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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

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| **Name of the Administration:** | **FRANCE** |
| **Contact person:** | **Stephane MEBALEY EKOME** |
| E-mail address: | **stephane.mebaleyekome@anfr.fr** |
| Telephone number: | **+33 (0)1 45 18 73 13** |

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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) | **Public service regulatory body** |
| **The geographical area over which you operate:** | Region 1 |

**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) As far as terrestrial broadcasting is concerned, France completely switched off analogue television on 30 November 2011, and has been operating in full digital television broadcasting since that date.**

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: France is using only DTTB.**

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) In France, free-to-air digital terrestrial television remains the primary method for television reception, with 57.9% of the households receiving television this way (H2 2013).**

**1 out of 3 TV-equipped households rely on the DTT platform only.**

**b) It is usually assumed that most of the DTT reception for TV sets is performed via rooftop antennas. There are nevertheless no available studies on the proportion of additional DTT reception via portable or mobile systems (indoor antennas to TV sets, usb dongle receivers, portable DVD & DTT players, etc.).**

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) In France DTT relies on system B of the Recommendation ITU-R BT.1306. As far as video coding is concerned, two standards are currently in use:**

* **MPEG-2 is used for free-to-air SDTV channels in main land France;**
* **MPEG-4 is used for free-to-air SDTV channels in French overseas territories, free-to-air HDTV channels in main land France, and pay-TV (SD and HD).**

**The coexistence of those two different video coding standards in France can be explained by the progressive roll-out of the DTT platform (especially in terms of TV service offer, see below).**

**Furthermore, DVB-T2 & HEVC are currently under assessment (with an undergoing UHD experimentation in Paris and an experimental mobile delivery of contents in Brittany).**

**The spectrum dedicated to the broadcasting service is more and more limited and highly constrained by international cross-border coordination. Therefore, the only way the DTT platform will meet the viewer expectations in the future, in particular in terms of higher picture quality (e.g. UHD), additional TV programmes and mobility, will be to migrate towards next generation transmission and video coding technologies, such as DVB-T2/HEVC.**

**As far as audio coding is concerned (for main audio stream, original soundtrack and audio-description), SDTV use MPEG audio system and HDTV usually rely on DD+ 5.1.**

**In 2011 HbbTV interactive data was introduced and is now supported by a growing part of the terrestrial TV channels (also available on the DTT complementary satellite service: FRANSAT).**

**Other data (subtitles, signalling, event information, etc.) use DVB standards.**

**b) The DTT platform was switched-on in main-land France in March 2005 (i.e. 9 years existence). The roll-out of such an infrastructure has required major public and private investments, in particular from broadcasters, and is still under construction until June 2015. More details are available below:**

* **March 2005: launch of DTT in main land France (free-to-air SDTV);**
* **November 2005: launch of pay-SDTV over the DTT platform in main land France;**
* **October 2008: launch of first 5 HDTV channels (simulcast) over the DTT platform in main land France;**
* **November 2010: launch of SDTV in French overseas territories;**
* **December 2012: launch of 6 additional HDTV channels.**

**The DTT platform is now made, in main land, of an 8-national-multiplex network[[2]](#footnote-2), covering 97.3% of the French population, and delivering 32 full-time national TV channels simultaneously, either public or commercial services:**

* **7 full-time national free-to-air public TV channels[[3]](#footnote-3);**
* **17 full-time national free-to-air commercial TV channels[[4]](#footnote-4);**
* **8 full-time Pay-TV channels[[5]](#footnote-5).**

**The coexistence of public and commercial free-to-air TV channels, along with Pay-TV channels, is essential to sustain the global economic viability of the DTT platform as a whole**.

