



Commission for  
**Communications Regulation**

**CONSULTATION PAPER**

# Use and Development of Radiocommunications Services in the 2500 – 2690 MHz Bands

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**An Coimisiún um Rialáil Cumarsáide**

**Commission for Communications Regulation**

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## **Foreword**

This consultation document seeks views on proposals for the long-term strategy for use of the 2500 – 2690 MHz frequency band. This band is currently used for the delivery of Microwave Multipoint Distribution services (MMDS), which provide a multi-channel TV service to areas currently beyond the reach of cable networks. The band has also been identified internationally as a long-term expansion band for third generation (3G) mobile services. Migration from analogue to digital TV transmission is already underway within the band and when complete may release a substantial portion of the spectrum for other uses.

This document presents a number of options for the future use of the 2500-2690 MHz band, taking account of the ongoing requirements of MMDS operators and the potential long-term requirement for 3G mobile expansion. I would welcome the views of all interested parties on these proposals, which I believe will help to further the development of radiocommunication services while at the same time ensuring provision for the long-term growth of 3G mobile services that have recently been licensed in Ireland. Please submit your responses to the address in section 2, by no later than Friday 1 August. I look forward to reviewing the responses to the consultation.

**Etain Doyle**

**Chairperson**

**Commission for Communications Regulation**

## **1 Introduction**

MMDS has been used for many years in Ireland to extend the reach of multi-channel TV services beyond the urban centres that are served by conventional cable TV networks. MMDS services are currently provided by two operators, Chorus and ntl.

In 2002, ComReg's predecessor, the ODTR, published its Spectrum Strategy document (ODTR 02/43), which indicated that the long term impact of future services such as broadband internet and 3G on MMDS would be carefully evaluated. A review to determine the long-term use of the band 2500 – 2690 MHz was planned for 2004. However, in view of the progress being made towards rollout of digital MMDS services, ComReg considers that an earlier review of the potential options for the band is appropriate.

This document provides background information and seeks views on current and potential future spectrum utilisation by MMDS and 3G mobile services and the implications for the future allocation of the 2500 – 2690 MHz band. Views are also sought on a suggested approach to the future allocation of the band taking account of the potential development of 3G mobile services and ongoing requirements for MMDS.

## **2 Responding to the Consultation**

The consultation period will run from Friday 20 June 2003 to Friday 1 August 2003. Written comments should be marked “Response to ComReg Consultation Paper on Use and Development of Radiocommunications Services in the 2.5 GHz bands” and submitted either electronically or in hard copy before 5.00 p.m. on Friday 1 August 2003, to:

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Commission for Communications Regulation  
Abbey Court  
Irish Life Centre  
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Dublin 1  
E-mail: [sinead.devey@comreg.ie](mailto:sinead.devey@comreg.ie)

All comments are welcome, and should reference the relevant question numbers from this document (for convenience a summary list of the questions is presented in section6).

ComReg expects to publish a report on this consultation. If there are elements of any response that are commercially confidential, then it is essential that these be clearly identified and placed in a separate annex to the main document. They will then be treated in confidence. ComReg regrets that it will not be possible to enter into correspondence with those supplying comments.

### 3 Current Spectrum Usage

This chapter reviews the current spectrum utilisation by MMDS, mobile and broadband services in Ireland.

#### 3.1 MMDS

The current MMDS spectrum allocation comprises twenty two 8MHz channels in the frequency range 2500 – 2676 MHz. There are two providers of MMDS services, Chorus and ntl. Households may not be connected to the MMDS service in an area that is licensed for cable distribution, except with the prior consent of ComReg.

The operators use this spectrum to provide analogue and/or digital television services. It is ComReg’s current expectation that analogue MMDS services will eventually cease and that consequently a number of the channels currently licensed for MMDS will no longer be required for television distribution.

It has been agreed that in 2005 the operators will vacate the channels occupying the sub-bands 2500 – 2520 MHz and 2670 – 2690 MHz, to accommodate a potential requirement for satellite 3G mobile services.

