

**NOKIA RESPONSE TO UK GOVERNMENT CONSULTATION ON THE USE OF THE  
ANALOGUE TV SPECTRUM**

**5<sup>th</sup> APRIL 2002**

## 1. SUMMARY

- *The priority is to improve the quality and coverage of the Digital Broadcast service.*
- *The Broadcast Technology (DVB-T) and spectrum should be planned to enable mobile operation, which requires new frequencies for DVB-T to be made available or converting one or more of the current multiplexes, with changes in some of the network parameters and implementation.*
- *A network which enables mobile operation would also provide contiguous, nationwide, indoor as well as outdoor coverage, to both 'fixed' and 'mobile' devices. This would also enable compelling differentiation between the terrestrial services when compared with the cable and satellite services.*
- *The regulations should be changed as soon as possible to enable the DVB-T network operators to use the Broadcast spectrum to provide IP / Data services without any artificial limits imposed. This should be done under the existing regime without waiting for Ofcom.*
- *We currently do not see a requirement for any refarmed analogue TV spectrum to be used for digital cellular type systems (GPRS, 3G, '4G', etc), because there is no prospect for a harmonised band plan (at either the European or Global levels) that would meet the economies of scale or capacity requirements of existing or future cellular systems.*
- *The broadcast spectrum, including refarmed analogue TV spectrum, should continue to be used for digital broadcast technologies (DVB-T).*

## 2. INTRODUCTION

It is essential that the UK continues to strive for a Europe wide and Globally harmonised approach to the use of all spectrum, including the spectrum used for broadcast, cellular, wireless LAN systems etc.

With the trends of digitalisation and the use of IP (Internet Protocol) it is technically possible for similar content and services to be provided by many delivery platforms – both wired (xDSL, cable, telephone, etc) and wireless (GPRS, 3G, DVB, WLAN, Bluetooth, etc).

In this context of convergence, both existing and future spectrum for wide area digital broadcast and cellular have to be viewed together as part of an overall long term (10-15 years) plan, instead of the 'silo' and shorter term approach. For example some idea of the availability of the

future spectrum for digital cellular is required in order to inform decisions on the spectrum for digital broadcast and vice versa.

As a manufacturer involved in many areas of wired and wireless communications equipment we believe that we are well placed to see the issues from the Broadcast as well as Telecommunications perspective.

Nokia has been manufacturing TV set top box solutions for more than quarter of a century. From delivering its first satellite receiver in 1976, Nokia has progressed to becoming a leading global supplier of digital set top boxes for satellite, cable and terrestrial platforms.

These include the launch of the UK's first digital satellite receiver in April 1997. This was followed by the World's first common interface receiver in September of the same year. The Common Interface continues to be an important element in Nokia product developments and sees the company well placed to support the likes of the RNIB Audio Description module and ensure this aspect of the "social inclusion" drive of the UK Government is maintained.

Finally, 1997 saw Nokia demonstrate the World's first working Digital Terrestrial TV (DTT) receiver. This has led to Nokia becoming a core supplier of ITV Digital licensed receivers in the UK as well as being the main purveyor of DTT products for other markets.

While the company remains totally committed to delivering compelling products for satellite, cable and emerging broadband services, through being uniquely placed as the only broadcast platform for potentially offering mobile and portable services, and as such great synergies with Nokia's core telephony/communications business, DTT remains a key focus area for Nokia. This is particularly so in the UK with it being the first market to launch DTT services and currently leading others who have just commenced or plan to start such services.

### **3. ROLLING OUT DIGITAL TELEVISION**

The priority should be in rolling out Digital Television services that are nationwide and of a good quality of service. The existing configuration of the UK networks is such that we believe that it will not be possible to design and modify the digital broadcast networks to provide contiguous, wide area indoor reception. A DVB-T 'hot spot' roll out approach will be required and if new frequencies become available (i.e. from reformed analogue TV spectrum) then this will be when these indoor contiguous reception is possible.

