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DIGITAL DIVIDEND PUBLIC CONSULTATION

Transforming the digital dividend opportunity into social benefits and economic growth in Europe

Teracom welcomes the opportunity to provide its comments, as enclosed, to the EC Consultation on “Transforming the digital dividend opportunity into social benefits and economic growth in Europe”. The comments mainly concern the proposed elements for a forthcoming roadmap and the need for urgent action.

Being the major network provider for terrestrial broadcasting in Sweden, Teracom’s comments are given against a background of solid and hands-on experience both from analogue-to-digital switch-over in Sweden, with all its challenges, and the process of migration of digital TV-services from the 800 MHz band to 470-790 MHz.

It should be noted that Sweden completed the full switch-over to digital TV broadcasting already in 2007 and that the 790-862 MHz band is currently being evacuated by terrestrial TV in order to be available for other services, perhaps already next year.

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Yours sincerely



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Response to the Consultation document

Transforming the digital dividend opportunity into social benefits and economic growth in Europe

Background

Teracom welcomes the opportunity to provide its comments to the EC Consultation document.

Teracom is the major network provider for terrestrial broadcasting in Sweden. The Teracom group also operates terrestrial pay TV services through wholly or partly owned subsidiaries in Sweden, Denmark and Finland. Furthermore, Teracom is providing various infrastructure services, such as site and collocation services to mobile operators and other users of radio systems.

Digital terrestrial television was launched in Sweden already in 1999 and analogue switch-off was completed in October 2007. Terrestrial digital TV has grown into a success with currently 5 national multiplexes and about 40 programme services.

Teracom has gained ample experience from all aspects of digital TV – introduction of new technologies, complex network roll-out, spectrum planning, marketing of services, information campaigns to the general public – all on a market with fierce competition between distribution platforms. Even if a large number of viewers and consumers are forced to adopt to new technology, the experience is that the challenges both can be met and must be met, but they must be taken seriously and shall not be underestimated.

General

A coordinated approach to spectrum usage across Member States provides obvious advantages for all users of radio frequency spectrum. Furthermore, it seems as the vast majority of Member States is already converging in decisions on allocating the band 470-790 MHz for terrestrial broadcasting and the band 790-862 MHz for other electronic communication services.

Basically Teracom supports this reallocation of spectrum as a consequence of the more efficient digital transmission technology. However, adaptation to a more limited spectrum resource is coming at high cost in terms of network replanning, additional investments and considerable constraints on the future development of terrestrial broadcasting.

Teracom agrees that mobile broadband and other novel telecommunications services are of significant importance for Europe's economic development. However, it must not be forgotten that a very high number, if not the majority, of Europe's citizens rely, wholly or partly, on terrestrial TV transmissions and that the TV and media industry is an equally important contributor to Europe's welfare and development.

Both the telecommunication sector and the broadcasting sector are facing demand for new and better services and both sectors must invest heavily in the forthcoming years.

A situation where availability of spectrum is predictable will be of paramount importance for all parties involved, especially when taking into account that decisions on network infrastructure investments always are made with very long term perspectives. In Teracom's view predictability and stability are also important to safeguard the TV-viewer's interests and public trust.

Change and migration

The TV distribution market in Europe is going through significant and big changes. It is particularly evident that the market demands both an increased number of services and better technical quality. Digitalisation means benefits for the consumers in terms of a wider selection of television programmes on all distribution platforms as well as new functionality and innovative services. Old bulky CRT receivers are successively being replaced with high definition flat-screens which in turn leads to growing demand for high definition television services in all European countries.

The terrestrial TV networks need to respond both to the demand for more channels and to the demand for HDTV. Even if competition between distribution platforms such as satellite, cable, broadband IPTV and terrestrial is increasing, it must be noted that terrestrial networks still serve, and will remain to serve, a high portion of European households as their primary means of receiving television content. Terrestrial networks generally provide for universal coverage of television services. At the same time, it must also be noted that the digitalisation of the terrestrial TV networks are at very different stages across Europe and switch-off of analogue services are not yet even scheduled in many countries.

In order for terrestrial networks to remain competitive and to be able to promote cultural diversity and media pluralism for all European citizens, the necessary spectrum resources need to remain available. In particular, it must not only be possible to simulcast analogue and digital services during transition but also to migrate to HDTV and eventually also to new coding and modulation systems.

