

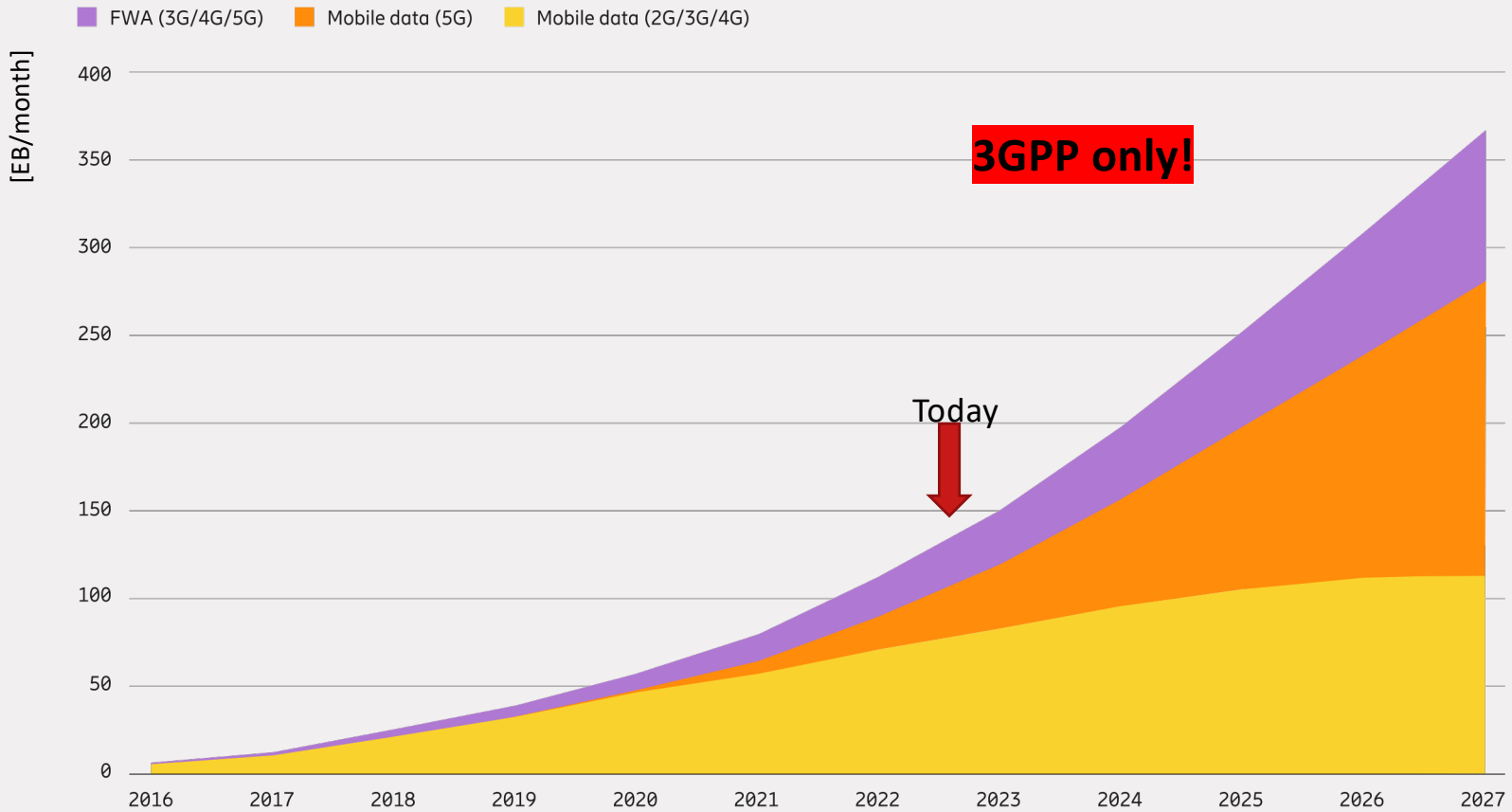


Need for Dynamic Spectrum and How to Satisfy It

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How to deal with wireless data traffic growth?



Source: Ericsson Mobility Report 2022

FWA = Fixed-wireless access

UNITED STATES FREQUENCY ALLOCATIONS

THE RADIO SPECTRUM

RADIO SERVICES COLOR LEGEND

AERONAUTICAL MOBILE	INTERSATELLITE	RADIO ASTRONOMY
AERONAUTICAL MOBILE SATELLITE	RADIO DETERMINATION SATELLITE	RADIOLOCATION
AERONAUTICAL RADIO NAVIGATION	LAND MOBILE SATELLITE	RADIOLOCATION SATELLITE
AMATEUR	MARITIME MOBILE SATELLITE	RADIO NAVIGATION
AMATEUR SATELLITE	MARITIME MOBILE SATELLITE	RADIO NAVIGATION SATELLITE
BROADCASTING	MARITIME RADIO NAVIGATION	RADIO NAVIGATION SATELLITE
BROADCASTING SATELLITE	METEOROLOGICAL AID	SPACE OPERATION
EARTH EXPLORATION SATELLITE	METEOROLOGICAL SATELLITE	SPACE RESEARCH
FIXED	MOBILE	STANDARD FREQUENCY AND TIME SIGNAL
FIXED SATELLITE	MOBILE SATELLITE	STANDARD FREQUENCY AND TIME SIGNAL SATELLITE

