UMTS Forum

Embracing the future

UMTS Forum key messages at WRC-15 on spectrum needs for tomorrow's mobile broadband services

Promoting mobile broadband evolution

W www.umts-forum.org T twitter.com/umtsforum

Introduction

For the past 15 years – since WRC-2000 – the UMTS Forum has made major contributions to the world of mobile communications, and in particular to the work within the structures of the International Telecommunication Union (ITU) on radio regulatory and spectrum aspects.

The mobile communications market has developed rapidly (see Figure 1), to the extent that there are now over 7.5 billion mobile subscriptions globally (including machine-to-machine (M2M)) – a total that represents some 3.7 billion unique mobile subscribers. What's more, the ITU forecasts that this global total of mobile connections will have virtually doubled to around 14 billion in 2025 (see Figure 2).

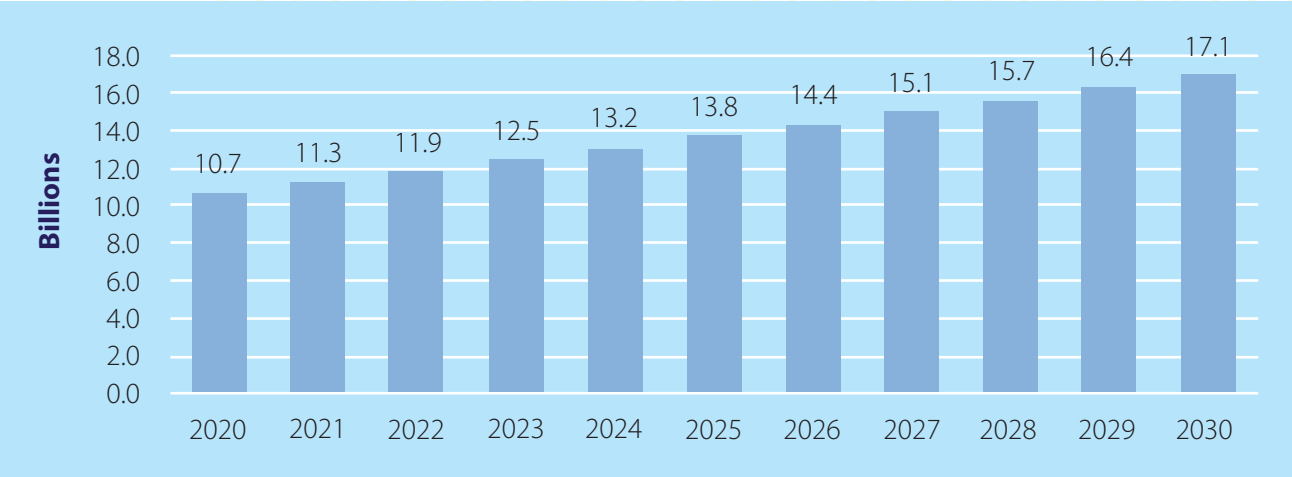
Similarly, the mobile broadband (MBB) market continues to evolve rapidly. 3G/4G subscriptions had reached 3.2 billion at the end of June 2015, while the user base of LTE subscriptions doubled in the year to June 2015, reaching more than 750 million – that's 10% of all mobile subscriptions.

Figure 1: Growth in global mobile cellular subscriptions
(Source: ITU-R Report M.2370 on IMT traffic estimates for the years 2020-2030, July 2015)

Number of subscriptions (millions)										
Years	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014***
Developed	992	1127	1243	1325	1383	1404	1411	1447	1490	1515
Developing	1213	1618	2125	2705	3257	3887	4453	4785	5171	5400
World	2205	2745	3368	4030	4640	5290	5863	6232	6662	6915