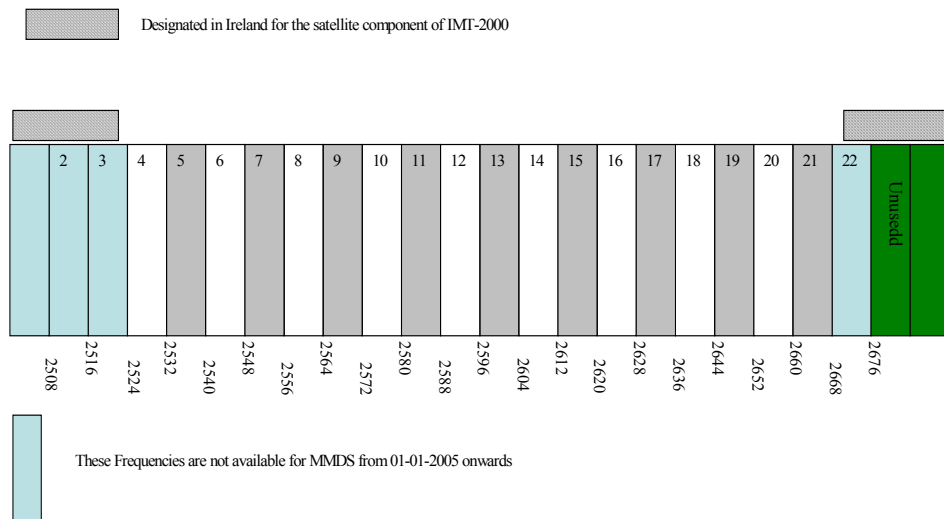
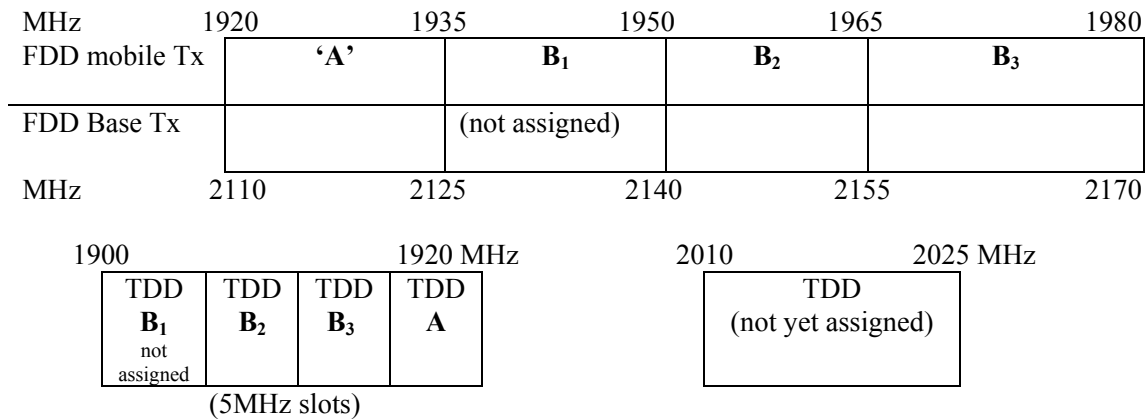


Figure 1: Current Usage of 2500 – 2690 MHz band by MMDS

### 3.2 3G Mobile

Three 3G (UMTS/IMT-2000) licences have been issued in the 3G ‘core’ bands in the 2GHz region. One licence block, B<sub>1</sub> (2x15 MHz + 5MHz), remains unassigned.

