



## APWPT – RSPG UHF Workshop

11 April 2025

# Audio PMSE in the 470-694 MHz band

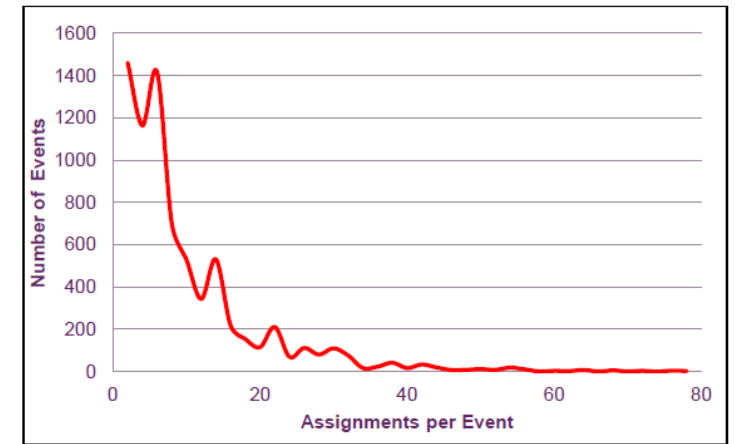
- Audio PMSE in the sub-700 MHz band primarily consists of wireless microphones and in ear monitors (IEMs)
- This band is the key spectrum resource in Europe for audio PMSE
  - 224 MHz of harmonised contiguous spectrum available in every EU Member State – although locally the total amount of usable spectrum will be less than this due to the regulatory need to protect TV reception
  - Outside Europe it is also the main spectrum resource for audio PMSE in the majority of countries
  - The band provides significant benefits through global economies of scale across the sector from manufacturers to end users
- The physical characteristics of this spectrum is vital to audio PMSE
  - Range
  - Power
  - Antenna size
  - Body loss
- Audio quality requirements drive the need for tailored technology – 3GPP 5G **does not meet** the sector's needs on latency, reliability, cost and access

600 MHz impact assessment

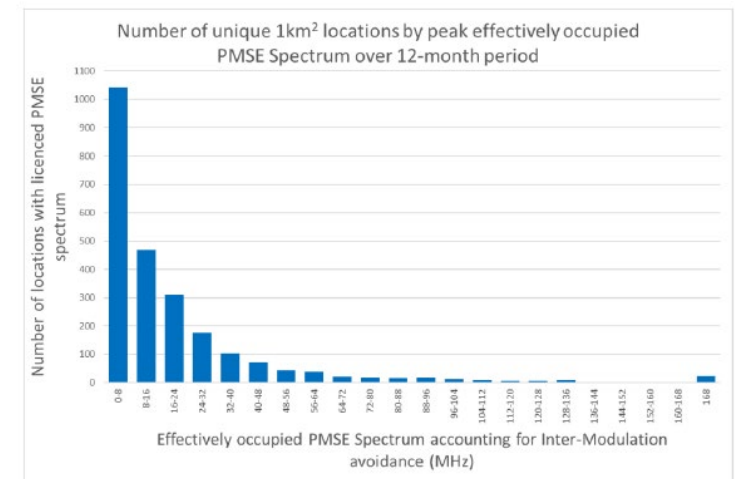
# Spectrum needs for audio PMSE

- Spectrum requirement is determined by many factors:
  - Size of the event, i.e. number of audio channels
  - Type of equipment, mics, IEMs
  - Type of event, concert, festival, TV or film production
  - External factors, e.g. video walls and other sources of RF disruption
- Spectrum demand follows a pareto-distribution (from SRF study)
  - 115 MHz for large events (100-200 coordinated links)
  - 174 MHz for major events (>200 coordinated links)
  - >174 MHz for exceptional events
- Largest events have the greatest economic and social value
- Loss of access to spectrum will affect the largest events and the associated economic and social benefits

Source: Ofcom 2014



Source: UK SPF 2022



# Impact assessment - methodology

- Used the same approach as Ofcom used in its assessment of the impact of the 700 MHz clearance (**1000 events/yr affected**)\*
- Identified representative events, assignments and equipment used
- Applied an indicative spectrum availability profile based on future DTT scenarios
- Replanned each representative event against each spectrum availability scenario
- Assessed the impact to each event: whether the assignment count is met; if not, what changes to working practices and/or equipment choice can mitigate the loss of spectrum and meet demand

Classification	Impact on equipment selection	Impact on working practices	Assignments
Minimal	None	None	Satisfied
Slight	The same equipment could be used, albeit in different frequency ranges	Some minor changes needed	Satisfied
Substantial	High-specification equipment needed if not already in use	Substantial changes needed	Satisfied
Severe	High-specification equipment needed if not already in use	Substantial changes needed	Some assignments lost (production quality reduced)
Critical	High-specification equipment needed if not already in use	Substantial changes needed	Significant loss of assignments; the event would no longer be viable in any recognisable form.