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| **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  (MHz)** |
| France (main territory) | 1 (R1) | DVB-T, 64-QAM | 3/4 | 1/8 | Fixed | 24.88 | 97% | 97% | 6 SD MPEG 2 | 199,04 Mbit/s | 320 MHz |
| 1 (R2) | DVB-T, 64-QAM | 3/4 | 1/8 | Fixed | 24.88 | 97% | 97% | 6 SD MPEG 2 |
| 1 (R3) | DVB-T, 64-QAM | 3/4 | 1/8 | Fixed | 24.88 | 97% | 97% | 1 HD MPEG 4 (Canal+)  3 SD MPEG 4  EMM/ECM |
| 1 (R4) | DVB-T, 64-QAM | 3/4 | 1/8 | Fixed | 24.88 | 97% | 97% | 3 SD MPEG 2  1 HD MPEG 4 (Arte HD)  1 SD MPEG 4  EMM/ECM |
| 1 (R5) | DVB-T, 64-QAM | 3/4 | 1/8 | Fixed | 24.88 | 96% | 97% | 3 HD MPEG 4 |
| 1 (R6) | DVB-T, 64-QAM | 3/4 | 1/8 | Fixed | 24.88 | 97% | 97% | 4 SD MPEG 2  3 SD MPEG 4  EMM/ECM |
| 1 (R7) | DVB-T, 64-QAM | 3/4 | 1/8 | Fixed | 24.88 | 89% | 97% | 3 HD MPEG 4 |
| 1 (R8) | DVB-T, 64-QAM | 3/4 | 1/8 | Fixed | 24.88 | 89% | 97% | 3 HD MPEG 4 |
| France (main territory) | 1 | DVB-T, 16-QAM or QPSK | ¾ or 2/3 | 1/8 | Fixed | 16,59 or 7.37 MBit/s | 25% | 25% | 1 to 4 SD MPEG2 | 16,59 or 7.37 MBit/s |
| France (overseas territory) | 1 | DVB-T, 64-QAM | 3/4 | 1/8 | Fixed | 24.88 | 95% | 95% | 8 to 10 SD MPEG4 | 24.88 | 320 MHz |

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 band 470-790 MHz is currently used for DTT which corresponds to 40 channels (channel 21 to channel 60). France intends to allocate the 700 MHz band to the mobile service, thus the frequency band usable for DTT will be, in a time frame which is still under discussions, 470-694 MHz, corresponding to channel 21 to channel 48.**

**b) The DTT network is made of around 1940 broadcasting sites in main-land France which cover more than 97% of the French metropolitan population:**

**-          1626 are paid by TV channels: 118 high-power main-sites + 1508 complementary lower power sites;**

**-          Additionally, around 310 additional lower power sites are paid by public local authorities on a voluntary basis (which reflects the importance of the DTT platform for these local authorities as well).**

**c) In France, the multiplex channel bandwidth in UHF band is 8 MHz, according to Geneva 06 Plan.**

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:**

**Bands used by terrestrial television are not shared with another primary service.**

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. **Yes**

**b) The whole band 470-790 MHz can be used for PMSE provided it does not create harmful interference to, nor claim protection from DTT. This band is one of the main band for PMSE activities.**

**Radioastronomy is using the band 608-614 MHz in a site called Nançay. The use of channel 38 (606-614 MHz) for broadcasting is therefore limited to few main transmitters in main land France and their relay stations, far enough from Nançay so as to avoid interference to radioastronomy.**

**The use of TV white spaces is still under consideration.**

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**

**There is a strong demand for HDTV, which – among several factors – can be explained by the adoption of larger and larger flat screen television by consumers. The success of DVD, Blu-Ray discs, video-game consoles or home theatre equipment has also reinforced the growing expectation of video and audio quality of households, and is making Standard Definition (SD) content appear comparatively inferior in terms of quality.**

**Therefore, the whole existing DTT offer is expected to migrate towards HD video format in the medium term in France.**

**UHD televisions are already commercially available and UHD is likely to become the next resolution standard as the consumer demand for higher picture resolution will probably continue to grow. All relevant TV distribution platforms, including DTT, may need, in the future, to support UHDTV (4K) format to meet this demand and stay attractive.**

