



Commission for
Communications Regulation

Information Notice

ComReg Response to Consultation on Frequency Spectrum Policy for Digital Broadcasting (DTT)

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1. Introduction

This document sets out the response of the Commission for Communications Regulation (ComReg) to the consultation issued on frequency spectrum policy for digital terrestrial television and other services, by the Department of Communications, Marine and Natural Resources (DCMNR) on the 8 October 2004. The Commission welcomes this timely consultation, which will define the national priorities in digital broadcasting for the foreseeable future and beyond.

As indicated in the DCMNR consultation paper, the background to this consultation is the work going on at an international level to develop frequency plans for digital terrestrial broadcasting.

In May 2004 the International Telecommunication Union (ITU) held the first session (RRC-04) of a two session Regional Radiocommunications Conference (RRC) to address the technical basis for the planning of digital radio and television services in the VHF and UHF bands. This is a major programme to advance the use of digital technology in terrestrial broadcasting which, is at present, predominantly analogue. RRC-04 also established the work programme for the period between sessions and the timescales for the work involved.

The work that must take place in the intersessional period requires clear national broadcast policy to form the framework around which the national preparations will revolve.

The current plan for analogue broadcasting in the VHF Band III and UHF Bands IV/V dates back to 1961 and has been used successfully for more than 40 years. It can be expected that any decision made on national broadcast policy, following on from this consultation, will have a lengthy validity. For this reason ComReg strongly agrees with the statement in the consultation that *'it is important that Ireland in preparing its input for the conference has a clear policy/strategy that will maximise the spectrum available to Ireland to accommodate the development of digital services in the broadcasting bands being planned'¹.*

As stated in the consultation, with the rapid development in convergence there is a need to take account of not only the broadcasting requirement but also, where possible, make spectrum provision for the delivery of other services using broadcasting technologies. For example, rural areas with their low population density create a greater challenge for the provision of broadband

¹ Paragraph 2 of section 2) of consultation.

access platforms and the DTT platform may provide a suitable access opportunity.

There is an interrelationship between the technical parameters selected and the social and economic objectives sought. However, the future plan must facilitate the maximum flexibility to take account of technological and commercial development of electronic communications services in the broadcasting bands. It may therefore be more prudent to avoid overly proscriptive policy in technical details as this could reduce flexibility and constrain the options to maximise the effective use of spectrum.

1.1 ComReg's Role

The views in this response are based on ComReg's legislative role regarding the radio spectrum which are as follows:

- i. One of the primary functions of the Commission is to ‘manage the radio spectrum and the national numbering resource,².**
- ii. The objectives of the Commission in exercising its function are to ‘ensure the efficient management and use of the radio spectrum³’.**
- iii. In so far as the promotion of competition is concerned, the Commission is mandated to take all reasonable measures to achieve its objective including ‘encouraging efficient use and ensuring the effective management of radio frequencies⁴’.**

Our response avoids giving views on areas of the consultation that are the responsibility of RTÉ and the Broadcasting Commission of Ireland (BCI).

² Section 10 (1) (b) of the Communications Regulation Act, 2002.

³ Section 12 (1) (a) (i) of the Communications Regulation Act, 2002.

⁴ Section 12 (2) (a) (iv) of the Communications Regulation Act, 2002.

2. Responses to Consultation Questions

2.1 Transition from Analogue Broadcasting to Digital Broadcasting

As a general principle should the development of a spectrum plan to accommodate digital broadcasting be done in

- i). A one step approach (i.e. fit the digital channels around the analogue channels);
- or
- ii). A two steps approach (i.e. develop the optimum plan for an all digital environment but include an interim step that would allow for the introduction of digital broadcasting while still protecting the existing analogue transmissions).

Response:

ComReg considers that the two step approach is the best and most likely option. With this approach an optimum all digital plan is developed, whilst permitting simulcasting of existing analogue television and new digital television, sound and data services during a transition phase. The provision of additional (non-broadcasting) services might encourage the take up of new technology and a more rapid phasing out of the analogue network.

Comment:

The response to this question is given in the knowledge that the rules of the new agreement to be finalised at the end of the RRC process are not yet clear. At this stage it is uncertain if the new agreement will protect existing analogue assignments; for how long the analogue assignments will remain protected or if analogue assignments will/can be converted after some transitional phase into digital assignments.

