Commission for
Communications Regulation

Consultation Paper

Licensing Digital Terrestrial Radio

Digital Terrestrial Sound Broadcasting Multiplex Licence Conditions

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All responses to this consultation should be clearly marked:- "Reference: Submission re Licensing Digital Radio Consultation 08/79" as indicated above, and sent by post, facsimile, e-mail or on-line at www.comreg.ie, to arrive on or before 5pm, 21 October 2008:

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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 05/24.

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1 Foreword

Digital terrestrial radio ("digital radio") is an important step forward for broadcast entertainment in Ireland. The traditional methods for listeners to avail of broadcast radio services in Ireland, which are amplitude or frequency modulated ("AM or FM") services, will be augmented with digital radio services.

Digital radio is also more spectrum efficient than current analogue broadcasting and accordingly offers the potential to carry many more services for a given amount of radio spectrum with potentially no loss of audio quality and with the possibility of additional features such as information display, pause & rewind radio, ease of tuning, interactivity and portability of content.

It is likely that analogue radio will continue for the foreseeable future. Nevertheless, the Commission for Communications Regulation ("ComReg") is aware of an interest among broadcasters in launching digital radio services on a permanent basis, following experiences gained during a digital radio trial, using Terrestrial – Digital Audio Broadcasting ("T-DAB"), undertaken by Radio Telefís Éireann ("RTÉ").

ComReg welcomes technological advances that benefit consumers and the proposals contained in this document are intended to inform and help establish an appropriate licensing regime so that digital radio can be successfully launched in Ireland.

By balancing the needs of the consumer, encouraging efficient use of the radio spectrum and promoting convergence, ComReg hopes to stimulate responses from a wide segment of the market for digital radio in Ireland. I would therefore encourage interested parties to respond to this consultation.

Mike Byrne,
Commissioner.

2 Executive Summary

The purpose of this document is to consult on proposed licence conditions for digital terrestrial sound broadcasting multiplex licences ("Digital Sound Broadcasting Multiplex") to be issued to RTÉ and the Broadcasting Commission of Ireland ("BCI"). This consultation arises following a request from RTÉ for a Digital Sound Broadcasting Multiplex licence, pursuant to section 6(1) of the Broadcasting (Amendment) Act, 2007 ("2007 Act"), for digital radio broadcasting using Band III spectrum (174 to 230MHz).

Digital Sound-Broadcasting Mulitplex licences will be issued by ComReg to RTÉ and the BCI, as required by the 2007 Act under the Broadcasting Authority Act 1960 and the Wireless Telegraphy Acts 1926 to 1988. ComReg expects that the first multiplex licence to enable digital radio broadcasting in Ireland will be issued following completion of this consultation process.

This consultation is focused on the regulatory regime within which ComReg intends to licence and regulate Digital Sound Broadcasting Multiplex licences. It identifies the requirements imposed by relevant legislation and proposes licence conditions which seek to ensure the efficient use of the radio spectrum going forward and which maximise the benefits to consumers and broadcasters of digital radio in Ireland.

The process involves consulting on a range of technical and non-technical licence conditions considered relevant by ComReg within this context. ComReg's preliminary views on proposed Digital Sound Broadcasting Multiplex licence conditions are set out in Section 5 of this document but encompass the following licence conditions:

- licence duration of 10 years;
- sanctions for non-compliance with licence conditions, which may include:
  - licence termination, suspension, term reduction, reduction of geographical coverage area, licence revocation and re-allocation of spectrum recovered; and
- technical conditions attached to multiplex licences as specified in Section 6 of this document.
- initial annual licence fees of €20,000 per multiplex, indexed to inflation on an annual basis using the consumer price index and subject to a fees review on the fifth anniversary of the commencement date of the licence;

This consultation is in accordance with the Regulation 19 of the European Communities (Electronic Communications Networks and Services)(Framework) Regulations (2003), S.I. No. 307 of 2003, ("Framework Regulations") by giving all interested parties the opportunity to respond to the proposals.

3 Introduction

3.1.1 Purpose of this document

The purpose of this document is to set out ComReg's proposed licensing framework for digital terrestrial sound broadcasting multiplex ("Digital Sound Broadcasting Multiplex") licences.

This framework reflects ComReg's statutory functions, objectives, duties and obligations, which are outlined in Section 4. The regulatory framework which ComReg is proposing and consulting upon is intended to address RTÉ's current request for a digital sound broadcasting multiplex[1] licence and any future BCI request(s).

3.1.2 Layout of this document

This document has the following structure:

- **Section 3** provides a background to digital radio in general. It introduces the context in which the consultation occurs and sets out the scope of the consultation;
- **Section 4** sets out the legislative and regulatory background regarding digital radio;
- **Section 5** sets out the Consultation Issues: Digital Terrestrial Sound Broadcasting Multiplex Non-technical Licence conditions; and
- **Section 6** sets out the Consultation Issues: Digital Terrestrial Sound Broadcasting Multiplex Technical Licence conditions;
- **Appendix A** sets out the draft technical conditions for the establishment, maintenance and operation of Digital Sound Broadcasting Multiplexes in Ireland; and
- **Appendix B** sets out the Consultation Questions.

