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COMMISSION DECISION

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

(notified under document number C(2008) 1873)

(Text with EEA relevance)

(2008/411/EC)

(OJ L 144, 4.6.2008, p. 77)

Amended by:

		Official Journal		
		No	page	date
►**M1**	Commission Implementing Decision 2014/276/EU of 2 May 2014	L 139	18	14.5.2014

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THE COMMISSION OF THE EUROPEAN COMMUNITIES,

Having regard to the Treaty establishing the European Community,

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 Commission has supported a more flexible use of spectrum in its Communication on 'Rapid access to spectrum for wireless electronic communications services through more flexibility' ([2]), which, *inter alia*, addresses the 3 400-3 800 MHz band. Technological neutrality and service neutrality have been underlined by Member States in the Radio Spectrum Policy Group (RSPG) opinion on Wireless Access Policy for Electronic Communications Services (WAPECS) of 23 November 2005 as important policy goals to achieve a more flexible use of spectrum. Moreover, according to this opinion, these policy goals should not be introduced abruptly, but in a gradual manner to avoid disruption of the market.

(2) The designation of the 3 400-3 800 MHz band for fixed, nomadic and mobile applications is an important element addressing the convergence of the mobile, fixed and broadcasting sectors and reflecting technical innovation. The services provided in this frequency band should mainly target end-user access to broadband communications.

(3) It is expected that the wireless broadband electronic communications services for which the 3 400–3 800 MHz band is to be designated will to a large extent be pan-European in the sense that users of such electronic communications service in one Member State could also gain access to equivalent services in any other Member State.

([1]) OJ L 108, 24.4.2002, p. 1.
([2]) COM(2007) 50.

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(4) Pursuant to Article 4(2) of Decision No 676/2002/EC, the Commission gave a mandate dated 4 January 2006 to the European Conference of Postal and Telecommunications Administrations (hereinafter the CEPT) to identify the conditions relating to the provision of harmonised radio frequency bands in the EU for Broadband Wireless Access (BWA) applications.

(5) In response to that Mandate, the CEPT issued a report (CEPT Report 15) on BWA, which concludes that the deployment of fixed, nomadic and mobile networks is technically feasible within the 3 400-3 800 MHz frequency band under the technical conditions described in the Electronic Communications Committee's Decision ECC/DEC/(07)02 and Recommendation ECC/REC/(04)05.

(6) The results of the Mandate to the CEPT should be made applicable in the Community and implemented by the Member States without delay given the market demand for the introduction of terrestrial electronic communication services providing broadband access in these bands. Taking into account the differences in current use and in market demand for the 3 400-3 600 MHz and 3 600-3 800 MHz sub-bands at national level a different deadline should be established for the designation and availability of the two sub-bands.

(7) The designation and making available of the 3 400-3 800 MHz band in accordance with the results of the Mandate on BWA recognises the fact that there are other existing applications within these bands and does not preclude the future use of these bands by other systems and services to which these bands are allocated in accordance with the ITU Radio Regulations (designation on a non-exclusive basis). Appropriate sharing criteria for coexistence with other systems and services in the same and adjacent bands have been developed in ECC Report 100. This report confirms, *inter alia*, that sharing with satellite services is often feasible considering the extent of their deployment in Europe, geographical separation requirements and case-by-case evaluation of actual terrain topography.

(8) Block Edge Masks (BEM) are technical parameters that apply to the entire block of spectrum of a specific user, irrespective of the number of channels occupied by the user's chosen technology. These masks are intended to form part of the authorisation regime for spectrum usage. They cover both emissions within the block of spectrum (i.e. in-block power) as well as emissions outside the block (i.e. out-of-block emission). They are regulatory requirements aimed at managing the risk of harmful interference between neighbouring networks and are without prejudice to limits set in equipment standards under Directive 1999/5/EC of the European Parliament and of the Council of 9 March 1999 on radio equipment and telecommunications terminal equipment and the mutual recognition of their conformity [1] (the R&TTE Directive).

