



*Radiocommunication Bureau*  
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**Circular letter**  
**6/LCCE/78**

11 May 2012

**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 terrestrial television broadcasting in connection with WRC-15 Agenda item 1.2

**References:** Administrative Circular CA/201

1 Consistent with the directives set forth by Administrative Circular [CA/201](#) and in accordance with the outcomes of the first session of the Conference Preparatory Meeting 15-1, ITU-R Working Party 6A seeks estimates from Member States and Sector Members of current and future spectrum requirements for terrestrial television broadcasting in Region 1 and Iran.

2 One particular question that will be addressed by the JTG 4-5-6-7 is to confirm the lower edge of the allocation to the mobile service made at WRC-12 from 694-790 MHz. As a result Working Party 6A realizes the JTG 4-5-6-7 needs to be fully informed about the implications to the broadcasting service consequential to that decision.

3 The following questionnaire, which is being sent to all Administrations and Sector Members in Region 1 and Iran, is designed to gather information on spectrum use in the band 694-790 MHz for television broadcasting.

4 Administrations and Sector Members are also invited to make more detailed inputs addressing the matter of current and future spectrum requirements for television broadcasting to the next meeting of WP 6A.

5 Administrations and Sector Members are requested to submit responses to [brsgd@itu.int](mailto:brsgd@itu.int) or [rsg6@itu.int](mailto:rsg6@itu.int) by 31 July 2012.

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At the request of the Chairman of Study Group 6 the attached questionnaire is published for consideration of the Administrations of Member States, Sector Members and Associates, as appropriate. The Radiocommunication Bureau does not make any engagement nor assume any responsibility with respect to the content of the attachment or any follow-up action as may be required.

**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

QUESTIONNAIRE ON SPECTRUM REQUIREMENTS FOR TERRESTRIAL TELEVISION BROADCASTING IN  
CONNECTION WITH  
WRC-15 AGENDA ITEM 1.2

This questionnaire can be completed online at the following web page:

<https://extranet.itu.int/rsg-meetings/sg6/wp6a/Lists/DTTB%20Questionnaire/overview.aspx>

Login as: **Username:** (your TIES username)@ties.itu.int

**Password:** (your TIES password)

NOTE - Electronic versions of Annexes 1, 2 & 2 can be found under QUESTIONNAIRE in the WP 6A Share Folder on the WP 6A Sharepoint site.

**Name of the Administration/Sector Member:**

**For sector members please indicate the geographical area over which you operate:**

**Contact person:**

**E-mail address:**

**Telephone number:**

- 1 a) What standards have you adopted for digital terrestrial television broadcasting?
- b) Have you started introduction of digital terrestrial television services?
- c) If yes, please provide further detail on the number of multiplexes in use, their technical specifications, the percentage of geographic area or population they are intended to cover and the total spectrum use to inform WP 6A.

A proposed format for detailed responses is provided in Annex 1.

**Reply:**

Country	No of multiplexes	System & modulation	FEC	GI	Reception mode <sup>1</sup>	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) <sup>2</sup>	Any additional comments (e.g. duration of licences)
Croatia	2	DVB-T, 64-QAM	3/4	¼	Fixed	22.3	>95.0%	>95.0%	4 SD MPEG2	140.1/ 142.6	320	Public services and commercial services broadcasted, multiplexes licensed until 2019
	1	DVB-T, 64-QAM	3/4, 5/6	¼	Fixed	22.3 / 24.8	>92.0%	>92.0%	4-6 SD MPEG2			Commercial services broadcasted, multiplex licensed until 2020
	2	DVB-T2, 256-QAM	2/3	19/256	Fixed	36.6	N/A	>94%	XX SD + XX HD MPEG4			Pay-TV services broadcasted, multiplexes licenced until 2021

- 2 a) Have you commenced analogue television switch-off?  
 b) If you have any such plans, when do you expect to have completed the analogue switch-off process?

**Reply:**

a) & b) Croatia has concluded its analogue television switch-off process in 2010.

<sup>1</sup> E.g. fixed, portable outdoor/mobile, portable indoor.

<sup>2</sup> Refer Sections 2 and 3 on page 1 of this circular.

- 3
- a) What is the percentage of viewer uptake of terrestrial television in your country, including those whose service provider uses terrestrial broadcast re-transmission (e.g. in cable networks)?
  - b) If possible, please also provide details of the number or proportion of users who receive television primarily by terrestrial means.