3.1.3 Background

There are an increasing number of sources for digital audio content available to Irish listeners and consumers. For example, web-sites maintained by traditional radio broadcasting stations, social networking web-sites, digital multimedia platforms in the telecommunications sector and various digital television sources. These new media outlets offer a variety of products and services to consumers including live listening or "streaming", "podcasting", downloading, copying and sharing of digital sound-broadcasting content.

[1] A "multiplex" means an electronic system which combines programme material and related and other data in a digital form and the transmission of that material and data so combined by means of wireless telegraphy directly or indirectly for reception by the general public. A "sound broadcasting multiplex" means a multiplex in which the programme material is predominantly sound: the 2007 Act.

Nevertheless, the medium of broadcast radio remains predominant in terms of consumer reach in Ireland. For instance, the Joint National Listenership Reach survey figures for analogue frequency modulated ("FM") in the period April 2007 to March 2008 indicated that 85% of the adult population were listening to a daily mix of national, regional and local radio throughout the country.[2]

Listeners to analogue terrestrial radio services in Ireland are enjoying an ever increasing variety and diversity of radio programming services. There are currently 5 national radio services and 54 regional, local, community, community of interest and institutional services. In addition the BCI issues occasional short term sound-broadcasting contracts to provide coverage of special events.

Independent commercial analogue radio in Ireland, which is advertiser led, continues to be buoyant. For example, there was a 10.2% increase in advertising spend on analogue radio between April and May 2008.[3] In addition, new commercial analogue radio stations have been licensed by the BCI in 2008 and further commercial stations are expected to be launched in the 2008 / 2009 period.

New digital media outlets, including digital radio, however, can offer features and functions over and above those available on analogue radio. For example, digital radio provides scope for operators to innovate by offering:

- more services in the same channel bandwidth thereby increasing consumer choice, which could facilitate further services for niche or specialised audiences;
- targeted download services;
- graphic content services associated with broadcast audio;
- text and other interactive services;
- higher audio quality.

These features provide the opportunity for consumers to improve their listening experience and provide operators with opportunities for new revenue streams.

Digital radio also caters for the new manner by which content is being consumed by audiences in the digital era. In particular, it offers an opportunity to provide real consumer benefits such as enhanced portability of digital radio content with appropriate digital rights management systems, pause-and-rewind radio, digital tuning, potentially better sound quality and an overall enhanced radio listening experience.

3.1.4 The digital radio trial: Digital Audio Broadcasting (DAB) Trial in Ireland

Currently, circa 47% of Ireland's population can, with the right equipment, receive digital terrestrial radio via a trial based on the Eureka 147 digital audio broadcasting

[2] http://www.bci.ie

[3] May - June Base figures from the Institute of Advertising Practitioners of Ireland

("DAB") technology (often referred to as the DAB system.) The trial consists of 21 digital radio programming services with broadcasts available in Dublin, Cork and Limerick and in parts of the north-eastern seaboard of Ireland.

The trial, which is being run by RTÉ, is licensed by ComReg under its trial licensing scheme. RTÉ has formed an industry group, Digitalradio.ie, with the independent radio stations which are providing programming content for the trial (see www.digitalradio.ie).

Digitalradio.ie, in its submission to the ComReg consultation on digital terrestrial television consultation (ComReg document 07/92s) highlighted the appropriateness of Band III spectrum (174 to 230MHz) for mobile reception, which it considered a key characteristics of radio listening. RTÉ in its request to ComReg for a multiplex licence for digital radio has also specified that it would use Band III spectrum (174 to 230MHz).

3.1.5 Technological developments in digital radio and digital radio take-up outside Ireland

DAB broadcasting technology was developed in the mid-1980s and based on what was then state-of-the-art coding technology, MPEG Audio Layer II ("MPEG 2").

DAB services have been offered in the United Kingdom since 1995. Approximately 7 million DAB receivers have been sold. In the UK there is a choice of 340 DAB receiver devices available to consumers through high street retail outlets. There are circa 900 models of DAB receivers currently manufactured worldwide including personal computers with plug and play universal serial bus receiving devices, cameras, personal digital assistant devices, mobile phones and car radios. [4]

The demand for DAB services in the UK is growing, with the UK's Digital Radio Working Group projecting that 9 million DAB radios will be sold by the end of 2008. [5] In addition, digital listening now accounts for at least 17.8% of all radio listening, with listening to DAB radio services representing 11%.

