Commission for
Communications Regulation

Consultation Paper

The Implementation of EC Decision 2008/411/EC and Introduction of Mobility to the 3400 – 3800 MHz Band

Regulatory and Technical Considerations

Document No:	**10/55**
Date:	**14 July 2010**

All responses to this consultation should be clearly marked:- "Reference: Submission re ComReg 10/55" as indicated above, and sent by post, facsimile or e-mail, to arrive on or before 5pm on 20 August 2010, to:

Ms. Sinead Devey
Commission for Communications Regulation
Irish Life Centre
Abbey Street
Freepost
Dublin 1
Ireland

Ph: +353-1-8049600 Fax: +353-1-8049680
Email: marketframeworkconsult@comreg.ie
Please note ComReg will publish all respondents submissions with the Response to this Consultation, subject to the provisions of ComReg's guidelines on the treatment of confidential information – ComReg Document 05/24

Contents

1 Foreword

This document outlines proposals by the Commission for Communications Regulation (ComReg) for the implementation of European Commission Decision 2008/411/EC, entitled "*Commission Decision of 21 May 2008 on the harmonisation of the 3400-3800 MHz frequency band for terrestrial systems capable of providing electronic communications services in the Community*" ("the EC Decision")[1]. The EC Decision mandates the introduction of mobility to the 3400 – 3800 MHz (3.6 GHz) band in all Member States.

ComReg is committed to creating a regulatory environment that stimulates competition and innovation, and to improving the price, choice and quality of electronic communications services available to the end consumer. While there are numerous platforms over which electronic communications services can be delivered, this consultation concentrates on the part of the radio spectrum which is currently allocated to the Fixed Wireless Access[2] service in the 3.6 GHz band in Ireland.

Since its launch in 2003, the Fixed Wireless Access Local Area (FWALA) licensing scheme has been very successful, providing broadband wireless access to 101,617 customers[3] through its operations in the 3.6 GHz, 10.5 GHz and 26 GHz bands. There are currently 162 FWALA licences and 16 operators in the 3.6 GHz band.

FWALA licences granted by ComReg allow for the use of *fixed wireless access* and *nomadic wireless access*[4] systems in Ireland. There is currently no form of FWALA licence which permits the use of *mobile wireless access*[5] systems in the 3.6 GHz band. However, Ireland is now legally obliged to implement the EC Decision which requires that the 3.6 GHz band be designated and made available on a non-exclusive basis for fixed, nomadic and mobile electronic communications networks.

ComReg therefore proposes to allow mobile wireless access systems to operate in the 3.6 GHz band in addition to fixed and nomadic systems, by establishing a new licensing framework. This proposal is in line with the trend towards mobility in the band across Europe and should enable 3.6 GHz operators to introduce new and innovative services to consumers.

When considering how best to implement the EC Decision ComReg must have regard to its statutory functions and objectives which include ensuring the efficient management and use of radio spectrum and promoting competition for the benefit of end users.

---

[1] EC Decision 2008/411/EC - full text in Appendix A of this document.

[2] Recommendation ITU-R F.1399-1 defines Fixed Wireless Access (FWA) as "Wireless access application in which the location of the end-user termination and the network access point to be connected to the end-user are fixed."

[3] ComReg Document 10/43: ComReg Quarterly Key Data Report for Q1 2010.

[4] Recommendation ITU-R F.1399-1 defines Nomadic Wireless Access (NWA) as "Wireless access application in which the location of the end-user termination may be in different places but it must be stationary while in use."

[5] Recommendation ITU-R F.1399-1 defines Mobile Wireless Access (MWA) as "Wireless access application in which the location of the end-user termination is mobile."

ComReg invites the views of interested parties on the proposals in this document and will publish its final decision in due course.

John Doherty,
Commissioner

2 Executive Summary

This consultation sets out ComReg's proposed approach to implementing a European Commission Decision which requires Member States to harmonise the 3400 - 3800 MHz radio frequency band ("the 3.6 GHz band") for electronic communications services ("ECS").

In Ireland at present, the 3.6 GHz band is mainly used by Fixed Wireless Access Local Area (FWALA) licensees who may provide wireless ECS in local areas defined by a circle of 20 km radius. Under current Regulations, 3.6 GHz FWALA licensees may only provide "fixed" and "nomadic" wireless access services; the main effect of implementing the EC Decision will be to permit the provision of "mobile" services. Hence the fundamental change will be the introduction of mobility to the 3.6 GHz band.

ComReg proposes to implement the EC Decision for the entire 3.6 GHz band at the same time while having due regard to potential implications for other services in the band, for services in adjacent bands, and for current 3.6 GHz FWALA licensees. ComReg proposes to introduce mobility by establishing a new Broadband Wireless Access Local Area (BWALA) licensing scheme which will allow for fixed, nomadic and mobile local area licences – this will require new Regulations made under the Wireless Telegraphy Act 1926.

Many aspects of the BWALA scheme are likely to be similar to the current FWALA scheme, including the size of the licensed service area, the required interference contour and field strength limit, and the application of a Code of Practice. ComReg further proposes that current FWALA licensees will have the options of retaining their 7-year FWALA licences or surrendering those FWALA licences and receiving new BWALA licences in return. However, it should be noted that BWALA licences shall be subject to an increased licence fee and moving from a FWALA to a BWALA licence will not increase the overall length of the licence term, which shall remain 7 years. In particular, as with 3.6 GHz FWALA licences all 3.6 GHz BWALA licences will expire no later than 31 July 2017 (see ComReg Information Notice 10/29[6]).

The structure of this Consultation Paper is as follows:

- Section 3 describes ComReg's relevant statutory functions and defines terminology used throughout the document.
- Section 4 sets out the purpose and main provisions of the EC Decision.
- Section 5 details Ireland's current frequency allocations in the 3.6 GHz band.
- Section 6 addresses the application of the EC Decision in Ireland and considers the implications for non-FWALA services in the 3.6 GHz band, for services in adjacent spectrum bands, and for current 3.6 GHz FWALA licensees.

[6] ComReg Document 10/29: Fixed Wireless Access Local Area Licensing - End date of the FWALA licensing scheme in the 3.6 GHz band.

- Section 7 sets out ComReg's proposal to introduce mobility by establishing a new Broadband Wireless Access Local Area (BWALA) licensing scheme.

- Section 8 addresses the annual fee for future BWALA licences.

- Section 9 summarises ComReg's proposals and sets out the next steps.

- Section 10 sets out the process and timelines for interested parties to respond to the consultation.

- Section 11 re-lists all of ComReg's specific questions as asked throughout the preceding sections.

All interested parties are invited to respond to the questions set out herein, to be received by ComReg in writing no later than 5pm on 20 August 2010. Please note that ComReg shall publish all of the responses it receives in due course and respondents should therefore clearly mark any information that they consider to be commercially sensitive and/or confidential.

3 Introduction

3.1 Purpose of this document

The purpose of this consultation paper is to set out ComReg's proposed approach to implementing the European Commission Decision on the harmonisation of the 3400 - 3800 MHz frequency band for terrestrial systems capable of providing electronic communications services in the Community" ("the EC Decision")[7] and to invite submissions from interested parties.

3.2 Definitions and examples of terms used in this document

The following definitions are set out in ITU Recommendation ITU-R F.1399:

- "Fixed wireless access" ("fixed") is defined as a *"Wireless access application in which the location of the end-user termination and the network access point to be connected to the end-user are fixed."*
- "Nomadic wireless access" ("nomadic") is defined as a *"Wireless access application in which the location of the end-user termination may be in different places but it must be stationary while in use."*
- "Mobile wireless access" ("mobile") is defined as a *"Wireless access application in which the location of the end-user termination is mobile."*

CEPT[8] ECC Decision ECC/DEC(07)02[9] defines Broadband Wireless Access (BWA[10]) as *"radiocommunications systems providing wireless delivery (mainly to an end user but not exclusively) of broadband traffic that can encompass fixed, nomadic and mobile applications. It is also considered that BWA systems might include backhauling services for the same or a second operator."*ECC Decision (07)02 also gives examples of fixed, nomadic and mobile systems: *"A typical example of FWA* [fixed] *TS*[11] *could be stationary roof-top user equipment. An example of NWA* [nomadic] *TS could be a desk-top portable user equipment or laptop PC equipped with the internal BWA access card. An example of MWA* [mobile] *TS could be a handheld user terminal."*

3.3 ComReg's statutory remit

Section 10(1) of the Communications Regulation Act 2002[12] ("the 2002 Act") sets out ComReg's statutory functions which include (a) ensuring compliance with obligations

[7] EC Decision 2008/411/EC - full text in Appendix A of this document.

[8] Conference of European Postal and Telecommunications Administrations.

[9] CEPT ECC Decision (07)02 of 30 March 2007 on availability of frequency bands between 3400-3800 MHz for the harmonised implementation of Broadband Wireless Access systems (BWA).

[10] Broadband Wireless Access in the context of this document refers to Electronic Communications Networks licensed in the 3.6 GHz band under a framework permitting the provision of fixed, nomadic and mobile services.

[11] Terminal Station.

[12] Communications Regulation Act, 2002 Number 20 of 2002.

relating to the supply of and access to electronic communications services and networks, and (b) managing the radio frequency spectrum. Section 12 of the 2002 Act sets out the statutory objectives to be met by ComReg in the performance of its functions; these objectives include to promote competition, to contribute to the development of the internal market, to promote the interests of users within the Community, and to ensure the efficient management and use of the radio frequency spectrum

In carrying out its functions in relation to radio frequency spectrum, the 2002 Act also requires ComReg to ensure that measures taken by it are proportionate, to have regard to international developments, to take utmost account of the desirability that the exercise of its functions does not result in discrimination in favour of or against particular types of technology, and to comply with any policy direction given by the Minister for Communications, Energy and Natural Resources ("the Minister")[13].

In Ireland, all "apparatus for wireless telegraphy" requires a licence for its possession and operation, granted by ComReg under secondary legislation ("Regulations") made pursuant to the Wireless Telegraphy Act 1926, as amended by the Broadcasting Act 2009. The only exception is where the particular type or category of apparatus has been made exempt from the requirement to be licensed. Licences normally contain specific technical and other conditions that the licensees must fully adhere to.

[13] Sections 12 & 13 of the Communications Regulation Act 2002.

4 EC Decision 2008/411/EC

4.1 Main provisions of the EC Decision

The EC Decision was adopted in May 2008. Its main purpose is to harmonise the efficient use of the 3.6 GHz band by terrestrial electronic communications services ("ECS") and electronic communications networks ("ECN") while taking into account the protection of existing users in the band. It requires that the 3.6 GHz band may be used for fixed, nomadic *and* mobile electronic communications networks and services, while ensuring appropriate protection for systems in adjacent frequency bands. It also sets out certain technical parameters which must be complied with, which are described below. Implementation of the EC Decision is mandatory for all EU Member States. The full text of the EC Decision is contained in Appendix A.

4.2 Technical parameters set out in the Annex of the EC Decision

The Annex to the EC Decision sets out technical requirements in relation to the in-block and out-of-block permissible power levels.

4.2.1 In-block power limits

The maximum in-band power spectral density limits applicable to fixed and nomadic operations are presented in Table 1 and the limits applicable to mobile operations are presented in Table 2.

