# TDN RESPONSE TO CONSULTATION ON THE PRINCIPLES FOR SPECTRUM PLANNING

**10.4.02.**

## INTRODUCTION

The Digital Network (TDN) is the co-ordinating body for DTT Multiplex Licensees and the BBC in relation to matters of common interest concerning DTT.

The members of TDN are the BBC, Digital 3and4, SDN and ITV Digital.

TDN members, working together, have been instrumental in managing many of the DTT developments such as initial transmitter roll-out, the current Power Increase Trials, set-top box specifications and developments, SI cross carriage and logical channel allocations.

TDN members welcome the opportunity to comment on the Principles for Spectrum Planning as described in the consultation document published in December 2001.

The response which follows has the full support of all the TDN members and gives reactions to the specific questions posed, together with comments on a number of other points which emerge from consideration of the commentary to the consultation paper.

## PREAMBLE

**TDN believes that the United Kingdom will benefit from a healthy, vibrant DTT platform. It is our view that the terrestrial delivery of digital services is essential to driving the penetration of digital television to the established base of television receivers in UK homes to a level consistent with the conditions for analogue switch-off. It is also our view that the UK benefits from having competition in the national Digital Pay Television marketplace. Further we are convinced that the presence of pay television services will help drive digital take up.**

### Meeting Government Objectives

The document 'Principles for Spectrum Planning' outlines objectives when 'Setting the framework for the switchover from analogue to digital terrestrial television', and in paragraph 1.3 it is stated that: "Our aim is for the UK to have the most dynamic and competitive market for digital TV in the G7, as measured by take up, choice and cost. The terrestrial platform has an important part to play in achieving this, and must be guaranteed sufficient spectrum if it is to operate effectively."

This too is the aim of TDN members, but we believe that achieving this is reliant upon a number of key elements and conditions being in place.

**Reaching Switch-off**

It is clear that the cost of "Digitising Britain" will depend upon the predominant method used to carry the new services into UK homes. It is impossible to imagine a scenario in which either Cable or Satellite or even a combination of both serves all homes. The cost of building out the cable network would be prohibitive and satellite reach across the UK is limited by topography and local clutter. By contrast, the DTT platform with its established base of domestic antennas and portable/mobile characteristics offers the only economic way to realise the penetration required to support any plan towards analogue switch-off. DTT is likely to be the most economic way to reach 2nd and 3rd sets in DSat and Dcable homes. Thus DTT presents a significantly cheaper option to the UK economy, and would leave in place a network which is both comprehensive and flexible. DTT therefore presents a vital component in assisting the Government to achieve its objective of analogue switch-off.

**Creating Competition**

Without a significant DTT platform - such as has been established in the UK – distribution of digital services, both pay and free-to-air would be left to the satellite operator and to cable systems.

TDN members feel that it is vital to the future of broadcasting that there is a choice of delivery for viewers and that that choice can only come from the continued development of the DTT platform.

**Investing in the future**

While planning for the future, it is also necessary to recognise the scale of investment and re-investment which has already been made by TDN members in the initial establishment and subsequent enhancement of the DTT platform. The costs of network construction, additional services and the necessary support processes already run to around £2bn, and significant further funding of a similar order by broadcasters and others is likely to be required if the plans for DTT roll-out and analogue switch-off are to be realised.

For broadcasters to have confidence in making the required levels of investment, both to support the growth of DTT and to deliver the requirements of the Digital Action Plan, it is important that mistakes made in the past are not repeated. Whilst these may have occurred as a result of inaccurate or incomplete information, there is a need to ensure that accurate planning criteria are used and that a complete plan is agreed and available before further substantial investment is made.

We believe that this investment should be made in the context of a partnership with Government. It is likely that the levels of coverage necessary for the commercial viability of some of the DTT multiplexes will not be delivered at switch off. Whichever option is finally chosen, broadcasters will inevitably be faced with further costs to re-engineer the DTT network in order to either release spectrum or to achieve the required coverage. We firmly believe that the costs of achieving this goal should not be borne solely by the Broadcasters.

TDN believes that further development of the DTT network requires the right regulatory and economic conditions, and clarity of Government objectives. Obtaining cross-industry agreement to significant further investment will remain difficult while there is a lack of clarity over the targets for spectrum release, the introduction of spectrum pricing, and the switch-over criteria themselves. TDN members recognise there is a balance to be struck, but there is a significant danger that setting any of these targets at too high a level will either significantly delay, or worse still prevent, analogue switch-off.

We therefore consider that early clarity on the following points will facilitate investment decisions:

1) *A clear Government commitment to the future of the DTT platform*
2) *Government's willingness to ensure that broadcasters do not bear the full cost of transforming the UK's television networks to digital*
3) *Early clarity on the channels to be released from the current broadcast usage*
4) *The number of channels released to be set at a level which allows DTT to develop and thrive*
5) *No unnecessary timing constraints on the release of spectrum - switchover may be facilitated if broadcasters can retain access to some or all of the cleared channels until a new use is identified*
6) *Those elements of cleared spectrum which will be allocated back to broadcasting or reserved for future broadcast use*
7) *Revised switch-over conditions which represent a more realistic and achievable plan*
8) *The impact of Spectrum Pricing*

Our detailed position on each of these points is set out in the main part of our response.

