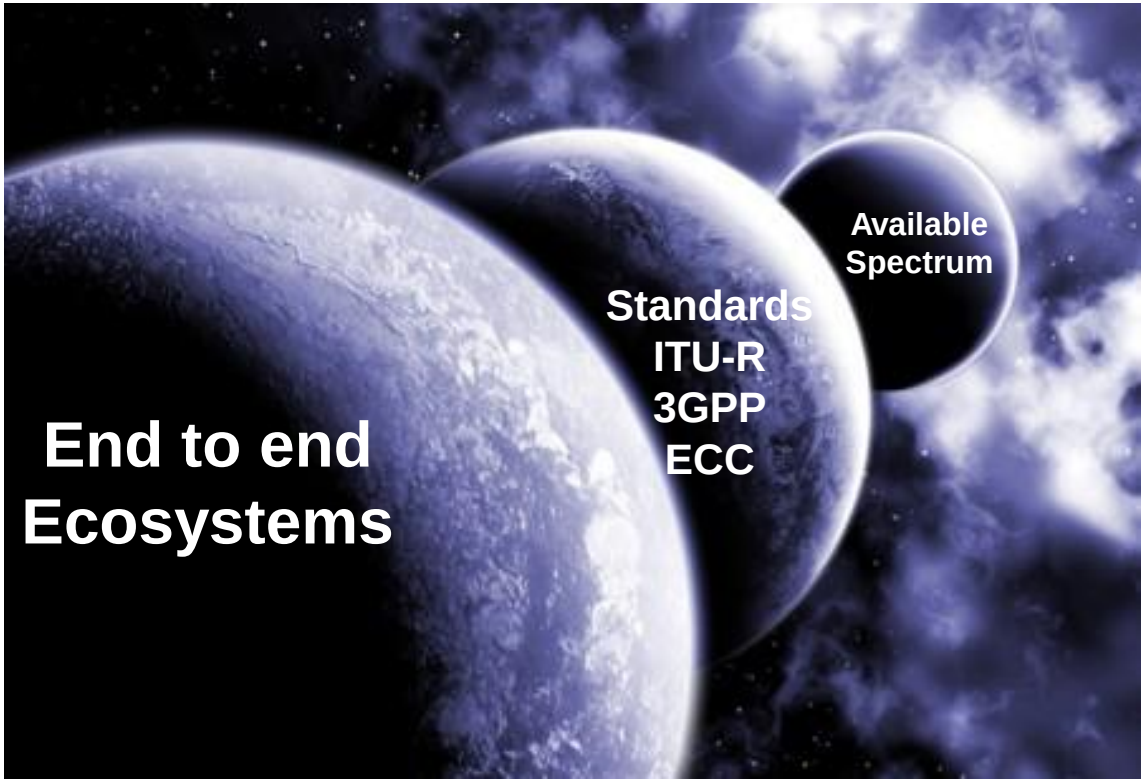
Spectrum needs for critical communications

Noel Kirkaldy
Market development
Public safety and defense
Government and cities
Nokia

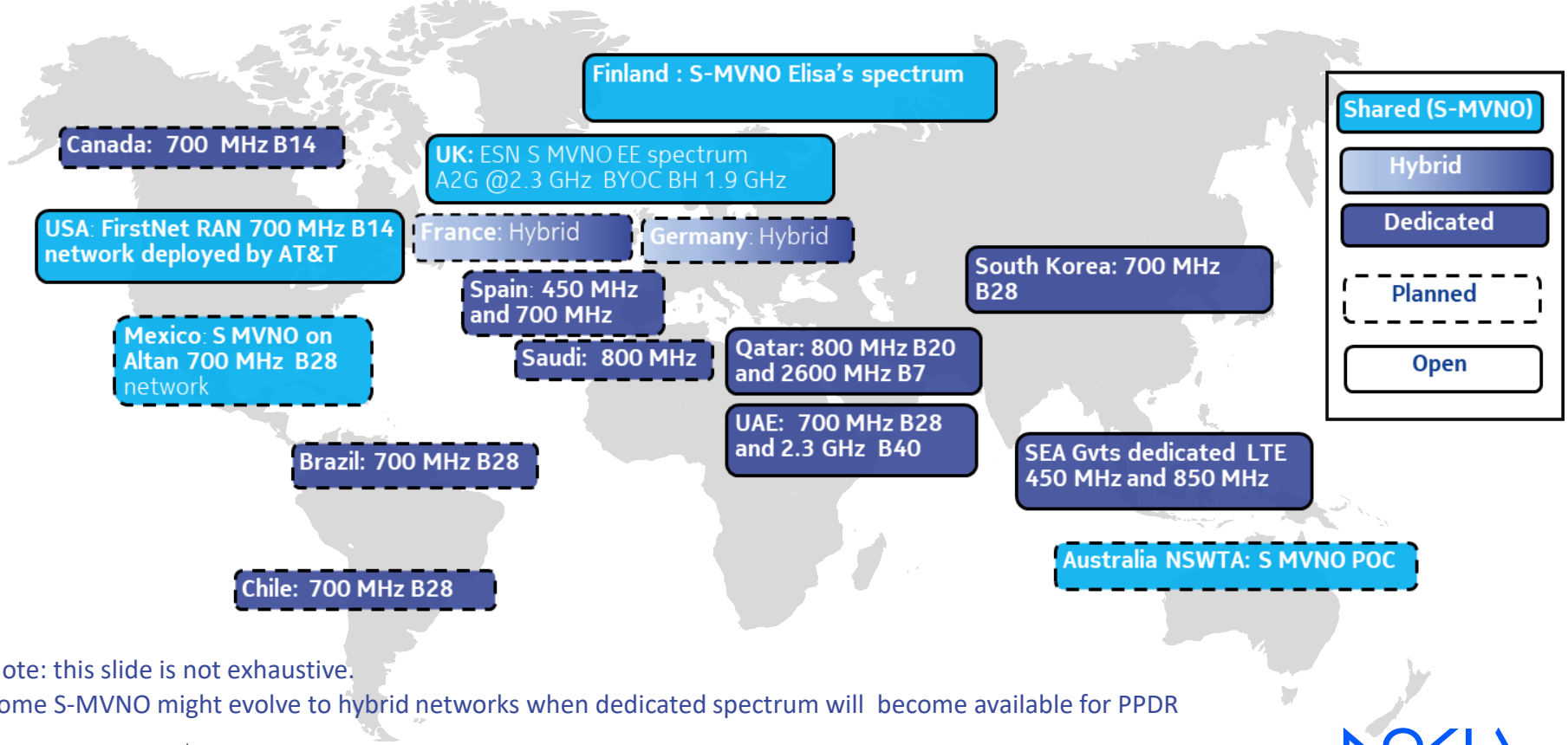
Spectrum needs for critical communications

