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COMMISSION IMPLEMENTING DECISION (EU) 2025/2425

of 2 December 2025

on the harmonisation of the 3 800-4 200 MHz frequency band for the shared use by terrestrial wireless broadband systems capable of providing local-area network connectivity in the Union

(notified under document C(2025) 8146)

(Text with EEA relevance)

THE EUROPEAN COMMISSION,

Having regard to the Treaty on the Functioning of the European Union,

Having regard to Decision No 676/2002/EC of the European Parliament and of the Council of 7 March 2002 on a regulatory framework for radio spectrum policy in the European Community (Radio Spectrum Decision)⁽¹⁾, and in particular Article 4(3) thereof,

Whereas:

- (1) The 3 800-4 200 MHz frequency band can enable the deployment of terrestrial wireless broadband systems to provide local-area network connectivity for a variety of services and applications, on the basis of technology neutrality. The wide range of local use cases across different industrial and non-industrial environments, both indoors and outdoors, will benefit from harmonised technical conditions.
- (2) The Commission Communication '5G for Europe: An Action Plan' ('5G action plan')⁽²⁾ sets out a coordinated Union approach to the deployment of 5G services as of 2020. The 5G action plan highlights 5G as a key enabler of the digitalisation of 'vertical industries' ('verticals')⁽³⁾. It also states that coordinated action is needed at Union level, including to identify and harmonise spectrum for 5G, to serve innovative business models and solutions for locally licensed access to spectrum.
- (3) The Radio Spectrum Policy Group (RSPG) in its 'Opinion on 5G implementation challenges (RSPG 3rd opinion on 5G)'⁽⁴⁾, concludes that connectivity for 'verticals' could be provided by mobile operator's solutions, third-party providers and directly by verticals themselves in the Union-harmonised bands for electronic communications services or in dedicated spectrum for verticals. The RSPG recommends that Member States also consider other spectrum solutions including dedicated or shared spectrum for the business/sectoral needs that may not be adequately met by mobile operators.
- (4) In its 'Opinion on additional spectrum needs and guidance on the fast rollout of future wireless broadband networks'⁽⁵⁾, the RSPG further recognises that there is a specific demand for mid-band spectrum and recommends that Member States investigate the possible use of the 3 800-4 200 MHz frequency band for local applications (namely low/medium power), including vertical applications while protecting satellite and other existing applications and services.
- (5) The 3 800-4 200 MHz frequency band is used across the Union for satellite services comprising space-to-Earth communications to satellite Earth stations in the Fixed Satellite Service (FSS). It is also used for terrestrial communications in the Fixed Service (FS) including both military and civil uses.

⁽¹⁾ OJ L 108, 24.4.2002, p. 1, ELI: [http://data.europa.eu/eli/dec/2002/676\(1\)/oj](http://data.europa.eu/eli/dec/2002/676(1)/oj).

⁽²⁾ COM(2016) 588 final.

⁽³⁾ Such as transport, logistics, automotive, health, energy, smart factories, media and entertainment.

⁽⁴⁾ Document RSPG19-007 final of 30 January 2019, *Strategic spectrum roadmap towards 5G for Europe: RSPG opinion on 5G implementation challenges (RSPG 3rd opinion on 5G)*.

⁽⁵⁾ Document RSPG21-024 final of 16 June 2021, *RSPG opinion on additional spectrum needs and guidance on the fast rollout of future wireless broadband networks*.

