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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:** | **Thailand** |
| **Contact person:** | **Mr.Supatrasit Suansook** |
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|  Telephone number: | **+66 2 271 7600 ext. 5303** |

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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) Yes.**

 **b) Not yet. The ASO planning and implementation will commence in 2015**

 **c) i) It is not decided yet. However, it is likely to be in line with ASEAN recommendation which encourages the ASEAN countries to complete the ASO process in 2020.**

 **ii) During the transition period, the spectrum of 280 MHz (510-790 MHz) is required for both analogue stations and digital stations for 5 multiplexes.**

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) See the Table in Annex 1.**

 **b) See the Table in Annex 1.**

 **c) VHF Band III and UHF Band IV/V (before Analogue Switched-Off).**

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) 26.6% (Nationwide) and 36% (Bangkok)**

 **b) No information.**

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) DVB-T2 as specified in Recommendation ITU-R BT.1877.**

 **b) The trial of networks and services were started in early 2012. The commercial and official digital terrestrial television services were started in May 2014.**

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) The frequency range 510 – 790 MHz (Channel 26 – 60) is being used and intended to be used.**

 **b) See the Table in Annex 1**

 **c) See the Table in 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.**

 **b) N/A**

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) The band 510-790 MHz is unlicensed to the low power transmitter aiming for transmitting video and audio signals. (the transmit power shall not exceed 10 mW.)**

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) - Currently, there are 7 HDTV channels / 17 SDTV channels for commercial services, and 3 HDTV channels for public services (plus at least 9 more SDTV channels for public services in the near future). Migration from SDTV to HDTV in the future may be possible to enhance the user experience.**

 **- UHDTV is also one of the technologies which may be possible to implement in the future to enhance the user experience and create a new business.**

 **- Interactive service is also one of the technologies which may be possible to implement in the future to enhance the user experience and create a new business.**

 **- Multimedia broadcasting (mobile television) is under consideration. NBTC will conduct feasibility study and make a decision at the end of 2014.**

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) Yes.**

 **b) At least one more multiplex after Analogue Switched-off.**

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) It is likely that 280 MHz in UHF Band is required for the terrestrial television broadcasting to serve 6 multiplexes and to prepare for the advanced broadcasting technologies mentioned in question 8). (No additional spectrum is required for the time being.)**

**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) AM Radio in the frequency band 526.5 – 1606.5 kHz.**

 **HFBC in the frequency band 5900 – 26100 kHz.**

 **FM Radio in the frequency band 87 – 108 MHz.**

 **b) See the Table in Annex 1.**

 **c) See the Table in 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) Yes, additional FM spectrum is required**

 **b) The amount of additional spectrum for the analogue sound broadcasting is not yet calculated. However, there is still a demand to operate the low power (local) FM stations. Currently, 6000-8000 applications were submitted.**

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. Thailand is considering introducing digital sound broadcasting.**

 **b) The system standard is not specified yet.**

 **c) No proposed date to start the commercial digital radio. Under study for DAB+ trial in VHF band III (174 MHz – 230 MHz)**

 **d) N/A**

 **e) Thailand is considering using VHF Band III for digital sound broadcasting and will conduct the field trial using this band.**

 **f) N/A**

 **g) It is likely that the frequency range 174-230 MHz is required for digital sound broadcasting in the future.**

 **h) N/A**

 **i) Due to the shortage of spectrum for FM Radio and the congestion of analogue sound broadcasting stations (both authorized licenses and trial licenses) in VHF Band II, the transition to digital sound broadcasting might be a solution to this issue. However, the spectrum requirement for digital sound broadcasting is not yet calculated.**

 **j) No switch-off plan for analogue sound broadcasting**

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) No.**

 **b) N/A**

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) The band 88-108 MHz is unlicensed to wireless microphone. (the transmit power shall not exceed 10 mW.)**

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) At least, the following frequency bands are likely to be necessary for terrestrial sound broadcasting:**

 **- 526.5 – 1606.5 kHz**

 **- 87 – 108 MHz**

 **- 174 – 230 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) Yes, Thailand is considering introducing multimedia broadcasting.**

 **b) Not yet decided.**

 **c) Not yet decided.**

 **d) Not yet decided.**

 **e) Not yet decided.**

 **f) Not yet decided.**

 **g) N/A**

ANNEX 1

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

A sample response is shown in *Italics* for guidance only.

|  |  |  |
| --- | --- | --- |
| **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)** | MF 9kHzVHF II 250kHz | - | VHF I/III 7MHzUHF IV/V 8MHz | UHF IV/V8MHz |
| **Thailand** | **LF** | 148.5-283.5 kHz | - | - | - | - |
| **MF** | 525-526.5 kHz | - | - | - | - |
| **MF** | 526.5-1606.5 kHz | 191 | - | - | - |
| **MF** | 1606.5-1705 kHz | - | - | - | - |
| **HF** | 2.3-26.1 MHz\*\* | 12(2 sites) | - | - | - |
| **VHF I** | 47-50 MHz | - | - | 2 | - |
|  | 50-54 MHz | - | - | - |
|  | 54-68 MHz | - | - | 20 | - |
|  | 68-72 MHz | - | - | - | - |
|  | 76-87.5 MHz | - | - | - | - |
| **VHF II** | 87.5-108 MHz | 313\*\*\* | - | - | - |
| **VHF III** | 174-216 MHz | - | - | 98 | - |
| **VHF III** | 216-230 MHz | - | - | 33 | - |
| **UHF IV** | 470-694 MHz \*\*\*\* | - | - | 82 | 235 (791) |
| **UHF V** | 694-790 MHz | - | - | 14 |
| **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. |

**Note :**

\*\*\* The number indicates only the authorized transmitting stations. There are currently 6093 low power transmitting stations which are under the trial status (as of May 2015).

\*\*\*\* (1) The frequency allocation for broadcasting service in Thailand is in the band 510-790 MHz.

(2) The number of additional stations is estimated on the assumption of 95% household coverage. Currently, NBTC is conducting the detailed planning for additional stations.

(3) The numbers do not include the 6th multiplex which is expected to be available after ASO.

**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.*

A sample response is shown in *italics* for guidance only.

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Country** | **No of multi-plexes** | **System & modulation** | **FEC** | **GI** | **Reception mode[[2]](#footnote-2)** | **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)** |
| **Thailand** | *4* | *DVB-T2, 64-QAM**(16k extended)* | *3/5* | *19/128* | *Fixed* *(portable indoor in municipal areas)* | *21.93* | *80%**(Household coverage)* | *95%**(Household coverage)* | *- 6 SD (MPEG-4)**- 2 HD (MPEG-4)* | *109.65* | *280 MHz* | *All 5 multiplexes are for public and commercial services (licensed from 2013 until 2028)* |
| *1* | *- 3 SD (MPEG-4)**-3 HD (MPEG-4)* |

**Note :** 1) The numbers indicated in “Content per multiplex” are the multiplex loading. Thailand expects to have 36 services in 5 multiplexes. (12 public services and 24 commercial services) Currently, there are only 27 services (3 public services and 24 commercial services)

 2) MUX#6 for local services will be in operation after analogue switched- off. MUX#6 is expected to carry 12 local services (SD).

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

1. Regions 1, 2 or 3 as defined in Nos. **5.3** to **5.9** of the Radio Regulations. [↑](#footnote-ref-1)
2. E.g. fixed, portable outdoor/mobile, portable indoor. [↑](#footnote-ref-2)