

Pursuant to Article 104, paragraph 1 of the Law on Electronic Communications (Official Gazette of the RS, nos. 44/10, 60/13 – CC and 62/14), at the proposal of the Regulatory Authority for Electronic Communications and Postal Services,

the Minister of Trade, Tourism and Telecommunications adopts a

## **RULEBOOK** **on the Switchover from Analogue to Digital Broadcasting of Television** **Programmes and Access to the Multiplex**

### **Article 1**

This Rulebook regulates the manner and schedule of the switchover, requirements and pace of establishing a network for multiplexing and distribution of digital television programmes in the territory of the Republic of Serbia, requirements for multiplex formation and the scope of use of radio frequencies, as well as requirements related to establishing an initial network for testing the broadcasting of digital television signal, to the extent necessary for successfully carrying out the switchover to digital broadcasting of television programmes.

### **Article 2**

Particular terms used in this Rulebook have the following meaning:

- 1) analogue broadcasting of television programmes is the transmission, broadcasting and/or reception of analogue video and audio signals, as well as other data intended for direct reception by the public;
- 2) digital broadcasting of television programmes is the transmission, broadcasting and/or reception of digital video and audio signals, as well as other data intended for direct reception by the public;
- 3) a multiplexer is a device, piece of equipment in digital television systems that combines different input signals into a single signal, for transmission and broadcasting purposes;
- 4) a simulcast is the simultaneous transmission and broadcasting of analogue and digital broadcasting signals in the period of switchover from analogue to digital broadcasting of television programmes (transition period);
- 5) a statistical multiplexer is a multiplexer that allocates bandwidth to input signals proportional to the complexity of the video content of those signals, with the total bandwidth of the multiplexer and its corresponding statistical multiplexer being equal;
- 6) DVB-T2 is the second generation of standards for the transmission and broadcasting of digital television signal through the terrestrial network of transmitters;
- 7) HDTV (High Definition TV) is high-resolution television, which provides better picture quality than standard-resolution television;
- 8) MPEG-4 version 10 (ISO/IEC 14496-10) is a video compression standard identical to the ITU-T H.264/AVC recommendation;
- 9) SDTV (Standard Definition TV), standard-resolution television, is a television standard for video and audio signals, known as 576i;
- 10) SFN (Single Frequency Network) is a single-frequency (same-channel) network.
- 11) STB (Set Top Box) is an external device used to adapt the received digital television signal for display on TV receivers that do not support the standard for broadcasting that signal;
- 12) UHF bands IV and V encompass the radio frequency band from 470 MHz to 862 MHz.

### Article 3

The network for multiplexing and distribution of digital television programmes, as well as for managing the network and multiplex for the purpose of carrying out the switchover from analogue to digital broadcasting of television programmes, shall be established within 15 allotment areas with a special allotment area for the wider area of the City of Belgrade in UHF bands IV and V, namely:

No.	Allotment area	Channels
1.	Avala	22, 28, 33, 45, 57, 62, 64
2.	Belgrade	43, 50, 51, 53, 59, 68
3.	Besna Kobila	35, 39, 43, 49, 54, 59, 62, 63, 69
4.	Vršac	25, 31, 37, 42, 49, 56, 60
5.	Deli Jovan	23, 24, 41, 43, 52, 59, 63, 66, 68
6.	Jastrebac	27, 33, 38, 42, 45, 55, 57, 60, 64
7.	Kikinda	29, 32, 51, 55, 59, 63, 69
8.	Kopaonik	22, 24, 28, 32, 34, 41, 51, 61, 66
9.	Kosovo and Metohija	21, 31, 44, 46, 48, 58, 67
10.	Tornik – Ovčar	23, 36, 39, 50, 56, 59, 63
11.	Rudnik-Crni vrh (Jagodina)	26, 29, 35, 40, 46, 67, 69
12.	Sombor	34, 39, 40, 43, 58, 62, 64
13.	Subotica	29, 40, 43, 55, 58, 59, 69
14.	Tupižnica	22, 25, 28, 31, 37, 44, 50, 58, 65
15.	Cer – Maljen	32, 34, 37, 42, 47, 49, 52
16.	Čot – Venac	24, 30, 41, 48, 54, 61, 66

Allotment areas 12 and 13 in UHF bands IV and V shall be merged for technical reasons in the first and second multiplex into a single allotment area (Sombor–Subotica). Allotment areas 7 and 13 in UHF bands IV and V shall be merged for technical reasons in the third multiplex into a single allotment area Kikinda–Subotica).

