5G in Serbia – deployment challenges and RATEL EMF project

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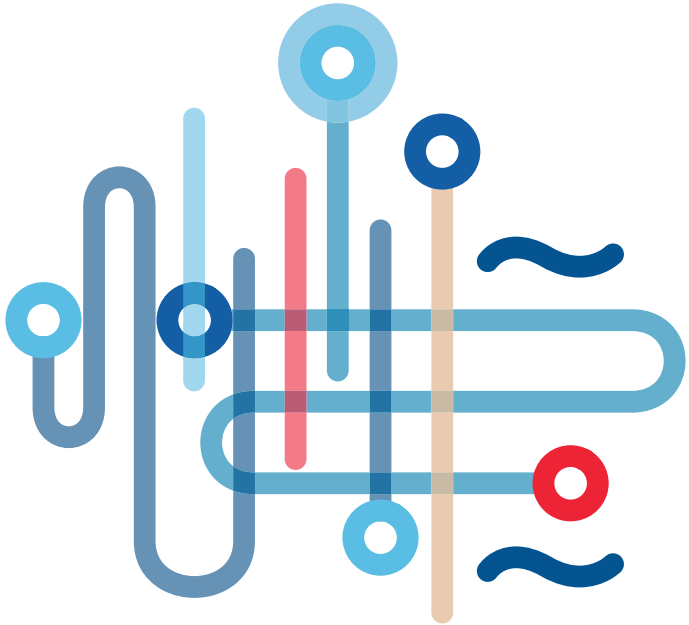
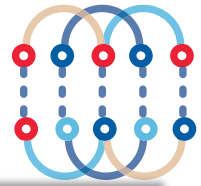


Summary



- 5G deployment challanges
  - 5G vision, achievements and plans
  - Regulatory framework challenges
  - 5G “pioneer bands” status
  - Reference levels for local exposure to electromagnetic fields SRB vs. ICNIRP
- EMF RATEL (System for continuous monitoring of high frequency electromagnetic field levels)

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5G vision, achievements and plans

- ❑ 5G changing the world
- ❑ Establishing the 5G environment in Serbia is an important step forward in a promising future
- ❑ “Strategy for the development of new generation networks until 2023” - aims to make Serbia the regional leader in development of digital economy and innovation

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5G test cases

- ❑ The first 5G test base stations in Serbia have been launched during 2019/2020 in Belgrade (Science Technology Park - Telenor and Belgrade Fair - Telekom)
- ❑ Throughput greater than 1Gbps achieved using test equipment
- ❑ RATEL issued frequency licences for temporary 5G spectrum usage in 3,4-3,8GHz (100MHz) with LTE anchor in 2,6GHz (2x20MHz)

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Smart Cites (LTE NB-IoT → 5G)

❑ Smart Cities project (project will encompass the biggest cities in the country: Belgrade, Novi Sad and Nis – pilot project)

GOING TO BE

Experimental 5G cross-border corridor

❑ Bulgaria, Greece and Serbia have signed an agreement to develop an experimental 5G cross-border corridor (Thessaloniki – Sofia – Belgrade) that will test driverless vehicles

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Regulatory framework challenges (estimated timeline)

- ❑ Radio Frequency Allocation Plan (2020) - Government of Republic of Serbia 

- ❑ Electronic Communications Law (2021) – National Assembly of Serbia
- ❑ Radio Frequency Allotment Plans (2020-2021) - Ministry of Trade, Tourism and Telecommunications
- ❑ Rulebook on the Minimum Requirements for the Issuance of Individual Licences for Radio Frequency (2021) - Ministry of Trade, Tourism and Telecommunications
- ❑ Spectrum awards procedure (2021/2022) – RATEL
- ❑ Spectrum assignment (2021/2022) – RATEL
- ❑ 5G Implementation (2022) - MNOs,...