- (6) The 3 400-3 800 MHz frequency band has been harmonised in the Union for terrestrial wireless broadband systems providing electronic communications services pursuant to Commission Decision 2008/411/EC ⁽⁶⁾ and represents the primary band for 5G deployment in the Union. It is crucial that those systems are adequately protected.
- (7) The 4 200-4 400 MHz frequency band is globally allocated to the Aeronautical Radio Navigation Service (ARNS) and is used by radio altimeters installed on board aircraft. Radio altimeters are used on different types of aircraft, including passenger and cargo airplanes, and helicopters. They provide precise height measurements critical for various safety functions in aviation, including automated landing, Ground Proximity Warning Systems, Terrain Awareness Warning Systems and collision avoidance, and should be protected.
- (8) Furthermore, some Very-long-baseline Interferometry (VLBI) Global Observing System (VGOS) stations are installed in some Member States as part of the European Critical Infrastructure Project Galileo, and have highly sensitive passive receivers. At present, these observatory operations do not benefit from a radio astronomy allocation in the 3 800-4 200 MHz frequency band. Nevertheless, Member States should take all practicable steps to protect them from harmful interference.
- (9) Under Article 4(2) of Decision No 676/2002/EC, the Commission issued to the European Conference of Postal and Telecommunications Administrations (CEPT) a mandate to develop harmonised technical conditions for the shared use of the 3 800-4 200 MHz frequency band for terrestrial wireless broadband systems providing local-area network connectivity in the Union.
- (10) In response to that mandate, on 8 November 2024, the CEPT issued Report 88 ⁽⁷⁾ ('CEPT Report'). It specifies the least restrictive harmonised technical conditions for the shared use of the 3 800-4 200 MHz frequency band for low- and medium-power terrestrial wireless broadband ('WBB LMP systems') systems for the provision of local-area network connectivity. Those conditions are based on the results of the ECC Reports 358 ⁽⁸⁾ and 362 ⁽⁹⁾.
- (11) The harmonised technical conditions set out in CEPT Report 88 ensure technology neutrality for the operation of WBB LMP systems, including 3rd Generation Partnership Project (3GPP) and Digital Enhanced Cordless Telecommunications (DECT)-2020 New Radio (NR) technologies. They allow for the unsynchronised operation of medium power base stations with both active antenna systems (AAS) and non-AAS, and low power base stations with non-AAS. Where necessary to manage coexistence between different WBB LMP systems within the 3 800-4 200 MHz frequency band, Member States should ensure national and, potentially, cross-border coordination.
- (12) The band can be accessed if techniques to access spectrum and mitigate interference that provide an appropriate level of receiver performance to comply with the essential requirements of Directive 2014/53/EU of the European Parliament and the Council ⁽¹⁰⁾ are used. Where relevant techniques are described in harmonized standards or parts thereof the references of which have been published in the *Official Journal of the European Union* in accordance with Directive 2014/53/EU, performance at least equivalent to the performance level associated with those techniques shall be ensured.

⁽⁶⁾ Commission Decision 2008/411/EC of 21 May 2008 on the harmonisation of the 3 400-3 800 MHz frequency band for terrestrial systems capable of providing electronic communications services in the Community (OJ L 144, 4.6.2008, p. 77, ELI: <http://data.europa.eu/eli/dec/2008/411/oj>).

⁽⁷⁾ CEPT Report 88: 'Report from CEPT to the European Commission in response to the Mandate on shared use of the 3 800-4 200 MHz frequency band by low/medium power terrestrial wireless broadband systems (WBB LMP) providing local-area network connectivity'.

⁽⁸⁾ ECC Report 358: 'In-band and adjacent bands sharing studies to assess the feasibility of the shared use of the 3,8-4,2 GHz frequency band by terrestrial wireless broadband systems providing local-area (i.e. low/medium power) network connectivity', approved June 2024.

⁽⁹⁾ ECC Report 362: 'Compatibility between mobile or fixed communications networks (MFCN) operating in 3 400-3 800 MHz and wireless broadband systems in low/medium power (WBB LMP) operating in the frequency band 3 800-4 200 MHz with Radio Altimeters (RA) operating in 4 200-4 400 MHz', approved November 2024.

⁽¹⁰⁾ Directive 2014/53/EU of the European Parliament and of the Council of 16 April 2014 on the harmonisation of the laws of the Member States relating to the making available on the market of radio equipment and repealing Directive 1999/5/EC (OJ L 153, 22.5.2014, p. 62, ELI: <http://data.europa.eu/eli/dir/2014/53/oj>).

