

Ericsson's Response to ANACOM's Public Consultation on Broadband Wireless Access

Ericsson welcomes the opportunity to respond to the public consultation on Broadband Wireless Access (BWA) dated 23 November 2006.

Ericsson wishes that this response is to be regarded as commercial in confidence.

Ericsson would like to confirm its position in favour of international harmonisation of frequency bands considered for the use of terrestrial public mobile communication systems, and for the interoperability of these systems used while moving nationally or internationally between cities and territories.

1 BWA Framework

- a Define and describe the technologies covered by BWA, indicating positive aspects and possible fragilities.

The ITU Recommendation ITU-R M.[8A/BWA] covers most of the relevant BWA standards, including IMT-2000/UMTS. Ericsson understands that both GSM (EDGE) and IMT-2000 standards falls within the definition of BWA.

- b Define the radio parameters of the technologies mentioned above, including:

- i. Power;
- ii. Channels;
- iii. Duplex mode (TDD/FDD);
- iv. Modulation;
- v. Standard applicable (if existing);
- vi. Coexistence of various technologies and variations of the same technology;

Same parameters as specified for IMT-2000/UMTS in the bands 2 GHz and 2.5 GHz could also be transposed on to the specification for the band 3400 – 3800 MHz.

- c What type of use is best suited to BWA technologies: connection to end user, transmission network or both?

Ericsson understands that the access connection for the end users would be the preferred usage.

- d) What types of service could be offered by each technology? Please explain in concrete terms the amount of spectrum needed to provide these services and the capabilities of the identified technologies.

Ericsson understands that, the migration towards the new innovative developments of IMT-2000/UMTS towards high speed packet access (HSPA), which is already commercially available, and also the long term evolution (LTE), is currently being consolidated within the global partnership project 3GPP. The expected capacity performance of LTE systems suggest that there will be a firm need to allocate several channels and wider blocks of e.g. 20 MHz width or more per operator to achieve the highest transmission rates, particularly in the downlink direction. However, at the moment, ITU-R is in the process of considering future mobile bands for IMT (i.e. for IMT-2000, enhancements of IMT-2000 and IMT-Advanced). The bands below 5 GHz have been considered to be suitable and today, including the band 3.4 - 4.2 GHz, which is under study where channels and blocks of 100 MHz width or more could be expected.

- e) What is the target market and how big is the market envisaged for the technologies/services offered?

For the wider understanding of the current situation for BWA; at the end of year 2006 there were more than 130 commercial IMT-2000/UMTS broadband wireless access networks in operation in various frequency bands with over 90 million subscribers, in almost 60 countries, in addition there are more than 470 different types of user equipment (within different price categories) available on the market. IMT-2000/UMTS is already a global success, and the market in the future will also be targeting the global market and global footprint. Currently the global penetration for GSM/IMT-2000 is around 2.7 billion (about 40%).

2 Frequency Use

- a) What comments do you have on the content of the CEPT/ECC decision and recommendation in Annex?

Decides 1 could already now, and not wait until the end of the year, include a new reference that "spectrum shall be designated for **mobile** BWA deployments".

Decides 2 is not clear enough what is meant by "equivalent technical specifications", it is regarded essential that it is made clear that IMT-2000/UMTS would be allowed under conditions of Decides 2.

Decides 3 the beneficial aspects of harmonization should be strengthened, as it is rightly stated in the consultation document that the course of discussions in various international fora on the introduction of this type of technology, looking at technical issues involved (e.g. technical solutions, the spectrum and standards) and at a regulatory framework for this technology, with the aim of achieving harmonization in the adopted solutions.

Decides 4 the mobile aspects of BWA usage could also be considered for inclusion in Decides 4; however, the reference made to Decides 1 may be sufficient.

Ericsson notes the discussions on technology-neutral philosophy which underpins much of a national regulatory approach. The arguments for market determination of successful technologies, services and service providers are understood and are generally supported by Ericsson. However, in the particular case of wide-area public access communications BWA networks, there is strong consumer and competition benefits in following internationally harmonized spectrum arrangements and open international standards:

- a “technology neutrality” practice could be translated in to “multi technologies” or result in “technology fragmentation”, which certainly could:
 - represent a major regulatory challenge where interference may become unmanageable and with increased criticism from the general public;
 - compromise other spectrum planning decisions and adversely affect Portugal's ability to benefit from future developments,
 - lead to spectrum inefficiency due to multiple allocations to incompatible technologies; and
 - be costly to the consumers as the advantage of economy of scale might be lost compared to standardized systems,
- the priority in regard to spectrum allocations in high demand and identified internationally for public mobile systems should be for:
 - fully mobile systems;
 - wide area seamless cellular networks, and
 - the most spectrum efficient usage based on international standards, allowing for high number of users and high traffic capacity within a given bandwidth,