[1] OJ L 91, 7.4.1999, p. 10. Directive as amended by Regulation (EC) No 1882/2003 (OJ L 284, 31.10.2003, p. 1).

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(9) Harmonisation of technical conditions for the availability and efficient use of spectrum does not cover assignment, licensing procedures and timing, nor the decision whether to use competitive selection procedures for the assignment of radio frequencies, which will be organised by Member States in line with Community law.

(10) Differences in the national legacy situations could result in competitive distortions. The existing regulatory framework gives Member States the tools to deal with these problems in a proportionate, non-discriminatory and objective manner, subject to Community law including Directive 2002/20/EC of the European Parliament and of the Council of 7 March 2002 on the authorisation of electronic communications networks and services (Authorisation Directive) ([1]) and Directive 2002/21/EC of the European Parliament and of the Council of 7 March 2002 on a common regulatory framework for electronic communications networks and services (Framework Directive) ([2]).

(11) The use of the 3 400-3 800 MHz band by other existing applications in third countries can limit the introduction and use of this band by electronic communications networks in several Member States. Information on such limitations should be notified to the Commission pursuant to Articles 7 and 6(2) of Decision No 676/2002/EC and published in accordance with Article 5 of Decision No 676/2002/EC.

(12) In order to ensure effective use of the 3 400-3 800 MHz band also in the longer term, administrations should continue with studies that may increase efficiency and innovative use, such as meshed network architectures. Such studies should be taken into account when considering a review of this Decision.

(13) 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 aims at harmonising, without prejudice to the protection and continued operation of other existing use in this band, the conditions for the availability and efficient use of the 3 400-3 800 MHz band for terrestrial systems capable of providing electronic communications services.

([1]) OJ L 108, 24.4.2002, p. 21.
([2]) OJ L 108, 24.4.2002, p. 33. Directive as amended by Regulation (EC) No 717/2007 (OJ L 171, 29.6.2007, p. 32).

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Article 2

1. Without prejudice to the protection and continued operation of other existing use in this band, Member States shall designate and subsequently make available, on a non-exclusive basis the 3 400-3 800 MHz frequency band for terrestrial electronic communications networks, in compliance with the parameters set out in the Annex. Moreover, Member States need not apply the parameters laid down in the Annex in respect of rights of use for terrestrial electronic communications networks in the 3 400-3 800 MHz frequency band existing at the date of adoption of this decision, to the extent that the exercise of those rights does not prevent the use of that band according to the Annex.

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

3. Member States shall not be bound to implement the obligations under this Decision in geographical areas where coordination with third countries requires a deviation from the parameters in the Annex.

Member States shall make all practicable efforts to solve such deviations, which they shall notify to the Commission, including the affected geographical areas, and publish the relevant information pursuant to Decision No 676/2002/EC.

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Article 3

Member States shall allow the use of the 3 400-3 800 MHz band in accordance with Article 2 for fixed, nomadic and mobile electronic communications networks.

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Member States shall facilitate cross-border coordination agreements with the aim of enabling the operation of those networks, taking into account existing regulatory procedures and rights.

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Article 4

Member States shall keep the use of the 3 400-3 800 MHz band under scrutiny and report their findings to the Commission to allow regular and timely review of the Decision.

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Article 4a

Member States shall apply the conditions laid down in the Annex on 30 June 2015 at the latest.

Member States shall report on the application of this Decision on 30 September 2015 at the latest.

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Article 5

This Decision is addressed to the Member States.

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ANNEX

PARAMETERS REFERRED TO IN ARTICLE 2

A. GENERAL PARAMETERS

1. The preferred duplex mode of operation in the 3 400-3 600 MHz sub-band shall be Time Division Duplex (TDD).

2. Member States may alternatively implement Frequency Division Duplex (FDD) mode of operation in the 3 400-3 600 MHz sub-band for the purpose of:

   (a) ensuring greater efficiency of spectrum use, such as when sharing with existing rights of use during a co-existence period or implementing market-based spectrum management; or

   (b) protecting existing uses or avoiding interference; or

   (c) coordination with non-EU countries.

