

# MANAGING OF RF SPECTRUM MOBILE CASE IN SERBIA



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# ABSTRACT

- **RATEL GOALS**
- **ELECTRONIC COMMUNICATIONS IN SERBIA – 2015**
- **MOBILE OPERATORS**
- **PUBLIC TENDERS**
- **MOBILE BROADBAND STATUS**
- **REMAINING SPECTRUM – FREE FOR SALE**
- **RF BAND 3.4 -3.8GHz**

## RATEL GOALS

- Creating conditions for the development of electronic communications
- Fostering competition of electronic networks and services
- Improving capacity and quality of networks
- Development of the electronic communications market
- Protection of the interests of users of electronic communications

## ELECTRONIC COMMUNICATIONS IN SERBIA - 2015

- **Total turnover 1,55 billion EUR, out of which:**
  - 58,3 % in mobile telephony services, 3 mobile operators (+ 2 MVNO in 2016)
  - 19,7% in fixed telephony services, 16 operators
  - 11,6% in access to the public Internet, 212 ISPs
  - 9,4 % in media content distribution services, 90 operators
  - ...
- **Total investments 276 million EUR**

# MOBILE OPERATORS

## ➤ **3 Mobile operators**

- Telekom Srbija
- Telenor
- Vip mobile

## ➤ **Frequency bands**

- 800 MHz
- 900 MHz
- 1800 MHz
- 2100 MHz

## PUBLIC TENDERS

In 2015 RATEL conducted public tenders for frequency bands which enabled the introduction of services of the fourth generation (4G) in two frequency bands

- 1710-1785/1805-1880 MHz
- 791-821/832-862 MHz – DD1

## RF band - 1800 MHz

➤ Result of the tender :

In 1800 MHz frequency band each operator has purchased additional frequency blocks (2x10MHz) for providing public electronic communication services for IMT system (IMT-2000 and IMT-Advanced) on a technology neutral basis

## RF band - 800 MHz

- Transition from analogue to digital TV was completed in June 2015 and the RF band 790-862MHz is reassigned from broadcast to public electronic communication services for IMT system (IMT-2000 and IMT-Advanced) on a technology neutral basis
- Result of the tender :  
Each operator has purchased additional frequency block (2x10MHz)



# MOBILE BROADBAND STATUS (1)

| Frequency bands already harmonised for mobile broadband |                            |  |
|---|----------------------------|--|
| CEPT  |                            |  |
| Band  | Size (MHz)                 | Ref  |
| 800 MHz   | 2 x 30                     | ECC/DEC/(09)03                                   |
| 900 MHz   | 2 x 35                     | ERC/DEC/(94)01 & ERC/DEC/(97)02 & ECC/DEC/(06)13 |
| 1452 - 1492 MHz   | 40                         | ECC/DEC/(13)03                                   |
| 1.8 MHz   | 2 x 75                     | ERC/DEC/(95)03 & ECC/DEC/(06)13                  |
| 2 GHz   | 2 x 60                     | ECC/DEC/(06)01                                   |
| 2.6 GHz   | 2 x 70 + 50                | ECC/DEC/(05)05                                   |
| 3.4 – 3.8 GHz   | 400                        | ECC/DEC/(11)06                                   |
|   | <b>SubTotal : 1030 MHz</b> |  |
| 700 MHz   | 2 x 30 + 20                | ECC/DEC/(15)01                                   |
| 2.3 – 2.4 GHz   | 100                        | ECC/DEC/(14)02                                   |
|   | <b>Total : 1210 MHz</b>    |  |

# MOBILE BROADBAND STATUS (2)

## SERBIA CASE

| Frequency bands already harmonised for mobile broadband SRB |                           |  |   |
|---|---------------------------|--|---|
| Band  | Size (MHz)                | Ref  | Assigned (sep 2016)                         |
| 800 MHz   | 2 x 30                    | ECC DEC (09)03   | 2 x 30                                      |
| 900 MHz   | 2 x 35                    | ERC/DEC/(94)01 & ERC/DEC/(97)02 & ECC/DEC/(06)13   | 2 x 23.4 MHz                                |
| 1452 - 1492 MHz   | 0                         | Broadcasting (Maastricht 2002 Special Arrangement, Rev. in Constanta 2007, EN 302 077& ECC/DEC/(03)02) | 0   |
| 1.8 MHz   | 2 x 75                    | ERC/DEC/(95)03 & ECC/DEC/(06)13  | 2 x 70 MHz                                  |
| 2.1 GHz   | 2 x 60 + 35               | ECC/DEC/(06)01   | 2 x 45 + 15 MHz                             |
| 2.6 GHz   | 2 x 70 + 50               | ECC/DEC/(05)05   | No  |
| 3.4 – 3.8 GHz   | 400                       | ECC/DEC/(11)06   | No  |
| 700 MHz   | 0                         | Broadcasting (Geneva Agreement 2006.& EN 302 755)  | 0   |
| 2.3 – 2.4 GHz   | 0                         | SAP/SAB&RR&Def.Syst (ERC/REC 62-02&ERC/REC25-10& EN 302 064&EN 301 783)                                | 0   |
|   | <b>Total<br/>1025 MHz</b> |  | <b>Total: 351.8 MHz<br/>Free: 673.2 MHz</b> |