Noel Kirkaldy
Spectrum task force, TCCA
Standards and regulatory, EUTC
Standards and regulatory, 450 MHz Alliance
Spectrum groups MEA and verticals, GSA

Critical communications market challenge

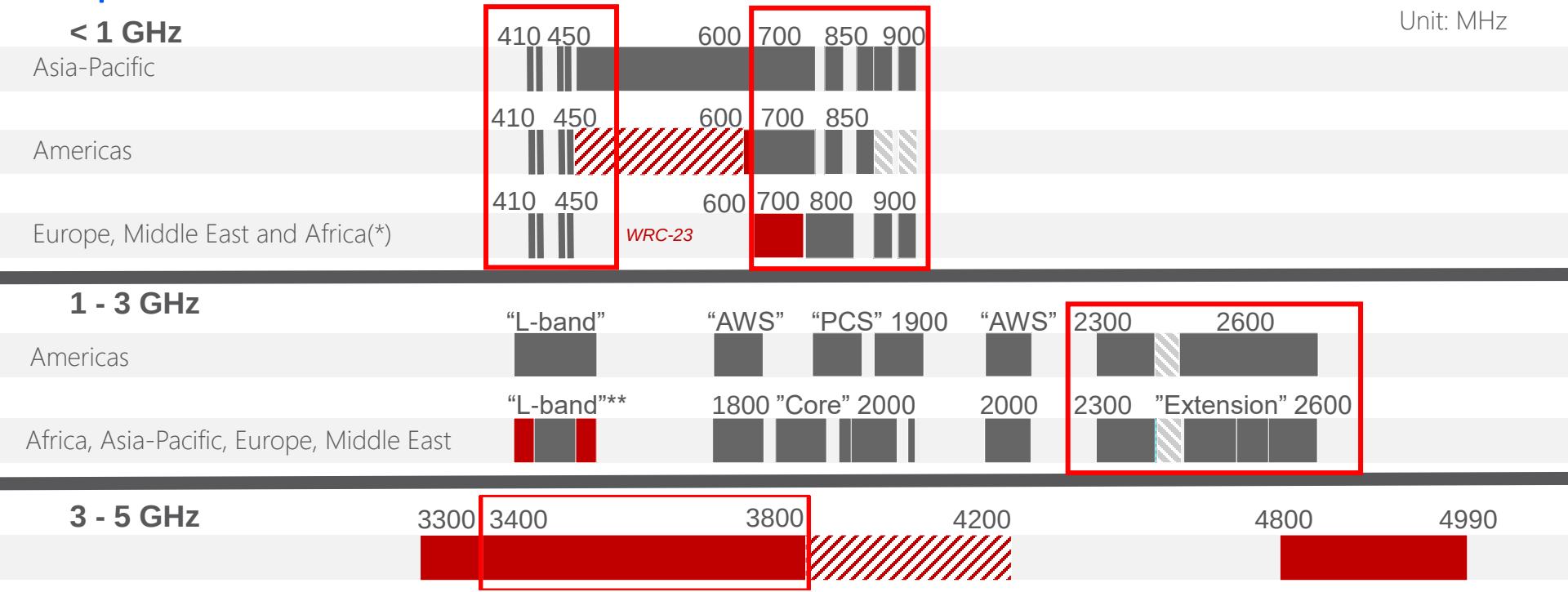


Worldwide status of critical communications (PPDR) network rollouts



Note: this slide is not exhaustive.
Some S-MVNO might evolve to hybrid networks when dedicated spectrum will become available for PPDR