   Where the FDD mode of operation is implemented, the duplex spacing shall be 100 MHz with terminal station transmission (FDD uplink) located in the lower part of the band starting at 3 410 MHz and finishing at 3 490 MHz and base station transmission (FDD downlink) located in the upper part of the band starting at 3 510 MHz and finishing at 3 590 MHz.

3. The duplex mode of operation in the 3 600-3 800 MHz sub-band shall be Time Division Duplex.

4. The assigned block sizes shall be in multiples of 5 MHz. The lower frequency limit of an assigned block shall be aligned with or spaced at multiples of 5 MHz from the relevant sub-band edge ([1]). Depending on the duplex mode of operation the relevant sub-band edges are: 3 400 MHz and 3 600 MHz for TDD; 3 410 MHz and 3 510 MHz for FDD.

5. Base station and terminal station transmission within the 3 400-3 800 MHz band shall be in compliance with the Block Edge Mask in this Annex.

B. 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 multilateral agreements between operators of such neighbouring networks. Less stringent technical parameters, if agreed among the operators of such networks, may also be used.

The BEM consists of several elements given in Table 1, both for the 3 400-3 600 MHz and the 3 600-3 800 MHz sub-band. The baseline power limit, designed to protect the spectrum of other operators, and the transitional region power limits, enabling filter roll-off from the in-block to the baseline power limit represent out-of-block elements. The guard bands apply only in the case of using FDD in the 3 400-3 600 MHz sub-band. The BEM is applicable to base stations with different power levels (typically referred to as macro, micro, pico and femto base stations ([2])).

([1]) If assigned blocks need to be offset to accommodate other existing users, a raster of 100 kHz must be used. Narrower blocks can be defined adjacent to other users, to allow efficient use of spectrum.

([2]) These terms are not uniquely defined and refer to cellular base stations with different power levels, which decrease in the following order: macro, micro, pico, femto, In particular, femto cells are small base stations with the lowest power levels, which are typically used indoors.

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Tables 2 to 6 contain the power limits for the different BEM elements. The in-block power limit is applied to a block owned by an operator. Power limits are provided also for guard bands and for the protection of radar operation below 3400 MHz.

The frequency ranges in Tables 1 to 6 depend on the duplex mode chosen for the 3 400-3 600 MHz sub-band (TDD or alternatively FDD). P_{Max} is the maximum carrier power for the base station in question, measured as EIRP ([1]). Synchronized operation means operation of TDD in two different networks where no simultaneous uplink and downlink transmissions occur, as defined in applicable standards.

To obtain a BEM for a specific block, the BEM elements that are defined in Table 1 are combined in the following steps:

1. In-block power limit is used for the block assigned to the operator.

2. Transitional regions are determined, and corresponding power limits are used. The transitional regions may overlap with guard bands, in which case transitional region power limits are used.

3. For the remaining spectrum assigned to FDD or TDD, baseline power limits are used.

4. For the remaining guard band spectrum, guard band power limits are used.

5. For spectrum below 3 400 MHz, one of the additional baseline power limits is used.

The Figure provides an example of the combination of different BEM elements.

In the case of unsynchronized TDD networks, the compliance of two adjacent operators with the BEM requirements could be achieved by introducing frequency separation (e.g. through the authorisation process at national level) between the block edges of both operators. As another option, the so-called restricted blocks may be introduced for two adjacent operators which would require them to limit the power level used in the upper- or lowermost portions of their assigned spectrum blocks ([2]).

Table 1

Definition of BEM elements

BEM element	Definition
In-block	Refers to a block for which the BEM is derived.
Baseline	Spectrum used for TDD, FDD uplink or FDD downlink, with the exception of the block assigned to the operator and the corresponding transitional regions.
Transitional region	For FDD downlink blocks, the transitional region applies 0 to 10 MHz below and 0 to 10 MHz above the block assigned to the operator. For TDD blocks, the transitional region applies 0 to 10 MHz below and 0 to 10 MHz above the block assigned to the operator. The transitional region applies to adjacent TDD blocks assigned to other operators if networks are synchronised, or to spectrum in-between adjacent TDD blocks that are separated by 5 or 10 MHz. Transitional regions do not apply to adjacent TDD blocks assigned to other operators, if networks are not synchronised.