Maximum e.i.r.p. spectral density limits for Central Stations and Repeater Station down-links	**Maximum e.i.r.p. spectral density limits for outdoor Terminal Stations and Repeater Station up-links**	**Maximum e.i.r.p. spectral density limits for indoor Terminal Station**
+53 dBm/MHz	+50 dBm/MHz	+42 dBm/MHz

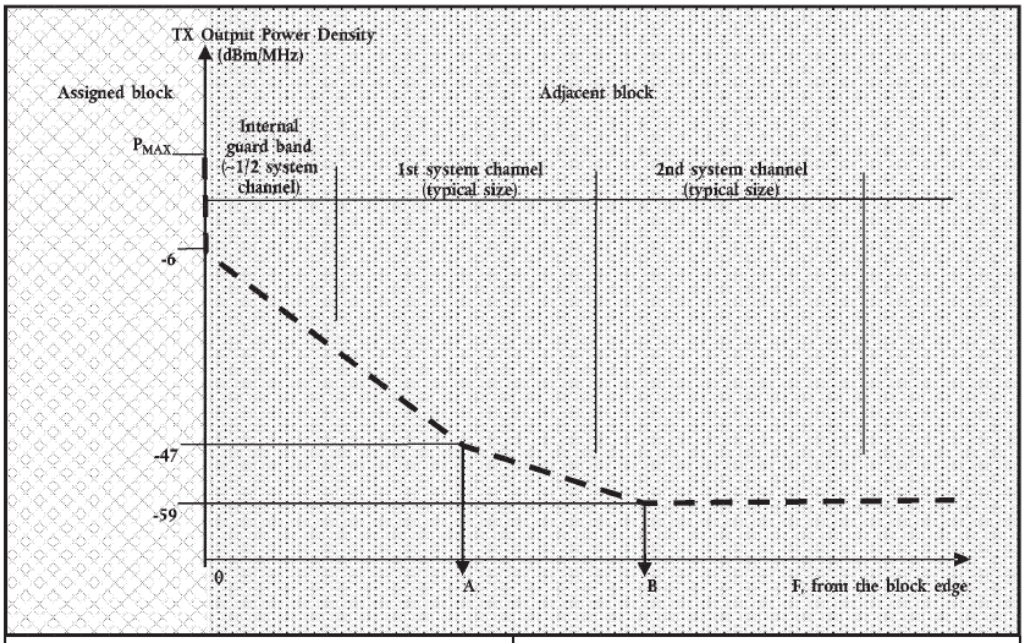
Table 1: Maximum in-block e.i.r.p. spectral density limits applicable to fixed and nomadic stations in the 3.6 GHz band.

Station type	**Maximum e.i.r.p. spectral density** (Minimum ATPC range: 15 dB)
Central Station	+ 53 dBm/MHz[1]
Terminal Station	+ 25 dBm/MHz
Note 1: The Central Station e.i.r.p. spectral density value given in the table is considered suitable for conventional 90 degrees sector antennas.	

Table 2: Maximum in-block e.i.r.p. spectral density limits applicable to mobile stations in the 3.6 GHz band.

4.2.2 Out-of-block power limits

The Block Edge Mask (BEM) as set out in the EC Decision is described in Figure 1 and Table 3 below.



Frequency offset	Definition (% of the size of the assigned block)
A	20 %
B	35 %

NB: The percentages given in the 'Definition' column refer to the smaller of adjacent blocks, if blocks are of unequal size.

Figure 1: Central Station out-of-block emissions.

Frequency offset ΔF	**Central Station Transmitter Output Power Density Limits (dBm/MHz)**
In-band (within assigned block)	See Tables 2 and 3 of annex to EC Decision
ΔF=0	-6
0<ΔF<A	-6 - 41·(ΔF/A)
A	-47
A<ΔF<B	-47 - 12·((ΔF-A)/(B-A))
ΔF≥B	-59

Table 3: Tabular description of Central Station Block Edge Mask.

5 The 3.6 GHz Frequency Band

This chapter details Ireland's frequency allocations in the 3.6 GHz band and Ireland's current use of that band.

5.1 Ireland's Frequency Allocations in the 3.6 GHz band

ComReg's Radio Frequency Plan[14] sets out Ireland's frequency allocations which are drawn from the ITU Radio Regulations, the European Common Allocation table (ECA)[15] and it also lists applicable EC and CEPT ECC Decisions and Recommendations. ComReg updated its Radio Frequency Plan in 2008 to reflect the application of the EC Decision to the 3.6 GHz band.

In the ECA, the lower segment of the 3.6 GHz band is allocated on a co-primary basis to the Fixed, Fixed-Satellite (space-to-Earth) and Mobile services and, on a secondary[16] basis, to the Radiolocation service. The upper segment of the 3.6 GHz band is allocated on a co-primary basis to the Fixed, Fixed-Satellite (space-to-Earth) and Mobile service.

In accordance with the ITU Radio Regulations, primary services all have equal status in the 3.6 GHz band and new services seeking access must co-exist with established primary services. The secondary service (Radiolocation) must not cause interference to the primary services and cannot claim protection from harmful interference caused by primary services.

5.2 Current use of the 3.6 GHz band in Ireland

The EC Decision only applies to terrestrial systems capable of providing ECS. In Ireland, the 3.6 GHz band is currently in use by terrestrial ECS as well as other services as detailed below.

[14] ComReg Document 08/90R1: Radio Frequency Plan for Ireland.

[15] CEPT ERC Report 025: The European Table of Frequency Allocations and Utilisations in the frequency range 9 kHz to 3000 GHz.

[16] Primary allocations have priority over secondary allocations. According to Articles 5.28-5.31 of the ITU Radio Regulations 2008, "Stations of a secondary service: *a)* shall not cause harmful interference to stations of primary services to which frequencies are already assigned or to which frequencies may be assigned at a later date; *b)* cannot claim protection from harmful interference from stations of a primary service to which frequencies are already assigned or may be assigned at a later date; *c)* can claim protection, however, from harmful interference from stations of the same or other secondary service(s) to which frequencies may be assigned at a later date."

5.2.1 Terrestrial Electronic Communications Services (ECS)

The current frequency plan for the 3.6 GHz band is shown in Figure 2.

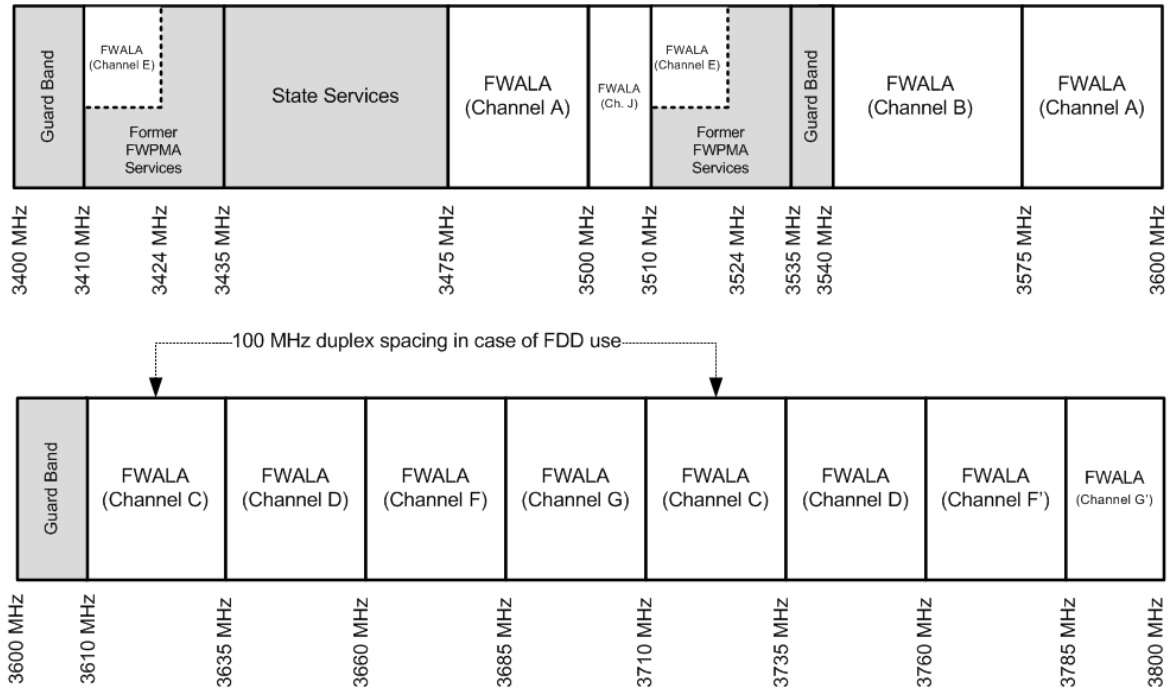


Figure 2: Current 3.6 GHz Band Frequency Plan

Fixed Wireless Access Local Area (FWALA) services occupy most of the 3.6 GHz band in Ireland. FWALA licences[17] currently permit licensees to provide Fixed and Nomadic services to the public in specific geographic service areas. With the exception of Channel E[18], the size of a service area is defined by a 20 km radius from a nominal central station. There are currently 162 FWALA licences in the 3.6 GHz band. The main technical parameters of the 3.6 GHz FWALA channels are detailed in Table 4 below.

[17] FWALA licence allows the licensee to keep, have possession of, install, maintain, work and use Fixed Wireless Access Apparatus in accordance with the FWALA Regulations.

[18] The service areas for Channel E operation range from 1.9 km to 7.5 km, depending on the area which is being serviced. More information is available in Table 2 of ComReg Document 06/17R6.

3.4GHz – 3.8GHz band FWALA channels	Channel Bandwidth	Mode of Operation
A	2 x 25 MHz	FDD or TDD
B	1 x 35 MHz	TDD
C	2 x 25 MHz	FDD or TDD
D	2 x 25 MHz	FDD or TDD
*E**	2 x 14 MHz	FDD or TDD
F	2 x 25 MHz	FDD or TDD
G	1 x 25 MHz and 1 x 15 MHz	FDD or TDD
J	1 x 10 MHz	TDD

Table 4: FWALA Channel Details at 3.6 GHz

** Note: Channel E is only available in 4 areas and has reduced service area in comparison to the other FWALA channels (see the FWALA Guidelines in ComReg 06/17R6[19] for more details).*

In April 2010, ComReg published an Information Notice 10/29[6] stating that the end date for the FWALA licensing scheme in the 3.6 GHz band will be 31 July 2017.

5.2.2 Other services operating in the 3.6 GHz band in Ireland

In addition to terrestrial ECS, the 3.6 GHz band is currently used by the following other services:

- **Fixed Satellite Service (FSS):**
  - FSS stations operating in the 3.6 GHz band include licence-exempt Very Small Aperture Terminals (VSATs), governed by licence exemption order S.I. 273 of 2000[20].
  - FSS stations in the 3.6 GHz band that require protection and coordination are licensed under the Fixed Satellite Earth Station and Teleport Facility Regulations, 2007[21]. Under these Regulations coordination with other co-primary services may be effected and the FSS station may be placed on the ITU's master register of stations. It should be noted that at present in Ireland there are no licensed FSS earth stations in the 3.6 GHz band. Should the need arise in the future, ComReg would coordinate any new FSS earth stations in accordance with the applicable national regulations and the ITU Radio Regulations.

- **State Service:** The 3435 – 3475 MHz segment of the 3.6 GHz band is used by Government (State) services in Ireland. This service is currently protected and will continue to be protected by ComReg for the foreseeable future.

[19] ComReg Document 06/17R6: Revised Guidelines to Applicants for Fixed Wireless Access Local Area (FWALA) Licences.

[20] S.I. No. 273 of 2000: Wireless Telegraphy Act, 1926 (Section 3) (Exemption of Certain Fixed Satellite Receiving Earth Stations) Order, 2000.

[21] S.I. No. 295 of 2007: Wireless Telegraphy (Fixed Satellite Earth Stations and Teleport Facility) Regulations 2007.