Spectrum used for critical communications broadband networks



(*) The band 850 MHz is used in some countries in MENA

(**) The L-band is envisaged for SDL

- IMT identification in the ITU-R Radio Regulations (WRC-15)
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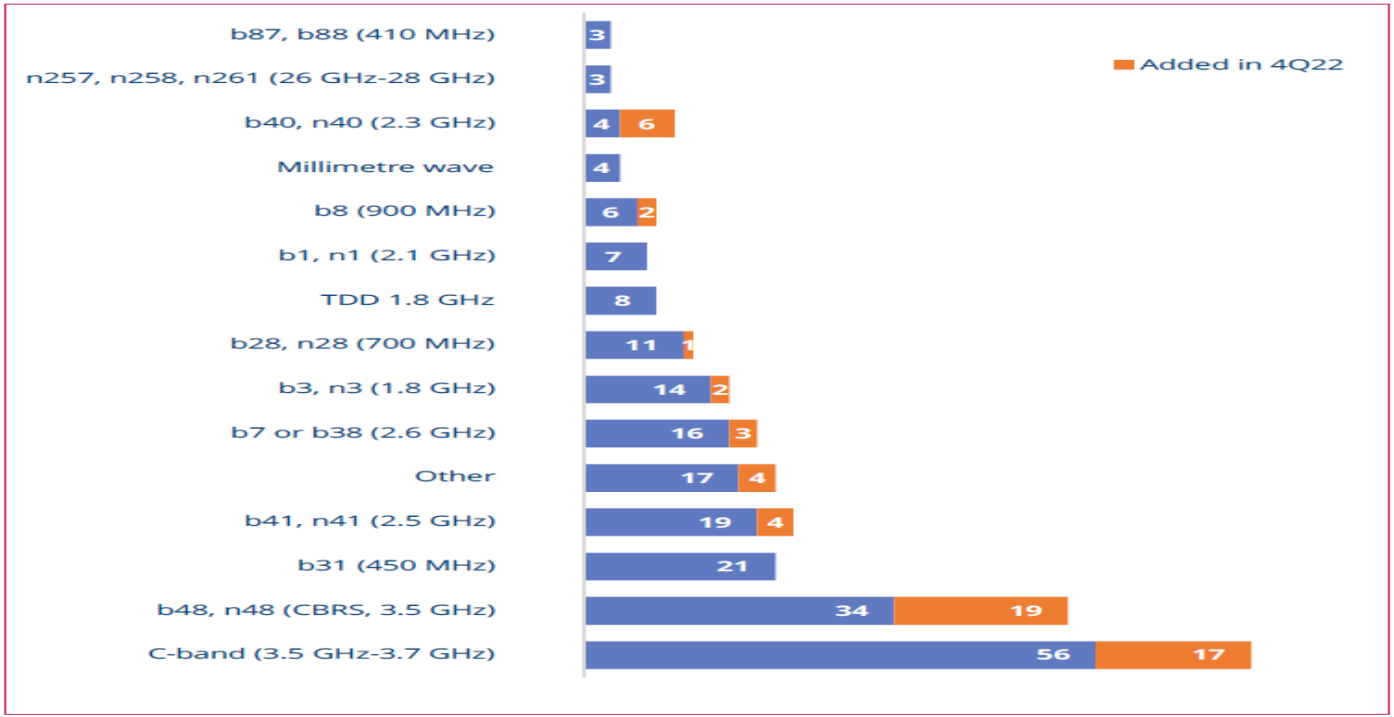
Private Mobile Networks Spectrum Bands



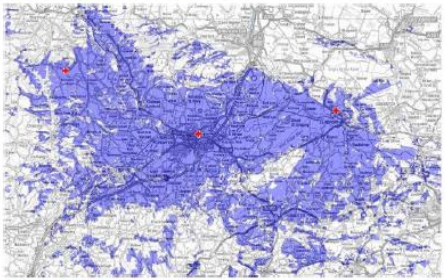
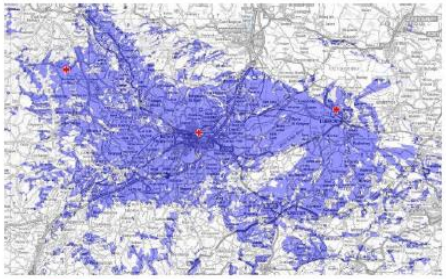
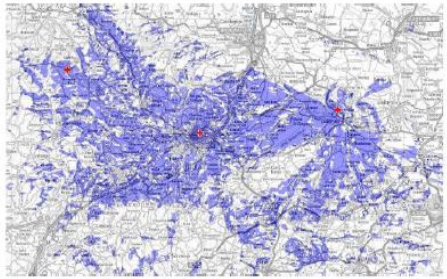
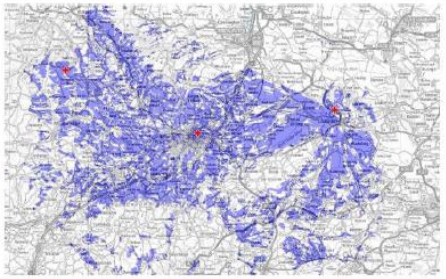
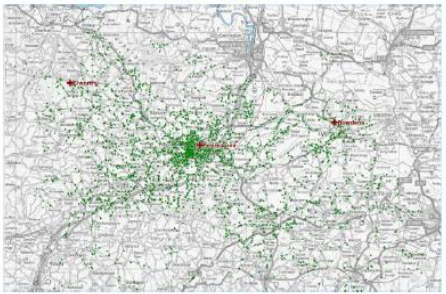
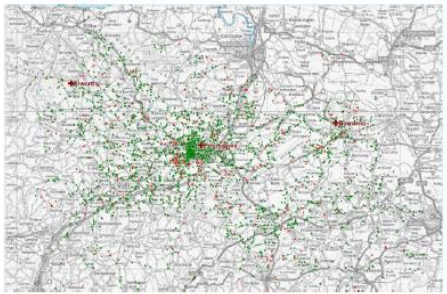
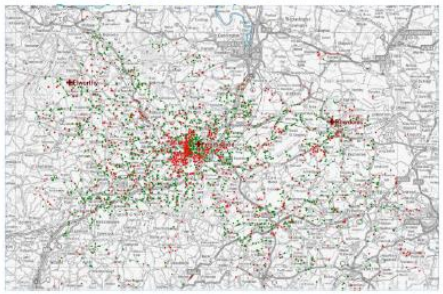
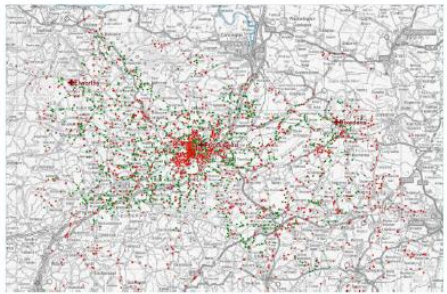
Source: GSA Report, March 2023

Radio coverage: benefits of using 410 MHz and 450 MHz bands

Coverage

WESTERN POWER DISTRIBUTION
Serving the Midlands, South West and Wales

450 alliance.org
promoting the advancement of 450 MHz worldwide.