([1]) Equivalent Isotropic Radiated Power.
([2]) A recommended value for such limited power level is 4 dBm/5 MHz EIRP per cell applied to the upper- or lowermost 5 MHz of an operator's assigned spectrum block.

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BEM element	Definition
	The transitional region does not apply below 3 400 MHz or above 3 800 MHz.
Guard bands	The following guard bands apply in case of an FDD allocation: 3 400-3 410, 3 490-3 510 (duplex gap) and 3 590-3 600 MHz In case of overlap between transitional regions and guard bands, transitional power limits are used.
Additional baseline	Spectrum below 3 400 MHz.

Table 2

In-block power limit

BEM element	Frequency range	Power limit
In-block	Block assigned to the operator	Not obligatory. In case an upper bound is desired by an administration, a value must be applied which does not exceed 68 dBm/5 MHz per antenna.

Explanatory note to Table 2

For femto base stations, power control should be applied to minimize interference to adjacent channels. The requirement on power control for femto base stations results from the need to reduce interference from equipment that may be deployed by consumers and may thus not be coordinated with surrounding networks.

Table 3

Baseline power limits

BEM element	Frequency range	Power limit
Baseline	FDD downlink (3 510-3 590 MHz). Synchronized TDD blocks (3 400-3 800 MHz or 3 600-3 800 MHz).	Min(P_{Max} — 43,13) dBm/5 MHz EIRP per antenna
Baseline	FDD uplink (3 410-3 490 MHz). Unsynchronised TDD blocks (3 400-3 800 MHz or 3 600-3 800 MHz).	– 34 dBm/5 MHz EIRP per cell (*)

(*) An exception for this baseline can be negotiated between adjacent operators for femto base stations in the case when there is no risk for interference to macro base stations. In that case – 25 dBm/5MHz EIRP per cell may be used.

Explanatory note to Table 3

The baseline for FDD downlink and synchronised TDD is expressed by combining attenuation relative to the maximum carrier power with a fixed upper limit. The stricter of the two requirements applies. The fixed level provides an upper bound on the interference from a base station. When two TDD blocks are synchronized, there will be no interference between base stations. In this case, the same baseline as for the FDD downlink region is used.

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The baseline power limit for FDD uplink and unsynchronised TDD is expressed as a fixed limit only.

Table 4

Transitional region power limits

BEM element	Frequency range	Power limit
Transitional region	– 5 to 0 MHz offset from lower block edge or 0 to 5 MHz offset from upper block edge	Min(P_{Max} — 40,21) dBm/5 MHz EIRP per antenna
Transitional region	– 10 to – 5 MHz offset from lower block edge or 5 to 10 MHz offset from upper block edge	Min(P_{Max} — 43,15) dBm/5 MHz EIRP per antenna

Explanatory note to Table 4

The transitional region power limits are defined to enable the reduction of power from the in-block level to the baseline or guard band levels. The requirements are expressed as attenuation relative to the maximum carrier power, combined with a fixed upper limit. The stricter of the two requirements applies.

Table 5

Guard band power limits for FDD

BEM element	Frequency range	Power limit
Guard band	3 400-3 410 MHz	– 34 dBm/5 MHz EIRP per cell
Guard band	3 490-3 500 MHz	– 23 dBm/5 MHz per antenna port
Guard band	3 500-3 510 MHz	Min(P_{Max} — 43,13) dBm/5 MHz EIRP per antenna
Guard band	3 590-3 600 MHz	Min(P_{Max} — 43,13) dBm/5 MHz EIRP per antenna

Explanatory note to Table 5

For the guard band 3 400-3 410 MHz, the power limit is chosen to be the same as the baseline in the adjacent FDD uplink (3 410-3 490 MHz). For the guard bands 3 500-3 510 MHz and 3 590-3 600 MHz, the power limit is chosen to be the same as the baseline in the adjacent FDD downlink (3 510-3 590 MHz). For the guard band 3 490-3 500 MHz, the power limit is based on the spurious emission requirement of – 30 dBm/MHz at the antenna port converted to 5 MHz bandwidth.

