

The Future of DTT in UK

Below are the questions from the Ofcom consultation and proposed response.

Question 1: Which Services are most likely to drive take up of DTT Consumer reception equipment using new technologies? In particular are HD Services the most likely to do so.

Answer 1: The consumer drive is for improved quality of content not only in terms of Picture Quality (High Definition), but also Audio quality (Multi-channel Audio). In relation to content itself, the key drivers are Key European or World Wide Sporting events together with prime time services broadcast in the evenings. We are in the same opinion of the BBC trust, which is that content providers should target a minimum of 9 hours of HD content per day. This should cover the prime time viewing band.

Question 2: Do you agree with Ofcom's assessment that it would be beneficial for the DTT Platform to begin to upgrade to new technologies – DVB-T2 and MPEG4 – to make more efficient use of spectrum to allow for the introduction of new services?

Answer 2: Basically yes, we believe if such direction is not taken it could be detrimental in the longer term. If Ofcom were to accept a direction where HD services are allowed to be launched on DVB-T by providing additional bandwidth it would provide difficult to introduce new more efficient broadcast technologies. The reason we say this is that we could not identify a value for the consumer to purchase a receiver for DVB-T2 alone as T2 only provides benefits for the broadcast community and there is no gain for the consumer.

Question 3: Ofcom is particularly interested in hearing from multiplex operators and programme providers as to whether they are interested in using DVB-T and/or MPEG-4, and whether Ofcom should consider permitting their use on DTT?

Answer 3: We have no comment as we are not a multiplex operator or programme provider.

Question 4: Do you agree that the earliest possible availability and adoption of the technologies is in the interests of consumers and citizens?

Answer 4: Yes, by taking such stance reduces the possibility of creating an additional group of legacy products in the market. It also creates an early migration map of these technologies for the broadcaster, manufacturer and consumer. This will also result in the continuing growth of the UK DTT platform and keep the platform in line with Satellite and Cable platform developments.

Question 5: do you agree with Ofcom's view that DVB-T2 MPEG-4 reception equipment could be commercially available in time for DSO in Granada region late 2009?

Answer 5: Basically yes, this is based upon our activity within the DVB groups discussing DVB-T2. However there are still a lot of unknown factors at this stage and the development of the technologies as with other will encounter problems during the development. On the other hand knowing that a clear decision has been made and that there is a definitive market for the development of the product will only drive the developers to put maximum effort in achieving the timescales.

Question 6: Do you agree that some intervention is required in order for the DTT platform to commence and upgrade to new technologies without delay?

Answer 6: Yes, without intervention HD could not be implemented successfully until ASO is completed at the end of 2012.

Question 7: Do you have any proposals for launching Mpeg-4 Services on a DTT multiplex using DVB-T in advance of the proposed 2009 timetable and if so can you provide details of how such a service would not undermine the proposed MPEG4/DVB-T2 launch in 2009?

Answer 7: No. We believe that launching HD services using Mpeg-4 and DVB-T would not only create an additional group of legacy receivers in the market if T2 were to be introduced at a later date, but would possibly prevent the possibility of the introduction of DVB-T2 all together. Our point is that it would be difficult to convince the consumer to purchase a new receiver with DVB-T2 as they would not have any visible benefit. This would result in a longer time frame to introduce receivers into the market and longer time for broadcasters to introduce T2 and efficiently use the spectrum available to them.

Question 8: Do you agree with Ofcom's proposed approach for adding SD and HD versions of MPEG-4 and DVB-T2 profiles to the list of permitted standards for DTT in the spring and that Ofcom's consent must be sought prior to adoption of these standards?

Answer 8: Basically yes, due availability of content at present broadcasters will initially struggle to supply HD only content, therefore initially the content should be allowed to be mixed between HD and SD upon the service, but SD should not be up-scaled. We foresee that eventually the current MPEG 2 content can begin to migrate to Mpeg-4 and DVB-T2 provide more available spectrum for more HD and/or SD services. However in light of discussions within the DVB-T2 group we would not be in favour of profiling of the modulation scheme as it adds complications to the receiver solution.