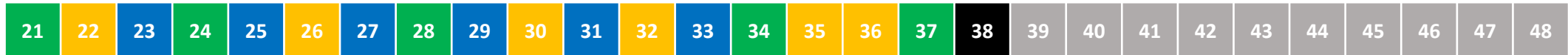
\* [See Annex 11 of Consultation on future use of the 700 MHz band](#)

# Impact assessment – DTT scenarios

## Typical DTT channel use (Berlin example)



## Scenario 1: DTTB 6 mux plan + neighbouring 6 mux interference



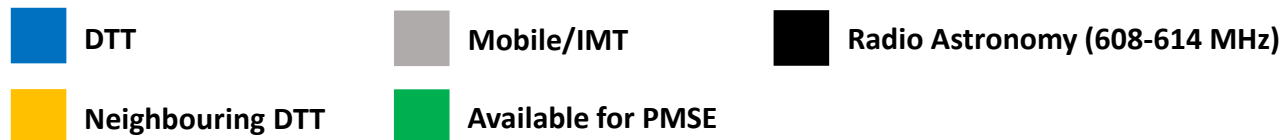
## Scenario 2: DTTB 6 mux plan (also covers 3 mux local + 3 mux neighbouring DTT)



## Scenario 3: DTTB 3 mux plan



## Scenario 4: DTTB switched off (It is unlikely that PMSE would be the only user in 470-606 MHz. More likely is another use/application would be introduced)



# Impact assessment – Results

Event	City and Country	Sector	Number of assignments	DTV scenario	Impact
Superbloom (2023 & 2024)	Munich Germany	Music festival	Day 1: 319 Day 2: 329	1	Critical
				2	Critical
				3	Critical
				4	Severe
Lollapalooza (2022)	Berlin Germany	Music festival, exhibition, fashion	631	1	Critical
				2	Critical
				3	Critical
				4	Critical
Cisco (2023, 2024 & 2025)	Amsterdam The Netherlands	Conference and congress (Technology)	500	1	Critical
				2	Critical
				3	Critical
				4	Severe
Special Olympics World Games (2023)	12 locations in and around Berlin Germany	International sport and festival	1000+ across all venues. ~300 in three locations	1	Critical
				2	Critical
				3	Severe
				4	Substantial

Event	City and Country	Sector	Number of assignments	DTV scenario	Impact
SDP (2023 & 2024 tour)	Different cities in Germany, Austria and Switzerland	Music tour	50 - 60	1	Critical
				2	Severe
				3	Substantial
				4	Slight
Fettes Brot Kultursommer	Hamburg Germany	Music concert	70 – 90	1	Critical
				2	Critical
				3	Severe
				4	Substantial
David Garrett	Several European cities	Music tour	38	1	Critical
				2	Critical
				3	Severe
				4	Substantial
Cindy Lauper (European Tour 2025)	Several European cities	Music tour	42	1	Severe
				2	Substantial
				3	Slight
				4	Minimal

# Impact assessment – UK analysis (BEIRG)

Name of Event	Sector	Number of assignments	DTTB Scenario	Impact
Elstree Film Studio (Note 1)	Studio Complex	>200	1	Critical
			2	Critical
			3	Severe
BBC Elstree (Note 1)	Studio Complex	>100	1	Critical
			2	Critical
			3	Severe
Dock 10 Studios (Note 1)	Studio Complex	>80	1	Critical
			2	Critical
			3	Severe

Note 1: Due to the nature of use at studio complexes such as Dock 10 and Elstree, with multiple concurrent productions in the same location, independent of any individual event these locations are at least severely impacted (under DTTB Scenario 3) by loss of access to spectrum. Many of these locations already make extensive use of PMSE equipment that operates in the 960 MHz band to accommodate channel counts that today cannot be satisfied within the UHF band alone.

