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| **Radiocommunication Bureau (BR)** |
| Circular Letter**6/LCCE/90** | 3 December 2014 |
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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 6and ITU-R Academia** |
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|  |
| Subject: | **Questionnaire on the future spectrum demands and use ofthe broadcasting service** |
|  |

During its November 2014 meeting, ITU-R Study Group 6 agreed the questionnaire[[1]](#footnote-1) in Attachment 1 on the future spectrum demands and use of the broadcasting service, and further agreed it should be sent to all Member States and Sector Members.

The questionnaire is designed to gather information on the future spectrum demand and use by sound and television broadcasting in the bands allocated to terrestrial broadcasting in view 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 ITU-R Study Group 6’s catalogue of Reports and Recommendations.

One of the questions that need to be addressed by Study Group 6 includes how broadcast requirements are changing with the move to digital broadcast systems, and the introduction of new and enhanced broadcast services.

Member States and Sector Members that have responded to the earlier questionnaire (see footnote 1 and Attachment 2) are not requested to respond to this Circular Letter, although Study Group 6 would be pleased to receive any update to their original responses.

Member States and Sector Members are requested to submit responses to brsgd@itu.int by 22nd May 2015.

François Rancy

Director

**Distribution:**

– Administrations of Member States of the ITU and Radiocommunication Sector Members participating in the work of
Radiocommunication Study Group 6

– ITU-R Associates participating in the work of Radiocommunication Study Group 6

– ITU-R Academia

– Chairman and Vice-Chairmen of Radiocommunication Study Group 6

– Secretary General of the ITU, Director of the Telecommunication Standardization Bureau, Director of the
Telecommunication Development Bureau

ATTACHMENT 1

Questionnaire on the future spectrum demands and
use of the broadcasting service

|  |  |
| --- | --- |
| **Name of the Administration:** | **Ministry of Transport, Information Technology and Communications** |
| **Contact person:** | **Dimitar Dimitrov** |
|  E-mail address: | **didimitrov@mtitc.government.bg** |
|  Telephone number: | **+ 359 2 949 2337** |

|  |  |
| --- | --- |
| **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) | **Policy-making authority****(answers to questionnaire are submitted jointly by the ministry and the regulator)** |
| **The geographical area over which you operate:** | **Republic of Bulgaria** |

**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:**

**Analogue television is not in operation in Bulgaria. Our country completely switched off the analogue television on 30 September 2013.**

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 questions 2a) and 2b) is provided in Annex 1.

**Reply:**

**NA**

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. **According to the latest statistic data approximately 18% of the households in Bulgaria are watching terrestrial television.**
2. **NA**

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. **Bulgaria has adopted DVB-T standard for digital terrestrial television broadcasting (system B of the Recommendation ITU-R BT.1306).**
2. **The first DVB-T network was launched in 2004 for the area of Sofia-city. Bulgaria has started introducing digital terrestrial services with national coverage since 1 March 2013 (the beginning of the simulcast). After 1 October 2013, Bulgaria switched to full digital television broadcasting (the analogue television was switched off).**
3. **The number of the multiplexes, their technical specifications, as well as the percentage of population they are intended to cover, are given in Annex 2. Information for the current percentage of population coverage and the number of programs per multiplex also shown in Annex 2.**

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 standard is it using or considering adopting? When did your country start, or when is it proposing 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.

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **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)** |
| **BUL** | 1 | DVB-T, 16-QAM | 2/3 | 1/16 | Portable outdoor/mobile | 15.61 | Sofia-city | Sofia-city | 4 SD TV & 2 radio, MPEG 4  | 157,46 | 680 | Local multiplexLicensed until 2016 |
| 2 | DVB-T, 64-QAM | 2/3 | 1/4 | Portable outdoor/mobile | 19.91 | 96.2%above 85% | 95%85% | 4 SD TV1 SD TV, MPEG4 | National multiplexesLicensed until 2024 |
| 1 | DVB-T, 64-QAM | 2/3 | 1/4 | Portable outdoor/mobile | 19.91 | 96.2% | 95% | 2 SD & 2 HD TV MPEG4 | Public service multiplexeslicensed until 2025 |
| 3 | DVB-T, 64-QAM | 2/3 | 1/4 | Portable outdoor/mobile | 19.91 | - | 85% | MPEG4 | - National multiplexesLicensed for 15 years |
| 1 | DVB-T, 64-QAM | 3/4 | 1/4 | Portable outdoor/mobile | 22.39 | - | 86% | MPEG4 | - National multiplexesLicensed for 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?

