An Coimisiún um
Rialáil Cumarsáide
Commission for
Communications Regulation

Non - Confidential Responses to Consultation 26/06

Response to Consultation Proposed licensing regime for Private Mobile Radio and Low Medium Power Wireless Broadband Systems

Submissions to Consultation

Reference: ComReg 26/42s

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List of Respondents

1. Sennheiser
2. Shure UK Ltd
3. RTÉ
4. DECT Forum

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Sennheiser Submissions to ComReg Response to Consultation 26/06
Proposed Licensing Framework for Private Mobile Radio and Wireless Broadband Low Medium Power

Sennheiser electronic SE & Co. KG welcomes the opportunity to provide feedback on ComReg's consultation on Proposed Licensing Framework for Private Mobile Radio and Wireless Broadband Low Medium Power, reference ComReg 26/06.

Our comments to document ComReg 26/06 are specific to the proposals relating to PMSE (Programme Making and Special Events) licensing.

About Sennheiser

At Sennheiser, we aim to shape the future of audio by creating unique sound experiences for our customers. As a third-generation family-run business, we are equally proud of our over 80-year history and past accomplishments and innovations in the world of audio and of our ambition to shape its future.

Sennheiser electronic SE & Co. KG, headquartered in Wedemark (Germany), is the leading European manufacturer for professional audio solutions such as microphones, meeting solutions, streaming technologies, and monitoring systems. The business with consumer devices such as headphones, soundbars and speech-enhanced hearables is operated by Sonova Holding AG under the license of Sennheiser.

Evolution of audio PMSE technology

Over the past 15 years, wireless microphone technology (audio PMSE) has undergone a period of rapid evolution driven by regulatory change, spectrum scarcity, and advances in digital transmission. Over the last two decades. The reallocation of UHF television spectrum, i.e. the 800 and 700 MHz bands, required manufacturers and users to rethink long-established technology and working practices to meet the growing demand for audio PMSE within a shrinking spectrum landscape. This challenge ignited an era of accelerated innovation.

Manufacturers responded first by improving spectral efficiency. Enhanced analogue designs introduced tighter deviation control and companding schemes to maximize audio quality while minimizing occupied bandwidth. At the same time, digital wireless microphones began gaining traction. Early digital systems prioritized audio transparency—offering uncompressed or near-lossless transmission—while gradually addressing latency and battery-life constraints. Over the mid-2010s, digital designs improved modulation robustness, adopted more efficient codecs, and introduced advanced features such as automatic frequency coordination and encrypted audio for enterprise and broadcast environments.

A major trend through the 2010s and early 2020s was the shift toward more intelligent spectrum management. As RF environments grew denser, systems incorporated real-time scanning, dynamic frequency selection, and networked control. This allowed productions—from touring concerts to major broadcast events—to reliably deploy dozens or even hundreds of channels despite shrinking spectrum availability. Narrowband digital technologies further increased channel density, packing more microphones into the same amount of RF space without sacrificing audio performance. Narrowband technology advancements were all based on the typical audio PMSE channel bandwidth of 200 kHz with one frequency for one audio link, i.e. a single microphone (or in ear monitor) uses its own 200 kHz channel, and 10 microphones use 10 x 200 kHz.

These evolutionary steps ultimately set the stage for *Wireless Multichannel Audio Systems* (WMAS), a significant technological leap now shaping the PMSE industry. WMAS departs from the traditional "one transmitter = one radio channel" model, instead using a wideband RF channel capable of carrying many bi-directional digital audio streams simultaneously. Within this wideband carrier, the system can dynamically allocate uplink and downlink resources, supporting microphones, in-ear monitors, and control data all within a single coordinated block frequency. This architecture dramatically increases spectral efficiency, simplifies frequency planning, and enhances coexistence in congested environments.

In essence, the last 15 years have transformed wireless audio from individually tuned narrowband channels into coordinated, software-driven digital ecosystems. WMAS represents the culmination of this shift—pointing toward a future where wireless production is more flexible, scalable, and spectrum-efficient than ever before.

