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DG Information Society & Media
B4 Radio Spectrum Policy
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By e-mail

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Ref: AD/2010/P6011

Dear Sirs

Re: response to questions following meeting of 27 April 2010 on usage of wireless microphones in live performance sector and formulated in an electronic message on 1 June 2010 by Mr Lefebvre

Preliminary remarks:

- The responses presented below mainly focus on the live performance sector, which is one of the PMSE users. A comprehensive response on behalf of the wide group of PMSE users (TV news gathering, TV racing and other sports events, TV Drama, Film making, Political Party Rallies and small and large scale Industrial Shows, ...), can further be facilitated by PMSE associations such as the British Entertainment Industry Radio Group BEIRG and the Association of professional wireless production technologies (APWPT), that have kindly contributed to this paper
- It should be noted that the responses encompass an initial contribution based on existing information available: further study and research is requested to provide a full response. The sector is prepared to collaborate in such initiative.
- The document does attempt to describe all types of use nor does it quantify the use over any time period. There are many other types of use/user within the PMSE sector, both professional, semi professional and amateur, and many (though not all) of these users encounter the same kind of problems, and require the same quality levels and range of spectrum, as the professional live entertainment sector.

- Whereas not addressed in the questions, the response does not cover the essential radio communication systems that are now so vital for the control and safety of complex scenery, effects and lighting systems that tour with productions. Communication systems usually occupy areas of spectrum away from the main wireless microphone frequencies

Question 1:

We first need to understand if we can "box" the multitude of PMSE applications in a limited number of technical/functional "profiles" which could be treated individually consistently, e.g.

1. outdoor professional recording concerts requiring up to nn microphones to be active at the same time over a distance of max...,
2. standardised non professional use indoor or limited outdoor with max.
- 3 nomadic sport events requiring lots of microphones but average sound quality (non master recordings),
4. permanent shows in indoor theaters,
Etcetera...

1. Outdoor professional events – Large scale concerts, Rock shows, Sporting events.

This type of presentation requires (currently) up to 80 channels with a range of 100 metres, the equipment used will include wireless mics, in ear monitors, instrument mics.

It should be noted that events on the scale of *Live Aid* or the *Olympic Games* may require double or more channels than outlined above.

Consistent and reliable high quality sound is part of the absolute essence of these shows and a given requirement.

The above excludes Radio Communication equipment.

Herewith attached annex A3 of ETSI system reference document TR 102 546, currently under revision, which give good examples.

Outdoor concerts :

- page 21 (Festspiele Bregenz, 88 Radio Microphones and 16 In Ear Monitors,),
- page 22 (Seefestspiele Mörbisch, 32 RM, 12 IEMs),
- page 24 (Domstufen Erfurt, 86 RM, no IEMs),
- page 27 (Prince’s Trust Concert Tour, 44 RM),



TR 102 546 Annex
A3.pdf

2. standardised non professional use indoor or limited outdoor with max.

This category includes a wide range of types of use – from Hotel lounge entertainment, Live music in pubs, Town Halls, Places of Worship. PMSE users and production companies underline that it concerns semi-professional use of wireless microphones and that the term non professional use is therefore not correct.

Semi-professional uses are most of the time in urban areas, indoor with a range of up to 30 metres and most of the time require 8 RM and 3 IEM, although quantity and range vary.

Whilst sound quality and consistency is important it is unlikely to be as critical as the professional requirement.

3. Big sport events are also mentioned in the attachment of the TR 102 546.

Examples can be found on:

- page 20 (UK Games 24 RM and 3 1 Watt audio links, without the ENG teams),
- page 24 (German Athletic Championship, 50 RM and 15 IEM, without ENG)
- page 27/28 (Tour de France, 1000 RM used daily by ENG teams)
- page 32 (opening ceremony of FIFA tournament, 20 RM without the ENG teams).

An illustration of what is needed by an ENG team can be found on page 25 (ENG team on Vienna Airport using 3 RM and 3 IEM). At sport events ENG teams can be numerous depending on the local, regional, national and international importance but may run up to the numbers of the Tour de France.

