Day 2
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The Role of Spectrum Sharing for Industrial Networks, Verticals & Increased 5G

- Alexander Kühn, Head of Section
  Benetza, Germany

- Ira Keltz, Deputy Chief for Engineering & Technology
  Federal Communication Commission (FCC), United States

- Olfa Jammeli, Director General
  National Agency of Frequencies, Tunisia

- Moderator: Rob McDowell
  Partner, Cooley LLP
The Role of Spectrum Sharing for Industrial Networks, Verticals and Increased 5G Capacity –

Alexander Kühn, Head of Section, Germany
2022 DSA Global Summit
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Verticals

- Industry
  - Fair Trades
    - Railways
    - Airports
    - Universities
    - Mobile Network Operators
    - Smart Cities
    - Broadcaster
    - Schools
  - ...
A history of spectrum for verticals

Cost-Benefit Ratio

Security

Control

Scalability

Availability

Unlicensed / General authorised Spectrum

Network Slicing

Campus Networks

Network of networks

RLAN / SRD 4G 5G 6G
Sharing elements

- New mobile technologies provide new opportunities:
  - Smaller networks (=>higher frequencies)
  - Latency
  - Capacity
  - Efficiency

Demand for different regulatory solutions
Licensees:
- Industry
- Broadcaster
- Mobile vendors/operators
- SME Communication companies
- Academia
- Fair Trade companies

Use cases:
- Industry 4.0 - applications
- Internal communication
- 5G Hotspots (Universities, Campus, etc)
- 5G trials & studies
- Network Consultancy / Realisation

New spectrum users

Technological Convergence

- Increased competition
- Faster development
- Accelerated deployment
- Innovative solutions
Authorisation provisions 3700-3800 MHz

- Application based process
- Usage by Owner, Tenant w/permission, Commissioned Provider
- Local frequency utilization only
  - No telecommunication services for the general public
- Technical Usage Conditions:
  - General requirements: TDD in 10 MHz blocks, no guardband
    (EMC values, minimized interference range, optimal planning)
  - Obligation to negotiate with neighbouring operators
    with a fall-back limit of 32dBμV/m/5MHz in 3m.
- Review after 1 year of authorisation incl. consultation of interested parties
- Fee: Depending on area, frequency bandwidth
• Full accordance with EC DEC (EU)2019/784
• **Application based process** *(Start: 1.1.2021)*
• **First-come-first-served principle**
• Ensure **protection of current use** of Fixed Service links (PTP/PMP) and EESS Earth Stations. No relocation of fixed radio links ⇨ but: **future utilization concept**
• **Technology- and Service- Neutrality**
• Start assignments in 26.5–27.5 GHz
• **Obligation of negotiation** for adjacent radio networks. PFD-Limit (65dBμV/m/200MHz in 3m) as fall-back.
• Allow individual coordination w/ existing user.
• “**Use-it-or-lose-it**” - Review (1 year).
• Current users: 14 (as of 15.08.2022)
Challenges and Opportunities

- Balance between exclusive spectrum and shared use
- Technological convergence may facilitate more 5G applications (e.g. 5G BS, URLLC)
- Coordination between neighbouring networks
  - Negotiation-Requirement
  - pfd-limit as fall-back
- Usage conditions (coverage obligations)
- Infrastructure vs. Application competition
- Location acquisition – ubiquitous networks vs. site acceptance
- Emerging business models

➢ Harmonisation will have positive effects!
Further possible sharing areas

- **4 GHz (3800-4200 MHz)**
  - Adjacent compatibility with aeronautical altimeters
- **6 GHz (5945-6425 MHz)**
  - General authorisation on basis of Decision (EU) 2021/1067
  - Extended channel bandwidth (160 MHz)
- **6 GHz (6425-7125 MHz)**
  - Studies on 5G (WRC-23) and RLAN (indoor and VLP outdoor)
- **66 GHz (57–71 GHz)**
  - General authorisation
  - Technology neutrality allows 5G
- **40 GHz (40.5 –43.5 GHz)**
Questions /Challenges

- Will the capacity demand of industry/verticals drive the development in millimetric wave bands?

- Sharing of technology, infrastructure and spectrum enhances efficiencies. Where is the limit?

- What role will 6G play?

- Should there be a more global approach of shared use?
Thank you for your attention!