**DAP Spectrum Planning Group**

We hope that it will be clear from these responses and the work that TDN has already commissioned that it would be sensible for TDN (and possibly others) to be active participants in the work of the DAP Spectrum Planning Group. As a Stakeholder we have been encouraged by Government to regard the DAP as a partnership exercise and we have been invited, along with the other stakeholders, to take up membership of the other three subgroups. For reasons that have not been explained, Stakeholders (other than the BBC which is present in a regulatory role) are not being offered partnership status in the work of the Spectrum Planning Group which carries the risk of alienation and the prospect that the skills and experience resident in TDN's membership will not be properly exploited. The "observer" status accorded to TDN and Channel 4 does not adequately overcome our strong concerns on this issue.

**Post switchover spectrum plan**

TDN members believe that Ministers appreciate the urgent need for the establishment of a full post switchover DTT spectrum plan and there is an expectation that the outcome of the current consultation will set the parameters for the creation of such a plan. This will enable broadcasters and their transmitter providers to embark on a coverage expansion programme based on solid business criteria and should avoid the

potential waste of time, finance and resources which would accompany further investment in the current climate of uncertainty.

Currently each of the analogue broadcasters is carrying the cost of operating two terrestrial transmitter networks, one analogue and one digital, as a consequence of the need to introduce digital broadcasting in advance of analogue switch-off. This represents a major financial burden for little benefit in terms of reach and share, and provides a real incentive for those broadcasters to move as swiftly as possible to analogue switch-off. However, it should be noted that the economic model for each of the analogue broadcasters is different, and it will be necessary for each broadcaster to draw a balance when considering where to re-invest any such savings; reinvestment in DTT transmitter infrastructure is not a given. *There will be a real need for broadcaster confidence in the future financial viability of the DTT platform before commitment to further investment will be forthcoming. The recent publication of proposals in the Cave report that could introduce unknown levels of spectrum pricing for both analogue and digital spectrum will not give such a level of confidence.*

The Cave report's suggestion that charging for analogue spectrum will give broadcasters an incentive to speed up the pace of switchover to digital is misplaced. Such charges would take money away from investment in digital, thereby slowing rather than encouraging the process. It would exert no leverage on the consumers who need to buy digital receivers, nor the Government, which will make the decision about the timing of switchover.

Cave's suggestion that DTT multiplex holders should pay a spectrum price from the date of renewal of their licences in 2009 or 2010 would also have the effect of slowing the drive towards digital. If multiplex holders have to pay for their licences there will be less finance available to spend on transmission networks or the services that are likely to drive digital take-up. The measure that would do most to encourage DTT investment would be an early commitment to renewing the multiplex licences for their second 12 year terms at nil cost combined with an undertaking to offer the licence holders the option of a third term of equal length. Such an undertaking would provide the long-term stability that could underpin further investment in the digital network.

The individual TDN members will be responding separately to the Cave report. However, it is clear that unless and until the report's proposals for pricing the broadcast network are rejected, they will act as a serious deterrent to future investment in DTT. The broadcasters require a degree of certainty about what tomorrow holds in order to commit resources today.

DTT needs two basic building blocks in place if it is to be enabled to play its part in creating and maintaining "..the most dynamic and competitive market for digital TV in the G7…." and we agree that " The terrestrial platform …must be guaranteed sufficient spectrum if it is to operate effectively." (Para 1.3)

Those two building blocks are:

- **Sufficient spectrum to allow for future growth of the terrestrial platform such that it can establish true competitiveness in areas such as interactivity and EPGs and to embrace new applications as these develop.**

  The current pre-switchover allocation of spectrum to the DTT platform may not be sufficient for it to mount all the services and applications necessary to compete with other platforms. In undertaking its cost benefit analysis of the spectrum allocation options the Government must take account of the possibility that a DTT platform that has no room for growth will not remain competitive in the medium and long term. It is important that in addition to the existing six DTT multiplexes space is identified for possible expansion of DTT. This additional space does not need to be allocated now but there need to be assurances that it will be available when the case is made for its use.

  If analogue broadcasting spectrum other than that occupied by BBC1, BBC2, ITV and Channel 4 had not remained available for future broadcasting use there would have been no room for Channel 5, the RSLs nor the existing DTT transmissions. There must be future proofing in the allocation of spectrum to current and future broadcasting use whilst also ensuring that best efforts are made to optimise usage.

  It is already clear that in order to meet Government objectives it may be necessary to be innovative in our approach to ensure that all possibilities are explored in the search for robust and effective DTT coverage. This may require the introduction of minimuxes and other devices to fill gaps in coverage and these will all occupy spectrum in addition to the main allocations.

- **The channels that could be available for DTT use post switchover must be clearly identified now so that there can be a rational approach to the planning for switchover and to expansion of the DTT transmitter network in the period leading up to switchover.**

  Confirmation of the allocation of spectrum to current and future broadcasting use needs to be accompanied by further detail of the channels available for use by DTT. It is recognised that the purpose of the planning exercise is to produce that final plan but a clear indication of the applicable parameters would allow sensible judgements to be made while that planning exercise is in progress.

