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HELLENIC TELECOMMUNICATIONS & POST COMMISSION

Overview of Frequency Bands for 5G Terrestrial Networks

Session 2

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Contents of the presentation

- Frequencies that 4G and 5G terrestrial networks use or are expected to use per range:
 - $f < 1$ GHz
 - $1 \text{ GHz} < f < 6 \text{ GHz}$
 - $24 \text{ GHz} < f < 86 \text{ GHz}$
- Regulatory challenges.
- Available bandwidth, merits, key issues per 5G strategic band in Greece.

Mobile Bands in Europe

Low-range

- 700 MHz (694-790 MHz)
- 800 MHz (790-862 MHz)
- 900 MHz (880-915 MHz / 925-960 MHz)

Mid-range

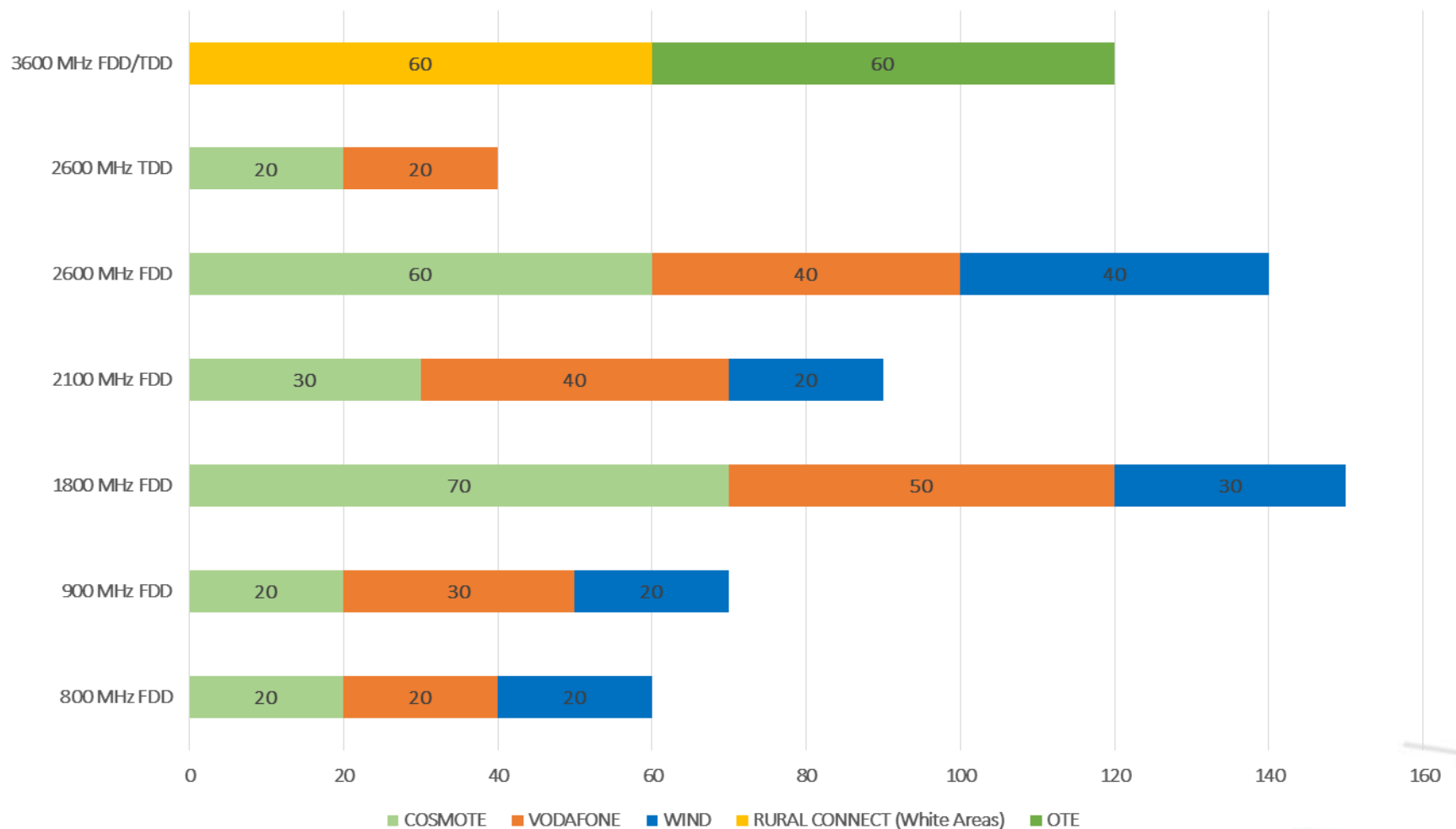
- 1.5 GHz (1427-1517 MHz)
- 1800 MHz (1710-1785 MHz / 1805-1880 MHz)
- 2.1 GHz (1920-1980 MHz / 2110-2170 MHz)
- 2.6 GHz (2500-2690 MHz)
- 3.6 GHz (3400-3800 MHz)