Spectrum occupancy

Audio PMSE RF channel assignments are typically planned within 8 MHz TV channels. For narrowband channels there is a need to have a frequency gap between each 200 kHz frequency to prevent interference from one channel into another. This means that there is a physical limit to the number of 200 kHz RF carriers that can occupy an 8 MHz TV channel. ECC Report 204, ECC Report 323 and CEPT Report 32 note that the number of audio PMSE channels that can be accommodated in 8 MHz is 12, and ETSI TR 102 546 (Technical characteristics for Audio PMSE equipment) states that for equipment used in high-end events and productions the channel density is between 1 – 2 audio channels/MHz. This gives an upper limit of 16 x 200 kHz channels per 8 MHz and equates to a channel separation of 500 kHz between carriers.

Consequently, a user that licences 16 narrowband wireless microphones would occupy the whole 8 MHz channel as it would not be possible to fit another frequency between any other channels. It is also highlighted that wireless microphones and in ear monitors have to be deployed in separate 8 MHz channels with at least one 8 MHz channel guard band. For WMAS the situation is different.

In the UHF band, WMAS can be configured to operate with a bandwidth of 6 MHz or 8 MHz (to align with the standard TV channel raster). The occupied bandwidth is less than the channel bandwidth, e.g. about 7.2 MHz in an 8 MHz variant. Sennheiser's implementation of WMAS, Spectera, can carry multiple bi-directional audio channels (i.e. can accommodate microphones and in ear monitors in the same RF channel) in a single wideband carrier. In addition, the RF channel also supports real-time control of all audio PMSE devices. This allows the sound engineer to dynamically assign resources to devices, significantly improving spectrum use through time-based resource management.

The capability to carry multiple bi-directional audio channels with real-time control can significantly improve spectrum efficiency and effective use compared to narrowband PMSE systems. However, ComReg's proposal on licence fees for audio PMSE disincentivises adoption of this innovative and spectrally efficient technology. This is contrary to ComReg's stated principles and obligations under the European Union (Electronic Communications Code) Regulations 2022:

- To impose fees which reflect the need to ensure the optimal use of spectrum; and
- To promote efficient investment and innovation in new and enhanced infrastructure.

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ComReg's proposals

Licence duration

Sennheiser supports the proposal to increase the maximum duration of the licence from 6 months to 12 months. This better supports those users with long-term assignment requirements such as broadcast studios and theatre venues.

Channels and licence fees

The proposed licence fee for audio PMSE assumes a typical channel size of 200 kHz. This is perfectly reasonable given how PMSE has operated to date. As shown in Table 6 of document 26/06, this equates to an annual licence fee of €65.75 for 5 x 200 kHz channels, or parts thereof, (with 10 x 200 kHz channels being €131.50, 15 x 200 kHz at €197.25 etc.).

If we consider the narrowband case 16 x 200 kHz channels in 8 MHz, this will equate to an annual licence fee of €263 (equivalent to 20 x 200 kHz giving 4 x €65.75). However, for a WMAS system occupying 8 MHz, ComReg has advised that adjacent 200 kHz channels have to be booked by the licensee. In practical terms, this requires 40 x 200 kHz (in an 8 MHz channel) and a licence fee that is double that of narrowband for the same total spectrum occupancy, i.e. €526 (8 x €65.75).

This price differential between narrowband and WMAS PMSE neither facilitates optimal use of the spectrum nor promotes innovation and incentivises users to cling to narrowband technology rather than adopt WMAS and its efficiency benefits.

Sennheiser proposes that the fee for WMAS is aligned with that for narrowband systems, recognising the total 'spectrum occupancy' (including the necessary channel separation needed in narrowband systems) is the same, i.e. 8 MHz. This would equate to:

- For an 8 MHz WMAS channel the licence fee is €263 (based on 20 X 200 kHz).
- For a 6 MHz WMAS channel the licence fee is €197.25 (at 500 kHz channel separation for narrowband it is possible to have 12 channels within 6 MHz, which would require the equivalent of 15 channels licensed @ 3 x €65.75.

