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| **Radiocommunication Study Groups** |  |
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| To Administrations of Member States of the ITU, Radiocommunication Sector Members, ITU-R Associates participating in the work of Radiocommunication Study Group 6 and ITU-R Academia |

**Subject**: Questionnaire on spectrum requirements for the future of sound and television broadcasting

**References**: Documents [6/ 93](http://www.itu.int/md/R12-SG06-C-0093/en) and [6/249](http://www.itu.int/md/R12-SG06-C-0249/en)

1 Study Group 6 (SG 6) is the ITU-R Study Group assigned to the Broadcasting service. Its scope covers radiocommunication broadcasting, including vision, sound, multimedia and data services principally intended for delivery to the general public.

2 SG 6 created a Rapporteur Group to look at the future spectrum requirements for the Broadcasting service in light of technical developments, decisions taken by WRC-03 and WRC-07 on the use of digital modulation in the HF Bands, and the changes to frequency allocations at WRC-97, WRC-07 and WRC-12, as part of the work in maintaining its catalogue of Reports and Recommendations.

3 One of the questions that needs to be addressed by SG 6 include how broadcast requirements are changing with the move to digital broadcast systems, and the introduction of new and enhanced broadcast services.

4 The following questionnaire, which is being sent to all Administrations and Sector Members, is designed to gather information on spectrum use by sound and television broadcasting in the bands allocated on a Regional[[1]](#footnote-1) or global basis to terrestrial broadcasting (see Annex 1).

5 Administrations and Sector Members are also invited to make more detailed inputs addressing the matter of current and future spectrum requirements for radio and television broadcasting to the next meeting of WP 6A and SG 6.

6 Administrations and Sector Members are requested to submit responses to brsgd@itu.int by 17 October 2014.

David Barrett

Chairman SG6 Rapporteur Group on spectrum requirements
for the future of the broadcasting Service

QUESTIONNAIRE ON SPECTRUM REQUIREMENTS FOR THE FUTURE OF SOUND AND TELEVISION BROADCASTING

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| **Name of the Administration:** | **Swedish National Post and Telecom Authority (PTS)** |
| **Contact person:** | **Amela Hatibovic Sehic** |
|  E-mail address: | **amela.hatibovic-sehic@pts.se** |
|  Telephone number: | **+46 8 678 5621** |

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| **Name of the Sector Member:** |  |
| **Contact person:** |  |
|  E-mail address: |  |
|  Telephone number: |  |
| **What best describes your organisation?**Commercial broadcaster/Public service broadcaster/ Service provider/ Other (please describe) |  |
| **The geographical area over which you operate:** |  |

**SECTION ONE – Television broadcasting**

1) a) Is your country still using analogue television?

 b) If yes, has analogue television switch-off commenced?

 c) If your country has any plans to switch-off analogue television:

 i) When is the analogue switch-off process expected to be completed?

 ii) How much extra spectrum will be required during the transition phase to digital terrestrial television broadcasting?

**Reply: a) No.**

 **b) –**

 **c) –**

2) a) Please indicate how many analogue television transmitters are in operation in your country and in which bands.

 b) What channel bandwidths are used for analogue television?

 c) What is the spectrum requirement for analogue television in your country?

A proposed format for responses to question 2a) and 2b) is provided in Annex 1

**Reply: a) –**

 **b) –**

 **c) –**

3) a) What is the percentage of viewer uptake of terrestrial television in your country?

 b) If possible, please also provide details of the number or proportion of users who receive television primarily by terrestrial means by:

 i) Fixed roof top antenna, or
ii) Portable indoor antenna.

**Reply: a) About 21.8% of households receive television in their permanent residence primarily by terrestrial means, either by a pay-DTT subscription or by receiving free-television[[2]](#footnote-2) only. (Source: Swedish Post and Telecom Authority, “The Swedish Telecommunications Market 2013”)**

 **About 27.8% of households in Sweden are using terrestrial television for at least one TV set. (Source: Swedish Broadcasting Authority, “Media development 2014”)**

 **b) i) There are no certain data.**

 **ii) There are no certain data.**

4) If your country has switched or is considering switching to digital terrestrial television broadcasting

 a) What system standard is your country using or considering adopting
(as specified in Recommendations ITU-R BT.1306 and BT.1877)?

 b) When did your country start or when is it proposing to start the introduction of digital terrestrial television services?

 c) Please provide further detail on the number of multiplexes in use, their technical specifications, the percentage of geographic area or population they cover or are intended to cover and the total spectrum use.