# REMAINING SPECTRUM

## - FREE FOR SALE

| FREQUENCY BAND<br>(MHz) | UL       |          | DL       |          | TOTAL (MHz)                        |
|-------------------------|----------|----------|----------|----------|------------------------------------|
|                         | from     | to       | from     | to       |                                    |
| 900                     | 958,900  | 959,800  | 913,900  | 914,900  | 2 x 1 MHz                          |
| 1800                    | 1875,200 | 1880,000 | 1780,200 | 1785,000 | 2 x 5 MHz                          |
| 2100 (UMTS TDD)         | 2010,000 | 2025,000 | 1915,000 | 1920,000 | 1 x 15 MHz and 1 x 5 MHz           |
| 2100 (UMTS FDD)         | 2155,000 | 2170,000 | 1965,000 | 1980,000 | 2 x 15 MHz                         |
| 2600                    | 2500     | 2570     | 2620     | 2690 MHz | 2x70                               |
| TOTAL                   |          |          |          |          | <b>2x91MHz (FDD) + 20MHz (TDD)</b> |

# RF band 3.4-3.8 GHz (1)

## Global developments (I)

- 3.5 GHz band is seen as “golden” and “innovation” band
- 400 MHz of continuous spectrum, low spectrum cost
- Well suited for mobile broadband employing small cell technology, BWA also supported
- Throughputs of up to 1Gbps achieved in 100 MHz bandwidth
- Massive MIMO is seen as a Key Technology for 5G
- Massive MIMO enhances 3.5GHz coverage
- 3.5GHz operators appeal conventional device vendors to launch handsets supporting 3.5GHz to enrich the variety of 3.5GHz portable devices

## RF band 3.4-3.8 GHz (2) Global developments (II)

- Many operators worldwide, who have launched TD-LTE, are in a process of testing and trials of 3.5 GHz TD-LTE service; a few will make it commercially available in Q2 2016
- In Europe 3.5 GHz licences have been issued in 2016 in Romania and Hungary, rights to use a part of 3.5 spectrum have been sold in Greece in 2014 and there are announcements of future auctions in France, Ireland and UK
- **Google**, in cooperation with 5 other technology companies, is conducting a test of 3.5GHz shared wireless in more than eight locations in Kansas City area for up to 18 months
- **AT&T** has asked the FCC for a three-year license to test 5G wireless technology at 3.5GHz, 4GHz, 15GHz and 28GHz in Austin, Texas

## RF band 3.4-3.8 GHz (3) SERBIA CASE (I)

- Unlike in most European countries, in Serbia this frequency band is **completely unused**
- There is only one valid FSS license
- According to the Allocation Plan frequency band 3400-3800 MHz is allocated for fixed, mobile and fixed-satellite service (space-to-Earth)
- According to the Allotment Plan for the frequency band 3400-3800 MHz, adopted in 2014, duplex mode of operation in the whole frequency band is Time Division Duplex (TDD)
- Serbia has signed the Technical arrangement between the national frequency management authorities of AUSTRIA, CROATIA, HUNGARY, SERBIA, THE SLOVAK REPUBLIC AND SLOVENIA on border coordination for terrestrial systems capable of providing electronic communications services in the frequency band 3400-3800 MHz, Geneva, 24 November 2015.

## RF band 3.4-3.8 GHz (4) SERBIA CASE (II)

- Public invitation for entities who intend to use frequency bands 3400-3600 MHz and 3600-3800 MHz for systems providing public electronic communications services - broadband wireless access systems (BWA), mobile / fixed communications networks (MFCN) in February 2016
- Issuance of individual licenses for regional and national coverage is not expected in next two years
- RATEL invites all interested parties to submit their requests for use of frequencies for the purpose of conducting trials in the frequency band 3400-3800 MHz. The Agency hopes that this will help stimulate innovation in every possible area of application for these frequency bands.

# Thank you for your attention !

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