



Comments on the draft RSPG Opinion on
"Strategic Challenges facing Europe in addressing the Growing
Spectrum Demand for Wireless Broadband"

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About GSMA

The GSMA represents the interests of mobile operators worldwide. Spanning more than 220 countries, the GSMA unites nearly 800 of the world's mobile operators, as well as more than 200 companies in the broader mobile ecosystem, including handset makers, software companies, equipment providers, Internet companies, and media and entertainment organisations. The GSMA also produces industry-leading events such as the Mobile World Congress and Mobile Asia Congress. For more information, please visit Mobile World Live, the online portal for the mobile communications industry, at www.mobileworldlive.com or the GSMA corporate website at <http://www.gsmworld.com>.

In the European Union, GSMA Europe represents over 100 operators providing more than 600 million subscriber connections across the region. www.gsmworld.com/gsma_europe



Introduction

In response to the public consultation on the draft RSPG Opinion on "Strategic Challenges facing Europe in addressing the Growing Spectrum Demand for Wireless Broadband", the GSMA would like to suggest a list of suitable frequency ranges for consideration by the RSPG. This view has been reached in discussion with our operator members globally, and has been submitted to the ITU World Radio communication Conference 15 process. The list of frequency ranges proposed by the GSMA does not include spectrum below 450 MHz and above 5/6 GHz. This does not exclude the potential usefulness of such bands, but the current view of the GSMA is that bands below 450 MHz may be difficult to use because of the impact on terminal size to ensure efficient antennas. The bands above 5/6 GHz are likely to prove most suitable for enhanced local access services. However it is the GSMA's view that bands below 5 GHz are likely to be most useful for the wide-area mobile services that are currently used for some six billion connections globally. It is such commercial services that will be the main mechanism for delivering broadband globally.

In coming to the view on the proposed list of bands to be considered, the GSMA has taken a number of factors into account. One factor is to identify bands that can help promote the wider availability of mobile broadband to consumers globally. A major enabler for this will be driving down device costs via global or regional economies of scale. Such economies of scale have enabled WCDMA/HSPA to pass the one billion connections mark globally. This was facilitated through widely available IMT capacity bands such as 2 GHz and 2.6 GHz in conjunction with coverage bands such as below 1 GHz.

It is also important to recognise that new technologies such as IMT-Advanced work better with wider channel bandwidths, and that many countries will want to ensure spectrum for multiple operators. It must also be borne in mind that the number of bands that can be accommodated in a device are limited. To make it economically viable to include extra RF bands, consideration must be given to the extra utility added. This suggests that new IMT bands should be a minimum of around 100 MHz (or more if possible). An exception to this might be where new bands are adjacent to existing IMT identifications, or help use existing IMT spectrum more efficiently.

Factors in assessing the suitability of bands

There are a number of issues that should be considered with regards to suitability of bands for mobile broadband. The GSMA would like to propose the list below:

1. The needs of developing nations should be taken into account, such as the need for economic/cost effective services for a wide range of user densities and coverage areas (such as rural).
2. The ability to deliver international harmonisation to reduce device costs.
3. The ability of bands to provide coverage and capacity (accepting that these terms need further discussion) as well as very high bit rates.
4. The technical suitability – factors such as the availability and feasibility of required RF components within the required time frame. Also that bands should be (ideally) contiguous and of sufficient bandwidth to allow IMT-Advanced systems to operate optimally.

The GSMA suggests that candidate bands be selected from the frequency ranges suggested here namely:



- **UHF (470-694 MHz);**
- **L Band (1 300-1 527 MHz – excluding 1400 – 1427 MHz);**
- **2.7-2.9 GHz; and**
- **C Band (3.6-4.2 GHz).**

470-694¹ MHz (UHF)

Coverage

The GSMA suggests that this is a suitable frequency range. The attractiveness of this band for coverage for terrestrial IMT is very high. Compared with core IMT spectrum at 2 GHz, spectrum at 1 GHz might have 6 dB link budget advantages. This would mean that in areas of low user densities the number of cells required purely for coverage would be far less than required at 2 GHz. This will also be a major advantage to countries with large rural areas.²

Global harmonisation – Low cost devices

This will depend on the ability for common bands to be identified globally (i.e. in all ITU Region). In Region 3 the entire band is "MOBILE" co-primary and has been so for many years. Whilst there are terrestrial TV services in many countries, this should not preclude those administrations that wish to, to deploy IMT terrestrial services. In fact IMT has been deployed in these bands (adjacent to terrestrial TV) in a number of countries (including Europe and the US).