A proposed format for detailed responses is provided in Annex 2

**Reply: a) The DTT systems used are DVB-T (System B) with 8 MHz bandwidth and DVB-T2 with 8 MHz/7 MHz bandwidth, as specified in ITU-R BT.1306 and BT.1877.**

 **b) The DTT transition was completed in November 2007.**

 **c) Please see Annex 2.**

5) a) What frequencies/channels are currently used or intended to be used by digital terrestrial television broadcasting in your country? Please distinguish between those in use and those intended to be used?

 b) Please indicate how many digital terrestrial television transmitters are currently used or intended to be used and in which bands.

 c) What channel bandwidth is used or intended to be used for digital terrestrial television in your country?

A proposed format for responses to question 5b) and 5c) is provided in Annex 1

**Reply: a) All DTT channels in 174-230 MHz and 470-790 MHz are used and are going to be used until 31st of March 2017.**

 **All DTT channels in 174-230 MHz and 470-694 MHz are going to be used as of 1st of April 2017.**

 **b) Please see Annex 1.**

 **c) Please see Annex 1.**

6) a) Are the terrestrial television frequency bands also shared with other primary services in your country?

 b) If yes, please give details of those systems and their spectrum use.

**Reply: a) No, 174-230 MHz and 470-790 MHz are not shared with other primary services, as there are no other primary services in these bands in Sweden. Frequency range 174- 230 MHz is shared by T-DAB and DVB-T2, according to the GE06 frequency plan.**

 **b) -**

7) a) Are the terrestrial television frequency bands also shared with secondary services used for the support of broadcasting such as SAB/SAP (services ancillary to broadcasting/production), or other types of services such as radio astronomy or wind-profile radar?

 b) If yes, please give details of those systems and their spectrum use.

**Reply: a) Yes.**

 **b) Low power audio transmitters are licenced in both 174-230 MHz and 470-790 MHz, on non-protection and non-interference basis using so called “white space” frequency ranges. 50 mW e.r.p. and 200 KHz bandwidth are general technical conditions.**

 **PTS has no record on the actual spectrum use for SAB/SAP in 174-230 MHz and 470-790 MHz.**

8) a) Does your country foresee a requirement for new and enhanced services, including multimedia and data applications, HD, 3D, and UHD television, on the terrestrial television platform?

 b) If yes, please give indicative details of the number and nature of services planned, and if known, the expected timeframe for their introduction.

**Reply: a) Yes.**

**b) Up to 15 national HD services (DVB-T2/MPEG-4) from 1st of April 2015 until 31st of March 2017, increased from 8 national HD services currently.**

**The amount of HD services as of 1st of April 2017 depends on the number of multiplexes available after re-planning of remaining broadcast spectrum.**

9) a) Are there plans in your country to launch more multiplexes in the future?

 b) If yes, how many more and when? Please also indicate the expected timeframe for their introduction.

**Reply: a) No.**

 **b) -**

10) a) What is the amount of spectrum your country foresees will be required for terrestrial television broadcasting, taking into consideration the responses to Questions 5, 6, 7, 8, and 9? Please indicate the modes of transmission that will be used, and timeframes.

**Reply: a) 174-230 MHz and 470-790 MHz, until 31st of March 2017**

 **174-230 MHz and 470-694 MHz, as of 1st of April 2017**

 **For information on modes of transmission please see Annex 2.**

**SECTION TWO – Sound broadcasting**

11) a) What analogue sound broadcasting standards are used in your country and what bands are they operating in?

 b) Please indicate how many analogue radio transmitters are in operation in your country and in which bands.

 c) What channel bandwidths do they use?