The current frequency assignments in the core band are illustrated in Figure 2 below:



**Key**

- A = ‘A’ Licence
- B<sub>1</sub> – B<sub>3</sub> = ‘B’ Licences
- FDD = Frequency Division Duplex
- TDD = Time Division Duplex

*Figure 2: Current Usage of 3G Mobile Spectrum*

### 3.3 Broadband Access

A number of frequency bands have been allocated for the provision of broadband wireless services in Ireland. However, to date, there has been relatively limited rollout of FWA services. A market review carried out by ODTR in 2002 concluded that this was in part due to the relatively high cost compared with alternative platforms such as DSL, and led to a number of initiatives intended to facilitate the provision of broadband wireless services, particularly in areas where there is little or no availability of alternatives. These initiatives included the introduction of local area licensing on a first come first served basis, the availability of licence-exempt spectrum in the 5.8 GHz band and potentially a limited secondary use of GSM operators’ licensed spectrum.

The current options for provision of broadband wireless access in Ireland are summarised in the following table:

Band	Date	Licensing Approach	Description
1.8 GHz	2003	Mobile Licence required	Potential limited provision of broadband wireless services using GSM1800 spectrum
3.5 GHz 26 GHz	1999	National FWPMA licence	Licences awarded by comparative selection. Limited availability of services in some areas
10 GHz 26 GHz	2003	Local Area FWA licence	Licences available on a first come, first served basis, subject to availability
3.5 GHz	2003	Local Area FWA licence	Licences available on a first come, first served basis, subject to availability
5.8 GHz	2002	Licence exempt FWA	Requires notification to ComReg only – allocation subject to withdrawal in the event of conflicting international requirements

**Table 3.1 Current Broadband Wireless Access spectrum in Ireland**

Recent developments have led to the deployment in the USA and elsewhere of MMDS technology in the 2.5-2.7 GHz frequency range for provision of broadband access services, reflecting the success of cable modem access provided over digital cable networks. It should also be noted that the provision of cable modem services using DOCSIS could also be considered in this band. Such services are typically provided in conjunction with multi-channel television services and have proved an effective way of stimulating take-up of broadband services.



## 4 Options for Development of MMDS and 3G Mobile Services

### 4.1 MMDS

As noted in the previous section the two MMDS operators are currently migrating to digital MMDS television services in the 2500 – 2690 MHz band. When this is completed there will no longer be a requirement to continue simulcasting on both analogue and digital channels. Following the ending of analogue services, spectrum will be available which could be used to facilitate other services. ComReg anticipates that using an all digital MMDS platform, delivery of a service equivalent to that currently provided on cable would require eleven 8 MHz channels. Depending upon the longer-term requirement for 3G mobile services, some or all of the remaining eleven channels could be used for the delivery of additional television or broadband access services.

The current cable and MMDS regulations prohibit connection of a subscriber to the MMDS service in areas where a cable licence is in place. Document ODTR 99/32 set out the Office's position on this issue. "It is essential to the development of the Irish economy that the telecommunications sector is advanced quickly and provides the widest range of services at the lowest possible prices. Cable television networks have been identified by a number of sources as powerful potential providers of telecommunications services to consumers... MMDS operators are currently precluded, except in exceptional circumstances, from offering services within a cabled area". ComReg is aware that only a limited proportion of cable networks have been upgraded to the extent necessary to provide communications services apart from television distribution. It also notes that of Article 2 of the EC Directive 2002/77/EC<sup>1</sup> introduced new provisions in relation to broadcasting. This article requires Member States not to grant or maintain exclusive or special rights for the establishment of electronic communications networks or the provision of publicly available electronic communication services subject to conditions set out in the Authorisation Directive<sup>2</sup>. ComReg is of the view that in the interests of efficient spectrum management some restriction is still required to facilitate the use of the

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<sup>1</sup> Commission Directive 2002/77/EC on competition in the market for electronic communications networks and services

<sup>2</sup> Commission Directive 2002/20/EC on the authorisation of electronic communications networks and services (Authorisation Directive).

band for expansion of 3G mobile services and these are addressed in section 5 below. ComReg expects that the greatest demand for 3G mobile services will be in the main urban areas, notably Dublin, Cork, Limerick, Galway and Waterford and therefore is minded to decide that the restriction should remain in these areas because it considers that there will be a need for spectrum at 2.5 GHz to accommodate the expansion band for 3G in the main urban areas.