For short-term licences the fees would be scaled accordingly based on the fee given in Table 7 of document 26/06, i.e €50 per every five 200 kHz channels (or part of).

In order to simplify the licensing process for both ComReg and stakeholders, it is suggested that ComReg looks to introduce the option for users to apply for an 8 MHz spectrum unit. This 'block booking' would be listed as a single frequency assignment with a bandwidth of 8 MHz that can be used for WMAS or multiple narrowband systems depending on the user. Such an assignment would be charged at €263 (for an annual licence) and remove the need to issue multiple 200 kHz licences, thereby reducing the administrative burden on ComReg. This approach would reflect the need to ensure the optimal use of spectrum and promote efficient investment and innovation in new technology.

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27 February 2026

Dear ComReg,

Submissions to ComReg Response to Consultation 26/06

Shure UK Ltd would like to thank ComReg for the opportunity to further respond. As ComReg notes in its Response to Consultation (ComReg 26/06), we responded to ComReg's Consultation 25/46 last year. In that response we expressed support for maintaining a distinct licensing framwork for PMSE and for the proposed removal of the per equipment charge attached to PMSE licences. We wish to state for the record that our response to Consultation 25/46 did not extend to an expression of support for the proposed fees outlined in Document 25/46, contrary to ComReg's statement in paragraph 2.7 of 26/06.

As an equipment manufacturer, it is typically users of our equipment who apply for spectrum licences, and so our interest in ComReg's PMSE fee proposals might be considered indirect. However, our concern in responding to Document 25/46 was that ComReg did not substitute an unsuitable pricing model, based on a per device fee, with another unsuitable or punitive fee model for PMSE licensees.

General observations on the proposed fees for PMSE

We support ComReg's acknowledgement that the required duration of PMSE licences varies depending on the requirements specific to the PMSE event or production. The proposal to increase the maximum PMSE licence duration from 6 months to 12 months (para. 4.18) seems a sensible accommodation for many permanent production venues, such as studios and theatres, where spectrum is used for PMSE in the same location year round on a daily/regular basis.

The application of cost-based fees to PMSE is appropriate, but if, as DotEcon admits on p.38 of its accompanying assessment, quantifying those costs is difficult and they are in any case low by virtue of an automated licensing process, the resulting price floor has the appearance of being somewhat arbitrarily determined and, for some PMSE use cases, potentially artificially high.

Accommodation of WMAS in the regulations and licensing process

In our response to 25/46, we also asked ComReg to accommodate the licensing of the latest Wireless Multichannel Audio System (WMAS) PMSE equipment (an excerpt from our response is included in para.2.6 of 26/06). There appears to be some confusion about the basis for our request, alluded to in para.2.9 of 26/06, which we would like to take the opportunity to clarify.

WMAS equipment utilises wider bandwidths than the "traditional" 200 kHz narrowband audio PMSE channels. In order to accommodate its authorisation, most national regulators have removed bandwidth restrictions in their regulations that specify a *maximum* channel bandwidth because it precludes the authorisation of wider WMAS channels. In many cases, an amendment from a 'maximum' to a 'typical'

channel bandwidth is all that is required. This is the reason we pointed out that p.23 of ComReg 08/08R7, which we understand is the current applicable revision, includes such a 200 kHz *maximum* channel bandwidth for wireless mics and IEMs (i.e. it appeared to us to have the effect of precluding the licensing by ComReg of WMAS equipment).

In para.4.30 of 25/46, repeated in para.2.4 of 26/06, ComReg states that it would consider other bandwidths for PMSE on a case-by-case basis. We interpreted that simply as an indication of a direction of travel by ComReg to accommodate the licensing of wider WMAS bandwidths. ComReg's reference to the implementation of a future revised regime of its eLicensing platform (footnote 6 on p.12 of 26/06) appears to confirm that, but we urge ComReg to ensure that licence fees for WMAS will not be disproportionately more expensive or inequitably priced in comparison to the licensing of narrowband PMSE.

We remain available should ComReg wish to discuss any of the points raised above.