- (13) The harmonised technical conditions and the relevant guidance set out in CEPT Report 88 address the protection and the long-term development of incumbent users sharing the 3 800-4 200 MHz frequency band, in particular receiving satellite Earth stations and terrestrial fixed links. They also address the protection of terrestrial wireless broadband systems providing electronic communications services below 3 800 MHz and radio altimeters operating in the 4 200-4 400 MHz frequency band. The harmonised technical conditions are based on the assumption of a national authorisation regime, where the locations of WBB LMP networks or base stations, fixed links in the FS, and the receiving satellite Earth stations in the FSS are known.
- (14) Shared use between WBB LMP systems, on the one hand, and FSS or FS systems, on the other, within the 3 800-4 200 MHz band is feasible on a case-by-case basis. To ensure the protection of existing FSS systems below 3 800 MHz, and of existing and future FSS and FS systems within the 3 800-4 200 MHz band, Member States should ensure careful planning of WBB LMP systems and case-by-case analysis. Member States should also consider applying appropriate mitigation techniques, both at national level and – where necessary due to large separation distances – through bilateral or multilateral cross-border coordination agreements. The use of the band 3 800-4 200 MHz for FSS and FS systems currently authorised on the market in Member States remains subject to national decisions. This Decision is without prejudice to the way Member States authorise the use of this band for FSS and FS systems.
- (15) Member States should ensure the protection of radio altimeters operating in the 4 200-4 400 MHz frequency band from WBB LMP systems operating in the 3 800-4 200 MHz frequency band, based on the results set out in ECC Report 362 and without prejudice to any aviation measure that could be taken by the European Aviation Safety Agency (EASA). Particular attention at national level should be given to the protection of radio altimeters, from medium power AAS base stations located in close proximity to airports, including in border areas, and operating within the 4 100-4 200 MHz frequency sub-band.
- (16) Member States should ensure the protection of terrestrial systems providing WBB electronic communications services (ECS) in the 3 400-3 800 MHz frequency band, including, as appropriate, through cross-border coordination, synchronised operation of networks, power flux density limits, separation distances and/or frequency separation requirements.
- (17) Because CEPT Report 88 did not examine the use of WBB LMP systems in the 3 800 -4 200 MHz frequency band for connectivity to aerial terminal stations, this Decision does not provide for harmonised technical and operational conditions for the use of aerial terminal stations. In accordance with the existing legal framework, Member States are entitled to restrict the use of aerial terminal stations in this frequency band, subject to any harmonised conditions to become available at Union level in the future.
- (18) It is essential to ensure coexistence between WBB LMP systems as well as between WBB LMP systems and other established services such as radio altimeters. In this regard, Member States may also refer to any ECC recommendations, for action at national or bilateral/multilateral levels ⁽¹¹⁾.
- (19) The notion of ‘designating and making available’ the 3 800-4 200 MHz frequency band in the context of this Decision refers to the following steps: (i) the adaptation of the national legal framework on frequency allocation to include the intended use of this band under the harmonised technical conditions set in this Decision; (ii) the initiation of all necessary measures in order to ensure coexistence with existing use in this band, to the extent necessary; and (iii) the initiation of the appropriate measures, supported by the launch of a stakeholder consultation process where appropriate, in order to allow the use of this band in accordance with the applicable legal framework at Union level, including the harmonised technical conditions of this Decision.
- (20) Cross-border coordination agreements among Member States as well as between Member States and non-EU countries may be necessary, in order to avoid harmful interference and to improve spectrum efficiency and convergence in spectrum use. Without prejudice to potential aviation measures by EASA, Member States should take

⁽¹¹⁾ This refers to the following coexistence scenarios: WBB LMP systems and FSS receiving Earth stations, WBB LMP systems and FS links, WBB LMP systems and WBB ECS in the 3 400-3 800 MHz frequency band, WBB LMP systems and radio altimeters in the 4 200-4 400 MHz frequency band.

into account relevant ECC recommendations to ensure the coherent protection of radio altimeters operating in the 4 200-4 400 MHz frequency band across borders. The Commission, in cooperation with the Member States and EASA, has prepared a non-binding EU roadmap for ensuring safe coexistence between mobile networks and aircraft radio altimeters within the frequency range 3 400-4 400 MHz ⁽¹²⁾.