***Question 1.** Do you agree with the assumption that delivery over a digital MMDS network of the digital television services currently provided over cable networks in Ireland would require eleven 8 MHz channels? If no, please provide supporting arguments to explain why more or less spectrum is required.*

***Question 2.** Do you have a view on how the remaining channels might be used, and how many channels would be required for each identified use? Please provide supporting arguments.*

***Question 3.** Do you agree with the decision to continue the restriction on the provision of MMDS services in the main urban licensed areas, notably Dublin, Cork, Limerick, Galway and Waterford?*

## **4.2 3G Mobile**

The European Communications Committee (ECC) of CEPT has issued a Decision (ECC/DEC/(02)06 ) designating the band 2500-2690 MHz for expansion of 3G services. The Decision requires the band to be made available for use by 3G mobile systems by 1 January 2008, subject to market demand and national licensing schemes. However, the frequency arrangements for the band, including the designation of base and mobile transmit frequencies, are not scheduled to be decided until the end of 2004. There is also uncertainty about the future requirement for satellite 3G mobile services in the band, which may result in additional spectrum becoming available for terrestrial services.

ComReg anticipates a phased approach to the expansion of 3G mobile services in Ireland, with additional spectrum being made available when there is a clear, demonstrable need. In addition to the 2500-2690 MHz band, there is in Ireland other potential spectrum that could be used for the expansion of 3G services, depending upon future market developments. These are described below:

#### 4.2.1 Remaining 3G “core spectrum”

There is currently one licence block in the “core” 3G mobile spectrum, namely licence B<sub>1</sub> (see figure 2), that remains unassigned. There are two possibilities for its future use:

1. interest develops in a fourth 3G licence in the Irish market and the licence is awarded to a new operator following a further competition; or
2. if there is no interest within a reasonable time-frame, perhaps 3 to 5 years, then block B<sub>1</sub> could be used to provide expansion spectrum for the existing three licensees on a demonstrable need basis, e.g., this would provide an additional 2x5 MHz (equivalent to one paired UMTS carrier) for each licensee if required.

**Question 4.** *Do you agree that 3 – 5 years is a reasonable time period to allow a fourth 3G operator to enter the market? If no please provide an alternative time period and an explanation as to why this is more appropriate.*

#### 4.2.2 Remaining GSM 1800 Spectrum

Currently a total of 2 x 26MHz of spectrum remains unassigned in this band, which like 2500-2690 MHz has been identified internationally as future expansion spectrum for 3G mobile services. However, as yet, there is no indication of the timeframe for availability of 3G network equipment and handsets in this band. A report<sup>3</sup> produced by CEPT ECC for the European Commission indicated that only Finland and Ireland were in a position to make spectrum in this band available now. Ultimately it is foreseen that the GSM bands will migrate to 3G services but this is generally seen as a long term prospect.

The remaining GSM 1800 spectrum could be used to provide further expansion of 2G (GSM) mobile services or, in the longer term, to provide expansion spectrum for 3G services. Should it be made available for expansion of 2G services, this could be done on a time-limited basis to provide for future 3G expansion when demand arises and the necessary equipment is available in the market. ComReg considers that a notice period of around 12 months for vacation of the band by 2G services would provide sufficient flexibility to meet changing market requirements.