  Different power levels will be permissible for different frequencies in different locations so decisions about the investment in infrastructure cannot sensibly be made without knowledge of the channels to be occupied.

## SWITCHOVER PROPOSALS

There are a number of switchover proposals that have been considered by Government in the past. More importantly, there are a number of proposals that have yet to receive full consideration from Government.

TDN has looked at a range of scenarios and after much debate has decided to present two for further consideration by Government.

The first, Genesis 2, Part 2, (See Appendix 2) would facilitate a DTT platform that is vibrant and competitive enabling room for future growth whilst achieving excellent DTT coverage for all multiplexes.

The second, a Two-Phase Release Plan (See Appendix 1) is predicated on prioritisation of spectrum release whilst maintaining universality for PSB multiplexes and is therefore necessarily a compromise with attendant limitations.

Any transition plan must be designed to minimise disruption to viewers during their transition to digital or as a result of unacceptable levels of interference to analogue services before switchover. Monitoring and measurement should be made available to ensure that this is minimised. The plan must also recognise the costs to commercial broadcasters of disruption to the continuity of services. Costs related to retuning viewers, provision of satellite reception to viewers unable to receive terrestrial transmissions post switchover and replacement aerials as a result of significant changes in channel assignments should not be the responsibility of Broadcasters and could be offset against future revenue from released spectrum.

## SUMMARY

*Put simply, the Government needs to clarify whether it wants:*

1. *A successful, vibrant DTT with sufficient channel capacity, coverage and technical reliability to be commercially successful, OR*

2. *Maximum spectrum release for non-broadcast use, with the consequential limitation of coverage and capacity of DTT and additional DTT transmission costs, OR*

3. *Spectrum charging which will also have a limiting effect on the ability of broadcasters to invest in DTT*

*Leaving these three ambitions unclear will prevent business planning for DTT.*

**Q1.** ***Our working assumption is that planning will continue for six multiplexes, as today. However, we would be interested in views on the costs and benefits of a more radical replanning. This could be either reducing or increasing the number of multiplexes by one. Do you have views on this ?***

Restricting the possible planning assumptions to the reduction or increase by one of the existing six multiplex plan is neither radical nor the answer to DTT's requirements if it is to maintain a competitive position in the future digital broadcasting universe.

Most, if not all of the existing multiplex operators are already short of the capacity required to fully meet broadcasters and viewers aspirations for services and quality.

It is also interesting to note that in its first report (December 2001) (Paragraph 4.3.2) the Viewer Panel established by the Secretary of State for Culture, Media and Sport recognised the need for future spectrum plans to allow greater EPG capacity on digital terrestrial television. This cannot sensibly be achieved without all multiplex operators diverting capacity away from the existing array of programme services.

During the transition to the 'all digital' environment it is likely that the cost and availability of 'new' display technologies such as Plasma, Projection TV, TFT, etc., will give much higher penetration of these displays into consumer markets. Tests have clearly shown that the quality limitations of the transmission system used in DTT which are imposed by spectrum scarcity are much more apparent on such new displays. Therefore there is a strong possibility of consumer demand for 'improved' quality of transmission during the ramp up of DTT. This will be a further drain on available spectrum.

TDN strongly supports the argument that future planning must assume an increase in the capacity made available to DTT and that all options should be considered including more than one additional multiplex and other more radical options such as minimuxes. Such additional capacity should be identified during the switchover planning process and reserved for use by DTT and associated applications as the need arises.

**Q.2** ***What do you see as the costs and benefits of maintaining the current basis for network configuration compared with those for adopting a configuration using fewer frequency channels?***

Since the planning for configurations using significantly fewer frequency channels has not been done in detail it is difficult to give precise comparative answers to this question. However, it appears that the existing transmitter network would not be suitably located for a wholly replanned network configuration, that there would be a requirement for a wholesale re-negotiation of international frequency assignments, (which is a difficult enough process without the prospect of ignoring international agreements on the use of spectrum), and that there would be a problem with household receive antenna.

There is not yet conclusive proof that the requisite levels of coverage could be obtained by adopting a radical reconfiguration any more efficiently than the current

basis, nor is there any clear quantification of the amount of spectrum that would be released and whether this would be in a form suitable for other potential uses.

The costs to TDN members would be those associated with a need to rebuild all or part of the DTT network which would mean abandoning many £100ms of investment. It is most unlikely that any of this investment in infrastructure would be reusable by potential users of the released spectrum. Not only would transmitters need to be re-engineered and relocated but the complete distribution network would require re-routing re-configuration and rebuilding.

The costs to the nation's viewers would also be considerable. Not only is it likely that existing receive aerials would be unsuitable for the frequencies assigned but wherever transmitter sites were relocated the existing rooftop receive antennas would need to be redirected to receive the optimum signal. In many cases the age and condition of existing installations would mean that this necessitated a new aerial.

