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**APWPT's Comments on the Draft RSPG Opinion on Strategic Challenges
facing Europe in addressing the Growing Spectrum Demand for Wireless
Broadband**

by

APWPT, the Association of Professional Wireless Production Technologies, is pleased to submit the following comments in the above-mentioned proceeding. APWPT is an international non-profit organisation, which is representing the needs of all kind of users of the Programme Making & Special Event ("PMSE") sector. Members of APWPT include PMSE organisations, users and manufacturers. The APWPT directly and indirectly represents far over 25,000 members of the PMSE community in Europe and beyond. APWPT is closely involved in PMSE regulatory matter, such as CEPT's FM 51.

PMSE is crucial on a daily basis for the production of content that has received worldwide acclaim and continues to attract a global audience. A vast array of organisations are reliant on radio spectrum for the production of content for Performing Arts, Broadcasting, News Gathering, Independent Film and TV Production, Corporate Events, Concerts, Night Venues, Sports Events, Churches, etc. In addition, other sectors that utilise

the current UHF spectrum include the Health Service, Education, Local Government, Political Programming and Conferencing.

APWPT welcomes the intention of RSPG to develop proposals for a long-term use of the different frequency ranges. All users and equipment manufacturers need long-term planning certainty and this draft is therefore a step into the right direction. However, the focus on the demands of the mobile (broadband) industry is lopsided and detached from the market realities. APWPT therefore demands a further study which covers the physical, technical and economic framework for each relevant frequency band, its current users and the demands of the PMSE users in particular.

Moreover,

RSPG also does not appropriately consider the actual impact on the current PMSE users in the affected frequency bands.

1. Forecast for Mobile Use is declining

Although the Visual Networking Index (VNI) 2013¹ is declining for the first time, the RSPG holds too firmly to the growth forecasts for the mobile data traffic. New studies on data traffic demand growth is necessary.

This prediction is supported by Analysis Mason-already in 2010 that

*"Smartphones can and do generate a lot of traffic (measured in gigabytes not megabytes), but that the greatest and growing proportion (probably between 80% and 90%) of this traffic is routed over Wi-Fi and fixed broadband networks because most of it is generated indoors. The volume of smartphone data that is actually routed over the (local; remark APWPT) cellular network is growing very fast, and 100% growth per year is not an unreasonable guess. However, increases in device penetration accounts for more of this growth than any increase in average usage, and in absolute terms the traffic volume remains tiny compared with that of large-screen mobile broadband. Only in the most-advanced markets is it approaching 10% of total data. Generally, it is nearer 5%. This proportion will grow, but not nearly enough to make total mobile data traffic double."*²

A further study ascertain the fact

*"4G LTE is a must-have but won't be enough to restore pricing power in European mobile industry - Telecoms industry faces revenue decline of -1.8% through to 2016"*³

In most events/festivals WiFi (local area network) is created in the event to support smartphone/attendees data traffic/demand. Because of the smaller cell size the data capacity is much higher than that of an IMT (wide area network) cell. APWPT found a practical implementation concept for large WiFi (local area network) in Germany⁴.

RSPG must recognize that it will not be possible to satisfy the unrealistic forecast data growth only by allocating additional frequencies. A lot of different surveys contain sufficient evidence that even providing the whole UHF-Spectrum for mobile broadband would not be sufficient to fulfil the expected demand for mobile communications⁵.

¹ http://www.cisco.com/en/US/netsol/ns827/networking_solutions_sub_solution.html#~forecast

² The mobile data explosion: myths and reality, <http://www.analysismason.com/About-Us/News/Insight/The-mobile-data-explosion-myths-and-reality/#11%20November%202010>

³ Arthur D. Little: 4G – going faster, but where? http://www.adlittle.com/downloads/tx_adlre-ports/Arthur_D_Little_Exane_Study_Executive_Summary_2013.pdf

⁴ Leverkusener Anzeiger, Volle Vernetzung in der BayArena, <http://www.ksta.de/stadt-leverkusen/bayer-04-volle-vernetzung-in-der-bayarena,15189132,22335934.html>

⁵ Europe's telcos must aim for €17 LTE data ARPU to stop revenue slide, <http://www.totaltele.com/view.aspx?ID=480648&G=1&C=1&Page=0>

It is often overlooked that one of the drivers for video data growth of the internet is pornography⁶. Sebastian Anthony has proven how much data is absorbed by this content. Should we release that much of frequency capacity to accommodate such data content in wide area networks?