Question 9: Do you agree with Ofcom's proposal that Multiplex B should be cleared and upgraded to new technologies?

Answer 9: Yes, not being experts with the spectrum issues the proposal made by Ofcom for the clearing of Multiplex B seems practical and we could not imagine any other method of implementation without the use of additional spectrum being made available.

Question 10: Do you agree with Ofcom's proposal that all multiplexes should be required to upgrade to 64 QAM at DSO in order to make the most efficient use of spectrum (i.e. that the mode change should not be merely optional)?

Answer 10: Yes, as with the answer to question 9, we could not identify any other solution to provide practical space for the introduction of the technologies unless additional spectrum is made available.

Question 11: Do you agree with our proposals for accommodating Five, S4C, TG4 and GDS on multiplex 2?

Answer 11: Yes, as with the answer to question 9 and 10, we could not identify any other solution to provide practical space for the introduction of the technologies unless additional spectrum is made available.

Question 12: Do you agree with our assessment that nine SD services can operate on Multiplex 2? If not, do you have an alternate proposal?

Answer 12: We believe the answer to this is quite difficult to answer. We have an impression that picture quality could be affected as bit rate of services would reduce. However this would be dependant on the algorithm for statistical multiplexing. In our experience the current picture quality level achieved in UK seems to be the reference used throughout Europe and actually we see in some cases that the bit rate used for some programmes is far too low.

Question 13: Do you agree with our proposals for the reorganisation process for the existing multiplex services set out in the central case scenario?

Answer 13: We have no opinion on this subject as we are not experts in the broadcast spectrum field, but no objection.

Question 14: Do you agree with the principles / conditions that Ofcom proposes to use to evaluate counter proposals for the reorganisation process?

Answer 14: Yes

Question 15: Do you have an alternate proposal for the reorganisation process? If yes please provide details.

Answer 15: No

Question 16: Do you agree with Ofcom's assessment of the options for allocating the upgraded capacity?

Answer 16: Yes

Question 17: Do you agree with the proposal that HD broadcasting on the DTT platform should use more efficient progressive format rather than the interlaced format?

Answer 17: We would prefer this, however we believe the broadcasters should be allowed to determine which format is best for the content in question and the consumer.

Question 18: Do you agree with the proposal that Ofcom should not mandate the use of the capacity for any particular service type (SD or HD) but allow the broadcasters to make proposals?

Answer 18: Yes, but a minimum percentage of HD content should be specified based upon a 24hour period, such as BBC trust proposal for a minimum of 9 hours per day.

Question 19: Do you agree with the proposal that the capacity should be allocated in three UK-wide blocks initially rising to four blocks at DSO?

Answer 19: Yes, based upon the work carried out on the BBC HD trial it was recommended by the BBC that 13mbps was the lowest limit at which HD content could be broadcast at that time based upon the encoder compression performance. Assuming that T2 provides a further 30% efficiency this would allow 3 services on one multiplex and with further improvements of Mpeg-4 encoding efficiency that is expected it seems reasonable that a 4th block could be added at a later date. However we would point out that the direction of the discussions on the final T2 specification at present are towards using technologies such as Time Frequency Slicing (TFS) and therefore would ask Ofcom to keep in mind the Multiplex licensing structure to achieve this in the future. For further detail refer to our additional comments related to TFS.

Question 20: Do you agree with the proposed criteria for the comparative selection process?

Answer 20: Yes

Question 21: Do you have any comments on Ofcom's proposals for the upgraded multiplex?

Answer 21: No

Question 22: Do you agree with Ofcom's impact assessment?

Answer 22: Yes.

Question 23: Do you agree with Ofcom's assessment of the potential benefits, risks and mitigations strategies relating to the impact of these proposals on the DSO programme?

Answer 23: Yes

Additional Comments:-

We would like to ask for additional information from Ofcom on how would regions of the UK that have already completed ASO by the end of 2009 would implement such further changes to the broadcast network.

