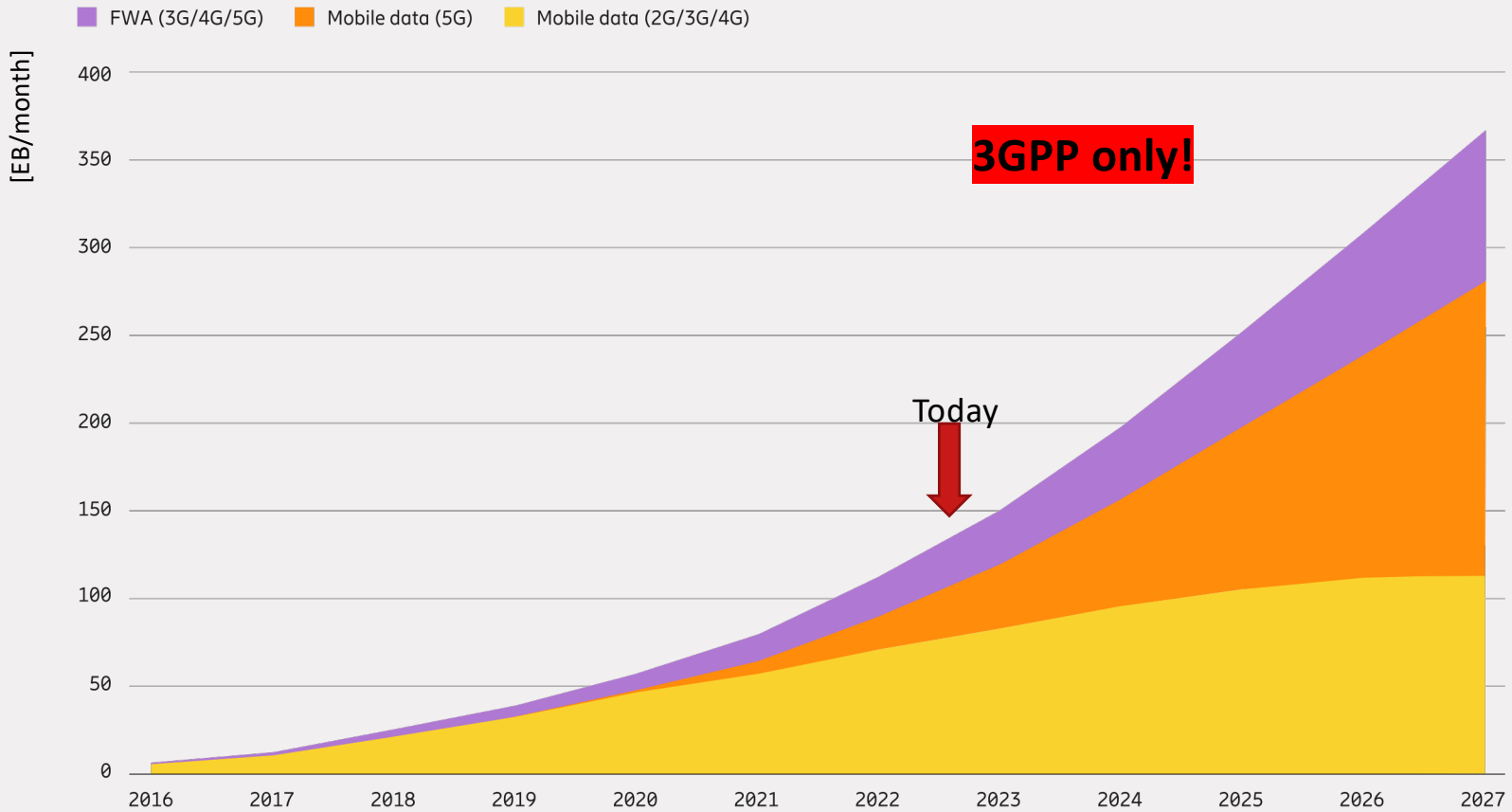# Need for Dynamic Spectrum and How to Satisfy It

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How to deal with wireless data traffic growth?

Legend:
- FWA (3G/4G/5G)
- Mobile data (5G)
- Mobile data (2G/3G/4G)

Y-axis: [EB/month] — 0, 50, 100, 150, 200, 250, 300, 350, 400

X-axis: 2016, 2017, 2018, 2019, 2020, 2021, 2022, 2023, 2024, 2025, 2026, 2027

3GPP only!