The RSPG consultation document is based on the false assumption that more spectrum for mobile broadband will automatically lead to economic growth. There is still no evidence for such a causal connection. It speaks volumes against that in the current economic crisis in several EU Member States neither national governments nor the European Commission have proposed to award frequencies for mobile broadband to resolve the crisis. More consolidations and mergers in the wireless market, such as recently in Spain and Austria, are very likely. In fact, the hype about frequencies for mobile applications could lead to a similar scenario as the hype about the EU Emission Certificates and Climate Change, where the prices for a ton of CO₂ have plummeted from €20 to 2.6 largely due to unreasonable expectations of economic growth. This experience should not be repeated. Only a well-balanced approach, taking into account the demands of all players (including the PMSE users) will avoid this market-failure.

APWPT proposes again to carry out an overall survey which also acknowledges the needs of all users of spectrum and without preferring the users of mobile broadband.

2. Wireless Use of the Spectrum is currently not efficient

In almost all EU Member States the mobile operators already dispose of enough frequencies to IMT to satisfy the increasing demand for mobile data.

Analysis Mason has indicated in the Kürner/Reimers study that LTE may lead to "*excess capacity. Mobile broadband demand is slowing and home smartphone data has been all but lost to the fixed operator. Excess capacity could drive another major devaluation of the value of transporting a byte. As a result, operators may be driven to offer huge, inexpensive data plans for mobile broadband not by any intrinsic demand for the service (average usage currently shows no growth at all), but simply by the need to get some kind of return on investment.*"⁷

⁶ Just how big are porn sites? <http://www.extremetech.com/computing/123929-just-how-big-are-porn-sites>

⁷ Kürner/Reimers et. al. A study of future spectrum requirements for terrestrial TV and mobile services and other radio applications in the 470-790 MHz frequency band, including an evaluation of the options for sharing frequency use from a number of socioeconomic and frequency technology perspectives, particularly in the 694-790 MHz frequency sub-band, Pages 20 and 21. <http://www.bmwi.de/English/Navigation/Service/publications,did=556500.html>

Therefore, before taking further action on the EU level to allocate additional spectrum for mobile operators, all mobile operators must be required to use the already allocated spectrum efficiently for their much hyped cutting-edge applications like LTE in all their networks and condense their networks to a smaller cell structure.

RSPG's consultation conveys the impression to award the UHF TV band spectrum for mobile broadband is a necessity due to physical and technical reasons. RSPG does not consider that many other alternative bands can be used for mobile communications. Instead, the RSPG solely focuses on the UHF TV band spectrum arguing that this spectrum allows to build up the networks cost-effectively in order to recoup investments quickly. However, this approach disregards

that the business situation of the mobile industry worldwide is dire and its access to financial resources is limited to say the least. The market value and EBITDA of nearly all operators is decreasing due to the lack of new business models⁸.

The investors and the mobile operators are thus very reluctant to bid for additional spectrum, which would require significant additional investments to build up the network infrastructure.

One recent indicator is the much-criticized plan of Deutsche Telekom AG to impose data caps on their very popular wired (DSL) internet access for heavy users among their approximately 12 million customers because its data business is not sufficiently profitable.

A study by Arthur D Little and Exane BNP Parisbas provides detailed information on the predictions of economic benefits from LTE/4G to IMT providers.

APWPT demands a study which covers the physical, technical and economic framework for each frequency band without a unilaterally alignment with IMT wide area mobile broadband.