Name of Event	Sector	Number of assignments	DTTB Scenario	Impact
King's Coronation (Windsor Castle)	State Event (outdoor)	197	1	Critical
			2	Critical
			3	Severe
King's Coronation (Westminster Abbey)	State Event	64	1	Slight
			2	Slight
			3	Slight
Festival of Remembrance (Royal Albert Hall)	TV Show	118	1	Critical
			2	Critical
			3	Severe
The Voice (DOCK 10 Studios, Manchester)	TV Show	90	1	Critical
			2	Critical
			3	Severe
Strictly Come Dancing (Elstree Film Studio)	TV Show (live)	104	1	Critical
			2	Critical
			3	Severe
BBC Proms (Royal Albert Hall)	TV Show and Radio Broadcast	>100	1	Critical
			2	Critical
			3	Severe
Major League Baseball (London Olympic Stadium)	Sports Event (outdoor)	16	1	Slight
			2	Slight
			3	Slight
Eurovision Song Contest (M&S Bank Arena, Liverpool)	TV Show	191	1	Critical
			2	Critical
			3	Critical



# Importance of Audio PMSE

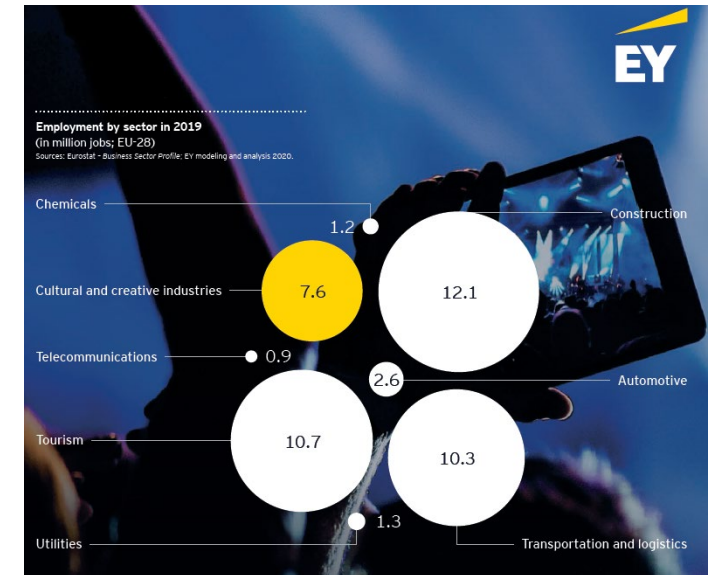
# Recognised spectrum needs

- EC study on the sub-700 MHz band ([Study: the use of the sub-700 MHz UHF band for TV broadcasting and events | Shaping Europe's digital future](#))
  - Demand for audio PMSE is growing – approx. 50% of MS observed a growth in demand
  - Meeting demand for PMSE **post 700 MHz clearance is difficult**, and further reduction in PMSE spectrum in this range may further complicate access to spectrum for PMSE users
  - MSs indicate that a dedicated allocation of the 600 MHz band to IMT mobile would leave **too little spectrum** for PMSE
- RSPG has highlighted the need to address the growing spectrum needs of PMSE (e.g. RSPG15-595; RSPG17-037 and RSPG23-045)
  - A further loss of access to spectrum...could have a detrimental impact on the ability of PMSE industry to continue delivering a service
  - There is a need to **find a solution** for the continuation of PMSE service delivery
  - In the case the capacity in the available bands will not be sufficient...a **timely identification of additional spectrum** for PMSE is required as part of this long-term strategy
  - There is a need to preserve sufficient spectrum for PMSE needs, particularly audio-PMSE which makes extensive use of the sub-700 MHz band
- **Despite these recommendations no substantive action has been taken to identify additional spectrum**

# Value of CCIs

- The value of the Cultural and Creative Industries (CCI) is recognised by the EU e.g. Creative Europe 2021-2027 (2021)
- EY study (2021):
  - In 2019 (pre-COVID) the CCIs represented 4.4% of EU GDP in terms of turnover, with annual revenues of €643bn and total added value of €253bn, employing more than 7.6 million people – 8.4 times more than the telecoms industry
- Eurovision 2024, Malmö:
  - €32m turnover (+ €5.5m to neighbouring Copenhagen)
  - Through Eurovision, **Malmö has enhanced its position** as an open city where both celebration and freedom of expression are welcomed
  - Hosting major events has **long-term positive effects** for host cities. Economically, they generate revenue and strengthen the city's brand and appeal.

“In the European Union, the cultural and creative sectors (CCS) have always been a rich facet of daily life. They make a meaningful contribution to Europe’s social cohesion and diversity.”