A proposed format for responses to question 11b) and 11c) is provided in Annex 1

**Reply: a) FM standard in 87.5-108 MHz**

 **b) Please see Annex 1.**

 **c) Please see Annex 1.**

12) a) Is additional spectrum required for growth in the analogue sound broadcasting platform in your country?

 b) If yes, how much additional spectrum is required?

**Reply: a) There is no request for additional spectrum in the analogue sound platform. However there is a certain interest to provide more analogue sound broadcasting which may be solved by developing and re-planning the existing analogue sound broadcasting platform.**

 **b) -**

13) a) Is your country considering introducing, or has it already introduced digital sound broadcasting?

 b) If yes, which system standards are used or are being considered for adoption (as specified in Recommendations ITU-R BS.1114, BS.1514, BS.1615)?

 c) When did your country start or when does it propose to start digital sound broadcasting?

 d) What channel bandwidths is your country using or considering using?

 e) What frequencies are currently used or intended to be used by digital sound broadcasting in your country? Please distinguish between those in use and those intended to be used.

 f) What is the percentage of the population that is covered by digital sound broadcasting by direct reception in your country?

 g) What additional spectrum was required or is considered to be required for the transition to digital sound broadcasting?

 h) Please indicate how many digital radio transmitters are currently used or intended to be used and in which bands.

 i) What is the spectrum requirement for digital sound broadcasting in your country?

 j) If your country has introduced digital sound broadcasting, how long will it continue to use analogue sound broadcasting?

A proposed format for responses to question 13d) and 13h) is provided in Annex 1

**Reply: a) Yes, Sweden has already introduced digital sound broadcasting.**

 **b) The digital sound broadcasting system used is T-DAB, Digital system A, as specified in ITU- R Recommendation ITU-R BS.1114.**

 **c) Digital sound broadcasting started in 1995.**

 **d) 1.536 MHz.**

 **e) At the moment one national multiplex is in operational use for Public Service programmes in four cities: Stockholm, Gothenburg, Malmö and Luleå. There is an intention to put into operation two more multiplexes for commercial radio, as of 1st of October 2015.**

 **f) Approximately 35% of population.**

 **g) No additional spectrum for digital sound broadcasting is considered to be required.**

 **h) There are 14 transmitters in operation. At the moment we have no data on total number of planned transmitters.**

 **i) The estimation of spectrum requirement for digital sound broadcasting hasn’t been made so far.**

 **However, the latest government’s decision on the frequency range for digital sound broadcasting says that three T-DAB multiplexes, according to GE06 (174-230 MHz) and Wi95revCo07 (230-240 MHz), are to be assigned for digital sound broadcasting.**

 **j) There is no decision on switching off the analogue sound broadcasting. However, in July 2013 the Swedish government appointed an industry coordinator who will propose a plan for the radio industry’s transition to digital terrestrial radio. The issue of an analogue switch off date will be addressed in this work. The coordinator’s plan will be presented by 30th of November 2014.**

14) a) Are the terrestrial sound broadcasting bands also shared with other primary services in your country?

 b) If yes, please give details of those systems and their spectrum use.

**Reply: a) 87.5-108 MHz, 174-230 MHz and 230-240 MHz are not shared with other services, as there are no other primary services in these bands in Sweden.**

**174-230 MHz is shared by T-DAB and DVB-T2, according to the GE06 frequency plan.**

15) a) Are the terrestrial sound broadcasting bands also shared with secondary services e.g., used for the support of broadcasting such as SAB/SAP (services ancillary to broadcasting/production), or other types of services such as radio astronomy or wind-profile radar?

 b) If yes, please give details of those systems and their spectrum use.

**Reply: a) Yes.**

**b) Low power audio transmitters are licenced in both 174-230 MHz and 470-790 MHz, on non-protection and non-interference basis using so called “white space” frequency ranges. 50 mW e.r.p. and 200 KHz bandwidth are general technical conditions. PTS has no record on the actual spectrum use for SAB/SAP in 174-230 MHz and 470-790 MHz.**

16) a) What is the amount of spectrum your country foresees will be required for terrestrial sound broadcasting, taking into consideration the responses to the previous questions? Please indicate the modes of transmission that will be used, and timeframes.