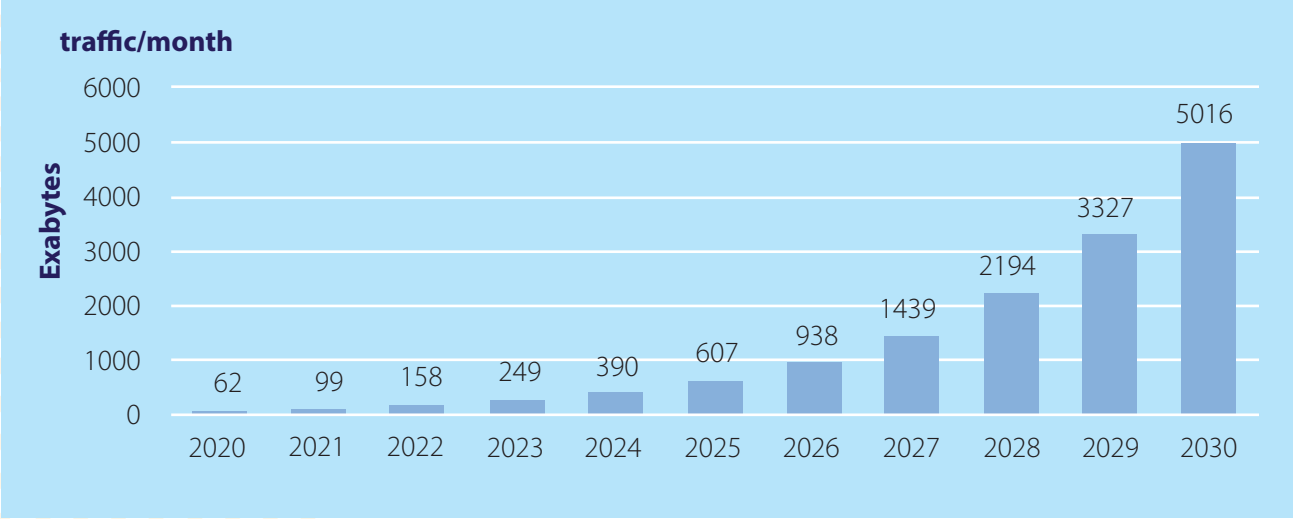
** projected figures at time of original forecast*

Figure 2: Estimation of global mobile subscriptions 2020-2030
(Source: ITU-R Report M.2370 on IMT traffic estimates for the years 2020-2030, July 2015)



In parallel with organic subscriber growth, mobile data and voice traffic has also continued to increase strongly – a trend that is forecast to continue over the coming decade and beyond (See Figure 3 overleaf). In the first quarter of 2015, traffic was 55% higher than the previous year's corresponding quarter.

Figure 3: Estimation of global mobile traffic 2020-2030 (M2M traffic included)
(Source: ITU-R Report M.2370 on IMT traffic estimates for the years 2020-2030, July 2015)



MBB continues to shape the way we live. And in many ways we are just at the beginning of a new era of advanced MBB communications. Reflecting this change, the interest of the UMTS Forum has evolved from addressing 'traditional' mobile voice communication to a rich world of connected apps, streaming video, social media platforms – and now also M2M communications and the Internet of Things.

By the first quarter of 2015, smartphones accounted for nearly 75% of all mobile phone sales worldwide – up on the corresponding 2014 figure of 65%. Similarly, the number of mobile broadband subscriptions is growing by around 30% year-on-year, increasing by approximately 150 million in the first quarter of 2015 alone.

MBB systems are without doubt providing the infrastructure and services driving future growth, while contributing positively to the economic and social developments of both developed and developing countries. The countries with such innovative and advanced MBB infrastructure will be the ones to reap the full benefits from its connected people, businesses, education, and health services and applications. Moreover, the recent spread of smart devices now places even greater emphasis on the migration from voice-centric networks to MBB. Unmatched by other communication industries, these positive influences provided through the mobile industry can be expressed in terms of empowerment of individual users in many countries, such as in Africa.