**Reply:**

- a) The total percentage of viewer uptake of terrestrial television in Croatia, including those whose service provider uses terrestrial broadcast re-transmission (e.g. in cable networks) is 72,1% in Q1 2012.
  - b) According to the data for Q1 2012 62,2% of households in Croatia receive television primary by terrestrial means, and an additionally 9,9% of households receive television via cable network providers.
- 4
- a) Indicate how many analogue television transmitters use channels in the frequency sub-band 694-790 MHz (as indicated in Resolution **232 (WRC-12)**).
  - b) How many are in the remaining part of the UHF band.

**Reply:**

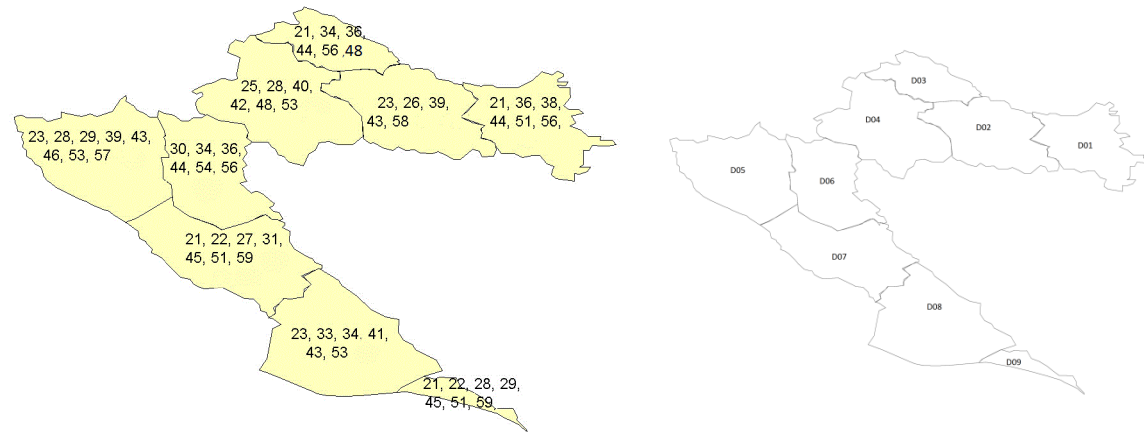
- a) & b) None, as the analogue television switch-off has been concluded in 2010. Only digital television broadcasting is in operation in band 470 – 790MHz.
- 5
- a) What frequencies/channels are currently used or intended to be used by digital terrestrial television broadcasting in your country? Please distinguish between those in use and those intended to be used.
  - b) If allotments/SFNs are in use, a sketch map of frequency allocations could be included, with an accompanying table of allocations, as shown in Annex 2. Otherwise, it might be possible to show main transmitters and channels, grouped in layers, in a table.
  - c) Please indicate how many digital television assignments/allotments use channels in the frequency sub-band 694-790 MHz (as indicated in Resolution **232 (WRC-12)**, and
  - d) How many are in the remaining part of the UHF band.

**Reply:**

- a) \* The frequencies/channels marked in green colour are in use and others are intended to be used in the future. Channels above the channel 60 are not presented in the table below as they are intended to be used for mobile communications.

Allotment	Layer 1	Layer 2	Layer 3	Layer 4	Layer 5	Layer 6	Layer 7	Layer 8
D01	21	36	38	44	51	56		
D02	23	26	39	43	58			
D03	21	34	36	44	56	48		
D04	25	28	40	42	48	53		
D05	23	28	29	39	43	46	53	57
D06	30	34	36	44	54	56		
D07	21	22	27	31	45	51	59	
D08	23	33	34	41	43	53		
D09	21	22	28	29	45	51	59	

- b)



- c) 14 out of 57 allotments in the band 470-790 MHz use frequencies in the frequency sub-band 694-790 MHz.
- d) The remaining 42 out of 57 allotments in the band 470-790 MHz use frequencies in the frequency sub-band 470-694 MHz.

- 6**
- a) Are those frequency bands also shared with other primary services?
  - b) If yes, please give details of those systems and their spectrum use.

**Reply:**

- a) These frequency bands are not shared with any other primary service.
- b) N/A

- 7
- a) Are those frequency bands also shared with secondary services such as PMSE (Programme Making and Special Events), radio astronomy or wind-profile radar?
  - b) If yes, please give details of those systems and their spectrum use.

**Reply:**

- a) Yes, these frequency bands are shared with other secondary services.
- b) These services use PMSE and SRD equipment in accordance to the ERC/REC 70-03.

- 8
- a) Do you foresee the adoption or expansion of television services broadcast using second-generation systems such as DVB-T2?
  - b) If yes, please give indicative details of the planned transition, including any simulcast period.