410 MHz	740 MHz	2350 MHz	3850 MHz
			
			
100% connected	91,3% connected 2.5-3 x eNB	58,7% connected 12-15 x eNB	45,6% connected 20-25 x eNB

E2E Ecosystem for 450 MHz and 410 MHz bands

450 alliance.org

Operators

ice group, CIBICOM, elisa, TiTan Broadband, TERACOM, ArgoNET, 450connect, Telekom Slovenije, PGE Systemy S.A., ah NET, IBERDROLA, UTILITY CONNECT, ESB Energy for generations

Device management

elisa, NOKIA, ERICSSON, monogoto

eSIM management

monogoto

Core

NOKIA, ERICSSON, ZTE

RAN

AIRBUS DEFENCE & SPACE, NOKIA, ERICSSON, ZTE, ANKTION TECH, UBIIK

Antennas

HUBER+SUHNER, AMPHENOL PROCOM connect with confidence, ANTENNA COMPANY

Devices

RAD, UNITAC, NOKIA, DigiComm, TELOX, CYRUS, RugGear, GE, INSYS icom, GARDEROS, Hitachi Energy, NOTION, intelliport solutions, DIGI, ANDRA, VIRTUAL ACCESS, Telit, wm SYSTEMS, SIERRA WIRELESS, ZTE