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<sup>3</sup> See the Final Report from CEPT to the EC under Mandate 4 at [www.ero.dk/EROWEB/ECC-PT1/Final%20Report%20Mandate%204.pdf](http://www.ero.dk/EROWEB/ECC-PT1/Final%20Report%20Mandate%204.pdf)

**Question 5.** *Do you agree that the unassigned 2 x 26 MHz of GSM 1800 spectrum should in the longer term be used for 3G services?*

**Question 6.** *Do you have a view on the timescales when 3G equipment might become commercially available for the GSM 1800 band? If so what are your expected timescales and why?*

**Question 7.** *Do you consider that there is likely to be a requirement for further spectrum to expand existing 2G mobile (GSM) services, and if so, how much and in what timescale? Please provide supporting data.*

## **5 Proposed Options for Future Use of the 2500 – 2690 MHz Band**

### **5.1 Compatibility and Frequency Sharing**

Preliminary studies have been carried out by ComReg to investigate the extent to which existing MMDS services and future UMTS/IMT-2000 3G mobile services could co-exist in the 2500 – 2690 MHz band. The results to date indicate that implementation of a guard band of up to 10 MHz between MMDS and UMTS/IMT-2000 networks may be necessary where both services are operating in the same geographic area. Assuming that eleven 8 MHz channels were required for provision of digital MMDS services, this would leave up to 50 MHz in the band for terrestrial UMTS/IMT-2000 3G mobile services. Two blocks of 2 x 20 MHz at the upper and lower end of the band are currently reserved for the satellite component of IMT-2000, but there is uncertainty about whether this requirement will arise. This issue is being addressed at the European level within CEPT and the European Commission and a decision is expected by the end of 2004. Should the satellite requirement not materialise, it is expected that this spectrum would be made available for terrestrial services (e.g. 3G and/or MMDS).

ComReg expects the highest demand for 3G mobile services to be concentrated in the main urban areas, notably Dublin, Cork, Limerick, Galway and Waterford. Initial estimates conducted by ComReg investigating the possibility of co-frequency sharing have indicated that a separation distance of up to 60 km may be required to prevent interference to MMDS receivers from high power 3G mobile macrocells, but that a separation of 15 km may be adequate in the case of lower power microcells or picocells.

ComReg anticipates that requirements for macrocell coverage will largely be met within the core 3G mobile spectrum and that expansion spectrum will be predominantly used for expanding capacity by means of micro- and picocells in “hotspot” areas. ComReg therefore would like to have views as to whether it would be appropriate to restrict the deployment of 3G mobile in the 2500-2690 MHz band to micro- and picocells.

**Question 8.** Do you agree with the principle of co-existence in the 2500-2690 MHz band between MMDS and UMTS/IMT-2000 networks on the basis of either:-

- frequency separation within the same geographic area (preliminary studies indicate that a frequency separation of 10 MHz may be required),

or

- geographic separation where co-frequency MMDS and 3G mobile services, are operated (preliminary studies show that this may be of the order of 15 km for microcell deployment)?

**Question 9.** Do you agree with the proposal to restrict 3G deployment in the 2500-2690 MHz band to micro and pico cells?

**Question 10.** Do you agree with the assumption that future demand for 3G mobile services (and hence for additional 3G mobile spectrum) is likely to be concentrated in the main urban areas, notably Dublin, Cork, Limerick, Galway and Waterford?

If you do not agree with any of the above, please provide supporting arguments.

## **5.2 A Possible Approach to co-existence between 3G mobile and MMDS services in the 2500-2690 MHz band**

As noted in Section 3 above, it is not possible to determine an appropriate plan for the 2500-2690 MHz band until an international band plan for 3G expansion spectrum is agreed by CEPT. This is not expected to take place until the end of 2004. However, in the meantime it is possible to consider the type of transitional arrangement that might apply in order to facilitate the progressive introduction of 3G services into the band, whilst continuing to cater for the ongoing requirement for MMDS services.

The proposed solution effectively divides the band 2500-2690 MHz into two sub-bands split between IMT-2000 and MMDS. The lower sub-band, comprising 50 MHz in total, would provide the initial tranche of 3G mobile expansion spectrum, commencing on or after 1<sup>st</sup> January 2008 when the ECC Decision takes effect, but subject to demonstrable need on the part of the operators. Such use would be confined to the cities of Dublin, Cork, Limerick, Galway and Waterford. The upper sub-band would continue to be used for the delivery of MMDS services for the duration of the current licences, except within 15 km of the Dublin City area<sup>4</sup>, where the spectrum may be used to provide further 3G expansion on a clear, demonstrable need basis (this is expected to be the area of highest demand within Ireland).

