Challenges in implementation of 5G in Croatia

2nd Meeting of the Regulatory Authorities and Institutions from SEE responsible for implementation and enforcement of the Directive 2014/53/EU

Ohrid, Republic of Macedonia
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CONTENT

1 5G FOR EUROPE - ACTION PLAN

2 SPECTRUM

3 COVERAGE & QoS

4 LICENSING

5 INFRASTRUCTURE

6 EMF EMISSIONS

7 SPECTRUM FEES & SECURITY

5G

USE CASES

- FWA
- Massive IoT
- Smart Vehicles
- Enhanced Broadband
- Human – IoT interaction
- Multimedia everywhere
- Critical control

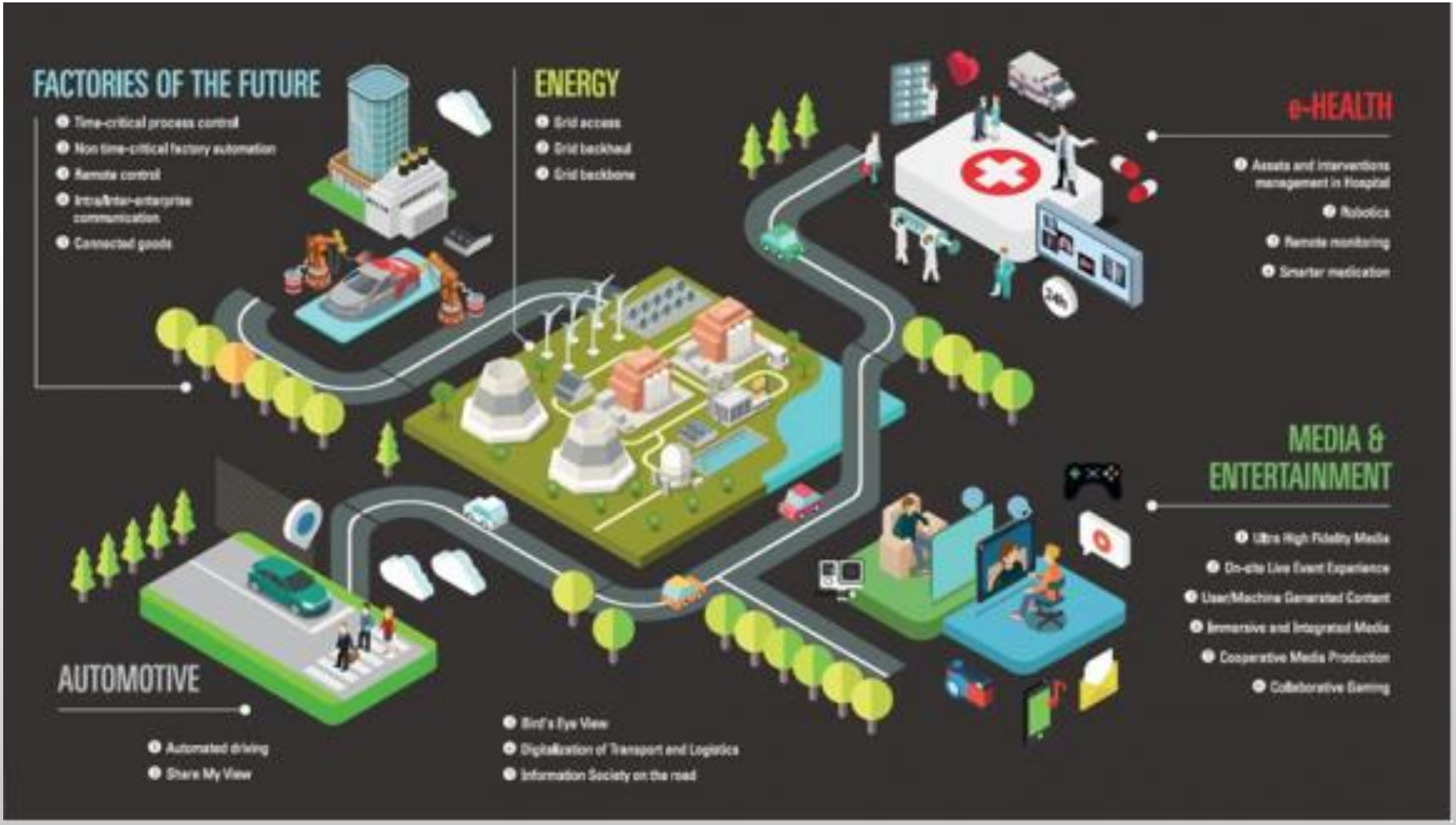
VERTICALS

- Industry
- Smart City
- Automotive Industry
- Energy
- Agriculture
- e-Health
- Public Safety & Security
- Media & Entertainment