Such a plan will lead to a much greater period of disruption to the 'average' viewer – both existing DTT viewers and those switching from analogue. This can only dent consumer confidence in the DTT platform, broadcaster's ability to deliver consistently reliable services into the home, and Government stewardship of broadcast spectrum.

**Q.3** ***Do you agree that we should continue to plan on an interleaved basis to support regional services ?***

TDN members are strong supporters of regionally and sub regionally based services and they believe that it is imperative that planning should continue on an interleaved basis to support these services.

**Q.4** ***To what extent should future planning of this spectrum take account of the provision of local services ?***

Future planning needs to be undertaken on the basis of a hierarchy of priorities. In order to achieve the Government's objectives for Digital Switchover existing national DTT services need to be planned first including the provision for additional capacity referred to above. This might be on the basis of a combination of full muxes and minimuxes.

Once the agreed provision for current and future DTT requirements has been planned and implemented, it is appropriate to offer interleaved spectrum to further regional and local services. The inclusion of local broadcasting in this way is likely to contribute to the efficient use of the spectrum allocated to broadcasting purposes.

**Q.5** ***What factors would have to be taken into account in order to plan to support mobile broadcasting services ?***

There are three broad reception categories for terrestrial broadcasting:

- Roof top
- Set top ( Portable )
- Mobile

Traditional frequency planning and coverage assessment methodology is based on the assumption that households have good quality rooftop aerials. However millions of portable analogue sets are in use.

It is probable that significant spectrum release will mean that individual transmitters will be restricted to operating at lower power levels than if more spectrum had been made available to the planners. This will adversely impact reception of DTT on set top aerials. TDN members consider that second sets and portables are one of the target areas that will drive the takeup of DTT.

There is no existing analogue equivalent of mobile reception although there may be some lessons available from experience with DAB. It is now over 5 years since the DTT network was first planned and the planners are still amending and refining their models to accommodate real life experience of DTT reception on rooftop aerials.

In terms of the priorities for planning effort it would seem preferable to concentrate on conclusion of planning for rooftop reception followed by consideration of how to achieve the same coverage for portable reception before attempting progress in the relatively unknown world of mobile reception.

If, however, it is decided to pursue this option then regard will need to be taken of the need for a separate infrastructure for transmission of mobile services. For mobile transmissions to be effective there will need to be a large number of small transmitters probably based on a Single Frequency Network. They will not work in interleaved capacity and the preferred option would be to provide ring fenced spectrum from any released from broadcasting for this purpose.

**Q.6** ***Does this analysis of coverage potential and associated costs adequately inform those taking decisions about the level of coverage by terrestrial means that should be required for public service broadcasters ?***

The price to broadcasters of transmission infrastructure is made up of three broad elements:

- Capital costs
- Operating costs, maintenance etc
- Profit to transmitter provider

The costs included in Section 3 are potentially confusing and their provenance is not given. However, it seems that the basis of the figures quoted is the capital cost of conversion of transmitters and that there is no provision for profit to ntl and Crown

Castle nor for the operational infrastructure required to support an enlarged DTT network.

Based on capital cost alone we believe that the estimates for conversion of the first 80 sites at £100m for two multiplexes and for a total of 120 sites at £140m are broadly acceptable as working assumptions. However, we believe that the costs quoted for converting 1100 sites are significantly understated and are probably as high as £400m.

The coverage assessments used in Section 3 appear to be in line with current thinking but a number of initiatives are in hand which might influence the analysis based on these figures.

- **The UK Planning Model:** the BBC, Crown Castle and ntl are currently finalising preparation of a revised set of parameters for inclusion in a new common frequency planning model. Once this is completed in July a revised DTT coverage assessment will be made. It is unlikely to produce drastically revised coverage calculations but any refinements that it brings should be used to inform consideration in this area.

- **Power Increase Trials:** TDN members have embarked on a number of power increase trials at selected sites. So far these have illustrated that a 3dB increase does not adversely affect viewer perceptions of interference to analogue services but it does have a beneficial effect on the quality of DTT reception by reducing the impact of, for example, impulsive interference. What has not yet been measured is the extent to which the coverage areas may have improved compared to the predictions from the planning model.

  Between January and April this year TDN has run further high power trials to establish the threshold for acceptable levels of interference to analogue reception from DTT transmissions. Again this was principally to determine what DTT powers might be acceptable before switchover but these trials will also assist in assessing how the current planning models perform against reality. TDN has been agreeably surprised by the low level of complaints about interference to analogue services during these trials which indicates that the “threshold of pain” for analogue viewers is probably higher than that breached at +3dB. The results of the trials are being analysed and will be used to inform future DTT network development.

  The output of these exercises should be included in any assessment of actual and predicted DTT coverage.

  **Satellite and Cable Coverage**

  It is the stated intention to establish the cost of consumers having the choice of reception from at least two digital platforms. The consultation paper rehearses at some length the position relating to DTT coverage but does not explore in any detail the issue of satellite and cable coverage, which must be the other element of the analysis.

If the availability of cable and satellite is to be an essential part of the equation then a similar amount of detailed thought must be given to coverage afforded by those two platforms. The difficulty for both satellite and DTT is that existing planning models are not sufficiently robust to produce reliable predictions of coverage down to individual household or even street level.

