

What might constitute a region?

122. For clarity of consumer communication we will need to be clear about what constitutes a “region” for the purposes of the switchover process. This will need to be agreed by the broadcasters, the transmission companies and the Government. There are four obvious methods of defining switchover regions, in generally increasing size of geographical coverage:
- a) a main transmitter and all of its relays
 - b) an ITV1 advertising region
 - c) an ITV1 region
 - d) a BBC ONE region
123. The UK comprises 30 transmitter regions, each comprising a main transmitter and all of its relays. When a main station is converted, all of its relays will need to be dealt with at the same time and so a main station parent and its relays would constitute a region from the transmission point of view.
124. The coverage of these transmitter regions are aggregated in various ways to create 14 ITV1 regions, 29 ITV1 advertising regions and 18 BBC ONE regions. In some parts of the country the transmitter (and hence regional programming boundaries) overlap, with the result that viewers in any particular area may be watching a variety of services either through choice or accident of geography or antenna system.
125. In practice, logistics will probably require a flexible approach to be adopted depending on the size of the programming region and the number of transmitters and relays from which it is comprised. For example the Oxford main transmitter and its relays, where the BBC ONE Oxford region and the Central (South) advertising region are essentially the same, would be relatively straightforward to convert. Conversely, Scotland comprises one BBC ONE region, three ITV1 programming regions, four ITV1 advertising regions, but thirteen transmitter regions.

The order in which regions could be switched over

126. Subject to logistical constraints, several regions could be undergoing switchover simultaneously. Indeed given that there are 30 transmitter regions, and current planning assumes four years to implement *nationwide* switchover, simultaneous regional conversions would probably be essential.
127. Because of considerable variations in topography, and the number of relays being fed from the main transmitters, there are considerable variations in the ease with which different transmitter regions could be switched over. For example, although Wales is one region for both BBC ONE and ITV1 programming purposes, it comprises six transmitter regions with 203 relays (of which 93 are fed by another

relay). Clearly the logistics of converting Wales are complex compared to, say, conversion of the Central (South)/BBC Oxford region which comprises one transmitter region with a handful of relays (four for ITV1 and Channel 4, only two for BBC ONE).

128. There will be many aspects of the marketing and communications strategy which will be challenging as a direct result of implementing the simultaneous switching of regions. Worth highlighting here are those resulting from regional overlap, where there could be the:
 - effects of significant numbers of viewers watching out-of-area signals. For example, there is significant overspill (and use) of services from English transmitters in Cardiff/Newport and North East Wales, and extensive use of London services in the Oxford area; and
 - adverse effects from a region undergoing switchover to analogue reception in adjacent regions which had yet to be converted (equally switching a region could, by reducing interference from the analogue services being withdrawn, permit the power of the pre-switchover digital signals to be increased in adjacent regions).
129. These overlap areas will create dependencies in the switchover order. For example, the conversion plan for North East Wales would have significant impact on analogue reception in the Manchester area during the transition period. Therefore conversion of North East Wales and the Manchester area of the North West would need to be closely linked in time to avoid prolonged disruption to analogue reception for those viewers in the North West without a digital alternative.
130. There will also be considerable regional variations in digital take-up (whether or not this takes account of the conversion of secondary TV sets) which, in turn, can be expected to translate into differing levels of consumer acceptance of the process.
131. To ensure that the benefits of learning from the early regions are maximised, and to minimise consumer apprehension, the BBC recommends that the regional switchover process starts modestly and builds.
132. Regions where international frequency negotiations could determine the final choice of frequencies for DTT use, for example ITV1 regions Anglia, Meridian and Ulster, could be planned to switchover later rather than sooner.
133. The characteristics of the London region, for example the significant number of homes which are flats and/or rented (either factor may represent a consumer barrier to adoption of digital TV); the wide variations of consumer demographics; and the fact that the London region is the most valuable in terms of TV advertising revenue; would also suggest that London should be planned to switch later.