We would also like to express that the earlier idea and possible easier option of launching additional HD/SD services using Mpeg-4 and DVB-T using additional spectrum in the short term could be detrimental not only to the consumer, but also the broadcasters in the longer term. However, we believe that Ofcom's proposal provides a migration and expansion path of the UK DTT platform that benefits the consumer, broadcaster and manufacturer in the foreseeable future

- We see that by adopting this approach the consumer will not have to wait until completion of ASO to start experiencing HD services.
- The approach allows earlier adoption of new technologies where the consumer can see the benefits and in the longer terms allows the migration of existing Mpeg-2 services to Mpeg-4 hence making available further capacity on the existing multiplexes for more SD/HD services.
- We also believe that the rest of Europe is watching and waiting for the UK to make the next step on the DTT network so that the results can be seen and adopted by themselves. This will also keep the UK as the leading country for Digital Terrestrial TV services.

Time Frequency Slicing (TFS)

In order to achieve an even higher gain by introducing DVB-T2, a technology named "Time Frequency Slicing" (TFS) that distributes TV content via a number of RF channels might be considered for adoption by OFCOM as soon as more than one RF channel per location for DVB-T2 becomes available in the future.

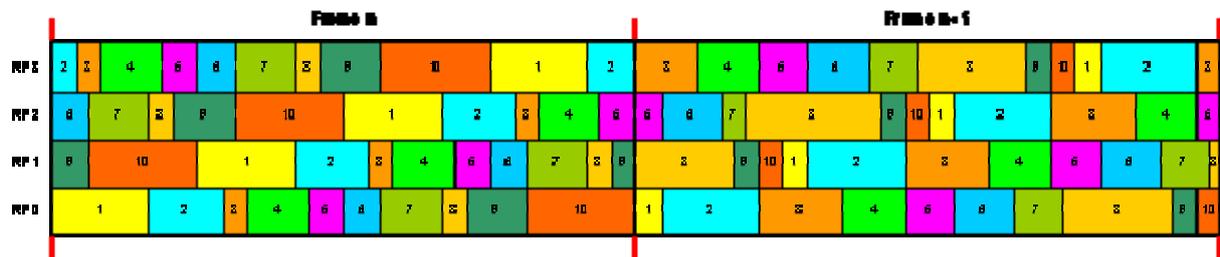
It should also be noted that based upon the DVB group discussions on the T2 specification set-top boxes and integrated TV sets for T2 will possibly employ two tuners and are hence able to receive two multiplexes in parallel, i.e. they would be perfectly suited for a TFS scenario.

The additional gain is mainly caused by two phenomena:

a) Statistical multiplexing of video content: This is a well-known technology already implemented in the field. It makes use of the fact that H.264-coded video streams are of a variable bitrate due to the fact that the capacity portion required at a time depends on the content encoded. With statistical multiplexing the overall maximum bitrate for all video streams together would be significantly lower than the sum of maximum bitrates for the individual video streams. This gain is higher with more services encoded in parallel and reaches saturation in the order of 9 to 12 services equivalent to two to three multiplexes involved in such a TFS scenario. Instead of eight HD services provided via two independent multiplexes, with TFS nine HD services could be provided.

b) Network gain: The TFS scenario makes constructive use of the local variations of the carrier-to-noise ratio of different channels at a particular location. Instead of maximising the coverage of each single RF channel, the coverage can now be optimised for the group of RF channels taking part on the TFS arrangement. This advantage (first trials showed an average gain of 4.5 dB!) might be converted into lower error protection and higher net capacity at the same time. This might add a tenth HD service to the example sketched under a) above.

The image below illustrates the approach with differently coloured slices for each individual programme service:



In summary, customers would benefit from TFS through a higher number of services transportable within the same bandwidth. Providers would benefit from lower costs per HD service. And the industry would benefit from a commitment on provider side regarding this feature - for their product planning.