Notwithstanding these considerations, it would appear that DAB take-up in the UK has been slow to reach critical mass. This is particularly evident when compared to the take-up by UK consumers of digital terrestrial television ("DTT") services. For example, DTT receiver sales in Q1 2008 were 55% higher than in the same period in 2007 and there are now 9.6million DTT-only households. [6]

[4] www.worlddab.org

[5] A report prepared by the Digital Radio Working Group, published by the Department for Culture, Media and Sport in the United Kingdom in June 2008

[6] Although there have been 7 million DAB radios sold there no DAB-only households *per se* as FM radio remains in operation on a nationwide and local basis across the UK.

It would also appear that the level of take-up of DAB as a source of digital radio has been relatively modest elsewhere. Table 1.0 below shows the sales figures for DAB radio receivers in a selection of countries.

Country	**Number of Receiver sold Approx**	**Percentage of population**
UK	7,000,000	11.6%
Denmark	450,000	8%
Germany	546,000	<1%
Norway	167,000	3%
South Korea	5,300,000 Digital Multimedia Broadcasting receivers, which are based on DAB	10%

Table 1: Number of receivers as a percentage of population in selected countries

While the cost of DAB radio receivers has reduced significantly in recent years, which may improve DAB take-up, the cost of rolling out a DAB transmission network has remained relatively high. As a result, it would appear that in other jurisdictions operators using DAB broadcasting technology have increased the number of services offered per multiplex as a means of offsetting these costs. In doing so, however, it would appear that one of the key consumer advantages of digital radio, being near compact disc ("CD") quality broadcasts, was not maintained. Indeed, in some cases it would appear that actual digital radio broadcast quality is below existing FM equivalent quality.

In recent years, advances in coding design and technology has led to the MPEG 4 standard[7] superseding MPEG 2 and being used in the next generation of DAB technology, DAB+. In terms of radio spectrum efficiency, a key advantage of DAB+ is that it can carry twice as many services as DAB for a given broadcast quality.[8] As a result DAB+ offers the potential for a higher number of programme services with no reduction in the level of audio quality which could be provided using older DAB technology.

DAB+ trials have taken place in Belgium, France, Italy, India, Luxembourg, South Africa and Switzerland. In addition, Australia, Malta and Sweden have decided that their respective digital radio regimes will be based on DAB+ technology. Roll-out of commercial DAB+ services in Australia is planned for January 2009. Other countries such as China, the Czech Republic, Germany, Italy, Malaysia, Malta, the Netherlands and Switzerland have also expressed interest launching commercial DAB+ services. Although DAB+ receivers are not yet widely available in the

[7] Advanced Audio Coding ("AAC").

[8] Broadcasting technologies are advancing in terms of spectrum efficiency and functionality for example, coding and decoding ("codecs") devices based on MPEG-4 technology are twice as spectrum efficient as codecs based on MPEG-2. The introduction of internet protocol (IP) functionality at a network / application layer provides further degrees of functionality for operators.

market, it is expected that widespread take-up of the format will also result in significant consumer offerings being made available.

The Office of Communications ("Ofcom") in the UK considers that the adoption of DAB+ there would lead to consumer confusion and legacy issues for the DAB consumer equipment already in the market. It considers that a move to DAB+ now would disenfranchise existing DAB listeners by requiring them to buy DAB+ receivers.[9] Ofcom however, does not rule out the future adoption of DAB+ in the UK and considers that it could it could be a desirable move if DAB+ becomes the future technology for digital radio across the world. Ofcom also considers that the UK may adopt DAB+ before the closure of FM services, if and when that happens.

3.1.6 The future of analogue radio in Ireland

Article 12.6 of the Regional Agreement, Geneva 2006 [10], states that analogue television broadcasting services in the Band IV and V frequency bands (470 to 862MHz) will cease to be protected from interference beyond 2015. In addition, the European Union's proposed switch-off date for analogue television broadcasting services in these bands is 2012. These factors have created urgency within Ireland to "switch on" digital terrestrial television ("DTT") services and progress DTT broadcasting.

There are, however, no similar external regulatory factors driving Ireland's move to digital radio services. ComReg expects that FM analogue radio services, which occupy 20MHz in the frequency range 88 to 108MHz (Band II), will continue to operate for the foreseeable future, depending on the demand for such services in the particular franchise areas. Accordingly, this consultation does not address matters relating to the potential switch-off of current analogue terrestrial radio services and migration between analogue and digital radio.

The Broadcasting Bill 2008, which is currently being considered by the Houses of the Oireachtas, represents a consolidation of almost 50 years of Irish broadcasting legislation. It proposes, amongst other things, a new regulatory authority for independent radio, the Broadcasting Authority of Ireland. It also provides for amendments to analogue sound-broadcasting contractor's contracts, including contract term extensions.

[9] The Future of Radio Consultation, 17 April 2007, page 15

[10] The Geneva 2006 Agreement and Frequency Plan (GE06) set out the technical and regulatory framework enabling the establishment and ongoing development of digital broadcasting in band III, IV and V in 108 countries.