ENABLERS

- Network Function Virtualization
- Software Defined Networking
- Smaller Wavelenght Spectrum
- Massive MIMO & Beamforming
- Low Latency
- Multi Site Transmission
- Carrier Aggregation

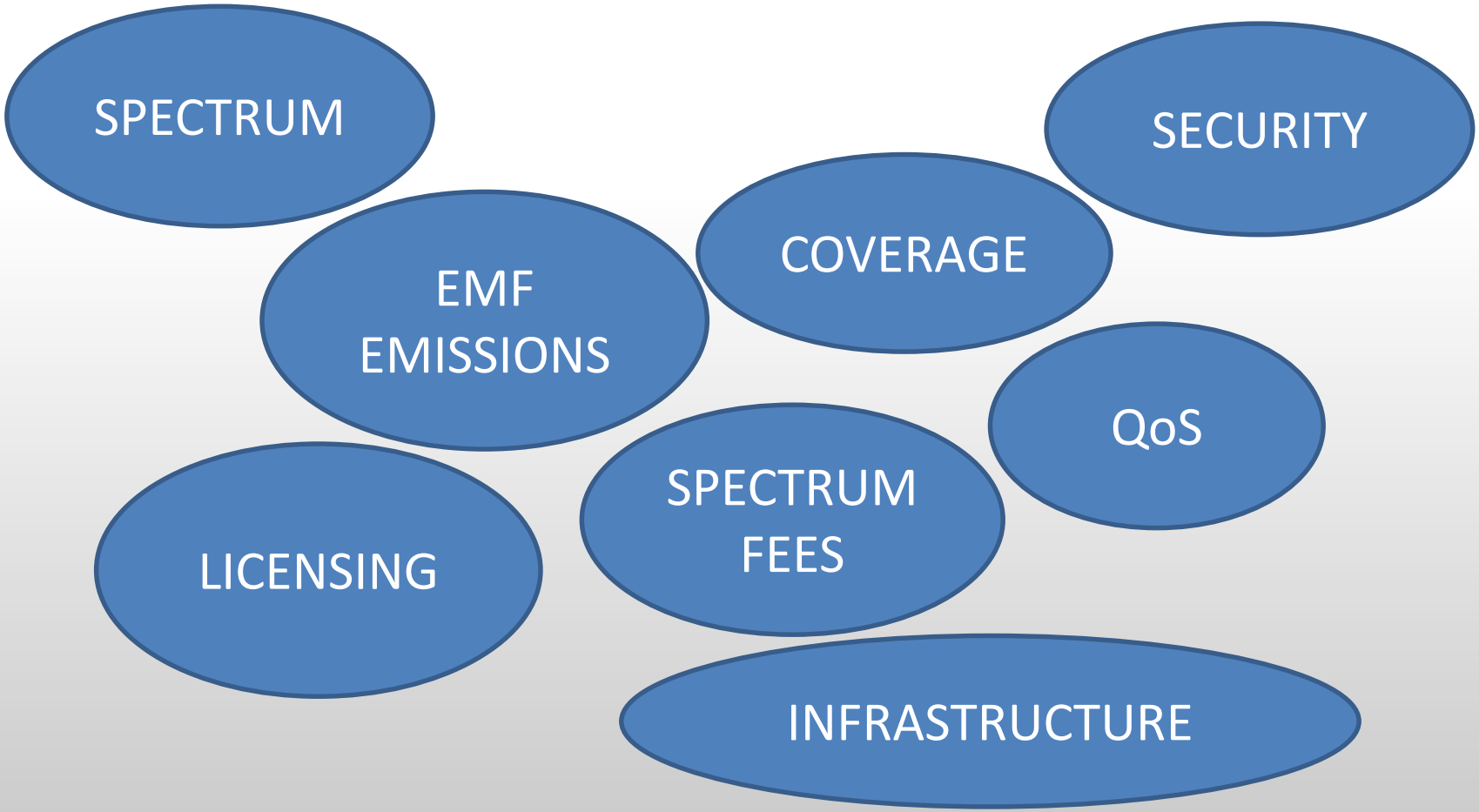
5G FOR EUROPE - ACTION PLAN



5G FOR EUROPE - ACTION PLAN

- *5G for Europe: An Action Plan defines 8 key action points*
  - *1 – common EU timetable*
    - *preliminary trials from 2017 onwards and pre-commercial from 2018.*
    - *national 5G deployment roadmaps as part of the national broadband plans*
    - *Identification of at least one major city to be "5G enabled" by the end of 2020 and uninterrupted 5G coverage of all urban areas and major terrestrial transport path by 2025*
  - *2 and 3 - early identification of 5G frequency bands for testing and commercial deployments*
  - *4 – Effective deployment of fibre links and small cell architecture*
  - *5 - Availability of the initial global 5G standards by the end of 2019*
  - *6 – Planning and deployment of selected 5G trials*
  - *7 - Using the future 5G infrastructure for PPDR networks*
  - *8 – Identification of the objectives, possible configuration, and modalities for a venture financing facility, possibly linked with other digital start-up actions– 5G Manifesto*
- *These 8 key points where endorsed by ministerial declaration (Making 5G a success for Europe) in 2017*