- (21) Without prejudice to the right of Member States to authorise the use of spectrum in their territory, the future review of the spectrum use under this Decision would be facilitated through the convergent use of consistent portions of spectrum across the EU, such as starting from the upper part of the band. Any coordinated way of use of the spectrum across the EU could be further investigated. Depending on the authorisation regime applied to the 3 800-4 200 MHz frequency band, Member States should assess the need to impose additional technical conditions, in order to ensure appropriate co-existence between WBB LMP systems and between WBB LMP systems and other services in that frequency band and in adjacent bands.
- (22) Member States should report to the Commission on the implementation of this Decision, in particular the gradual introduction and development of WBB LMP systems in the 3 800-4 200 MHz frequency band and any co-existence issues, to help assess its impact at Union level and the suitability of the harmonised technical conditions in ensuring adequate protection of incumbent services, as well as its timely review.
- (23) The measures provided for in this Decision are in accordance with the opinion of the Radio Spectrum Committee,

HAS ADOPTED THIS DECISION:

Article 1

This Decision establishes the harmonised technical conditions for the availability and efficient shared use of the 3 800-4 200 MHz frequency band, for low- and medium-power terrestrial wireless broadband (WBB LMP) systems capable of providing local-area network connectivity in the Union.

Article 2

For the purposes of this Decision:

‘radio altimeter’ means a downward-looking radar ranging system that measures the height of an aircraft above terrain and obstacles with a high degree of accuracy, integrity, and availability, during all phases of flight.

Article 3

By 30 September 2026, Member States shall designate and make available on a non-exclusive basis the 3 800-4 200 MHz frequency band for WBB LMP systems in compliance with the harmonised technical conditions set out in the Annex.

Article 4

Member States shall ensure, in compliance with the relevant harmonised technical conditions set out in the Annex, that the WBB LMP systems appropriately protect:

- (a) Earth stations in the Fixed Satellite Service (FSS) for space-to-Earth communications authorised to operate within the 3 800-4 200 MHz frequency band across the Union and below 3 800 MHz;
- (b) systems in the Fixed Service (FS) operating within the 3 800-4 200 MHz frequency band;

⁽¹²⁾ European Commission, *EU Roadmap for ensuring safe coexistence between mobile networks and aircraft radio altimeters within the frequency range 3 400-4 400 MHz in the Union*, Version 2 of 8 April 2025.

- (c) terrestrial systems providing wireless broadband electronic communications services (WBB ECS) within the 3 400-3 800 MHz frequency band;
- (d) radio altimeters in the aeronautical navigation service (ARNS) operating within the 4 200-4 400 MHz frequency band;
- (e) VLBI Global Observing System stations on the Union's territory, where necessary and taking due account of their regulatory status.

Article 5

Member States shall facilitate cross-border coordination agreements to enable operation of the WBB LMP, and also in accordance with Article 4, taking into account existing regulatory procedures and rights, and relevant international agreements.

Article 6

Member States shall report to the Commission on the implementation of this Decision by 31 December 2026.

Member States shall monitor the use of the 3 800-4 200 MHz frequency band, including the co-existence between WBB LMP systems and other systems referred to in Article 4. Member States shall report their findings to the Commission upon request or at their own initiative.

Article 7

This Decision is addressed to the Member States.

Done at Brussels, 2 December 2025.