4 Digital Terrestrial Radio and spectrum efficiency

4.1 ComReg's legislative role regarding the radio spectrum

ComReg's statutory functions and objectives are set out in sections 10 and 12 respectively of the Communications Regulation Act 2002 ("the 2002 Act").

ComReg's objectives in carrying out its function in relation to the radio frequency spectrum are to [11]:

- ensure the efficient management and use of the radio frequency spectrum in Ireland[12];
- promote competition[13];
- contribute to the development of the internal market[14]; and
- promote the interests of users within the Community[15].

In carrying out its radio frequency management function, the 2002 Act requires ComReg to, amongst other things:

- ensure that any measures taken by it are proportionate having regard to the objective of ensuring the efficient management and use of the radio frequency spectrum[16;]
- have regard to international developments with regard to electronic communications networks ("ECN") and electronic communications services ("ECS"), associated facilities, postal services, the radio frequency spectrum and numbering[17];
- take the utmost account of the desirability that the exercise of its functions aimed at achieving its radio frequency management objectives does not result in discrimination in favour of or against particular types of technology for the provision of ECS[18]; and
- comply with any policy direction given to ComReg by the Minister for Communications, Energy and Natural Resources ("the Minister") as he or she

[11] In line with Article 9 of Regulation 23(2) of the Electronic Communities (Electronic Communications Networks and Services (Framework) Regulations 2003 (the "Framework Regulations")

[12] Section 12(1)(b) of the 2002 Act.

[13] Section 12(1)(a)(i) of the 2002 Act.

[14] Section 12(1)(a)(ii) of the 2002 Act.

[15] Section 12(1)(a)(iii) of the 2002 Act.

[16] Section 12(3) of the 2002 Act.

[17] Section 12(5) of the 2002 Act.

[18] Section 12(6) of the 2002 Act.

considers appropriate to be followed by ComReg in the exercise of its functions. [19]

4.2 Legislative background on licensing digital sound-broadcasting multiplexes

The 2007 Act sets out the legislative framework for licensing digital broadcasting services, both radio and television, in Ireland.

Of particular relevance in the present context, section 6(1) of the 2007 Act obliges ComReg to issue to RTÉ, following a request by it, a wireless telegraphy licence for the establishment, maintenance and operation of a single national sound broadcasting multiplex under section 16(3)(a) of the Broadcasting Authority Act 1960.[20]

Section 6(3) similarly obliges ComReg to issue a single national sound broadcasting multiplex licence to the BCI. [21]

In light of these obligations, and in the interests of promoting regulatory certainty, ComReg therefore intends to put in place a regulatory regime to provide for the establishment, maintenance and operation of digital sound broadcasting multiplexes by a licensee, in the case of RTÉ, or by a third party in the case of the BCI, where the benefits and obligations of a licence have been passed on to that third party in any BCI multiplex contract.

Generally, ComReg sets coverage and roll-out obligations within Wireless Telegraphy Licences to ensure that efficient use is made of radio spectrum and that the benefits for users are maximised, including that no geographic digital divide emerges in the provision of services to consumers.

ComReg considers that the extent of the rollout of any public service national digital radio multiplex is a matter of national broadcasting policy to be set down by the Minister for Communications Energy and Natural Resources. RTÉ is obliged, under section 6 (1) of the 2007 Act, to establish, maintain and operate a Digital Radio Multiplex which, in so far as it is reasonably practicable, can be transmitted to the whole community of the State.

In relation to any Digital Sound Broadcasting Multiplex licence/s issued to the BCI, ComReg notes that the BCI, is obliged under section 6(3) of the 2007 Act, to establish, maintain and operate a sound-broadcasting multiplex, which so far as it is reasonably practicable can be transmitted to the whole of the State, in accordance with contracts to be entered into with third parties. It will be a matter for the BCI to

[19] Section 13(1)

[20] A second national sound broadcasting multiplex licence may be issued to RTÉ but only following a request by it and after consultation with the Minister and the BCI.

[21] Licences for further sound broadcasting multiplexes, for example in area(s) in accordance with contracts, arranged and entered into by the BCI with third parties, may be issued to the BCI: sections 6(4) and 6(5).

agree with its chosen contractor/s the extent of the required rollout of any digital radio network.

4.2.1 Regulatory obligations and responsibilities for multiplex licensees

Entities that operate digital multiplexes for radio or television services will be regarded by ComReg as operators of an ECN. As such, they will be subject to the requirements of a General Authorisation under the Common Regulatory Framework for Electronic Communications Networks and Services. These requirements, which include making a notification to ComReg regarding the type of network being operated, are additional to the proposed wireless telegraphy licence conditions.[22]

Entities that have previously made a notification to ComReg in respect of an ECN or ECS will nevertheless be required to update this notification to reflect the provision of a digital sound-broadcasting network.