3. The PMSE Demands for Spectrum are not Unreasonable

Focusing only to identify more frequencies for mobile broadband blocks the view on the spectrum demands for other applications. A lot of this demand is created by PMSE.

APWPT acknowledges that RSPG has recognised that PMSE needs spectrum for its different applications. However, neither RSPG nor the EU-Commission have developed a solution for the PMSE demands in the nearer and longer future.

⁸ Haucap/ Heimeshoff, Frequenzverlängerung des 900- und 1800-MHz-Spektrums: Verfahren der Bundesnetzagentur zu Bedarfsermittlung und Vergabeform - wissenschaftliches Gutachten im Auftrag des VATM e.V. Page 4 ff (<http://www.vatm.de/uploads/media/2013-03-21.pdf>)

Instead, it seems that that RSPG still hopes to find appropriate spectrum for PMSE somehow in the on-going process. The APWPT gains the impression that many decision makers are using PMSE in their daily business and lives without thinking that wireless microphones demand clean spectrum, which can only work properly in a small range of spectrum bands. They all expect a clear transmission of voice and data for PMSE and of course no harmful interferences. They set aside the PMSE spectrum demands but at the same time want to rely on PMSE applications, such as wireless microphones.

Until the WRC 15 will occur, the RSPG should urgently focus on the primary status and/ or a long term secured operation of PMSE [?] and the cornerstones for a further usage of PMSE which are:

- **Quality spectrum:** no harmful interference on PMSE, no or very little man-made noise, same access rules for all secondary users.

A study on behalf of the German Federal Ministry of Economics and Technology summarizes this demand as follows:

*"PMSE devices require an interference-free spectrum without interfering signals and man-made noise. As PMSE systems are primarily used at live events, interference with a single transmission path can result in the complete failure of the event. The ISM bands (Industrial, Scientific and Medical), SRD bands (Short Range Devices) and also the duplex gaps between downlink and uplink in the mobile communications range are unsuitable in most cases due to the potential for interfering signals. Meanwhile, all frequencies below the UHF band, including the VHF band, are still virtually unusable for PMSE devices due to man-made noise."*⁹

- **Reasonable amount of spectrum reserved for PMSE:** for daily productions, for special events, for large-scale productions and for further developments.

The Kürner/Reimers study mentioned above comes to the following conclusions¹⁰:

"The following overview illustrates how many PMSE channels are typically used for various events.

- *Up to 50 PMSE channels are required for standard uses, e.g. for theatrical productions, musicals, concerts and conferences, as well as in universities, churches, hotels, schools etc., for example:*

o Hanover Opera House 32 UHF PMSE channels

⁹ Kürner/Reimers et. al. A study of future spectrum requirements for terrestrial TV and mobile services and other radio applications in the 470-790 MHz frequency band, including an evaluation of the options for sharing frequency use from a number of socioeconomic and frequency technology perspectives, particularly in the 694-790 MHz frequency sub-band, Pages 20 and 21. <http://www.bmwi.de/English/Navigation/Service/publications,did=556500.html>

¹⁰ Kürner/Reimers, Pages 16 and 17.

o TU Braunschweig: 32 UHF PMSE channels (in 2010)

- *For large-scale events, such as TV, film and show productions or very large musical and theatrical productions, approximately 50 to 150 PMSE channels may be used.*
 - *Hanover Theatre: 62 PMSE channels*
 - *Musicals - "Mama Mia" or "The Lion King": 60 and 82 PMSE channels respectively*
- *For extremely large events, more than 150 PMSE channels are used, for example:*
 - *State parliament elections in Hanover, 2008: 380 channels*
 - *State election in Hamburg, 2008: 309 channels*
 - *Eurovision Song Contest 2011: 212 channels were coordinated.*

According to the spectrum-usage recordings taken by the DKE (the German Commission for Electrical, Electronic & Information Technologies of DIN and VDE), during the event, the maximum number of channels operating simultaneously at any one time was 126. Almost the entire UHF band from 470 – 790 MHz was occupied by PMSE systems – with the exception of those channels occupied by DVB-T transmissions.