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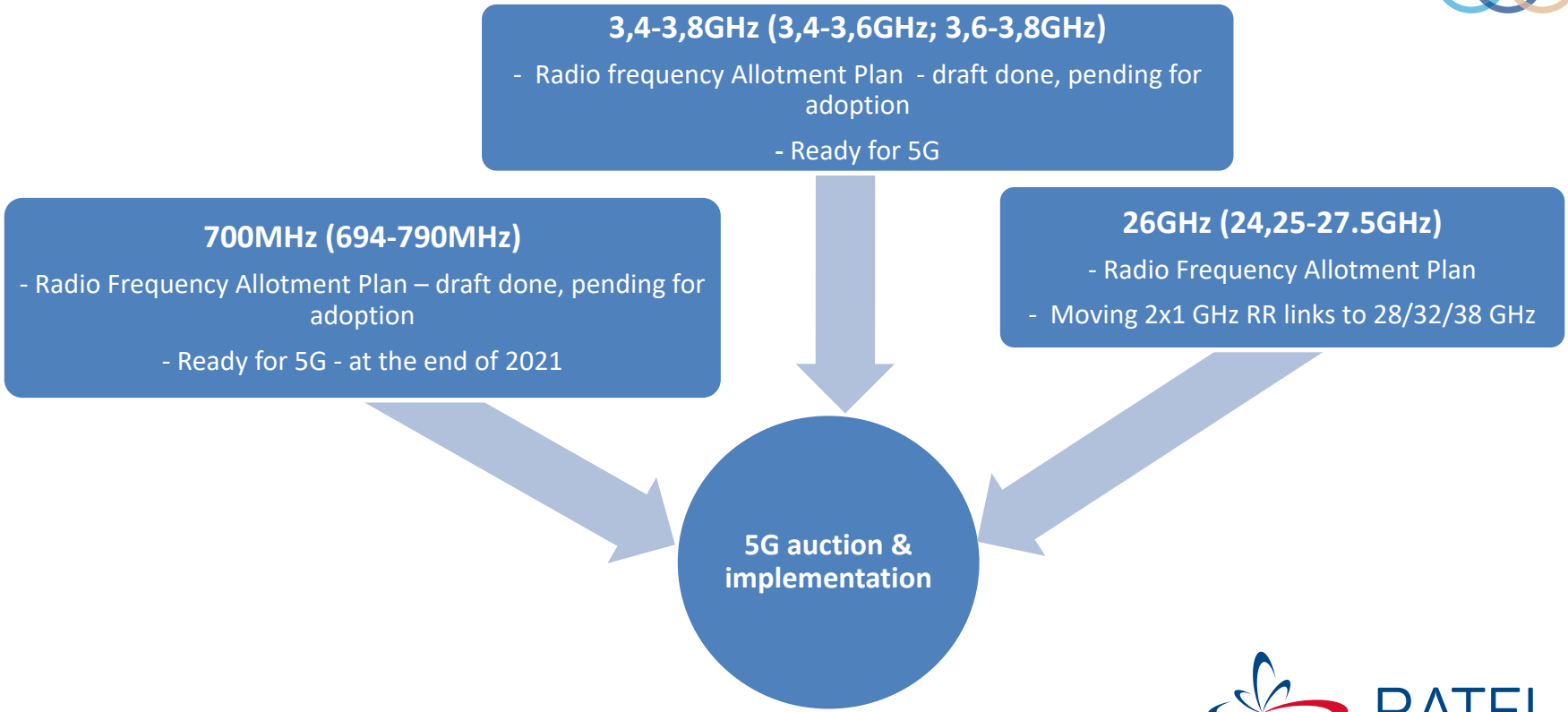
5G “pioneer bands” status



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Reference levels for local exposure to electromagnetic fields SRB vs. ICNIRP

Frequency	E-field strength (V/m)	H-field strength (A/m)	Power density (W/m^2)	Averaged over (min)	Standard
800MHz	15.56	0.042	0.64	6	RULEBOOK ON LIMITS OF EXPOSURE TO NON-IONIZING RADIATION ("Official Gazette of RS", No. 104/2009)/RULEBOOK ON NON-IONIZING RADIATION SOURCES OF SPECIAL INTEREST, TYPES OF SOURCES, METHOD AND PERIOD OF THEIR TESTING (" Official Gazette of RS ", No. 104/2009) *
900MHz	16.5	0.044	0.72	6	
1800MHz	23.33	0.063	1.44	6	
2100MHz	24.4	0.064	1.6	6	
800MHz	83.61	0.218	18.2	6	ICNIRP (International Commission on Non-Ionizing Radiation Protection) Guidelines for limiting exposure to electromagnetic fields (100 KHz to 300 GHz), 2020
900MHz	87.96	0.229	20.14	6	
1800MHz	118.5	0.309	36.56	6	
2100MHz	N/A	N/A	40	6	