2.2 UHF Bands IV & V (470 to 862 MHz) & VHF Band III (174 to 230 MHz).

1). While DTT will obviously be planned in the UHF band, should consideration be made for DTT in the VHF Band III or should this be the sole preserve of DAB?

If you feel both should be developed please specify your reasons.

Response

ComReg is of the considered opinion that the VHF Band III should continue to be allocated to the broadcasting service and used for digital sound and digital television services.

Reasons:

The VHF Band III is currently used for analogue television transmissions and whatever digital service(s) is introduced, the consumer will have to purchase a new digital receiver or adaptor. A single receiver capable of receiving any service broadcast in this band, be it audio, television or data would be in the best interests of the consumer, facilitate competition and optimise spectrum use in this band.

If the band is planned for DVB-T in 8 MHz wide channels then it will be possible to use the multiplex to deliver a combination of services including broadcasting and data. These services could include the traditional broadcast content as well as any other services that fit onto the multiplex or use the DVB-T channel spacing.

DVB systems have been established in Europe since 1998. Already consumer equipment is available, costing less than dedicated DAB receivers that provide sound broadcasting services, television broadcast and data streams using DVB-T. Large numbers of receivers have been purchased in the last year for DVB-T services in the UK and Germany. The 'Freeview' service available in the UK is one example where the consumer equipment is already available for less than £80 Sterling⁵ (approximately €125).

Until the mid 1990's VHF Band III provided substantial coverage for analogue television services using the main transmitter stations and relatively few

⁵ See http://www.digitalradiotech.co.uk/freeview_rx.htm

transposer stations. Provision of national coverage of digital television services in VHF Band III is likely to require considerably less infrastructure than in the UHF bands.

The cost of rolling out a DAB-only network has slowed the introduction of DAB by broadcasters and the relatively high cost of DAB receivers has mitigated against consumer take up where DAB services are operated. On the other hand radio services delivery via DVB-T may not have such constraints and radio services would only need to contribute a fraction of the cost of developing such a network.

Newer technologies will better utilise the spectrum and deliver a variety of services including television. This would be potentially more attractive to consumers, leading to take up by consumers and achieving the goals set by Government⁶.

2). With regard to the UHF band should all of it be planned for DTT platform use or should DTT platform planning be limited to a part of the band with the other part left aside for use by some other technology/platform type?

Response

ComReg proposes that the UHF band, for the purposes of the forthcoming Regional Radiocommunications Conference (RRC-06), should be allocated exclusively to the broadcasting service.

The RRC-06 is a planning conference for digital sound and digital television services. Only DVB-T systems will be planned in the UHF Bands IV/V. There may be a strategic disadvantage in limiting DVB-T planning to a part of the band. Once the band is planned on a broadcasting exclusive basis and protected within a regional plan, Ireland is able to consider other uses if the band is under utilised for broadcasting and if the need for other uses arises in the future. The priority at this stage, in light of preparations for the RRC-06, should be for broadcasting.

In the context of RRC-06, ComReg recommends that the whole UHF bands IV/V be planned for DVB-T, using a variety of planning criteria and reception modes, with a channel bandwidth of 8 MHz.

⁶ Goals as detailed in the Department of Communications, Marine and Natural Resources Statement of Strategy 2003 – 2005.

Reasons:

If the whole band is planned for DVB-T in 8 MHz wide channels then it will be possible to use the multiplex to deliver a combination of services including broadcasting and data. These services could include the traditional broadcast content as well as any other services that fit onto the multiplex or use the DVB-T channel spacing.

2.3 Difference between analogue and digital broadcasting

Standards and quality

There is a link between the standard and variant selected for digital broadcasting, the quality of the programme services and the quantity of services available.

1). Indicate the standard and parameter option you consider are best suited for selection as a representative set of parameters for the development of a spectrum plan for digital terrestrial television.

Response

ComReg asserts that in an all DVB-T environment, where there is sufficient capacity for services requiring carriage, that questions of quality versus capacity and the combination of services are broadcasting policy and or commercial issues.

Factors which will influence the selection of DVB-T System Variant or Reference Planning Configuration include the desired capacity (bit rate) of a multiplex, the network design, coverage required and desired reception mode. ComReg is therefore of the view that input requirements should be submitted to the ITU with different systems variants, as appropriate, dependent on the above factors.

