



ECC Decision (24)01

Harmonised technical conditions for the shared use of the 3800-4200 MHz frequency band by low/medium power terrestrial wireless broadband systems (WBB LMP) providing local-area network connectivity

approved 8 November 2024

EXPLANATORY MEMORANDUM

1 INTRODUCTION

The harmonised frequency arrangement and least restrictive technical conditions (LRTC) in this Decision are for the shared use of the 3.8-4.2 GHz frequency band by low/medium power terrestrial wireless broadband systems (WBB LMP) providing local-area network connectivity.

Studies have taken into account the compatibility with and protection of all incumbent services, including their future deployments, in the band and in adjacent bands. These studies have considered both AAS and non-AAS types of antennas, 3GPP NR and DECT-2020 NR parameters, including maximum e.i.r.p. levels and transmitter and receiver masks. The harmonised technical conditions presented are defined to respect technology neutrality for the operation of WBB LMP.

ECC Report 358 [2] concludes that it is not possible to define generic technical conditions that guarantee the protection of fixed service (FS) and fixed satellite service (FSS) in all scenarios across all CEPT administrations. Instead, a case-by-case analysis is needed, in combination of considering appropriate mitigation techniques, to ensure satisfactory coexistence.

For the protection of MFCN operating below 3.8 GHz, ECC Report 358 concludes that for unsynchronised WBB LMP operation in the lower part of the 3.8-4.2 GHz frequency band, coordination may be needed. Examples may include:

- geographical/frequency separation;
- defining a maximum allowed power level (pfd) at the border of the WBB LMP licensed area;
- defining the maximum unwanted emissions below 3.8 GHz depending on location of WBB LMP in relation to MFCN;
- WBB LMP network being synchronised with MFCN, or specific sub-cases of semi-synchronised operation, which only allows DL to UL modifications to the WBB LMP network compared to the frame structure of the MFCN.

These will be further elaborated in ECC Recommendations which are to be developed.

To enable administrations to carry out coordination, the least restrictive technical conditions (LRTC) in this Decision are derived on the basis that the location of the WBB LMP network or WBB LMP base station is known. A licensing regime where the location is not known is out of scope for this harmonisation as this situation may create a risk of interference for existing and new MFCN base stations, fixed links and FSS earth stations as well as between WBB LMP networks.

CEPT will develop guidelines to ensure, on a case-by-case basis, the protection and future evolution of FSS receiving earth stations and FS sharing the 3.8-4.2 GHz frequency band with WBB LMP, for managing coexistence between WBB LMP networks and between WBB LMP and MFCN as well as FSS and FS below 3.8 GHz.

CEPT has achieved a balance between how much coordination an administration is able to carry out at a local level between WBB LMP networks and incumbent services, and how restrictive the harmonised technical conditions on WBB LMP need to be.

2 BACKGROUND

The RSPG recognised that there is a specific demand for mid-band spectrum and recommended that Member States investigate the possible use of the 3.8-4.2 GHz frequency band for local vertical applications (i.e. low/medium power) while protecting FSS receiving earth stations and other incumbent services. In order to support a common approach to spectrum for possible shared use of the 3.8-4.2 GHz frequency band across the European Union, the European Commission issued in 2021 a Mandate to CEPT on “technical conditions regarding the shared use of the 3.8-4.2 GHz frequency band for terrestrial wireless broadband systems

providing local-area network connectivity in the Union". CEPT Report 88 provides the response to this Mandate [4].

CEPT performed sharing studies in order to assess the technical feasibility of the shared use of the 3.8 - 4.2 GHz frequency band by WBB LMP providing local-area network connectivity. These studies, excluding those relating to coexistence with radio altimeters operating in the adjacent band 4.2-4.4 GHz, are presented in ECC Report 358 [2]. Studies relating to coexistence with radio altimeters are presented in ECC Report 362 [3].

This Decision should facilitate the deployment of terrestrial wireless broadband systems, on a shared access basis, providing local-area network connectivity. These systems should support innovation and digital transformation of vertical industries, as well as wireless local-area connectivity serving both, private (e.g. enterprise) and public (e.g. community-type) networks. In recognition of incumbent services within the 3.8 - 4.2 GHz frequency band other than terrestrial wireless broadband, particular attention was paid to ensure the protection and the possibility of future evolution and development of FSS earth stations and terrestrial fixed links. The protection of FS and FSS also includes usage below 3.8 GHz. The coexistence with terrestrial systems providing wireless broadband electronic communications services (current and future deployment) and radio altimeters operating in adjacent bands was also addressed.

