GSM Association
7th Floor
5 New Street Square
London EC4A 3BF
United Kingdom
Tel +44 (0) 20 7356 0600
Fax +44 (0) 20 7356 0601
Web www.gsmworld.com

IT- og Telestyrelsen
Ministeriet for Videnskab Teknologi og Udvikling
Holsteinsgade 63
2100 København Ø
Denmark

ftf@itst.dk

London 24 June 2010

Dear Kristian Borten

The GSM Association (GSMA)[1] welcomes the opportunity to provide a response to the consultation on future use of the 800 band in Denmark.

The GSMA strongly support Denmark licensing the 790-821 / 832-862 MHz band[2] in a manner that will accommodate future use of the radio frequencies for providing mobile broadband services. This band is the first phase coverage band for LTE and making those radio frequencies available for market players in a way that promotes deployment of LTE will include Denmark in the continuing participation of global deployment of the leading mobile technology family of GSM/GPRS/EDGE, UMTS/HSPA and LTE. Furthermore, the GSMA warmly welcomes the Danish expression on intension to align with European harmonisation instruments for future use of the 800 band.

Summary of the views of the GSMA:

- Denmark should make the 800 band available for provision of mobile broadband services.
- Denmark should follow the European harmonised bandplan and technical conditions when preparing for the award and designing usage rights for this band.
- Denmark must make sure the licensing conditions promote deployment of LTE but the GSMA can support a technology neutral approach to awarding usage rights in this band.
- And finally Denmark should ensure an open, transparent and objective award procedure are designed and implemented.

[1] The GSMA represents over 750 operator members deploying GSM/GPRS/EDGE, UMTS/HSPA and LTE based networks. In addition, we have strong relationships with manufacturers (both device and infrastructure) with over 100 companies contributing to GSMA activities in building a comprehensive mobile ecosystem supporting mobile communication. For more information please visit: http://www.gsmworld.com/about-us/index.htm

[2] The band edges of the harmonised bandplan are 791-821 / 832-862 MHz.

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1. Maximizing social and economic value to Danish society

Along with the Danish government the GSMA shares the aim of maximising the welfare stemming from use of the UHF spectrum, to benefit Danish society and its consumers. Furthermore the GSMA promote developing the mobile sector to the benefit of the Danish consumer.

Denmark has a very developed and advanced mobile industry where several operators provide high quality mobile services based on the GSM family of technologies. GSM/GPRS/EDGE, UMTS/HSPA and LTE are backwards compatible technologies which means upgrading technologies and integrating them can be done in a more economical and operationally efficient way. This will allow the operators to offer the highest quality services at the lowest possible prices to consumers. The proposals by the Danish government and regulator supporting the release of the 800 MHz band for mobile, and doing so in accordance with European technical harmonisation, is strongly encouraged and supported by the GSMA.

Denmark has just completed the auction of 2600 MHz band spectrum. The 800[3] and 2600 bands are both bands where the first phase of commercial launch of LTE equipment are happening and making those bands available for market players makes it possible for Denmark to be among the early adopters of next generation mobile technologies.

The 800 and the 2600 band are complements not substitutes. The 800 band is the so-called coverage band for the first phase of commercial launch of LTE equipment. The 800 band is facilitating roll-out of LTE networks at approximately 30% of the cost of a 2600 band roll-out and in addition the 800 band makes excellent indoor coverage and cost-efficient rural coverage possible. The 2600 band is the capacity band of first phase commercial launch of LTE. To optimize the roll-out and coverage of LTE networks in an economic efficient way making it possible for operators to provide high quality services at lowest possible prices to consumers they need access to both coverage band and capacity band for LTE. Consequently GSMA strongly support Denmark releasing and awarding the 800 band.

There is strong support for allocating internationally harmonised UHF spectrum for mobile operators to deploy mobile broadband technologies that maximized social and economic benefits to societies:

[3] 800 band in Europe. 700 band in USA. Seems like it will be the700 band in most of Asia Pacific and Latin America but still work in progress before final decisions are made. Possibly the 800 band in Middle East and Africa but early stages of work in progress.