- While advocating a maintenance of spectrum harmonisation and interoperability, Ericsson supports a regulatory framework that allows public mobile licensees to benefit from future international developments as they occur, eg,:
 - applying market-based soft spectrum management practices allowing for the user and license holders, or a group of license holders, to decide on how the usage could be made more efficient and enhanced within practical limits of the license conditions,
 - allowing the users and license holders to decide on the most appropriate migrations of standard to be used within a particular allocated frequency band.
- in response to possible scarcity of frequencies in some allocated spectrum bands, the harmonization of the spectrum arrangements, and the harmonized usage should be the foremost matter to be addressed in developing and maintaining the national situation and the spectrum efficiency:
 - the currently used standards by public mobile communication standards and planned enhancements of such usage should continuously be provided for through the appropriate management practices, as to allow the current service providers to continue building future public services more efficiently in an innovative manner, and
 - thereby avoiding scarcity of spectrum, by this efficient usage of spectrum, economies of scale, and
 - be providing advanced service at affordable cost to the good of consumer and business users,

spectrum identified for IMT should not be allocated to other systems or services, arrangements for such systems or services might be subject to national planning arrangements in bands in less demand.

- b) Under what conditions do you consider that an operator authorised to operate FWA in the 3.5 GHz and/or 24.5 GHz or 27.5 GHz bands could expand their services, changing their current technology to use BWA technology?

It is difficult to predict, but perhaps under the condition of seeking to enhance services to the subscribers allowing the subscribers the benefit of harmonized and cost efficient user terminals.

- c) Which frequency bands do you consider suitable for the provision of BWA, taking into account such factors as international harmonisation, the state of technological development and the costs involved, the type of authorisation (with waiver or not of radio license), as well as the need for coexistence with other technology systems? Please state reasons.

The band 2300 – 2400 MHz as it seems to be harmonized for the usage of BWA in many countries outside of CEPT, probably suitable to have licensed operations only due to other usage and the limited size of the band. This band is a candidate band for the identification to IMT under the WRC-07 agenda item 1.4, in brief:

- this band is suitable for the mobile, fixed and nomadic BWA standards;
- this is a candidate band for IMT;
- ANACOM is invited to consider that Portugal could be suggesting to the ITU-R WRC-07 identifying this band for the use of IMT;

The band 2500 – 2690 MHz is not regarded suitable for other BWA standards than IMT-2000/UMTS as it is already harmonized for IMT-2000/UMTS, and certainly BWA TDD usage should not be considered in the band 2500 – 2690 MHz due to the severe risk for interference. Fixed BWA usage must be avoided this band;

The band 2700 – 2900 MHz:

- this frequency band was extensively studied in preparation for WRC-2000 for introduction of IMT-2000;
- sharing with radars is now considered to be feasible;
- a possibly for downlink only in this band may be considered;
- a globally harmonized band, however, a new mobile allocation is needed;
- this is a candidate band for IMT;

The band 3400 – 3800 MHz as it is coordinated and harmonized in many countries within CEPT but also in countries outside of CEPT probably suitable to have licensed operations only due to other usage, such as FSS. The considerable size of the band suggests that different usages and regulatory conditions may be feasible to apply. This band is a candidate band for the identification to IMT under the WRC-07 agenda item 1.4, in brief:

- this band is suitable for the mobile, fixed and nomadic BWA standards;
- this band could be suitable for the systems referred to in the ITU Recommendation ITU-R M.[8A/BWA],

- this is a candidate band for IMT;
- ANACOM is invited to consider that Portugal could be suggesting to the ITU-R WRC-07 identifying this band for the use of IMT;
- commercial operations of IMT systems is expected around year 2014;

The band 3800 – 4000 MHz:

- this is a candidate band for IMT;
- ANACOM is invited to consider that Portugal could be suggesting to the ITU-R WRC-07 identifying this band for the use of IMT;
- commercial operations of IMT systems is expected around year 2014;

The band 5725 – 5850 MHz which is harmonized in CEPT but also outside of CEPT.

In general with regard to the existing spectrum allocations, the ANACOM is invited to consider the future mobile use in terms of bandwidth capacity and coverage and the bands suited to those uses:

- the need for very high capacity advanced mobile services, demanding very high bitrate communications in urban and commercial areas offering indoor coverage:
 - preferably using bands in the range 2700 MHz to about 5000 MHz;
- the need for high capacity advanced mobile services, demanding high bitrate communications in suburban and remote areas offering extended range coverage:
 - preferably using bands in the range 470 MHz to 2690 MHz;
- the need for high capacity advanced mobile services, demanding high bitrate communications in high speed vehicles, such as high speed trains, and in very remote and sparsely populated areas:
 - preferably using bands in the range 470 MHz to about 600 MHz, and

that currently there are more than 2.7 billion subscriptions, that is, about 40% penetration of cellular subscriptions on a global basis, and there is expected to exceed 4 billion subscribers by year 2010 on a worldwide basis;

3 BWA implementation in Portugal

- a) Do you consider that access to BWA frequencies should be restricted to certain bodies? If so, please indicate which ones, and give reasons who you consider it necessary to put such restrictions in place.