Respectfully submitted,

Martin Brock

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RTÉ RESPONSE TO

COMREG CONSULTATION

Proposed Licensing Framework for Private Mobile Radio and Wireless Broadband Low Medium Power

ComReg 26/06

27th February 2026

RTÉ welcomes the opportunity to respond to this consultation in relation to proposed licensing of Programme Making and Special Events (PMSE) equipment.

As Ireland's national public service media organization, RTÉ is a key producer of media content. Production of content is increasingly relying on wireless technology and demand for wireless PMSE has experienced significant growth. Broadcasting national and international prestigious events depends on access to high quality spectrum which is an essential input to remain competitive in the content creation industry. High production values bring strict technical conditions (low latency, high resilience) which influences spectrum demand. In particular spectrum in the lower UHF band (470 to 694MHz), successfully shared with broadcast terrestrial TV, is vital for in studio and location production for secure use of Radio Microphones and In-Ear Monitors. There is currently no viable alternative for the still growing PMSE sector in this band, and as such it must be protected.

RTÉ has continued to invest in modern PMSE technology. Since our clearance of the 700MHz band in 2019 more spectrum efficient equipment has been deployed; in a high pressure

environment where it must coexist with multiple types and generations of analogue and digital technologies.

We believe that the use of PMSE equipment in Ireland continues to grow – in line with other European countries. However, not all industry users may be aware of their obligations to licence wireless production tools – and as such the true usage and utility of this spectrum may have been underestimated. The revision of this licensing scheme is an excellent opportunity to maximise accessibility for PMSE equipment users – both increasing awareness among a wider net of PMSE users (e.g. with increased outreach and information campaigns) and simplifying the application process to the benefit of all spectrum users.

PMSE License Duration (Section 4.18)

RTÉ welcomes the option to increase the licence duration to 1 year. This will better suit the usage profile of typical fixed premises long term users such as RTÉ. It will also reduce the administrative burden on licensees and ComReg alike, with no apparent additional spectrum management risks. Similarly, further benefits would be gained by users and ComReg alike by facilitating a renewal process for existing licensees (as used in Fixed Point to Point link licensing). As a relatively large user of licensed PMSE equipment, RTÉ would be pleased to take part in any testing of the licensing portal with the new licensing framework.

PMSE Channels (Section 4.19)

We believe that there is an opportunity to review the spectrum planning process and potentially increase the level of spectrum efficiency for PMSE use here. We propose that ComReg further engage with industry and consider publishing an up to date guide to assist PMSE applicants in choosing suitable clear frequencies when planning events or productions.

PMSE Fees (Section 4.24 to 4.26)

We support the proposed revised fee structure as scheduled in Table 6.

However, we would like some clarification on how the proposed fee calculations would apply to emerging wideband PMSE systems such as Wireless Multi-channel Audio Systems (WMAS) that promise enhanced spectrum efficiency in the UHF band.

For example – consider applying the fees set out in Table 6 to an 8MHz WMAS system operating in the 470-703MHz band. Would the annual fee be calculated as:

a) €65.75 x 40 (i.e. 8MHz/Typical Channel Size (200kHz)) = €2,630, or
b) €65.75 x 8 (i.e. 40/5 Typical Channels) = €526, or
c) 1 x 10MHz Wireless Broadband/Wireless Camera = €131.50

If calculated as per (a) above, we believe that this would disincentivise PMSE users from exploring new – and possibly more spectrum efficient in some applications – technologies.

Submitting Comments (Section 10.1)

We have included our comments originally submitted to ComReg 25/46 in Appendix 1 below for additional information.

Appendix 1 – RTÉ Response Submitted to ComReg 25/46

RTÉ RESPONSE TO

COMREG CONSULTATION

Proposed licensing regimes for Private Mobile Radio (PMR) and Low & Medium Power Wireless Broadband Systems (WBB LMP)

ComReg 25/46

22nd August 2025

RTÉ welcomes the opportunity to respond to this consultation in relation to proposed licensing of Programme Making and Special Events (PMSE) equipment.