Chipset

Altair, QUALCOMM

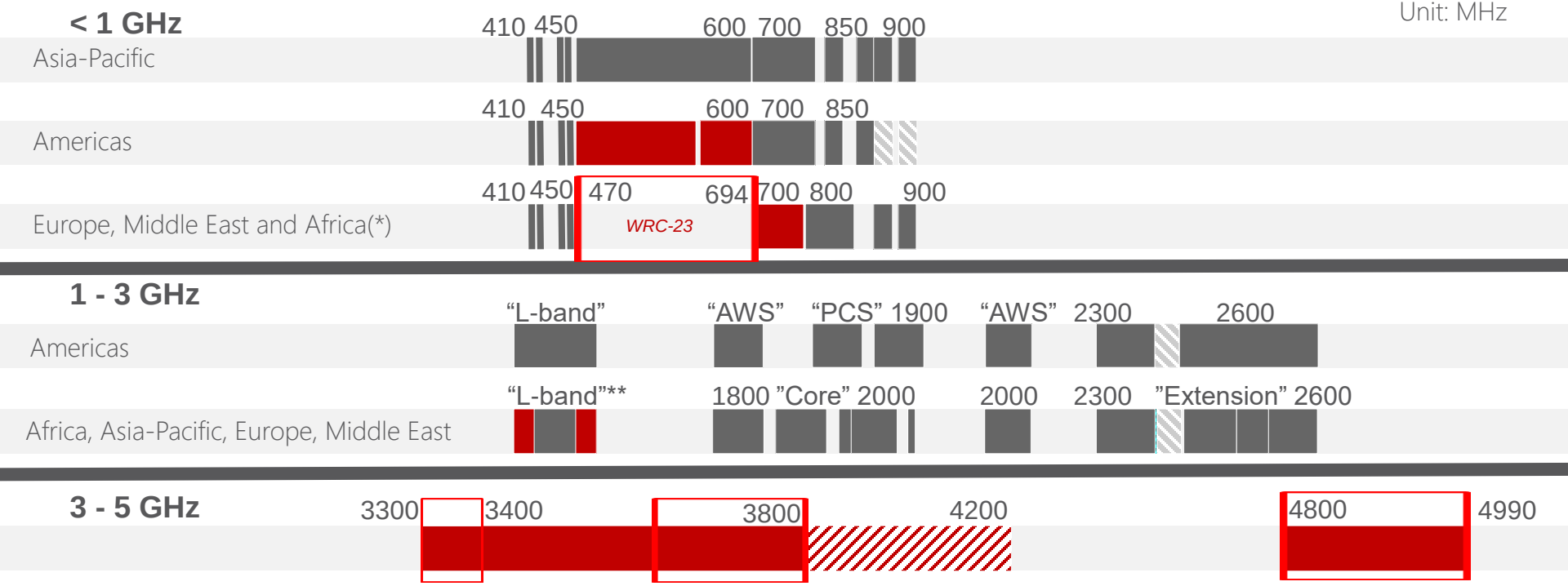
monogoto

Service and private networks providers

TDCOMM Rethinking Cellular

WRC-23 taking place in Dubai, UAE from 20th November to 15th December

Spectrum ranges covered by some WRC-23 agenda items



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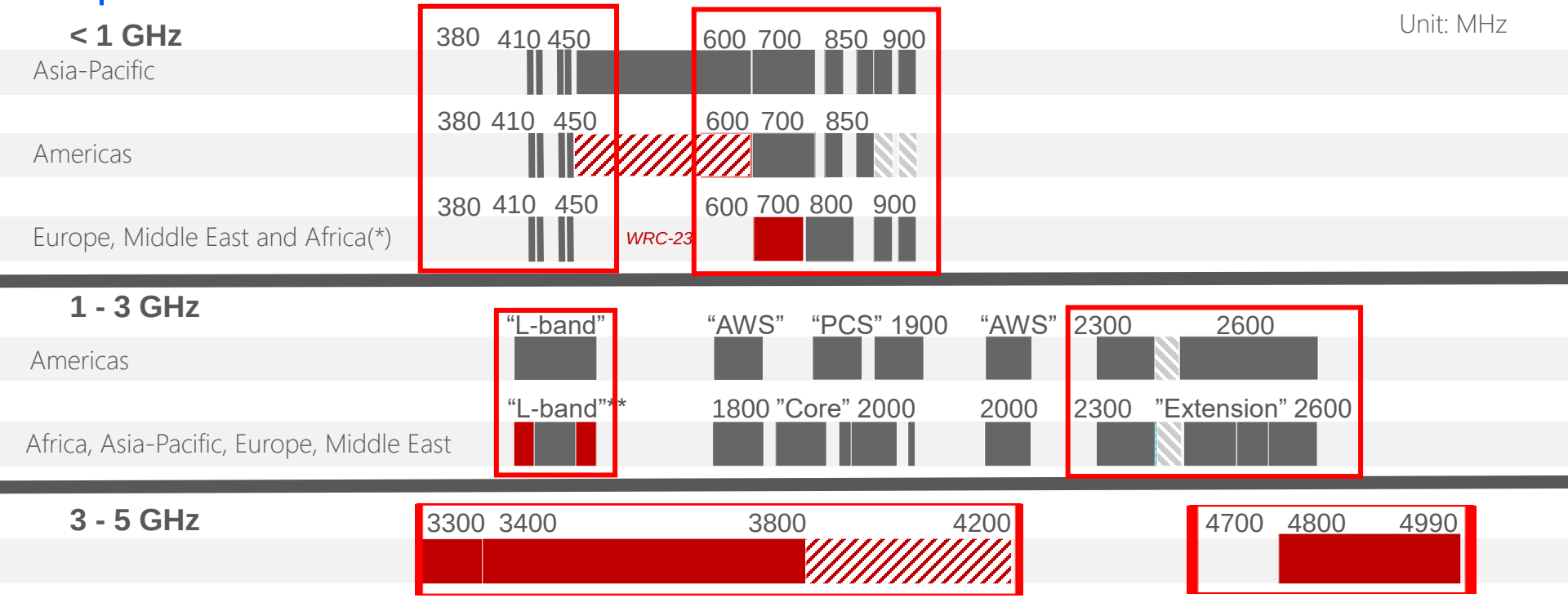
Spectrum for current and future critical communications networks

Unit: MHz



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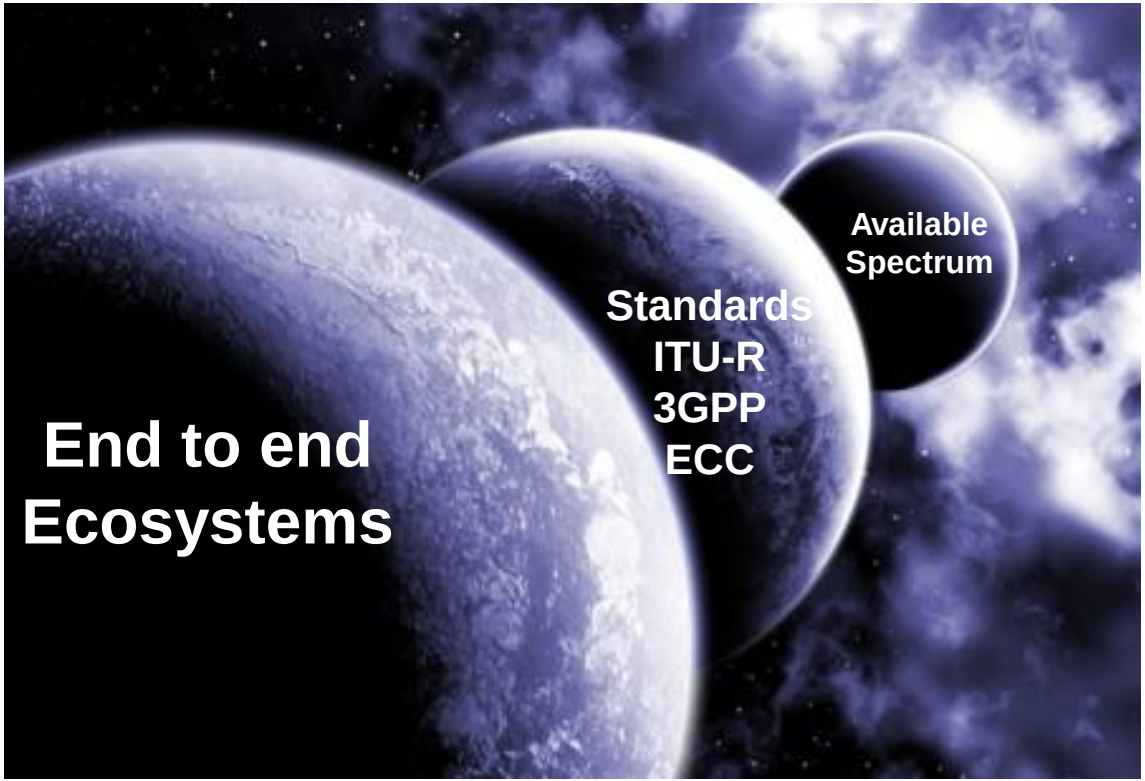
Critical communications market opportunity