In addition, developments ranging from autonomous cars to remote monitoring, security and environmental matters as well as Industry 4.0[1] will all have a profound impact on national economies. We are no longer discussing the simple idea of isolated 'services' delivered by mobile networks. MBB is instrumental in a major shift in society, with many economies already reliant on such infrastructures for their efficient management.

It is therefore time to adopt a broader, more enlightened view of radio spectrum allocation. Spectrum for MBB systems, also known as IMT (International Mobile Telecommunication) must be seen as a core part of our societal structures, and we must prepare for the convergence towards an integrated communication structure, allowing several disciplines to be served by the most efficient communication network. Identifying a spectrum band for IMT is no longer simply responding to the needs of a specific application; it is much more about unleashing innovation, enabling a rich social life and economic growth.

The WRC has therefore one profound question to consider: rely on the comfort zone of the past – or actively embrace the future?

[1] https://en.wikipedia.org/wiki/Industry_4.0

Detailed views

Agenda Item 1.1 *(to consider additional spectrum allocations to the mobile service on a primary basis and identification of additional frequency bands for IMT and related regulatory provisions)*

Compared to the initial goals of the agenda item – to facilitate and respond to the growth of mobile broadband – the developments and the interpretations of results of the study cycle will now have to live up to the many expectations of people around the world. Should the conference choose to respond to the need of the 'future' by taking necessary and bold decisions, the development of MBB – and the corresponding economic development worldwide – will be allowed to flourish.

470-694 MHz (600 MHz). UHF is obviously the key band for rural coverage and indoor penetration as well as broadcast/broadband convergence, being essential to satisfy the many needs for machine-to-machine and sensor networks. There is also the opportunity for countries to embrace new audio-visual viewing behaviour by allowing mobile and broadcasting to jointly deliver both linear and on-demand audio-visual content in a complementary manner. The future-proof resolution is to decide on a co-primary broadcasting and mobile services allocation arrangement in this band at WRC-15.

In a future where we will see households both in urban and remote areas being connected to high speed mobile broadband, the use of the range 470-694 MHz for both audio-visual content reception for linear and on-demand fashion as well as mobile Internet is the optimal scenario.

Many countries are already moving in this direction, by allowing both mobile and broadcasting use in the 600 MHz band. In the US, incentive auctions will probably provide for use of the 600 MHz band for mobile broadband. In Europe, the Lamy Report calls for administrations to be given flexibility in the use of the band.

Adopting a co-primary mobile allocation for the range 470-694 MHz offers therefore the best possible way to provide flexibility for countries wishing to move forward.

The UMTS Forum invites countries to consider a new co-primary allocation to the mobile service for the bands in the range 470-694 MHz at WRC-15.

1427-1518 MHz (L-band). This band is already partially allocated to mobile, and is in use for mobile broadband services in some parts of the world, especially Japan. This range of spectrum would indeed benefit from being further and fully harmonised on a global basis by an allocation to the mobile service and identification to IMT. Today, a new technology approach – the supplemental downlink (SDL) – has created a paradigm, allowing countries to turn this range into a very attractive spectrum asset for mobile broadband services and applications, as well as providing for the efficient distribution of audio-visual content over mobile broadband.

In particular, as part of this range (the band 1452-1492 MHz) is already and widely harmonised for DAB high power broadcasting technologies, it is also possible to use high power transmission in this band for mobile broadband, in order to overlay cell sizes similar to the cell sizes below 1 GHz. The range 1427-1518 MHz will therefore be a prime candidate for carrier aggregation with frequencies below 1 GHz, providing increased mobile broadband data rates throughout the coverage of mobile broadband networks, particular in remote areas.

The UMTS Forum wishes to stress that mandatory limits should be avoided at the frequency 1427 MHz, as has been suggested by some countries.

The UMTS Forum invites countries to consider new mobile allocations as appropriate and IMT identifications for the bands in the range 1427-1518 MHz at WRC-15.