TDN members recognise that there will be areas of the UK currently served by analogue terrestrial transmissions where satellite reception will not be possible, and where it will not be commercially viable for cable operators to deliver services.

***Q.7 Our working assumption is that the public service broadcasters should be required to reach a certain minimum percentage of households by the terrestrial platform. However, we would like your views on whether it is right to require a minimum, what that might be and the associated costs and benefits ?***

The concept of requiring public service broadcasters (or any broadcasters) to reach a certain minimum percentage of households by the terrestrial platform is potentially problematic.

When the ITC published the Invitations to Apply for the DTT Multiplex Licences in 1996 it accompanied them with an indication of the coverage likely to be achieved by each multiplex based on the then current frequency plan. The successful applicants for those licences were then required to build a specified network of 81* transmitters to match that frequency plan. They were not required to achieve a particular level of coverage nor, most importantly, were they guaranteed that by building the specified transmitters they would achieve any particular level of coverage.

Since the 80 existing DTT transmitters were built the actual coverage achieved has been reviewed a number of times but despite engineering revisions requiring significant additional investment and some channel changes it still does not match that indicated in 1996. There are a number of reasons for this and any detailed debate on the subject would need to be preceded by a definition of what is meant by “coverage”.

Suffice it to say that the broadcasters have already learned that it is exceedingly difficult to accurately predict DTT coverage and therefore there are issues in accepting the imposition of any requirement framed in terms of a particular coverage target without reference to the number of sites and the available spectrum.

However, TDN members do accept that in order for the Government to proceed with confidence towards analogue switch over there will need to be an agreement in advance as to the number and locations of the DTT transmitters making up the post switchover network together with predictions of the coverage likely to be achieved by that network.

* The 81st transmitter ( in the Channel Islands) has not been constructed because of initial difficulty in co-ordinating a frequency plan and, latterly, because the Broadcasting Act has not been extended to the Channel Islands.

The public service broadcasters (BBC and Digital 3and4) understand the concept of 'universal coverage' delivered in the analogue domain. To translate this to an all DTT environment will require a very extensive expansion of the current transmitter network. There is an urgent need to balance the cost to the broadcasters of extending the network against the benefit to Government of spectrum release and the coverage requirements.

The need for high levels of coverage for the two PSB Multiplexes was recognised in the original frequency planning when the BBC and Digital 3and4 multiplexes were awarded the frequencies with the highest predicted coverage. Since then the realities of take-up of the platform have led to the introduction of a revised set of planning priorities under the coverage equalisation programme where the emphasis has shifted to the need to find additional coverage for Multiplexes B, C and D.

In some cases the re-planning for coverage equalisation will have mitigated against the widest availability of the BBC and Digital 3and4 multiplexes.

Therefore any consideration of the requirement for any particular transmitter configuration for the BBC and Digital 3and4 must take into account the potential impact on the other multiplexes. In extremis, an obligation to achieve a particular coverage pattern for BBC and Digital 3and4 might only be deliverable by reducing the existing coverage of some or all of the other multiplexes.

Part of the purpose of this consultation is to inform Government thinking on the allocation of spectrum to DTT. Only once decisions have been made about the broad parameters of that allocation will it be possible to weigh all the balances and produce a sensible plan which is cost effective in achieving wide coverage for the PSB muxes and does not detrimentally affect the others.

**Q.8** ***Do you agree that the level of coverage provided by the networks supporting the four multiplexes carrying predominantly pay tv services should be left to the commercial judgement of the operators ?***

Multiplexes B, C and D do not currently have the ability to reach the same coverage as the BBC and Digital 3and4 from the existing 80 DTT sites due to the frequency channels assigned and the permitted power levels of those frequencies. During the infancy of the DTT platform this has proven problematic for take-up because of the desire of consumers to be able to access all services and ITV Digital's understandable decision not to subsidise set top boxes in areas where its services are not available.

TDN members have taken some steps towards redressing this problem through implementation of a coverage equalisation programme, which has achieved a significant reduction in the difference in coverage between the multiplexes. Further improvements of this nature are possible but there will still be a sizeable disparity between coverage of the best two multiplexes and the ITV Digital multiplexes.

Looking forward, all the planning for analogue switchover suggests that such disparities will continue in the all digital environment although if four analogue conversions are used at the 80 sites, the gap can be narrowed significantly with the BBC mux at 95.5% and the lowest coverage mux at 93.6%. However this improved

coverage has to be traded against ability to release nationally cleared channels (see Genesis II and response to Q.9 below) which is one of the Government's clearly stated objectives.

If the Government adopts an approach which would allow the possibility that near equal coverage could be granted to all muxes by foregoing some of the opportunities for spectrum release then there might be a case for imposing a coverage requirement on the four multiplexes carrying predominantly pay services so that all DTT viewers could access the full array of programme services, adding to the attractiveness of the DTT proposition. However, the emphasis on spectrum release suggests that this is unlikely in which case it would be unreasonable to impose any minimum coverage requirement on these multiplexes and decisions about extension of coverage should be left to them to make as purely commercial business decisions.

