

Ericsson's views on the Draft RSPG Opinion on Common Policy Objectives for WRC-15

1. Introduction

Ericsson is pleased to be provided an opportunity to present our views on the Draft RSPG Common Policy Objectives for WRC-15.

Ericsson concurs with RSPG regarding in its statement that Agenda Item 1.1 is “one of the most significant WRC issues for many years.” Additional spectrum below 6.5 GHz for Wireless Broadband/IMT is crucial for delivering wireless services to customers, by providing spectrum that enables coverage as well as capacity.

Looking both at year 2020 as well as beyond 2020, current research indicates that new use cases will lead to additional requirements on wider bandwidths, indicating that it is necessary to look for further spectrum resources above the frequency 10 GHz. It is thus important to obtain an agenda item for WRC-19 at WRC-15 under Agenda Item 10.

Below Ericsson provides its detailed response to the Draft RSPG Opinion on Common Policy Objectives for WRC-15 Agenda Items 1.1, 1.2 and 10.

2. Agenda Item 1.1

The growth of mobile services continues to be at a very high level, driven by the increase both in data traffic and subscriptions. The Ericsson Mobility Report (EMR) from November 2014 concludes that the total number of mobile subscriptions in the third quarter (Q3) 2014 amounts to 6.9 billion, out of which 37 % is associated with smartphone usage. Furthermore 65 – 70 % of all mobile phones sold in Q3 2014 were smartphones, and global mobile broadband subscriptions are growing by around 30 % year-on-year and reached 2.5 billion in Q3 2014.

In the EMR report it is forecasted that by year 2020 there will be a total of 9.5 billion subscriptions, 8.4 billion mobile broadband subscriptions and 6.1 billion smartphones. In addition, the average data volume per subscription will increase substantially. As a consequence, mobile data traffic is expected to rise at a CAGR of around 40 % in the time period 2014 – 2020, resulting in an 8-fold increase in traffic by the end of 2020 compared 2014.

Similar analysis carried out by ITU-R, GSMA and individual countries indicate similar growth until 2020. In particular, the ITU-R analysis points to a total spectrum need of the order of 1340 – 1960 MHz by 2020, depending on scenario and national circumstances. Furthermore, the European Digital Agenda stresses the importance of access to radio spectrum for the development of wireless broadband.

In summary, Ericsson very strongly supports the opinion that Member States should ensure that additional spectrum is identified for IMT and allocated to the mobile service. In addition Ericsson would like to stress the need for spectrum that enables both coverage (typically below 1 GHz) and capacity, the need for global harmonization to the maximum extent possible, and for progress at

WRC-15 in order not to delay the development of mobile broadband, which is of crucial importance to the European economy, and while keeping in mind the political target of offering 30 Mbps broadband access to all citizens by year 2020.

Ericsson provides detailed views on different potential candidate bands below, some of which are not mentioned in the RSPG Draft Opinion.

470 – 694 MHz

Internationally, the frequency range 470 – 694 / 698 MHz is allocated to the broadcasting service on a primary basis and is largely used for incumbent analogue and digital terrestrial TV (TTV) using various non-harmonized technologies. In ITU Region 2 and parts of Region 3 this range of spectrum is also allocated to the Mobile Service on a co-primary basis. It is the view of Ericsson that also Region 1 would benefit from an allocation to the Mobile Service on a co-primary basis.

The usage of TTV varies considerably from one country to another in Europe, from less than 5 % to over 60 % as primary means of watching TV¹, and furthermore the delivery of audio-visual content is possible through other means, such as fiber, cable, satellite and mobile broadband (MBB). As a consequence, regulatory flexibility should be provided to enable countries/administrations to select the solution best suited to them for distribution of multi-media content, and for optimized usage of this spectrum range. Making this range available to Mobile Services on a co-primary basis would allow consumers, particularly those living in support of remote and sparsely populated regions, to reap the benefits of the extended coverage afforded by the superior radio wave propagation. The availability of a common European mobile technology platform for distribution of multi-media content would also allow commuters and other travelers to enjoy advanced complementary TTV reception regardless of geographical location, to a certain extent comparable to the current MBB services and applications.