134. The switchover planning needs to balance these factors, while avoiding planning for the simultaneous switching over of two or more technically challenging regions, and bearing in mind the need to manage switchover dependencies.
135. Although agreement of the regional switchover order is not a short term necessity for the development of the nationwide plan, the longer this is left undecided, the greater the opportunity for uncertainty about the wider switchover process.
136. Industry, the Government and political and consumer representatives need to engage in early dialogue to establish the appropriate balance between technical, marketing and viewer interests in developing an appropriate regional switchover sequence.
137. The BBC would support the establishment of a large-scale switchover pilot to convert one UK “region” to digital as soon as possible. This would require a cross-industry partnership, working with the Government, transmitter providers, manufacturers and retailers. The BBC believes that this would be the best way of:
 - a) investigating the technical issues associated with transition;
 - b) identifying the likely costs associated with converting each household – including existing digital households beyond their primary TV sets;
 - c) evaluating public expectations and reactions to conversion;
 - d) identifying social and marketing barriers;
 - e) identifying missing components and technologies; and
 - f) identifying issues which might have been overlooked in paper-based studies.

The procedure for switching off the analogue transmitters

138. One factor which affects the order in which regions might be switched over is how switchover is actually implemented within each region. Although it is perfectly possible to plan to switch over a region in one big bang, the BBC has previously proposed that it would be preferable to instead plan to “phase” the switchover, so that the analogue services are withdrawn, the analogue conversion implemented, and the power of the DTT multiplexes boosted over a relatively short period. This would have several clear advantages:
 - a) viewers who, for whatever reason, had still not upgraded to digital at the start of their region’s switchover, would not lose all of their television services in one go. This should reduce consumer opposition to the process;
 - b) as the analogue services were withdrawn over a period, the “count down” to the withdrawal of the last analogue service

would build momentum amongst remaining analogue viewers to upgrade;

- c) for regions with many relays which are being converted, implementing a complete switchover may take up to 24 hours, with the risk of spreading consumer confusion amongst all viewers in the region for that entire duration.

139. Acceptance that switchover should be phased within regions, say over a few months, then leads onto the need to determine the order in which the analogue channels should be withdrawn. Because some of the frequencies currently being used by analogue services would be released rather than re-used for DTT only the *general*, rather than the exact, sequence could be determined.
140. As support for phased switchover has gained ground, some have already argued that the BBC's analogue channels should be the first two withdrawn. The BBC believes that, in considering the order of withdrawal, the general aim should be to minimise disruption to viewers and distortions to the advertising market²¹. As such, the two most important criteria should be that:
- the first channel to be withdrawn should not be either BBC ONE or ITV1 (i.e. the two most watched channels, even in multichannel homes); and
 - all of the commercial channels - i.e. ITV1, Channel 4/S4C and (where present) Five – should be withdrawn simultaneously so that no channel gains even a temporary commercial advantage (which, for the Crystal Palace region in particular, would be well worth having).

Communications strategy

141. There will be a need to manage the switchover programme, including the communications strategy (for consumers, consumer electronics manufacturers and retailers). The scope for consumer confusion, in particular, could be considerable and it will be essential that consumers' expectations are managed with a consistent, easy to understand set of messages.
142. The idea of an organisation (currently dubbed "SwitchCo") to manage this considerable task has been suggested by some in the industry and the BBC supports this. The process of marketing the advantages of digital (and, as we start the switchover process, the inevitability of the withdrawal of analogue broadcasts) will require considerable close co-operation between the Government and the industry.

²¹ The order in which analogue channels will be withdrawn will also need to take account of which frequencies currently used by analogue services are to be released.