**The first experimental broadcasting of terrestrial UHDTV in France has begun in May 2014. The authorization was granted to TDF (tower operator) which operates an open platform, welcoming any broadcaster or manufacturer willing to contribute. It can deliver up to two UHD services (HEVC over DVB-T2) to all the aerials in Paris area. Contents depend on market players proposals. The first “real time” content was broadcast during the Roland Garros tennis championship.**

**DTT will also continue to deliver higher audio quality, multichannel sound, better accessibility of TV programmes through higher availability of subtitles and audio-description, linear and interactive services such as HbbTV.**

**Also, the DTT platform could evolve towards mobility, with the objective to provide mobile reception of DTT programmes towards secondary screens, including mobile terminals integrating DTT tuners.**

**The DTT platform is already used by telecom operators to cope with the data traffic generated by linear video content on fixed network (most of the television boxes rent by the internet access providers include a DVB-T tuner and ISP encourage to use it). With a possible evolution of the DTT platform towards mobile broadcast delivery, mobile operators could also use it to cope with the data traffic generated by linear video content and certain high audience non-linear content that could be pushed (and stored) rather than hog the data point-to-point bandwidth.**

**b) With the on-going debates on the reallocation of the 700 MHz band, there is no detailed plan available for the time-being in France concerning the transition towards UHDTV and/or mobility.**

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) With the prospect of the 700 MHz band reallocation to the mobile service, the French DTT platform will inevitably see a reduction of its current number of multiplexes (from 8 to probably 6 national DVB-T multiplexes).**

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:**

**There will be 224 MHz remaining for DTT after the release of the 700 MHz band. This resource is seen as a minimum to allow the DTT platform to continue delivering attractive services to the users.**

**Recognizing the importance of the DTT platform for delivering free-to-air television and the various political, social, cultural and economic general interest objectives which are achieved through the DTT platform,** **France believes that access to the 470-694 MHz spectrum should be safeguarded until 2030 for broadcasting services. This is particularly important to give reassurance to terrestrial broadcasting industry for a next cycle of investments (DVB-T2/HEVC).**

**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:**

1. **Frequency Modulation (FM) broadcasting for VHF II band and Amplitude Modulation (AM) broadcasting for LF, MF and VHF I bands are used in France. VHF I is currently used for short range events radio.**
2. **And c) Please see Annex 1 below.**

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:**

1. **There is still a high demand for FM spectrum. In some areas, there is already a FM spectrum crunch. Nevertheless, there is no plan for additional FM broadcasting band, taken also into account the introduction of digital sound broadcasting in the VHF band.**
2. **Actually there is a high operator’s demand to increase their FM coverage. Currently, there is no decision about this topic.**

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:**

1. **Yes.**
2. **The Digital radio uses the A system: the Rec. ITU-R BS.1114-8 (DAB+ and T-DMB)**
3. **Digital sound broadcasting has been introduced in band III in 4 big towns: Paris, Nice, Marseille and Toulouse. Indeed, since the 20th of June 2014, digital radio services are broadcasted in several areas (6 multiplexes for Paris, 4 multiplexes for Marseille, 4 multiplexes for Nice) in band III. A national operator has been authorized to broadcast program also in L band. A transmitter is in operation since last September in Toulouse and 150 sites are forecasted for this network by the operator.**
4. **1.75 MHz channel bandwidth is used in France.**
5. **France is currently using both VHF III band (174 - 225 MHz) and L band (1.452 - 1.467 GHz)**
6. **Due to the relatively new start-up of digital radio in Band III in France, the coverage figures are currently in process regarding different reception quality criteria.**
7. **Additional studies are in progress to identify the real need.**
8. **Currently, 15 transmitters are on air : 1 in L band and 14 in band III**
9. **Band III and a part of L band might cover the spectrum requirement for digital sound broadcasting in France.**
10. **There is currently no date planned for switching off the 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:**

1. **Yes**
2. **Fixed service (microwaves) in L Band.**

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:**

1. **Yes.**
2. **Sharing is applicable in band III and in L band. Also in VHF I for several punctual or temporary events.**

