing to deploy new and innovative technologies and services. It is proposed to release this band without any restrictions on the type of service (fixed, mobile, nomadic) that can be offered, and on a technology neutral basis.

Currently limited usage is made of part of the 2.3 GHz band in a small number of geographic areas. This is detailed in Section 4.

Regulatory considerations surrounding the proposed licensing of spectrum in the 2.3 GHz band are detailed in Section 5.1. These considerations include potential licence type, fees and award process.

Section 5.2 details technical considerations which need to be addressed, including suitable channel size and block/band edge masks.

3.1 International Frequency Allocations and Assignments

At the International Telecommunication Union (ITU) World Radiocommunication Conference held in 2007 (WRC-07³), footnote 5.384A⁴, of Article 5 of the ITU Radio Regulations was amended identifying the 2.3 GHz band for use by administrations wishing to implement International Mobile Telecommunications (IMT). It must be noted, however, that this identification of the band for IMT does not preclude administrations from permitting deployment of other applications within this band. In releasing spectrum in the 2.3 GHz band ComReg is proposing to adopt a technology neutral approach.

² ComReg Document 08/50s - Submissions to Consultation 08/20 - Proposed Strategy for Managing the Radio Spectrum 2008 – 2010.

³ See <http://www.itu.int/ITU-R/index.asp?category=conferences&rlink=wrc&lang=en>

⁴ ITU Radio Regulations, Article 5, footnote 5.384A: The bands, or portions of the bands, 1710 – 1885 MHz, 2300 – 2400 MHz and 2500 – 2690 MHz, are identified for use by administrations wishing to implement International Mobile Telecommunications (IMT) in accordance with Resolution 223 (Rev. WRC-07). This identification does not preclude the use of these bands by any application of the services to which they are allocated and does not establish priority in the Radio Regulations. (WRC07)

3.2 European Developments in the 2.3 GHz band

Use of the 2.3 GHz band varies throughout Europe with one example being extensive use for military operations. Nevertheless, there is interest in designating the band for use by broadband wireless services (BWA). As a result of this interest a technical committee within the European Telecommunications Standards Institute (ETSI), ETSI BRAN (Broadband Radio Access Networks) has approved a New Work Item to develop a Systems Reference Document (SRDoc), on “Broadband Wireless Systems in the frequency range 2300 MHz to 2400 MHz range” by early 2010. This SRDoc will be the basis for development of a technical standard which could underpin harmonised usage of the band throughout Europe.

Although the 2.3 GHz band is not currently on the list of frequency bands being investigated at the European level for application of the Wireless Access Policy for Electronic Communications (WAPECS)⁵, it is the intention of the European Commission, through its Radio Spectrum Committee, to gradually expand the range of frequency bands covered by this policy. Meanwhile, ComReg proposes to licence this band using the WAPECS principles of technology and service neutrality as applicable, with minimal technological constraints.

It will be necessary to put some technical parameters in place to ensure coexistence between different technologies in the same and adjacent bands. With this objective in mind, ComReg proposes to adopt a two-phase approach by i) applying similar technical parameters as are currently applied in the 2.6 GHz band in the interim period and ii) then, when it is available, to adopt the relevant ETSI standard for the 2.3 GHz band with its associated conditions and technical parameters .

3.3 Current and proposed usage of the 2.3 GHz band worldwide

There is limited usage of the 2.3 GHz band for commercial deployments at this moment in time; however, this is likely to change dramatically in the near future as a result of new technology and equipment becoming available on a wider scale as technologies mature. A range of technologies could potentially utilise this 2.3 GHz spectrum for provision of wireless broadband services. This has led to many countries to release this particular frequency band (e.g. USA) and other countries are planning to release this spectrum in the near future.

Two technologies which promise to deliver high capacity mobile broadband, WiMAX and LTE, are both seen as being suitable for deployment in the 2.3 GHz band. Indeed there are currently WiMAX deployments in this band in some countries (notably Malaysia where services are being offered to end users), with deployments taking place in numerous other countries in the very near future. WiMAX and LTE are expected to be the most widely available next generation technology.

⁵ WAPECS is a framework for the provision of electronic communications services within a set of frequency bands to be identified and agreed between European Union Member States in which a range of electronic communications networks and electronic communications services may be offered on a technology and service neutral basis, provided that certain technical requirements are met, i.e., to avoid interference, to ensure the effective and efficient use of the spectrum and the authorisation conditions do not distort competition.

Developments in this band are likely to be substantially increased on foot of China Mobile carrying out LTE tests in Shanghai in 2010. This highlights the importance of 2.3 GHz in Ireland for the provision of mobile broadband technology.

3.4 Coordination agreements

There are currently no cross border coordination agreements in place in relation to this frequency band. However ComReg and Ofcom⁶ are currently considering establishing a Memorandum of Understanding ('MoU') regarding the co-ordination of frequency usage in the 2.3 GHz band between the Republic of Ireland and the United Kingdom.

Users of frequencies in the 2.3 GHz band will be required to adhere to applicable conditions in the agreed MoU.