Alexander Kühn
Head of Section
“International and National Spectrummanagement”
+49 228 14-1250
alexander.kuehn@bnetza.de
The Role of Spectrum Sharing for
Industrial Networks, Verticals
and Increased 5G Capacity

Ira Keltz, Deputy Chief
Office of Engineering and Technology

Federal Communications Commission
United States of America

Dynamic Spectrum Alliance Global Summit
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Note: The views expressed in this presentation are those of the author and may not necessarily represent the views of the Federal Communications Commission.
Vertical Markets

Companies that identify themselves in a narrow industry or group of companies

Examples

- Convention centers
- Public Safety
- Entertainment/Sports
- Healthcare
- Defense
- Transportation
- Manufacturing
- Education
- Finance

Limitless ways to define

Needs can be met using private networks and/or commercial carriers based on coverage and reliability requirements

Produce similar products or provide similar services

Often compete with each other

Buy and use similar goods and services

Have similar spectrum requirements
Spectrum Certainties

Finite spectrum
Exponentially increasing demand
Usage is outpacing forecasts
M2M is projected dominant use

Source: Cisco VNI Mobile, 2017

Source: Cisco Annual Internet Report, 2018–2023
New Entrant
Flexibility

Incumbent Rights/
Protection

Spectrum Access:
Choices

Exclusive Use

Unlicensed/
Shared Use

Spectrum Sharing is Key to Efficient Use

New Entrant Flexibility
Approaches to Spectrum Sharing

**Approach**
- Unlicensed Use
- License by rule / License Lite
- Traditional Licensing

**Sharing Options**
- Non-Interference Basis
- Static
- Dynamic
- Coordination
- Secondary Markets

**Applications / Services**
- Wi-Fi
- 60 GHz
- Whitespace
- 6 GHz
- CBRS
- LTE-U / LAA
- LBT
- 70 / 80 / 90 GHz
- Leasing / Partitioning / Disaggregation
Regulatory Approach

Provide variety of spectrum access options to create opportunities for businesses to use spectrum on its own terms

- Mix and match spectrum bands/equipment/access methods to pertinent use cases/applications
  - Machine to Machine / IoT
  - Target geographic areas where connectivity is needed
  - Internal business use
  - Voice

- Private networks (LTE, 5G, data) vs commercial offerings

In many cases using shared spectrum provides best option

- Low entry barriers
  - Unlicensed or licensed lite
  - Inexpensive equipment

- Tailor system to specific business needs
  - Commercial systems do not always serve areas where communications are needed.
Thank you!
Spectrum Sharing for Industrial Networks and Verticals

Mme Olfa JAMMELI JBEL
General Director
ANF

DSA 2022 Global Summit
Paris 13-14 September 2022
Spectrum sharing is a way to optimize the use of the airwaves, or wireless communications channels, by enabling multiple categories of users to safely share the same frequency bands. Spectrum sharing is necessary because:

- Growing demand is crowding the airwaves.
- Appearance of potential users who are the verticals
- The verticals have the same needs as MNOs in terms of spectrum but with limited coverage
The increasing demand for spectrum by emerging technologies proves that classic spectrum management is no longer effective (exclusive use of spectrum).

Regulators must look for other alternatives in the new radiocommunication landscape.
Sharing Spectrum—Use Case in Tunisia

- In 2004 publication of a decision: unlicensed spectrum in 2.4 GHz To WiFi
- In 2016 publication of a decision unlicensed spectrum UHF band (863-870MHz) To IoT
- In 2017 publication of a decision unlicensed spectrum in 5GHz band (5400-5700) to WiFi

- Allocation of its bands (unlicensed) for WiFi and IoT to ensure the strengthening of access networks and offload the MNO networks
In 2017, allocation 20MHz in 3.5 GHz Band to OMMP (Broadband – verticals) ; Private-LTE/5G regional license

In 2019 allocation UHF band (916-921)MHz Smart Grid (lite licensed)

Regional licensing increases spectrum efficiency and gives more flexibility to verticals to have their own private networks
In 2022 ANF has launched:

- A national dialogue within Commission of Communication Technology prospective in order:
  - To make sure that spectrum is used efficiently and in the best way possible for Tunisian society,
  - To established a decision about how and when we apply WiFi6. (deadline December-2022)

- A public Consultation about PLMR: Use Cases, Evolution & Spectrum needs:
  - To established a new kind of license (SLA, Lite, allotment license, PS, Utility)
  - Define the band that will be allocated to private networks
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