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- In October 2009 the European Commission published estimates on allocating UHF spectrum – the "digital dividend" – to new services in a coordinated way across Europe is worth between €17 and €44 billion for the EU.[4]
- A 2008 study on digital dividend in Europe estimated that economic output per MHz of bandwidth is €168 million for mobile compared to €28 million for digital TV.[5]
- Another 2008 study focusing on Europe concluded that allocating at least some UHF spectrum to mobile operators would generate between €63 billion and €145 billion in net present value (NPV).[6]

To maximize social and economic welfare stemming from the use of the 800 frequency band in Denmark the award of usage rights for this band should be designed to promote use for mobile broadband and deployment of LTE technology.

2. European harmonisation

The UHF allocations for mobile are unfortunately not a global allocation. For ITU region 2 and ITU region 3 countries it seems like allocations of the 700 band for mobile is more likely to happen in most countries. For ITU region 1 European countries are moving towards allocation of the 800 band to mobile while the work on allocating this band for mobile have basically just started in Africa. International harmonisation of frequency bands for mobile is a key issue for achieving economies of scale in the network equipment and handset production. And internationally harmonised mobile bands makes cross boarder coordination of use of radio frequencies easier and makes ideal conditions for international roaming. To make network equipment and handsets commercially available at reasonable prices the producers depend upon a certain volume in the production to achieve economies of scale. This basically means network equipment and handsets cannot be produced for national markets (except for a few really big ones) if reasonable prices is to be achieved. And most important in this context is that the necessary scale in equipment and handset production basically means Europe must agree on common band and bandplan. In addition, chipset manufacturers face limitations that cannot be avoided due to the limitations on number of bands / how many technologies a handset can accommodate.[7]

Consequently the GSMA supports the EU wide harmonisation approach taken by the EU Commission in their Commission Decision 2010/267/EU referring to the relevant CEPT technical harmonisation instruments and we are delighted to see that Denmark expresses their strong and clear intention to align with their fellow EU member countries on technical harmonisation for future use of the 800 band for mobile (broadband).

2.1 Broadcast and mobile interference discussions

The GSMA is aware of the ongoing European discussions on mobile use of the 800 band potentially creating interference for broadcasting in the band below the 800 MHz band.

[4] http://www.analysysmason.com/EC_digital_dividend_study
[5] http://www.gsmworld.com/documents/SCF_Associates_report_The_Mobile_Provide.pdf
[6] http://www.gsmworld.com/documents/Spectrum-Getting-the-most-out-of-the-digita-dividend-2008.pdf
[7] For more info on harmonised mobile bands and the impact on handsets please visit: http://www.gsmworld.com/documents/gsma_white_tech_note.pdf

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Aegis Systems have recently tested the risk of interference from Electronic Communication Networks base stations into cable TV network and concluded that this risk was negligible.

The Aegis Systems testing and report was a study into the assessment of potential interference from Electronic Communication Networks (ECN) base stations into Cable TV network equipment in the 800 MHz band (790-862 MHz). The study is based on an analysis of single interference entry into cable TV equipment and an application of Monte Carlo simulations to examine the impact of interference aggregation from multiple base stations. The system parameters assumed in the analysis are generally representative of IMT Long Term Evolution (LTE) technology as specified in CEPT Report 30 (the identification of common and minimal technical conditions for 790 - 862 MHz for the digital dividend in the European Union, 30 October 2009).

The Aegis Systems states in their conclusion:

> *"The analysis shows that there is a very small probability (one in a thousand) that the EN 50083-2 criterion will be exceeded by a small margin (up to 3 dB). However there are no scenarios where the lowest measured immunity value is exceeded and there is a high probability that the immunity of installed cable TV equipment will in practice exceed the EN 50083-2 / EN 50083-8 criterion by more than 3 dB in order to facilitate co existence with in-band local terrestrial TV transmissions. We therefore consider that the risk of interference from ECN base stations into cable TV network equipment is negligible."*

GSMA have published the complete report from Aegis Systems and it can be downloaded for free from the GSMA website.[8]

In the Commission Decision 2010/267/EU the EU Commission states that:

> *"The avoidance of harmful interference and disturbance to television receiver equipment, including cable TV equipment, may depend on more effective interference rejection in such equipment. "*

The GSMA observes that the EU Commission states that the avoidance of harmful interference and disturbance to television receiver equipment, including cable TV equipment, may depend on more effective interference rejection in such equipment.