4.3 ComReg's activities following a request from RTÉ for a licence for a national sound broadcasting multiplex in Band III (174 to 230MHz)

In response to RTÉ's request, ComReg is progressing the following two work streams:

- international co-ordination with the UK of the Band III frequencies required for the national multiplex licences for digital terrestrial sound broadcasting services in Band III (174 to 230MHz); and
- establishment of appropriate Digital Radio Multiplex licence conditions, including any technical requirements for operation of multiplexes in this frequency band.

This paper consults on proposed Digital Sound Broadcasting Multiplex licence conditions which would apply to RTÉ and to any subsequent Digital Sound Broadcasting Multiplex licence/s issued by ComReg, such as those which may be issued to the BCI in the frequency band 174 to 230MHz.

Section 5 of this paper sets out ComReg's proposals regarding the non-technical conditions of a multiplex licence and section 6 sets out ComReg's proposals regarding the technical conditions.

[22] ComReg Document 03/81 entitled *"General Authorisation – Conditions for the provision of Electronic Communications Networks and Services"*, available for download from www.comreg.ie, sets out the legal obligations on a provider of an electronic communications network or service under the General Authorisation framework. It also sets out the conditions which may be attached to a spectrum right of use or a licence.

5 Consultation Issues: Digital Terrestrial Sound Broadcasting Multiplex Licence Conditions - Non-technical

In accordance with its statutory obligations set out in Section 4, and particularly with respect to its mandate to ensure the efficient management and use of the radio spectrum, ComReg proposes that Digital Sound Broadcasting Multiplex licences would have non-technical conditions and obligations relating to:

1. licence duration;
2. interference and public safety;
3. other authorisations and responsibilities
4. variation of licence;
5. non-ionising radiation;
6. sanctions for non-compliance with licence conditions;
7. provision of information;
8. use of digital sound-broadcasting capacity; and
9. licence fees.

5.1 Licence duration

A licence should be of sufficient duration to allow operators to recoup the costs of investment in nationwide infrastructure. The longer a licence lasts, the greater the opportunity to recoup investment. However, granting a long-term licence may not maximise spectrum efficiency as it may restrict innovation in the frequency band, to the detriment of the consumer. This is particularly relevant given the rapid pace of technological change and the increasing trend towards converging services.

ComReg considers that a licence duration of 10 years should be applied to Digital Sound Broadcasting Multiplex licences. Factors informing this view include:

- the need for considerable infrastructure investment to establish digital radio services and the need to obtain a return on that investment;
- the need for simulcast and continuance of analogue radio broadcasts (on FM and/or AM);
- the need to achieve spectrum efficiency through the use of appropriate broadcasting technologies; and
- the fact that licences to RTÉ and the BCI will be renewable and that a 10 year duration gives an opportunity to review the licence conditions and obligations.

Q. 1. Do you consider that the proposed length of a Digital Radio Multiplex licence is appropriate? If not, how long should the licence period be for? Please give reasons supporting your proposal.

Q. 2. Do you consider that other factors might also need to be considered in determining the length of the licence?

5.2 Interference and public safety

In the event that ComReg is satisfied that the licensee, or a third party to whom the rights and obligations of the licence have been assigned, creates or would create harmful interference, or the operation of the licensee's or third party's equipment represents an immediate and serious threat to the safety, security or health of the general public, then ComReg may take such reasonable measures as would be necessary to ensure that any such interference or threat is avoided or removed.

5.3 Other authorisations and responsibilities

It is the responsibility of the licensee to obtain all other approvals, consents, licences, permissions, and authorisations required in connection with the provision of the digital radio service.

5.4 Variation of licence

ComReg may amend or vary the rights, conditions and procedures concerning a Digital Radio Multiplex licence in accordance with the Authorisation Regulations.

5.5 Non-ionising radiation

It is a standard provision in Wireless Telegraphy licences issued by ComReg that licensees ensure that non-ionising radio emissions from each radio installation operated under its licence are within the limits specified by the guidelines published by the International Commission for Non-Ionising Radiation Protection (ICNIRP) and any radiation emission standards adopted and published from time to time by ICNIRP or its successors or any emission standards specified by national and EU Law.

5.6 Sanctions for non-compliance with licence conditions

In issuing any Digital Sound Broadcasting Multiplex licence ComReg needs to be satisfied that licensees will comply with the licence terms. In the event of non-compliance, ComReg reserves the right to, as appropriate, terminate, suspend, reduce the geographical area of the licence and/or reduce the duration of the Multiplex Licence, and re-allocate any spectrum so released.

5.7 Provision of Information

It is a standard provision in Wireless Telegraphy licences issued by ComReg that a licensee is obliged to provide whatever information is requested by ComReg to assess the licensee's compliance with the requirements of the licence.