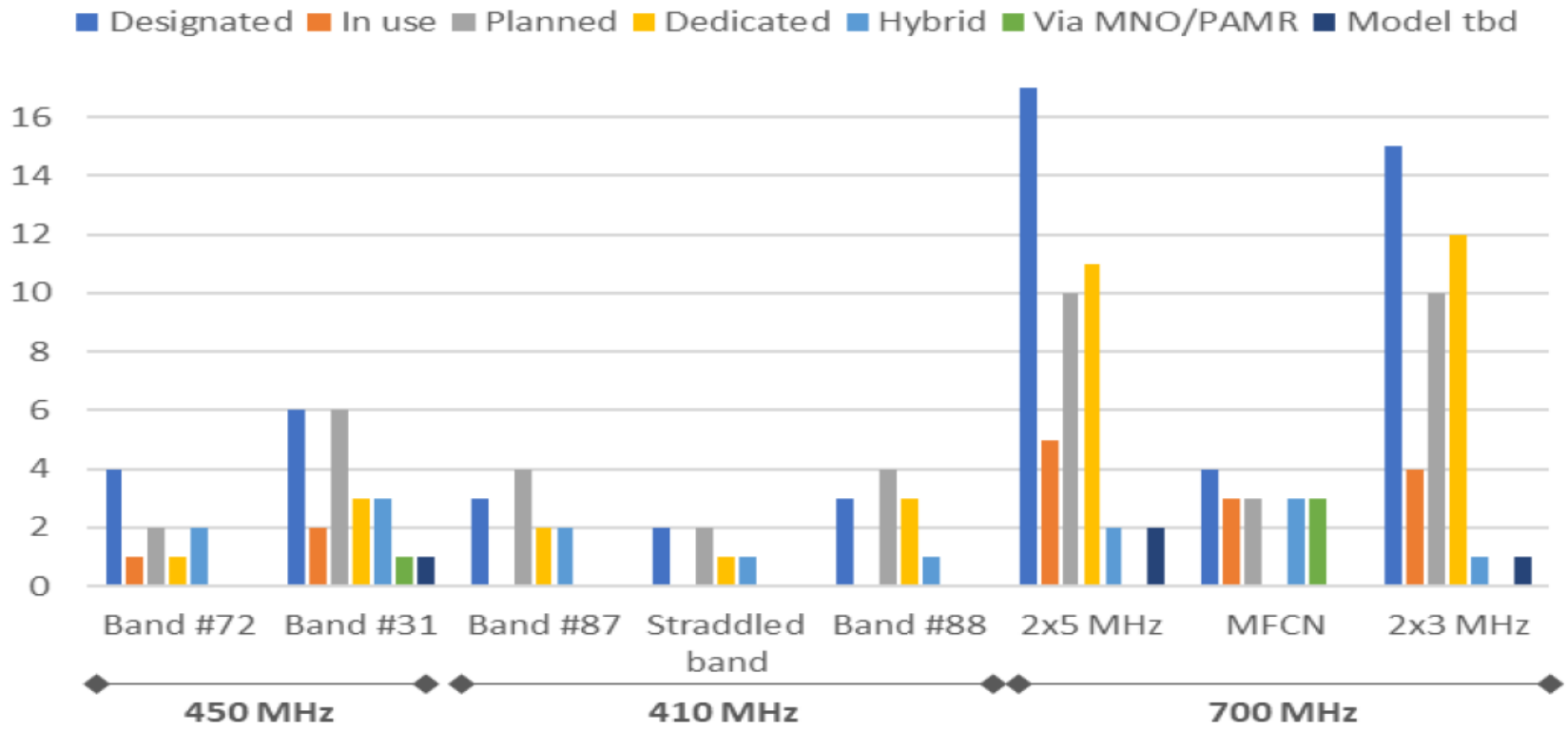
Thank you

Any questions?

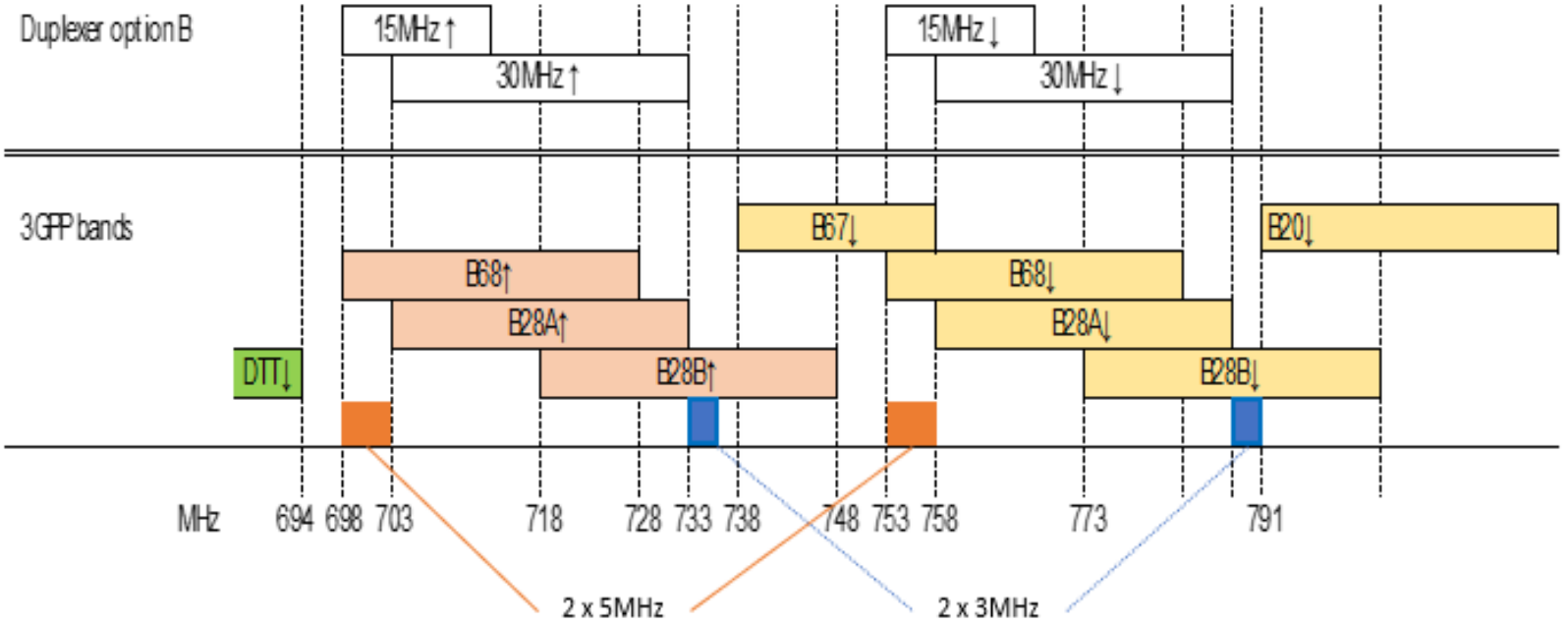
noel.kirkaldy@nokia.com

SPECTRUM FOR PRIVATE COMMUNICATIONS SYSTEMS IN BRAZIL

ECC Synthesis of the questionnaire on Spectrum for BB-PPDR and possible further actions by WG FM