Comment:

DVB-T input requirements to the RRC-06 will be made using either the three Reference Planning Configurations or a range of System Variants, which mainly differ with respect to their capacity, minimum signal strength and susceptibility to interference. The UK initially introduced 6 multiplexes using 64QAM code rate $\frac{2}{3}$, but the 4 BBC/Freeview multiplexes are now operating at 16QAM code rate $\frac{3}{4}$. The initial UK services operated with 17-20dB less power. The current UK proposals are for powers 7-10dB less than the current analogue service.

The DVB-T table of system variants allows for up to 120 variants. This range allows for every option from high bit rate multichannel multiplexes to very rugged multiplexes carrying only one or two TV services or perhaps one High Definition Television (HDTV) service. A transmission using a rugged modulation scheme carrying a low capacity multiplex could be received with signals 10-15dB weaker than the signals required to receive a high capacity

multiplex using a more fragile modulation scheme. This has an impact on the number of transmission sites required to provide the desired coverage.

Standards and quality

2). To what extent should a set of detailed reference parameters be specified in policy or should the determination of the reference parameters be left to be decided in the detailed planning work?

Response

ComReg is of the view that input requirements should be submitted to the ITU using different systems variants according to the service requirements. It is therefore more appropriate that the determination of such reference parameters should be decided based on the planning work undertaken.

Reason:

Whilst the coverages required and desired reception modes are matters of policy, the detail of the means by which these policies are realised should be decided in the detailed planning work and should not be determined in policy.

2.4 Approach to Planning

Approach to planning

Should frequency planning be based on allotment or assignment planning?

Please indicate why.

Response

ComReg is of the view that input requirements should be submitted to the ITU as a mixture of allotment and assignment requirements.

Reasons:

The suitability of either an assignment or an allotment input submission is dependent on the coverage required, desired reception mode and the presence of infrastructure.

Assignment planning is suitable where the transmission site and characteristics such as power and radiation pattern are known or where infrastructure is already in place. Allotment planning is suitable where the details of the transmission network are not known, but where the service area has been identified.

ComReg does not recommend submitting allotment input requirements where it is expected that high power transmissions from high sites will take place. There can be no guarantee that such transmission proposals would be acceptable to neighbouring administrations during the required subsequent international co-ordination for the conversion of an allotment into one or more assignments.

ComReg is not convinced of the benefits of allotment planning over assignment planning. However, where it is envisaged that portable reception is required, using dense transmitter networks not currently in operation, allotment input requirements should be submitted.

Where personalised data services are to be provided MFN's (Multi-Frequency Networks), possibly using a cellular approach, should be used as opposed to an SFN (Single Frequency Network). That might not in itself preclude the international records of such frequencies being derived from allotment requirements.

2.5 Network Parameters

Network parameters

There is a close link between the reception mode / coverage quality, the type of network and planned coverage area and the quantity of programme services that can be provided.

1). The extent to which you consider portable and mobile reception should be taken into account in planning.

Response:

ComReg proposes that priority should be given to achieving coverage of existing indigenous Irish Television services on a universal basis, as a minimum for fixed reception. Even where a network is planned on the basis of fixed reception, portable reception will be possible where the signal is sufficiently strong.

Data services to handheld devices and portable/mobile reception of broadcasting services may be desirable in some areas.

ComReg considers that mobile and portable reception of broadcasting services is desirable to facilitate convergence, maximise the use and take-up of such services, but that ultimately this is a policy issue. If it is policy to make provision for television services received by handheld portable and mobile devices, a policy decision needs to be taken as to whether or not dedicated multiplexes should be used for services intended for reception by mobile and portable equipment.

Reason:

Universal coverage for existing TV services may need a mixture of high power assignments supplemented by allotments served by low power fill-in transmitters operating co-channel. This may require a “duplicated” network of overlapping coverage of parent assignments and daughter allotments in some areas.

None-the-less in an all DVB-T environment it will be possible to provide multiplex capacity which would greatly exceed not only the capacity required for the current analogue television services available in Ireland but also,

simultaneously, to provide capacity that exceeds that required for the current national analogue radio services available in Ireland.

Network parameters

There is a close link between the reception mode / coverage quality, the type of network and planned coverage area and the quantity of programme services that can be provided.