⁶ Ofcom is the independent regulator and competition authority for the UK communications industries

4 Current Status and use of the Band in Ireland

Figure 1 sets out the current allocation of spectrum to various Radiocommunication services within the frequency range 2200 – 2500 MHz, which encompasses the 2.3 GHz band and adjacent frequency bands. Figure 2 shows the current designation of spectrum within these same frequency bands, in other words the intended usage by specific applications within those allocations. This information is extracted from ComReg's national frequency allocation table.⁷

In Europe and internationally, the 2300 – 2400 MHz band is allocated to the fixed, mobile and radiolocation services on a co-primary basis, and to the amateur service on a secondary basis. Stations which are allocated on a primary basis are protected from harmful interference from any non-primary services. Stations of a secondary service shall not cause harmful interface to stations of any primary service and cannot claim protection from harmful interference from stations of any primary service.

ComReg also allows SAP/SAB to utilize frequencies in the band on a non-interference non-protected basis for the duration of the event.

⁷ ComReg Document 08/90 – Radio Frequency plan for Ireland – published 21 November 2008

Frequency Allocation

	Fixed			Fixed	Mobile Satellite (S/E)
Space Research (S/E)(S/S)	Mobile except aeronautical mobile	Mobile			
Space Operation (S/E)(S/S)		Radiolocation			Fixed
Earth Exploration-Satellite (S/E)(S/S)	Space Research (Deep Space)(S/E)	Amateur		Mobile	
Mobile		Amateur-satellite			

2200 MHz
2290 MHz
2300 MHz
2400 MHz
2450 MHz
2483.5 MHz
2500 MHz

Figure 1: Current allocation of spectrum between 2200 – 2500 MHz in Ireland

Spectrum Designation

Fixed Point to Point Links	Fixed Links (Infrastructure)	Rurtel	Short Range Devices		Satellite Personal Communication Service
		Dail TV			
SAP/SAB (Wireless Cameras)	SAP/SAB (Wireless Cameras)	SAP/SAB (Wireless Cameras)		Amateur-satellite (Secondary)	
		Amateur (Secondary)			

2200 MHz
2290 MHz
2300 MHz
2308 MHz
2316 MHz
2400 MHz
2450 MHz
2500 MHz

Figure 2: Current use of spectrum between 2200 – 2500 MHz in Ireland

4.1 2.3 GHz band

The 2.3 GHz band has been allocated internationally and in Europe to the Fixed and Mobile Services on a co-primary basis, while Amateur and Radiolocation Services have access to the band on a secondary basis⁸.

Currently, in Ireland the sub-band 2307 - 2327 MHz is assigned to Rurtel (Rurtel also has associated frequency assignments in the band 2407-2427 MHz). The sub-band 2308-2316 MHz is assigned to Dáil TV.

The Amateur Service has access to the whole of the 2.3 GHz band on a secondary basis, whilst services ancillary to programming/services ancillary to broadcasting⁹ (SAP/SAB) utilises spectrum across the whole 2300 – 2400 MHz band. SAP/SAB assignments are made on a case by case basis, and operate on a non-interference non-protected basis..

4.1.1 Rurtel usage in Ireland

The Rurtel (Rural Telecommunications) service operated by *eircom* provides wireless telephony services to customers in rural areas of the country where it is not economically viable to provide copper to the premises. *eircom* is licensed to use 2 x 20 MHz of spectrum (2307 – 2327 MHz paired with 2407 – 2427 MHz) to provide this service using point to multipoint fixed links. The service is deployed in a limited number of specific geographic locations, which can be seen on the map of current utilisation of the spectrum band on Comreg's website¹⁰.

In any future licence award process it will be necessary to ensure that the Rurtel service, to which frequencies are assigned under a primary Fixed Service allocation, does not suffer interference from any new licensed services using the same or adjacent spectrum. Therefore, ComReg does not propose to assign frequencies in the range 2300 – 2330 MHz in geographical areas where Rurtel operates.

4.1.2 Dáil TV

Currently Aervision is licensed to transmit the Dáil TV channel using 8 MHz of spectrum in the 2308 – 2316 MHz part of the band. The usage of this frequency assignment is geographically limited to the Dublin area⁹.

In any future licence award process it will be necessary to ensure that this application does not suffer any interference from any new licensed services using the same or adjacent spectrum. Therefore, ComReg does not propose to assign frequencies in the range 2300 – 2330 MHz in geographical areas where Dáil TV operates.

⁸ Utilisation of spectrum on a secondary basis means that stations must not interfere with primary users of the spectrum, nor can the user claim any protection from interference from primary users.

⁹ Information regarding SAP/SAB usage can be found in ComReg Document 08/08 – Radio Licensing for Special Events and Temporary Use in Ireland

¹⁰ Map can be viewed here, http://comreg.ie/radio_spectrum/google_map.704.googlemap.html

4.1.3 SAP/SAB

SAP/SAB applications including wireless cameras are authorised for use in the 2.3 GHz band under the Special Events and Temporary Licensing regime¹¹. Licences offered for SAP/SAB permit operation on a non-interference, non-protected basis in the frequency range 2300 – 2330 MHz with Equivalent Isotropically Radiated Power (EIRP) limits of 100 mW (in order to protect Rurtel and Dail TV users) and, in the case of wireless cameras, with an EIRP limit of 5 W in the frequency range 2330 – 2400 MHz.