BWA, including IMT-2000/UMTS and IMT, is suitable for many different usages, but exceptionally suitable for public mobile communications and commercial operations.

- b) Do you consider that BWA services should be offered nationwide or would it be more suitable to limit them geographically (in which case please give details of the geographic location(s) you consider the service should be limited to)

International coordinated and harmonized spectrum for systems such as BWA, for public mobile communications and commercial operations, are best operated on a nation wide basis.

- c) What type of procedures do you consider most suitable for the allocation of rights/selection criteria for BWA systems in the bands mentioned in the Annexes?

Ericsson, as a manufacturer, understands this information should be provided by the Operators, and further decisions taken by ANACOM.

- d) What type of requirements, as regards coverage obligations, quality of service, interoperability or other, do you consider should apply to usage rights?

Ericsson, as a manufacturer, understands this information should be provided by the Operators, and further decisions taken by ANACOM.

- e) Do you consider that BWA services will complement or coincide with other existing or future technologies (in operation or planned) in the same or other frequency bands?

The question is not clear enough to be able to respond in regard to the reference to "BWA **services**" on one hand "existing and future **technologies**" on the other hand. However, subject to the particular and different usages, there might be coinciding, complementing and competing services in all the bands used for public commercial services.

4 Introduction of BWA systems in the market

- a) What conditions do you consider important for the successful implementation of BWA technologies?

By providing cost efficient and rich services, as well as a wide range services for different needs.

- b) When do you consider that BWA technologies will have the necessary conditions for successful implementation in the Portuguese market?

Through IMT-2000/UMTS the BWA services are already in place in Portugal.

- c) In what way would you be interested in using and eventually commercialising BWA technologies?

By strengthening the performance of IMT-2000/UMTS BWA systems.

5 Are there any other points you consider relevant?

It is the view that both the European IMT-2000/UMTS and the Cellular systems and the personal communication systems (PCS) licensing processes in the Americas created a significant new interest in the radio frequency spectrum from governments and investors. Spectrum, as an economic asset or encumbrance, is now more apparent to each and everyone. Nevertheless national spectrum policy is currently generally formulated on a:

- channel-by-channel;
- block-by-block;
- band-by-band or
- service-by-service basis;

typically in response to specific requests for spectrum for a particular service, but also on a:

- usage allocations, or
- station assignments basis.

This ad hoc spectrum planning approach has earned some criticism over the years and serves in some views as the cause of the spectrum scarcity situation. There is no doubt that elements of the current static administrative forms of spectrum management policies have worked well, particularly in the way that interference is managed, and has provided for stability leading to the creation and benefits of a mass market for public mobile communications – witness GSM with about 2 billion subscribers on worldwide basis. Interoperability and roaming are benefiting from the economies of scale through the harmonised and planned spectrum approach. Through this experienced knowledge it is believed that internationally harmonized spectrum will always be more valuable to the public mobile communication service providers.

Over the course of the last few years, new concepts such as spectrum trading, property rights, the "commons" approach and incentive pricing are all being considered. Some are of the opinion that the prevailing objective of the regulatory environment is to provide for more efficient and market-oriented spectrum usage with the objective to alleviate the spectrum scarcity. Whatever regulatory framework is chosen, interference must be managed.

The ANACOM may consider factors that affect the choice of regulatory model:

- the level of international harmonisation in suitable bands;
- the level of existing extensive usage in suitable frequency bands;
- the time and cost of acquiring suitable spectrum, and
- projected demand for and availability of spectrum in the future.

Ericsson is supportive of a regulatory approach that allows licensees to evolve technology within the spectrum they own, taking into account other usage. The main advantage would be the direct connection between the consumers' needs and the service and application provisions provided under a license which allows for adjustments to respond to such demands. The service providers have self-imposed reasons to nurse the use of the natural resource of radio frequency spectrum to a level of best practice. The public mobile communications market employs tremendous effort to develop the business case, involving considerable resources in refining the offered services, to meet the market expectations. It is well understood that the service providers are exposed to market forces and timing in responding to end-user expectations.

In the long-term, service providers cannot afford to launch products or services that do not fulfil customer requirements and expectations. This implies that there are no options available in accomplishing a success, other than the best practice in the use of spectrum, to satisfy the consumers. The possible advances of a new spectrum policy practice, has the potential to keep regulatory measures to the bare minimum with respect to legislative constraints, voluminous text and resources, and to be non-specific in terms of the type of radio-communication service and usage, only laying down the specific open standards, in the relevant and harmonized spectrum blocks. Any licensed allocation or trading process in public mobile BWA bands needs to have regard to the efficient use of spectrum as well as the market and business attributes of mobile operators who need usable blocks of spectrum and the necessary clarity, certainty security and freedom to develop their businesses in accordance with consumer and market needs.