ACTIVITY CODE

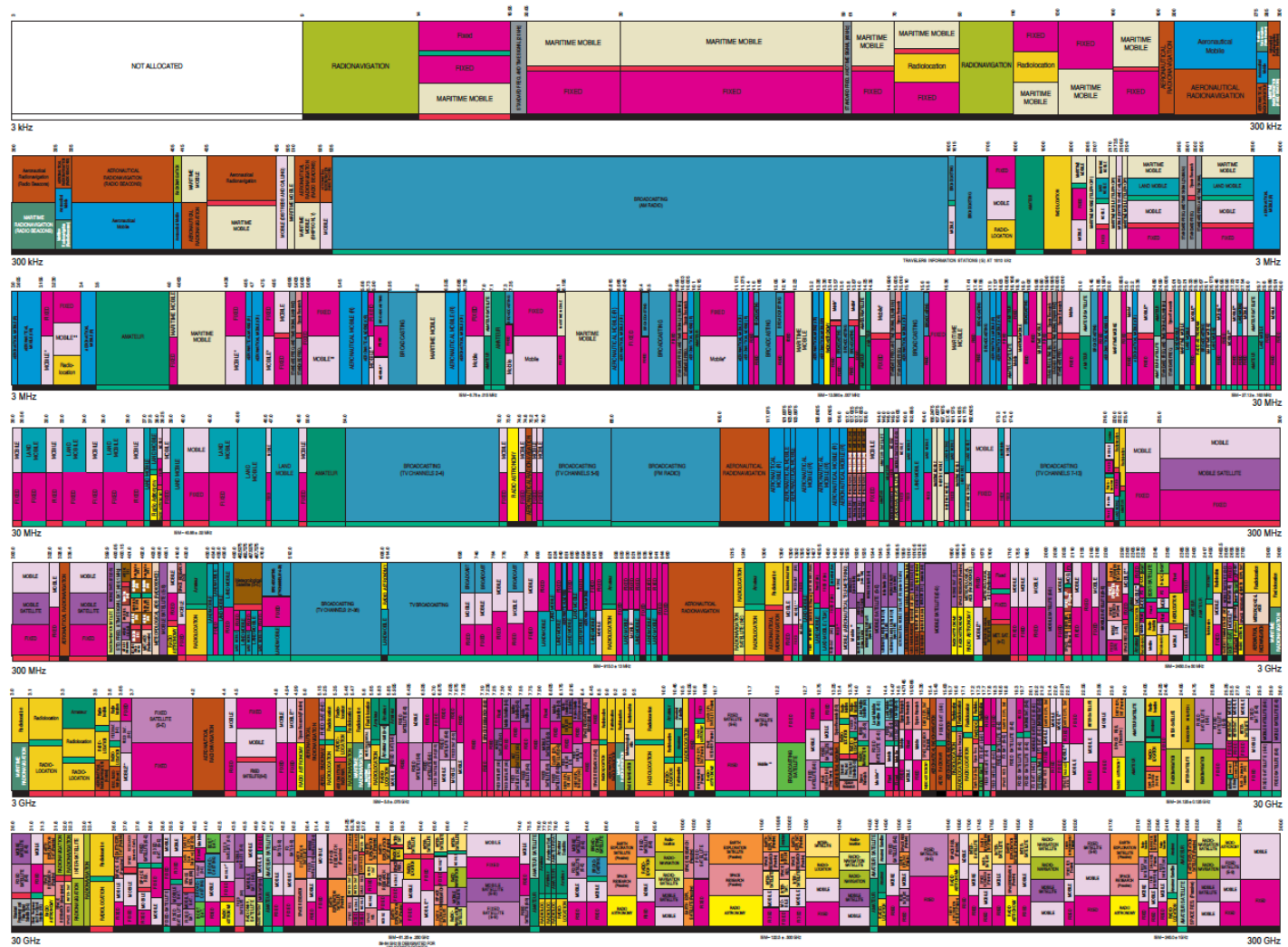
GOVERNMENT EXCLUSIVE	GOVERNMENT/NON-GOVERNMENT SHARED
NON-GOVERNMENT EXCLUSIVE	

ALLOCATION USAGE DESIGNATION

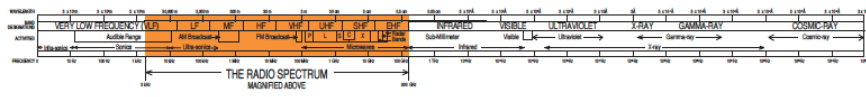
SERVICE	EXAMPLE	DESCRIPTION
Primary	FIXED	Capital Letters
Secondary	MOBILE	1st Capital with lower case letters

This chart is a graphic representation of the Table of Frequency Allocations used by the FCC and ITU. An asterisk (*) after the frequency range in Appendix C, indicates that the frequency allocation is subject to change. For complete information, users should consult the Table of Frequency Allocations. Symbols, for complete information, users should consult the Table to determine the current status of U.S. allocations.

U.S. DEPARTMENT OF COMMERCE
National Telecommunications and Information Administration
Office of Spectrum Management
October 2009



* ACCEPT ALSO MOBILE (M)
** ACCEPT ALSO MOBILE (M)



REMARKS: THE SPECTRUM ALLOCATED TO THE OPERATOR IS THE SPECTRUM TO BE USED BY THE OPERATOR. THE ACTUAL BANDWIDTH OF THE SPECTRUM IS SUBJECT TO CHANGE.

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)

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

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

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)