ComReg recognises that the 2.3 GHz band is an important band supporting the needs of wireless cameras at special events, and that adequate spectrum needs to be set aside for the continued use of wireless cameras. For example, approximately 42% of wireless camera assignments were made in the 2.3 GHz band in Ireland in 2008. Therefore, ComReg will need to take SAP/SAB applications into consideration when deciding on the use of the band¹². If other applications are permitted to operate within the 2.3 GHz band there could be implications for the availability of spectrum within the band for wireless cameras. It should be noted that this issue is under consideration in relation to the preparation of Agenda Item 1.5 for World Radiocommunication conference 2011 (WRC-11). CEPT preparatory group (CPG) Project Team D (PT-D) are responsible for developing European proposals on this item. Various frequency bands are being discussed. ECC Frequency Management Working Group project team FM PT 45 are currently considering options for various bands in the context of Agenda Item 1.5 for WRC-11.

4.2 Frequency bands adjacent to the 2.3 GHz band

The frequency band immediately below the 2.3 GHz band, 2290 – 2300 MHz, is currently utilised for SAP/SAB⁹ on a national basis. The frequency band (2400 – 2483.5 MHz) immediately above the 2.3 GHz band is a major band for licence exempt applications, including so-called WiFi wireless local area networks (WLAN), operating on non-interference, and non-protected basis. The latter band is also identified on a global basis for industrial, scientific and medical (ISM) applications.

The technical constraints placed on the usage of the 2.3 GHz band will need to be sufficient to adequately limit the out-of-band emissions, where applicable, to protect current and future adjacent band users.

¹¹ Information regarding SAP/SAB usage can be found in ComReg Document 08/08 – Radio Licensing for Special Events and Temporary Use in Ireland

¹² The 2.3 GHz band is a core band supporting the needs for wireless cameras at special events, while the operation of such cameras is intermittent i.e. for events only and not constant for 365 days per year. Typically, there is more than enough spectrum to deal with the usual demand for wireless cameras. However, there are exceptional circumstances where there is a very large demand for 2.3 GHz spectrum by wireless cameras for a short period, for example when the Ryder Cup was hosted in Ireland, or when the Volvo Ocean Race was hosted in Galway. At these times, typically all of the band would be assigned to wireless cameras. Should ComReg decide to release spectrum within the 2.3 GHz band for other services, this could cause the demand for spectrum for wireless cameras exceeding supply at times.

5 Possible options for the award of spectrum in the 2.3 GHz band

The 2.3 GHz band is allocated in Ireland on a co-primary basis to the Fixed and Mobile services. Part of the band is authorised for use in limited geographical areas for Dáil TV (8 MHz) and to *eircom* to provide telephony services in rural areas, Rurtel (20 MHz). Nationally, there is 74 MHz of spectrum, 2327 MHz – 2400 MHz, that is currently unassigned. In areas where Rurtel and Dáil TV are not used¹³, the whole 2300- 2400 MHz band is available for assignment. The current usage of the 2.3 GHz band is shown in Figure 2. In addition, the map of areas where these frequencies are utilised can be found on the ComReg website.

ComReg now plans to release spectrum within this band and in so doing protect current licensees that operate on a geographically limited scale in parts of the band.

Q. 1. ComReg proposes to release spectrum for licensing additional services in the 2.3 GHz band. Do you support ComReg’s proposal to release spectrum in the band? Are there other issues, besides those identified above, which ComReg needs to take into account in releasing spectrum in the band? Please give reasons for your answer.

5.1 Regulatory Considerations

5.1.1 Licence Type

ComReg has identified four possible approaches to licensing that may be applied in different parts of the 2.3 GHz band. The potential licence types, and which part of the band they may utilise, based on the efficient use of spectrum is shown in Table 1.

	2300 – 2330 MHz	2330 – 2400 MHz
Licence Type		
National	Not suitable	Suitable
Regional	Not particularly suitable	Suitable
Local Area	Suitable	Not suitable
Closer User Group	Suitable	Not suitable

Table 1: Potential licences within the 2.3 GHz band

These different licensing regimes are described further below.

¹³ Map of Ireland showing locations where 2.3 GHz spectrum is currently used by Rurtel and Dáil TV available here, http://comreg.ie/radio_spectrum/2300_MHz_Usage.704.2300MHzusage.html

5.1.1.1 National Licences

Under this option, 70 MHz of spectrum in the 2330 – 2400 MHz part of the band could be made available for national licences. National licences would enable operators to deploy services in this band throughout the entire country. This could facilitate innovative technologies and services being made available to all parts of the country enabling both rural and urban consumers to benefit. To ensure that operators maximise use of the spectrum for the benefit of end users, ComReg would apply conditions to any such licence.

Conditions that could be applied to licences could include roll out conditions and coverage requirements. For example, a licensee could need to achieve 50% geographical coverage within 2 years of acquiring the licence and 70% geographical coverage within 3 years. To incentivise these conditions it has proven useful with other spectrum releases to apply performance bonds to the licence conditions as well as recovering spectrum if licensees fail to meet their licence conditions.

Clearly, the benefit of acquiring a national licence is in the scale of operations that can be achieved. A national licence provides an opportunity for a licensee to provide services to end users throughout the state. However it requires the licensee to commit to upfront investment in national infrastructure before any certainty or market success can be assessed on a practical basis.