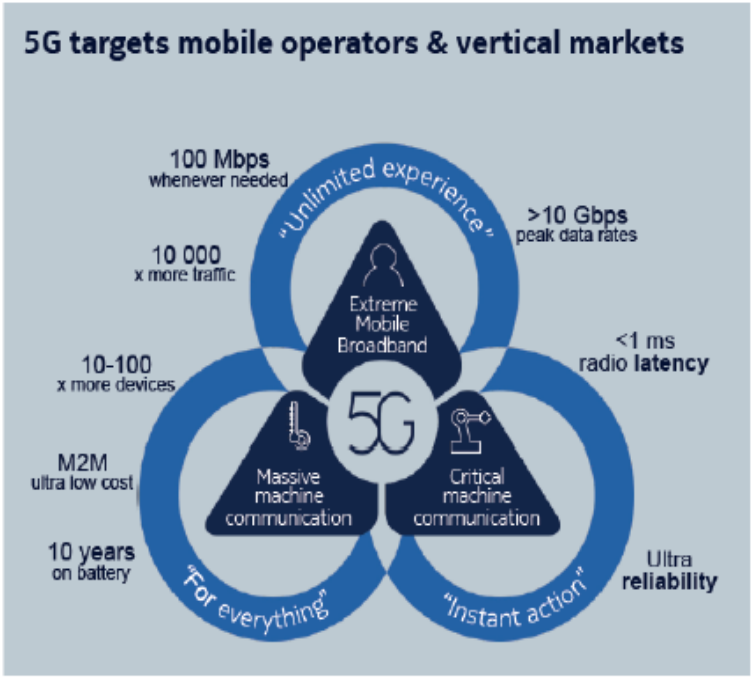


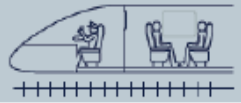
700 MHz 2x5 MHz Band 68 and 2x3 MHz of Band 28



5G NR: the natural choice for FRMCS

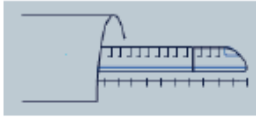
High Capacity – Low Latency – Reliability – Security – Energy Efficiency





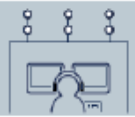
Train operations

Rolling stock maintenance



Trackside maintenance

Station maintenance



Supporting systems

The attributes of 5G NR are the needs of FRMCS

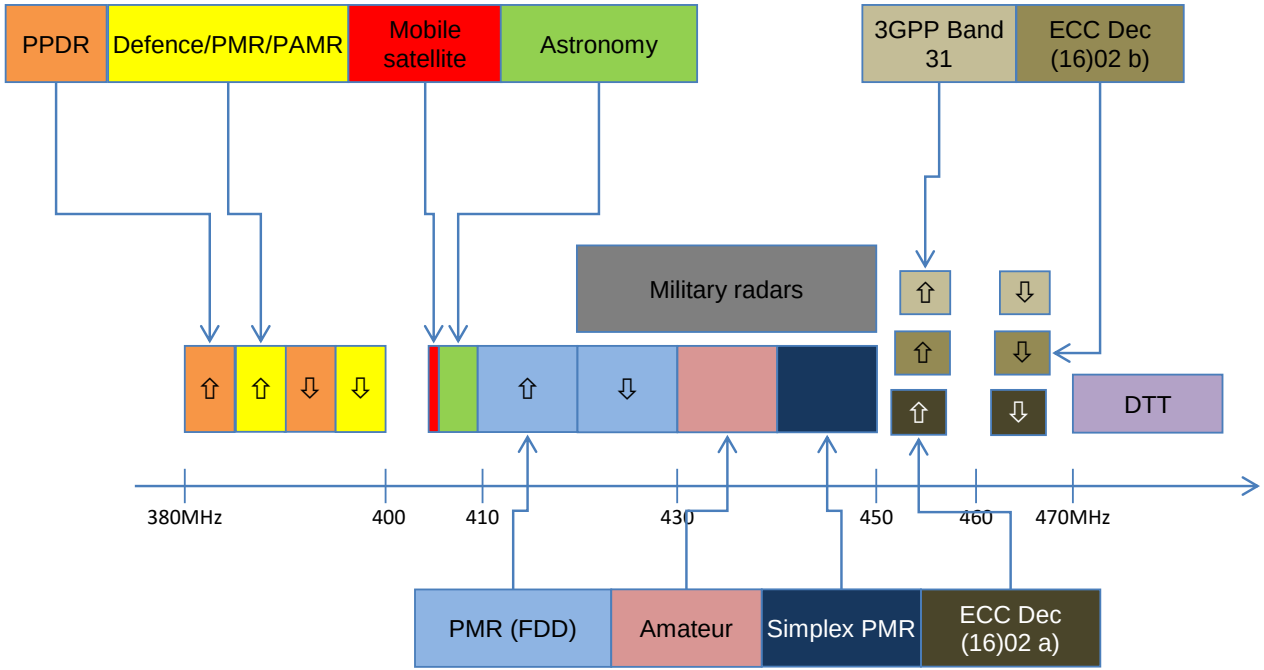
Spectrum landscape and co-existence

- New 3GPP NR operating bands for CEPT-designated spectrum for Railway Mobile Radio:

