

Radio Spectrum Policy Group

Questionnaire on the long term spectrum requirements for television broadcasting in the European Union including the number of TV services, HDTV, interactive services, mobility requirements and the possible introduction of Ultra High Definition Television

The questionnaire in **Annex 1** has been prepared to facilitate the work of the sub-working group of Radio Spectrum Policy Group (RSPG) preparing the draft opinion on the future spectrum requirements for Wireless Broadband, specifically issues relative to the future of the 700 MHz frequency band (694 -790 MHz). This frequency band is currently used in Europe for terrestrial television and in many countries also for PMSE on secondary basis and represents approximately 30% of the total remaining UHF spectrum used by the television broadcasting. The impact of an exclusive reallocation of this spectrum to wireless broadband will therefore be significantly more important for the broadcasting service than in the case of the 800 MHz band.

The responses to the questionnaire¹ will contribute to the analysis of the RSPG on the future use of the 700 MHz as well as on the evolution of the digital terrestrial platform (DTT) over the next decade (2012 – 2022)

For more information on the background to the various elements of the questionnaire see **Annex 2**.

For an example of how to respond to Question 1 please see **Annex 3**.

Please submit completed questionnaire contained in Annex 1 and return to [zeeshan.nazneen@comreg.ie] by [Friday 28th September 2012].

¹ The RSPG is aware of the ITU-R WP 6A questionnaire which addresses similar issues and we will if possible try to use responses to that questionnaire to complement the information/views in the draft opinion.

Annex 1: Questionnaire

Member State Response details (please complete):

<i>Member State</i>	<i>Name</i>	<i>Organisation</i>	<i>Date</i>
<u>ESTONIA</u>	<u>Liisi Moks</u>	<u>Ministry of Economic Affairs and Communications</u>	<u>03.10.2012</u>

Question 1 (consider section 1 of Annex 1 to help you with your answer):

(See Annex 2 for example answers for your assistance)

i) Please describe the DTT platform in your country, currently on-air, in following terms (please use the following format for your answers):

Member State	No. of Multiplexes	Reception availability	Reception mode²	Number of TV program services and content format	DTT System and modulation	Intended coverage reach³	Coverage obligation (Y/N)⁴	Coverage (as a percentage of population)	Spectrum band used (UHF IV/V or VHF Band III)
EST	1	Free-to-air Pay-TV	Fixed Fixed	5 SD 1 SD	DVB-T, 16-QAM DVB-T, 16-QAM	National	Y	100 % of territory 90 % territory	UHF Band IV/V UHF Band IV/V
EST	2	Pay-TV	Fixed	12 SD	DVB-T, 64-QAM	National	Y	90 % territory	UHF Band IV/V
EST	3	Pay-TV	Fixed	12 SD	DVB-T, 64-QAM	National	Y	90 % territory	UHF Band IV/V

² E.g., fixed (roof-top), portable indoor, portable outdoor, mobile.

³ E.g., national, regional, local.

⁴ Is there a legislative coverage obligation, e.g., a Public Service Broadcaster.

ii) Are there plans to deploy (a) additional DTT multiplexes and/or (b) foresee the launch of new services **in the short term (1 – 5 years)**?

(a) additional DTT multiplexes (please use the following format for your answers)

Member State	additional Multiplexes (Y/N)	No. of additional Multiplexes	Reception availability	Reception mode ⁵	Expected content format (SD and or HD)	Expected DTT system and modulation (if known)	Intended coverage reach ⁶	Intended Coverage (as a percentage of population)	Spectrum band used (UHF IV/V or VHF Band III)
EST	Y	3	Pay-TV	Fixed	SD and HD	DVB-T/T2, Not known yet	National	90 % of territory	UHF Band IV/V
EST	Y	2	Pay-TV	Fixed	SD and HD	DVB-T/T2, No information	National	90 % of territory	UHF Band IV/V

(b) foresee the launch of new services (please use the following format for your answers)

Member State	Additional Services (Y/N)	Expected content format (SD and or HD)	Reception availability	Expected content format (SD and or HD)	Interactive services (Y/N)	VoD (Y/N)	Ultra High Definition TV (Y/N)	Other (Y/N)	If answer Yes to Other, please specify
EST	Y	HD	No information	HD	No information	No information	No information	Y	3D TV

⁵ E.g., fixed (roof-top), portable indoor, portable outdoor, mobile.