❑ **** Article 3 & 8*** *Non-ionizing radiation sources of special interest are sources of electromagnetic radiation that can be harmful to human health, and are defined as stationary and mobile sources whose electromagnetic field in the zone of increased sensitivity reaches at least 10% of the reference value prescribed for that frequency. The user of the source provides periodic tests after source commissioning.*

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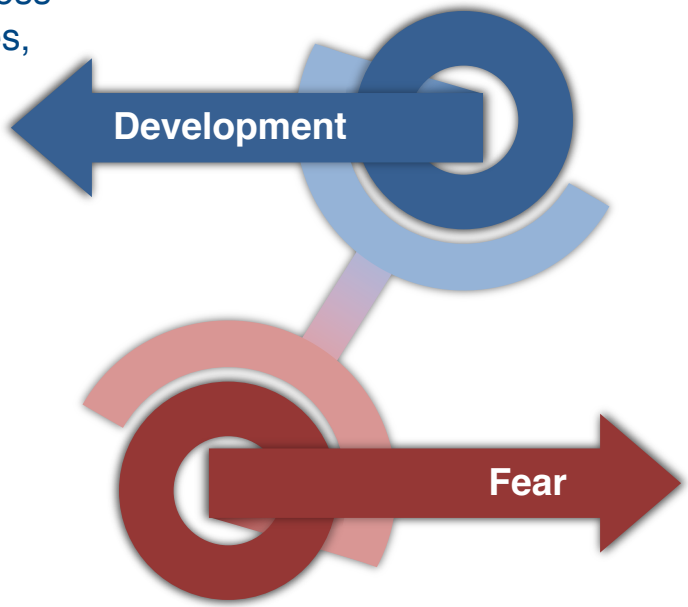
Background – RATEL EMF PROJECT

Rapid development of wireless telecommunications services, 5G networks

5G

Increasing number of transmitting sources of electromagnetic radiation (5G: small cells in large numbers)



Public concern of electromagnetic fields affects further development towards 5G networks

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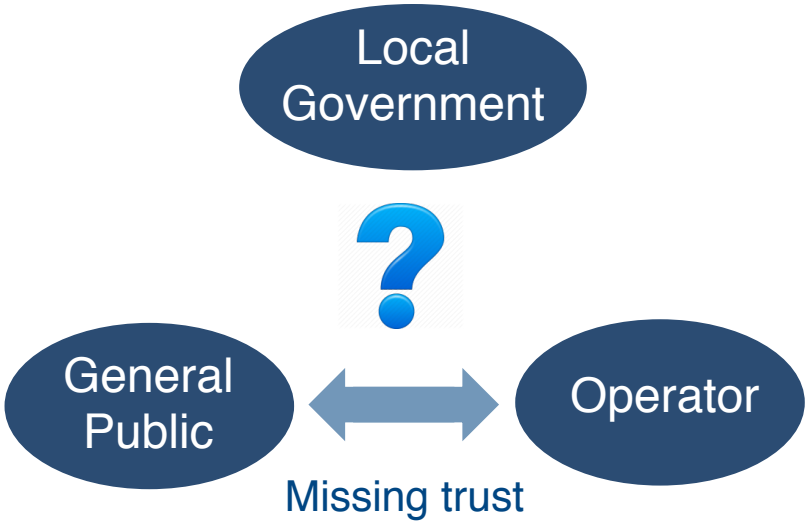
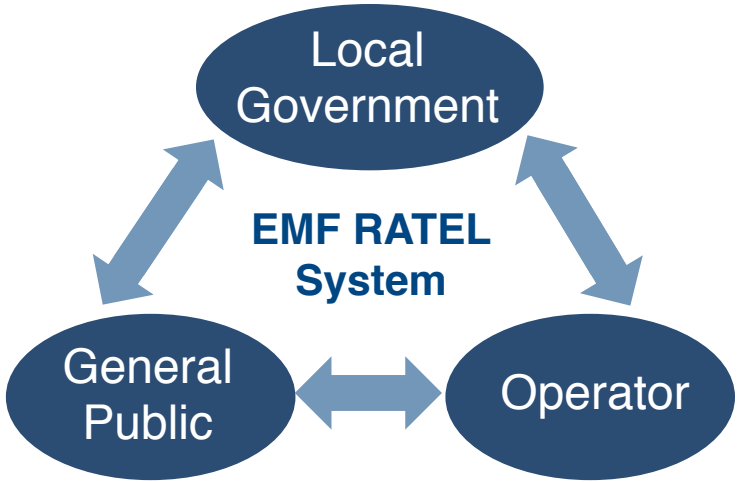
Why EMF Monitoring?