**Reply: a) The estimation of spectrum requirement for terrestrial sound broadcasting hasn’t been made so far.**

 **There is no decision on switching off the analogue FM sound broadcasting in 87.5-108 MHz. (For more information please see the reply 13b.)**

 **As per the latest government’s decision on the frequency range for digital sound broadcasting three T-DAB multiplexes (transmission mode I) are to be assigned for digital sound broadcasting in accordance to GE06 for 174-230 MHz and Wi95revCo07 for 230-240 MHz.**

**SECTION THREE –Multimedia broadcasting**

17) a) Is your country considering introducing or has already introduced multimedia broadcasting?

 b) If yes which system standards is your country using or considering using (as specified in Recommendations ITU-R BT.1833 and BT.2016)?

 c) In which Bands?

 d) When did your country start or when does it propose to start digital multimedia broadcasting?

 e) What are the current and proposed population coverages for digital multimedia broadcasting in your country?

 f) What is the spectrum requirement for multimedia broadcasting in your country?

 g) If your country has introduced digital multimedia broadcasting, please provide further information to describe the system, its implementation and any limitations on its operation.

**Reply: a) No.**

 **b) -**

 **c) -**

 **d) There are currently no plans to introduce multimedia broadcasting for mobile reception, as specified in Recommendations ITU-R BT.1833 and BT.2016, in Sweden.**

 **f) -**

 **g) -**

ANNEX 1

Suggested form of presentation of reply to Questions 2, 5, 11, and 13:

|  |  |  |
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| **Country** | **Band** | **Number of Transmitting Stations\*** |
| **Analogue Radio**)(Q11b & Q11c) | **Digital Radio**(Q13d & Q13h) | **Analogue TV**(Q2a & Q2)b | **Digital TV**(Q5b & Q5c) |
| **Channel bandwidth (MHz)** | *VHF II 300kHz* | *1.5 MHz* |  |  *VHF 7 MHz**UHF 8 MHz* |
| **XX** | **LF** | 148.5-283.5 kHz |  |  |  |  |
| **MF** | 525-526.5 kHz |  |  |  |  |
| **MF** | 526.5-1606.5 kHz |  |  |  |  |
| **MF** | 1606.5-1705 kHz |  |  |  |  |
| **HF** | 2.3-26.1 MHz\*\* |  |  |  |  |
| **VHF I** | 47-50 MHz |  |  |  |  |
|  | 50-54 MHz |  |  |  |  |
|  | 54-68 MHz |  |  |  |  |
|  | 68-72 MHz |  |  |  |  |
|  | 76-87.5 MHz |  |  |  |  |
| **VHF II** | 87.5-108 MHz | *1112* |  |  |  |
| **VHF III** | 174-216 MHz |  |  |  | *65* |
| **VHF III** | 216-230 MHz |  | *14* |  | *0* |
| **UHF IV** | 470-694 MHz |  |  |  | *1051* |
| **UHF V** | 694-790 MHz |  |  |  | *439* |
| **UHF V** | 790-890 MHz |  |  |  |  |
| **UHF V** | 890-960 MHz |  |  |  |  |
|  | 1452-1492 MHz |  |  |  |  |
|  | 11.7-12.5 GHz |  |  |  |  |
|  | 12.5-12.7 GHz |  |  |  |  |
|  | 40.5-42.5 GHz |  |  |  |  |
|  | 74-76 GHz |  |  |  |  |
| \* Transmitting stations please include “main stations” and “relay stations.” Please use parenthesis to indicate stations that have still to be brought into use\*\* The bands 3900-3950D, 3950-4000D kHz; the bands for tropical broadcasting: 2300-2498, 3200-3400D, 4750-4995 D, 5005-5060D kHz and the Article 12 Bands 5 900-5 950D, 5 950-6 200, 7 200-7 300, 7 300-7 400D, 7 400-7 450, 9 400-9 500D, 9 500-9 900, 11 600-11 650D, 11 650-12 050, 12 050-12 100D, 13 570-13 600D, 13 600-13 800, 13 800-13 870D, 15 100-15 600, 15 600-15 800D, 17 480-17 550D, 17 550-17 900, 18 900-19 020D, 21 450-21 850, 25 670-26 100. D Resolution 517 (Rev.WRC-07) applies. In the HF bands subject to Article 12 see also No. 5.134. |