For the Commission
Henna VIRKKUNEN
Executive Vice-President

ANNEX

TECHNICAL CONDITIONS REFERRED TO IN ARTICLE 3 AND 4

1. Definitions

For the purposes of this Annex, the following definitions apply:

AAS (active antenna systems) means a WBB LMP base station and an antenna system where the amplitude and/or phase between antenna elements is continually adjusted resulting in an antenna pattern that varies in response to short term changes in the radio environment. This is intended to exclude long term beam shaping such as fixed electrical down tilt ⁽¹⁾.

Synchronised operation means operation of two or more different time division duplex (TDD) networks, where simultaneous uplink (UL) and downlink (DL) transmissions do not occur, that is at any given moment in time either all networks transmit in downlink or all networks transmit in uplink. This requires the alignment of all DL and UL transmissions for all TDD networks involved as well as synchronising the beginning of the frame across all networks ⁽²⁾.

Unsynchronised operation means operation of two or more different TDD networks, where at any given moment in time at least one network transmits in DL while at least one network transmits in UL. This might happen if the TDD networks either do not align all DL and UL transmissions or do not synchronise at the beginning of the frame ⁽³⁾.

Semi-synchronised operation means operation of two or more different TDD networks, where part of the frame is consistent with synchronised operation, while the remaining portion of the frame is consistent with unsynchronised operation. This requires the adoption of a frame structure for all TDD networks involved, including slots where the UL/DL direction is not specified, as well as synchronising the beginning of the frame across all networks.

Equivalent isotropically radiated power (EIRP) is the product of the power supplied to the antenna and the antenna gain in a given direction relative to an isotropic antenna (absolute or isotropic gain)

Total radiated power (TRP) is a measure of how much power a composite antenna radiates. It equals the total conducted power input into the antenna array system less any losses in the antenna array system. TRP means the integral of the power transmitted in different directions over the entire radiation sphere as shown in the formula:

$$TRP \equiv \frac{1}{4\pi} \int_0^{2\pi} \int_0^\pi P(\vartheta, \varphi) \sin(\vartheta) d\vartheta d\varphi$$

where $P(\vartheta, \varphi)$ is the power radiated by an antenna array system in direction (ϑ, φ) given by the formula:

$$P(\vartheta, \varphi) = P_{Tx} g(\vartheta, \varphi)$$

where P_{Tx} denotes the conducted power (measured in Watts), which is input into the array system, and $g(\vartheta, \varphi)$ denotes the array systems directional gain along the (ϑ, φ) direction.

2. General Parameters

Within the 3 800-4 200 MHz frequency band:

- (1) the duplex mode of operation shall be time division duplex (TDD);
- (2) the assigned block sizes (or 'channels') shall be in multiples of 5 MHz (Figure 1);
- (3) the lower frequency limit of an assigned block shall be aligned with or spaced at multiples of 5 MHz from the lower band edge of 3 800 MHz;

⁽¹⁾ Non-AAS (non-active antenna systems) refers to WBB LMP base station transmitters which uses a passive antenna with a fixed antenna pattern. It may be possible to apply long term electrical beam steering to non-AAS, but non-AAS cannot respond to short term changes in the radio environment.

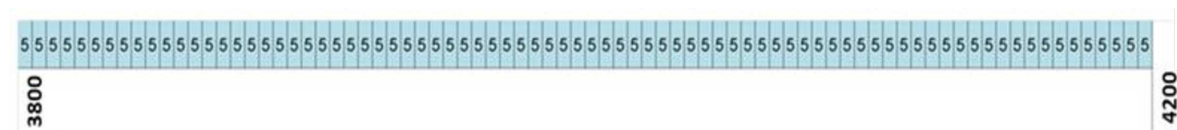
⁽²⁾ I.e. common phase clock reference.

⁽³⁾ I.e. no common phase clock reference.

- (4) multiple adjacent blocks of 5 MHz can be combined to obtain a wider channel;
- (5) the transmission of base stations and terminal stations shall be in compliance with the technical conditions specified in Section 3 and Section 4, respectively.