***The priority is to improve the quality and coverage of the Digital Broadcast service.***

### **4. ENABLING INDOOR AND MOBILE DIGITAL BROADCASTING**

Unlike other Digital Terrestrial TV networks elsewhere in Europe, such as in Germany, the UK networks have not been planned for wide area contiguous & indoor mobile operation. It is our view that they should be in the UK in order to continue to be at the forefront of technological developments. To do this requires a new network and new frequencies and a corresponding change in some of the DVB-T parameters / modes.

A change to 16QAM (or even QPSK) would relax the C/N-requirement at by 10dBs to round 16-17 dB. Still the network density should be designed so that good enough indoor coverage (mobile comes as a by-product) is achieved (the criteria is clearly different from the current network, which has been designed for roof top antennas). Selection of 2k/8k is a question of speed requirements. If very high mobility is required 2k should be selected and for lower mobility 8k is acceptable. Both Single Frequency (SFN) and Multi-frequency (MFN) network topologies can be used, but 2k is rather limited for this, at least the longest guard interval 1/4 should be selected. One possible scenario (which is used in other countries) is that large urban areas are covered with 8k SFN networks, and limited size 2k SFN or MFN networks are used for areas requiring higher mobility, like motorways.

Since the end of 1999 all of Nokia's UK DTT receivers have carried a combined 2K/8K front end. As a result any moves for UK services to become 8K based can be supported by the current base of receivers delivered since the start of the new millennium.

According to FEI most UK DTT receivers from other manufacturers deployed in the ITV Digital network in the last year also support 8K

***The Broadcast Technology (DVB-T) and spectrum should be planned to enable mobile operation, which requires new frequencies for DVB-T to be made available or converting one or more of the current multiplexes, with changes in some of the network parameters and implementation.***

***A network which enables mobile operation would also provide contiguous, nationwide, indoor as well as outdoor coverage, to both 'fixed' and 'mobile' devices. This would also enable compelling differentiation between the terrestrial services when compared with the cable and satellite services.***

## **5. IP / DATA SERVICES USING DIGITAL BROADCAST**

One interesting idea that is being explored further by some within the industry (add IPDC forum web site) is that of using digital broadcast technology (DVB-T) to transport digital content and services using the Internet Protocol. This could both complement the existing Digital TV services and if DVB-T networks were configured to be mobile capable then this could complement the digital cellular (GPRS, 3G, etc) services via a dual mode / band terminal that has both a DVB-T and GPRS / 3G technology in it. This is an area that is currently under investigation within various research projects and forums and it should be recognised that there are many market issues that also need to be resolved. It is our understanding that Broadcast regulations currently limit IP / Data services in the amount of Broadcast spectrum that they can use. We believe that this is outdated and restrictive and provided that the service obligations are met then the limit should be removed as soon as possible.

***The regulations should be changed as soon as possible to enable the DVB-T network operators to use the Broadcast spectrum to provide IP / Data services without any artificial limits imposed. This should be done under the existing regime without waiting for Ofcom.***

## 6. ESTABLISHING THE DEMAND FOR ANY REFORMED ANALOGUE TV SPECTRUM

We believe that the major driver for additional spectrum for wide area personal digital cellular type 'one to one' communications from the year 2010 onwards will be capacity rather than coverage. It is envisaged that a total requirement of additional spectrum will be somewhere in the order approaching 500 MHz to 1GHz from 2010 onwards. It is in our view unrealistic to expect to find additional spectrum of this magnitude, on a globally harmonised basis to enable a mass market, from any reformed analogue TV spectrum, from 2010 onwards. Spectrum above the existing 3G (IMT-2000) frequencies (upwards of 2.5 GHz) is much more feasible. It therefore imperative that the market requirement for the use of any reformed spectrum is clearly identified at an early stage. If this is not identified then the assumption should be taken at an early stage that these frequencies will continue to be used for Digital Broadcast technology (DVB-T).

***We currently do not see a requirement for any reformed analogue TV spectrum to be used for digital cellular type systems (GPRS, 3G, '4G', etc), because there is no prospect for a harmonised band plan (at either the European or Global levels) that would meet the economies of scale or capacity requirements of existing or future cellular systems.***

As we discussed in the introduction we believe that is essential that the use of the spectrum should continue to be on a harmonised basis; at a European and preferably Global level. Any use of the Analogue TV spectrum is certainly no exception. With the varying roll out schedules of Digital Broadcast across the world and the varying reforming schedules we believe that retaining this spectrum for Digital Broadcast technology offers the best possibilities for Europe wide and regional harmonisation.

