

Reprint

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Sony Ericsson



More frequencies needed for mobiles

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/// The background to the issue of mobile telecommunications' growing requirement for radio-frequency spectrum was covered in an article in the April 2007 edition of *ITU News*. Four years of intense preparations are now about to culminate at the World Radiocommunication Conference 2007 (WRC-07), which will "consider frequency-related matters for the future development of IMT-2000 and systems beyond IMT-2000" (agenda item 1.4).

The needs of IMT-2000 and more

To support the development of faster mobile services that are compatible worldwide, in 2000 ITU introduced a set of radio access interfaces known as International Mobile Telecommunications-2000 (IMT-2000), which is a global standard. Currently, there are five IMT-2000 terrestrial radio interfaces: IMT-2000 CDMA Direct Spread, IMT-2000 CDMA Multi-

Carrier, IMT-2000 CDMA TDD, IMT-2000 TDMA Single-Carrier, and IMT-2000 FDMA/TDMA, which are specified in Recommendation M.1457-6 of ITU's Radiocommunication Sector (ITU-R). There is also a proposal for a sixth terrestrial radio interface for IMT-2000, referred to as OFDMA TDD WMAN. This, along with the evolution of the existing radio interfaces, will be considered by the Radiocommunication Assembly that takes place in Geneva on 15–19 October, just before WRC-07.

The IMT-2000 radio technologies are expected to converge towards IMT-Advanced, supported by a common packet core network. This should be able to carry up to 100 Mbit/s for high-mobility services (such as mobile access) and up to approximately 1 Gbit/s for low-mobility services, such as nomadic/local wireless access, for deployment after 2010.



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To be able to operate these systems and deliver such bandwidth-intensive applications, sufficient spectrum will be needed. Existing, identified spectrum bands will not be able to carry the predicted traffic for IMT services after 2015.

Decisions needed now

The preparation process for world radiocommunication conferences involves all parties concerned, including the users of the spectrum, national administrations and regional groups. Since a conference results in updates to the ITU Radio Regulations that are treaty binding, there is a well-coordinated international effort to achieve the best results for everyone concerned. However, it can be a long process from the time of entry into force of a new edition of the Radio Regulations until the spectrum can actually be used.

The regional groups, such as the European Conference of Postal and Telecommunications Administrations (CEPT), the Inter-American Telecommunication Commission (CITEL) and the Asia-Pacific Telecommunity (APT), issue mandates and recommendations for use of the newly allocated spectrum, possibly following frequency arrangement Recommendations that need to be developed in ITU-R. After that, national administrations still need to issue the necessary regulatory standards and spectrum licences, relocating other users if necessary. Eventually, operators and end users are able to use the spectrum for wireless systems and applications.

Thus, from the time spectrum is allocated or identified at a conference, it may take up to 10 years to make it available to

users. For that reason, it is important that spectrum be allocated or identified well in advance of when it will be needed.

The perspective of mib

The Mobile Industry Backing Terrestrial Spectrum for IMT (known for short as "mib") is an industry group that has been preparing for WRC-07 agenda item 1.4, in collaboration with other industry forums and in support of work in ITU-R. Members of **mib** include Alcatel-Lucent, Ericsson, Fujitsu, Huawei, Motorola, NEC, Nokia, Nokia Siemens Networks, Nortel, Panasonic, Qualcomm, Samsung, Siemens, and ZTE.

A **mib** objective for WRC-07 is that, not only should sufficient spectrum be allocated to the mobile radiocommunication service, but also that it be identified for IMT in order to facilitate economies of scale and global roaming of mobile stations.

Another important issue for mib is that spectrum is identified at WRC-07 and a decision is not postponed to a future conference. This is critical, given the years it takes for spectrum to be made available following a WRC. Also, by providing a harmonized spectrum solution for IMT at WRC-07, unnecessary regional divergence can be avoided. As John Hoadley, Nortel Vice President of 4G Business and Ecosystem Development, has commented: "Early identification of spectrum enables wireless operators to plan an orderly growth of their networks with global roaming capabilities, resulting in significant benefits to the end users, including lower cost and advanced capabilities."

An ITU report (ITU-R M.2078) estimates that total spectrum bandwidth requirements will be up to 720 MHz by 2020,



including the bands currently in use for terrestrial wireless systems, and it will be a challenge to identify such spectrum. "ITU has laid a solid groundwork through its efforts to identify the spectrum requirements that will help bridge the digital divide and bring the benefits of mobile broadband to all," says Hank Menkes, CTO for Alcatel-Lucent's wireless business. "To ensure that all communities have sufficient access to mobile broadband services, there needs to be a consistent approach to spectrum allocation around the world to deliver the economies of scale needed to make broadband truly affordable. It is essential that WRC-07 balance the interests of new and incumbent users of spectrum with the need to support widespread availability of broadband services in every part of the world."

Connecting the unconnected by 2015

The Conference Preparatory Meeting (CPM) retained for consideration at WRC-07 the candidate bands identified by ITU-R:

410–430 MHz	2 300–2 400 MHz
450–470 MHz	2 700–2 900 MHz
470–806/862 MHz	3 400–4 200 MHz
	4 400–4 990 MHz.

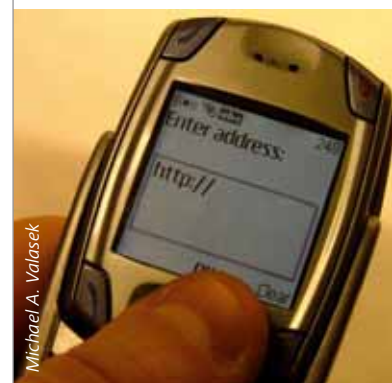
The advantages and disadvantages of each of these bands were described in the CPM-07 Report. This also outlines the methods for allocating spectrum for the future development of IMT-2000 and IMT-Advanced, which were highlighted in the article in the April edition of *ITU News*.

Spectrum-sharing studies are important and have resulted in various ITU-R reports, including those on sharing with geostationary satellite networks in the fixed-satellite service in the 3 400–4 200 MHz and 4 500–4 800 MHz bands (ITU-R M.1209); radiocommunication services in the 450–470 MHz band (ITU-R M.2110); radiocommunication services in the 3 400–3 700 MHz band (ITU-R M.2111), and airport surveillance radar and meteorological radar within the 2 700–2 900 MHz band (ITU-R M.2112).

New bands for IMT-Advanced should be globally common, wide enough to support carriers up to 100 MHz in bandwidth, and low enough in the spectrum (preferably below 5 GHz). A decision at WRC-07 would enable deployment within the 2015–2020 timeframe. "ITU has made world-changing, forward-looking decisions in the past... We look to WRC-07 to again provide that leadership and the positive decisions on IMT candidate bands, which are needed to facilitate the global development of the mobile Internet into the next decade," says Tero Ojanperä, CTO of Nokia.

According to **mib**, spectrum requirements for mobile communications will need to be met if ITU's vision of connecting the unconnected by 2015 is to be achieved.

Meanwhile, **mib** has conducted seminars and presentations in Asia, Africa, Europe and the Americas to elaborate in detail the rationale and needs for terrestrial spectrum for mobile services. These presentations, as well as further information, can be found on the **mib** website at: <http://standards.nortel.com/spectrum4IMT/>.



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