Q. 3. Do you agree with the proposed licence conditions relating to interference, other authorisations and responsibilities, variation of licence, non-ionising radiation, sanctions for non-compliance and provision of information? If not, please support your position with other relevant considerations.

Q. 4. Do you consider that any other relevant conditions should apply? If so, please specify and give the reasons for your proposal.

5.8 Use of digital sound broadcasting capacity

A sound broadcasting multiplex is defined in the 2007 Act as a multiplex in which the programme material is predominantly sound.

In line with this requirement, ComReg is proposing licence conditions which would ensure the primacy of sound broadcasting services and material in licensed Digital Radio Multiplexes by explicitly reserving multiplex capacity for sound broadcasting and associated services.

5.8.1 Digital Sound Broadcasting Multiplex capacity

ComReg considers that a minimum of 80% of a Digital Sound Broadcasting Multiplex's broadcasting capacity should be used to carry digital sound broadcasting services, associated technical services, or text and graphics content related to the sound broadcasting services.

5.8.2 Additional digital services

ComReg considers that additional digital services which might not be associated with digital radio should occupy no more than 20% of a Digital Sound Broadcasting Multiplex's capacity. These additional digital services might, for example, include:

- motor traffic information in either text or picture format;
- static or moving graphics (such as still or video advertising for display on a Digital Radio receiver); and/or
- music download services.

Q. 5. Do you agree with ComReg's proposal that at least 80% of a licensed Digital Sound Broadcasting Multiplex's capacity should be used to carry digital sound broadcasting services, associated technical services, or text and graphics content related to the sound broadcasting services? If not, please propose an alternative scheme and the reasons for your view.

5.9 Licence fees

ComReg proposes that the licence fee for a national Digital Sound Broadcasting Multiplex be set at €20,000 per annum and indexed annually to inflation via the consumer price index ("CPI").

In reaching the nationwide licence fee level, ComReg notes that it is proportionate to the fee for national Digital Terrestrial Television Multiplex ("DTT") Licences, see ComReg document 07/90. ComReg is prepared to offer a discount on its DTT licences issued up to 1 July 2012 on the basis of the market size and development level for DTT and Ireland's requirement to end analogue broadcasts in the UHF frequency bands. In the case of Digital Sound Broadcasting Multiplexes, however, ComReg believes that the proposed fee level is competitive and accordingly does not intend to offer a discount. [23]

ComReg proposes to conduct a licence fee review, in light of any technological or other relevant developments on the fifth anniversary of the commencement date of any Digital Sound Broadcasting Multiplexes.

5.9.1 Licence fee indexation

It is proposed that the licence fee would be indexed annually to inflation via CPI as a proxy for the rate of inflation.

5.9.2 Forward payment of fees

Licence fees would be payable on the date of the award of a Digital Sound Broadcasting Multiplex licence and annually on that date thereafter. If a Digital Sound Broadcasting Multiplex licence is suspended or revoked, the licensee shall not be entitled to be repaid any part of the licence fee paid and shall be liable to pay any sums outstanding at the date of the suspension/revocation.

[23] ComReg also notes that the proposed fee is considerably lower than that proposed by the Office of Communications ("Ofcom") for the national DAB Multiplexes Licences in the UK under the proposed administrative incentive pricing ("AIP") scheme. Ofcom has indicated that AIP will apply to national DAB multiplexes and that it might be in the order of £650,000 per annum per national multiplex from 2014. See www.ofcom.org.uk "Future pricing of spectrum used for terrestrial broadcasting." A Statement 19 June 2007.

5.9.3 Recovery of fees

A fee may be recovered by ComReg as a simple contract debt in any court of competent jurisdiction.

Q. 6. Do you agree with the level of licence fee proposed for Digital Sound Broadcasting Multiplex licences? If not, please suggest an alternative fee regime with supporting reasons.

Q. 7. Do you agree with the proposed licence fee review on the fifth anniversary of any Digital Sound-Broadcasting Licences? Please elaborate with reference to technological or other relevant developments.

6 Consultation Issues: Digital Terrestrial Sound Broadcasting Multiplex Licence Conditions – Technical

This section provides the background and outlines the considerations which are relevant to ComReg's view on technical conditions (which are set out in Appendix A).

6.1 Background

Table 2.0 describes the main digital broadcasting technologies which could be used to provide digital radio services.