As Ireland's national public service media organization, RTÉ is a key producer of media content. Production of content is increasingly relying on wireless technology and demand for wireless PMSE has experienced significant growth. Broadcasting national and international prestigious events depends on access to high quality spectrum which is an essential input to remain competitive in the content creation industry. High production values bring strict technical conditions (low latency, high resilience) requiring access to high quality spectrum. In particular spectrum in the lower UHF band (470 to 694MHz), successfully shared with broadcast terrestrial TV, is vital for in studio and location production for secure use of Radio Microphones and In-Ear Monitors. There is currently no viable alternative for the still growing PMSE sector in this band, and as such it must be protected.

We believe that the use of PMSE equipment in Ireland continues to grow – in line with other European countries. The revision of the this licensing scheme is an excellent opportunity to

maximise accessibility for PMSE equipment users – both increasing awareness among a wider net of PMSE users and simplifying the application process to the benefit of all spectrum users.

PMSE License Duration (Section 4.29)

We propose that there is an option to increase the licence duration for non-temporary fixed premises use (e.g. studios, theatres) to a minimum period of 1 year. This would better suit the usage profile of typical fixed premises long term users such as RTÉ. It would also reduce the administrative burden on licensees and ComReg alike, with no apparent additional spectrum management risks.

PMSE Fees (Section 4.34 & Annex 2)

We commend efforts to streamline the licence application calculation process.

However, we would like some clarification on how the proposed fee calculations would apply to PMSE use where:

a) multiple frequencies are in use at a single location within a single licence, and

b) for emerging wideband PMSE systems such as Wireless Multi-channel Audio Systems (WMAS) that promise enhanced spectrum efficiency in the UHF band.

a) Multiple Frequency Licences

[redacted] *[End of Commercially Sensitive – Not for Publication]*. Fees at this level would not be reflective of the administrative cost, and we believe would act as a serious deterrent for PMSE operators to comply with the scheme. This in turn would lead to a deterioration in the availability of high quality spectrum and create a significant new obstacle for the events and content creation industries in Ireland. If the intention is to calculate fees on a per channel cumulative basis, then we propose that the base fee 'α' be set at a much lower level for PMSE systems to ensure that there is no significant and disproportionate fee increase for existing compliant users.

b) WMAS

WMAS systems are designed to deliver high levels of flexibility in terms of configuration and number of supported devices, but within a standard 8MHz block.

In a typical TV studio use case a single WMAS system might be expected to support 48 devices (e.g. 32 Mics and 16 In-Ear Monitor sets).

With the existing fee structure (based on the current 200kHz channels) 12 months use would incur a licence fee of €1176 (2 x 6 month blocks of €588).

Using the proposed fee structure in Annex 2 (again assuming the current 200kHz channel as the bandwidth for the base fee) a licence fee of €10,520 (€263 x 8000kHz/200kHz) would be due for

12 months use. This level of licence fee would make investment in this technology prohibitively expensive in this case. Although we note that in some cases, where a larger number of devices was required, it may be practical to use multiple WMAS systems in the same locality sharing the same 8MHz block of spectrum.

If we have interpreted the proposed Option 2 fee calculation for PMSE correctly for this case, then we suggest an alternative hybrid option where the fee due would be based on the lower of a device based fee and a bandwidth based fee.

Dear ComReg,

Reference: Submission to ComReg Consultation 26/06

Response by the DECT Forum to proposed licensing regimes for Private Mobile Radio (PMR) and Low & Medium Power Wireless Broadband Systems (WBB LMP) – Open Consultation

Introduction

DECT Forum would like to thank ComReg for the opportunity to respond to the above-named open consultation. Our response focuses principally on ComReg's proposed WBB LMP licensing framework in the 3.8-4.2 GHz band. DECT Forum's response can be considered non-confidential.