For terrestrial television broadcasting there are no alternatives but the limited frequency bands given by the GE06 Agreement. Development of the networks cannot be accommodated anywhere else. In contrast, there are many bands with huge amounts of spectrum already allocated to mobile services, including mobile broadband. As Teracom sees it, operators of terrestrial broadcasting networks are forced to implement several successive phases of reinvestments and replanning in order to be able to retain and develop services in the remaining available spectrum, whereas the mobile broadband industry has several alternatives and does not face the same challenges.

A recent statement from the RSPG (Radio Spectrum Policy Group) says that it is *“foreseen that in bands below the 800 MHz band, i.e., 174-230 MHz and 470-790 MHz, the digital dividend will be used mainly for the development of new enhanced broadcasting services which will also bring significant benefits to society in terms of value to the industry and consumers.”* Teracom strongly supports RSPG's statement.

The present situation in Sweden can be taken as an illustration of the very difficult spectrum situation for terrestrial broadcasting. There are currently five digital terrestrial television networks in operation with a sixth network under construction. All of the originally planned 8 networks can no longer be implemented. Following the 2007 decision in Sweden on limiting broadcasting in the UHF band to 470-790 MHz, very limited spectrum resources remain in this band for further development of the terrestrial broadcasting services. Great effort has been spent on optimizing network capacity and migration paths within given limits. However, a conclusion is that *graceful* migration to new coding standards (MPEG4) and better modulation techniques (DVB-T2) will no longer be possible. Instead the cost, complexity and effort for every change is increased which in turn may slow down or even interrupt some of the planned development steps. Any changes to the existing networks will also need to take the situation for already existing viewers into account as well as the effort to renegotiate frequency coordination agreements with neighbouring administrations.

However, there is also a need to consider national circumstances and differences across Member States. Market demand for different services may vary across Europe. Many Member States have issued broadcasting licences with valid spectrum allocations for many years ahead in the 790-862 MHz band. Some Member States have also restricted access to parts of the spectrum due to domestic use or use in neighbouring countries, in particular for military services. The implementation should give reasonable room for national particularities and give Member States the freedom to take into account their national service requirements.

Teracom's detailed comments to the proposed roadmap and urgent actions are given below.

4. Proposed Elements for a Roadmap

4.1. Improving consumers' experience by ensuring high quality standards for terrestrial digital television receivers in Europe

Teracom fully supports that the focus for digital television should be to improve consumer's experience. One very important aspect is of course to stimulate high quality standards for terrestrial digital television receivers in Europe, while maintaining broad competition and low prices on receivers. Common standards provide the basis for large markets, giving economy of scale benefits.

However, it must be noted that there are large numbers of existing receivers in the European households today, and that it will take considerable time before existing receivers are replaced. Any migration scenarios and compatibility analyses need to consider this appropriately.

With regard to new transmission standards, Teracom is of the opinion that any introduction of DVB-T2 needs to be related to HDTV. The only feasible way to introduce large scale technology changes and make consumers acquire new types of equipment, is to link the new equipment to an enhanced and extended service offering. The analogue to digital switch-over process in Europe clearly shows that consumer

uptake and satisfaction is related to value added services. A simple replacement of existing services without additional offerings will not be successful.

In order for the terrestrial platform to remain attractive and competitive, the evident market demand for enhanced services, such as HDTV and various download services, needs to be met. High quality receivers at affordable prices are then required, as well as the necessary spectrum resources. It is very important with sufficient regulatory certainty, especially in relation to spectrum availability, in order to support this development and facilitate the necessary investments both by the broadcasting industry and consumers.

a. Ensuring the availability of a compression standard on all DTT receivers sold after 1 January 2012 that is at least as efficient as the H264/MPEG-4 AVC standard.

Teracom notes that MPEG-4 compression is already used in many Member States and is being planned in others. For example, the NorDig standard, developed and maintained in Scandinavia and other countries, today mandates MPEG-4 decoding to be included in receivers. The NorDig standard is continuously reviewed to be compatible with development of the transmission networks. The broadcasting industry has a clear incentive to develop and make systems and networks as cost efficient as possible. The introduction of MPEG-4 compression and the increased coding efficiency provided by MPEG-4 is a prerequisite for the market led introduction of HDTV. Most DTT receivers currently being produced are MPEG-4 compatible and the trend is that market forces are already leading to the full adoption of MPEG-4 receivers.