**Reply:**

- a) Yes.
- b) In August 2011 HAKOM started a tendering procedure for granting the license for spectrum usage for managing two digital television networks for two new multiplexes (MUX C and MUX E). After finalization of tendering procedure the license for two digital television networks for multiplexes MUX C and MUX E was issued in October 2011 to the consortium of Croatian companies (HP Produkcija d.o.o., Odašiljači i veze d.o.o. and Hrvatska pošta d.d.). According to the offer and issued license, license holders will provide pay TV services, as well as other services based on MPEG-4 encoding standard and conditional access system within the multiplexes using DVB-T2 transmission standard. The test transmission has already started and commercial start of multiplexes MUX C and MUX E is expected in September 2012.



- 9 a) Do you foresee a requirement for new and enhanced services, including HD and 3D 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) There is no exact plan on the number and nature of the services planned, as the implementation of new services depends heavily on the marked interest and the service providers business plans. Nevertheless, it is indicated by the service provider that the two Pay-TV DVB-T2 multiplexes MUX C and MUX E will provide several HD channels. For the moment there is no publicly available information on the future plans regarding 3D TV broadcasting.

- 10 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) There is no exact plan on the number of multiplexes, as the possibility to implement new multiplexes depends on the results of re-planning and coordination activities that has been initiated with all the neighbouring countries after the sub-band 790-860MHz has been vacated by broadcasting services in order to enable possibility to implement mobile services. One of the main goals of the re-planning and coordination activities is to ensure 6-7 layers (multiplexes) available for terrestrial television on a national level, as it was available after RRC'06 conference according to the GE'06 plan. The number of new multiplexes and time frame is difficult to envisage at this point, but the uptake of the PAY-TV services within MUX C and E probably will be one of the factors that will determine future usage of the remaining available spectrum in band 470-790MHz.

- 11 a) What is the amount of spectrum you foresee that will be required for terrestrial television broadcasting, if plans in Questions 8, 9 and 10 are to be supported, and services identified in Questions 6 and 7 are to be taken into account? Please indicate the modes of transmission that will be used, and timeframes.  
If appropriate, a suggested form to express these requirements is shown in Annex 3.

**Reply:**

Country	No of multiplexes	System & modulation	FEC	GI	Reception mode <sup>3</sup>	Capacity per multiplex (Mb/s)	Intended percentage population coverage	Content per multiplex	Total capacity (Mb/s)	Total spectrum bandwidth used or intended for implementation (MHz) <sup>4</sup>	Any additional comments including time frames
Croatia	2	DVB-T, 64-QAM	3/4	¼	Fixed	22.3	>95.0%	4 SD MPEG2	140.1-142.6	320	Licensed until 2019
	1	DVB-T, 64-QAM	¾, 5/6	¼	Fixed	22.3 / 24.8	>92.0%	4-5 SD MPEG2			Licensed until 2020
	2	DVB-T2, 256-QAM	2/3	19/156	Fixed	36.6	>94%	XX SD + XX HD MPEG4			Pay-TV multiplexes licenced until 2021
	2	DVB-T2	Tbd.	Tbd.	Tbd.	Tbd.	Tbd.	Tbd.	Tbd.		2 new multiplexes from 2015

<sup>3</sup> E.g. fixed, portable outdoor/mobile, portable indoor.

<sup>4</sup> Refer Sections 2 and 3 on page 1 of this circular.

## ANNEX 1

Suggested form of presentation of reply to Question 1: *What standards have you adopted for digital terrestrial television broadcasting? Have you started introduction of digital terrestrial television services? If yes, provide further detail on the number of multiplexes in use, their technical specifications, the percentage of geographic area or population they are intended to cover and the total spectrum use.*

A sample response is shown for guidance only.

Country	No of multiplexes	System & modulation	FEC	GI	Reception mode <sup>5</sup>	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) <sup>6</sup>	Any additional comments (e.g. duration of licences)
XX	2	DVB-T, 64-QAM	2/3	1/32	Fixed	24.10	98.0%	99.2%	9 SD MPEG2	169.7 plus two new muxes (tbc)	256	Public service multiplexes licensed until 2022
	1	DVB-T2, 256-QAM	2/3	1/128	Fixed	40.20	98.0%	99.2%	5 HD MPEG4			Public service multiplex licensed until 2022
	3	DVB-T, 64-QAM	¾	1/32	Fixed	27.10	89.0%	92.0%	11 SD MPEG2			Licensed until 2024
	1	[DVB-T, tbc]	[tbc]	[tbc]	Fixed	[tbc]	[tbc]		[tbc]			Expected local multiplex
	1	[DVB-T2, tbc]	[tbc]	[tbc]	Fixed	[tbc]	[tbc]		[tbc]			Expected local multiplex
YY	1	DVB-T2, 64-QAM	2/3	1/4	Portable indoor	22.6	-	60%	3 HD MPEG4	22.6		From 2013

<sup>5</sup> E.g. fixed, portable outdoor/mobile, portable indoor.

