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COMMISSION IMPLEMENTING DECISION (EU) 2019/784

of 14 May 2019

on harmonisation of the 24,25-27,5 GHz frequency band for terrestrial systems capable of providing wireless broadband electronic communications services in the Union

(notified under document C(2019) 3450)

(Text with EEA relevance)

(OJ L 127, 16.5.2019, p. 13)

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		Official Journal		
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►**M1**	Commission Implementing Decision (EU) 2020/590 of 24 April 2020	L 138	19	30.4.2020

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COMMISSION IMPLEMENTING DECISION (EU) 2019/784

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(notified under document C(2019) 3450)

(Text with EEA relevance)

Article 1

This Decision harmonises the essential technical conditions for the availability and efficient use of the 24,25-27,5 GHz frequency band in the Union for terrestrial systems capable of providing wireless broadband electronic communications services.

Article 2

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By 30 June 2020, Member States shall designate and make available on a non-exclusive basis the 24,25-27,5 GHz frequency band for terrestrial systems capable of providing wireless broadband electronic communications services, in compliance with the essential technical conditions set out in the Annex.

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Depending on the authorisation regime applied in this band, Member States shall analyse if it is necessary to impose additional technical conditions in order to ensure appropriate co-existence of terrestrial systems capable of providing wireless broadband electronic communications services with other services in the band.

Article 3

Member States shall ensure, in compliance with the relevant technical conditions in the Annex, that the terrestrial systems referred to in Article 1 appropriately protect:

(a) systems in adjacent bands, in particular in the Earth Exploration Satellite Service (passive) and in the Radio Astronomy Service in the 23,6-24,0 GHz frequency band;

(b) earth stations in the Earth Exploration Satellite Service and in the Space Research Service for space-to-earth communications operating within the 25,5-27,0 GHz frequency band;

(c) satellite systems for earth-to-space communications in the Fixed Satellite Service operating within the 24,65-25,25 GHz frequency band;

(d) satellite systems for inter-satellite communications operating within the 24,45-24,75 GHz and 25,25-27,5 GHz frequency bands.

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Article 4

Member States may allow the continued operation of fixed links within the 24,25-27,5 GHz frequency band, if the terrestrial systems referred to in Article 1 can co-exist with such fixed links through managed shared spectrum use.

Member States shall regularly monitor the need for continuing the operation of fixed links referred to in the first subparagraph of this Article.

Article 5

Under the condition that the number and locations of new earth stations are determined as not to impose disproportionate constraints on the systems referred to in Article 1, subject to market demand, Member States shall ensure, that the continued deployment of earth stations is made possible:

— in the Earth Exploration Satellite Service (space-to-earth) or in the Space Research Service (space-to-earth) within the 25,5-27,0 GHz frequency band;

— in the Fixed Satellite Service (earth-to-space), within the 24,65-25,25 GHz frequency band.

Article 6

Member States shall facilitate cross-border coordination agreements to enable operation of the terrestrial systems referred to in Article 1, taking into account existing regulatory procedures and rights, as well as relevant international agreements.

Article 7

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Member States shall report to the Commission on the implementation of this Decision by 30 September 2020.

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Member States shall monitor the use of the 24,25-27,5 GHz frequency band, including the progress on co-existence between the terrestrial systems referred to in Article 1 and other systems using the band, and report their findings to the Commission upon request or at their own initiative to allow a timely review of this Decision.

Article 8

This Decision is addressed to the Member States.

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ANNEX

TECHNICAL CONDITIONS REFERRED TO IN ARTICLES 2 AND 3

1. **Definitions**

Active antenna systems (AAS) means a 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 excludes long-term beam shaping such as fixed electrical down tilt. In AAS base stations the antenna system is integrated as part of the base station system or product.

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.

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.

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.

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:

$$TRP \stackrel{\text{def}}{=} \frac{1}{4\pi} \int_0^{2\pi} \int_0^{\pi} P(\theta, \varphi) \sin(\theta) d\theta d\varphi$$

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

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

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

2. **General Parameters**

1. The duplex mode of operation in the 24,25-27,5 GHz frequency band shall be time division duplex.

2. The assigned block size shall be a multiple of 200 MHz. A smaller block size of 50 MHz or 100 MHz or 150 MHz, adjacent to the assigned block of another spectrum user, is also possible to ensure efficient use of the full frequency band.