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

**Reply:**

1. **The bands UHF IV (470-694 MHz) and UHF V (694-862 MHz) are used for digital terrestrial television broadcasting.**

**Communications Regulation Commission has granted licenses for 7 national multiplexes (Layer 1 - 7). The development of the first 3 DVB-T (Layer 1 - 3) networks** **with national coverage is finished. In addition to the networks specified below, there is another local TV network for the area of Sofia-city, using channel 64.**

**The development of the last 4 DVB-T (Layer 4 - 7) networks with national coverage has not been started yet.**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Area** | **Layer 1** | **Layer 2** | **Layer 3** | **Layer 4** | **Layer 5** | **Layer 6** | **Layer 7** |
| **BUL 01** | 31 | 29 | 33 | 25 | 42 | 45 | 46 |
| **BUL 02** | 42 | 49 | 55 | 25 | 30 | 48 | 44 |
| **BUL 03** | 22 | 29 | 27 | 33 | 35 | 50 | 60 |
| **BUL 04** | 32 | 49 | 53 | 26 | 30 | 45 | 46 |
| **BUL 05** | 26 | 42 | 45 | 21 | 60 | 48 | 29 |
| **BUL 06** | 51 | 57 | 41 | 29 | 38 | 40 | 22 |
| **BUL 07** | 25 | 35 | 41 | 32 | 30 | 39 | 43 |
| **BUL 08** | 26 | 49 | 58 | 21 | 27 | 45 | 64 |
| **BUL 09** | 34 | 49 | 58 | 28 | 38 | 55 | 57 |
| **BUL 10** | 23 | 40 | 52 | 34 | 48 | 53 | 36 |
| **BUL 11** | 22 | 37 | 23 | 31 | 34 | 50 | 47 |
| **BUL 12** | 28 | 40 | 51 | 24 | 39 | 52 | 41 |

**Q5b) & Q5c) are given in Annex 1.**

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 & Q2b) | **Digital TV**(Q5b & Q5c) |
| **Channel bandwidth (MHz)** | *MF 9kHz**HF 10kHzVHF II 300 kHz* | *HF 10kHz* |  | *8 MHz* |
| **BUL** | **LF** | 148.5-283.5 kHz |  |  |  |  |
| **MF** | 525-526.5 kHz |  |  |  |  |
| **MF** | 526.5-1606.5 kHz | 1 |  |  |  |
| **MF** | 1606.5-1705 kHz |  |  |  |  |
| **HF** | 2.3-26.1 MHz\*\* | 1 | 1 |  |  |
| **VHF I** | 47-50 MHz |  |  |  |  |
|  | 50-54 MHz |  |  |  |  |
|  | 54-68 MHz |  |  |  |  |
|  | 68-72 MHz |  |  |  |  |
|  | 76-87.5 MHz |  |  |  |  |
| **VHF II** | 87.5-108 MHz | *527* |  |  |  |
| **VHF III** | 174-216 MHz |  |  |  |  |
| **VHF III** | 216-230 MHz |  |  |  |  |
| **UHF IV** | 470-694 MHz |  |  |  | *335* |
| **UHF V** | 694-790 MHz |  |  |  | *323* |
| **UHF V** | 790-890 MHz |  |  |  | *12* |
| **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 3 900-3 950D, 3 950-4 000D kHz; the bands for tropical broadcasting: 2 300-2 498, 3 200-3 400D, 4 750‑4 995D, 5 005‑5 060D 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**. |

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. **YES**
2. **The bands 478-494 MHz, 502-510 MHz, 590-614 MHz are used for national security purposes.**

**The bands 646-686 MHz, 726-758 MHz, 766-814 MHz and 822-862 MHz are also allocated to Aeronautical Radionavigation service** **on a primary basis and used for national security.**

**The band 790-862 MHz is allocated for Mobile except aeronautical mobile** **service on a primary basis too. But the band 790-862 MHz is not used for Mobile except aeronautical mobile** **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**
2. **The bands 470-786 MHz, 786-789 MHz and 823-832 MHz are allocated on a secondary basis and used for wireless audio PMSE equipment.**

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.

Annex 3 provides an approximate guide to the video bit rate required for HD and UHD television.