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:**

1. **This point is under study.**

**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 coverage 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. **Current DTT platform already delivers multimedia services, as audio-visual broadcasting, choice of subtitle and audio track, but also, associated data (time table, program’s topic…). Furthermore, services as HbbTV authorized enhanced experience with introducing interactive possibilities.**

**At the same time, the platform also delivers non-audiovisual data as traffic information or time table for bus stops.**

**Moreover, a new development for the delivery of digital content to mobile receivers (smartphones/tablets) through a new broadcast type of network in order to help in responding to the explosive demand for digital media consumption is under test (the so-called B2M project).**

**In this scenario, a DTT multiplex is not capable to address simultaneously both traditional fixed / rooftop receivers and mobile receivers under the current and foreseeable technology status; the signal level specifications of these two situations being very different, a network aiming at both would be quite over-specified and costly for fixed reception, leading to an inefficient network deployment and spectrum usage. Therefore, it assumes that one multiplex would be dedicated to this mobile delivery platform.**

**The associated model is the one of Mobile Multimedia Broadcast or of NotTV operated under the lead of NTT DoCoMo in Japan, were the mobile broadcast network is operated as a versatile and flexible platform for delivering any type of digital content (in Broadcast mode) to mobile receivers; this will include live and non-live TV / video content, the same for radio programing, electronic press content (magazines and dailies), etc.**

**These contents are then broadcast, stored on mobile devices (with some filtering to be applied based on issue date, existence of access rights, etc...) and are then available for the end-user to play them, in live or in on-demand model.**

**Such model, which is an adaptation of the broadcast platform to the new usage patterns for digital media, is integrating the major trends which are mobile, non-linear viewing and tablets as the versatile preferred device for all kind of medias, and ultimately, the convergence of media (e.g.; a newspaper will more and more integrate video content, while a TV program/service will –and already is – integrating text news content).**

**This versatile mobile delivery platform would be used under a combination of different business models;**

* **for a certain part, it could be used by media players who would be able to buy certain chunks of capacity, live or non-live, enabling them to push their content towards their audience**
* **for other parts, the capacity could be used by service providers (e.g. ; mobile operators) who would decide to off-load on the broadcast network the contents which are demanded by a high number of their users, thus savings scarce capacity on the mobile network thanks to the broadcast network.**

1. **France is considering using DVB-T2.**

**c) UHF band.**

**d) Multimedia broadcasting is already in use with HbbTV and data broadcasting. Those services are expected to keep growing.**

**e) Non available**

**f) Non relevant**

**g) Non relevant**

ANNEX 1

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **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)** | | **LF : 9 kHz**  **VHF II : 300kHz** | **VHF III : 1.75 MHz** |  | **8MHz** |
| **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 | **9 675** |  |  |  |
| **VHF III** | 174-216 MHz |  |  |  |  |
| **VHF III** | 216-230 MHz |  | **14** |  |  |
| **UHF IV** | 470-694 MHz |  |  |  | **1940** |
| **UHF V** | 694-790 MHz |  |  |  |  |
| **UHF V** | 790-890 MHz |  |  |  |  |
| **UHF V** | 890-960 MHz |  |  |  |  |
| **L** | 1452-1492 MHz |  | **1** |  |  |
|  | 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. | | | | | | |

1. Regions 1, 2 or 3 as defined in Nos. **5.3** to **5.9** of the Radio Regulations. [↑](#footnote-ref-1)
2. 2 national multiplexes, called “R7” and “R8” will finish their deployments in June 2015 [↑](#footnote-ref-2)
3. 1 public-funded TV channel is in fact 2 time-shared TV channels belonging to the French Parliament, the French State is a shareholder of France Télévisions TV channels, and ARTE is fully managed by a French-German international Treaty [↑](#footnote-ref-3)
4. the commercial free-to-air TV channels have such various obligations attached to their DTT licence that they could be considered as “PSB” in other EU countries [↑](#footnote-ref-4)
5. (2 of which broadcasting mandatory free-to-air time slots) [↑](#footnote-ref-5)