- **Short Range Devices (SRDs):** Since January 2009 the operation of very low power ultra-wideband (UWB) applications[22] is permitted in the 3.6 GHz band. These devices are covered by licence exemption order S.I. 405 of 2002 (as revised) but they are not protected nor are they permitted to cause interference. More information on permitted SRDs in Ireland is available in ComReg Document 02/71R4[23].

- **Radiolocation:** The Radiolocation service operates in a secondary allocation in the 3.6 GHz band.

In implementing the EC Decision, which applies to terrestrial ECS, ComReg will continue to protect services operating in the 3.6 GHz band in the appropriate manner.

[22] Relevant European Commission Decisions and CEPT ECC Decisions;

- Commission Decision 2007/131/EC on allowing the use of the radio spectrum for equipment using ultra-wideband technology in a harmonised manner in the Community;
- Commission Decision 2009/343/EC amending Decision 2007/131/EC on allowing the use of the radio spectrum for equipment using ultra-wideband technology in a harmonized way in the Community;
- CEPT ECC/DEC(06)04: ECC Decision of 24 March 2006 amended 6 July 2007 on the harmonised conditions for devices using UWB technology in bands below 10.6 GHz;
- CEPT ECC/DEC(06)12: ECC Decision of 1 December 2006 on the harmonised conditions for devices using Ultra-Wideband (UWB) technology with Low Duty Cycle (LDC) in the frequency band 3.4-4.8 GHz;
- CEPT ECC/DEC/(07)01: ECC Decision of 30 March 2007 on specific Material Sensing devices using Ultra-Wideband (UWB) Technology.

[23] ComReg Document 02/71R4: Permitted Short Range Devices in Ireland.

6 Application of the EC Decision in Ireland

6.1 Timing for implementation of the EC Decision

The EC Decision sets out a phased approach for the 3.6 GHz band to be designated and made available as follows;

- the 3400 - 3600 MHz sub-band is to be designated and made available for terrestrial ECS by 21 November 2008; and
- the 3600 - 3800 MHz sub-band is to be designated and made available for terrestrial ECS by 1 January 2012.

In Ireland, since most of the 3.6 GHz band is assigned to the same application (FWALA services) and currently there are no existing satellite earth stations licensed in the 3.6 GHz band, ComReg believes that there is no reason to split the timing of the implementation of the EC Decision over two phases. ComReg therefore intends to implement the EC Decision for both the 3400 – 3600 MHz sub-band and the 3600 – 3800 MHz sub-band at the same time.

Q. 1. Are there any reasons why ComReg should not implement the EC Decision for the 3400 – 3600 MHz and 3600 – 3800 MHz sub-bands at the same time? Please provide supporting arguments with your response.

6.2 Introducing mobility to the 3.6 GHz band

The fundamental difference between the requirements of the EC Decision and the current use of the 3.6 GHz band in Ireland relates to mobile systems. The existing 3.6 GHz FWALA licensing scheme permits the provision of local area services using fixed and nomadic systems, but not mobile systems. In order to comply with the EC Decision mobile systems in the 3.6 GHz band must now be permitted. This means that ComReg is required to introduce a licensing scheme that facilitates the provision of fixed, nomadic and mobile wireless access services.

6.2.1 Technical considerations when introducing mobility into the 3.6 GHz band

The remainder of this section considers the implications for the following services when introducing mobility into the 3.6 GHz band;

- Other (non-FWALA) services in the 3.6 GHz band;
- Services in spectrum adjacent to the 3.6 GHz band; and
- FWALA services in the 3.6 GHz band;

One of the distinctive aspects of Ireland's FWALA usage of the 3.6 GHz band is its focus on local area use. The service area of a FWALA licence is defined by a centre point and a maximum permitted radius. The centre point is the nominal geographic location of the

FWALA base station and, with the exception of Channel E, the service area is defined as a circle of 20 km radius from the nominated centre point.

In preparation for facilitating mobile services in the 3.6 GHz band, compatibility studies were conducted by CEPT and the results are reflected in CEPT ECC Report 100[24] and ECC Decision (07)02[25]. The results of the CEPT studies formed the basis for the Block Edge Mask (BEM) parameters to be observed by fixed, nomadic and mobile systems as laid down in the Annex to the EC Decision.

6.2.1.1 Impact on other services in the band

The EC Decision requires Member States to ensure that other existing and future systems in the 3.6 GHz band can co-exist with new BWA[10] systems. Where appropriate, ComReg intends to continue to protect and coordinate with the other services in the 3.6 GHz band, to ensure that they are afforded the appropriate level of protection.

CEPT studied the coexistence of BWA and other systems/services operating in the 3.6 GHz band including SAP/SAB[26] (which includes ENG/OB[27]), Fixed Point-to-Point links, Fixed Satellite Service (FSS) (space-to-Earth) and Radiolocation, and the results of these studies are reflected in ECC Report 100. The main conclusion of ECC Report 100 is that when deciding on BWA deployment, administrations need to take into account the use of the frequency band in the concerned area and that coordination with the existing users may be required.

In Ireland the radio services that may be affected by the introduction of BWA to the 3.6 GHz band are the Radiolocation Service, Short Range Devices (Ultra-Wideband applications) and the Fixed Satellite Service. The impact of BWA on these services is discussed below:

- *State Service* - The State Service operates between 3435 - 3475 MHz. This service is currently protected and will continue to be protected in the future.

- *Short Range Devices: Ultra-wideband (UWB)* - The Fixed and Mobile services operate in primary allocations in the 3.6 GHz band and take priority over Short Range Device (SRD) applications. Very low power UWB applications are currently permitted to operate in the 3.6 GHz band subject the technical requirements of ComReg 02/71R4[23] being met. These devices operate on a licence-exempt basis and may not cause interference[28] to, nor claim protection from, any primary services operating in the 3.6 GHz band.

[24] CEPT ECC Report 100 "Compatibility studies in the band 3400 - 3800 MHz between Broadband Wireless Access (BWA) systems and other services".

[25] CEPT ECC Decision (07)02 of 30 March 2007 on availability of frequency bands between 3400-3800 MHz for the harmonised implementation of Broadband Wireless Access systems (BWA).

[26] Services Ancillary to Programme making/Service Ancillary to Broadcasting (see Annex B for further details); also known as PMSE (Programme Making and Special Events).

[27] Electronic News Gathering/Outside Broadcasting.

[28] CEPT ECC Report 94: Technical Requirements for UWB LDC Devices to Ensure the Protection of FWA Systems.

- *Radiolocation Service* - The Fixed and Mobile services operate in primary allocations in the 3.6 GHz band. They take priority over the Radiolocation Service which operates in a secondary allocation in the band.

- *Fixed Satellite Service* - Ireland does not currently have any licensed FSS Earth Stations in the 3.6 GHz band and ComReg will treat any future applications in accordance with the ITU Radio Regulations.

A limited number of licence-exempt VSAT terminals may operate in the 3.6 GHz band in Ireland, as under S.I. 273/2000 VSAT terminals do not require a licence to operate with space-to-Earth downlinks in the band 3400 – 4200 MHz (C-band). Licensed Earth Stations with downlinks operating in the C-band are however far less common[29] in Ireland than those with downlinks in the bands 10.7 to 11.7 GHz and 12.5 to 12.75 GHz (Ku-band). ComReg is of the view that the use of VSAT terminals in Ireland is confined predominantly to the Ku-band on account of factors such as the larger antenna dimensions required for C-band operation.

Notwithstanding, ComReg is inviting any operators of licence exempted C-band VSAT terminals, to notify ComReg of the details of such installations in the State before 5pm on 20 August 2010 using the form supplied in Annex E, so that the presence and characteristics of such stations may be considered by ComReg when deciding on the appropriate implementation of the EC Decision.

Summary on co-existence with other systems in the 3.6 GHz band

ComReg is of the view that application of the power spectral density limits and BEM set out in the EC Decision may be introduced in Ireland without negatively impacting on other users of the 3.6 GHz band.

Q. 2. Do you foresee any co-existence issues with existing services or applications operating in the 3.6 GHz band when implementing the EC Decision in Ireland? Please provide supporting arguments with your response.

6.2.1.2 Impact on services below 3400 MHz and above 3800 MHz

Under Article 2(3) of the EC Decision, Member States are required to ensure that any provider of an ECS in the 3.6 GHz band gives appropriate protection to systems in adjacent bands. Services with frequency allocations in adjacent bands are listed in the Radio Frequency Plan for Ireland[30] and their co-existence with ECS in the 3.6 GHz band is discussed below.

6.2.1.2.1 Services below 3400 MHz

[29] There are 40 FSS Earth Stations licensed in the Ku-band compared to just 2 licensed in the C-band.

[30] ComReg Document 08/90R1: Radio Frequency Plan for Ireland.

The 3300 - 3400 MHz band is used by the Radiolocation service (radar) which has a primary allocation in the band.

The frequency plan for the 3.6 GHz band includes a 10 MHz guard band between 3400 and 3410 MHz in order to protect the Radiolocation Service operating in spectrum below 3400 MHz (see Figure 2). ECC Report 100 discusses the impact of BWA on radar systems operating below 3400 MHz. It advises that the best approach to ensure the successful co-existence of radar systems and wireless access systems is by co-ordination on a case-by-case basis.

ECC Report 100 indicates that the installation of BWA systems closer than 5 km from radar installations should be co-ordinated. The report also notes that to limit the Carrier to Interference (C/I) degradation of BWA systems, a protection distance of 11 km in some areas may also be required.

ComReg introduced a licensing scheme for Radiolocation Services in 2009. Under these regulations[31], licensing of existing installations is mandatory and the current database of pre-existing radar installations does not include any systems operating in spectrum above 2850 MHz, thus providing a frequency separation of 550 MHz between those radar installations and the proposed BWA services in spectrum above 3400 MHz.

Notwithstanding, ComReg urges operators of any remaining unlicensed Radiolocation systems to declare them before 5pm on 20 August 2010 using the form supplied in Annex F, so that the characteristics of any such installations may be considered by ComReg when implementing the EC Decision.

It should be noted that no interference complaints have been received to date in relation to 3.6 GHz FWALA base stations or user associated equipment interfering with Radiolocation services or vice verse.

In light of the above factors ComReg does not foresee any problems for the current Radiolocation Service installations operating below 3400 MHz in the implementation of the EC Decision in Ireland. In the case of any future Radiolocation installations, appropriate coordination will take place.

6.2.1.2.2 Services operating above 3800 MHz

There are two licensed C-band FSS Earth Stations in Ireland and both operate in spectrum above 3900 MHz. These Earth Stations are therefore protected by at least 100 MHz from proposed BWA systems in the 3.6 GHz band.

Although FWALA services and the proposed BWA services do not operate in the same spectrum as C-band FSS earth stations in Ireland, ECC Report 100 also highlights the potential for C-band FSS Earth Stations to suffer from receiver blocking on account of the wide-band nature of the Low Noise Block-converters (LNBs) used in some installations.

[31] S.I. No. 369 of 2009: Wireless Telegraphy (Radiodetermination, Air Traffic and Maritime Services) Regulations, 2009

This Report addressed a range of BWA transmit power levels and incident angles with respect to the axis of an Earth Station antenna.

CEPT ECC Report 100 states that the dominant risk of interference from BWA systems into FSS Earth Stations arises from the higher power BWA Central Stations and not from the lower power Terminal Stations. Therefore it is the Central Stations, as opposed to the Terminal Stations, that need to be co-ordinated. The Report recommends mitigation areas (a range of separation distances as listed in Table 5 below) for the successful co-existence of BWA Central Stations and FSS Earth Stations. It should be noted however that the Report contemplated some scenarios based on BWA power levels which exceed those that would be permitted under the technical requirements of the EC Decision.