Today

Source: Ericsson Mobility Report 2022   FWA = Fixed-wireless access

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UNITED STATES FREQUENCY ALLOCATIONS — THE RADIO SPECTRUM

U.S. DEPARTMENT OF COMMERCE
National Telecommunications and Information Administration
Office of Spectrum Management
October 2003
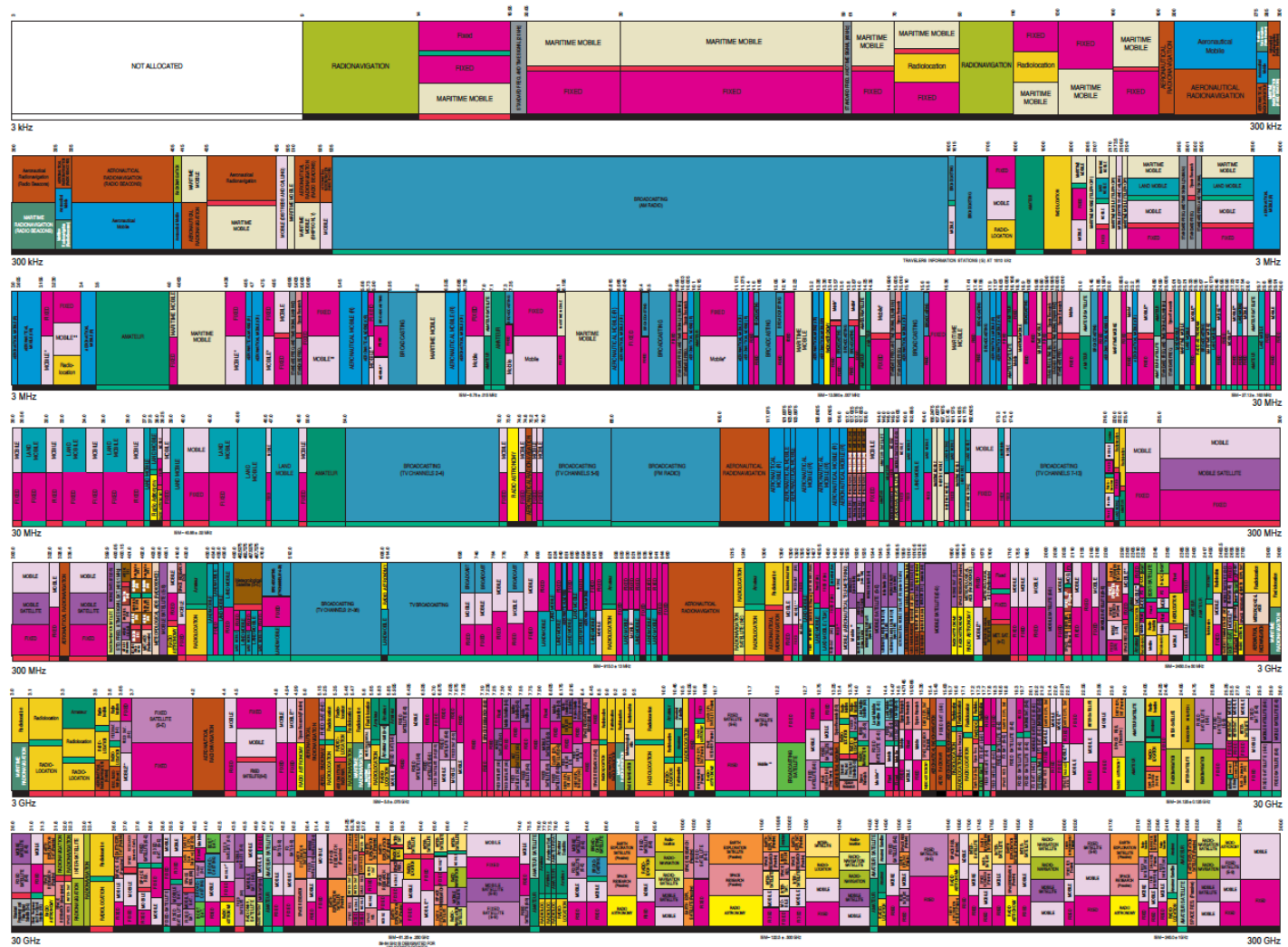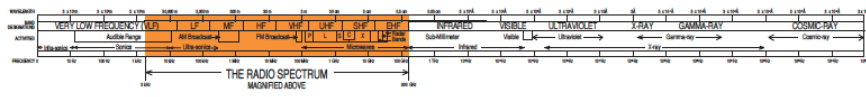
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How to get more spectrum?

- New spectrum: mmWave, THz and optical:

    huge bandwidth, but low coverage (propagation loss)
    => only local usage, but suitable for spatial reuse
    (dense picocells and beamforming)

- Better usage of licensed and unlicensed bands through
dynamic spectrum sharing (DSS)

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Present situation and opportunities

- Many licensed frequency bands are **little used in time or space**, e.g., bands allocated to particular radars, military, satellites, etc.

- Many frequency demands are **limited in time and space,** e.g., events

- Looking on a **"microscopic" time scale** (e.g., transmission times of frames or slots) a lot of spectrum is unused

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Need for "Spectrum Access Control"

- Required for DSS is a **"Spectrum Access Control "** across all spectrum users (MNOs, private networks, radars, broadcasters, satellites, airplanes, etc.)

- Analogous to **"Medium Access Control or MAC"** for a single network, which is about sharing a medium within a single network

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Two perspectives in this seminar

Research:

"Frameworks and Technologies that can enable Real-time Dynamic Spectrum Sharing"
Spilios Giannoulis, Universiteit Gent and IMEC

Regulator:

"Dynamic Frequency Management and Sharing (DSMS)"
Frank Bodewes, Dutch Digital Infrastructure Authority (RDI)

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