5.1.1.2 Regional Licences

Some operators may prefer to access the 2.3 GHz band on a regional basis. This could be accommodated by making spectrum in the range 2330 – 2400 MHz available on a regional basis. For example, the country could be divided into regions, such as provinces, or groups of counties, and each potentially with its own licence conditions as appropriate. Based on the population of each region the roll out conditions could be varied for each region. Operators could then apply for a licence to serve a particular region rather than the entire country. One further possibility is to hold a competition on a regional basis and allow licensees to aggregate regions to form what is in effect a multi-regional or even a national licence.

The key benefit in acquiring a regional licence is that it allows a licensee to roll out a network in a specific region or regions of interest, without the commitment and cost of rolling out a nationwide network.

The main disadvantage is that there may be potential for certain, less densely populated areas, to remain unserved.

5.1.1.3 Local Area Licences

Local area licensing schemes provide operators with the opportunity to grow their business organically and with incremental expense. It is a licensing scheme that has been used successfully in the Fixed Wireless Access Local Area¹⁴ (FWALA)

¹⁴ More information regarding the FWALA licensing regime can be found in ComReg document 06/17R4 – Revised Guidelines to Applicants for Fixed Wireless Access Local Area (FWALA) Licences

licensing scheme whereby operators defined the area they wished to serve and as their business grew they were able to obtain further licences to increase the footprint of their service area. Accordingly, in this option, the 2300 – 2330 MHz part of the band is made available on a local area basis with the potential to grow service areas in a fashion akin to the FWALA scheme. More spectrum, in the range 2330 – 2400 MHz, could also be allocated to facilitate additional local area licensing, depending on demand.

The advantage of this type of scheme is that it reduces the barriers for entry to smaller operators. As a result of the small geographical scale of the licences, they are invariably cheaper to obtain with simpler coverage and roll-out conditions attached. However, the downside of this approach is that it can promote fragmentation in terms of service availability on a geographic basis and limit the benefits of mobility that a regional or national licence naturally confers. In addition the limited amount of spectrum that it is proposed to make available may not be sufficient to promote competition.

5.1.1.4 Closed user groups

A further possible award option could see some of the spectrum available to users wishing to provide services to closed user groups such as schools or universities on a not-for-profit-basis. There is a growing demand in the second and third level education sectors for wireless access for students on large college and university campuses¹⁵.

One possible option to meet this demand would be to reserve a portion of the spectrum available in this band, namely the 30 MHz between 2300 – 2330 MHz, for the provision of services to educational institutions. This spectrum could be made available in specific locations with power limitations to enable the spectrum to be reused in adjacent geographical areas. This could then be licensed in a fashion not unlike a FWALA type licence as proposed in section 5.1.1.3.

¹⁵ Please see the submission by HEAnet to ComReg consultation "Proposed strategy for managing the radio spectrum: 2008 -2010", ComReg document 08/50s, which stated their requirement for 30 MHz of licensed spectrum, and quoting 2.3 GHz band as one option available

- Q. 2. Which of the licence types outlined above, in your view are the most appropriate for the 2.3 GHz band: national, regional , local or closed user group? Please cite reasons for your answer.**
- Q. 3. Do you believe there is a possibility for a combination of all or some of the above in the 2.3 GHz band and, if so, in what way? Please set out your suggested approach.**
- Q. 4. If you believe that there should be a combination of licence types in this band, how much spectrum should be allocated to each of the licence types defined in Question 2? For example, if you recommend in response to Question 2 that spectrum should be released on a national and regional basis, how much spectrum should be allocated to each licence type? Please give reasons for your answer.**
- Q. 5. If you believe that licences in this band should be offered on a regional basis, on what basis should ComReg determine the regions, e.g. provinces, groups of counties? Please support your response as appropriate.**
- Q. 6. If you believe Local Area licences to be the superior choice, what geographic area should these licences incorporate and on what basis? (For example, FWALA licences incorporate service area 20km from defined centre point of licence). What conditions should ComReg implement to mitigate potential interference between users using the same spectrum in adjacent geographical areas?**
- Q. 7. In order to protect current users of the 2.3 GHz band, ComReg proposes that any potential licences offered in the range 2300 – 2330 MHz would be released on the basis of local area or closed user group licences only. Do you agree with this proposal? If not, please give reasons for your answer.**

5.1.2 Award Process

In its Radio Spectrum Strategy statement, document 08/50, ComReg reiterated its commitment to using market mechanisms where appropriate to award licences. If the 2.3 GHz band is released on a national and/or regional basis, ComReg is proposing to use an auction as the assignment method for commercial assignments for this spectrum band (i.e. a different method could be used for closed user groups). Should spectrum be released on a local area basis, ComReg proposes to use a beauty competition, akin to the recent FWALA competition¹⁶. In advance of any award process, ComReg will take appropriate steps to ensure that all interested parties are fully aware of the competition arrangements and any reserve price that might apply¹⁷.

Q. 8. Do you agree with ComReg’s proposal that if this spectrum is offered on a national and/or regional basis, it should be by means of an auction or auctions? Do you agree with ComReg’s proposal to release any spectrum for local area licensing under a beauty competition? Please supply reasons to support your response.

