

5G-based PMSE¹ applications in frequency band 2.3 GHz - 2.4 GHz - Information on the frequency use

Technology-neutral use:

5G-based PMSE applications (hereinafter referred to as “PMSE-5G” private networks) can be authorised in the frequency band 2.3 GHz - 2.4 GHz as long as the conditions applicable to conventional PMSE applications are respected (technology-neutral use of the frequency band for PMSE applications).

The equipment must fulfil the technical requirements specified in the relevant PMSE-RIR, usually [RIR0203-11](#) (Cordless cameras). In particular, this also means that the spectrum masks of the [EN 302 064](#) referenced in the RIR must be met (Transmitter emission class 1). These spectrum masks apply to all PMSE devices, i.e. both to the PMSE-5G terminal equipment (e.g. 5G-based wireless cameras) and to the PMSE-5G base stations. It should be noted that compliance with the mobile communications standards generally applicable to ordinary LTE/5G devices alone is not sufficient.

For 5G-based PMSE applications, the following aspects must also be taken into account with regard to the requirements specified in the PMSE RIR:

Occupied Bandwidth:

The channel bandwidth of a typical (video) PMSE application ranges from 8 MHz to 20 MHz, EN 302 064 specifies a maximum bandwidth of 40 MHz. For 5G-based PMSE applications, several such frequency channels can be used as a contiguous frequency range (e.g. 3x20 MHz + 10 MHz for 70 MHz contiguous bandwidth). When using a contiguous frequency range of more than 40 MHz bandwidth, the corresponding edges of the spectrum mask (Emission class 1) specified in EN 302 064 for 40 MHz bandwidth must be met at the upper and lower end of the used bandwidth.

Transmit power / Power density:

To ensure interference-free operation of other PMSE applications in adjacent frequency channels to a 5G-based PMSE application, the corresponding planning assumptions of [ECC Report 219](#) have to be taken into account, in particular the transmission powers specified therein. The maximum transmission powers indicated in ECC Report 219 are based on an occupied channel bandwidth of 10 MHz. For conventional PMSE wireless cameras in the 2.3 GHz band, this is 23 dBm or 200 mW e.i.r.p. per 10 MHz channel bandwidth.

For 5G-based PMSE applications with larger contiguous frequency bandwidths, higher overall power is possible, as long as the maximum power density permitted according to ECC Report 219 and the limits for adjacent channel emissions (i.e. the relevant spectrum mask according to EN 302 064) are not exceeded.

Example: for a typical PMSE wireless camera in the 2.3 GHz band, the maximum transmission power is 200 mW eirp with a bandwidth of 10 MHz. For the base station of a 5G-based PMSE application in compliance RIR0203-11 with a bandwidth of 70 MHz, a total of $7 \times 200 \text{ mW} = 1400 \text{ mW}$ would be permissible, whereby the corresponding spectrum mask (see section ‘Occupied Bandwidth’) must be met and the power density of 200 mW/10 MHz eirp must not be exceeded.

Provided that a frequency spacing (guard band) of at least 5 MHz is maintained from the neighbouring PMSE frequency channel, a power increase of up to 6 dB (factor 4) may be authorised (800 mW eirp per 10 MHz), as long as the adjacent channel emissions are limited to such an extent that the spectrum mask specified in EN 302 064 for this transmission power (Emission class 1) is still met. A maximum transmission power of 4 W eirp may be permitted in total, in accordance with RIR0203-11.

Note: The PMSE private network operator must take the measures specified in the section ‘Frequency planning assumptions’ to minimise possible interference with other PMSE users.

¹ Programme Making and Special Events

Frequency planning assumptions:

As mentioned above, the ERC recommendation [ERC/REC 25-10](#) relevant for PMSE refers to the ECC Report 219 for the planning assumptions of video PMSE. This report provides technical and operational parameters for various PMSE application categories (e.g. cordless camera link). In addition to the maximum transmission power applicable to the corresponding application category, which, as mentioned above, is based on a bandwidth of 10 MHz, it also provides assumptions regarding antenna heights and antenna characteristics of PMSE transmitters and receivers.

However, these operational assumptions (deployment parameters) do not cover all possible PMSE application scenarios and, in some cases, no longer correspond in every respect to current practice. In particular, it should be noted that no explicit equivalent is provided in ECC Report 219 for the base station of a 5G private network required for 5G-based PMSE applications. Although the base station can be considered as a “cordless camera” that may transmit (and receive) in several consecutive channels, the required antenna height of the base station is likely to differ from the usual antenna height of a wireless camera. Particular attention must therefore be paid to the positioning of the base station and its antenna characteristics for 5G-based PMSE applications on site to ensure that no interference occurs with other PMSE receivers.

The operator of a 5G-based PMSE application must take the necessary measures to minimise possible radio interference and coordinate the positioning of the base station antenna with other PMSE users; **the transmission must not be aligned towards the main lobe of other PMSE receiving antennas!** If necessary, further restrictions or interference mitigation measures must be implemented, e.g. reduction of transmission power, adjustment of antenna characteristics, and use of AAS (Active Antenna System).

Remarks:

TDD Synchronisation:

In line with conventional PMSE applications, which generate continuous transmissions, TDD synchronisation with public mobile networks is not required for 5G-based PMSE applications. However, if multiple private PMSE 5G networks are present at the same event (e.g. a private network in the 2300-2340 MHz range and a private network in the 2350-2370 MHz range), TDD synchronisation is required between PMSE-5G networks, with a common LTE/5G frame structure to be agreed by the PMSE 5G operators involved.

Coordination with other PMSE applications / Declaration of consent:

As explained in the sections ‘Frequency planning assumptions’ and ‘TDD synchronisation’, the operator of a 5G-based PMSE application must take the necessary measures to minimise potential interference with other PMSE applications, coordinate the positioning of the base station antenna with other PMSE users and, if necessary, facilitate operator agreements with other PMSE users to minimise mutual radio interference. To this end, the operator of the PMSE-5G private network agrees in its license application that its contact details may be passed on by OFCOM to other operators if this is necessary for the coordination of PMSE 5G applications.

Frequency use:

For 5G-based PMSE applications, frequency use is strictly limited to PMSE applications as the licensee's internal communications. Telecommunications services in accordance with art. 3(b) and art. 4 ff. TCA must not be provided. In particular, other (non-PMSE) applications such as cash register systems are not permitted.

As with all PMSE applications, there is no guarantee of interference-free operation, and interference must not be caused to other radio users.

Frequencies and bandwidths are allocated subject to availability.