Interfering BWA Station Type and transmitted power level (eirp)	Appropriate separation distance if BWA Station is within ***5°*** of FSS Earth Station antenna axis *(least likely scenario)*	Appropriate separation distance if BWA Station is within ***15°*** of FSS Earth Station antenna axis	Appropriate separation distance if BWA Station is within ***30°*** of FSS Earth Station antenna axis *(most likely scenario)*
Central Station radiating +59 dBm *(i.e. 6dB greater than max level permitted under EC Decision)*	10.89 Km	2.76 Km	1.16 Km
Central Station radiating +51 dBm *(i.e. 2dB lower than max level permitted under EC Decision)*	4.3 Km	1.1 Km	0.46 Km
Up to 16 user Terminal Stations radiating +49 dBm *(i.e. 1dB lower than maximum level permitted under EC Decision)*	3.44 Km	0.87 Km	0.37 Km
Up to 16 user Terminal Stations radiating +31 dBm *(i.e. 19dB lower than maximum level permitted under EC Decision)*	0.43 Km	0.11 Km	0.05 Km
Up to 16 user Terminal Stations radiating +19 dBm *(i.e. 31dB lower than maximum level permitted under EC Decision)*	0.11 Km	0.03 Km	0.01 Km

Table 5: Separation distances between BWA and C-band FSS Earth Stations recommended by CEPT ECC Report 100.

In assessing the compatibility of the two licensed Earth Stations with the proposed BWA services in the 3.6 GHz band, ComReg has assumed the worst case scenario contemplated in ECC Report 100, i.e. where a BWA Central Station is radiating +59 dBm (i.e. 6dB

above the maximum power level permitted under the EC Decision and the mitigating effect of terrain and clutter[32] has been excluded). Under this scenario, the worst case zones within which co-ordination may be required between BWA licensees and FSS Earth Stations are depicted on the map shown in Figure 3 below.

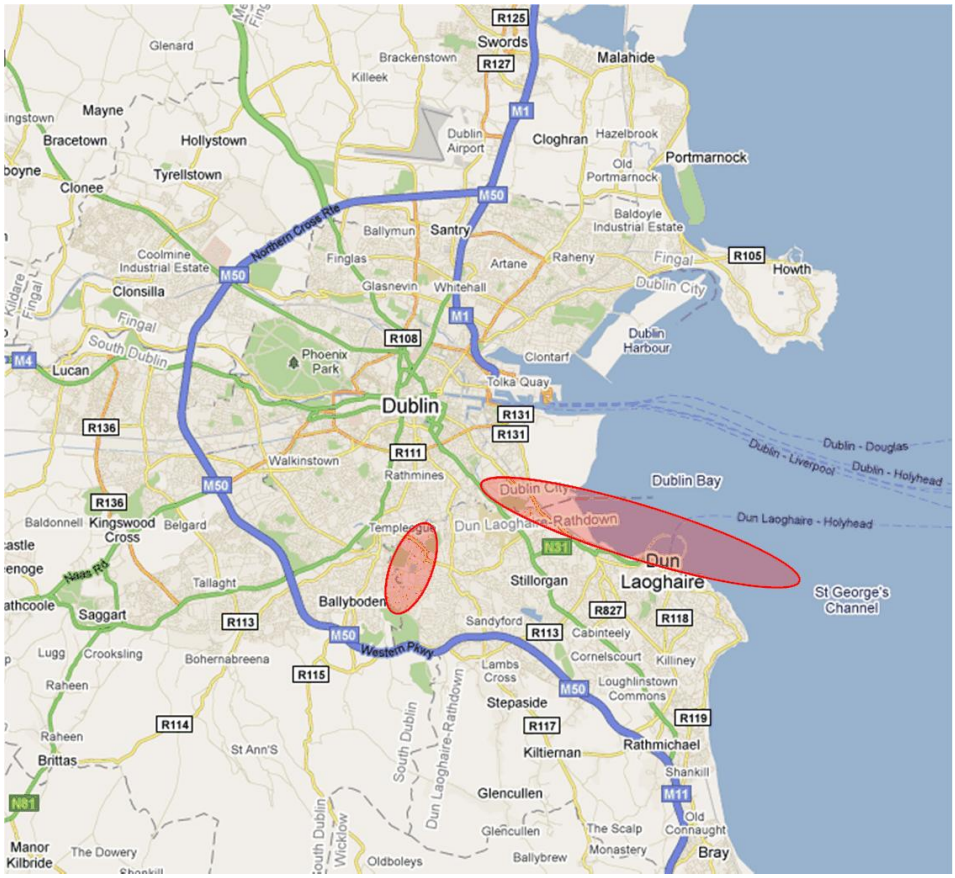


Figure 3: The worst case zones within which coordination between BWA and existing FSS Earth Stations may be required.

In a realistic scenario the limits on Central Station transmit power levels imposed by the EC Decision, combined with the mitigating effect of urban clutter mean that BWA systems should be capable of operating within these zones without affecting the two licensed FSS Earth Stations. ECC Report 100 also notes that in the unlikely case of Earth Station LNB saturation, the effect may also be further mitigated by fitting filters to affected Earth Stations.

ComReg notes, however, that the deployment of BWA within the zones indicated in Figure 3 may require co-ordination with the two FSS Earth Stations, and accordingly future BWA licensees will be required to notify ComReg before putting any Central Stations into service within these areas. Should a co-existence issue arise between a BWA system and either of these two licensed FSS Earth Stations, ComReg will investigate the issue and the onus to provide any required mitigation measures would lie with the BWA licensee concerned.

[32] Clutter is the term used to describe non-topographical objects located in the propagation path which scatter and attenuate a signal. Typical examples of clutter are vegetation, buildings and other man-made structures.

In relation to international co-ordination and protecting non-Irish FSS Earth Stations, ComReg will act in accordance with the ITU Radio Regulations.

6.2.1.3 Summary of impact on adjacent band services

The Radiolocation and Fixed Satellite Services operating in spectrum adjacent to the 3.6 GHz bands operate within frequency allocations which have been harmonised at an international level and the technical requirements set out in the EC Decision were based on extensive studies and co-operation between interested parties at CEPT level. In light of this and the factors discussed in the preceding sections, ComReg is of the view that BWA systems may be introduced into the 3.6 GHz band without negatively impacting on services in adjacent bands. ComReg will however continue to co-ordinate and protect existing services where appropriate, though ComReg does not foresee that the implementation of the EC Decision will cause problems for systems in adjacent bands.

Q. 3. Do you agree that the requirements of the EC Decision may be implemented in Ireland without adversely affecting services operating in spectrum below 3400 MHz or above 3800 MHz? Please provide supporting arguments with your response.

6.2.2 Impact on existing FWALA operations in the 3.6 GHz band

Due to the local area nature of the current FWALA scheme, implementing the EC Decision has the potential to change the interference environment for existing FWALA operations in the 3.6 GHz band. The implications are considered below.

6.2.2.1 Implications for FWALA Central Stations and Terminal Stations

Under the FWALA scheme, a number of different operators may use the same spectrum blocks in geographically adjacent areas. CEPT ECC Report 33[33] and ECC Recommendation (04)05[34] considered the scenario of two fixed networks in the 3.6 GHz band, owned and operated by different operators but providing the same service.

[33] CEPT ECC Report 33: The Analysis of the Coexistence of Point-to-Multipoint FWS Cells in the 3.4 - 3.8 GHz Band. Note this document covers Fixed Wireless Access only. ECC Report 33 dealt with two different deployment scenarios for operators (i) operating in the same or partly overlapping areas with adjacent frequency assignments and (ii) operating in adjacent or nearby areas re-using the same frequency assignment. The report found that a stringent protection requirement is needed only for central stations and that "the protection factor for terminal stations is far less stringent and reduces as the antenna directivity is improved."

[34] CEPT ECC Recommendation (04)05: Guidelines for accommodation and assignment of Multipoint fixed wireless systems in frequency bands 3.4-3.6 GHz and 3.6-3.8 GHz.

The BEM from ECC Recommendation (04)05 already applies to existing FWALA operations as part of ComReg's 3.6 GHz FWALA Code of Practice[35]. Adoption of the EC Decision BEM would potentially permit future BWA operators to deploy Central Stations with higher transmit power levels in line with the technical requirements of the Decision, however in order to protect FWALA services, all licensees will be required to comply with a 33 dBµV/m interference contour limit for the duration of the FWALA licensing scheme in the 3.6 GHz band (See section 7.1.2).

In the scenario where licensees use the same spectrum in adjacent service areas, the interference contour protects both parties from interference between Central Stations. Hence an increase in output power on the part of one operator in line with the EC Decision BEM would not affect the Central Station of a FWALA licensee in a neighbouring service area.

However, in the scenario where a FWALA licensee and a future BWA licensee with adjacent spectrum assignments operated within the same or overlapping service areas, and deploy Central Stations in close proximity to each other (such as co-location on a common tower/structure), then the higher power output of the BWA Central Station could cause front-end overload in the receivers incorporated into FWALA equipment. If the FWALA equipment has insufficient filter selectivity then this situation could degrade the performance of the FWALA network equipment.

Existing FWALA operators typically co-ordinate with one another to avoid interference and ComReg considers that the type of potential interference described above may be prevented or mitigated by appropriate site engineering and effective co-ordination between licensees.

ComReg is aware that deployment of mobile systems in the 3.6 GHz band may require operators to increase the power levels transmitted in line with the technical requirements in the Annex of the EC Decision. This is because mobile devices have antennas with a limited gain and hence higher power levels may be required from both Central Stations and mobile terminals in order to provide adequate coverage.

As part of its implementation of the EC Decision, ComReg is minded to update the current FWALA Guidelines set out in ComReg Document 07/74 by replacing the current BEM with the BEM in the Annex to the EC Decision. Doing so would permit all existing FWALA licensees in the 3.6 GHz band to operate within the increased power limits set out in the EC Decision, subject to existing requirements to observe the interference contour.

Q. 4. Do you agree with ComReg's proposal to allow existing FWALA licensees to increase power in line with the fixed and nomadic in-band power limit requirements and BEM set out in the Annex of the EC Decision? Please provide supporting arguments with your response.

[35] ComReg Document 07/74: FWALA - 3.5 GHz Domestic Frequency Coordination Licensed Operator Code of Practice.

6.2.2.2 Interference from mobile BWA terminals

With the introduction of BWA systems into the 3.6 GHz band there is the possibility of future users taking their a mobile terminal devices out of the geographic area served by their own service provider and entering the geographic area served by another service provider licensed to operate in the same spectrum. ComReg considers that the likelihood of harmful interference in such scenarios is minimal, for the following reasons:

1) Mobile terminals will be required to satisfy the requirements of Article 3 of the R&TTE Directive and comply with, or afford a level of protection similar to, ETSI Harmonised Standard EN 302 623 V.1.1.1 (2009-01)[36]. The latter includes measures to ensure that mobile devices cannot transmit in the absence of a valid[37] network.

2) Before entering the service area of another BWA service provider, a mobile terminal device would exit the interference contour of its own service provider. The interference contour limit (which all operators must comply with) requires licensees to ensure that a power level of no more than 33dBµV/m is present on the contour boundary. As a result of this licence condition, the power level from the device's serving Central Station that would be present in a neighbouring licensee's service area would be significantly less than the minimum receive power level[38] required by mobile terminals to operate. Under these circumstances the mobile terminal device should cease transmitting before passing into the neighbouring service area.

3) Should a mobile terminal device be carried into the service area of another BWA network which it determines to be a valid network, there is a possibility that it may transmit in an attempt to connect to that network. Such transmissions are unlikely to create serious interference and licensees may further mitigate this by inter-operator agreements such as roaming agreements.