**Q.9** ***Which channels are cleared will depend on the costs and benefits of different replanning options. For example, clearing 5 channels at the top and bottom of the frequency range is less disruptive to consumers and has lower switching costs than clearing ten at the top end. The benefits, though, will depend on the use to which such freed up spectrum can be put. We would like your views on the costs and benefits of different options.***

The Consultation Paper places heavy reliance on the ITC's Genesis report for its assumptions. Since its publication the TDN members have been critical of the report because of the artificially constrained assumptions on which it was based. It is important to note that one of the principal requirements was to produce a plan which would guarantee the release of the bottom 5 frequency channels (21 – 25) and the top 5 frequency channels (64 – 68). The exercise was also constrained by limiting the number of analogue conversions to be deployed.

For these reasons the ITC's Genesis report was not an exercise in efficient spectrum planning and it ignored a number of credible options, although it included a good deal of useful analysis on which further work could be based.

In order to ensure that all the options were examined TDN members asked for JPP to expand the Genesis work to look, in particular, at the use of more analogue conversions since there are clear advantages to the nation and to broadcasters in maximising the use of these. However, the ITC was unable to support this work.

TDN members then decided to commission the work independently of JPP, but the resultant "Genesis II" was only presented to TDN members late in February. There has been limited time to digest and discuss the results and no opportunity to commission supplementary work which might have led to more refined conclusions. However, TDN members have decided to append the report entitled "Genesis II Part 2" to this response as we believe that it is an important addition to the fund of knowledge in this complex area (See APPENDIX 2). The report also points to some planning options that are worthy of further consideration when the time comes to refine the post switchover frequency plan.

The principal terms of reference for Genesis II were to maximise the coverage from the existing 80 sites using as many analogue conversions as necessary and as far as possible to provide equalised coverage across the six multiplex platform. The planners

were given freedom to use whatever planning tools seemed appropriate and they were able to produce an optimised plan by using different techniques to solve a variety of issues.

The headline outcome of this process was a plan which would give the following predicted coverage:

| **MULTIPLEX** | BBC | D 3 AND 4 | SDN | ITVDig "B" | ITVDig "C" | ITVDig "D" | 3Mux FTV Core | 6 Mux Core |
|---|---|---|---|---|---|---|---|---|
| **% UK hh.** | 95.5% | 95.1% | 94.8% | 95.3% | 93.6% | 93.8% | 94.1% | 91.1% |

It is clear therefore that the planning techniques deployed have produced some very positive results. The Genesis II plan clearly produces good coverage across all DTT multiplexes from the 80 sites and provides scope for further expansion through additional interleaved networks together with possible spectrum release on interleaved channels. In addition it clears Channels 35 and 37 on a national basis. If this level of national spectrum release is acceptable to Government then planning could proceed on the basis of Genesis II.

However, the Consultation document is looking for spectrum clearance based on channels that are cleared nationwide, contiguous and in the part of the UHF spectrum where it is most likely to be possible to obtain international agreement on reuse (Paragraph 4.7).

In order to meet that requirement our preliminary conclusion is that the planning for Switchover should be based on a position somewhere between the constraints of the original Genesis Report and Genesis II. We recommend that the alternative planning methods used to produce Genesis II should be considered as options for use in the Switchover plan.

If the use of analogue conversions at each site is assumed coverage of the PSB multiplexes could be maximised giving Free to View services the potential for universal coverage. The three Pay Multiplexes would have coverage somewhere between the current coverage and Genesis.

The impact on the pay multiplexes is of concern to TDN because of its strongly held view that pay services are a vital ingredient in the creation and maintenance of a vital and viable platform able to compete with the other digital competition. In recognition of this and the Government's stated desire for spectrum release TDN members have considered a range of options which might achieve the necessary balance between the aspirations of Government and the individual broadcasters. One of these – a two-phase plan based principally on only two analogue conversions - is described in APPENDIX 1 but this clearly creates limitations compared to a plan based on Genesis II.

Adoption of any such plan sensibly requires a re-appraisal of the Chris Smith switchover criteria. In order to achieve the Chris Smith DTT coverage targets for the PSB multiplexes in advance of switchover, it would be necessary to construct an extended DTT network in parallel with the analogue, often using channels that are out of group, requiring viewers to obtain new aerials or re-align existing ones. This

process would need to be "reversed" after switchover when DTT services would move to existing analogue channels. Therefore, to benefit viewers, and to reduce costs of switchover for broadcasters, the "access" test should be expressed in terms of coverage immediately after switchover rather than immediately before.

## Benefits

As stated in the Consultation, the benefits of any switchover plan will be determined largely by the use to which freed up spectrum can be put. TDN members have examined the narrow issue of the benefits to viewers, broadcasters and the nation of the options for switchover as rehearsed above. However, we are concerned that artificial constraints are being placed on the process because of a belief that there will be the opportunity to use released spectrum for non-broadcasting use and that such non-broadcasting use will bring greater benefits to the nation than broadcasting and associated uses.