High-range

- 26 GHz (24.25-27.5 GHz)
- 42 GHz (40.5-43.5 GHz)
- 66-71 GHz

5G will require **new** spectrum as well as spectrum bands **already in use** by UMTS and LTE networks.

Harmonised Mobile Bands in Greece – Current Use



Strategic Bands for 5G in Europe

700 MHz

- enables 5G coverage to all areas, ensuring that everyone benefits.

3.6 GHz

- brings the necessary capacity for new 5G services in urban areas.

26 GHz

- gives ultra-high capacity for innovative new services, enabling new business models and sectors of the economy to benefit from 5G.

Regulatory challenges

- ❖ A lot of new spectrum to be technical prepared (coexistence issues, clearance, license terms) and assigned in a timely manner.
- ❖ Use of **Active Antenna Systems**-> new emission limits
- ❖ **5G trials** -> framework and licenses
- ❖ From FDD bands to TDD bands->need for **national synchronisation frameworks**
- ❖ In some cases potential refarming or migration of incumbent uses has to be assessed.

.....need for national measures per band. Cases that are not covered by European harmonisation measures



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700 MHz Band

- **Available Bandwidth:**
 - 60 MHz FDD
- **Merits:**
 - Provides wide area coverage.
 - Improves indoor coverage
- **Key Issues:**
 - Migration of incumbent uses (Terrestrial Broadcasting).
 - Protection of services in adjacent bands.
 - International coordination process.

3400-3800 MHz Band

- **Available Bandwidth:**

- 280 MHz TDD

- **Merits:**

- Provides substantially more bandwidth than bands below 1 GHz.

- Combines capacity merits with good coverage conditions.

- **Key Issues:**

- Protection of radars below 3400 MHz.

- Availability of large contiguous bandwidth (80-100 MHz) for 5G NR.

- Cross-technology synchronised operation between LTE-TDD and 5G NR

- Coexistence with current BWA and Rural incumbent users

24.25 -27.5 GHz Band

■ Available Bandwidth:

- 3.25 GHz TDD under the prerequisite of re-farming of current uses.
- 2 GHz TDD without re-farming of current uses.

■ Merits:

- Achieves very high speeds.
- Opportunities for innovative services.

■ Key Issues:

- Protection of passive services in 23.6-24 GHz (EESS).
- Coexistence between fixed links and 5G.
- Assess the spectrum needs of 5G NR in 26 GHz band.
- Impact assessment of migration of P-P/P-MP links in other bands.
- Solutions for national synchronisation framework.

EETT's related links

3400-3800 MHz: Public Consultation

- https://www.eett.gr/opencms/opencms/admin/PublicCons/cons_0344.html

5G trials: 3400-3800 MHz & 24.25-27.5 GHz

- https://www.eett.gr/opencms/opencms/admin/PublicCons/cons_0367.html

IoT in Mobile Bands

- https://www.eett.gr/opencms/opencms/admin/PublicCons/cons_0365.html

- Thank you!