Radio Frequency Electromagnetic Field Measurement and Monitoring in Serbia

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RATEL
REGULATORY AGENCY FOR ELECTRONIC COMMUNICATIONS AND POSTAL SERVICES

Project scope

- 100 EMF sensors
- Long-term project
- 25 cities
- Increased sensitivity locations
- Multi-vendors (NARDA, WaveControl)
- Open project

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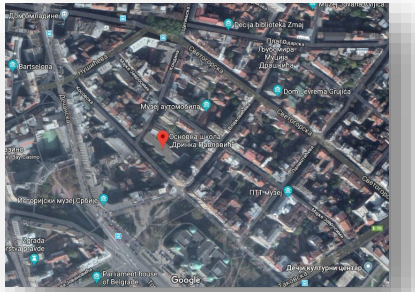
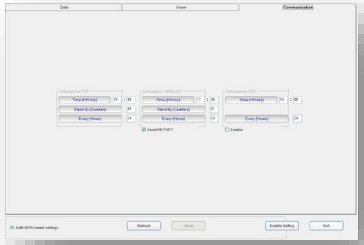
Project phases



Location acquisition

Site visits and test measurements

Testing equipment



Equipment configuration

Site visit due to installation

EMF sensor installation

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Multi-band EMF sensors: NARDA and WaveControl

narda
Safety Test Solutions
an L3 communications company

100 kHz to 7 GHz
0.2 V/m – 200 V/m
Communication:
2G/3G, WiFi, USB, Ethernet

WAVECONTROL
Safety, Quality, Service

100 kHz to 8 GHz
0.3 V/m – 130 V/m
Communication: 2G/3G, USB

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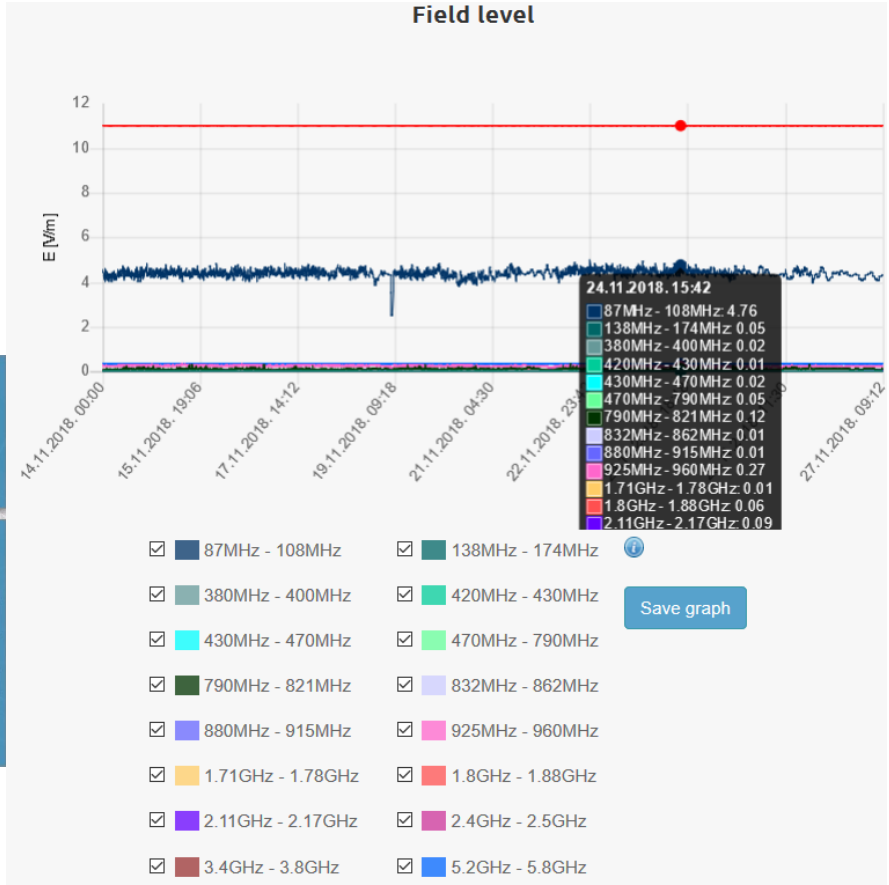
Location: Belgrade