Furthermore, ComReg believes that proper co-operation and co-ordination between licensees in the 3.6 GHz band can also reduce the probability of interference as the licensees will be the first port of call should a case of interference arise.

[36] ETSI EN 302 623 V.1.1.1 (2009-01) Broadband Wireless Access Systems (BWA) in the 3 400 MHz to 3 800 MHz frequency band; Mobile Terminal Stations; Harmonized EN covering the essential requirements of Article 3.2 of the R&TTE Directive. This standard is available at www.etsi.org.

[37] ETSI Harmonised Standard EN 302 623 limits the maximum measurable power transmitted by a mobile terminal in the "absence of a valid network" to -30dBm.

[38] The 33dBµV/m limit is applied so that any interference to a receiver in a service area beyond this contour would be at least 6 dB below the thermal noise floor.

Q. 5. Are there any other factors in regard to the movement of mobile terminal devices between the service areas of local area licences that ComReg should consider? Please provide supporting arguments with your response.

6.2.3 Conclusion on the introduction of mobility to the 3.6 GHz band

For the reasons set out above, ComReg considers that the introduction of mobility to the 3.6 GHz band is technically feasible and provided the requirements of the EC Decision are adhered to, should not adversely affect existing services in the 3.6 GHz band or adjacent bands. ComReg is of the view that mobility should be introduced as soon as possible to the 3.6 GHz band in order to ensure that consumers derive the maximum benefit from the flexibility and variety of services that mobility is expected to offer, and to ensure that Ireland complies with the EC Decision. Detailed proposals on how mobility will be introduced in the 3.6 GHz band are described in the next section.

Q. 6. Other than those described in this document, do you foresee any other issues with the introduction of mobile wireless access systems to the 3.6 GHz band? Please provide supporting arguments with your response.

Q. 7. Are there any additional technical measures that should be applied/required to mitigate against the possibility of interference from proposed BWA services into existing FWALA networks? Please provide supporting arguments with your response.

7 ComReg's Proposals to Introduce Mobility to the 3.6 GHz Band

7.1 Proposals for a new BWALA licensing scheme

ComReg proposes to establish a new 3.6 GHz local area licensing scheme to be known as the Broadband Wireless Access Local Area (BWALA) licensing scheme. BWALA licences will permit the operation, on a local area basis, of fixed, nomadic *and* mobile wireless access systems in the 3.6 GHz band.

Establishing the BWALA licensing scheme will require new Regulations and licensing documentation and it will run parallel to the current FWALA scheme.

ComReg Information Notice 10/29[6], published on 8 April 2010, refers to ComReg's intention to carry out this consultation. The Information Notice explains the basis for setting an end-date of 31 July 2017 for all 3.6 GHz FWALA licences; those licences have a maximum duration of 7 years and therefore 31 July 2017 is considered an appropriate end date as it will assure current licensees that their licences will run for their full 7-year duration while at the same time prospective licence applicants are made aware of the final end-date and that no 3.6 GHz licence shall be renewed or extended beyond that date. Setting an end-date will create an unfettered 3.6 GHz band by 31 July 2017, so that the most efficient means of allocating the spectrum can be considered absent of constraints at that time. The introduction of a new BWALA licensing scheme in parallel with the FWALA scheme will not change this objective and therefore it is proposed that ComReg Information Notice 10/29 shall apply equally to future 3.6 GHz BWALA licences as it does to current and future 3.6 GHz FWALA licences.

ComReg proposes to apply the technical requirements set out in the Annex to the EC Decision but it should be noted that these limits are maximum limits and licensees must use lower power levels where appropriate.

The BWALA scheme will be similar to the FWALA scheme in many respects. Some of the key aspects of the scheme are outlined below.

7.1.1 BWALA service area

The BWALA service area would be defined as the geographic area within which an operator may offer fixed, nomadic and/or mobile telecommunications services. The service area would be defined by a circle of 20 km radius from a nominated centre point (with the exception of Channel E in the 3.6 GHz band as outlined in section 5.2.1).

The Terminal Stations (TS) and outlying base stations[39] may only be deployed within the service area of a BWALA licence and may only operate on the frequency range covered by that licence.

[39] "Outlying base stations" are those base stations which are not located at the centre of the FWALA service.

7.1.2 Interference contour and field strength limit

Interference contour limits are fundamental to the successful operation of FWALA networks as they ensure that FWALA users are protected from interference from neighbouring FWALA service areas. The technical requirements of the EC Decision do not include Interference contour limits, but as ComReg considers it imperative to minimise interference to existing FWALA operations, it intends to apply interference contour limits to future BWALA licences similar to those that currently apply to FWALA licences.

The interference contour would be defined by means of a circle around the centre point of the service area. The interference contour radius would be set at 30 km (with the exception of Channel E in the 3.6 GHz band). An application for a BWALA licence will be rejected if its interference contour overlaps[40] with the interference contour of another applicant/licensee in the same channel.

Existing and future local area 3.6 GHz licensees will be required to meet the interference contour limits laid down in Table 6.

Frequency	Maximum Service Area Radius (km)	Interference Contour Radius (km)	Field Strength (dBµV/m)
3400 - 3800 MHz	20	30	33

Table 6: Interference contour limits for 3.6 GHz BWALA licences[41]

The local area licensing of ECS in the 3.6 GHz band and by extension the continued application of the interference contour limit post-2017 will be reviewed by ComReg in its future strategic review of the 3.6 GHz band and FWALA licensing scheme.

Q. 8. Do you agree in principle with ComReg's proposal to create new BWALA licences in the 3.6 GHz band? Please provide supporting arguments with your response.

Q. 9. Are there any other technical requirements that need to be imposed to safeguard the operation of BWA on a local area basis in the 3.6 GHz band? Please provide supporting arguments with your response.

[40] It is expected that the applicant will employ an appropriate propagation modelling tool using ITU-R P.452 when planning their network to ensure that the field strength limit at the interference contour is not exceeded.

[41] Note these limits do not apply to Channel E where operators are permitted to deploy services right up to the service area boundary and the requirement for an interference contour has been removed (see ComReg 06/17R6).

Q. 10. Do you foresee any adverse implications with regard to the implementation by existing and future local area 3.6 GHz operators of the in-block and out-of-block requirements laid down in the EC Decision? Please provide supporting arguments with your response.

Q. 11. Given the proposed increase in e.i.r.p. field strength limits, is the current 33 dBµV/m interference contour limit sufficient to safeguard existing operations in the 3.6 GHz band? Please provide supporting arguments with your response.

7.1.3 Geographic service areas (GSAs)

A Geographic Service Area (GSA) allows a FWALA licensee with two or more adjacent licenses, to extend its networks so that it may provide coverage in a contiguous manner across those service areas. However, as of June 2010 no GSA has been requested by a FWALA licensee. Notwithstanding the lack of GSA take up, ComReg considers the GSA provision (set out in ComReg Document 06/17R6) to be in the best interest of ensuring efficient spectrum use, as contiguous coverage across adjacent service areas would not otherwise be feasible given the power limits set down in individual FWALA licences.

ComReg considers that the GSA concept should apply to the proposed BWALA licensing scheme under conditions similar to FWALA licences. The BWALA GSA concept would apply as follows;

- 10 km interference buffer zones would be maintained, as required under the current FWALA licensing scheme; and
- the 33 dBµV/m interference field strength limits would be observed at the edge of the buffer zone, as with the current FWALA licensing scheme.

7.1.4 FWALA and BWALA code of practice for the 3.6 GHz band

While every effort is made by ComReg to minimise the possibility of interference between licensed operators, situations may nevertheless arise from time to time where it is necessary to co-ordinate the use of frequencies between different local area networks. The most appropriate way to deal with such instances is by means of a Code of Practice on domestic frequency coordination. A similar Code of Practice[42] applying to the FWALA licensing scheme has assisted in averting many cases of interference to date and ComReg intends to update the Code of Practice to address the proposed BWALA scheme.

[42] ComReg Document 07/74 - FWALA - 3.5 GHz Domestic Frequency Coordination - Licensed Operator Code of Practice.

The updated Code of Practice would apply to all 3.6 GHz FWALA and BWALA licences and would be based on the following principles:

1. It is not possible to assign frequencies to a service area which are completely free of interference;

2. Operators have a number of mitigation options available to deal with interference problems;

3. Operators require a level of certainty in frequency planning for their network;

4. It is not possible to anticipate every possible interference scenario – therefore a pragmatic approach is required;

5. Operators with neighbouring networks may arrive at sharing solutions independent of ComReg;

6. That a Code of Practice be considered best practice in the absence of any other agreements;

7. ComReg is responsible for the international coordination of radio systems between Ireland and other countries;

8. Management of the deployment of network infrastructure, including customer premises equipment, in the licensed service area and within the licensed frequency channel is generally a matter for the licensee;

9. The local area approach and the requirement to comply with the maximum permissible field strength contour will result in differing e.i.r.p. values for base-stations and customer premises equipment deployed within the licensed service area;

10. The approach in Ireland should as far as possible take into consideration the approach recommended by CEPT[43], the European Commission and other relevant bodies;

11. The Code of Practice is an operational document and may be subject to review and amendment from time to time in order to reflect such technological changes, new legal obligations, or other matters as may arise.

[43] CEPT Deliverables ERC/REC 14-03, ECC Report 033 and ECC/REC(04)05 (www.cept.dk or www.ero.dk).

Q. 12. Do you agree with the principals outlined in section 7.1.4 upon which ComReg proposes to base a revised Code of Practice for domestic frequency coordination in the 3.6 GHz band? Please provide supporting arguments with your response.

7.1.5 Cross-border frequency considerations

Radio transmissions at international borders can give rise to interference between services in neighbouring countries. For this reason bi-lateral or multi-lateral co-ordination agreements are typically agreed between neighbouring countries. There is currently a Memorandum of Understanding (MoU) in place between ComReg and its UK counterpart, Ofcom, to facilitate the operation of 3.6 GHz FWALA stations as close to the UK border as possible – the full text is contained in Annex 3 of ComReg Document 06/17R6. This MoU is bi-lateral and all licensees are required to meet its terms. The MoU caters for the use of the 3.6 GHz band by fixed, nomadic and mobile wireless access systems. All existing and future terrestrial ECS licensees in the 3.6 GHz band shall be bound by the terms of this MoU.

The criteria for cross-border frequency co-ordination are as follows:

1. A FWALA station may be established without co-ordination, provided that the predicted power spectral density (PSD) produced by the station, at a height of 10 meters above ground at 15 km from the border or coast line of the neighbouring country does not exceed 24 dBμV/m in a bandwidth of 1 MHz (equivalent to an aperture power of -122 dBW/MHz/m^2).

2. There may be an occasional need to establish stations such that the PSD will exceed the above limit. In such cases, each administration may coordinate in accordance with the MoU.

3. In the case of time division duplex technology the interference power shall be the power, during the active part of the signal, in the stated bandwidth.

7.1.6 Network and terminal equipment compliance

All radio equipment used to deliver BWALA services must comply with the Radio and Telecommunications Terminal Equipment Directive 1999/5/EC ("the R&TTE Directive")[44] as enacted into Irish law by S.I. 240/2001. Harmonised standards published by the European Telecommunications Standards Institute (ETSI) and CENELEC, can be

[44] Directive 1999/5/EC of the European Parliament and of the Council of 9 March 1999 on radio equipment and telecommunications terminal equipment and the mutual recognition of their conformity. OJEC reference L 91, 7.4.1999, p.10 (available from http://europa.eu.int/eur-lex/en/search/search_oj.html)

used to demonstrate compliance with the R&TTE Directive[45]. Information on the R&TTE Directive may be found in ComReg Documents 00/61 and 00/62R.

