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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](mailto: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

|  |  |
| --- | --- |
| **Name of the Administration:** | **Agencia Nacional del Espectro** |
| **Contact person:** |  |
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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:**

1. Colombia is still using analogue television.
2. Analogue TV switch-off has not started.
   1. Analogue switch-off in Colombia should be completed before December 31st 2019.
   2. The additional spectrum required during transition phase will be 48MHz (eight 6MHz channels) plus additional guard channels to avoid interference to analogue television stations (from 12MHz to 42MHz depending on geographical zone).

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:**

1. In Colombia there are the following number of analogue TV station:
   * VHF band: 678 stations
   * UHF band: 507 stations
2. In Colombia and in Region 2, the TV broadcasting channel bandwidth is 6 MHz. It doesn’t depend on the technology (whether is analogue or digital TV).
3. In Colombia, the spectrum required for analogue TV Broadcasting is 246MHz. The analysis done to determine this quantity is based on current TV operating stations in the city with most TV spectrum used and the guard channels needed between two operating channels to avoid interference.

Note: Detailed information is given in “Annex 1 CLM”

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:**

1. Viewers that could receive digital terrestrial television are described on the following table “Colombia: DEPLOYMENT PLAN DVB-T2”:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Date** | **Colombia: DTT DEPLOYMENT PLAN - DVB-T2** | | | | |
| **Private TV (broadcasters: Caracol and RCN)** | | **Public TV (Broadcasters: RTVC)** | **Local TV in Bogotá (Broadcaster: CityTV)** | |
| 2012 | 49.88% (\*) | 42%(\*\*) | N/A | N/A | N/A |
| 2013 | 49.88% | 42% | N/A | N/A | N/A |
| 2014 | 49.88% | 42% | 49.88% (\*\*\*) | 100% | 13.2% |
| may 2015 | 63.6% | 54% | 63.6% | 100% | 13.2% |
| june 2015 | 63.6% | 54% | 63.6% | 100% | 13.2% |
| 2015 | 73.75% | 63% | 73.75% | 100% | 13.2% |
| 2016 | 86.26% | 73% | 86.26% | 100% | 13.2% |
| 2017 | 93.38% | 79% | 89.26% | 100% | 13.2% |
| 2018 | 100% | 86% | 92.26% | 100% | 13.2% |
| 2019 | 100% | 86% | 92.26% | 100% | 13.2% |
| (\*) | According to contract obligation | | |  |  |
| (\*\*) | According to country population | | |  |  |
| (\*\*\*) | According to country population | | |  |  |

1. In Colombia, DTT networks are planned by broadcasters to provide indoor reception in the main cities around the country; this allows viewers to receive the DVB-T2 signal with just a portable indoor antenna. However, there are some rural regions or small cities that can receive the signal only with a rooftop antenna.

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:**

1. Colombia chose DVB-T2 after having chosen DVB-T. Currently, there are only 6 DVB-T operating stations, which are planned to be switched off in August 2015.
2. The first digital TV station was implemented in Colombia in 2012.
3. Please see “Annex 2 CLM”.

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:**

1. Channels used by digital TV broadcasting: 14, 15, 16, 17, 38, 39, 40, 41, 42, 44, 52, 53, 60, 61, 62.

Channels intended to be used by digital TV broadcasting: 18, 19, 20, 21, 22, 23, 24, 28, 29, 32, 34.

1. Please see “Annex 1 CLM”.
2. Please see “Annex 1 CLM”.

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:**

1. TV broadcast spectrum is not shared with any other primary service in Colombia.
2. Not apply.

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:**

1. In Colombia, it is allowed to use unlicensed devices with power restriction in the TV broadcasting spectrum.
2. The unlicensed devices allowed should only be used for transmitting control signals (for example, alarms, door opening signals and remote switching). These devices should not operate during time intervals longer than 5 seconds, unless they are used for applications such as:
   * Fire detection
   * Safety & rescue
   * Remote control for toys and models
   * Sound or video continuous transmission
   * Data transmission

The transmission power is restricted based on the operation frequency, as follows:

|  |  |  |
| --- | --- | --- |
| **Frequency band (MHz)** | **Maximum electric field intensity** | **Maximum power** |
| 70 - 88 | 1250uV/m | 470nW |
| 174 - 216 | 3750uV/m | - |
| 470 - 698 | 12500uV/m | 47uW |

Also, short range devices can only be used in the TV broadcasting spectrum if they operate in an intermittent and periodic basis or if they are used for biomedical telemetry applications.