The GSMA Europe participates in ongoing work on sorting out issues related to potential cable TV interference. The position of the GSMA Europe is publicly available[9] and the main conclusion is:

The cable industry's concerns are centred on the possibility that a mobile device (phone or mobile

[8] http://www.gsmworld.com/documents/Aegis_Submission__DIA_2_.pdf
[9] http://www.gsmeurope.org/documents/GSMA_Europe_Position_Paper_%20Cable_interference%20_15_March_2010.pdf

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broadband dongle) might interfere with a customer's cable equipment. Interference will not occur unless a combination of factors happens at the same time:

- The cable set-top box must be "tuned" to a channel close to the transmit frequency of the mobile device (which can affect no more than 5% of the capacity of the cable network;
- The mobile device must be transmitting at close to its maximum power; and
- The mobile device must be operating within a few metres of the cable set-top box.

In the rare event of these factors occurring at once, the majority of cases can simply be remedied by moving the mobile device and the cable set-top box slightly further apart.

3. Technology – Long Term Evolution

Mounting evidence suggests most existing mobile operators will favour LTE above other technologies for the UHF band, thanks to the huge installed base of networks in the mobile ecosystem and the value of maintaining operational compatibility across succeeding generations of networks.[10] The compatibility benefits customers and underpins sustainable rates of investment in new facilities. Operators can offer services with the widest possible national and international coverage while they are building and rolling out next-generation networks in parallel with operating the existing networks.

Deploying LTE in the UHF band will perfectly complement deployment of LTE in the 2600 MHz band (2500-2690 MHz). Making the 800 MHz band available in a manner which promotes LTE deployment will make cost-efficient rural coverage and cost efficient initial urban area roll-out with excellent indoor coverage for mobile broadband happen and the 2600 MHz band will constitute the perfect complement making it possible to achieve the capacity needed for handling greater traffic volume in urban areas.

LTE for the UHF band is standardised using frequency duplex division (FDD) methods and consequently the band plan for the 800 band must be designed for FDD to accommodate what is becoming the mobile technology of choice in the UHF band. The GSMA is pleased to see that implementation of a FDD bandplan is the solution in the EU Commission Decision 2010/267/EU and we are pleased to see that Denmark clearly commits to aligning with this European harmonised approach when moving forward towards licensing of the 800 band for mobile broadband purposes.

[10] According to the Global mobile Suppliers Association (GSA) by December 2009 there are around 51 LTE network commitments in 24 countries (see http://www.gsacom.com/news/gsa_288.php4). Even major non-GSM operators, notably Verizon Wireless, have also chosen LTE for their next generation system.

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4. Danish use of the band gap

The GSMA are not aware of use of the duplex gap of the 800 band for wireless microphones being a solution that is considered by a larger number of countries potentially leading to a harmonised way of using those radio frequencies.

The GSMA observes that Denmark has decided to implement a national specific use of frequencies of the 800 MHz duplex gap. We strongly encourage Denmark to make sure this use will not have any consequence on mobile services in the digital dividend prime spectrum.

GSMA would be delighted to participate in and contribute to making the 800 band available for provision of mobile broadband services. Please do not hesitate to contact us should you have questions or any other enquiries.[11]

Kristin Due Hauge
Director of Spectrum Policy
GSM Association
Mobile: +44 7824 413 155
kduehauge@gsm.org

[11] Please visit the GSMA Digital Dividend website for latest updated info and for signing up for the free GSMA Digital Dividend newsletter: http://www.gsmworld.com/our-work/public-policy/spectrum/digital-dividend/digital_dividend.htm