***The broadcast spectrum, including reformed analogue TV spectrum, should continue to be used for digital broadcast technologies (DVB-T).***

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**Questions:**

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

Today the UK industry focus is very much on promoting Free to View (FTV) digital services to end the perception to many that "digital TV equals payTV".

Free to view DTT services are primarily delivered on 3 muxes (D1-BBC, D2-ITV/Ch4, Mux ACh5/SDN).

These are the strongest of the total 6 muxes and as such deliver better coverage than the remaining 3 muxes used for ITV Digital subscription channels.

Work is currently being done by the Spectrum Planning Group within the Government's Digital TV forum. Work within the SPG indicates that the coverage can be claimed to be higher by 12% if just promoting Mux1 and 2 FTV services (IBBC/ITV) and by 6% if promoting 3 FTV muxes alone.

While this may help generate increased take-up by those who now find themselves in a suitable coverage area for FTV services or those who change their aerial to receive such.

Any future moves by these consumers to then seek additional subscription based channels as will be promoted heavily from other muxes may be unable to do so, through remaining outside of Mux B-D coverage or still having an incorrect aerial type. This issue may be compounded if ITV Digital does move to some form of pay as you go pay non-subscription card concept,-e.g. similar to that seen with mobile phones.

There would be a significant benefit in implementing a 'mobile' DVB-T network. This would enable contiguous, nationwide, indoor as well as outdoor, services to both 'mobile' and 'fixed' devices. This would also enable compelling differentiation in the terrestrial services when compared with cable and satellite services.

*Q2. What do you see as the costs and the benefits of maintaining the current basis for network configuration compared with those for adopting a configuration using fewer frequency channels?*

Does "adopting a configuration using fewer frequency channels?" infer some form of move to SFN (Single Frequency Network) and as such mobile based services? If so this would enable some radical differentiation for DTT based services from the satellite and cable alternatives with many more channels, i.e. You get less channels on DTT but can watch wherever you like. As stated before Nokia receivers and possibly other maker's models already support 2K/8K and as such there is minimal need for new hardware being deployed. Theoretically, any change to 8K based services can be delivered seamlessly without need for the consumer to change the configuration of their receiver

*Q3. Do you agree that we should continue to plan on an interleaved basis to support regional services?*

Regionalisation is another potentially strong differentiator for DTT versus satellite based services. Today satellite based services support regionalisation but DTT could deliver even more localised services. For example rather than BBC East Midlands News or similar from Meridian, DTT could deliver BBC Derby or Leicester news or BBC Basingstoke etc

*Q4: To what extent should the future planning of this spectrum take account of the provision of local services?*

Fundamentally the content has to be compelling whether its local or national. As above with this real differentiation could be delivered to satellite services in particular. It is worth noting however that cable co's promised much in the way of localised services and some having tried delivering found little take-up/interest. This leads back to the opening comment of the need for compelling programming.

*Q5. What factors would have to be taken into account in order to plan to support mobile broadcasting services?*

See previous comment in main body of response.

*Q6. 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?*

*Q7. 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?*

Provided that the requirements are met then the network operators should be able to use their spectrum to provide data IP services with no restrictions. See previous comments in the main body of the response.

*Q8. 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?*

Would this mean that they would potentially run the risk of impacting FTV services by increasing power transmissions etc as they try to enlarge their subscription base.

The number of subscribers as well as achieving higher ARPU are issues to be considered.

In general these are predominantly commercial issues.

If the speed for broadband rollout was radically increased, DTT operators could perhaps work with Telco partners to ensure increased reach and delivery of their content without need for further DTT coverage changes

*Q9. 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.*

For small hand held devices the size of the antenna is a very important consideration. Generally speaking the lower the frequency the larger the size of the antenna. It is therefore important that spectrum for mobile devices is from the higher broadcast frequencies.

*Q10. Which frequency channels should we clear?*

See previous comments.