A clear balance needs to be drawn and our proposal is that the Post Switchover Plan should be based on the following:

- Use of analogue conversions at each site thereby achieving best coverage for those multiplexes, minimising receive aerial issues and limiting the potential for difficulty in international co-ordination

- National clearance of ten channels but consideration given to earmarking an appropriate number for future broadcasting and associated uses.

- Taking into account the above and using all the techniques available, maximise the potential coverage for the Pay Multiplexes but leave it to their commercial judgement as to the extent to which they might expand beyond the existing 80 sites.

### Q.10 *Which frequency channels should we clear ?*

If the working hypothesis is that 10 channels are to be cleared, there is likely to be a consensus that 5 of those 10 should be at the top of the UHF Spectrum (i.e.) Channels 64 to 68, however, this should be after an agreed transition plan is available. This proposition is supported by the arguments in Para.4.8 of the Consultation and also because there have been difficulties with international clearances of channels for DTT use at this end of the band and DTT reception tends to diminish at the highest channels.

Selecting a further 5 channels for clearance is likely to be more controversial. However, given that most scenarios see Channels 35 and 37 cleared and given the desire for contiguity it makes sense to consider a block of channels from 33 to 37. (See Appendix 1).

The original Genesis assumption of clearing the bottom 5 channels (21 to 25) is problematic for TDN members, since it would mitigate against achievement of the highest DTT coverage obtainable from analogue conversions, and it would carry the risk of increasing receive aerial issues as reception is better from the lower channels. Releasing Channels 33 to 35 and 37 from the DTT plan also reduces the amount of channel re-allocation required compared to other options for 5 contiguous channels.

Any plan involving the release of further significant parts of the existing spectrum will be very disruptive for viewers, this will mitigate against the success of the switch over plan and could well lead to a haemorrhaging of viewers to other platforms.

## CONCLUSIONS

- Government must choose between its previously stated desire for a 'vibrant DTT', maximum release of spectrum for resale and taxation on spectrum use. Until an acceptable balance between these is achieved broadcasters will have great difficulty in developing business strategies that allow for significant investment in the development of the DTT platform.

- Sufficient spectrum must be allocated to DTT to allow for future growth of the terrestrial platform so that it can fully meet broadcasters and viewers aspirations for services and quality.

- The channels that will be available for DTT use post switchover must be clearly identified now so that there can be a rational approach to the planning for switchover and to expansion of the DTT transmitter network in the period leading up to switchover.

- Future frequency planning should assume an increase in the capacity made available to DTT and all options and planning techniques should be considered including more than one additional multiplex and other more radical options such as minimuxes.

- The current basis for network configuration should be retained unless it can be demonstrated that alternative methods using fewer channels can achieve the requisite levels of coverage without disruption, detriment or additional cost to broadcasters and viewers.

- Planning on an interleaved basis to support regional services should continue.

- Local services should be included in future planning as part of a hierarchy of priorities once national DTT and its future needs have been allocated capacity and the network implemented.

- Planning to support mobile services should only be considered once robust reception has been achieved in designated coverage areas for rooftop and portable reception.

- Coverage predictions need to take into account the current work on redefinition of the UK Planning Model and the output of the Power Increase Trials. More detailed information is required about satellite and cable coverage.

- Public Service Broadcasters accept the obligation to ensure that their PSB services are widely available on the DTT platform. This can be achieved most efficiently by use of analogue conversions. However, there are issues in accepting the imposition of any requirement framed in terms of a particular coverage target, without reference to the number of sites and the available spectrum.

- In defining coverage requirements for Public Service Broadcasters consideration should be given to the impact on the other multiplexes.

- If sufficient spectrum is made available to permit near equal coverage for all DTT multiplexes consideration could be given to imposition of a requirement on all multiplexes to provide such coverage. Otherwise the level of coverage provided by the Pay Multiplexes should be a matter for their commercial judgements.

- The original ITC Genesis Report was based on artificially constrained assumptions. The TDN commissioned Genesis II illustrates the high level of coverage that could be achieved from the existing 80 sites if maximum use is made of analogue conversions and additional 16-QAM multiplexes.

- TDN believes that the working hypothesis should make use of analogue conversions. This is likely to maximise the potential for the coverage of PSB multiplexes, leave the other multiplexes with a commercially acceptable level of coverage and permit clearance of up to 10 national channels.

- Preference for released spectrum should come from the top of band IV and top of band V.

- There should be no more significant DTT investment without the availability of a Government roadmap and the spectrum to be released is identified.

- The imposition of spectrum charges (either analogue or digital), as indicated by Professor Cave, will lead to a less effective DTT system.

- The Government should make clear that there will be no charges for the second DTT licence term and that the licences will be renewed for a third term of 12 years. This will enable broadcasters to plan the considerable expenditure necessary for increased DTT coverage.

- The Government should give a clear commitment to ensuring that Broadcasters do not have to bear financial responsibility for the consumer costs relating to digital transition which could be set against any future returns from released spectrum.

# APPENDIX 1.

# A Two-Phased Switchover Proposal

# APPENDIX 1 : A TWO-PHASED SWITCHOVER PROPOSAL

A two-phased approach to spectrum release, would offer many advantages to Government, to viewers, to broadcasters and to the planning organisations tasked with the planning and international co-ordination of switchover.