7.2 Licence exemption of 3.6 GHz mobile user terminals

Fixed and Nomadic user terminals in the 3.6 GHz band are currently licensed under appropriate FWALA licences. It is expected that future 3.6 GHz Mobile terminals will be integrated into everyday consumer devices such as laptops and other mobile wireless terminals which may be bought independently of 3.6 GHz licensees. At present, the unlicensed possession or use of any device which incorporated a mobile terminal would be an offence. ComReg believes that it will be necessary to authorise the future use of these devices in an appropriate manner.

Furthermore, ComReg considers that the probability of interference from these devices will be low given their relatively low transmitted power limit (maximum e.i.r.p. spectral density limit of + 25 dBm/MHz equivalent to 315mW/MHz) and assuming that the mitigation measures afford a level of protection similar to that achieved by devices compliant with ETSI Standard EN 302 623 V.1.1.1.

For these reasons, ComReg considers that 3.6 GHz band mobile terminals are an appropriate candidate for a licence exemption order which permit any end user to possess and operate any mobile terminal enabled device without having to obtain a licence. ComReg envisages that the licence exemption for 3.6 GHz band mobile terminals would be similar to those already in place for other mobile terminals[46].

ComReg proposes that the licence exemption will only apply to 3.6 GHz mobile wireless access terminals meeting the following criteria:

1. Full compliance with Directive 1999/5/EC (R&TTE Directive); and
2. Meeting the requirements of ETSI Harmonised Standard EN 302 623 V.1.1.1 (2009-01).

Q. 13. Do you agree that possession and use of 3.6 GHz band mobile terminals should be exempt from individual licensing under an appropriate authorisation regime? If not, please explain your reasoning.

[45] A list of the harmonised standards under the R&TTE Directive is maintained at: http://europa.eu.int/comm/enterprise/newapproach/standardization/harmstds/reflist/radiotte.html

[46] Examples include; S.I. No. 158 of 2003: Wireless Telegraphy Act, 1926 (Section 3) (Exemption of Mobile Telephones)(Amendment) Order, 2003; S.I. No. 107 of 1999: Wireless Telegraphy Act, 1926 (Section 3) (Exemption of DCS 1800 Mobile Terminals) Order, 1999 and S.I. No. 409 of 1997: Wireless Telegraphy (Mobile Telephones) Exemption Order, 1997.

Q. 14. Do you agree with the above proposed licence exemption criteria to be applied to 3.6 GHz mobile terminals? If not, please explain your reasoning.

Q. 15. Are there any other criteria that should be applied to licence-exempt 3.6 GHz mobile terminals? Please provide supporting arguments with your response.

7.3 New BWALA licences and option for surrender of 3.6 GHz FWALA licences

ComReg considers that enabling current FWALA licensees to convert to BWALA licences is a proportionate and objectively justified measure which will achieve timely implementation of the EC Decision, while also ensuring the most efficient use of the 3.6 GHz band in the period leading up to full review of that band.

ComReg does not consider that the measure is likely to result in any distortion of competition in the provision of ECS given that FWALA licensees who switch to BWALA licences will still only be able to operate in a local area governed by a circle of 20 km radius and having such a limited geographic area in which to operate greatly limits any economic advantage that may result from being able to offer a mobile service.

Further, FWALA licences are all of seven years duration but were issued on many different dates and are therefore subject to numerous expiry dates. Given that FWALA licences are local, of quite short duration, and expire on numerous different dates, it is not considered practical to hold a competitive award process until all of those licences have expired completely and this is why 31 July 2017 has been put in place as the outermost expiry date for all FWALA/BWALA licences. Prior to that date, there is little practical basis for holding a series of smaller competitive award processes in order to allocate BWALA spectrum, particularly as FWALA licence areas overlap in such a way that for the most part only incumbent FWALA licensees will be in a position to apply for any new BWALA licences.

ComReg proposes to permit, upon request, any existing 3.6 GHz FWALA licensees to convert their FWALA licences to BWALA licences, subject to the following conditions:

i. A FWALA licensee seeking to convert to a BWALA licence will be required to surrender the relevant FWALA licence and will be issued with a new BWALA licence. The BWALA licence will permit the licensee to provide Fixed, Nomadic *and* Mobile services using the same spectrum assignment and in the same geographical area granted in the original FWALA licence;

ii. Where a FWALA licensee surrenders a FWALA licence for a BWALA licence, the new BWALA licence will expire on the same date as specified in the original FWALA licence – i.e. 7 years from the original date of issue of the FWALA licence;

iii. On 31 July 2017, **all** 3.6 GHz FWALA and BWALA licences shall expire utterly and cannot be renewed – see ComReg Information Notice No 10/29; and

iv. The annual fee for a BWALA licence that replaces a surrendered FWALA licence shall be such as to reflect the increased value of the BWALA licence. (see Section 8 for details of licence fees).

Q. 16. Do you agree that existing FWALA licensees should be allowed to convert their licences to BWALA licences under the conditions (i) - (iv) above? Please provide supporting arguments with your response and detail any alternative if applicable.

8 Licence Fees

8.1 Current FWALA licence fees

The annual licence fees[47] that apply to 3.6 GHz FWALA licences are shown in Table 7 below. These fees are set down in the FWALA Regulations[48].

Bandwidth (Paired Channel)	Annual Licence fee (€)
Up to 7 MHz	1500
Over 7 MHz and up to 14 MHz	2000
Over 2 x 14 MHz and up to 2 x 28 MHz	2800

Table 7: Schedule of existing FWALA fees

8.2 Establishing the value of mobility

ComReg recently considered the level of fees paid by 3.6 GHz broadband wireless service licensees in other countries in order to inform its decision on setting fees for BWA licences. However, it was concluded that at present there is insufficient reliable information available on awards of mobile licences in the 3.6 GHz band. Hence it is not possible to accurately determine the additional value of mobile use in the 3.6 GHz band by looking elsewhere in Europe.

Following the inconclusive results, ComReg considered quantifying the additional value associated with mobility based on the value differential between fixed and mobile retail services offered to end users in other markets. However, the prevalence of bundled retail products in both the fixed and mobile markets makes a direct comparison of retail tariffs difficult and introduces a high degree of uncertainty into any resulting value differential.

Furthermore, the value increase associated with mobile licences is curtailed by the following factors that result from the current use of the 3.6 GHz band in Ireland;

1) Ireland's local area use of the band means that the introduction of mobility in the period up to 2017 would also have to be on a local area basis. The likely low level of demand for a mobile service that is limited to the geographical confines of a local area suggests that the increased value of the licensed spectrum will be relatively low;
2) ComReg will undertake a review of the 3.6 GHz band in advance of 2017 in which it will consider the possible adoption of a national or regional licensing scheme to replace the existing local area scheme. To ensure the band is unfettered at that time, **all** 3.6 GHz local area licences (both FWALA and any new BWALA licences) will expire simultaneously on 31 July 2017[49]. For this reason, any licences issued after

[47] It should be noted that a review of the level of fees for existing FWALA licences is outside the scope of this consultation. ComReg is planning a comprehensive review of FWALA fees as part of its strategic review of the FWALA licensing scheme and the future use of the 3.6 GHz band post 2017. This review is due to commence in Q4 2010.

[48] S.I. 79 of 2003: Wireless Telegraphy (Fixed Wireless Access Local Area Licence) Regulations, 2003.

[49] See ComReg Document 10/29.

31 July 2010 will necessarily be of shorter duration than the standard 7 years. The increasingly shortened duration of a BWALA licence (the closer one moves to 31 July 2017) may reduce the valuation of the spectrum licensed thereunder; and

3) Existing FWALA licensees may provide fixed and nomadic mobile services. While the right to provide mobile services should increase the economic value of the licensed spectrum, a wide selection of user terminals that are capable of true mobile operation has yet to develop in the 3.6 GHz band, and most terminal equipment currently in operation is intended for fixed or nomadic use only.

Noting these limitations and their likely impact on demand, in order to reflect the incremental benefit of mobility under current conditions, ComReg is minded to base the fees for BWALA licences on the current FWALA fees augmented by a low but non-trivial amount.

8.3 New BWALA licence fees

The proposed fees that would apply to BWALA licences for a 7 MHz, 14 MHz and 28 MHz channel are shown below in Table 8.

Bandwidth (Paired Channel)	Proposed Future BWALA Licence fee (€)	Current FWALA Licence fee (€)
Up to 7 MHz	1550	1500
Over 7 MHz and up to 14 MHz	2100	2000
Over 2 x 14 MHz and up to 2 x 28 MHz	3000	2800

Table 8: Schedule of proposed BWALA fees

Q. 17. Do you believe the fees set out in Table 8 are appropriate to future BWALA licences? Please provide supporting arguments with your response.

Q. 18. What other factors do you believe should inform ComReg's decision on the setting of appropriate annual BWALA licence fees?

Please provide supporting arguments with your response.

9 Conclusions/Summary & Next steps

This consultation document sets out ComReg's proposals relating to the implementation of EC Decision 2008/411/EC on the harmonisation of the 3400 - 3800 MHz frequency band ("the 3.6 GHz band") for terrestrial systems capable of providing electronic communications services in the Community, including the introduction of mobility to the band.

ComReg considers it feasible to introduce mobility into the 3.6 GHz band in Ireland and proposes to implement the EC Decision for the entire band as soon as practicable by introducing a new Broadband Wireless Access Local Area (BWALA) licensing scheme. BWALA licences will permit mobile use in addition to fixed and nomadic use.

The constraints imposed by the existing local area licensing scheme means that any new mobile licences must also operate on a local area basis. However ComReg has set 31 July 2017 as the end date for all local area licences in the 3.6 GHz band.

ComReg plans to publish its response to this consultation document in Q4 2010. Later this year ComReg will also begin a review of how the band should be used after 31 July 2017. The review will consider aspects such as future national or regional licensing of the band, award mechanisms and the appropriate level of licence fees.

10 Submitting Comments

The consultation period will run from 14 July to 5pm on 20 August 2010 during which the Commission welcomes written comments on any of the issues and proposals raised in this paper. 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.

All responses to this consultation should be clearly marked "Reference: Submission re ComReg 10/55" and sent by post, facsimile or e-mail to:

Ms. Sinead Devey
Commission for Communications Regulation,
Irish Life Centre,
Abbey Street,
Freepost,
Dublin 1,
Ireland.
Phone: +353-1-8049600 Fax: +353-1-8049680
Email: marketframeworkconsult@comreg.ie

Having analysed and considered the comments received, ComReg intends to publish a report on the consultation which will, *inter alia* summarise the responses to the consultation. Notwithstanding the need for additional analysis and even further consultation, ComReg intends to publish its Decision on the issues and proposals raised in this consultation in that report.

In order to promote further openness and transparency ComReg will publish all respondents' submissions to this consultation as well as any other correspondence received relating to the 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 easily incorporated into ComReg's 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 web-site 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[50] on the treatment of confidential information.

Respondents should also consider ComReg Document 03/31[51] which details ComReg's consultation procedures.

[50] ComReg Document 05/24: Guidelines on the treatment of confidential information.

[51] ComReg Document 03/31: Future Regulation of Electronic Communication Network and Services: ComReg Consultation Procedures.

11 List of Questions

Question 1: Are there any reasons why ComReg should not implement the EC Decision for the 3400 – 3600 MHz and 3600 – 3800 MHz sub-bands at the same time? Please provide supporting arguments with your response.