The distribution of channels by allotment areas for the first, second and third multiplex within the network referred to in paragraph 1 of this Article is:

Allotment area	Allotment area label	Channels by multiplex		
		First multiplex	Second multiplex	Third multiplex
Avala	1	22	28	45
Besna Kobila	3	35	39	43
Vršac	4	25	31	37
Deli Jovan	5	23	43	41
Jastrebac	6	27	38	42
Kikinda	7	32	55 <sup>1</sup>	29
Kopaonik	8	24	32	34
Kosovo and Metohija	9	21	31	44
Tornik – Ovčar	10	23	36	39
Rudnik – Crni Vrh (Jagodina)	11	26	29	35
Sombor	12	40	43	34
Subotica	13	40	43	29
Tupižnica	14	22	25	28
Cer – Maljen	15	32	34	37
Čot – Venac	16	24	30	41

The network for the distribution of digital terrestrial television programmes shall provide the coverage of at least 95% of the population in the first multiplex, as well as at least 90% of the population in the second and third multiplex.

The establishment of other networks for multiplexing and distribution of digital television programmes, as well as additional multiplexes, shall be carried out after the completion of the process of switchover to digital broadcasting of television signal, in accordance with the law.

In order to establish the network referred to in paragraph 1 of this Article, the Regulatory Authority for Electronic Communications and Postal Services (hereinafter: Authority) shall issue, upon the request of PE Transmitters and Communications (hereinafter: PE TC), individual licences for the use of radio frequencies, in accordance with the law governing electronic communications.

---

<sup>1</sup> Upon the adoption of the Decision on Change in the Use of the 700MHz Band (digital dividend 2), after the World Radiocommunication Conference WRC-15, this channel will be replaced with an appropriate channel outside the band of digital dividend 2 through an international coordination process.

#### **Article 4**

The technical standard for data compression within the multiplex referred to in Article 3 of this Rulebook shall be ITU-T H.264/AVC (MPEG-4 version 10).

The technical standard for broadcasting television signal within the multiplex referred to in Article 3 of this Rulebook shall be DVB-T2.

#### **Article 5**

The network for multiplexing and distribution of digital television programmes, as well as for managing the network and multiplex for the purpose of carrying out the switchover from analogue to digital broadcasting of television programmes shall be designed based on the single-frequency (same-channel) type of network (SFN) within each of the allotment areas referred to in Article 3 of this Rulebook.

#### **Article 6**

Requirements related to the switchover from analogue to digital broadcasting of television programmes in a particular region shall include:

- 1) the existence of a multiplex and network for the distribution of digital television signal;
- 2) an established user base for the reception of digital television signal.

The user base for the reception of digital television signal referred to in paragraph 1, item 2) of this article shall be established in the allotment area, namely:

- 1) by informing the public about the activities that need to be carried out in order to receive the digital television signal;
- 2) by informing the public about important deadlines for the cessation of analogue broadcasting of television programmes and the start of exclusively digital broadcasting of television programmes;
- 3) by providing an adequate amount of STB devices in the market, in proportion to the number of households receiving television signal through the terrestrial network of transmitters.

The complete shutdown of analogue TV signal shall be completed within deadlines that are in line with the international commitments of the Republic of Serbia.

## **Article 7**

The capacity of the multiplex shall be filled with television broadcasting services, with or without conditional access, in standard (SDTV) or high (HDTV) resolution, as well as other data transmitted through the multiplex (for example, teletext, electronic programme guide, translations, etc.), in accordance with the law governing the field of electronic media.