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3. The upper frequency limit of an assigned block shall be aligned with or spaced at a multiple of 200 MHz from the upper band edge of 27,5 GHz. If a block is smaller than 200 MHz according to paragraph 2 or needs to be offset to accommodate existing uses, this offset shall be a multiple of 10 MHz.

4. The technical conditions contained in this Annex are essential to address the mutual coexistence of terrestrial systems capable of providing wireless broadband electronic communication services and the coexistence of such systems with systems in the Earth Exploration Satellite Service (passive) in the form of limits on unwanted emissions into the 23,6-24 GHz frequency band as well as with space station receivers in the form of restrictions on the elevation of the main beam of the AAS of an outdoor base station. Additional measures may be required at a national level to ensure coexistence with other services and applications ([1]).

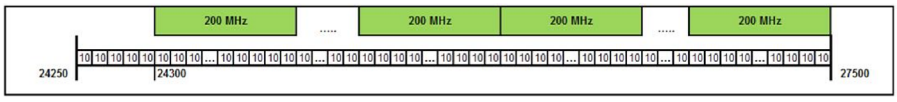
5. Use of the 24,25-27,5 GHz frequency band for communications with unmanned aerial vehicles shall be limited to the communication link from the terminal station on board the unmanned aerial vehicle to a base station of the terrestrial wireless broadband electronic communications network.

6. Base station and terminal station transmission within the 24,25-27,5 GHz frequency band shall be in compliance with the block edge mask in this Annex.

Figure 1 provides an example of a possible channelling arrangement.

Figure 1

Example of a channelling arrangement within the 24,25-27,5 GHz frequency band



3. **Technical conditions for base stations — Block Edge Mask**

The technical parameters for base stations, called block edge mask (BEM) set out in this section, are an essential component of the conditions necessary to ensure coexistence between neighbouring wireless broadband electronic communications networks in the absence of bilateral or multilateral agreements between operators of such neighbouring networks. Operators of wireless broadband electronic communications services in the 24,25-27,5 GHz band may agree, on a bilateral or multilateral basis, less stringent technical parameters provided that they continue to comply with the technical conditions applicable for the protection of other services, applications or networks and with their cross-border obligations. Member States shall ensure that those less stringent technical parameters can be used by agreement among all affected parties.

A BEM is an emission mask that defines power levels as a function of frequency relative to the edge of a block of spectrum assigned to an operator. It consists of several elements as shown in Table 1. The baseline power limit ensures that the spectrum of other operators is protected. The additional baseline power limit (out-of-band limit) ensures that the spectrum for services and applications outside the 24,25-27,5 GHz frequency band is protected. The transitional region power limit enables a roll-off of power levels from the in-block to the baseline power limit and ensures co-existence with other operators in adjacent blocks.

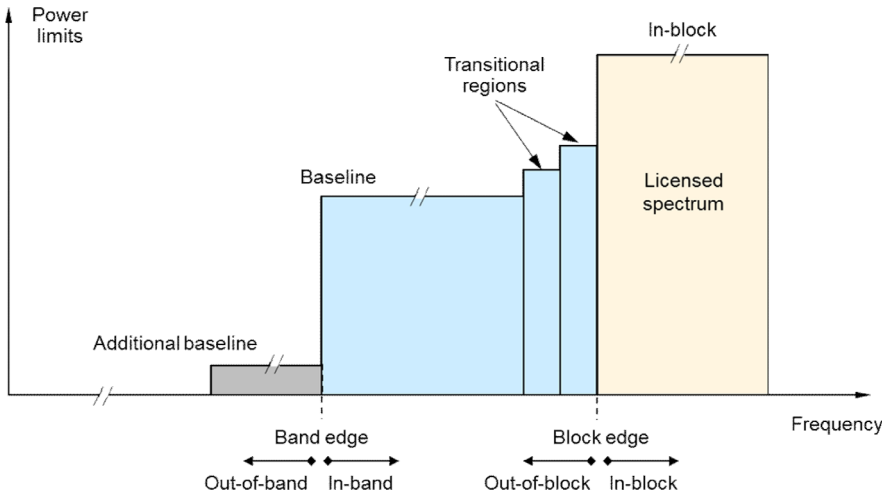
([1]) Such as radio astronomy services.

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Figure 2 shows a general BEM applicable to the 26 GHz frequency band.