5.1.3 Licence Fees

In establishing licence fees, ComReg will charge a price that appropriately values the spectrum. Licence fees must be set in a manner, which strikes the balance between offering users equitable and feasible access to spectrum, while also extracting a fair value for the opportunity costs associated with the spectrum. In setting licence fees ComReg has previously benchmarked fees set in other countries for similar spectrum releases and scaled the values to Ireland’s unique situation. Due to a limited amount of administrations having released spectrum in the 2.3 GHz band at this time, ComReg may benchmark against fees set for similar spectrum bands, by similar countries to Ireland. Another method of setting licence fees is carrying out economic analysis on the opportunity cost of spectrum in the band.

The licence fee that would be charged will vary dependent on the type of licence issued, i.e. a national licence will incur a proportionately larger licence fee than that of a regional or local licence.

¹⁶ More information relating to the recent FWALA comparative evaluation competition is available in ComReg document 09/24 – “Releasing Channels E and J, and making spectrum in the 3.6 GHz – 3.8 GHz band available for FWALA licensing”

¹⁷ ComReg has yet to determine what auction format (single sealed bid, multiround ascending etc) will be used in this process as the format of the auction will largely depend on the type of licences that ComReg will make available i.e. national, regional etc.

Q. 9. Do you agree with ComReg’s proposal to use benchmarking to assist in setting a fair licence fee for the spectrum? Alternatively, do you believe there is an alternative, superior method of setting the fees? Please supply reasons to support your response.

5.1.4 Licence Duration

The duration of licences offered to operators of radio spectrum in different spectrum bands vary depending on issues specific to the spectrum band in question. In determining the licence duration ComReg must balance the operator’s requirement for adequate licence duration to make it feasible to roll out a network and make a return on investment, with the potential for spectrum to be sterilised for long periods thereby limiting the opportunities for other operators to exploit the spectrum resource, as technologies and applications develop.

With this in mind, ComReg believes that a fixed licence duration of between 10 to 15 years would provide operators with predictability of their potential spectrum rights, while also allowing an adequate period to see a return on investment. A shorter licence term may be necessary for any closed-user licences or local area licences that are issued.

Q. 10. Do you agree with ComReg’s proposal to make licence duration of spectrum in the 2.3 GHz band between 10 - 15 years long? Please supply reasons to support your response.

5.1.5 Spectrum Cap

ComReg is mindful that operators need access to an adequate amount of spectrum in a particular band in order to increase efficiencies with respect to capacity, and to make it viable to roll out a network. In order to ensure that operators have access to spectrum, and to facilitate competition, ComReg is proposing to limit the amount of spectrum held by any one licensee in this band in any given geographic area to 30 MHz, irrespective of licence type. For example, if the distribution of licence types discussed in section 5.1.1 was done along the lines of 40 MHz allocated for national licences (more than 1 national licence, e.g. 2 x 20 MHz for different operator’s, 4 x 10 MHz for different operator’s), 20 MHz allocated for regional licences, 10 MHz for Local Area licences and 30 MHz for closed user groups, any given operator would not be allowed to obtain more than 30 MHz of spectrum for any given area.

Two examples of the potential distribution of different licence types across the band are shown in Figures 3 and 4.

The proposed spectrum cap would apply to the example in Figure 3 as follows:

an applicant who avails of the 30 MHz national licence would not be able to acquire any further spectrum in the band as the spectrum cap for all locations in the country has been reached.

An applicant could apply for a regional licence, and obtain up to 30 MHz of the 40 MHz available for that licence type, in that region. For example, if Leinster was one region, that applicant can obtain 30 MHz for that region. However, that same applicant could not acquire any spectrum on a local area basis within Leinster, as it has already reached the spectrum cap with the 30 MHz in the regional licence.