Question 2: Do you foresee any co-existence issues with existing services or applications operating in the 3.6 GHz band when implementing the EC Decision in Ireland? Please provide supporting arguments with your response.

Question 3: Do you agree that the requirements of the EC Decision may be implemented in Ireland without adversely affecting services operating in spectrum below 3400 MHz or above 3800 MHz? Please provide supporting arguments with your response.

Question 4: Do you agree with ComReg's proposal to allow existing FWALA licensees to increase power in line with the fixed and nomadic in-band power limit requirements and BEM set out in the Annex of the EC Decision? Please provide supporting arguments with your response.

Question 5: Are there any other factors in regard to the movement of mobile terminal devices between the service areas of local area licences that ComReg should consider? Please provide supporting arguments with your response.

Question 6: Other than those described in this document, do you foresee any other issues with the introduction of mobile wireless access systems to the 3.6 GHz band? Please provide supporting arguments with your response.

Question 7: Are there any additional technical measures that should be applied/required to mitigate against the possibility of interference from proposed BWA services into existing FWALA networks? Please provide supporting arguments with your response.

Question 8: Do you agree in principle with ComReg's proposal to create new BWALA licences in the 3.6 GHz band? Please provide supporting arguments with your response.

Question 9: Are there any other technical requirements that need to be imposed to safeguard the operation of BWA on a local area basis in the 3.6 GHz band? Please provide supporting arguments with your response.

Question 10: Do you foresee any adverse implications with regard to the implementation by existing and future local area 3.6 GHz operators of the in-block and out of block requirements laid down in the EC Decision? Please provide supporting arguments with your response.

Question11: Given the proposed increase in e.i.r.p. field strength limits, is the current 33 dBμV/m interference contour limit sufficient to safeguard existing operations in the 3.6 GHz band? Please provide supporting arguments with your response.

Question 12: Do you agree with the principals outlined in section 7.1.4 upon which ComReg proposes to base a revised Code of Practice for domestic frequency coordination in the 3.6 GHz band? Please provide supporting arguments with your response.

Question 13: Do you agree that possession and use of 3.6 GHz band mobile terminals should be exempt from individual licensing under an appropriate authorisation regime? If not, please explain your reasoning.

Question 14: Do you agree with the above proposed licence exemption criteria to be applied to 3.6 GHz mobile terminals? Please provide supporting arguments with your response.

Question 15: Are there any other criteria that should be applied to licence-exempt 3.6 GHz mobile terminals? Please provide supporting arguments with your response.

Question 16: Do you agree that existing FWALA licensees should be allowed to convert their licences to BWALA licences under the conditions (i) - (iv) above? Please provide supporting arguments with your response and detail any alternative if applicable.

Question 17: Do you believe the fees set out in Table 8 are appropriate to future BWALA licences? Please provide supporting arguments with your response.

Question 18: What other factors do you believe should inform ComReg's decision on the setting of appropriate annual BWALA licence fees? Please provide supporting arguments with your response.

Appendix A: Text of the EC Decision 2008/411/EC

4.6.2008 EN Official Journal of the European Union L 144/77

COMMISSION DECISION

of 21 May 2008

on the harmonisation of the 3 400-3 800 MHz frequency band for terrestrial systems capable of providing electronic communications services in the Community

(notified under document number C(2008) 1873)

(Text with EEA relevance)

(2008/411/EC)

THE COMMISSION OF THE EUROPEAN COMMUNITIES,

Having regard to the Treaty establishing the European Community,

Having regard to Decision No 676/2002/EC of the European Parliament and of the Council of 7 March 2002 on a regulatory framework for radio spectrum policy in the European Community (Radio Spectrum Decision) [1], and in particular Article 4(3) thereof,

Whereas:

(1) The Commission has supported a more flexible use of spectrum in its Communication on 'Rapid access to spectrum for wireless electronic communications services through more flexibility' [2], which, *inter alia*, addresses the 3 400-3 800 MHz band. Technological neutrality and service neutrality have been underlined by Member States in the Radio Spectrum Policy Group (RSPG) opinion on Wireless Access Policy for Electronic Communications Services (WAPECS) of 23 November 2005 as important policy goals to achieve a more flexible use of spectrum. Moreover, according to this opinion, these policy goals should not be introduced abruptly, but in a gradual manner to avoid disruption of the market.

(2) The designation of the 3 400-3 800 MHz band for fixed, nomadic and mobile applications is an important element addressing the convergence of the mobile, fixed and broadcasting sectors and reflecting technical innovation. The services provided in this frequency band should mainly target end-user access to broadband communications.

(3) It is expected that the wireless broadband electronic communications services for which the 3 400–3 800 MHz band is to be designated will to a large extent be pan-European in the sense that users of such electronic communications service in one Member State could also gain access to equivalent services in any other Member State.

(4) Pursuant to Article 4(2) of Decision No 676/2002/EC, the Commission gave a mandate dated 4 January 2006 to the European Conference of Postal and Telecommunications Administrations (hereinafter the CEPT) to identify the conditions relating to the provision of harmonised radio frequency bands in the EU for Broadband Wireless Access (BWA) applications.

(5) In response to that Mandate, the CEPT issued a report (CEPT Report 15) on BWA, which concludes that the deployment of fixed, nomadic and mobile networks is technically feasible within the 3 400-3 800 MHz frequency band under the technical conditions described in the Electronic Communications Committee's Decision ECC/DEC/(07)02 and Recommendation ECC/REC/(04)05.

(6) The results of the Mandate to the CEPT should be made applicable in the Community and implemented by the Member States without delay given the market demand for the introduction of terrestrial electronic communication services providing broadband access in these bands. Taking into account the differences in current use and in market demand for the 3 400-3 600 MHz and 3 600-3 800 MHz sub-bands at national level a different deadline should be established for the designation and availability of the two sub-bands.

(7) The designation and making available of the 3 400-3 800 MHz band in accordance with the results of the Mandate on BWA recognises the fact that there are other existing applications within these bands and does not preclude the future use of these bands by other systems and services to which these bands are allocated in accordance with the ITU Radio Regulations (designation on a non-exclusive basis). Appropriate sharing criteria for coexistence with other systems and services in the same and adjacent bands have been developed in ECC Report 100. This report confirms, *inter alia*, that sharing with satellite services is often feasible considering the extent of their deployment in Europe, geographical separation requirements and case-by-case evaluation of actual terrain topography.

[1] OJ L 108, 24.4.2002, p. 1.
[2] COM(2007) 50.

(8) Block Edge Masks (BEM) are technical parameters that apply to the entire block of spectrum of a specific user, irrespective of the number of channels occupied by the user's chosen technology. These masks are intended to form part of the authorisation regime for spectrum usage. They cover both emissions within the block of spectrum (i.e. in-block power) as well as emissions outside the block (i.e. out-of-block emission). They are regulatory requirements aimed at managing the risk of harmful interference between neighbouring networks and are without prejudice to limits set in equipment standards under Directive 1999/5/EC of the European Parliament and of the Council of 9 March 1999 on radio equipment and telecommunications terminal equipment and the mutual recognition of their conformity [1] (the R&TTE Directive).

(9) Harmonisation of technical conditions for the availability and efficient use of spectrum does not cover assignment, licensing procedures and timing, nor the decision whether to use competitive selection procedures for the assignment of radio frequencies, which will be organised by Member States in line with Community law.

(10) Differences in the national legacy situations could result in competitive distortions. The existing regulatory framework gives Member States the tools to deal with these problems in a proportionate, non-discriminatory and objective manner, subject to Community law including Directive 2002/20/EC of the European Parliament and of the Council of 7 March 2002 on the authorisation of electronic communications networks and services (Authorisation Directive) [2] and Directive 2002/21/EC of the European Parliament and of the Council of 7 March 2002 on a common regulatory framework for electronic communications networks and services (Framework Directive) [3].

(11) The use of the 3 400-3 800 MHz band by other existing applications in third countries can limit the introduction and use of this band by electronic communications networks in several Member States. Information on such limitations should be notified to the Commission pursuant to Articles 7 and 6(2) of Decision No 676/2002/EC and published in accordance with Article 5 of Decision No 676/2002/EC.

(12) In order to ensure effective use of the 3 400-3 800 MHz band also in the longer term, administrations should continue with studies that may increase efficiency and innovative use, such as meshed network architectures. Such studies should be taken into account when considering a review of this Decision.

(13) The measures provided for in this Decision are in accordance with the opinion of the Radio Spectrum Committee,

HAS ADOPTED THIS DECISION:

Article 1

This Decision aims at harmonising, without prejudice to the protection and continued operation of other existing use in this band, the conditions for the availability and efficient use of the 3 400-3 800 MHz band for terrestrial systems capable of providing electronic communications services.

Article 2

1. No later than six months after entry into force of this Decision Member States shall designate and make available, on a non-exclusive basis, the 3 400-3 600 MHz band for terrestrial electronic communications networks, in compliance with the parameters set out in the Annex to this Decision.

2. By 1 January 2012 Member States shall designate and subsequently make available, on a non-exclusive basis, the 3 600-3 800 MHz band for terrestrial electronic communications networks, in compliance with the parameters set out in the Annex to this Decision.

3. Member States shall ensure that networks referred to in paragraphs 1 and 2 give appropriate protection to systems in adjacent bands.

4. Member States shall not be bound to implement the obligations under this Decision in geographical areas where coordination with third countries requires a deviation from the parameters in the Annex to this Decision.

Member States shall make all practicable efforts to solve such deviations, which they shall notify to the Commission, including the affected geographical areas, and publish the relevant information pursuant to Decision No 676/2002/EC.

Article 3

Member States shall allow the use of the 3 400-3 800 MHz band in accordance with Article 2 for fixed, nomadic and mobile electronic communications networks.

[1] OJ L 91, 7.4.1999, p. 10. Directive as amended by Regulation (EC) No 1882/2003 (OJ L 284, 31.10.2003, p. 1).
[2] OJ L 108, 24.4.2002, p. 21.
[3] OJ L 108, 24.4.2002, p. 33. Directive as amended by Regulation (EC) No 717/2007 (OJ L 171, 29.6.2007, p. 32).

Article 4

Member States shall keep the use of the 3 400-3 800 MHz band under scrutiny and report their findings to the Commission to allow regular and timely review of the Decision.

Article 5

This Decision is addressed to the Member States.

Done at Brussels, 21 May 2008.

For the Commission
Viviane REDING
Member of the Commission

ANNEX

PARAMETERS REFERRED TO IN ARTICLE 2

The following technical parameters called block edge mask (BEM) are an essential component of conditions necessary to ensure coexistence in the absence of bilateral or multilateral agreements between neighbouring networks. Less stringent technical parameters, if agreed among the operators of such networks, can also be used. Equipment operating in this band may also make use of e.i.r.p. (1) limits other than those set out below provided that appropriate mitigation techniques are applied which comply with Directive 1999/5/EC and which offer at least an equivalent level of protection to that provided by these technical parameters (2).

A) LIMITS FOR IN-BLOCK EMISSIONS

Table 1

E.i.r.p. spectral density limits for fixed and nomadic deployments between 3 400 and 3 800 MHz

Station type	Maximum e.i.r.p. spectral density (dBm/MHz) (including tolerances and automatic transmitter power control (ATPC) range)
Central station (and repeater station downlinks)	+ 53 (1)
Terminal station outdoor (and repeater station uplinks)	+ 50
Terminal station (indoor)	+ 42

(1) The central station e.i.r.p. spectral density value given in the table is considered suitable for conventional 90 degrees sectorial antennas.