3 REQUIREMENT FOR AN ECC DECISION

The allocation or designation of frequency bands for use by a service or system under specified conditions in CEPT administrations is laid down by law, regulation or administrative action. ECC Decisions are required to deal with radio spectrum related matters and to harmonise the use of spectrum across CEPT. It is considered as necessary to designate and implement frequency bands for low/medium power terrestrial wireless broadband systems providing local-area network connectivity. A commitment by CEPT administrations to implement an ECC Decision will provide a clear indication that the required frequency bands will be made available on time and on a European-wide basis in accordance with the harmonised technical conditions.

This Decision includes the least restrictive harmonised technical conditions for spectrum use by WBB LMP designed for maximising spectrum utilisation whilst facilitating sharing amongst WBB LMP users and between WBB LMP and other incumbent users in the band as well as in the adjacent frequency bands, where relevant and to enable their protection and further development.

This Decision is further intended to provide the basis for manufacturers to develop equipment that meets the least restrictive harmonised technical conditions to be freely circulated across CEPT noting that given the nature of the sharing within this band, equipment needs to be able to be deployed in a flexible manner to accommodate sharing within the band. This will include the ability to restrict power levels at deployment sites to ensure coexistence in band and out of band.

This Decision is further intended to provide a basis for common terminal equipment in different countries across CEPT in a common frequency band.

With respect to in-block base station power, e.i.r.p. limits are defined for WBB low power and medium power base station as part of the harmonised technical conditions. This does not preclude local exceptions to be considered by national administrations in specific circumstances under the following conditions:

- it shall be on a case-by-case basis in exceptional cases;
- it shall remain a local area coverage (no nationwide network);
- protection of incumbent services (FSS receiving earth stations and FS) is ensured within the band where appropriate, taking into account their future development, as well as in adjacent bands, including in the neighbouring countries;
- coordination is completed if required.

ECC DECISION OF 8 NOVEMBER 2024 ON THE HARMONISED TECHNICAL CONDITIONS FOR THE SHARED USE OF THE 3800-4200 MHz FREQUENCY BAND BY LOW/MEDIUM POWER TERRESTRIAL WIRELESS BROADBAND SYSTEMS (WBB LMP) PROVIDING LOCAL-AREA NETWORK CONNECTIVITY (ECC DECISION (24)01)

“The European Conference of Postal and Telecommunications Administrations,

considering

- a) that the frequency band 3.8-4.2 GHz is allocated in the Radio Regulations on a primary basis to the fixed service and the fixed satellite service (space-to-Earth) and is used in some CEPT countries for those services;
- b) that the frequency band 3.8-4.2 GHz is allocated on a secondary basis to the mobile service in the Radio Regulations in Region 1;
- c) that ECC Report 358 [2] provides in-band and adjacent band sharing studies to assess the feasibility of the shared use of the 3.8-4.2 GHz frequency band for WBB LMP, and that these studies have been carried out assuming an authorisation regime where the location of WBB LMP networks or base stations is known;
- d) that ECC Report 362 [3] provides compatibility studies between WBB LMP operating in 3.8-4.2 GHz and Radio Altimeters operating in 4.2-4.4 GHz;
- e) that the frequency band 3.4-3.8 GHz is harmonised for MFCN in ECC Decision (11)06 [1];
- f) that CEPT Report 88 [4] provides the response to the Mandate from the European Commission to CEPT;
- g) that ERC Recommendation 12-08 [5] contains the harmonised radio frequency channel arrangements for fixed wireless systems operating in the frequency band 3.6-4.2 GHz;
- h) that in some CEPT countries, the frequency band 3.8-4.2 GHz is already in use for WBB LMP networks on a shared basis;
- i) that some VGOS observatories are installed around Europe as part of the European Critical Infrastructure Project Galileo, and that administrations are urged to take all practical steps to protect these observatory operations from harmful interference;
- j) that ECC Report 358 concludes that coordination may be needed on a case-by-case basis between WBB LMP and FS links or FSS earth stations within the 3.8-4.2 GHz frequency band and below 3.8 GHz;
- k) that the introduction of WBB LMP in the 3.8-4.2 GHz frequency band in one country can have an impact on incumbent FS and FSS usages within the 3.8-4.2 GHz frequency band and below 3.8 GHz in neighbouring countries and thus may require the need for cross-border bilateral or multilateral coordination agreement;
- l) that there is a demand for a designation of spectrum within the 3.8-4.2 GHz frequency range for harmonised implementation of terrestrial wireless broadband systems providing local-area network connectivity which could serve e.g. vertical industries and local communities;
- m) that in some CEPT countries, the harmonisation of the frequency band 3.4-3.8 GHz for MFCN triggered a migration of operation of FSS and FS equipment to the frequency band 3.8-4.2 GHz;
- n) that the use of WBB LMP in the frequency band 3.8-4.2 GHz for connectivity to aerial terminal stations was not studied, and that further studies are required in order to identify relevant technical and operational conditions for the usage of aerial terminal stations in this frequency band;
- o) that the harmonised technical conditions for WBB LMP set out in this Decision have been developed assuming an authorisation regime where the location of WBB LMP networks or base stations is known;

- p) that the protection of FSS receiving earth stations as well as FS stations are based on the assumption that their locations are known;
- q) that CEPT is developing an ECC Recommendation to provide to administrations relevant mechanisms/solutions to be further implemented at national and bilateral/multilateral level to manage coexistence between WBB LMP and FSS receiving earth stations;
- r) that CEPT is developing an ECC Recommendation to provide to administrations relevant mechanisms/solutions to be further implemented at national and bilateral/multilateral level to manage coexistence between WBB LMP and FS links;
- s) that CEPT is developing an ECC Recommendation to provide to administrations relevant mechanisms/solutions to be further implemented at national level to manage coexistence between WBB LMP and MFCN below 3.8 GHz, including the protection of MFCN in neighbouring countries;
- t) that CEPT is developing an ECC Recommendation to provide to administrations relevant mechanisms/solutions to be further implemented at national level to manage coexistence between WBB LMP in the 3.8-4.2 GHz band and radio altimeters in the 4.2-4.4 GHz frequency band;
- u) that CEPT is developing an ECC Recommendation to provide to administrations relevant mechanisms/solutions to be further implemented at national and bilateral/multilateral level to manage coexistence between WBB LMP networks within the 3.8-4.2 GHz frequency band;
- v) that in EU/EFTA countries the radio equipment that is under the scope of this Decision shall comply with the RE Directive. Conformity with the essential requirements of the RE Directive may be demonstrated by compliance with the applicable harmonised European standard(s), cited in the Official Journal (OJ) of the European Union, or by using the other conformity assessment procedures set out in the RE Directive;

DECIDES

1. that the **purpose of this ECC Decision** is to harmonise the use of the frequency band 3.8-4.2 GHz for shared access by low/medium power terrestrial wireless broadband systems (WBB LMP) providing local-area network connectivity;
2. that, for the purpose of this ECC Decision, WBB LMP networks are used in a defined limited geographical area (no nationwide network);
3. that, for the purpose of this ECC Decision, a base station is a fixed radio device providing the gateway between the back-end network, for example the gateway to the internet or the user's fixed infrastructure, and the WBB LMP radio network devices;
4. that CEPT **administrations shall:**
 - designate the frequency band 3.8-4.2 GHz, or parts of this band, on a non-exclusive basis for the use of low/medium power terrestrial wireless broadband systems (WBB LMP) providing local-area network connectivity;
 - ensure the protection of the incumbent services within the 3.8-4.2 GHz frequency band (FSS receiving earth stations and FS links) where appropriate, taking into account their future evolution and development;
 - ensure the protection of MFCN in the adjacent frequency band 3.4-3.8 GHz;
 - where appropriate, ensure the protection of incumbent services (FSS receiving earth stations and FS links) in the adjacent frequency band 3.4-3.8 GHz;
 - ensure the protection of radio altimeters on board aircraft in the adjacent frequency band 4.2-4.4 GHz;
 - allow the free circulation and use of WBB LMP terminals operating under the control of a terrestrial WBB LMP network;

5. that, for the purpose of this ECC Decision, the technical and operational parameters for WBB LMP specified in Annex 1 apply;
6. that administrations may restrict the use of WBB LMP aerial terminals;
7. that this Decision enters into force on 8 November 2024;
8. that the preferred date for implementation of this Decision shall be 8 May 2025;
9. that CEPT administrations shall communicate the national measures implementing this Decision to the ECC Chair and the Office when this ECC Decision is nationally implemented.”

Note:

Please check the Office documentation database <https://docdb.cept.org/> for the up to date position on the implementation of this and other ECC Decisions.

ANNEX 1: FREQUENCY ARRANGEMENT AND HARMONISED LEAST RESTRICTIVE TECHNICAL CONDITIONS FOR SHARED ACCESS OF WBB LMP IN 3800-4200 MHz

The harmonised technical conditions defined in this annex have been developed assuming that the location of WBB LMP networks or base stations is known, and that the protection of MFCN below 3.8 GHz, is ensured at national level with appropriate coordination.

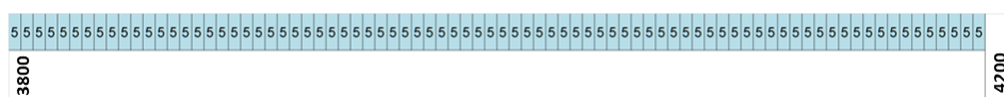
National and potentially cross-border coordination may be needed to manage coexistence with other WBB LMP networks within the 3.8-4.2 GHz frequency band.

National and/or cross-border coordination may be needed to protect the incumbent FSS receiving earth stations and FS.

A1.1 FREQUENCY ARRANGEMENT FOR THE 3800-4200 MHz FREQUENCY BAND

The frequency arrangement provided in Figure 1 is a TDD arrangement, based on a block size of 5 MHz starting at the lower edge of the frequency band at 3800 MHz. Multiple adjacent blocks of 5 MHz can be combined to obtain wider channels.

Figure 1: 3800-4200 MHz frequency arrangement



A1.2 AAS AND NON-AAS BASE STATIONS

AAS (active antenna systems) refers to a WBB LMP base station and 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.

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.

A1.3 WBB LMP BASE STATION IN-BLOCK POWER

Table 1 defines the maximum in-block e.i.r.p. per cell for base stations operating in the 3.8-4.2 GHz frequency band.

Table 1: Maximum in-block e.i.r.p. per cell for base stations operating in 3800-4200 MHz

Category	e.i.r.p. per cell (Note1 and Note 2)
Low power base station	≤ 24 dBm/channel for BW ≤ 20 MHz ≤ 18 dBm/5 MHz 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 e.i.r.p. 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 nationally) in the band as well as MFCN below 3.8 GHz and radio altimeters above 4.2 GHz is ensured, taking into account their future development, including in the neighbouring countries. Coverage shall remain local, i.e. no nationwide networks.	

To protect MFCN operating below 3.8 GHz, coordination may be required at national level¹.

A1.4 WBB LMP BASE STATION UNWANTED EMISSIONS ABOVE 4200 MHz

Table 2 defines the maximum unwanted emission levels above 4.2 GHz. These levels will provide a general protection of radio altimeters operating above 4.2 GHz. For AAS medium power base station in 4.1-4.2 GHz deployed in close proximity to those airports which support precision approach procedures, coordination may be needed².

Table 2: Maximum unwanted emission levels above 4200 MHz for WBB LMP base stations

Frequency range	Non-AAS base station e.i.r.p. limit dBm/5 MHz per cell (Note 1)	AAS MP base station t.r.p. limit dBm/5 MHz per cell
4200-4205 MHz	11	1
4205-4240 MHz	8	-3

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

The spurious domain in this Decision for a base station operating in 3.8-4.2 GHz starts 40 MHz from the band edge and the corresponding spurious emission limits are defined in ERC Recommendation 74-01 [7].

A1.5 WBB LMP TERMINAL IN-BLOCK REQUIREMENTS

- Maximum terminal station power: 28 dBm t.r.p. (including a 2 dB tolerance);
- For fixed terminals an in-block e.i.r.p. limit may be defined 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.

¹ 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 DL to UL modifications to the WBB LMP network compared to the frame structure of the MFCN and/or defining the maximum unwanted emissions below 3.8 GHz depending on location of WBB LMP in relation to MFCN.

² Examples of coordination may include no AAS medium power base station deployment closer than 1200 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 4200 and 4240 MHz.

ANNEX 2: LIST OF REFERENCES

- [1] [ECC Decision \(11\)06](#): “Harmonised frequency arrangements and least restrictive technical conditions (LRTC) for mobile/fixed communications networks (MFCN) operating in the band 3400-3800 MHz” approved December 2011, latest amended 26 October 2018
- [2] [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
- [3] ECC Report 362: “Compatibility between mobile or fixed communications networks (MFCN) operating in 3400-3800 MHz and wireless broadband systems in low/medium power (WBB LMP) operating in the frequency band 3800-4200 MHz with Radio Altimeters (RA) operating in 4200-4400 MHz”, approved November 2024
- [4] [CEPT Report 88](#): “Report from CEPT to the European Commission in response to the Mandate on shared use of 3800-4200 MHz by terrestrial wireless broadband systems providing local-area network connectivity (WBB LMP)”, approved November 2024
- [5] [ERC Recommendation 12-08](#): “Harmonised radio frequency channel arrangements and block allocations for low, medium and high capacity systems in the band 3600 MHz to 4200 MHz, approved 1997 and latest amended May 2024
- [6] [Directive 2014/53/EU](#): “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”
- [7] [ERC Recommendation 74-01](#): “Unwanted Emissions in the Spurious Domain,”, approved 1998 and latest corrected May 2022