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:**

1. Currently, Colombian broadcasters are transmitting SD and HD programs and some sound-only programs using the terrestrial platform. They might increase the quantity of HD programs to get more audience.

In addition, regulator are working in order to create rules in the near future taking the advantages provided by the new platform based on the DVB-T2 standard features.

1. The administration is analysing the best way to adapt the DTT capabilities to the Colombian situation.

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:**

1. Yes. The administration has been working with the goal to establish the appropriate conditions to launch the appropriate process to authorize the operation of new channels but it mostly depends on the available spectrum to deploy it.
2. There are planned to implement in the future 2 additional nationwide multiplexes, one of them is planned to be implemented in the next few years, the other one is planned after analogue switch-off.

Furthermore, depending on broadcasters’ interest, there are planned frequencies to 2 local future multiplexes in every main city in Colombia.

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:**

1. Taking into consideration the digital terrestrial television spectrum planning made by our administration and a new multiplexes projection based on current information, spectrum requirement for terrestrial television broadcasting is approximately 126MHz.

Nationalwide multiplexes are currently operating with (16k extended - 64QAM - 3/4) and (16k extended - 64QAM - 2/3). Future nationalwide and future local multiplexes have flexibility in choosing transmission mode.

**SECTION TWO – Sound broadcasting**

1) 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) Colombia cuenta con estaciones de radiodifusión sonora en Amplitud Modulada (A.M.) y en Frecuencia Modulada (F.M.) en las siguientes bandas de frecuencias:

Amplitud Modulada (A.M.):

Hectométricas: 535 – 1705 kHz

Decamétricas: Tropical: Banda de 2300 kHz a 2495 kHz

Banda de 3200 kHz a 3400 kHz

Banda de 4750 kHz a 5060 kHz

Internacional: Banda de 5900 kHz a 6200 kHz

Banda de 7300 kHz a 7350 kHz

Banda de 9400 kHz a 9900 kHz

Banda de 11600 kHz a 12100 kHz

Banda de 13570 kHz a 13870 kHz

Banda de 15100 kHz a 15800 kHz

Banda de 17480 kHz a 17900 kHz

Banda de 21450 kHz a 21850 kHz

Banda de 25670 kHz a 26100 kHz

Frecuencia Modulada (F.M.): 88 – 108 MHz

b) La respuesta se encuentra en el Anexo 1

c) El ancho de banda del canal para cada banda es:

Amplitud Modulada (A.M.):

Hectométricas: 535 – 1705 kHz (Ancho de Banda: 10 KHz)

Decamétricas: Tropical: Banda de 2300 kHz a 2495 kHz (Ancho de Banda: 10 KHz)

Banda de 3200 kHz a 3400 kHz (Ancho de Banda: 10 KHz)

Banda de 4750 kHz a 5060 kHz (Ancho de Banda: 10 KHz)

Internacional: Banda de 5900 kHz a 6200 kHz (Ancho de Banda: 5 KHz)

Banda de 7300 kHz a 7350 kHz (Ancho de Banda: 5 KHz)

Banda de 9400 kHz a 9900 kHz (Ancho de Banda: 5 KHz)

Banda de 11600 kHz a 12100 kHz (Ancho de Banda: 5 KHz)

Banda de 13570 kHz a 13870 kHz (Ancho de Banda: 5 KHz)

Banda de 15100 kHz a 15800 kHz (Ancho de Banda: 5 KHz)

Banda de 17480 kHz a 17900 kHz (Ancho de Banda: 5 KHz)

Banda de 21450 kHz a 21850 kHz (Ancho de Banda: 5 KHz)

Banda de 25670 kHz a 26100 kHz (Ancho de Banda: 5 KHz)

Frecuencia Modulada (F.M.): 88 – 108 MHz (Ancho de Banda: 100 KHz)

2) 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) Colombia no requiere espectro adicional para de desarrollo de la Radiodifusión Sonora Análoga.

b) NA

3) 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 11b) and 11c) is provided in Annex 1

**Reply:**

a) Actualmente Colombia no ha considerado implementar la Radiodifusión Sonora Digital

b) NA

c) NA

d) NA

e) NA

f) NA

g) NA

h) NA

i) NA

j) NA

4) 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) En Colombia las bandas de Amplitud Modulada (A.M.) en ondas Hectométricas y de Frecuencia Modulada (F.M.) están atribuidas a título primario exclusivamente para el Servicio de Radiodifusión Sonora.