# Creative Europe Programme (2021-2027)

## REGULATION (EU) 2021/818

- The general objectives of the Programme are to increase the competitiveness and the economic potential of the cultural and creative sectors, in particular the audiovisual sector
  - “Culture, arts, cultural heritage and cultural diversity are of great value to European society from a cultural, educational, democratic, environmental, social, human rights and economic point of view and should be promoted and supported.”
  - “Music, in all its forms and expressions, and in particular contemporary and **live music**, is an important component of the cultural, artistic and economic landscape of the Union and its heritage.”
- Access to spectrum for audio PMSE is a fundamental requirement to deliver the competitiveness and economic potential that the CEP mandates
- **Losing access to the 600 MHz band means the CEP’s objectives cannot be met**

# Conclusion

- Audio PMSE is a foundation of the cultural and creative industries that generate massive **economic and societal value**, and underpins the EC's Creative Europe Programme
- The 470-694 MHz band is the **primary** spectrum resource for audio PMSE
- Analysis shows there is **severe to critical** impact to a range of events if access to the 600 MHz band is lost
- Lack of spectrum will lead to **PMSE not-spots** – events will avoid locations that do not have the spectrum available to deliver the production (some events are **already constrained** by lack of spectrum)
- PMSE needs are growing! It is recognised that additional spectrum is needed but **no new spectrum opportunities** have been identified. Fragmented national islands of spectrum is not a solution
- PMSE needs **enduring harmonised access** to the 470-694 MHz band to continue to deliver the economic and cultural value and societal well-being that we all enjoy

**Keep it as it is: PMSE must have daily access to high-quality radio spectrum in 470-694 MHz**

**To what extent do we want to support cultural and political life in our pluralistic and democratic societies in the future?**

Long-term access to the 470 to 694 MHz band, free from interference, is vital for PMSE to produce independent, high-quality content that fosters social cohesion; enriches cultural life; unlocks creative innovation; and increases Europe's competitiveness and economic potential of the cultural and creative sectors. Importantly, PMSE operates independently of external infrastructure or business decisions, ensuring creators retain full control over their work.

The APWPT is calling for access to this spectrum to be maintained for PMSE beyond 2030. We will work closely with regulators and industry stakeholders to develop a long-term strategy to deliver growth in media and content production.

**More than ever, it is crucial to support European values through content and creativity to promote sharing values and emotions by bringing people together in “real world” events**

Wireless PMSE equipment (Programme Making and Special Events) plays a fundamental role in cultural, education, entertainment and media organizations across Europe. In live concerts, theatre productions, broadcasting, sports events and political conferences, wireless microphones and in-ear monitors rely on stable and interference-free spectrum.

For many decades PMSE has shared the UHF band with TV broadcasting. This band is the core spectrum resource and provides unparalleled reliability, range, and flexibility. PMSE operates in the gaps between TV broadcast frequencies and is made available on this basis in all EU member states (and globally). This coexistence between Broadcast and PMSE is very efficient and works very well.

Along with TV broadcasting, PMSE has lost access to the 800 MHz and 700 MHz bands under two reallocations of spectrum to IMT. The remaining spectrum from 470 to 694 MHz is essential to deliver the cultural and creative events that Europeans enjoy every day. Any further loss of radio spectrum would damage the sector's ability to deliver the events and productions that are the backbone of social cohesion and well-being along with economic and cultural value.

PMSE access to the 470-694 MHz band provides a sustainable harmonization that has been implemented in the European single market and provides huge benefit to the cultural and creative industries across the European Union.

## **Continued access to the 470-694 MHz band is necessary to maintain the long-standing successful use of this spectrum by PMSE and the cultural and creative industries throughout Europe**

Harmonised access to the 470-694 MHz band encourages investment in PMSE technology; lowers prices; allows for economies of scale; and enables cross-border portability. The risk of spectrum fragmentation across member states is a serious issue for the audio PMSE sector — it increases costs, stifles innovation, and complicates cross-border operation. Preserving harmonized spectrum is essential for efficient, sustainable use, especially for artists and performers on international tours.

Events are already constrained by lack of available spectrum, even with access to the 470 to 694 MHz band. This has been noted by the RSPG and its recommendation to find additional spectrum to support audio PMSE. Additional spectrum should be harmonised across member states under similar regulatory and technical conditions as the UHF band.

PMSE manufacturers continue to innovate and explore new technologies. Studies and trials of 5G based on 3GPP over the last 10 years have shown that this technology does not meet the performance requirements of audio PMSE and is not considered a viable technology for PMSE.

**APWPT - Association of Professional Wireless Production Technologies e. V.**

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