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►**B**

COMMISSION IMPLEMENTING DECISION

of 5 November 2012

on the harmonisation of the frequency bands 1 920-1 980 MHz and 2 110-2 170 MHz for terrestrial systems capable of providing electronic communications services in the Union

(notified under document C(2012) 7697)

(Text with EEA relevance)

(2012/688/EU)

(OJ L 307, 7.11.2012, p. 84)

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Article 1

This Decision aims at harmonising the conditions for the availability and efficient use of the frequency bands 1 920-1 980 MHz and 2 110-2 170 MHz (hereafter 'the paired terrestrial 2 GHz band') for terrestrial systems capable of providing electronic communications services in the Union.

Article 2

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1. Member States shall designate and make available, on a non-exclusive basis, the paired terrestrial 2 GHz band for terrestrial systems capable of providing electronic communications services in compliance with the parameters set out in the Annex to this Decision.

2. Until 1 January 2026, Member States need not apply the General Parameters laid down in section B of the Annex in respect of rights of use for terrestrial electronic communications networks of spectrum in the paired terrestrial 2 GHz frequency band existing on the date when this Decision takes effect, to the extent that the exercise of those rights does not prevent the use of that band according to the Annex, subject to market demand.

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3. Member States shall ensure that the systems referred to in paragraph 1 give appropriate protection to systems in adjacent bands.

4. Member States shall facilitate cross-border coordination agreements with the aim of enabling the operation of the systems referred to in paragraph 1, taking into account existing regulatory procedures and rights.

Article 3

Member States shall keep the use of the paired terrestrial 2 GHz band under scrutiny and report their findings to the Commission to allow regular and timely review of this Decision.

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Member States shall report to the Commission on the implementation of this Decision by 30 April 2021.

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Article 4

This Decision is addressed to the Member States.

▼**M1**

ANNEX

PARAMETERS REFERRED TO IN ARTICLE 2(1)

A. 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.

Non-active antenna systems (non-AAS) means a base station and an antenna system that provides one or more antenna connectors, which are connected to one or more separately designed passive antenna elements to radiate radio waves. The amplitude and phase of the signals to the antenna elements is not continually adjusted in response to short term changes in the radio environment.

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:

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

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 system's directional gain along the (θ, φ) direction.

B. GENERAL PARAMETERS

Within the paired terrestrial 2 GHz band, the frequency arrangement shall be as follows:

(1) The duplex mode of operation is Frequency Division Duplex (FDD). The duplex spacing shall be 190 MHz with terminal station transmission (FDD uplink) located in the lower part of the band starting at 1 920 MHz and finishing at 1 980 MHz ('lower band') and base station transmission (FDD downlink) located in the upper part of the band starting at 2 110 MHz and finishing at 2 170 MHz ('upper band').

(2) The assigned block size shall be in multiples of 5 MHz [1]. The lower frequency limit of an assigned block in the lower band of 1 920-1 980 MHz shall be aligned with or spaced at multiples of 5 MHz from its

[1] As the UMTS channel spacing is 200 kHz, the centre frequency of an assigned block used for UMTS can be offset 100 kHz from the centre of the block in the frequency arrangement.

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lower edge of 1 920 MHz. The lower frequency limit of an assigned block in the upper band of 2 110-2 170 MHz shall be aligned with or spaced at multiples of 5 MHz from its lower edge of 2 110 MHz. An assigned block may also have a size in the range of 4,8-5 MHz as long as it fits within the boundaries of a 5 MHz block as defined above.

(3) The lower band of 1 920-1 980 MHz or portions thereof, can be used for uplink-only operation ([2]) without paired spectrum within the upper band of 2 110-2 170 MHz.

(4) The upper band of 2 110-2 170 MHz or portions thereof, can be used for downlink-only operation ([3]) without paired spectrum within the lower band of 1 920-1 980 MHz.

(5) Base station and terminal station transmission shall be in compliance with the technical conditions specified in Part C and Part D, respectively.

C. TECHNICAL CONDITIONS FOR BASE STATIONS – BLOCK EDGE MASK

The following technical parameters for base stations called Block Edge Mask (BEM) are an essential component of conditions necessary to ensure coexistence between neighbouring networks, in the absence of bilateral or multi-lateral agreements between operators of such neighbouring networks. Less stringent technical parameters, if agreed among all affected operators of such networks, may also be used provided that these operators continue to comply with the technical conditions applicable for the protection of other services, applications or networks and with obligations resulting from cross-border coordination.

The BEM consists of several elements given in Table 1. The in-block power limit is applied to a block assigned to an operator. The baseline power limit, designed to protect the spectrum of other operators, and the transitional region power limit, enabling filter roll-off from the in-block to the baseline power limit represent out-of-block elements.

Power limits are provided separately for non-AAS and AAS. For non-AAS, the power limits apply to the mean EIRP. For AAS, the power limits apply to the mean TRP ([4]). The mean EIRP or mean TRP are measured by averaging over a time interval and over a measurement frequency bandwidth. In the time domain, the mean EIRP or mean TRP is averaged over the active portions of signal bursts and corresponds to a single power control setting. In the frequency domain, the mean EIRP or mean TRP is determined over the measurement frequency bandwidth as given in Tables 2, 3 and 4 below ([5]). In general, and unless stated otherwise, the BEM power limits correspond to the aggregate power radiated by the relevant device including all transmit antennas, except in the case of baseline and transition requirements for non-AAS base stations, which are specified per antenna.

([2]) Such as Supplemental UpLink (SUL)
([3]) Such as Supplemental DownLink (SDL)
([4]) TRP is a measure of how much power the antenna actually radiates. EIRP and TRP are equivalent for isotropic antennas
([5]) The actual measurement bandwidth of the measurement equipment used for purposes of compliance testing may be smaller than the measurement bandwidth provided in those tables.