⁶ E.g., national, regional, local.

iii) When do the existing DTT licenses in your country expire?

Answer: In Estonia the existing DTT frequency licenses are issued for 1 year and then need prolongation every year after payment of annual spectrum fee.

Question 2

How do you foresee different means of reception (DTT, ADSL, Cable, satellite, etc) complementing each other?

Answer: In Estonia TV market is shared as follows: Cable TV (51 %), DTT (23,3 %), IPTV (19,4 %) and SAT TV (6,3 %).

Question 3:

i) Do you think that the DTT platform in your country will evolve to being capable of delivering audio-visual services also to mobile terminals?

Answer: Yes. As the new subset standard of DVB-T2-Lite for broadcast mobile is in place since 2011, there is a project in process to test and evaluate its performance and analyze the opportunities for commercial launch.

ii) If yes, what is the required evolution of the DTT network platform architecture? Please give details in relation to: -

a. the DTT network topology (whether there will be a need to migrate from high- power/ high- tower to low- power/ low- tower type of networks);

Answer: In Estonia a mix of high- power/ high- tower and low- power/ low- tower networks is used already both in SFN and MFN setups to enable best possible coverage and reception quality in rural and densely populated areas. In case of broadcast networks for mobile reception, the robustness of signal is of top importance, meaning even more precise propagation modelling to be done for densely populated areas – probably some more lower power/low tower sites to be added. For rural areas, the same high-tower/power setups should be continued.

b. to the use of MFN versus SFN networks to achieve the evolution, and

Answer: This is a natural part of network planning and deployment.

c. a possible migration to a new DTT system(e.g. to facilitate interactive services) and transmitting technologies (e.g., DVB-T2, DVB-T2 Lite, etc.).

Answer: As described above, the future of DTT will be closely linked to new standards (DVB-T2, DVB-T2 Lite) and new coding generations like HEVC. The need for improvements is caused by large-scale adoption of big flat screens and the resulting expectation for HD quality programming and video. Another major driver is the adoption of tablets and smartphones, causing the need to supply QoS programming and video on the move. Transition to more advanced DTT system will stand for at least the following benefits:

- 1) Significantly lower cost of transmission
- 2) Significantly increased capacity

- 3) Improved coverage and signal reception indoors and on mobile
- 4) Significantly easier integration to portable and mobile receivers
- 5) Improved battery lifetime
- 6) Huge impact on solving network congestion problems in case of popular audiovisual services over wireless broadband.

iii) Do you believe that a DTT platform evolving towards delivering audio-visual services also to mobile terminals may also be used by mobile operators to cope with:

Answer: Indeed, when looking into the TV and video consumption statistics in some advanced countries, it will be inevitable to use more broadcast networks in delivering the ever-increasing volume of video and TV.

- a. the data traffic required to deliver linear video content (i.e., with mobile terminals including broadcasting tuners), and

Answer: First of all, across all continents and within the EU, we see statistics that show double-digit growth in number of smartphone and tablet users, number of people watching online video and number and minutes of videos watched. Irrespective of huge investments incurred by telecoms and wireless broadband network operators, there is ever-increasing dissatisfaction from mobile users regarding download speed, voice call quality and even network availability.

Now the challenge is to make these networks: broadcast and wireless broadband act as a well-coordinated duet in delivering video and linear programming. First time in many years of fruitless attempts, DVB-T2 Lite in combination with LTE can make it real. It needs a tight integration of both platforms in the head end and terminal levels.