2700-2900 MHz (S-band). This band is adjacent to the 2500-2690 MHz band. It is therefore perfect for complementing existing MBB networks by reaping the benefit of using the same antenna and feeder system for cost efficient implementation, both for the infrastructure and mobile devices. There are some promising approaches under study related to the use of this band via band segmentation, in case the whole band cannot be allocated and identified for IMT.

The UMTS Forum invites countries to consider a new co-primary allocation to the mobile service and identification to IMT for the band 2700-2900 MHz at WRC-15.

3400-4200 MHz (C-band). This is the only candidate range providing sufficient bandwidth to satisfy the IMT-Advanced vision – i.e. to provide at least 80 MHz to 100 MHz contiguous bandwidths per service provider. Contiguous spectrum has unmatched benefits over carrier aggregation (CA). This candidate range will become the key to the future of advanced mobile broadband services and applications as traffic and the demand for higher data rates increase, particularly in urban and sub-urban areas.

The UMTS Forum has commissioned a number of satellite studies related to the C-band. The results of these show that supply of satellite transponder equivalents (TPEs) is generally flat from year 2015, with drop-offs bringing demand back down to year 2014 levels at the end of the studied period around years 2023-2024. The decline is pronounced in North America and Europe, suggesting that there is indeed an opportunity to share this range of spectrum.

Again, and to secure the transmission quality, C-band gateway Earth stations are typically located outside of city-centres. Countries could therefore consider a more efficient use of spectrum by allowing the use of mobile broadband services and applications in the C-band for city areas while using satellite services outside of those cities. That is to use the cost-efficient mobile broadband services and applications in cities mainly for individuals and households where it is most needed, while satellite services could be used in remote areas to provide necessary services, typically more for institutions.

The UMTS Forum invites countries to consider a new allocation to the mobile service for the bands in the range 3400-4200 MHz and identification to IMT for the bands in the range 3400-3800 MHz at WRC-15.

Agenda Item 1.2 *(to examine results of ITU-R studies on use of the frequency band 694-790 MHz for mobile)*

The 700 MHz band is now *de facto* the most harmonised MBB frequency band worldwide. Administrations must coordinate their efforts to make the band available on as wide a geographical footprint as possible.

It is important for spectrum emission limits – especially for terminals which are harmonised globally and cannot be tailor-made for each country – not to place an undue burden on implementation. IMT terminals generate little (or no) cross border interference, and do not transmit anything without a network operating in the band. As such, it is unacceptable that countries that do not have existing plans today to implement the 700 MHz band in their country are requesting unreasonably tight emission limits, when they are neither concerned nor impacted by the topic. Such requests have a negative impact on all countries that depend on the 700 MHz band to provide broadband connectivity to rural coverage.

The UMTS Forum stresses that adopting emission limits that have not been studied and accepted by mobile broadband SDOs would most likely prevent operation in the 700 MHz band and would ignore the common efforts in the ITU. Within that context, Out-Of-Band Emission (OOBE) limits below 694 MHz for terminals operating in the band 694-790 MHz of -42 dBm/(8 MHz) satisfy the CEPT requirements, while ensuring that no extra cost would result for the other regions such as APAC/CALA. This confirms that the implementation of this limit is compatible with common developments for those regions.