**ANNEX 2**

Suggested form of presentation of reply to Question 4: *If your country has switched or is considering switching to digital terrestrial television broadcasting, what system standards is it using or considering adopting? When did your country start, or when is it proposed to start the introduction of digital terrestrial television services? Please provide further detail on the number of multiplexes in use, their technical specifications, the percentage of geographic area or population they cover or are intended to cover and the total spectrum use.*

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| **Country** | **No of multi-plexes** | **System & modulation** | **FEC** | **GI** | **Reception mode[[3]](#footnote-3)** | **Capacity per multiplex (Mb/s)** | **Current percentage population coverage** | **Intended percentage population coverage** | **Content per multiplex** | **Total capacity(Mb/s)** | **Total spectrum bandwidth used or intended for implementation(MHz)** | **Any additional comments(e.g. duration of licences)** |
| S | *1* | *DVB-T, 64-QAM* | *2/3; 3/4* | *1/4; 1/8* | *Fixed* | *22.4 Mbit/s; 22.1 Mbit/s* | *99.8%* | *99.8%* | *5 SD MPEG2* | *≈181Mbit/s* | *≈388.5 MHz* | *Public service with regional content* |
| *1* | *DVB-T, 64-QAM* | *2/3; 3/4* | *1/4; 1/8* | *Fixed* | *22.4 Mbit/s; 22.1 Mbit/s* | *98.0%* | *98.0%* | *7 SD MPEG2* | *Commercial channels with regional content**To be migrated to DVB-T2 no later than March 2017* |
| *1* | *DVB-T, 64-QAM* | *2/3; 3/4* | *1/4; 1/8* | *Fixed* | *22.4 Mbit/s; 22.1 Mbit/s* | *98.0%* | *98.0%* | *9 SD MPEG2* | *Commercial channels with regional content**To be migrated to DVB-T2 no later than March 2017* |
| *1* | *DVB-T, 64-QAM* | *2/3; 3/4* | *1/4; 1/8; 1/32* | *Fixed* | *22.4 Mbit/s; 22.1 Mbit/s; 24.1 Mbit/s* | *98.0%* | *98.0%* | *8 SD MPEG2**8 SD MPEG4* | *To be migrated to DVB-T2 during 2015* |
| *1* | *DVB-T, 64-QAM* | *2/3; 3/4* | *1/4; 1/8; 1/32* | *Fixed* | *22.4 Mbit/s; 22.1 Mbit/s; 24.1 Mbit/s* | *98.0%* | *98.0%* | *3 SD MPEG2**10 SD MPEG4* | *To be migrated to DVB-T2 during 2015* |
| *1* | *DVB-T2, 256QAM* | *2/3; 3/4* | *1/16; 1/8* | *Fixed* | *36.6 Mbit/s; 37.1 Mbit/s* | *≈98.0%* | *98.0%* | *5 HD MPEG4* | *Public service and commercial channels with regional content* |
| *1* | *DVB-T2, 256QAM* | *3/5; 2/3; 3/4* | *19/256; 1/8* | *Fixed* | *30.8 Mbit/s; 31.6 Mbit/s; 32.5 Mbit/s* | *≈98.0%* | *98.0%* | *3 HD MPEG4; 1 SD MPEG4* | *Commercial channels with regional content* |

*\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_*

1. Regions 1, 2 or 3 as defined in Nos. **5.3** to **5.9** of the Radio Regulations. [↑](#footnote-ref-1)
2. The PTS definition of free television is television that can be received unencrypted and free of charge by the end-user without requiring a subscription or equivalent. Free television is only available via the terrestrial network, where the broadcasters purchase the transmission service directly from Teracom, which transmits the channels unencrypted. [↑](#footnote-ref-2)
3. E.g. fixed, portable outdoor/mobile, portable indoor. [↑](#footnote-ref-3)