CROATIA 5G AREAS OF INTEREST



SPECTRUM

- *5G pioneer spectrum bands - 700 MHz, 3,6 GHz and 26 GHz*
- *700 MHz is currently used for DTV but it will be available for mobile usage in accordance with the Digital Broadcasting Strategy for the DVB-T2 system*
- *3400-3590 MHz – 90 MHz is now available and after 4.11.2023. whole band will be available countrywide*
- *3590-3800 MHz will be available countrywide after 31.12.2020.*
- *24,25-27,5 GHz is available countrywide*
- *2500-2690 is available countrywide*
- *Enough amount of spectrum at the local level is now available for the testing of the 5G technology*
- *Refarming of the already allocated RF spectrum will be needed to enable efficient use of 5G technology*

COVERAGE & QoS

- *5G coverage and QoS goals:*
  - *700 MHz Award - maximum territorial coverage with sufficient QoS taking into acount 800 MHz and 900 MHz bands*
  - *Sufficient QoS in urban areas using the 3.6 and 26 GHz in order to provide high-speed data capacity*
  - *Providing coverage for a specific location of the user equipment such as indoor, outdoor or transport paths*
  - *Aggregated coverage and network sharing regulation principles*
  - *Defining different coverage and QoS KPIs depending on the requirements of a service or verticals such as internet access, remote data reading or autonomous vehicles*

LICENSING

- *Individual license for use of the radio frequency spectrum can be granted in the public call, tender or auction procedure*
- *Appropriate license duration time*
- *To stimulate investments outside the electronic communications sector and to create stimulative environment for the development of innovation and the application of 5G technology, the following licensing scenarios should be considered for the frequency bands above 6 GHz:*
  - *General license*
  - *Light licensing*
  - *Licensed Spectrum Access (LSA)*
  - *Licensing at regional or local level*

INFRASTRUCTURE

- *Expected high data rates and capacity of the 5G network will lead to deployment of dense cellular networks – small cell scenario*
- *The result will be high capacity and low latency backhaul infrastructure*
- *The implementation of a new radio access and optical network will require large financial investments that will boost co-investment and network sharing*
- *Small cell scenario and optical backhaul construction issues:*
  - *Building act regulation*
  - *Electronic communications regulation*
  - *Responsibility and the role of local government*
  - *Proactive role of local government regarding financing the construction of optical networks using EU funds*
  - *Early 5G testing*
    - *Proofing concept*
    - *5G Popularization*

EMF EMISSIONS

- *EMF emission limit values in the Republic of Croatia are lower than the recommended EU / ICNIRP levels*
- *Increase of public interest about health and environmental effects of electromagnetic fields exposure is expected as result of deployment of dense cellular networks using multiple technologies across different frequency bands*
- *Public education measures about health and environmental effects of electromagnetic fields exposure are stipulated by The broadband access development strategy*
  - *Benefits and the full potential of 5G technology must be known to general public*
  - *Small cell testing scenario should result with the definition of typical installation which fulfills EMF emission limits*

SPECTRUM FEES & SECURITY

- *In the process of issuing a license for 5G it is necessary to take into account the amount of investment expected from the mobile operators*
- *Fee regulation can be used to encourage testing*
- *Fee regulation in the 5G case is associated with fulfillment of coverage and QoS requirements*

- *5G will introduce new services and applications where users are not just people but also devices that will generate a large amount of sensitive personal data on the network – The Act of Personal Data Protection*
- *5G network will have to provide adequate systems for Personal Data Protection*

CONCLUSION

- *5G Working Group (HAKOM, Operators, Industry, …) was established in 2017 and is working on 5G technology introduction in Croatia*
- *5G Working Group Goals:*
  - *Identification of challenges and constraints in introducing of 5G*
  - *Cooperation among all public and private entities that can contribute to the successful implementation of the National 5G Action Plan*
- *Current focus:*
  - *Cooperation with local government regarding building 5G infrastructure*
  - *Identification and realization of the 5G enabled city*
- *First 5G Panel named "The Future of the 5G Network in Mobile Communication on the Road to the Gigabit Society" was held in MIPRO 2017.*
- *Second 5G Panel named "The introduction of 5G networks in Croatia " will be held in MIPRO 2018.*
- *More 5G panels are planned in cooperation with local government*

THANK YOU FOR YOUR ATTENTION