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**DIGITAL TELEVISION AND RADIO
SERVICES IN IRELAND**
AN INTRODUCTION

RTE

THE PURPOSE OF THIS DOCUMENT IS TO PROVIDE AN INTRODUCTION TO DIGITAL TELEVISION AND RADIO CONCEPTS AND CONCERNS, IN THE CONTEXT OF IRELAND'S PLACE IN THE CURRENT DYNAMIC DIGITAL BROADCASTING LANDSCAPE. IT IS NOT INTENDED AS A COMPREHENSIVE GUIDE, BUT AS AN INTRODUCTORY OVERVIEW TO A COMPLEX TOPIC OF NATIONAL INTEREST. DIGITAL BROADCASTING IS CENTRAL TO DELIVERING THE PROMISES OF THE DIGITAL AGE AND TO ENSURING IRELAND'S COMPETITIVENESS GOING FORWARD.

RTÉ, as Ireland's Public Service Broadcaster, is committed to providing its services to all citizens on a free-to-air and universal coverage basis. RTÉ must ensure delivery of content across all major existing (and emerging) analogue/digital delivery channels, including terrestrial, satellite, cable/MMDS, Internet and telecommunications networks.

RTÉ Radio started broadcasting in 1926 and Television in 1961. Both use a terrestrial transmission network (masts, sites, antennae) for the delivery of analogue services. The national transmission network exists to deliver free-to-air television and radio signals to people in Ireland, and the current analogue network operated by RTÉ Network Transmission Ltd., (RTÉNL) achieves nearly universal coverage, at circa 99% of the population.

Digital television services are currently only available in Ireland as Pay TV through digital satellite, cable and MMDS services. RTÉ is supporting the Irish Government in the development of digital policies for terrestrial radio and television. This will require changes in broadcasting legislation and regulation.

As convergence between broadcasting and communications technologies unfolds, the demand for personalised, on-demand, and mobile broadcasting content for citizens will increase. To realise the digital dividends of the Information Society, a coherent national policy on broadcasting, information and communications technologies is required.

Change is necessary now because there is an EU recommendation on analogue switch-off and digital switchover. Also the Regional Radiocommunications Conference in 2006 (RRC 06) will agree the Irish radio spectrum allocations for broadcasting and this will determine national broadcasting policy for at least the next twenty years.¹

¹See Appendix on international spectrum co-ordination and the Irish broadcast spectrum.

SOME DEFINITIONS

Analogue TV: The traditional method used to broadcast off air television signals. The signals are sent by radio waves from a national network of masts and antennae.

Broadband: Broadband Internet access, often shortened to 'broadband Internet' or just 'broadband', is a high data transmission rate Internet connection. The main types of broadband Internet access available for residential customers today are:

- **DSL:** Digital Subscriber Line (DSL) technology uses existing telephone lines for multimedia and high-speed data communications. DSL can transmit at very high speeds over a relatively short distance. Because DSL is 'always on' there is no need for dial-up service.
- **ADSL:** Asymmetric Digital Subscriber Line (ADSL) is one of several types of DSL Internet connectivity. It transforms the standard telephone line between a local telephone exchange and a customer's telephone socket into a high-speed digital line. It is called 'asymmetric' because it moves data more quickly from exchange to customer than from customer to exchange.
- **Cable Internet:** High speed cable Internet access is available using a cable modem and a connection to the Internet through a coaxial cable. The coaxial cable is often the same line that carries the cable TV service. Like ADSL, high-speed cable Internet access is an 'always-on' connection designed to deliver high quality streaming media on computer.

In addition, wireless and satellite broadband technologies are now rapidly becoming available.

Digital TV: Uses state-of-the-art digital technology to broadcast television signals – using the binary system on which computers and all modern communication technologies are based. Digital is much more flexible than analogue and it allows the transmission of perfect pictures in various display formats, including high- and standard-definition television, in both conventional and wide-screen versions.

DAB: Digital Audio Broadcasting, digital radio, also called T-Dab, where T is 'terrestrial'.