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Project scope

100 EMF sensors

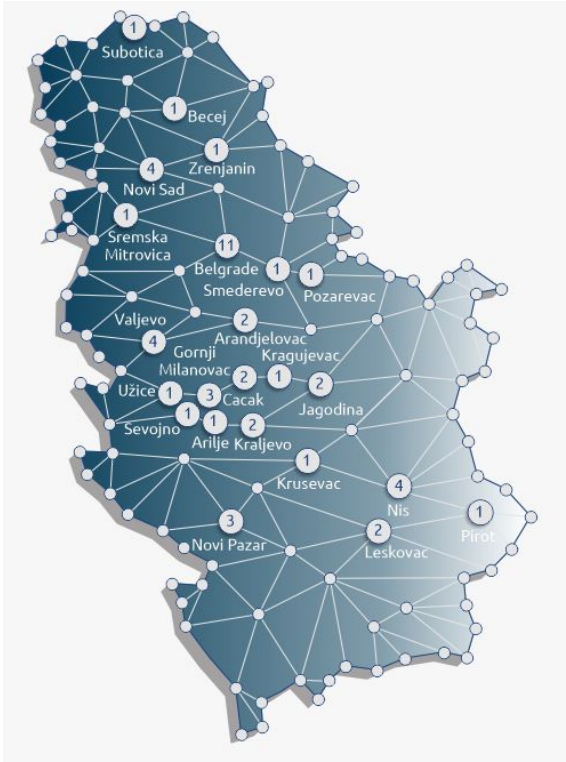
Long-term project

More than 30 cities

Increased sensitivity locations

Multi-vendors (NARDA, WaveControl)

Open project



Increased sensitivity locations based on:

✓ Rulebook on the Limits of Exposure to Non-Ionizing Radiation

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October 2020: 57 locations in 26 cities

ES “Lazar Savatić”, Belgrade

Faculty of Technical Sciences, Novi Sad

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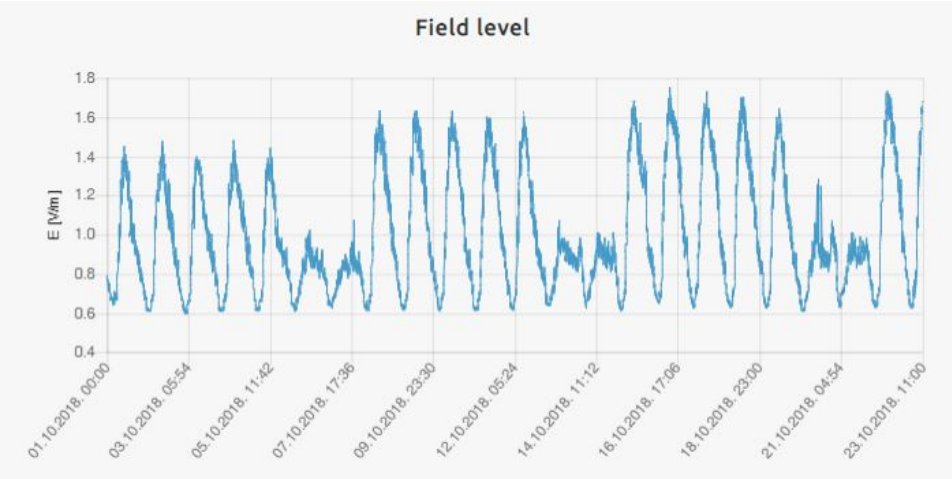
Location of interest: Novi Sad