In addition, Ericsson is of the view that a soft migration is achievable if a complementary MBB SDL is considered for the range 470 – 694 MHz as means for flexible transitional arrangements which would be allowing the current TTV to operate using its current configuration, and thus to satisfy different stakeholder interests.

In summary, it is Ericsson's view that the opportunity for using this spectrum for Mobile Broadband in the future should be recognized in the ITU Radio Regulations, through a co-primary Mobile Allocation. Postponing this regulatory flexibility would prevent usage of the spectrum for Mobile Services in the foreseeable future, and prevent different countries from progressing in the manner most suitable to them.

1350 – 1400 MHz and 1427 – 1518 MHz (L-bands)

Ericsson welcomes a global identification for these bands; particularly important is an identification of the band 1427 – 1518 MHz for IMT. The properties of spectrum in this L-band could provide a combination of wider bandwidths and propagation characteristics, and the process of making this spectrum available to Mobile Services is already well under way in Europe. Furthermore there is good opportunity for global harmonization of the L-band. Ericsson thus concurs with the view that

¹ Plum Consulting, "Valuing the Use of Spectrum in the EU", 2013

there should be a global identification for IMT in the band 1427 – 1518 MHz, and that there should be no additional regulatory constraints on mobile for the protection of aeronautical telemetry. Passive services in the band 1400 – 1427 MHz should be given due protection, while not damaging opportunities for Mobile Services above the frequency 1427 MHz by detrimental level of protection requirements.

It is also noted that some administrations in Europe are looking into the possibility of using parts of the L-band, for example 1375-1400 MHz paired with 1427-1452 MHz, for IMT, which could allow for frequency division duplex (FDD) services.²

In Region 2 one country (Brazil) has proposed that the 1350-1400 MHz band be allocated to the mobile service on a primary basis and that the band be identified for use by IMT, in response to agenda item 1.1.

2700 – 2900 MHz

In the EC Spectrum Inventory Report, the 2700 – 2900 MHz band is listed as one of those that are underutilized, with many Member States having less than five radars, and state that the fact that the radars are at fixed locations also provide an opportunity for geographical sharing. There is furthermore an advantage in the proximity to the IMT band 2500 – 2690 MHz, which would simplify and reduce deployment costs, e.g. due to re-use of base station sites and equipment. It has been noted in the ITU-R discussions that the sparse radar deployment could enable a segmentation of the band, for instance with IMT in the lower part of the band.

Improved radar technologies such as filtering should also enhance sharing opportunities, as well as the development of such sharing regimes as LSA/ASA.

Ericsson has trialed and demonstrated the band 2700 – 2920 MHz for IMT-Advanced in the Stockholm area using a co-channel configuration between aeronautical radars and an IMT-Advanced system with great success and without causing any interference to the radars. The trials and demonstrations were performed over a number of years. The site of the IMT-Advanced trial and demonstration system was located between the international and national airports and operated under the radar beams. These two airports are covered by the same two radar stations operating at a common location.

CITEL PCC.II approved a new Decision to request for information on the use of the band 2700-2900 MHz in the Americas ([Doc. 3703](#)) and the results should be known by the end of February 2015.

Ericsson consequently invites RSPG to establish an opinion to include band 2700 – 2900 MHz in the list of potential candidate bands to be supported by Member States.

3.3 – 3.4 GHz

Ericsson invites RSPG to an opinion to further consider this band, based on the fact that this band is under-used in Europe and in other parts of the world. While taking note of the fact that the countries, such as China, India and Viet Nam have previously used this band for MFCN systems. In

² See ITU-R Document 4-5-6-7/82 (France), “Possible Consideration of the Bands 1375-1400 MHz and 1427-1452 MHz under Agenda Item 1.1,” November 13, 2012.

Region 2 this band currently has a secondary allocation to the Mobile Service and one country (Colombia) has proposed that it be allocated on a primary basis and identified for IMT.