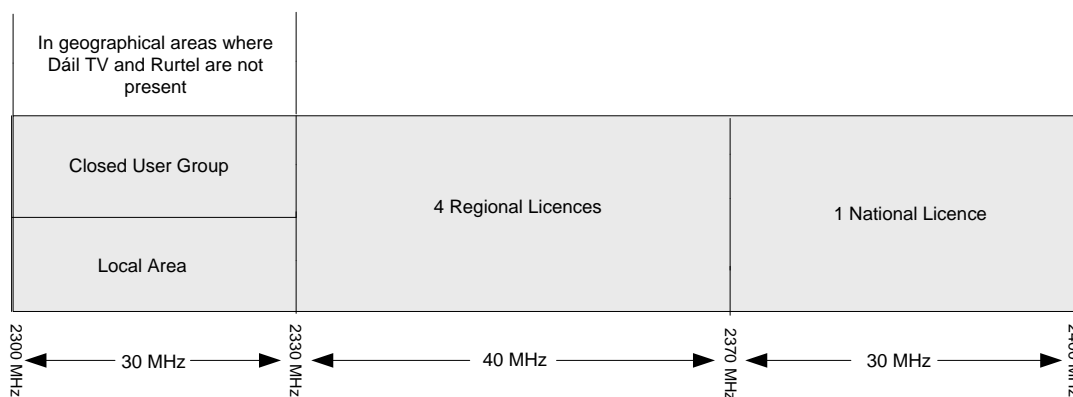


Figure 3: Example 1 of potential distribution of licence types in the band

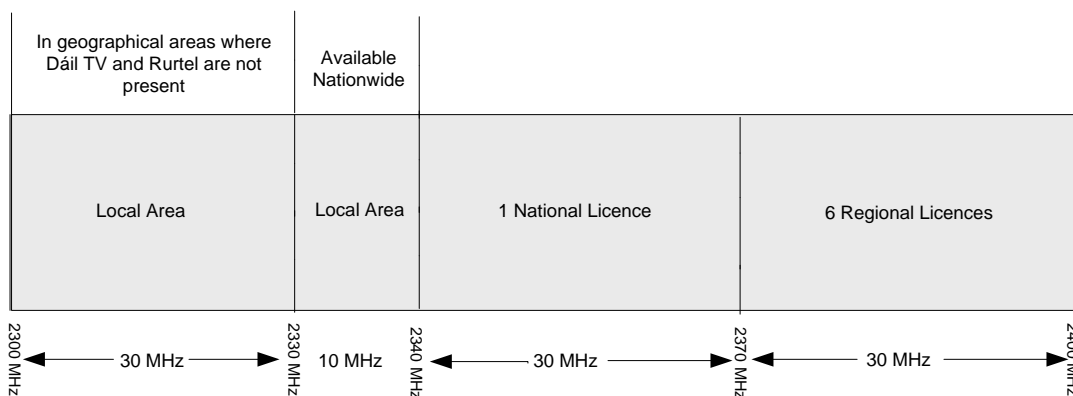


Figure 4: Example 2 of potential distribution of licence types in the band

It should be noted that this spectrum cap would only apply for any new licences issued in the band, i.e. licensees of the Dáil TV and Rurtel applications would be eligible to acquire spectrum up to the maximum value not exceeding the agreed cap.

Q. 11. Do you agree with ComReg’s proposal to limit the amount of spectrum available to any given operator to 30 MHz for a given area? Please supply reasons to support your response.

5.1.6 Utility Conditions

To prevent deliberate spectrum hoarding or to recover spectrum in the case of commercial failure, ComReg is of the view that it will be necessary to insert a “use it or lose it” clause in the licence conditions attached to any licences issued.

The utility clause would be linked to rollout and coverage obligations. Use it or lose it clauses can take many forms. One example is that a licence can be revoked should ComReg have evidence that a licensee does not utilise spectrum assigned to provide wireless services within a specific period from the date of issue of the licence.

Another type of use it or lose it clause could result in a reduction in the area in which a licensee can provide services, should ComReg be satisfied that the licensee is not providing wireless services in the licensed areas. For example, in the case of a national licence if a licensee was not providing wireless services in a licensed area, ComReg could reduce the geographic area to a regional licence excluding those areas where services were not being deployed.

Should ComReg include a performance bond component in the issuing of spectrum, any performance bond would be forfeit by the licensee should it not meet rollout and coverage obligations set out in its licence.

Q. 12. Do you agree with ComReg’s proposal to attach utility conditions to any potential licences in this band? If not, why? Please provide reasons for your answers.

5.2 Technical Considerations

ComReg will be adopting a technology and service neutral approach to this licensing process and will be applying the WAPECS principle of minimum technical constraints to the use of this band following any award process.

5.2.1 Channel Bandwidth

In order to minimise the potential for interference between adjacent channel licensees it will be necessary to assign an appropriate channel spacing for this band. ComReg has yet to make any decision on the appropriate channel spacing for this band and is seeking the views of interested parties on what would be most appropriate e.g., 5 MHz, 8.75 MHz, 10 MHz or 20 MHz etc. Other Administrations¹⁸

¹⁸ E.g., Hong Kong and Norway

who have released spectrum in this band have typically done so in blocks of 5 MHz and 10 MHz.

It should be noted that the CEPT project team, ECC PT1, responsible for IMT spectrum related issues, has stated that it does not intend to develop frequency (channelling) arrangements concerning this frequency band, and at this time, the ITU has not developed a channel plan for this band. Should the ITU generate a channel plan for this band prior to any potential release of the spectrum, ComReg would move to adopt the standardised ITU channel plan as appropriate.

Q. 13. In your view what would be the most appropriate channel spacing for the 2.3 GHz band? Please give detailed reasons for your answer.

5.2.2 Power Limits

ComReg proposes the following power limits for the use of this spectrum:

- Fixed Link Stations - maximum EIRP limited to 200 watts
- Fixed CPE – maximum EIRP limited to 25 watts
- Mobile base stations – maximum EIRP limited to 200 watts.
- Mobile terminals – maximum EIRP limited to 5 watts

Q. 14. Do you support ComReg's proposed power limit? If not, please set out the reasons for your answer.

5.2.3 Block Edge Mask

The WAPECS principle is based around making spectrum available on a technology and service neutral basis with minimal technical restrictions other than those required to avoid interference and to ensure the effective and efficient use of the spectrum. To this end, ComReg is proposing to adopt a Block Edge Mask (BEM) to be implemented by licensed operators in this band. However, a BEM cannot be developed until a decision has been made on the channel bandwidth that will apply to this band. There is currently no ETSI standard for the 2.3 GHz band, and therefore ComReg is proposing that the BEM that applies to the 2500 – 2690 MHz band, as detailed in the CEPT Report 19¹⁹, could be adapted to the 2.3 GHz band once a decision on the channel spacing for the 2.3 GHz band has been made. This BEM is detailed in Annex B.