- *Olympic Games in Sydney: over 800 channels*
- *Olympic Games 2012 in London: 248.3 MHz of spectrum in the UHF band was used for PMSE systems. A total of 6,052 wireless microphones and 1,468 in-ear monitoring systems were used during the Games.*

PMSE devices are also used in many public, government-funded institutions serving the public good in the spheres of science, education, culture and the arts.

A study by the University of Hanover calculated a daily requirement of 96 MHz for PMSE devices, based on an urban scenario in the centre of Berlin.

Overall, spectrum usage for PMSE applications is on the rise. The bandwidth of a PMSE audio channel is, with very few exceptions, 200 kHz, regardless of the technology used.

The APWPT fully supports these findings and hopes that the RSPG will duly and timely consider this expert opinion. These requirements only can be met within the remaining UHF-TV band Spectrum between 470-790 MHz and 1452-1518 MHz. Each restriction in these bands will have direct effects on the PMSE usage. Therefore, The APWPT asks RSPG to determine these effects in detail to make clear, which applications are affected and where they should operate in the future, and to remedy any negative effect these applications may have on PMSE.

4. Additional Concrete Proposals and Suggestions of the APWPT

Page 3: The Commission, the Council and the European Parliament still follow the objective to allocate a minimum of 1200 MHz for wireless broadband and to extend it in the period 2015-2020. These objectives need to be revisited and redefined to include the PMSE demands.

It is thus necessary to restrict the spectrum demands for wireless broadband and other different applications in favour of PMSE. After this happens, the RSPG should put out a revised frequency plan for further public consultation with all stakeholders.

Page 5: The Joint Task Group 4-5-6-7 is currently evaluating technical studies for the use of the 700 MHz-band for mobile services and the broadcasting service. It has to be clear that this study must include also PMSE because the UHF spectrum is the core band for these applications.

Studies on the compatibility between PMSE and LTE indicate that LTE is interfering with PMSE applications.¹¹ This has to be taken into account before the RSPG will be able to determine the duplex gaps as alternative spectrum.

Page 6: CEPT has decided to allow administrations to use parts of the 1452-1492 MHz band for other usage such as broadband. This would allow partly allocating spectrum for PMSE to compensate PMSE for any loss of the 800 MHz band.

Page 7: In several Member States mobile broadband is playing an important role for broadband access. However, the RPSG must consider in this context that mobile broadband will always be very limited as a tool to deliver high-speed applications as the usable spectrum has to be shared by all users.

If the EU really wants to ensure reliable high-speed usage for consumers, only a wired (fibre) connection will be able to keep these promises.

Alternatively, wireless broadband is only feasible if the cells are small - in areas of high user density (airports, train stations, hotels, conference centers, meeting points etc.). This service will only be profitable if there will be a permanent high use. In addition, wireless broadband will be no solution for rural areas and will call for huge investments that no provider will be able to finance.

¹¹ <http://www.apwpt.org/downloads/lte-interference-potential-to-micros30062012.pdf>

Page 8: RSPG explains that CEPT studies have shown that frequency bands with a limited maximum of bandwidth of 20 MHz are not attractive for manufactures to develop equipment. Examples given in this context are 1900-1920 MHz and 2010-2025. Rejecting this spectrum by mobile operators indicates that pressure of additional spectrum seems to be low. Even taking into account that LTE is a standard which allows operating in different bands.

PMSE manufactures would need to develop equipment for 20-30 MHz spectrum gaps, if the high quality spectrum use would be guaranteed for a long time.

RSPG is describing the expectations of the end-use for higher video quality. RSPG does not take into account that viewers also expect a higher quality for a better sound like HD-Sound. This increases the demand for spectrum.