DTT or DVB-T: Digital Terrestrial Television is an implementation of Digital Video Broadcasting (DVB) technology to provide a greater number of channels, and digital quality of sound and picture, through a conventional aerial instead of a satellite dish or cable connection. Digital terrestrial television is also known as DVB-T. Digital Terrestrial Television is transmitted on radio frequencies that are

similar to standard analogue television, with the primary difference being the use of multiplex transmitters to allow reception of multiple channels on a single frequency range (such as an UHF or VHF channel). DTT is received via a set-top box, or integrated receiving device, that decodes the signal received via a standard aerial.

DVB: Digital Video Broadcasting is a suite of internationally accepted, open standards for digital television maintained by the DVB Project, an industry consortium with more than 300 members, and published by a Joint Technical Committee (JTC) of the European Telecommunications Standards Institute (ETSI), the European Committee for Electrotechnical Standardization (CENELEC) and the European Broadcasting Union (EBU).

EPG: Electronic Programme Guide is the on-screen TV listings guide which provides current and future programme details. It features subject or channel searches, programme summaries, immediate access to a selected programme, and reminder and parental control functions.

HDTV: High-Definition Television, is one mode of operation of digital TV whereby the broadcaster transmits a wide-screen picture with many times more detail than is contained in current analogue television pictures.

IPTV: Internet Protocol Television has become a common denominator for systems where television and/or video signals are distributed to subscribers using Internet protocols. Often this is in parallel with the subscriber's Internet connection, supplied by a broadband operator using the same infrastructure and possibly bandwidth. IPTV covers both live TV (multicasting) as well as stored video (Video on Demand or VOD). The playback of IPTV requires either a personal computer or a set-top box connected to a TV.

MUX: Multiplex, used to combine signals into a single transport stream for distribution and transmission.

STB: Set-Top Box, an add-on box for a TV, enabling it to receive satellite, cable or terrestrial digital TV services. The functionality of a transmission network is as dependent on the STB as it is on the network transmission kit.

Wi-Fi: From Wireless Fidelity, Wi-Fi was intended to be used for wireless devices, but is now often used for Internet access. It enables a person with a wireless-enabled computer or personal digital assistant to connect to the Internet when close to an access point called a hotspot.

WiMAX: An acronym for World-wide Interoperability for Microwave Access, is a standards-based wireless technology that provides high-throughput broadband connections over long distances.

RTÉ'S COMMITMENT TO BEING PLATFORM NEUTRAL

As part of fulfilling RTÉ's Public Service Broadcasting remit, reaching all our audiences is paramount. Initially this commitment was based on the terrestrial analogue network and then extended to Pay TV analogue and digital options through BSkyB, NTL, Chorus and the MMDS operators. Only the RTÉNL-operated analogue terrestrial network is a free-to-air broadcasting platform.

For Public Service Broadcasting to survive in the current competitive environment, a digital free-to-air or free-to-the-consumer broadcasting model is required for Ireland. This need could be met through a combined platform approach, which could include the establishment of digital terrestrial television and radio services as well as a free-to-the-consumer satellite option, and broadband and mobile solutions, to allow for a blend of public service and commercial broadcasting.

Analysis indicates that in Ireland there are:

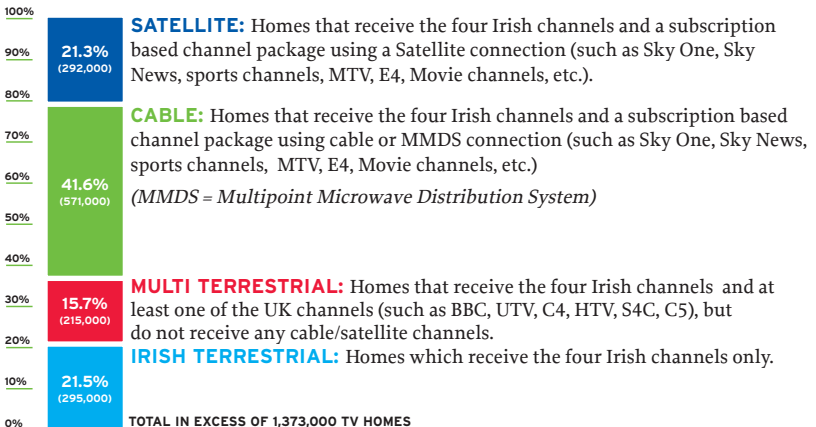
- 1.397m private households
- 1.373m private households with a TV
- 70% households have two or more television sets (that is, 2.4m + TV sets)².