It should be noted that in Member States where DTV was introduced early, a large number of MPEG-2 based receivers exist. This needs to be taken into account in national considerations and any migration should primarily be market-driven.

It can be questioned whether a formal EU regulation of receiver specifications really is the best choice. There is for instance a risk that such regulation will be counter-productive, since it may slow down further development. It cannot be expected that MPEG-4 compression is the end of the line in terms of compression technology.

Teracom is not opposed to the proposed regulation in principle, but questions whether it is appropriate and necessary. Market-led technical development is generally a better choice than regulated development.

b. Setting standards for the ability of digital TV receivers to resist interference.

Resistance to interference is one important feature for all radiocommunication equipment, including television receivers. Teracom generally welcomes any initiative to improve compatibility between different radio services. In this process it is important that requirements are balanced and cost must be taken into account. Any standard must correspond to what is reasonable to achieve in terms of technology and cost.

Even if new receivers may be designed for better interference rejection, they cannot be expected to handle all cases of interference. Furthermore, a large number of legacy receivers will remain for a long time in households across Europe. These receivers must

also be taken into account when new services are being introduced, e. g. in the band 790-862 MHz. If interference to television reception is caused by the new services then all involved stakeholders will be negatively affected. This includes regulators, broadcasters, viewers and the operators of the new services. Thus, relevant additional measures, technical and regulatory, will be needed to avoid harmful inference from the new services to broadcasting reception, in relation to existing receivers as well as in relation to improved receivers.

4.2. Increasing the size of the digital dividend through further spectrum efficiency gains.

As market development suggests that HDTV will become the new consumer standard within a few years it is imperative that also the DTT platform can migrate in this direction and meet market demand. It is necessary for the broadcasting sector to continue improving spectrum efficiency in order to increase available capacity and to use that capacity as efficient as possible. Even so, if the upper part of the UHF television band is to be used for other services, the remaining part, 470-790 MHz, may be too small to fully meet the market demand for HDTV services in DTV.

All possible efficiency gains regarding broadcasting transmission and compression technologies will be needed to meet the market demand for television services and it is highly unlikely that any additional spectrum in this band can be handed over to other services.

It should also be noted that it is expected that viewer expectations will continue to evolve in the future. New services and technologies such as Ultra High Definition TV and 3D TV are being developed and will give rise to even higher capacity demand.

a. Promoting collaboration between Member States to share future broadcasting network deployment plans (e.g. migration to MPEG-4 or DVB-T2).

The broadcasting industry is continuously developing its services, technology and networks in order to meet market demand and improve the viewer experience. The drive towards digital technology and switch-off of analogue services is just one example and, as explained above, the demand for HDTV and other new functionality and services will give clear incentives to continue this development. Broadcasting standards and equipment have always been transnational and collaboration and exchange of information has been important to create large common consumer markets and facilitate free circulation of equipment in Europe. The need for this kind of collaboration will only increase and is a prerequisite for the broadcasting sector to foster market development and to stimulate large scale markets for consumer equipment, benefitting from economy of scale in the whole European market.

Broadcasters have a long history of exchanging information about present and future broadcasting technology and network deployment plans. Such information is already shared in various contexts, in CEPT, ITU, EBU, DigiTAG and DVB, just to give a few examples. Continued collaboration between broadcasters and between Member States on such issues is of course beneficial.

b. Encouraging the deployment of Single Frequency Networks (SFNs) over Multiple Frequency Networks (MFNs).

The possibility to use single frequency networks is one important feature of digital technology. SFNs are in some cases a good tool for implementing DTT coverage efficiently. In other cases the use of large SFNs creates considerable problems for spectrum planning and an MFN approach (or small scale regional SFN:s) are a much better choice to use the available spectrum efficiently. It is thus a misunderstanding that SFNs in all cases give advantages in comparison to MFNs. There are technical aspects to consider, as well as administrative aspects and cost aspects.

Broadcasting service areas are generally defined by commercial and administrative requirements. Broadcasters also wish to provide local or regional services for cultural or language reasons and broadcasting licences are sometimes limited to certain geographical areas within a country.