The lower sub-band could also be used by MMDS licensees for provision of additional MMDS television or broadband wireless services, but after 2007 such provision may be limited to areas where the spectrum is not required for 3G mobile expansion, notably the urban areas identified above and a 15 km protection area around those areas. In the event that it is decided to introduce 3G mobile services in the band, ComReg would provide at least 12 months notice to the existing users.

The suggested approach would result in the configuration shown in figure 3 below:

Satellite UMTS	UMTS (urban) Additional MMDS services (rural)	Guard Band	Core MMDS services (11 channels) Additional UMTS expansion (Dublin only)	Satellite UMTS
2500 2520	2570 2580		MHz	2670 2690

*Figure 3: Hypothetical Band Plan for co-existence of 3G mobile and MMDS services in the 2.6 GHz band*

If it emerged at a future date that the satellite 3G mobile spectrum was not required for that purpose, the two lower MMDS channels (i.e. those in 2580-2600 MHz) could be transferred to the band 2670-2690 MHz. This would increase the available spectrum for terrestrial 3G mobile to 90 MHz, after allowing for a 10 MHz guard band to protect MMDS services.

**Question 11.** *Do you have a view on the above suggested approach to co-existence between 3G mobile and MMDS services? If you do not favour the suggested*

<sup>4</sup> The area bounded by the Grand Canal, Royal Canal and M50 motorway.

*approach, what alternative would you propose? Please provide supporting arguments.*



## 6 Summary of Consultation Issues

**Question 1.** Do you agree with the assumption that delivery over a digital MMDS network of the digital television services currently provided over cable networks in Ireland would require eleven 8 MHz channels? If no please provide supporting arguments to explain why more or less spectrum is required.

**Question 2.** Do you have a view on how the remaining channels might be used, and how many channels would be required for each identified use? Please provide supporting arguments.

**Question 3.** Do you agree with the decision to continue the restriction on the provision of MMDS services in the main urban areas, notably Dublin, Cork, Limerick, Galway and Waterford areas that are also currently served by cable networks?

**Question 4.** Do you agree that 3 – 5 years is a reasonable time period to allow a fourth 3G operator to enter the market? If no please provide an alternative time period and an explanation as to why this is more appropriate.

**Question 5.** Do you agree that the unassigned 2 x 26 MHz of GSM 1800 spectrum should in the longer term be used for 3G services?

**Question 6.** Do you have a view on the timescales when 3G equipment would become commercially available for the GSM 1800 band? If so what are your expected timescales and why.

**Question 7.** Do you consider that there is likely to be a requirement for further spectrum to expand existing 2G mobile (GSM) services, and if so, how much and in what timescale? Please provide supporting data.

**Question 8.** Do you agree with the principle of co-existence in the 2500-2690 MHz band between MMDS and UMTS/IMT-2000 networks on the basis of either:-

- frequency separation within the same geographic area (preliminary studies indicate that a frequency separation of 10 MHz may be required),

or

- geographic separation where co-frequency MMDS and 3G mobile services, are operated (preliminary studies show that this may be of the order of 15 km for microcell deployment)?

**Question 9.** Do you agree with the proposal to restrict 3G deployment in the 2500-2690 MHz band to micro and pico cells?

**Question 10.** Do you agree with the assumption that future demand for 3G mobile services (and hence for additional 3G mobile spectrum) is likely to be concentrated in the main urban areas, notably Dublin, Cork, Limerick, Galway and Waterford? If you do not agree with any of the above, please provide supporting arguments.

**Question 11.** Do you have a view on the above suggested approach to co-existence between 3G mobile and MMDS services? If you do not favour the suggested approach, what alternative would you propose? Please provide supporting arguments.