Page 9: RSPG recognizes that only a significantly revised and more granular cellular structure would be a long term solution for mobile broadband. Despite of this fact, the EU sticks to awarding the UHF-TV band spectrum to IMT.

There is a trend in the mobile industry to higher frequencies as they allow smaller cells rather than to lower frequencies (capacity). This also explains why spectrum users like Deutsche Telekom AG invest into LTE above 1GHz rather than into auctioned frequencies below.

RSPG describes the trend to time-shifted television without drawing the consequences. The already quoted Kürner/Reimers study¹² describes how the authors have developed different solutions for this scenario which are less spectrum consuming.

Page 10: RSPG recognizes that only new technologies will enable an increasing number of users to be satisfied by the same amount of spectrum as today. Against this background it will not be acceptable to award UHF TV band frequencies to mobile broadband as one of the important PMSE spectrum now and damaging its applications. As APWPT has stated at various occasions these applications have successfully made headway, created many jobs, and are growing steadily¹³.

RSPG acknowledges that the demand for spectrum differs from country to country. This depends on the broadcasting system and the political, social and cultural activities. Offering any one-fits - all solution for IMT mobile broadband leads to an unnecessary

¹² Kürner/Reimers et. al. A study of future spectrum requirements for terrestrial TV and mobile services and other radio applications in the 470-790 MHz frequency band, including an evaluation of the options for sharing frequency use from a number of socioeconomic and frequency technology perspectives, particularly in the 694-790 MHz frequency sub-band, Pages 20 and 21. <http://www.bmwi.de/English/Navigation/Service/publications,did=556500.html>

¹³ <http://www.apwpt.org/downloads/studysocialeconomicbenefitmarch2013.pdf>

waste of valuable spectrum resources, especially in countries without high wireless broadband demands.

Page 11: RSPG recognizes the economies of scale by harmonizing the bands. However, this is not only the case for IMT wireless broadband equipment but even more for PMSE. Therefore this argument does not stand muster to prove that using the 700 MHz spectrum for IMT wireless broadband, while disregarding PMSE demands, is the right path to go.

Pages 12/13: RSPG describes that spectrum in the 3,400 MHz range and above has been awarded but is not yet in use. Another example is the situation in Ireland. This scenario should lead to rethink the objective to award 1200 MHz to IMT wireless broadband and similar applications because there is obviously no sufficient demand for it.

Page 14: PMSE and military applications are used to share spectrum for a long time. RSPG should investigate carefully all options whether this shared use especially in the UHF spectrum is still warranted.

Page 15: The convergence of services in the TV business does not automatically lead to investments in new TV sets. Consumers are evaluating very carefully what the benefits of the new technologies are and are cautious before they buy new receivers.

The situation for IMT is different: In many cases, the user does not pay for the mobile device directly. He gets the device along with the contract with the operator. At least when the contract expires the consumer has the opportunity to acquire a new device, which may use a different spectrum and standard as the device held before.

Page 17: RSPG indicates that the use of the frequency band 1492-1518 MHz would allow for a possible further extension of the band 1452-1492 MHz by a further 25 MHz. Due to the loss of the 800 MHz band these frequencies have been designated to PMSE as compensation. Now the spectrum shall be used for mobile broadband?

Relying on the announcement to award the frequencies between 1492-1518 MHz to PMSE, PMSE manufactures invested millions of Euros to develop equipment. These investments seem to be useless if the RSPG goes ahead with this plan to allocate the band to IMT streaming.

Page 22 et seq.: RSPG notes many assumptions to the further development of mobile broadband. Unfortunately RSPG disregards the situation of PMSE and the negative consequences on PMSE if the UHF TV band spectrum would be awarded to IMT mobile broadband operators.

It is still time to take countermeasures to balance the demand for mobile broadband and to secure the spectrum for PMSE. The APWPT would be pleased to enter into a dialogue with the RSPG to find appropriate and feasible solutions.

Respectfully submitted by

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