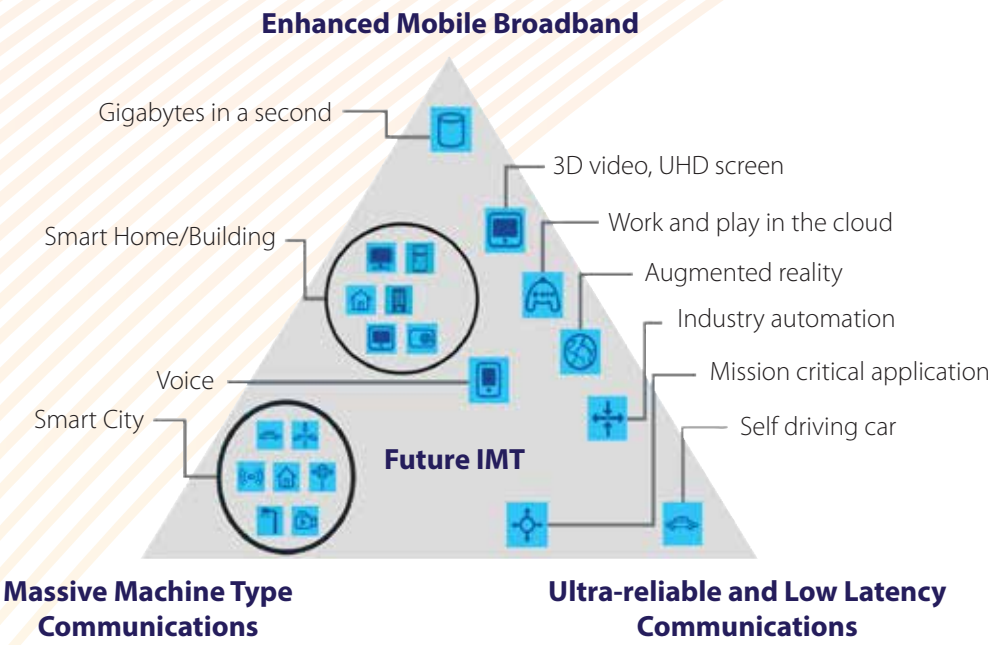
Agenda Item 10 *(recommended Agenda Items for WRC-19)*

The UMTS Forum supports an agenda item for WRC-19 on spectrum for 5G mobile systems, also known as IMT-2020[2]. Spectrum for 5G will enable many new very advanced services that will improve the life of people, especially those living in large cities of the world with a pressing need for advanced communication networks.

---

[2] To be confirmed by an appropriate ITU-R Resolution by the Radiocommunication Assembly 2015.

Figure 4: Usage Scenarios of IMT for 2020 and beyond
(Source: ITU-R Recommendation M.2083 on IMT Vision – "Framework and overall objectives of the future development of IMT for 2020 and beyond", September 2015)



It is foreseen that the first 5G system will be deployed on a commercialised basis by year 2020. Now is the time for ITU and recognised regional bodies to start to study and analyse 5G spectrum aspects. The first step of this process is for countries to decide on the respective Agenda Item for WRC-19, noting that studies of both centimetric and millimetric ranges are needed. This Agenda Item would facilitate detailed studies between WRC-15 and WRC-19 on the suitable and sufficient spectrum ranges/bands and the amount of spectrum bandwidth needed.

About the UMTS Forum

Mobile broadband is changing the way the world communicates. The UMTS Forum helps all players in this dynamic value chain understand and profit from the opportunities of 3G/4G LTE networks and their evolutions.

The UMTS Forum participates actively in the work of the ITU, EC, ETSI, 3GPP and CEPT as well as other technical and commercial organisations globally. It also contributes to the timely licensing and deployment of mobile broadband globally through regular dialogue with regulators and responses to public consultations.

The UMTS Forum supports the interests of its membership with a range of studies, reports and other outputs. Principal focus areas include markets trends, mobile broadband services and applications, key growth markets, spectrum & regulation, technology & implementation. A strong promotional voice is maintained via a high-profile presence at conferences, seminars and workshops as well as regular briefings to the media, analysts and other stakeholders.

Membership of the UMTS Forum draws together everyone with an interest in mobile broadband, including network operators, regulators and the manufacturers of network infrastructure and terminal equipment.

© The UMTS Forum 2015

The UMTS Forum,
10 St Bride Street
London
EC4A 4AD
United Kingdom

umts-forum.org
twitter.com/umtsforum
T: +44 20 7331 2020
E: umtsforum@btinternet.com