Figure 2

Illustration of a block edge mask



No harmonised in-block power limit is specified. Tables 2 and 3 assume synchronised operation. Unsynchronised or semi-synchronised operation also necessitates the geographical separation of neighbouring networks. Tables 4 and 6 specify out-of-band power limits for base stations and terminal stations respectively to ensure the protection of the Earth Exploration Satellite Service (EESS) (passive) in the 23,6-24,0 GHz frequency band. Table 5 provides an additional technical condition for base stations to facilitate co-existence with satellite systems in the earth-to-space Fixed Satellite Service (FSS) and in the Inter-Satellite Service (ISS).

Table 1

Definition of BEM elements

BEM element	Definition
In-block	Assigned spectrum block for which the BEM is derived.
Baseline	Spectrum within the 24,25-27,5 GHz frequency band used for terrestrial wireless broadband electronic communications services, not including the operator's block under consideration and corresponding transitional regions.
Transitional region	Spectrum adjacent to an operator's block.
Additional baseline	Spectrum within bands adjacent to the 24,25-27,5 GHz frequency band, where specific power limits apply with respect to other services or applications.

Table 2

Base station transitional region power limit for synchronised operation

Frequency range	Maximum TRP	Measurement bandwidth
Up to 50 MHz below or above an operator's block	12 dBm	50 MHz

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Explanatory note

The limit ensures coexistence between wireless broadband electronic communications networks in adjacent block(s) within the 26 GHz frequency band and in synchronised operation.

Table 3

Base station baseline power limit for synchronised operation

Frequency range	Maximum TRP	Measurement bandwidth
Baseline	4 dBm	50 MHz

Explanatory note

The limit ensures coexistence between wireless broadband electronic communications networks in non-adjacent blocks within the 26 GHz frequency band and in synchronised operation.

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Table 4

Base station additional baseline power limit

Frequency range	Maximum TRP	Measurement bandwidth	Entry into force
23,6-24,0 GHz	– 33 dBW	200 MHz	Entry into force of this Decision ([a])
	– 39 dBW	200 MHz	1 January 2024 ([b])

([a]) Member States shall not allow new deployments of terrestrial systems capable of providing wireless broadband electronic communications services in the frequency range 22-23,6 GHz, in order to ensure the appropriate protection of the Earth Exploration Satellite Service (passive) and the Radio Astronomy Service in the 23,6-24 GHz frequency band in conjunction with the limit applicable after 1 January 2024.

([b]) This limit applies to base stations brought into use after 1 January 2024. This limit does not apply to base stations that have been brought into use prior to that date. For those base stations, the limit of – 33 dBW/200 MHz continues to apply after 1 January 2024. Member States shall consider additional measures to assess and mitigate the aggregate impact of those base stations in relation to their obligation under Article 3(a) regarding the Earth Exploration Satellite Service (passive). Such measures include adaptation of the size of assigned blocks, the antenna configuration, the in-block power or the penetration of equipment.

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Explanatory note

The out-of-band limit applies to the maximum emissions in the 23,6-24,0 GHz band for the protection of the EESS (passive) in all stipulated modes of base station operation (that is to say maximum in-band power, electrical pointing, carrier configurations).

Table 5

Additional condition applying to AAS outdoor base stations

Requirement on elevation of the main beam of AAS outdoor base stations
When deploying such base stations, it shall be ensured that each antenna is normally transmitting only with the main beam pointing below the horizon and in addition the antenna shall have mechanical pointing below the horizon except when the base station is only receiving.

Explanatory note

The condition applies to the protection of space station receivers such as in the FSS (earth-to-space) and in the ISS.

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4. **Technical conditions for terminal stations**

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Table 6

Terminal station additional baseline power limit

Frequency range	Maximum TRP	Measurement bandwidth	Entry into force
23,6-24,0 GHz	– 29 dBW	200 MHz	Entry into force of this Decision
	– 35 dBW	200 MHz	1 January 2024 (a)

(a) This limit applies to terminal stations brought into use after 1 January 2024. This limit does not apply to terminal stations that have been brought into use prior to that date. For those terminal stations, the limit of – 29 dBW/200 MHz continues to apply after 1 January 2024.

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Explanatory note

The out-of-band limit applies to the maximum emissions in the 23,6-24,0 GHz frequency band for the protection of the EESS (passive) for all stipulated modes of terminal station operation (that is to say maximum in-band power, electrical pointing, carrier configurations).