Currently 29 countries allocated this band to the fixed and mobile services on a primary basis.

3.4 – 3.8 GHz

Ericsson welcomes the RSPG proposal that Member States should support a global identification for IMT in the bands 3400 – 3600 MHz and 3600 – 3800 MHz. Such identification would enable important economy of scale, and further drive the usage of these bands through availability of a global mobile ecosystem. This frequency range is well suited for high capacity networks due to the high bandwidth available.

The introduction of new technologies in the satellite industry, such as Adaptive Coding and Modulation (ACM) high capacity medium earth orbit (MEO) satellites etcetera, is allowing for a gradual shift from the C-band to the higher frequency Ka- and Ku-bands. Ericsson is of the view that the current as well as the estimated future uses of the Fixed Satellite Service (FSS) in this range would provide room for IMT systems in parts of the range 3400 – 3800 MHz on a global level for application in countries that so wish. Approximately 90 % of countries of the world have MFCN systems in operational use in the range 3400 – 3800 MHz. Accordingly, there should be a possibility for countries that so wish to allocate this range to the Mobile Service with an identification to IMT, or at least share parts of this range of spectrum between IMT and systems in the FSS. In countries where sharing between the Mobile Services and the FSS would be necessary, methodologies such as LSA/ASA could also be considered. Furthermore, it is noted that the 3GPP specifications provide flexibility to deploy either FDD or TDD systems in 3400-3600 MHz and TDD systems in 3600-3800 MHz³. The TDD arrangement would allow the use of part of the band and notching out of frequencies used by other services in countries where the whole band is not available.

During previous discussions of these bands, it has been noted that satellite services in tropical countries are affected by heavy rainfall, and thus rely on the propagation characteristics of the C-band for successful delivery of services. Recent analysis indicates that development of satellite technology means that this has become less of a problem⁴, and that higher frequency bands could be used instead.

3.8-4.2 GHz

Ericsson also supports a Mobile Allocation and identification to IMT in the range 3.8 – 4.2 GHz, based on a similar analysis as that for 3.4 – 3.8 GHz, and invites an opinion to include the band in the list to be supported by the Member States.

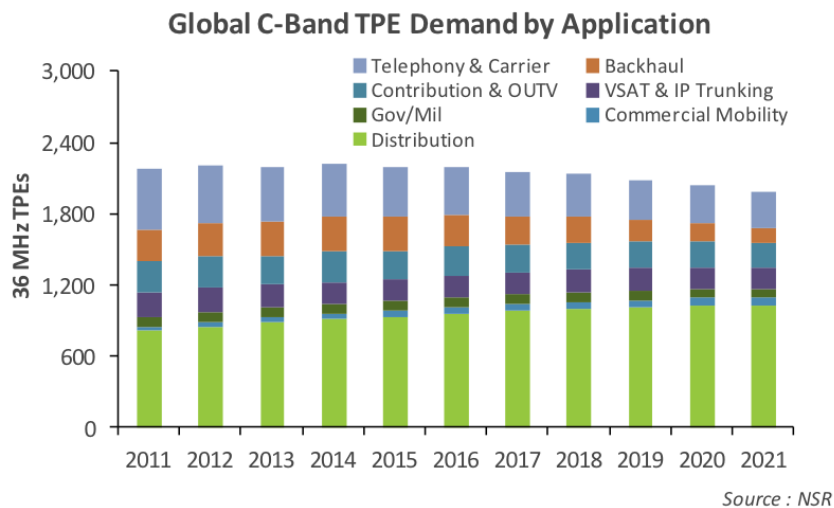
In a study by UMTS Forum⁵ it is indicated that, according to Euroconsult, in Western Europe, satellite usage of C-band is limited. In year 2012, satellite transponder demand was estimated to be 67 units,

³ The 3rd Generation Partnership Project (3GPP) has defined the operating band 22 (3 410 – 3 490 MHz / 3 510 – 3 590 MHz) for FDD and the operating bands 42 (3 400 – 3 600 MHz) and 43 (3 600 – 3 800 MHz) for TDD, including their corresponding sets of technical requirements.