- b. certain non-linear content that could be pushed (and stored)?

Answer: See the answer above. Broadcast network should be used to deliver

- 1) linear content in high quality (HD or UHD in the future)
- 2) most popular content
- 3) content forecasted by the big-data analytics for the specific user
- 4) ordered/preordered content by the user
- 5) specific public services (in combination with broadband networks).

iv) What evolutions do you expect would be required for mobile networks to be capable of delivering linear video content ubiquitously to both fixed and mobile terminals?

Answer: Technically these networks can deliver linear video. However, to make it available for many people at a time is not feasible technically and financially. Imagine the backbone infrastructure needed and density of base stations. It will cost trillions of Euros. Still the congestion problems cannot be avoided, as the consumption of video and TV over mobile devices grows exponentially. The only reasonable way in technical, financial and environmental

sense to deliver linear video will be broadcast network. And if anyone in telecoms would still like to give it a try, it should be towards higher frequency bands to enable more efficient reuse of frequencies and higher density networks. 700 and 800 MHz are clear no-go-s.

- v) Of a possible convergence between terrestrial mobile and (evolved) DTT platforms, what do you consider will be the consequences of mobile networks being capable of delivering linear video content to mobile terminals?

Answer: The question is somewhat unclear. In case the question is trying to figure out what will be the positive consequences for mobile networks from working together with broadcast networks, the answers could be the following:

- 1) Managed peak loads, similar to the way public clouds are used in parallel to private clouds: in case of peak loads, broadcast network capacity is used, that delivers same content to everyone with extremely low cost and high QoS.
- 2) More flat and efficient utilisation of mobile network capacity, resulting in better financial efficiency and QoS.
- 3) Increased total services delivered to consumers and higher arpu.

Question 4:

- i) How many DTT multiplexes do you expect will be needed in your country in the long-term (beyond 2020),

Answer: Minimum 7 for linear SD, HD and UHD programming and other push video and web content. In addition to existing 3 SD muxes, at least 3 HD muxes shall be deployed in the short term, to be completed with mobile and nonlinear services.

- ii) What services do you expect the DTT multiplexes to carry (assuming use of DVB-T2/HEVC)?

Answer: Linear HD/UHD content, 3D developments depend a lot on the broadcasters plans and how 3D will be adopted for mobile devices. Altogether 5 muxes to keep the same number (30) of channels

- 1) Linear SD content that is needed to complete the transition from SD to HD/UHD. (2-3 muxes)
- 2) Linear mobile content, all formats. (c-h) will require total 3-4 muxes)
- 3) Most popular mobile video in combination with preordered content,
- 4) Most popular web content
- 5) Push video on demand services for fixed and mobile terminals,
- 6) Datacasting for advertising and for public emergency needs,
- 7) Occasional transmissions during big events.

- iii) What transition and migration paths do you anticipate will be required to achieve this long-term DTT goal for your country?

Answer: There are some ingredients above the country level and some domestic issues to be solved and followed:

- 1) EC has to secure the deployment of 700MHz bands for broadcasting linear programming and top consumed video in hybrid format with wireless broadband networks to guarantee seamless video watching experience and solve wireless broadband network congestion problems.
- 2) EC policy and regulation should envision and incentivise standardisation and implementation of hybrid broadcast/wireless broadband solutions across member states to create uniform framework for mobile linear and non-linear delivery and consumption.
- 3) Optional: EC should act within its authority in defining the requirements for hybrid receivers (tablets, smartphones, other mobile, portable and fixed hybrid devices) that are welcome in the EU.
- 4) DTT transition in Estonia from existing DVB-T SD environment to HD and to the new hybrid environment will have to take place well planned manner at no obvious expense of the consumer/viewer. It will have to be service-lead pull-method, driven by telcos and new OTT entrants.
- 5) The transition for non-mobile consumers from DVB-T to DVB-T2 HD will happen in the coordination of broadcasters, pay-tv operator, OTT entrants and the broadcast network provider.