It would therefore seem that there is substantial scope for global harmonisation of new mobile spectrum identified for IMT within the UHF band.

Technical suitability

If spectrum were to be allocated to mobile on a co-primary basis (and identified for IMT) from the upper edge of this band, that would seem to have a high degree of technical suitability. It would be adjacent to existing IMT deployments, which is a strong indication that engineering challenges can be met within this band. The other element that would affect technical suitability is the amount of contiguous spectrum allocated. We have seen from deployments already in UHF that bandwidth of 2 x 30 to 2 x 45 MHz are realisable. This might suggest a figure of around 100 MHz might be a reasonable value to meet technical suitability criteria.

Ability to offer very high bit rates

Whilst in theory any frequency band (of sufficient size) could offer high bit rates, it is clear the relative scarcity of UHF makes it very unlikely that this band would in practice be used for very high bit rates.

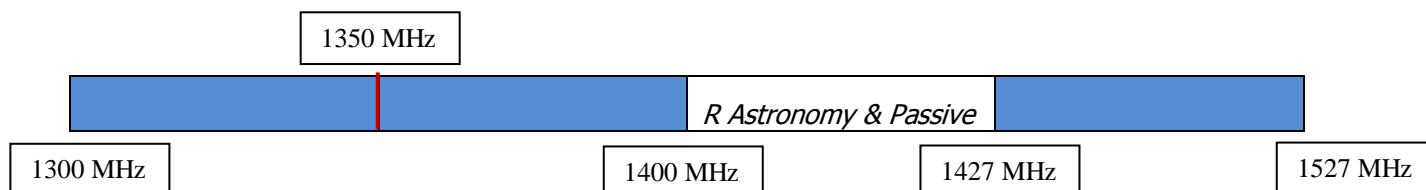
¹ Noting ITU RESOLUTION 232 [COM5/10] (WRC 12) for Region 1.

² See ITU-R Report M.2074 figure 8 for more information on frequency vs. site density.



L band

The GSMA believes that the band 1 300 to 1 527 MHz should be a candidate band, but noting 1 400-1 427 MHz may need to be protected.



Global Harmonisation – Low cost devices

This band is highly attractive from this point of view because at its core the 1 452-1 492 MHz band is allocated to broadcasting (T-DAB and S-DAB) with very little deployment. Late 2010, CEPT decided to undertake a review of the use of the L-band with the aim to change the current situation and enable the use of those 40 MHz for new services and applications that could bring substantial social and economic benefits for Europe. CEPT finalised its work mid 2012 with the conclusion that the most appropriate regulatory framework for the future use of the 1 452-1 492 MHz band in CEPT is the harmonisation of this band for mobile broadband / mobile supplemental downlink, while allowing individual countries to adapt to specific national circumstances. This band is also attractive because the 3GPP standards for FDD arrangements have been already available, which are specified as Band 11 (1 427.9-1 447.9 MHz/1 475.9-1 495.9 MHz) and Band 21 (1 447.9-1 462.9 MHz/1 495.9-1 510.9 MHz). In these bands, UMTS (Universal Mobile Telecommunications System) and LTE (Long Term Evolution) technologies are supported, and mobile terminals supporting these bands have been already commercially available. The band (1 427 to 1 525 MHz) is also co-primary mobile in all regions. The band 1350 to 1400 MHz is also co primary mobile in ITU Region 1 (which include EMEA).

The potential for this band to be widened out from its "core" 1452 to 1492 MHz of 40 MHz, would greatly add to the utility of this spectrum. It also seems to offer the possibility of widespread harmonisation globally.

Technical suitability

The feasibility of the band for RF components is clear due to the existence of higher frequency deployments. The suggestion is for a band of at least 100 MHz being made available for IMT terrestrial, which would be compatible with the technology trend for wider bandwidths for OFDM IMT deployments.

Capacity/Coverage

Whilst this band is probably not primarily a coverage band, it may offer some significant advantages over higher bands in certain locations. However it would be a valuable capacity band that could augment higher data rates in low user density areas.

2.7 to 2.9 GHz

The main strengths of this band would seem to be, its use for capacity, its technical suitability (being adjacent to an existing IMT band and size). It currently has a primary allocation for aeronautical radio-navigation. This would not be a coverage band, but would score well on:



Technical suitability

In terms of RF component availability, the fact that it is very close to the existing 2.5/2.6 GHz IMT band seems to indicate that this band would rank high on such a technical suitability. The size of the band at 200 MHz lends itself well to wider bandwidths preferred by new IMT technologies.