The high-level breakdown is as follows:

TV home main TV platform³

- 21% Satellite – significant growth
- 21% Irish Terrestrial – stable
- 42% Cable/MMDS – decreasing
- 16% Multi Terrestrial - decreasing

Reception type or platform is broken down as shown on chart:



¹ ComReg Attitudes to Broadcasting Services, December 2004.

² Analysis of Nielsen Media Research Establishment Survey 2004, RTÉ Audience Research Department November 2004.

At the end of March 2005 there were approximately 518,000 cable/MMDS and satellite digital subscribers. Digital households represent approximately 38% of all households with a television.

- Cable/MMDS accounts for 32% of all digital subscribers in the country.
- Satellite accounts for the remaining 68%.

37% of Irish consumers receive their primary TV services from terrestrial delivery platforms. In the absence of a digital terrestrial platform in Ireland, those consumers who receive multi-terrestrial signals may not be able to do so in the medium term due to analogue switch-off in the UK. This shutdown or analogue switch-off has started and may affect the eastern seaboard of Ireland by 2008 and along the border regions by 2012.

Satellite coverage is potentially 99%+ of the landmass, but there is currently no free-to-air satellite offering for Irish citizens. Cable/MMDS coverage is more restricted, and there is no free offering available at present.

DIGITAL TELEVISION RECEPTION OPTIONS

There is a variety of ways of receiving Digital TV, none of which are mutually exclusive:

- Through an aerial (DTT)
- Using a dish (Satellite)
- Using Cable (or Multipoint Microwave Distribution System, MMDS)
- Over Broadband (also IPTV)

DIGITAL TV THROUGH AN AERIAL (DIGITAL TERRESTRIAL TELEVISION - DTT)

- Digital Terrestrial TV (DTT) is received using a normal rooftop or set-top TV aerial. A set-top box is required together with an existing TV set or a new digital TV set designed to receive the new digital signals.

DIGITAL TV USING A DISH (DIGITAL SATELLITE)

- Sky offers Pay TV and subscription digital satellite to people in Ireland.
- To receive digital satellite television a set-top box is required to use with an existing TV set or a new digital TV set designed to receive the digital satellite signals. A 'mini-dish' is required on the outside of the house.
- Digital satellite signals can reach the vast majority of homes, but in a few cases reception may not be possible. This is because the satellite is hidden from the home by trees, high hills or tall buildings, or because planning laws do not permit people to put up a dish (for example, if the house is a listed building).

DIGITAL TV DELIVERED BY CABLE (OR MMDS)

- To receive digital TV via a cable connection people need to subscribe to one of the cable TV providers who then provide a set-top box to go with an existing TV set. Cable service is normally limited to highly urban areas. MMDS services operate in rural areas.

DIGITAL TV OVER BROADBAND

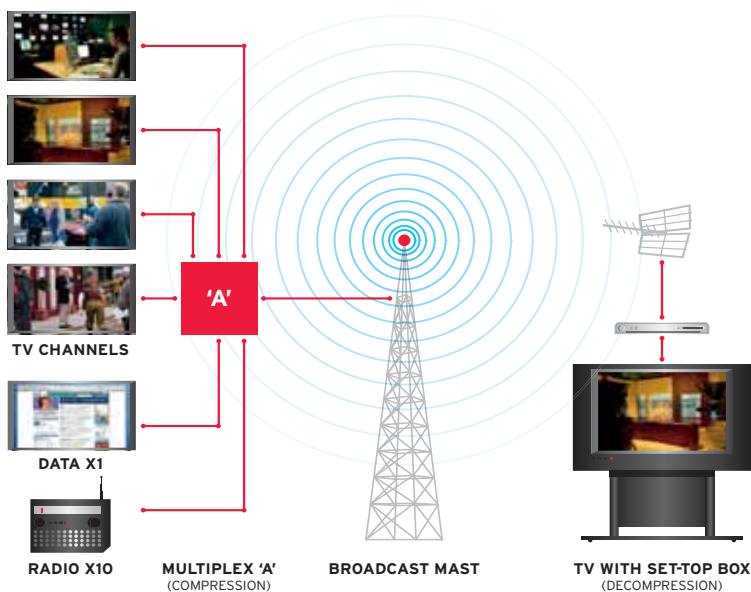
- A high speed Internet connection (i.e. broadband) could be DSL, probably ADSL, a cable Internet connection or an ISDN, T1 or T3 line. High speed Internet connection will result in high quality audio/video. It should be noted that this service is normally limited to highly urban areas.
- Wireless broadband technologies such as Wi-Fi and WiMax are also available.
- Satellite broadband is another option.