⁴ ITU-R document 4-5-6-7/550, "A study of rain fade depth on FSS frequency bands"

⁵ ITU-R document 4-5-6-7/520, "Study on spectrum uses, trends and demands in the range 3400 – 4200 MHz (C-band)"

down from 72 units in 2011. The arrival of submarine cables in Africa and the volume of traffic between Europe and the African continent may have negatively impacted demand. Transponder demand in C-band is expected to slowly decrease in the next eight years due to decreasing needs for international traffic trunking and because most other services will be in Ku- or Ka-bands. Transponder demand should stand at around 42 units by year 2022. Northern Sky Research (NSR) predicts that worldwide C-band demand will drop by approximately 190 satellite transponder equivalents (TPEs) between years 2012 and 2022 / 2021.



<http://www.nsr.com/news-resources/the-bottom-line/fear-not-for-c-band/>

4.4 – 4.99 GHz

The band 4.4 – 4.99 GHz is already allocated to the Mobile Service on primary basis in all three Regions of ITU at WRC-07. The size of the band would accommodate IMT-Advanced systems which are envisaged with large bandwidth and would provide significant capacity. We also note the interest shown by countries outside of Europe.

5.925 – 6.425 GHz (5 GHz RLAN)

It is noted that several countries have shown an interest in the RCC countries in this frequency band, and that it corresponds to the uplink band of the C-band satellites which is before now used for MFCN in Europe. Therefore, considering the decreasing number of C-band satellites in Europe, sharing between IMT and C-band satellite will provide a rational prospect for inclusion to an opinion.

3. Agenda Item 1.2

Ericsson supports the proposed common policy objectives for AI 1.2. We note further the importance of global and European harmonization, such as the adopting for Europe the 2*30 MHz FDD arrangement in alignment with the lower duplexer of the APT 700 MHz band.

In addition we would like to stress the opportunity for using the spectrum in the duplex gap for public commercial mobile networks through Supplemental Downlink. It could partially be used for PPDR, together with spectrum below 703 MHz, to be decided on a national basis.

We would like to stress the importance of a timely release of this spectrum, due to its importance for cost-effective delivery of mobile broadband services in Europe.

4. Agenda Item 10

Ericsson welcomes a proposal that “Member States should support an Agenda Item for WRC-19 addressing the spectrum needs for the fifth generation of mobile networks (commonly known as 5G) with the focus above 6 GHz.” Forecasts point towards continuing growth beyond year 2020, and higher frequency ranges would provide the possibility for contiguous allocations with very high capacity. We would further like to stress the importance of not restricting an option neither for mobile allocations nor for identifications to IMT too early in the process, as this could complicate global harmonization. Therefore, any detailed investigations spectrum and sharing studies should be carried out in the period between WRC-15 and WRC-19 while taking note of the still ongoing European Union funded Framework research program as well as other academia and mobile industry led research programs.

5. About Ericsson

Ericsson is the driving force behind the Networked Society - a world leader in communications technology and services. Our long-term relationships with every major telecom operator in the world allow people, businesses and societies to fulfill their potential and create a more sustainable future. Our services, software and infrastructure - especially in mobility, broadband and the cloud - are enabling the telecom industry and other sectors to do better business, increase efficiency, improve the user experience and capture new opportunities. With more than 110,000 professionals and customers in 180 countries, we combine global scale with technology and services leadership. We support networks that connect more than 2.5 billion subscribers. Forty percent of the world's mobile traffic is carried over Ericsson networks. And our investments in research and development ensure that our solutions - and our customers - stay in front. Founded in 1876, Ericsson has its headquarters in Stockholm, Sweden. Net sales in 2013 were SEK 227.4 billion (USD 34.9 billion). Ericsson is listed on NASDAQ OMX stock exchange in Stockholm and the NASDAQ in New York.