Faculty of Technical Sciences
Altitude: 14 m

NARDA multi-band EMF sensor
Max measured value: 2.12 V/m



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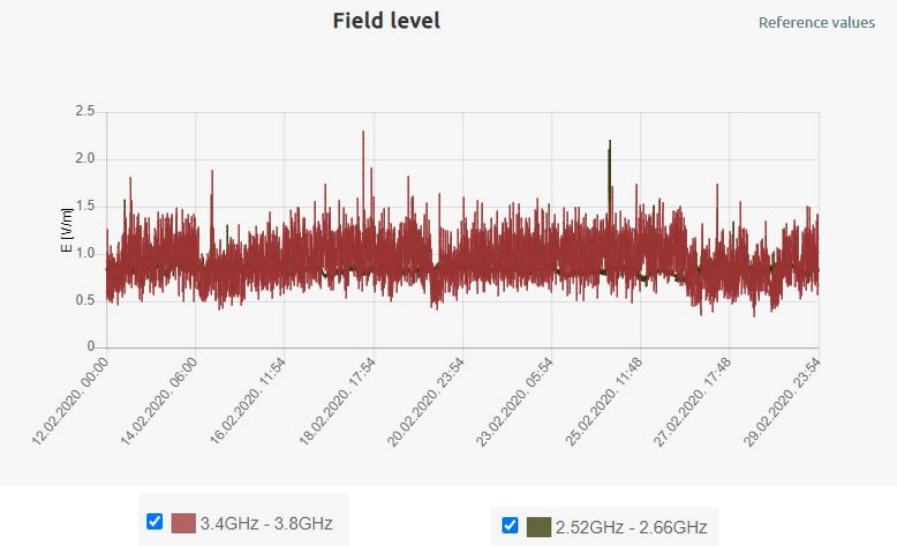
Science Technology Park : First 5G measurement

Defined bands for 5G:

2.52 – 2.66 GHz – NSA 5G (2,6 GHz UL/DL)

3.40 – 3.80 GHz – 5G (3,5 GHz DL/UL)