4. permanent shows are most of the time theater shows like musicals,

On average a musical requires 40 RM and 6 till 12 IEMs, and some examples can be found in the attachment on page 21 (Phantom of the Opera 22 RM and 2 IEM). The number is of 2006 RM and IEM use increased due to higher quality production.

Eric Pierens, frequency manager for Dutchview Broadcast facilities in the Netherlands claims: "events covered by broadcasters which need an average of 40 RM and 16 IEM and some high power audio links using UHF TV band frequencies, are on a weekly basis"

5. Indoor professional Productions at fixed bases.

These will typically include theatrical and music productions on varying scales, the now many large scale productions currently require up to 60 channels with a range of 40metres.

The equipment used is : wireless mics, in ear monitors, instrument mics.

Smaller scale productions will require proportionately fewer channels, though other criteria remain the same.

Consistent and reliable high quality sound is an absolute essential for all these types of production.

Radio Communication systems are not included above.

6. Indoor professional production Touring.

The same criteria in terms of number, range and quality outlined above also apply to this category of professional production.

Question 2:

We need to get a sense of the realistic technical trends for each of those categories (e.g. chance to get a digital alternative within 5 years, spectrum flexibility, etc).

Many manufacturers do research and development on digital wireless microphones, but it will be hard to establish the same real time audio quality and spectrum efficiency as with the current analogue systems. We think new digital systems with high audio quality will not be on the market the coming 4-5 years. It will take at least 2 till 3 years to develop a new technology and another 2-3 years to market it. Even European standards may be amended in order to grant larger channel space for digital radio microphones (400-600 kHz).

RM and IEM do give faster and cheaper production and due to the comfort of RM and IEM use will increase every year by 5%. CSMG a consultant to Ofcom UK wrote in November 2008 a report on PMSE uses and future expectations and many manufacturers were interviewed (herewith attached)



CSMG consult to
Ofcom on PWMS 090:

Question 3:

We need to know the statistics of life cycles/price levels for each categories.

For most users, from theaters, broadcasters, rental companies, etc. they work with RM till they really die. Life cycles of these professional tools commonly are more than 10 years, in average 15 years.

Only a very limited portion of the market frequently (less than 5 years) changes equipment.

A mid-scale theatre will invest about 150.000 – 200.000€. A larger theatre will have invested about 300.000€. For Germany it concerns 2 billion euros of equipment in theatres only.

Question 4:

Get advice from you on where you believe the EU should be going to assuming that there will be an increasing use of the UHF for mobile BB (a "status quo" request is not tenable for us/for you).

As more countries took decisions on the digital dividend, to provide for mobile BB to access the UHF, available frequencies for RM and IEM are getting scattered all over the bands in interleaved spectrum (TV band white spaces).

This threatens the quality and consistency which is needed for live performances in particular for Europe-wide coverage of live performance productions touring to festivals, theatres, etcetera. European harmonized frequencies for (semi) professional use for at least one or two TV channels, would be beneficial for ENG teams and is necessary for international operating companies and artists. The EU should therefore strongly encourage Member States to coordinate one or two TV channels for cultural purposes with nationwide coverage for RM and IEM.

The losses of UHF could be compensated through alternative bands such as easy access to VHF, L band, 1785 till 1805 MHz, etc.


The industry is and will be further disrupted: investments have to be made and Member States should be encouraged by the EU to take into account costs occurring to the industry following from the digital dividend in fact costs should be compensated.

In future plans and programmes on spectrum the consequences for our industry and PMSE use in general should be taken into account. It is therefore advisable to facilitate through ETSI and CEPT, when necessary, in-depth and comprehensive research.

Finally in view of international developments, with imported touring productions, an overfragmented use of the UHF such as for touring live productions, is detrimental for the competitiveness of the EU. Touring productions will avoid Europe if they cannot benefit of a certain extent of harmonised frequencies.

We remain at your disposal to provide further information and input.

Yours sincerely

A handwritten signature in black ink, appearing to read 'Anita Debaere', written in a cursive style.

Anita Debaere

Director