Financováno Evropskou unií
NextGenerationEU

MINISTERSTVO PRŮMYSLU A OBCHODU

Grant Thornton

4 GHz Band: Current and Future Use

Analysis of the 3400–4400 MHz band — Europe's contested 5G mid-band

Summary of Study 02 · prepared by Grant Thornton for the Ministry of Industry and Trade (CZ) · November 2024

AT A GLANCE

Study 02 examines how the 4 GHz band (3400–4400 MHz) is shared today and how its use will change as 5G/IMT, low- and medium-power wireless broadband (WBB LMP), fixed and satellite services and safety-critical aviation systems compete for the same spectrum. It reviews the ITU, 3GPP and CEPT/EU regulatory framework, maps national allocations across Europe, and sets out recommendations for the Czech regulator (ČTÚ) ahead of imminent CEPT/ECC decisions.

What the study covers

The 4 GHz band is one of Europe's most contested pieces of spectrum. It is the primary “5G mid-band”, yet it also carries fixed point-to-point links, satellite earth stations and — critically — aircraft radio altimeters. The study analyses the full regulatory framework (ITU Radio Regulations and WRC decisions, 3GPP releases, CEPT/ECC and the EU bodies RSC and RSPG), documents current European and Czech usage sub-band by sub-band, and assesses coexistence between every service sharing the band.

Why it matters

The band sits immediately before major regulatory change. Decisions taken in 2024–2027 — CEPT Reports 88 and 362, ECC Decision (24)01, the EU coexistence roadmap and WRC-27 work under ITU-R Resolution 73 — will determine whether new wireless-broadband networks can be deployed in 3800–4200 MHz without endangering aviation safety systems in 4200–4400 MHz. Fragmented national allocations also threaten the harmonisation that equipment makers depend on.

How the band is divided

Sub-band	Primary roles and users
3400–3800 MHz	Core European 5G / IMT mid-band (MFCN) for public mobile and fixed-wireless access; residual fixed service and satellite earth stations.
3800–4200 MHz	Emerging local / private wireless broadband (WBB LMP) for industrial verticals; fixed links; legacy C-band satellite downlinks.
4200–4400 MHz	Aeronautical radionavigation: radio altimeters (safety-of-life) plus wireless avionics intra-communications (WAIC).

Four services, one band

5G mid-band (IMT / MFCN)

Nationwide and regional public mobile and fixed-wireless access — the backbone of Europe's 5G coverage in 3400–3800 MHz.

Local & private networks (WBB LMP)

Industrial verticals — factories, logistics, campuses — increasingly licensed locally in 3800–4200 MHz at low / medium power.

Fixed & satellite services (FS / FSS)

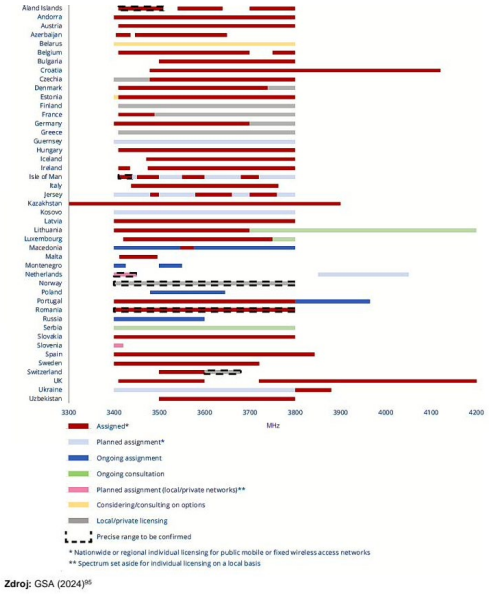
Point-to-point microwave links and C-band satellite earth stations, now largely concentrated above 3800 MHz.

Aviation safety (RA / WAIC)

Radio altimeters feed terrain awareness, automatic landing, wind-shear and collision-avoidance systems; interference is a safety-of-life risk.

A fragmented European landscape

A GSA snapshot reproduced in the study shows how widely European states differ in authorising the band — from nationwide IMT assignments to local/private licensing — with no harmonised arrangement yet for 3800–4200 MHz. National non-public-network allocations range from 3400–3440 MHz (Czechia) to 3900–4200 MHz (Poland) and 3800–4200 MHz (Norway and the UK).

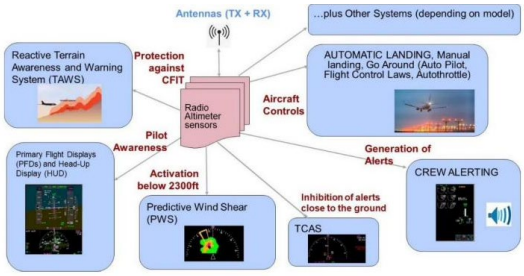


Zdroj: GSA (2024)[95]

IMT assignments in the C-band across Europe (3300–4200 MHz). Source: GSA (2024), reproduced in Study 02.

Why 4200–4400 MHz is safety-critical

Radio altimeters operating in 4200–4400 MHz are mandatory safety systems that measure an aircraft's height above terrain. Their output drives many other onboard functions, so harmful interference from adjacent wireless-broadband transmitters could pose a serious risk to passengers, crew and people on the ground.



Zdroj: ICAO[133]

Radio altimeters provide essential data to many aircraft systems. Source: ICAO, reproduced in Study 02.

Recommendations for ČTÚ and CEPT

Six priorities for the regulator

- Await the imminent CEPT/ECC outputs (Reports 88 and 362, ECC Decision (24)01) before resolving coexistence questions — many will provide definitive guidance.
- Introduce “light licensing” or registration for low-power WBB LMP stations, supported by a geo-database of location-aware devices for dynamic, revocable authorisations.
- Consider siting restrictions on WBB LMP active-antenna (AAS) transmitters near airport runways; the 60 m (200 ft) altitude threshold for altimeter interference may be too conservative.
- Verify whether any FSS transmissions below 3800 MHz over Czechia still require protection from IMT / WBB LMP.
- Ask CEPT for a mandate to define a harmonised 3800–4200 MHz band, given today's divergent national allocations.
- Examine protection requirements for the Wettzell (DE) radio-telescopes, around 20 km from the Czech border.

KEY TAKEAWAY

The 4 GHz band must reconcile Europe's 5G ambitions with safety-of-life aviation systems. With CEPT/ECC and EU decisions imminent, the Czech regulator should prepare flexible, location-aware licensing for wireless broadband while safeguarding radio altimeters — a shared priority across the European Union.