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EMF RATEL: System Overview

Sources of the EMF

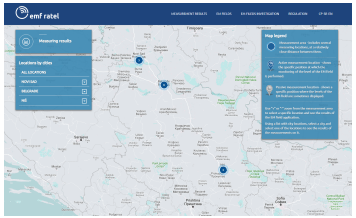
EMF Sensors

Mobile network

Central server with DB and web access

Internet

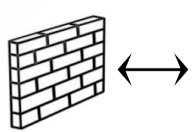
EMF RATEL Portal



http://emf.ratel.rs

Public users

Administrative RATEL users



Authorization

http://emf-admin.ratel.rs

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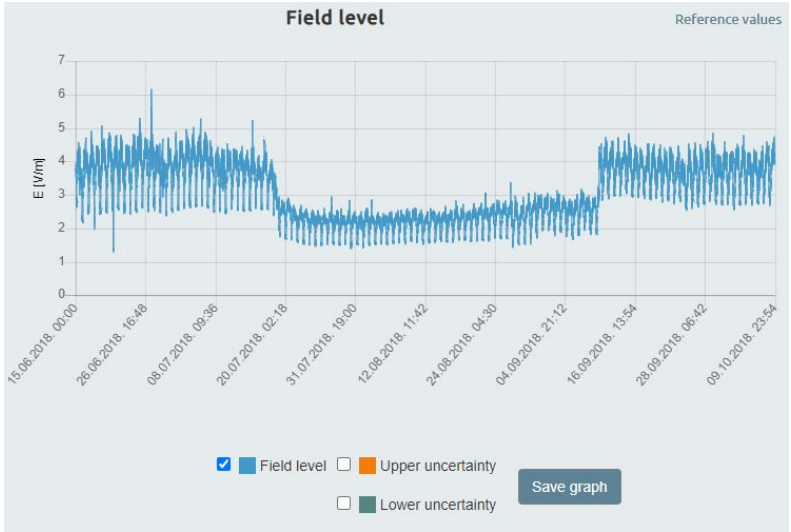
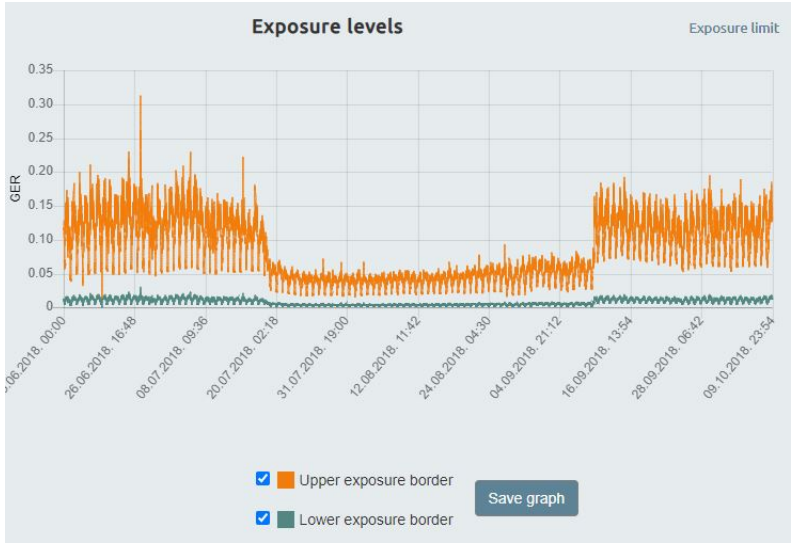
Impact of mobile networks: EMF level change

Still significantly below the limits





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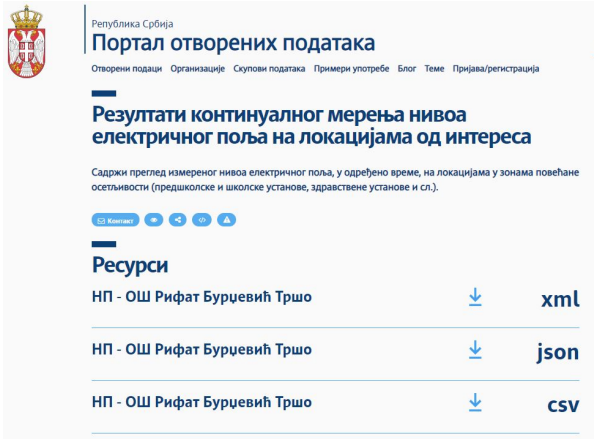
EMF RATEL: Open data

1 skup podataka (CSV, XML, JSON)

Available data:

- The location / object where the sensor is mounted
- Sensor type
- Date and time
- Measured electromagnetic field level
- Field level limit
- Upper and lower measurement uncertainty
- Upper and lower exposures
- Exposure limit



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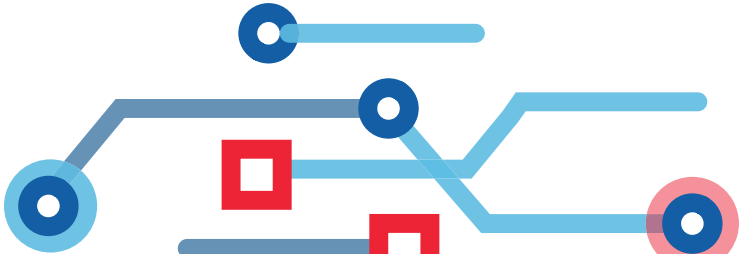
https://data.gov.rs/



EMF RATEL System

Outlook

- 26 cities
- New EMF sensors
- Involving other parties
- Open data

- Further development of the Public and Administrative EMF RATEL Portal

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Thank you !

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