2). Networks can be planned using the SFN or MFN approach or a combination of both. Have you any views on which approach should be adopted?

Response:

ComReg proposes that a combination of SFN and MFN networks should be considered. Multi Frequency Networks are most appropriate where different transmitter sites are not carrying identical multiplex transport streams (content) or where existing infrastructure precludes the use of one frequency throughout the network. SFN's are well suited to allotments, but may also be used as a subset of an MFN assignment approach. The choice of network type and frequencies used by neighbouring countries may also dictate an MFN or SFN approach.

ComReg does not recommend a national DVB-T SFN as it imposes constraints on the network parameters, capacity and backbone infrastructure. Also, given the large distances (across the centre of the country) between transmitter sites in the current national TV network, a national SFN has an increased probability of "self-interference" unless a very rugged system is used. Regional SFN's could be considered and will also allow for regional opt out services.

Where portable and mobile reception of data services is required MFN's, possibly using a cellular approach, should be used. However if portable reception of broadcast only services is required a dense transmitter SFN should be considered.

Network parameters

3). The selection of coverage areas can have a significant impact on the overall framework for the future development of broadcasting. National coverage area has been the norm for television planning to date. With the potential increase in the number of programme channels that a DTT system could provide to what extent should regional or local coverage areas be considered in the development of a spectrum plan for broadcasting or should the plan be based solely on national coverage?

Response:

ComReg proposes that priority should be given to achieving as many coverages as possible in any given area. Plans for national Multi-Frequency Networks need not preclude regional variations in content in the final implementation.

Multiplexes could be used in the provision of data (multimedia) services. Non-broadcast/multimedia multiplexes using local and regional MFN's could, however, also carry a local TV and some local radio services.

Reasons:

Even though there may be capacity for in excess of 30 television services, there is no evidence that such a number of indigenous Irish services would be established or made available in any one area. In the absence of a "multichannel terrestrial pay TV" platform and given the goal of increased broadband penetration, it seems unlikely that more than half the available DVB-T assignments/allotments planned in an area would be used for TV services.

The increased use of hard-disk based storage devices for recording not only data but also TV and radio services may significantly alter the requirements placed by society on Electronic Communications Networks in the future.

Network parameters

4). To what extent should network planning parameters be specified in policy or should they be left to be decided in the detailed planning work?

Response:

ComReg is of the view that the determination of network parameters should be decided based on the planning work undertaken.

Reason:

Whilst the coverages required and desired reception modes are matters of policy, the detail of the means (technical parameters) by which these policies are realised should not be determined in policy.

2.6 Other services that could use DTT Technology

Using DTT Technology for provision of other services

1). What applications do you envisage on a DTT system as well as TV broadcasting?

Response:

ComReg maintains that once the immediate and future requirements of multiplex capacity for broadcasting is met, then unused multiplex capacity can be assigned to any other service that uses the DVB-T technology as its platform.

ComReg considers that non-broadcast/multimedia multiplexes using local and regional MFN's could, however, also carry a local TV and some local radio services.

Reason:

The increased use of hard-disk based storage devices for recording not only data but also TV and radio services may significantly alter the requirements placed by society on Electronic Communications Networks in the future.

Comment:

The DVB-H standard was developed for uses where DVB signals are intended for reception on handheld devices. DVB-H can be transmitted using much of the same infrastructure and frequency plans as DVB-T. Aspects of the DVB-H standard can be used within DVB-T multiplex transmissions and DVB-H can be incorporated within a DVB-T multiplex or operated as a dedicated DVB-H multiplex.

Using DTT Technology for provision of other services

2). The extent to which capacity for additional services should be taken into account in developing our requirement for the forthcoming ITU conference?

Response:

ComReg is of the view that the majority of capacity in the UHF bands will be used in the provision of data (multimedia) services. Non-broadcast/multimedia multiplexes using local and regional MFN's could, however, also carry a local TV service and some local radio services.

Irrespective of the eventual use, we should as a priority seek as many DVB-T coverages in any given area as possible at the RRC-06.

Reason:

As already stated, even though there may be capacity for in excess of 30 television services, there is no evidence that such a number of indigenous Irish services would be established or made available in any one area. In the absence of a "terrestrial multichannel pay TV" platform and given the goal of increased broadband penetration, it seems unlikely that more than half the available DVB-T assignments/allotments planned in an area would be used for TV services.