Elementary school “Drinka Pavlović”
Altitude: 28 m

NARDA selective-band EMF sensor



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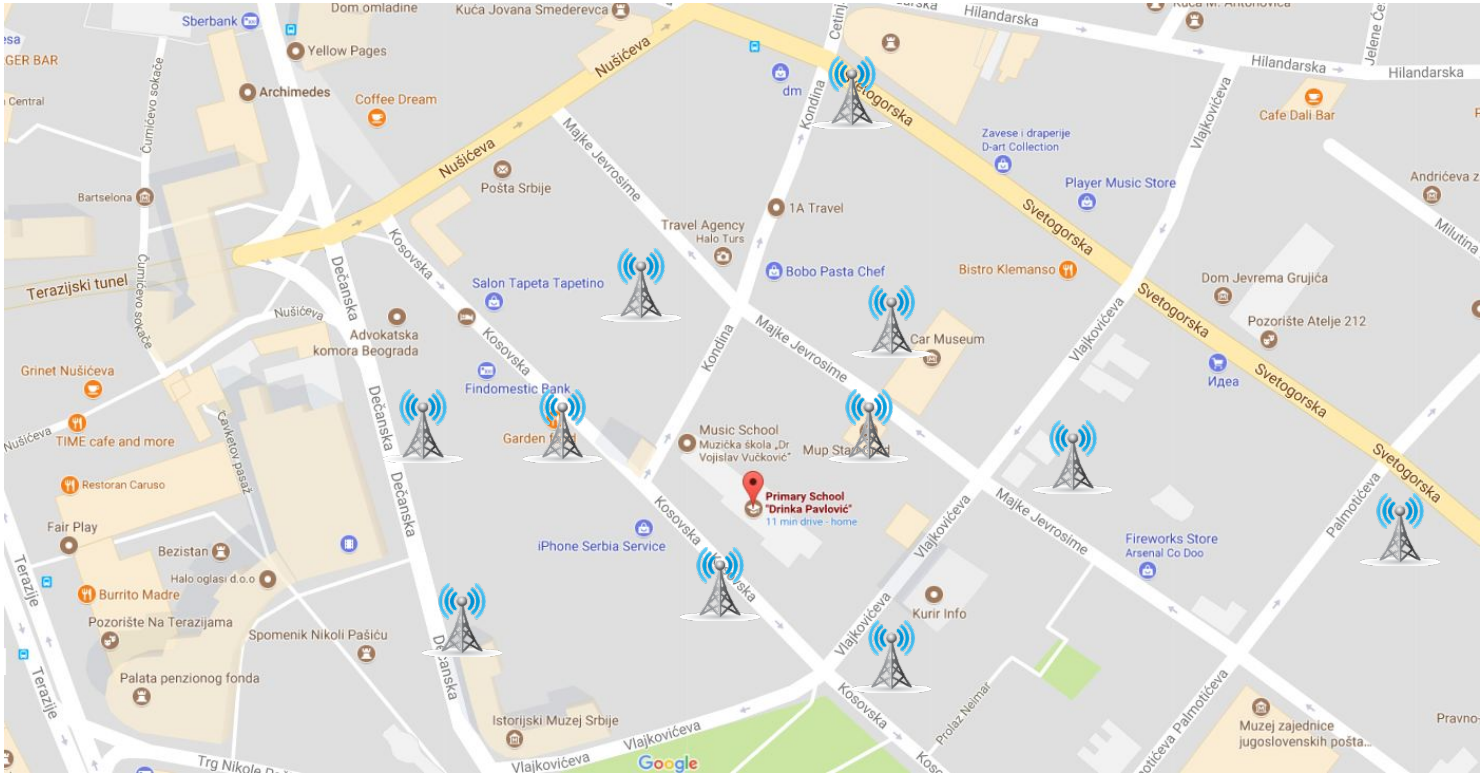
39 Radio systems