143. A previous example worth considering might be Action 2000, a not-for-profit organisation set up by the Government and chaired by Don Cruickshank, which promoted awareness of the “Millennium bug” issue amongst senior decision-makers in industry and commerce. This was partly funded by private companies, but mostly by the Government.
144. Regardless of the form and timing decided upon for the switchover process, it will be essential that a properly staffed organisation be established, with a significant marketing budget, to manage the switchover programme, including the communications strategy (for consumers, consumer electronics manufacturers and retailers). Like Action 2000, SwitchCo would probably need a high profile Chair and a consistent, recognisable logo could also help develop industry and consumer recognition of switchover.
145. All of this would need to be in place well before the start of the switchover process and would have two, consecutive objectives:
 - driving digital take-up for primary sets
 - driving conversion of secondary sets and preparing viewers for switchover.
146. These objectives will require a fundamentally different approach and criteria will need to be established to pinpoint when the marketing message will need to switch between the two.

Current DTT network topology

147. There is growing public disquiet that the current DTT network is not being extended. While the reasons for this are clear to the industry, given the success of DTT the situation is incomprehensible to the consumer.
148. Once the digital switchover plan is agreed, it may be possible to begin to grow the current DTT network in advance of full switchover by the judicious modification of existing transmitter sites and/or the addition of temporary low-power DTT transmissions for the three public service multiplexes at key relay sites, although because DTT does not have a platform operator in the same manner as satellite or cable, all such improvements would need the co-operation (and willingness to share costs) of the multiplex operators.
149. This would help to seed the receiver market in these areas and build public confidence that the switchover process is proceeding. The Government could significantly aid the process by reducing the protection enjoyed by analogue transmissions once the scope and timetable for switchover is known.

Achieving portable reception

150. Millions of consumers currently rely on set-top aerials (“portable reception”) for at least some of their TV viewing, often on second and third TV sets²². For many, particularly those in urban areas, such portable reception is often not a matter of choice, but of a lack of alternatives. Viewers in blocks of flats, particularly if renting, may not have access to a SMATV²³ distribution system or cable TV and installing their own satellite dish may not be a practical (or, indeed, legal) option for them.
151. DTT should represent the easiest route for such viewers to upgrade to digital, but ensuring there could be widespread, reliable portable DTT reception post-switchover presents a challenging policy dilemma.
152. It is estimated that only 39 per cent of viewers using ground floor set-top aerials, and still only 55 per cent using first floor set-top aerials, have good analogue reception. Yet even matching this with DTT (without requiring these consumers to obtain access to a roof-top aerial, to satellite or to cable for those TV sets) would be difficult.
153. However, there are a range of technical options which could improve matters. Manufacturers could be encouraged to offer DTT receivers with a “front end” as good as those of satellite receivers, although in DTT’s horizontal market it would then be useful for those manufacturers to be able to signal to consumers which receivers were better at portable reception. In addition, “diversity techniques”, which typically require the use of twin aerials and an associated digital tuner designed to work with these aerials, would enable improvements in portable reception. In this way, a second aerial could supply an extra signal in cases where the level received on the first aerial was low. BBC R&D studies have shown that significant improvements in portable reception could then be achieved, particularly in the number of multiplexes which could be decoded.

²² A March 2003 survey on behalf of the ITC for the Digital Action Plan’s Technology and Equipment Group estimated that about 21 per cent of TV sets were connected to set-top aerials.

²³ Satellite Master Antenna (TeleVison), whereby signals received by a dish or dishes on the roof of a building are then distributed by cable throughout that building.

154. There are also three potential technical solutions which broadcasters could implement, but each of these would require a trade-off to be made:

a) permit the power of DTT transmissions to increase, ideally before analogue is switched off. Since its launch in 1998, the efficiency of DTT broadcasting has been limited through a combination of restrictions on power output and antenna patterns. International frequency clearances (which continues to limit reliable DTT reception South of London) play a part, but the principal justification for limiting the reach of DTT from existing transmitters is to protect analogue reception from potential interference. When digital TV was launching in 1998 such in-built inefficiencies could have been considered proportionate – now, with only 46 per cent of households still relying on analogue TV, that is probably no longer the case. The Government could consider setting a trigger point (perhaps when only 30-35 per cent of households still rely on analogue) before permitting potential interference from DTT to analogue to increase. Of course, this would benefit all potential DTT viewers, not just those using set-top aerials.