Figure 1

3 800-4 200 MHz frequency arrangement



3. Technical conditions for base stations

Table 1 defines the maximum EIRP within an assigned block ("in-block EIRP") per cell for WBB LMP base stations operating in the 3 800-4 200 MHz frequency band.

Table 1

Maximum in-block EIRP per cell for WBB LMP base stations operating in the 3 800- 4 200 MHz frequency band

Type of base station	EIRP per cell (Note 1 and Note 2)
Low power base station	≤ 24 dBm/channel for BW ≤ 20 MHz ≤ 18 dBm/5MHz for BW > 20 MHz
Medium power base station	≤ 44 dBm/channel for BW ≤ 20 MHz ≤ 38 dBm/5MHz for BW > 20 MHz

Note 1: In a multi-sector site, the value per 'cell' corresponds to the value for one of the sectors.

Note 2: Higher EIRP levels may be authorised by national administrations in exceptional and duly justified cases, provided that protection of FSS receiving Earth stations and FS links (where appropriate at national level) in the band as well as terrestrial systems providing WBB ECS below 3 800 MHz and radio altimeters operating in the 4 200- 4 400 MHz frequency band is ensured, taking into account their future development, including in the neighbouring EU Member States. The network coverage shall remain local (i.e. no nationwide networks).

Explanatory note to Table 1: for the protection of terrestrial systems providing WBB ECS operating below 3 800 MHz, coordination may be required at national and/or cross-border level ⁽⁴⁾.

Table 2 defines the maximum unwanted emission levels for WBB LMP base stations above 4 200 MHz. These levels will provide a general protection of radio altimeters ⁽⁵⁾ operating in the 4 200-4 400 MHz frequency band. For WBB medium power base stations with AAS operating in the 4 100-4 200 MHz frequency band, that are deployed in close proximity to those airports which support precision approach procedures, coordination at national level may be needed ⁽⁶⁾.

⁽⁴⁾ Examples of coordination may include geographical/frequency separation, defining a maximum allowed power level (pfd) at the border of the WBB LMP licensed area, synchronised operation, specific sub-cases of semi-synchronised operation which only allow downlink to uplink modifications to the WBB LMP network compared to the frame structure of the WBB ECS and/or defining the maximum unwanted emissions below 3 800 MHz depending on location of WBB LMP in relation to WBB ECS.

⁽⁵⁾ This includes radio altimeters installed in large commercial aeroplanes and regional aircraft, which constitute the vast majority of radio altimeters in operation.

⁽⁶⁾ Examples of coordination may include no AAS medium power base station deployment closer than 1 200 m from the runway threshold and 40 m laterally from the edge of the runway, or AAS medium power base stations in compliance with emission levels meeting the spurious emission limit between 4 200 and 4 240 MHz.

Table 2

Maximum unwanted emission levels above 4 200 MHz for WBB LMP base stations

Frequency range	Non-AAS base station EIRP limit [dBm/5MHz per cell] (Note 1)	AAS medium power base station TRP limit [dBm/5MHz per cell]
4 200-4 205 MHz	11	1
4 205-4 240 MHz	8	- 3

Note 1: In a multi-sector base station site, the value per 'cell' corresponds to the value for one of the sectors.

Explanatory note to Table 2: The spurious domain in those technical conditions for a base station operating in the 3 800-4 200 MHz frequency band starts at 40 MHz from the band edge and the corresponding spurious emission limits are set in ERC Recommendation 74-01 (⁷).

4. Terminal Stations in-block requirements

Maximum WBB LMP terminal station power: 28 dBm TRP (including a 2 dB tolerance).

For fixed terminal stations, an in-block EIRP limit may be set out at national level, provided that protection of in-band and adjacent band incumbent services and cross-border obligations are fulfilled.

Transmission power control is mandatory and shall be activated.

(⁷) ERC Recommendation 74-01 'Unwanted emissions in the spurious domain', last updated on 1 October 2021.