11 Locations



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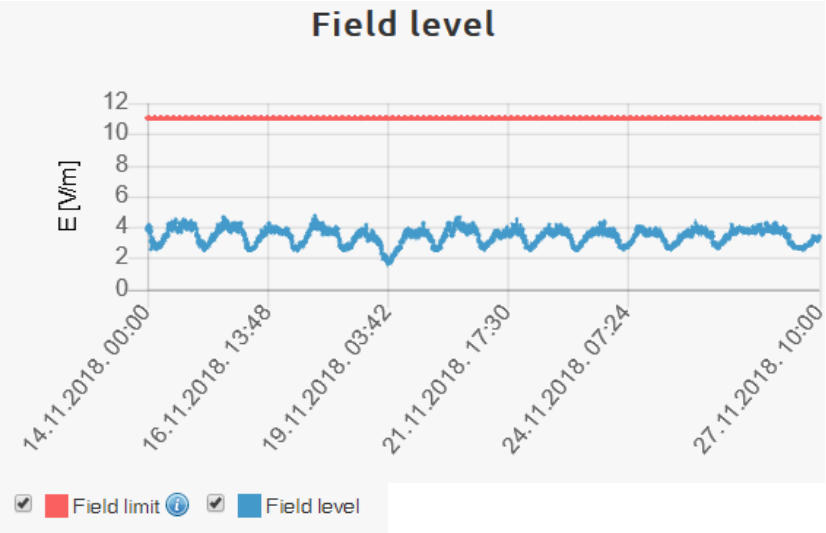
Location: Belgrade

Student dormitory “4th April”
Altitude: 12 m

NARDA multi-band EMF sensor
Max measured value: 6 V/m



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EMF RATEL: System Overview

EMF Source

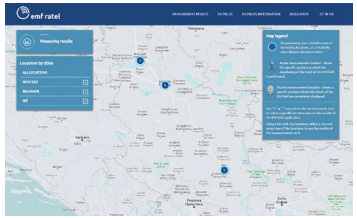
EMF Sensors

Mobile network

Central server with DB and web access

Internet

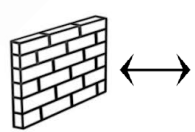
EMF RATEL Portal



http://emf.ratel.rs

Public users

Administrative RATEL users



Authorization

http://emf-admin.ratel.rs

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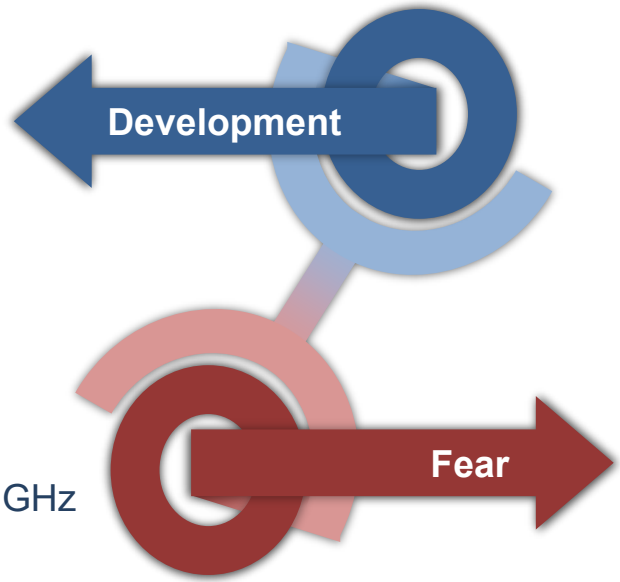
5G Challenges

Rapid development of
4G Advanced, 4G Advanced Pro and
5G networks

- Beamforming
- Massive MIMO
- Network and Backhaul Densification
- Low and Mid Bands: 600 ÷ 6000 MHz
- Millimeter wave Bands: 26, 28, 38, 60 GHz



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

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Rulebook on the Limits of Exposure to Non-Ionizing Radiation in Serbia

f (MHz)	E (V/m)
10 - 400	11,2
400 – 2.000	0,55√f
2000 – 10.000	24,4
10.000 – 300.000	24,4

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Operators obligations

- Mandatory Public consultations
- For all locations pre and post instalation measurement is required
- If the EMF level for Sensitive locations is ≥10% of the limit, measurement is required every 2 years