Technology	Description
Digital Audio Broadcasting (DAB)	A technology developed in the 1980's to improve mobile reception of radio broadcast signals.
Digital Audio Broadcasting plus (DAB+)	Based on the DAB technology but utilises spectrum more efficiently through a more efficient audio coding and decoding hardware (codec) Advanced Audio Coding (AAC)
Digital Audio Broadcasting Internet Protocol (DAB IP)	Based on the DAB technology but utilises internet protocol functionality to enable increased flexibility with other IP enabled devices and platforms e.g. the Internet. Used to transmit multimedia to mobile or hand-held devices
Terrestrial Digital Mult-media Broadcasting (T- DMB)	A variant of DAB and like DAB-IP permits transmission of mobile multimedia to mobile or hand-held terminals. Largest market penetration of DMB devices is in Asia but there have been some services in Europe www.worlddab.org
Digital Radio Mondiale (DRM)	Incorporates the AAC codec and is suitable for transmissions for bandwidths up to circa 300kHz.
Digital Radio Mondiale 120MHz / plus (DRM+)	An extension of DRM for use in the classical FM band (frequency modulated 88 to 108MHz) for bandwidths of up to cira 300kHz
HD Radio / In Band on Channel (IBOC)	A technology used only in the United States of America. Uses the classical FM band and permits analogue and digital signals to co-exist.
Digital Video Broadcasting (DVB)	Permits large bandwidth use i.e. 6,7 and 8MHz to carry digital broadcasting payloads
Media-Flo	Large bandwidth use i.e 6,7 and 8MHz to carry digital broadcasting payloads.
One Seg or Integrated Services Digital Broadcasting Terrestrial (ISDB-T)	A technology used only in Asia and uses bandwidths of 6MHz (13 individual channels of 429kHz) –for mobile broadcasting.

Table 2: Digital Radio Broadcasting Technologies

T-DMB, DVB, Media-Flo and ISDB-T do not provide programming features typically associated with traditional radio programming services. For example, traffic information features (such as traffic announcements and traffic programmes) and programme information features (such as information on the music being carried).

T-DMB, DVB, Media-Flo and ISDB-T are more suited to carrying digital picture services, with associated digital sound services, rather than carrying digital sound services on their own. Furthermore DVB, Media-Flo and ISDB-T use 6, 7 or 8MHz spectrum bandwidths whereas other technologies, which are more suited to carrying only digital sound, use appropriate narrower bandwidths, for example in the range 300kHz to 1.5MHz.

DAB, DAB+, DRM, DRM+ and IBOC are examples of technologies which do provide programming features associated with traditional radio services. These technologies are therefore relevant in the context of licences in which the content would be predominantly sound.

6.2 Spectrum bands and technical conditions

Table 3 indicates the spectrum bands associated with the DAB, DAB+, DRM, DRM+ and IBOC broadcasting technologies.

Spectrum band	**Technology**
Very High Frequency ("VHF") Band III (174 to 230MHz) Ultra High Frequency ("UHF") L-Band (1452 to 1492)	DAB, DAB IP DMB DAB+
Low Frequency LF band up to 30kHz Medium Frequency MF band up to 300kHz High Frequency HF band up to 30MHz	DRM
VHF Band II (88 to 108MHz)	DRM+ IBOC

Table 3: Spectrum bands and associated technologies

Given the considerations outlined in the introduction to this document and in section 3.1.6, where the VHF Band II (88 to 108MHz) spectrum band is likely to continue to

be used for analogue FM radio broadcasting for some time, issues associated with DRM+[24] or IBOC[25] are not considered further in this Consultation.

ComReg considers that the DAB technology, which is now over 20years in existence, will in the medium term be superseded by the more efficient DAB+ technology. At present however, there are fewer DAB+ receiver sets on the market while DAB equipment is plentiful and relatively cheap. The availability of competitively priced consumer equipment, which potentially increases the target listenership, must however be balanced by prospective broadcasters against the financial commitment needed to engineer and establish a whole new radio network based on an older technology.

ComReg is monitoring with interest the developments and draft amended standards at ETSI regarding DRM+, which has the advantage of using the current FM band and its planning parameters. ComReg considers that in the future this would be a considerably more cost effective means of bringing digital radio to current stations audiences as it will allow considerable re-use of existing radio frequency equipment.

In addition the use of DRM in the HF frequency is also not considered further in this consultation. Due to the seasonal planning nature associated with the HF band, there is no allotment or assignment plan for the HF frequency band. If a DRM transmission is to be operated in the HF frequency band, international coordination would be required. The planning principles and procedures specified in Article 12 of the ITU Radio Regulations, which govern the HF band would need to be followed and this multiplex licensing regime discussed in this paper would not be appropriate.

6.3 Band III spectrum (174 to 230MHz)

The Regional Radiocommunication Conference 2006 ("RRC-06"), held in Geneva in May and June of 2006, was the culmination of many years work on the development of frequency plans for digital television and radio broadcasting services. The purpose of the RRC-06 was to prepare an Agreement and associated Frequency Plan ("GE06 Frequency Plan") setting out the technical and regulatory framework to enable the establishment and ongoing development of digital broadcasting, and potentially other transmission networks, in Band III (174 to 230MHz), Band IV and V (470 to 862MHz) in 108 countries around the world.

