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

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**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:**

1) a) Yes.

 b) It’s currently planned to start on November 29th 2015.

 c)

 i) November 25th 2018.

 ii) Before DTV was introduced in Brazil in 2007, analogue TV used 342 MHz (54‑72 MHz, 76‑88 MHz, 174-216 MHz, 470‑608 MHz, 614-746 MHz). For the introduction of DTV simulcast, an additional 60 MHz spectrum (746-806 MHz), which was previously used in links to feed relay stations, was used for public broadcasting. After the analogue TV switch-off, there will be a channel repacking and 138 MHz will be released (54‑72 MHz, 76‑88 MHz, 698‑806 MHz).

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?

**Reply:**

2) a) Please find the answer in the table in Annex 1.

 b) Please find the answer in the table in Annex 1.

 c) 402 MHz (54‑72 MHz, 76‑88 MHz, 174‑216 MHz, 470‑608 MHz, 614‑806 MHz).

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:**

3) a) Based on a 2014 government survey, free-to-air TV (terrestrial or satellite) in Brazil has 91% of viewer uptake.

 b) Based on a 2012 industry survey, the following values can be assumed:

 i) Fixed roof top antenna: 45%
ii) Fixed indoor antenna: 55% (there is no information available on the number of portable/mobile receivers currently in the Brazilian market)

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.

**Reply:**

4)

 a) Brazil uses DTT System C (ISDB-T).

 b) DTT services in Brazil started officially in December 2nd 2007.

 c) There are about 518 TV multiplexers in operation in Brazil.

 Public broadcasters are allowed to use multiple programs per MUX and their configurations can vary according to the number of programs. On the other hand, commercial broadcasters use a single program per MUX, using typically 2 layers: Layer A (QPSK FEC 2/3 GI 1/8, typical) with one MPEG4 LD video (320x240) for portable/mobile reception and Layer B (64QAM FEC 3/4 GI 1/8, typical) with one MPEG4 HD video (1920x1080) for fixed reception, allowing about 17.27 Mb/s per MUX. Other configurations for are also being used.

 Currently, the DTT service reaches about 62% of the population, but it is intended to reach 93% before the analogue TV switch-off. TV licenses (commercial and public) must be renewed every 15 years.

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?

**Reply:**

5) a) Currently, the following frequency bands are used for DTT in Brazil: 174‑216 MHz (channels 7-13), 470‑608 MHz (channels 14-36), 614‑806 MHz (channels 38-69). After the analogue TV switch-off there will be a channel repacking and channels 52-69 (698‑806 MHz) will be released for IMT services.

 b) Please find the answer in the table in Annex 1.

 c) Please find the answer in 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:**

6) a) Yes.

 b) The 698‑806 MHz band in Brazil is already attributed for IMT Services on primary basis. However, the effective usage of the band for these services depends on the analogue switch-off and channel repacking..

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:**

7) a) Yes, audio SAB/SAP (e.g. wireless microphones).

 b) Audio SAB/SAP shares all the terrestrial television frequency bands as secondary service.

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:**

8) a) Currently, Brazil has not yet decided on the next generation of DTT services, as we are still completing the analogue-digital transition. Current generation already allows HD video. Nevertheless, some Brazilian broadcasters have already been trying possible next generation features (such as 3D, 4K and 8K UHD, 22.2 audio, HDR, Wide Color Gamut, HFR) for shooting, post-production and even for an experimental transmission of 2014 FIFA World Cup.

 b) As previously mentioned, these services are not yet planned, there is no definition on the expected timeframe for their introduction.

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:**

9) a) Although more multiplexers can be launched in the future, currently only those corresponding to the analogue stations that are still not available in DTT (276) are expected.

 b) They should be introduced by the end of 2018, as it is the deadline for analogue TV switch-off in Brazil.

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:**

10) a) The spectrum that will be available for DTT after the analogue TV switch-off and the channel repacking (264 MHz) is the absolute minimum requirement to keep the currently existing and planned DTT multiplexers. When Brazil decides to implement a next generation of DTT, there may be a need for additional spectrum for simulcasting during the transition phase.

**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?

**Reply:**

11) a) Amplitude Modulation (MF and HF) and Frequency Modulation (VHF).

 b) Please find the answer in the table in Annex 1.

 c) Please find the answer in 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:**

12) a) There will be a need for additional VHF spectrum for FM stations, as some stations will move from MF AM to VHF FM.

 b) It will be required 12 MHz (76‑88 MHz) from the spectrum that will be released after the analogue TV switch-off and channel repacking.

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?

**Reply:**

13) a) Yes, Brazil is considering introducing digital sound broadcasting and is studying the technology to be adopted.

 b) System C (IBOC AM and IBOC FM) and System G (DRM30 and DRM+).

 c) No decision was made yet.

 d) No decision was made yet.

 e) No decision was made yet.

 f) Not applicable.

 g) No decision was made yet.

 h) No decision was made yet.

 i) No decision was made yet.

 j) Not applicable.

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:**

14) a) No.

 b) Not applicable.

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:**

15) a) No.

 b) Not applicable.

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:**

16) a) Analogue terrestrial sound broadcasting will continue requiring the currently available spectrum (about 25 MHz, see the bands in the table in Annex 1), plus additional 12 MHz, as described in item 12. The necessity of additional spectrum will be evaluated after Brazil implements policies for digital terrestrial sound broadcasting.

**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:**

17) a) Not yet.

 b) Not applicable.

 c) Not applicable.

 d) Not applicable.

 e) Not applicable.

 f) Not applicable.

 g) Not applicable.

ANNEX 1

Reply to Questions 2, 5, 11, and 13:

|  |  |  |
| --- | --- | --- |
| **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** | MF: 10 kHzHF < 5900 kHz: 10 kHzHF ≥ 5900 kHz: 5 kHzVHF: 200 kHz | - | 6 MHz | 6 MHz |
| **Brazil** | **MF** | 525-1705 kHz |  1786 (381) | - | - | - |
| 2300-2495 kHz | 6 (428) | - | - | - |
| **HF** | 3200-3400 kHz | 11 (85) | - | - | - |
| 4750-4995 kHz | 48 (28) | - | - | - |
| 5005-5060 kHz | 9 (9) | - | - | - |
| 5900-6200 kHz | 25 (2) | - | - | - |
| 9500-9900 kHz | 18 (3) | - | - | - |
| 11600-12100 kHz | 16 (1) | - | - | - |
| 15100-15450 kHz | 5 (0) | - | - | - |
| 17770-17900 kHz | 2 (0) | - | - | - |
| 21450-21850 kHz | - | - | - | - |
| 25670-26100 kHz | - | - | - | - |
| **VHF** | 54-72 MHz | - | - | 1130 (135) | - |
| 76-87.8 MHz | - | - | 961 (54)  | - |
| 87.8-108 MHz | 6801 (5191) | - | - | - |
| 174-216 MHz | - | - | 4304 (254) | 1 (45) |
| **UHF** | 470-608 MHz | - | - | 2210 (434) | 2465 (4716) |
| 614-698 MHz | - | - | 1004 (251) | 933 (2021) |
| 698-806 MHz | - | - | 500 (88) | 182 (462) |
| **TOTAL** | **-** | **8727 (5191)** | **0** | **10109 (1216)** | **3581 (7244)** |
| \* Including “main stations” and “relay stations”. Parenthesis indicates stations that have still to be brought into use. |