The DECT Forum is a membership organisation which exists to support a collaborative environment of the Digital Enhanced Cordless Telecommunications (DECT) industry and drive programs to develop and improve DECT wireless technology to exceed wireless communications expectations and meet the needs of a technology-shifting world.[1]

DECT-2020 NR

DECT-2020 NR (also known as DECT NR+) is defined as an IMT-2020 (5G) radio interface technology for massive Machine-Type Communication (mMTC) and Ultra-Reliable Low-Latency Communication (URLLC) in Recommendation ITU-R M.2150-1.[2] It is the first and only non-cellular 5G technology that meets the 5G requirements for URLLC and mMTC. This makes NR+ a viable technology in the 3.8 to 4.2 GHz band for local area connectivity for 5G private network use cases as identified by ComReg in its Consultations (and supporting reports from Plum Consulting and DotEcon).

DECT Forum response

DECT Forum is pleased to see that ComReg has responded to some of our comments in relation to your previous consultation on Private Mobile Radio (PMR) and Low & Medium Power Wireless Broadband Systems (ComReg 25/46), for example including the definition of 'base station' from ECC Decision (24)01 in its licence conditions.

As DECT-2020 NR is only envisaged to operate within the low power category defined in ECC Decision (24)01, we do not comment on issues relating to medium power deployment. In general, DECT Forum supports the proposals set out in ComReg 26/06, however, there are areas that raise concerns and we respectfully ask that these are clarified.

In relation to technology neutrality DECT Forum is still of the view that some aspects of the proposals are 3GPP-centric. For example, in paragraph 5.35 ComReg states, "Further, ComReg also notes **3GPP technologies are a real use for the band** [emphasis added] and notes that these technologies and systems are in place in other countries." This suggests that ComReg only considers 3GPP-based technology as an option for low/medium power wireless broadband networks and does not view DECT-2020 NR as a viable candidate technology local area connectivity.

DECT Forum would like to highlight that DECT technology provides local connectivity solutions across a range of use cases within the 1880-1900 MHz range, so the technology is proven. DECT-2020 NR is

[1] DECT's list of member organisations can be found here: https://www.dect.org/members.aspx

[2] Detailed specifications of the terrestrial radio interfaces of International Mobile Telecommunications-2020 (IMT-2020)

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developed to address future digitalization needs and it is optimized for local area wireless applications, particularly for URLLC and mMTC. Access to the 3.8-4.2 GHz band for DECT provides robust, powerful, easy deployable technology for vertical industries. On this basis, DECT-2020 NR is very much a credible technology option in the band.

In paragraph 5.181, ComReg references the interference levels proposed by Plum as given in Table 3.1 of their report. It is noted that these limits are specifically related to coexistence between 3GPP-based WBB LMP networks, and there is no acknowledgement by Plum of DECT-2020 NR. DECT Forum does recognise that the levels given in Table 3.1 are taken from the draft ECC Recommendation being developed by FM60, but this coupled with ComReg's comment in 5.35 does give the impression that ComReg is of a single technology view. DECT Forum asks for reassurance that this is not the case.

DECT Forum notes that ComReg is following the work in FM60 and the development of the draft Recommendation on guidance on coordination between WBB LMP networks and WBB LMP and MFCN. It is highlighted that, on the basis of coexistence studies between DECT-2020 NR and MFCN that there is a low probability of DECT devices causing interference to MFCN below 3.8 GHz, and the draft Recommendation suggests a 20 MHz guard band (3800-3820 MHz) is sufficient to protect MFCN from DECT networks.

ComReg sets out its view that it will license deployments compatible with the default frame structure (as used in the 3.6 GHz band) in the lower part of the 3.8-4.2 GHz band and license other frame structures in other parts of the band. Our assumption is that "other frame structures" also covers use of DECT-2020 NR.

It is unclear in the consultation what ComReg means by the "lower part" of the 3.8 GHz band. Our current view is that for low power DECT operation ComReg is proposing allowing use from 3820 MHz as implied in paragraph 5.114. DECT Forum requests clarification on this point.

DECT Forum would like to thank ComReg for the opportunity to respond. We remain available to discuss any of the points raised in our response or to provide further information on DECT-2020 NR.

Respectfully submitted,

Martin Brock
Chair, Regulatory Working Group, DECT Forum

On behalf of the DECT Forum
26th February 2026

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