**Reply:**

**Neither obligations nor restrictions with relation to the type of services like HD or 3D and UHD television are stipulated.**

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:**

**See our answers for Layer 4-7 to Q5**

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:**

**See our answers to questions 5, 6, 7, 8 and 9**

**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 questions 11b) and 11c) is provided in Annex 1

**Reply:**

1. **In Bulgaria VHF II (87.5-108 MHz) band is used for Frequency Modulation (FM) broadcasting; LF (148.5-283.5 kHz), MF (526.5-1606.5 kHz) and HF (3950-26100 kHz) bands are used for Amplitude Modulation (AM) sound broadcasting.**

**Q11 b) &Q11 c) are given 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:**

**The Bulgarian Administration does not foresee to provide additional spectrum for the analogue sound broadcasting except bands, mentioned in Q 11.**

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), b), e)**

**Digital sound broadcasting is currently used in our country only in the band HF (3950-
26100 kHz) – DRM (rec. ITU-R SM.1541). The usages of HF band are subject to Article 12 of Radio Regulations.**

**c), e)**

**In 2014 Bulgaria (CRC i.e. regulator and the ministry) launched a public consultation for introducing digital sound broadcasting in band VHF III (174 MHz – 230 MHz) and band MF (526.5-1606.5 kHz). According to Geneva 06 Bulgaria foresees to use coordinated assignments for sound broadcasting in band VHF III.**

**f), g), i), j)**

**The consultation showed no business interest. In this regard, Bulgarian administration couldn’t provide actual information for switch off date, population coverage, additional spectrum, spectrum requirements and number of digital radio transmitters.**

**Q13 d) & Q13 h) are given in Annex 1.**

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. **The band 255-283.5 kHz is also allocated for Aeronautical Radionavigation service on a primary basis. The band 3.950-4.000 MHz is allocated for Fixed service on a primary basis too.**

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. **The band 9 kHz-30 MHz is allocated on a secondary basis and used for inductive applications.**

**The bands 9-600 kHz and 12.5-20 MHz are used for active medical implants, allocated on a secondary basis.**

**The bands 984-7484 kHz and 7.3-23.0 MHz are used for railway applications, allocated on a secondary basis.**

**The band 87.5-108 MHz is also allocated on a secondary basis and used for wireless audio applications (Low power FM transmitters).**

**The band 174-216 MHz is used for radio microphones and assistive listening devices applications, allocated on a secondary basis.**

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:**

**NA**

**SECTION THREE – Multimedia broadcasting for handheld devices**

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:**

**NA**

ANNEX 3

Video emission bit rates

The following chart indicates an approximate range for the video bit rate that may be used in the delivery of the video format for SDTV, HDTV and UHDTV. This video bit rate would then need to be encoded into 6 MHz, 7 MHz or 8 MHz channels, as appropriate:



It should be noted that these numbers do NOT include Audio, Closed Captioning, System Information, and Emission Error Correction. In some cases these additional services could add approximately 15% to the video bit rate

ATTACHMENT 2

Responses received by November 2014

The following Member States and Sector Members have submitted a response to the questionnaire on the future spectrum requirements for the broadcasting service.

**Member States**

Australia, Austria, Belgium[[3]](#footnote-3), Belize, Brazil (Federative Republic of), Colombia (Republic of), Côte d'Ivoire (Republic of), Croatia (Republic of), Cyprus (Republic of), Czech Republic, Finland, France, Georgia, Germany (Federal Republic of), Hungary, Iran (Islamic Republic of), Italy, Jamaica, Japan, Korea (Republic of), Latvia (Republic of), Lesotho (Kingdom of), Madagascar (Republic of), Monaco (Principality of), Myanmar (Union of), Netherlands (Kingdom of the), New Zealand, Norway, Palestine (State of)[[4]](#footnote-4)\*\*, Papua New Guinea, Portugal, Romania, Rwanda (Republic of), Serbia (Republic of), Seychelles (Republic of), Sierra Leone, Slovak Republic, Slovenia (Republic of), Spain, Suriname (Republic of), Sweden, Switzerland (Confederation of), Syrian Arab Republic, United Arab Emirates, United Kingdom of Great Britain and Northern Ireland, Vatican City State.

**Sector Members**

Abertis Telecom Terrestre, Nippon Hoso Kyokai, North American Broadcasters Association, and Rai Way.

The responses received can be accessed at <http://www.itu.int/md/R12-SURVEY.SG6-SP/en>.

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1. The questionnaire agreed by ITU-R Study Group 6 is a revision of the questionnaire previously circulated by the ITU-R Secretariat in July 2014 on behalf of the Study Group 6 Rapporteur Group on the future spectrum requirements for the broadcasting service, with the following amendments to assist in the development of responses to the questionnaire:

– a modification of the questionnaire title to better reflect its purpose;

– an addition to the questionnaire’s section 3 title to clarify that the section refers to handheld devices;

– the addition of Annex 3 providing a range of indicative emission bit rates for different video formats and compression schemes to assist with responses to questions 8 and 10. [↑](#footnote-ref-1)
2. E.g. fixed, portable outdoor/mobile, portable indoor. [↑](#footnote-ref-2)
3. Three responses have been received from the Flemish, French and German communities. [↑](#footnote-ref-3)
4. \*\* See Resolution 99 (PP-14). [↑](#footnote-ref-4)