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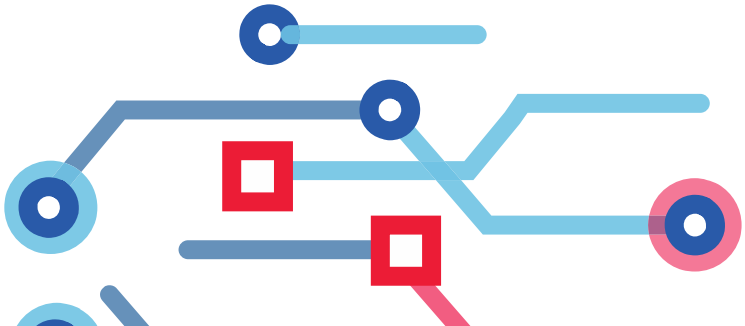
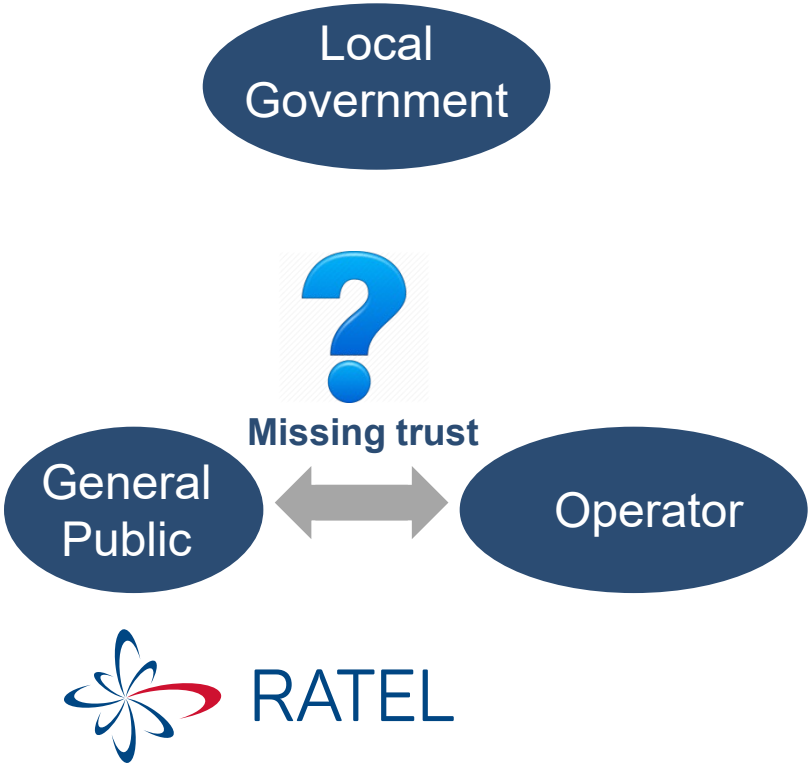
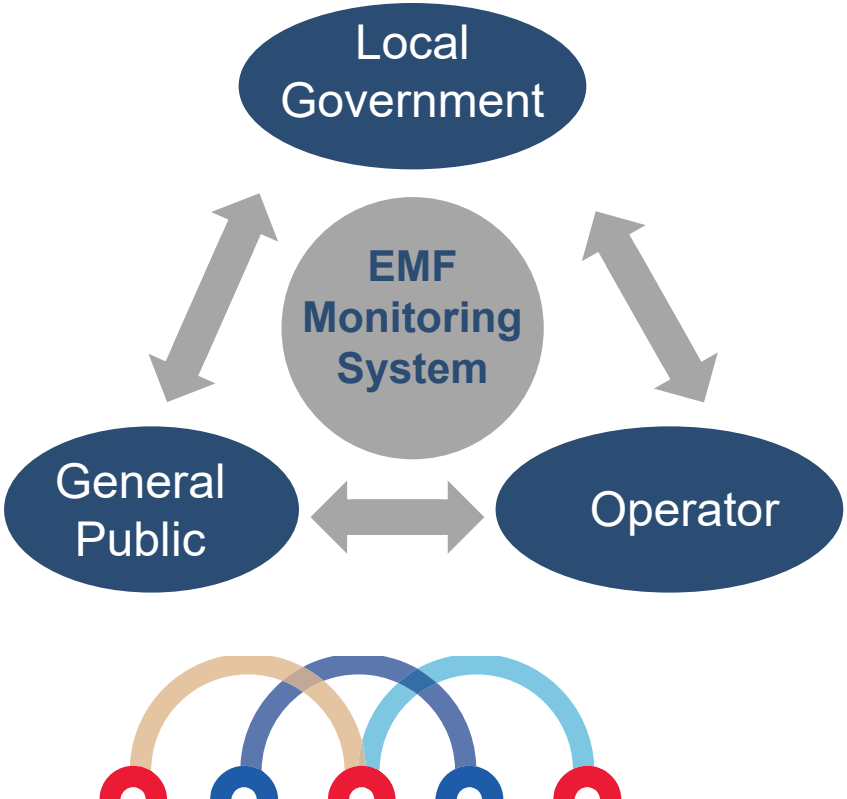