b) require all of the DTT multiplexes²⁴ carrying the public services to broadcast in the 16-QAM²⁵ transmission standard. As with power increases, this would contribute towards improved reliability of reception to all potential DTT viewers, although is particularly beneficial for portable reception. But this would require a trade-off between increasing portable reception and the number of channels which could then be offered. Recent developments in the DTT market with the launch of Top Up TV's service may make such a move more difficult now unless additional multiplexes were licensed by OFCOM.

c) a switch to the 8k carrier option²⁶ should bring increased robustness against impulsive interference²⁷ and improved resistance to multipath interference²⁸, both of which particularly affect portable reception. It would also open the way for innovative technical solutions to providing coverage in areas of severe frequency congestion, such as the Channel Islands. But there would be implications for the legacy base

²⁴ At present all of the public service channels, other than those of the BBC, are still broadcast in the less reliable 64-QAM mode used by ITV Digital.

²⁵ Quadrature Amplitude Modulation, one method of encoding digital data in an analogue signal.

²⁶ DVB-T is a reasonably flexible standard which incorporates a number of permissible modes of operation (eg differences in code rate, guard interval). One of the key variables within the DVB-T specification is the number of carriers, each of which carries a small part of the total coded data rate, which a DTT broadcast will comprise. The DVB originally defined a specification using 8000 carriers (the 8k system), however there were concerns about the additional complexity of an 8k system, so the DVB allowed the use of a 2000 carrier implementation (the 2k system) as an alternative for early implementation. In the UK, the ITC mandated the 2k system.

²⁷ Impulsive noise, in particular from domestic appliances which are poorly shielded (e.g. central heating thermostats, washing machines), leading to momentary picture break-up and audible clicks.

²⁸ Where signals bounce off buildings in a city, or other large obstructions, causing reflections which the receiver then receives in addition to the original signal.

of receivers and the potential for considerable consumer confusion. None of the 600,000 ex-ITV Digital set top boxes believed to be still in use and first generation idTVs would be capable of receiving 8k transmissions. All such receivers would need to be replaced. More recent Freeview adaptors are capable of operating using the 8k standard, but in some cases the receivers have not been optimised for this mode and in other cases a software download would be required to enable the feature. 8k could be introduced on a region-by-region basis, and could be done either before, concurrent with, or after the time of analogue conversion, although it would simplify the marketing and consumer management process if it were done simultaneously. In any scenario, the change would have to be implemented on a “big-bang” basis at each transmitter site; simulcasting is not an option.

Digital availability of the public service channels outside Freeview coverage

155. About 25 per cent of UK households are outside Freeview coverage. Some of these households would no doubt adopt the service now if it were available to them. But without prior DTT power increases, they would have to wait until the switchover process started.
156. Others may be willing to receive digital TV via satellite but are unwilling, or unable, to pay subscriptions to do so. Such consumers would be more willing to accept the inevitability of the switchover process if they could be persuaded to upgrade well before switchover starts in their region. This probably requires an attractive range of free-to-view channels via satellite to be made easily available to them.
157. Yet, with the withdrawal of the solus card scheme, satellite has now become far less attractive to such viewers. A viewer-friendly solution to this must be found before analogue services start being withdrawn.

Assistance for analogue viewers in regions being switched over

158. Even if the receiver industry succeeds in making the installation process for new equipment simpler than it is today, there will be many millions of items of existing reception equipment which have not had the benefit of this and which still have to be converted. It is reasonable to assume that many late adopters will not be technologically literate, or may have impairments which mean they will require assistance with setting up or re-tuning their home receiving equipment during the switchover process. Given the scale of the switchover project, the scope for unscrupulous operators moving into the market is very high.
159. The Government should therefore consider establishing a well-managed and closely controlled switchover assistance project which would be positioned to provide in-home technical support to those who needed it.