Global harmonisation and low cost devices

The use of the band for aeronautical radar on a primary basis globally gives rise to the possibility to get a de facto globally harmonised band (noting that there will always be exceptions). Although previous sharing studies noted the difficulty of sharing and large exclusion zones, more information is now available than in 2006. This is because of large scale investigations to deploy IMT in the 2.5/2.6 GHz bands (3GPP band 7). This has shown that perhaps assumptions made before were worst case, and that radar characteristics may be better than assumed in the work for WRC-07. There have also been a number of developments in IMT technology that may make sharing easier. The other major factor is the possibility to segment this band. This may give IMT access to a significant portion of this band. Such harmonisation can lead to low cost devices. We also note that studies have been undertaken by the Commission that seem to indicate that in many countries this band is lightly used.

Capacity

This band would be suitable as a capacity band for IMT because of its higher frequency range allowing for smaller cells in urban areas.

Ability to offer very high bit rates

Whilst in theory any frequency band (of sufficient size) could offer high bit rates, the relative scarcity of this band may not always make it suitable for very high bit rates.

3.4 GHz to 4.2 GHz

The ability to deliver global harmonisation to reduce device costs

Parts of these bands are already identified for IMT, specifically in Europe, but also a number of countries in Region 3, such as India and China (3.4 to 3.6 GHz). Parts of these bands were awarded for WiMax services in some countries in Region 2 (3.4-3.6 GHz). That suggests it may be feasible to allow IMT in these bands – where WiMax was previously deployed.

A number of countries have made submissions to WP 5D suggesting this band (or parts of) is a suitable frequency range/candidate band. The EU's Radio Spectrum Policy Programme specifies that EU member states should make the band 3.4-3.8 GHz available for wireless broadband. Whilst it is clear that some countries will require parts of this band for FSS, the size of this band (800 MHz) gives rise to the possibility of band segmentation, as well as revisiting sharing studies that were done for WRC-07, in light of the new conditions for sharing already addressed in the 2.7-2.9 GHz section above.

The potential for such widespread availability of this band could give very large scope for low cost devices.

Capacity

The potential size of this band and the higher frequency band makes this an ideal capacity band. The availability of such capacity bands in the time frame of the year 2020 will be needed in the fastest developing IMT markets. Other markets will follow depending on the availability of low cost devices and the award of spectrum.



Ability to offer very high bit rates

As has been noted in the paper, there is an overlap between capacity and the ability to offer very high bit rates.

The technical suitability

The availability of RF components in the required time frame will be aided by the development of deployments in 2.5 to 2.6 GHz. There have also been some limited deployments in the 3.4 to 3.6 GHz band of operators migrating from early WiMax to LTE/IMT. This supports the conclusion that this is a technically suitable band for IMT.

Shared Spectrum Access & Licensed Exempt Spectrum

The GSMA welcomes the fact that the RSPG is currently developing an opinion on Licensed Shared Access (LSA), to which we hope to comment through public consultation.

The GSMA is aware that several definitions of LSA are currently under consideration. The GSMA is in favour of a definition that identifies the LSA concept as an individual-license regime of a limited number of mobile network operator (MNO) licensees in a frequency band that is identified for IMT, and which is already assigned to other incumbent users whose spectrum rights of use have not been granted through an award procedure for commercial use, for which the additional users are allowed to use the spectrum (or part of the spectrum) in accordance with sharing rules included in the rights of use of spectrum granted to the licensees. A clear and well established definition would be welcome by the mobile industry to appropriately evaluate the concepts including the impact on innovation, investment and technology reliability. The GSMA is ready to contribute to the working groups defining the LSA concept. In this context there is a need to clarify on concerns regarding a too broad concept of spectrum sharing.

For mobile broadband spectrum, especially when it has been identified for IMT, a licensing regime based on well-defined exclusive access rights should be prioritised. Such exclusive access licensing ensures well-known benefits, such as a guarantee of quality of service, good interference management and a high degree of market certainty necessary to create adequate incentives for investment and innovation. In the context of the second, third and fourth generations of mobile networks (e.g., GSM or UMTS), the exclusive access regime has already demonstrated an ability to foster the development of innovative services such as mobile internet, among others services, while creating positive effects on investment, competitiveness, economic growth, job creation and social welfare.