For the purpose of developing a channel plan for the 2.3 GHz frequency band, 2300 – 2330 MHz is considered included in the band. This means that users of spectrum

¹⁹ Draft Report from CEPT to the European Commission response to the Mandate to develop least restrictive technical conditions for frequency bands addressed in the context of WAPECS

within the band can use the BEM when operating frequencies close to and above 2330 MHz.

Any decision made at this time is without prejudice to standards being developed by ETSI, and ComReg reserves the right to adopt the relevant ETSI standards at an appropriate time.

Q. 15. Do you agree with ComReg’s proposal to adapt the Block Edge Mask that applies to the 2500 – 2690 MHz band to the 2.3 GHz band, once a channel bandwidth has been agreed? Please provide reasons to support your response.

5.2.4 Unwanted Emission

In order to protect users of spectrum adjacent to the 2.3 GHz band, it is necessary to impose a limit on unwanted emissions from stations operating in the 2.3 GHz band. Unwanted emissions in this context comprise out-of-band emissions (emission on a frequency or frequencies anywhere outside the band 2.3 – 2.4 GHz), spurious emissions and harmonics. Unwanted emissions are to be measured when the transmitter is operating at the manufacturer’s rated power (not exceeding the maximum permitted EIRP level permitted in the band) at the output of the final amplifier stage or referenced to that point.

Based on ITU-R Recommendation SM.329-10²⁰ ComReg proposes to set the limit on unwanted emissions as follows:

- for licensees operating fixed services in the band the limit is set at -50 dBm in a 100 kHz bandwidth.
- for licensees operating mobile services in the band the limit is set at -36 dBm in a 100 kHz bandwidth for both base stations and mobiles.
- Any fixed CPE equipment will need to meet the fixed service limits.

ComReg reserves the right to adopt the relevant ETSI standards if/when they are finalised.

Q. 16. Do you agree with ComReg’s proposal to impose the unwanted emission limits detailed above? Please provide reasons to support your response.

²⁰ ITU-R Recommendation SM.329-10 – Unwanted emissions in the spurious domain, 2003.

6 Submitting Comments

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

The consultation will run until 5pm on 29 July 2009 during which the Commission welcomes written comments on any of the issues raised in this paper.

Having analysed and considered the comments received, ComReg will review the subject matter of the consultation and publish a report on the consultation which will, inter alia summarise the responses to the consultation. As a number of issues need to be finalised a further consultation may be necessary.

In order to promote openness and transparency ComReg will publish all respondents submissions to this consultation, subject to the provisions of ComReg's guidelines on the treatment of confidential information – ComReg 05/24. We would request that electronic submissions be submitted in an unprotected format so that they can be appended into the ComReg submissions document for publishing electronically.

Please note

ComReg appreciates that many of the issues raised in this paper may require respondents to provide confidential information if their comments are to be meaningful.

As it is ComReg's policy to make all responses available on its website and for inspection generally, respondents to consultations are requested to clearly identify confidential material and place confidential material in a separate annex to their response.

Such Information will be treated subject to the provisions of ComReg's guidelines on the treatment of confidential information – ComReg 05/24.

Annex A – Consultation Questions

List of Questions

- Q. 1. ComReg proposes to release spectrum for licensing additional services in the 2.3 GHz band. Do you support ComReg’s proposal to release spectrum in the band? Are there other issues, besides those identified above, which ComReg needs to take into account in releasing spectrum in the band? Please give reasons for your answer..... 11
- Q. 2. Which of the licence types outlined above, in your view are the most appropriate for the 2.3 GHz band: national , regional , local or closed user group? Please cite reasons for your answer. 14
- Q. 3. Do you believe there is a possibility for a combination of all or some of the above in the 2.3 GHz band and, if so, in what way? Please set out your suggested approach. 14
- Q. 4. If you believe that there should be a combination of licence types in this band, how much spectrum should be allocated to each of the licence types defined in Question 2? For example, if you recommend in response to Question 2 that spectrum should be released on a national and regional basis, how much spectrum should be allocated to each licence type? Please give reasons for your answer. 14
- Q. 5. If you believe that licences in this band should be offered on a regional basis, on what basis should ComReg determine the regions, e.g. provinces, groups of counties? Please support your response as appropriate..... 14
- Q. 6. If you believe Local Area licences to be the superior choice, what geographic area should these licences incorporate and on what basis? (For example, FWALA licences incorporate service area 20km from defined centre point of licence). What conditions should ComReg implement to mitigate potential interference between users using the same spectrum in adjacent geographical areas?..... 14
- Q. 7. In order to protect current users of the 2.3 GHz band, ComReg proposes that any potential licences offered in the range 2300 – 2330 MHz would be released on the basis of local area or closed user group licences only. Do you agree with this proposal? If not, please give reasons for your answer. 14
- Q. 8. Do you agree with ComReg’s proposal that if this spectrum is offered on a national and/or regional basis, it should be by means of an auction or auctions? Do you agree with ComReg’s proposal to release any spectrum for local area licensing under a beauty competition? Please supply reasons to support your response. 15
- Q. 9. Do you agree with ComReg’s proposal to use benchmarking to assist in setting a fair licence fee for the spectrum? Alternatively, do you believe there is an alternative, superior method of setting the fees? Please supply reasons to support your response. 16
- Q. 10. Do you agree with ComReg’s proposal to make licence duration of spectrum in the 2.3 GHz band between 10 - 15 years long? Please supply reasons to support your response. 16