IPTV (Internet Protocol Television) has become a common denominator for systems where television and/or video signals are distributed to subscribers using Internet protocols.

MOBILE TV, Mobile TV, using technologies such as DVB-H, DMB or 3G, are now becoming viable alternatives for personalised, mobile, one-to-one delivery of broadcasting services.

DIGITAL TERRESTRIAL TELEVISION

- Channels are compressed into multiplexes. Each multiplex can carry a number of TV channels depending on the quality of picture and signal reception required.
- The same amount of spectrum in use today by one analogue TV channel can be used for transmission of four or five digital television channels, (depending on the compression method used), ten radio channels and one data channel. High-definition digital television (HDTV) may require double capacity, depending on the compression method used.
- Set-top box (STB) decompresses the programme selected by the viewer through the Electronic Programme Guide (EPG).
- The data services that DTT could deliver to the majority of Irish homes offers substantial opportunities for both commercial and public service activities. This would bridge not only the digital but also the information divide. In addition to the potential for Irish broadcast and datacast industry there are other industries in Ireland involved in research and development of related products and services. DTT is thus an enabling technology. The ability to test and demonstrate products and services without having to travel to other DTT-enabled countries could stimulate the further growth of industry in this country and augment Ireland's competitiveness internationally.



DIGITAL RADIO RECEPTION OPTIONS

There are currently two main types of digital radio available in both fixed and mobile reception modes:

- **DAB: Digital Audio Broadcasting**, the digital radio system being generally adopted by national and local broadcasters in Europe and elsewhere. The UK is the most advanced DAB country in the world. DAB can deliver not only audio, but also text, pictures, data and video.
- **DRM: Digital Radio Mondiale**, developed as a replacement technology for current international broadcasters on long-wave, medium-wave/AM and short-wave. The international DRM Consortium was formed in 1998.

Increasingly, radio is offered as part of a mobile package of services, to include music downloads, mobile telephony etc., and trialling of new technologies is underway world-wide.

Additionally, digital radio is available to fixed (non-mobile) receivers as follows:

- **Digital TV**
Radio as part of a TV package.
- **Satellite**
Covers large areas, good for international radio.
- **Internet**
Low audio quality, costly to user, mostly restricted to computing devices, good for niche audiences.

DIGITAL BROADCASTING FOR IRELAND

The EU Commission has recommended digital switchover and analogue switch-off, to be completed in all Member States by 2012.

Sovereignty issues need to be recognised and addressed in the policies being devised for Ireland. While the future broadcasting landscape is likely to encompass a myriad of different delivery platforms for content to Irish citizens, an independent, national, terrestrial delivery network is part of the nation's infrastructure and is of strategic importance.

The UK has mandated analogue switch-off and digital switchover throughout the UK to start in 2008 and to be completed by 2012. The rapid success of Freeview (DTT in the UK), and the process of implementing analogue switch-off will result in further boosting of transmission power levels in Wales and Northern Ireland, and it is clear that the Irish analogue transmission network may increasingly encounter interference from 2008 onwards. This will affect the reception of television in Irish homes, primarily along the eastern seaboard and along the border areas with Northern Ireland. Without a free-to-air Irish digital terrestrial platform, Irish citizens will be at a disadvantage compared with their European counterparts.

As the demise of analogue becomes ever closer the development of DTT becomes more important for indigenous Irish broadcasters. Increasingly, existing analogue transmission equipment is becoming obsolete, this means that, in purely practical terms, Ireland's analogue transmission network may not survive beyond 2012-2015 as service quality and reliability may not be guaranteed and replacement parts may no longer be available.

The Irish Government pledged to introduce DTT, as stated in the Irish Government's *Statement of Strategy 2003-2007*, and have now announced a DTT Trial starting in 2006.

The Regional Radiocommunications Conference in 2006 (RRC 06) will agree frequency spectrum allocations for Europe for the next twenty years. This conference will determine Ireland's national allowance of frequencies and will be decisive for the nature and shape of Irish broadcasting for the foreseeable future.