Spectrum could be made available for release during both phases, whilst the disruption and cost to viewers and broadcasters is minimised. The first phase offers analogue switchover and a contiguous block of spectrum. The later second phase also offers a second contiguous block of spectrum at a point when pan-European decisions have been reached and other uses aside from DVB(T) are cleared to use this released spectrum.

For example :

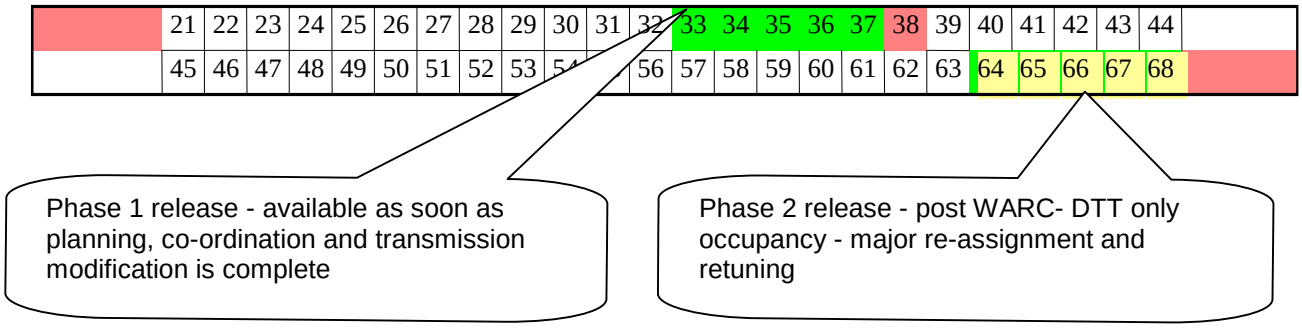
**Phase 1 elements**

- UHF channels 33, 34, 35, and 37 are identified for spectrum release ( to which Channel 36 could be added to produce a contiguous block)
- 2 conversions are used for the BBC and D3&4 multiplexes
- Other conversions are used where possible within the constraints of spectrum release
- Planning and international co-ordination releases channels 33 and 34 and reallocates existing DTT transmissions to alternative channels, whilst maintaining the existing aerial groupings wherever possible
- Multiplex operators modify transmission sites where conversions or new allocations are required
- Proactive aerial retuning modifies viewers receive antennas where out of group.
- Completion of planning, co-ordination and transmission modifications allows switchover process to take place
- Completion of switchover releases channels 33, 34, 35, 36 and 37 to Government

**Phase 2 elements**

- UHF channels 64, 65, 66, 67 and 68 are identified for possible future spectrum release
- Planning and international co-ordination re-assigns DTT allocations that currently exist within the spectrum identified for release
- Multiplex operators modify transmission sites where conversions or new allocations are required
- Proactive aerial retuning modifies viewers receive antennas where required .
- Completion of planning, co-ordination and transmission modifications allows reassignment process to take place
- Completion of reassignment releases channels 64, 65, 66, 67 and 68 to Government

**Spectrum released during a two-phased plan**




*Major benefits of the Proposed Scenario*

- Quickest and most cost-effective option for achieving switchover for the Government, broadcasters and viewers.
- It creates minimum disruption and cost to viewers and broadcasters whilst providing spectrum to the Government.
- Phase 1 spectrum release could be used by Government to gauge the interest in the spectrum and to understand the true financial income that may be realisable
- Phase 2 offers significant amounts of spectrum to Government at the point at which pan-European agreements for the usage of Band V will be known
- Existing international agreements (Chester) allow for immediate conversion. DTT can also use the higher powers already co-ordinated on those muxes that are converted
- Conversion now does not discount the possibility of reassignment later
- Remaining interleaved capacity can be efficiently used for a whole host of extra regional and local DVB-T services

Implementation of the Two-Phased Release Plan achieves a significant increase in coverage for those muxes that are gifted a conversion and could produce an 80 site FTV 2-mux core coverage of around 94-97% and a 6-mux core coverage of 72-76%[1]. Further rollout beyond 80 sites would clearly increase the UK coverage nearer to complete universality – although many hundreds of sites are likely to be required to make any further significant gains in coverage. As we have stated elsewhere it is unlikely to be economic for the broadcasters alone to fund rollout to the coverage levels deemed necessary by the Government.

It is important to recognise that whilst implementation of conversion using the existing Chester rules enables increases in power for the converted muxes, conversions also produce greater co-channel interference in comparison to the pre-existing analogue services. The net result of conversion is, therefore, an increase in the FTV 2-mux UK core coverage alongside a decrease in the 6-mux UK core coverage, all other things remaining equal. The degree of impact would need to be verified by detailed planning work.

[1] These figures are estimated as a percentage of UK homes and are indicative of coverage rather than actual reception across the UK, which will be lower than the figures quoted. They are also based on the current planning criteria and assume that modulation of all muxes remains at 64QAM. Further detailed planning work is required to verify these figures.