**The first multiplex shall be filled with programmes of public broadcasters in the Republic of Serbia and holders of licences for broadcasting television programmes across the territory of the Republic of Serbia, in accordance with the law governing the field of electronic media.\***

**The second multiplex shall be filled with television broadcasting services for which a licence for broadcasting television programmes in regional and local areas has been granted in accordance with the law.\***

**Exceptionally, the holder of the licence for broadcasting programmes in regional and local areas may, upon the holder's request and if the technical requirements are met, be granted access to the second multiplex in the adjacent allotment area, in accordance with the law. The new coverage area must include the coverage area of the holder of the licence for broadcasting programmes in regional and local areas in accordance with the law, which shall be confirmed by measurements.\*\***

**The third multiplex shall be filled with television broadcasting services for which a licence for broadcasting television programmes has been granted in accordance with the law.\***

\*Official Gazette of the RS, number 18/2015

\*\*Official Gazette of the RS, number 50/2015

## **Article 8**

The data bandwidth within the multiplex shall be least 2 Mb/s per individual television programme broadcast in standard resolution (SDTV) and at least 5 Mb/s in high resolution (HDTV) in the constant bit rate encoding variant, that is, bandwidth that can be provided using the appropriate statistical multiplexer, so that subjective quality is not diminished in accordance with relevant recommendations.

## **Article 9**

PE TC shall establish an electronic communications network for multiplexing and distribution of digital television programmes for the first, second and third multiplex, which will be commissioned and filled in the manner provided for in Article 7 of this Rulebook, and, during the switchover process, in accordance with the law governing electronic communications.

No later than 45 days before the shutdown of analogue and switchover to digital broadcasting of TV programmes, PE TC shall submit to the Regulatory Authority for Electronic Media (hereinafter: Regulator) information about available capacity in the multiplexes. Within 30 days, the Regulator shall adopt a decision on access to the multiplex for the licence holder.

Technical and economic requirements for access shall be regulated by a contract concluded by PE TC with each television broadcasting service provider.

The contract referred to in paragraph 3 shall become an integral part of the broadcasting licence.

## **Article 10**

The individual licence referred to in Article 3 of this Rulebook shall ensure the establishment of a network in such a manner that even before the complete shutdown of the analogue signal, network testing will be carried out at frequencies designated for the purpose of establishing the Initial Network for Testing the Broadcasting of Digital TV Signal (hereinafter: Initial Network) laid out in the regulation

setting out the Plan for the Allotment of Frequencies/Locations for Terrestrial Analogue FM and TV Broadcasting Stations for the Territory of the Republic of Serbia and at free frequencies in accordance with the regulation setting out the Plan for the Allotment of Frequencies/Locations/Allotment Areas for Terrestrial Digital TV Broadcasting Stations in the UHF Band for the Territory of the Republic of Serbia, in accordance with individual licences for the use of radio frequencies for the Initial Network, granted by the Authority.

The infrastructure of the Initial Network, depending on technical characteristics and needs, will be used in the final network, in accordance with the strategic document for the switchover from analogue to digital broadcasting of radio and television programmes in the Republic of Serbia.

### Article 11

All programmes of public broadcasters in the Republic of Serbia and holders of licences for the provision of television broadcasting services for the territory of the Republic of Serbia must be included in the Initial Network. Based on the information obtained from PE TC about free capacity in the Initial Network, the Regulator shall determine what programmes of holders of licences for the provision of television broadcasting services, and in what resolution (SDTV or HDTV), may be included in the Initial Network.

When the coverage of more than 90% of the population in an allotment area with the digital signal of the Initial Network has been achieved, the conditions for declaring the start of the simulcast shall be met. The start of the simulcast shall be declared by the PE TC. \* On the day of expiry of the period of simulcast in a particular allotment area, all analogue transmitters in that allotment area the programmes of which are broadcast in the Initial Network shall be shut down and digital broadcasting on the channels referred to in Article 3, paragraph 3 of this Rulebook shall continue. The remaining analogue programmes (those that are not part of the Initial Network), shall be included in the corresponding multiplexes, according to a schedule that ensures rational and efficient use of the available band, and their analogue transmitters shall be shut down.