CHALLENGES FOR IRELAND

COVERAGE: to achieve 98%+ DTT coverage (universal obligation) significant costs will be incurred for the 'extra mile'. Current estimates suggest that up to 95% can be readily achieved without requiring a significant number of additional sites but, because of topographical reasons, primarily, the remainder of the country might be best served by another delivery mechanism.

COST OF INFRASTRUCTURE: to build a DTT network will incur significant cost.

TRIALS TO PROMOTE AND EVALUATE DTT AND DAB: the Irish Government has indicated an intention to conduct trials for DTT and DAB during the 2005-2007 period.

COST OF SIMULCAST PERIOD: If DTT is introduced in Ireland a period of 'simulcasting' will be required before the switch-off of analogue and the complete switchover to digital transmission. Simulcasting means that channels are transmitted in both analogue and digital broadcast signal formats for a period of time, which increases the cost during the simulcasting period. Thereafter, costs should decrease overall.

ENGAGEMENT OF STAKEHOLDERS: : As the majority stakeholder, Government needs to bring all others together - regulators, industry and broadcasters - to devise a national digital broadcasting plan for Ireland. In addition, the public has to be persuaded that digital broadcasting brings benefits that are not to be missed.

To progress with DTT and DAB in Ireland a clear digital strategy is needed. The development of this policy requires:

- Consultation with stakeholders and the stimulation of the broadcasting and related industries.
- Plans for analogue switch-off and digital switchover, which will mean parallel analogue and digital transmissions for a simulcasting period.

Legislative and regulatory changes will be required. Serious consideration should be given to increasing public awareness concerning the benefits of digital broadcasting and to inaugurating a national action and communications plan.

ADVANTAGES OF DIGITAL BROADCASTING

Digital Terrestrial Television has many advantages over analogue terrestrial television, including:

- More choice for audiences.
- More efficient spectrum usage. Four digital television channels will fit in the same capacity as one analogue television channel.
- Cheaper operating costs in terms of power supply against channel numbers.
- Higher quality of service, better picture and sound quality.
- Potential for extra services - such as digital teletext, interactivity, enhanced television etc.

Digital Audio Broadcasting has many advantages over analogue terrestrial radio, including:

- More choice for audiences.
- More efficient use of spectrum.
- Ease of use.
- Better sound quality and reception - robust signal.
- Text and multimedia capability.
- Lower power costs per service, as DAB transmitters use less electricity.
- New channels, re-purposed content by genre.
- The availability to pause and rewind the radio.
- Less interference.
- Downloading of audio files on demand.
- Interactivity possibilities.

APPENDIX

THE IMPORTANCE OF INTERNATIONAL SPECTRUM CO-ORDINATION

Radio spectrum is an internationally co-ordinated natural resource. The radio spectrum bands used for broadcasting have traditionally been planned at international level by national broadcasters and the regulator.

Each country manages its own licensing of spectrum but it is internationally co-ordinated to ensure a balanced outcome for all by the International Telecommunications Union (ITU).

Broadcast spectrum for our digital future is currently being debated in an international co-ordination process which will conclude at the Regional Radiocommunications Conference in 2006 (RRC 06).

During 2005 the negotiating position of EU Member States will be put on the table for the RRC 2006. This will set the parameters for the use of spectrum for digital broadcasting for at least the next twenty years. If Ireland is to defend its spectrum for digital broadcasting it needs a clear and credible digital strategy.

Responsibility for policy and negotiation rests with the Department of Communications, Marine and Natural Resources (DCMNR), supported by ComReg, BCI, RTÉ and RTÉNL.

Responsibility for implementation rests with ComReg.



APPENDIX

IRISH BROADCAST SPECTRUM

Safeguarding radio spectrum for broadcasting is likely to be a central tenet of Ireland's negotiating position for the RRC o6 Conference.

- In Ireland, the spectrum available for broadcast delivery space runs from 30 KHz to 30 GHz.
- RTÉNL's analogue transmission network broadcasts radio signals in LW/MW and FM frequency bands and television signals in VHF (Band III) and UHF (Bands IV and V) bands.
- It has been proposed that Band III, VHF, be ultimately reserved for radio services if and when digital television services are offered in UHF (Bands IV and V).

GRAPHICAL REPRESENTATION OF THE IRISH BROADCAST SPECTRUM