The increased use of hard-disk based storage devices for recording not only data but also TV and radio services may significantly alter the requirements placed by society on Electronic Communications Networks in the future.

Comment:

A data multiplex service, with personalised multimedia content, has about 20Mbps of data available for delivery to the user base in the coverage area. If that coverage area services 1,000,000 TV households and assuming 20% take up of the data service, the 20Mbps would be shared between 200,000 households. If a 10% contention ratio (that is only 10% of users using the service at any one time) is assumed each user would typically have access to a continuous 1kbps. This would not be very attractive as 1000 users each requesting 400kbits every 20 seconds would use all the downstream resource. Clearly in order to provide even a basic broadband service a data multiplex would be required per 1000 active users. That equates to 20 data multiplexes

(400Mbps) per 200,000 users, which might cover an area of 1,000,000 TV households (based on 10% contention and 20% take up).

Where personalised data services are to be provided MFN's, using a cellular approach, should be used as opposed to an SFN. That might not in itself preclude the international records of such frequencies being derived from allotment requirements.

Using DTT Technology for provision of other services

3). Should a return path using the same spectrum bands be considered in developing our requirement for the forthcoming ITU conference?

Response:

ComReg is of the view that specific provision for a return path should not influence the input data requirements for RRC-06 as RRC-06 is not addressing return path requirements. ComReg is of the view that "In-Band" return channels would operate on a non protected, non interfering basis. If such an approach were adopted it may be possible to use the frequency of a planned assignment or allotment for the return path.

Reason:

Whilst the use of interactivity within Digital Television on all platforms is of interest, there are many possible communications systems which could provide a return path. International deployment of in-band return path equipment has not been significant. Such an approach is only possible where demand for spectrum for downstream services does not exceed that available in the broadcasting bands.

Comment:

Questions remain as to what services will be offered using the return path and the regulatory approach to in-band return paths. The RRC-06 is not addressing such requirements. It is as yet unclear how the in-band return channel operating frequency of consumer equipment would be controlled. The current DVB-RCT standard does not address this matter. ComReg considers that it will not be possible to guarantee that the same frequency could be made available nationwide for return channel use.

2.7 Number of Multiplexes

Number of multiplexes

Taking account of your responses to sections 5 and 7:

- 1). Indicate the number of multiplexes/networks that could be accommodated in the spectrum identified in your response to section 4. (If appropriate indicate the numbers in the different bands).
- 2). The type of coverage areas proposed (National, Regional) and the breakdown of the number of multiplexes for each type of service area.
- 3). Should a standard number of multiplexes be planned across the country or should different numbers be planned for different areas.
- 4). Other than for service area should all multiplexes be planned with the same parameters or should different sets of parameters be used for different applications?

Response:

ComReg proposes that priority should be given to achieving as many coverages as possible in any given area. Plans for national Multi-Frequency Networks need not preclude regional or local variations in content in the final implementation.

ComReg proposes that VHF Band III provide the basis for fixed reception of the existing indigenous Irish Television services.

“Duplicated” networks of parent assignments, possibly carrying HDTV services for fixed reception, and daughter allotments, carrying standard definition versions of the services including additional regional television and radio services for portable reception, could be implemented.

ComReg is of the view that input requirements should be submitted to the ITU using different System Variants and network structures dependent on the coverages required and desired reception modes, which are matters of policy.

Reason:

Quality versus capacity and the combination of services in a given area are policy or commercial issues.

Provision of national coverage of digital television services in VHF Band III is likely to require considerably less infrastructure than in the UHF bands.

The detail of the means (technical parameters) by which coverage and reception policies are realised should be decided in the detailed planning work and should not be determined in policy as this would reduce flexibility and could be less future-proof.

Comment:

The complex issue of equitable access to spectrum during RRC06 and between neighbouring countries may constrain the number of coverages which the conference may include in the resultant plans.

3. Conclusion

ComReg has taken an approach in this response, in line with its legislative requirements, that attempts to optimise the use of the radio spectrum.

Planning the future use of VHF Band III and UHF Bands IV/V with DVB-T, a digital technology that can simultaneously provide a number of different services, encourages flexibility of spectrum use and promotes convergence while balancing the needs of the consumer.