Band III spectrum in Ireland, as set out in the GE06 Frequency Plan, can be used to establish, operate and maintain national, regional or county-wide transmitter

[24] The first European field trials of the DRM+ broadcasting technology were conducted in Hanover, Germany in November 2007. Technical work is being conducted by the consortium which developed DRM, www.drm.org to bring DRM+ to the market. ComReg understands that the DRM+ broadcasting technology is likely to be standardised by the European Telecommunications Standards Institute (ETSI) at the end of 2008. IBOC is a technology used in the HD Radio technology which is licensed by iBiquity for digital radio in the USA www.HDradio.com .

[25] IBOC is a technology used in the HD Radio technology which is licensed by iBiquity for digital radio in the USA www.HDradio.com.

networks which could use the DAB broadcasting technology or technologies which would conform to the same emission standards as DAB, ie DAB IP, DAB+ or DMB.

In some areas in Ireland, however, analogue television transmissions use Band III spectrum which prevents the establishment of more than two nationwide networks using DAB. ComReg considers that either of the two available GE06 national network frequency blocks, given as 12A and 12C in the GE06 Frequency Plan, could be used in the licence to be assigned to RTÉ while analogue television transmissions remain active.

ComReg intends that one national frequency block will be available to the BCI, if it chooses to request a Digital Sound Broadcasting Multiplex licence.

If there is further demand for digital sound-broadcasting capacity in Band III, before the switch off of analogue television in the band, ComReg considers that further frequency identification work would be required.

6.3.1 Technology neutrality

ComReg's technical conditions are intended to be technologically neutral so that any of the four technologies, DAB, DAB IP, DAB+ and DMB, or indeed a mixture of them in the same multiplex as has been described in a publication by the European Broadcasting Union[26], could be used to carry digital radio services.

6.3.2 Audio quality for the listener and audio encoding parameters

ComReg notes that the current trial service, which uses the sunset DAB technology, rather than the more spectrally efficient and better sounding DAB+, has encoding parameters that are set at a level audibly inferior to the standard analogue FM service currently received by radio listeners in Ireland. The audio quality provided by the trial service is such that digital distortions are audible and quantifiable, even without direct comparison with FM. When a direct comparison is performed using modest source equipment such as stereo table radios the differences are stark, between grade 2 and 3 on the ITU-R five-grade impairment scale given in Recommendation ITU-R BS.562.

ComReg believes that in order to advance the acceptance of digital radio with the general public, bitrates for audio encoding should be set to offer the consumer at least an FM quality digital service. Audio quality is however, a function of content and ComReg intends to leave the specification of the audio encoding parameters to its licensees, RTÉ and BCI.

[26] Herrmann, F., Erismann, L.A. and Prosch, M, (2007) "The evolution of DAB" *European Broadcasting Union Technical Review 2007* www.ebu.ch.

Q. 8. Do you consider that broadcasters should set encoding parameters tgat can objectively offer an equivalent to the current FM analogue service? Please elaborate on your answer?

Q. 9. What audio encoding parameters would you suggest? Please justify your answer?

6.4 L-Band spectrum (1452 to 1492MHz)

The Maastricht 2002 Special Arrangement (MA02) as revised by the Constanța 2007 Special Arrangement ("MA02revCO07") set out a Special Arrangement and allotment Plan based on T-DAB network planning in L-Band.

ComReg intends that the technical conditions should enable multiplex licences, based on T-DAB network planning, to be issued using L-Band spectrum if required.

6.5 LF and MF (30kHz to 300kHz)

The Regional Agreement, Geneva 1975, and Frequency Plan ("GE75") set out the assignments in the LF and MF spectrum bands which are allocated for terrestrial broadcasting in Ireland.

The Digital Radio Mondiale ("DRM") broadcasting technology could be used to provide digital radio services in these frequency bands. Receivers for DRM digital radio services are more expensive (circa €250) than for DAB radio services.

A trial of the DRM broadcasting technology was conducted by RTÉ on its 252kHz transmitter station between April 2007 to April 2008 to gather information on the extent and quality of DRM coverage.

ComReg intends that the technical conditions should enable multiplex licences to be issued using LF, MF and spectrum if required.

6.6 Technical conditions

The proposed technical conditions are set out in Appendix A.

Q. 10. Please provide comments on the proposed technical conditions having regard to Sections 3.1.5, 3.1.6 and ComReg's legislative requirements in Section 4.1?

7 Submitting Comments

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

The consultation period will run from 16 September 2008 to 21 October 2008 during which the Commission welcomes written comments on any of the issues raised in this paper.

Having analysed and considered the comments received, ComReg will review the responses received and publish a report on the consultation which will, inter alia summarise the responses to the consultation.

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

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

As it is ComReg's policy to make all responses available on its 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 on the treatment of confidential information – ComReg 05/24

Appendix A – Technical conditions

Appendix B – Consultation Questions

List of Questions