There are also technical limitations to how large SFNs can be implemented without causing self-interference within the SFN. Furthermore, large area SFNs require the use of robust transmission modes with long guard intervals, which decreases capacity and spectrum efficiency in certain cases. Technical considerations include size of the service area, population distribution, what infrastructure to be used and type of terrain. SFN networks are generally more expensive to implement than MFN networks, especially if new or additional infrastructure is needed to avoid self interference. If a significantly different network topology and infrastructure than today should be enforced to broadcasting delivery, large costs as well as large problems for the viewers will be the result. Viewers will for example have to redirect their antennas and possibly make other adjustments.

SFNs are of course already used in many Member States, especially on a regional basis, to improve and facilitate frequency planning in certain cases. For national SFNs however, the possibilities obviously differ between different Member States, not the least depending on the size of the country. In the smallest Member States it may be technically feasible to provide a national SFN, while in Member States with larger geographical area it is a completely different story. A general requirement for large SFNs will also make cross-border coordination more complex. This is especially the case for Member States with many neighbours. For most Member States national SFNs are not technically viable.

A significant change of spectrum assignments, in order to create much larger service areas using large SFNs, would imply a complete frequency replanning in Europe and destabilizing the GE06 Agreement. This would be a major obstacle for the future development and efficiently stop the digital implementation and evolution in Europe. Such uncertainty can only result in lack of investment confidence and slow down migration into new technologies.

Teracom supports that efficient network planning and efficient use of available spectrum should be encouraged, given the required need for adequate geographical breakdown of services. This includes the extended use of SFNs where it is considered

appropriate and the additional costs are acceptable. Teracom considers a general requirement for large area SFNs to be counter-productive.

c. Supporting research into "frequency agile" mobile communications systems.

Frequency agile mobile communication systems could further facilitate frequency sharing in the future, especially between different mobile systems, and Teracom supports further research into this area.

4.3. Making the 800 MHz band available for low/medium power electronic communications networks, under harmonised technical conditions, following the principle of technology and service neutrality.

Making the 800 MHz band available for low/medium power electronic communications networks other than broadcasting explicitly means that existing broadcasting services using this band must evacuate and move to other frequencies in the band 470-790 MHz. This implies technical as well as financial challenges. Interference to broadcasting reception below 790 MHz from the new electronic communication services has to be avoided as far as possible.

If the 800 MHz band should be cleared from broadcasting, a strategy for the migration of existing DTT services to new frequencies is necessary to ensure the continuation of services and that viewers are not adversely affected. This comprises frequency planning and co-ordination, technical planning and provision of adequate information to the viewers.

There will be significant costs associated with such migration, including costs for changes to the broadcasting networks (new equipment, possibly additional sites), costs for viewers (possibly new aerials or re-installation) and costs for necessary information campaigns. A clear strategy for how these costs should be funded needs to be developed, at least on a national level. The broadcasting sector has made a significant investment in the development of digital networks and a pure frequency rearrangement will not bring any added value to the services. Therefore, it is not for the broadcast industry to fund the cost of a potential migration but for those who benefit from the rearrangement.

CEPT has developed draft technical arrangements for low/medium power electronic communication networks and services in the 800 MHz band. As stated in draft CEPT Report 30¹ the technical parameters are however not stringent enough to always ensure protection of broadcasting services in the band below 790 MHz.

For example, there are several different block edge masks specified, which limits broadcasting opportunities immediately below 790 MHz to various degrees. In Teracom's opinion the most stringent block edge mask should be used everywhere in order to improve co-existence. If the new networks and services are introduced in a way

¹ CEPT Report 30 "The identification of common and minimal (least restrictive) technical conditions for 790-862 MHz for the digital dividend in the European Union"

that causes harmful interference to existing and future broadcasting services, this will be very spectrum inefficient and cause unnecessary limits to the usefulness of adjacent spectrum.

In order to solve remaining interference cases, additional mitigation measures will be needed. These measures should be specified on a national or local basis and could include restrictions to the mobile networks and other appropriate mitigation techniques. The Commission should emphasize the need for Member States to implement all necessary measures to provide adequate protection for the reception of broadcasting services. One solution that should be explored is to introduce a general protection clause vs. broadcasting services in the licences for the new services.

