

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>

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)
FIN	1 (mux A)	Free-to-air	Fixed	6 SD	DVB-T, 64-QAM	National	Y	99,9%	UHF Band IV/V
FIN	1 (mux B)	Pay-TV and Free-to-air	Fixed	7 SD	DVB-T, 64-QAM	National	Y	99,9%	UHF Band IV/V
FIN	1 (mux C)	Pay-TV and Free-to-air	Fixed	8 SD	DVB-T, 64-QAM	National	Y	90,4%	UHF Band IV/V
FIN	1 (mux D)	Pay-TV and Free-to-air	Mobile	0 HD/SD; Currently no content on air	DVB-T2, 64-QAM	National	Y	40% (mobile) 80% (fixed)	UHF Band IV/V
FIN	1 (mux E)	Pay-TV and Free-	Fixed	9 SD	DVB-T, 64-QAM (allowed to use	National	Y	95%	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.

		to-air			DVB-T2 from 1.1.2013)				
FIN	1 (mux F)	Pay-TV and Free-to-air	Fixed	HD/SD; Currently no content on air	DVB-T2, 256-QAM	National	Y	60%	UHF Band IV/V
FIN	1 (mux G)		Fixed	HD/SD; Currently no content on air	DVB-T2, 256-QAM	Local (Capital area)	Y		UHF Band IV/V
FIN	1 (mux VHF A)	Pay-TV and Free-to-air	Fixed	4 HD, 2 SD	DVB-T2, 256-QAM	National	Y	85%	VHF Band III
FIN	1 (mux VHF B)	Pay-TV	Fixed	3 HD	DVB-T2, 256-QAM	National	Y	85%	VHF Band III
FIN	1 (mux VHF C)	Pay-TV	Fixed	2 HD, 8 SD	DVB-T2, 256-QAM	National	Y	85%	VHF Band III
FIN	2		Fixed	9 SD	DVB-T	Local (Åland)			UHF Band IV/V
FIN	1		Fixed		DVB-T	Local (Seinäjäski)			UHF Band IV/V
FIN	1		Fixed		DVB-T	Regional (Pohjanmaa)			UHF Band IV/V

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

⁶ E.g., national, regional, local.

FIN	Y	1 (mux H)	Pay-TV and Free-to-air	Fixed	HD/SD	DVB-T2	National	76 %	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 on TV (Y/N)	Other (Y/N)	If answer Yes to Other, please specify
FIN	Y	SD and HD	Pay-TV and Free-to-air	SD and HD	Y	N	N	Y	Mobile services, multiscreen content

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

Answer: 2016, except one multiplex in UHF expiring in 2026.

Question 2

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

Answer:

Slightly over 90 % of permanent households are TV-households. DTT and Cable are main means of reception (~ 50 % / 50 %). DTT serves in addition to permanent households (in all 2.5 millions) also free time cottages (500.000), cars, boats etc.. The countrywide DTT will be needed also in the future to provide public service channels. Satellite is mainly used as complementing DTT and Cable-TV providing premium channels, but is not very popular. Cable-TV penetration is growing slowly. Mainly DTT but also more or less Cable-TV will be complemented by linear and non-linear fixed and mobile IP delivery. More than 80 % of Cable-TV households can have access at least to 100 Mbps broadband connection. The penetration of pure IPTV is still quite low (over 5 %, 1.1.1012) but growing provision of non-linear TV by IPTV and OTT might change this situation already in the near future.

A growing demand for improved video quality can be expected e.g. due to large HD capable displays. The users with the best equipment, utilizing the advanced technology features, are usually also those that are most motivated to utilize also other media delivery means than DTT. Therefore the planned technology improvements could be made available also by complementary means e.g. ADSL, Cable, satellite etc.

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: One multiplex in the UHF band is capable of delivering content to mobile terminals using DVB-T2 technology. There is currently no content on air. Mobile reception is possible if mobile DVB-T2 receivers evolve and become widely available.

- ii) If yes, what is the required evolution of the DTT network platform architecture? Please give details in relation to: -
- 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);
 - to the use of MFN versus SFN networks to achieve the evolution, and
 - 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:

- The multiplex for mobile services was using low-power/low-tower topology with DVB-H-technology until March 2012. Through change to DVB-T2 also the network topology was changed to high-power/high-tower. To be able to provide full mobile coverage the high tower / high power DTT network would have to be supplemented with additional low power and low tower gap fillers.
 - It is possible to implement mobile DVB-T2 networks using SFN networks
 - Currently DVB-T2 is in use. A migration to DVB-T2 Lite is possible in the future.
- 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:
- the data traffic required to deliver linear video content (i.e., with mobile terminals including broadcasting tuners), and
 - certain non-linear content that could be pushed (and stored)?

Answer:

- This would be feasible technically and economically and DTT platform can be tested for that kind of services. There is on the other hand a wide assumption that mobile operators are more willing to build services on their own infrastructure, technology end services. It depends also on availability and

development of user friendly broadcasting tuners for regular mobile terminals. The DVB-H standard was not a success in any case.

DVB-T2 and T2 Lite would be needed for any mobile support of the DTT platform. However, it should be noted that there are no signs of DVB-T2 Lite to be adopted by any mobile devices.

- b) Maybe Push VOD and that kind of content, but there is not a wide consensus that this kind of content will be provided via DTT instead of mobile platforms.
- 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:

LTE-Advanced will offer platform for broadcasting services. LTE-A technology will make it possible to deliver linear video content to both fixed and mobile terminals. It might not be feasible to use mobile infrastructure and spectrum resources for broadcasting services. Mobile networks will be used likely to provide more personal services to mobile terminals. Broadcasting networks will probably be developed towards mobility and lower the capacity needs of mobile broadband networks. The fast mobile data is growing anyway so fast that more spectrum for mobile broadband will be needed also under 1 GHz band like 700 MHz band. The Government has decided to use 700 MHz band for mobile broadband after 2016.

There seems to be some shift from linear consumption of content to non-linear consumption as new distribution paths over fixed and mobile internet as faster broadband access become available. LTE with eMBMS (enhanced Multimedia Broadcast Multicast Service) could provide high flexibility in sharing network resources between linear content in multicast/broadcast fashion and non-linear content in point-to point mode. Even though this might be technically possible it might face commercial and techno-political hurdles. The hybrid network concept has been promoted with earlier mobile TV (DVB-H) trials, but has not found any commercial success.

- 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:

DTT platforms are optimized for large audiences and capacity of broadband access will be always limited. By using DTT for broadcast, mobile networks will be capable of serving personalized need and non-linear video. Mobile networks lack frequency efficiency in linear video distribution.

Mobile networks would require to be upgraded with new or modified antennas to cover new bands in the UHF range, with additional transceivers and respective signal processing capabilities. DTT technology not compatible with LTE and LTE-Advanced would require additional dedicated chipsets that even will vary across regions.

Question 4:

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

Answer:

According our present plan there will be at least four national multiplexes at UHF band and three national multiplexes at VHF band plus some regional multiplexes according the need until 2026. How many multiplexes will be needed in the long-term, will be depend on the evolution of broadcasting and mobile technologies and the needs of pay-tv demand and channels.

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

Answer:

According to the Finnish stakeholders there will be need for HD, UHD TV and 3D services targeted for mobile and portable reception.

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

Answer:

Difficult and time-consuming international co-operation processes will be needed. Long enough simulcast periods will be needed to ensure positive adaption to new technologies and services by end users.