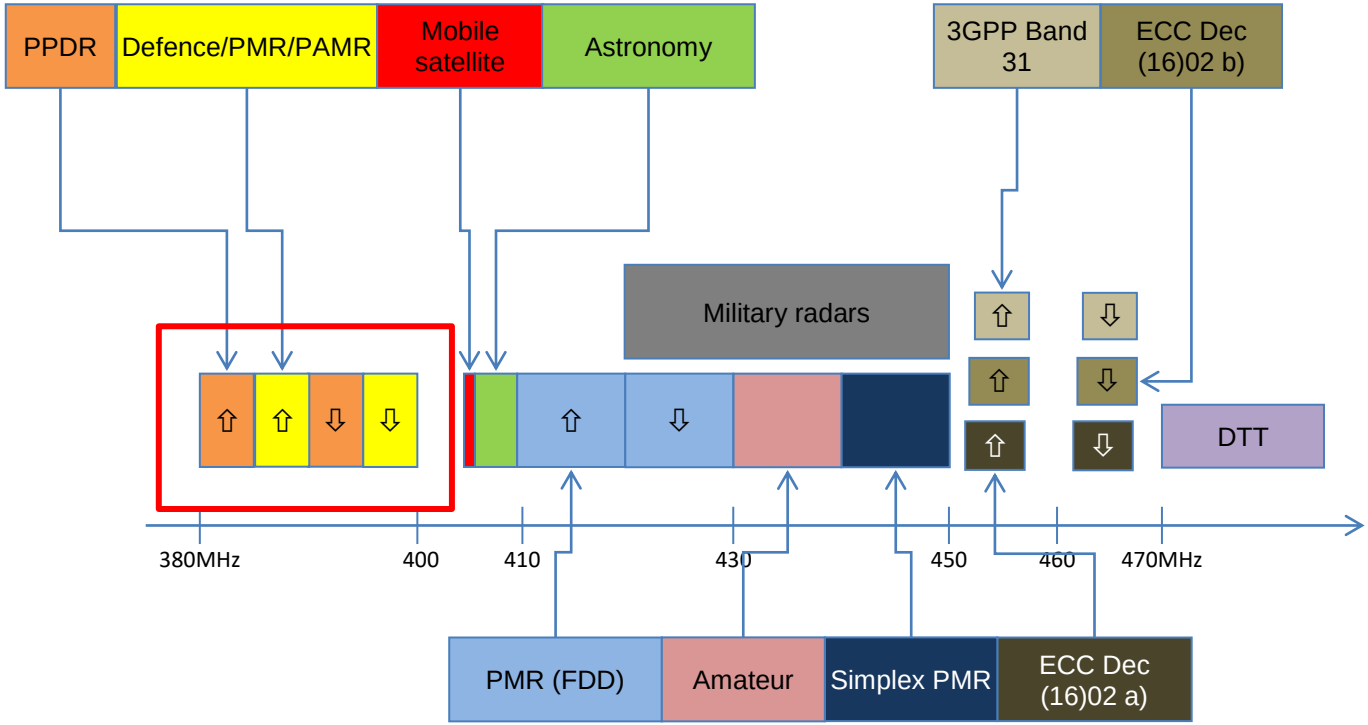
3GPP band	Duplex mode	Frequency range	Status
n100	FDD	UL: 874.4 – 880 MHz DL: 919.4 – 925 MHz	Target completion June 2022
n101	TDD	1900-1910 MHz	Completed March 2022

- 3GPP requirements ensure co-existence with adjacent spectrum, to avoid interference to/from established networks.
- European harmonized standards for type approval include additional requirements
  - e.g. base stations for band n1 (uplink 1920-1980 MHz) are required to tolerate signals in n101.

Three FDD frequency ranges: 380-400 MHz, 410-430 MHz and 450-470 MHz



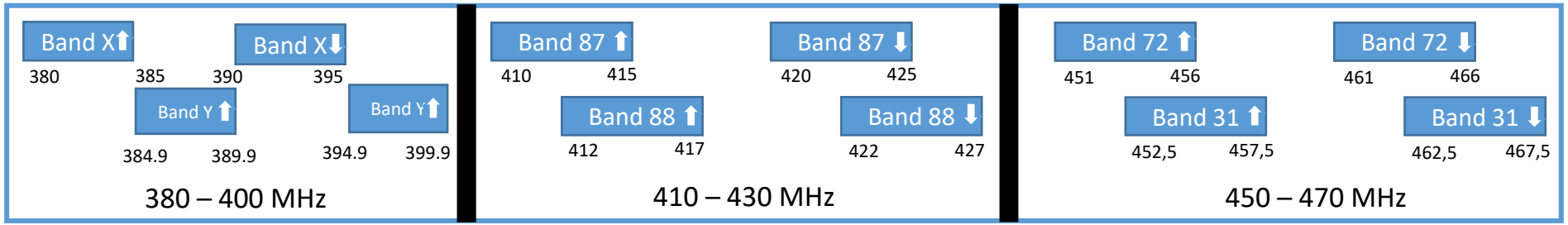
Final part of the Trilogy is 380-400 MHz



LTE Bands currently in scope and planned

450 alliance.org

promoting the advancement of 450 MHz worldwide.



Roadmap towards a new or updated 3GPP standard:

1. Submit a Work Item to 3GPP RAN Plenary
2. Formalise equipment standards ETSI and ECC
3. Spectrum assignments by national administrations

Typically 3 – 5 years

On the Raodmap: new LTE Band at 380 – 400 MHz and 5G for the existing bands