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Block Edge Mask (BEM)

Figure

Example of base station BEM elements and power limits

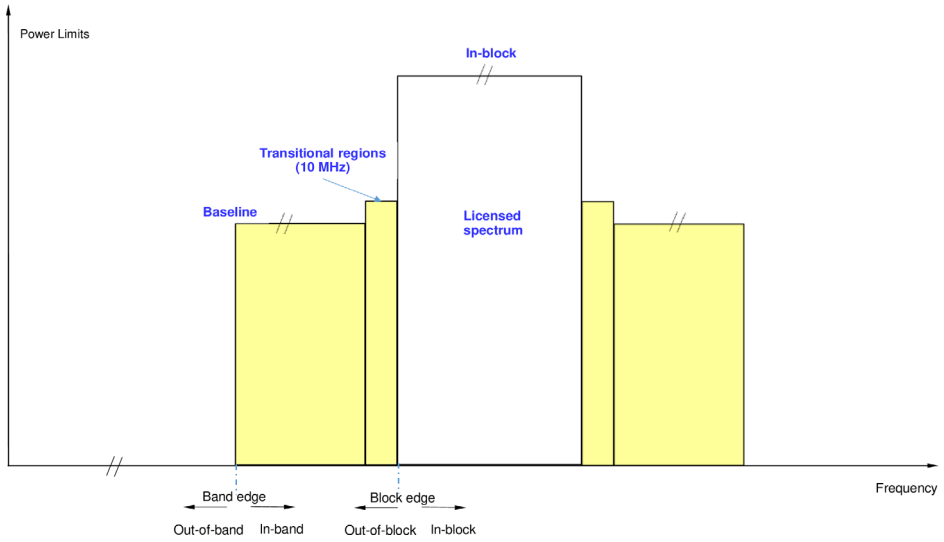


Table 1

Definition of BEM elements

BEM element	Definition
In-block	Refers to a block for which the BEM is derived.
Baseline	Spectrum within the FDD downlink frequency band used for WBB ECS, with the exception of block assigned to the operator and the corresponding transitional regions.
Transitional region	Spectrum within the FDD downlink within 0 to 10 MHz below and 0 to 10 MHz above the block assigned to the operator. The transitional regions do not apply below 2 110 MHz or above 2 170 MHz.

Table 2

In-block power limits for non-AAS and AAS base stations

BEM element	Frequency range	Non-AAS EIRP limit	AAS TRP limit
In-block	Block assigned to the operator	Not obligatory. In case an upper bound is set by a Member State, a value of 65 dBm/(5 MHz) per antenna may be applied.	Not obligatory. In case an upper bound is set by a Member State, a value of 57 dBm/(5 MHz) per cell [1] may be applied.

[1] In a multi-sector base station, the AAS radiated power limit applies to each one of the individual sectors.

Explanatory note to Table 2:

The corresponding in-block TRP limit is determined following guidelines given in ETSI TS 138 104 V15.6.0, Annex F, sections F.2 and F.3, on the basis of an antenna gain of 17 dBi and a total of eight beam forming antenna elements (scaling factor of 9 dB):

65 dBm/(5 MHz) – 17 dBi + 9 dB = 57 dBm/(5 MHz).

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Table 3

Baseline out-of-block power limits for non-AAS and AAS base stations

BEM element	Frequency range within FDD downlink	Non-AAS mean EIRP limit per antenna (1)	AAS mean TRP limit per cell (2)	Measurement bandwidth
Baseline	Frequencies spaced more than 10 MHz from the lower or upper block edge	9 dBm	1 dBm	5 MHz

(1) The non-AAS BEM level is defined per antenna and applicable to base station configuration with up to four antennas per sector.
(2) In a multi-sector base station, the AAS radiated power limit applies to each one of the individual sectors.

Table 4

Transitional region out-of-block power limits for non-AAS and AAS base stations

BEM element	Frequency range within FDD downlink	Non-AAS mean EIRP limit per antenna (1)	AAS mean TRP limit per cell (2)	Measurement bandwidth
Transitional region	– 10 to – 5 MHz from lower block edge	11 dBm	3 dBm	5 MHz
	– 5 to 0 MHz from lower block edge	16,3 dBm	8 dBm	5 MHz
	0 to + 5 MHz from upper block edge	16,3 dBm	8 dBm	5 MHz
	+ 5 to + 10 MHz from upper block edge	11 dBm	3 dBm	5 MHz

(1) The non-AAS BEM level is defined per antenna and applicable to base station configuration with up to four antennas per sector
(2) In a multi-sector base station, the AAS radiated power limit applies to each one of the individual sectors.

Explanatory note to Tables 3 and 4:

In alignment with the standardisation of unwanted emission conducted power (TRP) for AAS base stations in ETSI TS 138 104 (V15.6.0), Annex F, sections F.2 and F.3, the out-of-block TRP limits are set to a value that corresponds to a total of eight beam forming antenna elements, resulting in 8 dB difference between AAS and non-AAS as for the in-block case.

D. TECHNICAL CONDITIONS FOR TERMINAL STATIONS

Table 5

Terminal station BEM in-block power limit

Maximum mean in-block power (1)	24 dBm

(1) This power limit is specified as EIRP for terminal stations designed to be fixed or installed and as TRP for terminal stations designed to be mobile or nomadic. EIRP and TRP are equivalent for isotropic antennas. It is recognised that this value may be subject to a tolerance defined in the harmonised standards to take account of operation under extreme environmental conditions and production spread.

Explanatory note to Table 5:

Member States may relax this limit for specific deployments, e.g. fixed terminal stations in rural areas provided that protection of other services, networks and applications is not compromised and cross-border obligations are fulfilled.