- Q. 11. Do you agree with ComReg’s proposal to limit the amount of spectrum available to any given operator to 30 MHz for a given area? Please supply reasons to support your response. 18
- Q. 12. Do you agree with ComReg’s proposal to attach utility conditions to any potential licences in this band? If not, why? Please provide reasons for your answers. 18
- Q. 13. In your view what would be the most appropriate channel spacing for the 2.3 GHz band? Please give detailed reasons for you answer. 19
- Q. 14. Do you support ComReg’s proposed power limit? If not, please set out the reasons for your answer. 19
- Q. 15. Do you agree with ComReg’s proposal to adapt the Block Edge Mask that applies to the 2500 – 2690 MHz band to the 2.3 GHz band, once a channel bandwidth has been agreed? Please provide reasons to support your response. 20
- Q. 16. Do you agree with ComReg’s proposal to impose the unwanted emission limits detailed above? Please provide reasons to support your response. 20

Annex B – Block Edge Mask

Statement A, there should be a 5MHz separation between unrestricted blocks for cases where a TDD block is adjacent to a FDD-UL block or where two TDD blocks are adjacent to each other. The separation between these unrestricted blocks is referred to as a restricted block. The use of the restricted block is addressed in statement B.

It should also be noted that a 5MHz TDD block immediately adjacent to a FDD DL block may suffer an increase risk of interference. It is not necessary to treat this block as a restricted block in terms of reduced in-band power (as the protection requirement for the adjacent FDD block is different from the restricted block case). However, any users of this block should be aware that the adjacent unrestricted FDD block edge masks for base station transmissions have not been designed to protect this block from adjacent block interference and therefore must accept the fact that there is a significant risk that this 5 MHz TDD block may suffer increased interference. Administrations should also be aware of the above and therefore treat it appropriately when they award spectrum.

In cases where licensees choose to coordinate, including the case of synchronized TDD, such coordination could include an agreement to enable the restricted block to be operated as an unrestricted block. In addition, if licensee choose to coordinate and agree they can relax the baseline requirement level within their respective blocks.

The EIRP BEMs specified below are based on the following assumptions.

$$43\text{dBm} + 17\text{dBi} = 60\text{dBm (in a 3.94MHz channel)}$$

$(P_{\text{TxMacro}}) (G_{\text{TxMacro}})$

This is converted for the integration bandwidth of 5 MHz (+1dB conversion) to make the level less technology specific. The result is shown in the table A4.2 below:

Table A4.2 Base Station

Maximum in-block EIRP =	61dBm/5MHz	This limit can be relaxed up to 68dBm/5MHz by the administration for specific deployments (e.g. rural area, high mast, site-sharing) provided that it does not significantly increase the risk of TS receiver blocking.
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This value assumes 1 single transmit antenna.

The definition of the block specific out-of-block mask for unrestricted frequency blocks is specified in table A4.3 below:

Table A4.3 Base Station Out-of-block EIRP BEM

Offset from relevant block edge	Maximum mean EIRP
Start of band (2500MHz) to -5 MHz	Baseline requirement level

(lower edge)	
-5.0 to -1.0 MHz (lower edge)	+4 dBm/ MHz
-1.0 to -0.2 MHz (lower edge)	+3 + 15(Δ_f + 0.2) dBm/30kHz
-0.2 to 0.0 MHz (lower edge)	+3 dBm/30kHz
0.0 to +0.2 MHz (upper edge)	+3 dBm/30kHz
+0.2 to +1.0 MHz (upper edge)	+3 - 15(Δ_f - 0.2) dBm/30kHz
+1.0 to +5.0 MHz (upper edge)	+4 dBm/ MHz
+5.0 MHz (upper edge) to end of band (2690 MHz)	Baseline requirement level

Where: Δ_f is the frequency offset from the relevant block edge (in MHz)

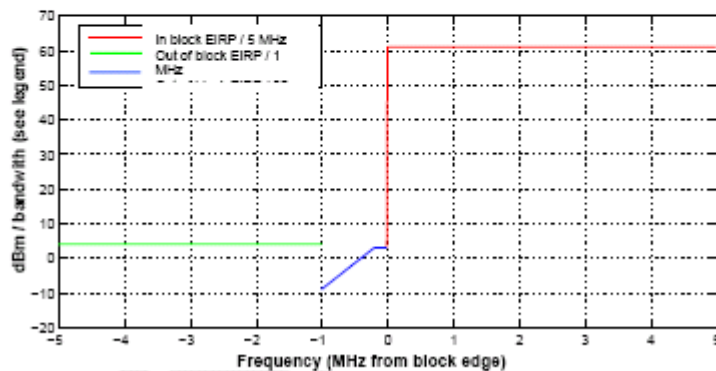


Figure A4.3: Base Station unrestricted block EIRP BEM BS lower block edge