<sup>6</sup> Refer Sections 2 and 3 on page 1 of this circular.

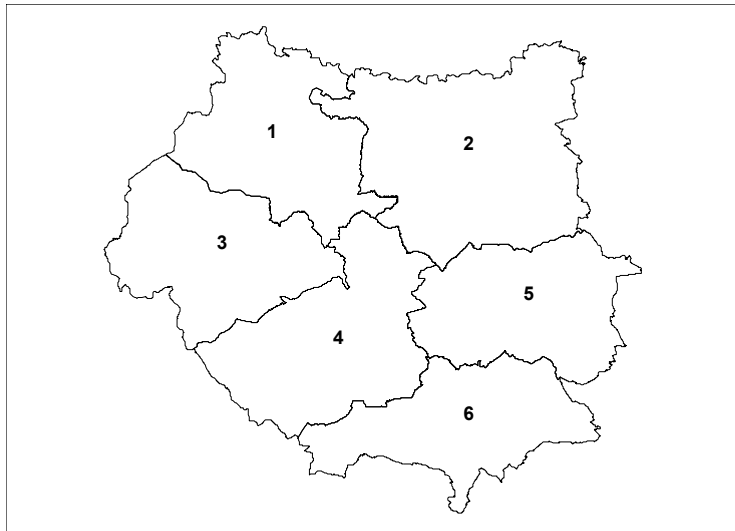
## ANNEX 2

Suggested presentation of reply to Question 5: *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.*

If allotments/SFNs are in use, a sketch map of frequency allocations could be included, with an accompanying table of allocations, as shown in Annex 2.

Otherwise, it might be possible to show main transmitters and channels, grouped in layers, in a table.

Please indicate how many digital television assignments/allotments use channels in the frequency sub-band 694-790 MHz (as indicated in Resolution **232 (WRC-12)**), and how many are in the remaining part of the UHF band.



Area	Layer 1	Layer 2	Layer 3	Layer 4	Layer 5	Layer 6	Layer 7
1	27	37	39	44	54	56	66
2	23	69	38	-	57	56	-
3	23	69	43	-	57	52	-
4	30	32	39	61	35	52	68
5	21	28	31	45	48	50	-
6	60	-	33	32	49	67	65

### ANNEX 3

Suggested form of presentation of reply to Question 11: *What is the minimum amount of spectrum you foresee that will be required for digital terrestrial television broadcasting in Bands IV & V, if plans in Questions 8, 9 and 10 are to be supported, and services identified in Questions 6 and 7 are to be taken into account? Please indicate the modes of transmission that will be used, and timeframes.*

One example methodology showing how spectrum requirements can be calculated from the different parameters using a set of assumptions can be found in Doc. [6A/59](#) submitted to WP 6A and which is currently under debate in this Working Party.

A sample response is shown for guidance only.

Country	No of multiplexes	System & modulation	FEC	GI	Reception mode <sup>7</sup>	Capacity per multiplex (Mb/s)	Intended percentage population coverage	Content per multiplex	Total capacity (Mb/s)	Total spectrum bandwidth needed (MHz) <sup>8</sup>	Any additional comments including time frames
XX	6	DVB-T2, 256-QAM	2/3	1/128	Fixed	40.20	99.2%	7 HD MPEG4	187.0		1 now, 5 more from 2020
	2	DVB-T2, 16-QAM	1/2	1/8	Fixed	13.1	90%	2 HD MPEG4			1 in 2013, 1 more from 2020
YY	4	DVB-T2, 64-QAM	2/3	1/4	Portable indoor	22.6	60%	15 SD MPEG4	90.4		1 from 2013 2 more from 2015, 1 more from 2020
ZZ	4	DVB-T2, 256-QAM	2/3	1/128	Fixed	40.20	99.2%	7 HD MPEG4	160.8		1 from 2013 2 more from 2015, 1 more from 2020

<sup>7</sup> E.g. fixed, portable outdoor/mobile, portable indoor.

<sup>8</sup> Refer Sections 2 and 3 on page 1 of this circular.