It should be noted that the need for more frequencies for mobile broadband and the possibility for making the 800 MHz band available for such services is not the same throughout Europe and national considerations need to be taken into account in the further process.

4.4. Adopting a common position on the potential use of the "white spaces" as part of a possible extension of the digital dividend.

The possibility to use the interleaved spectrum in the broadcasting band, the so called "white spaces", for other purposes, needs to be carefully studied in the European environment before any decision is taken. White space usage must not obstruct the DTT development, must not cause interference to broadcasting services or claim protection from the incumbent services. Appropriate technical criteria and conditions for any white space equipment need to be established, based on the European situation.

4.5. Ensuring the continuity and further development of wireless microphone applications and other secondary uses of the UHF spectrum.

Wireless microphone applications have been used on an interleaved and secondary basis in the UHF broadcasting band for a long time. This sharing is considered feasible also in the future.

In order to facilitate sharing in a changing environment, tuning ranges for the wireless microphones should be as large as possible. Teracom believes that it will be very difficult to harmonize specific channels within 470-790 MHz for wireless microphone applications.

4.6. More effective cross-border coordination with non-EU countries.

Effective cross-border coordination is of course a key element if major changes to frequency usage are considered. With regard to the 800 MHz band it is noted that in most cases the provisions of the GE06 Agreement apply, unless otherwise agreed.

4.7. Addressing future challenges.

It is evident that technology, services, market demand and societal requirements develop over time. This is true for all sectors, including fixed/mobile communications and broadcasting. It is especially challenging in the area of spectrum management since there are normally considerable lead times before a new spectrum allocation can be put into operation.

Concerning the consumer uptake of HDTV it is evident that households are already going in that direction in many Member States. Old CRT receivers are successively being replaced with high definition flat screens which in turn leads to growing demand for high definition television services. TV production is increasingly using high definition technology. All platforms for television distribution, including the terrestrial, will need to respond to this market behaviour to stay viable. It will be a basic requirement to be able to offer a certain package of HDTV services in the near future and the terrestrial platform thus needs the accompanying licensing framework as well as the necessary capacity and spectrum resources to be able to meet the market requirements.

With regard to new electronic communication services it seems that any assessment of spectrum needs must be done from a wider perspective than just the broadcasting band. There are already today huge amounts of spectrum allocated to mobile services, some of it practically unused so far. If there are capacity bottlenecks, there is large amounts of spectrum available on higher frequencies that could and should be used at first hand.

5. Urgent actions

5.1. Accelerating analogue switch-off by 2012.

In Sweden the analogue-to-digital switch-over was completed already in 2007. The future is digital and Teracom generally supports actions to promote switch-over in all Member States. The very successful switch-over process in Sweden was based on consumers getting a good market offer with improved services in terms of new programmes and improved technical quality. In Teracom's opinion it is imperative that technology upgrades must be connected to enhanced service offerings for the consumers.

For the analogue-to-digital switch-over to be successful, digital services need to be on air well in advance of the switch-off date, with an offer that drives the market and makes it attractive for consumers to opt for digital rather than being forced due to analogue switch-off. The digital coverage needs to be at least as large as the analogue coverage. A certain simulcast period is needed to give viewers time to adopt to the new digital technology. If a large part of the population is not appropriately prepared for the switch-over, all involved stakeholders will face a very challenging situation.

5.2. Taking steps towards the opening of the 800 MHz band for electronic communications services by adopting harmonised technical conditions of use in Europe.

As pointed out in the comments to item 4.3 above there are a number of issues related to implications for broadcasting services that needs to be properly addressed if the 800 MHz band should be opened for new electronic communication services.

Existing DTT services that use frequencies in the band 790-862 MHz need to migrate below 790 MHz. Interference to broadcasting reception below 790 MHz needs to be minimized. Funding of the costs for evacuation of the 800 MHz band needs to be identified.

Some member States have already announced time tables for licensing the 800 MHz band to new electronic communication services. The development in these Member States, especially when it comes to implementation, should be closely followed. The Commission should encourage exchange of information and experiences made in this area. In particular, observations of interference to broadcasting services in the adjacent band and any measures taken to suppress such interference should be analysed and "best practice" solutions should be identified.