#### Deadlines for start of simulcast and shutdown of analogue services, by allotment area\*

Allotment area*	Simulcast*		Shutdown group*
	Start*	End*	
Vršac*	01/09/2014*	15/04/2015*	1*
Subotica-Sombor*	01/09/2014*	08/05/2015*	2*
Kikinda*	01/09/2014*	08/05/2015*	2*
Čot-Venac*	01/09/2014*	18/05/2015*	3*
Avala*	01/09/2014*	25/05/2015*	4*
Rudnik-Crni Vrh Jagodina*	01/09/2014*	01/06/2015*	5*
Tupiznica*	01/10/2014*	01/06/2015*	5*
Tornik-Ovčar*	01/11/2014*	01/06/2015*	5*
Deli Jovan*	01/11/2014*	01/06/2015*	5*
Besna Kobilica*	01/10/2014*	15/06/2015*	6*
Jastrebac*	01/11/2014*	15/06/2015*	6*
Kopaonik*	01/11/2014*	15/06/2015*	6*
Cer-Maljen*	01/11/2014*	15/06/2015*	6*

\*Official Gazette of the RS, number 30/2015

## **Article 12**

The minimum technical requirements for broadcasting digital terrestrial television signal are provided in Annex 1, which is attached to this Rulebook and constitutes an integral part of it.

## **Article 13**

On the day this Rulebook enters into force, the Rulebook on the Switchover from Analogue to Digital Broadcasting of Television Programmes and Access to the Multiplex in Terrestrial Digital Broadcasting (Official Gazette of the RS, number 55/12) shall cease to be valid.

## **Article 14**

This Rulebook shall enter into force on the eighth day from the day of its publication in the Official Gazette of the Republic of Serbia.

Number 110-00-27/2014-07  
In Belgrade, 14 August 2014  
Minister  
**Rasim Ljajić**, signed

## **Annexes**

### **Annex 1. Minimum technical requirements for broadcasting digital terrestrial television signal**

Digital terrestrial television signal (hereinafter: signal) shall be broadcast in accordance with SRPS EN 302 755 and ETSI TS 102 831 standards, using the following parameters:

- channel spacing of 8 MHz in the UHF frequency band;
- the pilot pattern parameter shall be one of: PP1, PP2, PP3, PP4, PP5, PP6, PP7 or PP8;
- Single Input Signal Output (SISO) mode of operation;
- FFT size shall be one of: 1k, 2k, 4k, 8k, 16k, and 32k (for 8k, 16k, and 32k, extended mode of operation must also be enabled, in addition to normal mode);
- the constellation shall be 16QAM, 64QAM or 256QAM;
- the code rate shall be one of: 1/2, 3/5, 2/3, 3/4, 4/5 or 5/6;
- the guard interval shall be one of: 1/4, 19/128, 1/8, 19/256, 1/16, 1/32, 1/128.

The transport stream of the signal shall be compliant with the ISO/IEC 13818-1 standard. The implementation of video and audio encoding shall be compliant with specification ETSI TS 101 154.

The video recording within the signal shall be in MPEG-4 version 10 SD/HD format, in one of the resolutions: 720x576, 544x576, 480x576, 1920x1080i, 1920x1080p or 1280x720p.

The time delay between corresponding video and audio recordings shall be compliant with the ITU-R BT.1359 recommendation.

The audio recording within the signal shall be in one of the formats:

- MPEG-1 Layer II, compliant with ISO/IEC 13818-3, for SDTV;
- MPEG-4HE AAC, compliant with ISO/IEC 14496-3, for HDTV;
- AC-3\*, compliant with ETSI TS 102 366, for HDTV.

The specification of service information in DVB systems shall be compliant with ETSI EN 300 468 and ETSI TR 101 211.

The audio descriptor within the signal shall be compliant with ETSI TS 102 366 and TS 101 154 (Annex E).

The teletext information in the signal shall be compliant with the ETSI EN 300 472 standard. Translations (captions, DVB subtitles) shall be compliant with ETSI EN 300 743, including characters from ISO/IEC 8859-5 and ISO/IEC 8859-2 code tables.

In case of updating the system software from the transport stream (DVB SSU), updates shall be carried out in compliance with specification ETSI TS 102 006.

In case of broadcasting protected content, or programmes with conditional access, the CI Plus Specification v1.2 or newer standard shall be used.

\*Official Gazette of the RS, number 18/2015