Public trust issue





Objective: Development of the system for EMF monitoring

Establishment of trust
(public, operators, authorities)

Transparent results of EM radiation

Main goals

Education and
social responsibility

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Changing the public perception

- Measurement results are public
- Municipalities are involved in sensore location selection
- Municipalitie officials are present at test measurements done by RATEL
- RATEL PR Campaign (TV, Social and printed Media, e-publications)

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Open Project

Possibility of external participation in the project:

- Municipalities
- Airports
- Socially responsible companies

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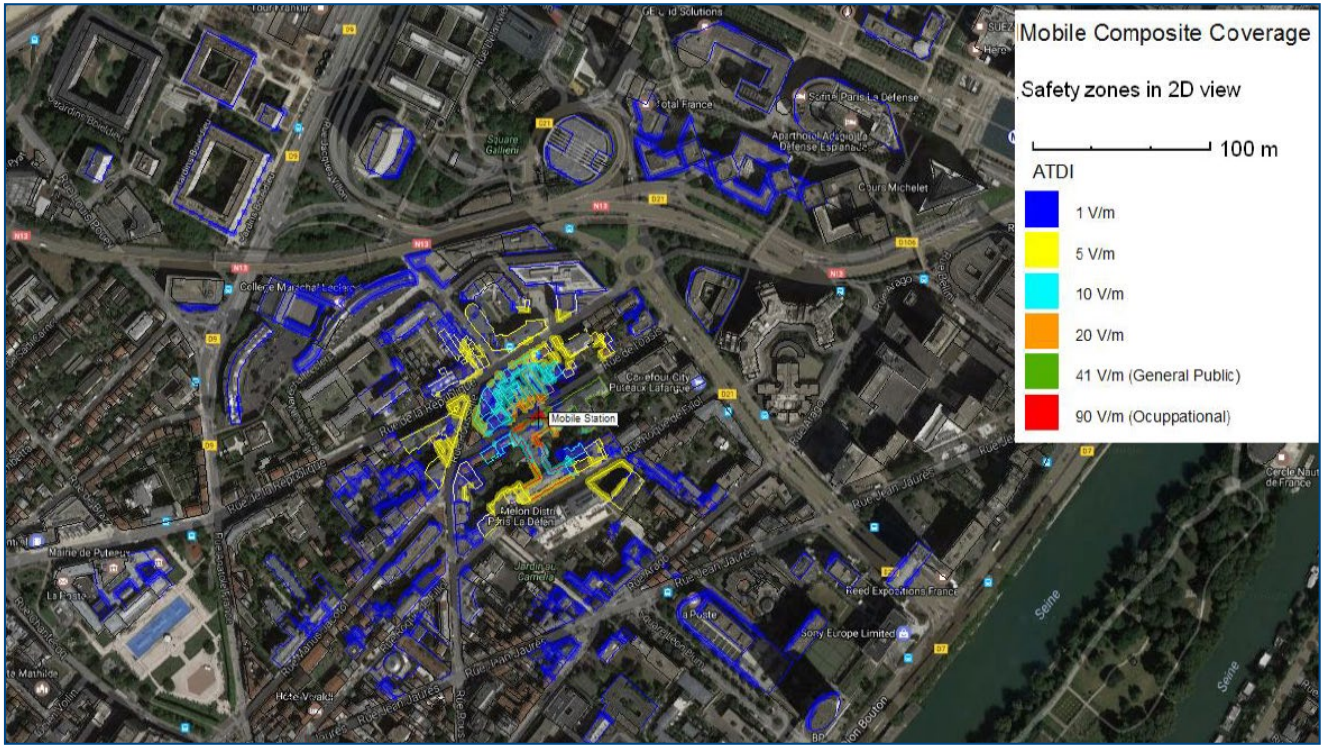
EMF Prediction



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Thank you !

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Republika Srbija
RATEL
Regulatorna agencija za elektronske komunikacije i poštanske usluge