Table 6

Base station additional baseline power limits for country specific cases

Case		BEM element	Frequency range	Power limit
A	Union countries with military radiolocation systems below 3 400 MHz	Additional Baseline	Below 3 400 MHz for both TDD and FDD designation (*)	– 59 dBm/MHz EIRP (**)

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Case		BEM element	Frequency range	Power limit
B	Union countries with military radiolocation systems below 3 400 MHz	Additional Baseline	Below 3 400 MHz for both TDD and FDD designation (*)	– 50 dBm/MHz EIRP (**)
C	Union countries without adjacent band usage or with usage that does not need extra protection	Additional Baseline	Below 3 400 MHz for both TDD and FDD designation	Not applicable

(*) Administrations may choose to have a guard band below 3 400 MHz. In that case the power limit may apply below the guard band only.

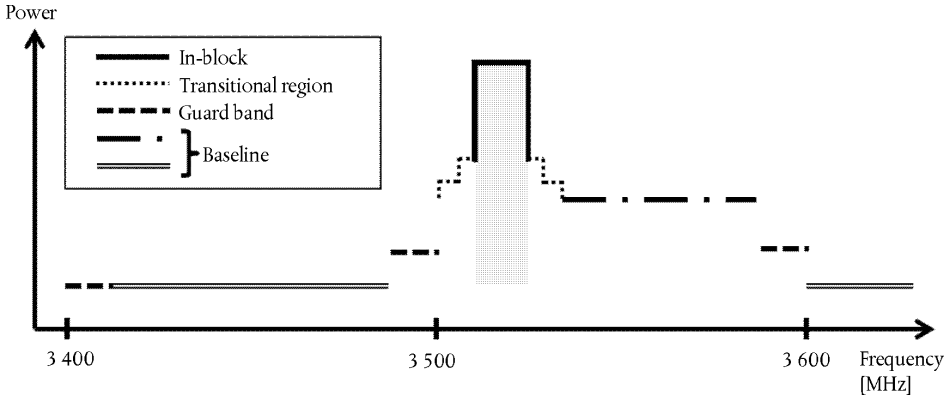
(**) Administrations may select the limit from case A or B depending on the level of protection required for the radar in the region in question.

Explanatory note to Table 6

The additional baseline power limits reflect the need for protection for military radiolocation in some countries. Cases A, B and C can be applied per region or country so that the adjacent band may have different levels of protection in different geographical areas or countries, depending on the deployment of the adjacent band systems. Other mitigation measures like geographical separation, coordination on a case-by-case basis or an additional guard band may be necessary for a TDD mode of operation. The additional baseline power limits given in Table 6 are applicable only to outdoor cells. In the case of an indoor cell, the power limits can be relaxed on a case by case basis. For terminal stations, other mitigation measures may be necessary such as geographical separation or an additional guard band for both the FDD and TDD mode of operation.

Figure

Example for combining BEM elements for base stations for an FDD block starting at 3 510 MHz (*)



(*) Note in particular that different baseline levels are defined for different parts of the spectrum and that the power limit of the lower transitional region is used in a part of the guard band 3 490–3 510 MHz. Spectrum below 3 400 MHz has not been included in the Figure, although the BEM element ‘additional baseline’ may be applied to protect military radiolocation.

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C. TECHNICAL CONDITIONS FOR TERMINAL STATIONS

Table 7

In-block requirement — terminal station BEM in-block power limit

Maximum in-block power (*)	25 dBm

(*) This power limit is specified as EIRP for terminal stations designed to be fixed or installed and as total radiated power (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 (of up to 2 dB) defined in the harmonised standards to take account of operation under extreme environmental conditions and production spread.

Member States may relax the limit set out in Table 7 under certain circumstances, for example fixed terminal stations, provided that protection and continued operation of other existing use in the 3 400-3 800 MHz band is not compromised and cross-border obligations are fulfilled.