Table 2

E.i.r.p. spectral density limits for mobile deployments between 3 400 and 3 800 MHz

Station type	Maximum e.i.r.p. spectral density (dBm/MHz) (Minimum ATPC range: 15 dB)
Central station	+ 53 (1)
Terminal station	+ 25

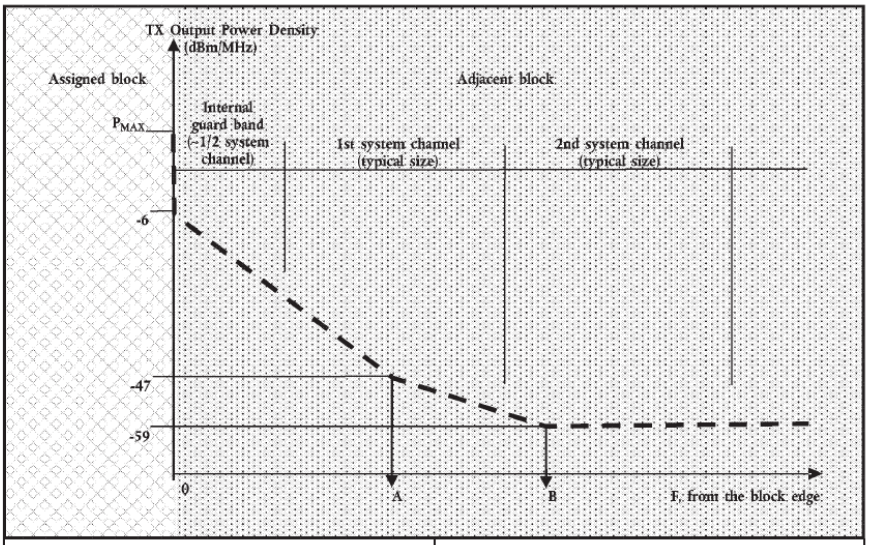
(1) The central station e.i.r.p. spectral density value given in the table is considered suitable for conventional 90 degrees sectorial antennas.

(1) Equivalent isotropically radiated power.
(2) The generic technical conditions applicable to fixed and nomadic networks are described in Harmonised Standards EN 302 326-2 and EN 302 326-3, which also include definitions for a central station and a terminal station. The term central station may be considered equivalent to the term base station in the context of mobile cellular networks.

B) LIMITS FOR OUT-OF-BLOCK EMISSIONS (BLOCK EDGE MASK FOR CENTRAL STATIONS)

Figure

Central station out-of-block emissions



Frequency offset	Definition (% of the size of the assigned block)
A	20 %
B	35 %

NB: The percentages given in the 'Definition' column refer to the smaller of adjacent blocks, if blocks are of unequal size.

Table

Tabular description of central station block edge mask

Frequency offset	Central station transmitter output power density limits (dBm/MHz)
In-band (within assigned block)	See Tables 1 and 2
$\Delta F = 0$	– 6
$0<\Delta F<A$	$-6-41\cdot(\Delta F/A)$
A	– 47
$A<\Delta F<B$	$-47-12\cdot((\Delta F-A)/(B-A))$
$\Delta F \geq B$	– 59

Appendix B - Definitions

Definitions from ITU-R F.1399-1: Vocabulary of terms for wireless access:

Wireless access
End-user radio connection(s) to core networks. Core networks include, for example, PSTN, ISDN, PLMN, PSDN, Internet, WAN/LAN, CATV. The end-user may be a single user or a user accessing the services on behalf of multiple users.

Fixed wireless access (FWA)
Wireless access application in which the location of the end-user termination and the network access point to be connected to the end-user are fixed.

Mobile wireless access (MWA)
Wireless access application in which the location of the end-user termination is mobile.

Nomadic wireless access (NWA)
Wireless access application in which the location of the end-user termination may be in different places but it must be stationary while in use.

Definitions from ECC Report 2: SAP/SAB (incl. ENG/OB) spectrum use and future requirements:

Service Ancillary to Programme making/Service Ancillary to Broadcasting (SAP/SAB): Services Ancillary to Programme making (SAP) support the activities carried out in the making of "programmes", such as film making, advertisements, corporate videos, concerts, theatre and similar activities not initially meant for broadcasting to general public. Services Ancillary to Broadcasting (SAB) support the activities of broadcast service companies carried out in the production of their programme material.

ENG: Electronic News Gathering is the collection of video and/or sound material without the use of film or tape recorder, using small, often hand-held, electronic cameras and/or microphones with radio links to the news room and/or to the portable tape or other recorders.

OB: Outside broadcasting is the temporary provision of programme making facilities at the location of on-going news, sport or other events, lasting from a few hours to several weeks. Outside Broadcasts are generally planned in advance, but it is often necessary to accommodate short notice changes of venue or unforeseen requirements. Video and/or sound reporting radio links (channels) might be required for mobile links, portable links and cordless cameras or microphones at the OB location. Additionally, video and/or sound reporting radio links may be required as part of a temporary point to point connection between the OB vehicle and the studio[52].

[52] Definitions from ECC Report 2: SAP/SAB (incl. ENG/OB) spectrum use and future requirements.

Appendix C: Abbreviations and Acronyms

BEM	Block Edge Mask
BWA	Broadband Wireless Access
BWALA	Broadband Wireless Access Local Area
CEPT	Conference of European Postal and Telecommunications Administrations
CS	Central Station
EC	European Commission
ECC	Electronic Communications Committee (of CEPT)
ECS	Electronic Communications Service
FWA	Fixed Wireless Access
FWALA	Fixed Wireless Access Local Area
ITU	International Telecommunication Union
MoU	Memorandum of Understanding
MWA	Mobile Wireless Access
NWA	Nomadic Wireless Access
OB	Outside Broadcasting
PMSE	Programme making AND Special Events
SAB/SAP	Services Ancillary to Broadcasting / Services Ancillary to Programme making
TS	Terminal Station

Appendix D: References

ComReg Documents *(available at http://www.comreg.ie)*

ComReg 06/17R6: Revised Guidelines to Applicants for Fixed Wireless Access Local Area (FWALA) Licences.

ComReg 07/74: FWALA – 3.5GHz Domestic Frequency Coordination.

ComReg 08/50: Spectrum management Strategy Statement 2008 -2010.

National Legislation *(available at http://www.attorneygeneral.ie/)*

Wireless Telegraphy Act 1926, No. 45/1926.

SI 295 of 2007: Wireless Telegraphy (Fixed Satellite Earth Stations and Teleport Facility) Regulations 2007.

S.I. 79 of 2003: Wireless Telegraphy (Fixed Wireless Access Local Area Licence) Regulations, 2003.

S.I. 530 of 2003: Wireless Telegraphy (Fixed Wireless Access Local Area Licence) (Amendment) Regulations, 2003.

S.I. No. 338 of 2003 Wireless Telegraphy (Fixed Wireless Point to Multi-point Access Licence)(Amendment)(no.2) Regulations, 2003.

S.I. No. 158 of 2003: Wireless Telegraphy Act, 1926 (Section 3) (Exemption of Mobile Telephones)(Amendment) Order, 2003.

S.I. No. 273 of 2000: Wireless Telegraphy Act, 1926 (Section 3) (Exemption of Certain Fixed Satellite Receiving Earth Stations) Order, 2000.

S.I. 287 of 1999, Wireless Telegraphy (Fixed Wireless Point to Multi-point Access Licence) Regulations.

S.I. No. 107 of 1999: Wireless Telegraphy Act, 1926 (Section 3) (Exemption of DCS 1800 Mobile Terminals) Order, 1999.

S.I. No. 409 of 1997: Wireless Telegraphy (Mobile Telephones) Exemption Order, 1997.

EC Decisions (available at http://ec.europa.eu/information_society/policy/ecomm/radio_spectrum/documents/legislation/index_en.htm)

Commission Decision 2008/411/EC on the harmonisation of the 3400 - 3800 MHz frequency band for terrestrial systems capable of providing electronic communications services in the Community.

ECC Decisions, Reports and Recommendations.

CEPT Report 015 "Report from CEPT to the European Commission in response to the Mandate to: identify the conditions relating to the provision of harmonised radio frequency bands in the European Union for Broadband Wireless Access applications".

ECC Report 33 "The Analysis of the Coexistence of Point-to-Multipoint FWS Cells in the 3.4 -3.8 GHz Band".

ECC Report 100 "Compatibility studies in the band 3400-3800 MHz between Broadband Wireless Access (BWA) systems and other services".

ERC Report 025: The European Table of Frequency Allocations and Utilisations in the frequency range 9 kHz to 3000 GHz.

ECC/DEC/(07)02 "ECC Decision of 30 March 2007 on availability of frequency bands between 3400-3800 MHz for the harmonised implementation of Broadband Wireless Access systems (BWA)".

ECC/REC/(04)05 "Guidelines for accommodation and assignment of Multipoint fixed wireless systems in frequency bands 3.4-3.6 GHz and 3.6-3.8 GHz".

ITU Documentation

Recommendation ITU-R F.1399-1: Vocabulary of terms for wireless access

Other Documentation

Memorandum of Understanding on Frequency Coordination between the Republic of Ireland and the United Kingdom for Wireless Access Services in the Frequency Band 3400 to 3800 MHz – see Annex 3 of ComReg 06/17R6.

OFCOM Consultation and Statements on Freedom4 application for licence variation. See http://www.ofcom.org.uk/consult/condocs/freedom4/.

Appendix E: Notification of Licence Exempt C-band VSAT Terminals.

*This form is provided solely for operators of VSAT (Very Small Aperture Terminals) operating in the band **3400 – 4200 MHz** pursuant to Statutory Instrument 273 of 2000 to notify ComReg of the details of any such installations. Please provide a separate form for each installation being notified. Completed forms may be returned before 5pm on 20 August 2010:*

Mr. Conor Conran
Market Framework Division,
Commission for Communications Regulation,
Block DEF, Abbey Court, Irish Life Centre
Lower Abbey Street, Dublin 1, Ireland.
Fax +353 1 804 9665 or e-mail: conor.conran@comreg.ie

Location of C-band VSAT Terminal
(please provide coordinates in Degrees° Minutes' and Seconds")

Longitude:

Latitude:

Frequency information

Uplink/transmit centre frequency:

Uplink/transmit bandwidth *(MHz)*:

Downlink/receive centre frequency:

Downlink/receive bandwidth *(MHz)*:

Antenna Details:

Antenna diameter in meters:

Antenna elevation angle:

Antenna azimuth angle *(in degrees East of True North)*:

Antenna elevation above ground level in meters:

Contact details for operator of C-band VSAT Terminal

Name and daytime contact telephone number:

Postal and e-mail addresses:

Appendix F: Notification of Radiolocation Stations.

*This form is provided solely for operators of Radiolocation (Radar) stations operating in the band **2850 – 3400 MHz** to notify ComReg of the details of any such installations .This form is not an application for a licence under SI 369 of 2009. Please provide a separate form for each station being notified. Completed forms may be returned before 5pm on 20 August 2010:*

Mr. Conor Conran
Market Framework Division,
Commission for Communications Regulation,
Block DEF, Abbey Court, Irish Life Centre
Lower Abbey Street, Dublin 1, Ireland.
Fax +353 1 804 9665 or e-mail: conor.conran@comreg.ie

Location of Radiolocation Installation
(please provide coordinates in Degrees° Minutes' and Seconds")

Longitude:

Latitude:

Frequency information

Transmit frequency:

Transmit bandwidth *(MHz)*:

In the case of installations operating with Frequency diversity, please include the following:

Second transmit frequency:

Second transmit bandwidth *(MHz)*:

Antenna Details:

Antenna type:

Antenna elevation above ground level in meters:

Contact details for operator of Radiolocation Installation

Name and daytime contact telephone number:

Postal and e-mail addresses: