



ERC Recommendation 25-10

Frequency Ranges for the Use of Terrestrial Audio and
Video Programme Making and Special Events (PMSE)
applications

approved 01 May 1995

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INTRODUCTION

Terrestrial audio and video wireless links are used for a number of PMSE applications. The range of applications covered by PMSE spans from theatrical productions and corporate events to various levels of broadcasting contribution activities. PMSE includes services ancillary to programme making (SAP) and broadcasting (SAB) and the links of the narrower category known as Electronic News Gathering and Outside Broadcasting (ENG/OB). The definitions of various types of audio and video PMSE links, as used for the purpose of this Recommendation are given in Annex 1.

It is important to note that a number of PMSE uses, in particular those of News Gathering, happen at unpredictable times and locations and necessitate a very rapid response time. In such cases, it is very important that the delay and the procedures for frequency co-ordination and licensing are limited to the minimum. On the other hand, some of the PMSE uses, such as Outside Broadcasting are normally planned in advance of an event. Frequency assignments for such events may take longer to coordinate, in particular when frequencies have to be “borrowed” from other users of radio spectrum because the spectrum demand exceeds the availability of spectrum allocated to PMSE. Additional information on PMSE licensing at special events and other regulatory aspects may be found in ECC Report 44 [2].

The use of PMSE equipment is not harmonised across the CEPT countries due to divergent national frequency plans and differing PMSE requirements. This Recommendation therefore pursues the concept of tuning ranges, where the term “tuning range” for PMSE means a range of frequencies over which radio equipment is envisaged to be capable of operating; within this tuning range the use in any one country of radio equipment will be limited to the range of frequencies identified nationally (if any) within that country for PMSE, and will be operated in accordance with the related national regulatory conditions and requirements. Within each tuning range, CEPT countries may assign specific sub-bands or particular frequencies for PMSE links subject to availability, actual demand and sharing arrangements with other services using those bands. Ideally, PMSE equipment should be capable of being operated within the whole tuning range and even beyond in order to provide flexibility for operation in different countries.

When considering the spectrum identified for use by PMSE on a tuning range basis, it can appear that there is a large amount of spectrum available. However, PMSE has always shared spectrum with a wide range of services and to manage use, individual licenses can be issued for a specific use on a specific date and at a specific location. The sharing conditions in a given country depend on the licence given to the new service. The available spectrum within the tuning ranges in any particular country is determined on a national basis; each tuning range may be wholly, partially or not available on a given day, in a given location, in a given country.

As described in ECC Report 204 [1] and complemented by ECC Report 323 [21], PMSE applications are divided into three main categories:

- Audio PMSE applications; information is provided in ECC Report 204, annex 1;
- Video PMSE applications; information is provided in ECC Report 204, annex 2;
- Service links, with a few exceptions such as In Ear Monitors (IEM), wide band talkback and video assist are normally outside the PMSE spectrum allocations and use existing radio service spectrum such as Private Mobile Radio, Short Range Devices (SRD) and even model control and similar spectrum. Additional information can be found in ECC Report 204, annex 3.

The operation of PMSE equipment in many CEPT member states requires appropriate authorisation of the frequencies to be used by that PMSE equipment. Approaches to the issuing of long term and short term licences differ greatly between the various CEPT member administrations. Contact information can be found for the various CEPT national frequency management administrations from this link (<https://www.cept.org/ecc/topics/programme-making-and-special-events-applications-pmse>).

This Recommendation is also electronically available in the EFIS database [link](#).

ERC RECOMMENDATION 25-10 OF 5 MAY 1995 ON FREQUENCY RANGES FOR THE USE OF TERRESTRIAL AUDIO AND VIDEO PMSE APPLICATIONS, AMENDED 11 FEBRUARY 2003, AMENDED 18 OCTOBER 2016, EDITORIAL UPDATE 28 MAY 2021, AMENDED 16 JUNE 2023

“The European Conference of Postal and Telecommunications Administrations,

considering

- a) that there is increasing demand for audio and video PMSE applications at national and international events in CEPT member countries;
- b) that the spectrum use and future requirements for PMSE equipment is analysed in the ECC Report 204 [1];
- c) that ECC Report 204 contains reference information related to audio PMSE (Annex 1), video PMSE (Annex 2) and service links (Annex 3);
- d) that ECC Report 323 [21] provides updated information on spectrum use and future requirements for PMSE;
- e) that in many CEPT countries audio and video PMSE links have, for many years, successfully shared frequency bands with other civil and military radio applications;
- f) that broadcasters, programme makers and PMSE service providers increasingly need to operate across the national borders;
- g) that lack of harmonised frequency tuning ranges creates difficulties for broadcasters, programme makers and PMSE service providers when operating in other CEPT member countries;
- h) that the bands identified for PMSE use are predominantly shared with other services. The use of the band by these other services can reduce the amount of spectrum available for PMSE at a given location;
- i) that identification of harmonised frequency tuning ranges would facilitate the development of standardised equipment;
- j) that ETSI develops Harmonised European Standards that may be referenced in the OJEU;
- k) that PMSE equipment that is capable of tuning across the frequency ranges identified in this Recommendation would provide operators with the greatest chance of meeting their requirements;
- l) that the typical application scenarios and technical characteristics of PMSE equipment are described in detail in ECC Report 219 (video PMSE) [3] and ERC Report 42 (audio PMSE) [4];
- m) that coordination may be required to ensure that there is no interference between PMSE and other systems and services;
- n) that ERC Recommendation 70-03, annex 10 [5] recommends technical parameters for the use of audio PMSE in tuning ranges listed in Annex 2 of this Recommendation;
- o) that Decision 2014/641/EU [9] and Decision (EU) 2016/339 [14] harmonise some frequency bands for audio PMSE and video PMSE, respectively, within the European Union;
- p) that ERC Recommendation 70-03, annex 10 identifies additional frequency bands for radio microphone applications not listed in Annex 2 of this Recommendation that may be less relevant for broadcasting or programme making and more suitable for non-professional PMSE use, if available;
- q) that administrations may decide to identify other frequency bands for PMSE use in addition to those identified in this Recommendation;
- r) that the size of the tuning range of the equipment is limited by the price and system performance;
- s) that advanced technology developments for PMSE equipment may increase the efficiency of spectrum use in some deployment scenarios;
- t) that some service links use frequency bands outside the scope of this Recommendation but form an integral part of PMSE use. Administrations may consider dealing with those applications in the same manner as recommended in recommends 4;

- u) that when selecting particular channels for PMSE links, care should be taken to limit the possibility of interference to passive services, which operate in some of the bands (see ITU RR No. 5.340) adjacent to the PMSE tuning ranges indicated in Annexes 2 and 3 of this Recommendation;
- v) that up-to-date information within EFIS regarding available frequencies for audio and video PMSE (as provided in Annexes 4 and 5 of this Recommendation) is to the benefit of administrations as well as PMSE manufacturers and users;
- w) that maintenance of Annexes 4 and 5 may be undertaken by administrations or the ECO within EFIS, based on information from administrations,

recommends

1. that for the purpose of this Recommendation the definitions of PMSE equipment are given in Annex 1;
2. that CEPT administrations should make available frequencies for audio and video PMSE applications from amongst the tuning ranges identified in Annexes 2 and 3 respectively;
3. that CEPT administrations should make available in Annexes 4 and 5 up-to-date information regarding availability and conditions with respect to the tuning ranges addressed in recommends 2;
4. that CEPT administrations should enable simple and timely procedures for allowing the use of frequencies by PMSE equipment;
5. that CEPT administrations should encourage manufacturers to develop PMSE equipment adapted to the tuning ranges identified in Annexes 2 and 3.”

Note:

Please check the Office documentation database <https://docdb.cept.org/> for the up to date implementation status of this ECC Recommendation, as well as for the CEPT deliverables in the list of references.

ANNEX 1: DEFINITIONS OF PMSE APPLICATIONS

For the purposes of this Recommendation, the following definitions of PMSE applications are assumed:

Table 1: Definitions of PMSE applications

Category	Application	Definition
Audio PMSE	Radio microphone	Handheld or body worn microphone with integrated or body worn transmitter.
	In-ear monitor	Body-worn miniature receiver with earpieces for personal monitoring of single or dual channel sound track.
	Portable audio link	Body worn transmitter used with one or more microphones, with longer operating range capabilities than that of radio microphones.
	Mobile audio link	Audio transmission system employing radio transmitters mounted in/on motorcycles, pedal cycles, cars, racing cars, boats, etc. One or both link terminals may be used while moving.
	Temporary point-to-point audio link	Temporary link between two points (e.g. part of a link between an OB site and a studio), used for carrying broadcast quality audio or for carrying service (voice) signals. Link terminals are mounted e.g. on tripods, temporary platforms, purpose built vehicles or hydraulic hoists. Two-way links are often required.
Video PMSE	Cordless camera (CCL)	Handheld or otherwise mounted camera with integrated transmitter, power pack and antenna for carrying broadcast-quality video together with sound signals over short-ranges. This can be line of sight or non-line of sight depending on application and frequency band used.
	Portable video link (PVL)	Handheld camera with separate body-worn transmitter, power pack and antenna.
	Mobile air-to-ground video link (MAGL)	Video transmission system employing radio transmitters and receivers mounted on helicopters, airships or other aircraft (including repeaters and relays).
	Mobile vehicular video link (including ground-to-air) (MGAL)	Video transmission system employing radio transmitters mounted in/on motorcycles, racing motorbikes, pedal cycles, cars, racing cars or boats. One or both link terminals may be used while moving.
	Temporary point-to-point video links (TPL)	Temporary link between two points (e.g. part of a link between an OB site and a studio), used for carrying broadcast quality video/audio signals. Link terminals are mounted e.g. on tripods, temporary platforms, purpose built vehicles or hydraulic hoists. Two-way links are often required.
Service links	Talk-back	For communicating the instructions of the director instantly to all those concerned in making the programme; these include presenters, interviewers, cameramen, sound operators, lighting operators and engineers. A number of talk-back channels may be in simultaneous use to cover those different activities. Talk-back usually employs constant transmission.
	Telecommand/remote control	Radio links for the remote control of programme making equipment for example cameras, theatre scenery and for signalling.

For further information on PMSE applications see ECC Report 204 [1], ECC Report 323 [21] and ETSI TR 102 546 [12].

ANNEX 2: TUNING RANGES FOR USE BY AUDIO PMSE APPLICATIONS

Table 2: Tuning ranges for use by audio PMSE applications

Type of link	Tuning range	Technical information	Background information
Radio microphones and In-ear monitors	A2: 174-216 MHz	ERC Recommendation 70-03, annex 10 [5]	Shared use. ETSI EN 300 422 [8].
Radio microphones and In-ear monitors	A3: 470-694 MHz	ERC Recommendation 70-03, annex 10	Currently a core band for professional PMSE use. Shared use. ETSI EN 300 422.
Radio microphones and In-ear monitors	A4: 733-757.5 MHz	ERC Recommendation 70-03, annex 10	Availability is dependent on national decisions (see ECC Decision (15)01 [7] and ECC Decision (16)02 [22]). Shared use. ETSI EN 300 422.
Radio microphones and In-ear monitors	A5: 821.5-832 MHz	ERC Recommendation 70-03, annex 10	Risk of out of band emissions from adjacent mobile services means there is limited utility for broadcast quality audio. Harmonised within EU member states, Decision 2014/641/EU [9]. ETSI EN 300 422.
Radio microphones and In-ear monitors	A6: 863-865 MHz	ERC Recommendation 70-03, annex 10	Risk of out of band emissions from adjacent mobile services and other short range devices means there is very limited utility for broadcast quality audio. Shared use. Note 1. Harmonised within EU member states, Decision 2006/771/EC [10] as amended. ETSI EN 300 422 and ETSI EN 301 357 [11].
Radio microphones and In-ear monitors	A7: 1350-1400 MHz	ERC Recommendation 70-03, annex 10	Shared use. See ECC Report 245 [20]. ETSI EN 300 422.
Radio microphones and In-ear monitors	A8: 1518-1525 MHz	ERC Recommendation 70-03, annex 10	Shared use. See ECC Report 253 [19]. ETSI EN 300 422.
Radio microphones and In-ear monitors	A9: 1785-1805 MHz	ERC Recommendation 70-03, annex 10	Harmonised within EU member states, Decision 2014/641/EU. ETSI EN 300 422.
Portable audio links, Mobile audio links and Temporary point-to-point audio links (Note 2), Talkback and Production communications (Note 3)	B1: 174-216 MHz	ERC Report 42 [4]	Shared use. ETSI EN 300 454 [13].

Portable audio links, Mobile audio links and Temporary point-to-point audio links (Note 2), Talkback and Production communications (Note 3)	B2: 470-694 MHz	ERC Report 42	Shared use. ETSI EN 300 422 and ETSI EN 300 454.
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Note 1: The band 863-865 MHz is available for radio microphones, however due note should be taken that it is used also for non-professional and consumer radio applications (cordless audio, etc.).

Note 2: Depending on application scenario, channel width and required transmitter power, the portable, mobile and temporary point-to-point audio links may be accommodated either in the frequency bands 174-216 MHz and 470-694 MHz identified for professional radio microphones (typically for low power/wideband applications) or in other VHF/UHF bands, including Private Mobile Radio (PMR) bands (typically for high power/narrowband applications).

Note 3: According to the definitions in Annex 1, these applications are service links that operate in the audio PMSE bands.

ANNEX 3: TUNING RANGES FOR USE BY VIDEO PMSE APPLICATIONS**Table 3: Tuning ranges for use by video PMSE applications**

Type of link	Tuning range	Technical information	Background information
Cordless Cameras; Portable video links; Mobile video links	C1: 2010-2025 MHz	ECC Report 219 [3]	Harmonised within EU member states, Decision (EU) 2016/339 [14]. Shared use. ETSI EN 302 064 [17].
Cordless Cameras; Portable video links; Mobile video links	C2: 2025-2110 MHz	ECC Report 219	Shared use. ETSI EN 302 064.
Cordless Cameras; Portable video links; Mobile video links	C3: 2200-2300 MHz	ECC Report 219	Shared use. ETSI EN 302 064.
Cordless Cameras; Portable video links; Mobile video links	C4: 2300-2400 MHz	ECC Report 219	Shared use. See ECC Decision(14)02 [24]. ETSI EN 302 064.
Cordless Cameras; Portable video links; Mobile video links	C5: 2400-2500 MHz	ECC Report 219	Use of the band by RLAN and other SRD means limited utility for broadcast quality. Shared use. ETSI EN 302 064.
Cordless Cameras; Portable video links; Mobile video links (Note 1)	C6: 2700-2900 MHz	ECC Report 243 [15]; CEPT Report 61 [16]	Shared use. ETSI EN 302 064.
Cordless Cameras; Portable video links; Mobile video links; Temporary point-to-point video link	C7: 7.0-8.5 GHz	ECC Report 219	Shared use. ETSI EN 302 064.
Cordless Cameras; Portable video links; Temporary point-to-point video link	C8: 10.0-10.68 GHz	(Note 2); ECC Report 219	Shared use. ETSI EN 302 064.
Cordless Cameras; Temporary point-to-point video link	C9: 21.2-24.5 GHz		Shared use. ETSI EN 302 064.

Note 1: The tuning range 2700-2900 MHz is not available for mobile air to ground video links,

Note 2: Within the tuning range 10-10.68 GHz, only occasional temporary point-to-point links should be allowed in the frequency band 10.6-10.68 GHz. Studies have concluded that even limited deployment of cordless cameras and portable video links in the band 10.6-10.68 GHz will result in interference to the EESS (passive) services using this band (see ECC Report 17 [18]).

It should also be noted that temporary point-to-point video links might be accommodated in the fixed service bands, following the same channel arrangements as the FS links.

ANNEX 4: NATIONAL CONDITIONS FOR AUDIO PMSE APPLICATIONS

This Annex 4 lists the national conditions for each of the tuning range mentioned in the Annex 2 for audio PMSE applications see latest details at <https://efis.cept.org/report/report2510AnnexImplementation.do?annexId=1>.

ANNEX 5: NATIONAL CONDITIONS FOR VIDEO PMSE APPLICATIONS

This Annex 5 lists the national conditions for each of the tuning range mentioned in the Annex 3 for video PMSE applications see latest details at .
<https://efis.cept.org/report/report2510AnnexImplementation.do?annexId=2>.

ANNEX 6: LIST OF REFERENCES

- [1] ECC Report 204: "Spectrum use and future requirements for PMSE", approved February 2014
- [2] ECC Report 44: "Guidance for radio usage at special events", approved October 2014
- [3] ECC Report 219: "Characteristics of PMSE digital video links to be used in compatibility and sharing studies", approved October 2014
- [4] ERC Report 42: "Handbook on radio equipment and systems; radio microphones and simple wide band audio links", approved October 1996
- [5] ERC Recommendation 70-03: Relating to the use of Short Range Devices (SRD)
- [6] CEPT Report 60: Report B from CEPT to the European Commission in response to the Mandate "to develop harmonised technical conditions for the 694-790 MHz ('700 MHz') frequency band in the EU for the provision of wireless broadband and other uses in support of EU spectrum policy objectives", approved March 2016
- [7] ECC Decision (15)01: "Harmonised technical conditions for mobile/fixed communications networks (MFCN) in the band 694-790 MHz including a paired frequency arrangement (Frequency Division Duplex 2x30 MHz) and an optional unpaired frequency arrangement (Supplemental Downlink)", approved March 2015
- [8] ETSI EN 300 422: "Wireless Microphones; Audio PMSE up to 3 GHz"
- [9] Decision 2014/641/EU: "Commission implementing Decision of 1 September 2014 on harmonised technical conditions of spectrum use by programme making and special events equipment in the Union"
- [10] Commission Decision 2006/771/EC of 9 November 2006 on the harmonisation of the radio spectrum for use by short-range devices
- [11] ETSI EN 301 357: "Cordless audio devices in the range 25 MHz to 2 000 MHz"
- [12] ETSI TR 102 546: "System Reference document (SRdoc); Technical characteristics for Audio PMSE equipment"
- [13] ETSI EN 300 454: "Wide band audio links"
- [14] Decision (EU) 2016/339: "Commission implementing Decision (EU) 2016/339 of 8 March 2016 on the harmonisation of the 2010-2025 MHz frequency band for portable or mobile wireless video links and cordless cameras used for programme making and special events"
- [15] ECC Report 243: "Wireless video links in the frequency bands 2700-2900 MHz and 2900-3400 MHz", approved January 2016
- [16] CEPT Report 61: Report from CEPT to the European Commission in response to the Mandate on "Harmonised compatibility and sharing conditions for video PMSE in the 2.7-2.9 GHz frequency band, taking into account radar use", approved June 2016
- [17] ETSI EN 302 064: "Wireless Video Links operating in the 1,3 GHz to 50 GHz frequency band"
- [18] ECC Report 17: "Sharing between EESS (Passive) and video SAP/SAB links in the band 10.6-10.68 GHz", approved October 2002
- [19] ECC Report 253: "Compatibility studies for audio PMSE at 1492-1518 MHz and 1518-1525 MHz", approved September 2016
- [20] ECC Report 245: "Compatibility studies between PMSE and other systems / services in the band 1350-1400 MHz", approved January 2016
- [21] ECC Report 323: "Spectrum use and future spectrum requirements for PMSE", approved February 2021
- [22] ECC Decision (16)02: "Harmonised technical conditions and frequency bands for the implementation of Broadband Public Protection and Disaster Relief (BB-PPDR) systems", approved March 2019