Algunas de las bandas de Amplitud Modulada (A.M.) en ondas Decamétricas que están atribuidas a título primario para el Servicio de Radiodifusión Sonora son compartidas a título primario con otros servicios.

1. Banda de 2300 kHz a 2495 kHz: FIJO, MÓVIL

Banda de 3200 kHz a 3230 kHz: FIJO, MÓVIL salvo móvil aeronáutico (R)

Banda de 3230 kHz a 3400 kHz: FIJO, MÓVIL salvo móvil aeronáutico

Banda de 4750 kHz a 4850 kHz: FIJO, MÓVIL salvo móvil aeronáutico (R)

Banda de 4850 kHz a 4995 kHz: FIJO, MÓVIL TERRESTRE

Banda de 5005 kHz a 5060 kHz: FIJO

5) 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) En Colombia las bandas de Amplitud Modulada (A.M.) en ondas Hectométricas y ondas Decamétricas y de Frecuencia Modulada (F.M.) atribuidas al Servicio de Radiodifusión Sonora no son compartidas con ningún servicio atribuido a título secundario.

b) NA

6) 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) Colombia no ha considerado atribuir una mayor cantidad de espectro para el servicio de Radiodifusión Sonora.

**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:**

1. Yes. Colombian broadcasters have made some testing which includes transmission of signals for portable reception on handheld devices.
2. However, there is not an official use of the ITU recommendation for broadcasting multimedia and data applications for mobile reception by handheld devices, because it mainly depends on the broadcasters business model, handheld devices market, content production, among others.
3. It would be on 470-698MHz.
4. Colombia started digital multimedia broadcasting in 2014 in a test controlled environment.
5. Actually, population covered with DTT was described in the question 3.
6. Colombian administration has not quantified the spectrum requirement for this application yet, because is in testing currently.
7. As we said before, Colombia is in a testing process about multimedia broadcasting including mobile services. We are just beginning to deploy the DTT network and the primary goal is provide fixed outdoor reception to population. This doesn’t mean that broadcasters may offer additional option to the viewers but at the end of the day, it will depend on the business model and industry trending in our country.

annex 1

**NUMBER OF BROADCAST STATIONS IN COLOMBIA**

The stations were counted using the channel center frequency as the station operation frequency.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **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)** | |  |  | 6 MHz | 6MHz |
| **CLM** | **LF** | 148.5-283.5 kHz |  |  |  |  |
| **MF** | 525-526.5 kHz |  |  |  |  |
| **MF** | 526.5-1606.5 kHz | 384 |  |  |  |
| **MF** | 1606.5-1705 kHz | 0 |  |  |  |
| **HF** | 2.3-26.1 MHz\*\* | 13 |  |  |  |
| **VHF I** | 47-50 MHz |  |  |  |  |
|  | 50-54 MHz |  |  |  |  |
|  | 54-68 MHz |  |  | 163 |  |
|  | 68-72 MHz |  |  |  |  |
|  | 76-87.5 MHz |  |  | 111 |  |
| **VHF II** | 87.5-108 MHz | 1183 |  |  |  |
| **VHF III** | 174-216 MHz |  |  | 404 |  |
| **VHF III** | 216-230 MHz |  |  |  |  |
| **UHF IV** | 470-694 MHz |  |  | 494 | 54 (used)  39 (intended) |
| **UHF V** | 694-790 MHz |  |  | 6 | 6 (used) |
| **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 CLM**

**Currently operating digital terrestrial television transmissions in Colombia:**

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Country** | **No of multi-plexes** | **System & modulation** | **FEC** | **GI** | **Reception mode** | **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)** |
| **CLM** | **3** | **DVB-T, 16-QAM** | **3/4** | **1/8** | **Fixed** | **-** | **-** | **-** | **-** | **-** | **18** | **Planned to switch-off in 2015** |
| **1** | **DVB-T2, 64-QAM** | **2/3** | **1/8** | **Fixed** | **19.3** | **50%** | **50%** | **-** | **19.3** | **18** | **-** |
| **1** | **DVB-T2, 64-QAM** | **2/3** | **1/8** | **Fixed** | **19.3** | **50%** | **50%** | **-** | **19.3** | **24** | **-** |
| **2** | **DVB-T2, 64-QAM** | **3/4** | **1/8** | **Fixed** | **20.3** | **50%** | **50%** | **-** | **20.3** | **36** | **-** |

1. Regions 1, 2 or 3 as defined in Nos. **5.3** to **5.9** of the Radio Regulations. [↑](#footnote-ref-1)